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PRINT DATE: 09/14/95

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE

NUMBER: M5-6MR-0306-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM/MIR-2

REVISION: 0 SEP 30, 1995

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: STANDARD SWITCH PANEL-3	SED33101201-303
SRU	: TOGGLE SWITCH	ME452-0102-7201

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SWITCH, TOGGLE, 2P2P MAINTAINED ON - ODS TRUSS CAMERA HEATER POWER.

REFERENCE DESIGNATORS: 31P73A12A2S6

QUANTITY OF LIKE ITEMS: 1
(ONE)

FUNCTION:
ALLOWS THE CREW TO PROVIDE POWER TO HEAT TO THE TRUSS CAMERA. THIS
NONAXIAL CAMERA WILL VIEW THE DM SOYUZ-TM TARGET. THIS CAMERA IS A
BACKUP TO THE ODS CENTERLINE CAMERA.

REFERENCE DOCUMENTS:

- 1) ECN 104-25017. ELECTRICAL CHANGE NOTICE. SHUTTLE/MIR MISSION #2, ORBITER DOCKING SYSTEM.
- 2) VS72-200143. INTEGRATED SCHEMATIC STS-74
- 3) JSC-26736. STS-74 CARGO SYSTEM MANUAL
- 4) VS70-953114. INTEGRATED SCHEMATIC - DOCKING SYSTEM, RUSSIAN MIR MISSION 2.

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL FAILURE MODE

NUMBER: M5-6MR-0306-01

REVISION#

SEP 30, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM/MIR-2

LRU: ME452-0102-7201

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

ITEM NAME: TOGGLE SWITCH

FAILURE MODE:

FAILS OPEN IN THE "ON" POSITION, FAILS CLOSED IN THE "OFF" POSITION, POLE-TO-POLE SHORT, SHORT TO CASE, SHORT TO GROUND

MISSION PHASE:

OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

CAUSE:

**A) STRUCTURAL FAILURE, B) CONTAMINATION, C) VIBRATION, D) MECHANICAL SHOCK,
E) PROCESSING ANOMALY, F) THERMAL STRESS**

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

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

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

PASS/FAIL RATIONALE:

A)

B)

C)

ALL POWER TO STANDARD SWITCH PANELS ROUTED THROUGH A SINGLE MPCA 2 CONNECTOR (J3), AND A SINGLE CABLE CONNECTOR (P310).

METHOD OF FAULT DETECTION:

EVENTUAL LOSS OF VIDEO IMAGE FROM ODS TRUSS CAMERA AS THE CAMERA TEMPERATURE DECREASES.

MASTER MEAS. LIST NUMBERS: NONE

CORRECTING ACTION:

USE ODS CENTERLINE CAMERA.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL FAILURE MODE
NUMBER: M5-SMR-0306-01**

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF POWER TO THE ODS TRUSS CAMERA HEATER.

(B) INTERFACING SUBSYSTEM(S):
EVENTUAL LOSS OF VIDEO IMAGE FROM ODS TRUSS CAMERA AS THE CAMERA TEMPERATURE DECREASES.

(C) MISSION:
FIRST FAILURE - NO EFFECT. ODS TRUSS CAMERA IS PROVIDED AS A BACKUP TO THE ODS CL CAMERA FOR MATING WITH THE DM.

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

(E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF MISSION OBJECTIVES AFTER THREE FAILURES.
1) SWITCH S6 FAILS OPEN - LOSS OF POWER SUPPLY AND CONTROL TO THE ODS TRUSS CAMERA HEATER. EVENTUAL LOSS OF VIDEO IMAGE FROM ODS TRUSS CAMERA AS THE CAMERA TEMPERATURE DECREASES. USE ODS CENTERLINE CAMERA
2) SWITCH S8 FAILS OPEN. LOSS OF POWER SUPPLY AND CONTROL TO THE ODS CENTERLINE CAMERA. PERFORM STANDARD SWITCH PANEL CABLE CHANGEOUT USING AN INFLIGHT MAINTENANCE PROCEDURE, AND USE SSP 2 SWITCH TO RECOVER FUNCTION.
3) SWITCH ON SSP 2 FAILS OPEN - UNABLE TO MATE ODS TO DM WITHOUT VIDEO FROM THE ODS CENTERLINE CAMERA OR ODS TRUSS CAMERA.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: HOURS

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: HOURS

**TIME REQUIRED TO IMPLEMENT CORRECTIVE ACTION LESS THAN TIME TO EFFECT?
YES**

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL FAILURE MODE

NUMBER: M5-6MR-0306-01

-DISPOSITION RATIONALE-

(A) DESIGN:

REFER TO APPENDIX A, ITEM #1, TOGGLE SWITCH.

(B) TEST:

REFER TO APPENDIX A, ITEM #1, TOGGLE SWITCH.

POWER CONTROL CIRCUIT OPERATION IS VERIFIED DURING GROUND CHECKOUT. ANY TURNAROUND TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

(C) INSPECTION:

REFER TO APPENDIX A, ITEM #1, TOGGLE SWITCH.

(D) FAILURE HISTORY:

REFER TO APPENDIX A, ITEM #1, TOGGLE SWITCH.

(E) OPERATIONAL USE:

PERFORM STANDARD SWITCH PANEL CABLE CHANGEOUT USING AN INFLIGHT MAINTENANCE PROCEDURE

- APPROVALS -

PRODUCT ASSURANCE ENGINEER
PRODUCT ASSURANCE MANAGER
DESIGN ENGINEER
CHIEF ENGINEER
NASA SS&MA
NASA SUBSYSTEM MANAGER
JSC MOD

: R. BLACKWELL
: W. MARLOWE
: T. NGUYEN
: B. BRANDT
:
:
:

R. Blackwell
W. Marlowe
T. Nguyen
B. Brandt
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