PRINT DATE: 13.02.97

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL HARDWARE
NUMBER: M6-6SS-B028-X

SUBSYSTEM NAME: E - DOCKING SYSTEM

REVISION: 0 FEB/DEC. 19976

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

PART DATA

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 DCUs 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 DCUs AND STATUS INDICATION TO THE APDS PANEL.
8. PROVIDES LOW LEVEL AXIAL SLIP CLUTCH LOCKING DEVICE POWER AND CONTROL (FOR THE "SOFT" DOCKING MECHANISM).

PRINT DATE: 17.02.97

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
NUMBER: M5-6SS-B028- 21

REVISION# 0 FEBDEC, 19976

SUBSYSTEM NAME: E - DOCKING SYSTEM
LRU: MC621-0087-1002
ITEM NAME: DSCU

CRITICALITY OF THIS FAILURE MODE: 2R3

FAILURE MODE:
LOSS OF ONE OF THREE ~~POWER~~/CONTROL SIGNALS TO ~~ONE OF~~ THREE EACH HI-ENERGY/LOW-ENERGY DAMPERS (-SOFT- MECHANISM)

MISSION PHASE:
OO ON-ORBIT

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

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)
"MASKED" BY REDUNDANT CONTROL SIGNAL

C)
REDUNDANT SIGNAL ROUTED THROUGH THE SAME CONNECTOR

METHOD OF FAULT DETECTION:
NONE.

MASTER MEAS. LIST NUMBERS: NONE

- FAILURE EFFECTS -

(A) SUBSYSTEM:
DEGRADATION OF REDUNDANCY FOR PROVIDING ~~POWER AND~~ A CONTROL SIGNAL TO ~~ONE OF~~ THE THREE EACH HI-ENERGY/LOW-ENERGY DAMPERS.

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

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
NUMBER: M5-6SS-B028- 21

(C) MISSION:
FIRST FAILURE - NO EFFECT.

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

(E) FUNCTIONAL CRITICALITY EFFECTS:
~~APPLIES TO SHUTTLE "SOFT" MECHANISM:~~ POSSIBLE LOSS OF MISSION AFTER TWO FAILURES.
1) LOSS OF ONE OF THREE EACH HI-ENERGY/LOW-ENERGY DAMPERS CONTROL SIGNALS. 2) LOSS OF SECOND ASSOCIATED HI-ENERGY/LOW-ENERGY DAMPERS CONTROL SIGNAL RESULTING IN LOSS OF ALL THREE EACH HI-ENERGY/LOW-ENERGY DAMPERS. POTENTIAL LOSS OF MISSION DUE TO EXCESSIVE LOADS ON THE MECHANISMS AND *EXCESSIVE YAW AND PITCH ANGLES* 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	:
NASA SSMA	:		:
NASA SUBSYSTEM MANAGER	:		:
ISC MOD	:		:
NASA EPDC SSMA	:		:
NASA EPDC SUBSYSTEM ENGINEER	:		: