

SPIRE_CP_SCAL2_PID Tune Control Loop PID
 File: H_COP_SPI_SC2P.xls
 Author: L.Lucas-hp



Procedure Summary

Objectives

The purpose of this procedure is to tune the control loop PID
 Based upon procedure:
 SPIRE_CP_SCAL2_PID (v3)
 Generated:27/03/2009

Summary of Constraints

Spacecraft Configuration

Start of Procedure

Mode = SPECSTBY or REDY

End of Procedure

Mode = SPECSTBY or REDY

Reference File(s)

Input Command Sequences

Output Command Sequences

HCSSC2P
 HCSSC2PY

Referenced Displays

ANDs	GRDs	SLDs
SA_4_559		
SA_1_559		
ZAZ90999		

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
16/01/09		1	Created	L.Lucas-hp	
20/01/09		1.01	Validation : AND Update	L.Lucas-hp	
27/01/09	2	2	Remove ETs for ease of Loading to manual stack	L.Lucas-hp	
27/02/09		3	Halt VM command set to manual1/8	L.Lucas-hp	
04/03/09	2.1	4	Run VM parameters made TPF parameters	L.Lucas-hp	
24/03/09	2.2	4.01	Validation : Title Update	L.Lucas-hp	
07/04/09		5	Prcedure updated in live with updated received from SPIRE	L.Lucas-hp	
21/04/09		5.01	Validation : Text Update	L.Lucas-hp	
21/04/09	2.3	5.02	Validation : Text mod	L.Lucas-hp	
04/05/09		6	Removed ET from CMD_PROPERTIES	L.Lucas-hp	

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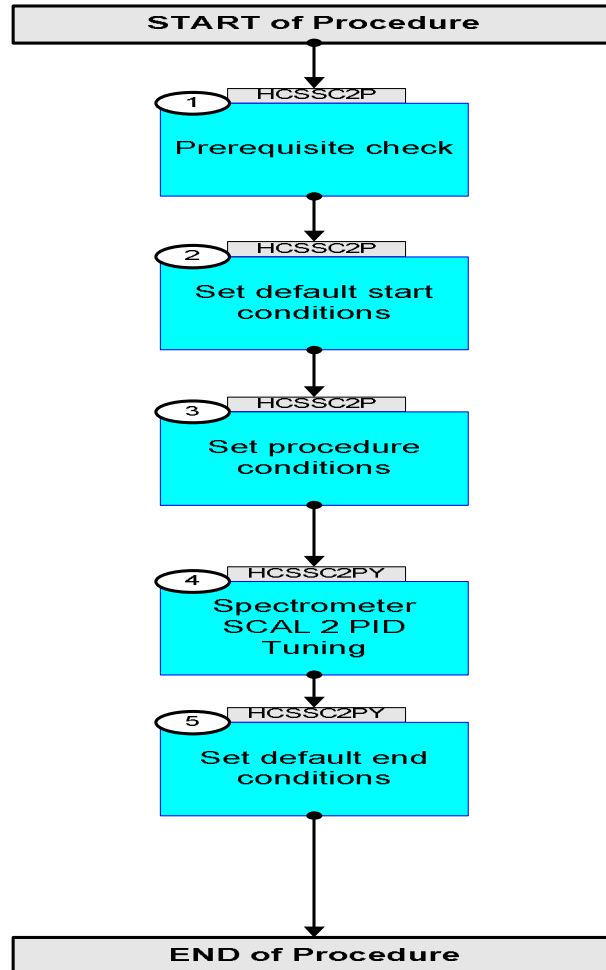


05/05/09	2.4	6.01	Validation : Text update to start and end s/c config	L.Lucas-hp	
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Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
Beginning of Procedure					
		TC Seq. Name :HCSSC2P (SCAL2 PID Tune start) TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>			
1		Prerequisite check		Next Step: 2	
1.1		HSC/ICC input			
		Verify that the HSC has supplied a valid OBSID value: OBS_ID = 0xnnnn nnnn			
1.2		TM Checks			
		Note TM Value <div style="text-align: center;">SCAL2CURR SMS0A520</div>		AND=SA_4_559	
		Note TM Value <div style="text-align: center;">SCAL2V SMS0V520</div>		AND=SA_4_559	
		Note TM Value <div style="text-align: center;">VM1STAT SMV1N500</div>		AND=SA_1_559	
2		Set default start conditions		Next Step: 3	
		Note that a TM(5,1) packet [New_Step_Report] is generated after each of the following SET_OBS_STEP telecommands			
	ET=+ UT=+00.00.00	SET_OBS_STEP <div style="text-align: center;">SET_OBS_STEP</div> Command Parameter(s) : <div style="text-align: center;">OBSERVATION_STEP SP03N500</div> 0 <hex> Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500	TC	
	ET=+ UT=+00.00.01	SET_BBID <div style="text-align: center;">SET_BBID</div> Command Parameter(s) : <div style="text-align: center;">BUILDING_BLOCK_ID SP01N500</div> 80010001 <hex> Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SC001500	TC	
		Verify Telemetry <div style="text-align: center;">BBFULLTYPE SM2LN500</div> = ClearObs	= ClearObs	AND=ZAZ90999	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
	ET=+ UT=+00.00.00	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SET_OBS_STEP SC003500 1 <hex>	TC	
	ET=+ UT=+00.00.01	SET_OBSID Command Parameter(s) : OBSERVATION_ID SP00N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION IDENTIFIER	SET_OBSID SC000500 00000000 <hex>	TC	
		Verify Telemetry OBSID SM10N500	= 00000000 <hex>	AND=ZAZ90999	
	ET=+ UT=+00.00.00	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SET_OBS_STEP SC003500 0 <hex>	TC	
	ET=+ UT=+00.00.01	SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID SP01N500 Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SET_BBID SC001500 80000000 <hex>	TC	
		Verify Telemetry BBFULLTYPE SM2LN500	= Null	AND=ZAZ90999	
	ET=+ UT=+00.00.00	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SET_OBS_STEP SC003500 0 <hex>	TC	
	ET=+ UT=+00.00.01	SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID SP01N500 Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SET_BBID SC001500 80020001 <hex>	TC	
		Verify Telemetry BBFULLTYPE SM2LN500	= StartObs	AND=ZAZ90999	
3		Set procedure conditions		Next Step: 4	
	ET=+ UT=+00.00.00	RESET_DRCU_COUNTERS Subsch. ID : 370 Det. descr. : RESET DRCU COUNTERS	RESET_DRCU_COUNTERS SCD00505	TC	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment																																	
	HCSSC2PY	TC Seq. Name : HCSSC2PY (SCAL 2 PID Tune) TimeTag Type: Y Sub Schedule ID: <input type="checkbox"/>																																				
4		Spectrometer SCAL 2 PID Tuning		Next Step: 5																																		
		This TC (SCV02500: RUN_VM1) may need to be re-run. If this is the case a new TPF the the SPIRE Instrumetn team will be delivered and the entire procedure will be re-run. TC Parameters are described below for purely information purposes.																																				
		TC Parameter SPV7N500 #01: a = Required SCAL temperature (ADC units) TC Parameter SPV7N500 #02: b = SCAL get temperature command TC Parameter SPV7N500 #03: c = SCAL set heater current command TC Parameter SPV7N500 #04: d = Loop period (us) TC Parameter SPV7N500 #05: e = Kp (PID parameter)-float																																				
		TC Parameter SPV7N500 #06: f = Ki (PID parameter)-float TC Parameter SPV7N500 #07: g = Kd (PID parameter)-float TC Parameter SPV7N500 #08: h = Ki limit - float TC Parameter SPV7N500 #09: i = Low pass filter gain - float TC Parameter SPV7N500 #10: j = Low pass filter coefficient b1 - float																																				
		TC Parameter SPV7N500 #11: k = Low pass filter coefficient b2 - float TC Parameter SPV7N500 #12: l = Max DAC value - int TC Parameter SPV7N500 #13: m = Pulse Width Modulation (PWM) flag (non-zero if used) TC Parameter SPV7N500 #14: n = TM flag (non-zero if DPU TM packets containing a copy of storage data are to be generated) TC Parameter SPV7N500 #15: o = Initialisation count (if non-zero this additional number of values will be read into the signal registers before starting PID) - try value >2																																				
		Only send the next RUN_VM1 TC if advised by the Instrument Team																																				
	ET=+ UT=+00.00.03	RUN_VM1 Command Parameter(s) : <table style="margin-left: 40px; border: none;"> <tr><td>TABLEID_RUNVM1</td><td>SPV4N500</td><td>50 <hex></td></tr> <tr><td>INDEX_RUNVM1</td><td>SPV5N500</td><td>0 <hex></td></tr> <tr><td>N_RUNVM1</td><td>SPV6N500</td><td>15 <dec></td></tr> <tr><td>DATA_RUNVM1</td><td>SPV7N500</td><td>1</td></tr> <tr><td>DATA_RUNVM1</td><td>SPV7N500</td><td>2</td></tr> <tr><td>DATA_RUNVM1</td><td>SPV7N500</td><td>3</td></tr> <tr><td>DATA_RUNVM1</td><td>SPV7N500</td><td>4</td></tr> <tr><td>DATA_RUNVM1</td><td>SPV7N500</td><td>5</td></tr> <tr><td>DATA_RUNVM1</td><td>SPV7N500</td><td>6</td></tr> <tr><td>DATA_RUNVM1</td><td>SPV7N500</td><td>7</td></tr> <tr><td>DATA_RUNVM1</td><td>SPV7N500</td><td>8</td></tr> </table>	TABLEID_RUNVM1	SPV4N500	50 <hex>	INDEX_RUNVM1	SPV5N500	0 <hex>	N_RUNVM1	SPV6N500	15 <dec>	DATA_RUNVM1	SPV7N500	1	DATA_RUNVM1	SPV7N500	2	DATA_RUNVM1	SPV7N500	3	DATA_RUNVM1	SPV7N500	4	DATA_RUNVM1	SPV7N500	5	DATA_RUNVM1	SPV7N500	6	DATA_RUNVM1	SPV7N500	7	DATA_RUNVM1	SPV7N500	8	SCV02500	TC	
TABLEID_RUNVM1	SPV4N500	50 <hex>																																				
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	ET=+ UT=+00.00.01	SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID TC Control Flags : Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SET_BBID SP01N500 GBM IL DSE ----	SC001500 80000000 <hex>	TC	
		Note that it may be necessary to repeat the test with different parameters for the RUN_VM1 TC. In that case the entire procedure will be re-run, using a new TPF received from the SPIRE Instrument team.				
4.1		TM Checks				
		Check that SCAL2 has been switched OFF:				
		Check that SCAL2 is OFF. TM reads 0mA +/- 0.01mA SCAL2CURR SMS0A520	SMS0A520 = 0.0 mA	AND=SA_4_559		
		Verify Telemetry reads 0V +/- 0.1mV SCAL2V SMS0V520	SMS0V520 = 0.0 V	AND=SA_4_559		
		Verify Telemetry is set to: VM1STAT SMV1N500	SMV1N500 0xFFFF	AND=SA_1_559		
5		Set default end conditions		Next Step: END		
		Note that a TM(5,1) packet [New_Step_Report] is generated after each of the following SET_OBS_STEP telecommands				
	ET=+ UT=+00.00.00	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SET_OBS_STEP SP03N500	SC003500 0 <hex>	TC	
	ET=+ UT=+00.00.01	SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SET_BBID SP01N500	SC001500 80000000 <hex>	TC	
		Verify Telemetry BBFULLTYPE SM2LN500	SM2LN500 = Null	AND=ZAZ90999		
	ET=+ UT=+00.00.00	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SET_OBS_STEP SP03N500	SC003500 0 <hex>	TC	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
	ET=+ UT=+00.00.01	SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID SP01N500 Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SET_BBID SC001500 80030001 <hex>	TC	
		Verify Telemetry BBFULLTYPE SM2LN500	= EndObs	AND=ZAZ90999	
	ET=+ UT=+00.00.00	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SET_OBS_STEP SC003500 1 <hex>	TC	
	ET=+ UT=+00.00.01	SET_OBSID Command Parameter(s) : OBSERVATION_ID SP00N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION IDENTIFIER	SET_OBSID SC000500 00000000 <hex>	TC	
		Verify Telemetry OBSID SM10N500	= 00000000 <hex>	AND=ZAZ90999	
	ET=+ UT=+00.00.00	SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SET_OBS_STEP SC003500 0 <hex>	TC	
	ET=+ UT=+00.00.01	SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID SP01N500 Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SET_BBID SC001500 80000000 <hex>	TC	
		Verify Telemetry BBFULLTYPE SM2LN500	= Null	AND=ZAZ90999	
End of Sequence					
End of Procedure					