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HPSDB/SVM OBSW Interface Data Sheet

H-P-1-ASP-ID-0856

Product Code : 000000

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ENREGISTREMENT DES EVOLUTIONS / CHANGE RECORD

Issue. Revision	DATE	§ : CHANGE RECORD	AUTHOR
1.0 Draft	14/12/2004	Draft Revision linked to anticipated first delivery of Bus Profiles in xml files.	G.P DRAGAN
1.0	21/01/2005	Initial Revision linked to first official delivery of Bus Profiles in xml files. Draft Revision updated following: - discussion with ALS/SES as reported in H-P-MI-AI-0717, and clarification provided concerning DEFAULT_SCBP_INDEX_VALUE and NBR_SCBP_DEF_VALUE parameters - correction of HPSDB box reference in Planck xml files Closes action item H-P-MI-AI-0562/AI#47	G.P DRAGAN
1.1	01/04/2005	Bus Profiles update: • StructForH_DefBusProf-v04 : Ø Correction of Packet/Message field for SA00T/R, SA01T/R, SA08T/R and SA28T/R for all Packet Terminals (ACC, HIFI, PACS, SPIRE): these shall be message transfers => PPMP (Packet) replaced by PPMM (Message) Ø Correction of default value for Transmit/Receive bits. According to PS-ICD, Transmit=1 and Receive=0 => modification of PTRT (0 replaced by 1) and PTRR (1 replaced by 0). Previous Bus Profiles were in line with [RD4] that has been found to be incorrect. • StructForP_DefBusProf-v04 : Ø Correction of Packet/Message field for SA00T/R, SA01T/R, SA08T/R and SA28T/R for all Packet Terminals (ACC, HFI, LFI, SCE): these shall be message transfers => PPMP (Packet) replaced by PPMM (Message) Ø Correction of default value for Transmit/Receive bits. According to PS-ICD, Transmit=1 and Receive=0 => modification of PTRT (0 replaced by 1) and PTRR (1 replaced by 0). Previous Bus Profiles were in line with [RD4] that has been found to be incorrect. All the xml files have been converted to be compliant with schema 3.0 using XML Translator v0.0.1. In addition, all the category flags were changed from	G.P DRAGAN

Issue. Revision	DATE	§ : CHANGE RECORD	AUTHOR
		255 to 7.	
1.2	11/05/2005	Bus Profiles update: • H_DefBusProf-v03.xml: Ø ACC, HIFI and PACS SA01T moved from Sub-Frame#01 or #02 to Sub-Frame#63 in order to avoid acquiring reset data Ø SPIRE SA01T moved from Sub-Frame#01 or #02 to Sub-Frame#62 in order to avoid acquiring reset data Ø SA01T replaced by SA11T for XPND1 (Sub-Frame#13) and XPND2 (Sub-Frame#15) to comply with new XPND ICD • P_DefBusProf-v03.xml: Ø ACC, HFI and LFI SA01T moved from Sub-Frame#01 or #02 to Sub-Frame#63 in order to avoid acquiring reset data Ø SCE SA01T moved from Sub-Frame#01 or #02 to Sub-Frame#62 in order to avoid acquiring reset data Ø SA01T replaced by SA11T for XPND1 (Sub-Frame#13) and XPND2 (Sub-Frame#15) to comply with new XPND ICD Ø XPND1 (Sub-Frame#13) and XPND2 (Sub-Frame#15) commanding (SA11R) replaced by Non-Intelligent RT Wild Card commanding (for consistency purpose)	G.P DRAGAN
2.0 Draft	23/09/2005	Modification of document template to cope with new company name Alcatel Alenia Space France instead of Alcatel Space Bus Profiles update: • H_DefBusProf-v04.xml: Ø Addition of Bus Profile definition for the Parallel Mode • RelNumber attribute removed from all xml files to ensure compatibility with schema 3.1.5. • Selection of Launch Bus Profile instead of Inactive one for BSW initialisation. • Compatibility with CDMU BSW ICD issue 8 instead of issue 6 Addition of CCU Housekeeping Packets Definition and related xml files delivery	G.P DRAGAN

Issue. Revision	DATE	§ : CHANGE RECORD	AUTHOR
3.0 Draft	23/02/2006	Bus Profiles update: • H_DefBusProf-v05.xml & P_DefBusProf-v05.xml: Ø Removal of INACTIVE Bus Profiles in order to improve the EEPROM memory budget. • NBR_SCBP_DEF_VALUE set accordingly Ø 9 for Herschel Ø 5 for Planck CCU HK Packets update: • CCU_Hkpackets_01.xml Ø Packet ZCB01999 ; Ord = 64 : ParValue has been corrected (DED40161) and comment changed accordingly (DID_BSW_SDB_RTA_CFG_CCU_B). Ø Packet ZCB01999 ; Ord = 65 : ParValue has been corrected (DED6F161) and comment changed accordingly (DID_BSW_SDB_RT_CFG_CCU_B). Ø Packet ZCB03999 ; Ord = 7 : Comment has been corrected (DID_BSW_SDB_RTA_CFG_CCU_B). Ø Packet ZCB03999 ; Ord = 8 : Comment has been corrected (DID_BSW_SDB_RT_CFG_CCU_B). Ø Packet ZCB06999 ; Ord = 7 : Comment has been corrected (DID_BSW_SDB_RTA_CFG_CCU_B). Ø Packet ZCB06999 ; Ord = 8 : Comment has been corrected (DID_BSW_SDB_RT_CFG_CCU_B). Note that the ParValue modifications on CCU HK Packets were already anticipated and communicated to AAS-I and modifications on comments only do not affect the CDMU OBSW code.	G.P DRAGAN
4.0	29/01/2007	Bus Profiles update: • H_DefBusProf-v06.xml: Ø Rectification for compliance to xml schema "HPSDBschema_Input(3318).xsd": § Removal of attributes "IsForbiden" and "Delay" for all TC items. § Removal of attribute "SwitchParRef" for "EL" box. Ø XML Clean Up for HPSDB loading (empty/irrelevant fields removed) § ComplementTcRef="" ; RedundantTcRef="" for all TC_TH items. § ValueRep="R" ; TakesDefault="Y" ;	G.P DRAGAN

Issue. Revision	DATE	§ : CHANGE RECORD	AUTHOR
		TakesDynamicDefault="N" for all TC structure item elements (TcStrType = "S") • P_DefBusProf-v06.xml: Ø Rectification for compliance to xml schema "HPSDBschema_Input(3318).xsd": § Removal of attributes "IsForbiden" and "Delay" for all TC items. § Removal of attribute "SwitchParRef" for "EL" box. Ø XML Clean Up for HPSDB loading (empty/irrelevant fields removed) § ComplementTcRef="" ; RedundantTcRef="" for all TC_TH items. § ValueRep="R" ; TakesDefault="Y" ; TakesDynamicDefault="N" for all TC structure item elements (TcStrType = "S") Ø Modification of TC packets C155, C156, C158, C159, C160, C161 (SCBP1 EARTH ACQ) for addition of Two subframes for LFI TM packet and One subframe for HFI TM packet. Ø Modification of TC packets C255, C256, C258, C259, C260, C261 (SCBP2 SCIENCE) for addition of Two subframes for LFI TM packet and One subframe for HFI TM packet. Ø Modification of TC packets C355, C356, C358, C359, C360, C361 (SCBP3 SUN ACQ) for addition of Two subframes for LFI TM packet and One subframe for HFI TM packet. Ø Modification of TC packets C133, C149 (SCBP1 EARTH ACQ) for addition of missing HFI_TMPTR (188TCST1100) in slot 20. Ø Modification of TC packets C233, C249 (SCBP2 SCIENCE) for addition of missing HFI_TMPTR (188TCST1100) in slot 20. Ø Modification of TC packets C333, C349 (SCBP3 SUN ACQ) for addition of missing HFI_TMPTR (188TCST1100) in slot 20. • StructForH_DefBusProf-v06 Ø Rectification for compliance to xml schema "HPSDBschema_Input(3318).xsd": § Removal of attribute "IsMandatory" ;	

Issue. Revision	DATE	§ : CHANGE RECORD	AUTHOR
		"RelatedParRef" ; "VcParRef" ; "AssociatedParRef" ; "VcValidityValue" ; "DisplayWidth" ; "BinaryConversion" ; "MaxOverLimits" ; "HasLimitCalibration" for all COMMAND_PAR_TH items.	
		§ Removal of attribute "SwitchParRef" for "EL" box.	
		Ø XML Clean Up for HPSDB loading (empty/irrelevant fields removed)	
		§ FixedAreaDesc="" ; CtrCmdParRef="" ; TcStrRef="" ; CdfEllen="" ; AcqParRef="" for all TC_STR_DEF item elements.	
		§ TakesDynamicDefault="N" for spare TC_STR_DEF item elements (GPSxx000). These item elements are defined as non editable (TcStrType = "F").	
		Ø Rectification of "LDesc" TC structures to SA00T, SA00R, SA01T, SA01R, SA00T, SA00R, SA01T, SA01R to intelligent Remotes Terminals (ACC, HIFI, SPIRE, PACS)	
		§ "***(Pkt)" replaced by "***(Msg)".	
		• StructForP_DefBusProf-v06	
		Ø Rectification for compliance to xml schema "HPSDBschema_Input(3318).xsd":	
		§ Removal of attribute "IsMandatory" ; "RelatedParRef" ; "VcParRef" ; "AssociatedParRef" ; "VcValidityValue" ; "DisplayWidth" ; "BinaryConversion" ; "MaxOverLimits" ; "HasLimitCalibration" for all COMMAND_PAR_TH items.	
		§ Removal of attribute "SwitchParRef" for "EL" box.	
		Ø XML Clean Up for HPSDB loading (empty/irrelevant fields removed)	
		§ FixedAreaDesc="" ; CtrCmdParRef="" ; TcStrRef="" ; CdfEllen="" ; AcqParRef="" for all TC_STR_DEF item elements.	
		§ TakesDynamicDefault="N" for spare TC_STR_DEF item elements (GPSxx000). These item elements are defined as non editable (TcStrType = "F").	
		Ø Rectification of "SDesc" and "LDesc" for Command Parameters	

Issue. Revision	DATE	§ : CHANGE RECORD	AUTHOR
		§ PRT1 : "HIFI" replaced by "HFI". § PRT2 : "SPIRE" replaced by "LFI" § PRT3 : "PACS" replaced by "SCE" Ø Rectification of "LDesc" TC structures to SA00T, SA00R, SA01T, SA01R, SA00T, SA00R, SA01T, SA01R to intelligent Remotes Terminals (ACC, LFI, HFI, SCE) § "***(Pkt)" replaced by "***(Msg)".	

TABLE OF CONTENTS

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LIST OF FIGURES AND TABLES

1. INTRODUCTION

1.1 Purpose of this document

This document aims at providing the definition of the HPSDB parameters under Alcatel Alenia Space France (AAS-F) responsibility which have to be taken into account for the generation and qualification of the SVM OBSW.

Beside serving as a support for the understanding of the content of the delivered XML files related to these parameters, this document also helps to manage their configuration.

Note that this issue of the document is dedicated to the definition of the S/C 1553B Bus Profiles to be used by the CDMU BSW.

2. DOCUMENTATION AND TERMINOLOGY

2.1 Applicable documents

Following documents must be applied when using this document, with the extend specified in the text.

The documents quoted in this section are referenced throughout the document by [ADi] as in the list below. If not specified, the latest available version is used.

[AD1]   HPSDB Data Collection Plan – Doc n° H-P-1-ASP-PL-0455
[AD2]   ICD - System Data Base / Software – Doc n° H-P-1-ASPI-TN-0196
[AD3]   Generic Data Collection – Doc n° H-P-1-ASP-TN-0543
[AD4]   HPSDB XML Schema Description Release – Doc n° H-P-1-ASP-TN-0851

2.2 Reference documents

Following documents have been taken into account when writing this document or are mentioned in the text as complementary information.

The documents quoted in this section are referenced throughout the document by [RDi] as in the list below. If not specified, the latest available version is used.

[RD1]   HPSDB Fields Description – Doc n° H-P-1-ASP-TN-0829
[RD2]   User's Manual HPSDB XML Input files – Doc n° H-P-1-ASP-TN-0790
[RD3]   System Database Guide – Doc n° H-P-1-ASPI-TN-0231
[RD4]   CDMU Software ICD for the BSW – Doc n° P-HPL-NOT-00076-SE
[RD5]   BSW System DB Utilisation – Doc n° P-HPL-NOT-00028-SE
[RD6]   CCU Management Function – Doc n° H-P-1-ASP-TN-0840 – Issue 1.0

2.3 Glossary of terms and acronyms

If not defined below, terms and acronyms used are listed and defined in [RD1].

ASW	Application SoftWare
BSW	Basic SoftWare
CCU	Cryostat Control Unit
CDMS	Command and Data Management Subsystem
CDMU	Central Data Management Unit
HPSDB	Herschel-Planck System Data-Base
ICD	Interface Control Document
OBSW	On-Board SoftWare
TBD	To Be Defined
SVM	SerVice Module

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3. S/C 1553B BUS PROFILES

3.1 Overview

The CDMU BSW offers the flexibility to specify up to 16 Default Bus Profiles for each spacecraft (Herschel and Planck) that allow to configure the CDMU BSW during its generation.

Each Bus Profile is composed of 64 sub-frames, composed of 24 slots.

The definition of these Bus Profiles can be modified down to the slot content, with the restriction that slot #1 and #23 can not be modified at all.

In order to modify the definition of a given sub-frame of a Bus Profile, a specific telecommand has been defined, namely TC(8,4,6,1) "Update Sub-frame of Selected SCBP" as described in [RD4].

In order to specify the 16 Default Bus Profiles, 16*64=1024 Default TC(8,4,6,1) are defined as indicated in [RD5].

The following operative Bus Profiles have been defined:

HERSCHEL: 9 Operative Bus Profiles

- Launch : index 0 and defined by TC(8,4,6,1) identified by C001 to C064.

- Earth Acquisition : index 1 and defined by TC(8,4,6,1) identified by C101 to C164.

- HIFI Prime : index 2 and defined by TC(8,4,6,1) identified by C201 to C264.

- SPIRE Prime : index 3 and defined by TC(8,4,6,1) identified by C301 to C364.

- PACS Prime : index 4 and defined by TC(8,4,6,1) identified by C401 to C464.

- Sun Acquisition : index 5 and defined by TC(8,4,6,1) identified by C501 to C564.

- Survival : index 6 and defined by TC(8,4,6,1) identified by C601 to C664.

- Burst : index 7 and defined by TC(8,4,6,1) identified by C701 to C764.

- Parallel Mode : index 8 and defined by TC(8,4,6,1) identified by C801 to C864.

PLANCK: 5 Operative Bus Profiles

- Launch : index 0 and defined by TC(8,4,6,1) identified by C001 to C064.

- Earth Acquisition : index 1 and defined by TC(8,4,6,1) identified by C101 to C164.

- Science : index 2 and defined by TC(8,4,6,1) identified by C201 to C264.

- Sun Acquisition : index 3 and defined by TC(8,4,6,1) identified by C301 to C364.

- Survival : index 4 and defined by TC(8,4,6,1) identified by C401 to C464.

The remaining Bus Profiles (7 for Herschel and 11 for Planck) were previously declared as INACTIVE and filled with slots without any activity. This means that when selecting these bus profiles, only the synchronisation without data in sub-frame 1 and synchronisation with data in subframe 2 to 64 would have been issued on the S/C 1553B Bus.

These INACTIVE Bus Profiles were anyway stored in CDMU EEPROM.

In order to reduce the EEPROM Memory Budget, it has been decided not to define them anymore on-board and consequently save the associated memory (2816 bytes per Bus Profile).

3.2 Layout for TC(8,4,6,1)

Each TC(8,4,6,1) ("TC" item in HPSDB) in the delivered XML files refers to :

- Command Header ("TCH" item in HPSDB) defined in HPSDB generic box (See [AD3])
- Command structure ("TC_STR" item in HPSDB) containing Function ID ; Activity ID ; SID which are defined as Command parameters ("COMMAND_PAR" items in HPSDB)
- Command parameter ("COMMAND_PAR" item in HPSDB) defining Frame ID
- 22 (one for each of the 24 slots except slot#1 and 24) Command structures ("TC_STR" item in HPSDB) containing SPR ; P/M ; RT; SADR ; T/R which are defined as Command parameters ("COMMAND_PAR" items in HPSDB)

All above command parameters have a default value expressed in decimal ("RawRadix" attribute set to "D").

This default value will be used into the TC packet ("TakesDefault" attribute of "TC_STR_DEF" item set to "Y").

3.3 Identification of TC(8,4,6,1) for the default bus profiles in HPSDB

For the identification of these TC packets, the "CdmuSwInitFlag" attribute of "TC" item has to be set to "Y".

In addition, two dedicated theoretical boxes for these TC packets have been defined:

- The box "H_DEF_BPROF" (box number 189) that is located in position 189 of D101 subsystem (CDMS_HER). It includes the default 1553 Spacecraft Data Bus profiles for Herschel spacecraft.
- The box "P_DEF_BPROF" (box number 188) that is located in position 189 of D201 subsystem (CDMS_PLA). It includes the default 1553 Spacecraft Data Bus profiles for Planck spacecraft.

Obviously some identical TC packet are present in both boxes (ie : they are duplicated into HPSDB).

The HPSDB identifier for these TC packets is DCnxx189, where:

- n (from 0 to F using hexadecimal notation) stands for the identification of the bus profile
- xx (from 1 to 64 using decimal notation) stands for the identification of the subframe.

Note that Short Description ("SDesc" attribute) and Long Description ("LDesc" attribute) of the "TC" item, also identify the bus profile and the subframe (eg : "SDesc" = SCBP0_SF1 ; "LDesc" = TC(8,4,6,1) for H Bus Profile 0 Subrame 1 Default Definition). They have to be considered for "human user" information whereas the automated process for code generation should rely on the HPSDB identifier.

Note that operationally, the sending of these TCs to spacecraft is not sufficient to set the default 1553 Spacecraft Data Bus profiles. Such a setting, in operational conditions, requires also the sending of appropriate TC(8,4,6,2) and TC(8,4,6,3) (see [RD4]).

3.4 Additional "Bus Profiles related" HPSDB Parameters

As described in [RD5], the following HPSDB parameters are also requested by the BSW for its configuration:

Mnemonic	Description	Herschel Value	Planck Value	Comment
DEFAULT_SCBP_INDEX_VALUE	Index of the Default Bus Profile to be used by the BSW after its initialisation up to the first selection of the active one by the CDMU ASW according to S/C mode	0	0	The BSW will use the Launch Bus Profile Definition. This Bus Profile will allow to acquire TM from active RT after cold start, i.e. ACC and PCDU
NBR_SCBP_DEF_VALUE	Number of Default Bus Profiles stored in EEPROM	9	5	

These parameters are not included in the xml files including the Bus Profiles Definitions but shall be inserted in the database in relevant BSW boxes.

3.5 Delivered Files

The following files are delivered:

S/C	File Name	Issue	Content	Checksum[1]
HERSCHEL	H_DefBusProf-v06.xml	-	defines 576 TC(8,4,6,1) packets for the definition of Herschel spacecraft Default Bus Profiles (9*64). These items are defined into the HPSDB box : "H_DEF_BPROF".	53329
HERSCHEL	StructForH_DefBusProf-v06.xml	-	defines all Command parameters and TC structures for definition of any TC(8,4,6,1) packet to Herschel spacecraft. These items are defined into the HPSDB box : "H_DEF_BPROF".	65393
PLANCK	P_DefBusProf-v06.xml	-	defines 320 TC(8,4,6,1) packets for the definition of Planck spacecraft Default Bus Profiles (5*64). These items are defined into the HPSDB box : "P_DEF_BPROF".	56656
PLANCK	StructForP_DefBusProf-v06.xml	-	defines all Command parameters and TC structures for definition of any TC(8,4,6,1) packet to Planck	174

[1] This checksum is computed using the UNIX "sum" command with SUN Solaris Operating System

			spacecraft. These items are defined into the HPSDB box : "P_DEF_BPROF".	

These Bus Profiles definitions are compatible with [RD4] issue 12.

The XML files are compatible with XML schema 3.3.1.8 as described in [AD4].

4. CCU HOUSEKEEPING PACKETS DEFINITION

4.1 Overview

The description of the default CCU Housekeeping Packets Definition that have to be declared in the CDMU BSW (Herschel only) is specified in [RD6].

4.2 Delivered Files

The xml files dealing with CCU Housekeeping Packets Definitions are no longer maintained and delivered by AAS-F as these definitions are included in the xml files defining all the SVM Housekeeping and Diagnostic Packets maintained by AAS-I.

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