ThinkFit communication protocol

File status: [ ] Draft [√] Release officially [ ] Under revising	Current version:	V1.0.0
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	Audit:	
	Finish date:	

Version Change History

Version	Description
V1.0.0	Initial version

Data Format

1、BLE UUID:（Name: TF-xxxxxx）

Type	Name	UUID
Service	Data transfer service	FFF0
Characteristic	Notify/Indicate	FFF1
Characteristic	Write	FFF2

2、Data Format（Max. Length is 20Bytes）：

Bytes	0	1	2 ··· (n - 3)	n - 2	n - 1
Type	Start code	Command	Command data	FCS	End code
Value	0x02			XOR check	0x03

3、数据 Type：

Data type	Bytes	Integer	Long Integer	Multi-byte
Symbol	uint8	uint16	uint32	N
Length	1	2	4	n

Notes：

1、The data format is Little-Endian mode；

2、Xor verifies xOR values from byte 1 to byte n-3；

3、Support 4800, 9600, 19200, 38400, 115200 baud rate, no parity, 8 bits data, 1 bit stop；

4、When communication, the interval between data packets must be at least 200ms. You are advised to set the interval to 200ms；

5、Unsupported instructions need to return packets with instructions as data, for example：

Double instructions:

Bytes	0	1	2	3	4	5
Type	Start code	Command		Command data	FCS	End code
Value	0x02	0x50	0x04	0x01	xx	0x03

Bytes	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x50	0x04	xx	0x03

Single instructions:

Bytes	0	1	2	3	4
Type	Start code	Command	Command data	FCS	End code
Value	0x02	0x50	0x01	xx	0x03

Bytes	0	1	2	3
Type	Start code	Command	FCS	End code

Value	0x02	0x50	xx	0x03

Obtain the device brand ID and model ID（0x50-0x00） （**Required**）

Obtain the device brand ID and model ID **（0x50-0x00）**

Byte	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x50	0x00	0x50	0x03

Respond（0x50-0x00）

Byte	0	1	2	3	4	5,6	7	8
Type	Start code	Command		Brand	Type	Machine	FCS	End code
Value	0x02	0x50	0x00	uint8	uint8	uint16	XOR check	0x03

Byte	Type	Description
0	Start code	0x02
1	Command	0x50
2		0x00
3	Brand	Provided by the party making the agreement
4	Type	Provided by the party making the agreement
5,6	Machine	Provided by the party making the agreement
7	FCS	The check is the FCS check of byte 1th to byte 6th
8	End code	0x03

Obtaining Device Parameters Command（0x41-0x02） （Required）

Obtaining Device Parameters Command（0x41-0x02）

Byte	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x41	0x02	0x43	0x03

Respond（0x41-0x02）

Byte	0	1	2	3	4	5	6	7	8
Type	Start code	Command		Resistance	Incline	Configuration	Reservation	FCS	End code
Value	0x02	0x41	0x02	uint8	uint8	uint8	uint8	XOR check	0x03

Byte	Type	Description
0	Start code	0x02
1	Command	0x41
2		0x02
3	Resistance	Maximum resistance, that is, the resistance range is 0- maximum resistance
4	Incline	Maximum slope and a return of 0 is not supported
5	Configuration	See the configuration table
6	Reservation	
7	FCS	The check is the FCS check of byte 1th to byte 6th
8	End code	0x03

Configuration table

Digits	Description
0	0：Kilometer，1：Miles
1	1：Support temporarily suspended
2	Reservation
3	
4	
5	
6	
7	

Obtaining device Accumulation Value Command（0x41-0x03） （Optional）

Obtaining device Accumulation ValueCommand（0x41-0x03）

Byte	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x41	0x03	0x42	0x03

Respond（0x41-0x03）

Byte	0	1	2	3-6	7	8
Type	Start code	Command		Accumulation Value	FCS	End code
Value	0x02	0x41	0x03	uint32	XOR check	0x03

Byte	Type	Description
0	Start code	0x02
1	Command	0x41
2		0x03
3-6	Accumulation Value	Total number of device counts. If not supported, the command without data is returned directly
7	FCS	The check is the FCS check of byte 1th to byte 6th
8	End code	0x03

Synchronizing device time Command（0x41-0x04） （Optional）

Synchronizing device time Command（0x41-0x04）

Byte	0	1	2	3	4	5	6	7	8	9	10	11
Type	Start code	Command		Year	Month	Day	Week	Hour	Minute	Second	FCS	End code
Value	0x02	0x41	0x04	uint8	uint8	uint8	uint8	uint8	uint8	uint8	xx	0x03

Byte	Type	Description
0	Start code	0x02
1	Command	0x41
2		0x04
3	Year	00-99，00 represents year 2000
4	Month	
5	Day	
6	Week	1-6 represents Monday to Saturday, and 0 represents Sunday
7	Hour	
8	Minute	
9	Second	
7	FCS	The check is the FCS check of byte 1th to byte 6th
8	End code	0x03

Respond（0x41-0x04）

Byte	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x41	0x04	0x45	0x03

Obtaining device Status Command（0x42） （Required）

Obtaining device Status Command（0x42）

Byte	0	1	2	3
Type	Start code	Command	FCS	End code
Value	0x02	0x42	0x42	0x03

Respond（0x42）

Byte	0	1	2	3 - (n-3)	n-2	n-1
Type	Start code	Command	Status	Data	FCS	End code
Value	0x02	0x42	uint8	N	xx	0x03

<table>
<tr><td>2</td><td colspan="7">3 - (n-3)</td></tr>
<tr><td>Status</td><td colspan="7">Data packets</td></tr>
<tr><td>Standby(0x00)</td><td colspan="7"></td></tr>
<tr><td>Starting
(0x01)</td><td colspan="7">Start countdown (seconds) (uint8)</td></tr>
<tr><td>Running
(0x02)</td><td rowspan="2">Current speed (uint16)</td><td rowspan="2">Current resistance (uint8)</td><td rowspan="2">Current RPM (uint16)</td><td rowspan="2">Current heart rate (uint8)</td><td rowspan="2">Current power (uint16)</td><td rowspan="2">Current slope (uint8)</td><td rowspan="2">Reservation (uint8)</td></tr>
<tr><td>Pause（0x03）</td></tr>
<tr><td>Sleep（0x14）</td><td colspan="7"></td></tr>
<tr><td>malfunction（0x15）</td><td colspan="7">Malfunction code (uint8)</td></tr>
<tr><td>Speed</td><td colspan="7">Unit：0.01km/h or 0.01mi/h, 1000 represents 10.00km/h or 10.00mi/h</td></tr>
<tr><td>RPM</td><td colspan="7">Represents step frequency,paddle frequency and so on</td></tr>
<tr><td>Power</td><td colspan="7">Unit: 0.1 watts, 1000 represents 100.0 watts</td></tr>
<tr><td>Countdown</td><td colspan="7">If not supporting countdown, change the state from standby to running directly</td></tr>
</table>

Obtain movement data Command（0x43-0x01） （Required）

Obtain movement data Command（0x43-0x01）

Byte	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x43	0x01	0x42	0x03

Respond（0x43-0x01）

Byte	0	1	2	3,4	5,6	7,8	9,10	11	12
Type	Start code	Command		Time	Distance	Calorie	Counts	FCS	End code
Value	0x02	0x43	0x01	uint16	uint16	uint16	uint16	xx	0x03

Time	Represents the time from the start of the movement to the current time, in seconds
Distance	When the highest bit is 0, the unit is 1; when the highest bit is 1, the unit is 10. Note: The highest bit is not included in the calculation and is only identified as a unit
Calorie	The units are kilojoules（0.1kJ）
Counts	Represents the movement from the start to the current sensor count

Device ready Command（0x44-0x01） （Required）

Device ready Command（0x44-0x01）

Byte	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x44	0x01	0x45	0x03

Respond（0x44-0x01）

Byte	0	1	2	3	4	5
Type	Start code	Command		Countdown	FCS	End code
Value	0x02	0x44	0x01	uint8	xx	0x03

Countdown	If don't need a countdown, it can just return 0

The device starts or continues Command（0x44-0x02） （Required）

The device starts or continues Command（0x44-0x02）

Byte	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x44	0x02	0x46	0x03

Respond（0x44-0x02）

Byte	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x44	0x02	0x46	0x03

Equipment suspended Command（0x44-0x03）（可选）

Equipment suspended Command（0x44-0x03）

Byte	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x44	0x03	0x47	0x03

Respond（0x44-0x03）

Byte	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x44	0x03	0x47	0x03

Equipment stop Command（0x44-0x04） （Required）

Equipment stop Command（0x44-0x04）

Byte	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x44	0x04	0x40	0x03

Respond（0x44-0x04）

Byte	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x44	0x04	0x40	0x03

Set resistance and slope Command（0x44-0x05） （Required）

Set resistance and slope Command（0x44-0x05）

Byte	0	1	2	3	4	5	6
Type	Start code	Command		Resistance	Slope	FCS	End code
Value	0x02	0x44	0x05	uint8	uint8	xx	0x03

Respond（0x44-0x05）

Byte	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x44	0x05	0x41	0x03

Set user information Command（0x44-0x0A） （Required）

Set user information Command（0x44-0x0A）

Byte	0	1	2	3-6	7	8	9	10	11	12
Type	Start code	Command		Reserved	Weight	Height	Age	Gender	FCS	End code
Value	0x02	0x44	0x0A	uint32	uint8	uint8	uint8	uint8	xx	0x03

Weight	kg
Height	cm
Age	
Gender	0-Male， 1- Female

Respond（0x44-0x0A）

Byte	0	1	2	3	4
Type	Start code	Command		FCS	End code
Value	0x02	0x44	0x0A	0x4E	0x03