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**Herschel PACS
DPU OBSW
Release notes
OBSW version 9.04**

Ref.: PACS-CR-TN-032
Issue: 11
Date: 8th June 2009
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Herschel PACS

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1 Introduction

This document gives the release notes for the DPU OBSW version 9.04. The document's structure follows Annex 1 of "Delivery Review Procedure for H-P Scientific Instruments Herschel / Planck Project", reference SCI-PT/27760, Issue 1, Revision 0, Date of issue 4 October 2004.

2 Identifying the version of the software

The OBSW delivered with the DPU is version 9.04. This number can be seen in all HK packets generated by the DPU in any operative mode. When switched on, DPU executes a boot SW which is not covered in this note. No identifier of the version of this SW is available.

3 Identifying the version of the sources it has been built with

Each new version of the OBSW is saved in a CVS repository provided by the Co-PI institute (KUL). The present version is tagged `obsnw_version_9_04`. Here is the list, ordered by modification date and then alphabetically, of all the files that are saved in CVS repository.

SEQ_BUFF.h	3.7	OBSW Version ID 9.04 - 8 Jun 2009
changelog.txt	3.47	OBSW Version ID 9.04 - 8 Jun 2009
DmcCmd.h	3.10	OBSW Version ID 9.04 - 28 Apr 2009
L9_GRATP.c	3.7	OBSW Version ID 9.04 - 28 Apr 2009
T1_INIT.c	3.28	OBSW Version ID 9.04 - 28 Apr 2009
T1_INIT.h	3.15	OBSW Version ID 9.04 - 28 Apr 2009
T5_HKMON.c	3.17	OBSW Version ID 9.04 - 28 Apr 2009
T9_OBCP.c	3.16	OBSW Version ID 9.04 - 28 Apr 2009
L4_FUNC.c	3.10	OBSW Version ID 9.02 - 3 Feb 2009
L9_BOL_P.c	3.6	OBSW Version ID 8.49 - 9 Jan 2008
LT_upTMb.c	3.6	OBSW Version ID 8.49 - 9 Jan 2008
MM_21020.s	3.7	OBSW Version ID 8.49 - 9 Jan 2008
MM_MISC.c	3.4	OBSW Version ID 8.49 - 9 Jan 2008
MM_MISC.h	3.2	OBSW Version ID 8.49 - 9 Jan 2008
T2TMTCIF.c	3.6	OBSW Version ID 8.49 - 9 Jan 2008
makefile	3.18	OBSW Version ID 8.49 - 9 Jan 2008
Eprm.c	3.6	OBSW Version ID 8.48 - 16 Jun 2007
Eprm.h	3.6	OBSW Version ID 8.48 - 16 Jun 2007
L4_LIB.c	3.7	OBSW Version ID 8.47 - 16 Apr 2007
L5_D_AUT.c	3.12	OBSW Version ID 8.47 - 16 Apr 2007
HK_def.h	3.14	OBSW Version ID 8.46 - 5 Apr 2007
L4_OBCP.c	3.8	OBSW Version ID 8.46 - 5 Apr 2007
LT_FUNC.c	3.5	OBSW Version ID 8.46 - 5 Apr 2007
LT_TMdef.h	3.9	OBSW Version ID 8.46 - 5 Apr 2007
T3IRQ1SV.c	3.9	OBSW Version ID 8.46 - 5 Apr 2007
Inttab.h	3.4	OBSW Version ID 8.45 - 15 Mar 2007
T7_SPSRX.c	3.6	OBSW Version ID 8.45 - 15 Mar 2007
T8_SPLRX.c	3.6	OBSW Version ID 8.45 - 15 Mar 2007
conf1553.h	3.4	OBSW Version ID 8.45 - 15 Mar 2007
irq2.s	3.5	OBSW Version ID 8.45 - 15 Mar 2007
isr1553.c	3.11	OBSW Version ID 8.45 - 15 Mar 2007
ivar1553.h	3.4	OBSW Version ID 8.45 - 15 Mar 2007



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util1553.c	3.6	OBSW Version ID 8.45 - 15 Mar 2007
init1553.h	3.4	OBSW Version ID 8.45 - 15 Mar 2007
L4_MEM.c	3.8	OBSW Version ID 8.44 - 10 Jan 2007
L4_OBCP.c	3.7	OBSW Version ID 8.44 - 10 Jan 2007
T4CNTRLR.c	3.6	OBSW Version ID 8.44 - 10 Jan 2007
MM_lib.c	3.8	OBSW Version ID 8.43 - 15 Dec 2006
L9_SWITC.c	3.10	OBSW Version ID 8.39 - 4 Dec 2006
L9_MISC.c	3.5	OBSW Version ID 8.38 - 27 Nov 2006
LT_FUNC.c	3.4	OBSW Version ID 8.38 - 27 Nov 2006
LT_1355.c	3.6	OBSW Version ID 8.36 - 30 Oct 2006
LT_HKdef.h	3.5	OBSW Version ID 8.36 - 30 Oct 2006
MM_lib.h	3.2	OBSW Version ID 8.36 - 30 Oct 2006
L9_EEPRM.c	3.4	OBSW Version ID 8.34 - 27 Sep 2006
L9_P1355.c	3.3	OBSW Version ID 8.32 - 17 Jul 2006
L9_PHOTC.c	3.4	OBSW Version ID 8.32 - 17 Jul 2006
L9_PHOTP.c	3.4	OBSW Version ID 8.32 - 17 Jul 2006
L9_SPCMD.c	3.3	OBSW Version ID 8.32 - 17 Jul 2006
L9_SPECC.c	3.4	OBSW Version ID 8.32 - 17 Jul 2006
L9_newOB.c	3.3	OBSW Version ID 8.32 - 17 Jul 2006
LT_FUNC.h	3.4	OBSW Version ID 8.32 - 17 Jul 2006
LT_INIT.c	3.5	OBSW Version ID 8.32 - 17 Jul 2006
LT_OBCP.h	3.4	OBSW Version ID 8.32 - 17 Jul 2006
MilConf.c	3.3	OBSW Version ID 8.32 - 17 Jul 2006
MilConf.h	3.5	OBSW Version ID 8.32 - 17 Jul 2006
MilDef.h	3.7	OBSW Version ID 8.32 - 17 Jul 2006
MilErr.h	3.5	OBSW Version ID 8.32 - 17 Jul 2006
MilInit.c	3.3	OBSW Version ID 8.32 - 17 Jul 2006
MilInit.h	3.5	OBSW Version ID 8.32 - 17 Jul 2006
MilIrq.c	3.3	OBSW Version ID 8.32 - 17 Jul 2006
MilIrq.h	3.5	OBSW Version ID 8.32 - 17 Jul 2006
MilRt.c	3.3	OBSW Version ID 8.32 - 17 Jul 2006
MilRt.h	3.5	OBSW Version ID 8.32 - 17 Jul 2006
Milmem.c	3.3	OBSW Version ID 8.32 - 17 Jul 2006
Milmem.h	3.5	OBSW Version ID 8.32 - 17 Jul 2006
NODE1.h	3.4	OBSW Version ID 8.32 - 17 Jul 2006
T6_MECRX.c	3.5	OBSW Version ID 8.32 - 17 Jul 2006
init1553.c	3.3	OBSW Version ID 8.32 - 17 Jul 2006
pacs.ach	3.9	OBSW Version ID 8.32 - 17 Jul 2006
pload.h	3.1	OBSW Version ID 8.32 - 17 Jul 2006
pload.s	3.4	OBSW Version ID 8.32 - 17 Jul 2006
DUMMY.c	3.1	OBSW Version ID 8.30 - 14 Feb 2006
MM_21020.h	3.1	OBSW Version ID 8.30 - 14 Feb 2006
MM_crc.c	3.1	OBSW Version ID 8.30 - 14 Feb 2006
MM_crc.h	3.1	OBSW Version ID 8.30 - 14 Feb 2006
PACS.NLI	3.1	OBSW Version ID 8.30 - 14 Feb 2006
PACSApp.vpf	3.4	OBSW Version ID 8.30 - 14 Feb 2006
base	3.1	OBSW Version ID 8.30 - 14 Feb 2006
isr.s	3.5	OBSW Version ID 8.30 - 14 Feb 2006
spwdef.H	3.4	OBSW Version ID 8.30 - 14 Feb 2006
LT_1355.h	3.2	OBSW Version ID 8.21 - 30 Sep 2005
LT_MEM.h	3.2	OBSW Version ID 8.21 - 30 Sep 2005



NODE1.c	3.9	OBSW Version ID 8.21 - 30 Sep 2005
SPUCmd.h	3.3	OBSW Version ID 8.21 - 30 Sep 2005
allnodes.h	3.2	OBSW Version ID 8.21 - 30 Sep 2005
1553_def.h	3.5	OBSW Version ID 8.20 - 12 Sep 2005

Here is the list of all files, in alphabetical order, with the corresponding md5 checksum

1553_def.h	1a80dd0a63bc5347966b54033a748a11
DUMMY.c	647de831013b05a58f6a72d3af9e9c50
DmcCmd.h	e408eaeb20c6f729f2ab8b96f18d0425
Eprm.c	34c7028d9d3233f0b0b6f7b4582ad608
Eprm.h	c6b8725a6fd66b6a5d80f6b3ac6ba488
HK_def.h	e723d03d9d1a310b0e74018cc13c33c0
Inttab.h	3ffa36a0e12d71408ee16c675b711fb6
L4_FUNC.c	d21fe792b3416dfa7155009eed9e1bf0
L4_LIB.c	a3ba299708636c7f8f9f9291a3e6a54e
L4_MEM.c	b1b4a38d9a3ed843c0c20987b19420b6
L4_OBCP.c	d6d749a9fea77b1a3f0ea9940fd1c6bb
L5_D_AUT.c	b4038c187252c7411bb5b79685dc2f98
L9_BOL_P.c	074697ca0ce3c807ebdc4956d4cc2a24
L9_EEPRM.c	0d6a366e0b06d8fde1357ecf35d03392
L9_GRATP.c	c766f9c41ab9c0a83715dc6dfa497b2a
L9_MISC.c	d25502edaffac7685f876c9c59d731da
L9_P1355.c	82378f6f0e70a6250278e3283f2eb8bc
L9_PHOTC.c	af87c4215364f9b035a4d5deabf06288
L9_PHOTP.c	b310fdb385fcaa9944046f39d100a756
L9_SPCMD.c	b38a0246d06bb9cdc6cb947dc6e9a497
L9_SPECC.c	3c3136e1cd4914b0047fce648cc9c2d3
L9_SWITC.c	d81f2a8a96f0b991861ba8eed9f5dc5a
L9_newOB.c	11b293526924b6d3f598890b720801e6
LT_1355.c	355ca4c0b66b55778a400e6cfe1f0b98
LT_1355.h	0bf816089a387dbf6e6e9efb9cc4c1f2
LT_FUNC.c	18dc4076ed4e60e0f7b8ddf82a5ee2f1
LT_FUNC.h	e039ab4edeb41f0b39d297476f45aefb
LT_HKdef.h	550ddae63e7356e9c0bfece3a0ccc35c
LT_INIT.c	75f8d70a63c26f17c5fd660c28eb622c
LT_MEM.h	10e39f62bbf4b55e2adc1a985270ef68
LT_OBCP.h	c31c21436894c78c2f5e910fe3378709
LT_TMdef.h	d7966bf546dbebd8b22f665023e10f94
LT_upTMb.c	fac31710524b58e46f80192d77031467
MM_21020.h	39e9e8c38cbdbf9e9907a163417be876
MM_21020.s	0e0a5da909afc12275eca750132a1328
MM_MISC.c	deb26fed816bdec9b29f70fe91eaa8f9
MM_MISC.h	7f4e80a7364c5c78eea14f773ac79121
MM_crc.c	9841336950ccf2818503f40f03b3beb7
MM_crc.h	e177eb59c16f39649ab273294e0561a8
MM_lib.c	3432481f1ff3392d36c97b6b54d77220
MM_lib.h	ddc7076d087cb4fc1b871393ac57e16f
MilConf.c	89de0b4d6d0c12bc613e6e2411f94b05
MilConf.h	641ccea8c31e3ef211434ac81e02a8c5
MilDef.h	d8ae57cecb83e5af42035d5b572ea141



MilErr.h	598f91f87ed6ae3ba4f84f42ed060c00
MilInit.c	6d890e91d45c93920a4fa3d2e1b4bc44
MilInit.h	286c20a895d696387d15c8e50d5e127e
MilIrq.c	63b1c1067b0b48d02af5cfc94b60e464
MilIrq.h	ba3bb192b4ca5e358c3ae124194af84f
MilRt.c	2413f0907853cf7f32c213eb841c19b6
MilRt.h	1a5a8631aeb1a3179e6af500765d8ec7
Milmem.c	c18e33876cd518670528d3a1d1ad871b
Milmem.h	2b4dfab3a57b51329ab0f6a688d87245
NODE1.c	d6f4f1185789e70ad5a5aa08c69fc300
NODE1.h	9ffdcbe4812e9c30eec46ffbcfc15fea
PACS.NLI	714ded95bcb03c37907ac4328b43b1b3
PACSApp.vpf	17eced5a8dbc795f8ddae3b7df230950
SEQ_BUFF.h	3bfbf3b00b9828bf6092c58fbd3ed42c
SPUCmd.h	02da1066be44a5445f47c6212fe4d00c
T1_INIT.c	8cbae5afc08242c670a352bed31beb91
T1_INIT.h	fa6aac32f9b1e62ffe1a9ad68d756a5d
T2TMTCIF.c	17caa806fa1379705c8e9a92a94d4b05
T3IRQ1SV.c	f46f5a5b2459a5f573309d8528dc4cc4
T4CNTRLR.c	38663c431bbdb632bf130f27a9399557
T5_HKMON.c	42229265a64d572fa1a2407c70d20dc7
T6_MECRX.c	9740288d5f218473179d3800f6aea92c
T7_SPSRX.c	c09dcb27afebaa377242a6dd7691a49f
T8_SPLRX.c	90f586e519542f4127743ec0bd09a157
T9_OBCP.c	c7b17c4ea9aa65a07123d8a3dfdd4718
allnodes.h	ebb39e2250fe068a06dd8fa403343a58
base	1f42865608d6a5055c917830416885b8
changelog.txt	395f6f67e88ed2a5815ec24d4bc23904
conf1553.h	2c7db0bdd5ba56864a77383e14fbb7a7
init1553.c	b32cd625552050aa4b4d25f6f689588d
init1553.h	5ac2c4dcba17e98d39e56d2f0477b2d8
irq2.s	464ef5c0692e597f4f6d2f00e5520cd9
isr.s	1af39e563ff84f87a192f46f21454fa5
isr1553.c	83a48b494cdc9c3d57a9d62931eda422
ivar1553.h	4622ff8d6bac14df1caee98300cc2337
makefile	309e019fa188405d7153d598c73fa138
pacs.ach	94eaab625d833ff3edea70c7b2a574f3
pload.h	9e4af4a90a07297297ab50d169cb0890
pload.s	e411dd5e2d3ac382ac3d5c816b52ca4c
spwdef.H	327bff6820ee4074f058d9db2413cc74
util1553.c	1d681717b8ddcf94c159a853fd481066

4 Identifying the version of the databases, if any, the software has been built against

None. As far as MIB is concerned, DPU OBSW version 9.04 is compatible with MIB version 9.4 (Flight Model) and 1.1 (Flight Spare).



5 Identifying version of tools and libraries that were used to build the software

Source code editing: NEdit 5.5, ConTEXT 0.97.1

Operating System: VIRTUOSO Version 4.1, Release 2.04

Compiler and Linker: ADI-DSP21020 tools, Version 3.3

Development platform: PC with Windows NT Version 4 and 2000.

6 Listing of changes (bug fixes, improvements) with respect to previous software release

The complete list of changes is daily written in the file `changelog.txt` (part of the SW delivery). Here it follows the list of SPR and their status from OBSW version 9.03.

SCR-1551	Modify DMC sequence #18 and OBCP #32	Closed	4-Jun-2009
SPR-1556	DPU OBSW can not be compiled (init segment is not large enough)	Closed	28-Apr-2009

7 Listing of known open issues (software problem reports)

None known.

8 Installation

To install a new software it is necessary to have a tool that sends the set of telecommands to the DPU; having such a tool there are three procedures, described below, to upload a new image.

For this section the DPU OBSW User Manual 3.4 (SUM hereinafter) should be kept at hand.

8.1 Short functional test

After the upload of a new OBSW version, have a look at Section 2.2 of SUM for a short functional test, in particular verify that `DP_SW_VERS_ID` is 9 and `DP_SW_SUBVERS_ID` is 4. There are also two couples of memory check commands, reported below, that can be used to verify the integrity of the OBSW; the choice of one or the other pair is explained in the following sections.

8.1.1 Memory check commands for OBSW in low program memory

seg_init		seg_pmco	
Memory ID	0x0100	0x0100	Memory ID
Start Address	0x4000	0x5551	Start Address
Length	0x1551	0xFFFF	Length
Expected checksum \Rightarrow	0x302C	0x69E1	\Leftarrow Expected checksum

8.1.2 Memory check commands for OBSW in high program memory

seg_init		seg_pmco	
Memory ID	0x0103	0x0103	Memory ID
Start Address	0x4000	0x5551	Start Address
Length	0x154F	0xB764	Length
Expected checksum \Rightarrow	0x44D3	0x876F	\Leftarrow Expected checksum

8.2 Uploading a new image using the boot SW

If the DPU boot SW is running, ie DPU just switched on, send all the 1520 memory load commands specific to boot SW. After each command the DPU sends an event (5,1) if the command is accepted. If the application software is running but it is necessary to use the boot SW, send first the DPU command “Jump to boot software” (see SUM) in order to start the boot SW.

After all the memory commands have been uploaded, send the command “Load TC and boot” to copy the full image from DM to PM and to start the application program. If the upload has been succesfull then OBSW starts sending HK packets; to verify the integrity of the OBSW the two memory check commands to use are those reported in Section 8.1.1 (OBSW in low program memory).

8.3 Uploading a new image using the OBSW (patching from 9.03)

If the OBSW is running it is possible to upload a new version without making use of the boot SW. The following procedure can be adopted for patching from 9.03

1. Send the command “Copy OBSW” (“DPU_PATCH_EXECUTE” in the MIB) with the following parameters

Direction	1
Start Address	0x30000
Number of words	0x10CC2

2. Upload the 1119 memory load commands containing the new OBSW image. If ObswLoader tool is used, the command line to type is

```
ObswLoader -dpu -apid 1152 -patch -interval 500 path/tc_for_patch*
```

where path is the subdir containing the commands;
3. For each telecommand the DPU generates two TM packets: (1,1) and (1,7) (only (1,7) if the acknowledgment bit in the TC packet header is not set to 1). After all the TC have been sent the DPU HK counter DP_COM_REC_DPU should be incremented to the expected value (old value + 1119). **If DP_COM_REC_DPU does not have the expected value the procedure must be repeated or aborted!**

4. Send the memory check commands given in Section 8.1.2 (OBSW in high program memory)
5. Send again the command “Copy OBSW” with the following parameters

Direction	2
Start Address	0x30000
Number of words	0x10CB5

On reception of this command the DPU copies the new image in the final destination and a SW reset is performed. If the procedure worked well the SW starts sending HK packets (see Section 8.1). Send the memory check commands given in Section 8.1.1 (OBSW in low program memory).

After a SW reset the DPU makes a reset of the 1355 chip which implies that if the uploading is done while the subsystems are connected to the DPU, communications with the subsystems are then lost. The user has to start again the links with the procedure “Start 1355 link” (see SUM).

If Step#5 fails (DPU does not send any TM packet) switch off the unit and from the boot SW send the command “Force boot” to start previous OBSW version.

8.4 Uploading a new image using the OBSW (full upload)

With the OBSW running it is also possible to upload a complete new version without making use of the boot SW. This is the procedure to follow

1. Upload the 1387 memory load commands containing the new OBSW image. If ObswLoader tool is used, the command line to type is
`ObswLoader -dpu -apid 1152 -patch -interval 500 path/tc_for_patch*`
where `path` is the subdir containing the commands;
2. For each telecommand the DPU generates two TM packets: (1,1) and (1,7) (only (1,7) if the acknowledgment bit in the TC packet header is not set to 1). After all the TC have been sent the DPU HK counter `DP_COM_REC_DPU` should be incremented to the expected value (old value + 1387). **If `DP_COM_REC_DPU` does not have the correct value, the procedure must be repeated or aborted!**
3. Send the memory check commands given in Section 8.1.2 (OBSW in high program memory)
4. Send the command “Copy OBSW” with the following parameters

Direction	2
Start Address	0x30000
Number of words	0x10CB5

On reception of this command the DPU copies the new image in the final destination and a SW reset is performed. If the procedure worked well the SW starts sending HK packets (see Section 8.1). Send the memory check commands given in Section 8.1.1 (OBSW in low program memory).

After a SW reset the DPU makes a reset of the 1355 chip which implies that if the uploading is done while the subsystems are connected to the DPU, communications with the subsystems are then lost. The user has to start again the links with the procedure “Start 1355 link” (see SUM).

If Step#5 fails (DPU does not send any TM packet) switch off the unit and from the boot SW send the command “Force boot” to start previous OBSW version.



8.5 Writing in EEPROM

After a new image has been uploaded with one of the two mechanism described before, it can be written in EEPROM via OBCP #20 with 5 parameters:

1. start of *seg_init* : for this version 0x4000;
2. end of *seg_pmco* : for this version 0x10CB4;
3. partition : 1 (primary partition) or 2 (secondary partition);
4. 0x19660502 or decimal 426 116 354;
5. number of pages to avoid : 0