PACE RS232 Communication Protocal

(PACE-RS232-TY16S)

2018-07-05

Change Record		
2018-07-05	Initial finalization	wang

1、Physical interface and Communication mode

1.1 Physical interface

The serial communication mode is adopted for Physical Interface,which is adopted by standard RS232 communication mode.It provides a information transmission methods by Asynchronous mode,a start bit,a stop bit,no check bit .The data transmission rate is 9600.

1.2 Communication mode

The Communication mode adopts the Master-Slave response mode.when the PC software or monitoring equipment initiates communication command as the host,the BMS responds the return command as the slave.if the host don’ t receive the response caomand or error information in 500 ms when the host has sent the command.in this case,this communication will be failed.

2、Protocal format

2.1 Frame format

Char A.1 Frame format

Ordinal	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	CID1	CID2	LENGTH	INFO	CHKSUM	EOI

2.2 basic format explanation

Char A.2 Basic format

Ordinal	Symbol	meaning	Remarks
1	SOI	START OF INFORMATION	(7EH)
2	VER	Protocal version (V2.5)	(25H)
3	ADR	Device address (0－15)	
4	CID1	Device indication code (device type description)	
5	CID2	Command information: control indication code (data or action description) Response information: return code RTN	
6	LENGTH	INFO length of bytes (including LENID and LCHKSUM)	
7	INFO	Command information: control data infaomation (COMMAND_INFO) Response information: response data information(DATA_INFO)	
8	CHKSUM	Check sum	
9	EOI	END OF INFORMATION	CR (0DH)

Remark: VER-means communication veision, usually uses V2.5, as 25H.

ADR-means battery pack address,BMS uses four-digit toggle switch to set the address, the address range is 0~15.

2.3 Data format

2.3.1 Basic data format

Beyond that the SOI and EOI is transmitted by 16-hex format,other items is transmitted by 16-hex ascii format.every byte uses two ascii,for example,when the CID2 = 4HH,the 34H and 42H will be transmitted in two bytes.

2.3.2 LENGTH data format

Char A.3 LENGTH data format

High byte								Low byte							
Check sum code LCHKSUM				LENID (means the information' s ascii bytes)											
D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0

2.3.3 LEDID

LENID means the ascii byte number of INFO,when LENID = 0,that means INFO is not.all data bytes is not uppt to 4096.

High byte is sent at first and low byte is sent at second for LENGTH information with four ASCII code.

2.3.4 LCHKSUM

The calculation method of check code: D11D10D9D8+D7D6D5D4+D3D2D1D0

After sum, module 16 takes inverse plus 1

For example:

INFO:中ASCII code number is 18, that' s LENID＝0000 0001 0010B。

D11D10D9D8+D7D6D5D4+D3D2D1D0＝0000B＋0001B＋0010B＝0011B, module 16 is 0011B, 0011B takes inverse plus 1 is 1101B, so LCHKSUM is 1101B。

so: LENGTH is 1101 0000 0001 0010B, that' s D012H。

2.4 CHKSUM data faomat

All char ascii code is calculated for sum without SOI,EOI and CHKSUM, the result module 65536 takes inverse plus 1。

For example:

When send or receive the data sequence:

“~1203400356ABCEFEFC72\R” (“~” is SOI, “CR” is EOI),

So the last five char “FC72\R” FC72 is CHKSUM,

Calculation method:

‘1’ + ‘2’ + ‘0’ + …+ ‘F’ + ‘E’ ＝31H＋32H＋30H＋…＋46H＋45H＝038EH

038EH module 65536 is 038EH, 038EH take inverse plus 1 is FC72H。

2.5 DATA_INFO data faomat

This protocal use the fixed point data type to send information.

1) int format (INTEGER, 2byte)

Signed int －32768－＋32767

Unsigned int 0－＋65535

High byte is send first,and the low byte is send second。

2） unsigned char (CHAR, 1byte, 0－255)

Char A.4 Fixed point data type

Ordinal	Telemetry content	Data type	Transmission unit
1	Battery cell voltage	Unsigned int	mV
2	temperature	Unsigned int	0.1K 25.5℃ = 25.5 * 10 + 2730 = 2985 (0.1K) -12.4℃ = -12.4 * 10 + 2730 = 2606 (0.1K)
3	Total battery voltage	Unsigned int	mV
4	Charge or discharge currnet	Signed int	10mA (the charge current is positive,the discharge current is negative)
5	Battery pack capacity	Unsigned int	10mAH (include the remain capacity,the fullcapacity and designed capaticy)

2.6 data time

DATA_TIME and COMMAND_TIME format can see as the chart:

Char A.5 Data time format

items	range	Data type	remark
year	(0－99)	CHAR	(one byte,decimal-format)
month	(1－12)	CHAR	(one byte,decimal-format)
data	(1－31)	CHAR	(one byte,decimal-format)
hour	(0－23)	CHAR	(one byte,decimal-format)
minute	(0－59)	CHAR	(one byte,decimal-format)
second	(0－59)	CHAR	(one byte,decimal-format)

Remark:the year is transmitted by char-format, real value = data + 2000。The range is 2000-2099。

3、code allocation

3.1 equipment type code allocation table (CID1)

Char A.6 CID1 table

item	content	CID1	remark
1	Iron lithium battery	46H	(suitable for ternary lithium)

3.2 command information cade allocation chart (CID2)

Char A.7 CID2 table

item	content	CID2	remark
1	Pack number	90H	

2	Pack analog information	42H	
3	Pack warn information	44H	
4	Control command	99H	
5	Software veision	C1H	define
6	Product information	C2H	define
7	Charge MOSFET control	9AH	define
8	Discharge MOSFET control	9BH	define
9	Getting BMS data time	B1H	define
10	Setting BMS data time	B2H	define
11	Pack capaticy information	A6H	define

Char A.8 CID2 response information (RTN)

item	symbol	RTN	remark
1	normal	00H	
2	undefine	01H	
3	CHKSUM error	02H	
4	LCHKSUM error	03H	
5	CID2 undefine	04H	
6	Undefined	05H	
7	Undefined	06H	
8	Operation or write error	09H	define

4、command explanation

4.1 getting pack number

Char A.9 Getting pack number information

Item	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	90H	LENGTH		CHKSUM	EOI

Remark : LENID = 00H。

For example,if the bms address is not equal to 1,the pack number responses the address as 1.if the bms address is equal to 1,as the master-slave mode,pack number is up to practice.

Char A.10 Response information

item	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1

Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Remark : LENID = 02H, DATAINFO is the pack number information。

4.2 getting pack analog information

Char A.11 Command information

Item	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	42H	LENGTH		CHKSUM	EOI

Remark : LENID = 02H。

INFO has one byte, as COMMAND:

COMMAND = FFH, getting all pack analog information。

COMMAND = 01H, getting 1’s pack analog information who’s address is one。

……

COMMAND = 0FH, getting 15’s pack analog information

Char A.12 Response information

Item	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

INFOFLAG is 00H or 01H

Char A.13 DATAI data transmit order

item	content	DATAI bytes	Remark
1	* PACK number M / COMMAND value	1	
2	PACK 1 battery data		See as chart A.14
3	……	……	
M + 1	PACK M battery data		See as chart A.14

- When the command is FFH, the response information is pack number. otherwise , the response information is command value.

Char A.14 Analog content and transmit order

item	content	DATAI bytes	Remark
1	Cell number M	1	
2	Cell voltage 1	2	
3	Cell voltage 2	2	
4	……	……	

M + 1	Cell voltage M	2	
M + 2	Temperature’s number N	1	
M + 3	Temperature 1	2	
M + 4	Temperature 2	2	
M + 5	……	……	
M + N + 2	Temperature N	2	
M + N + 3	PACK current	2	the charge current is positive, the discharge current is negative (uint:10mA)
M + N + 4	PACK total voltage	2	
M + N + 5	PACK remain capacity	2	uint: 10mAH
M + N + 6	Define number P = 3	1	
M + N + 7	PACK full capacity	2	uint: 10mAH
M + N + 8	Cycle number	2	
M + N + 9	PACK design capacity	2	uint: 10mAH

4.3 getting warn information

Char A.15 Getting pack warn command information

Item	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	44H	LENGTH		CHKSUM	EOI

Remark : LENID = 02H。

INFO has one byte, as COMMAND:

COMMAND = FFH, getting all PACK warn information。

COMMAND = 01H, getting PACK1 warn information。

……

COMMAND = 0FH, getting PACK15 warn information。

Remark :as the master-slave mode,you can get more pack data information by the RS232 who’s address must be 1.otherwise,you can only get one pack information.the command can be 01H or FFH.

Char A.16 Getting pack warn command response information

Item	1	2	3	4	5	6	7	8	9
bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Remark : DATAINFO is consist of INFOFLAG and WARNSTATE, WARNSTATE can see at chart A.17。

INFOFLAG can be 00H or 01H。

Char A.17 Response DATAI data transmittion order

item	content	DATAI bytes	Remark
1	* PACKnumber M / COMMAND value	1	
2	PACK 1warn information		See at chart A.18
3	……	……	
M + 1	PACK Mwarn information		See at chart A.18

* when the command if FFH,the response information is pack number.otherwise that is command value.

Char A.18 One pack warn information and transmittion order

item	content	DATAI bytes	Remark
1	Cell number M	1	
2	Cell voltage 1 warn	1	
3	Cell voltage 2 warn	1	
4	……	……	
M + 1	Cell voltage M warn	1	
M + 2	Temperature number N	1	
M + 3	Temperature 1 warn	1	
M + 4	Temperature 2 warn	1	
M + 5	……	……	
M + N + 2	Temperature N warn	1	
M + N + 3	PACK charge current warn	1	
M + N + 4	PACK total voltage warn	1	
M + N + 5	PACK discharge current warn	1	
M + N + 6	Protect state 1	1	See at chart A.19
M + N + 7	Protect state 2	1	See at chart A.20
M + N + 8	Instructions state	1	See at chart A.21
M + N + 9	Control state	1	See at chart A.22
M + N + 10	Fault state	1	See at chart A.23
M + N + 11	Balance state1	1	Balance state for 1-8
M + N + 12	Balance state2	1	Balance state for 9-16
M + N + 13	Warn state1	1	See at chart A.24
M + N + 14	Warn state2	1	See at chart A.25

description:

—— 00H: normal;

—— 01H: below lower limit;

—— 02H: above upper limit;

—— 80H—EFH: user define ;

—— F0H: other fault。

Char A.19 Protect state1 explanation

BIT	content	Remark
7	undefine	
6	Short circuit	1: Short circuit protect 0: normal
5	Discharge current protect	1: Discharge current protect 0: normal
4	charge current protect	1: charge current protect 0: normal
3	Lower total voltage protect	1:Lower total voltage protect 0:normal
2	Above total voltage protect	1:Above total voltage protect 0:normal
1	Lower cell voltage protect	1:Above total voltage protect 0:normal
0	Above cell voltage protect	1: Above cell voltage protect 0: normal

Char A.20 Protect state 2 explanation

BIT	content	Remark
7	Fully	1: Fully 0: normal
6	Lower Env temperature protect	1: Lower Env temperature protect 0: normal
5	above Env temperature protect	1: above Env temperature protect 0: normal
4	Above MOS temperature protect	1: Above MOS temperature protect 0: normal
3	Lower discharge temperature protect	1: Lower discharge temperature protect 0: normal
2	Lower charge temperature protect	1: Lower charge temperature protect 0: normal
1	above discharge temperature protect	1: above discharge temperature protect 0: normal
0	above charge temperature protect	1: above charge temperature protect 0: normal

Char A.21 Instructions state explanation

BIT	content	remark

7	Heart indicate	1: ON 0: OFF
6	undefine	
5	ACin	1: ON 0: normal
4	Reverse indicate	1: ON 0: normal
3	Pack indicate	1: Pack indicate 0: unuse
2	DFET indicate	1: ON 0: OFF
1	* CFET indicate	1: ON 0: OFF
0	Current limit indicate	1: ON 0: OFF

Char A.22 Control state explanation

BIT	Content	Remark
7	Undefined	
6	Undefined	
5	LED warn functiuon	1: unenable 0: enable
4	Current limit function	1: unenable 0: enable
3	Current limit gear	1: low gear 0: high gear
2	undefine	
1	undefine	
0	Buzzer warn function	1: enable 0: unenable

Char A.23 Fault state explanation

BIT	content	remark
7	undefine	
6	undefine	
5	Sample fault	1: fault 0: normal
4	Cell fault	1: fault 0: normal
3	Undefined	
2	NTC fault (NTC)	1: fault 0: normal
1	Discharge MOS fault	1: fault 0: normal
0	Charge MOS fault	1: fault 0: normal

Char A.24 Warn state1 explanation

BIT	Content	Remark
7	undefine	
6	undefine	

5	Discharge current warn	1: warn 0: normal
4	charge current warn	1: warn 0: normal
3	Lower tatal voltage warn	1: warn 0: normal
2	above tatal voltage warn	1: warn 0: normal
1	Lower cell voltage warn	1: warn 0: normal
0	above cell voltage warn	1: warn 0: normal

Char A.25 Warn state2 explanation

BIT	Content	Remark
7	Low power warn	1: warn 0: normal
6	High MOS temperature warn	1: warn 0: normal
5	low env temperature warn	1: warn 0: normal
4	high env temperature warn	1: warn 0: normal
3	low discharge temperature warn	1: warn 0: normal
2	low charge temperature warn)	1: warn 0: normal
1	above discharge temperature warn	1: warn 0: normal
0	above charge temperature warn	1: warn 0: normal

4.4 control command

Char A.26 **control command information**

Item	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	99H	LENGTH		CHKSUM	EOI

Remark : LENID = 02H。

INFO has one byte, as COMMAND:

COMMAND = 06H, enable LED warn function

COMMAND = 07H, unenable LED warn function

COMMAND = 08H, choose high gear

COMMAND = 09H, choose low gear

COMMAND = 0AH, enable current limit function

COMMAND = 0BH, unenable current limit function

COMMAND = 0CH, unenable buzzer warn function

COMMAND = 0DH, enable buzzer warn function

Char A.27response control command information

Item	1	2	3	4	5	6	7	8	9
bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Remark : LENID = 04H。

4.5 software version information

Char A.28 getting software version information command

Item	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	C1H	LENGTH		CHKSUM	EOI

Remark : LENID = 00H。

Char A.29 response information for version command

Item	1	2	3	4	5	6	7	8	9
bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Remark : LENID = 28H。

DATAINFO is consist of software version, includes of 20 char, if not 20 char, you can set space。

4.6 getting product information

Char A.30 getting product information command

Item	1	2	3	4	5	6	7	8	9
bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	C2H	LENGTH		CHKSUM	EOI

Remark : LENID = 00H。

Char A.31 response for product information command

Item	1	2	3	4	5	6	7	8	9
bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Remark : LENID = 50H or 28H。

4.7 charge MOSFET control

Char A.32 charge MOSFET command information

Item	1	2	3	4	5	6	7	8	9
bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	9AH	LENGTH		CHKSUM	EOI

Remark : LENID = 02H。

INFO has one byte , as COMMAND:

COMMAND = 00H, open charge MOSFET。

COMMAND = 01H, close discharge MOSFET。

Remark :if discharge MOSFET is closed,the charge MOSFET can’ t be closed

Char A.33 response for charge MOSFET control command

Item	1	2	3	4	5	6	7	8	9
bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Remark : LENID = 02H。

If RTN is 00H, that means operation is success,otherwise failed

4.8 discharge MOSFET control

Char A.34 discharge MOSFET command information

Item	1	2	3	4	5	6	7	8	9
bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	9BH	LENGTH		CHKSUM	EOI

Remark : LENID = 02H。

INFO has one byte , as COMMAND:

COMMAND = 00H, open discharge MOSFET。

COMMAND = 01H, close discharge MOSFET。

If charge MOSFET is closed,you can’ t operate the discharge MOSFE

Char A.35 response for discharge MOSFET control command

Item	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Remark : LENID = 02H。

If RTN is 00H, that means operation is success,otherwise failed

4.9 getting BMS time and date

Char A.36 getting BMS time and date command information

Item	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	B1H	LENGTH		CHKSUM	EOI

Remark: LENID = 00H。

Char A.37 response information for getting BMS time and date

Item	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Remark : LENID = 0CH。

DATAINFO has six bytes, that is time and date information, see at chartA.38。

Char A.38 DATAINFO content and transmission sequence

Item	content	DATAI bytes	Remark
1	Year	1	value＝transmist date + 2000
2	Month	1	
3	Date	1	
4	Hour	1	
5	Minute	1	
6	Second	1	

4.10 setting BMS date and time

Char A.39 Setting BMS date and time command information

Item	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	B2H	LENGTH		CHKSUM	EOI

Remark : LENID = 0CH,

DATAINFO has six bytes, that is time and date information, see at chartA.40。

Char A.40 Date and time INFO content and transmission sequence

Item	Content	DATAI bytes	Remark
1	Year	1	value＝transmist date - 2000
2	Month	1	
3	Date	1	
4	Hour	1	
5	Minute	1	
6	Second	1	

Char A.41 Response information for setting BMS date and time information

Item	1	2	3	4	5	6	7	8	9

bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Remark : LENID = 00H。

4.11 getting pack capacity

Char A.42 Getting pack capacity command information

Item	1	2	3	4	5	6	7	8	9
bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	A6H	LENGTH		CHKSUM	EOI

Remark : LENID = 00H。

Char A.43 Response for getting pack capacity command information

Item	1	2	3	4	5	6	7	8	9
bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Remark : LENID = 0CH。

DATAINFO has six bytes, that is time and date information, see at chartA.44。

Char A.44 Capacity INFO content and transmission sequence

Item	Content	DATAI bytes	Remark
1	PACK remain capacity	2	unit: 10mAH
2	PACK full capacity	2	unit: 10mAH
3	PACK design capacity	2	unit: 10mAH

5、example

When we use this communication mode,the address is not limited.the BMS response information can be the BMS address.besides CID2 code is 42H and 44H,other CID code is used for only one BMS pack.for example:

Getting pack analog information:

7E 32 35 30 30 34 36 34 32 45 30 30 32 30 31 46 44 33 31 0D (COMMAND = 01H)

7E 32 35 30 30 34 36 34 32 45 30 30 32 46 46 46 44 30 36 0D (COMMAND = FFH)

Getting pack warn information:

7E 32 35 30 30 34 36 34 34 45 30 30 32 30 31 46 44 32 46 0D (COMMAND = 01H)

7E 32 35 30 30 34 36 34 34 45 30 30 32 46 46 46 44 30 34 0D (COMMAND = FFH)

Response command information explanation:

Command information: 7E 32 35 30 30 34 36 34 32 45 30 30 32 46 46 46 44 30 36 0D

Response information:

7E 32 35 30 30 34 36 30 30 46 30 37 41 30 30 30 31 31 30 30 44 34 32 30 44 31 34 30 44 31 33 30 44 31 33 30 44 31 33 30 44 31 33 30 44 31 33 30 44 31 31 30 44 31 32 30 44 31 33 30 44 31 31 30

44 31 31 30 44 31 32 30 44 31 30 30 44 31 33 30 36 30 42 42 37 30 42 42 37 30 42 42 38 30 42 42 36 30 42 42 33 30 42 42 44 30 30 30 30 44 31 35 35 31 32 38 45 30 33 31 33 38 38 30 30 30 30 31 33 38 38 45 33 41 43 0D

Response information explanation:

7E (SOI)

32 35 (VER, that is veision 25H, V2.5)

30 30 (ADR, the battery address is 0)

34 36 (CID1, 46H)

30 30 (RTN, 00H)

46 30 37 41 (LENGTH, F07A, LENID is 07AH, DATAINFO length is 122 , LCHKSUM is FH)

30 30 (INFOFLAG is $00H_0$ other information is DATAI)

30 31 (PACK number, 01H)

31 30 (battery cell number M, is 10H, that has 16 cell)

30 44 34 32 (first cell voltage: 0D42H, that's 3394mV)

30 44 31 34 (second cell voltage: 0D14H, that's 3348mV)

30 44 31 33 (third cell voltage: 0D13H, that's 3347mV)

30 44 31 33 (forth cell voltage: 0D13H, that's 3347mV)

30 44 31 33 (fifth cell voltage: 0D13H, that's 3347mV)

30 44 31 33 (sixth cell voltage: 0D13H, that's 3347mV)

30 44 31 33 (seventh cell voltage: 0D13H, that's 3347mV)

30 44 31 33 (eighth cell voltage: 0D13H, that's 3347mV)

30 44 31 31 (ninth cell voltage : 0D11H, that's 3345mV)

30 44 31 32 (tenth cell voltage: 0D12H, that's 3346mV)

30 44 31 33 (eleventh cell voltage: 0D13H, that's 3347mV)

30 44 31 31 (twelfth cell voltage: 0D11H, that's 3345mV)

30 44 31 31 (thirteenth cell voltage: 0D11H, that's 3345mV)

30 44 31 32 (fourteenth cell voltage: 0D12H, that's 3346mV)

30 44 31 30 (fifteenth cell voltage: 0D10H, that's 3344mV)

30 44 31 33 (sixteenth cell voltage: 0D13H, that's 3347mV)

30 36 (temperature number N, 06H, has 6 temperatures)

30 42 42 37 (first temperature: 0BB7H, that's 2999, 26.9℃)

30 42 42 37 (second temperature: 0BB7H, that's 2999, 26.9℃)

30 42 42 38 (third temperature: 0BB8H, that's 3000, 27.0℃)

30 42 42 36 (forth temperature: 0BB6H, that's 2998, 26.8℃)

30 42 42 33 (fifth temperature (MOS): 0BB3H, that's 2995, 26.5℃)

30 42 42 44 (sixth temperature (environment): 0BBDH, that's 2994, 27.5℃)

30 30 30 30 (PACK current, 0000H, unit:10mA, range: -327.68A-+327.67A)

44 31 35 35 (PACK total voltage, D155H , that's 53.589V)

31 32 38 45 (PACK remain capacity, 128EH, that's 47.50AH)

30 33 (user define number P, 03H)

31 33 38 38 (PACK full capacity , 1388H , that's 50.00AH)

30 30 30 30 (cycle times, 0000H)

31 33 38 38 (PACK design capacity, 1388H , that's 50.00AH)

45 33 41 43 (CHKSUM, E3ACH)

0D (EOI)

remark

when communication debugging between monitoring equipment and BMS by RS232,we should pay attention to this situation:

1、 We should know the BMS is working or not,which can be judged by LED.if all LED is closed,we can push the key at 3-6 seconds to wake up the BMS.

2、 We should confirm that the monitoring equipment's baud is suitable with datasheet.

3、 When we analysis the data,please pay attention to the data's type.