# Software board general protocol V4

## 1、 Physical interface

This protocol supports the general protocol of RS485 / RS232 / UART interface of jiabaida software board, which is consistent with the host computer protocol. The baud rate is 9600bps or other customized rate.

## 2、 . frame structure

| Start bit | Status bit | Command code | length | Data content | check | Stop bit |
|---|---|---|---|---|---|---|
| 0xDD | 0xa5 read<br>0x5a write | Register address | Represents the length of the data, excluding itself | Data content, when the length is 0, skip here | It is the check sum of data segment content + length byte + command code byte, and then 1 is added in reverse, the high bit is in the front, and the low is in the back | 0x77 |

## 3、 Command interpretation

Command code: read 03 to read basic information and status

Read 04 to read the cell voltage

Read 05 to read the hardware version number of protection board

The host sends the instruction to read the basic information

| | | | | | | |
|---|---|---|---|---|---|---|
| 0xDD | 0xA5 | 0x03 | 0 | --(empty when not) | checksum | 0x77 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 0xDD | 0x03 | Status, table 0 is correct | Indicates the length of the data, excluding itself. The length of the response when writing is 0 | Data content, when the length is 0, skip here | checksum | 0x77 |
| | | If there is an error, it returns 0x80 | 0 | | checksum | 0x77 |

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 10 48 03 0f 02 0b 76 0b 82 FB FF 77

Red is the byte to be checked, which is the sum of all the bytes; the last two are the check result, which is the result of negation + 1 of the sum of all previous checks

Data content interpretation

| Data content | Byte size | explain |
|---|---|---|
| Total voltage | 2byte, unit 10mV, high byte in front, the same below | |
| electric current | 2byte in 10mA | The charge and discharge state of the battery is judged by the current. The charge is positive and the discharge is negative. |
| Remaining capacity | 2byte in 10mah | |
| Nominal | 2byte in 10mah | |

| | | |
|---|---|---|
| capacity | | |
| Number of cycles | 2BYTE | |
| date of manufacture | 2BYTE | Two bytes are used for transmission, such as 0x2068, where the date is the lowest 5: 0x2028 & 0x1f = 8 represents the date; month (0x2068 > > 5) & 0x0f = 0x03 represents March; year is 2000 + (0x2068 > > 9) = 2000 + 0x10 = 2016; |
| Equilibrium state | 2BYTE | Each bit indicates that each string is balanced, 0 is off, 1 is on, indicating 1-16 strings |
| Equilibrium state_high | 2BYTE | Each bit indicates that each string is balanced. 0 is off and 1 is on, indicating 17-32 strings. The maximum support is 32 strings, which is based on V0 version |
| Protection status | 2BYTE | Each bit represents a protection state, 0 is unprotected, and 1 is protected. See Note 1 for details |
| Software version | 1byte | 0x10 indicates version 1.0 |
| RSOC | 1byte | Represents the percentage of remaining capacity |
| FET control status | 1byte | MOS indicates the status, bit0 is charging, Bit1 is discharging, 0 is MOS off, 1 is on |
| Number of battery strings | 1byte | Number of battery strings |
| Number of NTCs n | 1byte | Number of NTCs |
| N NTC content | 2 * n, unit: 0.1k, height in front | Using absolute temperature transmission, 2731 + (actual temperature * 10), 0 degree = 2731, 25 degree = 2731 + 25 * 10 = 2981 |

Note 1: description of protection status

Bit0 monomer overvoltage protection
Bit1 monomer under voltage protection
Bit2 whole group overvoltage protection
Bit3 whole group under voltage protection
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 front end detection IC error
Bit12 software lock MOS
Bit13 ~ bit15 reserved

The host sends the instruction of reading unit voltage 0x04

| | | | | | | |
|---|---|---|---|---|---|---|
| 0xDD | 0xA5 | 0x04 | 0 | --(empty when not) | checksum | 0x77 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 0xDD | 0x04 | Status, table 0 is correct | Indicates the length of the data, excluding itself. The length of the response when writing is 0 | Data content, when the length is 0, skip here | checksum | 0x77 |
| | | If there is an error, it returns 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 f977

Red is the byte to be checked, which is the sum of all the bytes; the last two are the check result, which is the result of negation + 1 of the sum of all previous checks

Data content interpretation

| | |
|---|---|
| Data length | The data length is the number of battery strings n times 2 |
| First series of cell voltage | 2byte, unit MV, high order first |
| Second series single cell voltage | 2byte, unit MV, high order first |
| Unit voltage of the third series | 2byte, unit MV, high order first |
| Unit voltage of the nth series | 2byte, unit MV, high order first |

The host sends the instruction to read the hardware version number of the protection board, which supports 31 characters at most, and writes the model through the device model of the upper computer

| | | | | | | |
|---|---|---|---|---|---|---|
| 0xDD | 0xA5 | 0x05 | 0 | --(empty when not) | checksum | 0x77 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 0xDD | 0x04 | Status, table 0 is correct | Indicates the length of the data, excluding itself. The length of the response when writing is 0 | Data content, when the length is 0, skip here | checksum | 0x77 |
| | | If there is an error, it returns 0x80 | 0 | | checksum | 0x77 |

| | |
|---|---|
| Data length n | Equipment type name length |
| BYTE0 | The ASCII code of the first character (for example, if the hardware version is lh-xxx, 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

Red is the byte to be checked, which is the sum of all the bytes; the last two are the check result, which is the result of negation + 1 of the sum of all previous checks

4、 Control MOS command

Master sends control MOS command

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

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

| Value of XX | The action of MOS |
|---|---|
| 0x00 | Remove the action of closing MOS tube by software |
| 0x01 | Turn off the charging MOS by software, and turn off the discharging MOS by releasing the software |
| 0x02 | The software turns off the discharge MOS, and the release software turns off the charging MOS |
| 0x03 | The software turns off the charge and discharge MOS at the same time |
| Don't write values beyond the self range | |

For example, if the host side sends DD 5A E1 02 00 02 FF 1b 77, it means that the software turns off the discharge MOS;

5、 Protocol Data Description:

The host sends the instruction of reading unit voltage 0x04, and BMS returns data description:

DD -- frame header, start byte 04 -- command code, read unit voltage 00 -- status code, non-zero is error, 0 is correct, 22 -- short data length, 34 data, indicating that battery pack has 17 strings, a string of 2 data 0ec8 -- Section 1 unit voltage 37840ec8 -- Section 2 unit voltage 3744 0ecb -- Section 3 unit voltage 0ecf -- Section 4 unit voltage 0eca -- Section 5 unit voltage 0ec7--Section 6 cell voltage 0eca -- Section 7 cell voltage 0ecd -- Section 8 monomer voltage 0ec9 -- Section 9 monomer voltage 0eca -- Section 10 monomer voltage 0ecb -- Section 11 monomer voltage 0ecb -- Section 12 monomer voltage 0ec8 -- Section 13 monomer voltage 0ecc -- Section 14 monomer voltage 0ec8 -- section 15 monomer voltage 0ec9 -- Section 16 monomer voltage 0ec9 -- Section 17 monomer voltage f187 -- check code 77--End code

The host sends the instruction of reading basic information 0x03, and BMS returns data description:

DD -- start 03 -- name code 00 -- status code 1F -- data length 19df -- total voltage = 6623 = 66.23v, unit: 10mV f824 -- total current = 63524, highest bit is 1, discharge, current value = 65536-63524 = 2012, unit: 10mA, so the final current is - 20.12a 0da5 -- residual capacity = 3493, unit: 10mah, final residual capacity value is 34930mah 0fa0 -- nominal capacity=4000, because the unit is 10mah, all final capacity is 40000 MAH 0002 - number of cycles.Two times 2491 -- production date 0000 -- Balanced Low 0000 -- balanced high 0000 -- protection state 12 -- software version 57 -- residual capacity percentage 87 03 -- MOS state 11 -- battery string number 17 04 -- number of temperature probes 0b98 -- first temperature 2968 - 2731 = 247, unit: 0.1 ℃ = 24.7 ℃ 0ba9 -- second temperature 0b96 -- third temperature 0b97 -- fourth temperature f89a -- check code77 -- end code

UUID of Bluetooth

SERVICE UUID:0000ff00-0000-1000-8000-00805f9b34fb write characteristic UUID: 0000ff02-0000-1000-8000-00805f9b34fb read characteristic UUID:0000ff01-0000-1000-8000-00805f9b34fb"";

## 6、 Revision history

| Version name | explain |
| --- | --- |
| Version v0 | first draft |
| V1 version | Compatible with 30 series protection board, increase equalizing height by 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 MOS control instructions |