

ChubuSat-2/-3 Telemetry List(1/8)

No.	component	name	Length [bit]	Rate [Hz]	Conversion	Explanation	Notes
10101	SAS#1	SAS#1 X Vector	32	0.1	32bit IEEE754 float [no unit]	Sun Sensor #1 Sun Vector (X Sun Sensor value)	No use for ChubuSat-2
10102		SAS#1 Y Vector	32	0.1	32bit IEEE754 float [no unit]	Sun Sensor #1 Sun Vector (Y Sun Sensor value)	No use for ChubuSat-2
10103		SAS#1 Z Vector	32	0.1	32bit IEEE754 float [no unit]	Sun Sensor #1 Sun Vector (Z Sun Sensor value)	No use for ChubuSat-2
10104		SAS#1 Fit Quality	8	0.1	8bit signed int [no unit]	Output vector is (>=0)effective, (<0)not effective	No use for ChubuSat-2
10105		SAS#1 Geometry Quality	8	0.1	8bit signed int [no unit]	Output vector is (>=0)effective, (<0)not effective	No use for ChubuSat-2
10110		SAS#1 Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between Sun Sensor #1 and OBC	No use for ChubuSat-2
10201	SAS#2	SAS#2 X Vector	32	0.1	32bit IEEE754 float [no unit]	Sun Sensor #2 Sun Vector (X Sun Sensor value)	
10202		SAS#2 Y Vector	32	0.1	32bit IEEE754 float [no unit]	Sun Sensor #2 Sun Vector (Y Sun Sensor value)	
10203		SAS#2 Z Vector	32	0.1	32bit IEEE754 float [no unit]	Sun Sensor #2 Sun Vector (Z Sun Sensor value)	
10204		SAS#2 Fit Quality	8	0.1	8bit signed int [no unit]	Output vector is (>=0)effective, (<0)not effective	
10205		SAS#2 Geometry Quality	8	0.1	8bit signed int [no unit]	Output vector is (>=0)effective, (<0)not effective	
10210		SAS#2 Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between Sun Sensor #2 and OBC	
10301	SAS#3	SAS#3 X Vector	32	0.1	32bit IEEE754 float [no unit]	Sun Sensor #3 Sun Vector (X Sun Sensor value)	No use for ChubuSat-2
10302		SAS#3 Y Vector	32	0.1	32bit IEEE754 float [no unit]	Sun Sensor #3 Sun Vector (Y Sun Sensor value)	No use for ChubuSat-2
10303		SAS#3 Z Vector	32	0.1	32bit IEEE754 float [no unit]	Sun Sensor #3 Sun Vector (Z Sun Sensor value)	No use for ChubuSat-2
10304		SAS#3 Fit Quality	8	0.1	8bit signed int [no unit]	Output vector is (>=0)effective, (<0)not effective	No use for ChubuSat-2
10305		SAS#3 Geometry Quality	8	0.1	8bit signed int [no unit]	Output vector is (>=0)effective, (<0)not effective	No use for ChubuSat-2
10310		SAS#3 Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between Sun Sensor #3 and OBC	No use for ChubuSat-2
11101	RW X	RW X Measured Speed	32	1	DEC*0.008789-8789 [rpm]	Reaction Wheel X Measured Speed	
11110		RW X Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between Reaction Wheel X and OBC	
11201	RW Y	RW Y Measured Speed	32	1	DEC*0.008789-8789 [rpm]	Reaction Wheel Y Measured Speed	No use for ChubuSat-2/-3
11210		RW Y Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between Reaction Wheel Y and OBC	No use for ChubuSat-2/-3
11301	RW Z	RW Z Measured Speed	32	1	DEC*0.008789-8789 [rpm]	Reaction Wheel Z Measured Speed	No use for ChubuSat-2/-3
11310		RW Z Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between Reaction Wheel Z and OBC	No use for ChubuSat-2/-3
12001	A-TRX	RX A Receive Level	16	1	0000h:0V-FFFFh:5V	RX A Receive Level	
12002		RX B Receive Level	16	1	0000h:0V-FFFFh:5V	RX B Receive Level	
12011		TX Modem Select	1	1	0:TX-A, 1:TX-B	TX Modem Select status	
12012		TX Antenna Select	1	1	0:TX-ANT-A, 1:TX-ANT-B	TX Antenna Select status	
12013		TX Status	1	1	0:Finished, 1:Transmitting	TX finished/transmitting status	
12903		TX A Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between TX A and OBC	
12904		TX B Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between TX B and OBC	
12905		RX A Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between RX A and OBC	
12906		RX B Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between RX B and OBC	
12101	SRX	NRZS Data -	16	1	-	NRZS Data -	
12102		NRZS Data +	16	1	-	NRZS Data +	
12103		Data Clock +	16	1	-	Data Clock +	
12104		Data Clock -	16	1	-	Data Clock -	
12105		Carrier Lock	16	1	-	Carrier Lock	
12106		Sub Carrier Lock	16	1	-	Sub Carrier Lock	
12107		SRX Select Status	16	1	-	SRX Select Status	
12108		ASYN AGC Voltage	16	1	-	ASYN AGC Voltage	
12109		SYN AGC Voltage	16	1	-	SYN AGC Voltage	
12110		Frequency Error Voltage	16	1	-	Frequency Error Voltage	
12111		SRX Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between SRX and OBC	
12201	STX	+5V Monitor	16	1	-	+5V Monitor	
12202		STX Temperature	16	1	-	STX Temperature	
12203		STX Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between STX and OBC	
13041	STS	Observed STS Quartanion q1	32	1	32bit IEEE754 float [no unit]	Star Sensor quartanion output q1	No STS on ChubuSat-2/-3
13042		Observed STS Quartanion q2	32	1	32bit IEEE754 float [no unit]	Star Sensor quartanion output q2	No STS on ChubuSat-2/-3
13043		Observed STS Quartanion q3	32	1	32bit IEEE754 float [no unit]	Star Sensor quartanion output q3	No STS on ChubuSat-2/-3
13044		Observed STS Quartanion q4	32	1	32bit IEEE754 float [no unit]	Star Sensor quartanion output q4	No STS on ChubuSat-2/-3
13092		STS Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between Star Sensor and OBC	No STS on ChubuSat-2/-3
14001	GYRO X	GYRO X Temperature	16	0.1	signed int[degC]	GYRO X Temperature	
14014		Observed GYRO X Rate	32	1	32bit IEEE754 float *180/pi [deg/sec]	Observed GYRO X Rate	
14101	GYRO Y	GYRO Y Temperature	16	0.1	signed int[degC]	GYRO Y Temperature	
14114		Observed GYRO Y Rate	32	1	32bit IEEE754 float *180/pi [deg/sec]	Observed GYRO Y Rate	
14201	GYRO Z	GYRO Z Temperature	16	0.1	signed int[degC]	GYRO Z Temperature	
14214		Observed GYRO Z Rate	32	1	32bit IEEE754 float *180/pi [deg/sec]	Observed GYRO Z Rate	
14301	GYRO X/Y/Z	GYRO Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between GYRO and OBC	

ChubuSat-2/-3 Telemetry List (2/8)

No.	component	name	Length [bit]	Rate [Hz]	Conversion	Explanation	Notes
15001	GAS	GAS Temperature	16	0.1	[DEC]:signed short T[°C] = (0.1*( (5000.0 / 32767.0 ) * [DEC] )) - 273.0	Geomagnetic Sensor Temperature	
15011		Earth Magnetic Field X	32	0.1	32bit IEEE754 float [uT]	Earth Magnetic Field output(Geomagnetic Sensor_X value)	
15012		Earth Magnetic Field Y	32	0.1	32bit IEEE754 float [uT]	Earth Magnetic Field output(Geomagnetic Sensor_Y value)	
15013		Earth Magnetic Field Z	32	0.1	32bit IEEE754 float [uT]	Earth Magnetic Field output(Geomagnetic Sensor_Z value)	
16003	MTQ X	MTQ X Primary Temperature	8	0.1	00h-FFh:0-5[V] T[°C] =2.6027*E <sup>-3</sup> -18*E <sup>-2</sup> +56.648*E-61.388  E:voltage[V]	Magnetic Torquer X Primary Temperature	
16004		MTQ X Secondary Temperature	8	0.1	00h-FFh:0-5[V] T[°C] =2.6027*E <sup>-3</sup> -18*E <sup>-2</sup> +56.648*E-61.388  E:voltage[V]	Magnetic Torquer X Secondary Temperature	
16013	MTQ Y	MTQ Y Primary Temperature	8	0.1	00h-FFh:0-5[V] T[°C] =2.6027*E <sup>-3</sup> -18*E <sup>-2</sup> +56.648*E-61.388  E:voltage[V]	Magnetic Torquer Y Primary Temperature	
16014		MTQ Y Secondary Temperature	8	0.1	00h-FFh:0-5[V] T[°C] =2.6027*E <sup>-3</sup> -18*E <sup>-2</sup> +56.648*E-61.388  E:voltage[V]	Magnetic Torquer Y Secondary Temperature	
16023	MTQ Z	MTQ Z Primary Temperature	8	0.1	00h-FFh:0-5[V] T[°C] =2.6027*E <sup>-3</sup> -18*E <sup>-2</sup> +56.648*E-61.388  E:voltage[V]	Magnetic Torquer Z Primary Temperature	
16024		MTQ Z Secondary Temperature	8	0.1	00h-FFh:0-5[V] T[°C] =2.6027*E <sup>-3</sup> -18*E <sup>-2</sup> +56.648*E-61.388  E:voltage[V]	Magnetic Torquer Z Secondary Temperature	
16101	MTQ X/Y/Z	MTQ Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between Magnetic Torquer and OBC	
17001	GPSR	Position Latitude	32	1	signed int * 0.001[arcmin]	Position Latitude	No use for ChubuSat-2
17002		Position Longitude	32	1	signed int * 0.001[arcmin]	Position Longitude	No use for ChubuSat-2
17003		Position Altitude	24	1	signed int * 1[m]	Position Altitude	No use for ChubuSat-2
17004		Mesurement Speed	16	1	signed int * 1[m/s]	Mesurement Speed	No use for ChubuSat-2
17005		Mesurement Orientation	16	1	signed int * 0.1[deg]	Mesurement Orientation	No use for ChubuSat-2
17006		PDOP	16	1	signed int * 0.1	PDOP	No use for ChubuSat-2
17008		Number of satellite in good health	8	1	Range: 0 - 32	Number of satellite in good health	No use for ChubuSat-2
17009		Number of satellite in sight	8	1	Range: 0 - 32	Number of satellite in sight	No use for ChubuSat-2
17010		Position delay time	8	1	signed int * 0.1[s]	Position delay time	No use for ChubuSat-2
17011		PPS correction	8	1	0:Not completed 1:Completed	PPS correction	No use for ChubuSat-2
17012		Command receiving counter	8	1	Range: 0 - 127	Command receiving counter	No use for ChubuSat-2
17013		GPSR Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between GPS Receiver and OBC	No use for ChubuSat-2
17014		Positioning Status	8	1	-	GPS Receiver status	No use for ChubuSat-2

ChubuSat-2/-3 Telemetry List (3/8)

No.	component	name	Length [bit]	Rate [Hz]	Conversion	Explanation	Notes
20011	PCU	Battery 1 Voltage	8	1	00h:0V-FFh:+40V 156.86mV/bit	Battery 1 Voltage	
20012		Battery 2 Voltage	8	1	00h:0V-FFh:+40V 156.86mV/bit	Battery 2 Voltage	
20013		Battery 3 Voltage	8	1	00h:0V-FFh:+40V 156.86mV/bit	Battery 3 Voltage	
20014		Battery 4 Voltage	8	1	00h:0V-FFh:+40V 156.86mV/bit	Battery 4 Voltage	
20021		Battery 1 Charge/Discharge Current	8	1	00h-7Fh (a=0-127):charge current charge current=-8.8a+1125mA 80h-FFh (a=128-255):discharge current discharge current=-15.6a+1996mA	Battery 1 Charge/Discharge Current	
20022		Battery 2 Charge/Discharge Current	8	1	00h-7Fh (a=0-127):charge current charge current=-8.8a+1125mA 80h-FFh (a=128-255):discharge current discharge current=-15.6a+1996mA	Battery 2 Charge/Discharge Current	
20023		Battery 3 Charge/Discharge Current	8	1	00h-7Fh (a=0-127):charge current charge current=-8.8a+1125mA 80h-FFh (a=128-255):discharge current discharge current=-15.6a+1996mA	Battery 3 Charge/Discharge Current	
20024		Battery 4 Charge/Discharge Current	8	1	00h-7Fh (a=0-127):charge current charge current=-8.8a+1125mA 80h-FFh (a=128-255):discharge current discharge current=-15.6a+1996mA	Battery 4 Charge/Discharge Current	
20041		Battery Temperature #1 Ch 1	8	1	T[degC]=a/2.179-44.993 (a : DEC value) LSB = 0.46[degC]	Battery Temperature #1 Ch 1	
20044		Battery Temperature #1 Ch 4	8	1	T[degC]=a/2.261-45.439 (a : DEC value) LSB = 0.44[degC]	Battery Temperature #1 Ch 4	
20047		Battery Temperature #2 Ch 1	8	1	T[degC]=a/2.179-44.993 (a : DEC value) LSB = 0.46[degC]	Battery Temperature #2 Ch 1	
20050		Battery Temperature #2 Ch 4	8	1	T[degC]=a/2.261-45.439 (a : DEC value) LSB = 0.44[degC]	Battery Temperature #2 Ch 4	
20061		SAP A Voltage	8	1	00h:0V-FFh:+40V 156.86mV/bit	SAP A Voltage(+Z)	
20062		SAP B Voltage	8	1	00h:0V-FFh:+40V 156.86mV/bit	SAP B Voltage(+X)	No use for ChubuSat-2
20063		SAP C Voltage	8	1	00h:0V-FFh:+40V 156.86mV/bit	SAP C Voltage(-Z)	
20064		SAP D Voltage	8	1	00h:0V-FFh:+40V 156.86mV/bit	SAP D Voltage(+Y)	
20065		SAP E Voltage	8	1	00h:0V-FFh:+40V 156.86mV/bit	SAP E Voltage(-X)	
20066		SAP F Voltage	8	1	00h:0V-FFh:+40V 156.86mV/bit	SAP F Voltage(-Y)	
20081		Bus Voltage	8	1	00h:0V-FFh:+40V 156.86mV/bit	Bus Voltage	
20201		OBC mission I/F module power	1	1	0:OFF, 1:ON	On-Board Computer mission I/F module power ON/OFF status	
20202		S-TX Power	1	1	0:OFF, 1:ON	S-band Transmitter ON/OFF status	
20203		S-RX Power	1	1	0:OFF, 1:ON	S-band Receiver(main) ON/OFF status	
20204	S-RX(emergency) Power	1	1	0:OFF, 1:ON	S-band Receiver(emergency) ON/OFF status		
20206	A-TX-A Power	1	1	0:OFF, 1:ON	Amateur-band Transmitter #1 ON/OFF status		
20207	A-RX-A Power	1	1	0:OFF, 1:ON	Amateur-band Receiver #1 ON/OFF status		
20208	A-TX-B Power	1	1	0:OFF, 1:ON	Amateur-band Transmitter #2 ON/OFF status		
20209	A-RX-B Power	1	1	0:OFF, 1:ON	Amateur-band Receiver #2 ON/OFF status		
20210	SAS#1 Power	1	1	0:OFF, 1:ON	Sun Sensor #1 ON/OFFstatus	No use for ChubuSat-2	
20211	SAS#2 Power	1	1	0:OFF, 1:ON	Sun Sensor #2 ON/OFFstatus		
20212	SAS#3 Power	1	1	0:OFF, 1:ON	Sun Sensor #3 ON/OFFstatus	No use for ChubuSat-2	
20213	GYRO Power	1	1	0:OFF, 1:ON	GYRO ON/OFF status		
20214	GPSR Power	1	1	0:OFF, 1:ON	GPS Receiver ON/OFF status	No use for ChubuSat-2	
20215	STS Power	1	1	0:OFF, 1:ON	Star Sensor ON/OFF status	No use for ChubuSat-2/-3	
20216	RW X(+5V) Power	1	1	0:OFF, 1:ON	Reaction Wheel X(+5V) ON/OFF status		
20217	RW X(+28V) Power	1	1	0:OFF, 1:ON	Reaction Wheel X(+28V) ON/OFF status	No use for ChubuSat-2/-3	
20218	RW Y(+5V) Power	1	1	0:OFF, 1:ON	Reaction Wheel Y(+5V) ON/OFF status	No use for ChubuSat-2/-3	
20219	RW Y(+28V) Power	1	1	0:OFF, 1:ON	Reaction Wheel Y(+28V) ON/OFF status	No use for ChubuSat-2/-3	
20220	RW Z(+5V) Power	1	1	0:OFF, 1:ON	Reaction Wheel Z(+5V) ON/OFF status	No use for ChubuSat-2/-3	
20221	RW Z(+28V) Power	1	1	0:OFF, 1:ON	Reaction Wheel Z(+28V) ON/OFF status	No use for ChubuSat-2/-3	
20222	GAS(+12V) Power	1	1	0:OFF, 1:ON	Geomagnetic Sensor power (+12V) ON/OFF status		
20223	GAS(-12V) Power	1	1	0:OFF, 1:ON	Geomagnetic Sensor power (-12V) ON/OFF status		
20224	O-CAM Power	1	1	0:OFF, 1:ON	ChubuSat-2:IR Camera ON/OFF status ChubuSat-3:Optical Camera ON/OFF status		
20226	RD Power	1	1	0:OFF, 1:ON	ChubuSat-2:Radiation Detector ON/OFF status ChubuSat-3:Finder Camera ON/OFF status		

ChubuSat-2/-3 Telemetry List (4/8)

No.	component	name	Length [bit]	Rate [Hz]	Conversion	Explanation	Notes
20227	(PCU)	RF SW #1 Power	1	1	0:OFF, 1:ON	Amateur Transmitter switch ON/OFF status	
20228		RF SW #2 Power	1	1	0:OFF, 1:ON	Amateur transmitting antenna switch ON/OFF status	
20304		Battery A Charge Mode Status	8	1	00h:stop charging, 10h:300mA, 11h:500mA, 12h:1000mA, 13h:2000mA, 14h:3000mA	Battery A Charge Mode Status	
20305		Battery B Charge Mode Status	8	1	00h:stop charging, 10h:300mA, 11h:500mA, 12h:1000mA, 13h:2000mA, 14h:3001mA	Battery B Charge Mode Status	
20306		+5V Voltage	8	1	00h:0V-FFh:10V 39.2mV/bit	+5V Voltage	
20307		+12V Voltage	8	1	00h:0V-FFh:20V 78.3mV/bit	+12V Voltage	
20308		-12V Voltage	8	1	00h-FFh : 0V - -20V, Least Significant Bit = -78.3mV	-12V Voltage	
20309		+5V Voltage (Always ON)	8	1	00h:0V-FFh:10V 39.2mV/bit	+5V Voltage (Always ON)	
20310		+12V Voltage (Always ON)	8	1	00h:0V-FFh:20V 78.3mV/bit	+12V Voltage (Always ON)	
20311		-12V Voltage (Always ON)	8	1	00h-FFh : 0V - -20V, Least Significant Bit = -78.3mV	-12V Voltage (Always ON)	
20312		OBC Current	8	0.1	00h:0mA-FFh:2700mA 10.6mA/bit	On-Board Computer Current	
20313		S-TX Current	8	0.1	00h:0mA-FFh:8040mA 31.4mA/bit	S-band Transmitter Current	
20314		S-RX Current	8	0.1	00h:0mA-FFh:2040mA 8.0mA/bit	S-band Receiver Current	
20315		S-RX(emergency) Current	8	0.1	00h:0mA-FFh:5000mA 19.5mA/bit	S-band Receiver(emergency) Current	
20317		A-TX-A Current	8	0.1	00h:0mA-FFh:4000mA 15.9mA/bit	Amateur Transmitter #1 Current	
20318		A-RX-A Current	8	0.1	00h:0mA-FFh:420mA 1.6mA/bit	Amateur Receiver #1 Current	
20319		A-TX-B Current	8	0.1	00h:0mA-FFh:4000mA 15.9mA/bit	Amateur Transmitter #2 Current	
20320		A-RX-B Current	8	0.1	00h:0mA-FFh:420mA 1.6mA/bit	Amateur Receiver #2 Current	
20321		SAS#1 Current	8	0.1	00h:0mA-FFh:360mA 1.4mA/bit	Sun Sensor #1 Current	No use for ChubuSat-2
20322		SAS#2 Current	8	0.1	00h:0mA-FFh:360mA 1.4mA/bit	Sun Sensor #2 Current	
20323		SAS#3 Current	8	0.1	00h:0mA-FFh:360mA 1.4mA/bit	Sun Sensor #3 Current	No use for ChubuSat-2
20324		GYRO Current	8	0.1	00h:0mA-FFh:5200mA 20.3mA/bit	GYRO Current	
20325		GPSR Current	8	0.1	00h:0mA-FFh:3600mA 14.1mA/bit	GPS Receiver Current	No use for ChubuSat-2
20326		STS Current	8	0.1	00h:0mA-FFh:1500mA 5.9mA/bit	Star Sensor Current	No use for ChubuSat-2/-3
20327		RW X(+5V) Current	8	0.1	00h:0mA-FFh:1620mA 6.4mA/bit	Reaction Wheel X(+5V) Current	
20328		RW X(+28V) Current	8	0.1	00h:0mA-FFh:1400mA 5.5mA/bit	Reaction Wheel X(+28V) Current	
20329		RW Y(+5V) Current	8	0.1	00h:0mA-FFh:1620mA 6.4mA/bit	Reaction Wheel Y(+5V) Current	No use for ChubuSat-2/-3
20330		RW Y(+28V) Current	8	0.1	00h:0mA-FFh:1400mA 5.5mA/bit	Reaction Wheel Y(+28V) Current	No use for ChubuSat-2/-3
20331		RW Z(+5V) Current	8	0.1	00h:0mA-FFh:1620mA 6.4mA/bit	Reaction Wheel Z(+5V) Current	No use for ChubuSat-2/-3
20332		RW Z(+28V) Current	8	0.1	00h:0mA-FFh:1400mA 5.5mA/bit	Reaction Wheel Z(+28V) Current	No use for ChubuSat-2/-3
20333		GAS(+12V) Current	8	0.1	00h:0mA-FFh:240mA 0.9mA/bit	Geomagnetic Sensor (+12V) Current	
20334		GAS(-12V) Current	8	0.1	00h:0mA-FFh:240mA 0.9mA/bit	Geomagnetic Sensor (-12V) Current	
20335		O-CAM Current	8	0.1	00h:0mA-FFh:10000mA 39.1mA/bit	ChubuSat-2:IR Camera current ChubuSat-3:Optical Camera current	
20337		RD Current	8	0.1	00h:0mA-FFh:10000mA 39.1mA/bit	ChubuSat-2:Radiation Detector current ChubuSat-3:Finder Camera current	
20338		RF SW #1 Current	8	0.1	00h:0mA-FFh:1680mA 6.6mA/bit	Amateur Transmitter switch current	
20339		RF SW #2 Current	8	0.1	00h:0mA-FFh:1680mA 6.6mA/bit	Amateur transmitting antenna switch current	
20348		SAP A Current	8	1	00h-FFh:0mA-2000mA Least Significant Bit=7.8mA	SAP A Current(+Z)	
20349		SAP B Current	8	1	00h-FFh:0mA-2000mA Least Significant Bit=7.8mA	SAP B Current(+X)	No use for ChubuSat-2
20350		SAP C Current	8	1	00h-FFh:0mA-2000mA Least Significant Bit=7.8mA	SAP C Current(-Z)	
20351		SAP D Current	8	1	00h-FFh:0mA-2000mA Least Significant Bit=7.8mA	SAP D Current(+Y)	
20352		SAP E Current	8	1	00h-FFh:0mA-2000mA Least Significant Bit=7.8mA	SAP E Current(-X)	
20353		SAP F Current	8	1	00h-FFh:0mA-2000mA Least Significant Bit=7.8mA	SAP F Current(-Y)	
20401		SAP Deploy Status ch.1	1	1	0:OFF, 1:ON	SAP Deploy Status ch.1	
20402		SAP Deploy Status ch.2	1	1	0:OFF, 1:ON	SAP Deploy Status ch.2	
20403		SAP Deploy Status ch.3	1	1	0:OFF, 1:ON	SAP Deploy Status ch.3	
20404		SAP Deploy Status ch.4	1	1	0:OFF, 1:ON	SAP Deploy Status ch.4	
20501		CPU Select Status	1	1	0:CPU#1, 1:CPU#2	CPU Select Status	
20601		System Heater #1 ON/OFF status	4	1	0h:OFF, Fh:ON	System Heater #1 ON/OFF status	
20602		System Heater #2 ON/OFF status	4	1	0h:OFF, Fh:ON	System Heater #2 ON/OFF status	
20603		System Heater #3 ON/OFF status	4	1	0h:OFF, Fh:ON	System Heater #3 ON/OFF status	
20604		System Heater #4 ON/OFF status	4	1	0h:OFF, Fh:ON	System Heater #4 ON/OFF status	
20605		Battery Heater #1 ON/OFF status	4	1	0h:OFF, Fh:ON	Battery Heater #1 ON/OFF status	
20606		Battery Heater #2 ON/OFF status	4	1	0h:OFF, Fh:ON	Battery Heater #2 ON/OFF status	
20902		PCU Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between PCU and OBC	

ChubuSat-2/-3 Telemetry List (5/8)

No.	component	name	Length [bit]	Rate [Hz]	Conversion	Explanation	Notes
30001	OBC C&DH	OBC Mode Select	1	1	0:Flight Mode, 1:Ground Test Mode	OBC Mode status	
30002		FTE Line Select	1	1	0:RF, 1:FTE line	FTE Line Select status	
30012		Satellite Time	32	1	unsigned int[second]	Time after OBC start	
30013		Number of Command Stored	16	1	unsigned int	Number of Command Stored	
30014		COM Backup Operation Flag	1	0.1	0:Nominal, 1:Backup	Amateur Communication subsystem backup status	
30015		TX ENA/DIS	1	0.1	0:DIS, 1:ENA	Transmitting permission setting status	
30016		RX A Priority	1	0.1	0:OFF, 1:ON	Amateur Receiver #1 Priority status	
30021		System Mode	4	1	0:Boot & Initialization 1:Rate Dumping 2:Safe Hold 3:Nominal 4:Observation1 5:Observation2 6:Mission Termination 7:Ground Test 8:Low Consumption	System mode status	
30022		ACS Mode	4	1	0:No Operation 1:Rate Dumping 2:Sun Searching 3:Sun Pointing 4:Spin 5:CoE Pointing 6:Target Pointing 7:Inertial Pointing 8:Ground ACS Test	Attitude Control mode status	
30023		A-COM Mode	4	1	0:A Beacon 1:A Telemetry 2:B Beacon 3:B Telemetry 4:Not Use	Amateur Communication mode status	
30101		SAS#1 Check Complete	1	1	0:Not Finished, 1:Finished	Sun Sensor #1 initial check complete flag	
30102		SAS#2 Check Complete	1	1	0:Not Finished, 1:Finished	Sun Sensor #2 initial check complete flag	
30103		SAS#3 Check Complete	1	1	0:Not Finished, 1:Finished	Sun Sensor #3 initial check complete flag	
30104		SAS#1 Sun Capture	1	1	0:Not Finished, 1:Finished	Sun Sensor #1 sun capture complete flag	
30105		SAS#2 Sun Capture	1	1	0:Not Finished, 1:Finished	Sun Sensor #2 sun capture complete flag	
30106		SAS#3 Sun Capture	1	1	0:Not Finished, 1:Finished	Sun Sensor #3 sun capture complete flag	
30107		RW X Check Complete	1	1	0:Not Finished, 1:Finished	Reaction Wheel X initial check complete flag	
30108		RW Y Check Complete	1	1	0:Not Finished, 1:Finished	Reaction Wheel Y initial check complete flag	
30109		RW Z Check Complete	1	1	0:Not Finished, 1:Finished	Reaction Wheel Z initial check complete flag	
30110		STS Check Complete	1	1	0:Not Finished, 1:Finished	Star Sensor initial check complete flag	
30111		SAS#1 Temperature	16	0.1	signed int[°C]	Sun Sensor #1 temperature	
30112		SAS#2 Temperature	16	0.1	signed int[°C]	Sun Sensor #2 temperature	
30113		SAS#3 Temperature	16	0.1	signed int[°C]	Sun Sensor #3 temperature	
30114		RW X Temperature	10	0.1	unsigned int, T=0.4X-273[°C]	Reaction Wheel X temperature	
30115		RW Y Temperature	10	0.1	unsigned int, T=0.4X-273[°C]	Reaction Wheel Y temperature	
30116		RW Z Temperature	10	0.1	unsigned int, T=0.4X-273[°C]	Reaction Wheel Z temperature	
30117		GAS Check Complete	1	1	0:Not Finished, 1:Finished	Geomagnetic Sensor initial check complete flag	
30118		Gyro Check Complete	1	1	0:Not Finished, 1:Finished	Gyro initial check complete flag	
30119		GPSR Check Complete	1	1	0:Not Finished, 1:Finished	GPS Receiver initial check complete flag	
30201		SAS#1 Error	1	1	0:Normal, 1:Error	Sun Sensor #1 error flag	
30202		SAS#2 Error	1	1	0:Normal, 1:Error	Sun Sensor #2 error flag	
30203		SAS#3 Error	1	1	0:Normal, 1:Error	Sun Sensor #3 error flag	
30204		RW X Temperature Error	1	1	0:Normal, 1:Error	Reaction Wheel X temperature error flag	
30205		RW Y Temperature Error	1	1	0:Normal, 1:Error	Reaction Wheel Y temperature error flag	
30206		RW Z Temperature Error	1	1	0:Normal, 1:Error	Reaction Wheel Z temperature error flag	
30207		RW X Primary IF Error	1	1	0:Normal, 1:Error	Reaction Wheel X Primary IF error flag	
30208		RW Y Primary IF Error	1	1	0:Normal, 1:Error	Reaction Wheel Y Primary IF error flag	
30209		RW Z Primary IF Error	1	1	0:Normal, 1:Error	Reaction Wheel Z Primary IF error flag	
30210		RW X Secondary IF Error	1	1	0:Normal, 1:Error	Reaction Wheel X Secondary IF error flag	
30211		RW Y Secondary IF Error	1	1	0:Normal, 1:Error	Reaction Wheel Y Secondary IF error flag	
30212		RW Z Secondary IF Error	1	1	0:Normal, 1:Error	Reaction Wheel Z Secondary IF error flag	
30213		TX A IF Error	1	1	0:Normal, 1:Error	Amateur Transmitter #1 interface error flag	
30214		TX B IF Error	1	1	0:Normal, 1:Error	Amateur Transmitter #2 interface error flag	
30215		STS Error	1	1	0:Normal, 1:Error	Star Sensor error flag	
30216		GYRO X Temperature Error	1	1	0:Normal, 1:Error	GYRO X temperature error flag	
30217		GYRO Y Temperature Error	1	1	0:Normal, 1:Error	GYRO Y temperature error flag	

ChubuSat-2/-3 Telemetry List (6/8)

No.	component	name	Length [bit]	Rate [Hz]	Conversion	Explanation	Notes
30218	(OBC C&DH)	GYRO Z Temperature Error	1	1	0:Normal, 1:Error	GYRO Z temperature error flag	
30222		GAS Error	1	1	0:Normal, 1:Error	Geomagnetic Sensor error flag	
30224		MTQ X Primary Error	1	1	0:Normal, 1:Error	Magnetic Torquer X Primary error flag	
30225		MTQ Y Primary Error	1	1	0:Normal, 1:Error	Magnetic Torquer Y Primary error flag	
30226		MTQ Z Primary Error	1	1	0:Normal, 1:Error	Magnetic Torquer Z Primary error flag	
30227		MTQ X Secondary Error	1	1	0:Normal, 1:Error	Magnetic Torquer X Secondary error flag	
30228		MTQ Y Secondary Error	1	1	0:Normal, 1:Error	Magnetic Torquer Y Secondary error flag	
30229		MTQ Z Secondary Error	1	1	0:Normal, 1:Error	Magnetic Torquer Z Secondary error flag	
30230		GPSR Error	1	1	0:Normal, 1:Error	GPS Receiver error flag	
30231		S-TX Error	1	1	0:Normal, 1:Error	S-band Transmitter error flag	
30232		S-RX Error	1	1	0:Normal, 1:Error	S-band Receiver error flag	
30250		FD Flag	48	1	-	Fault Detection Flag WORD 5 GPSR/SAS#1/SAS#2/SAS#3/STS/GYRO-X/GYRO-Y/GYRO-Z WORD 4 GAS/RW-X/RW-Y/RW-Z/MTQ-X(pri)/MTQ-X(sec)/MTQ-Y(pri)/MTQ-Y(sec) WORD 3 MTQ-Z(pri)/MTQ-Z(sec)/SAP-A/SAP-B/SAP-C/SAP-D/SAP-E/SAP-F WORD 2 BAT1/BAT2/BAT3/BAT4/ACS-Rate/ACS-Kalman Filter/ACS-Attitude/(spare) WORD 1 A-RX1/A-TX1(1200)/A-TX1(9600)/A-RX2/A-TX2(1200)/A-TX2(9600)/S-TX/S-RX WORD 0 O-CAM/IR-CAM(Finder)/(spare)/RD/(spare)/(spare)/(spare)	
30301		SAS#1 Packet Sequence Counter	7	1	unsigned int	Sun Sensor #1 Packet Sequence Counter	
30302		SAS#2 Packet Sequence Counter	7	1	unsigned int	Sun Sensor #2 Packet Sequence Counter	
30303	SAS#3 Packet Sequence Counter	7	1	unsigned int	Sun Sensor #3 Packet Sequence Counter		
30304	RW-X Packet Sequence Counter	7	1	unsigned int	Reaction Wheel-X Packet Sequence Counter		
30305	RW-Y Packet Sequence Counter	7	1	unsigned int	Reaction Wheel-Y Packet Sequence Counter		
30306	RW-Z Packet Sequence Counter	7	1	unsigned int	Reaction Wheel-Z Packet Sequence Counter		
30311	STS Packet Sequence Counter	7	1	unsigned int	Star Sensor Packet Sequence Counter		
30312	PCU Packet Sequence Counter	7	1	unsigned int	Power Control Unit Packet Sequence Counter		
30313	OBC-DH Packet Sequence Counter	7	1	unsigned int	On-Board Computer Data Handling Packet Sequence Counter		
30314	OBC-ACS Packet Sequence Counter	7	1	unsigned int	On-Board Computer Attitude Control Packet Sequence Counter		
30315	GPSR Packet Sequence Counter	7	1	unsigned int	GPS Receiver Packet Sequence Counter		
30316	RD Packet Sequence Counter	7	1	unsigned int	ChubuSat-2:Radiation Detector Packet Sequence Counter ChubuSat-3:Finder Camera Packet Sequence Counter		
30317	O-CAM Packet Sequence Counter	7	1	unsigned int	ChubuSat-2:IR Camera Packet Sequence Counter ChubuSat-3:Optical Camera Packet Sequence Counter		
30401	Thermal Seneor Data1	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 1 Temperature		
30402	Thermal Seneor Data2	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 2 Temperature		
30403	Thermal Seneor Data3	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 3 Temperature		
30404	Thermal Seneor Data4	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 4 Temperature		
30405	Thermal Seneor Data5	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 5 Temperature		
30406	Thermal Seneor Data6	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 6 Temperature		
30407	Thermal Seneor Data7	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 7 Temperature		
30408	Thermal Seneor Data8	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 8 Temperature		
30409	Thermal Seneor Data9	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 9 Temperature		
30410	Thermal Seneor Data10	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 10 Temperature		
30411	Thermal Seneor Data11	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 11 Temperature		
30412	Thermal Seneor Data12	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 12 Temperature		
30413	Thermal Seneor Data13	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 13 Temperature		
30414	Thermal Seneor Data14	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 14 Temperature		
30415	Thermal Seneor Data15	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 15 Temperature		
30416	Thermal Seneor Data16	8	1	00h - FFh (see T-sensor.pdf)	Thermal Seneor 16 Temperature		
30911	Beacon ENA/DIS	1	1	0:DIS, 1:ENA	Beacon transmitting permission status		
30912	Memory Patrol ENA/DIS	1	1	0:DIS, 1:ENA	Memory Patrol ENA/DIS status		
30913	Amateur Com ENA/DIS	1	1	0:DIS, 1:ENA	Amateur BBS mission ENA/DIS status		
30914	BBS Message Num	8	0.1	int (range:00h-7Fh)	Number of messages in BBS		
30915	Internal Error Status	64	0.1	-	Internal Error Status		
30916	Internal Error Registration Ena/Dis	64	0.1	-	Internal Error Registration ENA/DIS status		
30917	Board0 SpW Status Error Counter	2	1	-	Board0 SpW Status Error Counter		
30918	Board0 SpW Status TimeOut	1	1	-	Board0 SpW Status TimeOut		
30919	Board0 SpW Status WARNING	1	1	-	Board0 SpW Status WARNING		
30920	Board1 SpW Status Error Counter	2	1	-	Board1 SpW Status Error Counter		
30921	Board1 SpW Status TimeOut	1	1	-	Board1 SpW Status TimeOut		
30922	Board1 SpW Status WARNING	1	1	-	Board1 SpW Status WARNING		
30923	Board0 SpW Error Clear Counter	2	1	-	Board0 SpW Error Clear Counter		
30924	Board1 SpW Error Clear Counter	2	1	-	Board1 SpW Error Clear Counter		

ChubuSat-2/-3 Telemetry List (7/8)

No.	component	name	Length [bit]	Rate [Hz]	Conversion	Explanation	Notes
40001	OBC ACS	ACS Control Mode	8	1	8bit unsigned int [no unit]	Algorithm Number	
40002		FDIR Attitude Flag	1	1	0:Normal, 1:Error	Fault Detection status of attitude	
40003		FDIR Rate Flag	1	1	0:Normal, 1:Error	Fault Detection status of rate	
40011		ACS Satellite Time	64	1	double[days]	Days from the beginning of the year	
40031		Kalman Filter Convergence Flag	1	1	0:Not converged, 1:Converged	Kalman Filter Convergence status	
40101		Estimated Attitude Quaternion q1	32	1	32bit IEEE754 float [no unit]	Estimated Attitude Quaternion q1	
40102		Estimated Attitude Quaternion q2	32	1	32bit IEEE754 float [no unit]	Estimated Attitude Quaternion q2	
40103		Estimated Attitude Quaternion q3	32	1	32bit IEEE754 float [no unit]	Estimated Attitude Quaternion q3	
40104		Estimated Attitude Quaternion q4	32	1	32bit IEEE754 float [no unit]	Estimated Attitude Quaternion q4	
40105		Attitude Quaternion q1	32	1	32bit IEEE754 float [no unit]	Attitude Quaternion q1 (Star Sensor output after coordinate transformation)	
40106		Attitude Quaternion q2	32	1	32bit IEEE754 float [no unit]	Attitude Quaternion q2 (Star Sensor output after coordinate transformation)	
40107		Attitude Quaternion q3	32	1	32bit IEEE754 float [no unit]	Attitude Quaternion q3 (Star Sensor output after coordinate transformation)	
40108		Attitude Quaternion q4	32	1	32bit IEEE754 float [no unit]	Attitude Quaternion q4 (Star Sensor output after coordinate transformation)	
40111		Commanded Attitude Quaternion q1	32	1	32bit IEEE754 float [no unit]	Commanded Attitude Quaternion q1	
40112		Commanded Attitude Quaternion q2	32	1	32bit IEEE754 float [no unit]	Commanded Attitude Quaternion q2	
40113		Commanded Attitude Quaternion q3	32	1	32bit IEEE754 float [no unit]	Commanded Attitude Quaternion q3	
40114		Commanded Attitude Quaternion q4	32	1	32bit IEEE754 float [no unit]	Commanded Attitude Quaternion q4	
40121		Sun Direction Vector X	32	1	32bit IEEE754 float [no unit]	Sun Direction Vector X	
40122		Sun Direction Vector Y	32	1	32bit IEEE754 float [no unit]	Sun Direction Vector Y	
40123		Sun Direction Vector Z	32	1	32bit IEEE754 float [no unit]	Sun Direction Vector Z	
40141		Estimated Rate X	32	1	32bit IEEE754 float *180/pi [deg/sec]	Estimated Rate X	
40142		Estimated Rate Y	32	1	32bit IEEE754 float *180/pi [deg/sec]	Estimated Rate Y	
40143		Estimated Rate Z	32	1	32bit IEEE754 float *180/pi [deg/sec]	Estimated Rate Z	
40144		Body Rate X	32	1	32bit IEEE754 float *180/pi [deg/sec]	Body Rate X (GYRO output after coordinate transformation)	
40145		Body Rate Y	32	1	32bit IEEE754 float *180/pi [deg/sec]	Body Rate Y (GYRO output after coordinate transformation)	
40146		Body Rate Z	32	1	32bit IEEE754 float *180/pi [deg/sec]	Body Rate Z (GYRO output after coordinate transformation)	
40161		Estimated RW X Speed	32	1	32bit IEEE754 float [rad/sec]	Estimated RW X Speed	
40162		Estimated RW Y Speed	32	1	32bit IEEE754 float [rad/sec]	Estimated RW Y Speed	
40163		Estimated RW Z Speed	32	1	32bit IEEE754 float [rad/sec]	Estimated RW Z Speed	
40171		Commanded RW X Speed	32	1	32bit IEEE754 float [rpm]	Commanded RW X Speed	
40172		Commanded RW Y Speed	32	1	32bit IEEE754 float [rpm]	Commanded RW Y Speed	
40173		Commanded RW Z Speed	32	1	32bit IEEE754 float [rpm]	Commanded RW Z Speed	
40181		RW X Unloading Flag	1	1	0:not in process, 1:in process	Reaction Wheel X unloading status	
40182		RW Y Unloading Flag	1	1	0:not in process, 1:in process	Reaction Wheel Y unloading status	
40183		RW Z Unloading Flag	1	1	0:not in process, 1:in process	Reaction Wheel Z unloading status	
40201		Satellite Position X	32	1	32bit IEEE754 float [m]	Satellite Position X (Earth center inertia coordinate system)	
40202		Satellite Position Y	32	1	32bit IEEE754 float [m]	Satellite Position Y (Earth center inertia coordinate system)	
40203		Satellite Position Z	32	1	32bit IEEE754 float [m]	Satellite Position Z (Earth center inertia coordinate system)	
40211		Satellite Velocity X	32	1	32bit IEEE754 float [m/sec]	Satellite Velocity X (Earth center inertia coordinate system)	
40212		Satellite Velocity Y	32	1	32bit IEEE754 float [m/sec]	Satellite Velocity Y (Earth center inertia coordinate system)	
40213	Satellite Velocity Z	32	1	32bit IEEE754 float [m/sec]	Satellite Velocity Z (Earth center inertia coordinate system)		
40214	ACS Earth Magnetic Field X	32	1	32bit IEEE754 float [uT]	Observed Earth Magnetic field (Satellite X value)		
40215	ACS Earth Magnetic Field Y	32	1	32bit IEEE754 float [uT]	Observed Earth Magnetic field (Satellite Y value)		
40216	ACS Earth Magnetic Field Z	32	1	32bit IEEE754 float [uT]	Observed Earth Magnetic field (Satellite Z value)		
40301	MTQ X 1 Current Command Status	2	1	00:No current, 01:Positive Current, 11:Negative Current	Magnetic Torquer X Primary Current Command status		
40302	MTQ Y 1 Current Command Status	2	1	00:No current, 01:Positive Current, 11:Negative Current	Magnetic Torquer Y Primary Current Command status		
40303	MTQ Z 1 Current Command Status	2	1	00:No current, 01:Positive Current, 11:Negative Current	Magnetic Torquer Z Primary Current Command status		
40311	MTQ X 2 Current Command Status	2	1	00:No current, 01:Positive Current, 11:Negative Current	Magnetic Torquer X Secondary Current Command status		
40312	MTQ Y 2 Current Command Status	2	1	00:No current, 01:Positive Current, 11:Negative Current	Magnetic Torquer Y Secondary Current Command status		
40313	MTQ Z 2 Current Command Status	2	1	00:No current, 01:Positive Current, 11:Negative Current	Magnetic Torquer Z Secondary Current Command status		

ChubuSat-2/-3 Telemetry List (8/8)

No.	component	name	Length [bit]	Rate [Hz]	Conversion	Explanation	Notes	
40401	(OBC ACS)	Acfs Year	8	1	unsigned char	Acfs Year		
40402		Acfs Month	8	1	unsigned char	Acfs Month		
40403		Acfs Day	8	1	unsigned char	Acfs Day		
40404		Acfs Hour	8	1	unsigned char	Acfs Hour		
40405		Acfs Minute	8	1	unsigned char	Acfs Minute		
40406		Acfs Second	32	1	32bit IEEE754 float	Acfs Second		
40411		Position Covariance X	32	1	32bit IEEE754 float	Position Covariance X		
40412		Position Covariance Y	32	1	32bit IEEE754 float	Position Covariance Y		
40413		Position Covariance Z	32	1	32bit IEEE754 float	Position Covariance Z		
40414		Attitude Coveriance X	32	1	32bit IEEE754 float	Attitude Coveriance X		
40415		Attitude Coveriance Y	32	1	32bit IEEE754 float	Attitude Coveriance Y		
40416		Attitude Coveriance Z	32	1	32bit IEEE754 float	Attitude Coveriance Z		
50946		RD	RD Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between Radiation Detector and OBC	
60701		IR-CAM	IR-CAM Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between IR-CAM and OBC	
60702			IR-CAM Shot Cmd Flg	1	0.1	0:OFF, 1:ON	IR-CAM shot flag	
60703			IR-CAM PicReadFlg	1	0.1	0:OFF, 1:ON	IR-CAM image read status	
60704	IR-CAM MsPicReadFlg		1	0.1	0:OFF, 1:ON	IR-CAM image(MS) read status		
60705	IR-CAM CompressFlg		1	0.1	0:OFF, 1:ON	IR-CAM image compressing status		
60902	O-CAM	O-CAM Com ENA/DIS	1	1	0:DIS, 1:ENA	Communication between Optical Camera and OBC		
60903		O-CAM BusyFlg	1	0.1	0:OFF, 1:ON	Optical Camera Busy status		
60904		O-CAM Read Data Start Flg	1	0.1	0:OFF, 1:ON	Optical Camera Read Data Start flag		
60905		O-CAM Read Data Flg	1	0.1	0:OFF, 1:ON	Optical Camera Read Data status		
60906		O-CAM Crc FrameGetFlg	1	0.1	0:OFF, 1:ON	Optical Camera CRC Frame Get flag		
60907		O-CAM Stream EndNotifyGetFlg	1	0.1	0:OFF, 1:ON	Optical Camera Stream End Notify Get flag		