

**LABEN**

**GOME 2**

**DOCUMENT TYPE:** DESIGN SPECIFICATION

**TITLE:** SCIENCE DATA PACKET DEFINITION  
(including TM Packets and Status Words)

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**PREPARED BY:** GOME 2 SW TEAM

**CHECKED BY:** G. TORNAGHI

**PROJECT LEADER:** G. TORNAGHI **DATE:**

**PAPM:** G. CAFAGNA **DATE:**

**PROGRAM MANAGER:** G. FUGGETTA **DATE:**

**CONFIGURATION:** L. E. RONDELLI

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## CHANGE RECORD

Issue	Date	Sheet	Description of Change	Release
1	DEC. 98	ALL	FIRST ISSUE OF THE DOCUMENT	---
2	MAR 99	ALL	Document inclusive of RID accepted by UR/R w.r.t: UR/R MO-MN-GAL-GO-0035 and UR/R MO-MN-GAL-GO-0037	
		§ 1	Science Data Packets are generated starting from IDLE mode.	
		§ 3	Inserted word 6 for Universal time code	
		§ 3.1.1	Corrected type indicator: 0 (not 1)	
		§ 3.2	Inserted word 6 for Universal time code	
		§ 4.1	Updated list of auxiliary data	
		§ 4.2	Inserted PMD identifier definition according to the MO-MN-GAL-GO-0037	
		§ 4.2.1	Corrected Mode 1	
		§ 4.2.2	Corrected Mode 2	
		§ 4.4	Inserted FPA readout indicator definition according to the MO-MN-GAL-GO-0037	
		§ 4.5	New paragraph for dump on x-band	
		§ 4.6	New paragraph for science test	
		§ 5	New paragraph: conventions	
		§ 6	New paragraph: list of implemented RID	
3	JUL 99	ALL		
		Table 4.1-1	According to PDR RID: PGO-PE-ME-02: <u>added fields:</u> PMD transfer Mode, FPA coadding status, Integration time status (one for each band) <u>Deleted fields</u> related to the header of the packet deleted SBT words from this table and inserted in tables 4.1-2; 4.1-3; 4.1-4 (last three words ) according to the MO-IC-MMT-GM-0001 figure 3.3.1-1	
		Table 4.1-2	Replaced the SPARE CDHU temp with: CDHU SDM temperature, CDHU HDM temperature, CDHU FTHM temperature, CDHU S&HS temperature. Inserted PMD cooler status according to PDR RID: PGO-PE-ME-02 Inserted SBT words according to MO-IC-MMT-GM-0001 figure 3.3.1-1	
		Table 4.1-3	Inserted SBT words according to MO-IC-MMT-GM-0001 figure 3.3.1-1	
		Table 4.1-4	Inserted SBT words according to MO-IC-MMT-GM-0001 figure 3.3.1-1	
		§ 4.2	"third" replaced by "fixed" according to the MO-MN-GAL-GO-0047	
		§ 4.2.1	"third" replaced by "fixed" according to the MO-MN-GAL-GO-0047	
		§ 4.2.2	"third" replaced by "fixed" according to the MO-MN-GAL-GO-0047	
4	JUN 00	Sections	Issue updating the baseline out of the SR/R according to action dispositioned by RID GAL-DSRR-CDHU-AD-0052.	
		§ 2	Updated list of Applicable Documents	
		§ 3	Updated general lay-out of the SDP	
		§ 3.1.1	Bit pattern for GOME 2 APID (384) corrected to '001 1000 0000'b	
		§ 4.1	Auxiliary HK data lay-out updated according to ΔSR/R MoM MO-MN-GAL-GO-0096 Table 4.1.-1 <ul style="list-style-type: none"> <li>SBT used for UTC moved at the begin of Aux data</li> <li>Fixed field, GOME model</li> <li>PMD, FPA status words</li> <li>Moved FPA arrays temperatures</li> <li>Peltier data</li> </ul> Table 4.1.-2 <ul style="list-style-type: none"> <li>Added Instrument S/S mode, CDHU status word, instrument op mode</li> <li>Cooler Target 'n'</li> </ul>	
		§4.2	PMD Data updated according to ECR MO-RS-GAL-GO-0007	
		§4.6	Science Data test pattern: specified enable/disable condition	

		§4.7	Added breakdown of Status Words in the Aux H/K
		§4.7.5	Added FPA/PMD pixel samples as per fax GOME2/243-00
		§4.7.6	Added PMD default settings as per fax GOME2/242-00
		APPX. A	Added synoptics of the 4 science data packets
5	APR 01	ALL	
		§ 2	Updated list of Applicable Documents
		§ 4.1	Auxiliary HK data lay-out updated Table 4.1.-1 <ul style="list-style-type: none"> <li>Length of Ancillary Data set to 481 words</li> <li>Data Subset Counter ranges 0000h ÷ 000Fh</li> <li>Actual PMD transfer Mode value ranges 1..3</li> <li>Added PMD actual readout mode</li> <li>Updated fields n. 174..179</li> <li>Added UTCo, OBTo and Ts fields</li> </ul> Table 4.1.-2 <ul style="list-style-type: none"> <li>Added SU Status Word, SU biases, SU CDHU protocol</li> <li>Added Xlate bits</li> </ul> Table 4.1.-5 <ul style="list-style-type: none"> <li>Changed size of DSM field</li> </ul> Defined the layout of some words in SDP as per fax GOME2/266-00 (point #1): Added Table 4.1.-6 for Actual PMD s/p integration time status Added Table 4.1.-7 for Actual FPA coadding status Added Table 4.1.-8 for Integration time status rd#1, rd#2 Added Table 4.1.-9 for Integration time phase-status rd#1, rd#2 Added Table 4.1.-10 for Timeline sequence report Added Table 4.1.-11 for GTT sequence report Added Table 4.1.-12 for DSM table
		§ 4.2	Added description of PMD data packing Corrected format of PMD data (15 bands packetisation). Corrected PMD readout indicator value. Added note in par. 4.2.2. as per fax GOME2/266-00 (point #3) Corrected word numbering of Mode 2 packet as per fax GOME2/266-00 (point #9)
		§ 4.3	Corrected FPA readout indicator value.
		§ 4.6	Corrected test pattern value as per fax GOME2/266-00 (point #10)
		§ 4.7.1	Corrected table of FPA samples
		§ 4.7.2	Completed definition of CDHU ICU Status Word #2. Completed definition of CDHU ICU Status Word #4. Completed definition of CDHU ICU Status Word #6. Completed definition of CDHU ICU Status Word #7. Completed definition of CDHU ICU Status Word #8.
		§ 4.7.3	Corrected PMD default settings according to OG fax GOME2/309-00
		APPX. A	Corrected actual PMD transfer mode field. Corrected actual PMD s/p integration time status. Added PMD actual readout mode. Corrected size of DSM field. Added SU Status Word, SU biases, SU CDHU protocol. Added Xlate bits.
		APPX. B	Corrected actual PMD transfer mode field. FPA and PMD switch status info now contained in one word. Added description of non-nominal telemetry area.
6	DEC 01	ALL	The title of the document has been upgraded to point out Telemetry and Status Word formats
			Update List of Implemented RIDs as per CDR Corrections due to CDR RIDs as listed in § 6
		§ 4.1	Table 4.1-7 corrected format of Actual FPA coadding status field
7	JUL 02	§ 4.7.2	Updating of the list adding contents of Word 234: "Instrument Operational Mode" page 26
		Table 4.1.1	Added information about Latch-up Counters (into Remarks column) page 7
		Table 4.1.7	Table updated
		Table 4.1.1	Words #174-#179 updated; 456,457 wording
		Table 4.7.1	Word #166-#173 p-s exchanged
		Appendix B	Inserted General Note; page B6
8	FEB 05		
		all	Document realigned to CDHU SW release 2.5 Update paragraph 3.1.2 too, in order to close the AI 5 of GOME2 CDHU ST REVIEW & WORKING MEETING

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## 1. SCOPE

The GOME 2 experiment on-board MetOp is controlled by the *Payload Module Computer (PMC)* through the OBDH/DBU interface, on which the CDHU transfers its **House Keeping Format TM packets**. Moreover it routes the **Scientific Data Packets (SPD's)** formatted in CCSDS to the *Fast Multiplexer Unit (FMU)*.

This document specifies the structure and the formatting and the transfer rate of these scientific packets which shall be generated as soon as the instrument enters Idle mode; moreover, the correspondence with HK format TM packets is evidenced.

## 2. APPLICABLE AND REFERENCE DOCUMENTS

- [AD.1] CDHU Software – User requirement document.  
TL14996, MO-RS-LAB-GO-0003; Issue 7, Nov 2001
- [AD.2] GOME-2 Global Ozone Monitoring Experiment – Science Data  
Requirements; MO-RS-ESA-GO-0119; Issue Draft 3; 16.03.98;
- [AD.3] GOME-2 ICD; MO-IC-MMT-GM-0001; Issue 4; Feb 2000
- [AD.4] CDHU Software – S/W Requirement Document;  
TL15432; MO-RS-LAB-GO-0004; Issue 10

### 3. SCIENTIFIC DATA PACKET DESCRIPTION

An overview of the GOME-2 **Scientific Data Packet (SDP)** structure is given in the next table.

Major Fields	Word number	Description	Remark
<b>Packet Primary Header</b>	0	<i>Packet Identification</i>	
	1	<i>Packet Sequence Control</i>	
	2	<i>Packet Length</i>	
<b>Packet Secondary Header</b>	3	<i>Time Stamp – word1</i>	Universal Time Code (UTC). The time corresponds to the end of the observation cycle
	4	<i>Time Stamp – word2</i>	Universal Time Code (UTC)
	5	<i>Time Stamp – word3</i>	Universal Time Code (UTC)
	6	<i>Time Stamp – word4</i>	Universal Time Code (UTC)
<b>User Data Field</b>	7..487	<i>Auxiliary HK Data</i>	Differences among the 4 Pckts
	488..1167	<i>PMD Data</i>	680 words
	1168..9367	<i>FPA Data</i>	8200 words
	9368	<i>Packet Error Control (PEC)</i>	CRC over all packet except PEC word itself

The GOME-2 Scientific Data Packets shall be composed of a **Packet Primary Header**, a **Packet Secondary Header** and a **User Data Field**.

The **Packet Primary Header** (3 words) shall be composed of three words representing the **Packet Identification**, the **Packet Sequence Control** and the **Packet Length**.

The **Packet Secondary Header** (4 words) contains a time stamp used to mark the science data acquisition time.

In GOME –2 the time stamp fields is extended by one word to contain the Universal Time Code (UTC).

The **User Data Field (Ancillary or Auxiliary HK Data, Application PMD & FPA Data and Packet Error Control word)** contains the GOME-2 measurement data –generated by the *FPA* sub-system and the *PMD* sub-system- the auxiliary information needed to interpret the measurement data and calibrate it.

Finally, the **Packet Error Control (PEC)** shall be computed on board with the above-specified formula for each the GOME-2 packets over the total packet content (with the exception of the PEC itself).

### 3.1. PACKET PRIMARY HEADER DESCRIPTION

The Packet Primary Header shall be composed of three words representing the *Packet Identification*, the *Packet Sequence Control* and the *Packet Length*.

#### 3.1.1. Packet Identification

The first word or 'Packet Identification' is composed of a version number '000', a type indicator '1', a flag indicating the presence of a secondary header '1', and a fixed GOME-2 Application Identifier '001 1000 0000'bin (allocated GOME-2 values range from 384 Dec to 447)

000 -	----	----	----	<b>Version number</b>
--- 0	----	----	----	<b>Type indicator</b>
----	1---	----	----	<b>Secondary header</b>
----	-001	1000	0000	<b>GOME-2 ApID (384)</b>

#### 3.1.2. Packet sequence control

The packet sequence control contains the segmentation flag '11' indicating that the GOME-2 packets are not segmented. The packet sequence counter is a 14 bits wrap-around counter which is set to all 0's when the GOME-2 generates its first science packet after entering in Idle mode.

The counter is reset whenever entering in Idle mode; more precisely, it is re-set every time the Idle MCMD is received, so also when Idle MCMD is issued in Idle mode.

The counter shall increment by 1 for each GOME-2 packet generated and shall wrap around every 16384 packets i.e. every 6144 seconds.

#### 3.1.3. Packet length

The packet length indicates the total 'number of bytes – 1' of the GOME-2 secondary packet and user data field and it shall be fixed to 18731 dec.

## 3.2. SECONDARY HEADER

The word 3, 4, 5, 6 contains the *Universal Time Code (UTC)*.

## 3.3. PACKET DATA FIELD DESCRIPTION

The packet data contains the GOME-2 measurement data for instrument user and an error control word that is generated for each packet.

### 3.3.1. User Data Field

This field contains the GOME-2 measurement data and shall be structured in:

- *AUXILIARY HK Data*
- *PMD Data* starting from the identifier
- *FPA Data* starting from separate identifier

The content of the user data field shall be as specified in paragraph 4.

### 3.3.2. Packet Error Control Field

The *Packet Error Control* field shall be computed on board with the specified formula ( $x^{16} + x^{12} + x^5 + 1$ ) for each one of GOME-2 scientific packet stream, produced at a rate of 375 ms, over the total packet content (with the exception of the PEC itself).

## 4. PACKET DATA FIELD CONTENT

### 4.1. AUXILIARY HK DATA

All telemetry point needed to analyse the science data and needed to evaluate the instrument status and operations will be present in the **GOME-2 data set**.

Since a GOME-2 data set corresponds to 1.5 second of data, i.e. covering *four* consecutive SDP's, part of this telemetry information is transmitted in the 1<sup>st</sup> packet, part in the 2<sup>nd</sup> packet and extends from word 7 to 487 of each packet.

The table 4.1-1 indicates the content (from word 7 to word 219) **common for all four Scientific Data Packets** of the GOME2 data set within a 1.5 s period (also called, *Ground Pixel*).

Table 4.1.-1. AUXILIARY data **common for all four** Scientific Data Packets (word 7 to word 219)

Word nr	TM description	Rate (s)	ms (in a 1.5 s period)				Remarks
			Pck 1	Pck 2	Pck 3	Pck 4	
7.	SBT (used to calculate the UTC) word 1	0.375	1	1	1	1	The time corresponds to the end of the observation cycle " "
8.	SBT (used to calculate the UTC) word 2	0.375	1	1	1	1	
9.	SBT (used to calculate the UTC) word 3	0.375	1	1	1	1	
10.	Length Of Ancillary Data	0.375	1	1	1	1	Set to 481 words
11.	Fixed Field 1 (4747 Hex)	0.375	1	1	1	1	
12.	Fixed Field 2 (4F4F Hex)	0.375	1	1	1	1	
13.	Fixed Field 3 (4D4D Hex)	0.375	1	1	1	1	
14.	Fixed Field 4 (4545 Hex)	0.375	1	1	1	1	
15.	GOME Model (EQM=1111; FM1=2222; FM2=3333; FM3=4444)	0.375	1	1	1	1	
16.	Data Subset Counter (and SubPixel Counter)	0.375	1	1	1	1	0000h ÷ 000Fh
17.	ICU SBT (LSW) at first 93.75 ms	0.375	1	1	1	1	( 4 word each 375 ms) The time corresponds to the end of the observation cycle
18.	ICU SBT (LSW) at second 93.75 ms	0.375	1	1	1	1	
19.	ICU SBT (LSW) at third 93.75 ms	0.375	1	1	1	1	
20.	ICU SBT (LSW) at fourth 93.75 ms	0.375	1	1	1	1	
21.	Actual PMD transfer Mode (1, 2, 3) 1 = mode 1, 2 = mode 2, 3 = raw data	0.375	1	1	1	1	See related section 4.2
22.	Actual PMD s/p Integration Time Status	0.375	1	1	1	1	See Table 4.1.-6
23.	Actual PMD-s Integration Time Value	0.375	1	1	1	1	
24.	Actual PMD-p Integration Time Value	0.375	1	1	1	1	
25.	Actual PMD Readout Mode 0 = Nominal mode, 1 = Sun mode, 2 = LED mode	0.375	1	1	1	1	
26.	Actual FPA coadding status (no coadding/ coadding-averaged)	0.375	1	1	1	1	See Table 4.1.-7
27.	Integration time status readout #1 (completed/notcompleted/aborted/forced to 0.1875)	0.375	1	1	1	1	See Table 4.1.-8
28.	Integration time-phase status rdout #1	0.375	1	1	1	1	See Table 4.1.-9
29.	Integration time Value rdt #1 band IA	0.375	1	1	1	1	
30.	Integration time Value rdt #1 band IB	0.375	1	1	1	1	
31.	Integration time Value rdt #1 band IIA	0.375	1	1	1	1	

Word nr	TM description	Rate (s)	ms (in a 1.5 s period)				Remarks
			375	750	1125	1500	
			Pck 1	Pck 2	Pck 3	Pck 4	
32.	Integration time Value rdt #1 band IIB	0.375	1	1	1	1	
33.	Integration time Value rdt #1 band III	0.375	1	1	1	1	
34.	Integration time Value rdt #1 band IV	0.375	1	1	1	1	
35.	Integration time status readout #2 (completed/notcompleted/aborted/forced to 0.1875)	0.375	1	1	1	1	See Table 4.1.-8
36.	Integration time-phase status rdout #2	0.375	1	1	1	1	See Table 4.1.-9
37.	Integration time Value rdt #2 band IA	0.375	1	1	1	1	
38.	Integration time Value rdt #2 band IB	0.375	1	1	1	1	
39.	Integration time Value rdt #2 band IIA	0.375	1	1	1	1	
40.	Integration time Value rdt #2 band IIB	0.375	1	1	1	1	
41.	Integration time Value rdt #2 band III	0.375	1	1	1	1	
42.	Integration time Value rdt #2 band IV	0.375	1	1	1	1	
43.	FPA 1 Latch-up counter	0,375	1	1	1	1	Latchup counters are never reset; subjected to Wrap Around
44.	FPA 2 Latch-up counter	0,375	1	1	1	1	
45.	FPA 3 Latch-up counter	0,375	1	1	1	1	
46.	FPA 4 Latch-up counter	0,375	1	1	1	1	
47.	PMD -p latch up counter	0,375	1	1	1	1	
48.	PMD -s latch up counter	0,375	1	1	1	1	
49.	HDM latch up counter	0,375	1	1	1	1	
50.	Radiometric (QTH) lamp Voltage	0.375	1	1	1	1	
51.	Radiometric (QTH) lamp Current	0,375	1	1	1	1	
52.	Spectral lamp Voltage	0,375	1	1	1	1	
53.	Spectral lamp Current	0,375	1	1	1	1	
54..57	FPA1 array Temperature-1	0.375	4	4	4	4	
58..61	FPA2 array Temperature-1	0.375	4	4	4	4	
62..65	FPA3 array Temperature-1	0.375	4	4	4	4	
66..69	FPA4 array Temperature-1	0.375	4	4	4	4	
70..73	FPA1 array Temperature-2	0.375	4	4	4	4	
74..77	FPA2 array Temperature-2	0.375	4	4	4	4	
78..81	FPA3 array Temperature-2	0.375	4	4	4	4	
82..85	FPA4 array Temperature-2	0.375	4	4	4	4	
86..89	FPA1 Peltier Loop Output	0.375	4	4	4	4	
90..93	FPA2 Peltier Loop Output	0.375	4	4	4	4	
94..97	FPA3 Peltier Loop Output	0.375	4	4	4	4	
98..101	FPA4 Peltier Loop Output	0.375	4	4	4	4	
102.	FPA1 Peltier loop error	0.375	1	1	1	1	
103.	FPA2 Peltier loop error	0.375	1	1	1	1	
104.	FPA3 Peltier loop error	0.375	1	1	1	1	
105.	FPA4 Peltier loop error	0.375	1	1	1	1	
106. ...109	Scan Mirror position 1..4 (ACQ_POSITION) at rate 93,75 ms	0.375	4	4	4	4	(4 words each 375 ms)
110...113	Scan Mirror torque 1..4 (I_MOT) at rate 93,75 ms	0.375	4	4	4	4	( 4 words each 375 ms)
114...117	Scan Mirror torque shift 1..4 (I_MOT_SHIFT) at rate 93,75 ms	0.375	4	4	4	4	( 4 words each 375 ms) Shift Value
118. ...129	FPA1 Samples ( 3 samples/93.75 ms)	0.375	12	12	12	12	See related section 4.7.1 For Pixel address
130. ...141	FPA2 Samples ( 3 samples/93.75 ms)	0.375	12	12	12	12	
142. ...153	FPA3 Samples ( 3 samples/93.75 ms)	0.375	12	12	12	12	
154. ...165	FPA4 Samples ( 3 samples/93.75 ms)	0.375	12	12	12	12	
166. ...169	PMD-p sample	0.375	4	4	4	4	
170. ...173	PMD-s sample:	0.375	4	4	4	4	
174.	Processor id (A8h=up1, 20h=up2, F0h=SU)	0.375	1	1	1	1	0 if no dump required
175.	Dump length	0.375	1	1	1	1	0 if no dump required
176.	dump start address MSW	0.375	1	1	1	1	0 if no dump required
177.	dump start address LSW	0.375	1	1	1	1	0 if no dump required
178.	Set to 0	0.375	1	1	1	1	
179.	Set to 0	0.375	1	1	1	1	
180....183	SU prc dump start address	0.375	4	4	4	4	
184.	SU prc number of dumped words	0.375	1	1	1	1	
185...200	SU prc memory dump	0.375	16	16	16	16	
201. 204	UTC0	0.375	4	4	4	4	

Word nr	TM description	Rate (s)	ms (in a 1.5 s period)				Remarks
			Pck 1	Pck 2	Pck 3	Pck 4	
205. ...207	OBTo	0.375	3	3	3	3	
208. ...209	Ts	0.375	2	2	2	2	
210...219	SPARE	0.375	10	10	10	10	

The table 4.1-2 indicates the content (from word 220 to word 487) for first Scientific Data Packet of the GOME-2 data set.

Table 4.1.-2. AUXILIARY data for the **first** Scientific Data Packet (word 220 to word 487)

Word number	TM description	Rate (s)	Pck 1	Remarks
220..222	Instrument S/S Mode	1.5	3	See related section 4.7.2
223..233	CDHU ICU	1.5	11	
234	Instrument Operational Mode	1.5	1	
235..236	2nd prc words	1.5	2	
237..240	SPARE	1.5	4	
241.	Timeline sequence report	1.5	1	See Table 4.1.-10
242.	GTT sequence report	1.5	1	See Table 4.1.-11
243.	Last routine command word 0	1.5	1	
244.	Last routine command word 1	1.5	1	
245.	Last routine command word 2	1.5	1	
246.	Last routine command word 3	1.5	1	
247.	Last routine command word 4	1.5	1	
248.	Last routine command word 5	1.5	1	
249.	Last routine Cmmnd Expansion Time ICU MSW	1.5	1	
250.	Last routine Cmmnd Expansion Time ICU LSW	1.5	1	
251.	Last non-routine command word 0	1.5	1	
252.	Last non-routine command word 1	1.5	1	
253.	Last non-routine command word 2	1.5	1	
254.	Last non-routine command word 3	1.5	1	
255.	Last non-routine command word 4	1.5	1	
256.	Last non-routine command word 5	1.5	1	
257.	Last non-routine Cmnd Expans. Time ICU MSW	1.5	1	
258.	Last non-routine Cmnd Expans. Time ICU LSW	1.5	1	
259.	Next timeline command word 0	1.5	1	
260.	Next timeline command word 1	1.5	1	
261.	Next timeline command word 2	1.5	1	
262.	Next timeline command word 3	1.5	1	
263.	Next timeline command word 4	1.5	1	
264.	Next timeline command word 5	1.5	1	
265.	Time of Next Timeline command MSW	1.5	1	
266.	Time of Next Timeline command LSW	1.5	1	
267. ...274	( spare )	N/A	8	
275...278	Monitoring flags	1.5	4	
279..282	Switch-down flags	1.5	4	
283..286	( spare )	1.5	4	
287.. 290	Min/max reporting enable/disable flag	1.5	4	
291 .. 332	( spare )	1.5	42	
333.	SPARE	1.5	1	
334.	SPARE	1.5	1	
335.	SPARE	1.5	1	
336.	SPARE	1.5	1	
337.	CDHU temp1 (DC/DC1- Power Supply)	1.5	1	
338.	CDHU temp2 (S&HS)	1.5	1	
339.	CDHU temp3 (HDM board)	1.5	1	
340.	CDHU temp4 (SDM board)	1.5	1	
341.	CDHU temp5 (FTHM)	1.5	1	
342.	GPDU EQ. DC/DC temp	1.5	1	

# GOME 2

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Word number	TM description	Rate (s)	Pck 1	Remarks
343.	Radiator Temperature	1.5	1	
344.	Scan Motor Temperature	1.5	1	
345.	Scan Unit Electronics temp	1.5	1	
346.	Radiometric Lamp Temperature	1.5	1	
347.	Radiometric Unit DC/DC temperature	1.5	1	
348.	Spectral Lamp Temperature	1.5	1	
349.	Spectral DC/DC Temperature	1.5	1	
350.	Sun Diffuser temperature	1.5	1	
351.	Shutter motor temperature	1.5	1	
352.	OptBench under CU temperature	1.5	1	
353.	Center of OptBench temperature	1.5	1	
354.	+Z side OptBench temperature	1.5	1	
355.	-X side OptBench temperature	1.5	1	
356.	-Z side OptBench temperature	1.5	1	
357.	Predisperser prism temperature	1.5	1	
358.	Analog board offset value (0.1%)	1.5	1	
359.	Analog board gain value (90%)	1.5	1	
360.	FPA1 Module temp1	1.5	1	
361.	FPA2 Module temp1	1.5	1	
362.	FPA3 Module temp1	1.5	1	
363.	FPA4 Module temp1	1.5	1	
364.	FPA1 Module temp2	1.5	1	
365.	FPA2 Module temp2	1.5	1	
366.	FPA3 Module temp2	1.5	1	
367.	FPA4 Module temp2	1.5	1	
368.	PMD-p array temp	1.5	1	
369.	PMD-s array temp	1.5	1	
370.	PMD-p module temp	1.5	1	
371.	PMD-s module temp	1.5	1	
372..375	( Spares )	N/A	4	
376.	Scan Mirror requested mode (from ICU Software)	1.5	1	
377.	Scan Mirror requested bias (from ICU Software)	1.5	1	
378.	Scan Mirror real mode (from SU TLM OPMODE)	1.5	1	
379.	Scan Mirror real bias (from SU TLM BIAS/POS)	1.5	1	
380.	SU Status Word	1.5	1	
381..384	SU biases	1.5	4	
385.	SU CDHU protocol	1.5	1	
386..400	PMD-p band 1.. 15 start	1.5	15	
401..415	PMD-p nb pixel in band 1 ...15	1.5	15	
416 .. 430	PMD-s band 1 ..15 start 1 ...15	1.5	15	
431..445	PMD-s nb pixel in band 1 ...15	1.5	15	
446.	PMD-p start of short wavelength rdout	1.5	1	
447.	PMD-p spare 1	1.5	1	
448.	PMD-s start of short wavelength rdout	1.5	1	
449.	Xlate bits	1.5	1	See Table 4.1.-12
450.	Programmed Integration Time band IA	1.5	1	
451.	Programmed Integration Time band IIA	1.5	1	
452.	Programmed Integration Time band IB	1.5	1	
453.	Programmed Integration Time band IIB	1.5	1	
454.	Programmed Integration Time band III	1.5	1	
455.	Programmed Integration Time band IV	1.5	1	
456.	ICU EEPROM memory checksum	1.5	1	
457.	Science Processor EEPROM memory checksum	1.5	1	
458. . 487	Spare TLM at 1.5 second	1.5	30	

The table 4.1-3 indicates the content (from word 220 to word 487) for second Scientific Data Packet of the GOME-2 data set.

Table 4.1.-3. AUXILIARY data for the **second** Scientific Data Packet (word 220 to word 487)

Word number	TM description	Rate(s)	Pck 2	Remarks
220.. 450	Previous Timeline (33lines*7=231 words)	1.5	231	
451 .. 487	SPARE WORDS	N/A	37	

The table 4.1-4 indicates the content (from word 220 to word 487) for third Scientific Data Packet of the GOME-2 data set.

Table 4.1.-4. AUXILIARY data for the **third** Scientific Data Packet (word 220 to word 487)

Word number	TM description	Rate(s)	Pck 3	Remarks
220.. 450	Present Timeline (33lines*7=231 words)	1.5	231	
451 .. 487	SPARE WORDS	N/A	37	

The table 4.1-5 indicates the content (from word 220 to word 487) for fourth Scientific Data Ppacket of the GOME-2 data set.

Table 4.1.-5. AUXILIARY data for the **fourth** Scientific Data Packet (word 220 to word 487)

Word number	TM description	Rate(s)	Pck 4	Remarks
220.. 275	GTT contents (28 lines*2 =56 words)	1.5	56	
276 .. 337	Default Setting param (DSM table) See Table 4.1.-13	1,5	62	
338 .. 487	SPARE WORDS	N/A	150	

Table 4.1.-6. Actual PMD S & P Integration Time status

Bit N°	0 .. 5	6 .. 7	8 ..13	14 .. 15
Content	Spare	PMD-p IT single status (0 = not completed or not running, 1 = completed, 2 = aborted)	Spare	PMD-s IT single status (0 = not completed or not running, 1 = completed, 2 = aborted)

Table 4.1.-7. Actual FPA bands co-adding status, word #26

Bit N°	0 .. 3	4	5	6	7	8	9	10	11	12	13	14	15
Content	Spare	1A	1B	2A	2B	3	4	1A	1B	2A	2B	3	4
		Coadding status readout 1 (0 = no coadding, 1 = coadding)						Coadding status readout 2 (0 = no coadding, 1 = coadding)					

Table 4.1.-8. Integration Time status rd#1(word#27), rd#2(word#35),

Bit N°	0 .. 3	4 .. 5	6 .. 7
Content	Spare	FPA 1A IT single status (0 = not completed or not running, 1 = completed, 2 = aborted, 3 = forced to 187 ms)	FPA 1B IT single status (0 = not completed or not running, 1 = completed, 2 = aborted, 3 = forced to 187 ms)

Bit N°	8 .. 9	10 .. 11
Content	FPA 2A IT single status (0 = not completed or not running, 1 =	FPA 2B IT single status (0 = not completed or not running, 1 =

	completed, 2 = aborted, 3 = forced to 187 ms)	completed, 2 = aborted, 3 = forced to 187 ms)
<b>Bit N°</b>	12 .. 13	14 .. 15
<b>Content</b>	FPA 3 IT single status (0 = not completed or not running, 1 = completed, 2 = aborted, 3 = forced to 187 ms)	FPA 4 IT single status (0 = not completed or not running, 1 = completed, 2 = aborted, 3 = forced to 187 ms)

Table 4.1.-9. Integration Time-*phase* status rd#1(word#28), rd#2(word#36)

<b>Bit N°</b>	0 .. 9	10	11
<b>Content</b>	Spare	Band 1A IT phase status (0 = in phase, 1 = not in phase)	Band 1B IT phase status (0 = in phase, 1 = not in phase)
<b>Bit N°</b>		12	13
<b>Content</b>		Band 2A IT phase status (0 = in phase, 1 = not in phase)	Band 2B IT phase status (0 = in phase, 1 = not in phase)
<b>Bit N°</b>		14	15
<b>Content</b>		Band 3 IT phase status (0 = in phase, 1 = not in phase)	Band 4 IT phase status (0 = in phase, 1 = not in phase)

Table 4.1.-10. Word #241 GOME TimeLine (GTL) *sequence report*

<b>Bit N°</b>	0	1	2 .. 5	6 .. 9	10 .. 15
<b>Content</b>	Process (0 = no timelines under execution, 1 = timeline under execution)	Status (0 = timeline under exec. has been <i>paused</i> , 1 = timeline under exec. is <i>running</i> )	GTL identifier (it contains the identifier of the timeline under execution)	Loop number (timeline repetition counter)	Line number (it identifies the <i>line</i> (i.e., the Command Word) of the timeline that is in execution)

Table 4.1.-11. Word #242 GOME TimeLine Table (GTT) *sequence report*

<b>Bit N°</b>	0	1	2 .. 5	6 .. 9	10 .. 15
<b>Content</b>	Process (0 = GTT not under execution, i.e. <i>not active</i> ; 1 = GTT under execution, i.e. <i>active</i> )	Status (0 = GTT is waiting, 1 = timeline in GTT under execution)	GTT identifier (it contains the identifier of the timeline in GTT under execution)	Spare	Line number (it identifies the line of the GTT that is in execution, i.e. the Timeline)

Table 4.1.-12. *Xlate* bits format

<b>Bit N°</b>	0	1	2	3
<b>Content</b>	FPA0 Xlate bit (default value = 1)	FPA1 Xlate bit (default value = 0)	FPA2 Xlate bit (default value 1)	FPA3 Xlate bit (default value 1)
<b>Bit N°</b>		4	5	6 .. 15

Content	PMD-p Xlate bit (default value = 0)	PMD-s Xlate bit (default value = 0)	Spare
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Table 4.1.-13. DSM table

Word number	Parameter	Value	
276	Shutter Emergency enable	1: enabled	0: disabled
277	Shutter movement enable	1: enabled	0: disabled
278	Channel 1 band separation	0 .. 1023	
279	Channel 2 band separation	0 .. 1023	
280	Cooler 1 cooling enable/disable	1: enabled	0: disabled
281	Cooler 1 annealing enable/disable	1: enabled	0: disabled
282	Cooler 1 set cold target temperature	1 .. 65535 (0K .. 500K)	
283	Cooler 1 set hot target temperature	1 .. 65535 (0K .. 500K)	
284	Cooler 2 cooling enable/disable	1: enabled	0: disabled
285	Cooler 2 annealing enable/disable	1: enabled	0: disabled
286	Cooler 2 set cold target temperature	1 .. 65535 (0K .. 500K)	
287	Cooler 2 set hot target temperature	1 .. 65535 (0K .. 500K)	
288	Cooler 3 cooling enable/disable	1: enabled	0: disabled
289	Cooler 3 annealing enable/disable	1: enabled	0: disabled
290	Cooler 3 set cold target temperature	1 .. 65535 (0K .. 500K)	
291	Cooler 3 set hot target temperature	1 .. 65535 (0K .. 500K)	
292	Cooler 4 cooling enable/disable	1: enabled	0: disabled
293	Cooler 4 annealing enable/disable	1: enabled	0: disabled
294	Cooler 4 set cold target temperature	1 .. 65535 (0K .. 500K)	
295	Cooler 4 set hot target temperature	1 .. 65535 (0K .. 500K)	
296	End duration flag 93.75 ms / 6 s	1:6 sec	0:93.75 ms
297	TEC always on	1: on	0: off
298	Lamp interlock enable	1: enabled	0: disabled
299	FPA 1 readout sequence	0: Normal	1: Reverse
300	FPA 2 readout sequence	0: Normal	1: Reverse
301	FPA 3 readout sequence	0: Normal	1: Reverse
302	FPA 4 readout sequence	0: Normal	1: Reverse
303	PMD-s readout sequence	0: Normal	1: Reverse
304	PMD-p readout sequence	0: Normal	1: Reverse
305	Default Integration time Band IA (FPA 1)	0 .. 255	
306	Default Integration time Band IB (FPA 1)	0 .. 255	
307	Default Integration time Band IIA (FPA 2)	0 .. 255	
308	Default Integration time Band IIB (FPA 2)	0 .. 255	
309	Default Integration time Band III (FPA 3)	0 .. 255	
310	Default Integration time Band IV (FPA 4)	0 .. 255	
311	Direct command enable	1: enabled	0: disabled
312	PMD Readout Mode	0: Nominal 1: Sun 2: Led	
313	FPA shortest int time mode	0 .. 1	
314	PMD coolers enable	1: enabled	0: disabled
315	PMD line	0: line 2	1: line 1
316	PMD IT	Multiple of 93.75 ms	
317	Standby/Refuse on Switch Fault	1: enabled	0: disabled
318	PMD reset cycle of flyback	48 .. 60	
319	Max history entries	0 .. 255	
320	FPA/PMD switch on	0: off	1: on
321	Scan Mirror Nadir Bias	0 .. FFFF	
322	Scan Mirror North Pole Bias	0 .. FFFF	
323	Scan Mirror South Pole Bias	0 .. FFFF	
324	Scan Mirror Programmable Bias	0 .. FFFF	
325	Set qth current	0 .. 3	
326	FPA 1 sensors enable	1 .. 3	
327	FPA 2 sensors enable	1 .. 3	
328	FPA 3 sensors enable	1 .. 3	
329	FPA 4 sensors enable	1 .. 3	
330	Patch enable flag	1: enabled	0: disabled
331	Not Used		
332	Not Used		
333	PMD transfer mode	1 .. 3	
334	PMD-s channel B start	256 .. 767	

Word number	Parameter	Value
335	PMD-s channel B length	1 .. 35
336	PMD-p channel B start	256 .. 767
337	PMD-p channel B length	1 .. 35

## 4.2. PMD DATA

The GOME-2 PMD is based on two equivalent channels, namely S- and P- channels, sampled by the same detector type as the main FPAs. Both PMD detectors are readout on a set of 256 pixels.



In the above sketch the detector is seen as 5 main segments: A and B represent the areas outside the useful block, while C, D and E make the 256 pixel useful block.

The following three *Readout Modes* are implemented: **Nominal** Readout Mode, **Sun** Readout Mode and **LED** Readout Mode.

Readout Mode	IT for each band	Content of SDP bands	Refresh rate of short wavelength data
<b>NOMINAL</b>	D and E areas read with IT = 23.43 ms C area read with IT = 46.86 ms A and B areas reset at 6 sec	D and E areas transferred in bands with resolution = 23.43 ms C bands with res. = 46.86 ms alternated with useless data taken from X segment <sup>i</sup>	B data are inserted as raw data in the field "short wavelength pixels" every 6 sec at array reset
<b>SUN</b>	D and E areas read with IT = 23.43 ms B and C areas read with IT = 46.86 ms	D and E areas transferred in bands with resolution = 23.43 ms C bands with res. = 46.86 ms alternated with data taken from B segment	B data are inserted as raw data in the field "short wavelength pixels" every 375 ms
<b>LED</b>	IT = multiple of 93.75 ms	If IT expired then Raw data are inserted; else 0xFFFF;	If IT expired then B data are inserted as "short wavelength pixels" (last readout); else 0xFFFF; i.e. refresh rate = 375 ms

In **Nominal** Readout Mode D and E areas are read with IT = 23.43 msec, segment C at 46 msec and the pixels outside the 256 block (including B segment) reset at 6 sec.

The reset is performed once in a whole scansion cycle, and more precisely, during the first 93.75 ms period of a selectable *subground pixel* ( $1 \text{ SubGround pixel} = 375 \text{ ms}$ ) of the *fly-back period* (4-th *Ground Pixel* within the *Scan Period*. Remember that:  $1 \text{ Ground Pixel} = 1.5 \text{ s}$ ,  $1 \text{ Scan Period} = 6 \text{ s}$ , so each Scan Period is formed by four

<sup>i</sup> X segment contains a number of pixels equal to C segment and is located outside the B, C, D, E areas.

Ground Pixels and sixteen SubGround Pixels periods). In this case a complete readout of the array is performed in order to reset the pixel content and to avoid pixel saturation.

The array reset is programmable in a certain SubGround Pixel of the fly-back period by the proper GOME DSM# 62.

D and E data are transferred in bands with resolution 23.43 msec; C data are transferred in bands with resolution 46.86 msec. The C bands associated fields alternates useful data (C data) with useless data (X data) with a period of 46.86 msec. In total, the 256 pixel read values are co-added or averaged by software into 15 programmable bands.

B data are inserted in SDP as raw data in the "PMD short wavelength pixels" field every 6 sec, at pixel array reset.

The number of data is:

- all B pixels if B length is  $\leq 35$  px
- or
- the last 35 pixels of B segment if B length is  $> 35$  px

The 35 pixels per channel (70 for both PMD channels) are repeated in the 375 msec packets and updated every 6 sec.

*Every 6 sec, in the fly-back part of a Scan Period, the entire pixel array is discharged by selecting two possible modes (Mode 1 and Mode 2) for the data packetisation, programmable by proper GOME DSM # 77*

When commanded by the proper GOME DSM, the C + D + E (256) pixels data are transferred as raw data instead of band processing.

Being in 375 ms eight CDE groups and eight XDE groups, the last acquired CDE group is transferred in the packet.

When **Sun** Readout Mode is commanded, D and E segments are read with  $IT = 23.43$  msec, while B and C segments are read with  $IT = 46.86$  msec. The pixels outside the 256 block are reset at 6 sec. The reset is performed once during the first 93.75 ms period of a selectable subground pixel of the fly-back period. In this case a complete readout of the array is performed in order to reset the pixel contents and to avoid pixel saturation.

The data packetisation requirements given for the Nominal Readout Mode are applicable. The B segment data transferred in bands is considered "useless data".

Every 6 sec. the entire array may discharged by selecting two possible modes (Mode 1 and Mode 2) for the data packetisation. The data packetisation mode (raw or band) is selected by GOME DSM, as for the Nominal Readout Mode. In case of raw data transfer the last acquired CDE group is put in the packet.

The SDP "PMD short wavelength pixels" field is filled with raw pixel coming from the last BDE group in the 375 msec period. The number of useful pixels to be put in the packet depends on the B segment length.

In case of Nominal and Sun Readout Modes PMD data are filled with:

- 15 bands, with the exception of the first 93,75 ms period of a programmable sub-ground pixel of the flyback, differently filled with raw data, according to selection between Mode 1 or Mode 2
- raw pixel data (Mode 3)

When packetisation in 15 band is applied, PMD data are filled with:

1 PMD Short wavelength indicator. +  
 70 short wavelength pixels +  
 1 PMD readout indicator. +  
 608 data = ( 16 readout [each 375ms] x (15[ bands] + 4 status word per bands ) ) x 2 [PMD]

In band area, the order of p-s data is the following:

PMD-p readout 0 bands 1 .. 15  
 PMD-s readout 0 bands 1 .. 15  
 PMD-p readout 1 bands 1 .. 15  
 PMD-s readout 1 bands 1 .. 15  
 .  
 PMD-p readout 15 bands 1 .. 15  
 PMD-s readout 15 bands 1 .. 15

Word Nr.	Telemetry	Rate (s)	Pck 1	Remarks
PMD DATA		0.375	680	<b>15 -bands packets</b>
488.	PMD short wavelength indicator (fixed value)	0.375	1	( 1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> 1.5 sec scan)
489. ..558	PMD short wavelength pixels ( 6 seconds) (in short wavelength area the sequence is p – s)	0.375	70	
559	PMD readout indicator	0.375	1	
560..1167	PMD co-added [2*16*(15+4)]	0.375	608	
	PMD –p readout 0 bands 1..4 status word1			
	PMD –p readout 0 bands 5..8 status word2			
	PMD –p readout 0 bands 9..12 status word3			
	PMD –p readout 0 bands 13..15 status word4			
	PMD –p readout 0 bands 1..15		15	Repeated for 16 readouts
	PMD –s readout 0 bands 0..14 status word1			
	PMD –s readout 0 bands 0..14 status word2			
	PMD –s readout 0 bands 0..14 status word3			
	PMD –s readout 0 bands 0..14 status word4			
	PMD –s readout 0 bands 0..14		15	

During the first 93,75 ms period of a programmable sub-ground pixel, selectable by the proper GOME DSM #62, this packet lay-out is replaced by 2 different packetisation modes: **Mode 1** ( see § 4.2.1) and **Mode 2** (see § 4.2.2) which are selectable by proper GOME DSM #77.

The PMD readout indicator word 559 is the following combination:

Pattern	Frame ID	Data Subset counter	Part of Packet sequence control
1011 'b'	1000 '8'	Wrap around Counter incremented by one every 375 ms pixel (0000 ...1111)	4 less significant bits extracted from the same 375 data set

The PMD status words will indicate for each band ( 4 bits for band) the divider used in the co-added and average operation. This divider will be power of 2 ( 1,2,4,8, .. 2<sup>15</sup>) and it represents the number of right shift applied to co-added band value.

PMD -s/p STATUS WORD 1				
Bit N°	0 .. 3	4 .. 7	8 ..11	12.. 15
Content	Shift for band 1	Shift for band 2	Shift for band 3	Shift for band 4

PMD -s/p STATUS WORD 2				
Bit N°	0 .. 3	4 .. 7	8 ..11	12.. 15
Content	Shift for band 5	Shift for band 6	Shift for band 7	Shift for band 8

PMD -s/p STATUS WORD 3				
Bit N°	0 .. 3	4 .. 7	8 ..11	12.. 15
Content	Shift for band 9	Shift for band 10	Shift for band 11	Shift for band 12

PMD -s/p STATUS WORD 4				
Bit N°	0 .. 3	4 .. 7	8 ..11	12.. 15
Content	Shift for band 13	Shift for band 14	Shift for band 15	N/A

#### 4.2.1. PMD Mode 1

When PMD mode 1 is selected, 609 PMD data are packed in 15 bands, but during a programmable sub-ground pixel of the flyback, data are so formatted:

1 PMD Short wavelength indicator. +  
 70 short wavelength pixels +  
 1 PMD readout indicator. +  
 608 data = ( 256 raw pixel + 48 unused word ) x 2 [PMD]

#### 4.2.2. PMD Mode 2

When PMD mode 2 is selected, 609 PMD data are packed in 15 bands, but during a programmable sub-ground pixel of the flyback, data are so formatted:

1 PMD Short wavelength indicator. +

70 short wavelength pixels +  
 1 PMD readout indicator. +  
 608 data = ( 76 raw pixel + 12 readout x ( 15 bands + 4 status word per readout ) x 2 [PMD]

The 76 raw pixels are the first 76 pixels from C start.  
 Note that the 12 readouts are related to the data acquired from the 5<sup>th</sup> to the 16<sup>th</sup> 23.43 ms periods of the 375 ms sub-ground pixel selected for the completed readout

Word Nr.	Telemetry	Rate (s)	Pck 1	Remarks
PMD DATA		0.375	680	<b>MODE 1 packet</b>
488.	PMD short wavelength indicator (fixed value)	0.375	1	( 4 <sup>th</sup> 1.5 sec scan –flyback)
489 .. 558	PMD short wavelength pixels ( 6 seconds) (in short wavelength area the sequence is p – s)	0.375	70	
559	PMD readout indicator	0.375	1	
560..1167	PMD [256 raw data +48 unused ] * 2	0.375	608	
	PMD –p 256 raw pixels			
	48 Unused words			
	PMD –s 256 raw pixels			
	48 Unused words			

Word Nr.	Telemetry	Rate (s)	Pck 1	Remarks
PMD DATA		0.375	680	<b>MODE 2 packet</b>
488.	PMD short wavelength indicator (fixed value)	0.375	1	( 4 <sup>th</sup> 1.5 sec scan –flyback)
489..558	PMD short wavelength pixels ( 6 seconds) (in short wavelength area the sequence is p – s)	0.375	70	
559	PMD readout indicator	0.375	1	
560..1167	PMD [76 raw data +12 rdo *(15+4) ] * 2	0.375	608	
	PMD –p 76 raw pixels			
	PMD –s 76 raw pixels			
	PMD –p readout 0 bands 1..4 status word1			
	PMD –p readout 0 bands 5..8 status word2			
	PMD –p readout 0 bands 9..12 status word3			
	PMD –p readout 0 bands 13..15 status word4			
	PMD –p readout 0 bands 1..15		15	Repeated for 12 readouts
	PMD –s readout 0 bands 1..4 status word1			
	PMD –s readout 0 bands 5..8 status word2			
	PMD –s readout 0 bands 9..12 status word3			
	PMD –s readout 0 bands 13..15 status word4			
	PMD –s readout 0 bands 1..15		15	

### 4.2.3. PMD Mode 3

When PMD mode 3 is selected, 609 PMD raw data are so packed for all the 375 ms packets:

1 PMD Short wavelength indicator. +  
 70 short wavelength pixels +  
 1 PMD readout indicator. +  
 608 data = ( (256 raw pixel or 0xFFFF) + 48 unused word ) x 2 [PMD]

Differences exist with reference to the chosen PMD Readout Mode:

- Nominal Mode: packed raw data are collected according to IT= 23.43 ms
- Sun Readout Mode: as same as the nominal mode
- LED Calibration Mode: packed raw data are collected according to IT  $\geq$  93.75 ms and then they are filled with 0XFFFF in case integration time has not expired yet. Short wavelength pixels are filled with raw data of the B segment (last readout) if IT expired or with 0xXXXX if IT not expired.

Word Nr.	Telemetry	Rate (s)	Pck 1	Remarks
PMD DATA		0.375	680	<b>MODE 3 packet</b>
490.	PMD short wavelength indicator (fixed value)	0.375	1	
491. ..558	PMD short wavelength pixels ( 6 seconds) (in short wavelength area the sequence is p – s)	0.375	70	
559	PMD readout indicator	0.375	1	
560..1167	PMD [256 raw data +48 unused ] * 2	0.375	608	
	PMD –p 256 raw pixels			
	48 Unused words			
	PMD –s 256 raw pixels			
	48 Unused words			

During the transition from Nominal/Sun to LED Mode a data loss can occur only for:

- the data related to the last 375 ms period of 4<sup>th</sup> ground pixel of the scan cycle in which the DSM has been changed
- in such 375 ms interval data are marked as “aborted” in the “actual PMD s/p IT status” word
- only PMD science data are lost.

## 4.3. FPA DATA

Word Nr.	Telemetry	Rate (s)	Pck 1	Remarks
FPA DATA		0.375	8200	
1168	FPA1 readout 1 indicator	0.375	1	
1169..2192	FPA1 readout 1 data	0.375	1K	
2193	FPA2 readout 1 indicator	0.375	1	
2194..3217	FPA2 readout 1 data	0.375	1K	
3218	FPA3 readout 1 indicator	0.375	1	
3219..4242	FPA3 readout 1 data	0.375	1K	
4243	FPA4 readout 1 indicator	0.375	1	
4244..5267	FPA4 readout 1 data	0.375	1K	
5268	FPA1 readout 2 indicator	0.375	1	
5269..6292	FPA1 readout 2 data	0.375	1K	
6293	FPA2 readout 2 indicator	0.375	1	
6294..7317	FPA2 readout 2 data	0.375	1K	
7318	FPA3 readout 2 indicator	0.375	1	
7319..8342	FPA3 readout 2 data	0.375	1K	
8343	FPA4 readout 2 indicator	0.375	1	
8344..9367	FPA4 readout 2 data	0.375	1K	

Readout Indicator (word 1168, 2193, 3218, 4243, 5268, 6293, 7318 and 8343) is the following combination:

Pattern	Frame ID	Data Subset counter	Part of Packet sequence control
1011 'b'	0000 '0':FPA1 readout 1 0001 '1':FPA2 readout 1 0010 '2':FPA3 readout 1 0011 '3':FPA4 readout 1 0100 '4':FPA1 readout 2 0101 '5':FPA2 readout 2 0110 '6':FPA3 readout 2 0111 '7':FPA4 readout 2	Wrap around Counter incremented by one every 375 ms pixel (0000 ...1111)	4 less significant bits extracted from the same 375 data set

## 4.4. PACKET ERROR CONTROL

Word number	TM	Rate (s)
9368	CRC	0,375

## 4.5. PMD AND FPA DATA AREA : DUMP DATA

It is possible by *Dump on X band* MCMD to use the PMD and FPA data area for the dump of all processors.

Each *Dump on X band* MCMD will dump 8K words starting at the request address. If the end of memory is reached before the end of 8K words, remaining words will be filled with FFFF. The CRC is calculated on whole packet as normal operation.

## 4.6. PMD AND FPA DATA AREA : TEST DATA

By *Science Data Test* MCMD, the PMD and FPA area is replaced with the pattern programmed in the MCMD.

If the pattern is all 0's then science data packets start containing a word incremental pattern starting at 0 dec up the word located prior of the CRC.

If the pattern is in 1 .. 0xFFFFE then science data packets start containing constantly and up to CRC the same programmed pattern.

If the pattern is 0xFFFF then science data packets stop replacing data with test pattern and come back to carry scientific data.

ICU status word #4 (bit 8) (see par. 4.7.2) contains the flag indicating if the test pattern is present or not.

## 4.7. DATA BREAKDOWN

### 4.7.1. FPA & PMD Samples

Three samples on FPA are collected each 93.75 ms and put in the AUX\_HK\_Field (118..165) according to the following address table:

FPA #	Pixel 1 (*) address	Pixel 2 address	Pixel 3 address
FPA1	290	511	941
FPA2	220	600	970
FPA3	42	700	961
FPA4	52	880	985

(\*) pixel 1 is inserted in the HK Real Time Format, too

PMD Channel	Pixel 1 address	Pixel 2 address	Pixel 3 (*) address	Pixel 4 address
PMD-s	755	786	882	1001
PMD-p	760	787	906	999

(\*) pixel 3 is inserted in the HK Real Time Format, too

Note that all the addresses are defined referred to the order of the data in the science packet. This means the following:

- when Xlate bit is 0, the set address is coincident with the detector physical address
- when Xlate bit is 1, the set address is complementary (to 1023) of the detector physical address.

The resulting SDP Field lay-out is as follows

118.	FPA1 Sample #1	First 93.75	Address: 290
119.	FPA1 Sample #2	First 93.75	Address: 511
120.	FPA1 Sample #3	First 93.75	Address: 941
121.	FPA1 Sample #1	second 93.75	Address: 290
122.	FPA1 Sample #2	second 93.75	Address: 511
123.	FPA1 Sample #3	second 93.75	Address: 941
124.	FPA1 Sample #1	Third 93.75	Address: 290
125.	FPA1 Sample #2	Third 93.75	Address: 511
126.	FPA1 Sample #3	Third 93.75	Address: 941
127.	FPA1 Sample #1	Fourth 93.75	Address: 290
128.	FPA1 Sample #2	Fourth 93.75	Address: 511
129.	FPA1 Sample #3	Fourth 93.75	Address: 941

130.	FPA2 Sample #1	First 93.75	Address: 220
131.	FPA2 Sample #2	First 93.75	Address: 600
132.	FPA2 Sample #3	First 93.75	Address: 970
133.	FPA2 Sample #1	second 93.75	Address: 220
134.	FPA2 Sample #2	second 93.75	Address: 600
135.	FPA2 Sample #3	second 93.75	Address: 970
136.	FPA2 Sample #1	Third 93.75	Address: 220

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137.	FPA2 Sample #2	Third 93.75	Address: 600
138.	FPA2 Sample #3	Third 93.75	Address: 970
139.	FPA2 Sample #1	Fourth 93.75	Address: 220
140.	FPA2 Sample #2	Fourth 93.75	Address: 600
141.	FPA2 Sample #3	Fourth 93.75	Address: 970

142.	FPA3 Sample #1	First 93.75	Address: 42
143.	FPA3 Sample #2	First 93.75	Address: 700
144.	FPA3 Sample #3	First 93.75	Address: 961
145.	FPA3 Sample #1	second 93.75	Address: 42
146.	FPA3 Sample #2	second 93.75	Address: 700
147.	FPA3 Sample #3	second 93.75	Address: 961
148.	FPA3 Sample #1	Third 93.75	Address: 42
149.	FPA3 Sample #2	Third 93.75	Address: 700
150.	FPA3 Sample #3	Third 93.75	Address: 961
151.	FPA3 Sample #1	Fourth 93.75	Address: 42
152.	FPA3 Sample #2	Fourth 93.75	Address: 700
153.	FPA3 Sample #3	Fourth 93.75	Address: 961

154.	FPA4 Sample #1	First 93.75	Address: 52
155.	FPA4 Sample #2	First 93.75	Address: 880
156.	FPA4 Sample #3	First 93.75	Address: 985
157.	FPA4 Sample #1	second 93.75	Address: 52
158.	FPA4 Sample #2	second 93.75	Address: 880
159.	FPA4 Sample #3	second 93.75	Address: 985
160.	FPA4 Sample #1	Third 93.75	Address: 52
161.	FPA4 Sample #2	Third 93.75	Address: 880
162.	FPA4 Sample #3	Third 93.75	Address: 985
163.	FPA4 Sample #1	Fourth 93.75	Address: 52
164.	FPA4 Sample #2	Fourth 93.75	Address: 880
165.	FPA4 Sample #3	Fourth 93.75	Address: 985

166.	PMD-p Sample #1	15 <sup>th</sup> 23.43	Address: 760
167.	PMD-p Sample #2	15 <sup>th</sup> 23.43	Address: 787
168.	PMD-p Sample #3	15 <sup>th</sup> 23.43	Address: 906
169.	PMD-p Sample #4	15 <sup>th</sup> 23.43	Address: 999

170.	PMD-s Sample #1	15 <sup>th</sup> 23.43	Address: 755
171.	PMD-s Sample #2	15 <sup>th</sup> 23.43	Address: 786
172.	PMD-s Sample #3	15 <sup>th</sup> 23.43	Address: 882
173.	PMD-s Sample #4	15 <sup>th</sup> 23.43	Address: 1001

## 4.7.2. Instrument S/S Mode and ICU Status Words

TM Field	Aux SDP	Word Name	Parameter Name	Value	Allocated bits (0=MSB 15=LSB)
10	220	Instrument S/S Mode word1	Shutter status	Value 1= Close Value 2= Open Value 3= Illegal Others: NotUsed	Bits(0..1) = Shutter Status
				Value 0= OFF Value 1= ON	Bit(2) = Shutter Emergency Bit(3) = Shutter Motor On Bits(4..5) : NotUsed = 0
			TEC & PMD cooler status	Value 0= OFF Value 1= ON	Bit(6) = PMD line 1 status Bit(7) = PMD line 2 status
				Value 00= OFF Value 01= On, cooling Value 10= On, annealing Value 11: NotUsed	Bits(08..09)= TEC1 status Bits(10..11)= TEC2 status Bits(12..13) = TEC3 status Bits(14..15) = TEC4 status
11	221	Instrument S/S Mode word2	Scan Unit Status word	0x=00: pck not received	Bits(0..7)=SU_error_pck(3)
				<ul style="list-style-type: none"> <li>SU HK pck error: badly formed HK pck or no reception</li> <li>Dump cmd error: set by any error on dump</li> <li>Patch cmd error: set by error after 3 replies</li> <li>Func cmd error (2): set to 1 after 3 unsuccessful retries</li> <li>Func cmd error: reset by ACK; else set to 1</li> </ul>	Bit(8) = SU HK pck error Bit(9) = Dump cmd error Bit(10) = Patch cmd error Bit(11) = Func. Cmd error after 3 retries (2) Bit(12) = Func. Cmd error
					Bit(13) : NotUsed= 0
				Value 00= OFF Value 01= On, init phase Value 10= On, normal	Bits(14..15)=SU status
65	222	Instrument S/S Mode word3	Spare	0X0000	-
8	223	CDHU ICU Word #1	FPA - PMD - HDM status	Value 0= Valid Value 1= Invalid	Bit(0) = HDM HK Valid (sw status)
				Value 0= normal Value 1= recovering (sw status)	Bit(1): NotUsed= 0 Bit(2) = PMD-p recov. stat Bit(3) = PMD-s recov. stat Bit(4) = FPA-1 recov. stat Bit(5) = FPA-2 recov. stat Bit(6) = FPA-3 recov. stat Bit(7) = FPA-4 recov. stat
				Value 0= OFF Value 1= ON (hw status)	Bits(8): NotUsed= 0 Bit(9) = HDM status Bit(10) = PMD-p status Bit(11) = PMD-s status Bit(12) = FPA-1 status Bit(13) = FPA-2 status Bit(14) = FPA-3 status Bit(15) = FPA-4 status
9	224	CDHU ICU Word # 2	Lamps & Relay Status	00: not(A) and not(B) 01: B only 10: A only 11 A and B	Bits(0): NotUsed= 0 Bits(1..2) = FMU Redund.cy
				Bit(x): 0 = OFF, 1 = ON X = 4..7 Bit(8): 1 = scheduler error, 0 = no error Bit(9): 1 = constraint error, 0 = no error	Bit(3) = HCL transient Bit(4) = LED 1N status Bit(5) = LED 2N status Bit(6) = LED 1R status Bit(7) = LED 2R status Bit(8) = scheduler error Bit(9) = constraint error trapped

TM Field	Aux SDP	Word Name	Parameter Name	Value	Allocated bits (0=MSB 15=LSB)
				Value 0= OFF Value 1= ON QTH curset: 0..3 Min. 0 = 360 mA, 1 = 380, 2 = 400, 3 = 420	Bits(10..11) = QTH Curset Bit(12) = Dale Resistor Relay status Bit(13) = EQ DC/DC status Bit(14) = QTH-Lamp status Bit(15) = HCL Lamp status
66	225	CDHU ICU Word #3	Monitoring Anomaly counter	Any, as anomaly counter of History Area	0-15
67	226	CDHU ICU Word #4	LED Status & Other Info	Bit(x) = 1 calibration in progress Bit(x) = 0 calibration process not active X = 9..15 Bit(8) = 1 test pattern present Bit(8) = 0 test pattern not present	Bits(0..7): NotUsed= 0 Bit(8) = Test pattern Bit(9) = HDM calibration Bit(10) = PMD-p calibration Bit(11) = PMD-s calibration Bit(12) = FPA1 calibration Bit(13) = FPA2 calibration Bit(14) = FPA3 calibration Bit(15) = FPA4 calibration
880	227	CDHU ICU Word 5	SU / CDHU Protocol word	<b>SU operative mode</b>	Bits(0..11): NotUsed=0 Bits(12..15) = Current SU Operative mode see Scan Unit Interface Control Document
881	228	CDHU ICU Word 6	RBI Status word	'1' b = Reset	Bit(0) = ICU Reset
			Readout of the RBI status word every 1.5 s	'0' b = Running or Wait	
				'1' b = Wait	Bit(1) = ICU Wait
				'0' b = Running or Reset	
				'1' b = Busy	Bit(2) = DMA Busy
				'0' b = Not Busy	
				'1' b = Running	Bit(3) = ICU Running
				'0' b = Reset or Wait	
				'1' b = Parity error	Bit(4) = Interr. Parity Error
				'0' b = No error	
	'1' b = Invalid Litton Code	Bit(5) = Interr. Validity Litton			
	'0' b = Valid Litton Code				
		Bit(6) : Not Used			
	'1' b = Wrong Interrogation	Bit(7) = Wrong Interrogation			
	'0' b = No Error				
	'1' b = Request Set	Bit(8) = Output Xfer Req.			
	'0' b = No Request				
	'00' b = No RBI anomaly	Bit(9..10) = RBI Errors			
	'01' b = Illegal Access				
	'10' b = DMA Acc. Not granted				
	'11' b = Running Bit Reset by RBI				
	'0' b = Reset Flag	Bit(11) S/W Indications: Process Flag EOM-EOT			
	'1' b = Set Flag				
	'0' b = normal	Bit(12) S/W Indications: EQ-SOL Reception			
	'1' b = Received EQ-SOL				
	'00000' b	Bit(13..15) S/W Indications: Not used			
882	229	CDHU ICU Word 7	SDM I/O Info	Image of Mode Register ACK read every 375 ms	Bits(0..7): NotUsed= 0
				'1' b = enabled	Bit(8) = Mirror enable ack
				'0' b = disabled	
				'1' b = running	Bit(9) = Output idle ack/
				'0' b = idle	
				'1' b = running	Bit(10) = Input idle ack/
				'0' b = idle	
				'1' b = cleared	Bit(11) = Timebase clear ack
	'0' b = running				
	'1' b = enabled	Bit(12) = Mirror enable			
	'0' b = disabled				
	'1' b = running	Bit(13) = Output Idle/			
	'0' b = idle				
	'1' b = running	Bit(14) = Input Idle/			
	'0' b = idle				

TM Field	Aux SDP	Word Name	Parameter Name	Value	Allocated bits (0=MSB 15=LSB)
				'1' b = cleared '0' b = running	Bit(15) = Timebase clear
883	230	CDHU ICU Word 8	Serial Control Register	Image of Serial CH1 Control Register	Bits(0..5): NotUsed= 0
				'1' b = enabled '0' b = disabled	Bit(6) = Serial channel 1 enable
				'1' b = enabled '0' b = disabled	Bit(7) = Break interrupt enable
				'1' b = enabled '0' b = disabled	Bit(8) = TX interrupt enable
				'1' b = enabled '0' b = disabled	Bit(9) = RX interrupt enable
				'1' b = wrong character '0' b = correct character	Bit(10) = Frame error
				'1' b = character overwritten '0' b = char. not overwritten	Bit(11) = Overrun error
				'1' b = break detected '0' b = break not detected	Bit(12) = Break Command
					Bit(13): NotUsed= 0
					'1' b = ready for a new char. '0' b = not ready
		'1' b = new char. available '0' b = serial data reg. empty	Bit(15) = RX ready		
884	231	CDHU ICU Word 9	Spare	0X0000	-
885	232	CDHU ICU Word 10	Spare	0X0000	-
886	233	CDHU ICU Word 11	Spare	0X0000	-
5	234	Instrument Operational Mode	Mode Transient BIT	0 = No Transition 1 = In Transition	BIT 8 = Transient BIT
			Operational Mode	Standby = 0C hex Standby_refuse = 0F hex Idle = 1B hex	BITs 9 to 15
68	235	Secondary processor word1	SW WD btw Master/Slave	'0' b = OK => CPU 2 WD not expired '1' b = CPU2 WD expired	The values of Health Status are: BIT (0 .. 6) = unused BIT (7) = Watch Dog expired BIT (8 .. 11) = Last Exception (Interrupt number : Interrupt ID#: 3 = FP_OFV, 4 = FPO, 6 FP_UDF) BIT (12 .. 15) = Exception Counter
69	236	Secondary processor word2	CPU2 error indication	'0' b = No patching '1' b = patching	Bit(14) = Patch Going on
				'0' b = OK '1' b = Error Occurrence	Bit(15) = Arithmetic error (sw status)

### 4.7.3. PMD default settings

Bands on the PMD -s -p pixels are collected according to the following table:

Band Nr	Nr of Pixels	Detector Pixels	Center Wavelength (first and last pxl) [nm]
1.	2	19-20	309.2 - 309.9
2.	5	23-27	311.7 - 314.4
3.	4	31-34	317.0 - 319.1
4.	12	37-48	321.2 - 329.5
5.	5	50-54	331.1 - 334.3

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Band Nr	Nr of Pixels	Detector Pixels	Center Wavelength (first and last pxl) [nm]
6.	43	56-98	335.9 - 377.7
7.	4	100-103	380.1 - 383.7
8.	20	115-134	399.3 - 428.4
9.	43	138-180	435.5 - 552.5
10.	2	183-184	553.6 - 557.5
11.	22	187-208	569.6 - 678.6
12.	2	217-218	742.3 - 750.2
13.	1	219	758.2
14.	1	223	792.1
15.	1	228	838.8

The above detector pixels values have to be added to the C start position (pixel 768). Note that all the addresses are defined referred to the order of the data in the science packet. This means the following:

- when Xlate bit is 0, the set address is coincident with the detector physical address
- when Xlate bit is 1, the set address is complementary (to 1023) of the detector physical address.

## 5. CONVENTIONS

All spare words in the packet will be filled with a known pattern “BBBBHex”.  
All unused fields within words will be filled with 0’s.

## 6. LIST OF IMPLEMENTED RID

RID Identifier	Action	Location
ESA-13	Inserted dump on x-bands, test pattern	§ 4.2 § 4.3
CDHU-URR-GAL-BR-066	Inserting of Project Ref. Is a task of configuration office.	Project ref.
CDHU-URR-GAL-BR-067	Allocated word 6 to time stamp using UTC	§ 3
CDHU-URR-GAL-BR-068	Changed Type indicator according to MO-IC-MMT-GM-0001	§ 3.1.1
CDHU-URR-GAL-BR-069	Inserted word 6 for UTC	§ 3.2
CDHU-URR-GAL-BR-070	Inserted § 4.5 on dump on x-band	§ 4.5
CDHU-URR-GAL-BR-071	Corrected list of parameter according to the MO-RS-ESA-GO-0119 issue draft 3 and list in the RID	§ 4.1
CDHU-URR-GAL-BR-072	Corrected the content of PMD data	§ 4.2
ESA-CDR-CDHS-AL-003	Added remark about data acquisition time	§ 3, § 4.1, Appendix A, B
ESA-CDR-CDHS-AL-004	Added note on measurement cycle	Appendix B
ESA-EC-04	Inserted C start value and Xlate bits interaction	§ 4.7.3
ESA-EC-06	Inserted table for Xlate bits	§ 4.1
ESA-EC-07	Detailed PMD data format	§ 4.2
GAL-CDR-CDHS-AD-018	Inserted table for sampling of analog Telemetry	Appendix B
GAL-CDR-CDHS-AD-026	Added note about data loss during PMD transition 1-3	§ 4.1.3
GAL-CDR-CDHS-AD-029	Inserted table for PMD data	§ 4.2
GAL-CDR-CDHS-AD-030	Added fields SBTo, UTC <sub>o</sub> and Ts	Appendix A
GAL-CDR-CDHS-AD-031	Added test pattern indication	§ 4.6, § 4.7.2
GAL-DADR-CDHU-PB-008	Specify contents of Word 234	§ 4.7.2
GAL-DADR-CDHU-AD-003	<ul style="list-style-type: none"> <li>Inserted information about Latchup: "Latchup counters are never reset"</li> <li>Inserted General Note at the end of Appendix B page B6</li> </ul>	Table 4.1.1  Appendix B, page B6

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## APPENDIX A - SCIENCE DATA PACKET SYNOPTICS

	Vars	rate	wrд#	Pckt 1	wrд#	Pckt 2	wrд#	Pckt 3	wrд#	Pckt 4	remark
GOME packetID (Header0)	1	0,375	0	1	0	1	0	1	0	1	
Packet sequence control (Header1)	1	0,375	1	1	1	1	1	1	1	1	
Packet length (Header2)	1	0,375	2	1	2	1	2	1	2	1	
Gome UTC time word 1 (secondary HDR 3)	1	0,375	3	1	3	1	3	1	3	1	Time corresponds to the end of the observation cycle
Gome UTC time word 2 (secondary HDR 4)	1	0,375	4	1	4	1	4	1	4	1	"
Gome UTC time word 3 (secondary HDR 5)	1	0,375	5	1	5	1	5	1	5	1	"
Gome UTC time word 4 (secondary HDR 6)	1	0,375	6	1	6	1	6	1	6	1	"
SBT for UTC computation	3	0,375	9	3	9	3	9	3	9	3	Time corresponds to the end of the observation cycle
Length of ancillary field	1	0,375	10	1	10	1	10	1	10	1	
Fixed field 1 (4747Hex)	1	0,375	11	1	11	1	11	1	11	1	
Fixed field 2 (4F4FHex)	1	0,375	12	1	12	1	12	1	12	1	
Fixed field 3 (4D4DHex)	1	0,375	13	1	13	1	13	1	13	1	
Fixed field 4 (4545Hex)	1	0,375	14	1	14	1	14	1	14	1	
GOME model (EQM=1111,FM1=2222, FM2=3333, FM3=4444)	1	0,375	15	1	15	1	15	1	15	1	
Data subset counter (and Sub-Pixel Counter)	1	0,375	16	1	16	1	16	1	16	1	
ICU on-board time (LSW) at 93.75 sync pulse	1	0,375	17	1	17	1	17	1	17	1	Time corresponds to the end of the observation cycle
ICU on-board time (LSW) at 93.75 sync pulse	1	0,375	18	1	18	1	18	1	18	1	"
ICU on-board time (LSW) at 93.75 sync pulse	1	0,375	19	1	19	1	19	1	19	1	"
ICU on-board time (LSW) at 93.75 sync pulse	1	0,375	20	1	20	1	20	1	20	1	"
Actual PMD transfer mode (1,2,3)	1	0,375	21	1	21	1	21	1	21	1	
Actual PMD s/p integration time status (0 = not completed or not running, 1 = completed, 2 = aborted)	1	0,375	22	1	22	1	22	1	22	1	
Actual integration time value PMD-s	1	0,375	23	1	23	1	23	1	23	1	
Actual integration time value PMD-p	1	0,375	24	1	24	1	24	1	24	1	
PMD actual readout mode	1	0,375	25	1	25	1	25	1	25	1	
Actual FPA co-adding status	1	0,375	26	1	26	1	26	1	26	1	
integration time status rd#1	1	0,375	27	1	27	1	27	1	27	1	
integration time-phase status rd#1	1	0,375	28	1	28	1	28	1	28	1	
integration time value rdt#1 Band 1	1	0,375	29	1	29	1	29	1	29	1	
integration time value rdt#1 Band 2	1	0,375	30	1	30	1	30	1	30	1	
integration time value rdt#1 Band 3	1	0,375	31	1	31	1	31	1	31	1	
integration time value rdt#1 Band 4	1	0,375	32	1	32	1	32	1	32	1	

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	Vars	rate	wrd# Pckt 1	wrd# Pckt 2	wrd# Pckt 3	wrd# Pckt 4	remark
integration time value rdt#1 Band 5	1	0,375	33 1	33 1	33 1	33 1	
integration time value rdt#1 Band 6	1	0,375	34 1	34 1	34 1	34 1	
integration time status rd#2	1	0,375	35 1	35 1	35 1	35 1	
integration time-phase status rd#2	1	0,375	36 1	36 1	36 1	36 1	
integration time value rdt#2 Band 1	1	0,375	37 1	37 1	37 1	37 1	
integration time value rdt#2 Band 2	1	0,375	38 1	38 1	38 1	38 1	
integration time value rdt#2 Band 3	1	0,375	39 1	39 1	39 1	39 1	
integration time value rdt#2 Band 4	1	0,375	40 1	40 1	40 1	40 1	
integration time value rdt#2 Band 5	1	0,375	41 1	41 1	41 1	41 1	
integration time value rdt#2 Band 6	1	0,375	42 1	42 1	42 1	42 1	
FPA1 latch-up counter	1	0,375	43 1	43 1	43 1	43 1	
FPA2 latch-up counter	1	0,375	44 1	44 1	44 1	44 1	
FPA3 latch-up counter	1	0,375	45 1	45 1	45 1	45 1	
FPA4 latch-up counter	1	0,375	46 1	46 1	46 1	46 1	
PMD-p latch-up counter	1	0,375	47 1	47 1	47 1	47 1	
PMD-s latch-up counter	1	0,375	48 1	48 1	48 1	48 1	
HDM latch-up counter	1	0,375	49 1	49 1	49 1	49 1	
Radiometric lamp voltage	1	0,375	50 1	50 1	50 1	50 1	
Radiometric lamp current	1	0,375	51 1	51 1	51 1	51 1	
Spectral lamp voltage	1	0,375	52 1	52 1	52 1	52 1	
Spectral lamp current	1	0,375	53 1	53 1	53 1	53 1	
FPA1 array temperature-1	4	0,375	57 4	57 4	57 4	57 4	
FPA2 array temperature-1	4	0,375	61 4	61 4	61 4	61 4	
FPA3 array temperature-1	4	0,375	65 4	65 4	65 4	65 4	
FPA4 array temperature-1	4	0,375	69 4	69 4	69 4	69 4	
FPA1 array temperature-2	4	0,375	73 4	73 4	73 4	73 4	
FPA2 array temperature-2	4	0,375	77 4	77 4	77 4	77 4	
FPA3 array temperature-2	4	0,375	81 4	81 4	81 4	81 4	
FPA4 array temperature-2	4	0,375	85 4	85 4	85 4	85 4	
FPA1 Peltier loop Output	4	0,375	89 4	89 4	89 4	89 4	
FPA2 Peltier loop Output	4	0,375	93 4	93 4	93 4	93 4	
FPA3 Peltier loop Output	4	0,375	97 4	97 4	97 4	97 4	
FPA4 Peltier loop Output	4	0,375	101 4	101 4	101 4	101 4	
FPA1 Peltier loop Error	1	0,375	102 1	102 1	102 1	102 1	
FPA2 Peltier loop Error	1	0,375	103 1	103 1	103 1	103 1	
FPA3 Peltier loop Error	1	0,375	104 1	104 1	104 1	104 1	
FPA4 Peltier loop Error	1	0,375	105 1	105 1	105 1	105 1	
scan mirror position 1	1	0,375	106 1	106 1	106 1	106 1	
scan mirror position 2	1	0,375	107 1	107 1	107 1	107 1	
scan mirror position 3	1	0,375	108 1	108 1	108 1	108 1	
scan mirror position 4	1	0,375	109 1	109 1	109 1	109 1	
scan mirror torque 1	1	0,375	110 1	110 1	110 1	110 1	
scan mirror torque 2	1	0,375	111 1	111 1	111 1	111 1	
scan mirror torque 3	1	0,375	112 1	112 1	112 1	112 1	

# GOME 2

	Vars	rate	wrd#	Pckt 1	wrd#	Pckt 2	wrd#	Pckt 3	wrd#	Pckt 4	remark	
scan mirror torque 4	1	0,375	113	1	113	1	113	1	113	1		
scan mirror torque shift 1	1	0,375	114	1	114	1	114	1	114	1		
scan mirror torque shift 2	1	0,375	115	1	115	1	115	1	115	1		
scan mirror torque shift 3	1	0,375	116	1	116	1	116	1	116	1		
scan mirror torque shift 4	1	0,375	117	1	117	1	117	1	117	1		
FPA 1 samples (3 samples/93.75ms)	12	0,375	129	12	129	12	129	12	129	12	sampling policy see Table;	
FPA 2 samples (3 samples/93.75ms)	12	0,375	141	12	141	12	141	12	141	12		
FPA 3 samples (3 samples/93.75ms)	12	0,375	153	12	153	12	153	12	153	12		
FPA 4 samples (3 samples/93.75ms)	12	0,375	165	12	165	12	165	12	165	12		
PMD p samples	4	0,375	169	4	169	4	169	4	169	4		
PMD s samples	4	0,375	173	4	173	4	173	4	173	4		
processor id	1	0,375	174	1	174	1	174	1	174	1		
dump length	1	0,375	175	1	175	1	175	1	175	1		
dump address MSW	1	0,375	176	1	176	1	176	1	176	1		
dump address LSW	1	0,375	177	1	177	1	177	1	177	1		
Set to 0	1	0,375	178	1	178	1	178	1	178	1		
Set to 0	1	0,375	179	1	179	1	179	1	179	1		
Scan mirror processor dump address	4	0,375	183	4	183	4	183	4	183	4		
scan mirror number of dumped words	1	0,375	184	1	184	1	184	1	184	1		
Scan mirror processor memory dump	16	0,375	200	16	200	16	200	16	200	16		
UTC0	4	0,375	204	4	204	4	204	4	204	4		
OBTo	3	0,375	207	3	207	3	207	3	207	3		
Ts	2	0,375	209	2	209	2	209	2	209	2		
spare at 375 ms	10	0,375	219	10	219	10	219	10	219	10		
Instrument subsystems mode	3	1,5	222	3	219	0	219	0	219	0		detailed content: see Table
CDHU ICU (stat,mode,self test,mcmd, ....)	11	1,5	233	11	219	0	219	0	219	0		
instrument operational mode	1	1,5	234	1	219	0	219	0	219	0		
secondary processor words	2	1,5	236	2	219	0	219	0	219	0		
Spare	4	1,5	240	4	219	0	219	0	219	0		
timeline sequence report	1	1,5	241	1	219	0	219	0	219	0		
GTT sequence report	1	1,5	242	1	219	0	219	0	219	0		
last routine command word 0	1	1,5	243	1	219	0	219	0	219	0		
last routine command word 1	1	1,5	244	1	219	0	219	0	219	0		
last routine command word 2	1	1,5	245	1	219	0	219	0	219	0		
last routine command word 3	1	1,5	246	1	219	0	219	0	219	0		
last routine command word 4	1	1,5	247	1	219	0	219	0	219	0		
last routine command word 5	1	1,5	248	1	219	0	219	0	219	0		
last routine command expansion time ICU MSW	1	1,5	249	1	219	0	219	0	219	0		
last routine command expansion time ICU LSW	1	1,5	250	1	219	0	219	0	219	0		
last non-routine command word 0	1	1,5	251	1	219	0	219	0	219	0		
last non-routine command word 1	1	1,5	252	1	219	0	219	0	219	0		
last non-routine command word 2	1	1,5	253	1	219	0	219	0	219	0		

# GOME 2

	Vars	rate	wrд#	Pckt 1	wrд#	Pckt 2	wrд#	Pckt 3	wrд#	Pckt 4	remark
last non-routine command word 3	1	1,5	254	1	219	0	219	0	219	0	
last non-routine command word 4	1	1,5	255	1	219	0	219	0	219	0	
last non-routine command word 5	1	1,5	256	1	219	0	219	0	219	0	
last non-routine command expansion time ICU MSW	1	1,5	257	1	219	0	219	0	219	0	
last non-routine command expansion time ICU LSW	1	1,5	258	1	219	0	219	0	219	0	
next timeline command word 0	1	1,5	259	1	219	0	219	0	219	0	
next timeline command word 1	1	1,5	260	1	219	0	219	0	219	0	
next timeline command word 2	1	1,5	261	1	219	0	219	0	219	0	
next timeline command word 3	1	1,5	262	1	219	0	219	0	219	0	
next timeline command word 4	1	1,5	263	1	219	0	219	0	219	0	
next timeline command word 5	1	1,5	264	1	219	0	219	0	219	0	
time of next timeline command MSW	1	1,5	265	1	219	0	219	0	219	0	
time of next timeline command LSW	1	1,5	266	1	219	0	219	0	219	0	
( spare )	1	1,5	267	1	219	0	219	0	219	0	
( spare )	1	1,5	268	1	219	0	219	0	219	0	
( spare )	1	1,5	269	1	219	0	219	0	219	0	
( spare )	1	1,5	270	1	219	0	219	0	219	0	
( spare )	1	1,5	271	1	219	0	219	0	219	0	
( spare )	1	1,5	272	1	219	0	219	0	219	0	
( spare )	1	1,5	273	1	219	0	219	0	219	0	
( spare )	1	1,5	274	1	219	0	219	0	219	0	
monitoring flags	4	1,5	278	4	219	0	219	0	219	0	detailed content: see Table
swich-down flags	4	1,5	282	4	219	0	219	0	219	0	detailed content: see Table
( spare )	4	1,5	286	4	219	0	219	0	219	0	
min/max reporting enable/disable flags	4	1,5	290	4	219	0	219	0	219	0	
spare words	42	1,5	332	42	219	0	219	0	219	0	
( spare )	1	1,5	333	1	219	0	219	0	219	0	
( spare )	1	1,5	334	1	219	0	219	0	219	0	
( spare )	1	1,5	335	1	219	0	219	0	219	0	
( spare )	1	1,5	336	1	219	0	219	0	219	0	
previous timeline (33 lines * 7)	231	1,5	336	0	450	231	219	0	219	0	
present timeline (33 lines * 7)	231	1,5	336	0	450	0	450	231	219	0	
GTT content (28 lines * 2)	56	1,5	336	0	450	0	450	0	275	56	
Default setting param (DSM table)	62	1,5	336	0	450	0	450	0	337	62	detailed content: see Table
CDHU temp 1 (DC/DC1)	1	1,5	337	1	450	0	450	0	342	0	
CDHU temp 2 (S&HS)	1	1,5	338	1	450	0	450	0	342	0	
CDHU temp 3 (HDM board)	1	1,5	339	1	450	0	450	0	342	0	
CDHU temp 4 (SDM board)	1	1,5	340	1	450	0	450	0	342	0	
CDHU temp 5 (FTHM board)	1	1,5	341	1	450	0	450	0	342	0	
GPDU EQ DC/DC converter temp	1	1,5	342	1	450	0	450	0	342	0	

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	Vars	rate	wrd#	Pckt 1	wrd#	Pckt 2	wrd#	Pckt 3	wrd#	Pckt 4	remark
Radiator temperature	1	1,5	343	1	450	0	450	0	342	0	
Scan motor temperature	1	1,5	344	1	450	0	450	0	342	0	
Scan unit electronics temperature	1	1,5	345	1	450	0	450	0	342	0	
Radiometric lamp temperature	1	1,5	346	1	450	0	450	0	342	0	
Radiometric unit DC/DC temperature	1	1,5	347	1	450	0	450	0	342	0	
Spectral lamp temperature	1	1,5	348	1	450	0	450	0	342	0	
Spectral DC/DC temperature	1	1,5	349	1	450	0	450	0	342	0	
Sun diffuser temperature	1	1,5	350	1	450	0	450	0	342	0	
Shutter motor temperature	1	1,5	351	1	450	0	450	0	342	0	
Optical bench under CU temperature	1	1,5	352	1	450	0	450	0	342	0	
Center of optical bench temperature	1	1,5	353	1	450	0	450	0	342	0	
+Z side of optical bench temperature	1	1,5	354	1	450	0	450	0	342	0	
-X side of optical bench temperature	1	1,5	355	1	450	0	450	0	342	0	
-Z side of optical bench temperature	1	1,5	356	1	450	0	450	0	342	0	
Pre-disperser prism temperature	1	1,5	357	1	450	0	450	0	342	0	
analog board offset value (0.1%)	1	1,5	358	1	450	0	450	0	342	0	
analog board gain value (90%)	1	1,5	359	1	450	0	450	0	342	0	
FPA1 module temperature-1	1	1,5	360	1	450	0	450	0	342	0	
FPA2 module temperature-1	1	1,5	361	1	450	0	450	0	342	0	
FPA3 module temperature-1	1	1,5	362	1	450	0	450	0	342	0	
FPA4 module temperature-1	1	1,5	363	1	450	0	450	0	342	0	
FPA1 module temperature-2	1	1,5	364	1	450	0	450	0	342	0	
FPA2 module temperature-2	1	1,5	365	1	450	0	450	0	342	0	
FPA3 module temperature-2	1	1,5	366	1	450	0	450	0	342	0	
FPA4 module temperature-2	1	1,5	367	1	450	0	450	0	342	0	
PMD-p array temperature	1	1,5	368	1	450	0	450	0	342	0	
PMD-s array temperature	1	1,5	369	1	450	0	450	0	342	0	
PMD-p module temperature	1	1,5	370	1	450	0	450	0	342	0	
PMD-s module temperature	1	1,5	371	1	450	0	450	0	342	0	
Spare	4	1,5	375	4	450	0	450	0	342	0	
Scan mirror requested mode (from ICU software)	1	1,5	376	1	450	0	450	0	342	0	
Scan mirror requested bias (from ICU software)	1	1,5	377	1	450	0	450	0	342	0	
Scan mirror real mode (from SU telemetry BIAS/POS)	1	1,5	378	1	450	0	450	0	342	0	
Scan mirror real bias (from SU telemetry OPMODE)	1	1,5	379	1	450	0	450	0	342	0	
Scan Unit status word	1	1,5	380	1	450	0	450	0	342	0	
Scan Unit bias 1	1	1,5	381	1	450	0	450	0	342	0	
Scan Unit bias 2	1	1,5	382	1	450	0	450	0	342	0	
Scan Unit bias 3	1	1,5	383	1	450	0	450	0	342	0	
Scan Unit bias 4	1	1,5	384	1	450	0	450	0	342	0	
Scan Unit protocol status	1	1,5	385	1	450	0	450	0	342	0	

# GOME 2

	Vars	rate	wrd#	Pckt 1	wrd#	Pckt 2	wrd#	Pckt 3	wrd#	Pckt 4	remark
PMD-p band start	15	1,5	400	15	450	0	450	0	342	0	
PMD-p nb pixels in band	15	1,5	415	15	450	0	450	0	342	0	
PMD-s band start	15	1,5	430	15	450	0	450	0	342	0	
PMD-s nb pixels in band	15	1,5	445	15	450	0	450	0	342	0	
PMD-p start of short wavelength readout	1	1,5	446	1	450	0	450	0	342	0	
PMD-p spare 1	1	1,5	447	1	450	0	450	0	342	0	
PMD-start of short wavelength readout	1	1,5	448	1	450	0	450	0	342	0	
Xlate bits	1	1,5	449	1	450	0	450	0	342	0	
Programmed Integration time band IA	1	1,5	450	1	450	0	450	0	342	0	
Programmed Integration time band IB	1	1,5	451	1	450	0	450	0	342	0	
Programmed Integration time band IIA	1	1,5	452	1	450	0	450	0	342	0	
Programmed Integration time band IIB	1	1,5	453	1	450	0	450	0	342	0	
Programmed Integration time band III	1	1,5	454	1	450	0	450	0	342	0	
Programmed Integration time band IV	1	1,5	455	1	450	0	450	0	342	0	
ICU memory checksum	1	1,5	456	1	450	0	450	0	342	0	
Science processor memory checksum	1	1,5	457	1	450	0	450	0	342	0	
Spare telemetry at 1.5 second	N/A	1,5	487	30	487	37	487	37	487	145	
PMD short wavelength indicator (fixed value)	1	0,375	488	1	488	1	488	1	488	1	pre-allocation only
PMD short wavelength pixels (6 seconds)	70	0,375	558	70	558	70	558	70	558	70	pre-allocation only
PMD readout indicator	1	0,375	559	1	559	1	559	1	559	1	
PMD co-added [2*16*(15+4)]	608	0,375	1167	608	1167	608	1167	608	1167	608	
FPA 1 readout 1 indicator	1	0,375	1168	1	1168	1	1168	1	1168	1	
FPA 1 readout 1 data	1024	0,375	2192	1024	2192	1024	2192	1024	2192	1024	
FPA 2 readout 1 indicator	1	0,375	2193	1	2193	1	2193	1	2193	1	
FPA 2 readout 1 data	1024	0,375	3217	1024	3217	1024	3217	1024	3217	1024	
FPA 3 readout 1 indicator	1	0,375	3218	1	3218	1	3218	1	3218	1	
FPA 3 readout 1 data	1024	0,375	4242	1024	4242	1024	4242	1024	4242	1024	
FPA 4 readout 1 indicator	1	0,375	4243	1	4243	1	4243	1	4243	1	
FPA 4 readout 1 data	1024	0,375	5267	1024	5267	1024	5267	1024	5267	1024	
FPA 1 readout 2 indicator	1	0,375	5268	1	5268	1	5268	1	5268	1	
FPA 1 readout 2 data	1024	0,375	6292	1024	6292	1024	6292	1024	6292	1024	
FPA 2 readout 2 indicator	1	0,375	6293	1	6293	1	6293	1	6293	1	
FPA 2 readout 2 data	1024	0,375	7317	1024	7317	1024	7317	1024	7317	1024	
FPA 3 readout 2 indicator	1	0,375	7318	1	7318	1	7318	1	7318	1	
FPA 3 readout 2 data	1024	0,375	8342	1024	8342	1024	8342	1024	8342	1024	
FPA 4 readout 2 indicator	1	0,375	8343	1	8343	1	8343	1	8343	1	
FPA 4 readout 2 data	1024	0,375	9367	1024	9367	1024	9367	1024	9367	1024	
CRC	1	0,375	9368	1	9368	1	9368	1	9368	1	
<b>total number of words in packet</b>				<b>9369</b>		<b>9369</b>		<b>9369</b>		<b>9369</b>	

# GOME 2

	Vars	rate	wrđ# Pckt 1	wrđ# Pckt 2	wrđ# Pckt 3	wrđ# Pckt 4	remark
data rate	399744	bits/second					

note 1: in each packet, the data shall be consistent (i.e. same 375 period) except when specified otherwise

note 2: the sampling of both PMD's shall be fully synchronous with the sampling of the FPA's

note 3: all functions (temperature readout/Peltier control/scan operations,...) shall be synchronised to the main FPA cycles and all Telemetry shall be acquired and updated at least every 1.5 second

note 4: the HK data transmitted in the S-band format shall be extracted from a single 1.5 second auxiliary data set

note 5: spare telemetry per packet is 391 per data set (at 1.5 second) + 16 spares per 375 ms packet (64 words per 1.5 second data set)

note 6: the number in the column word of each packet corresponds to the last location used by the relevant field

Modifications:

<a href="#">revision draft 7 changes: these changes are as discussed MOM MO-MN-GAL-GO-0065 (06/10/99) and fax OG dated 04/10/99</a>
change 1 : TEC incremental values removed
change 2 : SBT is not at end of the packet
change 3 : IT status/phase/duration are telemetred every 187 ms
change 4 : 16 words spare per packet have been inserted at end of 375 ms area to allow fast TM allocation without changing the packet structure
change 5 : memory nominal x-band dump ICU and secondary processor have been removed
change 6 : command echo is present for nominal and non-nominal command
change 7 : on-board default values (parameter limits etc...) have not been allocated yet
change 8 : detailed design many fields internal structure need now to be expanded (could still be some misunderstanding) fields are needed for database DAPB, CTB, DORNIER...
change 10 : Timeline sequence report consists of 2 words
change 11 : for all FPA/PMD arrays, the short wavelength appears always closer to the packet header independantly of the up/down flag or on-board array inversions. As well N1/N2 is independent of the up/down flag.
change 12 : TEC incremental value disappear from the AUX/HK data.
change 13 : PMD status words are now 4 words per readout to allow division of up to 4 bits per band.
change 14 : Packet is re-organized to group the TM per criteria (first criteria: rate, second criteria: sub-system)
change 15 : column with remarks added
change 16 : pre-allocation of new fields for extended PMD short wavelength (as per change request)
change 17 : moved spare words at 1.5 s to the end of the ancillary data set
change 18 : FPA science data area splitted per readout and readout indicator included
change 19 : re-allocated one ICU TM word (see #223 to #233) to Scan mirror status word (#330)
<a href="#">revision 8 changes: these changes are as discussed MOM MO-MN-GAL-GO-0096 (14/02/00) and fax LA-G2-DT-TF-0023, GOME2/170-00 AND LA-G2-DT-TF-0027</a>
change 20 : default settings for cooler 'n' cold/hot target reserved as spares - contents already in the DSM table reported in pckt4(276..342)
change 21 : monitoring out of limit flags reserved as spares in pckt1(283..286)
change 22 : DSM table (67 Default Settings) in pckt4 moved into fields(276..342)
change 23 : maximum pixel of bandIA (N1) reserved as spare
change 24 : maximum pixel of bandIIA (N2) reserved as spare
change 25 : individual FPA/PMD readout order reserved as spare
change 26 : GTT contents in pckt4 moved to fields(220..275) before DSM table

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change 27 : S.U. status word and CDHU protocol deleted as already in field 221 and 227 respectively
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change 28 : Scan mirror bias deleted and reserved for spares
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change 29 : meaning of words#174-#179 changed
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## APPENDIX B - REAL TIME TEST FORMAT TM PACKET (EXTENDED HK)

Note: all HK (temperatures, Scan Mirror TM, V & I of lamps, TEC TM, etc.), ancillary data and science data belong to the same measurement cycle.

Word Number	Telemetry Point Description	Aux data Equivalent (SDP)	Remark
0	Begin identifier – Source		Header
1	Type – S/W Health counter		Header
2	Length		Header
3	ICU OBT		Header (Time corresponds to the end of the observation cycle)
4	ICU OBT		Header (Time corresponds to the end of the observation cycle)
5	Mode – ICU Message		Header
6	Anomalies / History Area Space		Header
7	MCMD name – S – MCM Counter		
8	CDHU ICU Word 1	223	
9	CDHU ICU Word 2	224	
10	Instrument subsystem Mode Word 1	220	
11	Instrument subsystem Mode Word 2	221	
12	Timeline Sequence Report	241	
13	GTT sequence Report	242	
14	FPA 1 Temperature (first)	57 of pck 3	First value within 1.5 s
15	FPA 2 Temperature (first)	61 of pck 3	First value within 1.5 s
16	FPA 3 Temperature (first)	65 of pck 3	First value within 1.5 s
17	FPA 4 Temperature (first)	69 of pck 3	First value within 1.5 s
18	Peltier Output 1 (last)	89 of pck 3	Last value within 1.5 s
19	Peltier Output 2 (last)	93 of pck 3	Last value within 1.5 s
20	Peltier Output 3 (last)	97 of pck 3	Last value within 1.5 s
21	Peltier Output 4 (last)	101 of pck 3	Last value within 1.5 s
22	CDHU temp1DC/DC converter Temperature	337 of pck 1	
23	Scan Mirror motor temperature	344 of pck 1	
24	Spectral DC/DC Converter Temp	349 of pck 1	
25	Radiometric unit DC/DC Temp	347 of pck 1	
26	GPDU EQ DC/DC temperature	342 of pck 1	
27	PMD-s array temperature	369 of pck 1	
28	Scan Mirror Position (first)	106 of pck 1	First value within 1.5 s
29	Scan Mirror Position (last)	109 of pck 4	last value within 1.5 s
30	Scan Mirror Torque (first)	110 of pck 1	First value within 1.5 s
31	Packet sequence control (Header 1)	1	
32	GOME Model (EQM=1111, FM1=2222, FM2=3333, FM3 = 4444)	15	
33	Data Subset counter (and sub-pixel counter)	16	
34	ICU On-Board Time (LSW) at 93.75 ms sync pulse	20	
35	Actual PMD transfer Mode (1,2,3)	21	
36	Actual Integration Time value PMD-s	23	
37	Actual Integration Time value PMD-p	24	
38	Integration time status rd#1	27	
39	Integration time status rd#2	35	
40	FPA1 latch-up counter	43	
41	FPA2 latch-up counter	44	
42	FPA3 latch-up counter	45	
43	FPA4 latch-up counter	46	
44	PMD-p latch-up counter	47	
45	PMD-s latch-up counter	48	
46	HDM latch-up counter	49	
47	Radiometric Lamp voltage	50 of pck 3	
48	Radiometric Lamp current	51 of pck 3	
49	Spectral Lamp voltage	52 of pck 3	
50	Spectral Lamp current	53 of pck 3	
51	FPA1 array temperature-2	73 of pck 3	Last value within 1.5 sec
52	FPA2 array temperature-2	77 of pck 3	Last value within 1.5 sec

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Word Number	Telemetry Point Description	Aux data Equivalent (SDP)	Remark
53	FPA3 array temperature-2	81 of pck 3	Last value within 1.5 sec
54	FPA4 array temperature-2	85	Last value within 1.5 sec
55	FPA1 pixel sample 1 in first 93.75 ms	118	Same data as aux infirst pck in 1.5 sec
56	FPA2 pixel sample 1 in first 93.75 ms	130	Same data as aux infirst pck in 1.5 sec
57	FPA3 pixel sample 1 in first 93.75 ms	142	Same data as aux infirst pck in 1.5 sec
58	FPA4 pixel sample 1 in first 93.75 ms	154	Same data as aux infirst pck in 1.5 sec
59	FPA1 pixel sample 1 in 2 <sup>nd</sup> 93.75 ms	121	Same data as aux infirst pck in 1.5 sec
60	FPA2 pixel sample 1 in 2 <sup>nd</sup> 93.75 ms	133	Same data as aux infirst pck in 1.5 sec
61	FPA3 pixel sample 1 in 2 <sup>nd</sup> 93.75 ms	145	Same data as aux infirst pck in 1.5 sec
62	FPA4 pixel sample 1 in 2 <sup>nd</sup> 93.75 ms	157	Same data as aux infirst pck in 1.5 sec
63	PMD-p sample @ 3 <sup>rd</sup> pixel position	168	In the 4 <sup>th</sup> 93.75 ms of 1 <sup>st</sup> pck in 1.5 s
64	PMD-s sample @ 3 <sup>rd</sup> pixel position	172	In the 4 <sup>th</sup> 93.75 ms of 1 <sup>st</sup> pck in 1.5 s
65	Instrument Subsystem mode word 3	222	Shutter Status
66	CDHU ICU Word #3	225	Monitoring Anomaly Counter
67	CDHU ICU Word #4	226	LED Status
68	Secondary processor words word 1	235	S/W WD btw Master/Slave
69	Secondary processor words word 2	236	CPU2 Error indication
70	Last routine command word 0	243	
71	Last routine command word 1	244	
72	Last routine command word 2	245	
73	Last routine command word 3	246	
74	Last routine command word 4	247	
75	Last routine command word 5	248	
76	Last routine command expansion time ICU MS	249	
77	Last routine command expansion time ICU LS	250	
78	Last non-routine command word 0	251	
79	Last non-routine command word 1	252	
80	Last non-routine command word 2	253	
81	Last non-routine command word 3	254	All 0's
82	Last non-routine command word 4	255	All 0's
83	Last non-routine command word 5	256	
84	Last non routine command expansion time ICU MS	257	
85	Last non routine command expansion time ICU LS	258	
86	Next timeline command word 0	259	
87	Next timeline command word 1	260	
88	Next timeline command word 2	261	
89	Next timeline command word 3	262	
90	Next timeline command word 4	263	
91	Next timeline command word 5	264	
92	Time of next timeline command MSW	265	
93	Time of next timeline command LSW	266	
94	Monitoring flags word 1	275	1 bit each for the 1 <sup>st</sup> 16 mon. Parameters
95	Monitoring flags word 2	276	1 bit each for the 2 <sup>nd</sup> 16 mon. Parameters
96	Monitoring flags word 3	277	1 bit each for the 3 <sup>rd</sup> 16 mon. Parameters
97	Monitoring flags word 4	278	1 bit each for the 4 <sup>th</sup> 16 mon. Parameters
98	Switch-down flags word 1	279	1 bit each for the 1 <sup>st</sup> 16 mon. Parameters
99	Switch-down flags word 2	280	1 bit each for the 2 <sup>nd</sup> 16 mon. Parameters
100	Switch-down flags word 3	281	1 bit each for the 3 <sup>rd</sup> 16 mon. Parameters
101	Switch-down flags word 4	282	1 bit each for the 4 <sup>th</sup> 16 mon. Parameters
102	Scan Mirror torque shift 1	114	
103	Maximum pixel of band IA (N1)	(278 pck4)	Already in SDP AUX in the DSM(22)
104	Maximum pixel of band IIA (N2)	(279 pck4)	Already in SDP AUX in the DSM(23)
105	Individual FPA/PMD s Readout order	<del>324</del>	Already in SDP AUX in the DSM group(43..48)
106	CDHU Temp 2 ( S & HS)	338 of pck1	
106	CDHU Temp 5 (FTHM board)	341 of pck1	
108	Radiator Temperature	343 of pck1	
109	Scan Unit electronics temperature	345 of pck1	
110	Radiometric lamp temperature	346 of pck1	
111	Spectral Lamp temperature	348 of pck1	
112	Optical bench under CU temperature	352 of pck1	
113	Pre-disperser prism temperature	357 of pck1	
114	Analog board offset value (0.1 %)	358 of pck1	
115	Analog board gain value (90 %)	359 of pck1	
116	FPA1 module temperature-1	360 of pck1	
117	FPA2 module temperature-1	361 of pck1	

# GOME 2

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Word Number	Telemetry Point Description	Aux data Equivalent (SDP)	Remark
118	FPA3 module temperature-1	362 of pck1	
119	FPA4 module temperature-1	363 of pck1	
120	PMD-p array temperature	368 of pck1	
121	PMD-p module temperature	370 of pck1	
122	PMD-s module temperature	371 of pck1	
123	Scan Mirror Real mode (from SU TLM OPMODE)	378 of pck1	Forced to 0x90 when Scan Unit is in maintenance and HK are not received
124	Scan Mirror Real Bias (from SU TLM Bias/Pos)	379 of pck1	
125	<del>Scan Mirror Status word</del> (spare)	<del>374</del>	Already inserted in field 11
126	Programmed Integration time band IA	450 of pck1	
127	Programmed Integration time band IB	451 of pck1	
128	Programmed Integration time band IIA	452 of pck1	
129	Programmed Integration time band IIB	453 of pck1	
130	Programmed Integration time band III	454 of pck1	
131	Programmed Integration time band IV	455 of pck1	
132	<del>Monitoring error counter</del> PMD Readout Mode		
	<del>ICU memory checksum</del>	<del>450</del>	Moved to word #891
	<del>Science processor memory checksum</del>	<del>454</del>	Moved to word #892
133	<del>Monitoring flags word 1</del> (spare)	<del>271</del>	Reserved to spare
134	<del>Monitoring flags word 2</del> (spare)	<del>272</del>	Reserved to spare
135	<del>Monitoring flags word 3</del> (spare)	<del>273</del>	Reserved to spare
136	<del>Monitoring flags word 4</del> (spare)	<del>274</del>	Reserved to spare
137	<del>Switch down flags word 1</del> (spare)	<del>275</del>	Reserved to spare
138	<del>Switch down flags word 2</del> (spare)	<del>276</del>	Reserved to spare
139	<del>Switch down flags word 3</del> (spare)	<del>277</del>	Reserved to spare
140	<del>Switch down flags word 4</del> (spare)	<del>278</del>	Reserved to spare
141	Shutter Emergency enable	276 of pck4	(first parameter of the DSM table) Id 20
142	Shutter movement enable	277 of pck4	DSM table parameter
143	Channel 1 band separ. (i.e. last pixel of band IA)	278 of pck4	As above
144	Channel 2 band separ. (i.e. last pixel of band IIA)	279 of pck4	As above
145	Cooler 1 cooling enable/disable	280 of pck4	As above
146	Cooler 1 annealing enable/disable	281 of pck4	As above
147	Cooler 1 set cold target temperature	282 of pck4	As above
148	Cooler 1 set hot target temperature	283 of pck4	As above
149	Cooler 2 cooling enable/disable	284 of pck4	As above
150	Cooler 2 annealing enable/disable	285 of pck4	As above
151	Cooler 2 set cold target temperature	286 of pck4	As above
152	Cooler 2 set hot target temperature	287 of pck4	As above
153	Cooler 3 cooling enable/disable	288 of pck4	As above
154	Cooler 3 annealing enable/disable	289 of pck4	As above
155	Cooler 3 set cold target temperature	290 of pck4	As above
156	Cooler 3 set hot target temperature	291 of pck4	As above
157	Cooler 4 cooling enable/disable	292 of pck4	As above
158	Cooler 4 annealing enable/disable	293 of pck4	As above
159	Cooler 4 set cold target temperature	294 of pck4	As above
160	Cooler 4 set hot target temperature	295 of pck4	As above
161	End_duration flag 93.75ms /6s	296 of pck4	As above
162	TEC always on	297 of pck4	As above
163	Lamp interlock enable	298 of pck4	As above
164	FPA1 readout sequence	299 of pck4	As above
165	FPA2 readout sequence	300 of pck4	As above
166	FPA3 readout sequence	301of pck4	As above
167	FPA4 readout sequence	302of pck4	As above
168	PMD-s readout sequence	303 of pck4	As above
169	PMD-p readout sequence	304 of pck4	As above
170	Integration time Band IA (FPA 1)	305of pck4	As above
171	Integration time Band IB (FPA 1)	306 of pck4	As above
172	Integration time Band IIA (FPA 2)	307 of pck4	As above
173	Integration time Band IIB (FPA 2)	308 of pck4	As above
174	Integration time Band III (FPA 3)	309 of pck4	As above
175	Integration time Band IV (FPA 4)	310 of pck4	As above
176	Direct command enable	311 of pck4	As above
177	PMD Readout MODE	312 of pck4	As above
178	FPA shortest int time mode	313 of pck4	As above
179	PMD coolers enable	314 of pck4	As above

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Word Number	Telemetry Point Description	Aux data Equivalent (SDP)	Remark
180	PMD_line	315 of pck4	As above
181	PMD_IT	316 of pck4	As above
182	Stby/Refuse on Switch Fault	317 of pck4	As above: new DSM
183	PMD reset cycle of flyback	318 of pck4	As above
184	Max_history_entries	319 of pck4	As above
185	FPA_PMD_switch_on	320 of pck4	As above
186	Scan Mirror Nadir Bias	321 of pck4	As above
187	Scan Mirror North_Pole Bias	322 of pck4	As above
188	Scan Mirror South_Pole Bias	323 of pck4	As above
189	Scan Mirror Programmable Bias	324 of pck4	As above
190	Set gth current	325 of pck4	As above
191	FPA1 sensors enable	326 of pck4	As above
192	FPA2 sensors enable	327 of pck4	As above
193	FPA3 sensors enable	328 of pck4	As above
194	FPA4 sensors enable	329 of pck4	As above
195	Patch enable flag	330 of pck4	As above
196	(spare)	331 of pck4	Reserved to spare
197	(spare)	332 of pck4	Reserved to spare
198	PMD Transfer Mode	333 of pck4	As above: new DSM
199	PMD-s channel B Start	334 of pck4	As above
200	PMD-s channel B Length	335 of pck4	As above
201	PMD-p channel B Start	336 of pck4	As above
202	PMD-p channel B Length	337 of pck4	(Last parameter of DSM table ID.81)
203	(spare)	338 of pck4	Reserved to spare
204	(spare)	339 of pck4	Reserved to spare
205	(spare)	340 of pck4	Reserved to spare
206	(spare)	341 of pck4	Reserved to spare
207	(spare)	342 of pck4	Reserved to spare
208	Actual PMD s/p integration time status	22	
209	Actual FPA co-adding status	26	
210	Integration time-phase status rdt#1	28	
211	Integration time value rdt#1 band 1	29	
212	Integration time value rdt#1 band 2	30	
213	Integration time value rdt#1 band 3	31	
214	Integration time value rdt#1 band 4	32	
215	Integration time value rdt#1 band 5	33	
216	Integration time value rdt#1 band 6	34	
217	Integration time-phase status rdt#2	36	
218	Integration time value rdt#2 band 1	37	
219	Integration time value rdt#2 band 2	38	
220	Integration time value rdt#2 band 3	39	
221	Integration time value rdt#2 band 4	40	
222	Integration time value rdt#2 band 5	41	
223	Integration time value rdt#2 band 6	42	
224	FPA1 Peltier loop error	102	
225	FPA2 Peltier loop error	103	
226	FPA3 Peltier loop error	104	
227	FPA4 Peltier loop error	105	
228	Scan mirror position (2 of 1.5 sec)	107 of pck1	Sc. Mir. Pos (1 of 1.5 s) in field 28
229	Scan mirror position (3 of 1.5 sec)	108 of pck1	
230	Scan mirror position (4 of 1.5 sec)	109 of pck1	
231	Scan mirror position (5 of 1.5 sec)	106 of pck2	
232	Scan mirror position (6 of 1.5 sec)	107 of pck2	
233	Scan mirror position (7 of 1.5 sec)	108 of pck2	
234	Scan mirror position (8 of 1.5 sec)	109 of pck2	
235	Scan mirror position (9 of 1.5 sec)	106 of pck3	
236	Scan mirror position (10 of 1.5 sec)	107 of pck3	
237	Scan mirror position (11 of 1.5 sec)	108 of pck3	
238	Scan mirror position (12 of 1.5 sec)	109 of pck3	
239	Scan mirror position (13 of 1.5 sec)	106 of pck4	
240	Scan mirror position (14 of 1.5 sec)	107 of pck4	
241	Scan mirror position (15 of 1.5 sec)	108 of pck4	Sc. Mir. Pos (last of 1.5 s) in field 29
242	Scan mirror torque (2 of 1.5 sec)	111 of pck1	Sc. Mir. Trq (1 of 1.5 s) in field 30
243	Scan mirror torque (3 of 1.5 sec)	112 of pck1	
244	Scan mirror torque (4 of 1.5 sec)	113 of pck1	
245	Scan mirror torque (5 of 1.5 sec)	110 of pck2	

# GOME 2

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Word Number	Telemetry Point Description	Aux data Equivalent (SDP)	Remark
246	Scan mirror torque (6 of 1.5 sec)	111 of pck2	
247	Scan mirror torque (7 of 1.5 sec)	112 of pck2	
248	Scan mirror torque (8 of 1.5 sec)	113 of pck2	
249	Scan mirror torque (9 of 1.5 sec)	110 of pck3	
250	Scan mirror torque (10 of 1.5 sec)	111 of pck3	
251	Scan mirror torque (11 of 1.5 sec)	112 of pck3	
252	Scan mirror torque (12 of 1.5 sec)	113 of pck3	
253	Scan mirror torque (13 of 1.5 sec)	110 of pck4	
254	Scan mirror torque (14 of 1.5 sec)	111 of pck4	
255	Scan mirror torque (15 of 1.5 sec)	112 of pck4	
256	Scan mirror torque (16 of 1.5 sec)	113 of pck4	
257	Scan mirror torque shift 2	115 of pck1	
258	Scan mirror torque shift 3	116 of pck1	
259	Scan mirror torque shift 4	117 of pck1	
260	Scan mirror torque shift 5	114 of pck2	
261	Scan mirror torque shift 6	115 of pck2	
262	Scan mirror torque shift 7	116 of pck2	
263	Scan mirror torque shift 8	117 of pck2	
264	Scan mirror torque shift 9	114 of pck3	
265	Scan mirror torque shift 10	115 of pck3	
266	Scan mirror torque shift 11	116 of pck3	
267	Scan mirror torque shift 12	117 of pck3	
268	Scan mirror torque shift 13	114 of pck4	
269	Scan mirror torque shift 14	115 of pck4	
270	Scan mirror torque shift 15	116 of pck4	
271	Scan mirror torque shift 16	117 of pck4	
272	Main processor dump address MSW	174	Only in case of dump on x-band
273	Main processor dump address LSW	175	As above
274	Main processor number of dump word	176	As above
275	Science processor dump address MSW	177	As above
276	Science processor dump address LSW	178	As above
277	Science processor number of dump word	179	As above
278	CDHU temp 3 (HDM board)	339 of pck1	
279	CDHU temp 4 (SDM board)	340 of pck1	
280	Sun diffuser temperature	350 of pck1	
281	Center of optical bench temperature	353 of pck1	
282	+Z side of optical bench temperature	354 of pck1	
283	-X side of optical bench temperature	355 of pck1	
284	-Z side of optical bench temperature	356 of pck1	
285	FPA 1 module temperature -2	364 of pck1	
286	FPA 2 module temperature -2	365 of pck1	
287	FPA 3 module temperature -2	366 of pck1	
288	FPA 4 module temperature -2	367 of pck1	
289	Scan mirror requested mode (from CDHU)	376 of pck1	
290	Scan mirror requested bias (from CDHU)	377 of pck1	
291	<del>Scan mirror - CDHU protocol (spare)</del>	<del>379</del>	Reserved to spare
292..306	PMD-p band start (15 words)	386..400 of pck1	
307..321	PMD-p nb pixels in band (15 words)	401..415 of pck1	
322..336	PMD-s band start (15 words)	416..430 of pck1	
337..351	PMD-s nb pixels in band (15 words)	431..445 of pck1	
352..582	Present timeline (33x7) 231 words	220..450 of pck3	
583..813	Previous timeline (33x7) 231 words	220..450 of pck2	
814..869	GTT content (28x2) 56 words	220..275 of pck4	
870	FPA/PMD Xlate bits		6 bits: 1 bit for each FPA/PMD
871..879	UTC <sub>0</sub> , OBT <sub>0</sub> , Ts		
880	CDHU ICU status word # 5	227 of pck1	SU CDHU Protocol Word
881	CDHU ICU status word # 6	228 of pck1	RBI Status/error
882	CDHU ICU status word # 7	229 of pck1	SDM I/O Info
883	CDHU ICU status word word #8	230 of pck1	serial line init register
884 .. 886	CDHU ICU spare status words (3 words)	231 .. 233 of pk1	
887	Min-max_enable_flags word1	287	1 bit each for the 1 <sup>st</sup> 16 mon. Params
888	Min-max_enable_flags word2	288	1 bit each for the 1 <sup>st</sup> 16 mon. Params
889	Min-max_enable_flags word3	289	1 bit each for the 1 <sup>st</sup> 16 mon. Params
890	Min-max_enable_flags word4	290	1 bit each for the 1 <sup>st</sup> 16 mon. Params
891	ICU memory checksum	456 of pck1	

Word Number	Telemetry Point Description	Aux data Equivalent (SDP)	Remark
892	Science_proc_mem_checksum	457 of pck1	
893	Shutter Motor Temperature	351 of pck1	
894	FPA1 pixel sample 1 in 15 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
895	FPA2 pixel sample 1 in 15 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
896	FPA3 pixel sample 1 in 15 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
897	FPA4 pixel sample 1 in 15 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
898	FPA1 pixel sample 1 in 16 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
899	FPA2 pixel sample 1 in 16 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
900	FPA3 pixel sample 1 in 16 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
901	FPA4 pixel sample 1 in 16 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
902	FPA1 pixel sample 2 in 1 <sup>st</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
903	FPA2 pixel sample 2 in 1 <sup>st</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
904	FPA3 pixel sample 2 in 1 <sup>st</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
905	FPA4 pixel sample 2 in 1 <sup>st</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
906	FPA1 pixel sample 2 in 2 <sup>nd</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
907	FPA2 pixel sample 2 in 2 <sup>nd</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
908	FPA3 pixel sample 2 in 2 <sup>nd</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
909	FPA4 pixel sample 2 in 2 <sup>nd</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
910	FPA1 pixel sample 2 in 15 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
911	FPA2 pixel sample 2 in 15 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
912	FPA3 pixel sample 2 in 15 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
913	FPA4 pixel sample 2 in 15 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
914	FPA1 pixel sample 2 in 16 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
915	FPA2 pixel sample 2 in 16 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
916	FPA3 pixel sample 2 in 16 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
917	FPA4 pixel sample 2 in 16 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
918	FPA1 pixel sample 3 in 1 <sup>st</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
919	FPA2 pixel sample 3 in 1 <sup>st</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
920	FPA3 pixel sample 3 in 1 <sup>st</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
921	FPA4 pixel sample 3 in 1 <sup>st</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
922	FPA1 pixel sample 3 in 2 <sup>nd</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
923	FPA2 pixel sample 3 in 2 <sup>nd</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
924	FPA3 pixel sample 3 in 2 <sup>nd</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
925	FPA4 pixel sample 3 in 2 <sup>nd</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
926	FPA1 pixel sample 3 in 15 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
927	FPA2 pixel sample 3 in 15 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
928	FPA3 pixel sample 3 in 15 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
929	FPA4 pixel sample 3 in 15 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
930	FPA1 pixel sample 3 in 16 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
931	FPA2 pixel sample 3 in 16 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
932	FPA3 pixel sample 3 in 16 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
933	FPA4 pixel sample 3 in 16 <sup>th</sup> 93.75 ms		Same data as aux infirst pck in 1.5 sec
934	PMD-p sample @ 1 <sup>st</sup> pixel position	166	In the 4 <sup>th</sup> 93.75 ms of 1 <sup>st</sup> pck in 1.5 s
935	PMD-s sample @ 1 <sup>st</sup> pixel position	170	In the 4 <sup>th</sup> 93.75 ms of 1 <sup>st</sup> pck in 1.5 s
936	PMD-p sample @ 2 <sup>nd</sup> pixel position	167	In the 4 <sup>th</sup> 93.75 ms of 1 <sup>st</sup> pck in 1.5 s
937	PMD-s sample @ 2 <sup>nd</sup> pixel position	171	In the 4 <sup>th</sup> 93.75 ms of 1 <sup>st</sup> pck in 1.5 s
938	PMD-p sample @ 4 <sup>th</sup> pixel position	169	In the 4 <sup>th</sup> 93.75 ms of 1 <sup>st</sup> pck in 1.5 s
939	PMD-s sample @ 4 <sup>th</sup> pixel position	173	In the 4 <sup>th</sup> 93.75 ms of 1 <sup>st</sup> pck in 1.5 s
940	EEPROM checksum master	N/A	Reserved to spare
941	EEPROM checksum science		
942..1048	(spare) 107 words		
1049 1560	Non nominal Telemetry (512 words)	N/A	If req. By enable non-nominal TM MCMD
1561	End identifier (real-time test format)		

## General Note

By default, whenever data in SDP are under sampled with respect to the actual Acquisition Rate, last acquisition value is reported.

## NON NOMINAL TELEMETRY

The *Non Nominal Telemetry (NNT)* field in the RTT Format TM packet is enabled/inhibited by dedicated MCMD's: it reports the next information:

Non Nominal TM	Words	Note
<i>Header</i>	4	1 <sup>st</sup> word:16#FF00# 2 <sup>nd</sup> word:16#01FC# 3 <sup>rd</sup> & 4 <sup>th</sup> words: OBT for Non Nominal Acquisition Time
<i>PPT</i>	144	All descriptors of APEX2 Periodic Process Table (9 words x 16 processes)
<i>MPT</i>	320	Monitoring Parameters Table (5 words x 64 parameters)
<i>Spare field</i>	44	

where for each APEX2 process in *Periodic Process Table (PPT)*:

APEX2 Periodic Processes Descriptors (PPTable)																
Word \ bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	PID															
1	ADDR															
2	PRIORITY															
3	CONTINUE_FLAG															
4	MAX_CYCLE_OVERLOAD															
5	STATUS															
6	PERIOD															
7	PHASE															
8	SUSPENSION_TIME															

and for each parameter of *Monitoring Parameters Table (MPT)*:

Monitoring Parameters Table (as readout directly by the Activated Parameters Table)																
Word \ bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	Spare						Type			Filter						
1	Min/Max Limits (depends on type of monitoring)															
2																
3																
4																

## TELEMETRY PARAMETERS IN SDP

The following table reports, for each analog telemetry parameter, the rate of acquisition in the Scientific Data Packet and in the House Keeping Data of a Format TM packet.

Parameter	Sample in SDP	Sample in HK
Spectral lamp Current	Last acquisition within 375 ms	Last acquisition within 375 ms
Spectral lamp Voltage	Last acquisition within 375 ms	Last acquisition within 375 ms
FPA1 module temp1	Last acquisition within 1.5 s	Last acquisition within 1.5 s
FPA1 module temp2	Last acquisition within 1.5 s	Last acquisition within 1.5 s
FPA2 module temp1	Last acquisition within 1.5 s	Last acquisition within 1.5 s
FPA2 module temp2	Last acquisition within 1.5 s	Last acquisition within 1.5 s
FPA3 module temp1	Last acquisition within 1.5 s	Last acquisition within 1.5 s
FPA3 module temp2	Last acquisition within 1.5 s	Last acquisition within 1.5 s
FPA4 module temp1	Last acquisition within 1.5 s	Last acquisition within 1.5 s
FPA4 module temp2	Last acquisition within 1.5 s	Last acquisition within 1.5 s
PMD-p array temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
PMD-s array temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
PMD-p module temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
PMD-s module temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
Mirror Temperature	Last acquisition within 1.5 s	Last acquisition within 1.5 s
Scan Motor Temperature	Last acquisition within 1.5 s	Last acquisition within 1.5 s
Scan Unit Electronics temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
Sun Diffuser Temperature	Last acquisition within 1.5 s	Last acquisition within 1.5 s
CU Spectral Lamp Temperature	Last acquisition within 1.5 s	Last acquisition within 1.5 s
CU QTH Lamp Temperature	Last acquisition within 1.5 s	Last acquisition within 1.5 s
Spectral Source Power Supply temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
QTH Lamp Power Supply temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
CDHU Power Supply temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
CDHU SDM temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
CDHU HDM temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
CDHU FTHM temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
CDHU S&HS temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
GPDU EQ. DC/DC temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
Shutter Motor temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
Optical Bench under CU temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
Center of Optical Bench temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
+Z side Optical Bench temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
-Z side Optical Bench temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
-X side Optical Bench temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
Radiator temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
Predisperser prism temp	Last acquisition within 1.5 s	Last acquisition within 1.5 s
90% FS calibration voltage	Last acquisition within 1.5 s	Last acquisition within 1.5 s
0.1% FS calibration voltage	Last acquisition within 1.5 s	Last acquisition within 1.5 s
QTH lamp current	Last acquisition within 375 ms	Last acquisition within 375 ms
QTH lamp voltage	Last acquisition within 375 ms	Last acquisition within 375 ms
FPA1 array Temperature-1	1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> 93.75 ms acquisition	First acquisition within 1.5 s
FPA2 array Temperature-1	1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> 93.75 ms acquisition	First acquisition within 1.5 s
FPA3 array Temperature-1	1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> 93.75 ms acquisition	First acquisition within 1.5 s
FPA4 array Temperature-1	1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> 93.75 ms acquisition	First acquisition within 1.5 s
FPA1 array Temperature-2	1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> 93.75 ms acquisition	Last acquisition within 1.5 s
FPA2 array Temperature-2	1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> 93.75 ms acquisition	Last acquisition within 1.5 s
FPA3 array Temperature-2	1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> 93.75 ms acquisition	Last acquisition within 1.5 s
FPA4 array Temperature-2	1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> 93.75 ms acquisition	Last acquisition within 1.5 s