

# Specification

<b>Model</b>	FireFly
Camera: FireFly	
<b>Image Sensor</b>	1/3" CMOS Sensor
<b>Horizontal Resolution</b>	1200 TVL
<b>TV System</b>	NTSC / PAL optional
<b>IMAGE</b>	16:9 / 4:3 optional
<b>Synchronization</b>	Internal
<b>Electronic Shutter</b>	PAL: 1/50~100,000; NTSC: 1/60~100,000
<b>S/N Ratio</b>	>52dB (AGC OFF)
<b>Video Output</b>	CVBS
<b>Lens</b>	2.1mm
<b>Min. Illumination</b>	0.001Lux@F1.2
<b>Auto Gain Control</b>	YES
<b>BLC</b>	YES
<b>WDR</b>	Global WDR
<b>DNR</b>	2 DNR
<b>Dimensions</b>	14mm*14mm*16mm
<b>Wide Power Input</b>	DC 3.3-9V
<b>Work Temperature</b>	-20°C~+60°C
<b>Work Humidity</b>	20%~80%
<b>Weight</b>	4.1g (Camera + VTX)

VTX1	
<b>Feature</b>	TBS SMART OSD
<b>Frequency band</b>	5362~5945MHz
<b>Channel customer</b>	48
<b>Modulation type</b>	FM
<b>Channel SEL.</b>	Touch Switch
<b>Channel Indicate</b>	CH1~CH8 Channel indication with 8LEDS and A~F frequency group Indicate with 6 LEDES
<b>Transmit power</b>	13±1dBm
<b>Frequency control</b>	PLL
<b>All harmonic</b>	Max -50dBm
<b>Frequency Stability</b>	±100KHz (Typ.)
<b>Frequency precision</b>	±200KHz (Typ.)
<b>Channel Carrier error</b>	1dB
<b>Antenna Port</b>	50 Ω
<b>Power consumption</b>	140±20MA@5V DCIN
<b>Supply Voltage</b>	2.9-5.5v
<b>Operating Temperature</b>	-10°C~+60°C
<b>Profile dimension</b>	15mmX14mm

**Packing List:**

Camera with VTX x1

BAND	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
A (BOSCAM)	5865M	5845M	5825M	5805 M	5785 M	5765 M	5745 M	5725 M
b (BOSCAM)	5733 M	5752 M	5771 M	5790 M	5809 M	5828 M	5847 M	5866 M
C (BOSCAM)	5705 M	5685 M	5665 M	5645 M	5885 M	5905 M	5925 M	5945 M
d (FATSHAR)	5740 M	5760 M	5780 M	5800 M	5820 M	5840 M	5860 M	5880 M
E (RACEBAN)	5658 M	5695 M	5732 M	5769 M	5806 M	5843 M	5880 M	5917 M
<b>F</b>	<b>5362M</b>	<b>5399M</b>	<b>5436M</b>	<b>5473M</b>	<b>5510M</b>	<b>5547M</b>	<b>5584M</b>	<b>5621M</b>

**1 调制类型 (Modulation type) : FM**

详细频道表见附件

**Detailed channel table see attachment**

**2 结构规格书 (Mechanical Specification)**

Please refer to Figure 1.

**3 环境条件 (Environmental Specification) :**

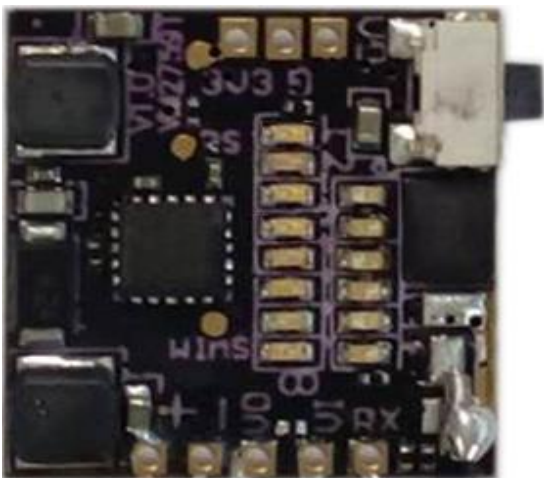
3.1 工作温度 (Temperature ) -10°C ~ +60°C

**4 测试条件 (Test Condition)**

4.1 周边环境温度 (Ambient temperature) : 25°C

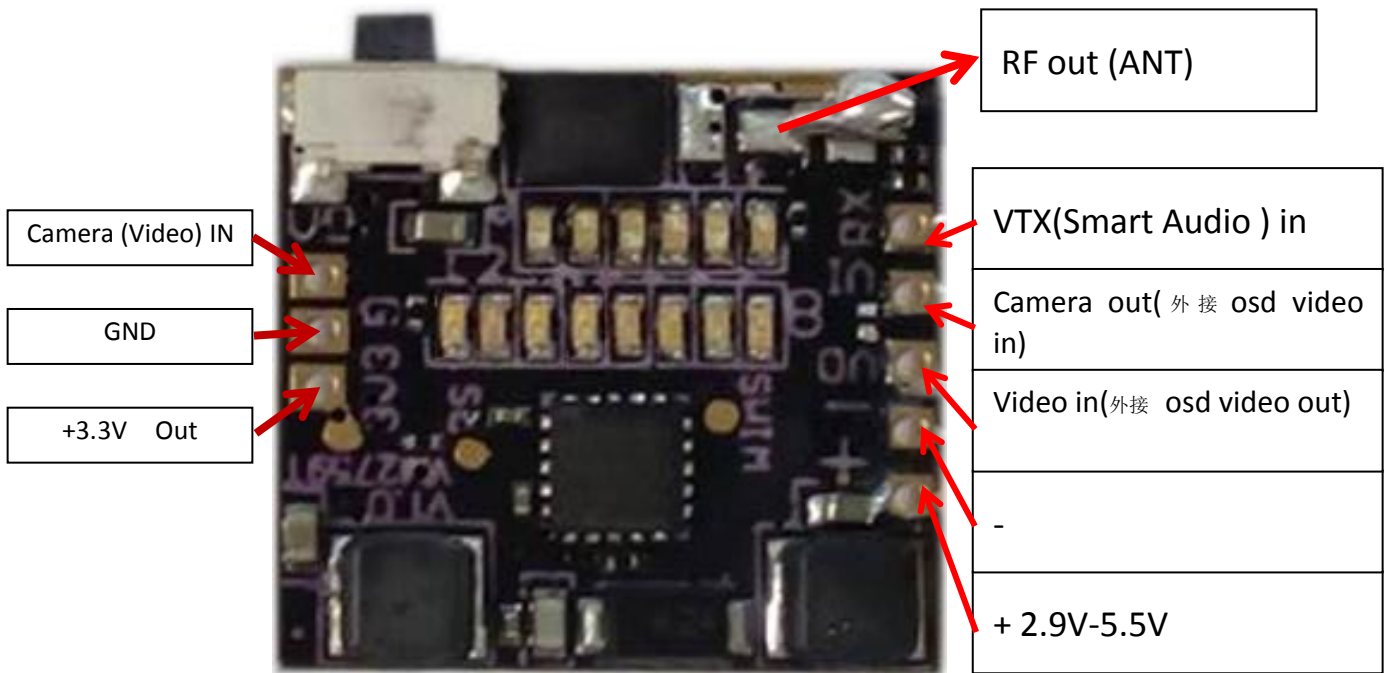
**5 电特性 (Electrical Characteristics)**

**6 接线图 (Pin Assignment )**

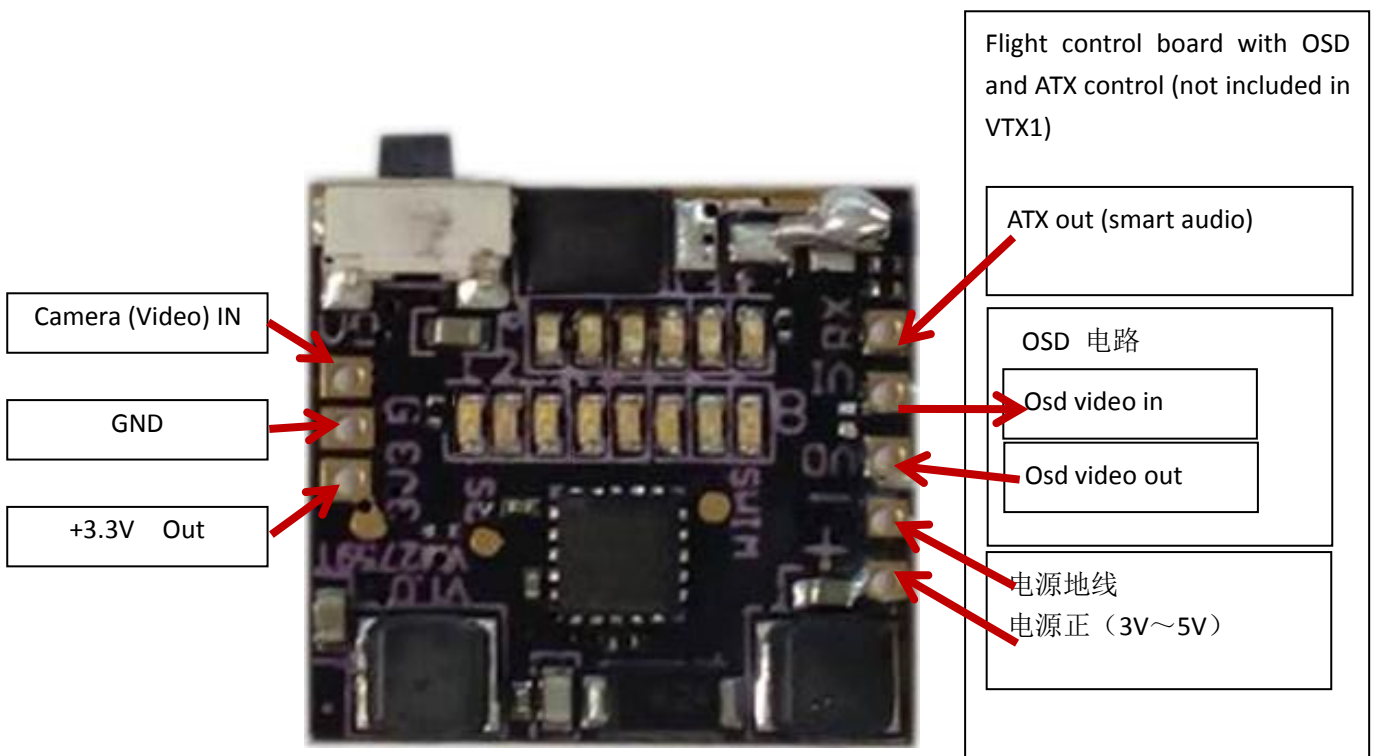


长按 2S 选择频率组，短  
按切换频率(Frequency  
group A~F selected  
long touch to  
2S;Channel ch1~ch8  
selected with short  
touch.

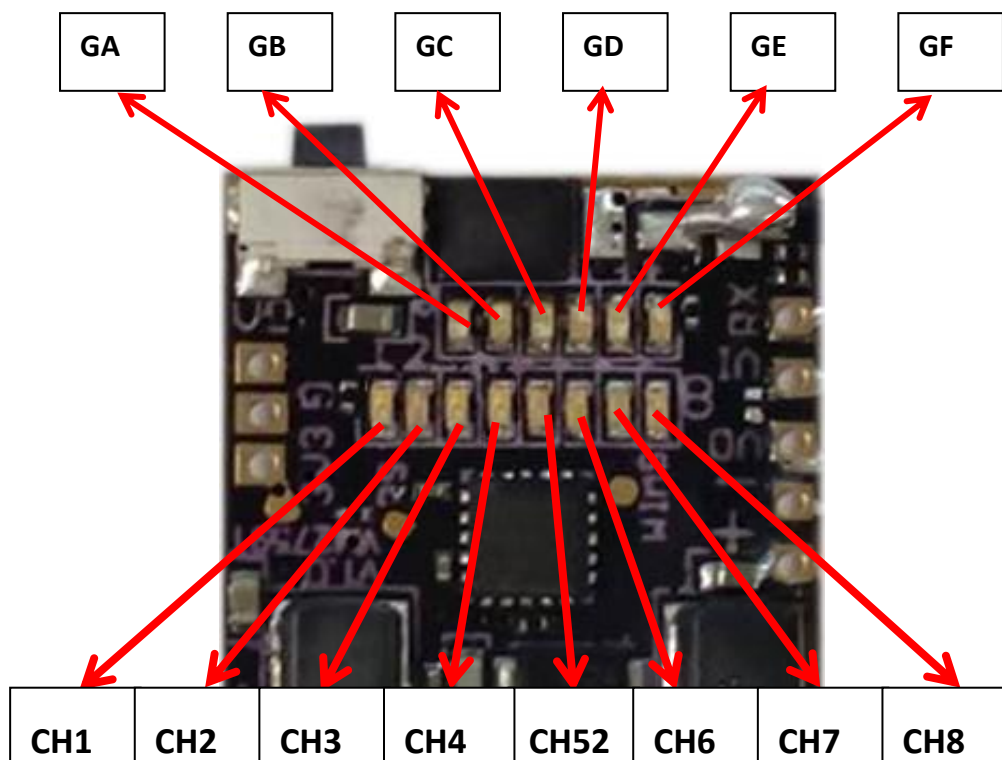
按键说明图 Button description



接线说明图



Wiring diagram with external OSD



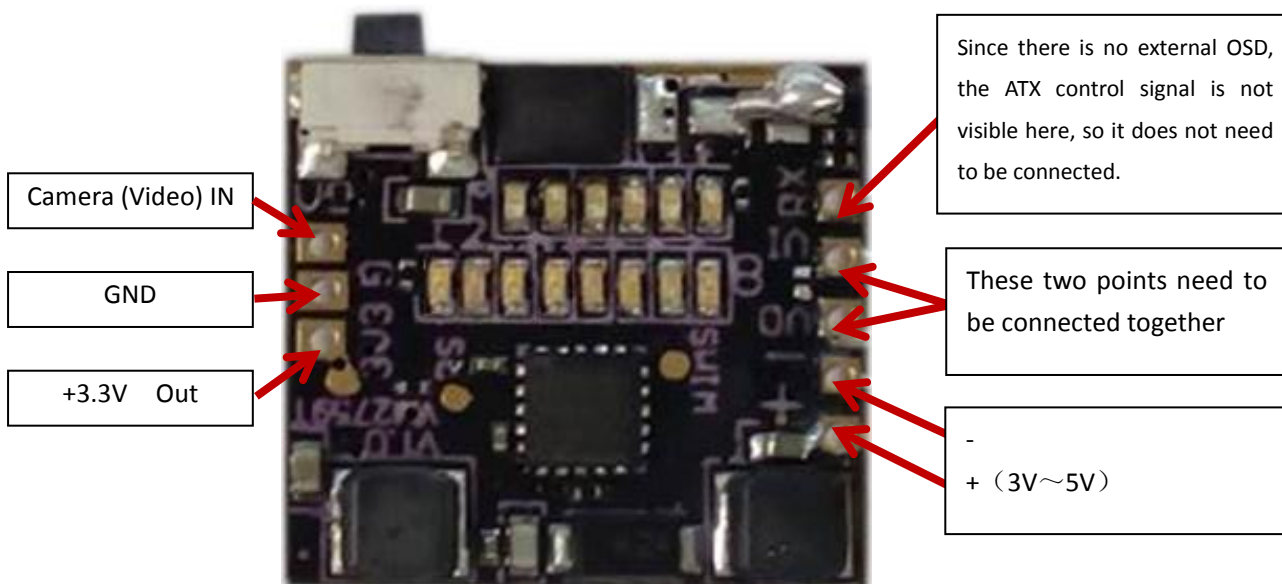
指示灯说明图 Indicator light diagram

说明:

频率和频率组控制: 可以用 ATX (Smart audio)协议 通过 RX/TX 口进行遥控操作控制; 功率固定为 25mW(遥控其它功率是不变的)。协议和控制方法可以参考 ATX (Smart audio)的遥控控制说明(注意: 6, BAND F 频道组是不会出现在遥控组的, 并且只有在在不接 ATX 控制线的情况下, 由按键选择控制, 否则 ATX 时刻发信号, 把控制拉回到 1-5 组频率组的)。

Description:

Frequency and frequency group control: It can be controlled by remote control operation through RX/TX port with ATX (Smart audio) protocol; the power is fixed at 25mW (the remote control other power is constant). The protocol and control method can refer to ATX (Smart audio) remote control description (Note: 6, BAND F channel group will not appear in the remote control group, and only if the ATX control line is not connected, the button selection control, Otherwise ATX will signal and pull control back to the 1-5 group of frequency groups).



Direct transmission (equivalent to CM275T) wiring diagram without OSD

结构尺寸 (Dimension)

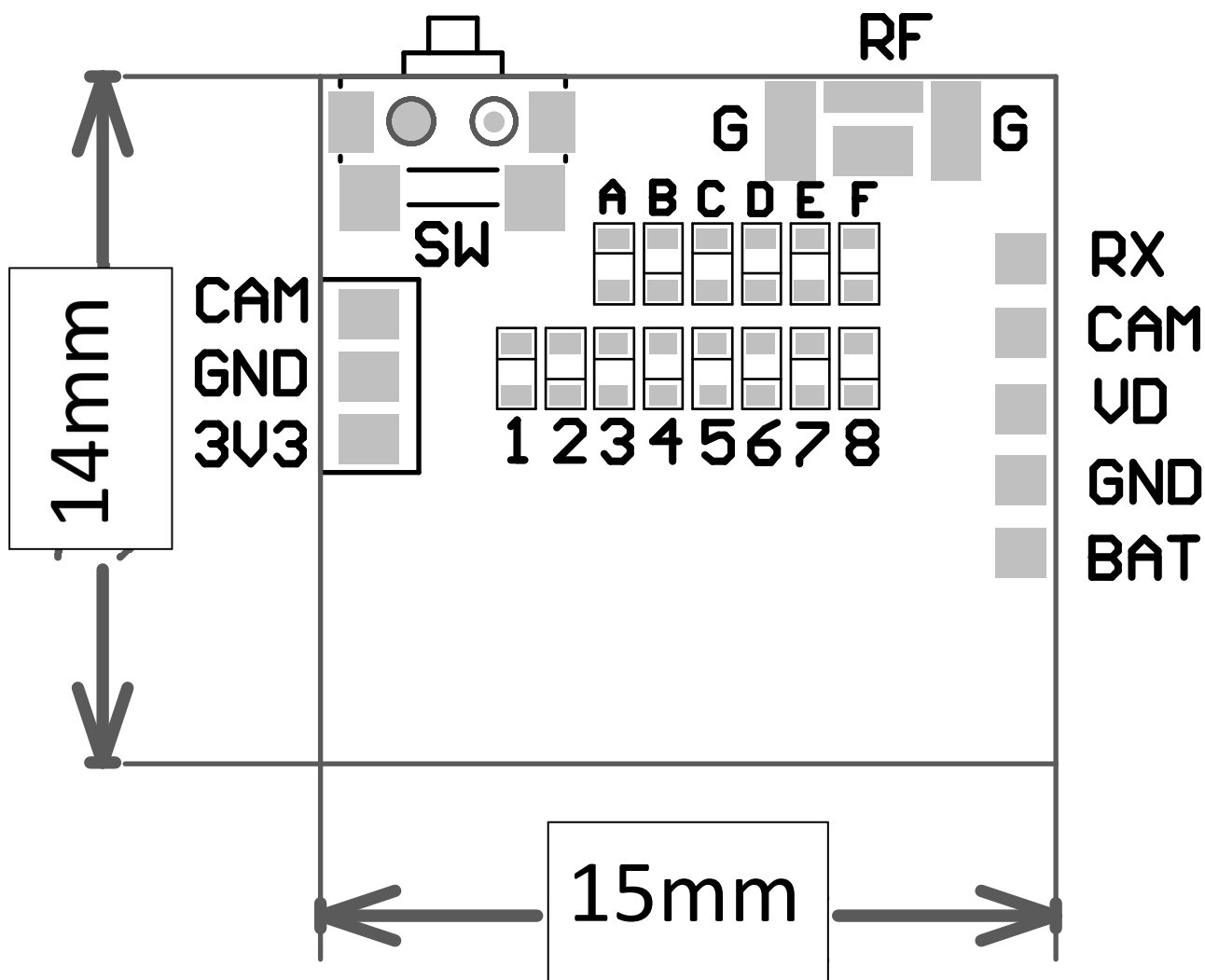


Figure 1

## 附录：OSD 配置图传参数简易说明

Appendix: Simple description of the parameters of the OSD configuration diagram

### 一、Betaflight 串口选择 Betaflight serial port selection

#### 1、集成了 OSD 的 F3、F4 飞控

将 VTX1 模块的 VTX(RX)、Video in 和 GND 三根线分别连接 Betaflight 飞控的空余 UART 口的 Tx 脚、Video out 和飞控的 GND 上。然后，通过 USB 将飞控连接到电脑上，运行 Betaflight 程序。

某些种类的 F3，F4 飞控因部分 UART 口附加了转换电路，可能就不支持我们的 OSD 调参了，这时可换其他 UART 口试下。比如 BR4 的 UART3 就因这种情况不支持 OSD 调参，而 UART1 和 2 就可以。然后，通过 USB 将飞控连接到电脑上，运行 Betaflight 程序。

#### 1. F3 and F4 flight control integrated with OSD

Connect the VTX (RX), Video in and GND lines of the VTX1 module to the Tx pin, Video out and the GND of the flight control of the free UART port of the Betaflight flight control. Then, connect the flight controller to your computer via USB and run the Betaflight program.

Some types of F3, F4 flight control due to the addition of a conversion circuit to some UART ports, may not support our OSD tuning, then you can change other UART port test. For example, UART3 of BR4 does not support OSD tuning because of this situation, and UART1 and 2 can. Then, connect the flight controller to your computer via USB and run the Betaflight program.

#### 2. 外加 OSD 的 F3、F4 飞控 (F3, F4 flight control with the OSD)

首先，OSD 要刷 MW OSD R1.6.5 以上版本，在 Config.h 文件中要选择 betaflight 和 canvas：然后将 VTX1 模块的 VTX(RX)、Video in 和 GND 三根线分别连接飞控的空余 UART 口的 Tx 脚、OSD 的 Video out 和飞控的 GND 上。然后，通过 USB 将飞控连接到电脑上，运行 Betaflight 程序。

First, OSD needs to brush MW OSD R1.6.5 or higher, and select betaflight and canvas in the Config.h file:

Then connect the VTX (RX), Video in and GND lines of the VTX1 module to the Tx pin of the free UART port of the flight control, the Video out of the OSD and the GND of the flight controller. Then, connect the flight controller to the computer via USB and run the Betaflight program.

```
// latest release...
#define BETAFLIGHT // Uncomment this if you are using latest BETAFLIGHT version 3.1 onwards
//#define BETAFLIGHT3 // Uncomment this if you are using BETAFLIGHT version 3.0.x

#define CANVAS_SUPPORT // Enable CANVAS mode support for post betaflight 3.1.0 CMS
//#define INVERTED_CHAR_SUPPORT // Enable inverted char support
```

#### 3、配置 UART 口参数

进入 Ports 项，选定连接了图传的 UART 口（本例是 UART6），再在 Peripheral 栏选择 TBS SmartAudio 项（如图 1），完成飞控的图传串口配置。

如果图传和选定的飞控 UART 口接线保持不变，这一步只需要操作 1 次即可。

### 3, configure the UART port parameters

Enter the Ports item, select the UART port connected to the picture transfer (in this case, UART6), and then select the TBS SmartAudio item in the Peripheral field (as shown in Figure 1) to complete the flight control serial port configuration.

If the picture transmission and the selected flight control UART port wiring remain unchanged, this step only needs to be operated once.

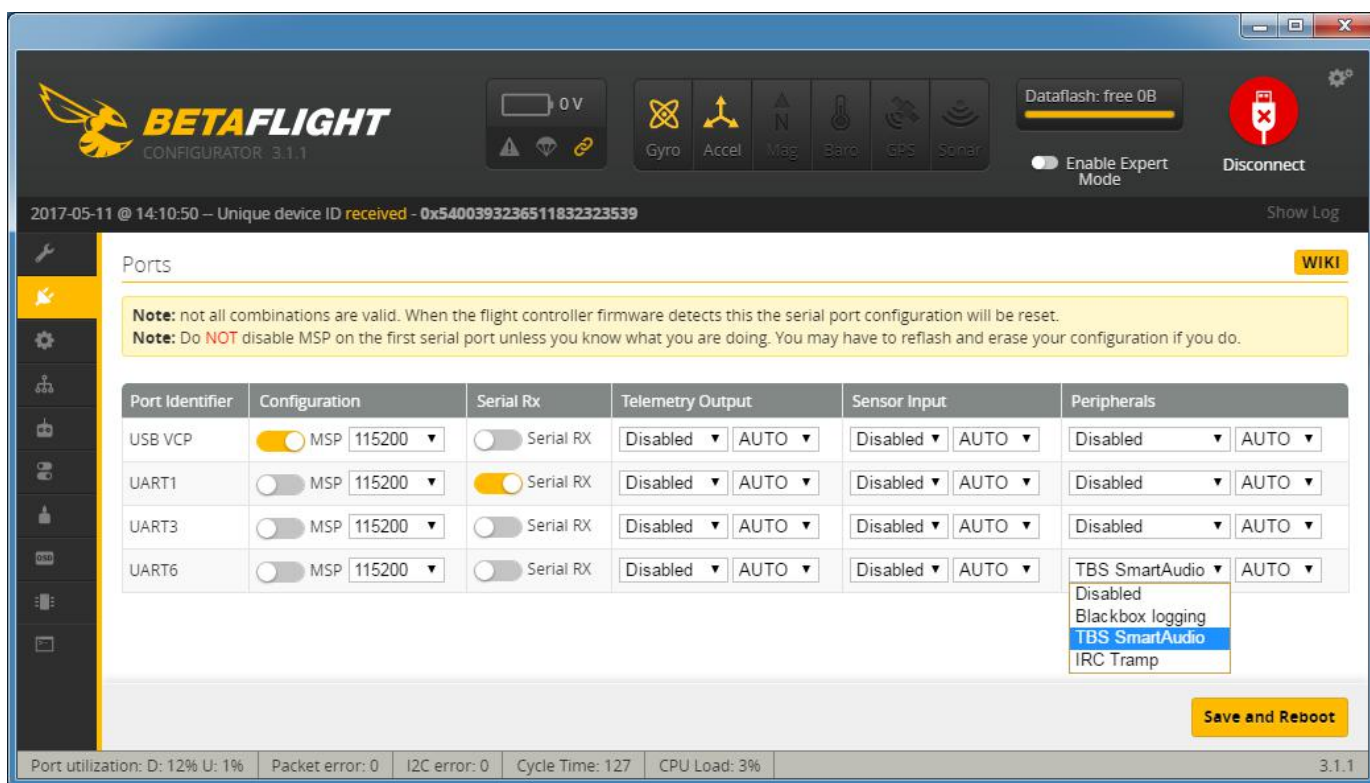


图 1 飞控串口配置

Figure 1 Flight Control Serial Port Configuration

## 二、频率分组、信道号和发射功率配置

### Second, frequency grouping, channel number and transmit power configuration

#### 1、进入 OSD 调参菜单

给 VTX1 图传发射、对应的图传接收机显示屏和飞控等上电，接收屏上会出现如图 2 所显示的信息：

#### 1, enter the OSD assistant menu

The VTX1 picture transmission, the corresponding picture transmission receiver display and the flight control are powered on, and the information shown in Figure 2 appears on the receiving screen:





图 2 上电显示信息

Figure 2 Power-on display information

此时，按照屏上提示操作 THR MID（油门居中）、YAW LEFT（YAW 摇杆拨向左）、PITCH UP（PITCH 摇杆拨到顶）进入 OSD 调参菜单（如图 3）。

At this point, follow the on-screen prompts to operate the THR MID, YAW LEFT, and PITCH UP to enter the OSD Assistant menu (Figure 3).

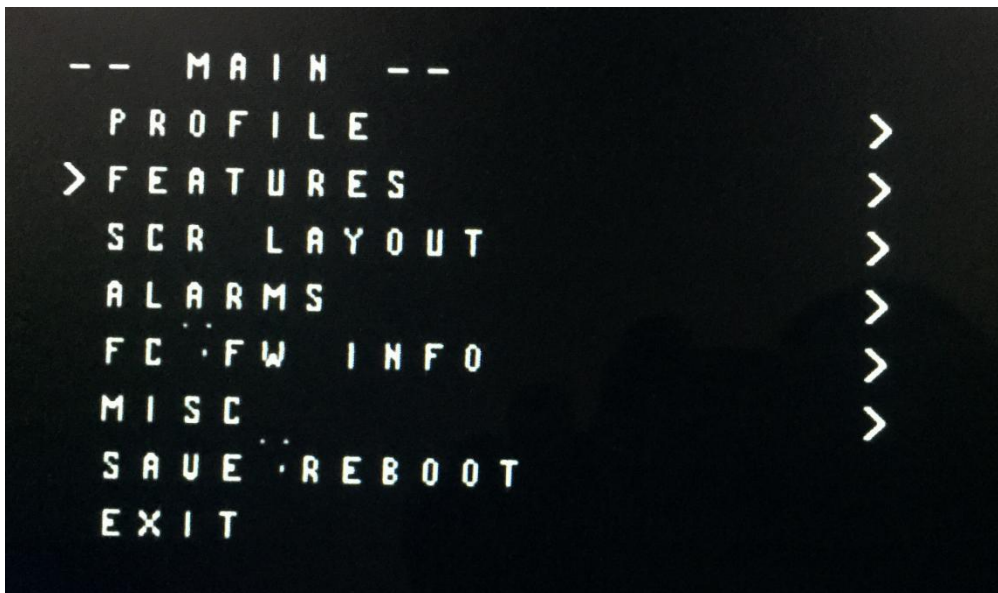


图 3 OSD 调参菜单

Figure 3 OSD Assistant Menu

## 2、分组和信道配置 Grouping and channel configuration

在 OSD MAIN 菜单下，上下拨动 PITCH 摇杆可以上下移动光标箭头到选择菜单项，选择 FEATURES 项后再向右拨动 ROLL 摇杆选定，进入下级配置菜单（如图 5）：

Under the OSD MAIN menu, move the PITCH joystick up and down to move the cursor arrow up and down to the selection menu item. Select the FEATURES item and then push the ROLL joystick to the right to enter the lower level configuration menu (Figure 5).

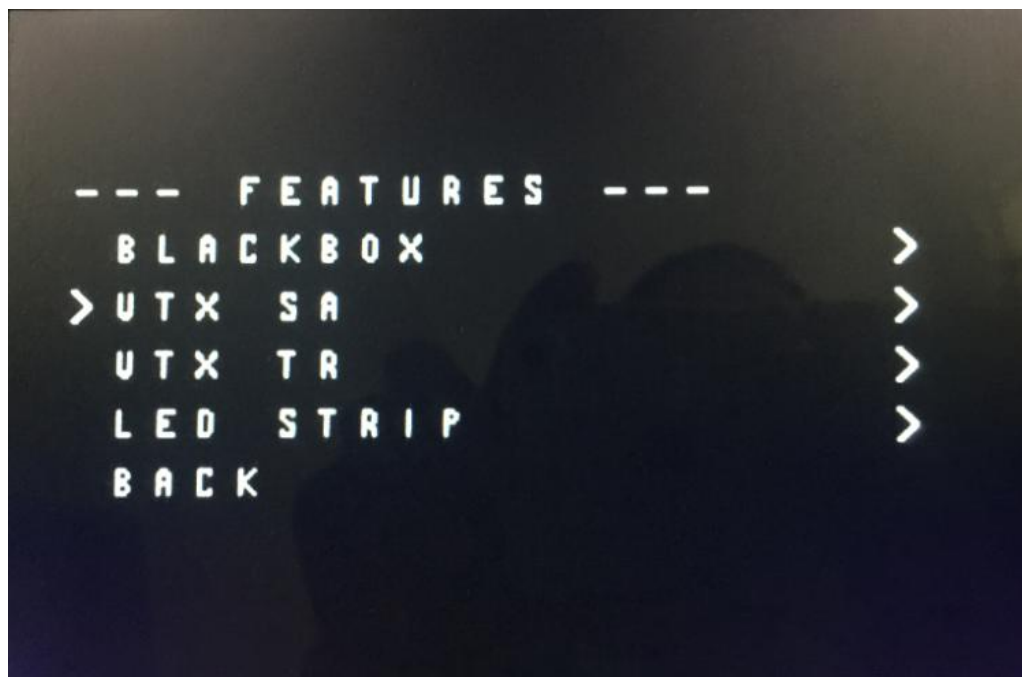


图 5 FEATURES 菜单  
Figure 5 FEATURES Menu

同样上下拨动 PITCH 摇杆选择 VTX SA 项，向右拨动 ROLL 杆选定，进入图传参数配置菜单（如图 6）：

Similarly, press the PITCH rocker up and down to select the VTX SA item, and toggle the ROLL lever to the right to enter the parameter transmission configuration menu (Figure 6):

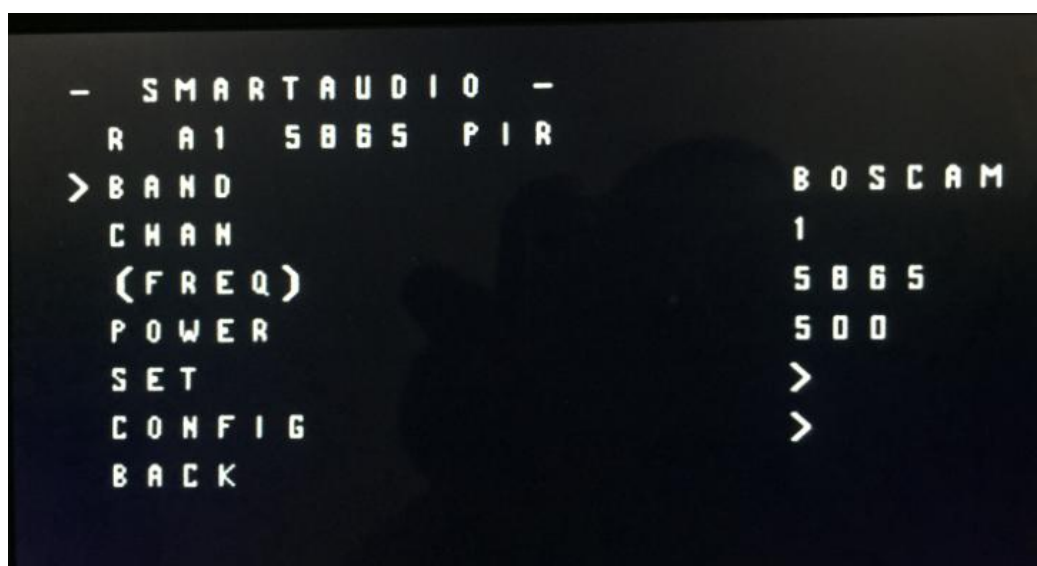


图 6 图传参数配置菜单  
Figure 6 VTX configuration menu

在图 5 的菜单里，通过左右拨动 ROLL 摇杆选定需要的频率分组 BAND 和信道 CHAN。

**注意：**因 VTX1 支持 48 个信道，用户可以通过按键选择 48 个信道中的任何一个信道。但目前 Betaflight 的 OSD 调参功能只支持 40 个信道，因此用户只能在 OSD 屏上配置支持的 40 个信道。

如果用户用按键方式选定了 OSD 调参不支持的 8 个信道之一，又进入了 OSD 调参，系统会自动把用户原先设定的信道强制更改为我们频率表上的 A1 信道上（5865Mhz），即用户只能用 OSD 调参配置支持的 40 个信道。

配置完分组和信道后要进入 SET 项，选择 YSE 后才能生效（如图 8）。

In the menu of Fig. 5, the desired frequency group BAND and channel CHAN are selected by flipping the ROLL joystick left and right.

**Note:** Since VTX1 supports 48 channels, the user can select any of the 48 channels by pressing the button. However, Betaflight's OSD assistant function currently only supports 40 channels, so users can only configure 40 channels supported on the OSD screen.

If the user selects one of the 8 channels that the OSD assistant does not support by button, and enters the OSD assistant, the system will automatically change the channel originally set by the user to the A1 channel on our frequency table (5865Mhz). ), that is, the user can only use the 40 channels supported by the OSD configuration.

After configuring the group and channel, you must enter the SET item and select YSE to take effect (Figure 8).

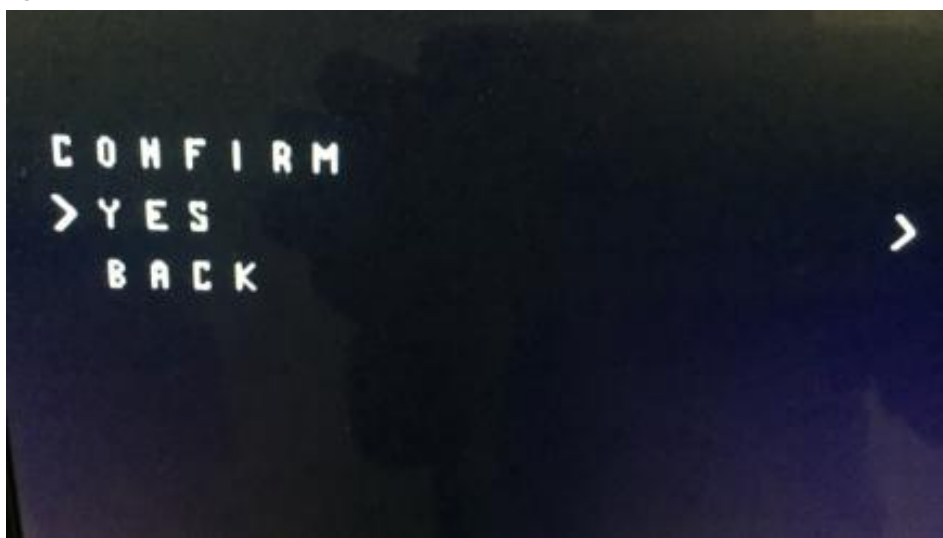


图 8 分组和信道配置确认生效

Figure 8 Group and channel configuration confirmation takes effect

### 3、输出功率配置 Output power configuration

同上节一样，通过遥控选择可以进入 POWER 项，选择需要的发射功率（如图 7）。VTX1 目前仅支持 25mW 功率选项，而 OSD 调参的 POWER 菜单中有 25mW、200mW、500mW、800mW 四种选项。因此，用户需要注意在选择时，200mW、500mW、800mW 的选项均将

VTX1 设置为 25mW 的发射功率。

注意：和配置 BAND 和 CHAN 不同，POWER 的设置不用进入 SET 项确认，即时生效。

As in the previous section, you can enter the POWER item by remote control and select the required transmit power (Figure 7). The VTX1 currently only supports 25mW power options, while the OSD tuning POWER menu has 25mW, 200mW, 500mW, and 800mW options. Therefore, users need to pay attention to the options of 200mW, 500mW, and 800mW to set VTX1 to 25mW transmit power.

**Note: Unlike the configuration BAND and CHAN, the POWER setting does not need to enter the SET item to confirm, and it takes effect immediately.**

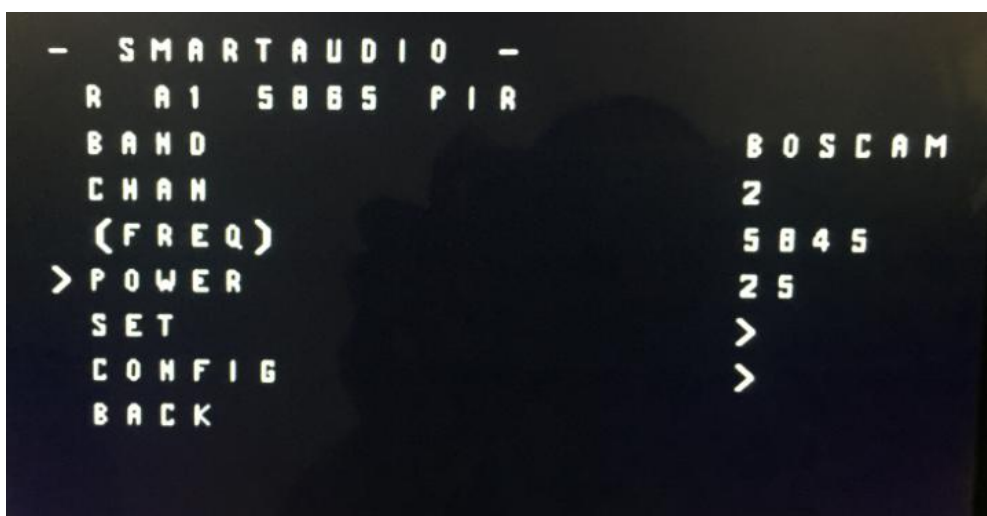


图 7 发射功率选择

Figure 7 Transmit power selection

### 1、信道号指示 Channel Number Indication

LED 灯显示设定的分组和信道，对应的工作频率见下表：

The LED lights show the set Group and channels. The corresponding operating frequencies are shown in the following table:

BAND	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
A (BOSCAM)	5865M	5845M	5825M	5805 M	5785 M	5765 M	5745 M	5725 M
b (BOSCAM)	5733 M	5752 M	5771 M	5790 M	5809 M	5828 M	5847 M	5866 M
C (BOSCAM)	5705 M	5685 M	5665 M	5645 M	5885 M	5905 M	5925 M	5945 M
d (FATSHAR)	5740 M	5760 M	5780 M	5800 M	5820 M	5840 M	5860 M	5880 M
E (RACEBAN)	5658 M	5695 M	5732 M	5769 M	5806 M	5843 M	5880 M	5917 M
<i>F</i>	<i>5362M</i>	<i>5399M</i>	<i>5436M</i>	<i>5473M</i>	<i>5510M</i>	<i>5547M</i>	<i>5584M</i>	<i>5621M</i>

注：斜体部分的 F 组信道，Betaflight OSD 配置暂不支持。

Note: The F group channel in the italic part, Betaflight OSD configuration is not supported at this time.