FS-BLE-V3x User Manual

1. Introduction

   FS-BLE-V3x is a Bluetooth low-power module based on BK3633 chip. The Bluetooth module only has BLE function, which can ensure stable communication between APP and sports equipment.

2. General information

1. The frequency range is 2402 MHz ~ 2480 MHz
2. Bluetooth low energy ,
3. Transmit power 2.55dBm
4. Working voltage   +2.0 ~ +3.6V
5. PCB antenna, Gain:1.0dBi
6.Modulation method:GFSK
7.Sensitivity: -96dBm at 30.8% PER
8.Support Services:Peripheral UUID FFF0   FTMS
9. Pin to Pin function

The Bluetooth module is installed in the sports device, and then you can use the Fitshow APP to connect with the Bluetooth module to collect data in the sports device or control the sports device.

FCC Statement

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

OEM Guidance

1. Applicable FCC rules

   This module has been tested and found to comply with part 15.247 requirements for

   Modular Approval.

2. The specific operational use conditions

   This module can be used in IoT devices. The input voltage to the module is nominally 3.3V DC. The

   operational ambient temperature of the module is -30 to 55 degree C. Only the embedded PCB

   antenna is allowed. Any other external antenna is prohibited.

3. Limited module procedures

   N/A

4. Trace antenna design

   N/A

5. RF exposure considerations
   This equipment complies with FCC radiation exposure limits set forth for an uncontrolled

   environment .

6. Antenna

Antenna type :PCB Antenna; Antenna Max. Peak Gain 1 dBi

7. Label and compliance information

When the module is installed in the host device, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: "Contains FCC ID: 2AUIEFS-BLEV3X

The FCC ID can be used only when all FCC ID compliance requirements are met.

8. Information on test modes and additional testing requirements

a)The modular transmitter has been fully tested by the module grantee on the required number of channels,modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter,perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).
b)The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration. It is important to note that host product manufacturers should not assume that because the modular transmitter is certified that they do not have any responsibility for final product compliance.
c)If the investigation indicates a compliance concern the host product manufacturer is obligated to mitigate the issue. Host products using a modular transmitter are subject to all the applicable individual technical rules as well as to the general conditions of operation in Sections 15.5, 15.15, and 15.29 to not cause interference. The operator of the host product will be obligated to stop operating the device until the interference have been corrected .
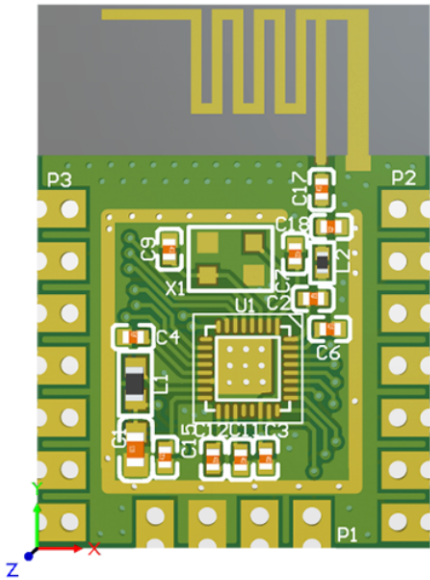

9. Additional testing, Part 15 Subpart B disclaimer
The final host / module combination need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part15 digital device. The host integrator installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules,including the transmitter operation and should refer to guidance in KDB 996369. For host products with certified modular transmitter, the frequency range of investigation of the composite system is specified by rule in Sections 15.33(a)(1) through (a)(3), or the range applicable to the digital device, as shown in Section 15.33(b)(1), whichever is the higher frequency range of investigation. When testing the host product, all the transmitters must be operating. The transmitters can be enabled by using publiclyavailable drivers and turned on, so the transmitters are active. In certain conditions it might be appropriate to use a technology-specific call box (test set) where accessory devices or drivers are not available. When testing for emissions from the unintentional radiator, the transmitter shall be placed in the receive mode or idle mode, if possible. If receive mode only is not possible then, the radio shall be passive (preferred) and/or active scanning. In these cases, this would need to enable activity on the communication BUS (i.e., PCIe, SDIO, USB) to ensure the unintentional radiator circuitry is enabled.
Testing laboratories may need to add attenuation or filters depending on the signal strength of any active beacons (if applicable) from the enabled radio(s). See ANSI C63.4, ANSI C63.10 and ANSI C63.26 for further general testing details.

Pin Configuration

PIn	Name	Function
P31	GPIO	RFU
P32	GPIO	RFU
P10	GPIO	APP connection output high level
P11	GPIO	APP connection output high power low
P12	GPIO	RFU
P13	GPIO	RFU
P33	GPIO	RFU

PIn	Name	Function
RSTN	REST	REST
P07	GPIO	RFU
P06	GPIO	RFU
P05	GPIO	RFU
P04	GPIO	RFU
P03	GPIO	RFU
P02	GPIO	pulse B

VCC	GND	RXD	TXD
+	-	COM+	COM-
		pulse A	heart rate
		rouse	

The bluetooth communication uses frame communication. Each frame uses the start header, check code, and end data format for data verification. The maximum frame interval is 250ms. After the frame return data is received correctly , Immediately proceed to the next frame of communication. The data format is as follows:

START	CMD	DATA	FCS	END
Start code	command	Data	Check code	End Code

rotocol: baud, N, 8, 1   (no parity, 8-bit data, 1-bit stop)
Baud rate: 4800, 9600, 19200, 38400, 115200, self-adaptation
Start code: fixed 1-byte data, in hexadecimal: 0x02;
Instruction: 1-byte instruction, or 2-byte contains sub-instruction;
Data: The length of the data written or read varies depending on the command;
Check code: command/data XORed value (1 byte) for each byte;
Final code: fixed 1-byte data, hexadecimal: 0x03.

*The data adopts a small-end alignment method, that is, the low bytecomes first and the high byte comes after. type of data:

B: Byte   W: Integer   L: Long Integer   N: Multi-byte   (Unspecified type data are all byte types)

*The device should return when it receives an instruction that does not appear in this agreement (the format conforms to the standard and the verification is successful)

The frame containing the current command is as follows:

START	CMD	DATA		FCS	END
0x02	0x7F	0x01	0x02	0x7C	0x03

START	CMD	FCS	END
0x02	0x7F	0x7F	0x03

Blue module common instructions

The Bluetooth module will send configuration instructions to the device after it is powered on and the device needs to return the data in the format.

Configure device model (required) 0x50

Configure the device model (necessary) Ox5O
The device model is the basis for APP identification, so the device must realize the model code data according to the format
return. Otherwise, the sports show will not be able to recognize the current Bluetooth module.
Data sent by blue: (the blue header represents blue sent to the device, the same below)

START	CMD		FCS	END
0x02	0x50	0x00	0x50	0x03

Data returned by the device: (The green header represents the device sent to the blue, the same below)

START	CMD		DATA		FCS	END
0x02	0x50	0x00	brand(W)	Model code(W)	XX	0x03

*Brand and model codes are 16-bit unsigned numbers. The brand code is fixed after being assigned by the sports show. The new model code must be applied by the manufacturer through the sports show official platform.

Device parameter 0x41

The APP needs some device parameters to adapt to related operations, so the APP will send a request command to obtain the device parameters after connecting to the Bluetooth module.

1.Equipment parameters
APP obtains device related parameters through this command

START	CMD		FCS	END
0x02	0x41	0x02	0x40	0x03

START	CMD		DATA				FCS	END
0x02	0x41	0x02	Block (B)	slope (B)	(B)	level (B)	xx	0x03

Configuration

a. Resistance: The device supports the maximum resistance level, APP will adjust from 0 to this value;

b. Slope: If the device supports slope, it will return the total supported slope value, otherwise it will return 0;

c. level: the number of segments supporting the program mode, APP will convert or filter the programs with the same number of segments.

It is convenient for the device to display program data. If it is not restricted, return 1 (APP sends a program between 8 and 48); return 0 means that the device does not support the APP startup program mode.

Configuration parameter definition:

bit	describe	bit	describe
0	1:I m p e r i a l u n i t	4	When the slope is supported, the upper 4 digits are used to indicate the negative slope range of the device, and it is 0 if the negative slope is not supported.
1	1:S u p p o r t	5	
2	p a u s e f u n c t i o n	6	
3		7	

2. C u m u l a t i v e   v a l u e

The device sensor accumulates the number of inductions. If the device does not support this command, the returned data does not include DATA section.

START	CMD		FCS	END
0x02	0x41	0x03	0x42	0x03

START	CMD		DATA	FCS	END
0x02	0x41	0x03	Grand total(L)	xx	0x03

3. S y n c h r o n i z e   d e v i c e   t i m e

After the APP connects to Bluetooth and obtains the parameters successfully, it will send a time synchronization command. If the device has a time function, the time contained in this command can be used to match the time on the device.

START	CMD		DATA	FCS	END
0x02	0x41	0x04	Time(7)	xx	0x03

YEAR	MONTH	DAY	WEEK	HOUR	MIN.	SEC.
15	8	13	4	12	0	0

START	CMD		FCS	END
0x02	0x41	0x04	0x45	0x03

*YEAR: the year value from 00 to 99.

*WEEK: 0 Monday, 16 MondaySaturday.

Device status 0x42, Device data 0x43

After the APP is connected to the Bluetooth, in standby and exercise, the APP will obtain the current state data of the device in real time to determine the corresponding data display.

Get device status
The current state of the device is the basis for the operation of the APP and the basis for the interoperability between the APP and the device. Therefore, after the APP is connected to the Bluetooth, the device status will be obtained continuously at a cycle of 3 times per second.

START	CMD	FCS	END
0x02	0x42	0x42	0x03

START	CMD	DATA		FCS	END
0x02	0x42	Start(B)	Data(N)	xx	0x03

2. Get exercise data

After the equipment is running, use this command to get the current exercise data.。

START	CMD		FCS	END
0x02	0x43	0x01	0x42	0x03

START	CMD		DATA				FCS	END
0x02	0x43	0x01	Time (W)	distance (W)	Calories (W)	count (W)	xx	0x03

a. The amount of exercise is not affected by the countdown mode, and the data always counts up from 0;

b. Time is the duration of the exercise, in seconds;

c. When the distance is less than 32000, the unit is 1, otherwise the highest position 1 and the unit is 10;

d. The count is the number of times the sensor has sensed after the start of the exercise.

Distance: If the current distance is 30000 meters, it will return 30000 (0x7530); if the movement distance reaches 50000 meters, it will return 37768 (0x9388), the value = distance divided by 10 and the highest position will be 1. You can also start by setting the highest position 1 to tell the APP that the distance is in units of 10 meters.

3. Get sports information

After the APP is connected to the bluetooth, if it is started by the device, the APP will send the current command to obtain the current exercise information, display it differently according to the mode, and also judge whether it conflicts with the current user.

START	CMD		FCS	END
0x02	0x43	0x02	0x41	0x03

START	CMD		DATA					FCS	END
0x02	0x43	0x02	user ID(L)	sprot ID(L)	module (B)	lave (B)	Traget (W)	xx	0x03

a. User ID and Motion ID are the values written by the device control command, which are returned here; b. For the mode, see the device startup command in the device control section;

c. The number of segments is the total number of segments of the corresponding program in the program mode, and 0 in other modes; d. The target is the countdown mode or the target total value of the program, and 0 in other modes.

e. When the target is distance, follow the High Position 1 standard, see above.

4. Get program data

When the device starts to exercise in program mode, the APP will send this command to obtain program data.

START	CMD		DATA		FCS	END
0x02	0x43	0x03	index(B)	length(B)	xx	0x03

START	CMD		DATA		FCS	END
0x02	0x43	0x03	index(B)	Data(N)	xx	0x03

NOTE: The index is the starting position of the program data, from 0 to the degree length -1. The APP automatically divides and sends this command multiple times according to the number of program segments to obtain all program data. The returned data is 1 segment of data per byte, representing the current resistance value.