4.30_V2.5 TURN ON DEA B

Last Revised: August 10, 2017
Filename: deab_on

BRIEF FUNCTIONAL DESCRIPTION:

This is an "atomic" procedure which powers up the B side of the DEA. It should be safe to execute under any condition except a spacecraft power or thermal emergency.

The sequence of actions for this procedure will be:

1. Verify that DEA A is powered off and disabled (see Constraints/Cautions, below)
2. Verify that DEA B is recieving power from the spacecraft
3. Enable and turn on DEA power supply side B
4. Verify that DEA A is still powered off

ASSUMED INSTRUMENT STATE:

1. Assumes that the PSMC is receiving power from the spacecraft.
2. Assumes that DEA A is off.
3. Assumes the DEA was previously powered from side B. If it was instead powered from side A, or if the prior state is unknown, the board 11 relays will need to be reset, as in the switch_deaa_b procedure.

SPECIAL INITIAL CONDITIONS:

OPERATIONAL CONSTRAINTS/CAUTIONS:

In normal operations, only one side of the DEA should be powered on (a) to prevent conflict for control of the focal plane temperature controller, (b) to avoid excess current draw from the spacecraft, and (c) to avoid over-heating within the PSMC.

The DEA power status is normally indicated by the values of the 1DEPSA and 1DEPSB flags, which should not both be 1 simultaneously. However, if neither side of the DPA is receiving power (*i.e.*, if 1DPP0AVO and 1DPP0BVO are simultaneously reading 0.0 ± 0.5 V), the DEA flag values will be unreliable and the DEA voltage channels (1DEP[0123][AB]VO) should instead be used to determine which sides of the DEA are powered).

Before sending the command to power on DEA B, the DEA Input Voltage B 1DE28BVO should be checked to make sure that DEA B is receiving power from the spacecraft.

The DEA input current monitors (1DEIC[AB]CU) are noisy. To give an indication of what variation may be expected, figures 1 and 2 show the behavior of the A-side DEA current with a ten-sample running average for two situations in which all video boards were powered down. Note that when either side of the DEA is unpowered, the corresponding current monitor, 1DEICBCU for side B, or 1DEICACU for side A, will be unreliable. They will read $16 - 18$ A when unpowered. This is a feature of all TDB versions up through v14 and is not an anomaly.

If the DEA powers off unexpectedly during a bakeout, the FP bakeout heater will lose power and this heater will NOT be re-enabled when the DEA side B power is restored. Additional SW commands are necessary to activate the FP bakeout heater. The DH bakeout heater is unaffected by a power loss to the DEA and will therefore still be executing a bakeout if power is lost to the DEA.

After successful execution, *the FP temperature control will be unregulated, and DEA interface A/D will be in low-resolution mode.*

REFERENCES:

CHANGE HISTORY:

V1.0

- Initial version, based on deaa_on.

V1.1

- Minor edits, for ACIS team review

V1.2

- Added caution about using both DEA power supplies at once. For ACIS team review.

V1.3

- Extra DEA-A off checks

V2.0

- For FOT review

V2.1

- Corrected expected voltages; added +28V input checks.

V2.2

- Removed input current check; added warning to text.

V2.3

- Added step 1.2 to verify the DEA B is receiving power from the spacecraft.
- Added description of this to the brief functional description, and to the constraints & cautions section.
- Added words about bakeout contingencies.
- Added Telemetry Description identifiers to the DEA ENB/DIS and ON/OFF items.
- Updated criticality values in the command table.
- Minor word changes to match the side A procedure.

V2.4

- Added warning about DEA relays if switching sides

V2.5

- Clarified language per PGF comments.

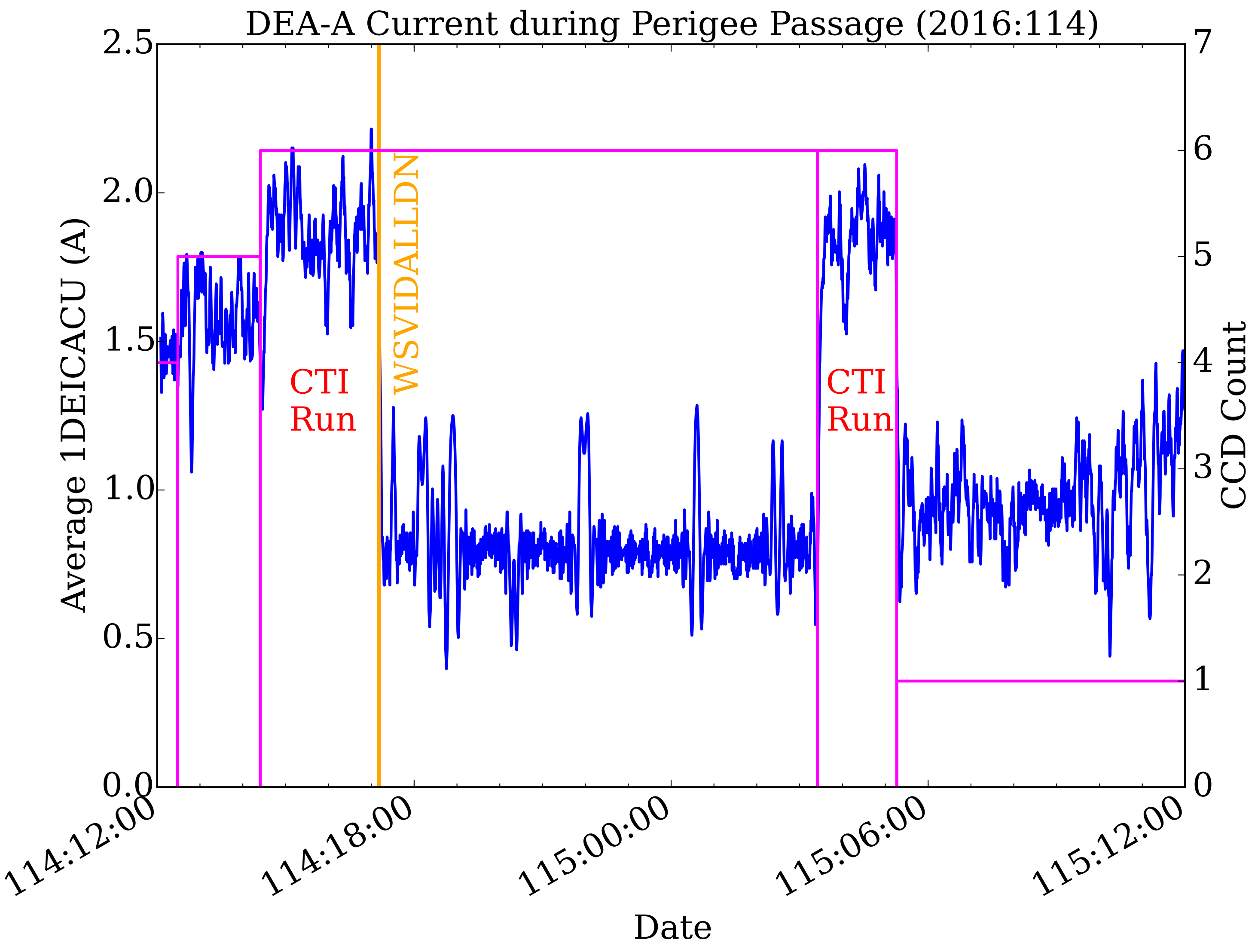

Figure 1: Ten-sample running average behavior of 1DEICACU during a perigee passage. All video boards are powered off after the issuing of the WSVIDALLDN command, which is marked by the orange line in the plot.

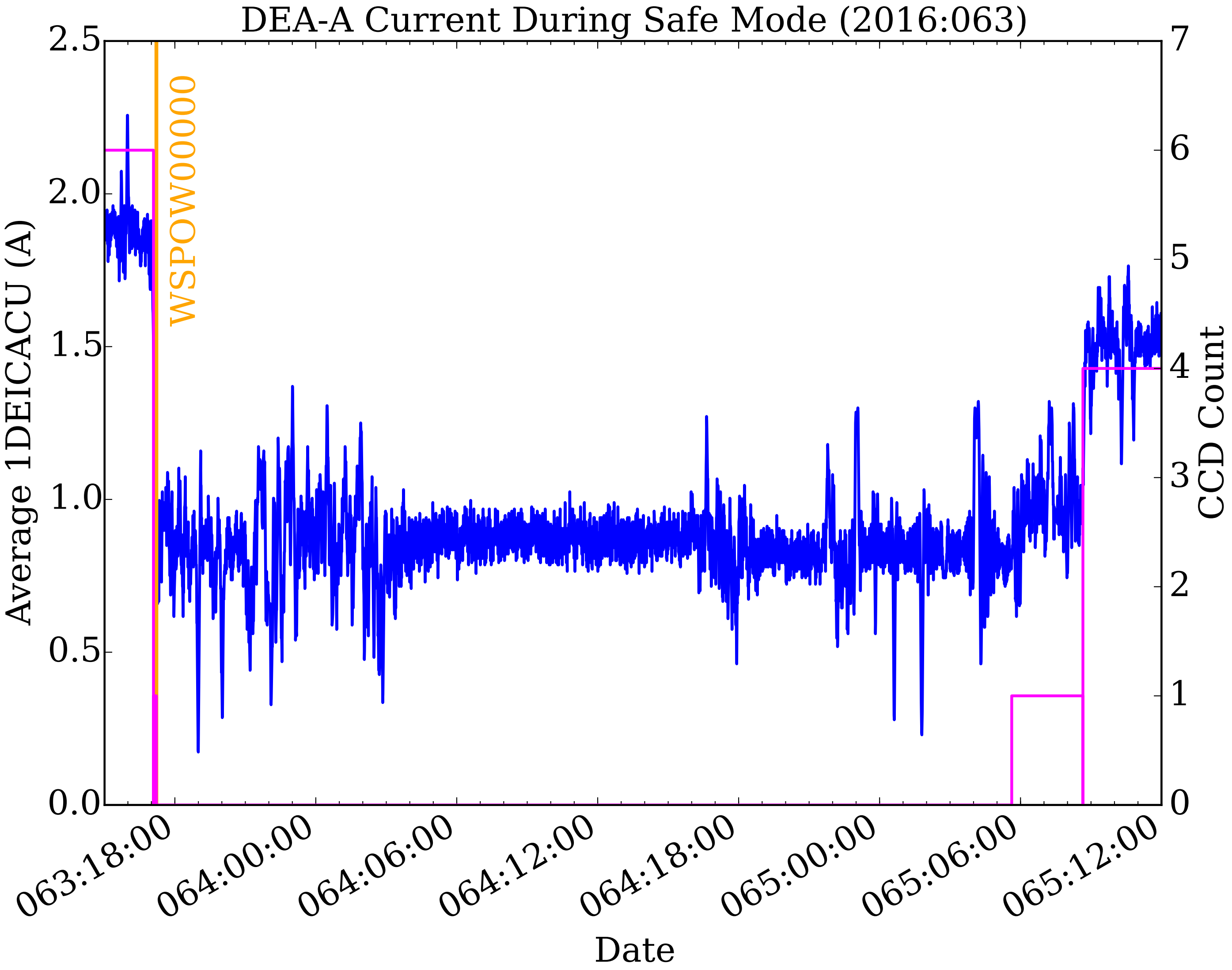

Figure 2: Ten-sample running average behavior of 1DEICACU during a safe mode. All video boards are powered off after the issuing of the WSPOW00000 command, which is marked by the orange line in the plot.

This page is intentionally blank

Table 1: **TURN ON DEA B (realtime version)(Page 1)**

Step #	**Title (Revision 4.30_V2.5)**	**Time (mins)**	**Command Description**	**Command Mnemonic**	**Telemetry Description**	**Telemetry Mnemonic**	**Expected Value**
1	**Turn on DEA B**						
1.1	Verify DEA A is off				DEA A ENB/DIS	1DEPSAX	DIS
					DEA A ON/OFF	1DEPSA	OFF
					DEA Input V A	1DE28AVO	25.0–34.0
					DEA +28 V A	1DEP3AVO	0.0 ± 0.5
					DEA +24 V A	1DEP2AVO	0.0 ± 0.5
					DEA +15 V A	1DEP1AVO	0.0 ± 0.5
					DEA +6 V A	1DEP0AVO	0.0 ± 0.5
					DEA -6 V A	1DEN0AVO	0.0 ± 0.5
					DEA -15 V A	1DEN1AVO	0.0 ± 0.5
1.2	Verify DEA B is receiving power				DEA Input V B	1DE28BVO	25.0–34.0
1.3	Enable DEA PS B	1	DEA PS B En	1DEPSBEN	DEA B ENB/DIS	1DEPSBX	ENB
1.4	DEA Power B On	1	DEA PS On B	1DEPSBON	DEA B ON/OFF	1DEPSB	ON
					DEA Input V B	1DE28BVO	25.0–34.0
					DEA +28 V B	1DEP3BVO	> 26.0
					DEA +24 V B	1DEP2BVO	24.0–26.0
					DEA +15 V B	1DEP1BVO	15.0–17.0
					DEA +6 V B	1DEP0BVO	5.6–6.7
					DEA -6 V B	1DEN0BVO	-7–-5.7
					DEA -15 V B	1DEN1BVO	-17–-15
					DEA Input I B	1DEICBCU	0.7–0.9

Table 1: **TURN ON DEA B (realtime version)(Page 1)**

Step #	Units	Telemetry EGSE	Other Verifier	Crit	Description	Notes	RT Con	Tlm Fmt	Min Alt	SIM Pos
1										
1.1				1	Ignore verifier if DPA A and B unpowered			1,2,4,6		
				1	Ignore verifier if DPA A and B unpowered					
	V			2						
	V			2						
	V			1						
	V			2						
	V			2						
	V			2						
	V			2						
1.2	V			1						
1.3					Ignore verifier if DPA A and B unpowered			1,2,4,6		
1.4					Ignore verifier if DPA A and B unpowered			1,2,4,6		
	V			2	Expect DEA side B power 24 ± 4 W, current					
	V			2	is noisy so average needed (see Figures).					
	V			1						
	V			2						
	V			2	**FP Temp unregulated**					
	V			2	**DEA Interface A/D in low-res mode**					
	V			2						
	A			2						

Table 1: **TURN ON DEA B (realtime version)(Page 2)**

Step #	**Title (Revision 4.30_V2.5)**	**Time (mins)**	**Command Description**	**Command Mnemonic**	**Telemetry Description**	**Telemetry Mnemonic**	**Expected Value**
1.5	Verify DEA A is off				DEA A ENB/DSB	1DEPSAX	DIS
					DEA A ON/OFF	1DEPSA	OFF
					DEA Input V A	1DE28AVO	25.0–34.0
					DEA +28 V A	1DEP3AVO	0.0 ± 0.5
					DEA +24 V A	1DEP2AVO	0.0 ± 0.5
					DEA +15 V A	1DEP1AVO	0.0 ± 0.5
					DEA +6 V A	1DEP0AVO	0.0 ± 0.5
					DEA -6 V A	1DEN0AVO	0.0 ± 0.5
					DEA -15 V A	1DEN1AVO	0.0 ± 0.5
	Total time:	2					

Table 1: **TURN ON DEA B (realtime version)(Page 2)**

Step #	**Units**	**Telemetry EGSE**	**Other Verifier**	**Crit**	**Description**	**Notes**	**RT Con**	**Tlm Fmt**	**Min Alt**	**SIM Pos**
1.5				1	Ignore verifier if DPA A and B unpowered			1,2,4,6		
				1	Ignore verifier if DPA A and B unpowered					
	V			2						
	V			2						
	V			1						
	V			2						
	V			2						
	V			2						
	V			2						