# 蓝牙模块 F-3188 使用说明书

## 一、产品概述：

F-3188 蓝牙模块为本公司自主开发的智能型无线音频数据传输产品，是低成本的高效率的立体声无线传输方案，模块采用了 CSR BC8 芯片为模块提供了高品质的音质和兼容性，整体性能更优化。F-3188 蓝牙模块采用免驱动方式，客户只需要把模块接入应用产品，就可以快捷地实现音乐的无线传输，享受无线音乐的乐趣。

## 二、应用领域：

该模块主要用于短距离的音乐传输，可以方便地和笔记本电脑，手机，PDA 等数码产品的蓝牙设备相连，实现音乐的无线传输。

※ 蓝牙音响
※ 蓝牙立体声耳机
※ 免提电话
※ 蓝牙无线传输音频

## 三、基本特性：

Bluetooth Profiles

※ Bluetooth v4.0 specification support
※ HFP v1.6 wideband speech (HD voice ready)
※ HSP v1.2
※ A2DP v1.2
※ AVRCP v1.4
※ Support for smartphone applications (apps)

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Improved Audio Quality

CSR’s latest 2-mic CVC audio enhancements for narrowband and wideband connections including:

※ 2-mic far-end audio enhancements
※ Near-end audio enhancements (noise suppressionand AEQ)
※ Wind noise reduction
※ Packet loss concealment
※ Bit error concealment
※ Automatic gain control and automatic volumecontrol
※ Frequency expansion for improved speech intelligibility
※ mSBC codec support for wideband speech

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Music Enhancements

※ Configurable 5-band EQ for music playback (rock,pop, classical, jazz, dance etc)
※ APTX, SBC, MP3, AAC and Faststream decoder
※ Stereo widening (S3D)
※ Volume Boost Additional Functionality Additional Functionality
※ Support for voice recognition
※ Support for multi-language programmable audio prompts
※ CSR's proximity pairing and CSR's proximity connection

※ Multipoint support for HFP connection to 2 handsets for voice

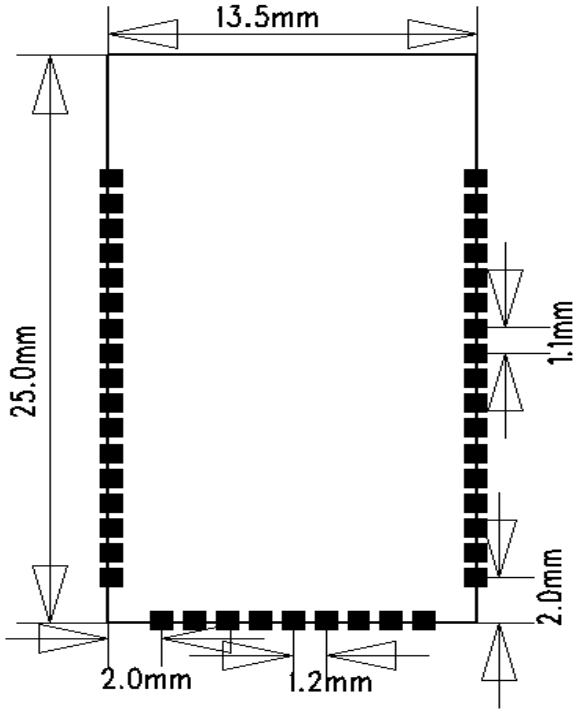
※ Multipoint support for A2DP connection to 2 A2DP sources for music playback

※ Talk-time extension

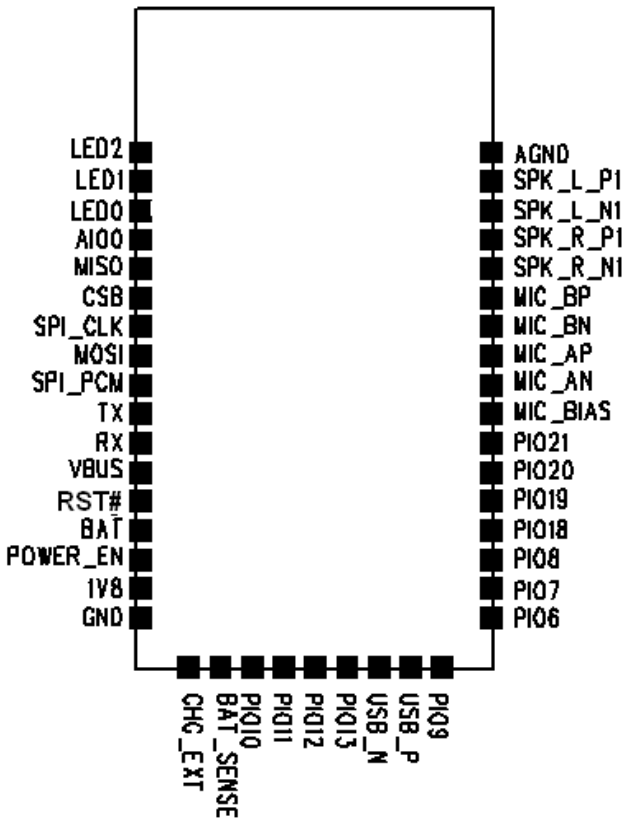
## 四、性能参数：

| | |
|---|---|
| 型号 | F-3188 |
| 蓝牙规格 | Bluetooth V4.0 |
| 调制方式 | GFSK, π/4 DQPSK, 8DPSK |
| 供电电压： | 3.3-4.2V |
| 支持蓝牙协议 | HFPV1.6, HSPV1.2, A2DPV1.2,AVRCPV1.4 |
| 工作电流 | ≤30mA |
| 待机电流 | <50uA |
| 温度范围 | -40℃ to +80℃ |
| 无线传输范围： | 大于 10 米 |
| 传输功率： | 支持 CLASS1/CLASS2/CLASS3　最大可调 9dBm |
| 灵敏度： | -80dBm<0.1%BER |
| 频率范围： | 2.4GHz-2.480GHz |
| 对外接口： | PIO, SPI, I2S and PCM,USB |
| 音频性能 | 支持 AAC, MP3, SBC, APTX,立体声 |
| 音频信噪比： | ≥75dB |
| 失真度 | ≤0.1% |
| 模块尺寸 | 25X13.5X0.8MM |

五、模块尺寸图：




六、模块脚位定义图



## 七、引脚功能说明

| Pin | Symb | I/O | Description |
|---|---|---|---|
| 1 | LED2 | Bi-directional | LED Driver |
| 2 | LED1 | Bi-directional | LED Driver |
| 3 | LED0 | Bi-directional | LED Driver |
| 4 | AIO0 | Bi-directional | Programmable input/output |
| 5 | MISO | Bi-directional with weak pull-down | Programmable input/output<br>Alternative function: SPI data Output<br>PCM1 synchronous data Output |
| 6 | CSB | Bi-directional with weak pull-down | Programmable input/output<br>Alternative function: SPI data Output<br>PCM1 synchronous data sync |
| 7 | SPI_CLK | Bi-directional with weak pull-down | Programmable input/output<br>Alternative function: SPI clock<br>PCM1 synchronous data Clock |
| 8 | MOSI | Bi-directional with weak pull-down | Programmable input/output<br>Alternative function: SPI data input<br>PCM1 synchronous data output |
| 9 | SPI_PCM | Input with weak pull-down | SPI/PCM select input<br>0: PCM/PIO interface<br>1: SPI |
| 10 | TX | Bi-directional with strong pull-down | Programmable input/output<br>Alternative function: UART data output |
| 11 | RX | Bi-directional with weak pull-down | Programmable input/output<br>Alternative function: UART data input |
| 12 | VBUS | Charger input | |
| 13 | RST# | | Reset if low,pull low minimum 5ms to case a reset |
| 14 | BAT | Battery positive terminal | 3.3-4.2V |
| 15 | POWER_EN | Input with weak pull-down | Regulator enable input |
| 16 | 1.8V VBUS | POWER | +1.8V Output |
| 17 | GND | Ground | Ground connect battery negative |
| 18 | CHG_EXT | External Battery charger | Charge |

| | | | |
|---|---|---|---|
| 19 | BAT_SENSE | Battery charger sense input | BAT_SENSE |
| 20 | PIO10 | Bi-directional with strong pull-down | Programmable input/output |
| 21 | PIO11 | Bi-directional with strong pull-down | Programmable input/output |
| 22 | PIO12 | Bi-directional with strong pull-down | Programmable input/output |
| 23 | PIO13 | Bi-directional with strong pull-down | Programmable input/output |
| 24 | USB_N | Bi-directional | USB data plus with selectable internal 1.5K pull up resistor |
| 25 | USB_P | Bi-directional | USB data minus |
| 26 | PIO9 | Bi-directional with strong pull-down | Programmable input/output |
| 27 | PIO6 | Bi-directional with strong pull-down | Programmable input/output |
| 28 | PIO7 | Bi-directional with strong pull-down | Programmable input/output |
| 29 | PIO8 | Bi-directional with strong pull-down | Programmable input/output |
| 30 | PIO18 | Bi-directional with weak pull-down | Programmable input/output |
| 31 | PIO19 | Bi-directional with weak pull-down | Programmable input/output |
| 32 | PIO20 | Bi-directional with weak | Programmable input/output |
| 33 | PIO21 | Bi-directional with weak | Programmable input/output |
| 34 | MIC_BIAS | Analogue out | Microphone bias |
| 35 | MIC_AN | Analogue in | Microphone input negative ,channel A |
| 36 | MIC_AP | Analogue in | Microphone input positive ,channel A |
| 37 | MIC_BN | Analogue in | Microphone input negative ,channel B |
| 38 | MIC_BP | Analogue in | Microphone input positive ,channel B |
| 39 | SPK_R_N1 | Analogue out | Speaker output positive, right |
| 40 | SPK_R_P1 | Analogue out | Speaker output negative, right |

| | | | |
|---|---|---|---|
| 41 | SPK_L_N1 | Analogue out | Speaker output positive, left |
| 42 | SPK_L_P1 | Analogue out | Speaker output negative,left |
| 43 | AGND | Analogue Ground | |

## 八、设计注意事项：（模块兼容 8610，8620，8640，8645 四个 IC，就是分单，双声道）

1）

BC8610，8620----------是单声道的芯片

这时音频只有 PIN41，PIN42 也就是 SPK_L_N, SPK_L_P 有音频输出，而 SPK_R_N, SPK_R_P 是空脚

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BC8640，8645----------是双声道的芯片，SPK_L_N, SPK_L_P，SPK_R_N, SPK_R_P 都有音频输出，属于立体声

2）IO 口注意事项

PIO21，PIO20，PIO19，PIO18，PIO7，只有这 5 个 IO 口可以用来做按键，其他的口做输出。

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## 九、电路连接注意：

F-3188 外接功放的时候，必须接差分输入的功放，如果不接差分输入的功放，必须接一个运放平衡两个差分的电平，否则会有“啪啪”的冲击声。

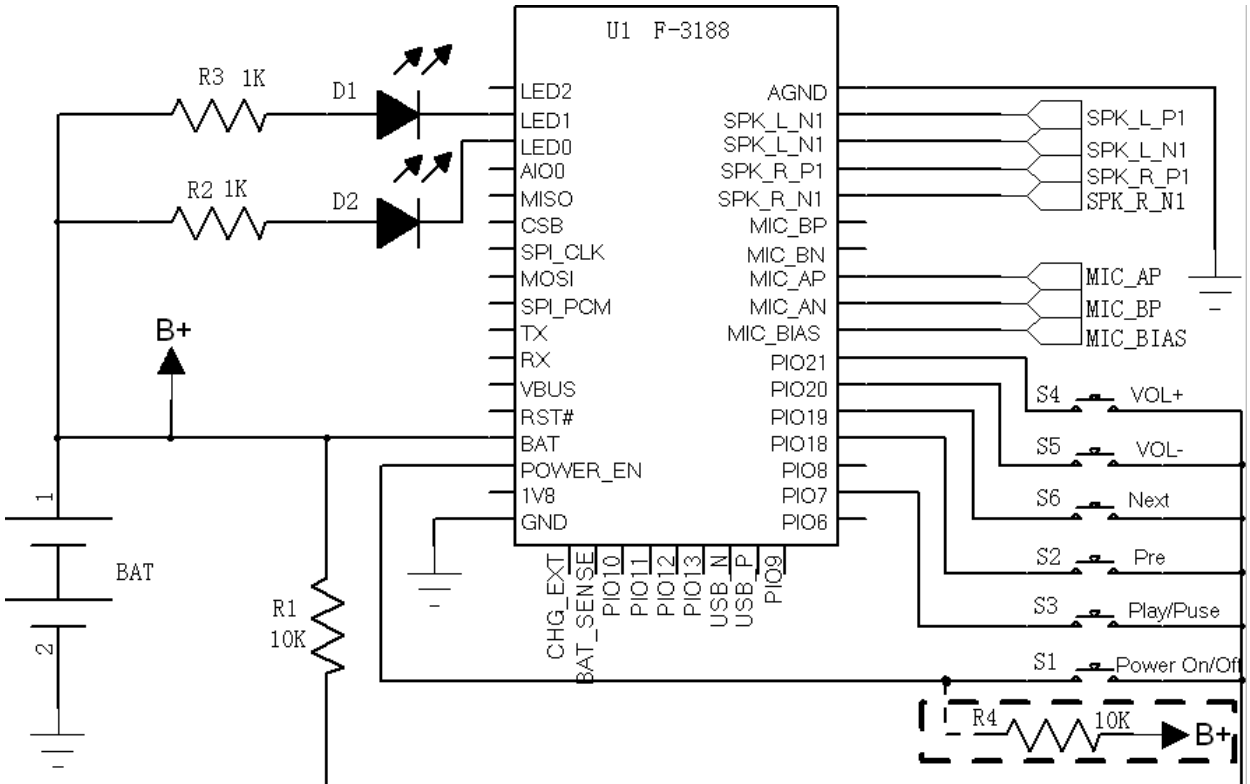
## 十、注意事项：

A．关于无线蓝牙的使用环境，无线信号包括蓝牙应用都受周围环境的影响很大，如树木、金属等障碍物会对无线信号有一定的吸收，从而在实际应用中，数据传输的距离受一定的影响。

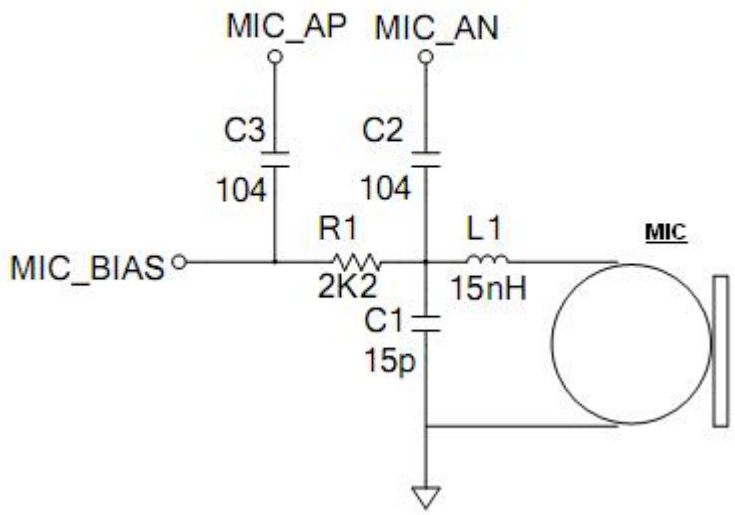
B．由于蓝牙模块都要配套现有的系统，放置在外壳中。由于金属外壳对无线射频信号是有屏蔽作用的。所以建议不要安装在金属外壳中。

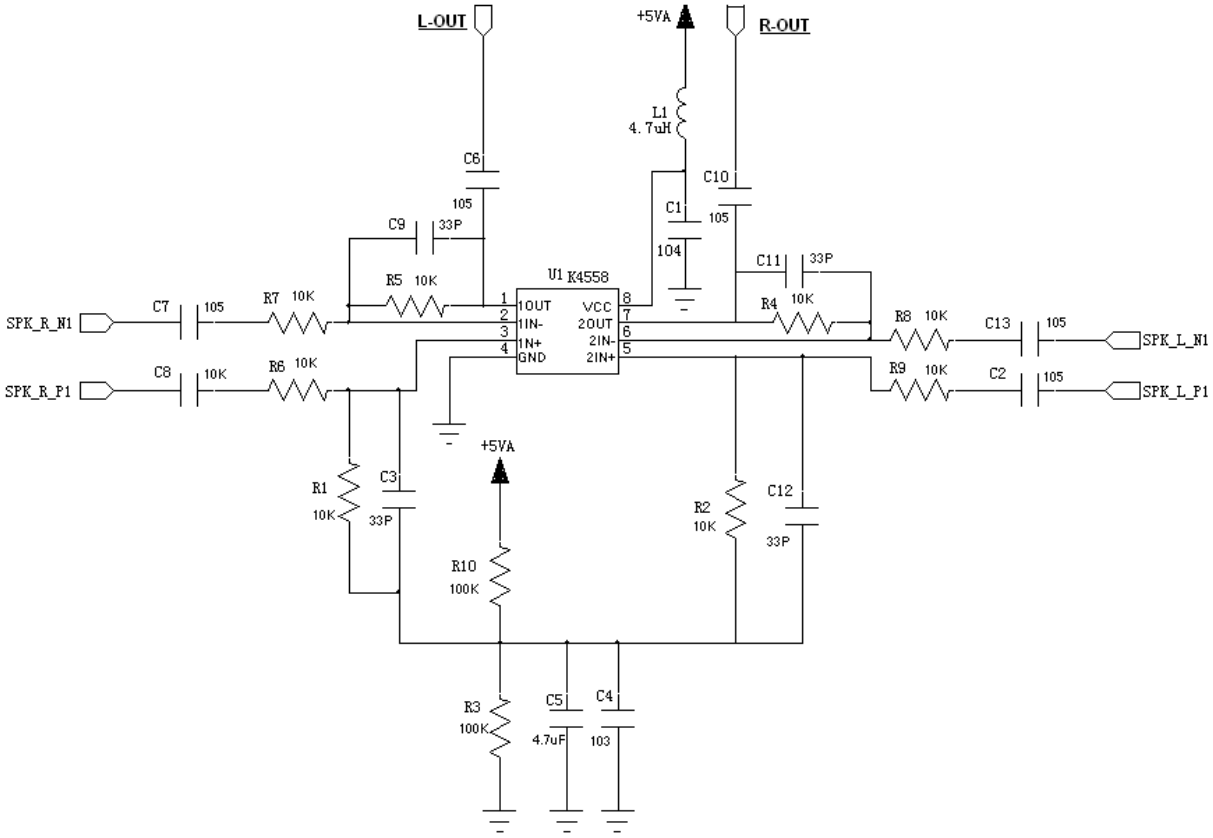
C．PCB 布板：蓝牙模块的天线部分的是 PCB 天线，由于金属会削弱天线的功能，在给模块布板的时候，模块天线下面严禁铺地和走线，若能挖空更好。

十、应用电路：




如若要上电即开机，侧用10K电阻接电池正极（如虚线框所示）替代S1开关电路


MIC_AP
MIC_AN
C3
104
C2
104
R1
2K2
L1
15nH
MIC
MIC_BIAS
C1
15p


L-OUT
+5VA
R-OUT
L1
4.7uH
C6
105
C10
C1
105
104
C9
33P
C11
33P
U1 K4558
R5 10K
R4 10K
C7
105
R7 10K
SPK_R_N1
1OUT
1IN-
1IN+
GND
VCC
2OUT
2IN-
2IN+
R8 10K
C13
105
SPK_L_N1
C8
10K
R6 10K
SPK_R_P1
R9 10K
C2
105
SPK_L_P1
+5VA
R1
10K
C3
33P
R2
10K
C12
33P
R10
100K
R3
100K
C5
4.7uF
C4
103