REDW2000 Revision 0.1, Dec. 1/2005 Prepared by: David M. Hiemstra dave.hiemstra@mdacorpoartion.com

Paper No., Page No.	First Author	Part No.	Type	Manufacture	Data		Total Ionizing Dose				Single Event Effects							Displacement Damage		Facilities	Standard	Environment
					Terrestrial	Flight	Co60	ELDRS	Protons	Electrons	SEU	SET	SEFI	SEL	SEB	SEGR	Dose Rate	Protons	Neutrons			
1, pp. 1-5	E. Blackmore		TRIUMF PIF proton beam properties																			
2, pp. 6-10	J. Gorelick	MMBT2222	Bipolar Transistor	General Semiconductor	√		√															
		MMBT2907	Bipolar Transistor	General Semiconductor	√		√															
		BC846B	Bipolar Transistor	General Semiconductor	√		√															
		BC856B	Bipolar Transistor	General Semiconductor	√		√															
		IRL2910	Power MOSFET	International Rectifier	√		√															
		LT1528	Voltage Regulator	Linear Technology	√		√	√														
		UC1836	Pulse Width Modulator Controller	Unitrode	√		√															
		58C1001	EEPROM	Hitachi	√		√															
		74LVC138	Decoder	Philips	√		√															
		74LVC138	Decoder	Fairchild	√		√															
		74LVC373	Latch	Philips	√		√															
		74LVC373	Latch	Fairchild	√		√															
3, pp. 11-15	P. McDonald	BUP307	Insulated Gate Bipolar Transistor	Infineon	√										√	√						
		OM6579SC	Insulated Gate Bipolar Transistor	Omnirel	√										√	√						
			Insulated Gate Bipolar Transistor	Semikron	√										√	√						
4, pp. 16-20	J. Benedetto		SRAM		√		√															
5, pp. 21-25	D. Hogue		Rad-Hard CMOS Cell Library		√		√															
6, pp. 26-31	G. Tomasch	ADS-937MM	16 bit ADC	Datel	√		√															
		LTC1419AISW	14 bit ADC	Linear Technology	√		√															
		AD9243AS	14 bit ADC	Analog Devices	√		√															
7, pp. 32-38	D. Hiemstra	OPA111AM	Operational Amplifier	Burr Browm	√		√															
		OPA627BM	Operational Amplifier	Burr Browm	√		√															
		OPA643P	Operational Amplifier	Burr Browm	√		√															
		CLC430AJP	Operational Amplifier	Comlinear	√		√															
		CLC425AJP	Operational Amplifier	Comlinear	√		√															
8, pp. 39-44	D. Hiemstra	Pentium MMX	Microprocessor	Intel	√				√		√		√									
		Celeron	Microprocessor	Intel	√				√		√		√									
9, pp. 45-52	R. Koga	KM44S64230A	256M bit SDRAM	Samsung	√						√		√	√								
		0325404CT3A	256M bit SDRAM	IBM	√						√		√	√								
		HM5225405B	256M bit SDRAM	Hitachi	√						√		√	√								
		KM44S32030B	128M bit SDRAM	Samsung	√						√		√	√								
		KM44V16004B	64M bit SDRAM	Samsung	√						√		√									
10, pp. 53-60	R. Koga	HS139RH	Voltage Comparator	Harris	√							√										
		LM139	Voltage Comparator	National Semicinductor	√							√										
11, pp. 61-63	L. Scheick	WMS128K8	128k x 8 SRAM	White	√						√			√								
		MT5C2564	64k x 4 SRAM	Austin	√						√			√								
		MT5C2568	32k x 8 SRAM	Austin	√						√			√								
12, pp. 64-67	D. Krawzsenek	28LV0100	1M bit EEPROM		√		√				√			√								
13, pp. 68-73	E. Vergnault	CS5016	16 bit ADC	Crystal Semiconductor	√									√								
		MAX195	16 bit ADC	Maxim	√		√				√			√								
		AD976	16 bit ADC	Analog Devices	√		√				√											
		AD7945	12 bit DAC	Analog Devices	√		√							√								
		MX7545	12 bit DAC	Maxim	√		√				√			√								
		AD790	Voltage Comparator	Analog Devices	√		√				√			√								
		AD8011	Operational Amplifier	Analog Devices	√		√															
		ADG411	Analog Switch	Analog Devices	√		√															
14, pp. 74-79	G. Hopkinson	AD9223	12 bit ADC	Analog Devices	√		√				√			√								
		LTC1415	12 bit ADC	Linear Technology	√		√				√			√								
15, pp. 80-84	M. Van Uffelen		Ge Doped Single Mode Fiber	Corning	√																	
			Ge Doped Single Mode Fiber	Plasma Optical Fibers	√																	
16, pp. 85-88	S. Crain	MC68302	Microprocessor	Motorola	√	√								√								
		XC68302	Microprocessor		√	√								√								
17, pp. 89-95	D. Falguere	HM65756	32k x 8 SRAM	Hitachi	√	√					√											
		MT5C1008	128k x 8 SRAM	Mitsubishi	√	√					√											
		HM68128	128k x 8 SRAM	Hitachi	√	√					√											
		SMJ416400	4M x 4 DRAM	Texsas Instruments	√	√					√											
		LUNA-E	4M x 4 DRAM	IBM	√	√					√											
			64k x1 SRAM	Russia	√	√					√											
		50G6269	8M x 4 DRAM	IBM	√	√					√											
		HM628512	512k x8 SRAM	Hitachi	√	√					√											
		M5M5408	512k x8 SRAM	Mitsubishi	√	√					√											
		KM684000	512k x8 SRAM	Samsung	√	√					√											
		EDI441024	1M x 4 DRAM	EDI	√	√					√											
		28C256	EEPROM	Xilinx		√					√											
		AT28C010	EEPROM	Atmel		√					√											
		MC68020	Microprocessor	Motorola		√					√											
		TSX68T020R16		Thomson		√					√											
18, pp. 96-99	D. Roth	KM29U128T	128M bit Flash Memory	Samsung	√		√				√			√								
		TC58256FT/DC	256M bit Flash Memory	Toshiba	√		√				√			√								
19, pp. 100-105	S. McClure	LP2953	Low Dropout Voltage Regulator	National Semicinductor	√		√	√														
		LT1528	Low Dropout Voltage Regulator	Linear Technology	√		√	√														
		AD3306	Low Dropout Voltage Regulator	Analog Devices	√		√	√														
		LT1763	Low Dropout Voltage Regulator	Linear Technology	√		√	√														
		LT1175	Low Dropout Voltage Regulator	Linear Technology	√		√	√														
		LT1185	Low Dropout Voltage Regulator	Linear Technology	√		√	√														
20, pp. 106-122	M. O'Bryan	TL7702B	Power Supervisor	Texas Instruments	√						√	√		√								
		TL7705B	Power Supervisor	Texas Instruments	√						√	√		√								
		TL7770-5	Power Supervisor	Texas Instruments	√							√		√								
		TLC7705	Power Supervisor	Texas Instruments	√							√		√								
		MX7225UQ	DAC08	Texsas Instruments	√									√								
		AD571S	10 Bit ADC	Analog Devices	√									√								
		LTC1419	14 bit ADC	Linear Technology	√									√								
		DAC08	8 bit DAC	Analog Devices	√							√		√								
		R29793	PROM	Fairchild	√							√		√								
		RH21020	Digital Signal Processor	LMFS	√							√										
		TSC21020F	Digital Signal Processor	Temic	√							√										
		10502	ECL NOR Gate	Motorola	√							√		√								
		MC74LCX08	And Gate	Motorola	√									√								
		HFBR-53D5	Fiber Optic Transceiver	Hewlett Packard	√							√										
		TTC-155M4	Fiber Optic Transceiver	Lasermate	√							√										
		TTC-155M2	Fiber Optic Transceiver	Lasermate	√							√										
		CLC449	Operational Amplifier	National Semicinductor	√							√		√								
		PA07	Power Operational Amplifier	APEX	√							√		√								
		LMC6081	Operational Amplifier	National Semicinductor	√									√								
		HS139	Voltage Comparator	Harris	√							√		√								
		LM139	Voltage Comparator	National Semicinductor	√							√		√								
		MAX962	Voltage Comparator	Maxim	√									√								
		AD783SQ	Sample and Hold	Analog Devices	√							√		√								
		A250	Charge Sensitive Amplifier	Aptek	√							√		√								
		MSA0670	MMIC Amplifier	Hewlett Packard	√							√		√								
		OLH5601	Optocoupler	Isolink	√							√										
		6N134	Optocoupler	Micropac	√							√										
		DS1670E	System Controller	Dallas Semiconductor	√								√									
		SN54LVTH16244A	Buffer/Drivers	Texas Instruments	√								√									
		CGS74LCT2524	Clock Driver	National Semicinductor	√								√									
		MIC4423	MOSFET driver	Micrel	√							√	√									
		MC74HC4538A	Multivibrator	Motorola	√								√									
		DS1803	Digital Potentiometer	Dallas Semiconductor	√						√		√									
		LM111	Voltage Comparator	National Semicinductor	√														√			
		OLH249	Optocoupler	Isolink	√														√			
		66099	Optocoupler	Micropac	√														√			
		OD800	LED	Optodiode	√														√			
		HFE-4080	VCSEL	Honeywell	√														√			
		MX913	Voltage Comparator	Maxim	√			√														
		CMP01	Voltage Comparator	Analog Devices	√		√															
		PM139	Voltage Comparator	Analog Devices	√		√															
		A1280A	FPGA	Actel	√		√															
		LMC6464	Operational Amplifier	National Semicinductor	√		√															
		CLC502	Operational Amplifier	National Semicinductor	√			√														
		AD783SQ	Sample and Hold	Analog Devices	√			√														
		AD620	Operational Amplifier	Analog Devices	√			√														
		AD845	Operational Amplifier	Analog Devices	√			√														
		OP-07	Operational Amplifier	Analog Devices	√			√														
		AMP01	Instrumentation Amplifier	Analog Devices	√			√														
		OP467	Operational Amplifier	Analog Devices	√			√														
		OP400	Operational Amplifier	Analog Devices	√			√														
		OP270	Operational Amplifier	Analog Devices	√			√														
		OP27	Operational Amplifier	Analog Devices	√			√														
		OP15	Operational Amplifier	Analog Devices	√			√														
		AD585	Sample and Hold	Analog Devices	√			√														
		AD524	Instrumentation Amplifier	Analog Devices	√			√														
		LF155A	Operational Amplifier	Linear Technology	√			√														
		LT1010	Power Buffer	Linear Technology	√			√														
		LF198	Sample and Hold	Linear Technology	√			√														
		LF147	Operational Amplifier	Linear Technology	√			√														
		INA117SM	Instrumentation Amplifier	Burr Browm	√			√														
		PA07M	Power Operational Amplifier	APEX	√			√														
		A250	Charge Sensitive Amplifier	Amptek	√			√														
		MAX494	Operational Amplifier	Maxim	√			√														
		OM11725SMX	Operational Amplifier	Omnirel	√			√														
		AD7821	8 bit ADC	Analog Devices	√		√															
		AD7885	16 bit ADC	Analog Devices	√		√															
		AD571	10 Bit ADC	Analog Devices	√		√															
		AD976	16 bit ADC	Analog Devices	√		√															
		DAC08	8 bit DAC	Analog Devices	√		√															
		AD7535	14 bit DAC	Analog Devices	√		√															
		AD7545	12 bit DAC	Analog Devices	√		√															
		AD8222	12 bit DAC	Analog Devices	√		√															
		MX7225	8 bit DAC	Maxim	√		√															
		MX536	RMS to DC Converter	Maxim	√		√															
		MN5295	16 bit DAC	Micronetworks	√		√															
		PIC7527	Switching Regulator	Linfinity	√			√														
		LM117K	Voltage Regulator	National Semicinductor	√			√														
		LM117H	Voltage Regulator	National Semicinductor	√			√														
		LM117HVK	Voltage Regulator	National Semicinductor	√			√														
		LM117HVH	Voltage Regulator	National Semicinductor	√			√														
		OM3914	Voltage Regulator	Omnirel	√			√														
		OM1850STM3	Voltage Regulator	Omnirel	√			√														
		AD588	Voltage Reference	Analog Devices	√			√														
		AD780	Voltage Reference	Analog Devices	√			√														
		KM48C800AS-6U	8M x 8 DRAM	Samsung	√		√															
		KM684002AJ-17	512k x8 SRAM	Samsung	√		√															
		28C256	256k bit EEPROM	SEEQ/ATMEL	√		√															
		R29773	2K x 8 PROM	Fairchild/Rayrtheon	√		√															
		DG412	Analog Switch	Maxim	√		√															
		DG403	Analog Switch	Maxim	√		√															
		HI300	Analog Switch	Harris	√		√															
		ATR2815TF	DC-DC Converter	Lambda/Advanced Analog	√		√															
		MTR2815	DC-DC Converter	Interpoint	√		√															
		MTR2805	DC-DC Converter	Interpoint	√		√															
		SG1846	Pulse Width Modulator Controller	Linfinity	√		√															
		54ABT245A	Transceiver	National Semicinductor	√		√															
		MIC4424	Power MOSFET Driver	Micrel	√		√															
		QT22AC10M	Crystal Oscillator	Q-Tech	√		√															
		DS7830	Differential Line Driver	National Semicinductor	√		√															
		54AC74	Flip-Flop	National Semicinductor	√		√															
		OM20P10	Power MOSFET	Omnirel	√		√															
		2N7225	Power MOSFET	Harris	√		√															
		2N5115	JFET	Solitron	√		√															
		2N4858	JFET	Motorola	√		√															
		MAX962ESA	Voltage Comparator	Maxim	√		√															
		MAX972ESA	Voltage Comparator	Maxim	√		√															
		LMC6081AIM	Operational Amplifier	National Semicinductor	√		√															
		LP2952IM	Voltage Regulator	National Semicinductor	√		√															
		LT1580 IR-2.5	Voltage Regulator	Linear Technology	√		√															

		AM29LV800B	Flash Memory	Advanced Micro Devices	√		√															
		MT48LC1M16A1TG	1M x 16 SDRAM	Micron	√		√															
		IRLR2905	Power MOSFET	International Rectifier	√		√															
		DS1670E	System Controller	Dallas Semiconductor	√		√															
		OR2T15A2S240DB	FPGA	Lucent Technology	√		√															
		CGS74LCT252M	Clock Driver	National Semicinductor	√		√															
		DS1803Z-010	Electronic Potentiometer	Dallas Semiconductor	√		√															
		LTC1153CS8	Electronic Circuit Breaker	Linear Technology	√		√															
		LTC1157CS8	Power MOSFET Driver	Linear Technology	√		√															
		MC74HC4538AD	Multivibrator	Motorola	√		√															
		MC74LCX08D	NAND Gate	Motorola	√		√															
		SN74LVT16244	Line Driver/Buffer	Texas Instruments	√		√															
		SY100EL16VZC	Differential Receiver	Synergy	√		√															
		SY100EL31ZC	D Flip-Flop	Synergy	√		√															
		SY10EL15ZC	Clock Distributor	Synergy	√		√															
21, pp. 123-146	K. LaBel	4N24	Optocoupler	Texas Instruments			√											√				
		4N49		Texas Instruments														√				
		4N49		Micopac			√					√						√				
		4N49		TRW														√				
		4N49		Optek														√				
		OLF400		Isolink														√				
		OMT1062		Isolink														√				
		66092		Micropac														√				
		66099		Micropac								√						√				
		66123		Micropac								√						√				
		4N48		Micropac														√				
		4N48		Optek								√						√				
		4N55		Hewlett Packard								√						√				
		4N55		Micropac														√				
		6N134		Hewlett Packard								√						√				
		6N134		Micropac								√						√				
		6N136		Micropac								√										
		6N140		Hewlett Packard								√						√				
		6N140		Micropac								√						√				
		6N140A		Hewlett Packard								√										
		DIH125	MOSFET Relay	Dionics														√				
		FB00KB4	MOSFET Relay	Teledyne														√				
		HCPL5231		Hewlett Packard														√				
		HCPL5430		Hewlett Packard														√				
		HCPL5431		Hewlett Packard														√				
		HCPL5530		Hewlett Packard														√				
		HCPL5531		Hewlett Packard														√				
		HCPL5630		Hewlett Packard														√				
		HCPL5701		Hewlett Packard														√				
		HCPL5730		Hewlett Packard														√				
		HCPL6651		Hewlett Packard														√				
		HCPL2201		Hewlett Packard								√						√				
		HCPL2430		Hewlett Packard								√						√				
		HCPL5401		Hewlett Packard								√										
		HCPL5631		Hewlett Packard								√										
		HCPL6651		Hewlett Packard								√										
		OLH149		Isolink								√						√				
		OLH249		Isolink			√					√						√	√			
		OLH304		Isolink														√				
		OLH349		Isolink														√				
		OLH400		Isolink														√				
		P2824		Hamamatsu								√						√	√			
		66088		Micropac														√				
		3C91C		Mitel														√				
		HSSR-7110	MOSFET Relay	Hewlett Packard														√				
		OLS700		Isolink														√				
		OLH1049		Optek														√				
		OLH1049.0002		Optek														√				
		OLH1049.OO3		Optek														√				
		4N35		Micropac								√						√				
		61082-300	Photodiode	Micropac								√						√				
		62017 GS3040-3	Light Emitting Diode	Micropac														√				
		OP224	Light Emitting Diode	Optek														√				
		OP604	Phototransistor	Optek								√						√				
		MC009		Micropac														√				
		OLI400		Isolink														√				
		QCPL-5729		Hewlett Packard														√				
		S4N49		Micropac															√			
		OLH5601		Isolink								√										
		QCPL-6637		Hewlett Packard								√										
22, pp. 147-152	P. Truscott	Geant 4	Space radiation shielding simulator																			√
23, pp. 153-157	K. Gill		Laser, InGaAs/InP MQW DCPBH	NEC															√			
24, pp. 158-162	K. Miller	CID22Q	Charge Injection Devices	CIDTEK	√		√															

Once the paper(s) with the response data required has been located it is the radiation effects engineer's responsibility to perform a detailed review to establish applicability.