# 充电器协议

串口

19200,n,8,1

SILP

End:0xC0

Esc:0xC1;

EscEnd:0xC2;

EscEsc:0xC3

BCMP Network Protocol（BNP）

BNP

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Header(1) | Opcode(1) | TX Number(2) | Length(2) | Data(n) | Checksum(2) | End(1) |

BCMP

|  |  |
| --- | --- |
| opcode(2) | Payload(n) |

## 1. Battery Network Protocol (BNP)

### 1.1 Format description:

* Header:0x7E
* Opcode:

0x01:Heart

0xB1: Heart \_Ack

0x02:Connect

0xB2: Connect \_Ack

0x03:Disconnect

0xB3: Disconnect \_Ack

0x04:Data

0xB4:Data\_Ack

0XE1:NoSupport\_Ack

* TX Number:
* Data:

当Opcode超出定义范畴或者Opcode != 0x04，在回复时，data[1] =Result,详情参见[1.3](#_1.3_Result：)

* Length: length of payload
* Checksum: sum of bytes in packet without header and end
* End:0x3E

### 1.2流程：

Connect——》

《——Connect\_Ack

Data——》

《——Data\_Ack

《——Data

Data\_Ack——》

Disconnect——》

《——Disconnect \_Ack

### 1.3 Result：

|  |  |  |
| --- | --- | --- |
| Value | Result | Description |
| 0x00 | Success |  |
| 0x01 | Failure |  |
| 0x02 | Unconnected |  |
| 0x03 | Invalid Parameter |  |
| 0x04 | Unsupported opcode |  |
| 0x05 |  |  |
|  |  |  |

## 2. Battery Control and Monitor Protocol（BCMP）

BNP Data. All messages have the same format, table below describes the detailed structure.

|  |  |
| --- | --- |
| opcode(2) | Payload(n) |

### 2.1 Format description:

* The BCMP Opcode is comprised of two fields: **a message type** filed and an **opcode identifier** filed.

**Opcode:**

MSB LSB

|  |  |
| --- | --- |
| MT | Opcode Identifier |

* Request: 0x0000 | Command
* Reply: 0x8000 | Command
* Broadcast: 0xB000 | Command
* Payload: Parameter of Opcode

### 2.2流程

Request->

<-Reply

<- Request

Reply ->

<- Broadcast

### 2.3指令

电池信息

#### 2.3.1 Battery Information: 0x0001

* Request:0x0001;

Query the information of battery;

Payload is empty

* Rely:0x8001:

Reply the battery information to client

Payload

* Boardcast:0xB001:

**Broadcast the battery information to client in cycle (3s), server actively send the broadcast when an Alert occurs for once.**

Payload is Battery information

##### 2.3.1.1 BATINFOREQ

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Offset | Filed | Size | Type | Description |
| 0 | BCMP Opcode | 2 | Constant | 0x0001 |

##### 2.3.1.2 BATINFOREP

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Offset | Filed | Size | Type | Description |
| 0 | BCMP Opcode | 2 | Constant | 0x8001 |
| 2 | Result | 1 | Number | See [1.3](#_1.3_Result：) |
| 3 | Bat Detailed Info | 0+ | Structure | BATINFOBRDCST:[2.3.1.3](#_2.3.1.3_BATINFOBRDCST) |

##### 2.3.1.3 BATINFOBRDCST

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Offset | Filed | Size | Type | Description |
| 0 | BCMP Opcode | 2 | Constant | 0xB001 |
| 2 | VIN | 2 | Number, signed | Input Voltage(V)(1000:1) |
| 4 | IIN | 2 | Number, signed | Input Current(A) (1000:1) |
| 6 | VCHARGE | 2 | Number, signed | Battery Charger Voltage(V) (1000:1) |
| 8 | ICHARGER | 2 | Number, signed | Battery Charger Current(A) (1000:1) |
| 10 | VSYS | 2 | Number, signed | System Voltage(V) (1000:1) |
| 12 | ISYS | 2 | Number, signed | Estimated Current(A) (1000:1) |
| 14 | Bat Total Capacity | 4 | Number | (Ah)(1000:1) |
| 18 | Bat Currently Capacity | 4 | Number | (Ah) (1000:1) |
| 22 | NTC | 2 | Number, signed | Battery temperature ℃（100:1） |
| 24 | DIE | 2 | Number, signed | die temperature ℃（100:1） |
| 26 | Battery State | 1 | Enumeration | 0x00: charging  0x01: Discharging  0x02: Idle  0x03:Abnormal |
| 27 | Alert Identifier | 1 | Number | 0x00:nothing happened  0x01:some alerts happened |
| 28 | Discharge time | 4 | Number | (Min) the time base on ISYS and Bat Current capacity.(1:1) |
| 32 | Remained time | 4 | Number | (Min) the time base on IBAT and Bat Current capacity, when the value is positive.(1:1) |

##### 2.3.1.4 Chemistry Type

|  |  |  |
| --- | --- | --- |
| Type | Value | Description |
| Li-lon Programmable | 0x00 |  |
| Li-lon Fixed 4.2V/cell | 0x01 |  |
| Li-lon Fixed 4.1V/cell | 0x02 |  |
| Li-lon Fixed 4.0V/cell | 0x03 |  |
| LiFePO4 Programmable | 0x04 |  |
| LiFePO4 Fixed Fast Charge | 0x05 |  |
| LiFePO4 Fixed 3.6V/cell | 0x06 |  |
| Lead-Acid Fixed | 0x07 |  |
| Lead-Acid Programmable | 0x08 |  |
|  |  |  |

##### 2.3.1.5 Charge Status

|  |  |  |
| --- | --- | --- |
| Status | Bits:15:0 | Charge status indicator. Individual bits are mutually exclusive. Only  active in charging states. |
| vin\_uvcl\_active | 3 | indicates the input undervoltage control loop is actively controlling  power delivery |
| iin\_limit\_active | 2 | indicates the input current limit control loop is actively controlling  power delivery |
| Constant current | 1 | indicates the charge current control loop is actively controlling  power delivery |
| Constant voltage | 0 | indicates the battery voltage control loop is actively controlling power  delivery |

##### 2.3.1.6 Charger State

|  |  |  |
| --- | --- | --- |
| Status | Bits:15:0 | Charge status indicator. Individual bits are mutually exclusive. Only  active in charging states. |
| equalize\_charge | 10 | indicates battery charger is in lead-acid equalization charge state |
| absorb\_charge | 9 | indicates battery charger is in absorb charge state |
| charger\_suspended | 8 | indicates battery charger is in charger suspended state |
| precharge | 7 | indicates battery charger is in precondition charge state |
| cc\_cv\_charge | 8 | indicates battery charger is in constant-current constant-voltage state |
| ntc\_pause | 5 | indicates battery charger is in thermistor pause state |
| timer\_term | 4 | indicates battery charger is in timer termination state |
|  | 3 | reserved |
| max\_charge\_time\_fault | 2 | indicates battery charger is in max\_charge\_time\_fault state |
| bat\_missing\_fault | 1 | indicates battery charger is in missing battery fault state |
| bat\_short\_fault | 0 | indicates battery charger is in shorted battery fault state |

#### 2.3.2 Battery Alert Configuration and Notify Service: 0x0002

This message is used to request notices of certain services of the server.

When a certain service is triggered, the server will send a notice message to the client which requested notice of such service. **The service is not requested notice of by default when the server is powered on.** Process of notice requesting and cancelling is shown in following Figure Process of notice requesting and cancelling.

* Request:0x0002;

Request to configure alert limit or enable notice of battery alert;

**Payload: Number [1] + {Type [1] +Operation [1] + Id [1] + Value [1] } [Number].**

* Rely:0x8002:

Reply the result of the service request;

Payload.

* Boardcast:0xB002:

Broadcast the battery alert info to client;

Payload is Battery alert type.

##### 2.3.2.1 ALERTNOTICESERVICEREQ

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Offset | Filed | Size | Type | Description |
| 0 | BCMP Opcode | 2 | Constant | 0x0002 |
| 2 | Number | 1 | Number | Set the amount of services to be requested |
| 3 | Configure Info | **Number\*4** | Array | Service item:2.3.2.2 |
|  |  |  |  |  |

##### 2.3.2.2 Configure Info

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Offset | Filed | Size | Type | Description |
| 0 | Type | 1 | Number | 0x00: Charger state alert  0x01: Charge status alert  0x02: Limit alert |
| 1 | Operation | 1 | Number | 0x00: Do not inform the client.  0x01: Inform the client. |
| 2 | Id | 2 | Number | Service item:[2.3.2.3](#_2.3.2.3_Alert_ID) |
| 4 | Value | 2 | Number | **If type is equal to 0x00 or 0x01, the value is invalid.**  **If the operation is equal to 0x00, the value is invalid.**  **If type is equal to 0x02, the value is an alert limit (signed).** |
|  |  |  |  |  |

##### 2.3.2.3 Alert ID

|  |  |  |  |
| --- | --- | --- | --- |
| Id | Value | Description | Default（param） |
| VBAT\_LO\_ALERT\_LIMIT | 0xA001 | Battery voltage low alert limit, signed, same format as VBAT.  (V)(1000:1) | 0x0000 |
| VBAT\_HI\_ALERT\_LIMIT | 0xA002 | Battery voltage high alert limit, signed, same format as VBAT  (V)(1000:1) | 0x0000 |
| VIN\_LO\_ALERT\_LIMIT | 0xA003 | Signed  (V)(1000:1) | 0x0000 |
| VIN\_HI\_ALERT\_LIMIT | 0xA004 | Signed  (V)(1000:1) | 0x0000 |
| VSYS\_LO\_ALERT\_LIMIT | 0xA005 | Signed  (V)(1000:1) | 0x0000 |
| VSYS\_HI\_ALERT\_LIMIT | 0xA006 | Signed  (V)(1000:1) | 0x0000 |
| IIN\_HI\_ALERT\_LIMIT | 0xA007 | Signed  (A)(1000:1) | 0x0000 |
| IBAT\_LO\_ALERT\_LIMIT | 0xA008 | Signed  (A)(1000:1) | 0x0000 |
| DIE\_TEMP\_HI\_ALERT\_LIMIT | 0xA009 | Signed  (℃)(100:1) | 0x0000 |
| BAT\_TEMP\_HI\_ALERT\_LIMIT | 0xA00C | Signed  (℃)(100:1) | 0x0000 |
|  |  |  |  |
| CONSTANT\_VOLTAGE\_CTRL\_ALERT | 0xB000 | Bool | False |
| CONSTANT\_CURRENT\_CTRL\_ALERT | 0xB001 | Bool | False |
| IIN\_LIMIT\_ACTIVE\_ALERT | 0xB002 | Bool | False |
| VIN\_UVCL\_ACTIVE\_ALERT | 0xB003 | Bool | False |
| BAT\_SHORT\_FAULT\_ALERT | 0xC000 | Bool | False |
| BAT\_MISSING\_FAULT\_ALERT | 0xC001 | Bool | False |
| MAX\_CHARGE\_TIME\_FAULT\_ALERT | 0xC002 | Bool | False |
| MAX\_CV\_TIME\_ALERT | 0xC004 | Bool | False |
| BAT\_NTC\_PAUSE\_ALERT | 0xC005 | Bool | False |
| CC\_CV\_CHARGE\_ALERT | 0xC006 | Bool | False |
| PRECHARGE\_ALERT | 0xC007 | Bool | False |
| CHARGER\_SUSPENDED\_ALERT | 0xC008 | Bool | False |
| ABSORT\_CHARGE\_ALERT | 0xC009 | Bool | False |
| EQUALIZE\_CHARGE\_ALERT | 0xC00A | Bool | False |
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#### 2.3.3 Alert Information: 0x0003

* Request:0x0003;

Query the alert information of charger;

Payload is empty.

* Rely:0x8003:

Reply the alert information to client;

**Payload:**

**Opcode [1] + Result [2] + Number [1] + {Type [1] + Id [2] + Value [2]} [Number]**

##### 2.3.3.1 ALERTINFOREQ

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Offset | Filed | Size | Type | Description |
| 0 | BCMP Opcode | 2 | Constant | 0x0003 |

##### 2.3.3.2 ALERTINFOREP

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Offset | Filed | Size | Type | Description |
| 0 | BCMP Opcode | 2 | Constant | 0x8003 |
| 2 | Result | 1 | Number | See [1.3](#_1.3_Result：) |
| 3 | Number | 1 | Number | alert amounts |
| 4 | Alert Detailed Info | Number\*5 | Array | See [2.3.3.3 Alert Detailed Info](#_2.3.3.3_Alert_Detailed) |

##### 2.3.3.3 Alert Detailed Info

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Offset | Filed | Size | Type | Description |
| 0 | Type | 1 | Number | 0x00: Charger state alert  0x01: Charge status alert  0x02: Limit alert |
| 1 | Id | 2 | Number | Service item:[2.3.2.3](#_2.3.2.3_Alert_ID) |
| 3 | Value | 2 | Number | **If type is equal to 0x00 or 0x01, the value is invalid.**  **If type is equal to 0x02, the value is an alert limit as** [2.3.2.3](#_2.3.2.3_Alert_ID) Description. |
|  |  |  |  |  |
|  |  |  |  |  |

#### 2.3.4 Configure Charger settings 0x0004

* Request:0x0004;

Request to configure the charger settings.

* Rely:0x8004:

Reply the request of configuration;

##### 2.3.4.1 CONFIGUREREQ

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Offset | Filed | Size | Type | Description |
| 0 | BCMP Opcode | 2 | Constant | 0x8004 |
| 2 | UVCL | 2 | Number | (V) (1000:1) |
| 4 | JEITA | 1 | Number | 0x00:disable  0x01:enable |
| 5 | VCHARGE/CELL | 2 | Number | (V)(1000:1)  If JEITA == 1, the value is invalid |
| 7 | ICHARGE/CELL | 2 | Number | (A)(1000:1)  If JEITA == 1, the value is invalid |
| 9 | IINLIM | 2 | Number | (A)(1000:1) |
| 11 | MAX CV TIME | 2 | Number | (sec) |
| 13 | MAX CHARGE TIME | 2 | Number | (sec) |
| 15 | BAT Capacity | 4 | Number | (Ah)(1000:1) |
| 19 | Charge status alerts | 2 | structure | 0x00:not to be notified  0x01:notice  Charge alert:[2.3.1.5 Charge Status](#_2.3.1.4_Charge_Status)  Charger alert:[2.3.1.6 Charger State](#_2.3.1.5_Charger_State) |
| 21 | Charger state alerts | 2 | structure |
| 23 | VBAT\_LO\_ALERT\_LIMIT | 5 | structure | [2.3.4.2 LIMITCONFIGURATION](#_2.3.4.2_LIMITCONFIGURATION) |
| 28 | VBAT\_HI\_ALERT\_LIMIT | 5 | structure | [2.3.4.2 LIMITCONFIGURATION](#_2.3.4.2_LIMITCONFIGURATION) |
| 33 | VIN\_LO\_ALERT\_LIMIT | 5 | structure | [2.3.4.2 LIMITCONFIGURATION](#_2.3.4.2_LIMITCONFIGURATION) |
| 38 | VIN\_HI\_ALERT\_LIMIT | 5 | structure | [2.3.4.2 LIMITCONFIGURATION](#_2.3.4.2_LIMITCONFIGURATION) |
| 43 | VSYS\_LO\_ALERT\_LIMIT | 5 | structure | [2.3.4.2 LIMITCONFIGURATION](#_2.3.4.2_LIMITCONFIGURATION) |
| 48 | VSYS\_HI\_ALERT\_LIMIT | 5 | structure | [2.3.4.2 LIMITCONFIGURATION](#_2.3.4.2_LIMITCONFIGURATION) |
| 53 | IIN\_HI\_ALERT\_LIMIT | 5 | structure | [2.3.4.2 LIMITCONFIGURATION](#_2.3.4.2_LIMITCONFIGURATION) |
| 58 | IBAT\_LO\_ALERT\_LIMIT | 5 | structure | [2.3.4.2 LIMITCONFIGURATION](#_2.3.4.2_LIMITCONFIGURATION) |
| 63 | DIE\_TEMP\_HI\_ALERT\_LIMIT | 5 | structure | [2.3.4.2 LIMITCONFIGURATION](#_2.3.4.2_LIMITCONFIGURATION) |
| 68 | BAT\_TEMP\_HI\_ALERT\_LIMIT | 5 | structure | [2.3.4.2 LIMITCONFIGURATION](#_2.3.4.2_LIMITCONFIGURATION) |
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##### 2.3.4.2 LIMITCONFIGURATION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Offset | Filed | Size | Type | Description |
| 1 | Id | 2 | Number | Service item:[2.3.2.3](#_2.3.2.3_Alert_ID) |
| 3 | Operation | 1 | Number | 0x00: Do not inform the client.  0x01: Inform the client. |
| 4 | Value | 2 | Number | **The value is an alert limit as** [2.3.2.3](#_2.3.2.3_Alert_ID) Description. |

##### 2.3.4.4 CONFIGUREREP

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Offset | Filed | Size | Type | Description |
| 0 | BCMP Opcode | 2 | Constant | 0x8004 |
| 2 | Result | 1 | Number | See [1.3](#_1.3_Result：) |
|  |  |  |  |  |