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CSR

ENGINEERING CHANGE ORDER
CENTER FOR SPACE RESEARCH
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ECO NO.
36-1024

DWG. NO.	NEW REV.	DRAWING TITLE
36-02215	02	RECOMMENDATIONS FOR FOT LIMIT CHECKING
36-02215	03	"

REASON FOR CHANGE: *Rev 02: PRE-LAUNCH VERSION*
Rev 03: 1 YR OF EXPERIENCE

DESCRIPTION OF CHANGE:
ONLY MINOR VALUE TRIMS OCCURED BETWEEN Rev 02 & Rev 03.

	SIGNATURE	DATE	REMARKS:
ORIGINATOR			
MECHANICAL			
ELECTRICAL			
SOFTWARE			
STRUCTURE			
FABRICATION			
SCIENCE			
SYSTEMS ENG.			
PERFORM. ASSUR.			
PROJ. ENGINEER	<i>[Signature]</i>	<i>1/12/00</i>	
PROJ. MANAGER			
RELEASE			

Recommendations for FOT limit checking	MIT Dwg 36-02215		
	Rev. 01	RFG	5/03/99
Negotiations with thermal complete	Rev. 02	RFG	6/24/99
Revisions based on a year of flight experience	Rev. 03	RFG	9/12/00

Paul's current proposal is for limit exceptions on current or voltage to only result in SOT notification -->> yellow limits; there will be no limits which trigger immediate FOT action -->> red limits. NB that specifying a red limit for anything implies that we will also have to specify what it is we want the FOT to (autonomously) do when the limit is tripped. If that action isn't clear, we should leave the limits yellow.

In the table below, the red thermal limits should trigger SCS 40: all power off. The red limits for the valve and door actuators need to trigger the valve/mechanism disables.

Use 1DEMBVOC (has the advantage that it already exists) or one of bits {8 13 14 25} in the PSMC Serial Digital Stream as a mode switch. In either case the value will be "1" if and only if both DPAs are off, which says that a "1" implies power-off/survival-thermal conditions and a "0" implies normal operation.

It isn't obvious what will happen to 1PIN1AT, 1SSMYT, 1SSPYT, 1VAH[CO][AB]T, and 1WR[AB]T since they occur once /before/ 1DEMBVOC and once after. Two solutions are offered here:

- Invent new mnemonics for the first occurrence and then ignore them
- Treat these as "unswitched" with essentially survival limits since their functions are covered by other mnemonics.

Limits and Stuff

Mnemonic	Description	LSB	Units	Normal					Survival			
				Nominal	RedLo	YelLo	YelHi	RedHi	RedLo	YelLo	YelHi	RedHi
1DACTAT	Door Angle					(none)				(none)		
1DAHACU	Housing Heater Current	0.0200	Amps	off			0.16					0.16
1DAHBCU*	Housing Heater Current	0.0200	Amps	0.6		0.3	0.8					0.16
1DAHAT	Housing Temp. Offset			off		(none)				(none)		
1DAHBT	Housing Temp. Offset			0x50		0x20	0x80			(none)		
1DAHAVO	Housing Htr Input Bus	0.1198	Volts	off			1					1
1DAHVVO*	Housing Heater Voltage	0.1198	Volts	8		4	12					1
1DAHVBVO*	Housing Htr Input Bus	0.138	Volts	0			0.6			24	35	
1DAHVBVO*	Housing Htr Input Bus	0.138	Volts	29		26	33			24	35	
1DE28[AB]VO*	DEA Input Voltage	0.138	Volts	29		26	34			24	35	
1DEIC[AB]CU	DEA Input Current	0.0704		noise		(none)				(none)		
1DEN0AVO*	DEA -6VDC	0.0301	Volts	-6.44		-6.60	-6.00			-1		
1DEN0BVO*	DEA -6VDC	0.0301	Volts	0		-0.3				-1		
1DEN1AVO*	DEA -15VDC	0.0769	Volts	-16.3		-16.6	-14.8			-1		
1DEN1BVO*	DEA -15VDC	0.0769	Volts	0		-0.8				-1		
1DEPOAVO*	DEA +6VDC	0.0300	Volts	6.21		5.90	6.30				1	
1DEPOBVO*	DEA +6VDC	0.0300	Volts	0			0.3					1
1DEP1AVO*	DEA +15VDC	0.0781	Volts	16.0		15.0	16.4				1	
1DEP1BVO*	DEA +15VDC	0.0781	Volts	0			0.4					1
1DEP2AVO*	DEA +24VDC	0.120	Volts	25.1		24.1	25.6				1	
1DEP2BVO*	DEA +24VDC	0.120	Volts	0			0.8					1
1DEP3AVO*	DEA +28VDC	0.150	Volts	30.3		29.5	31.3				1	
1DEP3BVO*	DEA +28VDC	0.150	Volts	0			0.8					1
1DP28[AB]VO*	DPA Input Voltage	0.138	Volts	29		26	34			24	35	
1DPIC[AB]CU*	DPA Input Current	0.0101	Amps	1.4		0.2	1.6				0.1	
1DPP0[AB]VO	DPA +5VDC	0.022	Volts	5.28		5.02	5.54				1	
1HOPR[AB]PR	Housing Pressure					(none)				(none)		
1CB[AB]T	Detector Housing	2.5	C	-60	-76	-63	-57	-52	-76	-71	-69	-52
1CR[AB]T*	Cold Radiator	2.5	C	-128	-142	-132	-105	-90	-142	-137	-105	-90
1DACTBT	Housing Collimator	2.5	C	-18		-21	-5			-48	-32	
1DEAMZT*	DEA SS -Z	0.4	C	8	-37.5	2	13	40.5	-37.5	-32.5	35.5	40.5
1DPAMYT*	DPA SS -Y	0.4	C	10	-37.5	-1	15	40.5	-37.5	-32.5	35.5	40.5
1DPAMZT*	DPA SS -Z	0.4	C	12	-37.5	4	17	40.5	-37.5	-32.5	35.5	40.5
1[MV]AH[OC][AB]T	Actuator Temperatures	0.8	C		200				200			
1OAHAT	Door Open Actuator	2.5	C			(none)				(none)		
1OAHBT	Door Actuator Housing	2.5	C			(none)				(none)		
1PDEAAT*	PSMC DEA Board	2.5	C	25	-37	8	43	59	-37	-32	54	59
1PDEABT*	PSMC DEA Board	2.5	C	16	-37	-3	37	59	-37	-32	54	59
1PIN1AT*	PSMC Lid	1.3	C	14	-37	-5	27	37	-37	-32	32	37
1SSMYT*	Support Structure -Y	0.4	C	12	-37.5	9	17	40.5	-37.5	-32.5	35.5	40.5
1SSPYT*	Support Structure +Y	0.4	C	12	-37.5	9	15	40.5	-37.5	-32.5	35.5	40.5
1WR[AB]T*	Warm Radiator	2.5	C	-82	-104	-86	-75	-70	-104	-99	-75	-70

Recommendations for FOT limit checking

MIT Dwg 36-02215

Rev. 01 RFG 5/03/99

Rev. 02 RFG 6/24/99

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It isn't obvious what will happen to 1PIN1AT, 1SSMYT, 1SSPYT, 1VAH[CO][AB]T, and 1WR[AB]T since they occur once /before/ 1DEMBVOC and once after. Two solutions are offered here:

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Mnemonic	Description	LSB	Units	Normal				Survival				
				Nominal	RedLo	YelLo	YelHi	RedHi	RedLo	YelLo	YelHi	RedHi
1DACTAT	Door Angle					(none)				(none)		
1DAHACU	Housing Heater Current	0.0200	Amps	off			0.16				0.16	
1DAHBCU	Housing Heater Current	0.0200	Amps			0.5	1.2				0.16	
1DAHAT	Housing Temp. Offset			off		(none)				(none)		
1DAHBT	Housing Temp. Offset			0x80		0x40	0xC0			(none)		
1DAHAVO	Housing Htr Input Bus	0.1198	Volts	off			1				1	
1DAHBO	Housing Heater Voltage	0.1198	Volts	14		7	20				1	
1DAH[AB]VO	Housing Htr Input Bus	0.138	Volts			28	34		24	35		
1DE28[AB]VO	DEA Input Voltage	0.138	Volts			28	34		24	35		
1DEIC[AB]CU	DEA Input Current	0.0704		noise		(none)			(none)			
1DENO[AB]VO	DEA -6VDC	0.0301	Volts	-6.38		-6.70	-6.06		-1			
1DEN1[AB]VO	DEA -15VDC	0.0769	Volts	-16.3		-17.1	-15.5		-1			
1DEP0[AB]VO	DEA +6VDC	0.0300	Volts	6.21		5.90	6.52				1	
1DEP1[AB]VO	DEA +15VDC	0.0781	Volts	16.2		15.4	17.0				1	
1DEP2[AB]VO	DEA +24VDC	0.120	Volts	25.2		23.9	26.5				1	
1DEP3[AB]VO	DEA +28VDC	0.150	Volts	30.8		29.3	32.3				1	
1DP28[AB]VO	DPA Input Voltage	0.138	Volts			28	34		24	35		
1DPIC[AB]CU	DPA Input Current	0.0101	Amps			0.175	1.750				0.1	
1DPP0[AB]VO	DPA +5VDC	0.022	Volts	5.28		5.02	5.54				1	
1HOPR[AB]PR	Housing Pressure					(none)			(none)			
1CB[AB]T	Detector Housing	2.5	C	-76		-63	-57	-52	-76	-71	-69	-52
1CR[AB]T	Cold Radiator	2.5	C	-142		-130	-125	-90	-142	-137	-125	-90
1DACTBT	Housing Collimator	2.5	C			-21	-5			-48	-32	
1DEAMZT	DEA SS -Z	0.4	C	-37.5		-17.5	30.5	40.5	-37.5	-32.5	35.5	40.5
1DPAMYT	DPA SS -Y	0.4	C	-37.5		-17.5	35.5	40.5	-37.5	-32.5	35.5	40.5
1DPAMZT	DPA SS -Z	0.4	C	-37.5		-17.5	35.5	40.5	-37.5	-32.5	35.5	40.5
1[MV]AH[OC][AB]T	Actuator Temperatures	0.8	C	200					200			
1OAHAT	Door Open Actuator	2.5	C			(none)				(none)		
1OAHBT	Door Actuator Housing	2.5	C			(none)				(none)		
1PDEA[AB]T	PSMC DEA Board	2.5	C	-37		-22	54	59	-37	-32	54	59
1PIN1AT	PSMC Lid	1.3	C	-37		-22	32	37	-37	-32	32	37
1SSMYT	Support Structure -Y	0.4	C	-37.5		-17.5	35.5	40.5	-37.5	-32.5	35.5	40.5
1SSPYT	Support Structure +Y	0.4	C	-37.5		-17.5	35.5	40.5	-37.5	-32.5	35.5	40.5
1WR[AB]T	Warm Radiator	2.5	C	-104		-88	-75	-70	-104	-99	-75	-70

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1DAHACU	Housing Heater Current	0.0200	Amps	off			0.16					0.16	
1DAHBCU	Housing Heater Current	0.0200	Amps			0.5	1.2					0.16	
1DAHAT	Housing Temp. Offset				(none)					(none)			
1DAHBT	Housing Temp. Offset					0x40	0xC0			(none)			
1DAHAVO	Housing Htr Input Bus	0.1198	Volts				1					1	
1DAHBO	Housing Heater Voltage	0.1198	Volts			7	20					1	
1DAH[AB]VO	Housing Htr Input Bus	0.138	Volts			28	34			24		35	
1DE28[AB]VO	DEA Input Voltage	0.138	Volts			28	34			24		35	
1DEIC[AB]CU	DEA Input Current	0.0704			(none)					(none)			
1DEN0[AB]VO	DEA -6VDC	0.0301	Volts	-6.38		-6.70	-6.06			-1			
1DEN1[AB]VO	DEA -15VDC	0.0769	Volts			-17.1	-15.5			-1			
1DEP0[AB]VO	DEA +6VDC	0.0300	Volts			5.90	6.52					1	
1DEP1[AB]VO	DEA +15VDC	0.0781	Volts			15.4	17.0					1	
1DEP2[AB]VO	DEA +24VDC	0.120	Volts			23.9	26.5					1	
1DEP3[AB]VO	DEA +28VDC	0.150	Volts			29.3	32.3					1	
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1DPP0[AB]VO	DPA +5VDC	0.022	Volts			5.02	5.54					1	
1HOPR[AB]PR	Housing Pressure						(none)						
1CB[AB]T	Detector Housing	2.5	C	-68	-63	-57	-52	-76	-71	-69	-64		
1CR[AB]T	Cold Radiator	2.5	C	-135	-130	-125	-120	-142	-137	-125	-120		
1DACTBT	Housing Collimator	2.5	C	-26	-21	-5	0	-53	-48	-32	-27		
1DEAMZT	DEA SS -Z	0.4	C	-22.5	-17.5	30.5	35.5	-37.5	-33.5	35.5	40.5		
1DPAMYT	DPA SS -Y	0.4	C	-22.5	-17.5	35.5	40.5	-37.5	-33.5	35.5	40.5		
1DPAMZT	DPA SS -Z	0.4	C	-22.5	-17.5	35.5	40.5	-37.5	-33.5	35.5	40.5		
1[MV]AH[OC][AB]T	Actuator Temperatures	0.8	C	200				200					
1OAHAT	Door Open Actuator	2.5	C	-45	-40	-25	-20	-57	-52	-32	-27		
1OAHBT	Door Actuator Housing	2.5	C	-45	-40	-25	-20	-57	-52	-32	-27		
1PDEA[AB]T	PSMC DEA Board	2.5	C	-27	-22	54	59	-37	-32	54	59		
1PIN1AT	PSMC Lid	1.3	C	-27	-22	32	37	-37	-32	32	37		
1SSMYT	Support Structure -Y	0.4	C	-22.5	-17.5	35.5	40.5	-37.5	-32.5	35.5	40.5		
1SSPYT	Support Structure +Y	0.4	C	-22.5	-17.5	35.5	40.5	-37.5	-32.5	35.5	40.5		
1WR[AB]T	Warm Radiator	2.5	C	-93	-88	-75	-70	-104	-99	-75	-70		