Laboratory For Atmospheric and Space Physics

LASP Engineering Division
University of Colorado
Boulder, Colorado

Radiation Belt Storm Probes
EFW - DFB Spares Plan
Document No. 108766

Approvers List

Prepared By	Mary Bolton, EFW-DFB Program Manager
Approved By	Cat Brant, EFW-DFB Parts Engineer
Approved By	Susan Batiste, EFW-DFB Systems Engineer
Configuration Management	

Revision History

Rev	ECO #	Change Description	By	Date
A	C02333	Initial Release	M Bolton	8/20/08

Laboratory For Atmospheric and Space Physics

LASP Engineering Division
University of Colorado
Boulder, Colorado

Radiation Belt Storm Probes
EFW - DFB Spares Plan
Document No. 108766

Approvers List

Prepared By	Mary Bolton, EFW-DFB Program Manager
Approved By	Cat Brant, EFW-DFB Parts Engineer
Approved By	Susan Batiste, EFW-DFB Systems Engineer
Configuration Management	CM RELEASED Ken Jackson UCB Mission Assurance Mgr

Revision History

Rev	ECO #	Change Description	By	Date
A	C02333	Initial Release	M Bolton	8/20/08

DATA ITEM DESCRIPTION	Date 8/20/08	DID No. **MS-006-001B**
Title: **Spares Plan Baseline**		Project Name **EFW-DFB**
Use: Describe the Instrument Team's approach to spares and long lead-time parts planning.		
DID Interrelationship: MA-001 Delivery Due Date Refer to CDRL Applicable Document(s) RBSP PAIP		
Preparation Information:		
The Spares List shall include the following:		
During phase B, develop and maintain a list of flight spare parts and ground equipment spare parts to be procured for the science investigation that is consistent with the project sparing policy that is posted on the RBSP website. Communicate the spares list and its current status to the project when requested.		
During phases B, C, and D, procurements of flight and ground equipment that should incorporate items identified on the list. The spare parts identified and maintained are meant to mitigate schedule risk and carry out a robust integration, verification, validation program, and mission operations. The project policy is meant to balance the cost of parts, the probabilities of failure, and the cost to the project for untimely failures. By reviewing the lists developed by the science investigations, the project can pursue a risk management approach in which there is a consistent project wide spares implementation. After review of the spares list, the project may direct the science investigation to adjust the spares procurement.		

****

The EFW-DFB project at LASP follows the below excerpt from the RBSP project policy dated 21 March, 2007 (obtained from the RBSP Wiki site).
"…The intent of the spares policy is to be able to recover within one-month of the occurrence of a part failure. The selection of spares will depend on several factors: 1) their vulnerability; 2) access to problem; 3) ability to rework versus replace, and 4) availability of parts.
Component Sparing
The project will decide which components are spared at the fully built, fully tested assembly level.
For EFW-DFB, LASP will provide 3 fully assembled and tested flight boards. One of these boards will be considered a flight spare board. These boards will be integrated into the EFW instrument IDPU component.
Populated Board Sparing
Some boards will be spared as populated or partially populated assemblies. Boards that have multiple builds within each observatory (like a power switching card) will likely have a fully populated board spare shared across both observatories. Boards that are densely populated and have difficult assembly issues, will likely have fully populated board spares -- absent expensive parts, such as ACTELS.
LASP will build and test 1 spare EFW-DFB flight board for delivery to the EFW instrument.

Kitted Board Sparing
For each board assembly type in the two observatories, there will be one spare board kitted and available for population into a flight board if needed.
LASP will kit a bare board which will be available for assembly.
EEE Parts
Standard institution policies should be used for spares needed to account for production yield issues and other issues typical of a flight development.
LASP will procure and maintain sufficient spares for building the 3 flight boards considering yield and assembly issues that could occur. Typical procurements will be 20% spares on piece parts over the 3 flight quantities.
Mechanical Spares
Standard institution policies should be used for mechanical spares and thermal materials needed to account for production yield issues and other issues typical of a flight development.
For EFW-DFW, no mechanical components (or spares) are needed.
Harness Spares
Flight fuse plug assemblies will be fully spared *Flight arming plug assemblies will have one spare for each plug type.*
For EFW-DFB, there are no fuse plugs or arming plug assemblies.
For EFW-DFB, EGSE is spared when testing efforts are in parallel for the two/three flight boards. No MGSE is required for EFW-DFB. The GSE and spares are not tracked as part of the LASP process for flight builds. Enough spares are included in procurement to cover build and yield/assembly issues.
The EFW-DFB Parts Identification List (PIL) is submitted to the project office thru the Parts Control Board. EFW-DFB piece part quantities are maintained in the PIL.

EFW-DFB Spares List

*****This List is taken from the PhC/D/E Proposal *****

Item	Part Type	Qty Per Board	2FM, 1FS (X3)	Spares (2 or 20%)	Total Qty
Capacitors					
	CDR01	16	48	10	58
	CDR05	65	195	39	234
	CDR32	160	480	96	576
	CDR34	6	18	4	22
	CWR06	18	54	11	65
Resistors					
	RM0705	450	1350	270	1620
	RM2010	12	36	8	44
	~~M55342E08B499B~~	~~6~~	18	4	22
	~~M55342E08B487B~~	~~6~~	18	4	22
	~~M55342E06B12B4~~	~~6~~	18	4	22
	~~M55342E06B14B0~~	~~6~~	18	4	22
	~~M55342E06B287B~~	~~6~~	18	4	22
	~~M55342E06B100B~~	~~18~~	54	11	65
	~~M55342E06B49B9~~	~~12~~	36	8	44
	~~M55342E06B20B0~~	~~18~~	54	11	65
	~~M55342E06B10B0~~	~~6~~	18	4	22
	100-267T	6	18	4	22
P-Ch MOSFET	IRHLF7970Z4	2	6	2	8
N-Ch MOSFET	IRHLUB770Z4	2	6	2	8
PNP Transistor	2N2907A	4	12	3	15
PNP Transistor, Dual	2N4854U	1	3	1	4
NPN Transistor	2N3700	6	18	4	22
Diode	1N6642US	48	144	29	173
OP Amp	AD648	27	81	17	98
OP Amp	OP462	14	42	9	51
OP Amp	RH1014M	2	6	2	8
Analog Switch	HS-303ARH	13	39	8	47
A/D Converter	LTC1604	2	6	2	8
Hex Inverter	54HC14	1	3	1	4
Level-Shift Xcvr	54ACS164245S	2	6	2	8
SRAM	M65609E	1	3	1	4
SRAM	HLX6228TSR	1	3	1	4
SRAM	512K x 8-Bit (4M)	1	3	1	4
FPGA	RTAX2000S-CQ352E B26	1	3	0	3
1.5V Voltage Regulator	MSK5922-1.5RH	1	3	1	4
3.3V Voltage Regulator	MSK5922-3.3RH	1	3	1	4
Connectors					
DFB Connector	M55302/131-01	1	3	1	4
B/P Connector	M55302/132-01	1	3	1	4
	22SMA-50-0-4/11	6	18	4	22
	26 pin D-sub HD	1	3	1	4
	Card Lock	2	6	2	8
	Card Lock NRE	1	3	1	4
PCB	PCB	1	3	1	4