



RSP-03 HK Beacon Format(EN)

2025.09.03

Rymansat Project

RSP-03 Development Team



Revision History

Version	Date	Revision Details
1.0	2025/07/30	Initial release
1.1	2025/08/24	• Added note that CW beacon format is little-endian format. • Corrected incorrect header values in GMSK packets 2 and 3.
1.2	2025/09/03	• GMSK Packet 1 No.12: Corrected an error in the number of uplink command receptions



Abbreviations and Definitions

OBC	On Board Computer	u8	unsigned 8bit
AOBC	Attitude On Board Computer	s8	signed 8bit
COBC	C&DH On Board Computer	u16	unsigned 16bit
TOBC	Telecommunication On Board Computer	s16	signed 16bit
MTQ	Magnetic Torquer	u32	unsigned 32bit
RW	Reaction Wheel	s32	signed 32bit
SAP	Solar Array Panel	u40	unsigned 40bit
PA	Power Amplifier	u64	unsigned 64bit
MCU	Micro Controller Unit		
IMU	Inertial Measurement Unit		
STT	Star Tracker		
ANTH	Antenna Deployment Heater		
u8	unsigned 8bit		
s8	signed 8bit		



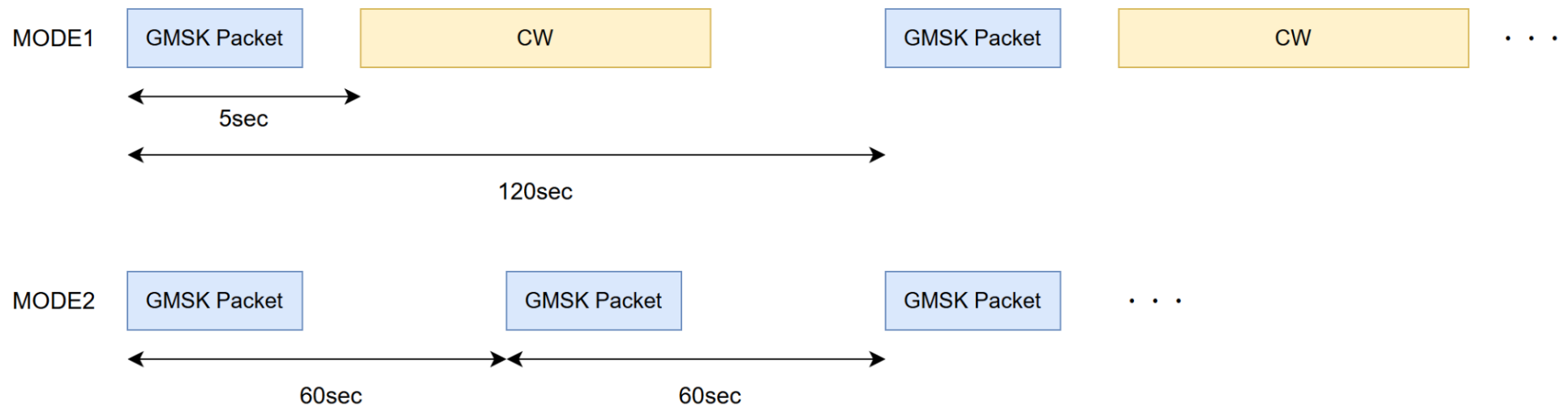
Overview

This document describes the data format of HK (Housekeeping) beacons transmitted from RSP-03.

HK beacon modes

RSP-03 provide two different modes for beacon transmission, each named MODE1 and MODE2, which are switched by the operators.

The following figure shows the types of beacons and their intervals in each mode.



As shown in the above figure, the default interval between GMSK packets is 60 seconds. This interval is susceptible to change during operation.



CW format

The message is transmitted in the following format. The details of the message contents are explained below.

DE JS1YOY *Telemetry Message* RSP $\overline{AR}$

The byte order is little-endian.

Example: GFF540018C4000000040F08**CA1D**08

→Battery 1 Volgag[mV]:CA1D → 1DCA(HEX) → 7626(DEC) → 7626mV

There are three types of messages, and the type can be identified by the first character of the message. The first character is either **G**, **H**, or **I**. The contents of each message type are described below. (Except for the message identifier, all fields represent hexadecimal values.)



When the first character is 'G'

No.	Description	Number of Characters	Value Range	Details
1	Message Identifier	1	G	Always "G"
2	Telemetry Type	2	FF	Always "FF"
3	COBC Boot Count	4	0000-FFFF	
4	COBC Uptime [seconds]	8	00000000-FFFFFFFF	
5	COBC Temperature [°C]	2	00-FF	Always "00"
6	Satellite Operation Mode	2	00-05	0: Initial State 1: Waiting for Antenna Deployment 2: Antenna Deployment in Progress 3: Pre-Deployment Safe Mode 4: Normal Mode 5: Safe Mode



When the first character is 'G' (Cont'd)

No.	Description	Number of Characters	Value Range	Details
7	Antenna Deployment Status	2	00-0F	Antenna deployment status bitmap: 0 = Not deployed, 1 = Deployed Bit[7:4]: Reserved (Always 0) Bit[3]: -Y Direction Bit[2]: +Y Direction Bit[1]: -X Direction Bit[0]: +X Direction
8	Uplink Reception Count	2	00-FF	
9	Battery 1 Voltage [mV]	4	0000-FFFF	
10	Battery 1 Charging Current (First Half) [mA]	2	00-FF	



When the first character is 'H'

No.	Description	Number of Characters	Value Range	Details
1	Message Identifier	1	H	Always "H"
2	Battery 1 Charging Current (Second Half) [mA]	2	00-FF	
3	Battery 1 Discharging Current [mA]	4	0000-FFFF	
4	Battery 1 Temperature [°C]	2	00-FF	
5	Battery 2 Voltage [mV]	4	0000-FFFF	
6	Battery 2 Charging Current [mA]	4	0000-FFFF	
7	Battery 2 Discharging Current [mA]	4	0000-FFFF	
8	Battery 2 Temperature [°C]	2	00-FF	



When the first character is 'H' (Cont'd)

No.	Description	Number of Characters	Value Range	Details
9	Subsystem Power Fault Status	2	00-FF	1: No fault / 0: Fault Bit[7]: Reserved Bit[6]: AOBC Bit[5]: MTQ Bit[4]: TOBC (MAIN) Bit[3]: ANTH Bit[2]: RW Bit[1]: TOBC (SUB) Bit[0]: MOBC
10	Subsystem Power ON/OFF Status	2	00-FF	1: ON / 0: OFF Bit[7]: Reserved Bit[6]: MOBC Bit[5]: AOBC Bit[4]: TOBC (MAIN) Bit[3]: ANTDEP Bit[2]: RW Bit[1]: TOBC (SUB) Bit[0]: MTQ
11	TOBC Main Boot Count	2	00-FF	



When the first character is 'I'

No.	Description	Number of Characters	Value Range	Details
1	Message Identifier	1	I	Always "I"
2	Main TOBC Operating Time [Hour]	2	00-FF	
3	Main TOBC Reception Count	2	00-FF	
4	Sub TOBC Boot Count	2	00-FF	
5	Sub TOBC Operating Time [Hour]	2	00-FF	
6	Sub TOBC Reception Count	2	00-FF	
7	AOBC Operation Mode	2	01-05	1: STANDBY 2: STABILIZING 3: POINTING 4: UNLOADING 5: COMMISSIONING



When the first character is 'I' (Cont'd)

No.	Description	Number of Characters	Value Range	Details
8	Attitude Control System Power Status	2	00-FF	Power status of RW and MTQ (1: ON / 0: OFF) Bit[0]: RW1 Bit[1]: RW2 Bit[2]: RW3 Bit[3]: MTQ1 Bit[4]: MTQ2 Bit[5]: MTQ3
9	X-axis Angular Velocity [mdeg/s]	4	0000-FFFF	Signed 16-bit integer
10	Y-axis Angular Velocity [mdeg/s]	4	0000-FFFF	Signed 16-bit integer
11	Z-axis Angular Velocity [mdeg/s]	4	0000-FFFF	Signed 16-bit integer
12	MOBC Operation Mode	2	00-FF	Bit[7:4]: Composition system status 0x00: Stopped / 0x01: Standby / 0x02: Composing Bit[3:0]: STT status 0x00: Stopped / 0x01: Standby / 0x02: Calculating



GMSK packet format

The GMSK beacon packets consist of three types of packets transmitted sequentially, as described below. The byte order of each element is little-endian, and the packets are transmitted in binary format. The contents of each packet are as follows.

The GMSK beacon packets are transmitted at 9600 bps using AX.25 protocol.

Packet 1

No.	Description	Number of Bytes	Data Type	Details
1	Header	5	u40	Always 0x0018AD8001
2	Time	4	u32	
3	Time	2	u16	
4	Packet Type	1	u8	Always 0x01
5	Telemetry ID	2	u16	
6	COBC Boot Count	4	u32	Number of satellite boots
7	COBC Uptime [sec]	8	u64	
8	Satellite System Time [ms]	8	u64	UNIX time



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
9	COBC Temperature [°C]	1	s8	Always 0x00
10	Satellite Operation Mode	1	u8	0x00: Initial state 0x01: Waiting for antenna deployment 0x02: Antenna deploying 0x03: Pre-deployment safe mode 0x04: Normal mode 0x05: Safe mode
11	Antenna Deployment Status	1	u8	Antenna deployment status bitmap 0: Not deployed / 1: Deployed Bit[7:4]: reserved (always 0) Bit[3]: -Y direction antenna Bit[2]: +Y direction antenna Bit[1]: -X direction antenna Bit[0]: +X direction antenna
12	Uplink Command Reception Count	2	u16	
13	COBC Temperature Upper Limit Exceed Count	1	u8	
14	COBC Temperature Lower Limit Exceed Count	1	u8	



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
15	COBC Voltage Upper Limit Exceed Count	1	u8	
16	COBC Voltage Lower Limit Exceed Count	1	u8	
17	COBC Current Upper Limit Exceed Count	1	u8	
18	COBC Current Lower Limit Exceed Count	1	u8	
19	Main TOBC Temperature Upper Limit Exceed Count	1	u8	
20	Main TOBC Temperature Lower Limit Exceed Count	1	u8	
21	Main TOBC Voltage Upper Limit Exceed Count	1	u8	
22	Main TOBC Voltage Lower Limit Exceed Count	1	u8	
23	Main TOBC Current Upper Limit Exceed Count	1	u8	
24	Main TOBC Current Lower Limit Exceed Count	1	u8	
25	Sub TOBC Temperature Upper Limit Exceed Count	1	u8	
26	Sub TOBC Temperature Lower Limit Exceed Count	1	u8	
27	Sub TOBC Voltage Upper Limit Exceed Count	1	u8	



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
28	Sub TOBC Voltage Lower Limit Exceed Count	1	u8	
29	Sub TOBC Current Upper Limit Exceed Count	1	u8	
30	Sub TOBC Current Lower Limit Exceed Count	1	u8	
31	AOBC Temperature Upper Limit Exceed Count	1	u8	
32	AOBC Temperature Lower Limit Exceed Count	1	u8	
33	AOBC Voltage Upper Limit Exceed Count	1	u8	
34	AOBC Voltage Lower Limit Exceed Count	1	u8	
35	AOBC Current Upper Limit Exceed Count	1	u8	
36	AOBC Current Lower Limit Exceed Count	1	u8	
37	MOBC Temperature Upper Limit Exceed Count	1	u8	
38	MOBC Temperature Lower Limit Exceed Count	1	u8	
39	MOBC Voltage Upper Limit Exceed Count	1	u8	
40	MOBC Voltage Lower Limit Exceed Count	1	u8	



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
41	MOBC Current Upper Limit Exceed Count	1	u8	
42	MOBC Current Lower Limit Exceed Count	1	u8	
43	Magnetic Torque Consumption Current [mA]	2	s16	
44	Reaction Wheel Consumption Current [mA]	2	s16	
45	Antenna Deployment Heater Consumption Current [mA]	2	s16	
46	Main TOBC Consumption Current [mA]	2	s16	
47	Sub TOBC Consumption Current [mA]	2	s16	
48	MOBC Consumption Current [mA]	2	s16	
49	COBC Consumption Current [mA]	2	s16	
50	AOBC Consumption Current [mA]	2	s16	
51	5V Bus Voltage [mV]	2	s16	
52	3.3V Line Voltage [mV]	2	s16	
53	Bus Current [mA]	2	s16	



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
54	SAP (+Z face) Voltage [mV]	2	s16	
55	SAP (+Z face) Temperature [°C]	2	s16	
56	SAP (-Z face) Voltage [mV]	2	s16	
57	SAP (-Z face) Temperature [°C]	2	s16	
58	SAP (+Y face) Voltage [mV]	2	s16	
59	SAP (+Y face) Temperature [°C]	2	s16	
60	SAP (-X face) Voltage [mV]	2	s16	
61	SAP (-X face) Temperature [°C]	2	s16	
62	SAP (-Y face) Voltage [mV]	2	s16	
63	SAP (-Y face) Temperature [°C]	2	s16	
64	SAP (+Z face) Current [mA]	2	s16	
65	SAP (-Z face) Current [mA]	2	s16	
66	SAP (+Y face) Current [mA]	2	s16	



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
67	SAP (-X face) Current [mA]	2	s16	
68	SAP (-Y face) Current [mA]	2	s16	
69	Battery 1 Output Voltage [mV]	2	s16	
70	Battery 1 Charging Current [mA]	2	s16	
71	Battery 1 Discharging Current [mA]	2	s16	
72	Battery 1 Temperature [°C]	2	s16	
73	Battery 1 Cumulative Charge [mAh]	4	u32	
74	Battery 1 Cumulative Discharge [mAh]	4	u32	
75	Battery 2 Output Voltage [mV]	2	s16	
76	Battery 2 Charging Current [mA]	2	s16	
77	Battery 2 Discharging Current [mA]	2	s16	
78	Battery 2 Temperature [°C]	2	s16	
79	Battery 2 Cumulative Charge [mAh]	4	u32	



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
80	Battery 2 Cumulative Discharge [mAh]	4	u32	
81	Equipment Power Anomaly Status	1	u8	1: No anomaly / 0: Anomaly Bit[7]: reserved Bit[6]: AOBC Bit[5]: MTQ Bit[4]: Main TOBC Bit[3]: ANTH Bit[2]: RW Bit[1]: Sub TOBC Bit[0]: MOBC
82	Equipment Power Status	1	u8	1: ON, 0: OFF Bit[7]: reserved Bit[6]: MOBC Bit[5]: AOBC Bit[4]: TOBC2 Bit[3]: ANTDEP Bit[2]: RW Bit[1]: TOBC1 Bit[0]: MTQ



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
83	MPPT Status	1	u8	1: Disabled, 0: Enabled Bit[7]: reserved Bit[6]: MPPT3 Bit[5]: MPPT4 Bit[4]: MPPT5 Bit[3:2]: reserved Bit[1]: MPPT1 Bit[0]: MPPT2
84	Battery Charge/Discharge Controller Status	1	u8	1: Disabled, 0: Enabled Bit[7]: BAT2 Discharge Control PGOOD (1: good, 0: no-good) Bit[6]: BAT1 Discharge Control PGOOD (1: good, 0: no-good) Bit[5]: BAT1 Discharge Bit[4]: BAT1 Charge Bit[3]: Forced enable BAT1,2 Bit[2]: BAT2 Charge Bit[1]: BAT2 Discharge Bit[0]: reserved



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
85	Internal Equipment Communication Error Status	1	u8	1: Communication failure, 0: Communication success Bit[7]: BAT Bit[6]: SAP Bit[5]: SAP temp Bit[4]: load sensor Bit[3]: battery switch Bit[2]: MPPT switch Bit[1]: power switch Bit[0]: fault detector
86	Main TOBC Boot Count	1	u8	
87	Main TOBC Uptime [h]	1	u8	
88	Main TOBC Period of no uplink reception [h]	1	u8	0-24
89	Main TOBC RSSI [dBm]	1	s8	Overflow to 127 for values below -129
90	Main TOBC Uplink Reception Counter	1	u8	
91	Main TOBC Uplink Modulation	1	u8	0:AFSK / 1:GMSK



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
92	Main TOBC Downlink Modulation	1	u8	0:AFSK 1:GMSK 2:4-FSK 3:O-QPSK
93	Main TOBC Downlink Protocol	1	u8	0:CCSDS / 1:Ax.25
94	Main TOBC Frequency Lock	1	u8	0:locked / 1:unlocked
95	Main TOBC PA Temperature [°C]	1	s8	
96	Main TOBC PA Current [mA]	2	s16	
97	Main TOBC MCU Temperature [°C]	1	s8	
98	Sub TOBC Boot Count	1	u8	
99	Sub TOBC Uptime [h]	1	u8	
100	Sub TOBC Period of no uplink reception [h]	1	u8	0-24
101	Sub TOBC RSSI [dBm]	1	s8	Overflow to 127 for values below -129
102	Sub TOBC Uplink Reception Counter	1	u8	



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
103	Sub TOBC Uplink Modulation	1	u8	0:AFSK / 1:GMSK
104	Sub TOBC Downlink Modulation	1	u8	0:AFSK 1:GMSK 2:4-FSK 3:Q-QPSK
105	Sub TOBC Downlink Protocol	1	u8	0:CCSDS / 1:Ax.25
106	Sub TOBC Frequency Lock	1	u8	0:locked / 1:unlocked
107	Sub TOBC PA Temperature [°C]	1	s8	
108	Sub TOBC PA Current [mA]	2	s16	
109	Sub TOBC MCU Temperature [°C]	1	s8	



Packet 2

No.	Description	Number of Bytes	Data Type	Details
1	Header	5	u40	Always 0x00184A8001
2	Timestamp	4	u32	
3	Timestamp	2	u16	
4	Packet Type	1	u8	Always 0x02
5	Telemetry ID	2	u16	
6	COBC Uptime [sec]	8	u64	
7	Satellite System Time [ms]	8	u64	UNIX time
8	Mission Command Execution Result	1	u8	0x00: Success 0xF1: CRC Error 0xF2: Command Execution Error 0xFF: Command Not Executable



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
9	Mission Command Execution Result Details	2	u16	0xFF00: Asynchronous Command Received 0xFFFF: Mission System Abnormal Termination 0xFF01: JSON Parse Error 0xFF02: Command Processing Result Error 0xFF03: Command ID Not Found
10	OS Time at Telemetry Generation [ms]	8	u64	
11	System Time at Telemetry Generation [ms]	8	u64	
12	MOBC Temperature [°C]	1	s8	
13	Composition System Status	1	u8	0x00: Stopped, 0x01: Standby, 0x02: Composing
14	STT Status	1	u8	0x00: Stopped, 0x01: Standby, 0x02: Computing
15	Right Ascension Last Acquired by STT [deg]	4	float	
16	Declination Last Acquired by STT [deg]	4	float	
17	Roll Angle Last Acquired by STT [deg/s]	4	float	
18	Validity of Acquired Coordinates	1	u8	



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
19	Image Capture Time [ms]	4	u64	
20	Most Recent Command ID 1	1	u8	
21	Most Recent Command Result 1	1	u8	Refer to No.8 Mission Command Execution Result
22	Most Recent Command Result Detail 1	2	u16	Refer to the Mission Command Result Detail Table
23	Most Recent Command ID 2	1	u8	
24	Most Recent Command Result 2	1	u8	Refer to No.8 Mission Command Execution Result
25	Most Recent Command Result Detail 2	2	u16	Refer to the Mission Command Result Detail Table
26	Most Recent Command ID 3	1	u8	
27	Most Recent Command Result 3	1	u8	Refer to No.8 Mission Command Execution Result
28	Most Recent Command Result Detail 3	2	u16	Refer to the Mission Command Result Detail Table



Packet2 Appended table Mission Command Execution Result Detail Table

Command	Value	Details
(Command Independent)	0xFF00	Asynchronous command received
	0xFFFF	Mission system terminated abnormally
	0xFF01	JSON parsing error occurred in mission system
	0xFF02	Failed to retrieve command execution result in mission system
	0xFF03	Requested command ID not found
ECHO	0x0100	Normal termination
SYNC	0x0200	Normal termination
	0x0201	Error occurred during time-setting command execution
REPORT	0x1000	Normal termination
	0x1001	Parameter validation error
TEST	0x1100	Normal termination



Command	Value	Details
STT_WITH_TAKE_PHOTO	0x2000	Normal termination
	0x2001	Failed to get return value from STT or camera process, or exception occurred during retrieval
	0x2002	Inter-process communication connection error
STT	0x2100	Normal termination
	0x2101	Exception occurred while retrieving return value from STT process
	0x2102	Inter-process communication connection error
GET_RADECINFO	0x2200	Normal termination
	0x2201	An exception occurred while loading radecinfohist.ndjson
TAKE_PHOTO	0x3000	Normal termination
	0x3001	Error retrieving return value from the camera process, or inter-process communication connection error



RSP-03 HK Beacon Format



Command	Value	Details
COMPOSE	0x0700	Normal termination
	0x0701	Error retrieving the file of right ascension and declination calculation result list
	0x0702	Error creating WAV file for Digitalker
	0x0703	Error writing composition information list
	0x0704	Cannot compose music based on image because image ID not found
	0x0705	Composition parameter ID not found
	0x0706	Composition parameter list file not found
	0x0707	Cannot connect to composition process
	0x0708	Failed to dynamically import magenta library or magenta execution error
	0x0709	Digitalker speech synthesis failure
	0x07FF	Other errors (unused)



Command	Value	Details
GET_MUSICINFOLIST	0x7100	Normal termination
	0x7101	Exception occurred during loading of musicinfolist.ndjson
GET_MUSICDATA	0x0800	Normal termination. All segmented data responded
	0x0801	Normal termination. Next segmented data available
	0x0802	Specified MUSIC_ID does not exist
	0x0803	Parameter error
SET_DIGITALK	0x0900	Normal termination
	0x0901	Parameter error
	0x0902	Specified MUSIC_ID does not exist
	0x0903	Abnormal termination
SET_SSTV	0x0C00	Normal termination
	0x0C01	Parameter error
	0x0C02	Specified IMAGE_ID does not exist
	0x0C03	Unexpected error



RSP-03 HK Beacon Format



Command	Value	Details
GET_PICINFO	0x3100	Normal termination
	0x3101	Exception occurred during loading of camerainfolist.ndjson
GET_PICDATA	0x3200	Normal completion. All segmented data responded
	0x3201	Normal completion. Next segmented data available
	0x3202	Specified IMAGE_ID does not exist
	0x3203	Parameter error
SET_CAM_CONFIG	0x3300	Normal termination
	0x3301	Parameter error
GET_CAM_CONFIG	0x3400	Normal termination
REGISTER_FILE	0x4000	Normal termination
UPLOAD	0x4100	Normal termination (All segmented data received; file merging was performed)
	0x4101	Normal termination (File merging was not performed due to missing segmented data)
	0x4102	Specified file ID does not exist



RSP-03 HK Beacon Format



Command	Value	Details
DOWNLOAD	0x4200	Normal termination (All segmented data of the specified size were responded)
	0x4201	Normal termination (Next segmented data available)
	0x4202	Specified file ID does not exist
	0x4203	File for the specified file ID does not exist
RUN_SHELL	0x4300	Normal termination
	0x43nn	Shell command terminated abnormally



Packet 3

No.	Description	Number of Bytes	Data Type	Details
1	Header	5	u40	Always 0x0018DF8001
2	Time	4	u32	
3	Time	2	u16	
4	Packet Type	1	u8	Always 0x03
5	Telemetry ID	2	u16	
6	COBC Uptime [sec]	8	u64	
7	Satellite System Time [ms]	8	u64	UNIX time
8	Telemetry Type	1	u8	Always 0x03
9	Attitude Control Mode	1	u8	1:STANDBY 2:STABILIZING 3:POINTING 4:UNLOADING 5:COMMISSIONING



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
10	Ground Packet Reception Count	2	u16	
11	X-axis RW Mode	1	u8	0:disable / 1:enable
12	X-axis RW Speed [rpm]	4	s32	Positive: CW / Negative: CCW
13	X-axis RW Status	1	u8	Unused. Fixed to 0.
14	Y-axis RW Mode	1	u8	0:disable / 1:enable
15	Y-axis RW Speed [rpm]	4	s32	Positive: CW / Negative: CCW
16	Y-axis RW Status	1	u8	Unused. Fixed to 0.
17	Z-axis RW Mode	1	u8	0:disable / 1:enable
18	Z-axis RW Speed [rpm]	4	s32	Positive: CW / Negative: CCW
19	Z-axis RW Status	1	u8	Unused. Fixed to 0.
20	X-axis MTQ Mode	1	u8	0: MTQ off, 1: MTQ active
21	X-axis MTQ Set Voltage [mV]	4	s32	
22	X-axis MTQ Status	1	u8	Unused. Fixed to 0.



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
23	Y-axis MTQ Mode	1	u8	0: MTQ off, 1: MTQ active
24	Y-axis MTQ Set Voltage [mV]	4	s32	
25	Y-axis MTQ Status	1	u8	Unused. Fixed to 0.
26	Z-axis MTQ Mode	1	u8	0: MTQ off, 1: MTQ active
27	Z-axis MTQ Set Voltage [mV]	4	s32	
28	Z-axis MTQ Status	1	u8	Unused. Fixed to 0.
29	IMU1 X-axis Acceleration [g]	4	float	
30	IMU1 Y-axis Acceleration [g]	4	float	
31	IMU1 Z-axis Acceleration [g]	4	float	
32	IMU1 X-axis Angular Velocity [mdeg/s]	4	float	
33	IMU1 Y-axis Angular Velocity [mdeg/s]	4	float	
34	IMU1 Z-axis Angular Velocity [mdeg/s]	4	float	
35	IMU1 X-axis Magnetic Field [μ T]	4	float	



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
36	IMU1 Y-axis Magnetic Field [μ T]	4	float	
37	IMU1 Z-axis Magnetic Field [μ T]	4	float	
38	IMU1 Temperature [$^{\circ}$ C]	4	float	
39	IMU1 Status	1	u8	Unused. Fixed to 0.
40	IMU2 X-axis Acceleration [g]	4	float	
41	IMU2 Y-axis Acceleration [g]	4	float	
42	IMU2 Z-axis Acceleration [g]	4	float	
43	IMU2 X-axis Angular Velocity [mdeg/s]	4	float	
44	IMU2 Y-axis Angular Velocity [mdeg/s]	4	float	
45	IMU2 Z-axis Angular Velocity [mdeg/s]	4	float	
46	IMU2 X-axis Magnetic Field [μ T]	4	float	
47	IMU2 Y-axis Magnetic Field [μ T]	4	float	
48	IMU2 Z-axis Magnetic Field [μ T]	4	float	



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
49	IMU2 Temperature [m°C]	4	float	
50	IMU2 Status	1	u8	Unused. Fixed to 0.
51	IMU3 X-axis Acceleration [g]	4	float	
52	IMU3 Y-axis Acceleration [g]	4	float	
53	IMU3 Z-axis Acceleration [g]	4	float	
54	IMU3 X-axis Angular Velocity [mdeg/s]	4	float	
55	IMU3 Y-axis Angular Velocity [mdeg/s]	4	float	
56	IMU3 Z-axis Angular Velocity [mdeg/s]	4	float	
57	IMU3 X-axis Magnetic Field [μT]	4	float	
58	IMU3 Y-axis Magnetic Field [μT]	4	float	
59	IMU3 Z-axis Magnetic Field [μT]	4	float	
60	IMU3 Temperature [m°C]	4	float	
61	IMU3 Status	1	u8	Unused. Fixed to 0.



RSP-03 HK Beacon Format



No.	Description	Number of Bytes	Data Type	Details
62	X-axis RW Proportional Gain	4	float	
63	X-axis RW Derivative Gain	4	float	
64	Y-axis RW Proportional Gain	4	float	
65	Y-axis RW Derivative Gain	4	float	
66	Z-axis RW Proportional Gain	4	float	
67	Z-axis RW Derivative Gain	4	float	
68	Commissioning Runtime [s]	4	u32	
69	IMU Fault Detection Threshold	4	float	
70	Active IMU	1	u8	0/1/2
71	Bdot Control Voltage [mV]	4	u32	
72	Bdot Reference Magnetic Field [μ T]	4	float	Reference for determining direction in Bdot control