深圳市三为创新电子科技有限公司

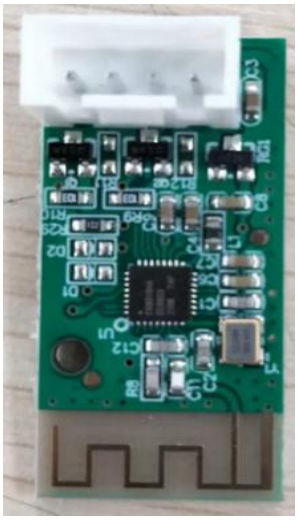
ShenZhen SunWay Electronics Co.，Ltd

FTMS对接协议

FTMS connection protocol

本协议适合跑步机、单车、划船机、椭圆机等设备

This agreement is suitable for treadmills, bicycles, rowing machines, ellipticals, etc.



- Supports two PDM digital MIC inputs
- One channel analog MUX
- Supports cap-less, single-ended, and differential mode at the DAC path
- Supports 16ohm and 32ohm Speaker loading

Bluetooth

- Compliant with Bluetooth V5.1+BR+EDR+BLE specification

Packages

- SOP16

Temperature

- Operating temperature: -20℃ to +70℃
- Storage temperature: -65℃ to +150℃

Applications

- Bluetooth speaker

目录（Table of Contents）

一、概述（Overview）

本协议用于和健身系统厂商对接FTMS协议。

This protocol is used to connect with fitness system manufacturers using the FTMS protocol.

二、协议说明（**Protocol description**）

本协议描述的通讯是指适配FTMS的蓝牙模块通过UART 与跑步机电子表MCU 之间的**双向通讯。**

This protocol is used to connect with fitness system manufacturers using the FTMS protocol.

1、 UART 配置为（UART configuration）：

115200, N, 8, 1 (无校验，8 位数据，1 位停止)

115200, N, 8, 1 (No check, 8 bit data, 1 stop)

2、 数据帧格式（Data frame format）：

双向通讯协议采用数据帧进行通讯，每一帧包含起始码、指令码、数据长度、数据码、序列号、校验码和终止码，基本数据格式如下：

The two-way communication protocol uses data frames for communication, each frame contains start code, instruction code, data length, data code, sequence number, code and end code, the basic data format is as follows：

0x57	CMD	DATA_LEN	DATA	FCS	0x54
起始码(B)	指令码(W)	数据长度(B)	数据码	校验码(B)	终止码(B)
Starting code (B)	Instruction code (W)	Data length (B)	Data code	Verification code (B)	Termination code (B)

起始码：表征祯开头，固定的 1 字节数据，为 16 进制 0x57。

Start code: Represents the beginning of the frame, a fixed 1 byte of data, in hexadecimal 0x5.

指令码：所要操作的指令，长度为 2 个字节。

Instruction code: The instruction to be performed, with a length of 2 bytes.

数据长度：写入或读取数据的长度，长度为 1 个字节。

Data length: length of the data to be written or read, one byte in length.

数据码：写入或读取的数据，不同命令数据内容及长度有所不同；若指令不带数据则数据长度为0，数据码为空。

Data code: The data written or read, the content and length of which are different for different commands; if the command does not carry data, the length is 0, and the data code is empty.

校验码：指令码到数据码的所有字节按位异或生成，长度为 1 字节，校验参考代码见附录。

Checksum: All bytes of the instruction code and the data code are XORed bit by bit to generate, the length is 1 byte, the check reference code is attached.

终止码：表征祯结尾，固定的 1 字节数据，为 16 进制：0x54。

End code: Represents the end of a frame, a fixed 1 byte of data, in hexadecimal: 0x54

注（Note）：

A、发送与接收数据采用大端对齐方式。即：整型数据(2 字节) 低字节在后、高字节在前；长整型(4 字节)高字节在最前，低字节在最后。

Data transmission and reception shall be in big-endian format. That is: the low byte of the integer data (2 bytes) is at the and the high byte is at the front; the high byte of the long integer (4 bytes) is at the front and the low byte is at the end

B、数据类型： B:字节 W:整型 L:长整型。

Data types: B: Byte; W: Word; L: Long.

C、祯与祯之间间隔推荐设置为 100ms 以上。

The interval between Zhen and Zhen is recommended to be set to more than 100ms.

D、串口波特率可以根据电子表 MCU 性能适当调整。

The serial port baud rate can be adjusted appropriately according to the performance of the electronic meter MCU.

三、协议命令内容（Protocol command content）

本协议制定了六种类型命令：获取跑步机/单车信息、获取跑步机/单车状态、获取跑步机/单车数据、跑步机/单车控制、按键操作主动上报, 蓝牙修改名字。以下协议命令中只列出，指令码、数据长度、数据码，在实际使用时需严格按照完整的数据帧格式。

This protocol defines six types of commands: obtaining treadmill/bike information, obtaining treadmill/bike status, obtaining treadmill/bike data, treadmill/bike, key operation active reporting, Bluetooth name modification. Only the instruction code, data length, and data code are listed in the following protocol commands. In actual use, is necessary to strictly follow the complete data frame format.

1、获取跑步机/单车信息指令（Get treadmill/bike information command）

指令码（Instruction code）：　　SYS_INFO = 0x50

通过此指令可获取跑步机的信息数据，如厂商信息，还有设备的一些限制参数，如最高速度等，若设备不支持指定参数，设备只需返回指令即可。

This command can be used to get information data about the treadmill, such as manufacturer information, as well as some limiting parameters of the device, such as speed, etc. If the device does not support a specified parameter, the device only needs to return the command.

(1)、 INFO_MANU = 0　　获取厂商信息及软硬件版本号

Get the manufacturer information and the software and hardware version numbers

指令码（Instruction code）：0x50，0x00

(2)、 INFO_PARAMETER = 2　　获取跑步机参数范围

Get treadmill parameter range

指令码（Instruction code）：0x50，0x02

(3)、 INFO_ FEATURE =3　　获取跑步机的性能

Get the treadmill performance

指令码（Instruction code）：0x50，0x03

蓝牙发送到跑步机的数据(起始、校验、序列号、终止已省略，下同)：

Bluetooth data sent to treadmill (start, checksum, serial number, end omitted, same below):

CMD		DATA_LEN	DATA	
SYS_INFO	INFO_MANU	0		
	INFO_PARAMETER	0		
	INFO_ FEATURE	0		

跑步机返回信息：

Treadmill return information:

CMD		DATA_LEN	DATA											
SYS_INFO	INFO_MANU	12	Model-distinguish treadmill from bike (B)			British and American systems（B）		Electronic table version number（W）	厂商信息(字符串8个B) Manufacturer information (string 8 bytes)					
	INFO_PARAME TER	12	Maximum speed(B)	Minimum speed(B)	Speed accuracy(B)	Maximum INCLINE (B)	Minimum INCLINE (B)	INCLINE accuracy (B)	Maximum heart rate(B)	Minimum heart rate(B)	Heart rate accuracy(B)	Maximum resistance (B)	Lowest drag(B)	Drag accuracy (B)
	INFO_ FEATURE	8	Fitness Machine Feature(L)				Target Setting Features(L)							

说明（Explanation）：

(1)蓝牙未连接或断开连接时会一直发送获取跑步机信息指令。

(1) Bluetooth will continuously send the command to obtain treadmill information when it is not connected or disconnected.

(2)对于软件版本号，我们一般要求的格式为：**V M.N.V**，所以发送的字节和必须**大于等于 100**，如软件版本号发送“0x00,0x65”，则表示软件版本号为 V1.0.1，对于厂商信息，一般为 ASCII 转为 **16 进制**，如序列信息为“Wi-001”，则只需要发送“0x57,0x69,0x2D,0x30,0x30,0x31”即可。无错误时回复0xff的错误码,有错误则按协议发送；INFO_MANU会根据需求更换

(3) For software version numbers, we generally require the format to be: V M.N.V, so the bytes sent and must greater than or equal to 100. For example, if the software version number is sent as "0x00,0x65", indicates that the software version number is V1.0.1. For manufacturer information, it is generally ASCII converted to hexadecimal. For example, the serial information is "Wi-001", then it is only necessary to send "0x57,0x69,0x2D0x30,0x30,0x31". Reply with an error code of 0xff if there is no error, and send to the protocol if there is an error; INFO_MANU will be replaced according to the requirements.

(4)若该跑步机不支持**坡度等参数**，则最大、最小范围值及精度均**填 0** 即可。

(4) If the treadmill does not support parameters such as incline, fill in 0 for the maximum, minimum range values and precision

(5) **对于 INFO_ FEATURE 指令，**主要作用是：**告诉 APP 该跑步机会报哪些运动数据，同时也告诉 APP 该跑步机什么运动参数是可以通过 APP 设定的。该条指令一定要根据跑步机的实际能力回复！**支持则相应 bit 位置 1，否则为 0，具体的 bit 位含义需要依据如下表：

(5) For the INFO_FEATURE command, the main function is: to tell the APP which sports data the treadmill will report, also to tell the APP which sports parameters can be set through the APP. This command must be replied according to the actual capabilities of the treadmill! Support the corresponding bit as 1, otherwise as 0, the specific bit meaning needs to be based on the following table:

跑步机性能 Fitness Machine Feature：（Field的定义按标准的SIG来定义）

Treadmill performance Fitness Machine Feature: (Field's definition is based on the standard SIG)

a.Fitness Machine Features Field:表示此跑步机可以上报什么数据；若当前机型支持的数据有平均速度、总距离、坡度、爬坡高度、消耗卡路里、心率、已运行时间，则回复 **0x0000161D**

a. Fitness Machine Features Field: Indicates what data this treadmill can report; if the current model supports data such as average speed, total distance,cline, climb height, calories burned, heart rate, and running time, then reply 0x0000161D

b .Target Setting Features Field: 表示什么参数是 APP 可以设定的；若当前机型支持速度设置、坡度设置， 则回复 **0x00000003**

b .Target Setting Features Field: Indicates which parameters can be set by the APP; if the current model supports speed setting, slope setting, reply 0x00000003

下表格为 Fitness Machine Features Field 和 Target Setting Features Field 定义

Fitness Machine Features Field	
bit	Definition
0	Average Speed Supported 平均速度
1	Cadence Supported踏频
2	Total Distance Supported 总距离
3	Inclination Supported 坡度
4	Elevation Gain Supported 爬坡高度
5	Pace Supported步频
6	Step Count Supported步数
7	Resistance Level Supported阻力
8	Stride Count Supported步幅计数
9	Expended Energy Supported 消耗卡路里
10	Heart Rate Measurement Supported 心率
11	Metabolic Equivalent Supported代谢当量
12	Elapsed Time Supported 已运行时间
13	Remaining Time Supported剩余时间
14	Power Measurement Supported功率
15	Force on Belt and Power Output Supported皮带上的力和功率输出
16	User Data Retention Supported
17--31	Reserved for Future Use

Target Setting Features Field	
bit	Number Definition
0	Speed Target Setting Supported 速度设置
1	Inclination Target Setting Supported 坡度设置
2	Resistance Target Setting Supported阻力设置
3	Power Target Setting Supported功率设置
4	Heart Rate Target Setting Supported心率设置
5	Targeted Expended Energy Configuration Supported
6	Targeted Step Number Configuration Supported
7	Targeted Stride Number Configuration Supported
8	Targeted Distance Configuration Supported
9	Targeted Training Time Configuration Supported
10	Targeted Time in Two Heart Rate Zones Configuration Supported
11	Targeted Time in Three Heart Rate Zones Configuration Supported
12	Targeted Time in Five Heart Rate Zones Configuration Supported
13	Indoor Bike Simulation Parameters Supported
14	Wheel Circumference Configuration Supported
15	Spin Down Control Supported
16	Targeted Cadence Configuration Supported
17--31	Reserved for Future Use

2、**获取跑步机/单车状态命令（Get treadmill/bike status command）**

指令码（Instruction code）：SYS_STATUS = 0x51

通过此命令可以获取跑步机当前的运行状态及一些参数，设备
根据当前运行状态返回状态：

This command can get the current running status and some parameters of the treadmill, and the device returns the status according to the current running status

STATUS_NORMAL = 0x00 待机状态（Standby state）

STATUS_END = 0x01 减速已停机状态(还未返回到待机)（Slowdown has stopped the machine state (not yet returned to standby)）

STATUS_START = 0x02 开始启动状态(倒计时)（Starting up state (countdown)）

STATUS_RUNNING = 0x03 运行中状态（Run state）

STATUS_STOP = 0x04 减速停止中状态（Slowing to a stop; state of ）

STATUS_PAUSE= 0x05 暂停中状态（Paused state）

蓝牙发送到跑步机的数据(起始、校验、序列号、终止已省略，下同)：

Bluetooth data sent to treadmill (start, checksum, serial number, end omitted, same below):

CMD		DATA_LEN	DATA
SYS_STATUS	0	0	

动感单车返回信息：

Stationary bike return information:

CMD		DATA_LEN	DATA							
SYS_STATUS	STATUS_NORMAL	0								
	STATUS_END	14	当前速度（Current speed）(W)	当前阻力（Current resistance）(B)	正计时间（Real time;）(W)	正计距离（Positive distance）(W)	正计卡路里（Counting calories）(W)	正计踏频（Current cadence）(W)	当前心率（Current heart rate）(B)	当前功率（Current power）(W)
	STATUS_RUNNING									
	STATUS_STOP									
	STATUS_START	1	当前倒计值(B) 秒（Current countdown value (B) seconds）							
	STATUS_PAUSE	0								

跑步机返回信息：

Treadmill return information:

CMD		DATA_LEN	DATA						
SYS_STATUS	STATUS_NORMAL	0							
	STATUS_END	12	当前速度（Current speed）(W)	当前阻力（Current resistance）(B)	正计时间（Real time;）(W)	正计距离（Positive distance）(W)	正计卡路里（Counting calories）(W)	正计踏频（Current cadence）(W)	当前心率（Current heart rate）(B)
	STATUS_RUNNING								
	STATUS_STOP								
	STATUS_START	1	当前倒计值(B) 秒（Current countdown value (B) seconds）						
	STATUS_PAUSE	0							

说明（Explanation）：

1、 速度单位 0.01km/h，坡度单位 1%，时间单位 1s，距离单位 1m，热量单位 0.1 大卡。**注：若跑步机厂商参数精度和此处不同，请 联系。**

1. Speed unit 0.01 km/h; slope unit 1%; time unit 1 s; distance unit 1 m; unit 0.1 kcal. Note: if the accuracy of treadmill parameters is different from here, please contact.

2、 此协议中已经包含华为 APP 需要的所有的运动数据，此命令中的部分参数若跑步机不支持的， 直接回复 0，**但 INFO_ FEATURE 中对应的 bit 位要置 0。**

2、This agreement has already included all the motion data needed by the Huawei APP. If the treadmill does not support some of the parameters in this, directly reply with 0, but the corresponding bit in INFO_FEATURE should be set to 0.

3、 蓝牙被连接上后，就会定时发送此命令，查询跑步机运动状态及参数。

3、After Bluetooth is connected, this command will be sent regularly to query the treadmill's motion state and parameters.

3、 获取跑步机/单车数据（Get treadmill/bike data）

指令码（Instruction code）：

SYS_DATA = 0x52

DATA_SPORT = 0　　读取当前运动量（Read the current amount of exercise）

蓝牙发送到跑步机的数据(起始、校验、序列号、终止已省略，下同)：

Bluetooth data sent to treadmill (start, checksum, serial number, end omitted, same below):

CMD		DATA_LEN	DATA
SYS_DATA	DATA_SPORT	0	

跑步机返回信息：

Treadmill return information:

CMD		DATA_LEN	DATA					
SYS_DATA	DATA_SPORT	10	平均速度 (W)	平均踏频 (W)	平均功率 (W)	小时热量 (W)	分钟热量 (B)	训练状态 (B)

说明（Explanation）：

1. 此命令中的部分参数若跑步机不支持，则此参数回复 0，**但 INFO_ FEATURE 中对应的 bit 位要置 0。**

1.Some parameters in this command are set to 0 if the treadmill does not support them, but the corresponding bit in INFO_FEATURE is cleared

2. 小时热量单位 **0.1 大卡/小时**，分钟热量单位 0.1 大卡/分钟

2. Calories per hour unit 0.1 kcal/hr; calories per minute unit 0.1 kcal/min

3. 蓝牙被连接上后，就会定时发送此命令，查询跑步机运动数据。

4. After Bluetooth is connected, this command will be sent regularly to query treadmill exercise data.

4、 训练状态(Training Status)参数：

Training Status 具体的参数含义请参考下图（Training Status; For specific parameter meanings, please refer to the figure below）：

Training Status Field

Value	Definition
0x00	Other
0x01	Idle
0x02	Warming Up
0x03	Low Intensity Interval
0x04	High Intensity Interval
0x05	Recovery Interval
0x06	Isometric
0x07	Heart Rate Control
0x08	Fitness Test
0x09	Speed Outside of Control Region - Low (increase speed to return to controllable region)
0x0A	Speed Outside of Control Region - High (decrease speed to return to controllable region)
0x0B	Cool Down
0x0C	Watt Control
0x0D	Manual Mode (Quick Start)
0x0E	Pre-Workout
0x0F	Post-Workout
0x10-0xFF	Reserved for Future Use

华为 APP 需要的训练状态只有 0x01，0x0E，0x0D，0x0F 四种。

The training states needed by Huawei APP are only 0x01, 0x0E, 0x0D, 0xF.

(1) 当跑步机处于空闲状态时，Training Status=0x01

(1) When the treadmill is idle, Training Status=0x01

(2) 当跑步机处于开始运动倒计时状态时(STATUS_START)，Training Status=0x0E

(2) When the treadmill is in the state of starting the exercise countdown (STATUS_START), Training Status = 0x0

(3) 当跑步机处于正常的跑步运行状态时(STATUS_RUNNING)，Training Status=0x0D

(3) When the treadmill is in normal running status (STATUS_RUNNING), Training Status=0x0D

(4) 当跑步机处于减速停机状态时，Training Status=0x0F

(4) When the treadmill is in the deceleration stop state, Training Status=0x0F

注意（Note）：

(1) 当通过仪表按键或 APP 控制跑步机暂停时，训练状态不需要变化；

(1)When the treadmill is paused by the instrument key or APP control, the training state does not need to change;

(2) 当通过仪表按键或 APP 控制跑步机暂停后再启动时，训练状态不需要变化；

(2)When the treadmill is paused and then started again through the console button or APP control, the training status does not need to change

(3) 当通过仪表按键或 APP 控制跑步机暂停后再停止时，训练状态变为空闲；

(3) When the treadmill is paused and then stopped through the console button or APP control, the training status becomes idle;

(4) 对于其他情况，不管是按键还是 APP 操作，训练状态都要相应改变；

(4) For other cases, whether it is key or APP operation, the training state should be changed accordingly;

4、跑步机/单车控制指令（Treadmill/bike control command）

指令码（Instruction code）： SYS_CONTROL = 0x53

CONTROL_START = 0	开始运动或继续运动（Start moving or continue moving）
CONTROL_STOP = 1	停止设备或暂停运行（Stop the device or pause operation）
CONTROL_SPEED = 2	控制运行速度（Control the running speed）
CONTROL_INCLINE = 3	控制运行坡度（Control the running gradient）
CONTROL_REQUEST=4	请求控制（Request control）
CONTROL_RESET=5	复位跑步机（Reset treadmill）
CONTROL_ Resistance=6	控制运行阻力（Control running resistance）

5、 获取动感单车状态命令 （Get the command of the state of the exercise bike）

指令码（Instruction code）： SYS_STATUS = 0x5A

通过此命令可以获取跑步机当前的运行状态及一些参数，设备根据当前运行状态返回状态：

This command can get the current running status and some parameters of the treadmill, and the device returns the status according to the current running status:

STATUS_NORMAL = 0x00 待机状态 （Standby state）

STATUS_END = 0x01 减速已停机状态(还未返回到待机)（Slowdown has stopped the machine state (not yet returned to standby)）

STATUS_START = 0x02 开始启动状态(倒计时)（Starting up state (countdown)）

STATUS_RUNNING = 0x03 运行中状态 （Run state）

STATUS_STOP = 0x04 减速停止中状态 （Slowing to a stop; state of ）

STATUS_PAUSE= 0x05 暂停中状态（ Paused state）

蓝牙发送到跑步机的数据(起始、校验、序列号、终止已省略，下同)

Bluetooth data sent to treadmill (start, checksum, serial number, end omitted, same below)

CMD		DATA_LEN	DATA
SYS_CONTROL	CONTROL_START	0	
	CONTROL_STOP	1	Stop or pause（B）：01（STOP），02（PAUSE）
	CONTROL_SPEED	2	速度（SPEED）(W)
	CONTROL_ INCLINE	1	坡度(INCLINE)(B)
	CONTROL_ Resistance	1	阻力(Resistance)(B)
	CONTROL_REQUEST	0	
	CONTROL_RESET	0	

说明（Explanation）：

(1) CONTROL_REQUEST：该指令用于查询跑步机，是否允许控制，**只有跑步机允许控制之后，APP才能发控制命令控制跑步机。**

(1)CONTROL_REQUEST: This instruction is used to query the treadmill whether it allows control. Only after the treadmill allows control, the can send control commands to control the treadmill.

(2) CONTROL_RESET：该指令用于复位跑步机，跑步机收到该指令后，停机，清零各项运动参数。同时清除暂停状态下的缓存数据。并将最终状态置为待机状态。复位成功，**training status** 也要对应改变！若复位失败， training staus 就不用改变！

(2)CONTROL_RESET: This instruction is used to reset the treadmill. After receiving this instruction, the treadmill will stop, all motion parameters, and clear the cached data in the paused state. The final state will be set to standby. If the reset is successful, the training status also be changed accordingly! If the reset fails, the training status does not need to be changed!

注（Note）：

开始和继续运动的指令都为 CONTROL_START，需要跑步机根据自身状态判断到底是开始还是继续运动；若是继续运动，则此时需以机台的最小速度、最小坡度开始恢复运动，时间、距离、能量等累计参数在暂停时的基础上继续累计。

The instruction for starting and continuing exercise is CONTROL_START, and the treadmill needs to judge whether it is starting or continuing exercise according to its state; if it is continuing exercise, it is necessary to start recovering exercise with the minimum speed and minimum slope of the machine at this time, and the cumulative parameters as time, distance, and energy continue to accumulate on the basis of the pause.

跑步机返回信息（Treadmill return information）：

CMD		DATA_LEN	DATA
SYS_CONTROL	CONTROL_START	0	
	CONTROL_STOP	1	Stop or pause（B）：01 （STOP），02 (PAUSE)
	CONTROL_SPEED	2	目标速度(Target speed)(W)
	CONTROL_INCLINE	1	目标坡度(Target gradient)(B)
	CONTROL_Resistance	1	目标阻力(Target resistance)(B)
	CONTROL_REQUEST	1	请求结果(Request results)(B)
	CONTROL_RESET	1	复位结果(Reset results)(B)

说明（Explanation）：

1、CONTROL_REQUEST：请求结果 =0，表示拒绝控制；请求结果=1，表示允许控制。

1、CONTROL_REQUEST: request result =0, indicating control is refused; request result =1, indicating control is allowed

2、CONTROL_RESET：复位结果 =0，表示拒绝复位；复位结果=1，表示允许复位。

2、CONTROL_RESET: Reset result=0 indicates reset is refused; reset result=1 indicates reset is allowed.

3、APP 操作复位之后，APP 要想控制跑步机，需要重新请求控制。

3、After the APP operation reset, the APP needs to request control again to control the treadmill.

5、跑步机/单车上报按键操作状态（电子表主动上报）（

Treadmill/bike key operation status reporting (electronic table active reporting)

指令码（Instruction code）： STATUS_ Fitness Machine Status = 0x55

跑步机主动上报信息，该指令蓝牙不需要回复（Treadmill active report information, this command Bluetooth does not need to reply）

CMD		DATA_LEN	DATA	
STATUS_Fitness Machine Status	0	2	当前状态（Current state）(B)	参数（parameter）(B) 速度或坡度变了需要带实际的参数，同时停止或暂停需要带参数，其它状态填 0 Speed or slope changed needs to be brought with actual parameters, and stopping or pausing needs to be brought with parameters, other states fill in

设备根据当前运行状态返回 Status(B)：

The device returns Status(B) based on the current operating state:

(1) Reset

=0x01 复位到待机状态，参数为 0。

Reset to standby state, parameter is 0

(2) Fitness Machine Stopped or Paused by the User

=0x02 用户按键停止或暂停，参数为 0x01 表示停止，0x02 表示暂停。

User key press to stop or pause, parameter is 0x01 for stop, 0x02 for pause.

(2) Fitness Machine Stopped by Safety Key

=0x03 拔安全开关停止，参数为 0。

Pull the safety switch to stop, the parameter is -0.

(3) Fitness Machine Started or Resumed by the User

=0x04 用户按键开始运行或按键从暂停状态恢复运行，开始或继续参数都为 0。

User key to start running or key to resume running from pause, start or continue parameters are both 0.

(4) Target Speed Changed =0x05 按键改变速度，参数为改变的目标速度。
Key to change speed, parameter is the target speed to be changed to.

(5) Target Incline Changed =0x06 按键改变坡度，参数为改变的目标坡度。
Key to change the pitch, parameter is the target pitch to be changed.

(6) Target Resistance Level Changed =0x07 按键改变阻力，参数为改变的目标阻力。
Button to change resistance, parameter is the target resistance to be changed.

(7) Err Code =0x08 机台发生错误，参数为错误码数据。
Machine error occurred, the parameter is the error code data.

注（Note）：

(1)只有当按下跑步机仪表按键且跑步机对应状态改变时，主动上报一次，APP 控制跑步机时，不需要上报！

Note: (1) Only when the treadmill dashboard key is pressed and the corresponding state of the treadmill changes, it is actively reported once, no need report when the APP controls the treadmill!

(2)如果跑步机有模式设定，当跑步机达到设定值且自动停止时，需要上报停止状态，即 0x02；

(3) If the treadmill has a mode setting, when the treadmill reaches the set value and automatically stops, it is necessary to report the stop state i.e. 0x02;

6、 跑步机/单车修改蓝牙名字（Treadmill/bike modify bluetooth name）

指令码（Instruction code）： 0x58

跑步机要求控制命令格式如下（The control command format for the treadmill is as follows:）
蓝牙不回复，开机修改名字（Bluetooth not responding, turn on to modify the name）

注意（Note）：

1、如果该协议用于蓝牙FTMS模块的形式，则通讯的方式适用于本协议描述：蓝牙未连接发送50 00/02/03查询，蓝牙连接则发送51 00，52 00查询；

1、if the agreement is used in the form of Bluetooth FTMS module, the communication mode applies to the description of this agreement: Bluetooth is not to send 50 00/02/03 inquiry, Bluetooth is connected to send 51 00, 52 0 inquiry;

2、如果该协议用于飞梭，则通讯方式改为：开机轮询50 00-->50 02-->50 03,查询到以上数据后，交替查询51 00，52 00两个指令

2、if this protocol is used for shuttle, the communication mode is changed to: startup polling 50 00-->50 02-->50 03, after the above data is queried, the two instructions 51 00 52 00 are queried alternately.

CMD		Lenth	DATA
0x5B	0x01	32	XX
	0x02		

附录（Appendix）：

校验码参考代码（Captcha reference code）：

```
unsigned char crc_cheack(unsigned char *pkt, unsigned char len)
{
    unsigned char i=0, calculatedCRC=0;
    calculatedCRC = pkt[0];
    for(i = 1; i < len; i++)
    {
        calculatedCRC = calculatedCRC ^ pkt[i];
    }
    return calculatedCRC;
}
```

FCC Warning Statement: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- **Reorient or relocate the receiving antenna.**
- **Increase the separation between the equipment and receiver.**
- **Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.**
- **Consult the dealer or an experienced radio/TV technician for help.**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Radiation Exposure Statement

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

antenna or transmitter.
The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.
The firmware setting is not accessible by the end user.
The final end product must be labelled in a visible area with the following: “Contains FCC ID: 2BN72-SWBLE03”

The module can be used for Bluetooth Module with -0.58 dBi antenna.
The host manufacturer installing this module into their product must ensure that the final compost product complies with the FCC requirements by a technical assessment or evaluation to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warming as show in this manual.

Requirement per KDB996369 D03

2.2 List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended to a host manufacturer. See alsoSection 2.10 below concerning the need to notify host manufacturers that further testing is required.3

Explanation: This module meets the requirements of FCC part 15C (15.247).itSpecifically identified AC Power Line Conducted Emission,Radiated Spurious emissions,Band edge and RF Conducted Spurious Emissions,Conducted Peak Output Power,Bandwidth,Power Spectral Density,Antenna Requirement.

Summarize the specific operational useconditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

Explanation: The EUT has one PCB antenna, the antenna can't be replaced by other authorized antennas, and the gain of each replacement antenna is no more than 2.06dBi

2.3 Limited module procedures

If a modular transmitter is approved as a "limited module," then the module manufacturer isresponsible for approving the host environment that the limited module is used with. The manufacturer of a limited module must describe, both in the filing and in the installation instructions, the alternative means that the limited module manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions.

A limited module manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited

module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.
This limited module procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited
module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.
Explanation: The module is a limited single module.

2.6 RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).

Explanation: This module complies with FCC RF radiation exposure limits set forth for an uncontrolled environment, This equipment should be installed and operated with a minimum distance of 5mm between the radiator and your body." This module is designed to comply with the FCC statement, FCC ID is: 2BN72-SWBLE03.

2.7 Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an "omni-directional antenna" is not considered to be a specific "antenna type")).
For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product.

The module manufacturers shall provide a list of acceptable unique connectors.

Explanation: The EUT has one PCB antenna, the antenna can't be replaced by other authorized antennas, and the gain of each replacement antenna is no more than -0.58dBi

2.8 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This
includes advising host product manufacturers that they need to provide a physical or e-label stating “Contains FCC ID” with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

Explanation: The host system using this module, should have label in a visible area indicated the following texts: "Contains FCC ID: 2BN72-SWBLE03.

2.9 Information on test modes and additional testing requirements5

Additional guidance for testing host products is given in KDBPublication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer’s determination that a module as installed in a host complies with FCC requirements.

Explanation: **Hangzhou Soundlive Electronic Co., Ltd.**
can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

2.10 Additional testing, Part 15 Subpart Bdisclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product

as being Part 15
Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Explanation: The module without unintentional-radiator digital circuity, so the module does not require an evaluation by FCC Part 15 Subpart B. The host shoule be evaluated by the FCC Subpart B.

OEM integration instructions:
This device is intended only for OEM integrators under the following conditions:

The transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the external antenna(s) that has been originally tested and certified with this module.

As long as the conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

Validity of using the module certification:
In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End product labeling:
The final end product must be labeled in a visible area with the following: “Contains Transmitter Module FCC ID: 2BN72-SWBLE03”.

Information that must be placed in the end user manual:
The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.