

## PLTBEITO Single UART Protocol

--- Suzhou Pairlink Network Technology Ltd.,

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Version	History	Remark
1.0	First release	Combine Master and Slave Mode
1.1	New CMD&EVENT added	
1.2	Fix some typos	
1.3	New CMD added	
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# 1. UART Control

## 1.1 UART configuration

NO	NAME	CONFIG
1	Baud Rate	115200(default)
2	Data Bit	8 bits
3	Stop	1 bit
4	Parity Bit	None

## 1.2 UART Packet format

LSB					MSB
Header	Type	Length	Opcode	Parameters	Check_XOR

<b>Header (1 Byte)</b>	0x77
<b>Type (1 Byte)</b>	Type of Packet 0xA1: Command 0xA2: Reserved 0xA3: Response 0xA4: Event
<b>Length (1 Byte)</b>	Length of OpCode + Parameters
<b>OpCode (1 Byte)</b>	Operation code of this packet
<b>Parameters ( Length-1 Bytes)</b>	Data payload of each OpCode
<b>Check_XOR (1 Bytes)</b>	Check the packet validity <b>Check_XOR = Header ^ Type ^ Length ^ OpCode ^ Parameters</b>

### 1.3 UART packet -- Command

Command:MCU--->PLTBEITO.

#### 1.3.1 Command Opcode: Get Local address[0x01](M/S)

Get modules's MAC.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	01	01	N/A	

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	07	01	Public_Address[6]	

#### 1.3.2 Command Opcode: Send User Data[0x02](M/S)

MCU send data to remote M/S.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	n	02	Connection_ID Userdata[]	

Connection\_ID:uint16\_t,each connection will be allocated a connection ID.

Userdata[]: Passthrough data, max 252bytes.

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	02	Err	

Parameters : Err = Error Code [Refer to 1.4.1 \[1byte\]](#)

#### 1.3.3 Command Opcode: Get Paired Device[0x03](M)

Get the stored slave devices' MAC.The paired devices will be report in the event.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	01	03	N/A	

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	03	num	

num: the number of paired device.

#### 1.3.4 Command Opcode: Add device[0x04](M)

Add device.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	07	04	Public_Address[6]	<b>variable</b>

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	04	Err	variable

Parameters : Err = Error Code [Refer to 1.4.1 \[1byte\]](#)

### 1.3.5 Command Opcode: Delete device[0x05](M)

Delete device.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	07	05	Public_Address[6]	variable

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	05	Err	variable

Parameters : Err = Error Code [Refer to 1.4.1 \[1byte\]](#)

### 1.3.6 Command Opcode: Discoverable[0x06](M)

Set the module the discoverable mode in which OTA is possible.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	02	06	Duration	variable

Duration :Unit s.

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	06	Err	variable

Parameters : Err = Error Code [Refer to 1.4.1 \[1byte\]](#)

### 1.3.7 Command Opcode: Get Connection ID[0x07](S)

Get the current connection ID.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	01	07	NULL	variable

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	03	07	Connection_ID	variable

Connection\_ID: 0x0000 means disconnected, others mean connected.

### 1.3.8 Command Opcode: Get Device Info[0x08](M/S)

Get the information about the module.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	02	08	type	variable

Type: 00 model  
 01 software version  
 02 hardware version  
 03-FF RESERVED

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	n	08	Info_String[ ]	variable

Info\_String[:information returned according to the type.

### 1.3.9 Command Opcode: Shut Down Sleep[0x09](M/S)

Set the module to deep sleep mode.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	01	09	NULL	variable

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	09	00	variable

A rising edge on P00 will wake up the module.

### 1.3.10 Command Opcode: Get CCC Value[0x0a](S)

Get client configuration value .

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	01	0a	NULL	variable

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	03	0a	CCC_value	variable

When CCC\_value is 0x0001,it means notification is enabled.

Only when notification is enabled,the slave module can send data to master module.

### 1.3.11 Command Opcode:Upgrade Control[0x0b](M/S)

Local firmware update through UART.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	n	0b	Upgrade command	variable

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	0b	status	variable

Upgrade command:

start: 01 xx xx xx xx, append the length of the bin file

stop: 02

check: 03 xx xx xx xx, append the crc32 of the bin file, if check successfully, module will reboot.

### 1.3.12 Command Opcode:Upgrade Data[0x0c](M/S)

Local firmware update through UART.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	n	0c	Data[]	variable

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	0c	status	variable

Send firmware data in sequence after UART upgrade start.

### 1.3.13 Command Opcode:Discover Slaves[0x0d](M)

Master module try to find slaves nearby.

Note:During the procedure,auto connection establish will not work.The CMD< Add device>will stop the discovery right now.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	02	0d	Timeout	variable

If Timeout == 0,stop the previous discovery

If Timeout != 0,start discovery until timeout,unit is second.

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	0d	status	variable

An event will be generated when a slave is found.



### 1.3.14 Command Opcode:Discover Specified Slave[0x0e](M)

Master module try to find a specified slave nearby.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	08	0e	Timeout Address[6]	variable

If Timeout == 0,stop the previous discovery

If Timeout != 0,start discovery until timeout,unit is second.

Address[6]:specify the address to find

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	0e	status	variable

An event will be generated when the slave is found.

### 1.3.15 Command Opcode:Set UART Baud Rate[0x0f](M/S)

Change the baud rate of UART.

The default value is 115200.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	05	0f	baudrate	variable

Baudrate: 9600~1000000

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	0f	status	variable

The baud rate will change to the new setting after 150ms.

The baud rate will be stored to NVRAM.

### 1.3.16 Command Opcode:Set Device Name[0x10](S)

Change the device name.

The default name is "ito-single".

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	n	10	Name[]	variable

Name[]: string of the name,max 29 bytes.

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	10	status	variable

The name will be stored to NVRAM.

### 1.3.17 Command Opcode:Set ADV TX Power[0x11](S)

Change the advertising TX power.

The default value is 12dbm.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	02	11	level	variable

level: int8\_t,-16~12.

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	11	status	variable

The TX power will be stored to NVRAM.

### 1.3.18 Command Opcode:Set ADV Interval[0x12](S)

Change the advertising interval.

The default value is 0x0040.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	03	12	interval	variable

interval: uint16\_t,0x0020~0x4000.

The actual interval of advertising will be (interval\*0.625)ms.

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	12	status	variable

The interval will be stored to NVRAM.

### 1.3.19 Command Opcode:Set ADV User Data[0x13](S)

Change the user data in advertising.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	n	13	Data[]	variable

Data[]:max 8bytes.

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	13	status	variable

The data will be stored to NVRAM.

### 1.3.20 Command Opcode:Set UART Flow Control[0x14](M/S)

Enable/disable the hardware RTS(P28)/CTS(P27) flow control.

Command					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A1	2	14	enable	variable

enable:1/0.

Response					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A3	02	14	status	variable

The data will be stored to NVRAM.

## 1.4 UART packet -- Response

Response packet could be considered as ACK for the command packet.

The response packet is dedicated to the command package.

### 1.4.1 Response Error Code

#### 1) Error Code

Value	Comment
0x00	ERR_NONE
0x01	ERR_INVALID_LENGTH
0x02	ERR_INVALID_PARAMETER
0x03	ERR_UNKNOWN_CMD
0x04	ERR_DISCONNECTED
0x05	ERR_BUSY
0x06	ERR_NOTIFY_DISABLED
0x07	ERR_NO_RESOURCE

## 1.5 UART packet -- Event

Event packet is sent to MCU from PLTBEITO to notify MCU that, there is event or data triggered .

### 1.5.1 Event opcode: System Ready[0x01](M/S)

System boot up.When P06 is pulled up,the module will enter master mode.When P06 is pulled down,the module will enter slave mode.

Event					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A4	02	01	mode	variable

mode: 0x01 slave mode  
0x02 master mode

### 1.5.2 Event opcode: Connection up [0x02](M/S)

Generated when a connection is established.

Event					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A4	09	02	Connection_id Address[6]	variable

Connection\_id:this connection's identify.  
Address[6]:remote's MAC.

### 1.5.3 Event opcode: Connection down[0x03](M/S)

Generated when a connection is shutdown.

Event					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A4	03	03	Connection_id	variable

### 1.5.4 Event opcode: Paired Device[0x04](M)

Generated when cmd<Get Paired Device>is received.

Event					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A4	n	04	num Address[num][6]	variable

Num: the number of stored slaves  
Address[num][6]:the array of stored slaves' MAC

### 1.5.5 Event opcode: User Data Received[0x05](M/S)

Generated when data is received.

Event					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A4	n	05	Connection_id	variable

				User_data[]	
--	--	--	--	-------------	--

Connection\_id:the connection identify

User\_data[]:Passthrough data from remote

### 1.5.6 Event opcode: Connection Recover from BUSY[0x06](M/S)

Generated after the connection recover from busy state.

Event					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A4	03	06	Connection_id	variable

### 1.5.7 Event opcode:Notify Enabled[0x07](S)

Generated when the notification is enabled.

Event					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A4	03	07	Connection_id	variable

### 1.5.8 Event opcode:RSSI\_Of\_Connection[0x08](M)

Generated when a connection is established.

Event					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A4	02	08	RSSI	variable

### 1.5.9 Event opcode:Found\_Slave[0x09](M)

Generated when a slave is found.

Event					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A4	07	09	Address[6]	variable

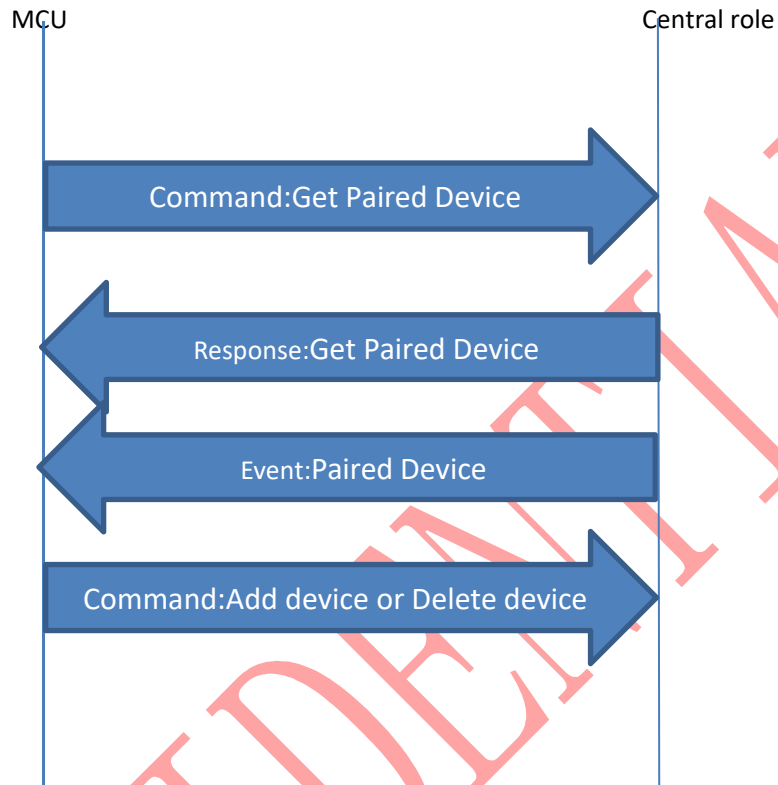
### 1.5.10 Event opcode:Found\_Specified\_Slave[0x0a](M)

Generated when the specified slave is found.

Event					
Header	Type	Length	Opcode	Parameters	Check_XOR
77	A4	27	0a	RSSI Address[6] Advertising data[31]	variable

## 2. Appendix

### 2.1 Central role bond flow (UART command)

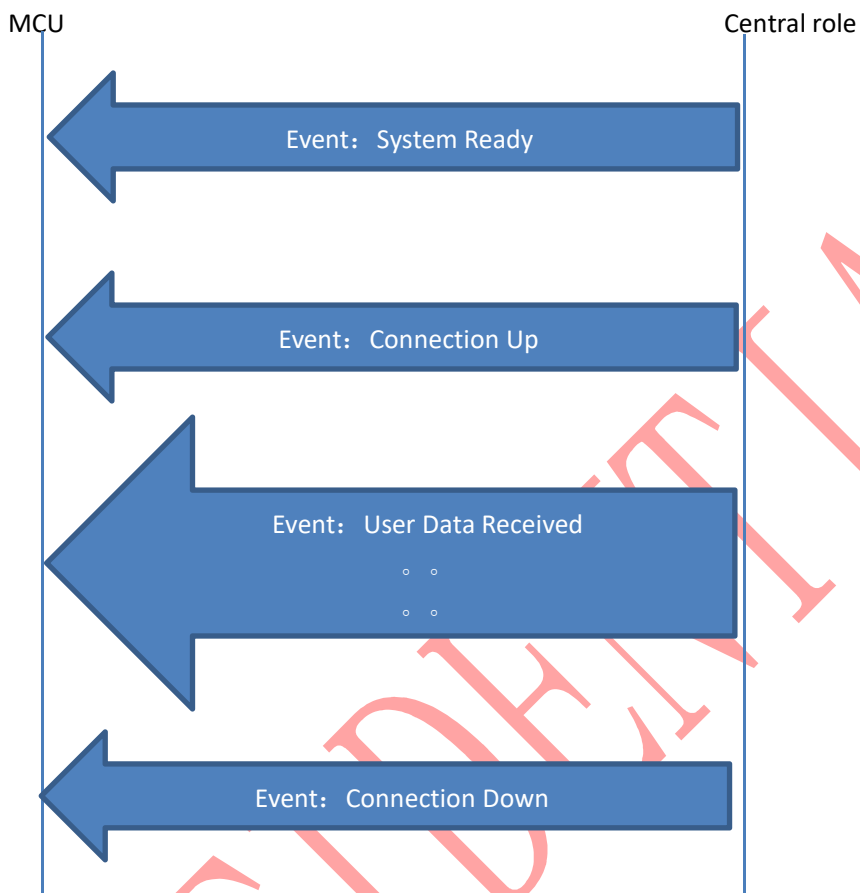


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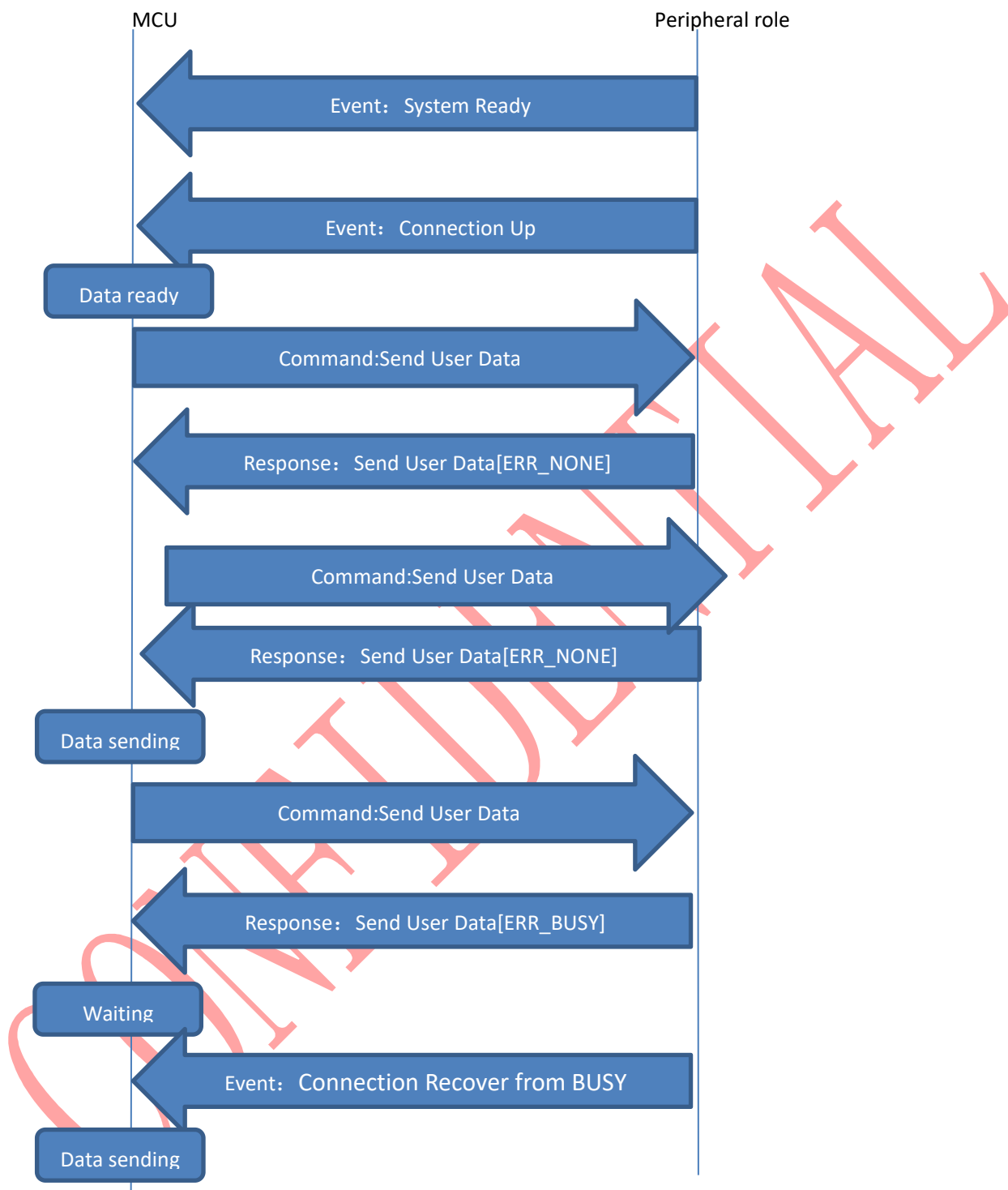
## 2.2 Data transmit

### 2.2.1 Central role

Suppose the bonding has completed



### 2.2.2 Peripheral role





## 2.3 OTA via UART

