HW-FOC Communication Protocol

1. Overview

ESC sends telemetry data to DataLink via its UART, baud rate is 19200bps, 8 bit data + 1bit stop, no parity.

2. Data Format

	0	1	2	3	...	...	...	n-2	n
	Initial Byte								
	Head of the data frame	Length of the data frame	Version No. of the Communication Protocol	Command				Check CRC-LO	Check CRC-HO
	0x55	0x32	0x01	0x02:Real-time Data	...	Payload	...	0x33	0x33
	* The Check CRC-16/XMODEM calculated by the Formula: X16+X12+X5+1								Checksum

3. When the Command=0x02, the Payload is the telemetry data (/real-time data) of the ESC. The payload data has 18 bytes. When the motor is running, the telemetry data packet is sent once per 50ms.

	D+1	D+2	D+3	D+4	D+5	D+6	D+7	D+8	D+9	D+10	D+11	D+12	D+13	D+14	D+15	D+16	D+17	D+18
	Packet No.-H	Packet No.-L	Input Throttle Value-H	Input Throttle Value-L	Output Throttle-H	Output Throttle-L	USB_V	BUS_V	Input Voltage-H	Input Voltage-L	Input Current-H	Input Current-L	Phase Current-H	Phase Current-L	ESC temp.low value	ESC temp.high value	Motor Pole-H	Motor Pole-L
	0x00H	0x00L	0x00H	0x00L			0x00H	0x00L	0x00H	0x00L	0x00H	0x00L	0x00H	0x00L	0x00H	0x00L	0x00H	0x00L
	Real value=XXXX *100/1024						Motor RPM=XXXX * 60/(Gear ratio * pole pairs)		Voltage=XXXX/ 10		Highest bit=0 means the positive value. Real current=XXXX/ 64				Check the" ESC vs Temp" form to get the real temperature of the ESC Capacitor		See "Notes"	

Notes

Status Code-L

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
NA	MOSFET overheat	NA	The throttle signal is lost	NA	Over current	Input Voltage is too low	Input Voltage is too high

Status Code-H

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
NA	Operational amplifier is abnormal in Phase B	Operational amplifier is abnormal in Phase C	Operational amplifier is abnormal in Phase A	Open circuit of lower bridge MOSFET	n	MOSFET open circuit	Motor is blocked

ADC vs Temperature

ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp
255	0	248	1	241	2	234	3	227	4	220	5	213	6	206	7	199	8	192	9
253	10	246	11	239	12	232	13	225	14	218	15	211	16	204	17	197	18	190	19
251	20	244	21	237	22	230	23	223	24	216	25	209	26	202	27	195	28	188	29
249	30	242	31	235	32	228	33	221	34	214	35	207	36	200	37	193	38	186	39
247	40	240	41	233	42	226	43	219	44	212	45	205	46	198	47	191	48	184	49
245	50	238	51	231	52	224	53	217	54	210	55	203	56	196	57	189	58	182	59
243	60	236	61	229	62	222	63	215	64	208	65	201	66	194	67	187	68	180	69
241	70	234	71	227	72	220	73	213	74	206	75	199	76	192	77	185	78	178	79
239	80	232	81	225	82	218	83	211	84	204	85	197	86	190	87	183	88	176	89
237	90	230	91	223	92	216	93	209	94	202	95	195	96	188	97	181	98	174	99
235	100	228	101	221	102	214	103	207	104	200	105	193	106	186	107	179	108	172	109
233	110	226	111	219	112	212	113	205	114	198	115	191	116	184	117	177	118	170	119
231	120	224	121	217	122	210	123	203	124	196	125	189	126	182	127	175	128	168	129