

CW Telemetry Format

Save power mode: Send COM lines only (No:1,3,5)

Normal mode: Send all lines (No:1~6)

1 s t l i n e (C O M)	Letters	H	E	L	L	O	,	W	O	R	L	D	
	Order of character	1	2	3	4	5	6	7	8	9	10	11	12
	Form	ASCII	ASCII	ASCII	ASCII	ASCII	ASCII		ASCII	ASCII	ASCII	ASCII	ASCII
	Bit												
Content							space						

2 n d l i n e (C & D H)	Letters	M	2		A₅	A₄		A₃	A₂		A₁	A₀		B₁	B₀
	Order of character	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Form	ASCII	ASCII		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal
	Bit				3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0
Content		Line No.	space	Time	space	Time	space	Time	space	Time	space	Condition			

3 r d l i n e (C O M)	Letters	M	3		C₁	C₀		D₁	D₀		D₁	D₀		D₁	D₀
	Order of character	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Form	ASCII	ASCII		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal
	Bit				3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0
Content		Line No.	space	RSSI	space	Temperature	space	Temperature	space	Temperature					

4 t h l i n e (C & D H)	Letters	M	4		E₁	E₀		F₁	F₀		O	O		G₁	G₀
	Order of character	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Form	ASCII	ASCII		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal
	Bit				3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0
Content		Line No.	space	Mode	space	Reset times of COM system	space	N/A	space	Receive times of C&DH					

5 t h l i n e (C O M)	Letters	M	5		H₁	H₀		I₁	I₀		J₁	J₀		K₁	K₀
	Order of character	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Form	ASCII	ASCII		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal
	Bit				3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0
Content		Line No.	space	Solar cell Current	space	Solar cell Voltage	space	Total System Current	space	Total Voltage					

6 t h l i n e (C & D H)	Letters	M	6		L₃	L₂		L₁	L₀		M₃	M₂		M₁	M₀
	Order of character	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Form	ASCII	ASCII		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal		Hexadecimal	Hexadecimal
	Bit				3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0		3 2 1 0	3 2 1 0
Content		Line No.	space	Solar cell Voltage	space	Solar cell Voltage	space	Total Voltage	space	Total Voltage					

Time

$$A_5A_4A_3A_2A_1A_0 = A_5 \times 16^5 + A_4 \times 16^4 + A_3 \times 16^3 + A_2 \times 16^2 + A_1 \times 16^1 + A_0 \times 16^0 \quad [s]$$

Condition

$$B_1B_0 = B_1 \times 16^1 + B_0 \times 16^0 = B'$$

Table1. Checklist to determine whether Mission can be started

B'		Judgment
Mother	Daughter	
0	0	
1	0	×
0	1 ~ 15	×
1	1 ~ 15	×

Judgment: Mission can be started
 × Mission can't be started

RSSI

$$C_1C_0 = \frac{(C_1 \times 16^1 + C_0 \times 16^0)}{2} = C' \quad [V]$$

Table2. Property data (RSSI)

IN (dB μ) 145.835MHz		-	-20	-10	0	10	20	30	40	50
RSSI OUT (V)	No.1	0.45	0.5	0.75	1.1	1.4	1.7	1.95	2.15	2.15
	No.2	0.35	0.4	0.65	0.95	1.3	1.6	1.9	2.1	2.15
	No.3	0.3	0.35	0.55	0.85	1.2	1.5	1.8	2.05	2.15

Temperature

$$D_1D_0 = D_1 \times 16^1 + D_0 \times 16^0 = D'$$

$$-24.96 \times \ln \frac{10 \times 5 \times D'}{255} + 87.802 = D'' \quad [^{\circ}C]$$

$$5 - \frac{5 \times D'}{255}$$

Mode

$$E_1E_0 = E_1 \times 16^1 + E_0 \times 16^0 = E'$$

Table3. Mode Checklist

E'	Mode
2	Primary
130	Normal
128,136,138,144,146,152,154,160, 162,168,170,176,178,184,186	Mission
134,142,192,194,196,198,200, 202,206,208,216	Emergency

Reset times of COM system

$$F_1F_0 = F_1 \times 16^1 + F_0 \times 16^0$$

Receive times of C&DH

$$G_1G_0 = G_1 \times 16^1 + G_0 \times 16^0$$

Solar cell Current

$$H_1H_0 = (H_1 \times 16^1 + H_0 \times 16^0) \times \frac{5}{255} \times \frac{1}{2.48} \quad [A]$$

Solar cell Voltage

$$I_1I_0 = (I_1 \times 16^1 + I_0 \times 16^0) \times \frac{5}{255} \times \frac{10}{3.33} \quad [V]$$

Total System Current

$$J_1J_0 = (J_1 \times 16^1 + J_0 \times 16^0) \times \frac{5}{255} \times \frac{1}{0.78} \quad [A]$$

Total Voltage

$$K_1K_0 = (K_1 \times 16^1 + K_0 \times 16^0) \times \frac{5}{255} \times \frac{10}{3.33} \quad [\text{V}]$$

Solar cell Voltage(C&DH)

$$L_3L_2L_1L_0 = (L_3 \times 16^3 + L_2 \times 16^2 + L_1 \times 16^1 + L_0 \times 16^0) \times \frac{5}{255} \times \frac{10}{3.33} \quad [\text{V}]$$

Total Voltage(C&DH)

$$M_3M_2M_1M_0 = (M_3 \times 16^3 + M_2 \times 16^2 + M_1 \times 16^1 + M_0 \times 16^0) \times \frac{5}{255} \times \frac{10}{3.33} \quad [\text{V}]$$