			FAILURE N	ODES EFFECTS AND CRITIC	ality a	NALYSIS (FME	CA)			
Product:	SPIRE Instrument			Prepared by: R. Orfei	Document reference: SPIRE-IFS-DOC-000785					
11	Phase: Herschel			Approved by:	Issue:					
System/Subsystem/Equipment: DPU										
				Date: 11-07-'01		Page of				
Mission phase/Operational Mode: Space Flight										
ld		Function Failure mode	Failure	Failure effects	Severity	Failure	Compensation	Correction	Remarks	
number	block		cause	a. Local effects		detection method/	provisions	actions		
				b. End effects		observable symptoms				
1.001	DPU	Input Power 28V short to	Connector failure	a. Loss of DPU b. Loss of nominal side, propagation of short	1R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE	Further analysis required. LCLs at	
		Gnd		to the source					the power source	
1.002		No function	Manufacturing error, part failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.1.001	DC/DC conv.	Shorted	Internal failure	a. Loss of DPU	2R	No housekeeping	Switch to redundant	None in SPIRE		
	Main			b. Loss of nominal side		data from SPIRE	side			
1.1.002		Open	Internal failure	a. Loss of DPU	2R	No housekeeping	Switch to redundant	None in SPIRE		
1.1.003		Erratic output	Internal failure	b. Loss of nominal side a. Loss of DPU	2R	data from SPIRE No housekeeping	side Switch to redundant	None in SPIRE		
1.1.003		Enalic oulput		b. Loss of nominal side	21	data from SPIRE	side	NOTE IN SFIRE		
1.1.004	i i	No output	Internal failure	a. Loss of DPU	2R	No housekeeping	Switch to redundant	None in SPIRE		
				b. Loss of nominal side		data from SPIRE	side			
1.2.001	CPU	Shorted	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.2.002		Open	Internal failure	a. Loss of DPU	2R	No housekeeping	Switch to redundant	None in SPIRE		
		-		b. Loss of nominal side		data from SPIRE	side			
1.2.003		Output stuck	Internal failure	a. Loss of DPU	2R	No housekeeping	Switch to redundant	None in SPIRE		
1.2.004		low Output stuck	Internal failure	b. Loss of nominal side a. Loss of DPU	2R	data from SPIRE No housekeeping	side Switch to redundant	None in SPIRE		
1.2.004		high		b. Loss of nominal side	21	data from SPIRE	side	NOTE IN SFIRE		
1.2.005		Output open	Internal failure	a. Loss of DPU	2R	No housekeeping	Switch to redundant	None in SPIRE		
				b. Loss of nominal side		data from SPIRE	side			
1.2.006		Input open	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.3.001	2 Serial I/F	Shorted	Internal failure	a. Loss of DPU	2R	Corrupted HK data	Switch to redundant	None in SPIRE		
	to/from DRU			 Loss of nominal side 		from SPIRE	side			
1.3.002		Output stuck	Internal failure	a. Loss of DPU	2R	Corrupted HK data	Switch to redundant	None in SPIRE		
1.3.003		low	Internal failure	b. Loss of nominal side a. Loss of DPU	2R	from SPIRE Corrupted HK data	side Switch to redundant	None in SPIRE		
1.3.003		Output stuck high	internal failure	b. Loss of nominal side	ZR	from SPIRE	side	None in SPIRE		
1.3.004		Output open	Internal failure	a. Loss of DPU	2R	Corrupted HK data	Switch to redundant	None in SPIRE		
				b. Loss of nominal side		from SPIRE	side			
1.3.005		Input stuck low	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	Corrupted HK data from SPIRE	Switch to redundant side	None in SPIRE		
1.3.006		Input stuck	Internal failure	a. Loss of DPU	2R	Corrupted HK data	Switch to redundant	None in SPIRE		
		high		b. Loss of nominal side		from SPIRE	side			
1.3.007		Input open	Internal failure	a. Loss of DPU	2R	Corrupted HK data	Switch to redundant	None in SPIRE		
1.4.001	Serial I/F	Shorted	Internal failure	b. Loss of nominal side a. Loss of DPU	2R	from SPIRE Corrupted HK data	side Switch to redundant	None in SPIRE		
1.4.001	to/from MCU	Shutteu	internal failure	b. Loss of nominal side	217	from SPIRE	side	NULLE III SPIRE		
1.4.002		Output stuck	Internal failure	a. Loss of DPU	2R	Corrupted HK data	Switch to redundant	None in SPIRE	1 1	
		low		b. Loss of nominal side		from SPIRE	side			
1.4.003		Output stuck high	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	Corrupted HK data from SPIRE	Switch to redundant side	None in SPIRE		
1.4.004		Output open	Internal failure	a. Loss of DPU	2R	Corrupted HK data	Switch to redundant	None in SPIRE		
				b. Loss of nominal side		from SPIRE	side	-		

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ld number	Item/ block	Function	Failure mode	Failure cause	Failure effects a. Local effects b. End effects	Severity	Failure detection method/ observable symptoms	Compensation provisions	Correction actions	Remarks	
1.4.005			Input stuck low	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	Corrupted HK data from SPIRE	Switch to redundant side	None in SPIRE		
1.4.006			Input stuck high	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	Corrupted HK data from SPIRE	Switch to redundant side	None in SPIRE		
1.4.007			Input open	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	Corrupted HK data from SPIRE	Switch to redundant side	None in SPIRE		
1.5.001	S/C I/F		Shorted	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.5.002			Output stuck low	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.5.003			Output stuck high	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.5.004			Output open	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.5.005			Input stuck low	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.5.006			Input stuck high	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.5.007			Input open	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.6.001	Data RAM 2MB		Shorted	Internal failure	a. Loss of DPU b. Likely loss of nominal side	2R	No housekeeping data from SPIRE	Depending on page failure remedial actions are possible	None in SPIRE		
1.6.002			Open	Internal failure	a. Loss of DPU b. Likely loss of nominal side	2R	No housekeeping data from SPIRE	Depending on page failure remedial actions are possible	None in SPIRE		
1.6.003			Slow transfer of data	Internal failure	a. Loss of DPU b. Likely loss of nominal side	2R	No housekeeping data from SPIRE	Depending on page failure remedial actions are possible	None in SPIRE		
1.6.004			Bit loss	Internal failure	a. Loss of DPU b. Likely loss of nominal side	2R	Corrupted data from SPIRE	Depending on page failure remedial actions are possible	None in SPIRE		
1.7.001	Data EEPROM 1MB		Shorted	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.7.002			Open	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.7.003			Slow transfer of data	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.7.004			Bit loss	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	Corrupted data from SPIRE	Switch to redundant side	None in SPIRE		
1.8.001	Program PROM 32kB		Shorted	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.8.002			Open	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		
1.8.003			Slow transfer of data	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Switch to redundant side	None in SPIRE		

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ld number	ltem/ block	Function	Failure mode	Failure cause	Failure effects a. Local effects b. End effects	Severity	Failure detection method/ observable symptoms	Compensation provisions	Correction actions	Remarks		
1.8.004			Bit loss	Internal failure	a. Loss of DPU b. Loss of nominal side	2R	No housekeeping data from SPIRE	Depending on Bit address the instrument could still perform nominally	None in SPIRE			
1.9.001	Program RAM 3MB		Shorted	Internal failure	a. Loss of DPU b. Likely loss of nominal side	2R	No housekeeping data from SPIRE	Depending on page failure remedial actions are possible	None in SPIRE			
1.9.002			Open	Internal failure	a. Loss of DPU b. Likely loss of nominal side	2R	No housekeeping data from SPIRE	Depending on page failure remedial actions are possible	None in SPIRE			
1.9.003			Slow transfer of data	Internal failure	a. Loss of DPU b. Likely loss of nominal side	2R	No housekeeping data from SPIRE	Depending on page failure remedial actions are possible				
1.9.004			Bit loss	Internal failure	a. Loss of DPU b. Likely loss of nominal side	2R	No housekeeping data from SPIRE	Depending on page failure remedial actions are possible	None in SPIRE			