CREAM Instrument Internal Power Agreement

The internal agreed-upon instrument power plan calls for separate switched 28V±7V power connections from the bus for each of the 4 major power consumers – TRD, TCD, calorimeter module, CREAM Common Boxes (including FDS – Flight Data System). Each of these components will be responsible for any DC-DC conversions required for its use. The total power allocated to the instrument is 380W. The division between instrument consumers is as follows. A detailed listing of the power allocations is given in the CREAM Box Spreadsheet.

1. TRD – up to 70W including conversion inefficiencies for TRD and Z2 Cherenkov Detector
2. TCD – up to 80W including conversion inefficiencies for TCD and TCD Trigger
3. Cal – up to 161W including conversion inefficiencies for calorimeter, supplemental charge detection and Calorimeter Trigger
4. CREAM Common Boxes (Command Distribution, Housekeeping, FDS, Power Distribution, Master Trigger) – up to 33W including conversion inefficiencies

The total of 344W leaves a 36W margin (10.5%). This margin should be kept to allow for unexpected developments in the CREAM Common Boxes, as these have not yet been fully designed. Some of the margin may be used to reduce the instrument power requirement to save cost and/or weight when we get close to signing a CREAM Power ICD with WFF.

	QTY	STATUS	POWER	TOTAL PWR	LOCATION	COMMENTS
CREAM COMMON BOXES						
Command Distribution	1	ESTIMATE	2	2		Powered by Computer
Housekeeping	1	ESTIMATE	2	2		Powered by Computer
CREAM Flight Computer	1	BUILDING	26	26	Mounted to Deck	Includes Power Converters
Power Distribution	1	ESTIMATE	1	1	Anywhere	
Master Trigger	1	ESTIMATE	2	2	Near CREAM Flight Computer	Powered by Computer
Total CREAM Instrument Boxes	5			33		
CALORIMETER MODULE BOXES						
Calorimeter charge detector readout	4	ESTIMATE	10.9	43.6	One per side	Mounted to sides of Target
Calorimeter HPD Assembly	4	BUILDING	6.7	26.7	One per side	Measured Power with IDE ASICs
Target HPD Assembly	12	ESTIMATE	3.6	43.2	Three per side	CR, Non-ASIC R/O w/50% margin
Data Sparsification	3	BUILT	1.5	4.5	Near CREAM Flight Computer	Powered by Computer
Calorimeter Calibration	1	ESTIMATE	2.0	2.0	Anywhere	
Calorimeter Trigger	1	ESTIMATE	2.0	2.0	Anywhere	
Charge Detector Power Converter	1	ESTIMATE	14.5	14.5	Mounted to Deck	
Calorimeter Power Converter	1	ESTIMATE	10.2	10.2	Mounted to Deck	Powers Calibration & Trigger
Target Power Converter	1	ESTIMATE	14.4	14.4	Mounted to Deck	
Total Calorimeter Module Boxes	24			161.2		
TRD BOXES						
Amplex - 4 chips\board, 2 channels\board	16	BUILDING	0.4	5.92	Four per side (TBD)	
I/F - Signal & Power for Amplex	4	BUILDING	0.3	1	One per side (TBD)	
High Voltage Converters w/distribution card	2	ESTIMATE	2.8	5.6	One per ~~side~~ stack	
Low Voltage Converters w/ON/OFF relay card	1	ESTIMATE	5.0	5	Mounted to Deck (below deck)	
Main - Command I/F, Sensor Amps, etc.	1	ESTIMATE	4.5	4.5	~~Solar Panel Side~~ (-Y side?)	

Amplex ADCs w/Control, CMD, & I/F	11+	BUILDING	8.0	10.9	-Y side w/main (TBD)	
Valves, Sensors	-	DESIGN	2.0	2	All sides above - @cylinder below, deck	
S2 BOXES						
CSA - 4 OP37's in a box	1	BUILDING	0.4	0.4		
Fast Amplifier -- 4 input box	1	BUILDING	0.3	0.3		
Peak Detector -- 4/board	1	BUILDING	2.8	2.8		
PHA -- Dual 8 channel board	1	BUILDING	0.3	0.3		
Control Logic Board	1	ESTIMATE	0.3	0.3		
Cherinkov PMT's	8	ESTIMATE	3.5	28.0		
High Voltage Converters w/distribution card	1	BUILDING	2.8	2.8		
GAS Regulator						
Matheson 3810 regulator	1	OEM	0.0	0	deck	gas regulator - need access to control
TRD Total Power				69.8		
TRD Total E-Weight						
TCD BOXES						
Photomultiplier Tube Head Unit	18	ESTIMATE	4.1	73.8	Four per side, Two near Calorimeter	
TCD Trigger Module (Beatty Box)	1	ESTIMATE	6.0	6.0	Anywhere	
Total TCD Boxes	18			79.8		
TOTAL INSTRUMENT POWER				343.8		
POWER MARGIN			10%	34.4		
TOTAL with MARGIN				**378.2**		
TOTAL INSTRUMENT E-WEIGHT						

NOTES:
STATUS =
ESTIMATE/DESIGN/BUILDING/BUILT