UART: Mini computer <--> MCU

1 Physical interface

This protocol supports the general protocol UART interface, and the baud rate is 9600BPS

2 Frame structure

a Mini computer (MCP) send to MCU

Start bit	Status command	ID	length	Data content	check	Stop byte
0xEE	0xB5-read 0x5B-write	address(3.c)	Indicates the data length Not including itself	--		0xAA

b MCU send to MCP

Start bit	ID	Status	length	Data content	check	Stop byte
0xEE	address(3.c)	Error: 0x08 Non error: 0x00	Indicates the data length Not including itself	--		0xAA

3 Command explanation

a Start bit (1 Byte)

0xEE Indicate one frame data is started

b Status command (1 Byte)

0xBB Read command

0xCC Write command

c ID (1 Byte)

0x03 Read basic information Battery

0x04 Read basic information speed

0x08 Read error status

0xA3 Write parameter control

0xA4 Write reset MCU

d Length data (2 Byte)

Total length data contents have in frame, unit is byte

If have not data contents, this value is 0x00

e Data contents

All information contained in the frame, this content depends on the ID of the command (mentioned in section 4)

If length data is 0x00, this content is ignore (NA)

f Checksum (2 Byte)

This is the sume of all bytes of the frame, and XOR with 0xFFFF

Example:

MCP sends: EE 5B 03 00 FE B3 AA

Sum: 0x014C

XOR 0xFFFF

Checksum: 0xFEB3

g status (MCU to MCP)

This is status when MCU give data,

0x08: Error occure

4 Data content

a 0x03: Read basic information battery

MCP send command

0xEE	0xB5	0x03	0	--	checksum	0xAA

MCU response

0xEE	0x03	Status: 0x00 Error: 0x08	Length	Data content	checksum	0xAA

Data content explanation

Data content	Byte size	Description
Total voltage	2BYTE,	unit 10mV, high byte first, the same below
Current	2BYTE,	The charge and discharge state of the battery is judged by the current, charging is positive and discharging is negative.unit 10mA
The remaining capacity	2BYTE,	unit 10mAh
Nominal capacity	2BYTE,	unit 10mAh
Cycles	2BYTE	indicate cycle charching time of battery
Software version	1byte	0x10 means version 1.0
RSOC	1byte	Indicates the percentage of remaining capacity
FET control status	1byte	MOS indicates the status, bit0 means charging, bit1 means discharging, 0 means MOS off, 1 means on
Number of battery strings	1byte	Number of battery strings
NTC number N	1byte	
N NTC content	2*N, unit 0.1K, high first	Using absolute temperature transmission, 2731+(actual temperature*10), 0 degrees = 2731 25 degrees

b 0x04: Read basic information speed

MCP send command

0xEE	0xB5	0x04	0	--	checksum	0xAA

MCU response

0xEE	0x04	Status: 0x00 Error: 0x08	Length	Data content	checksum	0xAA

Data content explanation

Data content	Byte size	Description
Speed precent	2BYTE	unit [0.001m/s], high byte first, the same below

c 0x08: Read error status

MCP send command

0xEE	0xB5	0x08	0	--	checksum	0xAA

MCU response

0xEE	0x08	Error: 0x08 Error: 0x08	Length	Data content	checksum	0xAA

Data content explanation

Data content	Byte size	Description
Error status	4 byte	Error ocure in MCU, See Note 1:

Note 1:

bit0	Reserver
bit1	Reserver
bit2	Reserver
bit3	Reserver
bit4	Reserver
bit5	Reserver
bit6	Reserver
bit7	Reserver
bit8	Reserver
bit9	Reserver
bit10	Reserver
bit11	Reserver
bit12	Reserver
bit13	Reserver
bit14	Reserver
bit15	Reserver
bit16	Reserver
bit17	Reserver
bit18	Reserver
bit19	Reserver
bit20	Reserver
bit21	Reserver
bit22	Reserver
bit23-31	Reserver

d 0xA3: Write parameter control

MCP send command

0xEE	0x5B	0xA3	Length	Data content	checksum	0xAA

MCU response

0xEE	0xA3	Status: 0x00 Error: 0x08	0	--	checksum	0xAA

Data content explanation

Data content	Byte size	Description
Normal speed	2 bytes	Normal speed setup: [m/s]
Slow speed	2 Bytes	Slow speed setup [m/s]

e 0xA4: Write reset MCU

MCP send command

0xEE	0x5B	0xA4	Length	Data content	checksum	0xAA

MCU response

0xEE	0xA4	Status: 0x00 Error: 0x08	0	--	checksum	0xAA

Data content explanation

Data content	Byte size	Description
Reset Run data	1 bytes	0x00: not reset, 0x01: Reset Run data
Reset MCU by software	1 Bytes	0x00: not reset, 0x01: Reset MCU by software

5 Protocol data description:

The host sends the 0x03 command to read basic information baterry

0xEE	Start byte
0x03	Command code
0x00	Status code
0x1F	Data length
0x19DF	Total voltage = 6623 = 66.23V, the unit is 10mV
0xF824	The highest bit is 1, which is discharge, the current value = 65536-63524 = 2012, the unit is 10mA, so the final current is -20.12A
0x0DA5	Remaining capacity = 3493, the unit is 10mAH, the final remaining capacity value is 34930mAH
0x0FA0	Nominal capacity = 4000, because the unit is 10mAH, all final capacity is 40000mAH
0x0002	Cycles. 2 times
0x12	Software version

0x57	Remaining capacity percentage 87
0x03	FET control status
0x11	Number of battery strings 17
0x04	Number of temperature probes
0x0B98	The first temperature 2968 -2731 =247, the unit is 0.1℃ = 24.7℃
0x0BA9	2nd temperature
0x0B96	3nd temperature
0x0B97	4nd temperature
0xF89A	checksum
0xAA	End byte