Multilink UART Protocol

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Version	History	Remark
1.0	First release	
1.1	Modify event parameter of 02 and 03 Add command 06 and event 06 Add sample flow chart	
1.2	Add command 07 and event 07	
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1 UART Control

1.1 UART configuration

NO	NAME	CONFIG
1	Baud Rate	115200
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**

Header (1 Byte)	0x77
Type (1 Byte)	Type of packet 0x01: Command 0x02: Reserved 0x03: Response 0x04: Event
Length (1 Byte)	Total length of opcode and parameters
Opcode (1 Byte)	Operation code of this packet
Parameters (n Bytes)	Data payload of each opcode
Check (1 Bytes)	Check the packet validity Check = Header ^ Type ^ Length ^ Opcode ^ Parameters

1.3 UART packet -- Command

Command packets are defined for MCU to control the PLTBEITO.

1.3.1 Enable Discoverable mode[0x01]

PLTBEITO will enter *discoverable mode* when receiving this command.

In discoverable mode, the PLTBEITO can be added into one mesh-net, or do firmware upgrade.

Command					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	01	02	01	nSec	

Parameters	**Length**	**value**	**description**
nSec	1	1~255	the time to stay in discoverable mode

Response					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	03	02	01	Err	

Parameters	**Length**	**value**	**description**
Err	1	Refer to 1.4.1	The status of the command

1.3.2 Get Local address[0x02]

Get the PLTBEITO's MAC.

When received this command successfully,PLTBEITO will send an event to MCU.

Command					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	01	01	02	N/A	75

Response					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	03	02	02	Err	

Parameters	**Length**	**value**	**description**

Err	1	Refer to 1.4.1	The status of the command

1.3.3 Set IDs[0x03]

MCU can set companyID and productID into PLTBEITO through this command. The APK/APP could inquiry this two IDs to learn which product it is.

Command					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	01	05	03	CID PID	

Parameters	Length	value	description
CID	2	User defined	Company id
PID	2	User defined	Product id

Response					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	03	02	03	Err	

Parameters	Length	value	description
Err	1	Refer to 1.4.1	The status of the command

1.3.4 Register Data Channel[0x04]

MCU send this command to PLTBEITO to register the channels, from which it want to receive mesh data.

Command					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	01	05	04	channel_sel	

Parameters	Length	value	description
channel_sel	4	Bit0~bit31	Bit mask of each channel

Response					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	03	02	04	Err	check

Parameters	Length	value	description
Err	1	Refer to 1.4.1	The status of the command

1.3.5 Send User Data[0x05]

MCU send data to other devices in mesh.

Command					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	01	n	05	Virtual Address Channel Data	

Parameters	Length	value	description
Virtual Address	4	Uint32_t	The destination of the data.0xFFFFFFFF means broadcast
Channel	1	0~31	The channel to send the data
Data	n	Byte array	User data

Response					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	03	02	05	Err	check

Parameters	Length	value	description
Err	1	Refer to 1.4.1	The status of the command

1.3.6 Send Bypass User Data[0x06]

MCU send data to smart phone when in discoverable mode.

Command					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	01	n	06	Data	

Parameters	Length	value	description
Data	n	Byte array	User data

Response					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	03	02	06	Err	check

Parameters	Length	value	description
Err	1	Refer to 1.4.1	The status of the command

1.3.7 Check Data Route[0x07]

MCU send the source virtual address to get the virtual address of node who has passed the data,if Err in response equal to ERR_NONE,then an event[07] will be generated.

Command					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	01	5	07	Virtual Address	

Parameters	Length	value	description
Virtual Address	4	Virtual address of the source	

Response					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	03	02	06	Err	check

Parameters	Length	value	description
Err	1	Refer to 1.4.1	The status of the command

1.4 UART packet -- Response

Response packet could be considered as ACK for the command packet.
When one command packet is sent to PLTBEITO, there is one response packet sent back to MCU.
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_LENGTH_FAIL
0x02	ERR_INVALID_FAIL
0x03	ERR_UNKNOWN_CMD
0X04	ERR_OFFLINE

1.5 UART packet -- Event

Event packet is sent to MCU from PLTBEITO to notify MCU that, there is event or data triggered in the Mesh-net.

1.5.1 System status [0x01]

PLTBEITO is ready. This event packet would be sent to MCU after PLTBEITO system boot up.

Event					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	04	02	01	01	check

1.5.2 Discoverable Status[0x02]

Event					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	04	02	02	status	check

Parameters	Length	value	description
status	1	0x01 Discoverable mode now. 0x02 Timeout-exit	Notify the discoverable status

1.5.3 Mesh Status[0x03]

Event					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	04	03	03	Type Value	check

Parameters	Length	value	description
Type	1	0x00 Configure Status 0x01 Device Number in mesh	Notify the mesh status.
Value	1	According to Type	If Type == 0x00,value is below: MESH_CONFIG_DELETE 0 MESH_CONFIG_NEW 1

			MESH_CONFIG_SAME 2 If Type == 0x01，value indicate the device number in mesh

1.5.4 Local Address[0x04]

Generated after receive the command[0x02] of “Get Local address”

Event					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	04	07	04	address	check

Parameters	Length	value	description
address	6	Byte[6]	The MAC address of the module

1.5.5 User Data[0x05]

Generated when PLTBEITO receive user data from Mesh-net on the registered channel.

Event					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	04	n	05	Channel Virtual address Data	

Parameters	Length	value	description
Channel	1	0~31	The channel received data
Virtual address	4	Uint32_t	The source address the data
Data	n	Byte array	User data

1.5.6 Bypass User Data[0x06]

Generated when PLTBEITO receive user data in discoverable mode.

Event					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	04	n	06	Data	

Parameters	Length	value	description
Data	n	Byte array	User data

1.5.7 Data Route[0x07]

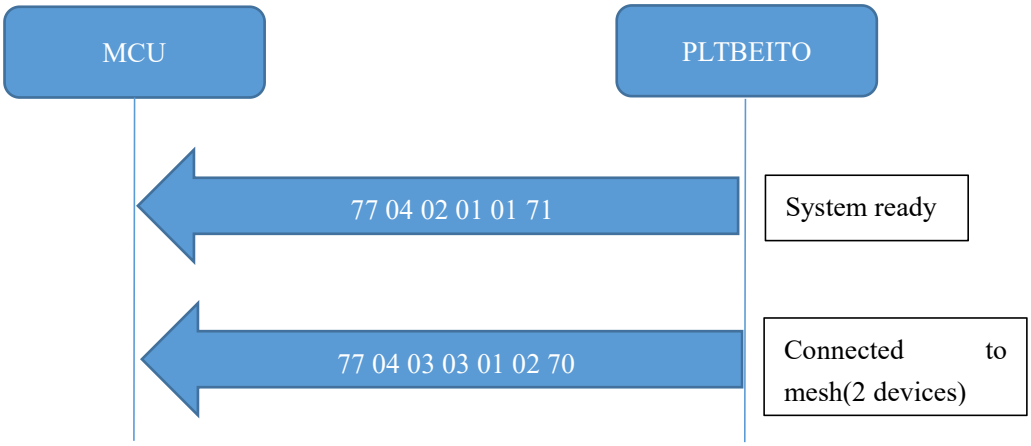
Generated when PLTBEITO receive cmd[07].

Event					
Header	**Type**	**Length**	**Opcode**	**Parameters**	**Check**
77	04	n	07	Virtual Address Array	

Parameters	Length	value	description
Virtual Address Array	n	Src_vaddr Passed_vaddr ... Dst_vaddr	Virtual address list

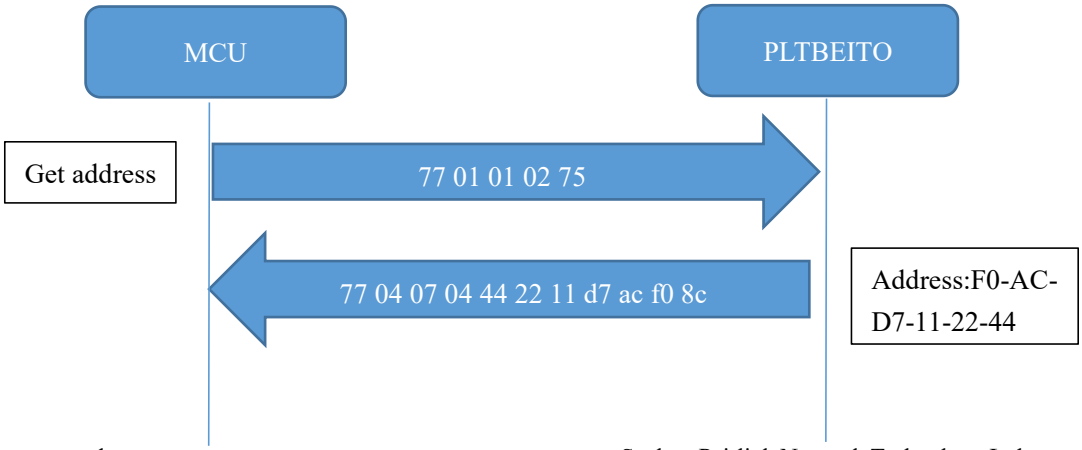
2 Flow Chart

2.1 Boot up

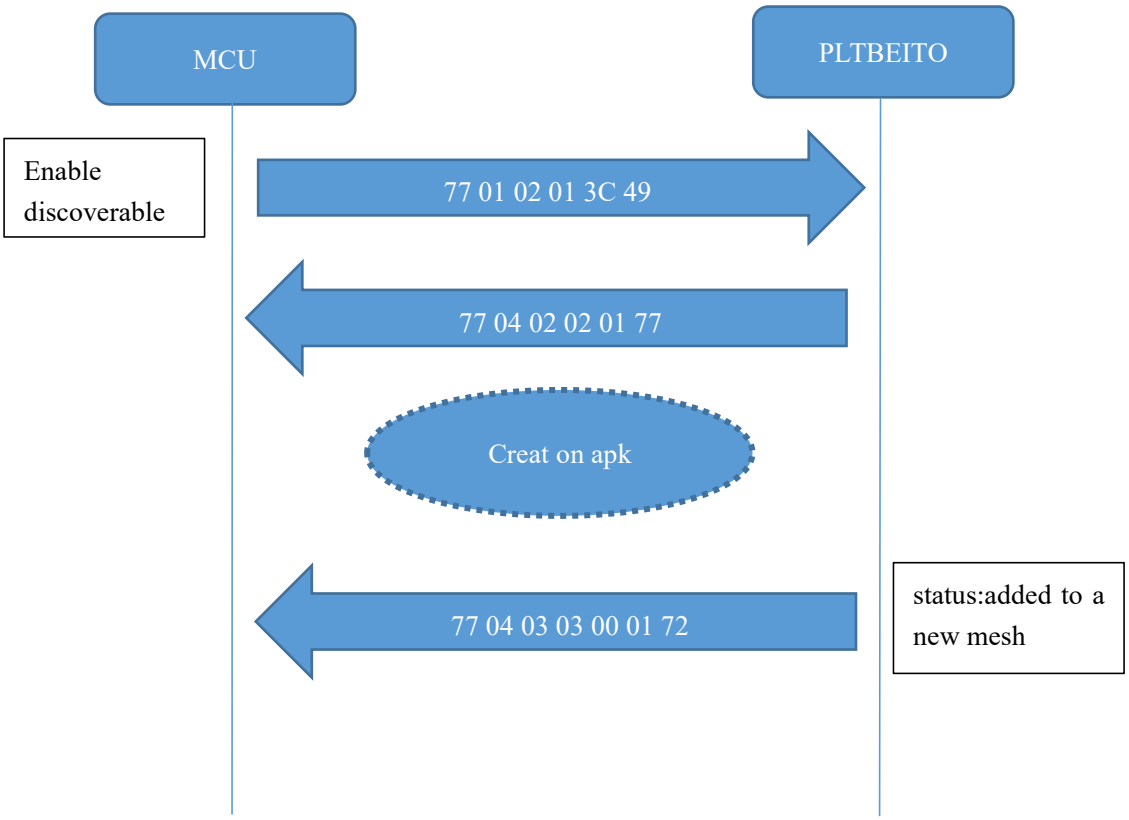


Assume there is another PLTBEITO powered on in the same net

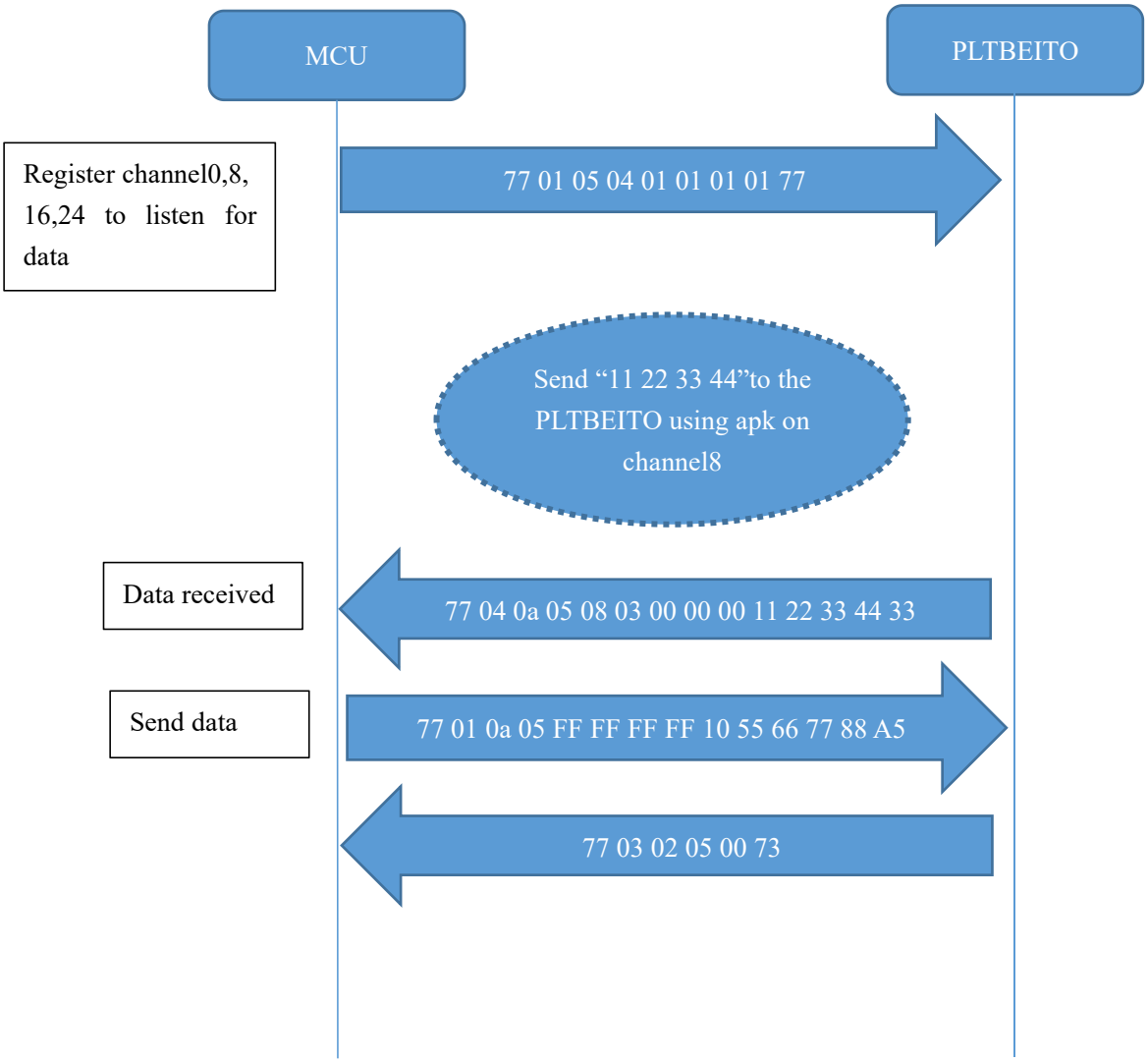
2.2 Read BT Address



2.3 Configure Mesh(cmd)



2.4 Data communication



Assume the PLTBEITO has already connected to mesh