

Blumoo API

Overview:

This document describes the protocol used to communicate with Blumoo via a Bluetooth Serial Port Profile (SPP) or BLE connection (See “Appendix A” for additional information).

Message Format		
Header	Parcel	Tail
2	Variable	4

Header: 2 bytes

- Start/Sync: 1 bytes
 - Message will start with the DLE character, 0x10
- Description: 1 byte

Reserved						ACK	
7	6	5	4	3	2	1	0

ACK Value	Description
0	No ACK requested
1	ACK requested
10	ACK response
11	Undefined, not used

Parcel: Variable size, minimum 6 bytes

- Identifier: 2 bytes
- Size: 4 bytes
- Data[0]..[“Size“-1]: message payload

Tail: 4 bytes

- Checksum: 2 bytes
 - Checksum: sum of all bytes recieved from (and including) Start/Sync character to the end of the data payload. Does not include message tail or "escape" bytes. See "Message Processing" section for details.
- Terminate: 2 bytes
 - End with a DLE character, 0x10, followed by an ETX character, 0x03

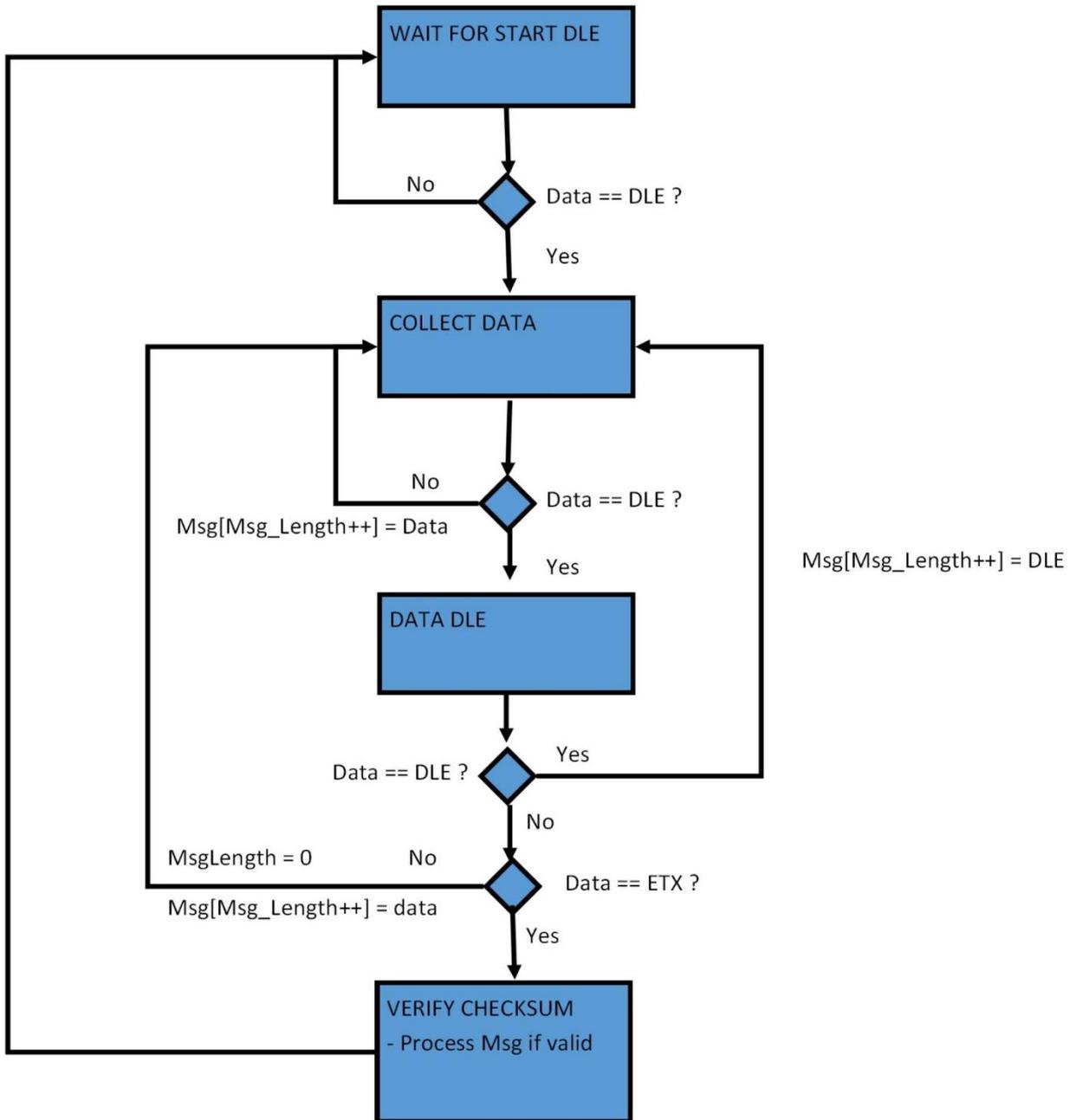
Acknowledgements:

- If a packet marks the "ACK" field with the description byte as ACK requested, the receiving device will response set the ACK field with int response as "ACK response", use the same Identifier, and set the message parcel size to 0.

Message Processing: See flow chart below:

- Escape bytes: All bytes within a message (exlcuding START/SYNC & terminate header) will be "escaped" by prefacing them with a DLE (0x10) character

- Escape bytes should be added after the message has been formatted so they don't affect the checksum within the "Tail" header.
- Multi-byte Fields: Unless otherwise specified, all multiple byte values shall be transmitted most significant byte (MSB) first.



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Instrument ID List:

ID	Value
IR_CODE_DATA	0
PROD_RQST	7
PROD_DATA	8
...	
IR_CODE2_DATA	40

Command ID List:

ID	Value
DOWNLOAD_ESN	0
BT_DOWNLOAD_BT_ADDR	1

Instrument ID Descriptions:

IR_CODE_DATA: 0

Description: Used to send IR code (Pronto format) from the app to our device.

Field	Tx Count	Format ID	Padding	Freq Divider	Padding	# of Once Codes	Padding	# of Repeat Codes	Once Codes	Repeat Codes	CR	LF
Size	1	4	1	4	1	4	1	4	5*x	5 * y	1	1

Tx Count = # of times device will send desired IR code

x = # of Once Codes

y = # of Repeat Codes

ACK required: NO

Notes: Currently, Blumoo only supports “raw oscillated” Pronto IR codes.

Instrument ID Descriptions (cont'd):

PROD_RQST: 7

Description: Request from the app to retrieve information about the product.

Field	NONE
Size	

ACK required: YES

Notes: No data in message payload, device will respond with *PROD_DATA* instrument ID.

Instrument ID Descriptions (cont'd):

PROD_RQST_DATA: 8

Description: Returns basic information about the device.

Field	Product #		SW Version	Product Description String
	LSB	MSB		
Size	2		4	Variable: Null terminated string

Field	SW Version			
	Build version		Minor	Major
	LSB	MSB		
Size	2		1	1

ACK required: NO

Notes: See "Appendix B" for an example on how to use the *PROD_RQST / PROD_RQST_DATA* instrument IDs.

Instrument ID Descriptions (cont'd):

IR_CODE2_DATA: 40

Description: Used to send “packed” IR code from the app to our device.

Field	Tx Count	Format ID		Freq Divider		# of Once Codes		# of Repeat Codes		Once Codes		Repeat Codes	
		LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB
Size	1	2		2		2		2		2 * x		2 * y	

Tx Count = # of times device will send desired IR code

x = # of Once Code Pairs

y = # of Repeat Code Pairs

ACK required: NO

Notes: This IR code format is supported with Blumoo firmware version 1.0.00 and newer.

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Appendix A: BLE UUID & Packet Header Description

BLE Services UUID: 0x15beFFC0e60b4af5b1f5cc1cebfda43a

BLE Characteristics UUIDs:

- Notify: 0x15beFFC1e60b4af5b1f5cc1cebfda43a
 - Send data from app to Blumoo
- Write w/o response: 0x15beFFC2e60b4af5b1f5cc1cebfda43a
 - Receive data from Blumoo

Due to restrictions in the size of each BLE data packet (MTU size = 20 bytes), messages will need to be broken down into small BLE packets with a 2 byte header describing each packet:

BLE Packet Structure	
Description	# of Bytes
Packet #	1
payload_size	1
data payload	16

Header

Ex. Product Request Reponse from Blumoo																									
Byte #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	0x10	0x00	0x00	0x08	0x00	0x00	0x00	0xd	0x2	0x0	0x41	0x0	0x1	0x2	0x42 (B)	0x6C (l)	0x75 (u)	0x6D (m)	0x6F (o)	0x6F (o)	0x0	0x2	d9	0x10	0x03
	BLE packet #0 payload																BLE packet #1 payload								

1st BLE Packet	
Packet #	0x0
payload_size	0x10
Payload	1 0x10
	2 0x00
	3 0x00
	4 0x08
	5 0x00
	6 0x00
	7 0x00
	8 0x0d
	9 0x2
	10 0x0
	11 0x41
	12 0x0
	13 0x10
	14 0x2
	15 0x42
	16 0x6c

2nd BLE Packet		
Packet #		0x0
payload_size		0x9
Payload	1	0x75
	2	0x6d
	3	0x6f
	4	0x6f
	5	0x00
	6	0x02
	7	0xd9
	8	0x10
	9	0x3

Appendix B: Product Request Example

Product request from APP												
Byte	1	2	3	4	5	6	7	8	9	10	11	12
	0x10	0x01	0x00	0x07	0x0	0x0	0x0	0x0	Checksum		0x10	0x03
	DLE		ID		Size			MSB	LSB	DLE	EXT	
			MSB	LSB	MSB			LSB				

ACK from Blumoo												
Byte	1	2	3	4	5	6	7	8	9	10	11	12
	0x10	0x02	0x00	0x07	0x0	0x0	0x0	0x0	Checksum		0x10	0x03
	DLE		ID		Size			MSB	LSB	DLE	EXT	
			MSB	LSB	MSB			LSB				

Product Request Response from Blumoo: SW version 2.1.65														
Byte	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	0x10	0x00	0x00	0x08	0x0	0x0	0x0	0xd	0x2	0x0	0x41	0x0	0x1	0x2
			ID				Size		Product #		SW Version			
			MSB	LSB	MSB			LSB	LSB	MSB	Build Version		Minor	Major

Product Request Response (cont'd)											
	15	16	17	18	19	20	21	22	23	24	25
	0x42 (B)	0x6C (l)	0x75 (u)	0x6D (m)	0x6F (o)	0x6F (o)	0x0	0x2	d9	0x10	0x03
	Product Description							Checksum		DLE	EXT
							MSB	LSB			