

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : COMMUNICATION & TRACKING FMEA NO 05-2R -5113 -1 REV:06/27/88

ASSEMBLY : PNL A1A1 CRIT. FUNC: 2
P/N RI : ME452-0102-7406 CRIT. HDW: 2
P/N VENDOR: VEHICLE 102 103 104
QUANTITY : 1 EFFECTIVITY: X X X
: ONE PHASE(S): PL LO OO X DO LS

PREPARED BY: DES H D HADDAD APPROVED BY: DES *[Signature]* 8/27/84 REDUNDANCY SCREEN: A- B- C-
REL ~~7-5-88~~ J Y HARADA REL *[Signature]* 8-30-88 APPROVED BY (NASA): SSM *[Signature]* 9/1/81
QE J T COURSEN QE *[Signature]* 8-27-88 QE *[Signature]* 9/18/81

ITEM:
A1S13, TOGGLE SWITCH, 4P3T, KU-BAND A MODE

FUNCTION:
THREE SWITCH POSITIONS ARE "COMM", "RADAR PASS", AND "RADAR COOP".
SELECTS COMM "ON" RADAR PASSIVE TARGET "ON", RADAR ACTIVE TARGET "ON",
WHEN "POWER ON" IS SELECTED BY S12. SELECTS "COMM STANDBY" OR "RADAR
STANDBY" WHEN "POWER STANDBY" IS SELECTED BY S12. WHEN A RADAR "ON"
MODE IS SELECTED, PROVIDES POWER TO RADAR OUTPUT SWITCH S14 AND THE
CROSS POINTER M1. 36V73A1A1S13.

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 (GCIL
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.

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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) 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 SELECTED AND CORRECT TELEMETRY RESPONSE 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.