Disto-xble Bluetooth communication protocol

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Disto xble's protocol is based on that of the disto x2. As the author of disto xble, I made minimal modifications to the protocol to facilitate seamless integration of developer's disto x2 into disto xble.

Service UUID: 6e400001-b5a3-f393-e0a9-e50e24dcca9e

Write Characteristic UUID: 6e400002-b5a3-f393-e0a9-e50e24dcca9e

Read Characteristic UUID: 6e400003-b5a3-f393-e0a9-e50e24dcca9e

To write, use the BLE write UUID, and set the read UUID for notifications.

Shot data and calibration data:

When the storage is not empty, data is automatically transmitted through the BLE read characteristic (notify).

In the disto x2's protocol, two packets are sent for one set of shot data. In disto xble, these two packets are combined into a single 17-byte packet.

1^{st} byte	2^{nd} -9^{th} byte	10^{th} -17^{th} byte
Packet identifier	1^{st} packet of disto x2	2^{nd} packet of disto x2

Where packet identifier:

0x01: measure data packet.

0x02: calibration data packet.

The app must send a reply message to indicate to disto x that the data packet has been received. The reply message is defined as follows:

Packet Header					**Payload Length**	**Payload**	**Packet Footer**	
1^{st}	**2^{nd}**	**3^{rd}**	**4^{th}**	**5^{th}**	**6^{th}**	**7^{th}**	**8^{th}**	**9^{th}**
0x64	**0x61**	**0x74**	**0x61**	**0x3a**	**0x01**	**Reply byte**	**0x0d**	**0x0a**

Where:

Reply byte = (2nd byte of the packet & 0x80) | 0x55

Upon receiving the reply message, disto xble will proceed to send the next 17-byte packet for the next shot if the storage is not empty.

Send Command to disto-xble:

Commands are sent by the following format via write characteristic:

Packet Header					Payload Length	Command	Packet Footer	
1st	2nd	3rd	4th	5th	6th	7th	8th	9th
0x64	0x61	0x74	0x61	0x3a	LEN	CMD	0x0d	0x0a

Where

LEN: Equals 0x01.

CMD:

0x30: Quit calibration mode.

0x31: Enter calibration mode.

0x32: Quit silent mode.

0x33: Enter silent mode.

0x34: Power off.

0x36: Laser on.

0x37: Laser off.

0x38: Laser trigger.

(Here, the command definitions are the same as in disto x2.)

Read/Write Memory of disto-xble:

Memory read are defined in the following format:

Packet Header					Payload Length
1st	2nd	3rd	4th	5th	6th
0x64	0x61	0x74	0x61	0x3a	PAYL_LEN

Payloads				Packet Footer	
Read Memory Command	Address		Data length to read from ADDR		
7th	8th	9th	10th	11th	12th
0x3d	ADDR_L	ADDR_H	N	0x0d	0x0a

Where:

ADDR_L: The low 8 bytes of the address to read from.

ADDR_H: The high 8 bytes of the address to read from.

N: The length of data (in bytes) to write to the address. It must be a multiple of 4.

PAYL_LEN: Equals 4 here.

Memory read reply message is defined in the following table:

Command	Address		N bytes read from ADDR
1th	2th	3th	4th – (4+N)th
0x3d	ADDR_L	ADDR_H	DATA

Memory write are defined in the following format:

Packet Header					Payload Length
1st	2nd	3rd	4th	5th	6th
0x64	0x61	0x74	0x61	0x3a	PAYL_LEN

Payloads					Packet Footer	
Write Memory Command	Address		Data length to write from ADDR	DATA_LEN Bytes to write		
7th	8th	9th	10th	11th – (11+N)th	(12+N)th	(13+N)th
0x3e	ADDR_L	ADDR_H	N	DATA in N-bytes	0x0d	0x0a

Where:

ADDR_L: The low 8 bytes of the address to write.

ADDR_H: The high 8 bytes of the address to write.

N: The length of data (in bytes) to write to the address. It must be a multiple of 4.

PAYL_LEN: Equals 4 + N.

The memory write reply message is defined in the following table:

Command	Address		N bytes write to ADDR
1^{th}	2^{th}	3^{th}	4^{th} – $(4+N)^{th}$
0x3d	ADDR_L	ADDR_H	DATA in N-bytes

Memory mappings:

0x0000 – 0x7FFF data store

0x8010 – 0x8043 Calibration Coefficients

0xE000 – 0xE003 Firmware version

0xE004 – 0xE007 Hardware version

0xC000 – 0xDFFF RAM

It is highly recommended that the app utilizes the aforementioned protocol to read and write the 52-byte coefficients in a single operation.