INDEPENDENT ORBITER ASSESSMENT

ANALYSIS OF THE
ELECTRICAL POWER
DISTRIBUTION AND CONTROL/
REMOTE MANIPULATOR SYSTEM
SUBSYSTEM

12 FEBRUARY 1987
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CONTROL/REMOTE MANIPULATOR SYSTEM SUBSYSTEM

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PREPARED BY: W. W. Robinson
EPD&C/RMS Analyst
Independent Orbiter Assessment

APPROVED BY: K. R. Schmeckpeper
EPD&C Lead
Independent Orbiter Assessment

APPROVED BY: G. W. Knori
Technical Manager
Independent Orbiter Assessment

APPROVED BY: W. F. Huning
Deputy Program Manager
STSEOS
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1.0 EXECUTIVE SUMMARY

The McDonnell Douglas Astronautics Company (MDAC) was selected in June 1986 to perform an Independent Orbiter Assessment (IOA) of the Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL). Direction was given by the Space Transportation System (STS) Orbiter and Government Furnished Equipment (GFE) Projects Office to perform the hardware analysis using the instructions and ground rules defined in National Space Transportation System (NSTS) 22206, Instructions for Preparation of FMEA and CIL, 10 October 1986.

The IOA approach features a top-down analysis of the Electrical Power Distribution and Control (EPD&C)/Remote Manipulator System (RMS) hardware to determine failure modes, criticality, and potential critical items. To preserve independence, this analysis was accomplished without reliance upon the results contained in the NASA FMEA/CIL documentation. This report documents (Appendix C) the results of the independent analysis of the EPD&C/RMS (both port and starboard) hardware.

The EPD&C/RMS subsystem hardware provides the electrical power and power control circuitry required to safely deploy, operate, control, and stow or guillotine and jettison two (one port and one starboard) RMSs. The EPD&C/RMS subsystem is subdivided into the four following functional divisions:

- Remote Manipulator Arm
- Manipulator Deploy Control
- Manipulator Latch Control
- Manipulator Arm Shoulder Jettison
  and Retention Arm Jettison

The IOA analysis process utilized available EPD&C/RMS hardware drawings and schematics for defining hardware assemblies, components, and hardware items. Each level of hardware was evaluated and analyzed for possible failure modes and effects. Criticality was assigned based on the severity of the effect for each failure mode.

Figure 1 presents a summary of the failure criticalities for each of the four subdivisions of the EPD&C/RMS subsystem. A summary of the number of failure modes, by criticality combination, is also presented below with Hardware (HW) criticality on the left of the slash and Functional (F) criticality on the right of the slash or (HW/F).
## EPD&C/RMS Analysis Summary

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<th># PCIs</th>
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### Manipulator Arm SHLDR/RETN Arm & Jett

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<td>0</td>
</tr>
<tr>
<td>3/3</td>
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<td>TOTAL</td>
<td>74</td>
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Figure 1 - EPD&C/RMS Analysis Summary Overview
For each failure mode identified, the criticality and redundancy screens were examined to identify critical items. A summary of Potential Critical Items (PCIs) is presented as follows:

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<th>Summary of IOA Potential Critical Items (HW/F)</th>
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<table>
<thead>
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<th>Summary of IOA Failure Modes by Criticality (HW/F)</th>
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2.0 INTRODUCTION

2.1 Purpose

The STS-51L Challenger accident prompted the NASA to readdress safety policies, concepts, and rationale being used in the National Space Transportation System (NSTS). The NSTS Office has undertaken the task of reevaluating the FMEA/CIL for the Space Shuttle design. The MDAC is providing an independent assessment of the Orbiter FMEA/CIL reevaluation results for completeness and technical accuracy.

2.2 Scope

The scope of the independent FMEA/CIL assessment activity encompasses those Shuttle Orbiter subsystems and Government Furnished Equipment (GFE) hardware identified in the Space Shuttle Independent FMEA/CIL Assessment Contractor Statement of Work. Each subsystem analysis addresses hardware, functions, internal and external interfaces, and operational requirements for all mission phases.
2.2 Analysis Approach

The independent analysis approach is a top-down analysis utilizing as-built drawings to breakdown the respective subsystem into components and low-level hardware items. Each hardware item is evaluated for failure mode, effects, and criticality. These data are documented in the respective subsystem analysis report, and used to assess the NASA and Prime Contractor FMEA/CIL reevaluation results. The IOA analysis approach is summarized in the following steps 1.0 through 3.0. Step 4.0 summarizes the assessment of the NASA and Prime Contractor FMEAs/CILs that is performed and documented at a later date.

Step 1.0 Subsystem Familiarization

1.1 Define subsystem functions
1.2 Define subsystem components
1.3 Define subsystem specific ground rules and assumptions

Step 2.0 Define Subsystem Analysis Diagram

2.1 Define subsystem
2.2 Define major assemblies
2.3 Define detailed subsystems representations

Step 3.0 Define Failure Events

3.1 Construct matrix of failure modes
3.2 Document IOA analysis results

Step 4.0 Compare IOA Analysis Data to NASA FMEA/CIL

4.1 Resolve differences
4.2 Review in-house
4.3 Document assessment issues
4.4 Forward findings to Project Manager

2.4 Ground Rules and Assumptions

The EPD&C/RMS specific ground rules and assumptions used in the IOA are defined in Appendix B.
2.5 Analysis Subsystem Interfacing Identification Coding

In order to provide for ease of cross-referencing and comparisons of subsystems, the analysis of the EPD&C/RMS subsystem is further subdivided into the four separate subdivisions that comply with the EPD&C/Interfacing Subsystem Identifiers defined in Tables 4.0 and 5.0, Rockwell International Space Division Reliability Desk Instruction No. 100-2G, Flight Hardware Failure Mode Effects Analysis (FMEA) & Critical Items List (CIL), dated January 31, 1984.

The EPD&C/RMS subsystem interfacing identifiers and subdivision names are as follows:

- **05-6** Electrical Power Distribution and Control (EPD&C)
- **05-6IA** Remote Manipulator Arm
- **05-6IB** Manipulator Deploy Control
- **05-6IC** Manipulator Latch Control
- **05-6ID** Manipulator Arm Shoulder Jettison and Retention Arm Jettison
3.0 SUBSYSTEM DESCRIPTION

3.1 Design and Function

The EPD&C/RMS subsystem provides the electrical power and power control circuitry required to safely deploy, operate, control, and stow one port and one starboard RMS. The EPD&C/RMS is a subset of the Orbiter EPD&C subsystem and uses the same three main busses and the same type of distribution and control hardware that is used to supply electrical power to the rest of the space shuttle subsystems. In addition, electrical power and control circuitry is provided to guillotine the appropriate cabling and jettison either or both the remote manipulator arms in the event it becomes necessary for crew/vehicle safety.

Although the EPD&C/RMS subsystem is designed to supply the required electrical power to both a port and a starboard RMS on a given mission, only one RMS can be powered-on at a given time. The port and starboard RMSs are essentially mirror images of one another. Some of the EPD&C/RMS electrical power control switches are common to both the port and starboard systems and some switches are dedicated to one or the other RMS. The port and starboard EPD&C/RMS subsystems are essentially identical in design. The port and starboard systems do differ in that power and control bus assignments are not the same for both systems.

The EPD&C/RMS subsystem consists of the following subdivisions:

1. The EPD&C/RMS Remote Manipulator Arm (05-6IA) subdivision consists of the hardware to provide Main Bus 28 volts Direct Current (DC) and 115 volts, three-phase (3-PH) and single-phase (1-PH), 400 Hertz (Hz) Alternating Current (AC) primary and backup (standby redundant) power to both the port and starboard (only one at a time) Remote Manipulator Arms for operation of its control electronics, heaters, lights and drive motors.

2. The EPD&C/RMS Manipulator Deploy Control (05-6IB) subdivision consists of the hardware to provide Main Bus 28 volts DC and 115 volts, 3-phase (3-PH), 400 Hz AC power to the Motor Control Assemblies (MCAs) to control power to the two electrical motors that drive the actuator to physically drive the appropriate Manipulator Positioning Mechanism (MPM) to stow or deploy the port and starboard Remote Manipulator Arms.
3. The EPD&C/RMS Manipulator Latch Control (05-6IC) subdivision consists of the hardware to provide Main Bus 28 volts DC and 115 volts, 3-phase (3-PH), 400 Hz AC power to the MCAs to control power to the three sets of electrical motor pairs that drive the retention latch actuators to release or latch position. There are three retention latch mechanisms with one located at each of the forward, mid, and aft positions for the port arm and another set for the starboard arm.

4. The EPD&C/RMS Manipulator Arm Shoulder Jettison and Retention Arm Jettison (05-6ID) subdivision consists of the hardware to provide the 28 volts DC and control switching to safely arm and fire the Pyro Initiator Controllers (PICs) that enable detonation of the explosives to guillotine the necessary RMS cables and jettison either or both the port and/or starboard arms if it becomes necessary for crew/vehicle safety.

3.2 Interfaces and Locations

The remote manipulator arm is attached to the Orbiter longeron (port, starboard, or both) through a roll-out deployment mechanism. The RMS is operated by a crewmember using direct viewing and Closed Circuit Television (CCTV) from the Display and Control (D&C) station on the aft flight deck. Most of the EPD&C/RMS switches are located on panels A8A2 and A14. The Payload Bay Mechanical (PLBM) power switches that control the power to the Motor Control Assemblies are located on panel R13A1 in the cockpit and the circuit breakers are located on the standard circuit breaker panels.

3.3 Hierarchy

Figure 2 illustrates the hierarchy of the EPD&C/RMS and the corresponding subdivisions. The subdivisions are represented in Figures 3 through 6.
Figure 2 - EPD&C/RMS SUBSYSTEM (05-6I) OVERVIEW
Figure 3 - EPD&C/RMS REMOTE MANIPULATOR ARM (05-6IA)
Figure 4 - EPD&C/RMS MANIPULATOR DEPLOY CONTROL (05-61B)
Figure 5 - EPD&C/RMS MANIPULATOR LATCH CONTROL (05-6IC)
Figure 5 - EPD&C/RMS MANIPULATOR LATCH CONTROL (05-6IC) - CONTINUED
Figure 5 - EPD&C/RMS MANIPULATOR LATCH CONTROL (05-6IC) - CONCLUDED
Figure 6 - EPD&C/RMS MANIPULATOR ARM SHOULDER JETTISON AND RETENTION ARM JETTISON (05-6ID)
4.0 ANALYSIS RESULTS

Detailed analysis results for each of the identified failure modes are presented in Appendix C. Table I presents a summary of the failure criticalities for each of the four major subdivisions of the RMS/EPD&C. Further discussions of each of the subdivisions and the applicable failure modes is provided in subsequent paragraphs.

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<tr>
<th>TABLE I</th>
<th>Summary of IOA Failure Modes and Criticalities</th>
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<tr>
<td>05-6ID:</td>
<td>10</td>
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<td>23</td>
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Of the three hundred and forty-five (345) failure modes analyzed, twenty-three (23) single failures were determined to result in possible loss of crew or vehicle, and fifteen (15) were determined to result in loss of mission. A summary of the potential critical items is presented in Table II. Appendix D presents a cross reference between each Potential Critical Item (PCI) and a specific worksheet in appendix C.

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<th>TABLE II</th>
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<td>TOTAL:</td>
<td>23</td>
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4.1 Analysis Results - Remote Manipulator Arm (05-6IA)

The EPD&C/RMS Remote Manipulator Arm subdivision provides the DC and AC electrical power to the port and the starboard systems for operation of the control electronics, heaters, lights and drive motors. There are forty-eight (48) failure modes identified for this subdivision. Of these, three (3) are Criticality 1/1; fifteen (15) are Criticality 2/1R; thirteen (13) are Criticality 2/2; eight (8) are Criticality 3/2R; and nine (9) are Criticality 3/3.
4.2 Analysis Result - Manipulator Deploy Control (05-6IB)

The EPD&C/RMS Manipulator Deploy Control subdivision provides the DC and AC electrical power to the port and the starboard systems for control and operation of the Manipulator Positioning Mechanisms to stow and deploy the respective arms. There are seventy-four (74) failure modes identified for this division. Of these, ten (10) are Criticality 1/1; two (2) are Criticality 2/1R; two (2) are Criticality 2/2; thirty (30) are Criticality 3/2R; and thirty (30) are Criticality 3/3.

4.3 Analysis Results - Manipulator Latch Control (05-6IC)

The EPD&C/RMS Manipulator Latch Control subdivision provides the DC and AC electrical power to the port and the starboard systems for control and operation of the retention latch actuators to latch and release the respective forward, mid and aft retention latch mechanisms. There are one hundred and forty-four (144) failure modes identified for this division. Of these, seventy (70) are Criticality 3/2R; and seventy-four (74) are Criticality 3/3.

4.4 Analysis Results - Manipulator Arm Shoulder Jettison and Retention Arm Jettison (05-6ID)

The EPD&C/RMS Manipulator Arm Shoulder Jettison and Retention Arm Jettison (05-6ID) subdivision provides the 28 volts DC and control switching to safely arm and fire the Pyro Initiator Controllers (PICs) that enable the detonation of the explosives to guillotine the necessary RMS cables and jettison either or both the port or starboard arms if it becomes necessary for crew/vehicle safety. There are seventy-nine (79) failure modes identified for this division. Of these, ten (10) are Criticality 1/1; sixty-two are (62) Criticality 2/1R; one is Criticality 3/2R; and six (6) are Criticality 3/3.
5.0 REFERENCES

Reference documentation available from NASA and Rockwell International Space Division was used in the analysis. The documentation used in the analysis includes the following:

1. NSTS 22206, Instructions for Preparation of Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL), Oct. 10, 1986


3. VS72-956099, Rockwell International Electrical Schematics, Remote Manipulator System

### APPENDIX A

**ACRONYMS and ABBREVIATIONS**

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<td>AOA</td>
<td>Abort Once Around</td>
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<tr>
<td>AMP</td>
<td>Ampere</td>
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<tr>
<td>LIM</td>
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<tr>
<td>MCIU</td>
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<td>Multiplexer/Demultiplexer</td>
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APPENDIX B

DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

B.1 Definitions
B.2 Project Level Ground Rules and Assumptions
B.3 Subsystem-Specific Ground Rules and Assumptions
APPENDIX B
DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

B.1 Definitions

Definitions contained in NSTS 22206, Instructions For Preparation of FMEA/CIL, 10 October 1986, were used with the following amplifications and additions.

INTACT ABORT DEFINITIONS:

**RTLS** - begins at transition to OPS 6 and ends at transition to OPS 9, post-flight

**TAL** - begins at declaration of the abort and ends at transition to OPS 9, post-flight

**AOA** - begins at declaration of the abort and ends at transition to OPS 9, post-flight

**ATO** - begins at declaration of the abort and ends at transition to OPS 9, post-flight

**CREDIBLE (CAUSE)** - an event that can be predicted or expected in anticipated operational environmental conditions. Excludes an event where multiple failures must first occur to result in environmental extremes

**CONTINGENCY CREW PROCEDURES** - procedures that are utilized beyond the standard malfunction procedures, pocket checklists, and cue cards

**EARLY MISSION TERMINATION** - termination of on-orbit phase prior to planned end of mission

**EFFECTS/RATIONALE** - description of the case which generated the highest criticality

**HIGHEST CRITICALITY** - the highest functional criticality determined in the phase-by-phase analysis

**MAJOR MODE (MM)** - major sub-mode of software operational sequence (OPS)

**MC** - Memory Configuration of Primary Avionics Software System (PASS)

**MISSION** - assigned performance of a specific Orbiter flight with payload/objective accomplishments including orbit phasing and altitude (excludes secondary payloads such as GAS cans, middeck P/L, etc.)
MULTIPLE ORDER FAILURE - describes the failure due to a single cause or event of all units which perform a necessary (critical) function

OFF-NOMINAL CREW PROCEDURES - procedures that are utilized beyond the standard malfunction procedures, pocket checklists, and cue cards

OPS - software operational sequence

PRIMARY MISSION OBJECTIVES - worst case primary mission objectives are equal to mission objectives

PHASE DEFINITIONS:

PRELAUNCH PHASE - begins at launch count-down Orbiter power-up and ends at moding to OPS Major Mode 102 (liftoff)

LIFTOFF MISSION PHASE - begins at SRB ignition (MM 102) and ends at transition out of OPS 1 (Synonymous with ASCENT)

ONORBIT PHASE - begins at transition to OPS 2 or OPS 8 and ends at transition out of OPS 2 or OPS 8

DEORBIT PHASE - begins at transition to OPS Major Mode 301 and ends at first main landing gear touchdown

LANDING/SAFING PHASE - begins at first main gear touchdown and ends with the completion of post-landing safing operations
APPENDIX B
DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

B.2 IOA Project Level Ground Rules and Assumptions

The philosophy embodied in NSTS 22206, Instructions for Preparation of FMEA/CIL, 10 October 1986, was employed with the following amplifications and additions.

1. The operational flight software is an accurate implementation of the Flight System Software Requirements (FSSRs).

   **RATIONALE:** Software verification is out-of-scope of this task.

2. After liftoff, any parameter which is monitored by system management (SM) or which drives any part of the Caution and Warning System (C&W) will support passage of Redundancy Screen B for its corresponding hardware item.

   **RATIONALE:** Analysis of on-board parameter availability and/or the actual monitoring by the crew is beyond the scope of this task.

3. Any data employed with flight software is assumed to be functional for the specific vehicle and specific mission being flown.

   **RATIONALE:** Mission data verification is out-of-scope of this task.

4. All hardware (including firmware) is manufactured and assembled to the design specifications/drawings.

   **RATIONALE:** Acceptance and verification testing is designed to detect and identify problems before the item is approved for use.

5. All Flight Data File crew procedures will be assumed performed as written, and will not include human error in their performance.

   **RATIONALE:** Failures caused by human operational error are out-of-scope of this task.
6. All hardware analyses will, as a minimum, be performed at the level of analysis existent within NASA/Prime Contractor Orbiter FMEA/CILs, and will be permitted to go to greater hardware detail levels but not lesser.

RATIONALE: Comparison of IOA analysis results with other analyses requires that both analyses be performed to a comparable level of detail.

7. Verification that a telemetry parameter is actually monitored during AOS by ground-based personnel is not required.

RATIONALE: Analysis of mission-dependent telemetry availability and/or the actual monitoring of applicable data by ground-based personnel is beyond the scope of this task.

8. The determination of criticalities per phase is based on the worst case effect of a failure for the phase being analyzed. The failure can occur in the phase being analyzed or in any previous phase, whichever produces the worst case effects for the phase of interest.

RATIONALE: Assigning phase criticalities ensures a thorough and complete analysis.

9. Analysis of wire harnesses, cables, and electrical connectors to determine if FMEAs are warranted will not be performed nor FMEAs assessed.

RATIONALE: Analysis was substantially complete prior to NSTS 22206 ground rule redirection.

10. Analysis of welds or brazed joints that cannot be inspected will not be performed nor FMEAs assessed.

RATIONALE: Analysis was substantially complete prior to NSTS 22206 ground rule redirection.

11. Emergency system or hardware will include burst discs and will exclude the EMU Secondary Oxygen Pack (SOP), pressure relief valves and the landing gear pyrotechnics.

RATIONALE: Clarify definition of emergency systems to ensure consistency throughout IOA project.
B.3 EPD&C/RMS-Specific Ground Rules and Assumptions

The IOA analysis was performed to the component level wherever it was deemed appropriate and the components were identifiable on the drawings. The analysis was performed to the assembly level for those assemblies that are common to general EPD&C usage. The analysis considered the worst case effects of the hardware or functional failure on the subsystem, mission, and crew and vehicle safety.

1. Component age life was not considered in the analysis.

    RATIONALE: Component age analysis is beyond the scope of this task.

2. A RMS mission is considered to be uncradling, grappling a berthed payload, unberthing it, deploying it, and then retrieving a rotating payload, reberthing it, and performing Manned Foot Restraint (MFR) operations. Any failure that prevents the completion of any of these tasks is considered to be loss of mission.

    RATIONALE: This is the most demanding RMS mission possible. This causes the worst case criticalities for certain failures because they will prevent completion of this mission.

3. Any failure that causes uncommanded motion of any part of the RMS will be considered to be the highest criticality until it is definitely established that there is no time at which the given uncommanded motion would be of no consequence or absolutely could not occur.

    RATIONALE: Uncommanded motion in its worst case could possibly cause physical damage to the vehicle that would preclude safe reentry.
4. The loss of primary power causes loss of primary mode of operation of the RMS, which will cause loss of mission.

RATIONALE: Backup RMS power is standby redundant and provides for safe release of the payload and cradling the arm for some failures. Therefore, loss of primary power is considered to be Criticality 2 even though backup power is available since loss of primary power causes loss of primary mode of operation of a RMS.

5. EPD&C/RMS failures are only considered for the on-orbit phase.

RATIONALE: During ascent, entry, and aborts the RMS is latched and unpowered. Inadvertent power application to the retention latch mechanism or stow/deploy actuator motors would require multiple failure combinations which is beyond the scope of this analysis. Prelaunch failures are not included as part of the EPD&C/RMS analysis since failures that could occur during prelaunch would be general EPD&C and are covered in that analysis.

6. Failure modes for port and starboard arms were analyzed as individual failures and no consideration was given to any provision of redundancy that could exist on a two RMS mission.

RATIONALE: The individual analysis was done to ensure that, indeed, the port and starboard RMS were similar. There are differences, however, in remote power control and power bus assignments that are a function of port or starboard location.
This section contains the IOA analysis worksheets generated during the analysis of this subsystem. The information on these worksheets is intentionally similar to the NASA FMEAs. Each of these sheets identifies the hardware item being analyzed, and the parent assembly, as well as the function. For each failure mode, the possible causes are outlined, and the assessed hardware and functional criticality for each mission phase is listed, as described in the NSTS 22206, Instructions for Preparation of FMEA and CIL, 10 October 1986. Finally, effects are entered at the bottom of each sheet, and the worst case criticality is entered at the top.

LEGEND FOR IOA ANALYSIS WORKSHEETS

Hardware Criticalities:
1 = Loss of life or vehicle
2 = Loss of mission or next failure of any redundant item (like or unlike) could cause loss of life/vehicle
3 = All others

Functional Criticalities:
1R = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of life or vehicle.
2R = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of mission.

Redundancy Screen A:
1 = Is Checked Out PreFlight
2 = Is Capable of Check Out PreFlight
3 = Not Capable of Check Out PreFlight
NA = Not Applicable

Redundancy Screens B and C:
P = Passed Screen
F = Failed Screen
NA = Not Applicable
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: EPD&C
MDAC ID: 4001

ITEM: SWITCH, S4
FAILURE MODE: FAILS TO SWITCH FROM OFF POSITION.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) RMS POWER SWITCH, PRIMARY/OFF/BACKUP
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 4-POLE, 3-POSITION
7) SWITCH, S4

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A8A2S4
PART NUMBER: ME452-0102-7403

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE EITHER PRIMARY OR BACKUP 28 VDC AND 115 VAC POWER TO EITHER THE PORT OR STBD REMOTE MANIPULATOR ARM.
INABILITY TO PROVIDE ELECTRICAL POWER TO THE RMS NEGATES ITS USE FOR MISSION FUNCTIONS. LOSS OF MISSION RESULTS.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-2
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: EPD&C
MDAC ID: 4002
HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 1/1
ABORT: /NA

ITEM: SWITCH, S4
FAILURE MODE: CONTACTS SHORT TO GROUND WHILE RMS IS IN USE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:

1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) RMS POWER SWITCH, PRIMARY/OFF/BACKUP
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 4-POLE, 3-POSITION
7) SWITCH, S4
8)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A8A2S4
PART NUMBER: ME452-0102-7403

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE EITHER PRIMARY OR BACKUP 28 VDC AND 115 VAC POWER TO EITHER THE PORT OR STBD REMOTE MANIPULATOR ARM.
LOSS OF POWER TO AN RMS IN USE COULD REQUIRE JETTISON OF THE RMS IF SAFE JETTISON IS AN OPTION. IF THE RMS CANNOT BE SAFELY JETTISONED, LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-3
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: EP&C MDAC
MDAC ID: 4003
ITEM: SWITCH, S4
FAILURE MODE: FAILS TO SWITCH PRIMARY POWER ON.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) RMS POWER SWITCH, PRIMARY/OFF/BACKUP
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 4-POLE, 3-POSITION
7) SWITCH, S4

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A8A2S4
PART NUMBER: ME452-0102-7403

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION,
CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE PRIMARY 28VDC AND 115 VAC POWER TO
EITHER THE PORT OR STBD REMOTE MANIPULATOR ARM.
LOSS OF PRIMARY POWER RESULTS IN LOSS OF PRIME MODE OF
OPERATION OF THE RMS. THE ARM CAN BE SAFELY STOWED WITH BACKUP
POWER. LOSS OF USE OF THE RMS RESULTS IN LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-4
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: EPD&C
MDAC ID: 4004

ITEM: SWITCH, S4
FAILURE MODE: FAILS TO SWITCH BACKUP POWER ON.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL ASA2
4) RMS POWER SWITCH, PRIMARY/OFF/BACKUP
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 4-POLE, 3-POSITION
7) SWITCH, S4
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A8A2S4
PART NUMBER: ME452-0102-7403

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE BACKUP 28VDC POWER TO THE REMOTE MANIPULATOR ARM. BACKUP POWER TO THE RMS IS STANDBY REDUNDANT. BACKUP POWER IS REQUIRED TO POSITION AND STOW THE ARM IN THE EVENT OF FAILURE OF PRIMARY POWER SYSTEM. WITH NO POWER REDUNDANCY AVAILABLE, THE ARM COULD NOT SAFELY BE USED TO FULFILL MISSION REQUIREMENTS, THUS LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-5
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: EPD&C
MDAC ID: 4005

ITEM: SWITCH, S4
FAILURE MODE: PRIMARY POWER FAILS OPEN WHILE ARM IS IN USE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61A
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) RMS POWER SWITCH, PRIMARY/OFF/BACKUP
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 4-POLE, 3-POSITION
7) SWITCH, S4
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CRITICALITIES

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LOCATION:  36V73A8A2S4
PART NUMBER:  ME452-0102-7403

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF PRIMARY 28VDC AND 115 VAC POWER TO THE RMS. BACKUP POWER TO THE RMS IS STANDBY REDUNDANT.

IF LOSS OF PRIMARY POWER OCCURRED AT A TIME WHEN THE ARM WAS IN A POSITION SUCH THAT IT COULD NOT BE SAFELY JETTISONED, A SUBSEQUENT FAILURE IN THE BACKUP POWER SYSTEM COULD CAUSE LOSS OF VEHICLE/CREW.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-6
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/29/86
SUBSYSTEM: EPD&C
MDAC ID: 4006

ITEM: SWITCH, S4
FAILURE MODE: FAILS CLOSED IN PRIMARY POSITION.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) RMS POWER SWITCH, PRIMARY/OFF/BACKUP
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 4-POLE, 3-POSITION
7) SWITCH, S4

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A8A2S4
PART NUMBER: ME452-0102-7403

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNABLE TO POWER DOWN THE RMS WITH THE POWER SWITCH.
NO EFFECT. PRIMARY POWER TO THE CIRCUIT COULD BE INTERRUPTED USING SWITCH S1 (MN A) AND CIRCUIT BREAKER CB17 (AC1).

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/30/86    HIGHEST CRITICALITY: HDW/FUNC
SUBSYSTEM: EPD&C   FLIGHT: 2/2
MDAC ID: 4007    ABORT: /NA

ITEM: SWITCH, S1
FAILURE MODE: FAILS TO SWITCH FROM OFF POSITION.

LEAD ANALYST: ROBINSON    SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL ASA2
4) RMS SELECT SWITCH, PORT/OFF/STBD
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S1
8)
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]   B [ ]   C [ ]

LOCATION: 36V73A8A2S1
PART NUMBER: ME452-0102-7203

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE EITHER 28 VDC PRIMARY OR BACKUP POWER TO EITHER PORT OR STBD REMOTE MANIPULATOR ARMS. THE 'RMS SELECT' SWITCH (S1) IS A SINGLE POINT FAILURE ITEM.
LOSS OF USE OF THE RMS TO FULFILL MISSION REQUIREMENTS, THUS LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/30/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 1/1
MDAC ID: 4008  ABORT: /NA

ITEM: SWITCH, S1
FAILURE MODE: CONTACTS SHORTS TO GROUND WHILE RMS IS IN USE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) RMS SELECT SWITCH, PORT/OFF/STBD
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S1
8)
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 36V73A8A2S1
PART NUMBER: ME452-0102-7203

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE EITHER 28 VDC PRIMARY OR BACKUP POWER TO THE REMOTE MANIPULATOR ARM BEING USED (AND ALSO THE OTHER ARM). THE 'RMS SELECT' SWITCH (S1) IS A SINGLE POINT FAILURE ITEM.

LOSS OF POWER TO AN RMS IN USE WOULD RESULT IN LOSS OF MISSION. POSSIBLE LOSS OF VEHICLE/CREW IF ARM IN USE CANNOT BE STOWED OR SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-9
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/30/86
SUBSYSTEM: EPD&C
MDAC ID: 4009

ITEM: SWITCH, S1
FAILURE MODE: FAILS OPEN WHILE EITHER ARM IS IN USE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) RMS SELECT SWITCH, PORT/OFF/STBD
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S1
8)
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A8A2S1
PART NUMBER: ME452-0102-7203

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
- LOSS OF BOTH PRIMARY AND SECONDARY POWER TO THE REMOTE MANIPULATOR ARM BEING USED.
- LOSS OF BOTH PRIMARY AND BACKUP POWER TO THE RMS WOULD CAUSE LOSS OF MISSION AND POSSIBLY LOSS OF VEHICLE/CREW IF THE ARM IN USE CANNOT BE STOWED OR SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-10
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/31/86
SUBSYSTEM: EPD&G
MDAC ID: 4010

ITEM: SWITCH, S8
FAILURE MODE: FAILS OFF WHILE ARM IS IN USE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) PORT RMS HEATER A, AUTO/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S8
8) 
9) 

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LOCATION: 36V73A8A2S8
PART NUMBER: ME452-0102-7101

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO CONTROL RPC 27 IN MPC1 TO ENABLE THE PORT RMS MN A 28 VDC HEATER BUS.
ANY SUBSEQUENT FAILURE IN THE PORT RMS HEATER SYSTEM B COULD CAUSE LOSS OF MANIPULATOR POSITIONING CAPABILITY, WHICH COULD CAUSE LOSS OF MISSION AND POSSIBLY LOSS OF VEHICLE/CREW IF ARM COULD NOT BE STOWED OR SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-11
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/31/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 2/1R
MDAC ID: 4011  ABORT: /NA

ITEM: SWITCH, SI0
FAILURE MODE: FAILS OFF WHILE ARM IS IN USE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61A
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) PORT RMS HEATER B, AUTO/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S10
8)
9)

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LOCATION: 36V73A8A2S10
PART NUMBER: ME452-0102-7101

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO CONTROL RPC 28 IN MPC2 TO ENABLE THE PORT RMS MN B 28 VDC HEATER BUS.
ANY SUBSEQUENT FAILURE IN THE PORT RMS HEATER SYSTEM A COULD CAUSE LOSS OF MANIPULATOR POSITIONING CAPABILITY, WHICH COULD CAUSE LOSS OF MISSION AND POSSIBLY LOSS OF VEHICLE/CREW IF ARM COULD NOT BE STOWED OR SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-12
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/31/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 2/2
MDAC ID: 4012  ABORT: /NA

ITEM: SWITCHES, S8, S10
FAILURE MODE: FAILS TO SWITCH FROM OFF TO AUTO POSITION.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) PORT RMS HEATERS A & B, AUTO/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 2-POLE, 3-POSITION, 2 EACH
7) SWITCHES, S8, S10
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9)

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 36V73A8A2S8, S10
PART NUMBER: ME452-0102-7101

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO ENABLE AUTO CONTROL OF EITHER OR BOTH PORT RMS HEATER BUS POWER SYSTEMS A/B.
Both heater systems A & B are thermostatically controlled and are nominally used with both in the auto position while operating the arm. Loss of redundancy in the heater systems would preclude operation of the arm thus resulting in loss of mission.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-13
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/31/86
SUBSYSTEM: EPD&C
MDAC ID: 4013

ITEM: SWITCH, S7
FAILURE MODE: FAILS OFF WHILE ARM IS IN USE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) STBD RMS HEATER A, AUTO/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S7
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LOCATION: 36V73A8A2S7
PART NUMBER: ME452-0102-7101

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO CONTROL RPC 26 IN MPC1 TO ENABLE THE STBD RMS MN A 28 VDC HEATER BUS.

ANY SUBSEQUENT FAILURE IN THE STBD RMS HEATER SYSTEM B COULD CAUSE LOSS OF MANIPULATOR POSITIONING CAPABILITY, WHICH COULD CAUSE LOSS OF MISSION AND POSSIBLY LOSS OF VEHICLE/CREW IF ARM COULD NOT BE STOWED OR SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-14
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/31/86
SUBSYSTEM: EPD&C
MDAC ID: 4014

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: SWITCH, S9
FAILURE MODE: FAILS TO SWITCH FROM OFF TO AUTO POSITION.

LEAD ANALYST: ROBINSON   SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) STBD RMS HEATER B, AUTO/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S9

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LOCATION: 36V73A8A2S9
PART NUMBER: ME452-0102-7101

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO CONTROL RPC 29 IN MPC2 TO ENABLE THE STBD RMS MN B 28 VDC HEATER BUS.
ANY SUBSEQUENT FAILURE IN THE STBD RMS HEATER SYSTEM A COULD CAUSE LOSS OF MANIPULATOR POSITIONING CAPABILITY, WHICH COULD CAUSE LOSS OF MISSION AND POSSIBLY LOSS OF VEHICLE IF ARM COULD NOT BE STOWED OR SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87   C-15
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/31/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C
FLIGHT: 2/2
MDAC ID: 4015
ABORT: /NA

ITEM: SWITCHES, S7, S9
FAILURE MODE: FAILS TO SWITCH FROM AUTO TO OFF POSITION.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) STBD RMS HEATER A & B, AUTO/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 2-POLE, 3-POSITION, 2 EACH
7) SWITCHES, S7, S9
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 36V73A8A2S7, S9
PART NUMBER: ME452-0102-7101

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO ENABLE AUTO CONTROL OF EITHER OR BOTH THE STBD RMS HEATER SYSTEMS A/B.

BOTH HEATER SYSTEMS A & B ARE THERMOSTATICALLY CONTROLLED AND ARE NOMINALLY USED IN THE AUTO POSITION WHILE OPERATING THE ARM. LOSS OF REDUNDANCY IN THE HEATER SYSTEMS WOULD PRECLUDE OPERATION OF THE ARM THUS RESULTING IN LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-16
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/31/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 2/2
MDAC ID: 4016  ABORT: /NA

ITEM: FUSE, F1
FAILURE MODE: FAILS OPEN PRIOR TO ARM DEPLOYMENT.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) RMS POWER SWITCH, S4
5) PRIMARY SWITCH POSITION, (MN A) FUSE
6) FUSE, 2 AMP
7) FUSE, F1
8)  
9)  

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 36V73A8A2F1
PART NUMBER: ME451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE PRIMARY (28 VDC MN A) POWER TO EITHER REMOTE MANIPULATOR ARM, THE MCIU, OR LOAD PANEL A8A1. BACKUP POWER IS STANDBY REDUNDANT.
LOSS OF PRIMARY POWER WOULD NEGATE USE OF RMS TO FULFILL MISSION REQUIREMENTS. LOSS OF MISSION RESULTS.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-17
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/31/86
SUBSYSTEM: EPD&C
MDAC ID: 4017

HIGHEST CRITICITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: FUSE, F1
FAILURE MODE: FAILS OPEN WHILE ARM IS IN USE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) RMS POWER SWITCH, S4
5) PRIMARY SWITCH POSITION, (MN A) FUSE
6) FUSE, 2 AMP
7) FUSE, F1
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LOCATION: 36V73A8A2F1
PART NUMBER: ME451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
- LOSS OF ABILITY TO PROVIDE PRIMARY (28 VDC MN A) POWER TO EITHER REMOTE MANIPULATOR ARM, THE MCIU, OR LOAD PANEL A8A1. BACKUP POWER IS STANDBY REDUNDANT.
- ANY SUBSEQUENT FAILURE IN THE BACKUP POWER COULD CAUSE LOSS OF VEHICLE/CREW IF ARM CANNOT BE STOWED OR SAFELY JETTISONED

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-18
INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET  

DATE: 10/31/86  
SUBSYSTEM: EPD&C  
MDAC ID: 4018  

ITEM: FUSE, F2  
FAILURE MODE: FAILS OPEN PRIOR TO ARM DEPLOYMENT,  
LEAD ANALYST: ROBINSON  
SUBSYS LEAD: SCHMECKPEPER  

BREAKDOWN HIERARCHY:  
1) RMS, 05-6IA  
2) REMOTE MANIPULATOR ARM  
3) PANEL A8A2  
4) RMS POWER SWITCH, S4  
5) BACKUP SWITCH POSITION, (MN B) FUSE  
6) FUSE, 2 AMP  
7) FUSE, F2  
8)  
9)  

CRITICALITIES  

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REDUNDANCY SCREENS:  
A [ ]  B [ ]  C [ ]  

LOCATION: 36V73A8A2F2  
PART NUMBER: ME451-0018-0200  

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION  

EFFECTS/RATIONALE:  
LOSS OF ABILITY TO PROVIDE BACKUP (28 VDC MN B) POWER TO EITHER REMOTE MANIPULATOR ARM. BACKUP POWER IS STANDBY REDUNDANT.  
LOSS OF BACKUP POWER PRIOR TO DEPLOYMENT WOULD NEGATE THE USE OF THE REMOTE MANIPULATOR ARM TO FULFILL MISSION REQUIREMENTS, THUS LOSS OF MISSION.  

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS  
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK  

REPORT DATE 02/25/87  
C-19
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/31/86
SUBSYSTEM: EPD&C
MDAC ID: 4019

ITEM: FUSE, F2
FAILURE MODE: FAILS OPEN WHILE ARM IS IN USE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61A
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) RMS POWER SWITCH, S4
5) BACKUP SWITCH POSITION, (MN B) FUSE
6) FUSE, 2 AMP
7) FUSE, F2
8)
9)

CRITICALITIES

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LOCATION: 36V73A8A2F2
PART NUMBER: ME451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
- LOSS OF ABILITY TO PROVIDE BACKUP (28 VDC MN B) POWER TO EITHER REMOTE MANIPULATOR ARM. BACKUP POWER IS STANDBY REDUNDANT.
- BACKUP POWER WOULD ONLY BE USED AFTER PRIMARY FAILURE OCCURRED WHILE IN USE. LOSS OF BACKUP POWER WHILE REMOTE MANIPULATOR IS USING BACKUP POWER COULD RESULT IN LOSS OF VEHICLE/CREW IF ARM CANNOT BE STOWED OR SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-20
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/31/86
SUBSYSTEM: EPD&C
MDAC ID: 4020

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: RESISTOR, A3R2
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) SWITCH, PORT HEATER A, S8
5) RESISTOR, CURRENT LIMITING
6) RESISTOR, 1.2K OHM, 2 WATT
7) RESISTOR, A3R2
8)  
9)  

CRITICALITIES

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LOCATION: 36V73A8A2A3R2
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO ENABLE RPC 27 (MPC 1, MN A) TO PROVIDE AUTO HEATER A POWER TO PORT REMOTE MANIPULATOR ARM.
ANY SUBSEQUENT FAILURE IN HEATER SYSTEM B COULD CAUSE LOSS OF MANIPULATOR POSITIONING CAPABILITY, THUS LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-21
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/31/86  HIGHEST CRITICALITY HDW/func
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4021  ABORT: /NA

ITEM: RESISTOR, A3R3
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) SWITCH, PORT HEATER B, S10
5) RESISTOR, CURRENT LIMITING
6) RESISTOR, 1.2K OHM, 2 WATT
7) RESISTOR, A3R3
8)
9)

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LOCATION: 36V73A8A2A3R3
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO ENABLE RPC 28 (MPC 2, MN B) TO PROVIDE AUTO HEATER B POWER TO PORT REMOTE MANIPULATOR ARM.
ANY SUBSEQUENT FAILURE IN HEATER SYSTEM A COULD CAUSE LOSS OF MANIPULATOR POSITIONING CAPABILITY, THUS LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-22
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/31/86
SUBSYSTEM: EPD&C
MDAC ID: 4022

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: RESISTOR, A2R2
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61A
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) SWITCH, STBD HEATER A, S7
5) RESISTOR, CURRENT LIMITING
6) RESISTOR, 1.2K OHM, 2 WATT
7) RESISTOR, A2R2

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LOCATION: 36V73A8A2A2R2
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO ENABLE RPC 26 (MPC 1, MN A) TO PROVIDE AUTO HEATER A POWER TO STBD REMOTE MANIPULATOR ARM.
ANY SUBSEQUENT FAILURE IN HEATER SYSTEM B COULD CAUSE LOSS OF MANIPULATOR POSITIONING CAPABILITY, THUS LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 10/31/86
SUBSYSTEM: EPD&C
MDAC ID: 4023

ITEM: RESISTOR, A2R3
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) SWITCH, STBD HEATER B, S9
5) RESISTOR, CURRENT LIMITING
6) RESISTOR, 1.2K OHM, 2 WATT
7) RESISTOR, A2R3
8) 
9) 

CRITICALITIES

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LOCATION: 36V73A8A2A2R3
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO ENABLE RPC 29 (MPC 2, MN B) TO PROVIDE AUTO HEATER B POWER TO STBD REMOTE MANIPULATOR ARM.
ANY SUBSEQUENT FAILURE IN HEATER SYSTEM A COULD CAUSE LOSS OF MANIPULATOR POSITIONING CAPABILITY, THUS LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-24
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/03/86

ITEM: RESISTOR, A1R1
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) RMS POWER SWITCH SCAN CIRCUIT, MDM OF4
5) PRIMARY POWER ON/OFF (V54S06000E)
6) RESISTOR, ISOLATION
7) RESISTOR, 5.1K OH, 1/4 WATT
8) RESISTOR, A1R1
9) RESISTOR, ISOLATION

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A8A2A1R1
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF SWITCH SCAN MEASUREMENT. THE 'RMS PRIMARY POWER ON' MEASUREMENT (V54S06000E) TO MDM OF4 WILL ALWAYS INDICATE 'OFF'. MEASUREMENT NOT CRITICAL TO OPERATION OF SYSTEM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/03/86
SUBSYSTEM: EPD&C
MDAC ID: 4025
HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, A1R2
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) RMS POWER SWITCH SCAN CIRCUIT, MDM OF4
5) BACKUP POWER ON/OFF (V54S06001E)
6) RESISTOR, ISOLATION
7) RESISTOR, 5.1K OH, 1/4 WATT
8) RESISTOR, A1R2

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A8A2A1R2
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF SWITCH SCAN MEASUREMENT. THE 'RMS BACKUP POWER ON' MEASUREMENT (V54S06001E) TO MDM OF4 WILL ALWAYS INDICATE 'OFF'. MEASUREMENT NOT CRITICAL TO OPERATION OF SYSTEM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-26
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/03/86
SUBSYSTEM: EPD&C
MDAC ID: 4026

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, A3R1
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A8A2
4) RMS HEATER POWER SWITCH SCAN CIRCUIT, MDM OF4
5) PORT HEATER A POWER AUTO/OFF (V54S0760E)
6) RESISTOR, ISOLATION
7) RESISTOR, 5.1K OH, 1/4 WATT
8) RESISTOR, A3R1
9) RESISTOR, ISOLATION

CRITICALITIES
FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC
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LANDING/SAFING: /NA

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A8A2A3R1
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF SWITCH SCAN MEASUREMENT. THE 'PORT RMS HEATER A POWER AUTO' MEASUREMENT (V54S0760E) TO MDM OF4 WILL ALWAYS INDICATE 'OFF'.
MEASUREMENT NOT CRITICAL TO OPERATION OF SYSTEM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-27
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/03/86
SUBSYSTEM: EPD&C
MDAC ID: 4027

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, A2R1
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL A4A2
4) RMS HEATER POWER SWITCH SCAN CIRCUIT, MDM OF4
5) STBD HEATER A POWER AUTO/OFF (V54S0960E)
6) RESISTOR, ISOLATION
7) RESISTOR, 5.1K OH, 1/4 WATT
8) RESISTOR, A2R1
9) RMS, 05-6IA

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A8A2A2R1
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF SWITCH SCAN MEASUREMENT. THE 'STBD RMS HEATER A POWER AUTO' MEASUREMENT (V54S0760E) TO MDM OF4 WILL ALWAYS INDICATE 'OFF'. MEASUREMENT NOT CRITICAL TO OPERATION OF SYSTEM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4028

ITEM: CIRCUIT BREAKER, CBI7
FAILURE MODE: FAILS OPEN PRIOR TO ARM DEPLOYMENT.

LEAD ANALYST: ROBINSON                  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL M73C
4) AC SYSTEM 1 POWER
5) CIRCUIT BREAKER, 1-PH, 3 AMP
6) CIRCUIT BREAKER, CBI7
7) 
8) 
9) 

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REDUNDANCY SCREENS: A [ ]    B [ ]    C [ ]

LOCATION: 85V73A129CB17
PART NUMBER: MC454-0026-2030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
- LOSS OF ABILITY TO PROVIDE PRIMARY AC POWER (SYSTEM 1) TO THE RMS LOAD PANEL A8A1 PRIMARY POWER CONTROL CIRCUIT. BACKUP POWER IS STANDBY REDUNDANT.
- LOSS OF PRIMARY POWER CONTROL CIRCUIT POWER WOULD NEGATE USE OF REMOTE MANIPULATOR ARM. LOSS OF MISSION WOULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-29
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4029

ITEM: CIRCUIT BREAKER, CB17
FAILRE MODE: FAILS OPEN WHILE ARM IS IN USE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL M73C
4) AC SYSTEM 1 POWER
5) CIRCUIT BREAKER, 1-PH, 3 AMP
6) CIRCUIT BREAKER, CB17
7)
8)
9)

CRITICALITIES

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LOCATION: 85V73A129CB17
PART NUMBER: MC454-0026-2030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE PRIMARY AC POWER (SYSTEM 1) TO THE RMS LOAD PANEL A8A1 PRIMARY POWER CONTROL CIRCUIT. BACKUP POWER IS STANDBY REDUNDANT.
LOSS OF PRIMARY AC POWER WHILE ARM IS IN USE WOULD CAUSE LOSS OF PRIMARY MODE OF OPERATION, THUS LOSS OF MISSION. ANY SUBSEQUENT FAILURE IN BACKUP SYSTEM COULD CAUSE LOSS OF VEHICLE/CREW IF ARM COULD NOT BE STOWED OR SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-30
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4030

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: /NA

ITEM: CIRCUIT BREAKER, CB17
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL M73C
4) AC SYSTEM 1 POWER
5) CIRCUIT BREAKER, L-PH, 3 AMP
6) CIRCUIT BREAKER, CB17
7) 
8) 
9) 

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 85V73A129CB17
PART NUMBER: MC454-0026-2030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE CIRCUIT PROTECTION FOR LOAD PANEL A8A1 AC POWER SYSTEM 1 POWER CONTROL CIRCUIT. POWER CAN BE REMOVED BY SWITCH.
CIRCUIT BREAKER IS NORMALLY CLOSED THUS THE FAILURE COULD REMAIN UNDETECTED UNTIL POWERDOWN OF CIRCUIT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-31
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4031

ITEM: CIRCUIT BREAKER, CB19
FAILURE MODE: FAILS OPEN PRIOR TO DEPLOYMENT OF ARM.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61A
2) REMOTE MANIPULATOR ARM
3) PANEL M73C
4) AC SYSTEM 2 POWER
5) CIRCUIT BREAKER, 1-PH, 3 AMP
6) CIRCUIT BREAKER, CB19
7) 
8) 
9) 

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 85V73A129CB19
PART NUMBER: MC454-0026-2030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE BACKUP AC POWER (SYSTEM 2) TO THE RMS LOAD PANEL A8A1 BACKUP POWER CONTROL CIRCUIT. BACKUP AC POWER IS STANDBY REDUNDANT.
LOSS OF BACKUP POWER CONTROL CIRCUIT WOULD NEGATE USE OF REMOTE MANIPULATOR ARM FOR SAFETY REASONS THUS LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-32
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4032

HIGHEST CRITICALITY
HDW/func: FLIGHT: 2/1R
ABORT: /NA

ITEM: CIRCUIT BREAKER, CB19
FAILURE MODE: FAILS OPEN WHILE ARM IS IN USE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PANEL M73C
4) AC SYSTEM 2 POWER
5) CIRCUIT BREAKER, 1-PH, 3 AMP
6) CIRCUIT BREAKER, CB19
7) 
8) 
9) 

CRITICALITIES

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LOCATION: 85V73A129CB19
PART NUMBER: MC454-0026-2030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE BACKUP AC POWER (SYSTEM 2) TO THE RMS LOAD PANEL A8A1 BACKUP POWER CONTROL CIRCUIT. BACKUP AC POWER IS STANDBY REDUNDANT.

LOSS OF BACKUP AC POWER WHILE ARM IS IN USE WOULD CAUSE LOSS OF BACKUP MODE OF OPERATION WHICH SHOULD ABORT THE MISSION. ANY SUBSEQUENT FAILURE IN PRIMARY SYSTEM COULD CAUSE LOSS OF VEHICLE/CREW IF ARM CANNOT BE STOWED OR SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-33
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4033

ITEM: CIRCUIT BREAKER, CB19
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61A
2) REMOTE MANIPULATOR ARM
3) PANEL M73C
4) AC SYSTEM 2 POWER
5) CIRCUIT BREAKER, 1-PH, 3 AMP
6) CIRCUIT BREAKER, CB19
7) 
8) 
9) 

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 85V73A129CB19
PART NUMBER: MC454-0026-2030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE CIRCUIT PROTECTION FOR BACKUP AC POWER (SYSTEM 2) TO THE RMS LOAD PANEL A8A1 POWER CONTROL CIRCUIT. POWER CAN BE REMOVED BY SWITCH.
CIRCUIT BREAKER IS NORMALLY CLOSED THUS THE FAILURE COULD REMAIN UNDETECTED UNTIL POWERDOWN OF CIRCUIT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-34
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

| DATE: 11/04/86 | HIGHEST CRITICALITY | HDW/FUNC |
| SUBSYSTEM: EPD&C | FLIGHT: 2/2 | |
| MDAC ID: 4034 | ABORT: /NA | |

ITEM: RELAY, K1
FAILURE MODE: FAILS OPEN PRIOR TO ARM DEPLOYMENT.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PORT PRIMARY POWER (MN A)
4) MID POWER CONTROLLER ASSY (MPC) 1
5) RELAY, 50 AMP FUSED, K1
6) RELAY, K1
7) 
8) 
9) 

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A25K1
PART NUMBER: MC455-0134-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF PRIMARY (28 VDC MN A) POWER TO THE PORT REMOTE MANIPULATOR ARM. BACKUP POWER IS STANDBY REDUNDANT.
LOSS OF MISSION BY LOSS OF PRIME MODE OF RMS OPERATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-35
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4035

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: RELAY, K1
FAILURE MODE: FAILS OPEN WHILE ARM IS IN USE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PORT PRIMARY POWER (MN A)
4) MID POWER CONTROLLER ASSY (MPC) 1
5) RELAY, 50 AMP FUSED, K1
6) RELAY, K1
7) 
8) 
9) 

CRITICALITIES

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LOCATION: 40V76A25K1
PART NUMBER: MC455-0134-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF PRIMARY (28 VDC MN A) POWER TO THE PORT REMOTE MANIPULATOR ARM. BACKUP POWER IS STANDBY REDUNDANT. BACKUP POWER IS STANDBY REDUNDANT.
LOSS OF MISSION BY LOSS OF PRIME MODE OF RMS OPERATION. SUBSEQUENT LOSS OF BACKUP POWER COULD RESULT IN LOSS OF VEHICLE IF RMS COULD NOT BE SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-36
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4036

ITEM: RELAY, K1
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PORT PRIMARY POWER (MN A)
4) MID POWER CONTROLLER ASSY (MPC) 1
5) RELAY, 50 AMP FUSED, K1
6) RELAY, K1
7)
8)
9)

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A25K1
PART NUMBER: MC455-0134-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
APPLIES UNTIMELY PRIMARY (28 VDC MN A) POWER TO THE PORT REMOTE MANIPULATOR ARM. POWER CANNOT BE REMOVED FROM ARM.
INABILITY TO DEPOWER THE REMOTE MANIPULATOR ARM BY RELAY ACTION WOULD HAVE NO EFFECT ALONE. SUBSEQUENT FAILURES MAY WARRANT CONSIDERATION OF DEPOWERING MN A BUS IN MPC1

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4037

ITEM: RELAY, K2
FAILURE MODE: FAILS OPEN PRIOR TO ARM DEPLOYMENT.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATON ARM
3) STBD PRIMARY POWER (MN A)
4) MID POWER CONTROLLER ASSY (MPC) 1
5) RELAY, 50 AMP FUSED, K2
6) RELAY, K2
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8)
9)

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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION:  40V76A25K2
PART NUMBER:  MC455-0134-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF PRIMARY (28 VDC MN A) POWER TO THE STBD MANIPULATOR ARM. BACKUP POWER IS STANDBY REDUNDANT.
LOSS OF MISSION BY LOSS OF PRIME MODE OF RMS OPERATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-38
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/04/86
SUBSYSTEM: EP&C
MDAC ID: 4038

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: RELAY, K2
FAILURE MODE: FAILS OPEN WHILE ARM IS IN USE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) STBD PRIMARY POWER (MN A)
4) MID POWER CONTROLLER ASSY (MPC) 1
5) RELAY, 50 AMP FUSED, K2
6) RELAY, K2
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9)

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LOCATION: 40V76A25K2
PART NUMBER: MC455-0134-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF PRIMARY (28 VDC MN A) POWER TO THE STBD MANIPULATOR ARM. BACKUP POWER IS STANDBY REDUNDANT.
LOSS OF MISSION BY LOSS OF PRIME MODE OF RMS OPERATION. SUBSEQUENT LOSS OF BACKUP POWER COULD RESULT IN LOSS OF VEHICLE/CREW IF ARM CANNOT BE STOWED OR SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-39
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4039

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: RELAY, K2
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) STBD PRIMARY POWER (MN A)
4) MID POWER CONTROLLER ASSY (MPC) 1
5) RELAY, 50 AMP FUSED, K2
6) RELAY, K2

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A25K2
PART NUMBER: MC455-0134-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
APPLIES UNTIMELY PRIMARY (28 VDC MN A) POWER TO THE STBD MANIPULATOR ARM. POWER CANNOT BE REMOVED FROM ARM.
INABILITY TO DEPOWER THE REMOTE MANIPULATOR ARM BY RELAY ACTION WOULD HAVE NO EFFECT ON THE SYSTEM WITH NO OTHER FAILURES INVOLVED. SUBSEQUENT FAILURES MAY WARRANT CONSIDERATION OF DEPOWERING MN B TO MPC1.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-II174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-40
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/13/86
SUBSYSTEM: EPD&C
MDAC ID: 4040

ITEM: FUSE, F26
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PORT MN BUS A, SYSTEM 1 POWER
4) MID POWER CONTROLLER ASSY (MPC) 1
5) RELAY, K1
6) FUSE, 50 AMP
7) FUSE, F26
8) 9)

CRITICALITIES

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LOCATION: 40V76A25F27
PART NUMBER: ME451-0016-1050

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF PRIMARY (28 VDC MN A) POWER TO THE PORT REMOTE MANIPULATOR ARM. BACKUP POWER IS STANDBY RESUNDANT.
LOSS OF MISSION BY LOSS OF PRIME MODE OF RMS OPERATION.
SUBSEQUENT LOSS OF BACKUP POWER COULD RESULT IN LOSS OF VEHICLE/CREW IF THE ARM CANNOT BE STOWED OR SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-41
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/13/86
SUBSYSTEM: EP&D&C
MDAC ID: 4041

ITEM: FUSE, F27
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PORT MN BUS A, SYSTEM 1 POWER
4) MID POWER CONTROLLER ASSY (MPC) 1
5) RELAY, K2
6) FUSE, 50 AMP
7) FUSE, F27
8) 
9) 

CRITICALITIES

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LOCATION: 40V76A25F27
PART NUMBER: ME451-0016-1050

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF PRIMARY (28 VDC MN A) POWER TO THE STBD REMOTE MANIPULATOR ARM. BACKUP POWER IS STANDBY REDUNDANT.
LOSS OF MISSION BY LOSS OF PRIME MODE OF RMS OPERATION.
SUBSEQUENT LOSS OF BACKUP POWER WHILE ARM IS IN USE COULD RESULT IN LOSS OF VEHICLE IF ARM CANNOT BE STOWED OR SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-42
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4042

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: REMOTE POWER CONTROLLER, RPC 27
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PORT HEATER A POWER (MN A)
4) MID POWER CONTROLLER ASSY (MPC) 1
5) REMOTE POWER CONTROLLER, 20 AMP
6) REMOTE POWER CONTROLLER, RPC 27
7) 
8) 
9) RMS, 05-6IA

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LOCATION: 40V76A25RPC27
PART NUMBER: MC450-0017-1200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE HEATER A (28 VDC MN A) POWER TO PORT REMOTE MANIPULATOR ARM.
LOSS OF HEATER POWER B TO PORT MANIPULATOR ARM COULD RESULT IN LOSS OF MANIPULATOR POSITIONING CAPABILITY, THUS LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-43
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4043

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: ABORT: 3/2R /NA

ITEM: REMOTE POWER CONTROLLER, RPC 26
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON        SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) STBD HEATER A POWER (MN A)
4) MID POWER CONTROLLER ASSY (MPC) 1
5) REMOTE POWER CONTROLLER, 20 AMP
6) REMOTE POWER CONTROLLER, RPC 26

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LOCATION: 40V76A25RPC26
PART NUMBER: MC450-0017-1200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE HEATER A (28 VDC MN A) POWER TO STBD REMOTE MANIPULATOR ARM. LOSS OF HEATER POWER B TO STBD MANIPULATOR ARM COULD RESULT IN LOSS OF MANIPULATOR POSITIONING CAPABILITY, THUS LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-44
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4044

ITEM: REMOTE POWER CONTROLLER, RPC 4
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) MCIU PRIMARY POWER (MN A)
4) FWD POWER CONTROLLER ASSY (MPC) 1
5) REMOTE POWER CONTROLLER, 10 AMP
6) REMOTE POWER CONTROLLER, RPC 4

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 81V76A22RPC4
PART NUMBER: MC450-0017-1100

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE PRIMARY (28 VDC MN A) POWER TO MANIPULATOR CONTROLLER INTERFACE UNIT (MCIU). THERE ARE NO PROVISIONS TO PROVIDE BACKUP POWER TO THE MCIU.

SINCE THERE ARE NO PROVISIONS TO PROVIDE BACKUP POWER TO THE MCIU, IF RPC 4 FAILS OPEN, THE RESULT IS LOSS OF PRIMARY MODE OF OPERATION OF THE REMOTE MANIPULATOR ARM, THUS LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-45
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/05/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C FLIGHT: 2/1R
MDAC ID: 4045 ABORT: /NA

ITEM: REMOTE POWER CONTROLLER, RPC 31
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) PORT BACKUP POWER (MN B)
4) MID POWER CONTROLLER ASSY (MPC) 2
5) REMOTE POWER CONTROLLER, 10 AMP
6) REMOTE POWER CONTROLLER, RPC 31
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LOCATION: 40V76A26RPC31
PART NUMBER: MC450-0017-1100

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
- LOSS OF BACKUP (28 VDC MN B) POWER TO PORT REMOTE MANIPULATOR ARM PRIOR TO START OF ARM DEPLOYMENT WOULD NEGATE USE OF ARM THUS LOSS OF MISSION. BACKUP POWER IS STANDBY REDUNDANT.
- LOSS OF BACKUP POWER PRIOR TO DEPLOYMENT OR WHILE ARM IS IN USE WOULD ABORT OPERATION OF ARM THUS LOSS OF MISSION. LOSS OF BACKUP AFTER LOSS OF PRIMARY WHILE ARM IS IN USE COULD RESULT IN LOSS OF VEHICLE IF ARM CANNOT BE STOWED OR SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-46
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/05/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 2/1R
MDAC ID: 4046  ABORT: /NA

ITEM: REMOTE POWER CONTROLLER, RPC 30
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) STBD BACKUP POWER (MN B)
4) MID POWER CONTROLLER ASSY (MPC) 2
5) REMOTE POWER CONTROLLER, 10 AMP
6) REMOTE POWER CONTROLLER, RPC 30

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LOCATION: 40V76A26RPC30
PART NUMBER: MC450-0017-1100

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF BACKUP (28 VDC MN B) POWER TO STBD REMOTE MANIPULATOR ARM PRIOR TO START OF ARM DEPLOYMENT WOULD NEGATE USE OF ARM THUS LOSS OF MISSION. BACKUP POWER IS STANDBY REDUNDANT.
LOSS OF BACKUP POWER PRIOR TO DEPLOYMENT OR WHILE ARM IS IN USE WOULD ABDOT OPERATION OF ARM THUS LOSS OF MISSION. LOSS OF BACKUP AFTER LOSS OF PRIMARY WHILE ARM IS IN USE COULD RESULT IN LOSS OF VEHICLE IF ARM CANNOT BE STOWED OR SAFELY JETTISONED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-47
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/05/86
SUBSYSTEM: EPD&C
MDAC ID: 4047

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: REMOTE POWER CONTROLLER, RPC 28
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61A
2) REMOTE MANIPULATOR ARM
3) PORT HEATER B POWER (MN B)
4) MID POWER CONTROLLER ASSY (MPC) 2
5) REMOTE POWER CONTROLLER, 10 AMP
6) REMOTE POWER CONTROLLER, RPC 28
7)
8)
9)

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LOCATION: 40V76A26RPC28
PART NUMBER: MC450-0017-1100

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE HEATER B (28 VDC MN B) POWER TO PORT REMOTE MANIPULATOR ARM.
LOSS OF BOTH HEATER POWER B AND HEATER POWER A COULD RESULT IN LOSS OF MANIPULATOR POSITIONING CAPABILITY.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-48
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/05/86
SUBSYSTEM: EPD&C
MDAC ID: 4048

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 3/2R
ABORT: /NA

ITEM: REMOTE POWER CONTROLLER, RPC 29
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMEECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IA
2) REMOTE MANIPULATOR ARM
3) STBD HEATER B POWER (MN B)
4) MID POWER CONTROLLER ASSY (MPC) 2
5) REMOTE POWER CONTROLLER, 10 AMP
6) REMOTE POWER CONTROLLER, RPC 29
7) 
8) 
9) 

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LOCATION: 40V76A26RPC29
PART NUMBER: MC450-0017-1100

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF ABILITY TO PROVIDE HEATER B (28 VDC MN B) POWER TO STBD REMOTE MANIPULATOR ARM.
LOSS OF BOTH HEATER POWER B AND HEATER POWER A COULD RESULT IN LOSS OF MANIPULATOR POSITIONING CAPABILITY.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-49
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EPD&C
MDAC ID: 4101

ITEM: SWITCH, S1
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL R13A2
4) PL BAY MECH (PBM), SYS 1, 3-PH AC POWER, ON/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 4-POLE, 2-POS
7) SWITCH, S1

CRITICALITIES

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LOCATION: 32V73RI3A2S1
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE PAYLOAD BAY MECHANICAL (PBM) SYSTEM 1, 3-PHASE AC POWER. ALTHOUGH PBM POWER IS USED BY OTHER PAYLOAD BAY SYSTEMS, ONLY THE RMS EFFECTS ARE CONSIDERED HERE.
INABILITY TO PROVIDE SYSTEM 1, 3-PHASE AC POWER TO REMOTE MANIPULATOR RETENTION SYSTEM. FAILURE OF SYSTEM 2 COULD CAUSE LOSS OF MISSION AND POSSIBLY LOSS OF VEHICLE.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-50
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86  HIGHEST CRITICALITY
SUBSYSTEM: EPD&C  HDW/FUNC
MDAC ID: 4102  FLIGHT: 3/3

ITEM: SWITCH, S1
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL R13A2
4) PL BAY MECH (PBM), SYS 1, 3-PH AC POWER, ON/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 4-POLE, 2-POS
7) SWITCH, S1
8) 
9) 

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 32V73RI3A2S1
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNINTENTIONAL APPLICATION OF PAYLOAD BAY MECHANICAL (PBM) SYSTEM 1, 3-PHASE AC POWER.
UNINTENTIONAL APPLICATION OF SYSTEM 1, 3-PHASE AC PBM POWER SHOULD HAVE NO EFFECT AS A SINGLE FAILURE. WITH SWITCH FAILED CLOSED. POWER CAN BE REMOVED BY CIRCUIT BREAKER OPERATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-51
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EPD&C
MDAC ID: 4103

HIGHEST CRITICALITY
HDW/FUNC

ITEM: SWITCH, S2
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL R13A2
4) PL BAY MECH (PBM), SYS 2, 3-PH AC POWER, ON/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 4-POLE, 2-POS
7) SWITCH, S2

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LOCATION: 32V73RI3A2S2
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
- INABILITY TO PROVIDE PAYLOAD BAY MECHANICAL (PBM) SYSTEM 2, 3-PHASE AC POWER. ALTHOUGH PBM POWER IS USED BY PAYLOAD BAY SYSTEMS ONLY THE RMS IS CONSIDERED HERE.
- INABILITY TO PROVIDE SYSTEM 2, 3-PHASE AC PBM POWER TO REMOTE MANIPULATOR RETENTION SYSTEM. FAILURE OF SYSTEM 1 COULD CAUSE LOSS OF VEHICLE OR MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-52
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86  
HIGHEST CRITICALITY  
SUBSYSTEM: EPD&C  
HDW/FUNC  
MDAC ID: 4104  
ABORT: /NA  

ITEM: SWITCH, S2  
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.  

LEAD ANALYST: ROBINSON  
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL R13A2
4) PL BAY MECH (PBM), SYS 2, 3-PH AC POWER, ON/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 4-POLE, 2-POS
7) SWITCH, S2
8)  
9)  

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 32V73RI3A2S2
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNINTENTIONAL APPLICATION OF PAYLOAD BAY MECHANICAL (PBM) SYSTEM 2, 3-PHASE AC POWER.
UNINTENTIONAL APPLICATION OF SYSTEM 2, 3-PHASE AC PBM POWER SHOULD HAVE NO EFFECT. WITH THE SWITCH FAILED CLOSED. POWER COULD BE REMOVED BY CIRCUIT BREAKER OPERATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-53
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/02/86
SUBSYSTEM: EPD&C
MDAC ID: 4105

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2
ABORT: /NA

ITEM: SWITCH, S5
FAILURE MODE: OPEN, failing to close to either Deploy or Stow.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL A8A2
4) PORT RMS DEPLOY/STOW
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 2-POLE, 2-POS
7) SWITCH, S5

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 32V73A8A2S5
PART NUMBER: ME452-0102-7201

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE CONTROL VOLTAGE TO OPERATE THE STOW/DEPLOY ACTUATOR.
LOSS OF OPERATION OF THE STOW/DEPLOY ACTUATOR WOULD CAUSE LOSS OF MISSION AND POSSIBLY REQUIRE JETTISON OF REMOTE MANIPULATOR ARM IF IT CANNOT BE SAFELY STOWED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/02/86
SUBSYSTEM: EPD&C
MDAC ID: 4106

ITEM: SWITCH, S5
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL A8A2
4) PORT RMS DEPLOY/STOW
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 2-POLE, 2-POS
7) SWITCH, S5

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 32V73A8A2S5
PART NUMBER: ME452-0102-7201

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNINTENTIONAL APPLICATION OF POWER TO THE STOW/DEPLOY ACTUATOR MOTORS.
UNTIMELY OPERATION OF THE STOW/DEPLOY ACTUATOR MOTORS COULD CAUSE PHYSICAL DAMAGE TO THE RMS/PAYLOADS/ORBITER. POSSIBLE LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-55
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/02/86
SUBSYSTEM: EPD&C
MDAC ID: 4107

ITEM: SWITCH, S2
FAILURE MODE: OPEN, FAILS TO CLOSE TO EITHER DEPLOY OR STOW.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61B
2) MANIPULATOR DEPLOY CONTROL
3) PANEL ABA2
4) STBD RMS DEPLOY/STOW
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 2-POLE, 2-POS
7) SWITCH, S2

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 32V73A8A2S2
PART NUMBER: ME452-0102-7201

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE CONTROL VOLTAGE TO OPERATE THE STOW/DEPLOY ACTUATOR.
LOSS OF OPERATION OF THE STOW/DEPLOY ACTUATOR COULD CAUSE LOSS OF MISSION AND POSSIBLY REQUIRE JETTISON OF THE REMOTE MANIPULATOR ARM IF IT CANNOT BE SAFELY STOWED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-56
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/02/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 1/1
MDAC ID: 4108  ABORT: /NA

ITEM: SWITCH, S2
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL A8A2
4) STBD RMS DEPLOY/STOW
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 4-POLE, 2-POS
7) SWITCH, S2
8)
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 32V73A8A2S2
PART NUMBER: ME452-0102-7201

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNINTENTIONAL APPLICATION OF POWER TO THE STOW/DEPLOY ACTUATOR MOTORS.
UNTIMELY OPERATION OF THE STOW/DEPLOY ACTUATOR MOTORS COULD CAUSE PHYSICAL DAMAGE TO THE RMS/PAYLOADS/ORBITER. POSSIBLE LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-57
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/02/86
SUBSYSTEM: EPD&C
MDAC ID: 4109

ITEM: FUSE, F6
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL ABA2
4) PORT RMS DEPLOY/STOW SWITCH, S5
5) FUSE, CONTROL VOLT CA2
6) FUSE, 1 AMP
7) FUSE, F6
8)
9)

CRITICALITIES

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LOCATION: 36V73A8A2F6
PART NUMBER: ME451-0018-0100

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE CONTROL VOLTAGE TO STOW/DEPLOY SYSTEM 1 SWITCH POSITION.
A SUBSEQUENT FAILURE IN MANIPULATOR DEPLOY CONTROL SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO STOW/DEPLOY THE REMOTE MANIPULATOR ARM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/02/86
SUBSYSTEM: EPD&C
MDAC ID: 4110

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: FUSE, F5
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL A8A2
4) PORT RMS DEPLOY/STOW SWITCH, S5
5) FUSE, CONTROL VOLT BC1
6) FUSE, 1 AMP
7) FUSE, F11
8) 
9) 

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LOCATION: 36V73A8A2F5
PART NUMBER: ME451-0018-0100

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE CONTROL VOLTAGE TO STOW/DEPLOY SYSTEM 2 SWITCH POSITION.
A SUBSEQUENT FAILURE IN MANIPULATOR DEPLOY CONTROL SYSTEM 1 WOULD CAUSE LOSS OF ABILITY TO STOW/DEPLOY THE REMOTE MANIPULATOR ARM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-59
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/02/86
SUBSYSTEM: EPD&C
MDAC ID: 4111

ITEM: FUSE, FII
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL A8A2
4) STBD RMS DEPLOY/STOW SWITCH, S6
5) FUSE, CONTROL VOLT CA2
6) FUSE, 1 AMP
7) FUSE, F5

CRITICALITIES

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LOCATION: 36V73A8A2FII
PART NUMBER: ME451-0018-0100

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE CONTROL VOLTAGE TO STOW/DEPLOY SYSTEM 1 SWITCH POSITION.
A SUBSEQUENT FAILURE IN MANIPULATOR DEPLOY CONTROL SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO STOW/DEPLOY THE REMOTE MANIPULATOR ARM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-60
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/02/86    HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C    FLIGHT: 3/2R
MDAC ID: 4112    ABORT: /NA

ITEM: FUSE, F10
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON    SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL A8A2
4) STBD RMS DEPLOY/STOW SWITCH, S6
5) FUSE, CONTROL VOLT BC1
6) FUSE, 1 AMP
7) FUSE, F10
8) 
9) 

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LOCATION: 36V73A8A2F10
PART NUMBER: ME451-0018-0100

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE CONTROL VOLTAGE TO STOW/DEPLOY SYSTEM 2 SWITCH POSITION.
A SUBSEQUENT FAILURE IN MANIPULATOR DEPLOY CONTROL SYSTEM 1 WOULD CAUSE LOSS OF ABILITY TO STOW/DEPLOY THE REMOTE MANIPULATOR ARM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4113  ABORT: /NA

ITEM: HYBRID RELAY, K72
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
5) DEPLOY ACTUATOR MOTOR POWER, AC3PBM
6) HYBRID RELAY, ACTUATOR DEPLOY
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K72
9)

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LOCATION: 40V76A120K72
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE 3-PHASE, AC3 PBM VOLTAGE TO ACTUATOR SYSTEM 1 MOTOR TO DRIVE TO DEPLOY POSITION.
A SUBSEQUENT FAILURE IN MANIPULATOR DEPLOY CONTROL SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO DEPLOY THE REMOTE MANIPULATOR ARM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-62
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86
SUBSYSTEM: EPD&C
MDAC ID: 4114

HIGHEST CRITICALLY HDW/FUNC
FLIGHT: 1/1
ABORT: /NA

ITEM: HYBRID RELAY, K72
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61B
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
5) DEPLOY ACTUATOR MOTOR POWER, AC3PBM
6) HYBRID RELAY, ACTUATOR DEPLOY
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K72
9)

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120K72
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNINTENTIONAL APPLICATION OF 3-PHASE, AC3 PBM VOLTAGE TO ACTUATOR SYSTEM 1 MOTOR TO DRIVE TO DEPLOY POSITION.
UNTIMELY OPERATION OF A DEPLOY ACTUATOR MOTOR COULD CAUSE PHYSICAL DAMAGE TO THE RMS/PAYLOADS/ORBITER. LOSS OF MISSION AND POSSIBLY LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-63
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86
SUBSYSTEM: EPD&C
MDAC ID: 4115

ITEM: HYBRID RELAY, K49
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
5) DEPLOY ACTUATOR MOTOR POWER, AC2PBM
6) HYBRID RELAY, ACTUATOR DEPLOY
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K49
9)

CRITICALITIES

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LOCATION: 40V76A118K49
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE 3-PHASE, AC2 PBM VOLTAGE TO ACTUATOR SYSTEM 1 MOTOR TO DRIVE TO DEPLOY POSITION.
A SUBSEQUENT FAILURE IN MANIPULATOR DEPLOY CONTROL SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO DEPLOY THE REMOTE MANIPULATOR ARM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-64
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86
SUBSYSTEM: EPD&C
MDAC ID: 4116

HIGHEST CRITICALITY
FLIGHT: 1/1
ABORT: /NA

ITEM: HYBRID RELAY, K49
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
5) DEPLOY ACTUATOR MOTOR POWER, AC2PBM
6) HYBRID RELAY, ACTUATOR DEPLOY
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K49
9) HYBRID RELAY, K49

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118K49
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNINTENTIONAL APPLICATION OF 3-PHASE, AC2 PBM VOLTAGE TO ACTUATOR SYSTEM 1 MOTOR TO DRIVE TO DEPLOY POSITION.
UNTIMELY OPERATION OF A DEPLOY ACTUATOR MOTOR COULD CAUSE PHYSICAL DAMAGE TO THE RMS/PAYLOADS/ORBITER. LOSS OF MISSION AND POSSIBLY LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86
SUBSYSTEM: EPD&C
MDAC ID: 4117

ITEM: HYBRID RELAY, K60
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
5) DEPLOY ACTUATOR MOTOR POWER, AC3PBM
6) HYBRID RELAY, ACTUATOR STOW
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K60

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LOCATION: 40V76A120K60
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE 3-PHASE, AC3 PBM VOLTAGE TO ACTUATOR SYSTEM 1 MOTOR TO DRIVE TO STOW POSITION.
A SUBSEQUENT FAILURE IN MANIPULATOR DEPLOY CONTROL SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO STOW THE REMOTE MANIPULATOR ARM WHICH COULD REQUIRE JETTISON OF THE ARM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-66
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86
SUBSYSTEM: EPD&C
MDAC ID: 4118

ITEM: HYBRID RELAY, K60
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
5) DEPLOY ACTUATOR MOTOR POWER, AC3PBM
6) HYBRID RELAY, ACTUATOR STOW
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K60
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120K60
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNINTENTIONAL APPLICATION OF 3-PHASE, AC3 PBM VOLTAGE TO ACTUATOR SYSTEM 1 MOTOR TO DRIVE TO STOW POSITION.
UNTIMELY OPERATION OF A STOW ACTUATOR MOTOR COULD CAUSE PHYSICAL DAMAGE TO THE RMS/PAYLOADS/ORBITER. LOSS OF MISSION AND POSSIBLY CAUSE LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-67
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86
SUBSYSTEM: EP&D
MDAC: 4119

ITEM: HYBRID RELAY, K51
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61B
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
5) DEPLOY ACTUATOR MOTOR POWER, AC2PBM
6) HYBRID RELAY, ACTUATOR STOW
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K51
9)

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LOCATION: 40V76A118K51
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE 3-PHASE, AC3 PBM VOLTAGE TO ACTUATOR SYSTEM 1 MOTOR TO DRIVE TO THE STOW POSITION.
A SUBSEQUENT FAILURE IN MANIPULATOR DEPLOY CONTROL SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO STOW THE REMOTE MANIPULATOR ARM WHICH COULD REQUIRE JETTISON OF THE ARM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-68
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86
SUBSYSTEM: EPD&C
MDAC ID: 4120

HIGHEST CRITICALITY

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118K51
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNINTENTIONAL APPLICATION OF 3-PHASE, AC3 PBM VOLTAGE TO ACTUATOR SYSTEM 1 MOTOR TO DRIVE TO THE STOW POSITION.
UNTIMELY OPERATION OF A STOW ACTUATOR MOTOR COULD CAUSE PHYSICAL DAMAGE TO THE RMS/PAYLOADS/ORBITER. LOSS OF MISSION AND POSSIBLY LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

ITEM: HYBRID RELAY, K51
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
5) DEPLOY ACTUATOR MOTOR POWER, AC2PBM
6) HYBRID RELAY, ACTUATOR STOW
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K51
9) HYBRID RELAY, ACTUATOR STOW

LOCATION: 40V76A118K51
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNINTENTIONAL APPLICATION OF 3-PHASE, AC3 PBM VOLTAGE TO ACTUATOR SYSTEM 1 MOTOR TO DRIVE TO THE STOW POSITION.
UNTIMELY OPERATION OF A STOW ACTUATOR MOTOR COULD CAUSE PHYSICAL DAMAGE TO THE RMS/PAYLOADS/ORBITER. LOSS OF MISSION AND POSSIBLY LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK
INDEPENDENT ORBITER ASSESSMENT ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4121  ABORT: /NA

ITEM: HYBRID RELAY, K22
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
5) DEPLOY ACTUATOR MOTOR POWER, AC2PBM
6) HYBRID RELAY, ACTUATOR DEPLOY
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K22
9) 

CRITICALITIES

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LOCATION: 40V76A118K22
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE 3-PHASE, AC2 PBM VOLTAGE TO ACTUATOR SYSTEM 2 MOTOR TO DRIVE TO THE DEPLOY POSITION.
A SUBSEQUENT FAILURE IN MANIPULATOR DEPLOY CONTROL SYSTEM 1 WOULD CAUSE INABILITY TO DEPLOY THE REMOTE MANIPULATOR ARM THUS CAUSING LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-70
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86
SUBSYSTEM: EP&D&C
MDAC ID: 4122
HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1
ABORT: /NA

ITEM: HYBRID RELAY, K22
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
LEAD: SCHMECKPEPER
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
5) DEPLOY ACTUATOR MOTOR POWER, AC2PBM
6) HYBRID RELAY, ACTUATOR DEPLOY
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K22
9) HYBRID RELAY, ACTUATOR DEPLOY

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118K22
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNINTENTIONAL APPLICATION OF 3-PHASE, AC2 PBM VOLTAGE TO ACTUATOR SYSTEM 2 MOTOR TO DRIVE TO THE DEPLOY POSITION.
UNTIMELY OPERATION OF A DEPLOY ACTUATOR MOTOR COULD CAUSE PHYSICAL DAMAGE TO THE RMS/PAYLOADS/ORBITER. LOSS OF MISSION AND POSSIBLY LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-71
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86
SUBSYSTEM: EPD&C
MDAC ID: 4123

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K62
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
5) DEPLOY ACTUATOR MOTOR POWER, AC3PBM
6) HYBRID RELAY, ACTUATOR DEPLOY
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K62

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LOCATION: 40V76A118K62
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE 3-PHASE, AC2 PBM VOLTAGE TO ACTUATOR SYSTEM 2 MOTOR TO DRIVE TO THE DEPLOY POSITION.
A SUBSEQUENT FAILURE IN MANIPULATOR DEPLOY CONTROL SYSTEM 1 WOULD CAUSE INABILITY TO DEPLOY THE REMOTE MANIPULATOR ARM THUS CAUSING LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-72
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86

SUBSYSTEM: EPD&C
MDAC ID: 4124

HIGHEST CRITICALITY
FLIGHT: 1/1
ABORT: /NA

ITEM: HYBRID RELAY, K62
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
5) DEPLOY ACTUATOR MOTOR POWER, AC3PBM
6) HYBRID RELAY, ACTUATOR DEPLOY
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K62
9) HYBRID RELAY, K62

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REDUNDANCY SCREENS: A [ ]   B [ ]   C [ ]

LOCATION: 40V76A118K62
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNINTENTIONAL APPLICATION OF 3-PHASE, AC2 PBM VOLTAGE TO ACTUATOR SYSTEM 2 MOTOR TO DRIVE TO THE DEPLOY POSITION.
UNTIMELY OPERATION OF A DEPLOY ACTUATOR MOTOR COULD CAUSE PHYSICAL DAMAGE TO THE RMS/PAYLOADS/ORBITER. LOSS OF MISSION AND POSSIBLY LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-73
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

SUBSYSTEM: EPD&C
MDAC ID: 4125

ITEM: HYBRID RELAY, K24
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
5) DEPLOY ACTUATOR MOTOR POWER, AC2PBM
6) HYBRID RELAY, ACTUATOR STOW
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K24
9)....

CRITICALITIES
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ONORB: 3/2R AOA: /NA
DEORB: /NA ATO: /NA
LANDING/SAFING: /NA


LOCATION: 40V76A118K24
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION,
CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE 3-PHASE, AC3 PBM VOLTAGE TO ACTUATOR
SYSTEM 2 MOTOR TO DRIVE TO THE STOW POSITION.
A SUBSEQUENT FAILURE IN MANIPULATOR DEPLOY CONTROL SYSTEM 1
WOULD CAUSE LOSS OF ABILITY TO STOW THE REMOTE MANIPULATOR ARM
THUS REQUIRING JETTISON OF THE ARM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS' HANDBOOK

REPORT DATE 02/25/87 C-74
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 1/1
MDAC ID: 4126  ABORT: /NA

ITEM: HYBRID RELAY, K24
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC) -2 (40V76A118)
5) DEPLOY ACTUATOR MOTOR POWER, AC2PBM
6) HYBRID RELAY, ACTUATOR STOW
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K24

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A118K24
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNINTENTIONAL APPLICATION OF 3-PHASE, AC3 PBM VOLTAGE TO ACTUATOR SYSTEM 2 MOTOR TO DRIVE TO THE STOW POSITION.
UNTIMELY OPERATION OF A STOW ACTUATOR MOTOR COULD CAUSE PHYSICAL DAMAGE TO THE RMS/PAYLOADS/ORBITER. LOSS OF MISSION AND POSSIBLY LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-75
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86
SUBSYSTEM: EPD&C
MDAC ID: 4127

ITEM: HYBRID RELAY, K50
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
5) DEPLOY ACTUATOR MOTOR POWER, AC3PBM
6) HYBRID RELAY, ACTUATOR STOW
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K50
9)

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LOCATION: 40V76A118K50
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE 3-PHASE, AC3 PBM VOLTAGE TO ACTUATOR SYSTEM 2 MOTOR TO DRIVE TO THE STOW POSITION.
A SUBSEQUENT FAILURE IN MANIPULATOR DEPLOY CONTROL SYSTEM 1 WOULD CAUSE LOSS OF ABILITY TO STOW THE REMOTE MANIPULATOR ARM AND POSSIBLY REQUIRE JETTISON OF THE ARM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-76
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/03/86
SUBSYSTEM: EP&D&C
MDAC ID: 4128

ITEM: HYBRID RELAY, K50
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
5) DEPLOY ACTUATOR MOTOR POWER, AC3PBM
6) HYBRID RELAY, ACTUATOR STOW
7) HYBRID RELAY, 3-PHASE
8) HYBRID RELAY, K50
9)...

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118K50
PART NUMBER: MC452-0123-0003

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNINTENTIONAL APPLICATION OF 3-PHASE, AC3 PBM VOLTAGE TO ACTUATOR SYSTEM 1 MOTOR TO DRIVE TO THE STOW POSITION.
UNTIMELY OPERATION OF A STOW ACTUATOR MOTOR COULD CAUSE PHYSICAL DAMAGE TO THE RMS/PAYLOADS/ORBITER. LOSS OF MISSION AND POSSIBLY CAUSE LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-77
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/04/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C FLIGHT: 3/3
MDAC ID: 4129 ABORT: /NA

ITEM: HYBRID DRIVERS, AR9, II
FAILURE MODE: FAILS OPEN, ONE OR BOTH.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
5) PORT RMS DEPLOY TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR9, II

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A119AR9, II
PART NUMBER: ME477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT AS LONG AS SYSTEM 2 IS FUNCTIONAL.
SUBSEQUENT SIMILAR FAILURE IN SYSTEM 2 WOULD NOT PROVIDE POWER TO DRIVE THE TALKBACK INDICATOR DS4 ON SWITCH S5 ON PANEL A8A2 TO INDICATE 'DEPLOYED'.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-78
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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**ITEM:** HYBRID DRIVERS, AR9, 11
**FAILURE MODE:** FAILS CLOSED.

**LEAD ANALYST:** ROBINSON
**SUBSYS LEAD:** SCHMECKPEPER

**BREAKDOWN HIERARCHY:**
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
5) PORT RMS DEPLOY TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR9, 11
8) 
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**REDUNDANCY SCREENS:** A [ ] B [ ] C [ ]

**LOCATION:** 40V76A119AR9, 11
**PART NUMBER:** ME477-0261-0002

**CAUSES:** MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

**EFFECTS/RATIONALE:**
COULD GIVE ERRONEOUS SIGNAL TO TALKBACK INDICATOR.
'DEPLOYED' TALKBACK INDICATION NOT CRITICAL.

**REFERENCES:** VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

**REPORT DATE 02/25/87**
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4131

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: HYBRID DRIVERS, AR13, 15
FAILURE MODE: Fails open, one or both.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61B
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
5) PORT RMS DEPLOY TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR13, 15
8) 9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118AR13, 15
PART NUMBER: ME477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT AS LONG AS SYSTEM 1 IS FUNCTIONAL.
SUBSEQUENT SIMILAR FAILURE IN SYSTEM 2 WOULD NOT PROVIDE POWER TO DRIVE THE TALKBACK INDICATOR DS4 ON SWITCH S5 ON PANEL A8A2 TO INDICATE DEPLOYED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-80
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4132

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: /NA

ITEM: HYBRID DRIVERS, AR13, 15
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
5) PORT RMS DEPLOY TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR13, 15
8)
9)

CRITICALITIES

|-----------------|---------------|-----------|--------------|---------|--------------|---------|--------------|---------|---------------------|

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118AR13, 15
PART NUMBER: ME477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
COULD GIVE ERRONEOUS SIGNAL TO TALKBACK INDICATOR.
'DEPLOYED' TALKBACK INDICATION NOT CRITICAL.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-81
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4133

ITEM: HYBRID DRIVERS, AR8, 10
FAILURE MODE: FAILS OPEN, ONE OR BOTH.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61B
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
5) PORT RMS STOW TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR8, 10
8) 9)

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A119AR8, 10
PART NUMBER: ME477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT AS LONG AS SYSTEM 2 IS FUNCTIONAL.
SUBSEQUENT SIMILAR FAILURE IN SYSTEM 2 WOULD NOT PROVIDE POWER TO DRIVE THE TALKBACK INDICATOR DS4 ON SWITCH S5 ON PANEL A8A2 TO INDICATE STOWED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-82
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4134

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: HYBRID DRIVERS, AR8, 10
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
5) PORT RMS STOW TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR8, 10
8)  
9) 

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A119AR8, 10
PART NUMBER: ME477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
COULD GIVE ERRONEOUS SIGNAL TO TALKBACK INDICATOR.
THE CRT DISPLAY STOWED INDICATION WOULD DISAGREE WITH THE TALKBACK INDICATOR.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-83
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4135

ITEM: HYBRID DRIVERS, AR12, 14
FAILURE MODE: FAILS OPEN, ONE OR BOTH.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
5) PORT RMS STOW TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR12, 14
8)
9)

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REdundancy Screens: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A118AR12, 14
PART NUMBER: ME477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT AS LONG AS SYSTEM 1 IS FUNCTIONAL.
SUBSEQUENT SIMILAR FAILURE IN SYSTEM 2 WOULD NOT PROVIDE POWER TO DRIVE THE TALKBACK INDICATOR DS4 ON SWITCH S5 ON PANEL A8A2 TO INDICATE STOWED STATE.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4136
HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: HYBRID DRIVERS, AR12, 14
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PORT MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
5) PORT RMS STOW TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR12, 14
8)
9)

CRITICALITIES
FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC
PRELAUNCH: /NA RTLS: /NA
LIFTOFF: /NA TAL: /NA
ONORBIT: 3/3 AOA: /NA
DEORBIT: /NA ATO: /NA
LANDING/SAFING: /NA

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118AR12, 14
PART NUMBER: ME477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
COULD GIVE ERRONEOUS SIGNAL TO TALKBACK INDICATOR.
THE CRT DISPLAY STOWED INDICATION WOULD DISAGREE WITH THE TALKBACK INDICATOR.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-85
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4137

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: /NA

ITEM: HYBRID DRIVERS, AR14, 18
FAILURE MODE: FAILS OPEN, ONE OR BOTH.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61B
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
5) STBD RMS DEPLOY TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR14, 18
8)
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A117AR14, 18
PART NUMBER: ME477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT AS LONG AS SYSTEM 2 IS FUNCTIONAL.
SUBSEQUENT SIMILAR FAILURE IN SYSTEM 2 WOULD NOT PROVIDE POWER TO DRIVE THE TALKBACK INDICATOR DS4 ON SWITCH S5 ON PANEL A8A2 TO INDICATE DEPLOYED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4138

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 3/3
ABORT: /NA

ITEM: HYBRID DRIVERS, AR14, 18
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61B
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
5) STBD RMS DEPLOY TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR14, 18
8) 
9) 

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A117AR14, 18
PART NUMBER: ME477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
COULD GIVE ERRONEOUS SIGNAL TO TALKBACK INDICATOR.
'DEPLOYED' TALKBACK INDICATION NOT CRITICAL.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-87
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/04/86  HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/3
SUBSYSTEM: EPDM C  ABORT: /NA
MDAC ID: 4139

ITEM: HYBRID DRIVERS, AR6, 8
FAILURE MODE: FAILS OPEN, ONE OR BOTH.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
5) STBD RMS DEPLOY TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR6, 8
8) 
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120AR6, 8
PART NUMBER: ME477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT AS LONG AS SYSTEM 1 IS FUNCTIONAL.
SUBSEQUENT SIMILAR FAILURE IN SYSTEM 2 WOULD NOT PROVIDE POWER TO DRIVE THE TALKBACK INDICATOR DS4 ON SWITCH S5 ON PANEL A8A2 TO INDICATE DEPLOYED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-88
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4140

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 3/3
ABORT: /NA

ITEM: HYBRID DRIVERS, AR6, 8
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
5) STBD RMS DEPLOY TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR6, 8
8) 9)

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120AR6, 8
PART NUMBER: ME477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
COULD GIVE ERRONEOUS SIGNAL TO TALKBACK INDICATOR.
'DEPLOYED' TALKBACK INDICATION NOT CRITICAL.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-89
### Independent Orbiter Assessment

**Orbiter Subsystem Analysis Worksheet**

**DATE:** 12/04/86  
**SUBSYSTEM:** EPD&C  
**MDAC ID:** 4141

**Item:** HYBRID DRIVERS, AR12, 16  
**Failure Mode:** Fails open, one or both.

**Lead Analyst:** Robinson  
**Subsys Lead:** Schmeckpeper

**Breakdown Hierarchy:**
1) RMS, 05-61B  
2) MANIPULATOR DEPLOY CONTROL  
3) STBD MANIPULATOR DEPLOY SYSTEM 1  
4) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)  
5) STBD RMS STOW TALKBACK INDICATOR DS4  
6) HYBRID DRIVERS, TYPE 1, 2 EACH  
7) HYBRID DRIVERS, AR12, 16

**Criticalities**

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**Redundancy Screens:** A [ ]  B [ ]  C [ ]

**Location:** 40V76A117AR12, 16  
**Part Number:** ME477-0261-0002

**Causes:** MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

**Effects/Rationale:**

NO EFFECT AS LONG AS SYSTEM 2 IS FUNCTIONAL.  
SUBSEQUENT SIMILAR FAILURE IN SYSTEM 2 WOULD NOT PROVIDE POWER TO DRIVE THE TALKBACK INDICATOR DS4 ON SWITCH S5 ON PANEL A8A2 TO INDICATE STOWED.

**References:** VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

**Report Date:** 02/25/87  C-90
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/04/86

HIGHEST CRITICALITY

SUBSYSTEM: EPD&C

Flight: 3/3

MDAC ID: 4142

ABORT: /NA

ITEM: HYBRID DRIVERS, AR12, 16

FAILURE MODE: Fails closed.

LEAD ANALYST: ROBINSON

SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:

1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 1
4) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
5) STBD RMS STOW TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR12, 16

CRITICALITIES

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REdundancy Screens: A [ ] B [ ] C [ ]

LOCATION: 40V76A117AR12, 16

PART NUMBER: ME477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
COULD GIVE ERRONEOUS SIGNAL TO TALKBACK INDICATOR.
THE CRT DISPLAY STOWED INDICATION WOULD DISAGREE WITH THE TALKBACK INDICATOR.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-91
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/04/86
SUBSYSTEM: EPD&C
MDAC ID: 4143

ITEM: HYBRID DRIVERS, AR2, 4
FAILURE MODE: FAILS OPEN, ONE OR BOTH.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61B
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
5) STBD RMS STOW TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR2, 4
8) 
9) 

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120AR2, 4
PART NUMBER: ME477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT AS LONG AS SYSTEM 1 IS FUNCTIONAL.
SUBSEQUENT SIMILAR FAILURE IN SYSTEM 2 WOULD NOT PROVIDE POWER TO DRIVE THE TALKBACK INDICATOR DS4 ON SWITCH S5 ON PANEL A8A2 TO INDICATE STOWED.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-92
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/04/86
SUBSYSTEM: EP&D&C
MDAC ID: 4144

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: HYBRID DRIVERS, AR2, 4
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) STBD MANIPULATOR DEPLOY SYSTEM 2
4) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
5) STBD RMS STOW TALKBACK INDICATOR DS4
6) HYBRID DRIVERS, TYPE 1, 2 EACH
7) HYBRID DRIVERS, AR2, 4
8)
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120AR2, 4
PART NUMBER: ME477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
COULD GIVE ERRONEOUS SIGNAL TO TALKBACK INDICATOR.
THE CRT DISPLAY STOWED INDICATION WOULD DISAGREE WITH THE TALKBACK INDICATOR.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-93
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86           HIGHEST CRITICALITY
SUBSYSTEM: EPD&C            HDW/FUNC
MDAC ID: 4145               FLIGHT: 3/2R

ITEM: CIRCUIT BREAKER, CB2
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON       SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) PBM POWER, SYSTEM 1, MCA LOGIC
5) MCA POWER, AC 1, 3-PHASE, MID 1
6) CIRCUIT BREAKER, 3-PH, 3 AMP
7) CIRCUIT BREAKER, CB2

CRITICALITIES

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LOCATION: 85V73A129CB2
PART NUMBER: ME454-0032-3030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE AC1 3-PHASE POWER TO AC1 PBM BUS IN MMC1.
LOSS OF AC 3-PHASE POWER TO DRIVE SYSTEM 1 MID RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE MID RETENTION LATCH ACTUATOR MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-94
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EPD&C
MDAC ID: 4146

ITEM: CIRCUIT BREAKER, CB2
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) PBM POWER, SYSTEM 1, MCA LOGIC
5) MCA POWER, AC 1, 3-PHASE, MID 1
6) CIRCUIT BREAKER, 3-PH, 3 AMP
7) CIRCUIT BREAKER, CB2
8)
9)

CRITICALITIES

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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION: 85V73A129CB2
PART NUMBER: ME454-0032-3030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE: NO EFFECT. POWER CAN BE REMOVED BY SWITCH OR RELAY ACTION. NO EFFECT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EPD&C
MDAC ID: 4147

ITEM: CIRCUIT BREAKER, CB7
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) PBM POWER, SYSTEM 1, MCA LOGIC
5) MCA POWER, AC 2, 3-PHASE, MID 2
6) CIRCUIT BREAKER, 3-PH, 3 AMP
7) CIRCUIT BREAKER, CB7
8) 
9) 

CRITICALITIES

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LOCATION: 85V73A129CB7
PART NUMBER: ME454-0032-3030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE AC2 3-PHASE POWER TO AC2 PBM BUS IN MMC2.
LOSS OF AC 3-PHASE POWER TO DRIVE SYSTEM 1 FWD RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE FWD RETENTION LATCH ACTUATOR MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-96
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EP&D&C
MDAC ID: 4148

ITEM: CIRCUIT BREAKER, CB7
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) PBM POWER, SYSTEM 1, MCA LOGIC
5) MCA POWER, AC 2, 3-PHASE, MID 2
6) CIRCUIT BREAKER, 3-PH, 3 AMP
7) CIRCUIT BREAKER, CB7
8) 

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 85V73A129CB7
PART NUMBER: ME454-0032-3030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT. POWER CAN BE REMOVED BY SWITCH OR RELAY ACTION.
NO EFFECT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-97
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EPD&C
MDAC ID: 4149

ITEM: CIR_IT BR, CBI2
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) PBM POWER, SYSTEM 1, MCA LOGIC
5) MCA POWER, AC 3, 3-PHASE, MID 2
6) CIRCUIT BREAKER, 3-PH, 3 AMP
7) CIRCUIT BREAKER, CB12

CRITICALITIES

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LOCATION: 85V73A129CB12
PART NUMBER: ME454-0032-3030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE AC3 3-PHASE POWER TO AC3 PBM BUS IN MMC2.
LOSS OF AC 3-PHASE POWER TO DRIVE SYSTEM 1 AFT RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE AFT RETENTION LATCH ACTUATOR MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-98
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EPD&C
MDAC ID: 4150

ITEM: CIRCUIT BREAKER, CBI2
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) PBM POWER, SYSTEM 1, MCA LOGIC
5) MCA POWER, AC 3, 3-PHASE, MID 2
6) CIRCUIT BREAKER, 3-PH, 3 AMP
7) CIRCUIT BREAKER, CBI2
8) 
9) 

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 85V73A129CB12
PART NUMBER: ME454-0032-3030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT. POWER CAN BE REMOVED BY SWITCH OR RELAY ACTION.
NO EFFECT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-99
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4151  ABORT: /NA

ITEM: CIRCUIT BREAKER, CB3
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) PBM POWER, SYSTEM 2, MCA LOGIC
5) MCA POWER, AC 1, 3-PHASE, MID 3
6) CIRCUIT BREAKER, 3-PH, 3 AMP
7) CIRCUIT BREAKER, CB3
8) 
9) 

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LOCATION: 85V73A129CB3
PART NUMBER: ME454-0032-3030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE AC1 3-PHASE POWER TO AC1 PBM BUS IN MMC3.
LOSS OF AC 3-PHASE POWER TO DRIVE SYSTEM 2 AFT RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE AFT RETENTION LATCH ACTUATOR MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-100
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EPD&C
MDAC ID: 4152

ITEM: CIRCUIT BREAKER, CB3
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) PBM POWER, SYSTEM 2, MCA LOGIC
5) MCA POWER, AC 1, 3-PHASE, MID 3
6) CIRCUIT BREAKER, 3-PH, 3 AMP
7) CIRCUIT BREAKER, CB3
8)
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 85V73A129CB3
PART NUMBER: ME454-0032-3030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT. POWER CAN BE REMOVED BY SWITCH OR RELAY ACTION.
NO EFFECT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-101
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EPD&C
MDAC ID: 4153

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: CIRCUIT BREAKER, CB9
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61B
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) PBM POWER, SYSTEM 2, MCA LOGIC
5) MCA POWER, AC 2, 3-PHASE, MID 4
6) CIRCUIT BREAKER, 3-PH, 3 AMP
7) CIRCUIT BREAKER, CB9
8) 
9) 

CRITICALITIES

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LOCATION: 85V73A129CB9
PART NUMBER: ME454-0032-3030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE AC2 3-PHASE POWER TO AC2 PBM BUS IN MMC4. LOSS OF AC 3-PHASE POWER TO DRIVE SYSTEM 2 MID RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE FWD RETENTION LATCH ACTUATOR MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87   C-102
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EP&D&C
MDAC ID: 4154

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: CIRCUIT BREAKER, CB9
FAILURE MODE: Fails Closed.

LEAD ANALYST: ROBINSON     SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) PBM POWER, SYSTEM 2, MCA Logic
5) MCA POWER, AC 2, 3-PHASE, MID 4
6) CIRCUIT BREAKER, 3-PH, 3 AMP
7) CIRCUIT BREAKER, CB9
8) 
9) 

CRITICALITIES

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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION:  85V73A129CB9
PART NUMBER:  ME454-0032-3030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT. POWER CAN BE REMOVED BY SWITCH OR RELAY ACTION.
NO EFFECT.

REFERENCES:  VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87     C-103
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4155  ABORT: /NA

ITEM: CIRCUIT BREAKER, CBI3
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) PBM POWER, SYSTEM 2, MCA LOGIC
5) MCA POWER, AC 3, 3-PHASE, MID 4
6) CIRCUIT BREAKER, 3-PH, 3 AMP
7) CIRCUIT BREAKER, CBI3
8) 
9) 

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LOCATION: 85V73A129CB13
PART NUMBER: ME454-0032-3030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE AC3 3-PHASE POWER TO AC3 PBM BUS IN MMC4.
LOSS OF AC 3-PHASE POWER TO DRIVE SYSTEM 2 FWD RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE FWD RETENTION LATCH ACTUATOR MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-104
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EPD&C
MDAC ID: 4156

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: CIRCUIT BREAKER, CB13
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON        SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) PBM POWER, SYSTEM 2, MCA LOGIC
5) MCA POWER, AC 3, 3-PHASE, MID 4
6) CIRCUIT BREAKER, 3-PH, 3 AMP
7) CIRCUIT BREAKER, CB13

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 85V73A129CB13
PART NUMBER: ME454-0032-3030

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT. POWER CAN BE REMOVED BY SWITCH OR RELAY ACTION.
NO EFFECT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87       C-105
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4157  ABORT: /NA

ITEM: SWITCH, S2
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
  1) RMS, 05-6IB
  2) MANIPULATOR DEPLOY CONTROL
  3) PANEL MA73C
  4) MCA LOGIC, MN A POWER, MID 1, ON/OFF
  5) SWITCH, TOGGLE, MAINTAINED
  6) SWITCH, 1-POLE, 2-POSITION
  7) SWITCH, S2

CRITICALITIES

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LOCATION: 85V73A129S2
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO DRIVE RPC TO PROVIDE MN A 28VDC POWER TO MMC1.
LOSS OF MN A 28 VDC POWER TO MMC1 DISABLES OPERATION OF SYSTEM 1 MID RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT LOSS OF SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE MID RETENTION LATCH ACTUATOR MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-106
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C FLIGHT: 3/3
MDAC ID: 4158 ABORT: /NA

ITEM: SWITCH, S2
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN A POWER, MID 1, ON/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 1-POLE, 2-POSITION
7) SWITCH, S2
8)
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 85V73A129S2
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT.
NO EFFECT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-107
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EP&D&C
MDAC ID: 4159

ITEM: SWITCH, S3
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN A POWER, MID 3, ON/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 1-POLE, 2-POSITION
7) SWITCH, S3
8) ...
9) ...

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LOCATION: 85V73A12983
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO DRIVE RPC TO PROVIDE MN A 28VDC POWER TO MMC3.
LOSS OF MN A 28 VDC POWER TO MMC3 DISABLES OPERATION OF SYSTEM 2 AFT RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT LOSS OF SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE MID RETENTION LATCH ACTUATOR MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-108
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:          11/21/86
SUBSYSTEM:    EPD&C
MDAC ID:      4160

HIGHEST CRITICALITY
FLIGHT:       3/3
ABORT:        /NA

ITEM: SWITCH, S3
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON           SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
  1) RMS, 05-6IB
  2) MANIPULATOR DEPLOY CONTROL
  3) PANEL MA73C
  4) MCA LOGIC, MN A POWER, MID 3, ON/OFF
  5) SWITCH, TOGGLE, MAINTAINED
  6) SWITCH, 1-POLE, 2-POSITION
  7) SWITCH, S3

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REDUNDANCY SCREENS:   A [   ]   B [   ]   C [   ]

LOCATION:  85V73A129S3
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT.
NO EFFECT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87   C-109
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EPD&C
MDAC ID: 4161

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: SWITCH, S7
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN B POWER, MID 2, ON/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 1-POLE, 2-POSITION
7) SWITCH, S7
8) 
9) 

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LOCATION: 85V73A12957
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO DRIVE RPC TO PROVIDE MN B 28VDC POWER TO MMC2.
LOSS OF MN B 28 VDC POWER TO MMC2 DISABLES OPERATION OF SYSTEM 1 FWD RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT LOSS OF SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE MID RETENTION LATCH ACTUATOR MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-110
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EPD&C
MDAC ID: 4162

ITEM: SWITCH, S7
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN B POWER, MID 2, ON/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 1-POLE, 2-POSITION
7) SWITCH, S7
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 85V73A129S7
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT. NO EFFECT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-111
**INDEPENDENT ORBITER ASSESSMENT**
**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

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**ITEM:** SWITCH, S9
**FAILURE MODE:** OPEN, FAILS TO CLOSE.

**LEAD ANALYST:** ROBINSON  **SUBSYS LEAD:** SCHMECKPEPER

**BREAKDOWN HIERARCHY:**
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN B POWER, MID 4, ON/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 1-POLE, 2-POSITION
7) SWITCH, S9
8) 
9) 

**CRITICALITIES**

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**REDUNDANCY SCREENS:** A [ ]  B [NA ]  C [NA ]

**LOCATION:** 85V73A1299S9  **PART NUMBER:** ME452-0102-7401

**CAUSES:** MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

**EFFECTS/RATIONALE:**
INABILITY TO DRIVE RPC TO PROVIDE MN B 28VDC POWER TO MMC4. LOSS OF MN B 28 VDC POWER TO MMC4 DISABLES OPERATION OF SYSTEM 2 MID RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT LOSS OF SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE MID RETENTION LATCH ACTUATOR MECHANISM. LOSS OF MISSION COULD RESULT.

**REFERENCES:** VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86

SUBSYSTEM: EPD&C

MDAC ID: 4164

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: SWITCH, $9

FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN B POWER, MID 4, ON/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 1-POLE, 2-POSITION
7) SWITCH, $9
8)
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 85V73A129S9
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT.
NO EFFECT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-113
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4165  ABORT: /NA

ITEM: SWITCH, S12
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN C POWER, MID 2, ON/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 1-POLE, 2-POSITION
7) SWITCH, S12
8) ....................................................
9) ....................................................

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LOCATION: 85V73A129S12
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO DRIVE RPC TO PROVIDE MN C 28VDC POWER TO MMC2. LOSS OF MN C 28 VDC POWER TO MMC2 DISABLES OPERATION OF SYSTEM 1 AFT RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT LOSS OF SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE MID RETENTION LATCH ACTUATOR MECHANISM. LOSS OF MISSION COULD RESULT

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-114
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EPD&C
MDAC ID: 4166

HIGHEST CRITICALITY

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ITEM: SWITCH, S12
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN C POWER, MID 2, ON/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 1-POLE, 2-POSITION
7) SWITCH, S12
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 85V73A129S12
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT.
NO EFFECT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-115
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4167  ABORT: /NA

ITEM: SWITCH, S13
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON   SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN C POWER, MID 4, ON/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 1-POLE, 2-POSITION
7) SWITCH, S13
8)  
9) 

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LOCATION: 85V73A129S13
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO DRIVE RPC TO PROVIDE MN C 28VDC POWER TO MMC4.
LOSS OF MN C 28 VDC POWER TO MMC4 DISABLES OPERATION OF SYSTEM 2 FWD RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT LOSS OF SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE MID RETENTION LATCH ACTUATOR MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-116
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EPD&C
MDAC ID: 4168

ITEM: SWITCH, S13
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN C POWER, MID 4, ON/OFF
5) SWITCH, TOGGLE, MAINTAINED
6) SWITCH, 1-POLE, 2-POSITION
7) SWITCH, S13
8)
9)

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 85V73A129813
PART NUMBER: ME452-0102-7401

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
NO EFFECT.
NO EFFECT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-117
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/21/86
SUBSYSTEM: EPD&C
MDAC ID: 4169

ITEM: RESISTOR, R2
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN A POWER, MID 1, ON/OFF, S2
5) RESISTOR, CURRENT LIMITING
6) RESISTOR, 1.2K OHM 2 WATT
7) RESISTOR, R2
8)...
9)

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LOCATION: 85V73A129R2
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
SWITCH S2 WILL NOT FUNCTION TO DRIVE RPC TO PROVIDE MN A 28VDC POWER TO MMC1.
LOSS OF MN A 28 VDC POWER TO MMC1 DISABLES OPERATION OF SYSTEM 1 MID RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT FAILURE IN SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE MID RETENTION LATCH MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-118
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4170  ABORT: /NA

ITEM: RESISTOR, R3
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN A POWER, MID 3, ON/OFF, S3
5) RESISTOR, CURRENT LIMITING
6) RESISTOR, 1.2K OHM 2 WATT
7) RESISTOR, R3
8)
9)

CRITICALITIES

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LOCATION: 85V73A129R3
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
SWITCH S3 WILL NOT FUNCTION TO DRIVE RPC TO PROVIDE MN A 28VDC POWER TO MMC1.
LOSS OF MN A 28 VDC POWER TO MMC3 DISABLES OPERATION OF SYSTEM 2 MID RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT FAILURE IN SYSTEM 1 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE MID RETENTION LATCH MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-119
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4171

ITEM: RESISTOR, R7
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN B POWER, MID 2, ON/OFF, S7
5) RESISTOR, CURRENT LIMITING
6) RESISTOR, 1.2K OHM 2 WATT
7) RESISTOR, R7
8) ...
9) ...

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LOCATION: 85V73A129R7
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
SWITCH S7 WILL NOT FUNCTION TO DRIVE RPC TO PROVIDE MN A 28VDC POWER TO MMC1.
LOSS OF MN A 28 VDC POWER TO MMC2 DISABLES OPERATION OF SYSTEM 1 MID RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT FAILURE IN SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE MID RETENTION LATCH MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-120
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4172  ABORT: /NA

ITEM: RESISTOR, R9  FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN B POWER, MID 4, ON/OFF, S9
5) RESISTOR, CURRENT LIMITING
6) RESISTOR, 1.2K OHM 2 WATT
7) RESISTOR, R9
8) 
9)

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LOCATION: 85V73A129R9
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
SWITCH S9 WILL NOT FUNCTION TO DRIVE RPC TO PROVIDE MN A 28VDC POWER TO MMC1.
LOSS OF MN A 28 VDC POWER TO MMC4 DISABLES OPERATION OF SYSTEM 2 MID RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT FAILURE IN SYSTEM 1 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE MID RETENTION LATCH MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86

SUBSYSTEM: EPD&C

MDAC ID: 4173

ITEM: RESISTOR, R12

FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN C POWER, MID 2, ON/OFF, S12
5) RESISTOR, CURRENT LIMITING
6) RESISTOR, 1.2K OHM 2 WATT
7) RESISTOR, R12
8)
9)

CRITICALITIES

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LOCATION: 85V73A129R12
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
SWITCH S12 WILL NOT FUNCTION TO DRIVE RPC TO PROVIDE MN A 28VDC POWER TO MMC1.
LOSS OF MN A 28 VDC POWER TO MMC2 DISABLES OPERATION OF SYSTEM 1 MID RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT FAILURE IN SYSTEM 2 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE MID RETENTION LATCH MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-122
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4174

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: RESISTOR, R13
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IB
2) MANIPULATOR DEPLOY CONTROL
3) PANEL MA73C
4) MCA LOGIC, MN C POWER, MID 4, ON/OFF, S13
5) RESISTOR, CURRENT LIMITING
6) RESISTOR, 1.2K OHM 2 WATT
7) RESISTOR, R13
8)
9)

CRITICALITIES

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LOCATION: 85V73A129R13
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
SWITCH S13 WILL NOT FUNCTION TO DRIVE RPC TO PROVIDE MN A 28VDC POWER TO MMC1.
LOSS OF MN A 28 VDC POWER TO MMC4 DISABLES OPERATION OF SYSTEM 2 MID RETENTION LATCH ACTUATOR MOTOR. SUBSEQUENT FAILURE IN SYSTEM 1 WOULD CAUSE LOSS OF ABILITY TO OPERATE THE MID RETENTION LATCH MECHANISM. LOSS OF MISSION COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-123
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4201

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K20
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD ACTUATOR SYS 1, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K20

CRITICALITIES

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LOCATION: 40V76A118X20
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-2 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR TO DRIVE THE PORT MANIPULATOR FWD RETENTION LATCH ACTUATOR TO THE LATCH POSITION.
ANY SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO LATCH THE PORT FWD LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-124
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4202

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K20
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:

1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD ACTUATOR SYS 1, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K20
9) CRITICALITIES

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LOCATION: 40V76A118K20
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY APPLICATION OF PLBM AC-2 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR COULD DRIVE THE PORT MANIPULATOR FWD RETENTION LATCH ACTUATOR TO THE LATCH POSITION AS AN UNSCHEDULED EVENT. UNTIMELY ACTUATOR LATCHING COULD CAUSE PHYSICAL DAMAGE TO RMS/ORBITER/PAYLOADS. IF FAILURE OCCURRED WHILE POWER APPLIED TO THE RELEASE DRIVE MOTOR, MOTOR FAILURE COULD RESULT. SUBSEQUENT FAILURE OF THE REDUNDANT SYSTEM RESULTS IN INABILITY TO LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-125
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4203

ITEM: HYBRID RELAY, K52
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON               SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYS 1, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K52
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CRITICALITIES

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LOCATION: 40V76A120K52
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-3 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR TO DRIVE THE STBD MANIPULATOR FWD RETENTION LATCH ACTUATOR TO THE LATCH POSITION.
ANY SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO LATCH THE STARBOARD FWD LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-126
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4204
HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K52
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYS 1, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K52
9) HYBRID RELAY, K52

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LOCATION: 40V76A120K52
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY APPLICATION OF PLBM AC-3 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR COULD DRIVE THE STBD MANIPULATOR FWD RETENTION LATCH ACTUATOR TO THE LATCH POSITION AS AN UNSCHEDULED EVENT. UNTIMELY ACTUATOR LATCHING COULD CAUSE PHYSICAL DAMAGE TO THE RMS/ORBITER/PAYLOADS. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD RESULT. SUBSEQUENT FAILURE IN THE REDUNDANT SYSTEM RESULTS IN INABILITY TO LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-127
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4205

ITEM: HYBRID RELAY, K8
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD ACTUATOR SYS 1, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K8
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LOCATION: 40V76A118K8
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-2 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR TO DRIVE THE PORT MANIPULATOR FWD RETENTION LATCH ACTUATOR TO THE RELEASE POSITION.
ANY SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO RELEASE THE PORT FWD LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87   C-128
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4206

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K8
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:

1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD ACTUATOR SYS 1, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K8

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LOCATION: 40V76A118K8
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY APPLICATION OF PLBM AC-2 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR COULD DRIVE THE PORT MANIPULATOR FWD RETENTION LATCH ACTUATOR TO THE RELEASE POSITION AS AN UNSCHEDULED EVENT.
UNTIMELY ACTUATOR RELEASE COULD CAUSE PHYSICAL DAMAGE TO THE RMS/ORBITER/PAYLOADS. IF THE FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO LATCH, MOTOR FAILURE COULD OCCUR. SUBSEQUENT FAILURE IN REDUNDANT SYSTEM WOULD RESULT IN INABILITY TO RELEASE.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-129
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4207

ITEM: HYBRID RELAY, K64
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STRD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYS 1, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K64
9) FWD ACTUATOR SYS 2, RELEASE RELAY

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LOCATION: 40V76A120K64
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PBLM AC-3 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR TO DRIVE THE STBD MANIPULATOR FWD RETENTION LATCH ACTUATOR TO THE RELEASE POSITION.
ANY SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO RELEASE THE STARBOARD FWD LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-130
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EP&D&C
MDAC ID: 4208

ITEM: HYBRID RELAY, K64
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: Robinson
SUBSYS LEAD: Schmeckpeper

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STRD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYS 1, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K64

CRITICALITIES

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LOCATION: 40V76A120K64
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY APPLICATION OF P/LBM AC-3 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR COULD DRIVE THE STBD MANIPULATOR FWD RETENTION LATCH ACTUATOR TO THE RELEASE POSITION AS AN UNSCHEDULED EVENT. UNTIMELY ACTUATOR RELEASE COULD CAUSE PHYSICAL DAMAGE TO THE RMS/ORBITER/PAYLOADS. IF THE FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO LATCH, MOTOR FAILURE COULD OCCUR. SUBSEQUENT FAILURE IN REDUNDANT SYSTEM WOULD RESULT IN INABILITY TO RELEASE.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-131
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4209

ITEM: RELAY, K44
FAILURE MODE: FAILS CLOSED IN RESET OR DEADFACE POSITION.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD ACTUATOR SYS 1, GND-RESET/DFACE RELAY
7) RELAY, LATCHING, 2-POLE
8) RELAY, K44
9)

CRITICALITIES

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LOCATION: 40V76A118K44
PART NUMBER: MC455-0128-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:

WILL NOT ALLOW RESET OR DEADFACE OF THE PORT FWD MOTOR CONTROL CIRCUIT AS REQUIRED.
IF FAILED IN THE DEADFACE POSITION, NEITHER THE LATCH OR RELEASE FUNCTION OF PORT SYSTEM 1 FWD ACTUATOR COULD BE OPERATED.
LOSS OF ABILITY TO DEADFACE IF FAILED IN RESET POSITION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87 C-132
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4210

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: RELAY, K76
FAILURE MODE: FAILS CLOSED IN RESET OR DEADFACE POSITION.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYS 1, GND-RESET/DFACE RELAY
7) RELAY, LATCHING, 2-POLE
8) RELAY, K76

CRITICALITIES

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LOCATION: 40V76A120K76
PART NUMBER: MC455-0128-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT ALLOW RESET OR DEADFACE OF THE STBD FWD MOTOR CONTROL CIRCUIT AS REQUIRED.
IF FAILED IN THE DEADFACE POSITION, NEITHER THE LATCH OR RELEASE FUNCTION OF STBD SYSTEM 1 FWD ACTUATOR COULD BE OPERATED.
LOSS OF ABILITY TO DEADFACE IF FAILED IN RESET POSITION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87 C-133
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4211
HIGHEST CRITICALITY: HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: FUSE, F4
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD READY-TO-LATCH SW ASSY 1 (V54X0840E)
7) FUSE, 2 AMP, (K44-B3)
8) FUSE, F4
9) FUSE, 2 AMP, (K44-B3)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118F4
PART NUMBER: MC451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION,
CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PORT FWD SYSTEM 1 'FWD READY TO LATCH' SIGNAL
(V54X0837E) TO EVENT INDICATOR DS10 ON PANEL A8A2 OR (V54X0840E)
TO MDM OA2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-134
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86  HIGHEST CRITICALITY  HDW/FUNC
11/22/86  3/3
SUBSYSTEM: EPD&C  FLIGHT: 3/3
MDAC ID: 4212  ABORT: /NA

ITEM: FUSE, F6
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD READY-TO-LATCH SW ASSY 1 (V54X1040E)
7) FUSE, 2 AMP, (K76-B3)
8) FUSE, F6

CRITICALITIES

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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION: 40V76A120F6
PART NUMBER: MC451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:

WILL NOT PROVIDE STBD FWD SYSTEM 1 'FWD READY TO LATCH' SIGNAL (V54X1037E) TO EVENT INDICATOR DS9 ON PANEL A8A2 OR (V54X1040E) TO MDM OA2.

LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-135
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4213

HIGHEST CRITICALITY
HDW/FUNC

FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD READY-TO-LATCH SW ASSY 1 (V54X0840E)
7) RESISTOR, ISOL, 2.2K OHM
8) RESISTOR, R27

CRITICALITIES

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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION: 40V76A118R27
PART NUMBER: RLR2002201GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PORT FWD SYSTEM 1 'FWD READY TO LATCH' SIGNAL (V54X0840E) TO MDM QA2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-136
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4214

ITEM: RESISTOR, R67
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD READY-TO-LATCH SW ASSY 1 (V54X1040E)
7) RESISTOR, ISOL, 2.2K OHM
8) RESISTOR, R67
9) 

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A120R67
PART NUMBER: RLR2002201GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE STBD FWD SYSTEM 1 'FWD READY TO LATCH' SIGNAL (V54X1040E) TO MDM OA2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-137
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4215

ITEM: RESISTOR, R28
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD READY-TO-LATCH SW ASSY 1 (V54X0840E)
7) RESISTOR, BLEED, 1.8K OHM
8) RESISTOR, R28

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118R28
PART NUMBER: RLR0701801GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PORT FWD SYSTEM 1 'FWD READY TO LATCH' SIGNAL (V54X0840E) TO MDM OA2 (V54X0840E).
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-138
**INDEPENDENT ORBITER ASSESSMENT**
**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

**DATE:** 11/22/86  
**SUBSYSTEM:** EPD&C  
**MDAC ID:** 4216

**ITEM:** RESISTOR, R63  
**FAIL MODE:** FAILS OPEN.

**LEAD ANALYST:** ROBINSON  
**SUBSYS LEAD:** SCHMECKPEPER

**BREAKDOWN HIERARCHY:**
1) RMS, 05-6IC  
2) MANIPULATOR LATCH CONTROL  
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1  
4) FWD LATCH ACTUATOR (40V54A15)  
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)  
6) FWD READY-TO-LATCH SW ASSY 1 (V54X1040E)  
7) RESISTOR, BLEED, 1.8K OHM  
8) RESISTOR, R63  
9) 

**CRITICALITIES**

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**REDUNDANCY SCREENS:** A [ ]  
B [ ]  
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**LOCATION:** 40V76A120R63  
**PART NUMBER:** RLR0701801GR

**CAUSES:** MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

**EFFECTS/RATIONALE:**  
WILL NOT PROVIDE STBD FWD SYSTEM 1 'FWD READY TO LATCH' SIGNAL (V54X1040E) TO MDM OA2.  
LOSS OF MEASUREMENT.

**REFERENCES:** VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

**REPORT DATE 02/25/87**  
C-139
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86

SUBSYSTEM: EPD&C
MDAC ID: 4217

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, R2
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD ACTUATOR SYS 1, LATCH/RELEASE (K44-A3)
7) RESISTOR, ISOL, 1.2K OHM, 2 WATT
8) RESISTOR, R2
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118R2
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PORT FWD SYSTEM 1 LATCH/RELEASE ENABLE SIGNAL TO APPROPRIATE ACTUATOR MOTOR RELAY K20/K8.
LOSS OF ABILITY TO OPERATE PORT SYSTEM 1 FWD RETENTION LATCH ACTUATOR TO EITHER LATCH OR RELEASE. SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 COULD RESULT IN LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-140
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
HIGHEST CRITICALITY
SUBSYSTEM: EPD&C
ABORT: 3/3
MDAC ID: 4218
HDW/FUNC

ITEM: RESISTOR, R14
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYS 1, LATCH/RELEASE (K76-A3)
7) RESISTOR, ISOL, 1.2K OHM, 2 WATT
8) RESISTOR, R14
9) CRITICALITIES

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120R14
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE STBD FWD SYSTEM 1 LATCH/RELEASE ENABLE SIGNAL TO APPROPRIATE ACTUATOR MOTOR RELAY K52/K64.
LOSS OF ABILITY TO OPERATE STBD SYSTEM 1 FWD RETENTION LATCH ACTUATOR TO EITHER LATCH OR RELEASE. SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 COULD RESULT IN LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-141
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86
SUBSYSTEM: EPD&C
MDAC ID: 4219

ITEM: RESISTOR, R25
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD ACTUATOR SYS 1, K20 LATCHED, (V54X0860E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R25

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118R25
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PORT FWD SYSTEM 1 LATCH ENABLE MONITORING MEASUREMENT (V54X0860E) TO MDM OA2 OR (V54X0859E) TO EVENT INDICATOR ON PANEL A8A2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-142
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86  HIGHEST CRITICALITY
SUBSYSTEM: EPD&C  FLIGHT: 3/3
MDAC ID: 4220  ABORT: /NA

ITEM: RESISTOR, R32
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYS 1, K52 LATCHED, (V54X1060E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R32
9)  

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A120R32
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE STBD FWD SYSTEM 1 LATCH ENABLE MONITORING MEASUREMENT (V54X1060E) TO MDM OA2 OR (V54X1059E) TO EVENT INDICATOR ON PANEL A8A2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-143
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/3
MDAC ID: 4221  ABORT: /NA

ITEM: RESISTOR, R26
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD ACTUATOR SYS 1, K8 RELEASED, (V54X0870E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R26
9) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A118R26
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PORT FWD SYSTEM 1 RELEASE ENABLE MONITORING MEASUREMENT (V54X0870E) TO MDM OA2 OR (V54X0869E) TO EVENT INDICATOR ON PANEL A8A2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-144
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/22/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/3
MDAC ID: 4222  ABORT: /NA

ITEM: RESISTOR, R33  FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYS 1, K64 RELEASED, (V54X1070E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R33
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A120R33
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:

WILL NOT PROVIDE STBD FWD SYSTEM 1 RELEASE ENABLE MONITORING MEASUREMENT (V54X1070E) TO MDM OA2 OR (V54X1069E) TO EVENT INDICATOR ON PANEL A8A2. LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-145
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/24/86
SUBSYSTEM: EPD&C
MDAC ID: 4223

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: HYBRID DRIVER, AR4
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD ACT SYS 1, LATCH EVENT, A8A2S6DS5, (V5X40859E)
7) HYBRID DRIVER, TYPE 1
8) HYBRID DRIVER, AR4

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118AR4
PART NUMBER: MC477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PORT FWD SYSTEM 1 LATCH ENABLE SIGNAL (V5X40859E) TO EVENT INDICATOR DS5 ON PANEL A8A2 SWITCH S6, LOSS OF EVENT INDICATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-146
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/24/86
SUBSYSTEM: EPD&C
MDAC ID: 4224

HIGHEST CRITICALITY: 3/3
FLIGHT: /NA
ABORT: /NA

ITEM: HYBRID DRIVER, AR4
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD ACT SYS 1, LATCH EVENT, A8A2S6DS5, (V5X40859E)
7) HYBRID DRIVER, TYPE 1
8) HYBRID DRIVER, AR4
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CRITICALITIES

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REdundancy Screens: A [ ] B [ ] C [ ]

LOCATION: 40V76A118AR4
PART NUMBER: MC477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE ERRONEOUS PORT FWD SYSTEM 1 LATCH ENABLE SIGNAL (V54X0859E) TO EVENT INDICATOR DS5 ON PANEL A8A2 SWITCH S6. LOSS OF EVENT INDICATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-147
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/24/86
SUBSYSTEM: EPD&C
MDAC ID: 4225

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: HYBRID DRIVER, AR10
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACT SYS 1, LATCH EVENT, A8A2S3DS10, (V54X1059E)
7) HYBRID DRIVER, TYPE 1
8) HYBRID DRIVER, AR10
9) CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120AR10
PART NUMBER: MC477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE STBD FWD SYSTEM 1 LATCH ENABLE SIGNAL (V54X1059E) TO EVENT INDICATOR DS5 ON PANEL A8A2 SWITCH S3. LOSS OF EVENT INDICATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-148
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/24/86
SUBSYSTEM: EPD&C
MDAC ID: 4226

ITEM: HYBRID DRIVER, AR10
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACT SYS 1, LATCH EVENT, A8A2S3DS10, (V54X1059E)
7) HYBRID DRIVER, TYPE 1
8) HYBRID DRIVER, AR10
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120AR10
PART NUMBER: MC477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION,
CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE ERRONEOUS STBD FWD SYSTEM 1 LATCH ENABLE SIGNAL (V54X1059E) TO EVENT INDICATOR DS5 ON PANEL A8A2 SWITCH S3.
LOSS OF EVENT INDICATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-149
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/24/86
SUBSYSTEM: EPD&C
MDAC ID: 4227

ITEM: HYBRID DRIVER, AR5
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD ACT SYS 1, RELEASE EVENT, A8A2S6DS5, (V54X0859E)
7) HYBRID DRIVER, TYPE 1
8) HYBRID DRIVER, AR5

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A118AR5
PART NUMBER: MC477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PORT FWD SYSTEM 1 RELEASE ENABLE SIGNAL (V54X0859E) TO EVENT INDICATOR DS5 ON PANEL A8A2 SWITCH S6. LOSS OF EVENT INDICATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-150
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/24/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/3
MDAC ID: 4228  ABORT: /NA

ITEM: HYBRID DRIVER, AR5
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) FWD ACT SYS 1, RELEASE EVENT, A8A2S6DS5, (V54X0859E)
7) HYBRID DRIVER, TYPE 1
8) HYBRID DRIVER, AR5
9) (V54X0859E)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A118AR5
PART NUMBER: MC477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE ERRONEOUS PORT FWD SYSTEM 1 RELEASE ENABLE SIGNAL (V54X0869E) TO EVENT INDICATOR DS5 ON PANEL A8A2 SWITCH S6.
LOSS OF EVENT INDICATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-151
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/24/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C                FLIGHT: 3/3
MDAC ID: 4229                   ABORT: /NA

ITEM: HYBRID DRIVER, AR13
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON          SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACT SYS 1, RELEASE EVENT, A8A2S3DS10, (V54X1059E)
7) HYBRID DRIVER, TYPE 1
8) HYBRID DRIVER, AR13
9) 

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120AR13
PART NUMBER: MC477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE STBD FWD SYSTEM 1 RELEASE ENABLE SIGNAL (V54X1069E) TO EVENT INDICATOR DS5 ON PANEL A8A2 SWITCH S3. LOSS OF EVENT INDICATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-152
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/24/86
SUBSYSTEM: EPD&C
MDAC ID: 4230

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: /NA

ITEM: HYBRID DRIVER, AR13
FAILURE MODE: FAILS CLOSED.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACT SYS 1, RELEASE EVENT, A8A2S3DS10, (V54X1059E)
7) HYBRID DRIVER, TYPE 1
8) HYBRID DRIVER, AR13
9) (V54XI059E)

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120AR13
PART NUMBER: MC477-0261-0002

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE ERRONEOUS STBD FWD SYSTEM 1 RELEASE ENABLE SIGNAL (V54X1069E) TO EVENT INDICATOR DS5 ON PANEL A8A2 SWITCH S3.
LOSS OF EVENT INDICATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-153
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/24/86
SUBSYSTEM: EPD&C
MDAC ID: 4231

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: FUSE, AR4F1
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) HYBRID DRIVE, AR4, FUSE
7) FUSE, 2 AMP
8) FUSE, AR4F1

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118AR4F1
PART NUMBER: MC451-0018-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PORT FWD SYSTEM 1 LATCH ENABLE SIGNAL (V54X0859E) TO EVENT INDICATOR DS5 ON PANEL A8A2 SWITCH S6. LOSS OF EVENT INDICATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-154
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/24/86
SUBSYSTEM: EPD&C
MDAC ID: 4232

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: FUSE, AR10F1
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) HYBRID DRIVER, AR10, FUSE
7) FUSE, 2 AMP
8) FUSE, AR10F1
9)

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120AR10F1
PART NUMBER: MC451-0018-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE STBD FWD SYSTEM 1 LATCH ENABLE SIGNAL (V54X1059E) TO EVENT INDICATOR DS9 ON PANEL A8A2 SWITCH S3.
LOSS OF EVENT INDICATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-155
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/24/86
SUBSYSTEM: EPD&C
MDAC ID: 4233

HIGHEST CRITICALITY:

FLIGHT: 3/3
ABORT: /NA

ITEM: FUSE, AR5F1
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) HYBRID DRIVER, AR5, FUSE
7) FUSE, 2 AMP
8) FUSE, AR5F1
9) CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118AR5F1
PART NUMBER: MC451-0018-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PORT FWD SYSTEM 1 RELEASE ENABLE SIGNAL (V54X0869E) TO EVENT INDICATOR DS5 ON PANEL A8A2 SWITCH S6. LOSS OF EVENT INDICATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-156
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/24/86
SUBSYSTEM: EPD&C
MDAC ID: 4234

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: /NA

ITEM: FUSE, AR13F1
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) HYBRID DRIVER, AR13, FUSE
7) FUSE, 2 AMP
8) FUSE, AR13F1
9) FUSE, AR13F1

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A120AR13F1
PART NUMBER: MC451-0018-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE STBD FWD SYSTEM 1 RELEASE ENABLE SIGNAL (V54X1069E) TO EVENT INDICATOR DS5 ON PANEL A8A2 SWITCH S3. LOSS OF EVENT INDICATION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-157
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4235

ITEM: HYBRID RELAY, K55
FAILURE MODE: OPEN, FAILS TO CLOSE.
LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) MID ACTUATOR SYS 1, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K55

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LOCATION: 40V76A117K55
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-1 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR TO DRIVE THE PORT MANIPULATOR MID RETENTION LATCH ACTUATOR TO THE LATCH POSITION.
ANY SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO LATCH THE PORT MID LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-158
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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**ITEM:** HYBRID RELAY, K55
**FAIL MODE:** FAILS CLOSED, APPLIES UNTIMELY POWER.

**LEAD ANALYST:** ROBINSON
**SUBSYS LEAD:** SCHMECKPEPER

**BREAKDOWN HIERARCHY:**
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) MID ACTUATOR SYS 1, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K55
9) HYBRID RELAY, K55

**CRITICALITIES**

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**REDUNDANCY SCREENS:**
A [ ]
B [NA ]
C [NA ]

**LOCATION:** 40V76A117K55
**PART NUMBER:** MC455-0135-0001

**CAUSES:** MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

**EFFECTS/RATIONALE:**
UNTIELY APPLICATION OF PLBM AC-1 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR COULD DRIVE THE PORT MANIPULATOR MID RETENTION LATCH ACTUATOR TO THE LATCH POSITION AS AN UNSCHEDULED EVENT. UNTIELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF THE FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD RESULT. ANY SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO LATCH THE PORT MID LATCH.

**REFERENCES:** VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

**REPORT DATE** 02/25/87  C-159
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4237

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K69
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYS 1, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K69

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LOCATION: 40V76A120K69
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-2 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR TO DRIVE THE STARBOARD MANIPULATOR MID RETENTION LATCH ACTUATOR TO THE LATCH POSITION.
ANY SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO LATCH THE STBD MID LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-160
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4238  ABORT: /NA

ITEM: HYBRID RELAY, K69
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYS 1, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K69
9) CRITICALITIES

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LOCATION: 40V76A120K69
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY APPLICATION OF PLBM AC-2 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR COULD DRIVE THE STARBOARD MANIPULATOR MID RETENTION LATCH ACTUATOR TO THE LATCH POSITION AS AN UNSCHEDULED EVENT.
UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF THE FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD RESULT. ANY SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO LATCH THE STBD MID LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-161
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4239  ABORT: /NA

ITEM: HYBRID RELAY, K43
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V514A6)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) MID ACTUATOR SYS 1, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K43
9)

CRITICALITIES

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LOCATION: 40V76A117K43
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-1 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR TO DRIVE THE PORT MANIPULATOR MID RETENTION LATCH ACTUATOR TO THE RELEASE POSITION.
ANY SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO RELEASE THE PORT MID LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-162
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4240

HIGHEST CRITICALITY
HDW/FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K43
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) MID ACTUATOR SYS 1, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K43
9)

CRITICALITIES

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LOCATION: 40V76A117K43
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY APPLICATION OF PLBM AC-1 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR COULD DRIVE THE PORT MANIPULATOR MID RETENTION LATCH ACTUATOR TO THE RELEASE POSITION AS AN UNSCHEDULED EVENT. UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF THE FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO LATCH, MOTOR FAILURE COULD RESULT. ANY SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO RELEASE THE PORT MID LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-163
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86       HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C      FLIGHT: 3/2R
MDAC ID: 4241        ABORT: /NA

ITEM: HYBRID RELAY, K57
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON       SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYS 1, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K57
9) CRITICALITIES

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LOCATION: 40V76A120K57
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-2 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR TO DRIVE THE STARBOARD MID MANIPULATOR RETENTION LATCH ACTUATOR TO THE RELEASE POSITION.
ANY SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO RELEASE THE STBD MID LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87       C-164
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4242

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K57
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61C
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYS 1, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K57
9) CRITICALITIES

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LOCATION: 40V76A120K57
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
- UNTIMELY APPLICATION OF PLBM AC-2 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR COULD DRIVE THE STARBOARD MID MANIPULATOR RETENTION LATCH ACTUATOR TO THE RELEASE POSITION AS AN UNSCHEDULED EVENT.
- UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF THE FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO LATCH, MOTOR FAILURE COULD RESULT. ANY SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO RELEASE THE STBD MID LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-165
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4243  ABORT: /NA

ITEM: RELAY, K57
FAILURE MODE: FAILS CLOSED IN RESET OR DEADFACE POSITION.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) MID ACTUATOR SYS 1, GND-RESET/DFACE RELAY
7) RELAY, LATCHING, 2-POLE
8) RELAY, K57
9) RELAY, LATCHING, 2-POLE

CRITICALITIES

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LOCATION: 40V76A117K57
PART NUMBER: MC455-0128-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT ALLOW RESET OR DEADFACE OF THE MID MOTOR CONTROL CIRCUIT AS REQUIRED.
IF FAILED IN THE DEADFACE POSITION NEITHER THE LATCH OR RELEASE FUNCTION OF THE PORT SYSTEM 1 MID RETENTION LATCH ACTUATOR COULD BE OPERATED. LOSS OF ABILITY TO DEADFACE IF FAILED IN THE RESET POSITION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-166
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4244

HIGHEST CRITICALITY
FLIGHT: 3/2R
ABORT: /NA

ITEM: RELAY, K80
FAILURE MODE: FAILS CLOSED IN RESET OR DEADFACE POSITION.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYS 1, GND-RESET/DFACE RELAY
7) RELAY, LATCHING, 2-POLE
8) RELAY, K88
9)

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LOCATION: 40V76A120K80
PART NUMBER: MC455-0128-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT ALLOW RESET OR DEADFACE OF THE MID MOTOR CONTROL CIRCUIT AS REQUIRED.
IF FAILED IN THE DEADFACE POSITION NEITHER THE LATCH OR RELEASE FUNCTION OF THE STBD SYSTEM 1 MID RETENTION LATCH ACTUATOR COULD BE OPERATED. LOSS OF ABILITY TO DEADFACE IF FAILED IN THE RESET POSITION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-167
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4245

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BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) MID READY-TO-LATCH SW ASSY 2 (V54X0842E)
7) FUSE, 2 AMP, (K57-B3)
8) FUSE, F2

CRITICALITIES

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REDUNDANCY SCREENS: A[ ] B[ ] C[ ]

LOCATION: 40V76A117F2
PART NUMBER: MC451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 1 'MID READY-TO-LATCH' MEASUREMENT (V54X0842E) TO MDM OF4 OR (V54X0838E) TO EVENT INDICATOR DS8 ON PANEL A8A2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-168
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4246

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: FUSE, F4
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID READY-TO-LATCH SW ASSY 2 (V54X1042E)
7) FUSE, 2 AMP, (K57-B3)
8) FUSE, F4
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A120F4
PART NUMBER: MC451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 1 'MID READY-TO-LATCH' MEASUREMENT (V54X1042E) TO MDM OA1 OR (V54X1038E) TO EVENT INDICATOR DS7 ON PANEL A8A2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-169
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

| DATE       | 11/25/86 | HIGHEST CRITICALITY | MDAC ID  
|------------|----------|----------------------|----------
| SUBSYSTEM  | EP&D&C   |                      | 4247     |
| ABORT      | /NA      | FLIGHT: 3/3          |          |

ITEM: RESISTOR, R29
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) MID READY-TO-LATCH SW ASSY 2 (V54X0842E)
7) RESISTOR, ISOL, 2.2K OHM
8) RESISTOR, R29

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A117R29
PART NUMBER: RLR2002201GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 1 'MID READY-TO-LATCH' MEASUREMENT (V54X0842E) TO MDM OF4.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-170
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/3
MDAC ID: 4248  ABORT: /NA

ITEM: RESISTOR, R65
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID READY-TO-LATCH SW ASSY 2 (V54X1042E)
7) RESISTOR, ISOL, 2.2K OHM
8) RESISTOR, R65
9)

CRITICALITIES

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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION: 40V76A120R65
PART NUMBER: RLR2002201GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 1 'MID READY-TO-LATCH' MEASUREMENT (V54X1042E) TO MDM OA1.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-171
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY  HDW/FUNC  FLIGHT: 3/3  ABORT: /NA
SUBSYSTEM: EPD&C  MDAC ID: 4249
ITEM: RESISTOR, R28  FAILURE MODE: FAILS OPEN.
LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MNC)-1 (40V76A117)
6) MID READY-TO-LATCH SW ASSY 2 (V54X0842E)
7) RESISTOR, BLEED, 1.8K OHM
8) RESISTOR, R28

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]
LOCATION: 40V76A117R28
PART NUMBER: RLR0701801GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 1 'MID READY-TO-LATCH' MEASUREMENT (V54X0842E) TO MDM OF4. LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-172
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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ITEM: RESISTOR, R61
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID READY-TO-LATCH SW ASSY 2 (V54X1042E)
7) RESISTOR, BLEED, 1.8K OHM
8) RESISTOR, R61
9) CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120R61
PART NUMBER: RLR0701801GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 1 'MID READY-TO-LATCH' MEASUREMENT (V54X1042E) TO MDM OAI.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-173
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4251

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: RESISTOR, R1
FAILURE MODE: Fails open.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) MID ACTUATOR SYSTEM 1, LATCH/RELEASE (K57-A3)
7) RESISTOR, ISO, 1.2K OHM, 2 WATT
8) RESISTOR, R1

CRITICALITIES
FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC
PRELAUNCH: /NA RTLS: /NA
LIPTOFF: /NA TAL: /NA
ONORBIT: 3/2R AOA: /NA
DEORBIT: /NA ATO: /NA
LANDING/SAFING: /NA

LOCATION: 40V76A117R1
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 1 LATCH/RELEASE ENABLE SIGNAL TO APPROPRIATE ACTUATOR MOTOR RELAY K55/K43.
LOSS OF ABILITY TO OPERATE PORT SYSTEM 1 MID RETENTION LATCH ACTUATOR TO EITHER LATCH OR RELEASE. SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 2 COULD CAUSE LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-174
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4252  ABORT: /NA

ITEM: RESISTOR, R11
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYSTEM 1, LATCH/RELEASE (K80-A3)
7) RESISTOR, ISO; 1.2K OHM, 2 WATT
8) RESISTOR, R11
9)

CRITICALITIES

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LOCATION: 40V76A120R11
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 1 LATCH/RELEASE ENABLE SIGNAL TO APPROPRIATE ACTUATOR MOTOR RELAY K69/H57.
LOSS OF ABILITY TO OPERATE STBD SYSTEM 1 MID RETENTION LATCH ACTUATOR TO EITHER LATCH OR RELEASE. SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 2 COULD CAUSE LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-175
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4253

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, R25
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) MID ACTUATOR SYSTEM 1, K55 LATCHED, (V54X0862E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R25

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A117R25
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 1 LATCH ENABLE MONITORING MEASUREMENT (V54X0872E) TO MDM OF4.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-176
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4254

ITEM: RESISTOR, R14
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYSTEM 1, K69 LATCHED, (V54X1062E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R14

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120R14
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 1 LATCH ENABLE MONITORING MEASUREMENT (V54X1062E) TO MDM OA1.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-177
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4255

ITEM: RESISTOR, R26
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) MID ACTUATOR SYSTEM 1, K43 LATCHED, (V54X1062E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 Watt
8) RESISTOR, R26

CRITICALITIES

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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION: 40V76A117R26
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 1 RELEASE ENABLE MONITORING MEASUREMENT (V54X0872E) TO MDM OF4.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-178
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4256

ITEM: RESISTOR, R15
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYSTEM 1, K57 RELEASED, (V54X1072E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R15
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120R15
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 1 RELEASE ENABLE MONITORING MEASUREMENT (V54X1072E) TO MDM OA1.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-179
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/26/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4257  ABORT: /NA

ITEM: HYBRID RELAY, K75  FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) AFT ACTUATOR SYS 1, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K75
9) CRITICALITIES

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LOCATION: 40V76A118K75
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-3 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR TO DRIVE THE PORT MANIPULATOR AFT RETENTION LATCH ACTUATOR TO THE LATCH POSITION.
ANY SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO LATCH THE PORT AFT LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-180
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/26/86
SUBSYSTEM: EPD&C
MDAC ID: 4258

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K75
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) AFT ACTUATOR SYS 1, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K75
9) HYBRID RELAY, 3-POLE

CRITICALITIES

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LOCATION: 40V76A118K75
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNTIMELY PLBM AC-3 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR WHICH COULD DRIVE THE PORT MANIPULATOR AFT RETENTION LATCH ACTUATOR TO THE LATCH POSITION AS AN UNSCHEDULED EVENT.
UNTIMELY ACTUATOR LATCHING COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD RESULT. SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 COULD RESULT IN INABILITY TO LATCH/RELEASE THE STBD AFT LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-181
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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ITEM: HYBRID RELAY, K78
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT ACTUATOR SYS 1, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K78
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LOCATION: 40V76A119K78
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-1 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR TO DRIVE THE STARBOARD MANIPULATOR AFT RETENTION LATCH ACTUATOR TO THE LATCH POSITION.
ANY SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO LATCH THE STBD AFT LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-182
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/26/86
SUBSYSTEM: EPD&C
MDAC ID: 4260

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K78
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT ACTUATOR SYS 1, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K78
9) CROSS REFERENCES:

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LOCATION: 40V76A119K78
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNTIMELY PLBM AC-1 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR WHICH COULD DRIVE THE STBD MANIPULATOR AFT RETENTION LATCH ACTUATOR TO THE LATCH POSITION AS AN UNSCHEDULED EVENT.
UNTIMELY ACTUATOR LATCHING COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD RESULT. SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 COULD RESULT IN INABILITY TO LATCH/RELEASE THE STBD AFT LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-183
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/26/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C FLIGHT: 3/2R
MDAC ID: 4261 ABORT: /NA

ITEM: HYBRID RELAY, K73
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) AFT ACTUATOR SYS 1, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K73

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LOCATION: 40V76A118K73
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-3 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR TO DRIVE THE PORT MANIPULATOR AFT RETENTION LATCH ACTUATOR TO THE LATCH POSITION.
ANY SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO RELEASE THE PORT AFT LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-184
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/26/86
SUBSYSTEM: EPD&C
MDAC ID: 4262

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K73
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) AFT ACTUATOR SYS 1, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K73

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LOCATION: 40V76A118K73
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ACTUATOR LATCHING COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD RESULT. SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2 COULD RESULT IN INABILITY TO LATCH/RELEASE THE PORT AFT LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-185
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/26/86
SUBSYSTEM: EPD&C
MDAC ID: 4263

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K76
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT ACTUATOR SYS 1, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K76

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LOCATION: 40V76A119K76
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-1 115 VAC 400 Hz POWER TO THE SYSTEM 1 MOTOR TO DRIVE THE STARBOARD MANIPULATOR AFT RETENTION LATCH ACTUATOR TO THE LATCH POSITION.
ANY SUBSEQUENT FAILURE OF 'REDUNDANT SYSTEM 2 WOULD RESULT IN INABILITY TO RELEASE THE STBD AFT LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-186
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/26/86

SUBSYSTEM: EPD&C
MDAC ID: 4264

HIGHEST CRITICALITY
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K76
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT ACTUATOR SYS 1, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K76

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LOCATION: 40V76A119K76
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNTIMELY PLBM AC-1 115 VAC 400 Hz POWER TO THE
SYSTEM 1 MOTOR WHICH COULD DRIVE THE STARBOARD MANIPULATOR AFT
RETENTION LATCH ACTUATOR TO THE LATCH POSITION AS AN UNSCHEDULED
EVENT.
UNTIMELY ACTUATOR LATCHING COULD CAUSE PHYSICAL DAMAGE. IF
FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR
FAILURE COULD RESULT. SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 2
COULD RESULT IN INABILITY TO LATCH/RELEASE THE STBD AFT LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-187
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/26/86
SUBSYSTEM: EPD&C
MDAC ID: 4265

ITEM: RELAY, K77
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) AFT ACTUATOR SYS 1, GND-RESET/DFACE RELAY
7) RELAY, LATCHING, 2-POLE
8) RELAY, K77

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LOCATION: 40V76A118K77
PART NUMBER: MC455-0128-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT ALLOW RESET OR DEADFACE OF THE AFT MOTOR CONTROL CIRCUIT AS REQUIRED.
IF FAILED IN THE DEADFACE POSITION NEITHER THE LATCH OR RELEASE FUNCTION OF THE PORT SYSTEM 1 AFT RETENTION LATCH ACTUATOR COULD BE OPERATED. LOSS OF ABILITY TO DEADFACE IF FAILED IN THE RESET POSITION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-188
**INDEPENDENT ORBITER ASSESSMENT**

**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

**DATE:** 11/26/86  
**HIGHEST CRITICALITY**  
**FLIGHT:** 3/2R  
**ABORT:** /NA

**ITEM:** RELAY, KII  
**FAILURE MODE:** FAILS OPEN.

**LEAD ANALYST:** ROBINSON  
**SUBSYS LEAD:** SCHMECKPEPER

**BREAKDOWN HIERARCHY:**

1) RMS, 05-6IC  
2) MANIPULATOR LATCH CONTROL  
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1  
4) AFT LATCH ACTUATOR (40V54A17)  
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)  
6) AFT ACTUATOR SYS 1, GND-RESET/DFACE RELAY  
7) RELAY, LATCHING, 2-POLE  
8) RELAY, KII

**CRITICALITIES**

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**REDUNDANCY SCREENS:** A [ ] B [NA] C [NA]

**LOCATION:** 40V76A119K11  
**PART NUMBER:** MC455-0128-0001

**CAUSES:** MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

**EFFECTS/RATIONALE:**

WILL NOT ALLOW RESET OR DEADFACE OF THE AFT MOTOR CONTROL CIRCUIT AS REQUIRED.

IF FAILED IN THE DEADFACE POSITION NEITHER THE LATCH OR RELEASE FUNCTION OF THE STBD SYSTEM 1 AFT RETENTION LATCH ACTUATOR COULD BE OPERATED. LOSS OF ABILITY TO DEADFACE IF FAILED IN THE RESET POSITION.

**REFERENCES:** VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

**REPORT DATE** 02/25/87  
**C-189**
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/26/86
SUBSYSTEM: EPD&C
MDAC ID: 4267

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 3/3
ABORT: /NA

ITEM: FUSE, F8
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (4OV54A7)
5) MID MOTOR CONTROLLER (MMC)-2 (4OV76A118)
6) AFT READY-TO-LATCH SW ASSY 3 (V54X0844E)
7) FUSE, 2-AMP (K77-A3)
8) FUSE, F8

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 4OV76A118F8
PART NUMBER: MC451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 1 'AFT READY-TO-LATCH' MEASUREMENT (V540844E) TO MDM OF1 OR (V54X0839E) TO EVENT INDICATOR DS6 ON PANEL A8A2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-190
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/26/86
SUBSYSTEM: EPD&C
MDAC ID: 4268

ITEM: FUSE, F2
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT READY-TO-LATCH SW ASSY 3 (V54X1044E)
7) FUSE, 2-AMP (K11-A3)
8) FUSE, F2
9)...

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A119F2
PART NUMBER: MC451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 1 'AFT READY-TO-LATCH' MEASUREMENT (V541044E) TO MDM OF1 OR (V54X1039E) TO EVENT INDICATOR DS3 ON PANEL A8A2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-191
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/26/86
MDAC ID: 4269

SUBSYSTEM: EPD&C
SUBSYSTEM ID: 11/26/86 EPD&C 4269

ITEM: RESISTOR, R61
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) AFT READY-TO-LATCH SW ASSY 3 (V54X0844E)
7) RESISTOR, ISOL, 2.2K OHM
8) RESISTOR, R61

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118R61
PART NUMBER: RLR2002201GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 1 'AFT READY-TO-LATCH' MEASUREMENT (V540844E) TO MDM OF1.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-192
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/28/86
SUBSYSTEM: EPD&C
MDAC ID: 4270

ITEM: RESISTOR, R41
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT READY-TO-LATCH SW ASSY 3 (V54X1044E)
7) RESISTOR, ISOL, 2.2K OHM
8) RESISTOR, R41
9)

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A119R41
PART NUMBER: RLR2002201GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 1 'AFT READY-TO-LATCH' MEASUREMENT (V541044E) TO MDM OF1.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-1174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-193
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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**ITEM:** RESISTOR, R62  
**FAILURE MODE:** FAILS OPEN.

**LEAD ANALYST:** ROBINSON  
**SUBSYS LEAD:** SCHMECKPEPER

**BREAKDOWN HIERARCHY:**
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A7)
5) MTD MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) AFT READY-TO-LATCH SW ASSY 3 (V54X0844E)
7) RESISTOR, BLEED, 1.8K OHM
8) RESISTOR, R62

**CRITICALITIES**

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**REDUNDANCY SCREENS:** A [ ]  B [ ]  C [ ]

**LOCATION:** 40V76A118R62  
**PART NUMBER:** RLR0701801GR

**CAUSES:** MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

**EFFECTS/RATIONALE:**
WILL NOT PROVIDE AFT SYSTEM 1 'AFT READY-TO-LATCH' MEASUREMENT (V540844E) TO MDM OF1.
LOSS OF MEASUREMENT.

**REFERENCES:** VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-194
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/28/86
SUBSYSTEM: EPD&C
MDAC ID: 4272

ITEM: RESISTOR, R40
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT READY-TO-LATCH SW ASSY 3 (V54X1044E)
7) RESISTOR, BLEED, 1.8K OHM
8) RESISTOR, R40

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A119R40
PART NUMBER: RLR0701801GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 1 'AFT READY-TO-LATCH' MEASUREMENT (V541044E) TO MDM OF1.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87

C-195
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/28/86

SUBSYSTEM: EPD&C
MDAC ID: 4273

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: RESISTOR, R14
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) AFT ACTUATOR SYSTEM 1, LATCH/RELEASE (K77-A3)
7) RESISTOR, ISOL, 1.2K OHM, 2 WATT
8) RESISTOR, R14

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LOCATION: 40V76A118R14
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 1 LATCH/RELEASE ENABLE SIGNAL TO APPROPRIATE ACTUATOR MOTOR RELAY K78/K76.
LOSS OF ABILITY TO OPERATE THE PORT SYSTEM 1 AFT RETENTION LATCH ACTUATOR TO EITHER RELEASE OR LATCH. SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 2 COULD CAUSE LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-196
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/28/86
SUBSYSTEM: EP&C
MDAC ID: 4274

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: RESISTOR, R2
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT ACTUATOR SYSTEM 1, LATCH/RELEASE (K11-A3)
7) RESISTOR, ISOL, 1.2K OHM, 2 WATT
8) RESISTOR, R2
9)

CRITICALITIES

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LOCATION: 40V76A119R2
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 1 LATCH/RELEASE ENABLE SIGNAL TO APPROPRIATE ACTUATOR MOTOR RELAY K78/K76.
LOSS OF ABILITY TO OPERATE THE STBD SYSTEM 1 AFT RETENTION LATCH ACTUATOR TO EITHER RELEASE OR LATCH. SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 2 COULD CAUSE LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-197
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/28/86
SUBSYSTEM: EPD&C
MDAC ID: 4275

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, R59
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) AFT ACTUATOR SYSTEM 1, K75 LATCHED, (V54X0864E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R59

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118R59
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 1 LATCH ENABLE MONITORING MEASUREMENT (V540864E) TO MDM OA3. LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-198
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/28/86
SUBSYSTEM: EPD&C
MDAC ID: 4276

ITEM: RESISTOR, R31
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT ACTUATOR SYSTEM 1, K78 LATCHED, (V54X1064E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R31
9) ...

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A119R31
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 1 LATCH ENABLE MONITORING MEASUREMENT (V541064E) TO MDM OF1.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-199
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/28/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&c FLIGHT: 3/3
MDAC ID: 4277 ABORT: /NA

ITEM: RESISTOR, R60
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) AFT ACTUATOR SYSTEM 1, K73 RELEASED, (V54X0874E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R60
9) 

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A118R60
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 1 RELEASE ENABLE MONITORING MEASUREMENT (V540874E) TO MDM OA3.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-200
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/28/86
SUBSYSTEM: EPD&C
MDAC ID: 4278

ITEM: RESISTOR, R33
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON

SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 1
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT ACTUATOR SYSTEM 1, K76 RELEASED, (V54X1074E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R33

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A119R33
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 1 RELEASE ENABLE MONITORING MEASUREMENT (V541074E) TO MDM OF1.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-201
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4279

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K54
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYS 2, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K54

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LOCATION: 40V76A120K54
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:

WILL NOT PROVIDE PLBM AC-3 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR TO DRIVE THE PORT FWD RETENTION LATCH ACTUATOR TO THE LATCH POSITION.

ANY SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH THE PORT FORWARD RETENTION LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-202
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EP&D&C
MDAC ID: 4280

HIGHEST CRITICALITY
HDW/<Func
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K54
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYS 2, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K54

CRITICALITIES

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LOCATION: 40V76A120K54
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNTIMELY PLBM AC-3 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR WHICH COULD DRIVE THE PORT FWD RETENTION LATCH ACTUATOR TO THE LATCH POSITION AS AN UNSCHEDULED EVENT.
UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD RESULT. SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 1 COULD RESULT IN INABILITY TO LATCH/RELEASE THE PORT FWD LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-203
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4281

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K56
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) FWD ACTUATOR SYS 2, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K56
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LOCATION: 40V76A117K56
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-1 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR TO DRIVE THE STARBOARD FWD RETENTION LATCH ACTUATOR TO THE LATCH POSITION.
ANY SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH THE STBD FWD LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-204
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4282

HIGHEST CRITICALITY: HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K56
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05–6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) FWD ACTUATOR SYS 2, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K56
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CRITICALITIES

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LOCATION: 40V76A117K56
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNTIMELY PLBM AC-1 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR WHICH COULD DRIVE THE STARBOARD FWD RETENTION LATCH ACTUATOR TO THE LATCH POSITION AS AN UNSCHEDULED EVENT. UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD RESULT. SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 1 COULD RESULT IN INABILITY TO LATCH/RELEASE THE STBD FWD LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-205
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4283

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K66
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYS 2, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K66
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LOCATION: 40V76A120K66
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-3 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR TO DRIVE THE PORT FWD RETENTION LATCH ACTUATOR TO THE RELEASE POSITION.
ANY SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD RESULT IN INABILITY TO RELEASE THE PORT FWD LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-206
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4284

ITEM: HYBRID RELAY, K66
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYS 2, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K66

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LOCATION: 40V76A120K66
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNTIMELY PLBM AC-3 115 VAC 400 Hz POWER TO THE SYSTEM 2 MOTOR WHICH COULD DRIVE THE PORT FWD RETENTION LATCH ACTUATOR TO THE RELEASE POSITION AS AN UNSCHEDULED EVENT.
UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD RESULT. SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 1 COULD RESULT IN INABILITY TO LATCH/RELEASE THE STBD FWD LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-207
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4285

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K44
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) FWD ACTUATOR SYS 2, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K44
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LOCATION: 40V76A117K44
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-1 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR TO DRIVE THE STARBOARD FWD RETENTION LATCH ACTUATOR TO THE RELEASE POSITION.
ANY SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD RESULT IN INABILITY TO RELEASE THE STBD LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-208
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EP&D&C
MDAC ID: 4286

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K44
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) FWD ACTUATOR SYS 2, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K44
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CRITICALITIES

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LOCATION: 40V76A117K44
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNTIMELY PLBM AC-1 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR WHICH COULD DRIVE THE STARBOARD FWD RETENTION LATCH ACTUATOR TO THE RELEASE POSITION AS AN UNSCHEDULED EVENT. UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD RESULT. SUBSEQUENT FAILURE OF REDUNDANT SYSTEM 1 COULD RESULT IN INABILITY TO LATCH/RELEASE THE STBD FWD LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-209
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4287

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: RELAY, K68
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYS 2, GND RESET/DFACE RELAY
7) RELAY, LATCHING, 2-POLE
8) RELAY, K68
9) CRITICALITIES

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LOCATION: 40V76A120K68
PART NUMBER: MC455-0128-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT ALLOW RESET OR DEADFACE OF THE FWD MOTOR CONTROL CIRCUIT AS REQUIRED.
IF FAILED IN THE DEADFACE POSITION NEITHER THE LATCH OR RELEASE FUNCTION OF THE PORT SYSTEM 2 FWD RETENTION LATCH ACTUATOR COULD BE OPERATED. LOSS OF ABILITY TO DEADFACE IF FAILED IN THE RESET POSITION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-210
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4288

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: RELAY, K58
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) FWD ACTUATOR SYS 2, GND RESET/DFACE RELAY
7) RELAY, LATCHING, 2-POLE
8) RELAY, K58
9) 

CRITICALITIES

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LOCATION: 40V76A117K58
PART NUMBER: MC455-0128-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT ALLOW RESET OR DEADFACE OF THE FWD MOTOR CONTROL CIRCUIT AS REQUIRED.
IF FAILED IN THE DEADFACE POSITION NEITHER THE LATCH OR RELEASE FUNCTION OF THE STBD SYSTEM 2 FWD RETENTION LATCH ACTUATOR COULD BE OPERATED. LOSS OF ABILITY TO DEADFACE IF FAILED IN THE RESET POSITION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-211
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/3
MDAC ID: 4289  ABORT: /NA

ITEM: FUSE, F7
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61C
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD READY-TO-LATCH ASSY 1 (V54X0841E)
7) FUSE, 2 AMP, (K68-B3)
8) FUSE, F7
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A120F7
PART NUMBER: MC451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE FWD SYSTEM 2 'FWD READY-TO-LATCH' MEASUREMENT (V54X0841E) TO MDM OA2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-212
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/3
MDAC ID: 4290  ABORT: /NA

ITEM: FUSE, F3
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC) - 1 (40V76A117)
6) FWD READY-TO-LATCH ASSY 1 (V54X1041E)
7) FUSE, 2 AMP, (K68-B3)
8) FUSE, F3
9)  

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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION:  40V76A117F3
PART NUMBER: MC451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE FWD SYSTEM 2 'FWD READY-TO-LATCH' MEASUREMENT (V54X1041E) TO MDM OF4.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-213
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4291

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, R68
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD READY-TO-LATCH ASSY 1 (V54X0841E)
7) ISTORE, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R68
9) CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A120R68
PART NUMBER: RLR2002201GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE FWD SYSTEM 2 'FWD READY-TO-LATCH' MEASUREMENT (V54X0841E) TO MDM OA2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-214
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4292

ITEM: RESISTOR, R34
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) FWD READY-TO-LATCH ASSY 1 (V54X1041E)
7) RESISTOR, ISOL, 2.2K OHM
8) RESISTOR, R34
9) 

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A117R34
PART NUMBER: RLR2002201GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE FWD SYSTEM 2 'FWD READY-TO-LATCH' MEASUREMENT (V54X1041E) TO MDM OF4.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-215
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4293

HIGHEST CRITICALITY FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, R64
FAILURE MODE: FAIL OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD READY-TO-LATCH ASSY 1 (V54X0841E)
7) RESISTOR, BLEED, 1.8K OHM
8) RESISTOR, R64
9) RESISTOR, R64

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120R64
PART NUMBER: RLR0701801GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE FWD SYSTEM 2 'FWD READY-TO-LATCH' MEASUREMENT (V54X0841E) TO MDM OA2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-216
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4294

ITEM: RESISTOR, R33
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) FWD READY-TO-LATCH ASSY 1 (V54X1041E)
7) RESISTOR, BLEED, 1.8K OHM
8) RESISTOR, R33

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A117R33
PART NUMBER: RLR0701801GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE FWD SYSTEM 2 'FWD READY-TO-LATCH' MEASUREMENT (V54X1041E) TO MDM OF4.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-217
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4295  ABORT: /NA

ITEM: RESISTOR, R12
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYSTEM 2, LATCH/RELEASE (K68-A3)
7) RESISTOR, ISOL, 1.2K OHM, 2 WATT
8) RESISTOR, R12
9) 

CRITICALITIES

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LOCATION: 40V76A120R12
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE FWD SYSTEM 2 LATCH/RELEASE ENABLE SIGNAL TO THE APPROPRIATE ACTUATOR RELAY K54/K66.
LOSS OF ABILITY TO OPERATE THE PORT SYSTEM 2 FWD RETENTION LATCH ACTUATOR TO EITHER RELEASE OR LATCH POSITION. SUBSEQUENT LOSS OF REDUNDANT SYSTEM 1 COULD CAUSE LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-218
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4296  ABORT: /NA

ITEM: RESISTOR, R2
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) FWD ACTUATOR SYSTEM 2, LATCH/RELEASE (K58-A3)
7) RESISTOR, ISOL, 1.2K OHM, 2 WATT
8) RESISTOR, R2
9)

CRITICALITIES

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LOCATION: 40V76A117R2
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE FWD SYSTEM 2 LATCH/RELEASE ENABLE SIGNAL TO THE APPROPRIATE ACTUATOR RELAY K56/K44.
LOSS OF ABILITY TO OPERATE THE STBD SYSTEM 2 FWD RETENTION LATCH ACTUATOR TO EITHER RELEASE OR LATCH POSITION. SUBSEQUENT LOSS OF REDUNDANT SYSTEM 1 COULD CAUSE LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-219
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4297

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, R35
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYSTEM 2, K54 LATCHED, (V54X0861E)
7) RESISTOR, CUR Lim, 5.1K OHM, 1/4 WATT
8) RESISTOR, R35
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120R35
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE FWD SYSTEM 2 LATCH ENABLE MONITORING MEASUREMENT (V540861E) TO MDM OA2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-220
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
HIGHEST CRITICALITY
MDAC ID: 4298
FLIGHT: 3/3

ITEM: RESISTOR, R31
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) FWD ACTUATOR SYSTEM 2, K56 LATCHED, (V54X1061E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R31

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A117R31
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE FWD SYSTEM 2 LATCH ENABLE MONITORING MEASUREMENT (V541061E) TO MDM OF4.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-221
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4299

ITEM: RESISTOR, R34
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A5)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) FWD ACTUATOR SYSTEM 2, K66 RELEASED, (V54X0871E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R34

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120R34
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE FWD SYSTEM 2 RELEASE ENABLE MONITORING MEASUREMENT (V540861E) TO MDM OA2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-222
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4300
HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, R30
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) FWD LATCH ACTUATOR (40V54A15)
5) MID MOTOR CONTROLLER (MMC)-1 (40V76A117)
6) FWD ACTUATOR SYSTEM 2, K44 RELEASED, (V54X1071E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R30

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A117R30
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE FWD SYSTEM 2 RELEASE ENABLE MONITORING MEASUREMENT (V541061E) TO MDM OF4.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87   C-223
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4301  ABORT: /NA

ITEM: HYBRID RELAY, K59
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYS 2, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K59

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LOCATION: 40V76A120K59
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-2 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR TO DRIVE THE PORT MID RETENTION LATCH ACTUATOR TO THE LATCH POSITION.
ANY SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH THE PORT MID RETENTION LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4302

ITEM: HYBRID RELAY, K59
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYS 2, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K59
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LOCATION: 40V76A120K59
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNTIMELY PLBM AC-2 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR WHICH COULD DRIVE THE PORT MID RETENTION LATCH ACTUATOR TO THE LATCH POSITION AS AN UNSCHEDULED EVENT.

UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD RESULT. SUBSEQUENT FAILURE IN SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH/RELEASE THE PORT MID RETENTION LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-225
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86

HIGHEST CRITICALITY
HDW/FUNC

SUBSYSTEM: EPD&C

MDAC ID: 4303

FLIGHT: 3/2R

ABORT: /NA

ITEM: HYBRID RELAY, K76

FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON

SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (4OV54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (4OV76A120)
6) MID ACTUATOR SYS 2, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K76
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REDUNDANCY SCREENS:

LOCATION: 40V76A120K76

PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-3 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR TO DRIVE THE STARBOARD MID RETENTION LATCH ACTUATOR TO THE LATCH POSITION.
ANY SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH THE STBD MID RETENTION LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87  C-226
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4304

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K76
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYS 2, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K76
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LOCATION: 40V76A120K76
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNTIMELY PLBM AC-3 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR WHICH COULD DRIVE THE STARBOARD MID RETENTION LATCH ACTUATOR TO THE LATCH POSITION AS AN UNSCHEDULED EVENT. UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD RESULT. SUBSEQUENT FAILURE IN SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH/RELEASE THE PORT MID RETENTION LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-227
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4305  ABORT: /NA

ITEM: HYBRID RELAY, K71
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYS 2, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K71
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LOCATION: 40V76A120K71
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-2 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR TO DRIVE THE PORT MID RETENTION LATCH ACTUATOR TO THE RELEASE POSITION.
ANY SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD RESULT IN INABILITY TO RELEASE THE STBD MID RETENTION LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-228
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4306  ABORT: /NA

ITEM: HYBRID RELAY, K71
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-4 (4OV76A120)
6) MID ACTUATOR SYS 2, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K71
9) HYBRID RELAY, K71

CRITICALITIES

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LOCATION: 40V76A120K71
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNTIMELY PLBM AC-2 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR WHICH COULD DRIVE THE PORT MID RETENTION LATCH ACTUATOR TO THE RELEASE POSITION AS AN UNSCHEDULED EVENT. UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD RESULT. SUBSEQUENT FAILURE IN SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH/RELEASE THE PORT MID RETENTION LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-229
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4307  ABORT: /NA

ITEM: HYBRID RELAY, K74
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYS 2, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K74
9)

CRITICALITIES

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LOCATION: 40V76A120K74
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-3 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR TO DRIVE THE STARBOARD MID RETENTION LATCH ACTUATOR TO THE RELEASE POSITION.
ANY SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD RESULT IN INABILITY TO RELEASE THE PORT MID RETENTION LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-230
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4308

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K74
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYS 2, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K74
9) CRITICALITIES

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LOCATION: 40V76A120K74
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-3 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR WHICH COULD DRIVE THE STARBOARD MID RETENTION LATCH ACTUATOR TO THE RELEASE POSITION AS AN UNSCHEDULED EVENT. UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD RESULT. SUBSEQUENT FAILURE IN SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH/RELEASE THE PORT MID RETENTION LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-231
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4309

ITEM: RELAY, K78
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYS 2, GND RESET/DFACE RELAY
7) RELAY, LATCHING, 2-POLE
8) RELAY, K78

CRITICALITIES

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LOCATION: 40V76A120K78
PART NUMBER: MC455-0128-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT ALLOW RESET OR DEADFACE OF THE MID MOTOR CONTROL CIRCUIT AS REQUIRED
IF FAILED IN THE DEADFACE POSITION NEITHER THE RELEASE OR LATCH FUNCTION OF THE PORT SYSTEM 2 MID RETENTION LATCH MECHANISM COULD BE OPERATED. LOSS OF ABILITY TO DEADFACE IF FAILED IN THE RESET POSITION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87 C-232
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EP&D&C
MDAC ID: 4310

HIGHEST CRITICALITY
FLIGHT: 3/2R
ABORT: /NA

ITEM: RELAY, K78
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYS 2, GND RESET/DFACE RELAY
7) RELAY, LATCHING, 2-POLE
8) RELAY, K78

CRITICALITIES

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LOCATION: 40V76A120K78
PART NUMBER: MC455-0128-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
  WILL NOT ALLOW RESET OR DEADFACE OF THE MID MOTOR CONTROL CIRCUIT AS REQUIRED
  IF FAILED IN THE DEADFACE POSITION NEITHER THE RELEASE OR LATCH FUNCTION OF THE STBD SYSTEM 2 MID RETENTION LATCH MECHANISM COULD BE OPERATED. LOSS OF ABILITY TO DEADFACE IF FAILED IN THE RESET POSITION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87   C-233
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4311

HIGHEST CRITICALITY HDW/FUNC
HDW/FUNC  ABORT:
FLIGHT:  3/3 /NA
ABORT:  /NA

ITEM: FUSE, F5,
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID READY-TO-LATCH ASSY 2 (V54X0843E)
7) FUSE, 2 AMP, (K78-B3)
8) FUSE, F5
9) CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A120F5
PART NUMBER: MC451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION,
CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 2 'MID READY-TO-LATCH' MEASUREMENT
(V54X0843E) TO MDM OF4.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87  C-234
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4312

HIGHEST CRITICALITY  HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: FUSE, F9
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID READY-TO-LATCH ASSY 2 (V54X1043E)
7) FUSE, 2 AMP, (K78-B3)
8) FUSE, F9
9) CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A120F9
PART NUMBER: MC451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 2 'MID READY-TO-LATCH' MEASUREMENT (V54X1043E) TO MDM OA3.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87  C-235
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/3
MDAC ID: 4313  ABORT: /NA

ITEM: RESISTOR, R66
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID READY-TO-LATCH ASSY 2 (V54X0843E)
7) RESISTOR, ISOL, 2.2K OHM
8) RESISTOR, R66
9) 

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120R66
PART NUMBER: RLR2002201GR

CAUSES: MECHANICAL / STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS / RATIONALE:
WILL NOT PROVIDE MID SYSTEM 2 'MID READY-TO-LATCH' MEASUREMENT (V54X0843E) TO MDM OF 4.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-236
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY
SUBSYSTEM: EPD&C  HDW/FUNC
MDAC ID: 4314  FLIGHT: 3/3

ITEM: RESISTOR, R66  ABORT: /NA
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID READY-TO-LATCH ASSY 2 (V54X1043E)
7) RESISTOR, ISOL, 2.2K OHM
8) RESISTOR, R66
9)  

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A120R66
PART NUMBER: RLR2002201GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 2 'MID READY-TO-LATCH' MEASUREMENT (V54X1043E) TO MDM OA3.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-237
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4315

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, R62
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID READY-TO-LATCH ASSY 2 (V54X0843E)
7) RESISTOR, BLEED, 1.8K OHM
8) RESISTOR, R62

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A120R62
PART NUMBER: RLR0701801GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 2 'MID READY-TO-LATCH' MEASUREMENT (V54X0843E) TO MDM OF4.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-238
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4316

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, R67
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON    SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID READY-TO-LATCH ASSY 2 (V54X1043E)
7) RESISTOR, BLEED, 1.8K OHM
8) RESISTOR, R67
9)  

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120R67
PART NUMBER: RLR0701801GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 2 'MID READY-TO-LATCH' MEASUREMENT (V54X1043E) TO MDM OA3.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-239
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4317

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: RESISTOR, R10
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61C
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYSTEM 2, LATCH/RELEASE (K78-A3)
7) RESISTOR, ISOL, 1.2K OHM, 2 WATT
8) RESISTOR, R10
9)

CRITICALITIES

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LOCATION: 40V76A120R10
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 2 LATCH/RELEASE ENABLE SIGNAL TO THE APPROPRIATE RELAY K76/K74.
LOSS OF ABILITY TO OPERATE THE PORT SYSTEM 2 MID RETENTION LATCH ACTUATOR TO EITHER THE RELEASE OR LATCH POSITION.
SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 COULD CAUSE LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-240
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4318

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: RESISTOR, R2
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYSTEM 2, LATCH/RELEASE (K78-A3)
7) RESISTOR, ISOL, 1.2K OHM, 2 WATT
8) RESISTOR, R2
9)

CRITICALITIES

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LOCATION: 40V76A120R2
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 2 LATCH/RELEASE ENABLE SIGNAL TO THE APPROPRIATE RELAY K76/K74.
LOSS OF ABILITY TO OPERATE THE STBD SYSTEM 2 MID RETENTION LATCH ACTUATOR TO EITHER THE RELEASE OR LATCH POSITION.
SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 COULD CAUSE LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

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INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT:  3/3
MDAC ID:  4319  ABORT: /NA

ITEM: RESISTOR, R16
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYSTEM 2, K59 LATCHED, (V54X0863E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R16
9)  

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A120R16
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 2 LATCH ENABLE MONITORING MEASUREMENT (V54X0863E) TO MDM 0A3.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

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INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4320

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, R64
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A16)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYSTEM 2, K76 LATCHED, (V54X1063E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R64

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120R64
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 2 LATCH ENABLE MONITORING MEASUREMENT (V54X1063E) TO MDM OA3.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

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INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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ITEM: RESISTOR, R17
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) MID LATCH ACTUATOR (40V54A6)
5) MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6) MID ACTUATOR SYSTEM 2, K71 RELEASED, (V54X0873E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R17
9) 

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A120R17
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE MID SYSTEM 2 RELEASE MONITORING MEASUREMENT (V54X0863E) TO MDM OA2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87 C-244
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**ITEM:** RESISTOR, R65  
**FAILURE MODE:** FAILS OPEN.

**LEAD ANALYST:** ROBINSON  
**SUBSYS LEAD:** SCHMECKPEPER

**BREAKDOWN HIERARCHY:**
1. RMS, 05-6IC
2. MANIPULATOR LATCH CONTROL
3. STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4. MID LATCH ACTUATOR (40V54A16)
5. MID MOTOR CONTROLLER (MMC)-4 (40V76A120)
6. MID ACTUATOR SYSTEM 2, K74 RELEASED, (V54X1073E)
7. RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8. RESISTOR, R65

**CRITICALITIES**

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**REDUNDANCY SCREENS:**
- A [ ]
- B [ ]
- C [ ]

**LOCATION:** 40V76A120R65  
**PART NUMBER:** RLR0705101GR

**CAUSES:** MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

**EFFECTS/RATIONALE:**
- WILL NOT PROVIDE MID SYSTEM 2 RELEASE ENABLE MONITORING MEASUREMENT (V54X1063E) TO MDM OA3.  
- LOSS OF MEASUREMENT.

**REFERENCES:** VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

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INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4323

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K24
FAILURE MODE: OPEN, Fails to close.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

CRITICALITIES

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LOCATION: 40V76A119K24
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-1 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR TO DRIVE THE PORT AFT LATCH ACTUATOR TO THE LATCH POSITION. ANY SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH THE PORT AFT RETENTION LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

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ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  
SUBSYSTEM: EPD&C  
MDAC ID: 4324

HIGHEST CRITICALITY  HDW/FUNC
FLIGHT: 3/2R  
ABORT: /NA

ITEM: HYBRID RELAY, K24
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON  
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC  
2) MANIPULATOR LATCH CONTROL  
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2  
4) AFT LATCH ACTUATOR (40V54A7)  
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)  
6) AFT ACTUATOR SYS 2, LATCH RELAY  
7) HYBRID RELAY, 3-POLE  
8) HYBRID RELAY, K24  
9) 

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REDUNDANCY SCREENS: A [ ]  
B [NA ]  
C [NA ]

LOCATION: 40V76A119K24
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNTIMELY PLBM AC-1 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR WHICH COULD DRIVE THE PORT AFT LATCH ACTUATOR TO THE LATCH POSITION AS AN UNSCHEDULED EVENT.
UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD OCCUR. SUBSEQUENT FAILURE IN SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH/RELEASE THE PORT AFT RETENTION LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

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ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C
FLIGHT: 3/2R
MDAC ID: 4325
ABORT: /NA

ITEM: HYBRID RELAY, K27
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) AFT ACTUATOR SYS 2, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K27
9)

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LOCATION: 40V76A118K27
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-2 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR TO DRIVE THE STARBOARD AFT LATCH ACTUATOR TO THE LATCH POSITION.
ANY SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH THE STBD AFT RETENTION LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-248
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4326  ABORT: /NA

ITEM: HYBRID RELAY, K27
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-2 (40V76A118)
6) AFT ACTUATOR SYS 2, LATCH RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K27
9) 

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LOCATION: 40V76A118K27
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNTIMELY PLBM AC-2 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR WHICH COULD DRIVE THE STARBOARD AFT LATCH ACTUATOR TO THE LATCH POSITION AS AN UNSCHEDULED EVENT. UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD OCCUR. SUBSEQUENT FAILURE IN SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH/RELEASE THE STBD AFT RETENTION LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87  C-249
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4327

HIGHEST CRITICALITY
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K12
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT ACTUATOR SYS 2, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K12
9) HYBRID RELAY, K12

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LOCATION: 40V76A119K12
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-1 115 VAC 400 HZ POWER TO THE SYSTEM 1 MOTOR TO DRIVE THE PORT AFT LATCH ACTUATOR TO THE RELEASE POSITION.
ANY SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD RESULT IN INABILITY TO RELEASE THE PORT AFT RETENTION LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-250
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4328

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K12
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT ACTUATOR SYS 2, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K12
9) HYBRID RELAY, K12

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LOCATION: 40V76A119K12
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNIMRY PLBM AC-1 115 VAC 400 HZ POWER TO THE SYSTEM 1 MOTOR WHICH COULD DRIVE THE PORT AFT LATCH ACTUATOR TO THE RELEASE POSITION AS AN UNSCHEDULED EVENT.
UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD OCCUR. SUBSEQUENT FAILURE IN SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH/RELEASE THE PORT AFT RETENTION LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87   C-251
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EP&D&C
MDAC ID: 4328

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K12
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT ACTUATOR SYS 2, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K12
9)

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LOCATION: 40V76A119K12
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNYIMRLY PLBM AC-1 115 VAC 400 HZ POWER TO THE SYSTEM 1 MOTOR WHICH COULD DRIVE THE PORT AFT LATCH ACTUATOR TO THE RELEASE POSITION AS AN UNSCHEDULED EVENT.

UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILD POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD OCCUR. SUBSEQUENT FAILURE IN SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH/RELEASE THE PORT AFT RETENTION LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-251
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4329

ITEM: HYBRID RELAY, K29
FAILURE MODE: OPEN, FAILS TO CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A118)
6) AFT ACTUATOR SYS 2, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K29
9)

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LOCATION: 40V76A118K29
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE PLBM AC-1 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR TO DRIVE THE STARBOARD AFT LATCH ACTUATOR TO THE RELEASE POSITION.
ANY SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 WOULD RESULT IN INABILITY TO RELEASE THE STBD AFT RETENTION LATCH MECHANISM.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87   Č-252
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4330

HIGHEST CRITICALITY: HDW/FUNC
FLIGHT: 3/2R
ABORT: /NA

ITEM: HYBRID RELAY, K29
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A118)
6) AFT ACTUATOR SYS 2, RELEASE RELAY
7) HYBRID RELAY, 3-POLE
8) HYBRID RELAY, K29
9)

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LOCATION: 40V76A118K29
PART NUMBER: MC455-0135-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL PROVIDE UNTIMELY PLBM AC-1 115 VAC 400 HZ POWER TO THE SYSTEM 2 MOTOR WHICH COULD DRIVE THE STARBOARD AFT LATCH ACTUATOR TO THE RELEASE POSITION AS AN UNSCHEDULED EVENT.
UNTIMELY ACTUATOR OPERATION COULD CAUSE PHYSICAL DAMAGE. IF FAILURE OCCURRED WHILE POWER WAS BEING APPLIED TO RELEASE, MOTOR FAILURE COULD OCCUR. SUBSEQUENT FAILURE IN SYSTEM 1 WOULD RESULT IN INABILITY TO LATCH/RELEASE THE STBD AFT RETENTION LATCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-253
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4331

ITEM: RELAY, K23
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT ACTUATOR SYS 2, GND RESET/DFACE RELAY
7) RELAY LATCHING, 2-POLE
8) RELAY, K23
9)

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LOCATION: 40V76A119K23
PART NUMBER: MC455-0128-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT ALLOW RESET OR DEADFACE OF THE AFT MOTOR CONTROL CIRCUIT AS REQUIRED/
IF FAILED IN THE DEADFACE POSITION NEITHER THE RELEASE OR LATCH FUNCTION OF THE PORT SYSTEM 2 AFT RETENTION LATCH MECHANISM COULD BE OPERATED. LOSS OF ABILITY TO DEADFACE IF FAILED IN THE RESET POSITION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-254
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4332  ABORT: /NA

ITEM: RELAY, K17
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A118)
6) AFT ACTUATOR SYS 2, GND RESET/DFACE RELAY
7) RELAY LATCHING, 2-POLE
8) RELAY, K17
9)

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LOCATION: 40V76A118K17
PART NUMBER: MC455-0128-0001

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT ALLOW RESET OR DEADFACE OF THE AFT MOTOR CONTROL CIRCUIT AS REQUIRED/
IF FAILED IN THE DEADFACE POSITION NEITHER THE RELEASE OR LATCH FUNCTION OF THE STBD SYSTEM 2 AFT RETENTION LATCH MECHANISM COULD BE OPERATED. LOSS OF ABILITY TO DEADFACE IF FAILED IN THE RESET POSITION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-255
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4333

ITEM: FUSE, 2 AMP, F3
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT READY-TO-LATCH ASSY 3, (V54X0845E)
7) FUSE, 2 AMP, (K23-B3)
8) FUSE, F3

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A119F3
PART NUMBER: MC451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 2 'AFT READY-TO-LATCH' MEASUREMENT (V54X0845E) TO MDM OF1.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-256
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/3
MDAC ID: 4334  ABORT: /NA

ITEM: FUSE, 2 AMP, F3
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A118)
6) AFT READY-TO-LATCH ASSY 3, (V54X1045E)
7) FUSE, 2 AMP, (K17-B3)
8) FUSE, F3

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A118F3
PART NUMBER: MC451-0018-0200

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 2 'AFT READY-TO-LATCH' MEASUREMENT (V54X0105E) TO MDM OA2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-257
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4335

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, R49
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT READY-TO-LATCH ASSY 3, (V54X0845E)
7) RESISTOR, ISOL, 1.2K OHM, 2 WATT
8) RESISTOR, R49
9) CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A119R49
PART NUMBER: RLR0022201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 2 'AFT READY-TO-LATCH' MEASUREMENT (V54X0845E) TO MDM OF1. LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-258
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/3
MDAC ID: 4336  ABORT: /NA

ITEM: RESISTOR, R22
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A118)
6) AFT READY-TO-LATCH ASSY 3, (V54X1045E)
7) RESISTOR, ISOL, 1.2K OHM, 2 WATT
8) RESISTOR, R22

CRITICALITIES

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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION: 40V76A118R22
PART NUMBER: RLR0022201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 2 'AFT READY-TO-LATCH' MEASUREMENT (V54X1045E) TO MDM OA2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-259
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4337

ITEM: RESISTOR, R42
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT READY-TO-LATCH ASSY 3, (V54X0845E)
7) RESISTOR, BLEED, 1.8K OHM
8) RESISTOR, R42
9) [ ] [ ] [ ]

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A119R42
PART NUMBER: RLR0701801GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 2 'AFT READY-TO-LATCH' MEASUREMENT (V54X0845E) TO MDM OF1. LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-260
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4338

ITEM: RESISTOR, R23
FAILURE MODE: FAILS OPEN.
LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A118)
6) AFT READY-TO-LATCH ASSY 3, (V54X1045E)
7) RESISTOR, BLEED, 1.8K OHM
8) RESISTOR, R23

CRITICALITIES

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REDUNDANCY SCREENS: A [[]] B [[]] C [[]]

LOCATION: 40V76A118R23
PART NUMBER: RLR0701801GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 2 'AFT READY-TO-LATCH' MEASUREMENT (V54X1045E) TO MDM A21.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-261
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4339

ITEM: RESISTOR, R2
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT ACTUATOR SYSTEM 2, LATCH/RELEASE (K23-A3)
7) RESISTOR, ISOL, 1.2K OHM, 2 WATT
8) RESISTOR, R2

CRITICALITIES

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LOCATION: 40V76A119R2
PART NUMBER: RLR4201201GM

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 2 LATCH/RELEASE ENABLE SIGNAL TO THE APPROPRIATE RELAY K27/K29.
LOSS OF ABILITY TO OPERATE THE PORT SYSTEM 2 AFT RETENTION LATCH ACTUATOR TO EITHER THE RELEASE OR LATCH POSITION.
SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 COULD CAUSE LOSS OF MISSION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-262
**INDEPENDENT ORBITER ASSESSMENT**  
**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

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*ITEM:* RESISTOR, R3  
*FAILURE MODE:* FAILS OPEN.

*LEAD ANALYST:* ROBINSON  
*SUBSYS LEAD:* SCHMECKPEPER

**BREAKDOWN HIERARCHY:**
1) RMS, 05-6IC  
2) MANIPULATOR LATCH CONTROL  
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2  
4) AFT LATCH ACTUATOR (40V54A17)  
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A118)  
6) AFT ACTUATOR SYSTEM 2, LATCH/RELEASE (K17-A3)  
7) RESISTOR, ISOL, 1.2K OHM, 2 WATT  
8) RESISTOR, R3

**CRITICALITIES**

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*REDUNDANCY SCREENS:* A [ ]  
B [NA ]  
C [NA ]

*LOCATION:* 40V76A118R3  
*PART NUMBER:* RLR4201201GM

*CAUSES:* MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

*EFFECTS/RATIONALE:*  
WILL NOT PROVIDE AFT SYSTEM 2 LATCH/RELEASE ENABLE SIGNAL TO THE APPROPRIATE RELAY K27/K29.  
LOSS OF ABILITY TO OPERATE THE STBD SYSTEM 2 AFT RETENTION LATCH ACTUATOR TO EITHER THE RELEASE OR LATCH POSITION.  
SUBSEQUENT FAILURE IN REDUNDANT SYSTEM 1 COULD CAUSE LOSS OF MISSION.

*REFERENCES:* VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

**REPORT DATE 02/25/87**  
C-263
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4341

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, R34
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A119)
6) AFT ACTUATOR SYSTEM 2, K24 LATCHED, (V54X0865E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R34
9) 

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 40V76A119R34
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 2 LATCH ENABLE MONITORING MEASUREMENT (V54X0865E) TO MDM OF1.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-264
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4342

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: /NA

ITEM: RESISTOR, R33
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (4OV54A17)
5) MID MOTOR CONTROLLER (MMC)-3 (4OV76A118)
6) AFT ACTUATOR SYSTEM 2, K27 LATCHED, (V54X0865E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R33

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 4OV76A118R33
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 2 LATCH ENABLE MONITORING MEASUREMENT (V54X1065E) TO MDM OA2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-265
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86
SUBSYSTEM: EPD&C
MDAC ID: 4343

ITEM: RESISTOR, R36
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON    SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) PORT MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (4OV54A7)
5) MID MOTOR CONTROLLER (MMC)-3 (4OV76A119)
6) AFT ACTUATOR SYSTEM 2, K12 RELEASED, (V54X0875E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R36
9) CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A119R36
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 2 RELEASE ENABLE MONITORING MEASUREMENT (V54X0875E) TO MDM OF1.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87   C-266
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/25/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&G  FLIGHT: 3/3
MDAC ID: 4344  ABORT: /NA

ITEM: RESISTOR, R31
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6IC
2) MANIPULATOR LATCH CONTROL
3) STBD MANIPULATOR LATCH CONTROL, SYSTEM 2
4) AFT LATCH ACTUATOR (40V54A7)
5) MID MOTOR CONTROLLER (MMC)-3 (40V76A118)
6) AFT ACTUATOR SYSTEM 2, R29 RELEASED, (V54X0875E)
7) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT
8) RESISTOR, R31
9) RESISTOR, CUR LIM, 5.1K OHM, 1/4 WATT

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<th>ABORT</th>
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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 40V76A118R31
PART NUMBER: RLR0705101GR

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK, VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
WILL NOT PROVIDE AFT SYSTEM 2 RELEASE ENABLE MONITORING MEASUREMENT (V54X1075E) TO MDM OA2.
LOSS OF MEASUREMENT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-267
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/05/86

SUBSYSTEM: EPD&C
MDAC ID: 4501

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1
ABORT: /NA

ITEM: SWITCH, S21
FAILURE MODE: FAILS LOCKED IN SAFE (CENTER) POSITION.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, STBD RMS PYRO ARM, JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALLED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S21
8)
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A14S21
PART NUMBER: ME452-0102-7254

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM THE STBD RMS SYSTEM A OR SYSTEM B JETTISON/GUILLOTINE PYRO INITIATOR CONTROLLERS (PICS).
INABILITY TO PERFORM RMS JETTISON WHEN IT IS REQUIRED COULD RESULT IN LOSS OF VEHICLE/CREW.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-268
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/05/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 2/1R
MDAC ID: 4502  ABORT: /NA

ITEM: SWITCH, S21
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, STBD RMS PYRO ARM, JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S21
8)
9)

CRITICALITIES

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LOCATION: 36V73A14S21
PART NUMBER: ME452-0102-7254

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY APPLICATION OF POWER TO ARM THE STBD RMS SYSTEM A AND/OR SYSTEM B JETTISON/GUILLOTINE PICS.
WOULD REQUIRE OTHER PREVIOUS OR SUBSEQUENT FAILURES TO CAUSE UNTIMELY PIC FIRING. POWER CAN BE REMOVED BY OPENING CIRCUIT BREAKERS CB27 & CB33.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-269
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/05/86
SUBSYSTEM: EPD&C
MDAC ID: 4503

ITEM: SWITCH, S28
FAILURE MODE: FAILS LOCKED IN SAFE (CENTER) POSITION.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PORT RMS PYRO ARM, JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S28

CRITICALITIES
FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC
PRELAUNCH: /NA RTLS: /NA
LIFTOFF: /NA TAL: /NA
ONORBIT: 1/1 AOA: /NA
DEORBIT: /NA ATO: /NA
LANDING/SAVING: /NA

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A14S28
PART NUMBER: ME452-0102-7254

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM THE PORT RMS SYSTEM A OR SYSTEM B JETTISON/GUILLOTINE PYRO INITIATOR CONTROLLERS (PICs).
INABILITY TO PERFORM RMS JETTISON WHEN IT IS REQUIRED COULD RESULT IN LOSS OF VEHICLE/CREW.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-270
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/05/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C FLIGHT: 2/1R
MDAC ID: 4504 ABORT: /NA

ITEM: SWITCH, S28
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PORT RMS PYRO ARM, JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S28

CRITICALITIES

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LOCATION: 36V73A14S28
PART NUMBER: ME452-0102-7254

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY APPLICATION OF POWER TO ARM PORT RMS SYSTEM A AND/OR SYSTEM B JETTISON/GUILLOTINE PICS.
WOULD REQUIRE OTHER PREVIOUS OF SUBSEQUENT FAILURES TO CAUSE UNTIMELY PIC FIRING. POWER CAN BE REMOVED BY OPENING CIRCUIT BREAKERS CB29 AND CB32.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-271
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/06/86

SUBSYSTEM: EP&D&C

MDAC ID: 4505

HIGHEST CRITICALITY HDW/FUNC

FAILURE MODE: FAILS LOCKED IN SAFE (CENTER) POSITION.

LEAD ANALYST: ROBINSON

SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:

1) RMS, 05-61D
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PYRO STBD LATCHES, AFT JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S25
8)
9)

CRITICALITIES

FLIGHT PHASE | HDW/FUNC | ABORT | HDW/FUNC
PRELAUNCH:    | /NA      | RTLS:  | /NA
LIFTOFF:      | /NA      | TAL:   | /NA
ONORBIT:      | 1/1      | AOA:   | /NA
DEORBIT:      | /NA      | ATO:   | /NA
LANDING/SAFING: | /NA   |        |       

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A14S25

PART NUMBER: ME452-0102-7257

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:

INABILITY TO ACTIVATE THE STBD RMS SYSTEM A OR SYSTEM B AFT LATCH JETTISON/GUILLOTINE PICS.
INABILITY TO PERFORM RMS JETTISON WHEN IT IS REQUIRED COULD RESULT IN LOSS OF VEHICLE/CREW.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-272
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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<th>SUBSYS LEAD</th>
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<td>Switch, S25, fails closed, applies untimely power.</td>
<td>Robinson</td>
<td>Schmeckpeper</td>
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BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) Manipulator arm/shoulder jettison & retention arm jettison
3) Panel A14
4) Switch, pyro STBD latches, AFT JETTISON/SAFE/GUILLotine
5) Switch, toggle, Herm-sealed, lever-locked in center-pos
6) Switch, 2-pole, 3-position
7) Switch, S25
8)
9)

CRITICALITIES

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LOCATION: 36V73A14S25
PART NUMBER: ME452-0102-7257

CAUSES: Mechanical/structural malfunction, shock vibration, corrosion, contamination

EFFECTS/RATIONALE:
Untimely application of power to activate the STBD RMS system A and/or system B aft latch jettison/guillotine pics. Would require other previous or subsequent failures to cause untimely pic firing.

REFERENCES: VS72-956099, Rockwell Electrical Schematic, RMS JSC-11174, Space Shuttle Systems Handbook

REPORT DATE 02/25/87 C-273
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4507

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1
ABORT: /NA

ITEM: SWITCH, S32
FAILURE MODE: FAILS LOCKED IN SAFE (CENTER) POSITION.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PYRO PORT LATCHES, AFT JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S32
8)
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A14632
PART NUMBER: ME452-0102-7257

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
- INABILITY TO ACTIVATE THE PORT RMS SYSTEM A OR SYSTEM B AFT LATCH JETTISON/GUILLOTINE PICS.
- INABILITY TO PERFORM RMS JETTISON WHEN IT IS REQUIRED COULD RESULT IN LOSS OF VEHICLE/CREW.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-274
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/06/86                      HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C                    FLIGHT: 2/1R
MDAC ID: 4508                       ABORT: /NA

ITEM: SWITCH, S32
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PYRO PORT LATCHES, AFT JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S32
8) RMS, 05-6ID

CRITICALITIES

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LOCATION: 36V73A14532
PART NUMBER: ME452-0102-7257

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY APPLICATION OF POWER TO ACTIVATE THE PORT RMS SYSTEM A AND/OR SYSTEM B AFT LATCH JETTISON/GUILLOTINE PICS.
WOULD REQUIRE OTHER PREVIOUS OR SUBSEQUENT FAILURES TO CAUSE UNTIMELY PIC FIRING.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87 C-275
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4509

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 1/1
ABORT: /NA

ITEM: SWITCH, S24
FAILURE MODE: FAILS LOCKED IN SAFE (CENTER) POSITION.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PYRO STBD LATCHES, M ID JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S24
8) ... 9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A14S24
PART NUMBER: ME452-0102-7257

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ACTIVATE THE STBD RMS SYSTEM A OR SYSTEM B MID LATCH JETTISON/GUILLOTINE PICS.
INABILITY TO PERFORM RMS JETTISON WHEN IT IS REQUIRED COULD RESULT IN LOSS OF VEHICLE/CREW.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-276
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4510

ITEM: SWITCH, S24
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PYRO STBD LATCHES, MID JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALMED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S24
8) 9)

CRITICALITIES

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LOCATION: 36V73A14S24
PART NUMBER: ME452-0102-7257

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY APPLICATION OF POWER TO ACTIVATE THE STBD RMS SYSTEM A AND/OR SYSTEM B MID LATCH JETTISON/GUILLOTINE PICS.
WOULD REQUIRE OTHER PREVIOUS OR SUBSEQUENT FAILURES TO CAUSE UNTIMELY PIC FIRING.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87 C-277
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/06/86  HIGHEST CRITICALITY
SUBSYSTEM: EPD&C  HDW/FUNC
MDAC ID: 4511

ITEM: SWITCH, S31
FAILURE MODE: FAILS LOCKED IN SAFE (CENTER) POSITION.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PYRO PORT LATCHES, MID JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S31
8) 
9) 

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION: 36V73A14S31
PART NUMBER: ME452-0102-7257

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ACTIVATE THE PORT RMS SYSTEM A OR SYSTEM B MID LATCH JETTISON/GUILLOTINE PICS.
INABILITY TO PERFORM RMS JETTISON WHEN IT IS REQUIRED COULD RESULT IN LOSS OF VEHICLE/CREW.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-278
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/06/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C
FLIGHT: 2/1R
MDAC ID: 4512
ABORT: /NA

ITEM: SWITCH, S31
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PYRO PORT LATCHES, MID JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S31

CRITICALITIES

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LOCATION: 36V73A14S31
PART NUMBER: ME452-0102-7257

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY APPLICATION OF POWER TO ACTIVATE THE PORT RMS SYSTEM A AND/OR SYSTEM B MID LATCH JETTISON/GUILLOTINE PICS. WOULD REQUIRE OTHER PREVIOUS OR SUBSEQUENT FAILURES TO CAUSE UNTIMELY PIC FIRING.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-279
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4513

ITEM: SWITCH, S23
FAILURE MODE: FAILS LOCKED IN SAFE (CENTER) POSITION.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PYRO STBD LATCHES, FWD JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S23
8) 
9) 

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A14S23
PART NUMBER: ME452-0102-7257

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ACTIVATE THE STBD RMS SYSTEM A OR SYSTEM B FWD LATCH JETTISON/GUILLOTINE PICS.
INABILITY TO PERFORM RMS JETTISON WHEN IT IS REQUIRED COULD RESULT IN LOSS OF VEHICLE/CREW.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-280
### INDEPENDENT ORBITER ASSESSMENT
#### ORBITER SUBSYSTEM ANALYSIS WORKSHEET

**DATE:** 11/06/86  
**SUBSYSTEM:** EPD&C  
**MDAC ID:** 4514  
**ITEM:** SWITCH, S23  
**FAILURE MODE:** FAILS CLOSED, APPLIES UNTIMELY POWER.  
**LEAD ANALYST:** ROBINSON  
**SUBSYS LEAD:** SCHMECKPEPER

**BREAKDOWN HIERARCHY:**

1) RMS, 05-6ID  
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON  
3) PANEL A14  
4) SWITCH, PYRO STBD LATCHES, FWD JETTISON/SAFE/GUILLOTINE  
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS  
6) SWITCH, 2-POLE, 3-POSITION  
7) SWITCH, S23

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**REdundancy Screens:** A [ ] B [P] C [P]

**LOCATION:** 36V73A14S23  
**PART NUMBER:** ME452-0102-7257

**CAUSES:** MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

**EFFECTS/RATIONALE:**

UNTIMELY APPLICATION OF POWER TO ACTIVATE THE STBD RMS SYSTEM A AND/OR SYSTEM B FWD LATCH JETTISON/GUILLOTINE PICS. WOULD REQUIRE OTHER PREVIOUS OR SUBSEQUENT FAILURES TO CAUSE UNTIMELY PIC FIRING.

**REFERENCES:** VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

**REPORT DATE 02/25/87 C-281**
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4515

ITEM: SWITCH, S30
FAILURE MODE: FAILS LOCKED IN SAFE (CENTER) POSITION.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PYRO PORT LATCHES, FWD JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S30
8) 
CRITICALITIES

FLIGHT PHASE | HDW/FUNC | ABORT | HDW/FUNC
-------------|----------|-------|----------
PRELAUNCH:   | /NA      |       | /NA      
LIFTOFF:     | /NA      |       | /NA      
ONORBIT:     | 1/1      |       | /NA      
DEORB:       | /NA      | ATO:  | /NA      
LANDING/SAFING: | /NA |       | /NA      

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A14S30
PART NUMBER: ME452-0102-7257

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ACTIVATE THE PORT RMS SYSTEM A OR SYSTEM B FWD LATCH JETTISON/GUILLOTINE PICS.
INABILITY TO PERFORM RMS JETTISON WHEN IT IS REQUIRED COULD RESULT IN LOSS OF VEHICLE/CREW.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-282
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/06/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 2/1R
MDAC ID: 4516  ABORT: /NA

ITEM: SWITCH, S30
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PYRO PORT LATCHES, FWD JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S30
8)
9)

CRITICALITIES

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LOCATION: 36V73A14S30
PART NUMBER: ME452-0102-7257

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY APPLICATION OF POWER TO ACTIVATE THE PORT RMS SYSTEM A AND/OR SYSTEM B FWD LATCH JETTISON/GUILLOTINE PICS.
WOULD REQUIRE OTHER PREVIOUS OR SUBSEQUENT FAILURES TO CAUSE UNTIMELY PIC FIRING.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-283
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4517

HIGHEST CRITICALITY HDW/FUNC FLIGHT: 1/1 ABORT: \( /\text{NA} \)

ITEM: SWITCH, S22
FAILURE MODE: FAILS LOCKED IN SAFE (CENTER) POSITION.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PYRO STBD RMS SHOULDER, JETTISON/Safe/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S22
8) 
9) 

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A14S22
PART NUMBER: ME452-0102-7257

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ACTIVATE THE STBD RMS SYSTEM A OR SYSTEM B SHOULDER RETRACTOR/GUILLOTINE PICS.
INABILITY TO PERFORM RMS JETTISON WHEN IT IS REQUIRED COULD RESULT IN LOSS OF VEHICLE/CREW.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-284
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4518
HDW/FUNC:
FLIGHT: 2/1R
ABORT: /NA

ITEM: SWITCH, S22
FAILURE MODE: Fails closed, applies untimely power.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PYRO STBD RMS SHOULDER, JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S22
8)
9)

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LOCATION: 36V73A14S22
PART NUMBER: ME452-0102-7257

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY APPLICATION OF POWER TO ACTIVATE THE STBD RMS SYSTEM A AND/OR SYSTEM B SHOULDER RETRACTOR/GUILLOTINE PICS.
WOULD REQUIRE OTHER PREVIOUS OR SUBSEQUENT FAILURES TO CAUSE UNTIMELY PIC FIRING.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-285
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/06/86
SUBSYSTEM: EPD&C
MDAC ID: 4519

ITEM: SWITCH, S29
FAILURE MODE: FAILS LOCKED IN SAFE (CENTER) POSITION.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PYRO PORT RMS SHOULDER, JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S29

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A14S29
PART NUMBER: ME452-0102-7257

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ACTIVATE THE PORT RMS SYSTEM A OR SYSTEM B SHOULDER RETRACTOR/GUILLOTINE PICS.
INABILITY TO PERFORM RMS JETTISON WHEN IT IS REQUIRED COULD RESULT IN LOSS OF VEHICLE/CREW.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-286
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/06/86                      HIGHEST CRITICALITY: HDW/FUNC
SUBSYSTEM: EPD&C                      FLIGHT: 2/1R
MDAC ID: 4520                        ABORT: /NA

ITEM: SWITCH, S29
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON              SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PYRO PORT RMS SHOULDER, JETTISON/SAFE/GUILLOTINE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S29
8)  
9)  

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LOCATION: 36V73A14S29
PART NUMBER: ME452-0102-7257

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION,
CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY APPLICATION OF POWER TO ACTIVATE THE PORT RMS SYSTEM A
AND/OR SYSTEM B SHOULDER RETRACTOR/GUILLOTINE PICS.
WOULD REQUIRE OTHER PREVIOUS OR SUBSEQUENT FAILURES TO CAUSE
UNTIMELY PIC FIRING.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-287
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/07/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/3
MDAC ID: 4521  ABORT: /NA

ITEM: SWITCH, S33
FAILURE MODE: FAILS LOCKED IN SAFE (CENTER) POSITION.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PORT/STBD RMS LATCHES, GROUND RESET/SAFE/DEADFACE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S33
8) 
9) 

CRITICALITIES

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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION:  36V73A14S33
PART NUMBER:  ME452-0102-7254

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PERFORM THE GROUND RESET OR DEADFACE FUNCTIONS FOR THE RMS LATCHES.
ON-ORBIT FAILURE WOULD CAUSE INABILITY TO DEADFACE RMS LATCH CIRCUITS PRIOR TO GUILLOTINE ACTION.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-288
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/07/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/2R
MDAC ID: 4522  ABORT: /NA

ITEM: SWITCH, S33
FAILURE MODE: FAILS CLOSED, APPLIES UNTIMELY POWER.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) SWITCH, PORT/STBD RMS LATCHES, GROUND RESETSAFE/DEADFACE
5) SWITCH, TOGGLE, HERM-SEALED, LEVER-LOCKED IN CENTER-POS
6) SWITCH, 2-POLE, 3-POSITION
7) SWITCH, S33
8)
9)

CRITICALITIES

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LOCATION: 36V73A14S33
PART NUMBER: ME452-0102-7254

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
IF FAILED IN GROUND RESET POSITION, NO EFFECT ON ORBIT SINCE PRE-FLIGHT TEST VOLTAGE IS NOT APPLIED. IF FAILED IN THE DEADFACE POSITION, THE POWER TO THE SWITCH COULD BE REMOVED BY OPENING SYSTEM A CIRCUIT BREAKER.
IF FAILED IN THE DEADFACE POSITION, POWER COULD BE REMOVED BY OPENING THE SYSTEM A CIRCUIT BREAKER (PORT CB29 OR STBD CB27).

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-289
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/07/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 3/3
MDAC ID: 4523  ABORT: /NA

ITEM: FUSE, F27
FAILURE MODE: FAILS OPEN.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL A14
4) PREFLIGHT TEST BUS POWER
5) SWITCH, PORT/STBD, RMS LATCHES, GROUND-RESET/SAFE/DEADFACE
6) FUSE, CIRCUIT PROTECTION, 3 AMP
7) FUSE, F27
8) 
9) 

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 36V73A14F37
PART NUMBER: ME451-0018-0300

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO PROVIDE PRE-FLIGHT TEST BUS VOLTAGE TO SWITCH S33 ON PANEL A14.
INABILITY TO PERFORM GROUND RESET FUNCTION FOR RMS LATCHES. NO EFFECT IN FLIGHT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-290
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/07/86
SUBSYSTEM: EPD&C
MDAC ID: 4524

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 2/1R
ABORT: /NA

ITEM: CIRCUIT BREAKER, CB27
FAILURE MODE: FAILS OPEN. WILL NOT CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL ML 86B:D
4) MN A STBD PYRO JETT, SYSTEM A
5) CIRCUIT BREAKER, 5 AMP
6) CIRCUIT BREAKER, CB27

CRITICALITIES

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LOCATION: 80V73A180CB27
PART NUMBER: ME454-0062-2050

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
- LOSS OF MN A 28 VDC TO ARM THE STBD RMS SYSTEM A AND SYSTEM B JETTISON/GUILLOTINE PICS
- SUBSEQUENT FAILURE OF REDUNDANT SYSTEM WOULD RESULT IN LOSS OF POWER TO ARM THE STBD RMS SYSTEM A AND SYSTEM B JETTISON/GUILLOTINE PICS. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-291
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/07/86
SUBSYSTEM: EPD&C
MDAC ID: 4525
HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: /NA

ITEM: CIRCUIT BREAKER, CB27
FAILURE MODE: FAILS CLOSED, WILL NOT OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL ML 86B:D
4) MN A STBD PYRO JETT, SYSTEM A
5) CIRCUIT BREAKER, 5 AMP
6) CIRCUIT BREAKER, CB27
7)
8)
9)

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 80V73A180CB27
PART NUMBER: ME454-0062-2050

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF CIRCUIT PROTECTION FOR MN A 28 VDC THAT IS USED TO ARM THE STBD RMS SYSTEM A AND SYSTEM B JETTISON/GUILLOTINE PICS NO EFFECT. POWER CAN BE REMOVED BY SWITCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-292
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/07/86
SUBSYSTEM: EPD&C
MDAC ID: 4526

ITEM: FAILURE MODE: CIRCUIT BREAKER, CB29
FAILS OPEN. WILL NOT CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL ML 86B:D
4) MN B PORT PYRO JETT, SYSTEM A
5) CIRCUIT BREAKER, 5 AMP
6) CIRCUIT BREAKER, CB29
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LOCATION: 80V73A18OCB29
PART NUMBER: ME454-0062-2050

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF MN B 28 VDC TO ARM THE PORT RMS SYSTEM A AND SYSTEM B JETTISON/GUILLOTINE PICS

SUBSEQUENT FAILURE OF REDUNDANT SYSTEM WOULD RESULT IN LOSS OF POWER TO ARM THE PORT RMS SYSTEM A AND SYSTEM B JETTISON/GUILLOTINE PICS. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-293
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/07/86
SUBSYSTEM: EPD&C
MDAC ID: 4527

HIGHEST CRITICALITY
FLIGHT: 3/3
ABORT: /NA

ITEM: CIRCUIT BREAKER, CB29
FAILURE MODE: FAILS CLOSED, WILL NOT OPEN.

LEAD ANALYST: ROBINSON      SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL ML 86B:D
4) MN B PORT PYRO JETT, SYSTEM A
5) CIRCUIT BREAKER, 5 AMP
6) CIRCUIT BREAKER, CB29
7) 
8) 
9) 

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]   B [ ]   C [ ]

LOCATION: 80V73A180CB29
PART NUMBER: ME454-0062-2050

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF CIRCUIT PROTECTION FOR MN B 28 VDC THAT IS USED TO ARM THE PORT RMS SYSTEM A AND SYSTEM B JETTISON/GUILLOTINE PICS
NO EFFECT. POWER CAN BE REMOVED BY SWITCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87   C-294
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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REPORT DATE 02/25/87  C-295
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/07/86
SUBSYSTEM: EPD&C
MDAC ID: 4529

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: CIRCUIT BREAKER, CB33
FAILURE MODE: FAILS CLOSED, WILL NOT OPEN.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL ML 86B:D
4) MN C STBD PYRO JETT, SYSTEM B
5) CIRCUIT BREAKER, 5 AMP
6) CIRCUIT BREAKER, CB33

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 80V73A180CB33
PART NUMBER: ME454-0062-2050

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE: LOSS OF CIRCUIT PROTECTION FOR MN C 28 VDC THAT IS USED TO ARM THE STBD RMS SYSTEM A AND SYSTEM B JETTISON/GUILLOTINE PICS NO EFFECT. POWER CAN BE REMOVED BY SWITCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-296
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/07/86
SUBSYSTEM: EP&C
MDAC ID: 4530

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: CIRCUIT BREAKER, CB32
FAILURE MODE: FAILS OPEN. WILL NOT CLOSE.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) PANEL ML 86B:D
4) MN C PORT PYRO JETT, SYSTEM B
5) CIRCUIT BREAKER, 5 AMP
6) CIRCUIT BREAKER, CB32
7)...
8)...
9)...

CRITICALITIES

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LOCATION: 80V73A180CB32
PART NUMBER: ME454-0062-2050

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF MN C 28 VDC TO ARM THE PORT RMS SYSTEM A AND SYSTEM B JETTISON/GUILLOTINE PICS
SUBSEQUENT FAILURE OF REDUNDANT SYSTEM WOULD RESULT IN LOSS OF POWER TO ARM THE PORT RMS SYSTEM A AND SYSTEM B JETTISON/GUILLOTINE PICS. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-297
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 11/07/86
SUBSYSTEM: EPD&C
MDAC ID: 4531

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ABORT: /NA

ITEM: CIRCUIT BREAKER, CB32
FAILURE MODE: FAILS CLOSED, WILL NOT OPEN.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
   2) MANIPULATOR ARM/SOULDER JETTISON & RETENTION ARM JETTISON
   3) PANEL ML 86B:D
   4) MN C PORT PYRO JETT, SYSTEM B
   5) CIRCUIT BREAKER, 5 AMP
   6) CIRCUIT BREAKER, CB32
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 80V73A180CB32
PART NUMBER: ME454-0062-2050

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF CIRCUIT PROTECTION FOR MN C 28 VDC THAT IS USED TO ARM THE STBD RMS SYSTEM A AND SYSTEM B JETTISON/GUILLOTINE PICS
NO EFFECT. POWER CAN BE REMOVED BY SWITCH.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-298
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 2/1R
MDAC ID: 4532  ABORT: /NA

ITEM: PIC 1
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR SHOULDER GUILLOTINE SYSTEM B
5) SHOULDER GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
6) PIC 1
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8)
9)

CRITICALITIES

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LOCATION: 40V76A137PIC1
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE PORT RMS SHOULDER GUILLOTINE SYSTEM B PYRO.

SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO GUILLOTINE THE PORT SHOULDER CABLES WHICH WOULD NOT ALLOW JETTISON OF THE MANIPULATOR ARM. POSSIBLE LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-299
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86  HIGHEST CRITICALITY    HDW/FUNC
SUBSYSTEM: EP&D&C    FLIGHT: 2/1R
MDAC ID: 4533    ABORT: /NA

ITEM: PIC 1
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR SHOULDER GUILLOTINE SYSTEM B
5) SHOULDER GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
6) PIC 1
7) 
8) 
9) 

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LOCATION: 40V76A138PIC1
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE STBD RMS SHOULDER GUILLOTINE SYSTEM B PYRO.
SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO GUILLOTINE THE STBD SHOULDER CABLES WHICH WOULD NOT ALLOW JETTISON OF THE MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87   C-300
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4534

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 12
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR SHOULDER GUILLOTINE SYSTEM A
5) SHOULDER GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
6) PIC 12
7) 
8) 
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LOCATION: 40V76A137PIC12
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE PORT RMS SHOULDER GUILLOTINE SYSTEM A PYRO.

SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO GUILLOTINE THE PORT SHOULDER CABLES WHICH WOULD NOT ALLOW JETTISON OF THE MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-301
**INDEPENDENT ORBITER ASSESSMENT**
**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

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**ITEM:** PIC 12
**FAILURE MODE:** FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

**LEAD ANALYST:** ROBINSON  **SUBSYS LEAD:** SCHMECKPEPER

**BREAKDOWN HIERARCHY:**
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR SHOULDER GUILLOTINE SYSTEM A
5) SHOULDER GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
6) PIC 12

**CRITICALITIES**

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**LOCATION:** 40V76A138PIC12
**PART NUMBER:** ME450-0018-0004

**CAUSES:** MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

**EFFECTS/RATIONALE:**
INABILITY TO ARM/FIRE THE STBD RMS SHOULDER GUILLOTINE SYSTEM A PYRO.
SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO GUILLOTINE THE STBD SHOULDER CABLES WHICH WOULD NOT ALLOW JETTISON OF THE MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

**REFERENCES:** VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-302
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 2/1R
MDAC ID: 4536  ABORT: /NA

ITEM: PIC 1, 12
FAILURE MODE: EITHER PIC 1 OR 12 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR SHOULDER GUILLOTINE SYSTEMS A & B
5) SHOULDER GUILLOTINE PYRO INITIATOR CONTROLLERS (PICS)
6) PIC 1, 12
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LOCATION: 40V76A137PIC1,12
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE PORT RMS SHOULDER GUILLOTINE SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN FOUND THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.

NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS GUILLOTINE PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87  C-303
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86

HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C FLIGHT: 2/1R
MDAC ID: 4537 ABORT: /NA

ITEM: PIC 1, 12
FAILURE MODE: EITHER PIC 1 OR 12 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR SHOULDER GUILLOTINE SYSTEMS A & B
5) SHOULDER GUILLOTINE PYRO INITIATOR CONTROLLERS (PICS)
6) PIC 1, 12
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LOCATION: 40V76A138PIC1,12
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE STBD RMS SHOULDER GUILLOTINE SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN FOUND THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.
NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS GUILLOTINE PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87 C-304
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86  
SUBSYSTEM: EPD&C  
MDAC ID: 4537  

HIGHEST CRITICALITY HDW/FUNC: FLIGHT: 2/1R  
ABORT: /NA  

ITEM: PIC 1, 12  
FAILURE MODE: EITHER PIC 1 OR 12 ARMS/FIRES PREMATURELY.  

LEAD ANALYST: ROBINSON  
SUBSYS LEAD: SCHMECKPEPER  

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR SHOULDER GUILLOTINE SYSTEMS A & B
5) SHOULDER GUILLOTINE PYRO INITIATOR CONTROLLERS (PICS)
6) PIC 1, 12
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LOCATION: 40V76A138PIC1,12
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE STBD RMS SHOULDER GUILLOTINE SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN FOUND THAT CAN CAUSED UNTIMELY ARMING AND UNTIMELY FIRING OF THE EITHER PIC.
NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS GUILLOTINE PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-304
INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET  

DATE: 12/18/86 HIGHEST CRITICALITY HDW/FUNC  
SUBSYSTEM: EPD&C  
MDAC ID: 4538  
FLIGHT: 2/1R  
ABORT: /NA  

ITEM: PIC 6  
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/both).  
LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER  

BREAKDOWN HIERARCHY:  
1) RMS, 05-6ID  
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON  
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1  
4) PORT MANIPULATOR FWD LATCH GUILLOTINE SYSTEM B  
5) FWD LATCH GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)  
6) PIC 6  
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LOCATION: 40V76A137PIC6  
PART NUMBER: ME450-0018-0004  

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION  

EFFECTS/RATIONALE:  
INABILITY TO ARM/FIRE THE PORT RMS FWD LATCH GUILLOTINE SYSTEM B PYRO.  
SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO GUILLOTINE THE FWD LATCH CABLES WHICH WOULD NOT ALLOW JETTISON OF THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.  

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK  

REPORT DATE 02/25/87 C-305
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4539

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 6
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/Both).

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR FWD LATCH GUILLOTINE SYSTEM B
5) FWD LATCH GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
6) PIC 6
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8) 
9) 

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LOCATION: 40V76A138PIC6
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE STBD RMS FWD LATCH GUILLOTINE SYSTEM B PYRO.
SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO GUILLOTINE THE FWD LATCH CABLES WHICH WOULD NOT ALLOW JETTISON OF THE STBD MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-306
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4540

ITEM: PIC 17
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR FWD LATCH GUILLOTINE SYSTEM A
5) FWD LATCH GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
6) PIC 17

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LOCATION: 40V76A137PIC17
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE PORT RMS FWD LATCH GUILLOTINE SYSTEM A PYRO.
SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO GUILLOTINE THE FWD LATCH CABLES WHICH WOULD NOT ALLOW JETTISON OF THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-307
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 2/1R
MDAC ID: 4541  ABORT: /NA

ITEM: PIC 17
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/both).

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR FWD LATCH GUILLOTINE SYSTEM A
5) FWD LATCH GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
6) PIC 17
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LOCATION: 40V76A138PIC17
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE STBD RMS FWD LATCH GUILLOTINE SYSTEM A PYRO.
SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO GUILLOTINE THE FWD LATCH CABLES WHICH WOULD NOT ALLOW JETTISON OF THE STBD MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 03/02/87  C-308
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4542

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 6, 17
FAILURE MODE: EITHER PIC 6 OR 17 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR FWD LATCH GUILLOTINE SYSTEMS A & B
5) FWD LATCH GUILLOTINE PYRO INITIATOR CONTROLLERS (PICS)
6) PIC 6, 17
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LOCATION: 40V76A137PIC6, 17
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE PORT RMS FWD LATCH GUILLOTINE SYSTEM A OR B COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN FOUND THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.

NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS GUILLOTINE PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-309
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4543

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 6, 17
FAILURE MODE: EITHER PIC 6 OR 17 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR FWD LATCH GUILLOTINE SYSTEMS A & B
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LOCATION: 40V76A138PIC6, 17
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE STBD RMS FWD LATCH GUILLOTINE SYSTEM A OR B COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN FOUND THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.
NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS GUILLOTINE PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-310
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 2/1R
MDAC ID: 4544  ABORT: /NA

ITEM: PIC 8
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR MID LATCH GUILLOTINE SYSTEM B
5) MID LATCH GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
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LOCATION: 40V76A137PIC8
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE PORT RMS MID LATCH GUILLOTINE SYSTEM B PYRO.
SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO GUILLOTINE THE MID LATCH CABLES WHICH WOULD NOT ALLOW JETTISON OF THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-1174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-311
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4545

ITEM: PIC 8
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR MID LATCH GUILLOTINE SYSTEM B
5) MID LATCH GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
6) PIC 8
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LOCATION: 40V76A138PIC8
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE STBD RMS MID LATCH GUILLOTINE SYSTEM B PYRO.
SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO GUILLOTINE THE MID LATCH CABLES WHICH WOULD NOT ALLOW JETTISON OF THE STBD MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-312
INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86  
SUBSYSTEM: EPD&C  
MDAC ID: 4546

HIGHEST CRITICALITY: HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 19
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON  
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:

1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR MID LATCH GUILLOTINE SYSTEM A
5) MID LATCH GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
6) PIC 19


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LOCATION: 40V76A137PIC19  
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION,  
CORROSION, CONTAMINATION

EFFECTS/RATIONALE:

INABILITY TO ARM/FIRE THE PORT RMS MID LATCH GUILLOTINE SYSTEM
A PYRO.

SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO
GUILLOTINE THE MID LATCH CABLES WHICH WOULD NOT ALLOW JETTISON OF
THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS
JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  
C-313
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86 HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C FLIGHT: 2/1R
MDAC ID: 4547 ABORT: /NA

ITEM: PIC 19
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR MID LATCH GUILLOTINE SYSTEM A
5) MID LATCH GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
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LOCATION: 40V76A138PIC19
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
* INABILITY TO ARM/FIRE THE STBD RMS MID LATCH GUILLOTINE SYSTEM A PYRO.
* SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO GUILLOTINE THE MID LATCH CABLES WHICH WOULD NOT ALLOW JETTISON OF THE STBD MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-314
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4548

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 8, 19
FAILURE MODE: EITHER PIC 8 OR 19 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR MID LATCH GUILLOTINE SYSTEMS A & B
5) MID LATCH GUILLOTINE PYRO INITIATOR CONTROLLED (PICS)
6) PIC 8, 19
7) 
8) 
9)

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LOCATION: 40V76A137PIC8, 19
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE PORT RMS MID GUILLOTINE SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.

NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS GUILLOTINE PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-315
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4549

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 8, 19
FAILURE MODE: EITHER PIC 8 OR 19 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR MID LATCH GUILLOTINE SYSTEMS A & B
5) MID LATCH GUILLOTINE PYRO INITIATOR CONTROLLERS (PICS)
6) PIC 8, 19
7) 8) 9)

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LOCATION: 40V76A138PIC8, 19
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE STBD RMS MID GUILLOTINE SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.
NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS GUILLOTINE PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-316
DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4550

ITEM: PIC 10
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR AFT LATCH GUILLOTINE SYSTEM B
5) AFT LATCH GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
6) PIC 10
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LOCATION: 40V76A137PIC10
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE PORT RMS AFT LATCH GUILLOTINE SYSTEM B PYRO.
SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO GUILLOTINE THE AFT LATCH CABLES WHICH WOULD NOT ALLOW JETTISON OF THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-317
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
HIGHEST CRITICALITY: HDW/FUNC
SUBSYSTEM: EPD&C
FLIGHT: 2/1R
MDAC ID: 4551
ABORT: /NA

ITEM: PIC 10
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:

1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) PORT MANIPULATOR AFT LATCH GUILLOTINE SYSTEM B
5) AFT LATCH GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
6) PIC 10
7)
8)
9)

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LOCATION: 40V76A138PIC10
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE STBD RMS AFT LATCH GUILLOTINE SYSTEM B PYRO.
SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO GUILLOTINE THE AFT LATCH CABLES WHICH WOULD NOT ALLOW JETTISON OF THE STBD MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-318
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4552
HIGHEST CRITICALITY HDW/FUNC FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 21
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/both).

LEAD ANALYST: ROBINSON SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR AFT LATCH GUILLOTINE SYSTEM A
5) AFT LATCH GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
6) PIC 21
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LOCATION: 40V76A137PIC21
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE PORT RMS AFT LATCH GUILLOTINE SYSTEM A PYRO.
SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO GUILLOTINE THE AFT LATCH CABLES WHICH WOULD NOT ALLOW JETTISON OF THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-319
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4553

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 21
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) PORT MANIPULATOR AFT LATCH GUILLOTINE SYSTEM A
5) AFT LATCH GUILLOTINE PYRO INITIATOR CONTROLLER (PIC)
6) PIC 21
7) 8) 9)

CRITICALITIES
FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC
PRELAUNCH: /NA RTLS: /NA
LIFTOFF: /NA TAL: /NA
ONORBIT: 2/1R AOA: /NA
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LANDING/SAFING: /NA


LOCATION: 40V76A138PIC21
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE STBD RMS AFT LATCH GUILLOTINE SYSTEM A PYRO.
SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO GUILLOTINE THE AFT LATCH CABLES WHICH WOULD NOT ALLOW JETTISON OF THE STBD MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-320
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4554

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 10, 21
FAILURE MODE: EITHER PIC 10 OR 21 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL COUENT CONTROL ASSEMBLY 1
4) PORT MANIPULATOR AFT LATCH GUILLOTINE SYSTEMS A & B
5) AFT LATCH GUILLOTINE PYRO INITIATOR CONTROLLERS (PICS)
6) PIC 10, 21
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8) 
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LOCATION: 40V76A137PIC10, 21
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE PORT RMS AFT LATCH GUILLOTINE SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.
NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS GUILLOTINE PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-321
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4555

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 10, 21
FAILURE MODE: EITHER PIC 10 OR 21 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) PORT MANIPULATOR AFT LATCH GUILLOTINE SYSTEMS A & B
5) AFT LATCH GUILLOTINE PYRO INITIATOR CONTROLLERS (PICS)
6) PIC 10, 21
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LOCATION: 40V76A138PIC10, 21
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE STBD RMS AFT LATCH GUILLOTINE SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.

NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS GUILLOTINE PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-322
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR SHOULDER RETRACTOR SYSTEM B
5) SHOULDER RETRACTOR PYRO INITIATOR CONTROLLER (PIC)
6) PIC 2
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LOCATION: 40V76A137PIC2
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE PORT RMS SHOULDER RETRACTOR JETTISON SYSTEM B PYRO.
SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO JETTISON THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-323
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4557

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 2
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR SHOULDER RETRACTOR SYSTEM B
5) SHOULDER RETRACTOR PYRO INITIATOR CONTROLLER (PIC)
6) PIC 2
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LOCATION: 40V76A138PIC2
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE STBD RMS SHOULDER RETRACTOR JETTISON SYSTEM B PYRO.
SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO JETTISON THE STBD MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-324
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT:  2/1R
MDAC ID: 4558  ABORT: /NA

ITEM: PIC 13
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-61D
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR SHOULDER RETRACTOR SYSTEM A
5) SHOULDER RETRACTOR PYRO INITIATOR CONTROLLER (PIC)
6) PIC 13

CRITICALITIES

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LOCATION: 40V76A137PIC13
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE PORT RMS SHOULDER RETRACTOR JETTISON SYSTEM A PYRO.
SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO JETTISON THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-325
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
SUBSYSTEM: EPD&C
MDAC ID: 4559

HIGHEST CRITICALITY: HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 13
FAILURE MODE: FAILS TO ARM AND/OR FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR SHOULDER RETRACTOR SYSTEM A
5) SHOULDER RETRACTOR PYRO INITIATOR CONTROLLER (PIC)
6) PIC 13
7)
8)
9)

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LOCATION: 40V76A138PIC13
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE STBD RMS SHOULDER RETRACTOR JETTISON SYSTEM A PYRO.
SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO JETTISON THE STDB MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-326
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C
FLIGHT: 2/1R
MDAC ID: 4560
ABORT: /NA

ITEM: PIC 2, 13
FAILURE MODE: EITHER PIC 2 OR 13 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR SHOULDER RETRACTOR SYSTEMS A & B
5) SHOULDER RETRACTOR PYRO INITIATOR CONTROLLERS (PICS)
6) PIC 2, 13
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LOCATION: 40V76A137PIC2, 13
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE PORT RMS SHOULDER RETRACTOR JETTISON SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.
NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-327
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/18/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C
FLIGHT: 2/1R
MDAC ID: 4561
ABORT: /NA

ITEM: PIC 2, 13
FAILURE MODE: EITHER PIC 2 OR 13 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR SHOULDER RETRACTOR SYSTEMS A & B
5) SHOULDER RETRACTOR PYRO INITIATOR CONTROLLERS (PICS)
6) PIC 2, 13
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9)

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LOCATION: 40V76A138PIC2, 13
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE STBD RMS SHOULDER RETRACTOR JETTISON SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.
NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-328
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86
SUBSYSTEM: EPD&C
MDAC ID: 4562

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 7
FAILURE MODE: FAILS TO ARM, FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR FWD LATCH BOLT SYSTEM B
5) FWD LATCH BOLT PYRO INITIATOR CONTROLLER (PIC)
6) PIC 7
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LOCATION: 40V76A137PIC7
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE PORT RMS FWD JETTISON LATCH BOLT SYSTEM B PYRO.
SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO JETTISON THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-329
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86
SUBSYSTEM: EPD&C
MDAC ID: 4563

ITEM: PIC 7
FAILURE MODE: FAILS TO ARM, FAILS TO FIRE (EITHER/BOTH).
LEAD ANALYST: ROBINSON

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR FWD LATCH BOLT SYSTEM B
5) FWD LATCH BOLT PYRO INITIATOR CONTROLLER (PIC)
6) PIC 7
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LOCATION: 40V76A138PIC7
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
- INABILITY TO ARM/FIRE THE STBD RMS FWD JETTISON LATCH BOLT SYSTEM B PYRO.
- SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO JETTISON THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-330
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86
SUBSYSTEM: EPD&C
MDAC ID: 4564

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 18
FAILURE MODE: FAILS TO ARM, FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR FWD LATCH BOLT SYSTEM A
5) FWD LATCH BOLT PYRO INITIATOR CONTROLLER (PIC)
6) PIC 18
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LOCATION: 40V76A137PIC18
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE PORT RMS FWD JETTISON LATCH BOLT SYSTEM A PYRO.
SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO JETTISON THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-331
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86
SUBSYSTEM: EPD&C
MDAC ID: 4565
HIGHEST CRITICALITY HDW/FUNC: ABORT: /NA
FLIGHT: 2/1R

ITEM: PIC 18
FAILURE MODE: FAILS TO ARM, FAILS TO FIRE (EITHER/both).

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR FWD LATCH BOLT SYSTEM A
5) FWD LATCH BOLT PYRO INITIATOR CONTROLLER (PIC)
6) PIC 18
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LOCATION: 40V76A138PIC18
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE STBD RMS FWD JETTISON LATCH BOLT SYSTEM A PYRO.
SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO JETTISON THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE: 02/25/87  C-332
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C
FLIGHT: 2/1R
MDAC ID: 4566
ABORT: /NA

ITEM: PIC 7, 18
FAILURE MODE: EITHER PIC 7 OR 18 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR FWD LATCH BOLT SYSTEMS A & B
5) FWD LATCH BOLT PYRO INITIATOR CONTROLLERS (PICS)
6) PIC 7, 18
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LOCATION: 40V76A137PIC7,18
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE PORT RMS FWD JETTISON LATCH BOLT SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.

NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-333
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C
FLIGHT: 2/1R
MDAC ID: 4567
ABORT: /NA

ITEM: PIC 7, 18
FAILURE MODE: EITHER PIC 7 OR 18 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MJD JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR FWD LATCH BOLT SYSTEMS A & B
5) FWD LATCH BOLT PYRO INITIATOR CONTROLLERS (PICS)
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LOCATION: 40V76A138 PIC7, 18
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE STBD RMS FWD JETTISON LATCH BOLT SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.
NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-334
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86
SUBSYSTEM: EP&D&C
MDAC ID: 4568

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 9
FAILURE MODE: FAILS TO ARM, FAILS TO FIRE (EITHER/both).

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR MID LATCH BOLT SYSTEMS B
5) MID LATCH BOLT PYRO INITIATOR CONTROLLER (PIC)
6) PIC 9
7)
8)
9)

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LOCATION: 40V76A137PIC9
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE PORT RMS MID JETTISON LATCH BOLT SYSTEM B PYRO.

SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO JETTISON THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-335
INDEPENDENT ORBITER ASSESSMENT
ORBITE SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86
HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C
FLIGHT: 2/1R
MDAC ID: 4569
ABORT: /NA

ITEM: PIC 9
FAILURE MODE: FAILS TO ARM, FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL ASSEMBLY 2
4) STBD MANIPULATOR MID LATCH BOLT SYSTEMS B
5) MID LATCH BOLT PYRO INITIATOR CONTROLLER (PIC)
6) PIC 9
7) 
8) 
9)

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LOCATION: 40V76A138PIC9
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE STBD RMS MID JETTISON LATCH BOLT SYSTEM B PYRO.
SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO JETTISON THE STBD MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-336
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86
SUBSYSTEM: EPD&C
MDAC ID: 4570
HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 20
FAILURE MODE: FAILS TO ARM, FAILS TO FIRE (EITHER/BOTH).
LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR MID LATCH BOLT SYSTEMS A
5) MID LATCH BOLT PYRO INITIATOR CONTROLLER (PIC)
6) PIC 20
7)
8)
9)

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LOCATION: 40V76A137PIC20
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE PORT RMS MID JETTISON LATCH BOLT SYSTEM A PYRO.
SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO JETTISON THE PORT MANIPULATOR ARM. LOSS OF VEHICLE COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-337
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 2/1R
MDAC ID: 4571  ABORT: /NA

ITEM: PIC 20
FAILURE MODE: FAILS TO ARM, FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR MID LATCH BOLT SYSTEMS A
5) MID LATCH BOLT PYRO INITIATOR CONTROLLER (PIC)
6) PIC 20
7)
8)
9)

CRITICALITIES
FLIGHT PHASE  HDW/FUNC  ABORT  HDW/FUNC
PRELAUNCH: /NA  RTLS: /NA
LIFTOFF: /NA  TAL: /NA
ONORBIT: 2/1R  AOA: /NA
DEOORBIT: /NA  ATO: /NA
LANDING/SAFING: /NA


LOCATION: 40V76A138PIC20
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE STBD RMS MID JETTISON LATCH BOLT SYSTEM A PYRO.
SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO JETTISON THE STBD MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-338
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 2/1R
MDAC ID: 4572  ABORT: /NA

ITEM: PIC 9, 20
FAILURE MODE: EITHER PIC 9 OR 20 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR MID LATCH BOLT SYSTEMS A & B
5) MID LATCH BOLT PYRO INITIATOR CONTROLLERS (PICS)
6) PIC 9, 20
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COSTS:

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE PORT RMS MID JETTISON LATCH BOLT SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.

NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-339
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: EPD&C

FLIGHT: 2/1R

ABORT: /NA

MDAC ID: 4573

ITEM: PIC 9, 20

FAILURE MODE: EITHER PIC 9 OR 20 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON

SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR MID LATCH BOLT SYSTEMS A & B
5) MID LATCH BOLT PYRO INITIATOR CONTROLLERS (PICS)
6) PIC 9, 20
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LOCATION: 40V76A138PIC9, 20

PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE STBD RMS MID JETTISON LATCH BOLT SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC. NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-340
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 2/1R
MDAC ID: 4574  ABORT: /NA

ITEM: PIC II
FAILURE MODE: FAILS TO ARM, FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR AFT LATCH BOLT SYSTEMS B
5) AFT LATCH BOLT PYRO INITIATOR CONTROLLER (PIC)
6) PIC II

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LOCATION: 40V76AL37PICII
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE PORT RMS AFT JETTISON LATCH BOLT SYSTEM B PYRO.
SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO JETTISON THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-341
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86
SUBSYSTEM: EPD&C
MDAC ID: 4575

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 11
FAILURE MODE: FAILS TO ARM, FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR AFT LATCH BOLT SYSTEMS B
5) AFT LATCH BOLT PYRO INITIATOR CONTROLLER (PIC)
6) PIC 11
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8)
9)

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LOCATION: 40V76A138PIC11
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE STBD RMS AFT JETTISON LATCH BOLT SYSTEM B PYRO.
SUBSEQUENT FAILURE OF SYSTEM A WOULD RESULT IN INABILITY TO JETTISON THE STBD MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-342
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86
SUBSYSTEM: EPD&C
MDAC ID: 4576

ITEM: PIC 22
FAILURE MODE: FAILS TO ARM, FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
   2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
   3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
   4) PORT MANIPULATOR AFT LATCH BOLT SYSTEMS A
   5) AFT LATCH BOLT PYRO INITIATOR CONTROLLER (PIC)
   6) PIC 22
   7) 
   8) 
   9) 

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LOCATION: 40V76A137PIC22
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE PORT RMS AFT JETTISON LATCH BOLT SYSTEM A PYRO.
SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO JETTISON THE PORT MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-343
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EPD&C  FLIGHT: 2/1R
MDAC ID: 4577  ABORT: /NA

ITEM: PIC 22
FAILURE MODE: FAILS TO ARM, FAILS TO FIRE (EITHER/BOTH).

LEAD ANALYST: ROBINSON  SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR AFT LATCH BOLT SYSTEMS A
5) AFT LATCH BOLT PYRO INITIATOR CONTROLLER (PIC)
6) PIC 22
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LOCATION: 40V76A138PIC22
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
INABILITY TO ARM/FIRE THE STBD RMS AFT JETTISON LATCH BOLT SYSTEM A PYRO.
SUBSEQUENT FAILURE OF SYSTEM B WOULD RESULT IN INABILITY TO JETTISON THE STBD MANIPULATOR ARM. LOSS OF VEHICLE/CREW COULD RESULT.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-344
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86
SUBSYSTEM: EPD&C
MDAC ID: 4578

HIGHEST CRITICALITY
FLIGHT: 2/1R
ABORT: /NA

ITEM: PIC 11, 22
FAILURE MODE: EITHER PIC 11 OR 22 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 1
4) PORT MANIPULATOR AFT LATCH BOLT SYSTEMS A & B
5) AFT LATCH BOLT PYRO INITIATOR CONTROLLERS (PICS)
6) PIC 11, 22

CRITICALITIES

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LOCATION: 40V76A137PIC11, 22
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE PORT RMS AFT JETTISON LATCH BOLT SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.

NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87  C-345
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 12/19/86
SUBSYSTEM: EPD&C
MDAC ID: 4579

HIGHEST CRITICALITY
HDW/FUNC

ITEM: PIC 11, 22
FAILURE MODE: EITHER PIC 11 OR 22 ARMS/FIRES PREMATURELY.

LEAD ANALYST: ROBINSON
SUBSYS LEAD: SCHMECKPEPER

BREAKDOWN HIERARCHY:
1) RMS, 05-6ID
2) MANIPULATOR ARM/SHOULDER JETTISON & RETENTION ARM JETTISON
3) MID JETTISON CONTROL CONTROL ASSEMBLY 2
4) STBD MANIPULATOR AFT LATCH BOLT SYSTEMS A & B
5) AFT LATCH BOLT PYRO INITIATOR CONTROLLERS (PICS)
6) PIC 11, 22
7)
8)
9)

CRITICALITIES
FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC
PRELAUNCH: /NA RTLS: /NA
LIFTOFF: /NA TAL: /NA
ONORBIT: 2/1R AOA: /NA
DEORBIT: /NA ATO: /NA
LANDING/SAFING: /NA


LOCATION: 40V76A138PIC11, 22
PART NUMBER: ME450-0018-0004

CAUSES: MECHANICAL/STRUCTURAL MALFUNCTION, SHOCK VIBRATION, CORROSION, CONTAMINATION

EFFECTS/RATIONALE:
UNTIMELY ARMING/FIRING THE STBD RMS AFT JETTISON LATCH BOLT SYSTEM A OR B PYROS COULD CAUSE LOSS OF VEHICLE. NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT CAN CAUSE UNTIMELY ARMING AND UNTIMELY FIRING OF EITHER PIC.

NO SINGLE FAILURE HAS BEEN IDENTIFIED THAT COULD CAUSE BOTH PREMATURE ARMING AND PREMATURE FIRING OF AN RMS PYRO.

REFERENCES: VS72-956099, ROCKWELL ELECTRICAL SCHEMATIC, RMS JSC-11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE 02/25/87 C-346
## APPENDIX D

### POTENTIAL CRITICAL ITEMS

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## POTENTIAL CRITICAL ITEMS (CONT'D)

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#### POTENTIAL CRITICAL ITEMS (CONT'D)

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### POTENTIAL CRITICAL ITEMS (CONT'D)

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<td>FAILS TO ARM AND/FAILS TO FIRE (EITHER/BOTH)</td>
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<td>FAILS TO ARM AND/FAILS TO FIRE (EITHER/BOTH)</td>
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