F TTLE CRITICAL ITEMS LIST ORBITER

SUBSYSTEM :R/RADAR & COM ANT DEPLOY FMEA NO 05-6EH-56000 -4 REV:05/21/9

ASSEMBLY :RT SD CONSOLE, PNL R13
P/N RI :ME452-0102-7406
P/N VENDOR:
QUANTITY :1
:ONE
:

CRIT. FUNC: 1R
CRIT. HDW: 3

VEHICLE EFFECTIVITY:	102	103	104
	X	X	X

PHASE(S): PL LO X OO X DO X LS

REDUNDANCY SCREEN: A-PASS B-FAIL C-PAS

PREPARED BY:
DES T BANHIDY
REL J RESSIA 5-21-90
QE J COURSEN

APPROVED BY:
DES
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APPROVED BY (NASA):
SSM
REL
QE

EPD&C SSH
EPD&C SSE

ITEM:
SWITCH, TOGGLE - DEPLOY/GND/STOW

FUNCTION:
PROVIDES SIGNAL TO KA-1 ANTENNA CONTROL CIRCUIT FOR STOW SEQUENCE
PROVIDE GIMBAL LOCK INITIATE AND PROVIDES COMMAND DISCRETES TO THE M
INITIATIONS OF STOW/DEPLOY SEQUENCES. 32V73A13A2S8

FAILURE MODE:
PREMATURE CLOSURE, FAILS CLOSED (TWO CONTACT SETS), CONTACT-TO-CONTA
SHORT (TWO CONTACT SETS), POLE-TO-POLE SHORT

CAUSE(S):
PIECE-PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANIC
SHOCK, PROCESSING ANOMALY, THERMAL STRESS (EXCLUDE "THERMAL STRESS" FR
"POLE-TO-POLE SHORT" FAILURE MODE)

EFFECT(S) ON:
(A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE:

(A) FIRST FAILURE - FAILURE COULD RESULT IN A DEPLOY OR STOW OPERATIC
WHEN MECHANICAL 3-PHASE POWER IS TURNED ON. IF FAILURE (PREMATUR
CLOSURE) BECOMES PERMANENT IN THE DEPLOY POSITION, THE DIRECT STOW SWITC
CANNOT BE USED BECAUSE OF A PHASE-TO-PHASE SHORT.

(B) FIRST FAILURE - IF FAILURE (PREMATURE CLOSURE) OCCURS WITH THE SWITC
IN THE DEPLOY POSITION WHILE THE DEPLOYED ASSEMBLY IS DEPLOYED, JETTISC
WILL BE REQUIRED. IF FAILURE OCCURS WITH THE SWITCH IN THE STOW POSITIC
WHILE THE DEPLOYED ASSEMBLY IS STOWED, S-BAND OR UHF WILL BE REQUIRED FC
STATE VECTOR UPDATE.

(C) FIRST FAILURE - IN THE CASE OF A PREMATURE CLOSURE, POSSIBLE LOSS C
MISSION THAT REQUIRES KU-BAND OPERATIONS DUE EITHER TO LOSS OF DEPLO
CAPABILITY OR A FAILED "ON" BOOM STOW COMMAND.

(D) NO EFFECT - FIRST FAILURE. POSSIBLE LOSS OF CREW/VEHICLE AFTE THREE FAILURES (THIS TOGGLE SWITCH FAILS CLOSED (TWO CONTACT SETS) MECHANICAL 3-PHASE POWER SWITCH FAILS CLOSED, DRIVING THE KU-BAN DEPLOYED ASSEMBLY INTO THE RADIATOR, CAUSING LOSS OF FREON COOLANT LOOP AND LOSS OF REDUNDANT FREON COOLANT LOOP) DURING POWERED FLIGHT, CAUSIN LOSS OF ALL VEHICLE COOLING CAPABILITY.

IN THE CASE OF A PREMATURE CLOSURE, FAILURE TO STOW COULD PREVENT PAYLOA BAY DOOR CLOSURE RESULTING IN DEPLOYED ASSEMBLY JETTISON TO PREVENT LOS OF CREW/VEHICLE. POSSIBLE LOSS OF CREW/VEHICLE WITH LOSS OF ABILITY T JETTISON THE DEPLOYED ASSEMBLY.

FIRST FAILURE IS CONSIDERED AS NOT BEING READILY DETECTABLE IN FLIGH ALTHOUGH OPERATIONAL STATUS MONITORING EXISTS FOR THE AFFECTED HYBRI RELAYS. SUFFICIENT TIME MAY NOT BE AVAILABLE TO ALLOW CORRECTIVE ACTIO TO BE PERFORMED.

DISPOSITION & RATIONALE:
(A)DESIGN (B)TEST (C)INSPECTION (D)FAILURE HISTORY (E)OPERATIONAL USE:

(A-D) DISPOSITION AND RATIONALE
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

(B) GROUND TURNAROUND TEST
"KU-BAND ANTENNA DEPLOY MOTOR 1 AND 2" VERIFIES THAT MOTORS 1 AND DEPLOY WITHIN SPECIFIED OPERATING TIMES, AND "KU-BAND ANTENNA STOW MOTO 1 AND 2" VERIFIES THAT MOTORS 1 AND 2 STOW WITHIN SPECIFIED OPERATIN TIMES. STOW/DEPLOY MOTORS PERFORMANCE IS VERIFIED DURING IN-FLIGHT OPERATION. ON GROUND TESTING WOULD BE ACCOMPLISHED WHEN A VALI VERIFICATION IS UNOBTAINABLE DURING FLIGHT, OR FOLLOWING LRU REPLACEMENT ALSO, SINGLE MOTOR OPERATION IS VERIFIED EVERY FLOW: DEPLOY MOTOR 1/STO MOTOR 2 IS VERIFIED ON ODD FLOWS; AND DEPLOY MOTOR 2/STOW MOTOR 1 I VERIFIED ON EVEN FLOWS.

(E) OPERATIONAL USE
FAILURE CAN BE DETECTED BY THE GROUND VIA DOWN-LINKED TELEMETRY OF TH OPERATIONAL STATUS WHICH INDICATES THE POSITION OF THE HYBRID RELAY THAT ALLOW POWER TO THE DEPLOYMENT ACTUATOR. CONTINGENCY PROCEDURE WHICH DO NOT JEOPARDIZE FLIGHT SAFETY WILL BE CONSIDERED IF TIME I AVAILABLE. AN IN-FLIGHT MAINTENANCE PROCEDURE TO BYPASS THE FAILE SWITCH IS AVAILABLE ON BOARD. DURING POWERED FLIGHT, SECOND FAILUR COULD CAUSE LOSS OF ONE FREON COOLANT LOOP, REQUIRING EQUIPMENT POWER- DOWN TO MINIMIZE HEAT GENERATION AND LANDING AT NEXT PRIMARY LANDING SIT (PLS). THE THIRD FAILURE (LOSS OF REDUNDANT FREON COOLANT LOOP) COUL CAUSE LOSS OF CREW/VEHICLE. THE SWITCH CAN BE CYCLED TO RECOVER FRO FAILURE IF THE "PREMATURE CLOSE" FAILURE MODE OF THIS SWITCH WAS CREATE BY A "TEASE" AND IS A REVERSIBLE OR TEMPORARY CONDITION.