MARS EXPRESS

PLANETARY FOURIER SPECTROMETER

HOUSEKEEPING INFORMATION

MEX-CNR-FUM 4

FUM 4 – HOUSEKEEPING INFORMATION

1–Introduction

2-Housekeeping: Word by Word Definition

3–Range of Values.

4–Table of Conversion Factors.

1 INTRODUCTION

The PFS housekeeping contains all the information describing the status of all PFS components.
The PFS Housekeeping block is 480 bytes long and permits to monitor the critical parameters that describe DAM and OBDM hardware and software.
The follow is the macro organization of DAM software:

1. **Memory Status**
2. **Power Information**
3. **Mass Memory status**
4. **OBDM Temperature and failure**
5. **SCANNER Temperature**
6. **DAM Software Status**
7. **Module O voltage**
8. **DAM Software information**
9. **OBDM Status**
10. **OBDM Housekeeping info**
11. **OBDM Control Table**
12. **List of received Telecommands (last 16)**

2 HOUSEKEEPING : WORD BY WORD DEFINITION

Offset packet	*Length*	*Field*	*Meaning*
		- MEMORY STATUS -	
0000H-0001H	2 byte	**CPU segments**	**CS, DS, SS, 00**
0002H-0003H	2 byte	**RAM status**	**Status of RAM (zero bit means good block)**
		- POWER INFORMATION -	
0004H-0005H	2 byte	**Power configuration**	**Power supply configuration**
0006H-0007H	2 byte	**Power status**	**Power supply status**
		- MASS MEMORY STATUS -	
0008H-000FH	8 byte	**MMsingle-bit err**	**Counter of MM single-bit errors for banks 0..3**
0010H-0017H	8 byte	**MMdouble-bit err**	**Counter of MMdouble-bit errors for banks 0..3**
0018H-0019H	2 byte	**MMlistHead**	**List of MM blocks: Head**
001AH-001BH	2 byte	**MMlistTail**	**List of MM blocks: Tail**
001CH-001DH	2 byte	**MMlistNum**	**Number of free MM blocks**
001EH	1 byte	**Mmpower**	**Powered MM banks**
001FH	1 byte	**Mmstatus**	**Status of MM banks (zero means good)**
		- OBDM TEMPERATURE AND FAILURE -	
0020H-0021H	2 byte	**OBDMtemp1**	**Mod.O point 1 temperature ***
0022H-0023H	2 byte	**OBDMtemp2**	**Mod.O point 2 temperature ***
0024H-0025H	2 byte	**OBDMtemp3**	**Mod.O point 3 temperature ***
0026H-0027H	2 byte	**OBDMtemp4**	**Mod.O point 4 temperature ***
0028H-0029H	2 byte	**OBDMtemp5**	**Mod.O point 5 temperature ***
002AH-002BH	2 byte	**OBDMtemp6**	**Mod.O point 6 temperature ***
002CH-002DH	2 byte	**OBDMtemp7**	**Mod.O point 7 temperature ***
002EH-002FH	2 byte	**OBDMtemp8**	**Mod.O point 8 temperature ***
0030H-0031H	2 byte	**OBDMtempL1**	**Mod.O Laser 1 temperature ***
0032H-0033H	2 byte	**OBDMtempL2**	**Mod.O Laser 2 temperature ***
0034H-0035H	2 byte	**OBDMtempD1**	**Mod.O Detector 1 temperature ***
0036H-0037H	2 byte	**OBDMtempD2**	**Mod.O Detector 2 temperature ***
0038H-0039H	2 byte	**OBDMfailure**	**Last Mod.O failure**
		- SCANNER TEMPERATURE -	
003AH-003BH	2 byte	**SCANtemp1**	**Black Body point 1 temperature ***
003CH-003DH	2 byte	**SCANtemp2**	**Black Body point 2 temperature ***
		- DAM SOFTWARE STATUS -	
003EH-003FH	2 byte	**CSckSum**	**Checksum of Code Segment**
0040H-0043H	4 byte	**SCET**	**Spacecraft Elapsed Time [sec]**
0044H-0047H	4 byte	**ClockSec**	**DAM internal clock [sec]**
0048H	1 byte	**HKrepEnabled**	**HK Reports enabled**
0049H	1 byte	**SciRepEnab**	**Science Reports enabled**
004AH-004BH	2 byte	**MeasPeriod**	**Period between measurements [s]**
004CH	1 byte	**OBDMsleep**	**Request to execute OCOM in Sleeping Mode**
004DH	1 byte	**OBDMrefChan**	**Reference Channel Mode for Module O**
004EH	1 byte	**MMfull**	**Sign “Mass Memory full”**
004FH	1 byte	**Mmrange**	**Range of MM blocks to use**
0050H	1 byte	**DTMcalib**	**DTM for calibrations**

0051H	1 byte	**DTMmeas**	**DTM for measurements**
0052H	1 byte	**MMsegChk**	**MM segment being checked**
0053H	1 byte	**MMareaChk**	**MM area being checked**
0054H-0055H	2 byte	**CPU CS**	**CPU Code Segment**
0056H-0057H	2 byte	**AutotestCnt**	**Counter of Autotests**
0058H-0059H	2 byte	**CalibrNum**	**Number of calibrations**
005AH-005BH	2 byte	**InterfNum**	**Counter of measurements**
005CH-005DH	2 byte	**ProcessNo**	**Measurement Number within a Session**
005EH-005FH	2 byte	**DelayCnt2**	**Delay Counter [10 ms]**
0060H-0061H	2 byte	**SecDelayCnt**	**Long Delay Counter [sec]**
0062H-0063H	2 byte	**-- free --**	**Not used**
0064H-0065H	2 byte	**OBDMtimeout**	**Timeout for OBDM command**
0066H-0067H	2 byte	**SCANtimeout**	**Timeout for SCAN command**
0068H-0069H	2 byte	**ICMtimeout**	**Timeout for ICM command**
006AH	1 byte	**PFSstate**	**PFS state**
006BH	1 byte	**PFSmode**	**PFS mode**
006CH	1 byte	**-- free --**	**Not used**
006DH	1 byte	**ClockSrc**	**Source for ClockSec, timeouts, delays**
006EH	1 byte	**ICMbias**	**Bias to be used during the compression**
006FH	1 byte	**DisableCurr**	**Disable subsystems duing the current Session**
0070H	1 byte	**DisableNext**	**Disable subsystems during the next Session**
0071H	1 byte	**IgnorePOWR**	**Ignore Power events**
0072H	1 byte	**IgnoreOBDM**	**Ignore OBDM events**
0073H	1 byte	**IgnoreSCAN**	**Ignore SCAN events**
0074H	1 byte	**IgnoreICM**	**Ignore ICM events**
0075H	1 byte	**OBDMtest**	**OBDM test mode**
0076H	1 byte	**OBDMauto**	**OBDM Autotest parameter**
0077H	1 byte	**SimulMode**	**Simulation Mode**

1 2 7

- DAM SOFTWARE INFORMATION -

00A2H-00A3H	2 byte	**PID8604num**	**Number of sent packets with PID=86, Pcat=4**
00A4H-00A5H	2 byte	**PID8607num**	**Number of sent packets with PID=86, Pcat=7**
00A6H-00A7H	2 byte	**S1701ack**	**Number of sent ACK reports**
00A8H-00A9H	2 byte	**DMAaddr**	**DMA Address register**
00AAH-00ABH	2 byte	**DMAcount**	**DMA Word Count register**
00ACH-00ADH	2 byte	**DMAstatReq**	**DMA Status and Request registers**
00AEH-00AFH	2 byte	**DMAcomMask**	**DMA Command and Mask registers**
00B0H-00B1H	2 byte	**DMAmod0**	**DMA Mode register for channel 0**
00B2H-00B3H	2 byte	**DMAmod1**	**DMA Mode register for channel 1**
00B4H-00B5H	2 byte	**DMAmod2**	**DMA Mode register for channel 2**
00B6H-00B7H	2 byte	**DMAmod3**	**DMA Mode register for channel 3**
00B8H-00B9H	2 byte	**Sec100**	**Counter of 1/100 sec**
00BAH-00BBH	2 byte	**IntMask**	**Masks of PICs**
00BCH-00BDH	2 byte	**IntNMI**	**Counter of nonmaskable interrupts**
00BEH-00BFH	2 byte	**IntU**	**Counter of spurious interrupts**
00C0H-00C1H	2 byte	**IntM0**	**Counter of Timer 2.0 interrupts**
00C2H-00C3H	2 byte	**IntM1**	**Counter of DMA EOP interrupts**
00C4H-00C5H	2 byte	**IntM2**	**Counter of ICM interrupts**
00C6H-00C7H	2 byte	**IntM3**	**Counter of Timer2.2 interrupts**
00C8H-00C9H	2 byte	**IntM4**	**Counter of Hamming Processor requests**
00CAH-00CBH	2 byte	**IntM5**	**Counter of parallel port input interrupts**
00CCH-00CDH	2 byte	**IntM6**	**Second Counter of ICM interrupts**
00CEH-00CFH	2 byte	**IntM7**	**Counter of parallel port output interrupts**
00D0H-00D1H	2 byte	**IntS0**	**Counter of Timer 1.0 interrupts**
00D2H-00D3H	2 byte	**IntS1**	**Counter of PICS1 interrupts**
00D4H-00D5H	2 byte	**IntS2**	**Counter of SCAN port output interrupts**
00D6H-00D7H	2 byte	**IntS3**	**Counter of SCAN port input interrupts**
00D8H-00D9H	2 byte	**IntS4**	**Counter of TC reception interrupts**
00DAH-00DBH	2 byte	**IntS5**	**Counter of SCET interrupts**
00DCH-00DDH	2 byte	**IntS6**	**Counter of FIFO half full interrupts**
00DEH-00DFH	2 byte	**IntS7**	**Counter of glitch interrupts**

- OBDM STATUS -

00E0H-00E1H	2 byte	**OBDMstWdg10per**	**Watchdog conter 1.0**
00E2H-00E3H	2 byte	**OBDMstWdg11per**	**Watchdog conter 1.1**
00E4H-00E5H	2 byte	**OBDMstWdg12per**	**Watchdog conter 1.2**
00E6H-00E7H	2 byte	**OBDMstTim20per**	**Highest Cut-off Frequency of SW ZeroX**
00E8H-00E9H	2 byte	**OBDMstTim21per**	**Highest Cut-off Frequency of LW ZeroX**
00EAH-00EBH	2 byte	**OBDMstTim22per**	**Speed Clock**
00ECH-00EDH	2 byte	**OBDMstTim30per**	**ADCs Serial Converters Clock**
00EEH-00EFH	2 byte	**OBDMstTim31per**	**Highest Cut-off Frequency of SW Detector**
00F0H-00F1H	2 byte	**OBDMstTim32per**	**Highest Cut-off Frequency of LW Detector**
00F2H	1 byte	**OBDMstMskALFA_A**	**Mask for setting in analog port Alfa A**
00F3H	1 byte	**OBDMstMskALFA_C**	**Mask for setting in analog port Alfa C**
00F4H	1 byte	**OBDMstMskBETA_A**	**Mask for setting in analog port Beta A**
00F5H	1 byte	**OBDMstMskBETA_B**	**Mask for setting in analog port Beta B**
00F6H	1 byte	**OBDMstMskBETA_C**	**Mask for setting in analog port Beta C**
00F7H-00F8H	2 byte	**OBDMstZOPDSW**	**SW ZOPD Position Counter**
00F9H-00FAH	2 byte	**OBDMstZOPDLW**	**LW ZOPD Position Counter**
00FBH-00FCH	2 byte	**OBDMstEndRight**	**Right Micro-Switch Counter**
00FDH-00FEH	2 byte	**OBDMstEndLeft**	**Left Micro-Switch Counter**
00FFH	1 byte	**-- free --**	**Not used**

- OBDM HOUSEKEEPING INFO -

0100H-0101H	2 byte	**OBDMhkV5LD1pow**	**Power of Laser Diode 1 in ± 5V range**
0102H-0103H	2 byte	**OBDMhkV5LD2pow**	**Power of Laser Diode 2 in ± 5V range**
0104H-0105H	2 byte	**OBDMhkV5PD1pow**	**Power of Photo Diode 1 in ± 5V range**
0106H-0107H	2 byte	**OBDMhkV5PD2pow**	**Power of Photo Diode 2 in ± 5V range**
0108H-0109H	2 byte	**OBDMhkV5curMC**	**Current of Active Motor Coil in ± 5V range**
010AH-010BH	2 byte	**OBDMhkV5temp1**	**Temperature inside IB, point 1 in ± 5V range**
010CH-010DH	2 byte	**OBDMhkV5temp2**	**Temperature inside IB, point 2 in ± 5V range**
010EH-010FH	2 byte	**OBDMhkV5temp3**	**Temperature inside IB, point 3 in ± 5V range**
0110H-0111H	2 byte	**OBDMhkV5temp4**	**Temperature inside IB, point 4 in ± 5V range**
0112H-0113H	2 byte	**OBDMhkV5temp5**	**Temperature inside IB, point 5 in ± 5V range**
0114H-0115H	2 byte	**OBDMhkV5temp6**	**Temperature inside IB, point 6 in ± 5V range**
0116H-0117H	2 byte	**OBDMhkV5temp7**	**Temperature inside IB, point 7 in ± 5V range**
0118H-0119H	2 byte	**OBDMhkV5temp8**	**Temperature inside IB, point 8 in ± 5V range**
011AH-011BH	2 byte	**OBDMhkV5LDtemp1**	**Temperature of Laser Diode 1 in ± 5V range**
011CH-011DH	2 byte	**OBDMhkV5LDtemp2**	**Temperature of Laser Diode 2 in ± 5V range**
011EH-011FH	2 byte	**OBDMhkV5tempSW**	**Temperature of SW detector in ± 5V range**
0120H-0121H	2 byte	**OBDMhkV5tempLW**	**Temperature of LW detector in ± 5V range**
0122H-0123H	2 byte	**OBDMhkV5curTRW1**	**Current of TRW 1 LED in ± 5V range**
0124H-0125H	2 byte	**OBDMhkV5curTRW2**	**Current of TRW 2 LED in ± 5V range**
0126H-0127H	2 byte	**OBDMhkV5tempA1**	**Temperature PFS-A 1 in ± 5V range**
0128H-0129H	2 byte	**OBDMhkV5tempA2**	**Temperature PFS-A 2 in ± 5V range**
012AH-012BH	2 byte	**OBDMhkV5voltageSL**	**Voltage of Standard Lamp in ± 5V range**
012CH-012DH	2 byte	**OBDMhkV5voltageCL**	**Voltage of Calibration Lamp in ± 5V range**
012EH-012FH	2 byte	**-- free --**	**Not used**
0130H-0131H	2 byte	**OBDMhkV5voltageM5**	**Voltage of –5V power supply in ± 5V range**
0132H-0133H	2 byte	**OBDMhkV5voltageP5**	**Voltage of +5V power supply in ± 5V range**
0134H-0135H	2 byte	**OBDMhkV5voltageM15**	**Voltage of –15V power supply in ± 5V range**
0136H-0137H	2 byte	**OBDMhkV5voltageP15**	**Voltage of +15V power supply in ± 5V range**
0138H-0139H	2 byte	**-- free --**	**Not used**
013AH-013BH	2 byte	**-- free --**	**Not used**
013CH-013DH	2 byte	**-- free --**	**Not used**
013EH-013FH	2 byte	**-- free --**	**Not used**
0140H-0141H	2 byte	**OBDMhkV10LD1pow**	**Power of Laser Diode 1 in ± 10V range**
0142H-0143H	2 byte	**OBDMhkV10LD2pow**	**Power of Laser Diode 2 in ± 10V range**
0144H-0145H	2 byte	**OBDMhkV10PD1pow**	**Power of Photo Diode 1 in ± 10V range**
0146H-0147H	2 byte	**OBDMhkV10PD2pow**	**Power of Photo Diode 2 in ± 10V range**
0148H-0149H	2 byte	**OBDMhkV10curMC**	**Current of Active Motor Coil in ± 10V range**
014AH-014BH	2 byte	**OBDMhkV10temp1**	**Temperature inside IB, point 1 in ± 10V range**
014CH-014DH	2 byte	**OBDMhkV10temp2**	**Temperature inside IB, point 2 in ± 10V range**
014EH-014FH	2 byte	**OBDMhkV10temp3**	**Temperature inside IB, point 3 in ± 10V range**
0150H-0151H	2 byte	**OBDMhkV10temp4**	**Temperature inside IB, point 4 in ± 10V range**
0152H-0153H	2 byte	**OBDMhkV10temp5**	**Temperature inside IB, point 5 in ± 10V range**
0154H-0155H	2 byte	**OBDMhkV10temp6**	**Temperature inside IB, point 6 in ± 10V range**
0156H-0157H	2 byte	**OBDMhkV10temp7**	**Temperature inside IB, point 7 in ± 10V range**
0158H-0159H	2 byte	**OBDMhkV10temp8**	**Temperature inside IB, point 8 in ± 10V range**
015AH-015BH	2 byte	**OBDMhkV10LDtemp1**	**Temperature of Laser Diode 1 in ± 10V range**
015CH-015DH	2 byte	**OBDMhkV10LDtemp2**	**Temperature of Laser Diode 2 in ± 10V range**
015EH-015FH	2 byte	**OBDMhkV10tempSW**	**Temperature of SW detector in ± 10V range**
0160H-0161H	2 byte	**OBDMhkV10tempLW**	**Temperature of LW detector in ± 10V range**
0162H-0163H	2 byte	**OBDMhkV10curTRW1**	**Current of TRW 1 LED in ± 10V range**

0164H-0165H	2 byte	**OBDMhkV10curTRW2**	**Current of TRW 2 LED in ± 10V range**
0166H-0167H	2 byte	**OBDMhkV10tempA1**	**Temperature PFS-A 1 in ± 10V range**
0168H-0169H	2 byte	**OBDMhkV10tempA2**	**Temperature PFS-A 2 in ± 10V range**
016AH-016BH	2 byte	**OBDMhkV10voltageSL**	**Voltage of Standard Lamp in ± 10V range**
016CH-016DH	2 byte	**OBDMhkV10voltageCL**	**Voltage of Calibration Lamp in ± 10V range**
016EH-016FH	2 byte	**-- free --**	**Not used**
0170H-0171H	2 byte	**OBDMhkV10voltageM5**	**Voltage of –5V power supply in ± 10V range**
0172H-0173H	2 byte	**OBDMhkV10voltageP5**	**Voltage of +5V power supply in ± 10V range**
0174H-0175H	2 byte	**OBDMhkV10voltageM15**	**Voltage of –15V power supply in ± 10V range**
0176H-0177H	2 byte	**OBDMhkV10voltageP15**	**Voltage of +15V power supply in ± 10V range**
0178H-0179H	2 byte	**-- free --**	**Not used**
017AH-017BH	2 byte	**-- free --**	**Not used**
017CH-017DH	2 byte	**-- free --**	**Not used**
017EH-017FH	2 byte	**-- free --**	**Not used**

- OBDM CONTROL TABLE -

0180H	1 byte	**OBDMtabTEMP1**	**Temperature 1 (IB mod, SW base)**
0181H	1 byte	**OBDMtabTEMP2**	**Temperature 2 (IB mod, LW base)**
0182H	1 byte	**OBDMtabTEMP3**	**Temperature 3 (IB mod, LW front)**
0183H	1 byte	**OBDMtabTEMP4**	**Temperature 4 (IB mod, SW front)**
0184H	1 byte	**OBDMtabTEMP5**	**Temperature 5 (IB mod, Bl/Unbl back)**
0185H	1 byte	**OBDMtabTEMP6**	**Temperature 6 (IB mod, sensors back)**
0186H	1 byte	**OBDMtabTEMP7**	**Temperature 7 (IB mod, LW arm)**
0187H	1 byte	**OBDMtabTEMP8**	**Temperature 8 (IB mod, SW arm)**
0188H	1 byte	**OBDMtabL1pow**	**Laser 1 (SW) power**
0189H	1 byte	**OBDMtabL2pow**	**Laser 2 (LW) power**
018AH	1 byte	**OBDMtabL1tmp**	**Laser 1 (SW) temperature**
018BH	1 byte	**OBDMtabL2tmp**	**Laser 2 (LW) temperature**
018CH	1 byte	**OBDMtabD1tmp**	**Detector 1 (SW) temperature**
018DH	1 byte	**OBDMtabD2tmp**	**Detector 2 (LW) temperature**
018EH	1 byte	**OBDMtabLED1c**	**TRW (ZOPD) 1 LED current**
018FH	1 byte	**OBDMtabLED2c**	**TRW (ZOPD) 2 LED current**
0190H-0191H	2 byte	**OBDMtabT20**	**Period of SW 0xing clock**
0192H-0193H	2 byte	**OBDMtabT21**	**Period of LW 0xing clock**
0194H-0195H	2 byte	**OBDMtabT22**	**Period of Speed Control Loop clock**
0196H-0197H	2 byte	**OBDMtabT30**	**Period of Serial Converter clock**
0198H-0199H	2 byte	**OBDMtabT31**	**Period of SW upper freq. filter**
019AH-019BH	2 byte	**OBDMtabT32**	**Period of LW upper freq. filter**
019CH	1 byte	**OBDMtabA_A**	**ALPHA port A**
019DH	1 byte	**OBDMtabA_C**	**ALPHA port C**
019EH	1 byte	**OBDMtabB_A**	**BETA port A**
019FH	1 byte	**OBDMtabB_B**	**BETA port B**

- RECEIVED TELECOMMANDS -

01A0H-01DFH	64 byte	**TCreceived**	**List of received Telecommands (last 16)**

. Vittorio Formisano
CNR IFSI

[redacted]

10mA w 0014.2994 Tw8650

4 TABLE OF CONVERSION FACTORS

4.1 Memory Status

<table>
<tr><th>Field</th><th>Conversion</th><th>Range without conversion</th><th>Comments</th></tr>
<tr><td>CPU segments</td><td>
<table>
<tr><td colspan="2">0001H</td><td colspan="2">0000H</td></tr>
<tr><td>CCCC</td><td>DDDD</td><td>SSSS</td><td>0000</td></tr>
</table>
<table>
<tr><td>CCCC</td><td>Code Segment register</td></tr>
<tr><td>DDDD</td><td>Data Segment register</td></tr>
<tr><td>SSSS</td><td>Stack Segment register</td></tr>
<tr><td>0000</td><td>Always zero</td></tr>
</table>
</td><td>- all value -</td><td>The segments in normal condition are different.
In a critical condition it may be equal.</td></tr>
<tr><td>RAM status</td><td>
<table>
<tr><td colspan="2">0003H</td><td colspan="2">0002H</td></tr>
<tr><td>0000</td><td>0000</td><td>0000</td><td>3210</td></tr>
</table>
<table>
<tr><td rowspan="2">3</td><td>Status Bank 3</td></tr>
<tr><td>0=bad block ; 1=good block</td></tr>
<tr><td rowspan="2">2</td><td>Status Bank 2</td></tr>
<tr><td>0=bad block ; 1=good block</td></tr>
<tr><td rowspan="2">1</td><td>Status Bank 1</td></tr>
<tr><td>0=bad block ; 1=good block</td></tr>
<tr><td rowspan="2">0</td><td>Status Bank 0</td></tr>
<tr><td>0=bad block ; 1=good block</td></tr>
<tr><td>0000</td><td>Always zero</td></tr>
</table>
</td><td>0000_H-$000F_H$</td><td>--</td></tr>
</table>

4.2 Power Information

<table>
<tr><th>Field</th><th>Conversion</th><th>Range without conversion</th><th>Comments</th></tr>
<tr><td>Power configuration</td><td>
<table>
<tr><td>0004H</td><td>0003H</td></tr>
<tr><td>PORT B</td><td>PORT A</td></tr>
</table>
<table>
<tr><td>PORT A</td><td>Power setting port status</td></tr>
<tr><td>PORT B</td><td>Power port setting</td></tr>
</table>
</td><td>- all value -</td><td>PORT A contain the real power setting.
PORT B contain the software power setting.</td></tr>
<tr><td>Power status</td><td>
<table>
<tr><td>0006H</td><td>0005H</td></tr>
<tr><td>PORT B</td><td>PORT A</td></tr>
</table>
<table>
<tr><td>PORT A</td><td>Power setting port status</td></tr>
<tr><td>PORT B</td><td>Power port setting</td></tr>
</table>
</td><td>- all value -</td><td>PORT A contain the real power setting.
PORT B contain the software power setting.</td></tr>
</table>

4.3 Mass memory status

Field	*Conversion*	*Range without conversion*	*Comments*
MMsingle-bit err	*- no conversion -*	*- all value -*	--
MMdouble-bit err	*- no conversion -*	*- all value -*	--
MMlistHead	*- no conversion -*	*- all value -*	--
MMlistTail	*- no conversion -*	*- all value -*	--
MMlistNum	*- no conversion -*	*- all value -*	--
Mmpower	*- no conversion -*	*- all value -*	--
Mmstatus	*001FH*: 7654 | 3210 bit 7: *Status Mm-Bank 7* — **0**=bad block ; **1**=good block bit 6: *Status Mm-Bank 6* — **0**=bad block ; **1**=good block bit 5: *Status Mm-Bank 5* — **0**=bad block ; **1**=good block bit 4: *Status Mm-Bank 4* — **0**=bad block ; **1**=good block bit 3: *Status Mm-Bank 3* — **0**=bad block ; **1**=good block bit 2: *Status Mm-Bank 2* — **0**=bad block ; **1**=good block bit 1: *Status Mm-Bank 1* — **0**=bad block ; **1**=good block bit 0: *Status Mm-Bank 0* — **0**=bad block ; **1**=good block	0000_H-$000F_H$	--

4.4 OBDM Temperature and Failure

Field	*Conversion*	*Range without conversion*	*Comments*
OBDMtemp1 *(Temperature [K])*	*0021H*: 0000 | XXXX; *0020H*: XXXX | XXXX --: X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP1*	0000_H-$0FFF_H$	* OBDMtabTEMP1 is the real value set in the control table.
OBDMtemp2 *(Temperature [K])*	*0023H*: 0000 | XXXX; *0022H*: XXXX | XXXX --: X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP2*	0000_H-$0FFF_H$	* OBDMtabTEMP2 is the real value set in the control table.

OBDMtemp3 *(Temperature [K])*	*0025H* / *0024H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP3*	0000_H-$0FFF_H$	* OBDMtabTEMP3 is the real value set in the control table.
OBDMtemp4 *(Temperature [K])*	*0027H* / *0026H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP4*	0000_H-$0FFF_H$	* OBDMtabTEMP4 is the real value set in the control table.
OBDMtemp5 *(Temperature [K])*	*0029H* / *0028H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP5*	0000_H-$0FFF_H$	* OBDMtabTEMP5 is the real value set in the control table.
OBDMtemp6 *(Temperature [K])*	*002BH* / *002AH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP6*	0000_H-$0FFF_H$	* OBDMtabTEMP6 is the real value set in the control table.
OBDMtemp7 *(Temperature [K])*	*002DH* / *002CH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP7*	0000_H-$0FFF_H$	* OBDMtabTEMP7 is the real value set in the control table.
OBDMtemp8 *(Temperature [K])*	*002FH* / *002EH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP8*	0000_H-$0FFF_H$	* OBDMtabTEMP8 is the real value set in the control table.
OBDMtempL1 *(Temperature [K])*	*0031H* / *0030H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (20.00/4095) - 10 + OBDMtabL1tmp*	0000_H-$0FFF_H$	* OBDMtabL1tmp is the real value set in the control table.
OBDMtempL2 *(Temperature [K])*	*0033H* / *0032H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (20.00/4095) - 10 + OBDMtabL2tmp*	0000_H-$0FFF_H$	* OBDMtabL2tmp is the real value set in the control table.

OBDMtempD1 *(Temperature [K])*	*0035H* / *0034H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (40.00/4095) - 20 + OBDMtabD1tmp*	0000_H-$0FFF_H$	* OBDMtabD1tmp is the real value set in the control table.
OBDMtempD2 *(Temperature [K])*	*0037H* / *0036H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (40.00/4095) - 20 + OBDMtabD2tmp*	0000_H-$0FFF_H$	* OBDMtabD2tmp is the real value set in the control table.
OBDMfailure	*- no conversion -*	*- all value -*	--

4.5 SCANNER Temperature

Field	***Conversion***	***Range without conversion***	***Comments***
SCANtemp1 *(Temperature [K])*	*003BH* / *003AH* 0000 XXXX XXXX XXXX -- X [12bit] (X [12bit] -2048) / 2048 * 10000 - 3296)	0000_H-$0FFF_H$	--
SCANtemp2 *(Temperature [K])*	*003DH* / *003CH* 0000 XXXX XXXX XXXX -- X [12bit] (X [12bit] -2048) / 2048 * 10000 - 3296)	0000_H-$0FFF_H$	--

4.6 DAM Software Status

Field	*Conversion*	*Range without conversion*	*Comments*
CSckSum	*- no conversion -*	*- all value -*	--
SCET *(Time [s])*	*- no conversion -*	*- all value -*	--
ClockSec *(Time [s])*	*- no conversion -*	*- all value -*	--
HKrepEnabled	*0048H* 0000 000X X: **0**=disabled ; **1**=enabled	00_H-01_H	--
SciRepEnab	*0049H* 0000 000X X: **0**=disabled ; **1**=enabled	00_H-01_H	--
MeasPeriod *(Time [s])*	*- no conversion -*	*- all value -*	--
OBDMsleep	*004CH* 0000 0XXX 0001 *Block Double Pendulum* 0010 *Initial Position* 0011 *Init. Pos. and Block D.P.* 0100 *Unblock Double Pendulum* 0110 *Unblock D.P. and Init. Pos.* 0111 *Unbl. D.P. - Init.P. - Block D.P.*	00_H-07_H	--
OBDMrefChan	*004DH* 0000 000X 0: Clear Reference Channel Mode (acquire interferograms) 1: Set Reference Channel Mode (acquire reference channel)	00_H-01_H	--
MMfull	*004EH* 0000 000X 0: Mass Memory Empty 1: Mass Memory Full	00_H-01_H	--
Mmrange	*- no conversion -*	*- all value -*	--
DTMcalib	*- no conversion -*	00_H-$1C_H$	--
DTMmeas	*- no conversion -*	00_H-$1C_H$	--
MMsegChk	*- no conversion -*	*- all value -*	--
MMareaChk	*- no conversion -*	*- all value -*	--

<table>
<tr><td>IgnoreOBDM</td><td>
<table>
<tr><td colspan="2">0072H</td></tr>
<tr><td>HGFE</td><td>DCBA</td></tr>
</table>
<table>
<tr><td rowspan="2">H</td><td>OBDM message "Error in Command"</td></tr><tr><td>0=not ignore ; 1=ignore</td></tr>
<tr><td rowspan="2">G</td><td>Interf. transfer timestamp</td></tr><tr><td>0=not ignore ; 1=ignore</td></tr>
<tr><td rowspan="2">F</td><td>“Error in the OBDM message” error</td></tr><tr><td>0=not ignore ; 1=ignore</td></tr>
<tr><td rowspan="2">E</td><td>“No OBDM response” error</td></tr><tr><td>0=not ignore ; 1=ignore</td></tr>
<tr><td rowspan="2">D</td><td>“Comm. with OBDM is OK” message</td></tr><tr><td>0=not ignore ; 1=ignore</td></tr>
<tr><td rowspan="2">C</td><td>“D.Pend. to be moved is blocked” error</td></tr><tr><td>0=not ignore ; 1=ignore</td></tr>
<tr><td rowspan="2">B</td><td>“Comm. with OBDM is bad” error</td></tr><tr><td>0=not ignore ; 1=ignore</td></tr>
<tr><td rowspan="2">A</td><td>“No OBDM booted” error</td></tr><tr><td>0=not ignore ; 1=ignore</td></tr>
</table>
</td><td>- all value -</td><td>--</td></tr>
<tr><td>IgnoreSCAN</td><td>
<table>
<tr><td colspan="2">0073H</td></tr>
<tr><td>0000</td><td>00BA</td></tr>
</table>
<table>
<tr><td rowspan="2">A</td><td>“Wrong scanner position” error</td></tr><tr><td>0=not ignore ; 1=ignore</td></tr>
<tr><td rowspan="2">B</td><td>“No SCAN response” error</td></tr><tr><td>0=not ignore ; 1=ignore</td></tr>
</table>
</td><td>00_H - 03_H</td><td>--</td></tr>
<tr><td>IgnoreICM</td><td>- no conversion -</td><td>- all value -</td><td>--</td></tr>
<tr><td>OBDMtest</td><td>
<table>
<tr><td colspan="2">0075H</td></tr>
<tr><td>0000</td><td>000X</td></tr>
</table>
<table>
<tr><td>X</td><td></td></tr>
<tr><td>0</td><td>OBDM in normal mode</td></tr>
<tr><td>1</td><td>OBDM in test mode</td></tr>
</table>
</td><td>00_H - 01_H</td><td>--</td></tr>
<tr><td>OBDMauto</td><td>- no conversion -</td><td>- all value -</td><td>--</td></tr>
<tr><td>SimulMode</td><td>
<table>
<tr><td colspan="2">0077H</td></tr>
<tr><td>0000</td><td>000X</td></tr>
</table>
<table>
<tr><td>X</td><td></td></tr>
<tr><td>0</td><td>Normal mode</td></tr>
<tr><td>1</td><td>Simulation mode</td></tr>
</table>
</td><td>00_H - 01_H</td><td>--</td></tr>
<tr><td>SCANmode</td><td>
<table>
<tr><td colspan="2">0078H</td></tr>
<tr><td>0000</td><td>00BA</td></tr>
</table>
<table>
<tr><td rowspan="2">A</td><td>main</td></tr><tr><td>0=OFF; 1=ON</td></tr>
<tr><td rowspan="2">B</td><td>reserve</td></tr><tr><td>0=OFF; 1=ON</td></tr>
</table>
</td><td>00_H - 03_H</td><td>--</td></tr>
<tr><td>ICMmode</td><td>
<table>
<tr><td colspan="2">0079H</td></tr>
<tr><td>00BB</td><td>00AV</td></tr>
</table>
<table>
<tr><td>V</td><td>Average</td></tr>
<tr><td>A</td><td>Apodization</td></tr>
<tr><td>BB</td><td>Bank 4K</td></tr>
</table>
</td><td>00_H - 33_H</td><td>--</td></tr>
</table>

SCANretNum	*- no conversion -*	*- all value -*	--
OBDMretNum	*- no conversion -*	*- all value -*	--
ScanPos	00H Init pos. - Black Body 01H Angle +25 02H Cold Space 03H Angle +12.5 04H Angle -25 05H Calibration lamp 06H Angle -12.5 07H Nadir	00_H - 07_H	--
DPstate	6E *Unblocked* 7C *Blocked*	$6E_H$; $7C_H$	--
DPstateM	6E *Unblocked* 7C *Blocked*	$6E_H$; $7C_H$	--
CalMode	*- no conversion -*	*- no value -*	
VersionTime	*- constant value -*	$2C2F_H$	--
VersionDate	*- constant value -*	$0B3A_H$	
VersionName [1 byte]	*- constant value -*	46_H	
VersionName [2 byte]	*- constant value -*	37_H	
VersionName [3 byte]	*- constant value -*	$2E_H$	
VersionName [4 byte]	*- constant value -*	53_H	
VersionName [5 byte]	*- constant value -*	20_H	
VersionName [6 byte]	*- constant value -*	20_H	
VersionName [7 byte]	*- constant value -*	20_H	
VersionName [8 byte]	*- constant value -*	20_H	
PID8609num	*- no conversion -*	*- all value -*	
HKperiod	*- no conversion -*	*- all value -*	
SCETnum	*- no conversion -*	*- all value -*	
S0901num	*- no conversion -*	*- all value -*	
S1701num	*- no conversion -*	*- all value -*	
PID8601num	*- no conversion -*	*- all value -*	
PID8712num	*- no conversion -*	*- all value -*	

4.7 Module O voltage

Field	*Conversion*	*Range without conversion*	*Comments*
VoltageM5 *(Voltage [V])*	*009BH* | *009AH* 0000 | XXXX | XXXX | XXXX -- | X [12bit] X [12bit]* (20.00/4095) -10.0	0000_H-$0FFF_H$	--
VoltageP5 *(Voltage [V])*	*009DH* | *009CH* 0000 | XXXX | XXXX | XXXX -- | X [12bit] X [12bit]* (20.00/4095) -10.0	0000_H-$0FFF_H$	--
VoltageM15 *(Voltage [V])*	*009FH* | *009EH* 0000 | XXXX | XXXX | XXXX -- | X [12bit] X [12bit]* (50.08/4095) -25.04	0000_H-$0FFF_H$	--
VoltageP15 *(Voltage [V])*	*00A0H* | *00A1H* 0000 | XXXX | XXXX | XXXX -- | X [12bit] X [12bit]* (50.08/4095) -25.04	0000_H-$0FFF_H$	--

4.8 DAM Software Information

Field	*Conversion*	*Range without conversion*	*Comments*
PID8604num	*- no conversion -*	*- all value -*	--
PID8607num	*- no conversion -*	*- all value -*	--
S1701ack	*- no conversion -*	*- all value -*	--
DMAaddr	*- no conversion -*	*- all value -*	--
DMAcount	*- no conversion -*	*- all value -*	--
DMAstatReq	*- no conversion -*	*- all value -*	--
DMAcomMask	*- no conversion -*	*- all value -*	--
DMAmod0	*- no conversion -*	*- all value -*	--
DMAmod1	*- no conversion -*	*- all value -*	--
DMAmod2	*- no conversion -*	*- all value -*	--
DMAmod3	*- no conversion -*	*- all value -*	--
Sec100	*- no conversion -*	*- all value -*	--
IntMask	*- no conversion -*	*- all value -*	--
IntNMI	*- no conversion -*	*- all value -*	--
IntU	*- no conversion -*	*- all value -*	--
IntM0	*- no conversion -*	*- all value -*	--
IntM1	*- no conversion -*	*- all value -*	--
IntM2	*- no conversion -*	*- all value -*	--
IntM3	*- no conversion -*	*- all value -*	--
IntM4	*- no conversion -*	*- all value -*	--
IntM5	*- no conversion -*	*- all value -*	--
IntM6	*- no conversion -*	*- all value -*	--
IntM7	*- no conversion -*	*- all value -*	--
IntS0	*- no conversion -*	*- all value -*	--
IntS1	*- no conversion -*	*- all value -*	--
IntS2	*- no conversion -*	*- all value -*	--
IntS3	*- no conversion -*	*- all value -*	--
IntS4	*- no conversion -*	*- all value -*	--
IntS5	*- no conversion -*	*- all value -*	--
IntS6	*- no conversion -*	*- all value -*	--
IntS7	*- no conversion -*	*- all value -*	--

4.9 OBDM Status

Field	*Conversion*	*Range without conversion*	*Comments*
OBDMstWdg10per *(Tempo [µS])*	*00E1H* | *00E0H* XXXX XXXX XXXX XXXX X X[12bit] / 8 MHz	*- all value -*	--
OBDMstWdg11per *(Tempo [µS])*	*00E3H* | *00E2H* XXXX XXXX XXXX XXXX X X / 4 MHz	*- all value -*	--
OBDMstWdg12per *(Tempo [µS])*	*00E5H* | *00E4H* XXXX XXXX XXXX XXXX X X / 4 MHz	*- all value -*	--
OBDMstTim20per *(Frequenza [MHz])*	*00E7H* | *00E6H* XXXX XXXX XXXX XXXX X 8 MHz /(X*150)	*- all value -*	--
OBDMstTim21per *(Frequenza [MHz])*	*00E9H* | *00E8H* XXXX XXXX XXXX XXXX X 8 MHz /(X*150)	*- all value -*	--
OBDMstTim22per *(Frequenza [MHz])*	*00EBH* | *00EAH* XXXX XXXX XXXX XXXX X 8 MHz/X	*- all value -*	--
OBDMstTim30per *(Frequenza [MHz])*	*00EDH* | *00ECH* XXXX XXXX XXXX XXXX X 8 MHz/X	*- all value -*	--
OBDMstTim31per *(Frequenza [MHz])*	*00EFH* | *00EEH* XXXX XXXX XXXX XXXX X 8 MHz /(X*150)	*- all value -*	--

<table>
<tr>
<td>OBDMstTim32per
(Frequenza [MHz])</td>
<td>
<table>
<tr><td colspan="2">00F1H</td><td colspan="2">00F0H</td></tr>
<tr><td>XXXX</td><td>XXXX</td><td>XXXX</td><td>XXXX</td></tr>
<tr><td colspan="4">X</td></tr>
</table>
8 MHz /(X*150)
</td>
<td>- all value -</td>
<td>--</td>
</tr>
<tr>
<td>OBDMstMskALFA_A</td>
<td>
<table>
<tr><td colspan="8">00F2H</td></tr>
<tr><td>A7</td><td>A6</td><td>A5</td><td>A4</td><td>A3</td><td>A2</td><td>A1</td><td>A0</td></tr>
</table>
<table>
<tr><td>A0</td><td>(bit 0) gain control channel 1 (SW)</td></tr>
<tr><td>A1</td><td>(bit 1) gain control channel 1 (SW)</td></tr>
<tr><td>A2</td><td>(bit 0) gain control channel 2 (LW)</td></tr>
<tr><td>A3</td><td>(bit 1) gain control channel 2 (LW)</td></tr>
<tr><td>A4</td><td>select first ADC channel 1 (SW)</td></tr>
<tr><td>A5</td><td>select second ADC channel 1 (LW)</td></tr>
<tr><td>A6</td><td>select first ADC channel 2 (LW)</td></tr>
<tr><td>A7</td><td>select second ADC channel 2 (SW)</td></tr>
</table>
</td>
<td>- all value -</td>
<td>--</td>
</tr>
<tr>
<td>OBDMstMskALFA_C</td>
<td>
<table>
<tr><td colspan="8">00F3H</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>C4</td><td>1</td><td>1</td><td>C1</td><td>C0</td></tr>
</table>
<table>
<tr><td>C0</td><td>ADC SW/LW sel.databus d0-d7(bit0)</td></tr>
<tr><td>C1</td><td>ADC SW/LW sel.databus d0-d7(bit1)</td></tr>
<tr><td>C4</td><td>1=upper byte, 0=low byte on bus</td></tr>
</table>
</td>
<td>- all value -</td>
<td>--</td>
</tr>
<tr>
<td>OBDMstMskBETA_A</td>
<td>
<table>
<tr><td colspan="8">00F4H</td></tr>
<tr><td>1</td><td>1</td><td>A5</td><td>A4</td><td>A3</td><td>A2</td><td>A1</td><td>A0</td></tr>
</table>
<table>
<tr><td>A0</td><td>motor coil select</td></tr>
<tr><td>A1</td><td>run double pendulum forward/reverse</td></tr>
<tr><td rowspan="2">A2</td><td>speed controller right stop command</td></tr>
<tr><td>1=stop ; 0=no</td></tr>
<tr><td rowspan="2">A3</td><td>speed controller left stop command</td></tr>
<tr><td>1=stop ; 0=no</td></tr>
<tr><td rowspan="2">A4</td><td>secondary heater for block/unblock</td></tr>
<tr><td>1=on ; 0=off</td></tr>
<tr><td rowspan="2">A5</td><td>primary heater for block/unblock</td></tr>
<tr><td>1=on ; 0=off</td></tr>
</table>
</td>
<td>- all value -</td>
<td>--</td>
</tr>
<tr>
<td>OBDMstMskBETA_B</td>
<td>
<table>
<tr><td colspan="8">00F5H</td></tr>
<tr><td>1</td><td>B6</td><td>B5</td><td>B4</td><td>B3</td><td>B2</td><td>B1</td><td>B0</td></tr>
</table>
<table>
<tr><td>B0</td><td>bit 0 0xing SW gain control</td></tr>
<tr><td>B1</td><td>bit 1 0xing SW gain control</td></tr>
<tr><td>B2</td><td>bit 0 0xing LW gain control</td></tr>
<tr><td>B3</td><td>bit 1 0xing LW gain control</td></tr>
<tr><td>B4</td><td>select zero crossing LW or SW</td></tr>
<tr><td>B5</td><td>turn on/off laser 1 (SW) (1=off)</td></tr>
<tr><td>B6</td><td>turn on/off laser 2 (LW) (1=off)</td></tr>
</table>
</td>
<td>- all value -</td>
<td>--</td>
</tr>
<tr>
<td>OBDMstMskBETA_C</td>
<td>
<table>
<tr><td colspan="8">00F6H</td></tr>
<tr><td>C7</td><td>C6</td><td>C5</td><td>C4</td><td>x</td><td>C2</td><td>C1</td><td>C0</td></tr>
</table>
<table>
<tr><td>C0</td><td>right stop reached</td></tr>
<tr><td>C1</td><td>left stop reached</td></tr>
<tr><td>C2</td><td>speed controller locked</td></tr>
<tr><td>x</td><td>State undefined</td></tr>
<tr><td>C4</td><td>pin extended</td></tr>
<tr><td>C5</td><td>pin retracted</td></tr>
<tr><td>C6</td><td>0 path on SW channel</td></tr>
<tr><td>C7</td><td>0 path on LW channel</td></tr>
</table>
</td>
<td>- all value -</td>
<td>--</td>
</tr>
</table>

OBDMstZOPDSW	*- no conversion -*	*- all value -*	--
OBDMstZOPDLW	*- no conversion -*	*- all value -*	--
OBDMstEndRight	*- no conversion -*	*- all value -*	--
OBDMstEndLeft	*- no conversion -*	*- all value -*	--
-- free --	--	*- not used -*	--

4.10 OBDM Housekeeping Info

Field	*Conversion*	*Range without conversion*	*Comments*
OBDMhkV5LD1pow *(Power [mW])*	*0101H*: 0000 XXXX; *0100H*: XXXX XXXX; -- X [12bit] X [12bit]* (-5.98/4095) + 2.485	0000_H-$0FFF_H$	--
OBDMhkV5LD2pow *(Power [mW])*	*0103H*: 0000 XXXX; *0102H*: XXXX XXXX; -- X [12bit] X [12bit]* (-5.98/4095) + 2.485	0000_H-$0FFF_H$	--
OBDMhkV5PD1pow *(Power [mW])*	*0105H*: 0000 XXXX; *0104H*: XXXX XXXX; -- X [12bit] X [12bit]* (10.00/4095) -5.0	0000_H-$0FFF_H$	--
OBDMhkV5PD2pow *(Power [mW])*	*0107H*: 0000 XXXX; *0106H*: XXXX XXXX; -- X [12bit] X [12bit]* (10.00/4095) -5.0	0000_H-$0FFF_H$	--
OBDMhkV5curMC	*- no conversion -*	*- all value -*	--
OBDMhkV5temp1 *(Temperature [K])*	*010BH*: 0000 XXXX; *010AH*: XXXX XXXX; -- X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP1*	0000_H-$0FFF_H$	* OBDMtabTEMP1 is the real value set in the control table.
OBDMhkV5temp2 *(Temperature [K])*	*010DH*: 0000 XXXX; *010CH*: XXXX XXXX; -- X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP2*	0000_H-$0FFF_H$	* OBDMtabTEMP2 is the real value set in the control table.
OBDMhkV5temp3 *(Temperature [K])*	*010FH*: 0000 XXXX; *010EH*: XXXX XXXX; -- X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP3*	0000_H-$0FFF_H$	* OBDMtabTEMP3 is the real value set in the control table.

OBDMhkV5temp4 *(Temperature [K])*	*0111H* / *0110H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP4*	0000_H-$0FFF_H$	* OBDMtabTEMP4 is the real value set in the control table.
OBDMhkV5temp5 *(Temperature [K])*	*0113H* / *0112H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP5*	0000_H-$0FFF_H$	* OBDMtabTEMP5 is the real value set in the control table.
OBDMhkV5temp6 *(Temperature [K])*	*0115H* / *0114H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP6*	0000_H-$0FFF_H$	* OBDMtabTEMP6 is the real value set in the control table.
OBDMhkV5temp7 *(Temperature [K])*	*0117H* / *0116H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP7*	0000_H-$0FFF_H$	* OBDMtabTEMP7 is the real value set in the control table.
OBDMhkV5temp8 *(Temperature [K])*	*0119H* / *0118H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (64.00/4095) - 32.0 + OBDMtabTEMP8*	0000_H-$0FFF_H$	* OBDMtabTEMP8 is the real value set in the control table.
OBDMhkV5LDtemp1 *(Temperature [K])*	*011BH* / *011AH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (20.00/4095) - 10 + OBDMtabL1tmp*	0000_H-$0FFF_H$	* OBDMtabL1tmp is the real value set in the control table.
OBDMhkV5LDtemp2 *(Temperature [K])*	*011DH* / *011CH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (20.00/4095) - 10 + OBDMtabL2tmp*	0000_H-$0FFF_H$	* OBDMtabL2tmp is the real value set in the control table.
OBDMhkV5tempSW *(Temperature [K])*	*011FH* / *011EH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (40.00/4095) - 20 + OBDMtabD1tmp*	0000_H-$0FFF_H$	* OBDMtabD1tmp is the real value set in the control table.

OBDMhkV5tempLW *(Temperature [K])*	*0121H* / *0120H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] ^{x} (40.00/4095) - 20 + OBDMtabD2tmp*	0000_H-$0FFF_H$	* OBDMtabD2tmp is the real value set in the control table.
OBDMhkV5curTRW1 *(Current [A])*	*0123H* / *0122H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] * 0.020302-41594+ OBDMtabLED1c	0000_H-$0FFF_H$	* OBDMtabLED1c is the real value set in the control table.
OBDMhkV5curTRW2 *(Current [A])*	*0125H* / *0124H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* 0.020302-41594 + OBDMtabLED2c	0000_H-$0FFF_H$	* OBDMtabLED2c is the real value set in the control table.
OBDMhkV5tempA1 *(Temperature [K])*	*0127H* / *0126H* 0000 XXXX XXXX XXXX -- X [12bit] (X [12bit] * 2,442-8296) /125,13 + 273,15	0000_H-$0FFF_H$	--
OBDMhkV5tempA2 *(Temperature [K])*	*0129H* / *0128H* 0000 XXXX XXXX XXXX -- X [12bit] (X [12bit] * 2,442-8325) /126,05 + 273,15	0000_H-$0FFF_H$	--
OBDMhkV5voltageSL *(Voltage [V])*	*012BH* / *012AH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (10.00/4095) -5.0	0000_H-$0FFF_H$	--
OBDMhkV5voltageCL *(Voltage [V])*	*012DH* / *012CH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (10.00/4095) -5.0	0000_H-$0FFF_H$	--
-- free --	--	**Not used**	--
OBDMhkV5voltageM5 *(Voltage [V])*	*0131H* / *0130H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (20.00/4095) -10.0	0000_H-$0FFF_H$	--
OBDMhkV5voltageP5 *(Voltage [V])*	*0133H* / *0132H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (20.00/4095) -10.0	0000_H-$0FFF_H$	--

OBDMhkV5voltageM15 *(Voltage [V])*	*0135H* / *0134H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (50.08/4095) -25.04	0000_H-$0FFF_H$	--
OBDMhkV5voltageP15 *(Voltage [V])*	*0137H* / *0136H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (50.08/4095) -25.04	0000_H-$0FFF_H$	--
-- free --		**Not used**	
-- free --		**Not used**	
-- free --		**Not used**	
-- free --		**Not used**	
OBDMhkV10LD1pow *(Power [mW])*	*0141H* / *0140H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (-9.94/4095) + 4.97	0000_H-$0FFF_H$	--
OBDMhkV10LD2pow *(Power [mW])*	*0143H* / *0142H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (-9.94/4095) + 4.97	0000_H-$0FFF_H$	--
OBDMhkV10PD1pow *(Power [mW])*	*0145H* / *0144H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (20.00/4095) -10.0	0000_H-$0FFF_H$	--
OBDMhkV10PD2pow *(Power [mW])*	*0147H* / *0146H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (20.00/4095) -10.0	0000_H-$0FFF_H$	--
OBDMhkV10curMC	*- no conversion -*	*- all value -*	--
OBDMhkV10temp1 *(Temperature [K])*	*014BH* / *014AH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (128.00/4095) – 64.0 + OBDMtabTEMP1*	0000_H-$0FFF_H$	* OBDMtabTEMP1 is the real value set in the control table.
OBDMhkV10temp2 *(Temperature [K])*	*014DH* / *014CH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] * (128.00/4095) – 64.0 + OBDMtabTEMP2*	0000_H-$0FFF_H$	* OBDMtabTEMP2 is the real value set in the control table.
OBDMhkV10temp3 *(Temperature [K])*	*014FH* / *014EH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] * (128.00/4095) – 64.0 + OBDMtabTEMP3*	0000_H-$0FFF_H$	* OBDMtabTEMP3 is the real value set in the control table.

OBDMhkV10temp4 *(Temperature [K])*	*0151H* / *0150H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] * (128.00/4095) – 64.0 + OBDMtabTEMP4*	0000_H-$0FFF_H$	* OBDMtabTEMP4 is the real value set in the control table.
OBDMhkV10temp5 *(Temperature [K])*	*0153H* / *0152H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] * (128.00/4095) – 64.0 + OBDMtabTEMP5*	0000_H-$0FFF_H$	* OBDMtabTEMP5 is the real value set in the control table.
OBDMhkV10temp6 *(Temperature [K])*	*0155H* / *0154H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] * (128.00/4095) – 64.0 + OBDMtabTEMP6*	0000_H-$0FFF_H$	* OBDMtabTEMP6 is the real value set in the control table.
OBDMhkV10temp7 *(Temperature [K])*	*0157H* / *0156H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] * (128.00/4095) – 64.0 + OBDMtabTEMP7*	0000_H-$0FFF_H$	* OBDMtabTEMP7 is the real value set in the control table.
OBDMhkV10temp8 *(Temperature [K])*	*0159H* / *0158H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] * (128.00/4095) – 64.0 + OBDMtabTEMP8*	0000_H-$0FFF_H$	* OBDMtabTEMP8 is the real value set in the control table.
OBDMhkV10LDtemp1 *(Temperature [K])*	*015BH* / *015AH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] * (40.00/4095) - 20 + OBDMtabL1tmp*	0000_H-$0FFF_H$	* OBDMtabL1tmp is the real value set in the control table.
OBDMhkV10LDtemp2 *(Temperature [K])*	*015DH* / *015CH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] * (40.00/4095) - 20 + OBDMtabL2tmp*	0000_H-$0FFF_H$	* OBDMtabL2tmp is the real value set in the control table.
OBDMhkV10tempSW *(Temperature [K])*	*015FH* / *015EH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] * (80.00/4095) - 40 + OBDMtabD1tmp*	0000_H-$0FFF_H$	* OBDMtabD1tmp is the real value set in the control table.
OBDMhkV10tempLW *(Temperature [K])*	*0161H* / *0160H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] * (80.00/4095) - 40 + OBDMtabD2tmp*	0000_H-$0FFF_H$	* OBDMtabD2tmp is the real value set in the control table.

OBDMhkV10curTRW1 *(Current [A])*	*0163H* / *0162H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] * 0.40618 -83188+ OBDMtabLED1c*	0000_H-$0FFF_H$	* OBDMtabLED1c is the real value set in the control table.
OBDMhkV10curTRW2 *(Current [A])*	*0165H* / *0164H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit] * 0.040604-83158+ OBDMtabLED2c*	0000_H-$0FFF_H$	* OBDMtabLED2c is the real value set in the control table.
OBDMhkV10tempA1 *(Temperature [K])*	*0167H* / *0166H* 0000 XXXX XXXX XXXX -- X [12bit] (X [12bit] * 4,884-13296) /125,13 + 273,15	0000_H-$0FFF_H$	--
OBDMhkV10tempA2 *(Temperature [K])*	*0169H* / *0168H* 0000 XXXX XXXX XXXX -- X [12bit] (X [12bit] * 4,884-13325) /126,05 + 273,15	0000_H-$0FFF_H$	--
OBDMhkV10voltageSL *(Voltage [V])*	*016BH* / *016AH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (20.00/4095) -10.0	0000_H-$0FFF_H$	--
OBDMhkV10voltageCL *(Voltage [V])*	*016DH* / *016CH* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (20.00/4095) -10.0	0000_H-$0FFF_H$	--
-- free --	--	**Not used**	--
OBDMhkV10voltageM5 *(Voltage [V])*	*0171H* / *0170H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (40.00/4095) -20.0	0000_H-$0FFF_H$	--
OBDMhkV10voltageP5 *(Voltage [V])*	*0173H* / *0172H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (40.00/4095) -20.0	0000_H-$0FFF_H$	--
OBDMhkV10voltageM15 *(Voltage [V])*	*0175H* / *0174H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (100.16/4095) -50.08	0000_H-$0FFF_H$	--
OBDMhkV10voltageP15 *(Voltage [V])*	*0177H* / *0176H* 0000 XXXX XXXX XXXX -- X [12bit] X [12bit]* (100.16/4095) -50.08	0000_H-$0FFF_H$	--
-- free --		**Not used**	

-- free --		**Not used**	
-- free --		**Not used**	
-- free --		**Not used**	

4.11 OBDM Control Table

Field	*Conversion*	*Range without conversion*	*Comments*
OBDMtabTEMP1	*0180H* XXXX | XXXX X X * (64/255) + 268	00_H-FF_H	--
OBDMtabTEMP2	*0181H* XXXX | XXXX X X * (64/255) + 268	00_H-FF_H	--
OBDMtabTEMP3	*0182H* XXXX | XXXX X X * (64/255) + 268	00_H-FF_H	--
OBDMtabTEMP4	*0183H* XXXX | XXXX X X * (64/255) + 268	00_H-FF_H	--
OBDMtabTEMP5	*0184H* XXXX | XXXX X X * (64/255) + 268	00_H-FF_H	--
OBDMtabTEMP6	*0185H* XXXX | XXXX X X * (64/255) + 268	00_H-FF_H	--
OBDMtabTEMP7	*0186H* XXXX | XXXX X X * (64/255) + 268	00_H-FF_H	--
OBDMtabTEMP8	*0187H* XXXX | XXXX X X * (64/255) + 268	00_H-FF_H	--

OBDMtabL1pow	*0188H* XXXX | XXXX X X * (5.92/255)	00_H-FF_H	--
OBDMtabL2pow	*0189H* XXXX | XXXX X X * (5.92/255)	00_H-FF_H	--
OBDMtabL1tmp	*018AH* XXXX | XXXX X X * (40/255) +275	00_H-FF_H	--
OBDMtabL2tmp	*018BH* XXXX | XXXX X X * (40/255) +275	00_H-FF_H	--
OBDMtabD1tmp	*018CH* XXXX | XXXX X X * (80/255)+200	00_H-FF_H	--
OBDMtabD2tmp	*018DH* XXXX | XXXX X X * (80/255)+260	00_H-FF_H	--
OBDMtabLED1c	*018EH* XXXX | XXXX X X * 79.57	00_H-FF_H	--
OBDMtabLED2c	*018FH* XXXX | XXXX X X * 79.57	00_H-FF_H	--
OBDMtabT20	*0191H* | *0190H* 0000 | XXXX | XXXX | XXXX -- | X [12bit] 8 MHz /(X*150)	0000_H-$0FFF_H$	--

OBDMtabT21	*0193H* / *0192H* 0000 XXXX XXXX XXXX -- X [12bit] 8 MHz /(X*150)	0000_H-$0FFF_H$	--
OBDMtabT22	*0195H* / *0194H* 0000 XXXX XXXX XXXX -- X [12bit] 8 MHz/X	0000_H-$0FFF_H$	--
OBDMtabT30	*0197H* / *0196H* 0000 XXXX XXXX XXXX -- X [12bit] 8 MHz/X	0000_H-$0FFF_H$	--
OBDMtabT31	*0199H* / *0198H* 0000 XXXX XXXX XXXX -- X [12bit] 8 MHz /(X*150)	0000_H-$0FFF_H$	--
OBDMtabT32	*019BH* / *019AH* 0000 XXXX XXXX XXXX -- X [12bit] 8 MHz /(X*150)	0000_H-$0FFF_H$	--

<table>
<tr>
<td>OBDMtabB_A</td>
<td>
<table>
<tr><td colspan="8">019EH</td></tr>
<tr><td>1</td><td>1</td><td>A5</td><td>A4</td><td>A3</td><td>A2</td><td>A1</td><td>A0</td></tr>
</table>
<table>
<tr><td>A0</td><td>motor coil select</td></tr>
<tr><td>A1</td><td>run double pendulum forward/reverse</td></tr>
<tr><td rowspan="2">A2</td><td>speed controller right stop command</td></tr>
<tr><td>1=stop ; 0=no</td></tr>
<tr><td rowspan="2">A3</td><td>speed controller left stop command</td></tr>
<tr><td>1=stop ; 0=no</td></tr>
<tr><td rowspan="2">A4</td><td>secondary heater for block/unblock</td></tr>
<tr><td>1=on ; 0=off</td></tr>
<tr><td rowspan="2">A5</td><td>primary heater for block/unblock</td></tr>
<tr><td>1=on ; 0=off</td></tr>
</table>
</td>
<td>0000_H-$0FFF_H$</td>
<td>--</td>
</tr>
<tr>
<td>OBDMtabB_B</td>
<td>
<table>
<tr><td colspan="8">019FH</td></tr>
<tr><td>1</td><td>B6</td><td>B5</td><td>B4</td><td>B3</td><td>B2</td><td>B1</td><td>B0</td></tr>
</table>
<table>
<tr><td>B0</td><td>bit 0 0xing SW gain control</td></tr>
<tr><td>B1</td><td>bit 1 0xing SW gain control</td></tr>
<tr><td>B2</td><td>bit 0 0xing LW gain control</td></tr>
<tr><td>B3</td><td>bit 1 0xing LW gain control</td></tr>
<tr><td>B4</td><td>select zero crossing LW or SW</td></tr>
<tr><td>B5</td><td>turn on/off laser 1 (SW) (1=off)</td></tr>
<tr><td>B6</td><td>turn on/off laser 2 (LW) (1=off)</td></tr>
</table>
</td>
<td>0000_H-$0FFF_H$</td>
<td>--</td>
</tr>
</table>

4.12 Received Telecommands

Field	*Conversion*	*Range without conversion*	*Comments*
TCrec_TS [0]	*01A1H* XXXX XXXX TYPE; *01A0H* XXXX XXXX SUBTYPE	*- all value -*	--
TCrec_SC [0]	*01A3H* XXXX XXXX; *01A2H* XXXX XXXX SEQUENCE COUNTER	*- all value -*	--
TCrec_TS [1]	*01A5H* XXXX XXXX TYPE; *01A4H* XXXX XXXX SUBTYPE	*- all value -*	--
TCrec_SC [1]	*01A7H* XXXX XXXX; *01A6H* XXXX XXXX SEQUENCE COUNTER	*- all value -*	--
TCrec_TS [2]	*01A9H* XXXX XXXX TYPE; *01A8H* XXXX XXXX SUBTYPE	*- all value -*	--
TCrec_SC [2]	*01ABH* XXXX XXXX; *01AAH* XXXX XXXX SEQUENCE COUNTER	*- all value -*	--
TCrec_TS [3]	*01ADH* XXXX XXXX TYPE; *01ACH* XXXX XXXX SUBTYPE	*- all value -*	--
TCrec_SC [3]	*01AFH* XXXX XXXX; *01AEH* XXXX XXXX SEQUENCE COUNTER	*- all value -*	--
TCrec_TS [4]	*01B1H* XXXX XXXX TYPE; *01B0H* XXXX XXXX SUBTYPE	*- all value -*	--
TCrec_SC [4]	*01B3H* XXXX XXXX; *01B2H* XXXX XXXX SEQUENCE COUNTER	*- all value -*	--

TCrec_TS [5]	*01B5H* / *01B4H* XXXX XXXX / XXXX XXXX TYPE / SUBTYPE	*- all value -*	--
TCrec_SC [5]	*01B7H* / *01B6H* XXXX XXXX / XXXX XXXX SEQUENCE COUNTER	*- all value -*	--
TCrec_TS [6]	*01B9H* / *01B8H* XXXX XXXX / XXXX XXXX TYPE / SUBTYPE	*- all value -*	--
TCrec_SC [6]	*01BBH* / *01BAH* XXXX XXXX / XXXX XXXX SEQUENCE COUNTER	*- all value -*	--
TCrec_TS [7]	*01BDH* / *01BCH* XXXX XXXX / XXXX XXXX TYPE / SUBTYPE	*- all value -*	--
TCrec_SC [7]	*01BFH* / *01BEH* XXXX XXXX / XXXX XXXX SEQUENCE COUNTER	*- all value -*	--
TCrec_TS [8]	*01C1H* / *01C0H* XXXX XXXX / XXXX XXXX TYPE / SUBTYPE	*- all value -*	--
TCrec_SC [8]	*01C3H* / *01C2H* XXXX XXXX / XXXX XXXX SEQUENCE COUNTER	*- all value -*	--
TCrec_TS [9]	*01C5H* / *01C4H* XXXX XXXX / XXXX XXXX TYPE / SUBTYPE	*- all value -*	--
TCrec_SC [9]	*01C7H* / *01C6H* XXXX XXXX / XXXX XXXX SEQUENCE COUNTER	*- all value -*	--
TCrec_TS [10]	*01C9H* / *01C8H* XXXX XXXX / XXXX XXXX TYPE / SUBTYPE		

TCrec_TS [11]	*01CDH* / *01CCH* XXXX XXXX XXXX XXXX TYPE SUBTYPE	*- all value -*	--
TCrec_SC [11]	*01CFH* / *01CEH* XXXX XXXX XXXX XXXX SEQUENCE COUNTER	*- all value -*	--
TCrec_TS [12]	*01D1H* / *01D0H* XXXX XXXX XXXX XXXX TYPE SUBTYPE	*- all value -*	--
TCrec_SC [12]	*01A3H* / *01A2H* XXXX XXXX XXXX XXXX SEQUENCE COUNTER	*- all value -*	--
TCrec_TS [13]	*01A1H* / *01A0H* XXXX XXXX XXXX XXXX TYPE SUBTYPE	*- all value -*	--
TCrec_SC [13]	*01A3H* / *01A2H* XXXX XXXX XXXX XXXX SEQUENCE COUNTER	*- all value -*	--
TCrec_TS [14]	*01A1H* / *01A0H* XXXX XXXX XXXX XXXX TYPE SUBTYPE	*- all value -*	--
TCrec_SC [14]	*01A3H* / *01A2H* XXXX XXXX XXXX XXXX SEQUENCE COUNTER	*- all value -*	--
TCrec_TS [15]	*01A1H* / *01A0H* XXXX XXXX XXXX XXXX TYPE SUBTYPE	*- all value -*	--
TCrec_SC [15]	*01A3H* / *01A2H* XXXX XXXX XXXX XXXX SEQUENCE COUNTER	*- all value -*	--