

Time verification  
 File: H\_FCP\_DHS\_3020.xls  
 Author: S. Manganelli



## Procedure Summary

### Objectives

This procedure describes the steps needed to verify the time managed internally by the intelligent remote terminals connected on the 1553 S/C bus.

### Summary of Constraints

Note that the most suitable approach to perform the time verification for ACC is to rely on DID\_BSW\_OBT\_SMOOTH\_ERR instead of TM(9,9) report that provide back DID\_BSW\_OBT\_CYC\_BOUNDARY which holds the value for "this" ACMS cycle.

### Spacecraft Configuration

#### Start of Procedure

CDMU in default configuration, that is:

- PM A or B ON (nominally A)
- TM Encoder/OBT A or B active (nominally A)
- RM A and B enabled
- MM A and B ON

#### End of Procedure

CDMU in default configuration, that is:

- PM A or B ON (nominally A)
- TM Encoder/OBT A or B active (nominally A)
- RM A and B enabled
- MM A and B ON

### Reference File(s)

#### Input Command Sequences

#### Output Command Sequences

HFD3020B  
 HFD3020C  
 HFD3020D

### Referenced Displays

**ANDs**      **GRDs**      **SLDs**  
 ZAA0B999

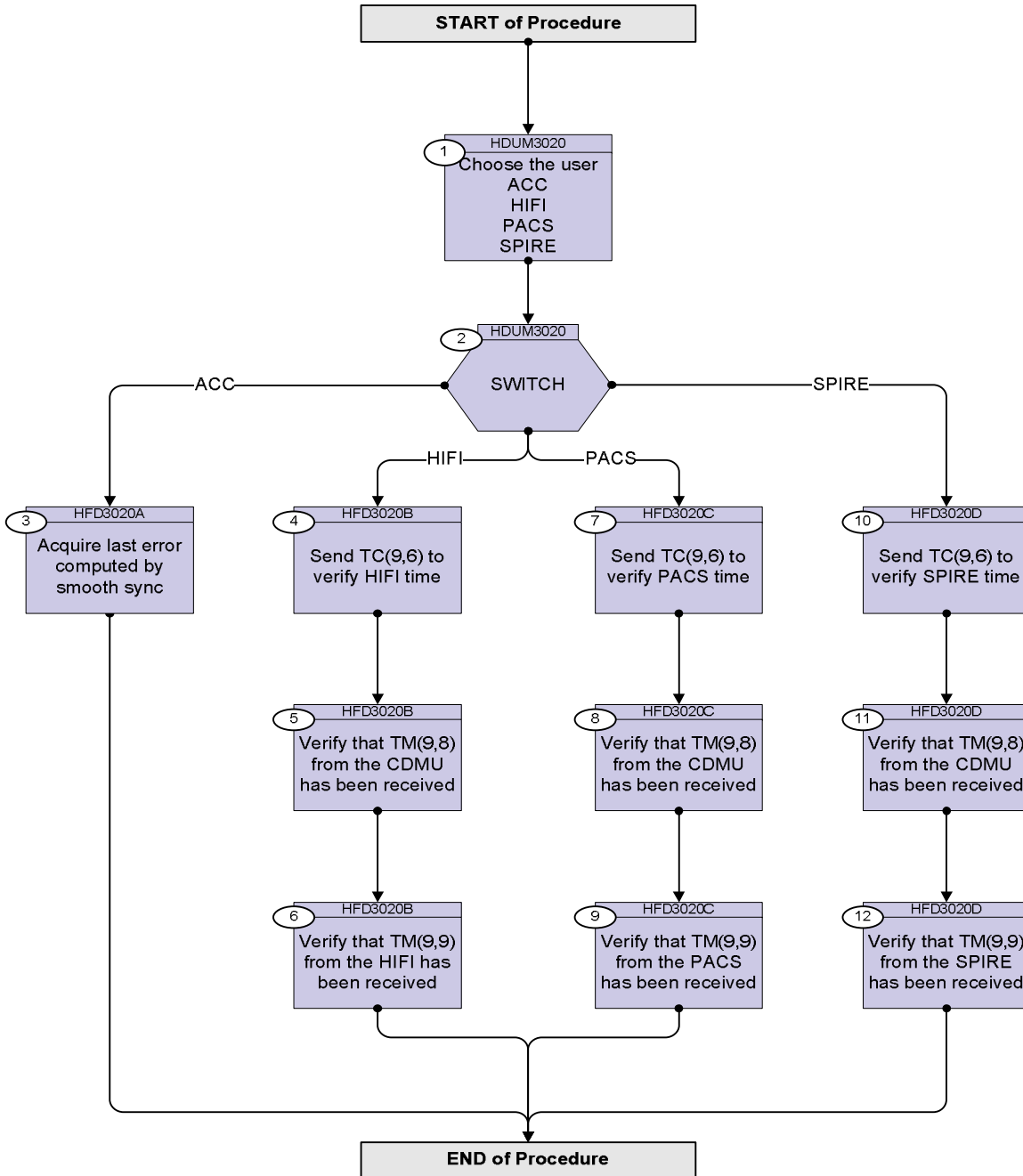
### Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
12/11/07		1	Created	cmevi-hp	
19/12/07		2	Threshold introduced for parameter AEGZ0050.	cmevi-hp	
16/01/08		3	Batch update of TC flags	S. Manganelli	
13/02/08	1	4	Instruments TM(9,9) introduced.	cmevi-hp	
01/12/08	2	5	checked vs TAS-F inputs UM 3.1	S. Manganelli	

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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 :HDUM3020 (Dummy sequence)</i></p> <p><i>TimeTag Type:</i>  <i>Sub Schedule ID:</i></p> <p style="text-align: center;"><input type="checkbox"/></p>				
1		Choose the user ACC HIFI PACS SPIRE		Next Step: 2
2		SWITCH		Next Step: ACC 3 HIFI 4 PACS 7 SPIRE 10
<p><i>TC Seq. Name :HFD3020A (ACC time verificatio)</i></p> <p><i>TimeTag Type:</i>  <i>Sub Schedule ID:</i></p> <p style="text-align: center;"><input type="checkbox"/></p>				
3		Acquire last error computed by smooth sync		Next Step: END
		Verify Telemetry <b>BSW_ObtSmoothEr                      AEGZ0050</b>	<b>&lt;= 1500 &lt;hex&gt;</b>	<b>AND=ZAA0B999</b>
		<p><i>The parameter above represents the difference detected by the OBT algorithm between the Central Reference Time distributed by the CDMU and the OBT counter of the active PM of the ACC. The data are encoded as a signed integer with the LSB corresponding to 2<sup>(-24)</sup> seconds (this approximately equals 60 nanoseconds). The value specified for the verification criterion corresponds to about 90 microseconds and is set just below the threshold used by the BSW to declare loss of synchronisation with the CDMU.</i></p>		
<p><i>TC Seq. Name :HFD3020B (HIFI time verificati)</i></p> <p><i>TimeTag Type:</i>  <i>Sub Schedule ID:</i></p> <p style="text-align: center;"><input type="checkbox"/></p>				
4		Send TC(9,6) to verify HIFI time		Next Step: 5

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<p>At the reception of this TC, the CDMU will send autonomously a TC(9,7) ("enable time verification") to the HIFI and will generate a TM(9,8) ("central time reference").</p> <p>At the reception of TC(9,7), the HIFI will generate a TM(9,9).</p>		
		<p>Execute Telecommand</p> <p style="text-align: center;"><b>VerifyHifiTime_Her</b></p> <p>TC Control Flags :</p> <p style="text-align: right;">GBM IL DSE --Y -- --</p> <p>Subsch. ID : 10            Det. descr. : Time: Verify Hifi Time TC(9,6), Herschel Only</p>	DC35F159	
5		Verify that TM(9,8) from the CDMU has been received		Next Step: 6
		<p>Verify Packet Reception</p> <p style="text-align: center;"><b>TM 9-8 Central Time Reference</b></p> <p>Packet Details:</p> <p style="text-align: right;">APID: 16            Type: 9            Subtype: 8            PI1:            PI2:</p>	CentrTimeRef	
		<p>Verify Packet Telemetry (Pkt = CentrTimeRef)</p> <p style="text-align: center;"><b>Ctr                    DELA0170</b></p>		(None)
6		Verify that TM(9,9) from the HIFI has been received		Next Step: END
		<p>Verify Packet Reception</p> <p style="text-align: center;"><b>HIFI_time_verification_report</b></p> <p>Packet Details:</p> <p style="text-align: right;">APID: 1024            Type: 9            Subtype: 9            PI1:            PI2:</p>	H_Timeverif	
		<p>Verify Packet Telemetry (Pkt = H_Timeverif)</p> <p style="text-align: center;"><b>HI_verify_time                    HM065190</b></p>		
<p>TC Seq. Name :HFD3020C (PACS time verificati)</p> <p>TimeTag Type:            Sub Schedule ID:  <input type="checkbox"/></p>				
7		Send TC(9,6) to verify PACS time		Next Step: 8

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		<p>At the reception of this TC, the CDMU will send autonomously a TC(9,7) ("enable time verification") to the PACS and will generate a TM(9,8) ("central time reference").</p> <p>At the reception of TC(9,7), the PACS will generate a TM(9,9).</p>		
		<p>Execute Telecommand</p> <p style="text-align: center;"><b>VerifyPacsTime_Her</b></p> <p>TC Control Flags :</p> <p style="text-align: right;">GBM IL DSE --Y -- --</p> <p>Subsch. ID : 10            Det. descr. : Time: Verify Pacs Time TC(9,6), Herschel Only</p>	DC37F159	
8		Verify that TM(9,8) from the CDMU has been received		Next Step: 9
		<p>Verify Packet Reception</p> <p style="text-align: center;"><b>TM 9-8 Central Time Reference</b></p> <p>Packet Details:</p> <p style="text-align: right;">APID: 16            Type: 9            Subtype: 8            PI1:            PI2:</p>	CentrTimeRef	
		<p>Verify Packet Telemetry (Pkt = CentrTimeRef)</p> <p style="text-align: center;"><b>Ctr            DELA0170</b></p>		(None)
9		Verify that TM(9,9) from the PACS has been received		Next Step: END
		<p>Verify Packet Reception</p> <p style="text-align: center;"><b>PACS_TIME_VERIFICATION</b></p> <p>Packet Details:</p> <p style="text-align: right;">APID: 1152            Type: 9            Subtype: 9            PI1:            PI2:</p>	TIME_VERIF	
		<p>Verify Packet Telemetry (Pkt = TIME_VERIF)</p> <p style="text-align: center;"><b>HD_VERSION_NUMB            PM000380</b></p>		
		<p>Verify Packet Telemetry (Pkt = TIME_VERIF)</p> <p style="text-align: center;"><b>HD_SOURCE_TYPE            PM001380</b></p>		
		<p>Verify Packet Telemetry (Pkt = TIME_VERIF)</p> <p style="text-align: center;"><b>HD_DATA_FLAG            PM002380</b></p>		
		<p>Verify Packet Telemetry (Pkt = TIME_VERIF)</p> <p style="text-align: center;"><b>HD_APID            PM003380</b></p>		
		<p>Verify Packet Telemetry (Pkt = TIME_VERIF)</p> <p style="text-align: center;"><b>HD_SEG_FLAG            PM004380</b></p>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Packet Telemetry (Pkt = TIME_VERIF) <b>HD_SRC_SEQ_CTN</b> <b>PM005380</b>		
		Verify Packet Telemetry (Pkt = TIME_VERIF) <b>HD_LENGTH</b> <b>PM006380</b>		
		Verify Packet Telemetry (Pkt = TIME_VERIF) <b>HD_SPARE_1</b> <b>PM007380</b>		
		Verify Packet Telemetry (Pkt = TIME_VERIF) <b>HD_PUS_VERSION</b> <b>PM008380</b>		
		Verify Packet Telemetry (Pkt = TIME_VERIF) <b>HD_SPARE_2</b> <b>PM009380</b>		
		Verify Packet Telemetry (Pkt = TIME_VERIF) <b>HD_PACKET_TYPE</b> <b>PM010380</b>		
		Verify Packet Telemetry (Pkt = TIME_VERIF) <b>HD_PCKT_SUBTYPE</b> <b>PM011380</b>		
		Verify Packet Telemetry (Pkt = TIME_VERIF) <b>HD_SPARE_3</b> <b>PM012380</b>		
		Verify Packet Telemetry (Pkt = TIME_VERIF) <b>FIRST32BIT_TIME</b> <b>PM089380</b>		
		Verify Packet Telemetry (Pkt = TIME_VERIF) <b>LAST_16BIT_TIME</b> <b>PM090380</b>		
		Verify Packet Telemetry (Pkt = TIME_VERIF) <b>DP_32BITS_TIME</b> <b>PM121380</b>		
		Verify Packet Telemetry (Pkt = TIME_VERIF) <b>DP_16BITS_TIME</b> <b>PM122380</b>		
<p><i>TC Seq. Name :HFD3020D (SPIRE time verificat)</i></p> <p><i>TimeTag Type:</i>  <i>Sub Schedule ID:</i></p> <p>□</p>				
10		Send TC(9,6) to verify SPIRE time		Next Step: 11
		<p><b>At the reception of this TC, the CDMU will send autonomously a TC(9,7) ("enable time verification") to the SPIRE and will generate a TM(9,8) ("central time reference").</b></p> <p><b>At the reception of TC(9,7), the SPIRE will generate a TM(9,9).</b></p>		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Execute Telecommand  <b>VerifySpireTime_Her</b>  <i>TC Control Flags :</i>  Subsch. ID : 10 Det. descr. : Time: Verify Spire Time TC(9,6), Herschel Only  GBM IL DSE --Y -- --	DC39F159	
11		Verify that TM(9,8) from the CDMU has been received		Next Step: 12
		Verify Packet Reception <b>TM 9-8 Central Time Reference</b> <i>Packet Details:</i>  APID: 16 Type: 9 Subtype: 8 PI1: PI2:	CentrTimeRef	
		Verify Packet Telemetry (Pkt = CentrTimeRef)  <b>Ctr DELA0170</b>		(None)
12		Verify that TM(9,9) from the SPIRE has been received		Next Step: END
		Verify Packet Reception <b>Time_Verification_Report</b> <i>Packet Details:</i>  APID: 1280 Type: 9 Subtype: 9 PI1: PI2:	STIMEVER0500	
		Verify Packet Telemetry (Pkt = STIMEVER0500)  <b>VERIFYTIME SMT0T500</b>		
		Verify Packet Telemetry (Pkt = STIMEVER0500)  <b>DPUTIME SMT1T500</b>		
<b>End of Procedure</b>				