

MCU\_BOOT  
 File: H\_COP\_SPI\_MCUN.xls  
 Author: L.Lucas-hp



## Procedure Summary

### Objectives

The purpose of this procedure is a MCU Boot Check  
 Based on Procedure:  
 MCU\_BOOT (v3)

Test Description: Apply power to MCU from SCU and boot the MCU  
 DSP ROM software, checking voltages and status. To power on  
 the MCU into a state ready to execute SMEC or BSM commands. This  
 procedure also tests the low speed interface to the MCU, used for  
 command and housekeeping data transfer.

### Summary of Constraints

n/a

### Spacecraft Configuration

#### Start of Procedure

Sub-Mode: SCU\_ON

#### End of Procedure

Mode: REDY

### Reference File(s)

#### Input Command Sequences

#### Output Command Sequences

HCSMCUN

### Referenced Displays

**ANDs**      **GRDs**      **SLDs**  
 ZAZ90999  
 SA\_1\_559  
 SA\_7\_559

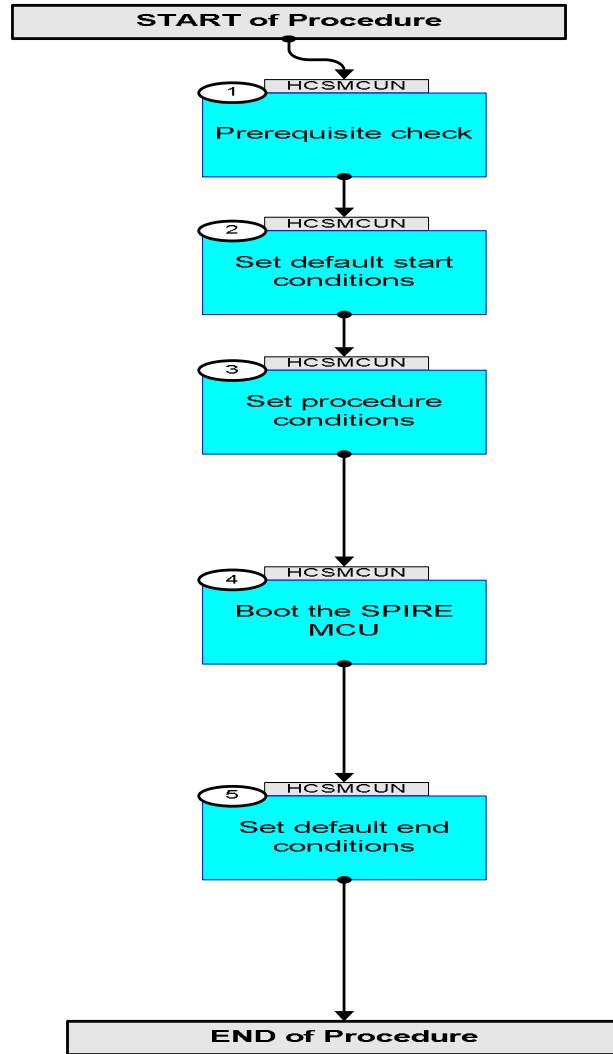
### Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
22/12/08		1	Created	L.Lucas-hp	
14/01/09		1.01	Validation : Update AND	L.Lucas-hp	
20/01/09		2	TC parameter update	L.Lucas-hp	
27/01/09	2	3	Remove ETs for ease of Loading to manual stack	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
<b>Beginning of Procedure</b>					
HCSMCUN <i>TC Seq. Name :HCSMCUN ( MCU Boot )</i>  <i>TimeTag Type: Y</i> <i>Sub Schedule ID:</i>  <input type="checkbox"/>					
1		Prerequisite check		Next Step: 2	
1.1		HSC/ICC input			
		Verify that the HSC has supplied a valid OBSID value:  <b>OBS_ID = 0xnnnn nnnn</b>			
2		Set default start conditions		Next Step: 3	
		Note that a <b>TM(5,1)</b> packet [New_Step_Report] is generated after each of the following SET_OBS_STEP telecommands			
	ET+= UT+=00.00.00	<b>SET_OBS_STEP</b>  <b>SET_OBS_STEP</b>  Command Parameter(s) : <b>OBSERVATION_STEP</b> <b>SP03N500</b> <b>0 &lt;hex&gt;</b>  Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	<b>SC003500</b>	<b>TC</b>	
	ET+= UT+=00.00.01	<b>SET_BBID</b>  <b>SET_BBID</b>  Command Parameter(s) : <b>BUILDING_BLOCK_ID</b> <b>SP01N500</b> <b>80010001 &lt;hex&gt;</b>  Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	<b>SC001500</b>	<b>TC</b>	
		Verify Telemetry  <b>BBFULLTYPE</b> <b>SM2LN500</b> <b>= ClearObs</b>		<b>AND=ZAZ90999</b>	
	ET+= UT+=00.00.00	<b>SET_OBS_STEP</b>  <b>SET_OBS_STEP</b>  Command Parameter(s) : <b>OBSERVATION_STEP</b> <b>SP03N500</b> <b>1 &lt;hex&gt;</b>  Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	<b>SC003500</b>	<b>TC</b>	
	ET+= UT+=00.00.01	<b>SET_OBSID</b>  <b>SET_OBSID</b>  Command Parameter(s) : <b>OBSERVATION_ID</b> <b>SP00N500</b> <b>00000000 &lt;hex&gt;</b>  Subsch. ID : 370 Det. descr. : SET OBSERVATION IDENTIFIER	<b>SC000500</b>	<b>TC</b>	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Verify Telemetry OBSID SM10N500	= 00000000 <hex>	AND=ZAZ90999	
	ET=+ UT=+00.00.00	SET_OBS_STEP SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 0 <hex>	TC	
	ET=+ UT=+00.00.01	SET_BBID SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID SP01N500 Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SC001500 80000000 <hex>	TC	
		Verify Telemetry BBFULLTYPE SM2LN500	= Null	AND=ZAZ90999	
	ET=+ UT=+00.00.00	SET_OBS_STEP SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 0 <hex>	TC	
	ET=+ UT=+00.00.01	SET_BBID SET_BBID Command Parameter(s) : BUILDING_BLOCK_ID SP01N500 Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	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 RESET_DRCU_COUNTERS Subsch. ID : 370 Det. descr. : RESET DRCU COUNTERS	SCD00505	TC	
		Verify that the TRESET parameter has the same value as the THSK parameter TRESET SM01T500	same as THSK	AND=SA_1_559	
		THSK SM00T500	any	AND=SA_1_559	
		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 SET_OBS_STEP Command Parameter(s) : OBSERVATION_STEP SP03N500 Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	SC003500 1 <hex>	TC	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
	ET=+ UT=+00.00.01	SET_OBSID  Command Parameter(s) : OBSERVATION_ID SP00N500  Subsch. ID : 370 Det. descr. : SET OBSERVATION IDENTIFIER	SET_OBSID  SC000500  OBS_ID	TC	
		Verify Telemetry  OBSID SM10N500	OBS_ID	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  89000001 <hex>	TC	
		Verify Telemetry  BBFULLTYPE SM2LN500	= MCU_Boot	AND=ZAZ90999	
4		Boot the SPIRE MCU		Next Step: 5	
	ET=+ UT=+00.00.03	SEND_DRCU_COMMAND  Command Parameter(s) : DRCUCOMMAND SPD4N505 OVERRIDE SPD9N505  TC Control Flags :  Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SEND_DRCU_COMMAND  SCD06505  A0870004 <hex> 0 <hex> (Def)	TC	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
	ET=+ UT=+00.00.05	SEND_DRCU_COMMAND  SEND_DRCU_COMMAND  Command Parameter(s) : DRCUCOMMAND           SPD4N505 OVERRIDE        SPD9N505  TC Control Flags :  GBM IL DSE --- -- ---  Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505  90010005 <hex> 0 <hex> (Def)	TC	
	ET=+ UT=+00.00.05	SEND_DRCU_COMMAND  SEND_DRCU_COMMAND  Command Parameter(s) : DRCUCOMMAND           SPD4N505 OVERRIDE        SPD9N505  TC Control Flags :  GBM IL DSE --- -- ---  Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505  90010007 <hex> 0 <hex> (Def)	TC	
	ET=+ UT=+00.00.05	SEND_DRCU_COMMAND  SEND_DRCU_COMMAND  Command Parameter(s) : DRCUCOMMAND           SPD4N505 OVERRIDE        SPD9N505  TC Control Flags :  GBM IL DSE --- -- ---  Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505  90010003 <hex> 0 <hex> (Def)	TC	
	ET=+ UT=+00.00.05	SEND_DRCU_COMMAND  SEND_DRCU_COMMAND  Command Parameter(s) : DRCUCOMMAND           SPD4N505 OVERRIDE        SPD9N505  TC Control Flags :  GBM IL DSE --- -- ---  Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505  90010007 <hex> 0 <hex> (Def)	TC	
	ET=+ UT=+00.00.05	SEND_DRCU_COMMAND  SEND_DRCU_COMMAND  Command Parameter(s) : DRCUCOMMAND           SPD4N505 OVERRIDE        SPD9N505  TC Control Flags :  GBM IL DSE --- -- ---  Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505  9021c000 <hex> 0 <hex> (Def)	TC	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
	ET=+ UT=+00.00.05	SEND_DRCU_COMMAND  SEND_DRCU_COMMAND  Command Parameter(s) : DRCUCOMMAND           SPD4N505 OVERRIDE        SPD9N505  TC Control Flags :  GBM IL DSE --- -- ---  Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505  90240001 <hex> 0 <hex> (Def)	TC	
	ET=+ UT=+00.00.05	SEND_DRCU_COMMAND  SEND_DRCU_COMMAND  Command Parameter(s) : DRCUCOMMAND           SPD4N505 OVERRIDE        SPD9N505  TC Control Flags :  GBM IL DSE --- -- ---  Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505  91c90067 <hex> 0 <hex> (Def)	TC	
	ET=+ UT=+00.00.01	SEND_DRCU_COMMAND  SEND_DRCU_COMMAND  Command Parameter(s) : DRCUCOMMAND           SPD4N505 OVERRIDE        SPD9N505  TC Control Flags :  GBM IL DSE --- -- ---  Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505  91ca0070 <hex> 0 <hex> (Def)	TC	
	ET=+ UT=+00.00.01	SEND_DRCU_COMMAND  SEND_DRCU_COMMAND  Command Parameter(s) : DRCUCOMMAND           SPD4N505 OVERRIDE        SPD9N505  TC Control Flags :  GBM IL DSE --- -- ---  Subsch. ID : 370 Det. descr. : SEND A SINGLE COMMAND TO THE DRCU	SCD06505  91d4006b <hex> 0 <hex> (Def)	TC	
5		Set default end conditions		Next Step: END	
		Note that a <b>TM(5,1)</b> packet [New_Step_Report] is generated after each of the following SET_OBS_STEP telecommands			
	ET=+ UT=+00.00.00	SET_OBS_STEP  SET_OBS_STEP  Command Parameter(s) : OBSERVATION_STEP        SP03N500  Subsch. ID : 370 Det. descr. : SET OBSERVATION STEP	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  Subsch. ID : 370 Det. descr. : SET BUILDING BLOCK IDENTIFIER	SET_BBID  SP01N500  80000000 <hex>	SC001500	TC	
		Verify Telemetry BBFULLTYPE	SM2LN500	= Null	AND=ZAZ90999	
		TMCHECK MCUP5V should be -5V				
		Verify Telemetry MCUP5V	SM_4V515		AND=SA_7_559	
		TMCHECK MCUP15V should be ~15.5V				
		Verify Telemetry MCUP15V	SM_0V515		AND=SA_7_559	
		TMCHECK MCUP14V should be ~14.1V				
		Verify Telemetry MCUP14V	SM_2V515		AND=SA_7_559	
		TMCHECK MCUM14V should be ~14.5V				
		Verify Telemetry MCUM14V	SM_3V515		AND=SA_7_559	
		TMCHECK MCUM15V should be ~15.6V				
		Verify Telemetry MCUM15V	SM_1V515		AND=SA_7_559	
	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  0 <hex>	SC003500	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  80030001 <hex>	SC001500	TC	
		Verify Telemetry BBFULLTYPE	SM2LN500	= EndObs	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  1 <hex>	SC003500	TC	
	ET=+ UT=+00.00.01	SET_OBSID  Command Parameter(s) : OBSERVATION_ID  Subsch. ID : 370 Det. descr. : SET OBSERVATION IDENTIFIER	SET_OBSID  SP00N500  00000000 <hex>	SC000500	TC	



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