Smart BMS General agreement V4

1、 Physical interface

This protocol supports QUCC smart BMS RS485 / RS232 / UART interface general protocol, which is consistent with the host computer protocol, and the baud rate is 9600BPS.

2、. Frame structure

Start bit	Status bit	Command code	Length	Data content	check	Stop bit
0xDD	0xA5-Read 0x5A-Write	Register address	It indicates the length of the data, not including itself	Data content, If the length is 0, skip here.	It is the checksum of the data segment content + length byte + command code byte and then inverted and added 1, the high bit is in front and the low bit is in the back	0x77

3、 Command explanation

Command code： 03 Read basic information and status

04 Read battery cell voltage

05 Read the hardware version number of the protection board

The host sends a command to read basic information 0x03.

0xDD	0xA5	0x03	0	-- (Null if no)	checksum	0x77

BMS Response and read basic information 0x03 instruction

0xDD	0x03	Status, 0 means correct	Indicates the data length, excluding itself. The response length is 0.	f the length is 0, skip here	checksum	0x77
		Error,	0		checksum	0x77

	return 0x80			

Host send：DD A5 03 00 FF FD 77

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

Red is the checked byte, which is the sum of all bytes. The next 2 are the check results, which are the sum of all the previous checks.

The result of reading reverse +1

Data content interpretation

Data content	Byte size	Description
Total voltage	2BYTE, unit 10mV，High byte first	
Current	2BYTE，unit 10mA，High byte first	The charging and discharging state of the battery is judged by current, and the charging is positive and the discharging is negative.
The remaining capacity	2BYTE，unit 10mAh，High byte first	
Nominal capacity	2BYTE，unit 10mAh，High byte first	
Number of cycles	2BYTE，unit 10mAh，High byte first	
Production Date	2BYTE，unit 10mAh，High byte first	2 bytes transmission For example, 0 x2068, The minimum date is 5: 0 x2028 & 0x1f = 8 indicates the date; Month (0x2068> 5)& 0x0f = 0x03 indicates 3 months; The year is 2000 + (0x2068> 9) = 2000+0x10=2016;
Balanced state	2BYTE，unit 10mAh，High byte first	Each bit means each series is balanced, 0 means turn off, 1 means turn on, and 1~16 strings
Balanced state _high	2BYTE，unit 10mAh，High byte first	Each bit means each series is balanced, 0 means turn off, 1 means turn on, 17S to 32S, and up to 32S are supported.
Protection status	2BYTE，unit 10mAh，High byte first	Each bit represents a protection status, 0 means unprotected, 1 means protection occurs. See Note 1:

Software version	1byte	0x10 means version 1.0
RSOC	1byte	Indicates the percentage of remaining capacity
FET Control state	1byte	MOS indicates status, bit0 means charging, bit1 means discharging, 0 means MOS is turn off, 1 means turn on.
Number of battery strings	1byte	Number of battery strings
NTC Number N	1byte	Number of NTC
N* NTC content	2*N，The unit is 0.1K, high first	Using absolute temperature transmission, 2731+ (actual temperature x 10) 0 degrees = 2731 25 degrees = 2731+25*10 = 2981

Note 1：Protection status description

bit0 Single battery overvoltage protection	bit4 Charging over temperature protection	bit9 Discharge overcurrent protection
bit1 Single battery undervoltage protection	bit5 Charging low temperature protection	bit10 Short circuit protection
bit2 battery pack overvoltage protection	bit6 Discharge over temperature protection	bit11 Front-end detection IC error
bit3 battery pack undervoltage protection	bit7 Discharge low temperature protection	bit12 Software lock MOS
	bit8 Charge overcurrent protection	bit13~bit15 Reserved

The host sends a read single battery voltage 0x04 command

0xDD	0xA5	0x04	0	-- (Null if no)	checksum	0x77

BMS response to read basic information 0x03 command

0xDD	0x04	Status, 0 means correct	Indicates the length of the data, excluding itself, the length is 0 when the response is written	Data content, when the length is 0, skip here	checksum	0x77
		If it is wrong, return 0x80	0		checksum	0x77

Host send：DD A5 04 00 FF FC 77

BMS response：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

Red is the checked byte, which is the sum of all bytes. The next 2 are the check results, which are the sum of all the previous checks.

The result of reading reverse +1

Data content explanation

Data length	The data length is the number of battery strings N multiplied by 2
First string cell voltage	2Byte, unit mV, high order first
Second string cell voltage	2Byte, unit mV, high order first
The third string cell voltage	2Byte, unit mV, high order first
Nth string cell voltage	2Byte, unit mV, high order first

The host sends the instruction to read the hardware version number 0x05 of the protection board, which can be up to 31 characters, and write the model number through the device model of the host computer

0xDD	0xA5	0x05	0	-- (Null if no)	checksum	0x77

BMS response to read basic information 0x03 command

0xDD	0x04	Status, 0 means correct	Indicates the length of the data, excluding itself, the length is 0 when the response is written	Data content, when the length is 0, skip here	checksum	0x77
		If it is wrong, return 0x80	0		checksum	0x77

Data content explanation

Data length N	Device type name length
BYTE0	The ASCII code of the first character (for example, the hardware version is LH-XXXX, then the length is 7, byte0 = 'L')
BYTE(N-1)	

Host send：DD A5 05 00 FF FB 77

BMS response：DD 05 00 0A 30 31 32 33 34 35 36 37 38 39 FD E9 77   -- Indicates its hardware version number 0123456789

Red is the checked byte, which is the sum of all bytes. The next 2 are the check results, which are the sum of all the previous checks.

The result of reading reverse +1

4、Control MOS instruction

Host sends control MOS command

Start bit	Status bit	Command code	length	Data content	Data content	Stop bit
0xDD	0X5A	0XE1	0X02	0X00 XX	CHECKSUM_H CHECKSUM_L	0X77

BMS responds to read basic information 0x03 command

0xDD	0xe1	0x00	0x00	--	Checksum_H Checksum_L	0x77

Note: The check calculation method is consistent with other methods. Where XX represents the state of the control MOS.

XX value	MOS action
0x00	Release the software to close the MOS action
0x01	Software closes charging MOS, and releases software closes discharging MOS
0x02	The software closes the discharging MOS, and the software closes the charging MOS.
0x03	The software closes the charge and discharge MOS at the same time
	Do not edit values beyond the self-range

Example: The host sends DD 5A E1 02 00 02 FF 1B 77 to indicate that the software closes the discharge MOS

5、Protocol data description:

The host sends the read cell voltage 0x04 command, and the BMS returns the data description:

DD -- Frame header, start byte

04 -- Command code, read cell voltage

00 -- Status code, not 0 for error, 0 for correct

22 -- The short data length is 34 data, which means that the battery pack has 17S, and 1S means 2 data

0EC8 -- Section 1 cell voltage 3784

0EC8 -- Section 2 cell voltage 3744

0ECB -- Section 3 cell voltage

0ECF -- Section 4 cell voltage

0ECA -- Section 5 cell voltage

0EC7 -- Section 6 cell voltage

0ECA -- Section 7 cell voltage

0ECD -- Section 8 cell voltage

0EC9 -- Section 9 cell voltage

0ECA -- Section 10 cell voltage

0ECB -- Section 11 cell voltage

0ECB -- Section 12 cell voltage

0EC8 -- Section 13cell voltage

0ECC -- Section 14 cell voltage

0EC8 -- Section 15 cell voltage

0EC9 -- Section 16 cell voltage

0EC9 -- Section 17 cell voltage

F187 -- Check code

77 -- End code

The host sends the instruction to read basic information 0x03, and the BMS return the data description：

DD -- Start

03 -- Naming code

00 -- Status code

1F -- Data length

19DF -- Total voltage = 6623 = 66.23V，Unit is 10mV

F824 -- Total current = 63524，The highest bit is 1, for discharge，Current value = 65536-63524 = 2012，The unit is 10mA，So the final current is -20.12A

0DA5 -- The remaining capacity = 3493，unit 10mAH，The final remaining capacity value is 34930mAH

0FA0 -- Nominal capacity = 4000，Because the unit is 10mAH，All final capacity is 40000mAH

0002 -- Cycles. 2 times

2491 -- Production Date

0000 -- Low balance

0000 -- high Balanced

0000 -- Protection status

12 -- Software version

57 -- 87% of remaining capacity

03 --MOS status

11 -- Number of battery strings 17

04 -- Number of temperature sensors

0B98   -- The first temperature 2968 -2731 =247，The unit is 0.1℃ = 24.7℃

0BA9   -- 2nd temperature

0B96   -- 3rd temperature

0B97   -- 4th temperature

F89A   -- Check code

77 -- End code

Bluetooth of UUID

SERVICE UUID:0000ff00-0000-1000-8000-00805f9b34fb

write characteristic UUID: 0000ff02-0000-1000-8000-00805f9b34fb

read characteristic UUID:0000ff01-0000-1000-8000-00805f9b34fb");

6、revise history

Version name	Version name
V0 Version	First draft
V1 Version	Compatible with 30S BMS, increase the balanced high 16 bits
V2 Version	Add the instruction to read the hardware version number, corresponding to the device type in the parameter setting
V3 Version	Add BMS return data description
V4 Version	Add verification instructions and add instructions to control MOS