

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL HARDWARE
NUMBER: M5-6MR-B028-X**

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 1 OCT, 1995

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	DSCU RSC-E	MC521-0087-1002 33Y.5212.005

PART DATA

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

REFERENCE DESIGNATORS: 40V53A1A2

**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 DCUs AND STATUS INDICATION TO THE APDS CONTROL PANEL.

OUTPUT FUNCTIONS:

1. PROVIDES HI-ENERGY DAMPERS POWER AND CONTROL.
2. PROVIDES CONTROL FOR DOCKING RING EXTENSION AND RETRACTION.
3. PROVIDES FIXERS POWER AND CONTROL.
4. PROVIDES HOOKS OPENING AND CLOSING CONTROL.
5. PROVIDES CAPTURE LATCHES OPENING AND CLOSING CONTROL.
6. PROVIDES TELEMETRY TO THE DCUs AND STATUS INDICATION TO THE APDS PANEL.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL FAILURE MODE
NUMBER: MS-6MR-8028-15**

REVISION# 1 SEPT 1, 1995

**SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
LRU: MC521-0087-1002
ITEM NAME: DSCU**

**CRITICALITY OF THIS
FAILURE MODE: 2R3**

**FAILURE MODE:
LOSS OF ONE OF THREE RING OUT STOP CONTROL SIGNALS.**

**MISSION PHASE:
OO ON-ORBIT**

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

**CAUSE:
MULTIPLE INTERNAL COMPONENT FAILURES**

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

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

**REDUNDANCY SCREEN A) PASS
 B) FAILS
 C) FAILS**

**PASS/FAIL RATIONALE:
A)
B)
FAILURE OF ONE COMMAND IS "MASKED" BY REDUNDANT SIGNALS.
C)
REDUNDANT FUNCTIONS ROUTED THROUGH THE SAME CONNECTOR.**

**METHOD OF FAULT DETECTION:
NONE**

MASTER MEAS. LIST NUMBERS: NONE

**CORRECTING ACTION:
NONE**

- FAILURE EFFECTS -

**(A) SUBSYSTEM:
DEGRADATION OF REDUNDANCY FOR RING OUT STOP ACTIVATION.**

**(B) INTERFACING SUBSYSTEM(S):
LOSS OF ONE OF THREE RING OUT STOP SIGNALS TO THE DMCU.**

(C) MISSION:



RSC Energie Proprietary Data

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CHL FAILURE MODE
NUMBER: MS-6MR-8028-15

FIRST FAILURE - NO EFFECT.

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

(E) FUNCTIONAL CRITICALITY EFFECTS:

POSSIBLE LOSS OF MISSION AFTER TWO FAILURES. 1) LOSS OF ONE RING OUT STOP CONTROL SIGNAL TO THE DMCU - NO EFFECT.

2) LOSS OF SECOND ASSOCIATED RING OUT STOP CONTROL SIGNAL TO THE DMCU - LOSS OF CAPABILITY TO RETRACT RING. POSSIBLE DOCKING RING MOTOR OVERHEATING WHICH MAY PRECLUDE DOCKING OPERATIONS.

DESIGN CRITICALITY (PRIOR TO OPERATIONAL DOWNGRADE, DESCRIBED IN F): 2R3

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
N/A

-DISPOSITION RATIONALE-

(A) DESIGN:

REFER TO APPENDIX I, ENERGIA HARDWARE.

(B) TEST:

REFER TO APPENDIX I, ENERGIA HARDWARE.

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

(C) INSPECTION:

REFER TO APPENDIX I, ENERGIA HARDWARE.

(D) FAILURE HISTORY:

REFER TO APPENDIX I, ENERGIA HARDWARE.

(E) OPERATIONAL USE:

AFTER SECOND FAILURE, CREW COULD PERFORM AN IN-FLIGHT MAINTENANCE TO DRIVE THE RING MOTORS DIRECTLY FROM THE FEED-THROUGH CONNECTORS IN THE EXTERNAL AIRLOCK USING THE ORBITER BREAKOUT BOX. HOWEVER, WORST CASE, CREW WOULD ABORT DOCKING SINCE THIS WORKAROUND REQUIRES A GREAT DEAL OF TIME TO PERFORM.

- APPROVALS -

PRODUCT ASSURANCE ENGR : M. NIKOLAYEVA
DESIGN ENGINEER : B. VAKULIN
NASA SS/MA :
NASA SUBSYSTEM MANAGER :
NASA EP/EC SUBSYSTEM MANAGER :

[Handwritten signatures and dates]
9/21/95
9/22/95
Francisco Blain 9/21/95



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