

SPEC. ID:	UART_MAP	Issue Date:	March 21, 2017	PAGE 1 OF 6
Description	UART map for PCM4~16*** BMS	REV:	A3	

Table of Contents:

1 Abstract.....	2
2 Specification.....	2
2.1 Communication Setting	2
2.2 Frame Format	2
2.2.1 Definitions	2
2.2.2 Real Time Data Map	3
2.2.3 FET Map.....	6
2.2.4 Version information	6
2.2.5 Acknowledgement	6
3 Example Code.....	6

SPEC. ID:	UART_MAP	Issue Date:	March 21, 2017	PAGE 2 OF 6
Description	UART map for PCM4~16**** BMS	REV:	A3	

1 Abstract

Communication map for UART port of PCM4~16***** BMS.

This document will detail the information and messages that could be read from this series of BMS.

2 Specification

2.1 Communication Setting

Baud Rate	9600 bps
Data	8 bit
Parity	None
Stop	1 bit
Flow Control	None

Standard UART RX, TX, GND connection.

a 10 Ω resister on communication line is recommended.

2.2 Frame Format

No.	1	2	3	4	5	6	7	8
Format	SOI	Addr	Cmd	Ver	Len	Data	CRC	EOI
Length [ASCII]	1	1	1	1	2	N	1	1

2.2.1 Definitions

SOI	Start String	0x3A
EOI	End String	0x7E
Addr	Device Address	0 Universal
Cmd	Command for BMS *detailed more below	Bit 6 ~ bit 0 according cmd. Bit 7 = 1; no answer. Bit 7 = 0; answer needed.
Ver	Protocol Version	101
Len	Length of the entire posted data.	2 ASCII
CRC	Verification of the String, Excluding SOI and EOI. If received as ASCII need to translate to HEX for calculation.	//crc cala verification method (C language) // i = length of string uint8 crc = 0; for (j = 1; j < i; j++) { crc += Rx485buf [j]; } crc ^= 0xff;

SPEC. ID:	UART_MAP	Issue Date:	March 21, 2017	PAGE 3 OF 6
Description	UART map for PCM4~16*** BMS	REV:	A3	

2.2.2 Real Time Data Map

For real time data, write Cmd 0x02 with Data void.

Returns Cmd = 0x82 and Data will follow.

No. #	Content	ASCII Length	Representation
1	Time_t	7	expressed in seconds, to the number of seconds 1970-01-01 00:00:00 UTC 0 time zone
2	Vbat	2	battery voltage, output is 0.5 of the total voltage;
3	CellNum	1	Number of cells 1~16
4	Vcell[n]	2*n	Vcell[16] in mV, a string of all voltages by order in ASCII
5	Current[2]	2*2	Current[0] = CHG current [10mA] Current[1] = DSG Current [10mA] In ASCII
6	TempNum	1	Number of temp sensors (m)
7	Temp[m]	1*m	In 1°C + 40°C in ASCII
8	VSTATE	2	uint16_t VOV:1; //single cell overvoltage uint16_t VUV:1; //single cell undervoltage uint16_t BVOV:1; //battery pack overvoltage uint16_t BVUV:1; //battery pack undervoltage uint16_t wVOV:1; //single cell overvoltage warning value uint16_t wVUV:1; //single cell undervoltage warning value uint16_t wBVOV:1; //battery pack overvoltage warning value uint16_t wBVUV:1; //battery pack undervoltage warning value uint16_t VDIFF:1; //dropout voltage protection uint16_t VBREAK:1; //disconnection uint16_t CSGDIS:1; //low voltage, prohibit charging
9	CSTATE	2	uint16_t CING:1; //charge status uint16_t DING:1; //discharge status uint16_t OCCSG:1; //over-current charge

SPEC. ID:	UART_MAP	Issue Date:	March 21, 2017	PAGE 4 OF 6
Description	UART map for PCM4~16*** BMS	REV:	A3	

			uint16_t SHORT:1; //short-circuit protection uint16_t OCDSG1:1; //over-current discharge first-grade uint16_t OCDSG2:1; //over-current discharge second-class uint16_t WOCCSG:1; //charge current warning value uint16_t WOCD SG:1; //discharge current warning value
10	TSTATE	2	uint16_t TCELL_CSGH:1; //charge high temperature uint16_t TCELL_CSGL:1; //charge low temperature uint16_t TCELL_DSGH:1; //discharge high temperature uint16_t TCELL_DSGL:1; //discharge low temperature uint16_t TENV_H:1; //environment high temperature uint16_t TENV_L:1; //environment low temperature uint16_t TFET_H:1; //power high temperature uint16_t TFET_L:1; //power low temperature uint16_t wTCELL_H:1; //battery cell high temperature warning uint16_t wTCELL_L:1; // battery cell low temperature warning uint16_t wTENV_H:1; // environment high temperature warning uint16_t wTENV_L:1; // environment low temperature warning uint16_t wTFET_H:1; // power high temperature warning uint16_t wTFET_L:1; // power low temperature warning
11	Alarm	2	uint16_t bit0:1; //voltage warning, dropout voltage protection, disconnection protection uint16_t bit1:1; //charge fet damage warning

SPEC. ID:	UART_MAP	Issue Date:	March 21, 2017	PAGE 5 OF 6
Description	UART map for PCM4~16*** BMS	REV:	A3	

			uint16_t bit2:1; //SD ERR 1,error 0,normal uint16_t SPI_ERR:1; //ML5238 communication uint16_t E2PROM_ERR:1; //external storage: E2PROM ERR 1,error 0,normal uint16_t bit5:1; //reserved uint16_t FCC_UPDATING:1; //charge study turn on status uint16_t FCC_DSGLEARN:1; //discharge study turn on status
12	FET-STATE	1	uint8_t DFET:1; //discharge on/off status, 1 means on, 0 means off uint8_t CFET:1; //charge on/off status, 1 means on uint8_t SDFET:1; // discharge on/off, 1 means on, 0 means off uint8_t SCFET:1; // charge on/off, 1 means on uint8_t DFET_DAMAGE:1; //discharge MOS status, 1 means damaged uint8_t CFET_DAMAGE:1; //charge MOS status, 1 means damaged uint8_t CCFET:1; //reserved, 1 means on
13	WARN_VOV	2	single cell high voltage warning value mV
14	WARN_VUV	2	single cell undervoltage warning value
15	WARN_VHIGH	2	battery pack high voltage warning value
16	WARN_VLOW	2	battery pack undervoltage warning value
17	BalanceState	2	Balance state for V0 to V15
18	DchgNum	2	Number of discharge events
19	ChgNum	2	Number of charge events
20	SOC	1	Battery SOC [%]
21	CapNow	2	Current capacity
22	CapFull	2	Full Charge Capacity

SPEC. ID:	UART_MAP	Issue Date:	March 21, 2017	PAGE 6 OF 6
Description	UART map for PCM4~16*** BMS	REV:	A3	

2.2.3 FET Map

FET request operation Cmd = 0x06, Data Follows:

No. #	Content	ASCII Length	Representation
1	SFET	1	0: DFET 1: CFET open 2: ~ 7: NC

2.2.4 Version information

Version information request, Cmd = 0x09, Data follows in text format.

Example: "V1.1 Version"

2.2.5 Acknowledgement

Cmd = 0x8A – Success

Cmd = 0x8B - error

3 Example Code

Read the instruction protection parameters:

Send data

:000200000ee8~

: (SOI),00(addr),02(cmd),00(ver),000e(len),e8(crc),~ (EOI)

Received data

: (SOI),01(addr),82(cmd),52(ver),0090(len), 000000000000(time_t)
48F8(Vbat),0A(cell_num=10),0EA9(v1),0EB3(v2),0EB6(v3),0EB4(v4),0E8C(v5),0EB4(v6),
0E45(v7),0E9E(v8),0E9E(v9),0E6A(v10),0000(curr[0]),0000(curr[1]),02(TempNum),47(temp[0]),
45(temp[1]),0000(Vstate),0000(Cstate),0000(Tstate),0000(Alarm),0F(FetState),
0000(WARN_VOV),0000(WARN_VUV),0000(NUM_WARN_VHIGH),0000(NUM_WARN_VLOW),
0000(BlanceState),0000(DchgNum),0000(ChgNum),2D(soc),0048(CapNow),00A0(CapFull),
4E(CRC),~(EOI)

CRC calculation example:

:000100000E09~

0x30 + 0x30 + 0x30 + 0x31 + 0x30 + 0x30 + 0x30 + 0x30 + 0x30 + 0x45 = 0xF6

0xF6 ^ 0xFF = 0x09 – write in ASCII -> 09.