Smart BMS Protocol (Version V3)

一. Physical interface

This protocol can be used for RS485/RS232/UART Physical interface

Baud rate: 9600BPS

二. Structure of Data Packet or Frame

Start bit	0*DD
Status	0*A5-Read
	0*5A-Write
Command code	Register address
Length	length of data frame, not include data itself
Data content	When the length of data frame is 0, content is none
check	data + length + command code checksum high position first, low in the back
Stop bit	0*77

三. Description of commend code

Command code:

Read 03 Read basic information and status

Read 04 Read voltage of single battery cell

Read 05 Read the hardware protection board version number

Sender send 0*03 to read the basic information

Start bit	0*DD
Status	0*A5
Command code	0*03
Length	0
Data content	--
Party bit	checksum
Stop bit	0*77

BMS react 0*03, and read the basic information

Start bit	0*DD
Status	0*03
Command code	Status, usually is 0, if failed, 0*80
Length	length of frame of data, not include data itself, when write, length is 0
Data content	When length of data is 0, content is none

Party bit	checksum
Stop bit	0*77

Sender send:DD A5 03 00 FF FD 77
BMS react: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

Explanation of Data content

Content	BIT	Description
voltage	2BYTE, 10mv, high byte first, below is the same	
Current	2BYTE Unit 10mv	The state of charge and discharge of the battery is judged by the current, charge is positive, discharge is negative.
The remaining capacity	2BYTE Unit 10mv	
Nominal capacity	2BYTE Unit 10mv	
Cycle life	2BYTE	
Production Date	2BYTE	Use 2 bytes to transfer such as 0x2068, where the date is the lowest 5: 0x2028&0x1f = 8 is the date; month (0x2068>>5) & 0x0f= 0x03 means March; The year is 2000+ (0x2068>>9) = 2000 + 0x10 =2016;
balance status	2BYTE	Each bit represents each serial balance, 0 is off, and 1 is on, indicate 1~16 series
balance status	2BYTE	Each bit represents each serial balance, 0 is off, 1 is on, to indicate 17~32 series, highest up to 32 series (added on the V0 version.)
Protection status	2BYTE	Each bit represents a protection status, 0 is unprotected, and 1 is protected. See Note 1:
Protocol version	1byte	0x10 means 1.0 version

RSOC	1byte	Indicates the percentage of remaining capacity
FET	1byte	MOS status, bit0 indicates charging, bit1 indicates discharging, 0 indicates MOS is off, and 1 indicates on.
Number of series	1byte	Number of battery series
Number of NTC	1byte	Number of NTC
Several NTC content	2*N, unit 0.1K, high byte first	With absolute temperature transfer, 2731+ (actual temperature *10), 0 degrees = 2731 25 degrees = 2731+25*10 = 2981

Note 1: Description of protection status
Bit0 over voltage protection of single cell
Bit1 under voltage protection of single cell
Bit2 over voltage protection of whole battery set
Bit3 under voltage protection of whole battery set

Bit4 charging over temperature protection
Bit5 charging low temperature protection
Bit6 discharge over temperature protection
Bit7 discharge low temperature protection
Bit8 charging over current protection

Bit9 discharge over current protection
Bit10 short circuit protection
Bit11 detection IC error
bit12 software lock MOS
bit13~bit15 reserved

Sender send 0*04 to read the voltage of single cell

Start bit	0*DD
Status	0*A5
Command code	0*04
Length	0
Data content	--
Party bit	checksum
Stop bit	0*77

BMS react 0*03, and read the basic information

Start bit	0*DD
Status	0*04
Command code	Status, usually is 0, if failed, 0*80
Length	length of frame of data, not include data itself, when write, length is 0
Data content	When length of data is 0, content is none
Party bit	checksum
Stop bit	0*77

Sender send: DD A5 04 00 FF FC 77
BMS react: 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

Explanation of Data content

Length of data frame	Length of data frame: number of series *2
Voltage of first series	2Byte, unit mv, high byte first
Voltage of second series	2Byte, unit mv, high byte first
Voltage of third series	2Byte, unit mv, high byte first
Voltage of N series	2Byte, unit mv, high byte first

The sender send 0*05 and supports up to 31 characters at most. The model number is written by the device model number of the sender computer.

Start bit	0*DD
Status	0*A5
Command code	0*05
Length	0
Data content	--
Party bit	checksum
Stop bit	0*77

BMS react 0*03 , read the basic information

Start bit	0*DD
Status	0*04
Command code	Status, usually is 0, if failed, 0*80
Length	length of frame of data, not include data itself, when write, length is 0
Data content	When length of data is 0, content is none

Check	checksum
Stop bit	0*77

Explanation of Data content

Length of data	length of name of device
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)	

Sender send :DD A5 05 00 FF FB 77
BMS react: DD 05 00 0A 30 31 32 33 34 35 36 37 38 39 FD E9 7
-- indicated the hardware version number 0123456789

四． Data Description

Sender send 0*04 to read voltage of single cell, BMS return

DD-- Start bit
04 --control code, read voltage of single cell
00-- command code, 0 is correct, not 0 is error
22-- length of data, 34 data, indicating that the battery pack has 17 series, a series of 2 data
0EC8 -- Section 1 single cell voltage 3784
0EC8 -- Section 2 single cell voltage 3744
0ECB -- Section 3 single cell voltage
0ECF -- Section 4 single cell voltage
0ECA -- Section 5 single cell voltage
0EC7 -- Section 6 single cell voltage
0ECA -- Section 7 single cell voltage
0ECD -- Section 8 single cell voltage
0EC9 -- Section 9 single cell voltage
0ECA -- Section 10 single cell voltage
0ECB -- Section 11 single cell voltage
0ECB -- Section 12 single cell voltage
0EC8 -- Section 13 single cell voltage
0ECC -- Section 14 single cell voltage
0EC8 -- Section 15 single cell voltage
0EC9 -- Section 16 single cell voltage
0EC9 -- Section 17 single cell voltage

F187 -- check code
77 -- end code

The sender sends 0x03 command to read basic information, BMS react data description:

DD -- start bit
03 -- Name code
00 -- status code
1F -- length of data frame
19DF -- Total voltage = 6623 = 66.23V Unit: 10mV
F824 -- total current = 63524, the highest bit is 1, it is discharge, current = 65536-63524 = 2012, the unit is 10mA, so the final current is -20.12A
0DA5 -- 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 -- the number of cycles. 2 times
2491 -- date of manufacture
0000 -- low balance
0000 -- high balance
0000 -- protection status
12 -- Software version
57 -- Percentage of remaining capacity 87
03 --MOS Status
11 --Number of battery series 17
04 --Number of temperature probes
0B98 -- first temperature 2968 -2731 = 247, unit is 0.1 ° C = 24.7 ° C
0BA9 -- the second temperature
0B96 -- the third temperature
0B97 -- the 4th temperature
F89A -- check code
77 -- end code

五. **Revision history**

Version	description
V0 version	first draft
V2 version	compatible with 30-series protection board, increasing balance height 16 bits
V3 version	Add the instruction to read the hardware version number, corresponding device type
V version	Add BMS return data description