ESC DATA-HUB How does the ESC Send Data Signals to the DATA-HUB

1. Overview

DATA-HUB The ESC slowly sends signals to the DATA-HUB via the serial port in real time; there are 8 channels, so (up to) 8 ESCs can send signals to the HUB at the same time.
19200BPS
 Signals' verification via the 8-bit cumulative sum.
The number of bytes included in a data frame: the number of bytes in the frame minus the number of cumulative sum bytes.
UART 8+1 格式   UART 8+1 format.

DATA-HUB，DATA-HUB The ESC quickly sends the eRPM signals to the DATA-HUB in real time, and the HUB will calculate the cycle & RPM after receiving those signals.

2. 命令格式 Format

0	1	2	3	○ ○ ○	○ ○ ○	○ ○ ○		
Initial Byte								**Final Byte**
Initial Mark of a Data Frame	The Number of Bytes included in a Data Frame	Version No. of a Communication Protocol	Command Word			**Data in the Middle Segment**	**Low -order Bit of Cumulative Sum**	**High -order Bit of Cumulative Sum**
0x9B	0xXX	0xXX	0x00: Reserved 0xFF: Reserved 0x01: ESC Info 0x02: Real-time Data	○ ○ ○	○ ○ ○		**0xXX**	**0xXX**

3. When the command word is 0x01, the middle segment of the corresponding ESC info contains 16*4+8*1=72bytes; the ESC will only send signals (once per 500ms) to the HUB when the throttle stick is moved to the bottom position.

3+16*3+1 ~ 3+16*3+16	3+16*0+1 ~ 3+16*0+16	3+16*1+1 ~ 3+16*1+16	3+16*2+1 ~ 3+16*2+16	3+16*4+1 ~ 3+16*4+8
BOOT Software Version 16bytes ASCII	Device Type 16bytes ASCII	Hardware Version 16bytes ASCII	APP Software Version 16bytes ASCII	App Software Serial No. 8bytes ASCII
0xXX	0xXX	0xXX	0xXX	0xXX

4. When the command word is 0x02, the middle segment of the corresponding real-time data contains 18*1=18 bytes, the ESC will signals (once per 50ms) to the HUB when the throttle stick is moved to the bottom position and the ESC is trying to drive the motor.

3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10	3+11	3+12	3+13	3+14	3+15	3+16	3+17	3+18
High-order Bit	**Low-order Bit**	**High-order Bit**	**Low-order Bit**	**High-order Bit**	**Low-order Bit**	**High-order Bit**	**Low-order Bit**	**High-order Bit**	**Low-order Bit**	**High-order Bit**	**Low-order Bit**	**High-order Bit**	**Low-order Bit**			**High-order Bit**	**Low-order Bit**
Bale No.	Bale No.	Rx Throttle Value	Rx Throttle Value	Actual Throttle Output	Actual Throttle Ouput	eRPM	eRPM	Intput Voltage	Intput Voltage	Input Current	Input Current	Output Current	Output Current	M O S Temp.	Cap. Temp.	Status Code	Status Code
0xXX	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX
Notes																	
Low-order Bit of Status Code																	
bit0	bit1	bit2	bit3	bit4	bit5	bit6	bit7										
Over-voltage	Under-voltage	Over-current	Current Limit	Throttle Signal Loss	Throttle Stick is not moved to the bottom Position	MOS Overheat	Cap. Overheat										
状态码高位 High-order Bit of Status Code																	
bit0	bit1	bit2	bit3	bit4	bit5	bit6	bit7										
(Motor) Lock-up	It failed the self-test, causes to this issue include abnormal voltage/current or MOS is open-circuited or short-circuited					The ESC RPM is disconnected from the HUB.	The ESC serial port is disconnected from the HUB.										

NTC resistance value

NTC 电阻值

1556	1477	1402	1332	1266	1203	1144	1089	1036	986
939	895	853	813	775	740	706	674	643	614
587	561	536	513	491	470	449	430	412	395
378	363	348	333	320	307	295	283	272	261
251	241	232	223	214	206	198	191	184	177
170	164	158	152	147	142	137	132	127	123
118	114	110	107	103	100	96	93	90	87
84	81	79	76	74	71	69	67	65	63
61	59	57	55	54	52	50	49	47	46
45	43	42	41	40	39	37	36	35	34
33	32	32	31	30	29	28	27	27	26
25	25	24	23	23	22	22	21	20	20
19	19	18	18	18	17	17	16	16	15

ADC value corresponding to NTC resistance value

NTC 电阻值对应的ADC 值

3849	3836	3823	3810	3796	3782	3767	3752	3735	3719
3702	3684	3666	3647	3628	3608	3588	3567	3545	3522
3500	3476	3452	3428	3403	3377	3350	3323	3296	3269
3239	3211	3182	3150	3121	3090	3059	3027	2995	2961
2929	2895	2862	2828	2792	2757	2722	2688	2654	2617
2579	2544	2508	2471	2438	2403	2368	2330	2292	2259
2217	2182	2146	2117	2078	2048	2006	1974	1940	1906
1870	1833	1808	1769	1742	1701	1672	1643	1614	1583
1552	1520	1487	1453	1436	1401	1365	1347	1310	1291
1271	1232	1211	1191	1170	1149	1106	1084	1062	1039
1016	993	993	969	945	921	896	871	871	845
819	819	793	766	766	739	739	711	683	683
654	654	625	625	625	595	595	565	565	534

ADC value corresponding to NTC resistance value sent by serial port

Temperature value corresponding to NTC resistance value

串口发出来的 NTC 电阻值对应的ADC 值 | NTC 电阻值对应的温度值

ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp
241	0	240	1	239	2	238	3	237	4	236	5	235	6	234	7	233	8	232	9
231	10	230	11	229	12	228	13	227	14	226	15	224	16	223	17	222	18	220	19
219	20	217	21	216	22	214	23	213	24	211	25	209	26	208	27	206	28	204	29
202	30	201	31	199	32	197	33	195	34	193	35	191	36	189	37	187	38	185	39
183	40	181	41	179	42	177	43	174	44	172	45	170	46	168	47	166	48	164	49
161	50	159	51	157	52	154	53	152	54	150	55	148	56	146	57	143	58	141	59
139	60	136	61	134	62	132	63	130	64	128	65	125	66	123	67	121	68	119	69
117	70	115	71	113	72	111	73	109	74	106	75	105	76	103	77	101	78	99	79
97	80	95	81	93	82	91	83	90	84	88	85	85	86	84	87	82	88	81	89
79	90	77	91	76	92	74	93	73	94	72	95	69	96	68	97	66	98	65	99
64	100	62	101	62	102	61	103	59	104	58	105	56	106	54	107	54	108	53	109
51	110	51	111	50	112	48	113	48	114	46	115	46	116	44	117	43	118	43	119
41	120	41	121	39	122	39	123	39	124	37	125	37	126	35	127	35	128	33	129