

General Protocol V4

Physical Interface

RS485/RS232/UART 9600BPS

The protocol supports RS485 / RS232 / UART interface general protocol, consistent with the host computer protocol, Baud rate is 9600 BPS or other customized rate.

Frame Structure

Start Bit	Status Bit	Command Code	Length	Data Content	Calibration	Stop Bit
0xDD	0xA5- read 0x5A- write	register address	Data length only, excluding itself	The data content, the length is 0, to skip	check data segment content+ length byte + command code byte, then take back plus 1, the higher ahead, the lower behind.	0x77

Command Interpretation

Command Code:

03=basic information and status

04=the voltage of cell block

0xDD	0xA5	0x03	0	-- (no=empty)	checksum	0x77
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The host sends 0x03 to read basic information. BMS feedbacks 0x03 to read basic

information

0xDD	0x03	status, 0=correct	Data length only, excluding itself. As feedback it is 0.	The data content, the length is 0, to skip	checksum	0x77
		Error return 0x80	0		checksum	0x77

Host send: DD A5 03 00 FF FD 77

BMS feedback: DD 03 00 1B 17 00 00 00 02 D0 03 E8 00 00 20 78 00 00 00 00 00 10 48 03 0F 02 0B 76 0B 82 FB FF 77

Red is the checked byte, the sum of all bytes; the latter two are the checked result, which is the sum of all the previous checks and reverses + 1.

Data Content Interpretation

Data Content	Byte Size	Description
Total Voltage	2BYTE, unit 10mV, High byte ahead, the same below	
Current	2BYTE, unit 10mA	The charge and discharge state of the battery is judged by current. The charge is positive and the discharge is negative.
Residual Capacity	2BYTE, unit 10mAh	
Nominal Capacity	2BYTE, unit 10mAh	
Cycle Life	2BYTE	
Product Date	2BYTE	0x2028&0x1f = 8 (0x2068>>5) &0x0f= 0x03 3; 2000+ (0x2068>>9) = 2000 + 0x10 =2016; Two bytes are used for transmission such as 0x2068, where the date is the lowest 5: 0x2028 & 0x1f = 8 for date; the month (0x2068 > > > 5) & 0x0f = 0x03 for

		March; the year 2000 + 0x2068 > 9 = 2000 + 0x10 = 2016;
Balance Status	2BYTE	Each bit represent each cell block's balance, 0 is off, 1 is on ; 1~16pcs in series.
Balance Status_High	2BYTE	Each bit represents each cell block's balance, 0 is off, 1 is on ; 17~32pcs in series, 32pcs at the most. Increased base on V0
Protection Status	2BYTE	Each bit represents a protective state, 0 is unprotected, and 1 is protected. Note 1 on details:
Version	1byte	0x10 is for Version1.0
RSOC	1byte	it means the percentage of the residual capacity.
FET Control Status	1byte	MOS is status, bit0 is charging. bit1 is discharging, 0 is MOS OFF.
Cell Block Numbers in series	1byte	Cell Block Numbers in series
NTC Numbers N	1byte	NTC 个数 numbers
N ↑ NTC content	2*N , unit 0.1K , higher ahead	Using absolute temperature transmission, 2731+ (real temperature *10), 0 degrees = 273125 degrees = 2731+25*10 = 2981

Remark1: Protection status

bit0 Cell Block Over-Vol
bit1 Cell Block Under-Vol
bit2 Battery Over-Vol
bit3 Battery Under-Vol

bit4 Charging Over-temp

bit5 Charging Low-temp

bit6 Over-temp

bit7 Discharging Low-temp

bit8 Over-current

bit9 Discharging Over-current

bit10 Short Circuit

bit11 Fore-end IC Erro

bit12 MOS Software Lock-in

bit13~bit15 Reserve

The host sends the read command 0x04 to read the cell block voltage.

0xDD	0xA5	0x04	0	-- (no=empty)	checksum	0x77
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BMS feedback 0x03 command to read the basic information

0xDD	0x04	status, 0=correct	Data length only, excluding itself. As feedback it is 0.	The data content, the length is 0, to skip	checksum	0x77
		0x80 error return 0x80	0		checksum	0x77

The host send: DD A5 04 00 FF FC 77

BMS feedback: DD 04 00 1E 0F 66 0F 63 0F 63 0F 64 0F 3E 0F 63 0F 37 0F 5B 0F 65 0F 3B 0F 63 0F 63 0F 3C 0F 66 0F 3D F9 F9 77

2 +1 Red is the checked byte, the sum of all bytes; the latter two are the checked result, which is the sum of all the previous checks and reverses + 1.

Data Content Interpretation

Data Length	N 2 the length is string No.*2
cell block voltage for 1st string	2Byte, mV, 2Byte, unit mV, the higher ahead
cell block voltage for 2nd string	2Byte, mV, 2Byte, unit mV, the higher ahead
cell block voltage for 3th string	2Byte, mV, 2Byte, unit mV, the higher ahead
N cell block voltage for N string	2Byte, mV, 2Byte, unit mV, the higher ahead

The host sends the read command 0x05 to read the BMS version, up to 31 charactors, input the model via the host device model.

0xDD	0xA5	0x05	0	--	checksum	0x77
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BMS 响应读取基本信息 0x03 指令 BMS feedback 0x03 command to read the basic information

0xDD	0x04	status, 0=correct	Data length only, excluding itself. As feedback it is 0.	The data content, the length is 0, to skip	checksum	0x77
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		error return 0x80	0		checksum	0x77
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Data Content Interpretation

Data Length N	Device Model Length
BYTE0	The 1 st character ASCII code(such as, the version is LH-XXXX, the length should be 7, byte0 = 'L')
BYTE(N-1)	

The host send: DD A5 05 00 FF FB 77

BMS feedback: DD 05 00 0A 30 31 32 33 34 35 36 37 38 39 FD E9 77 -- hardware version no.0123456789

Red is the checked byte, the sum of all bytes; the latter two are the checked result, which is the sum of all the previous checks and reverses + 1.

MOS Control Command

The host sends the MOS control command

Start Bit	Status Bit	Command Code	Length	Data Content	Calibration	Stop Bit
0xDD	0X5A	0XE1	0X02	0X00 XX	CHECKSUM_H CHECKSUM_L	0X77

BMS 响应读取基本信息 0x03 指令 BMS feedback 0x03 command to read the basic information

0xDD	0xe1	0x00	0x00	--	Checksum_H Checksum_L	0x77
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Note: the calibration calculation is consistent with other methods. XX means the state of MOS control.

XX 的值 XX Value	MOS 的动作 MOS Action
0x00	解除软件关闭 MOS 管动作 Release software from closing MOS
0x01	软件关闭充电 MOS, 解除软件关闭放电 MOS Software shutdown the charging MOS, release software to shutdown the discharging MOS.
0x02	软件关闭放电 MOS, 解除软件关闭充电 MOS Software shutdown the discharging MOS, release software to shutdown the charging MOS.
0x03	软件同时关闭充放电 MOS Software shutdown the charging/discharging MOS at the same time
不要写超过自范围的值 Do not over the defined value!	

例：主机端发送 DD 5A E1 02 00 02 FF 1B 77 则表示软件关闭放电 MOS；

Such as, the host sends DD 5A E1 02 00 02 FF 1B 77, it means software shutdown discharging MOS.

五、协议数据说明：Protocol Data Interpretation

主机发送读取单体电压 0x04 指令，BMS 返回数据说明：The host sends 0x04 command to read the cell block voltage, BMS feedback:

DD --帧头，起始字节 Frame header, start bit

04 --命令码，读取单体电压 command code, read the cell block voltage

00 --状态码, 非 0 为错误, 0 为正确 status code, non 0 is error, 0 is correct

22 --数据短长度, 为 34 个数据, 表示电池组有 17 串, 一串 2 个数据 data length, 34pcs, it means the battery is 17pcs in series, 2 data for each string.

0EC8 --第 1 节单体电压 3784 1st cell block voltage

0EC8 --第 2 节单体电压 3744 2nd cell block voltage

0ECB --第 3 节单体电压 3rd cell block voltage

0ECF --第 4 节单体电压 4th cell block voltage

0ECA --第 5 节单体电压 5th cell block voltage

0EC7 --第 6 节单体电压 6th cell block voltage

0ECA --第 7 节单体电压 7th cell block voltage

0ECD --第 8 节单体电压 8th cell block voltage

0EC9 --第 9 节单体电压 9th cell block voltage

0ECA --第 10 节单体电压 10th cell block voltage

0ECB --第 11 节单体电压 11th cell block voltage

0ECB --第 12 节单体电压 12th cell block voltage

0EC8 --第 13 节单体电压 13th cell block voltage

0ECC --第 14 节单体电压 14th cell block voltage

0EC8 --第 15 节单体电压 15th cell block voltage

0EC9 --第 16 节单体电压 16th cell block voltage

0EC9 --第 17 节单体电压 17th cell block voltage

F187 --校验码 Calibration Code

77 --结束码 End Code

主机发送读取基本信息 0x03 指令, BMS 返回数据说明: The host sends 0x03 command to read the basic information, BMS feedback:

DD --起始 start bit

03 --命名码 command code

00 --状态码 status code

1F --数据长度 data length

19DF -- 总电压 total voltage = 6623 = 66.23V, 单位是 unit 10mV

F824 --总电流 total current = 63524, 最高位为 1, 为放电, the top digit is 1, for discharging 电流值 current value = 65536-63524 = 2012, 单位是 unit 10mA, 所以最终电流为-20.12A the final current is -20.12A

0DA5 --剩余容量 residual capacity = 3493, 单位 unit 10mAH, 最终剩余容量值为 34930mAH the final residual capacity is 34930mAH

0FA0 --标称容量 nominal capacity = 4000, 因为单位是 unit 10mAH, 所有最终容量是 40000mAH the final capacity is 40000mAH

0002 --循环次数 cycle life 2 次 2cycles

2491 --生产日期 production date

0000 --均衡低 balance low

0000 --均衡高 balance high

0000 --保护状态 protection status

12 --软件版本 version

57 --剩余容量百分比 87 the percentage of residual capacity is 87

03 --MOS 状态 MOS status

11 --电池串数 17 the numbers of cell blocks in series

04 --温度探头个数 temperature probe numbers

0B98 --第一个温度 2968 -2731 =247, 单位为 0.1°C = 24.7°C 1st temperature

0BA9 --第 2 个温度 2nd temperature

0B96 --第 3 个温度 3rd temperature

0B97 --第 4 个温度 4th temperature

F89A --校验码 calibration code

77 --结束码 end code