

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : COMMUNICATION & TRACKING FMEA NO 05-2R -5112 -1 REV:06/27/88

ASSEMBLY : PNL A1A1  
P/N RI : ME452-8102-7306  
P/N VENDOR:  
QUANTITY : 1  
: ONE  
:  
VEHICLE 102  
EFFECTIVITY: X  
PHASE(S): PL LO  
CRIT. FUNC: 2  
CRIT. HDW: 2  
103 104  
X X X  
OO X DO LS

PREPARED BY: DES H D HADDAD  
REL 7-5-88 J Y HARADA  
QE J T COURSEN  
REDUNDANCY SCREEN: A- B- C-  
APPROVED BY: DES *Haddad 2/27/89*  
REL *Harada 8-30-88*  
QE *J. Courson 8-31-88*  
APPROVED BY (NASA): SEMO *John W. Hoff 9/19*  
REL *9/18*  
QE *9/18/88*

ITEM:

A1S12, TOGGLE SWITCH, 3P3T, "OFF"- "STANDBY" - "ON", KU-BAND A POWER

FUNCTION:

SELECTS KU-BAND A "POWER ON", "POWER STANDBY", OR "POWER OFF".  
MECHANIZATION IS TO PROVIDE A 28 VDC "POWER ON" OR "POWER STANDBY"  
DISCRETE TO THE MODE SWITCH WHICH THEN PROVIDES SPECIFIC OPERATE COMMAND  
DISCRETES TO EA-1A. 36V73A1A1S12

FAILURE MODE:

FAILS OPEN, PREMATURE OPEN, FAILS CLOSED, PREMATURE CLOSURE, CONTACT-TO-  
CONTACT SHORT

CAUSE(S):

VIBRATION, MECHANICAL SHOCK, CONTAMINATION, PIECE-PART STRUCTURAL  
FAILURE, PROCESSING ANOMALY.

EFFECT(S) ON:

(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE

EFFECTS ON ABILITY TO CONTROL, POSITION, OR LOCK ANTENNA GIMBALS - 1R/3

(A,B) POSSIBLE LOSS OF ABILITY TO TURN KU-BAND ON, LOSS OF ONE PATH TO  
COMMAND ANTENNA GIMBALS TO LOCK. AFTER TWO FAILURES, REAL-TIME DECISION  
REQUIRED TO PERFORM IN-FLIGHT MAINTENANCE PROCEDURE WITH EVA OR JETTISON  
THE DEPLOYED ASSEMBLY.

(C,D) POSSIBLE LOSS OF CREW/VEHICLE AFTER TWO ADDITIONAL FAILURES (GCILU  
OR PNL/CMD SWITCH & JETTISON SYSTEM). POSSIBLE LOSS OF CREW/VEHICLE IF  
THE DA CANNOT BE SECURED FOR REENTRY OR JETTISONED. REENTRY WITH  
GIMBALS UNLOCKED MAY RESULT IN DAMAGE TO THE RADIATOR.

EFFECTS ON MISSIONS REQUIRING KU-BAND SYSTEM SUPPORT - 2/2

(A,B,C) POSSIBLE LOSS OF ALL MISSION OBJECTIVES REQUIRING KU-BAND  
RENDEZVOUS RADAR. AFTER SECOND FAILURE (GCILU OR PNL/CMD SWITCH)

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POSSIBLE LOSS OF ALL MISSION OBJECTIVES REQUIRING KU-BAND COMM.

(D) NO EFFECT.

EFFECTS ON PROVIDING DATA TO NSP FOR STATE VECTOR UPDATE - 1R/3

(A,B,C,D) AFTER SECOND FAILURE (GCILU OR PNL/CMD SWITCH) POSSIBLE LOSS OF ONE OF THE THREE REDUNDANT PATHS TO SUPPLY DATA TO NSP FOR STATE VECTOR UPDATE. UHF PROVIDES AN INDEPENDENT PATH FOR STATE VECTOR UPDATE. AFTER FIVE FAILURES POSSIBLE LOSS OF CREW/VEHICLE DUE TO LOSS OF STATE VECTOR UPDATE. NOTE- A SINGLE FAILURE OF A KU-BAND SPA DASH NUMBER -4001 CAN CAUSE THE LOSS OF POWER TO BOTH NSP'S, RESULTING IN ONLY ONE REMAINING PATH (UHF) TO UPDATE THE STATE VECTOR. THIS FAILURE CAN OCCUR DURING ANY MISSION PHASE. (KU-BAND POWERED ON OR OFF.)

DISPOSITION & RATIONALE:

(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE

(A,B,C,D) REFER TO APPENDIX A, ITEM # 1, TOGGLE SWITCH

(B) TEST

GROUND TURNAROUND TEST - ALL SWITCH POSITIONS ARE SELECTED AND CORRECT TELEMETRY RESPONSES VERIFIED - PERFORMED EVERY FLIGHT.

(E) OPERATIONAL USE

WORKAROUND TO REGAIN ABILITY TO CONTROL, POSITION, OR LOCK ANTENNA GIMBALS

LOCK GIMBALS AND STOW THE DA WITH THE NORMAL STOW PROCEDURE REVISED TO STOW IN THE COMMAND COMMUNICATIONS MODE.

WORKAROUND TO REGAIN SUPPORT OF MISSION OBJECTIVES

COMM: USE GCILU CMD MODE. RADAR: ATTEMPT RENDEZVOUS WITH ALTERNATE SENSORS. USE BACK-UP RENDEZVOUS PROCEDURES.

WORKAROUND TO PROVIDE THE STATE VECTOR UPDATE.

THE STATE VECTOR CAN BE UPDATED VIA THE NORMAL S-BAND COMMUNICATIONS LINK OR VIA UHF/AUDIO.