

Set DoD voltage threshold  
File: H\_CRP\_EPS\_DOD.xls  
Author: E. Picallo



## Procedure Summary

### Objectives

This procedure describes the steps needed to set the battery Depth of Discharge (DoD) threshold.

### Summary of Constraints

The battery DoD threshold is high (20 V) by default.

The DoD threshold is changed through ASW TCs(8,4,112,3/5); thus the status of the ASW function "PCDU Management" has to be "running".

Notice that the TCs are sent separately for each of the three bits of the DoD level, therefore if it necessary to change the three bits this procedure has to be executed three times.

To change the enable/disable status of an alarm it is necessary to temporarily disable the relevant RM.  
Moreover the RM alarms status are modified through the "TTR Management" function. Thus, the the function has to be running.

### Spacecraft Configuration

#### Start of Procedure

CDMU in default configuration;  
DoD set to any value.

#### End of Procedure

CDMU in default configuration;  
DoD value updated.

### Reference File(s)

#### Input Command Sequences

#### Output Command Sequences

HRWDOD1  
HRWDOD2  
HRWDOD3  
HRWDOD4  
HRWDOD5  
HRWDOD6

### Referenced Displays

**ANDs**      **GRDs**      **SLDs**  
ZAZ7H999

### Configuration Control Information

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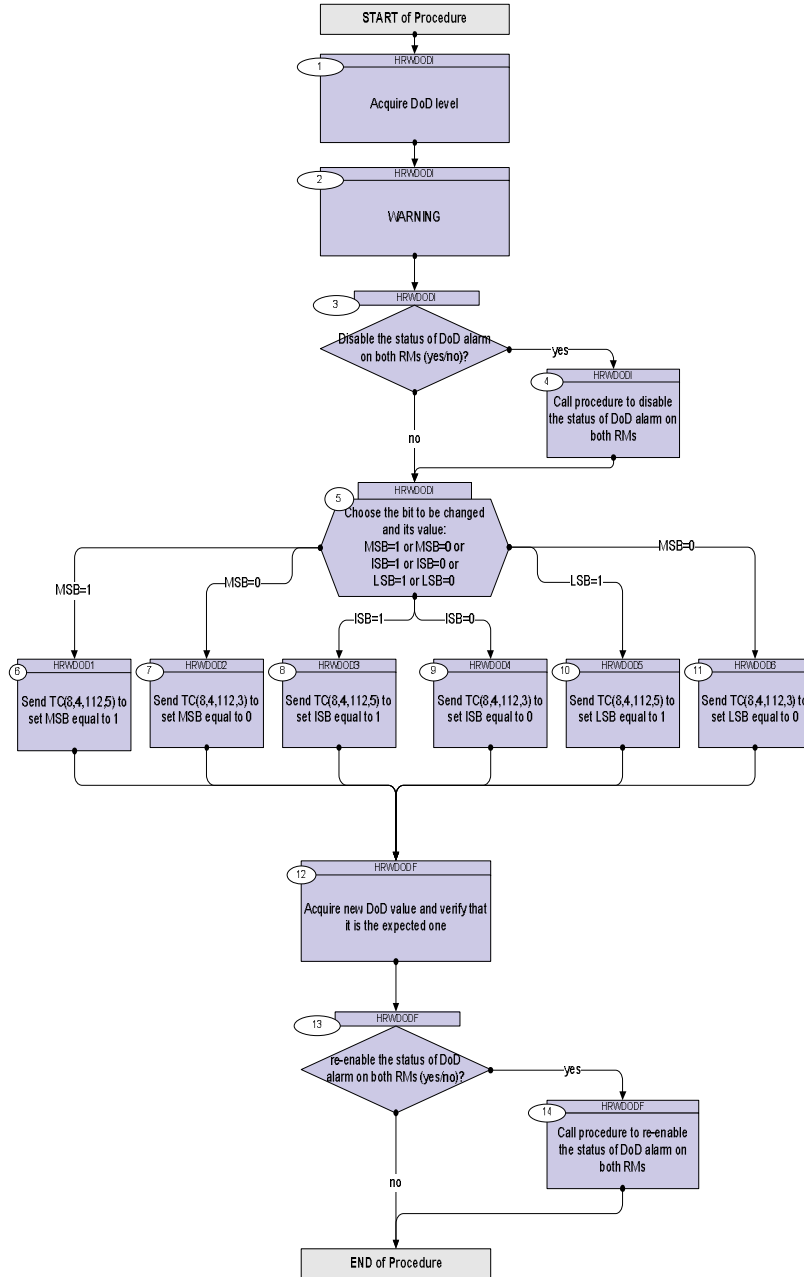


DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
01/10/08		1	Created	E. Picallo	
01/10/08		1.01	Validation : sequence name correction to HVRWDODF	E. Picallo	
15/12/08		2	Enable/disable RMs replaced by Enable/disable DoD alarms	E. Picallo	
16/01/09		3	TC(8,4,112,3) used for set bit =0 and TC(8,4,112,5) used for set bit=1 correction	E. Picallo	
21/01/09	2	4	Step title correction (to be in line with TC being sent)	E. Picallo	
18/03/09	2.2	5	Call to H_CRP_DHS_3018 (RM alarm maintenance) corrected	E. Picallo	

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## Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
<b>Beginning of Procedure</b>				
<p><i>TC Seq. Name :HRWDODI (Set DoD thr init)</i>  <i>Set DoD voltage threshold initial</i></p> <p><i>TimeTag Type: N</i>  <i>Sub Schedule ID:</i></p> <p style="text-align: center;">□</p>				
1		Acquire DoD level		Next Step: 2
		Verify Depth of discharge status Telemetry DOD_LEVEL WMT1C565		AND=ZAZ7H999
2		WARNING		Next Step: 3
		<p><b>It is recommended to leave the DoD alarms enabled and to change the bits carefully.</b></p> <p><b>Starting from the default value (000), there are no problems changing the bits in whatever order.</b></p> <p><b>Starting from another setting the following general rules applies:</b></p> <p><b>- when increasing the voltage threshold (e.g. from 100 to 011) it is safer to change the bits in the order below: --&gt; LSB and/or ISB and/or MSB</b></p> <p><b>- when decreasing the voltage threshold (e.g. from 011 to 100) it is safer to change the bits in the order below: --&gt; MSB and/or ISB and/or LSB</b></p>		
		<p><b>The possible eight DoD levels are the following:</b></p> <p><b>20.00 V (000) default value</b>  <b>19.68 V (001)</b>  <b>19.37 V (010)</b>  <b>19.07 V (011)</b>  <b>18.78 V (100)</b>  <b>18.50 V (101)</b>  <b>18.23 V (110)</b>  <b>17.97 V (111)</b></p>		
3		Disable the status of DoD alarm on both RMs (yes/no)?		Next Step: yes 4 no 5
4		Call procedure to disable the status of DoD alarm on both RMs		Next Step: 5
		<b>The following procedure must be called twice to disable alarms DoD_1 &amp; DoD_2 of both RMs.</b>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute procedure: H_CRP_DHS_3018 RM alarm maintenance		
5		Choose the bit to be changed and its value: MSB=1 or MSB=0 or ISB=1 or ISB=0 or LSB=1 or LSB=0		Next Step: MSB=1 6 MSB=0 7 ISB=1 8 ISB=0 9 LSB=1 10 MSB=0 11
<p>TC Seq. Name :HRWDOD1 (Set DoD thr MSB=1)            Set DoD voltage threshold MSB equal to 1</p> <p>TimeTag Type: N            Sub Schedule ID:</p> <p><input type="checkbox"/></p>				
6		Send TC(8,4,112,5) to set MSB equal to 1		Next Step: 12
		Execute Telecommand  PcduswOnDodMsb  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : PCDU TC(8,4,112,5) switch On DoD MSB	DCE6B170	
<p>TC Seq. Name :HRWDOD2 (Set DoD thr MSB=0)            Set DoD voltage threshold MSB equal to 0</p> <p>TimeTag Type: N            Sub Schedule ID:</p> <p><input type="checkbox"/></p>				
7		Send TC(8,4,112,3) to set MSB equal to 0		Next Step: 12
		Execute Telecommand  PcduswOffDodMsb  TC Control Flags :  GBM IL DSE --Y -- ---  Subsch. ID : 10 Det. descr. : PCDU TC(8,4,112,3) switch Off DoD MSB	DCE5P170	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
<p><i>TC Seq. Name :HRWDOD3 (Set DoD thr ISB=1)</i>            Set DoD voltage threshold ISB equal to 1</p> <p><i>TimeTag Type: N</i>  <i>Sub Schedule ID:</i></p> <p>□</p>				
8		Send TC(8,4,112,5) to set ISB equal to 1		Next Step: 12
		Execute Telecommand <p style="text-align: right;"><b>PcduSwOnDodMiddleBit</b></p> <p><i>TC Control Flags :</i></p> <p style="text-align: right;">GBM IL DSE --Y -- --</p> <p><i>Subsch. ID : 10</i>  <i>Det. descr. : PCDU TC(8,4,112,5) switch On DoD middle bit</i></p>	DCE6A170	
<p><i>TC Seq. Name :HRWDOD4 (Set DoD thr ISB=0)</i>            Set DoD voltage threshold ISB equal to 0</p> <p><i>TimeTag Type: N</i>  <i>Sub Schedule ID:</i></p> <p>□</p>				
9		Send TC(8,4,112,3) to set ISB equal to 0		Next Step: 12
		Execute Telecommand <p style="text-align: right;"><b>PcduSwOffDodMiddleBit</b></p> <p><i>TC Control Flags :</i></p> <p style="text-align: right;">GBM IL DSE --Y -- --</p> <p><i>Subsch. ID : 10</i>  <i>Det. descr. : PCDU TC(8,4,112,3) switch Off DoD middle bit</i></p>	DCE5N170	
<p><i>TC Seq. Name :HRWDOD5 (Set DoD thr LSB=1)</i>            Set DoD voltage threshold LSB equal to 1</p> <p><i>TimeTag Type: N</i>  <i>Sub Schedule ID:</i></p> <p>□</p>				
10		Send TC(8,4,112,5) to set LSB equal to 1		Next Step: 12

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand <p style="text-align: right;">PcduswOnDodLsb</p> TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- --</p> Subsch. ID : 10 Det. descr. : PCDU TC(8,4,112,5) switch On DoD LSB	DCE69170	
TC Seq. Name : HRWDOD6 (Set DoD thr LSB=0) Set DoD voltage threshold LSB equal to 0  TimeTag Type: N Sub Schedule ID:  <input type="checkbox"/>				
11		Send TC(8,4,112,3) to set LSB equal to 0		Next Step: 12
		Execute Telecommand <p style="text-align: right;">PcduswOffDodLsb</p> TC Control Flags : <p style="text-align: right;">GBM IL DSE --Y -- --</p> Subsch. ID : 10 Det. descr. : PCDU TC(8,4,112,3) switch Off DoD LSB	DCE5M170	
TC Seq. Name : HRWDODF (Set DoD thr Final) Set DoD voltage threshold final  TimeTag Type: N Sub Schedule ID:  <input type="checkbox"/>				
12		Acquire new DoD value and verify that it is the expected one		Next Step: 13
		Verify Depth of discharge status Telemetry <p style="text-align: center;">DOD_LEVEL                      WMT1C565</p>		AND=ZAZ7H999
		<b>Warning: in some cases alias value and related raw value are not equal.</b>  <b>For example, if the DoD level has been set to '100' (equal to '4' in decimal and corresponding to a 18.78 V), in telemetry the raw value will be '001' while the alias will be '18.78 thrs-L4'.</b>		
13		re-enable the status of DoD alarm on both RMs (yes/no)?		Next Step: yes 14 no END

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
14		<i>Call procedure to re-enable the status of DoD alarm on both RMs</i>		Next Step: END
		<b>The following procedure must be called twice to re-enable alarms DoD_1 &amp; DoD_2 of both the RMs.</b>		
		Execute procedure: <b>H_CRP_DHS_3018</b> <b>RM alarm maintenance</b>		
<b>End of Procedure</b>				