

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL HARDWARE
NUMBER:05-2P-300ULP -X

SUBSYSTEM NAME: GPS THREE STRINGS

REVISION: 0

04/09/97

 PART DATA

PART NAME	PART NUMBER
VENDOR NAME	VENDOR NUMBER
LRU :PRE-AMPLIFIER SHASON MICROWAVE CORPORATION	ME473-0119-0001 LA10230-10F

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
UPPER AND LOWER PRE-AMPLIFIERS / FILTERS. TWO STAGE 20 DB HYBRID
AMPLIFIERS. FREQUENCY RANGE BETWEEN 1.2 TO 1.6 GHZ. GAIN IS 10 DB MINIMUM,
NOISE FIGURE OF 3.25 DB. UTILIZE 28 VDC AT 150 MA. ATTENUATION AT <1150 MHZ AND
AT >1700 MHZ.

REFERENCE DESIGNATORS: 40V74A154
40V74A155
22V74A171
22V74A172
22V74A174
22V74A175

QUANTITY OF LIKE ITEMS: SIX
THREE UPPER AND THREE LOWER

FUNCTION:
THE PREAMPLIFIER AMPLIFIES AND BAND PASS FILTERS RECEIVED SIGNALS FROM
THE ANTENNA BEFORE PASSING THROUGH THE COMBINER FOR INPUT TO THE GPS
RECEIVER.

FAILURE MODES EFFECTS ANALYSIS FMEA -- NON-CIL FAILURE MODE

NUMBER: 05-2P-300ULP-01

REVISION#: A 10/14/99

SUBSYSTEM NAME: GPS SINGLE STRING

LRU: PRE-AMPLIFIERS/FILTERS, UPPER & LOWER

ITEM NAME: PRE-AMPLIFIERS/FILTERS, UPPER & LOWER

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:

LOSS OF OUTPUT, INTERMITTENT OUTPUT

MISSION PHASE: DO DE-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY:	102	COLUMBIA
	103	DISCOVERY
	104	ATLANTIS
	105	ENDEAVOUR

CAUSE:

PIECE PART FAILURE (MECHANICAL STRESS, VIBRATION), CONTAMINATION, ELECTRICAL STRESS, THERMAL STRESS, PROCESSING ANOMALY

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN

- A) PASS
- B) N/A
- C) PASS

PASS/FAIL RATIONALE:

A)

B)

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF GPS SIGNALS FROM ONE OF TWO ANTENNAS FOR ONE OF THREE GPS RECEIVER STRINGS. CAUSES PARTIAL LOSS OF SATELLITE RECEPTION COVERAGE FOR ONE GPS RECEIVER BUT ALLOWS THAT GPS RECEIVER TO CONTINUE FUNCTIONING.

(B) INTERFACING SUBSYSTEM(S):

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
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FAILED GPS OUTPUTS ARE IGNORED AND THE OUTPUTS OF THE REMAINING GPS' ARE USED.

(C) MISSION:
NO EFFECT

(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT - FIRST FAILURE. OPERATIONS CONTINUE WITH PARTIAL RECEPTION LOSS OF ONE GPS STRING. NO EFFECT - SECOND FAILURE ON THE SAME STRING. LOSS OF ONE GPS STRING. OPERATIONS CONTINUE WITH TWO REMAINING GPS STRINGS. POSSIBLE LOSS OF CREW/VEHICLE AFTER THIRD AND FOURTH FAILURES WHERE THE TWO REMAINING GPS RECEIVER STRINGS FAIL (LOSS OF OUTPUT, ERRONEOUS OUTPUT FAILURE) DUE TO INABILITY TO MAKE LANDING SITE.

(E) FUNCTIONAL CRITICALITY EFFECTS:
DUE TO THE METHOD USED TO INSTALL THE AMPLIFIERS FOR GPS STRINGS ONE AND THREE, IT IS POSSIBLE TO HAVE PARTIAL LOSS OF RECEPTION IN BOTH STRINGS ONE AND THREE WITH A SINGLE CAUSE. THE UPPER AMPLIFIER OF STRING ONE IS MOUNTED SIDE BY SIDE WITH THE LOWER AMPLIFIER OF STRING THREE. THE UPPER AMPLIFIER OF STRING THREE IS MOUNTED SIDE BY SIDE WITH THE LOWER AMPLIFIER OF STRING ONE.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: N/A

TIME FROM FAILURE OCCURRENCE TO DETECTION: SECONDS

TIME FROM DETECTION TO COMPLETED CORRECTING ACTION: N/A

IS TIME REQUIRED TO IMPLEMENT CORRECTING ACTION LESS THAN TIME TO EFFECT?
N/A

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
N/A

- APPROVALS -

PRODUCT ASSURANCE ENGR : M. HOLTHAUS
DESIGN ENGR : J. R. SWANSON

Mark Holthaus 10/19/99
J.R. Swanson 10/21/99