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FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE  
NUMBER: M5-6SS-B026-X

SUBSYSTEM NAME: E - DOCKING SYSTEM

REVISION: 0 FEBDEC. 19976

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	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	DSCU RSC-E	MC621-0087-1002 33Y.5212.005

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**PART DATA**

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**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**  
LINE REPLACEABLE UNIT (LRU) DSCU - DOCKING SYSTEM CONTROL UNIT.

**REFERENCE DESIGNATORS:** 45V53A2A2

**QUANTITY OF LIKE ITEMS:** 1  
(ONE)

**FUNCTION:**

THE DSCU IS USED TO IMPLEMENT THE AUTOMATED DOCKING SEQUENCE AND TO RECEIVE AND PROCESS THE COMMANDS FROM THE APDS CONTROL PANEL. THE UNIT PROVIDES TELEMETRY TO THE DCU<sub>s</sub> AND STATUS INDICATION TO THE APDS CONTROL PANEL.

**OUTPUT FUNCTIONS:**

1. PROVIDES HI-ENERGY DAMPERS POWER AND CONTROL FOR THE HARD-DOCKING MECHANISM.
2. PROVIDES HI-ENERGY AND LOW-ENERGY DAMPERS POWER AND CONTROL (FOR THE "SOFT" DOCKING MECHANISM).
3. PROVIDES CONTROL FOR DOCKING RING EXTENSION AND RETRACTION.
4. PROVIDES FIXERS POWER AND CONTROL.
5. PROVIDES HOOKS OPENING AND CLOSING CONTROL.
6. PROVIDES CAPTURE LATCHES OPENING AND CLOSING CONTROL.
7. PROVIDES TELEMETRY TO THE DCU<sub>s</sub> AND STATUS INDICATION TO THE APDS PANEL.
8. PROVIDES LOW LEVEL AXIAL SLIP CLUTCH LOCKING DEVICE POWER AND CONTROL (FOR THE "SOFT" DOCKING MECHANISM).

## FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL FAILURE MODE

NUMBER: M5-6SS-B028-22

REVISION# 0 FEBDEC, 1997E

SUBSYSTEM NAME: E - DOCKING SYSTEM

LRU: MC621-0087-1002

ITEM NAME: DSCU

CRITICALITY OF THIS

FAILURE MODE: 2R3

## FAILURE MODE:

INADVERTENT ACTIVATION OF ONE OF THREE CONTROL SIGNALS TO THREE EACH HI-ENERGY/THE LOW-ENERGY DAMPERS (-SOFT- MECHANISM).

## MISSION PHASE:

00 ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 103 DISCOVERY  
104 ATLANTIS  
105 ENDEAVOUR

## CAUSE:

MULTIPLE INTERNAL COMPONENT FAILURES

CRITICALITY 1R1 DURING INTACT ABORT ONLY? NO

CRITICALITY 1R2 DURING INTACT ABORT ONLY (AVIONICS ONLY)? NO

## REDUNDANCY SCREEN

A) PASS  
B) FAILS  
C) PASS

## PASS/FAIL RATIONALE:

A)

B)

FAILURE "MASKED" BY REDUNDANT CONTROL SIGNAL

C)

## METHOD OF FAULT DETECTION:

NONE.

## MASTER MEAS. LIST NUMBERS:

NONE

## - FAILURE EFFECTS -

## (A) SUBSYSTEM:

ONE OF THREE HI-ENERGY/LOW-ENERGY DAMPER CONTROL SIGNALS CONTINUALLY ACTIVATED.

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL FAILURE MODE  
NUMBER: M5-6SS-B026-22

(B) INTERFACING SUBSYSTEM(S):  
FIRST FAILURE - NO EFFECT.

(C) MISSION:  
FIRST FAILURE - NO EFFECT.

(D) CREW, VEHICLE, AND ELEMENT(S):  
FIRST FAILURE - NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:

~~APPLIES TO SHUTTLE SOFT MECHANISM~~ POSSIBLE LOSS OF MISSION AFTER TWO FAILURES OCCURRING WITHIN FIVE SECONDS AFTER CAPTURE.

1) INADVERTENT ACTIVATION OF ONE OF THREE EACH HI-ENERGY/LOW-ENERGY DAMPERS CONTROL SIGNALS - NO EFFECT. 2) INADVERTENT ACTIVATION OF SECOND ASSOCIATED CONTROL SIGNAL - ALL SIX THREE DAMPERS ACTIVATED. MECHANISM IS STIFFENED DURING INITIAL CAPTURE, WHICH MAY CAUSE EXCESSIVE AXIAL TENSION LOADS RESULTING IN DAMAGE TO THE MECHANISM. POTENTIAL LOSS OF MISSION DUE TO EXCESSIVE LOADS ON THE MECHANISMS WHICH MAY PRECLUDE DOCKING.

DESIGN CRITICALITY (PRIOR TO OPERATIONAL DOWNGRADE, DESCRIBED IN F):

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:  
N/A (THERE ARE NO WORKAROUNDS TO CIRCUMVENT THIS FAILURE.)

**-DISPOSITION RATIONALE-**

(A) DESIGN:  
REFER TO APPENDIX X7, ENERGIA HARDWARE.

(B) TEST:  
REFER TO APPENDIX X7, ENERGIA HARDWARE.

DSCU CIRCUIT OPERATION IS VERIFIED DURING GROUND CHECKOUT. ANY TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

(C) INSPECTION:  
REFER TO APPENDIX X7, ENERGIA HARDWARE.

(D) FAILURE HISTORY:  
REFER TO APPENDIX X7, ENERGIA HARDWARE.

(E) OPERATIONAL USE:  
NONE

**- APPROVALS -**

PRODUCT ASSURANCE ENGR : M. NIKOLAYEVA  
DESIGN ENGINEER : B. VAKULIN  
JASA SSMA :  
JASA SUBSYSTEM MANAGER :  
SC MOD :  
ASA EPDC SSMA :  
ASA EPDC SUBSYSTEM MANAGER :

*[Handwritten signatures and initials over approval lines]*