

# SKYLINE32 Instruction Manual v1.2

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## Feature

- Dimensions : SKYline32(35mm×35mm×5mm ) ( 1378mil×1378mil×197mil ) , SKYline32 MINI(30mm×16mm×7.5mm) ( 1181mil×630mil×295mil)
- Weight: SKYline32 ( Acro 4.8g, Advanced 5.4g ) ( Acro 0.169oz, Advanced 0.190oz ) , SKYline32 MINI ( Acro 2.5g, Advanced 2.6g ) ( Acro 0.088oz, Advanced 0.092oz ) 。 ( Wires are not included ) 。
- 32-bit ARM micro processor running at 3.3V/72MHz.
- With gyro, Magnetometer, and space reserved for Barometer and outer flash(used for recording data)  
**Note: Outer flash space only for SKYline32 Acro version**
- Support Manual mode(not select any flight mode), Angle mode ( Angle ) , Horizon mode ( Horizon ) , Heading hold mode ( Headadj ) , Head-free mode ( Headfree ) , Altitude hold flight mode ( Baro ).  
**Note: Altitude hold flight mode ( Baro ) only for SKYline32 Advanced & Mini advanced version**
- Support Quad-, Tri-, Hex-, Octo-, various multirotors
- Support RC input - Standard, CPPM (PPM Sum),and Spektrum.,etc.
- Battery voltage monitoring and low voltage alarm. **Note: SKYLINE32 MINI version without this function**
- Built-in FrSky telemetry converter  
**Note: SKYLINE32 MINI version without this function**
- Support OSD module input. **Note: SKYLINE32 MINI version without this function**
- Support OLED input **Note: SKYLINE32 MINI version without this function**
- Onboard Micro-USB for setup and configuration.

13. Cleanflight configuration and Baseflight configuration GUI

14. GPS position hold / return to home

**Note:** SKYLINE32 hardware is compatible with NAZE32 firmware, including Baseflight and Cleanflight. Below are the links to the source codes:

<https://github.com/cleanflight/cleanflight>

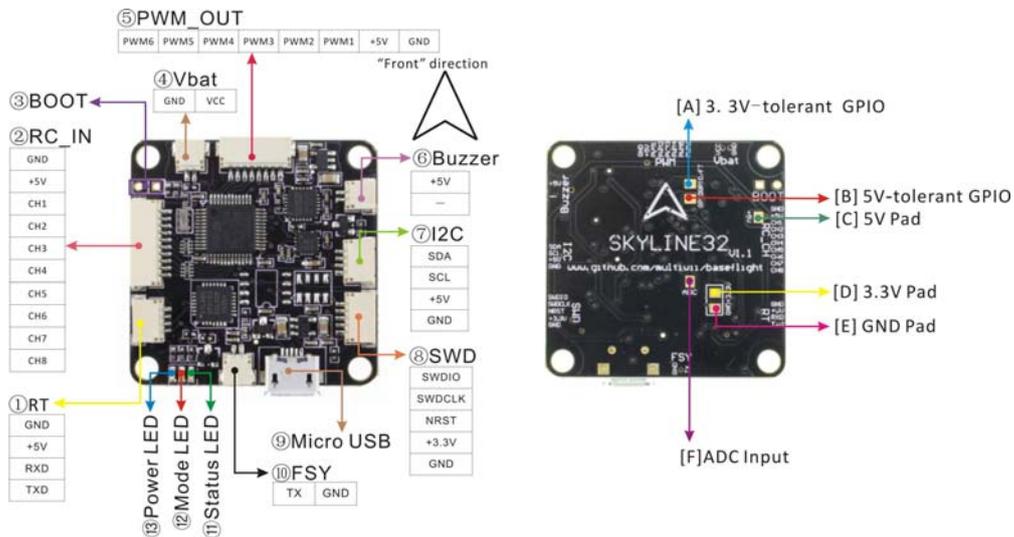
<https://github.com/multiwii/baseflight>

SKYLINE32 is loaded with Cleanflight-Configurator. The Cleanflight-Configurator GUI must be downloaded from the Chrome Extension store. Baseflight is another firmware option and requires the Baseflight GUI, also available from the Chrome Extension Store. This manual will introduce basic instruction for these parameter adjusting software. For more, kindly check "<http://yinyanmodel.com/En/DownView.asp?ID=40>"

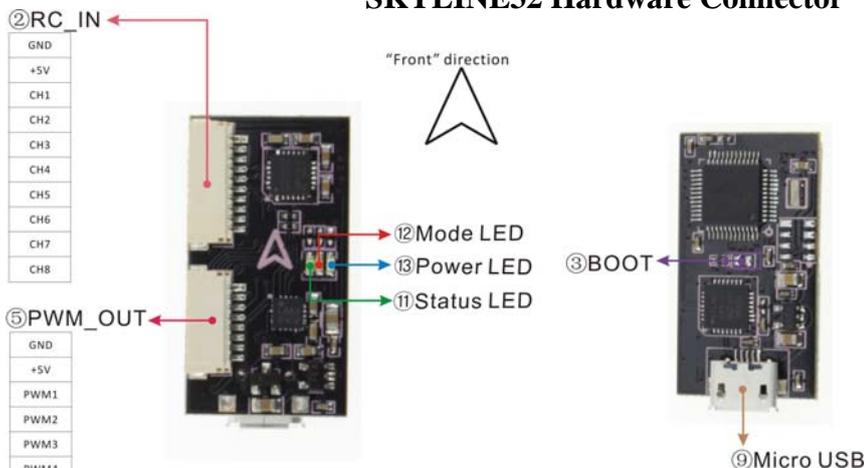
Note: with firmware and configuration based on "MultiWii" software, the processor used is not Atmel AVR, and can not be compiled via Arduino or other AVR tools. Below is some information about STM32 development:

<http://code.google.com/p/afrodevices/wiki/STM32Development>

## Hardware And Connection



### SKYLINE32 Hardware Connector



### SKYLINE32 Mini Hardware Connector

① Serial communication connector. Used for external serial communication, such as OSD module with serial communication.

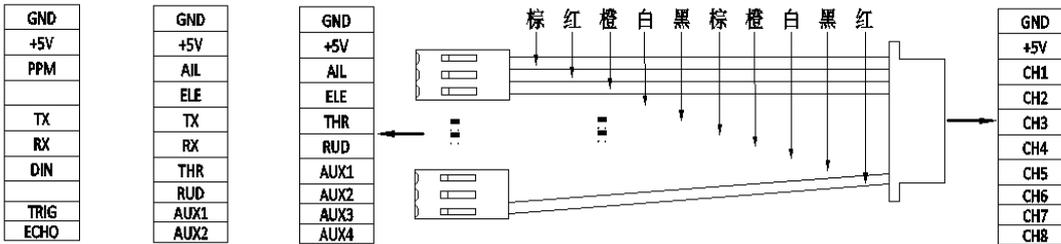
②RC Input (PWM/CPPM) / Servo Output / GPS connector.

Default pins order is (from top to bottom): GND, +5V, CH1-CH8. CH1-CH8 for channels: AIL, ELE, THR, RUD, AUX1...AUX4.

PPM                  GPS                  Standard  
 Connection      Connection      Connection

10Pin Wire

RC\_IN



When GPS feature is enabled, CH3 and CH4 are used for GPS connection.(CH3:TX, CH4:RX). When using CPPM receiver, these are normally unused, with standard receiver, connect AIL to 1, ELE to CH2, THR to CH5, RUD to CH6, and AUX1/2 to CH7 and CH8.

When using CPPM receiver, CH5 to CH8 can also be used as motor or servo outputs, depending on **airframe** type and configuration.

③Bootloader pads: **\*\*\*ONLY USE IF GUI CAN NOT CONNECT TO SKYLINE32. This is not required for normal firmware updates.** When upgrading firmware, use a forcep to short pads together and power SKYLINE32 on by USB cable. After power LED indicator turns blue, then remove the short. Firmware updated tool can then be used to reload firmware.

Download source: <http://yinyanmodel.com/En/DownView.asp?ID=39>

④Battery Voltage Monitor: connect this header to battery or power distribution board to enable battery voltage monitoring. Supports Up to 6S LiPo battery. .

**Warning:** No reverse polarity protection - connecting battery in reverse will instantly destroy the hardware.

**Note: MINI version without this connector**

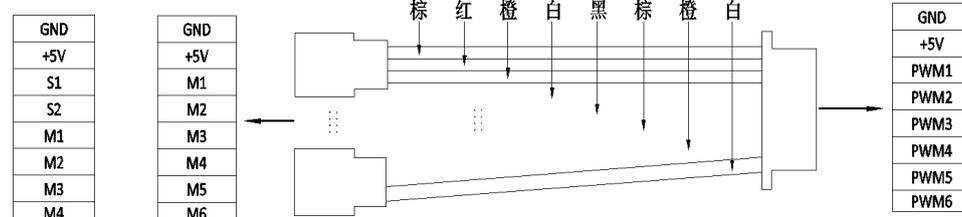


⑤ESC / Servo Headers: From right to left: GND, +5V, PWM1- PWM6. Standard mode: PWM1-PWM6 for ESC input M1-M6; Servo mode: PWM1-PWM6 for servo input S1, S2 and ESC input M1-M4.

Servo Mode      Standard Mode

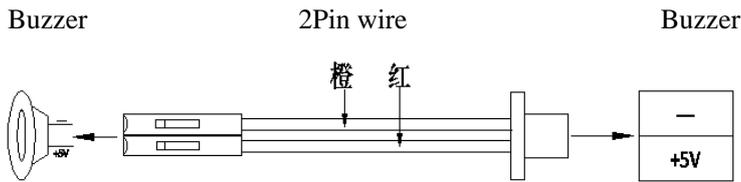
8Pin wire

PWM\_Out



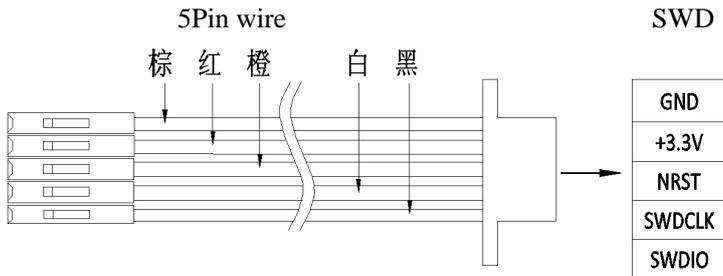
⑥Buzzer: connect a buzzer here while battery voltage monitor is enabled, buzzer used for a low voltage alarm.

Setting battery voltage in Configuration of Parameter adjustment, kindly refer to <http://yinyanmodel.com/En/DownView.asp?ID=40>” **Note: MINI version without this connector.**



⑦ I2C Connector: Used for outer I2C communication equipment, such as OLED module. **Note: MINI version without this connector.**

⑧ SWD port: for software modification during software development period. **Note: MINI version without this connector.**



⑨ Micro-USB port: For firmware upgrade and configuration.

⑩ FSY connector: FrSky output, Connect this connector with transmit and ground from FrSky receiver telemetry port (wire usually included with receiver, such as X4R and DR4II.)

**Note: MINI version without this connector.**

⑪ Status LED (Green)。

⑫ Mode LED (Red): The LED will be on for the corresponding mode chosen.

⑬ Power LED (Blue): LED on when the board is power on.

[A] Withstand voltage 3.3V GPIO port, This pad connected with the STM32 PB5 pin. Can not be connected to 5V voltage, otherwise it will burn the parts **Note: MINI version without such pads.**

[B] Withstand voltage 5V GPIO port, this pad connected with the STM32 PB5. Can be connected to 5V IO port. **Note: MINI version without such pads.**

[C] 5V extended pad, this pad used for RC input & ESC connector, convenient for supply power for other 5v parts **Note: MINI version without such pads.**

[D] 3.3V extended pad. It offer power supply for other low voltage parts, such as spectrum, satellite RC or bluetooth module, etc. **Note: MINI version without such pads.**

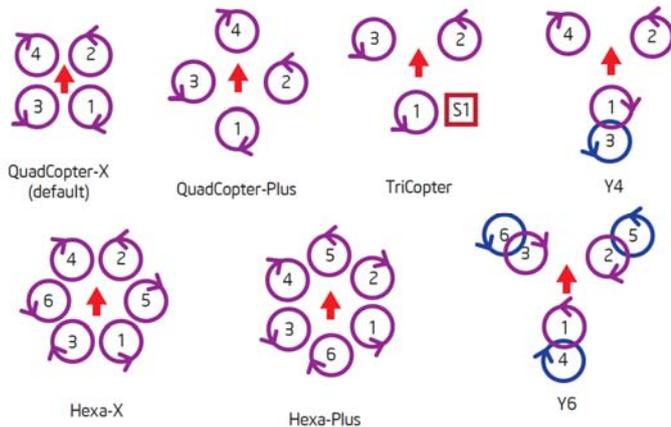
[E] Ground pad. when use 5V and 3.3V extended power for out parts, the out parts could occupy same space with flight controller.

**Note: MINI version without such pads.**

[F] 3.3V ADC input pad, it is connected with PA5 of STM32 (ADC12\_IN5) **Note: This pad with 3.3V, 5V couldn't be connected. MINI version without such pads. Note: Right connection, avoid parts damage.**

# Motor Connection

Figures below show motor position and rotation:



In the above figure, the front of red arrow points to the head of the multirotor. The arrows in the small circles point to the direction of motor rotation. Motor numbers are marked inside the circles and S1 stands for servo. Purple motors are top, and blue circle are bottom.

**Note: Configurations with more than 6 motors require CPPM receiver.**

## Aircraft assembly

Please install flight controller and ESC on your aircraft. Please refer to the instructions above for proper connection of the SKYLINE32 to the ESC's and receiver. Anti shock, anti-vibration mounting is recommended, preferably with soft double-sided adhesive to increase the damping effect. Avoid vibration of gyro, to increase flight stability.

## Parameter Adjustment Installation

### 1. Program driver installation:

Please install the driver program to your computer if you do not have it already.

(1) Please choose the compatible driver for your computer, link

<http://www.silabs.com/products/mcu/pages/usbtouartbridgevcpdrivers.aspx>

(2) Install the driver program on your computer.

(3) Please switch the ESC switch to ON

(4) Connect flight controller to computer with Micro USB cable

(5) Follow steps to install the driver.

### 2. Install Configuration Software

(1) Please install Google chrome web browser.

(2) Open Google Chrome web browser, go to "Chrome Web Store" and search BaseFlight - Configurator.

(3) Add " BaseFlight - Configurator" App.

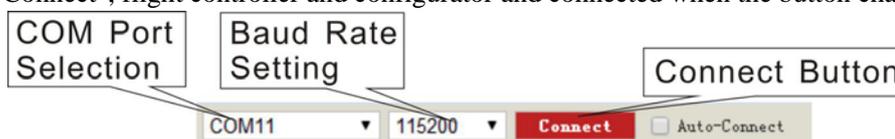
Note: Installing Cleanflight Configurator is similar to Baseflight Configurator, we will not discuss it in this manual

# Parameter adjustment

## Cleanflight-Configurator Parameter adjustment

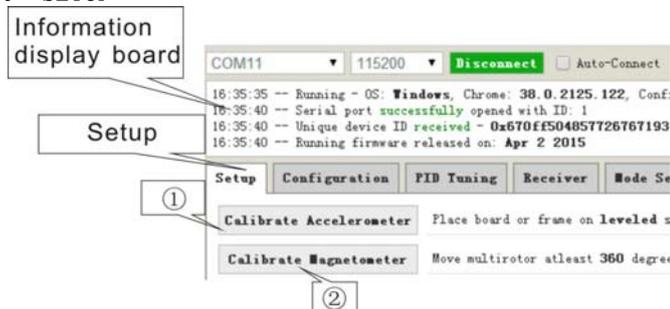
### 1. Parameter adjustment and FC connection

- (1) Connect flight controller to computer with Micro USB cable.
- (2) In Cleanflight Configurator App, select the COM port that displays when you connect the Skyline 32.  
Baud Rate should be 115200
- (3) Click "Connect", flight controller and configurator and connected when the button change to green.



### 2. Acc & Compass calibration

Please select "SETUP"



#### ① Calibrate Accelerometer

(1) Calibrate Accelerometer: Place board or frame on a level surface, then select "Calibrate Accelerometer". Once the accelerometer calibration is complete, data will be save automatically. Note: Starting or ending accelerometer calibration will be show in the message display. (Make sure not to move the board or frame during calibration).

#### ② Calibrate Magnetometer

(2) Calibrate Magnetometer: Select "Calibrate Magnetometer", make sure to rotate the board or frame 360 degree in all axis within 30sec (rotate axis included: Roll axis, pitch axis and yaw axis). Note: Starting or ending magnetometer calibration will be show in the message display.

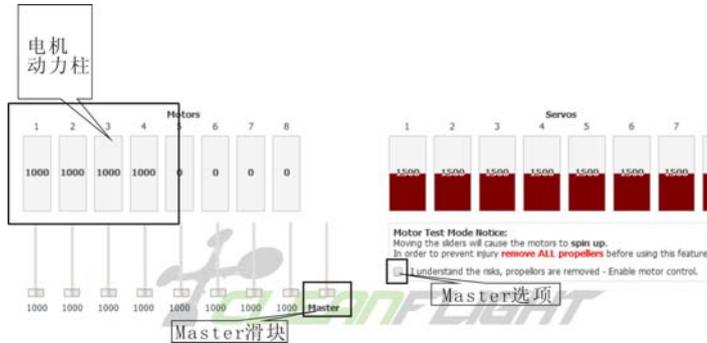
### 3. ESC Calibration

**Please make sure to REMOVE PROPELLERS before perform ESC Calibration!**

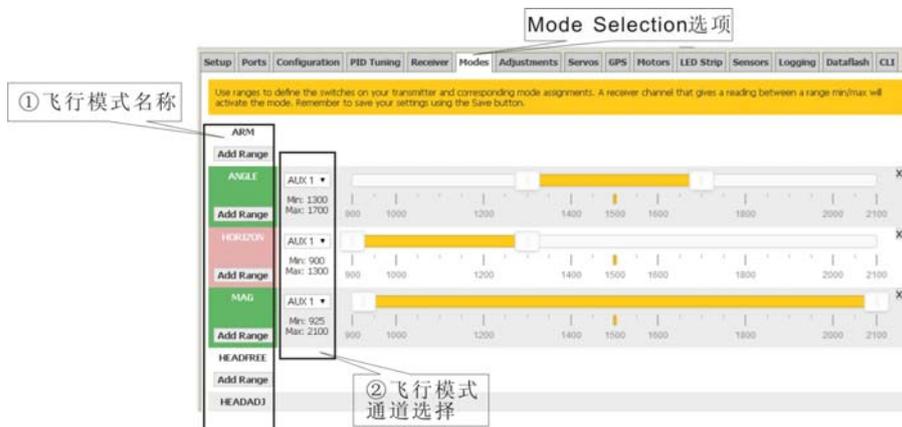
- (1) Please select "Configuration", change Maximum Throttle to 2000 and save
- (2) Please select "Motor Testing"
  - ① Please check the box for Motor Test

② Move the “Master” slider to MAXIMUM

Apply power to your ship so that all ESC’s are powered. When your ESC’s play their initial tune, move throttle “Master” quickly to the bottom. You will then hear a confirmation tune. When the tune ends the ESC calibration is completed. If an ESC continues to beep, unplug the power and start over.



## 4. Select Mode



Switching interface into Mode selection.

① Modes: ARM, ANGLE, HORIZON, MAG, HEADFREE, etc. To add a mode click “Add Range” and then assign channel. AUX1 is channel 6 and AUX2 is channel 7.

② Channel Select for Modes.

Click “Add Range” button under any mode to add flight mode. Then select a channel in the drop-down box as channel for that mode. Then check the box and save the setting by click “SAVE” at right bottom corner. If the corresponding flight mode of selected channel is active. Then when switching to the channels, flight Modes Options screen will be highlighted green. Other will highlighted red on the screen. Red LED also indicates whether the it is active or not (red light means that the selected flight mode is not active). Some models will be based on hardware sensors access situation to decide whether to display. For example, with hardware without a barometer module, Altitude hold will not be available. Some modes need to be selected at the same time to function correctly.

## 5. Receiver Calibration

1. \*\*\*Please remove ALL propellers for these steps.

2 Go to the Receiver tab. Connect power to the flight controller and power on your RC transmitter.

Check to see the proper bar moves when your RC transmitter stick is moved. If the wrong bar moves, select a different option in the “Channel Mapping” drop down box. Once you have the controls selected properly, make sure they move in the proper direction. Throttle at the bottom should indicate 1000, and throttle max should be 2000. When the rudder stick is left, the scale should show 1000. If these are reversed, reverse the channel in your radio and check again. Also check the range. When the control sticks on your transmitter are moved, they should go from 1000–2000. If there are within 10 that is okay, anything more then that you will need to adjust your endpoints on your radio.

Also on the receiver tab is Pitch, Roll, and Yaw Rate. These set how responsive the ship is. For a very tame ship set at .25 for all three. For more aggressive try pitch and roll at .56 and yaw at .36. Test fly and then adjust according to your preference.

Now, the basic set of flight control has been completed, you can fly now.

## Baseflight-Configurator Introduction

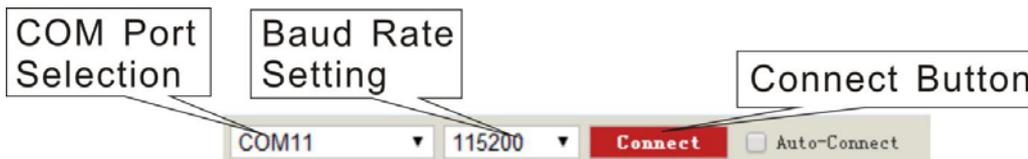
### 1. Flight Controller and Configurator

(1) Connect flight controller to computer with Micro USB cable, 飞控蓝色电源灯点亮, 同时飞控系统开始自检。Self test as bellows:

Red green led flashes fast→red led flashes fast→green led off→red led off,green led then flashes a few times then off (if at this time the red light is constantly green after it is off , indicating some kind of flight mode has been selected and valid)→ self check completed

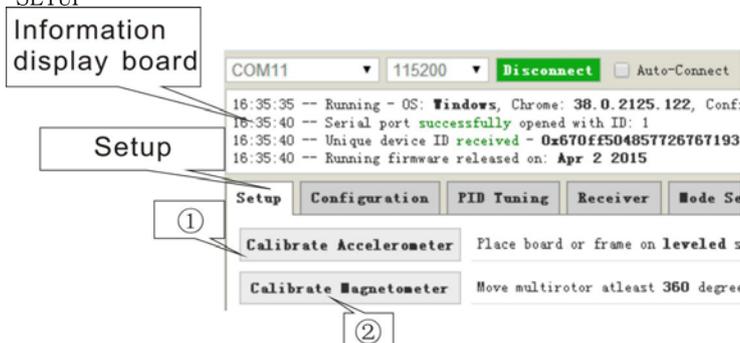
(2) In Baseflight Configurator App, select COM port and Baud Rate

(3) Click "Connect", flight controller and configurator ID and connected when the button change to green.



### 2. Accelerometer and Magnetometer Calibration

Please select "SETUP"



① Calibrate Accelerometer

(1) Calibrate Accelerometer: Place board or frame on leveled surface, then select "Calibrate Accelerometer". Once the accelerometer calibration is complete, data will be saved automatically. Note: Starting or ending accelerometer calibration will be shown in the message display. (Make sure not to move the board or frame during calibration).

② Calibrate Magnetometer

(2) Calibrate Magnetometer: Select "Calibrate Magnetometer", make sure to rotate the board or frame 360 degrees in all axes within 30 seconds (rotate axes included: Roll axis, pitch axis and yaw axis). Note: Starting or ending magnetometer calibration will be shown in the message display.

### 3. ESC Calibration

Please make sure to REMOVE PROPELLERS before performing ESC Calibration!

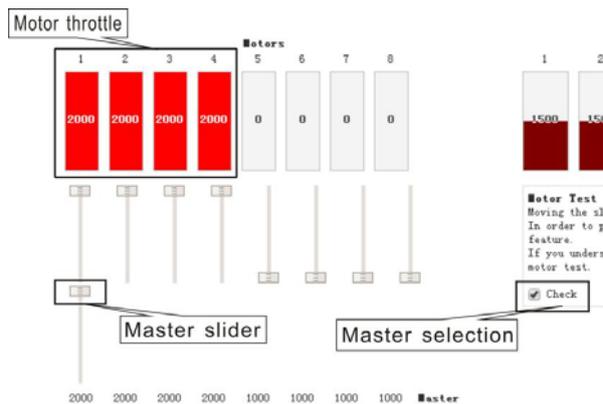
(1) Please select "Configuration", change Maximum Throttle to 2000 and save

(2) Please select "Motor Testing"

① Please check the box for Motor Test

② Move the "Master" slider to MAXIMUM

Apply power to your ship so that all ESCs are powered. When your ESCs play their initial tune, move throttle "Master" quickly to the bottom. You will then hear a confirmation tune. When the tune ends, the ESC calibration is completed. If an ESC continues to beep, unplug the power and start over.



### 4. Mode Selections

① Flight Mode

Mode Selection

② AUX Channel Select for Modes

Name	AUX 1			AUX 2			AUX 3			AUX 4		
	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
ARM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ANGLE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HORIZON	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MAG	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>								
HEADFREE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HEADADJ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BEEPER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OSD SW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AVTITUDE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(1) Please select "Mode Selection"

① Modes: ARM, ANGLE, HORIZON, MAG, HEADFREE, HEADADJ, BEEPER, OSD SW, etc... Some modes will not appear unless a sensor is connected. Ex: If a barometer is not connected to the flight controller, the altitude mode will not display in the list.

②AUX Channel Select for Modes.

(2) AUX Channel for Modes: Select desired AUX channel for mode, then check the box and save the setting by click the "SAVE" at right bottom corner. When the mode is selected and the switch is activated selected mode name will highlight green. Non selected modes will highlight red on the screen. Some modes need to be selected at the same time to function correctly.

## 5. Receiver Calibration

1.\*\*\*Please remove ALL propellers for these steps.

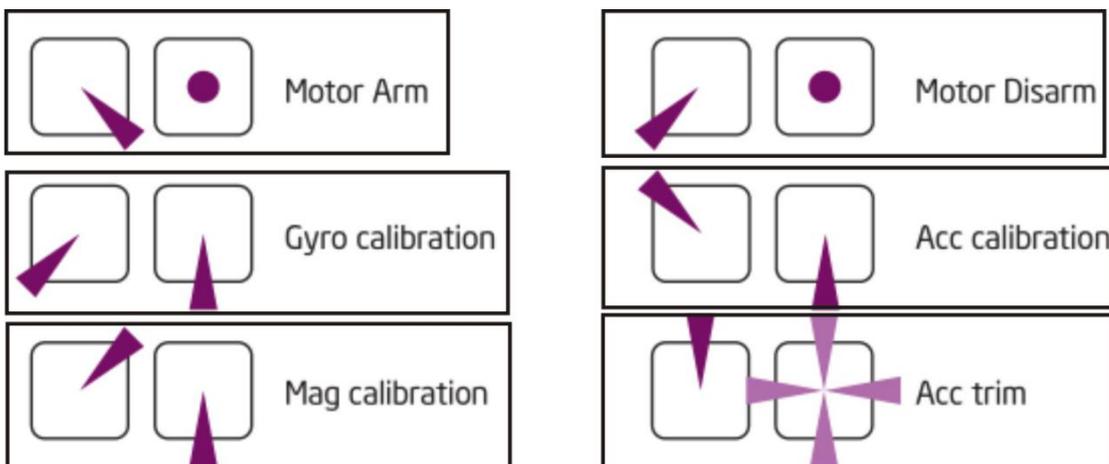
2 Go to the Receiver tab. Connect power to the flight controller and power on your RC transmitter. Check to see the proper bar moves when your RC transmitter stick is moved. If the wrong bar moves, select a different option in the "Channel Mapping" drop down box. Once you have the controls selected properly, make sure they move in the proper direction. Throttle at the bottom should indicate 1000, and throttle max should be 2000. When the rudder stick is left, the scale should show 1000. If these are reversed, reverse the channel in your radio and check again. Also check the range. When the control sticks on your transmitter are moved, they should go from 1000-2000. If there are within 10 that is okay, anything more then that you will need to adjust your endpoints on your radio.

Also on the receiver tab is Pitch, Roll, and Yaw Rate. These set how responsive the ship is. For a very tame ship set .25 for all three. For more aggressive try pitch and roll at .56 and yaw at .36. Test fly and then adjust according to your preference.

Now, the basic set of flight control has been completed, you can fly now.

## Transmitter Joystick Command (Mode 2 transmitter as example below)

The below chart is stick order of left hand throttle transmitter



If using right hand transmitter, move the stick to the bottom when disarm it, and then move the Yaw axis (direction axis) to max. Move the stick to bottom before locking, then move the Yaw axis to minimum.

# Firmware update

For introduction of firmware update, kindly check <http://yinyanmodel.com/En/DownView.asp?ID=39>

## Troubleshooting

1. Roll and pitch drifting
  - Recalibrate Acc
  - Using Acc Trim stick
2. Course shift
  - Recalibrate ESC
  - Calibrate compass (mag) .
  - Selecting MAG flight mode.