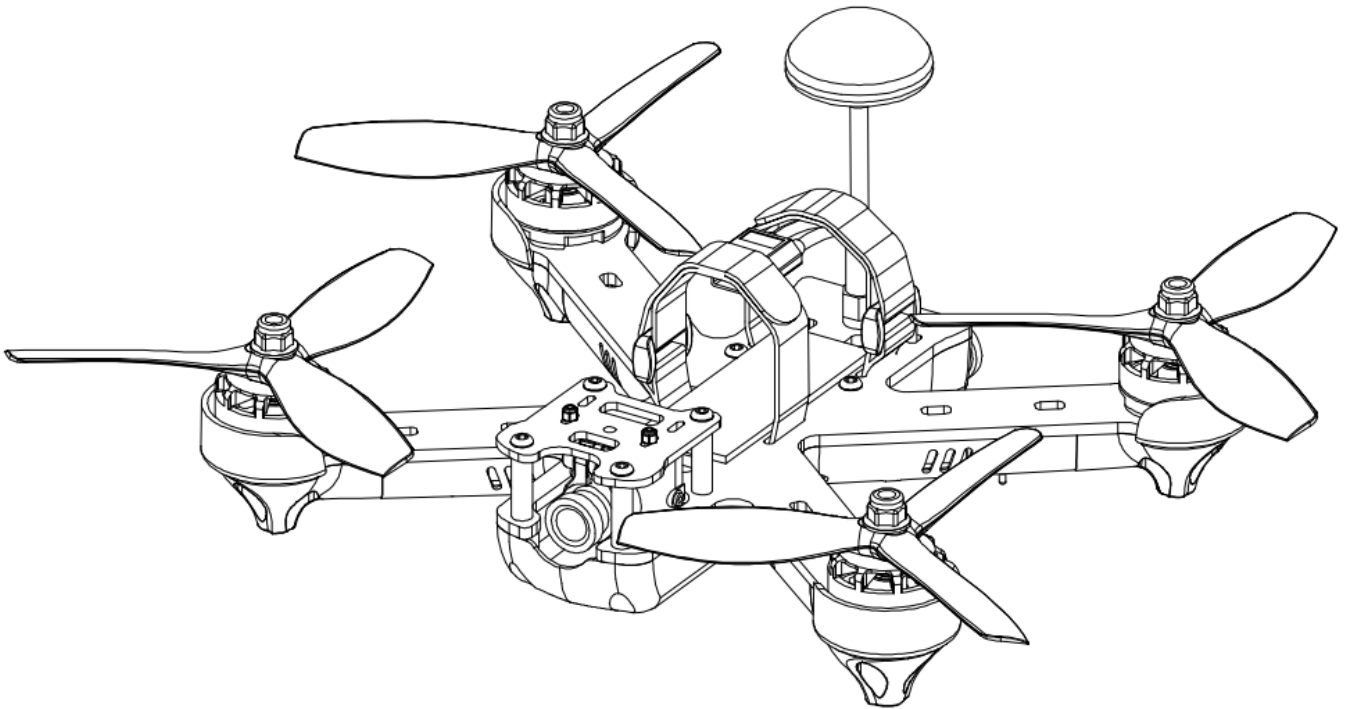# NIGHTHAWK PRO 200

# Instruction Manual V1.0

Thanks for purchasing the Nighthawk Pro 200. Please follow the instruction manual to install and configure your Nighthawk Pro 200.

After completing the instruction manual, use the configurator GUI to configure flight controller settings for the Nighthawk Pro 200. Please refer to this link to learn more: "http://yinyanmodel.com/en/DownList.asp"

# Index

# Disclaimer

**Please read the disclaimer carefully before using this product. By using this product, you hereby agree to this disclaimer and signify that you have read them carefully and completely. This product is not suitable for people under the age of 18. Adult supervision is highly recommended for kids under the age of 18.**

    Our Nighthawk Pro 200 features open-source flight controller and Electronic Speed Controllers to satisfy the FPV enthusiasts' need to update/upgrade their software and hardware.

    Please read the instruction manual and warnings carefully. Before every flight, make sure the battery is fully charged and power connections are secure. DO NOT fly around crowds, children, animals or objects. EMAX ACCEPTS NO LIABILITY FOR DAMAGE(S) OR INJURIES INCURRED DIRECTLY OR INDIRECTLY FROM THE USE OF THIS PRODUCT.

# ⚠️ **Warnings**

1. Please follow the instruction manual to install software and operate Nighthawk Pro 200.

2. DO NOT use Nighthawk Pro 200 while drunk, under influence of drugs, feeling dizziness, fatigue, nausea and/or any other conditions that may impair your ability to safely operate the product.

3. Must fly in safe zones (Area larger than 2500 square meters and away from locations of high air traffic).

4. DO NOT modify or overload the system with inappropriate parts or accessories.

5. DO NOT fly during severe weather conditions (This includes wind speeds exceeding 10m/s, snow, rain, thunder/lightning, and fog)

6. DO NOT fly in high-electromagnetic environments.

# Certifications

Nighthawk Pro 200 has been certified by CE, RoHs.

# Features Highlight

Nighthawk Pro 200 PNP Quadcopter, installed with the latest in drone racing technology, allows new pilots in the hobby to progressively fly like the professionals. The Nighthawk Pro 200 features a great price, amazing value, and technology compared to competitor's products.

- Race ready motors right out of the box. The RS2205 motors are the Champion's choice for competition. Now you can get the best!
- Modular design with the ability to switch out main components without having to solder to small connectors.
- Full LED coverage to help gauge orientation in the brightest of days and darkest of nights.
- Easy access port to switch off motor mount LED's
- Plastic molded motor guards and bottom shell for increased durability and protection of electronics in the event of a crash.
- High quality 3k Carbon fiber mainframe for maximum structural integrity.
- CCD Camera for high quality image through FPV.
- Adjustable for different lighting conditions.
- 25-600mw switchable Video Transmitter with 48 Channels of frequency.
- Digital LED display for easy view of current channel setting.
- Integrated Power Distribution Board (PDB) to supply regulated power for all electronic components.
- 2mm Socket Button Head Screws are standard.
- Adjustable camera mount to suit faster (high camera angle) or more stable (low camera angle) flights.
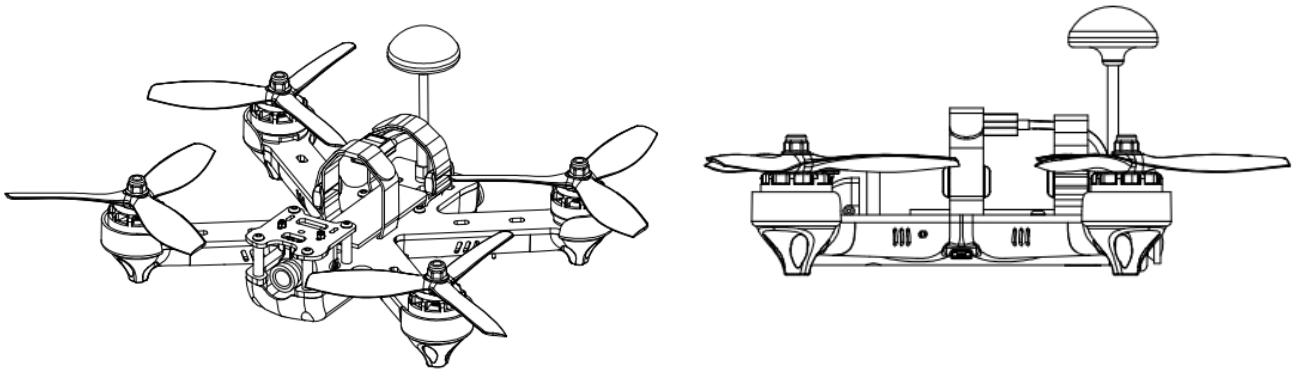- Top cover to accommodate an HD camera.

# Specifications

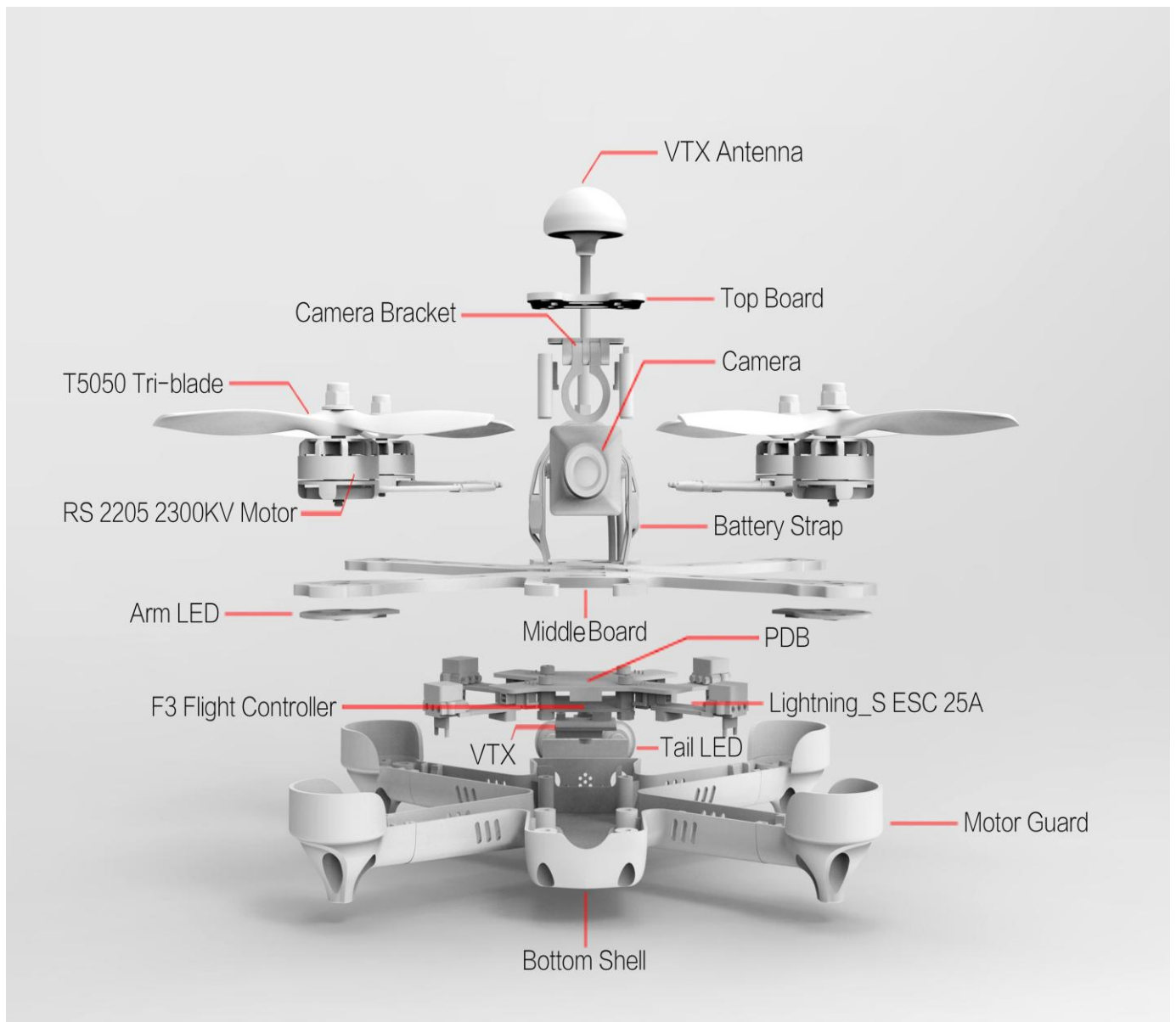| Size & Weight ＼ Model | PNP/RTF |
|---|---|
| Wheelbase（L x W x H）<br>( Not including propeller) | 200mm |
| Package（L x W x H） | 260mm x 185mm x 65mm |
| Nighthawk Pro 200（L x W x H） | 207mm x 165mm x 43mm (Not including antenna) |
| Camera | CCD 600TVL |
| Propeller | T5050 Tri-Blade Propeller |
| Flight controller | SP Racing F3 ACRO |
| Motor | RS2205 2300KV CW THREAD |
| ESC | Lightning_S 25A (BLHeli_S) |
| Flight weight (g) | 370g    (Not including battery) |

# Included In the Box

1. User Manual x 1
2. Nighthawk Pro 200 x 1
3. Cloverleaf Video Transmitter Antenna x 1
4. T5050 Tri-Blade Propeller x 4 (2CW & 2CCW)

# Overall View



# Explode View



VTX Antenna

Camera Bracket

Top Board

Camera

T5050 Tri-blade

RS 2205 2300KV Motor

Battery Strap

Arm LED

Middle Board

PDB

F3 Flight Controller

Lightning_S ESC 25A

VTX

Tail LED

Motor Guard

Bottom Shell

# Required Tools and Equipment

1. Computer or Laptop
2. Monitor with Video Receiver and/or Goggles.
3. Radio Transmitter (PNP MODEL ONLY)
4. 1.5MM, 2.0MM, 2.5MM hex driver, tweezers, needle nose pliers, scissors.
5. LiPo Battery with XT60 connector (Suggested battery size: 85*40*60mm，3S-4S)

# Installation Steps

## Step 1: Preparation

Remove the Nighthawk Pro 200 from the package and place it on a leveled, horizontal place (like a table). Using a Micro USB cable, connect the Nighthawk Pro 200 to the Computer.

## Step 2: Driver and Configuration Software Installation

### 1. Driver Installation

Please install the Driver to your computer. If you already have the proper Driver installed, continue on to Step 2.
（1） Please choose the compatible driver for your computer. Link to Driver:
**http://url.cn/7SnpKh**
（2） Install the Driver onto your computer following the installation windows.
（3） Connect the flight controller to the computer using a Micro USB cable.
（4） Follow steps to complete installing the driver

### 2. Configuration Software Installation

（1）Please install Google Chrome Web Browser.
（2）Open Google Chrome Web Browser and go to "Chrome Web Store" and search for "Betaflight - Configurator."
（3）Add " Betaflight - Configurator" App.

Note: Follow the same procedure described above to install Cleanflight - or Baseflight - Configurators.

## Step 3: How to use Betaflight - Configurator

Only "Betaflight - Configurator" will be discussed below. If customers use Baseflight or Cleanflight firmwares, please download Baseflight or Cleanflight - Configurator to configure your controller.

# 1. Flight Controller and Configurator

（1）Please supply power to the Nighthawk Pro 200 using a 3S or 4S LiPo Battery.

（2）Connect the flight controller to the computer using a Micro USB cable. A BLUE LED will light on the flight controller indicating initial setup and self checking. (Please refer to Appendix - Self checking light status)

（3）In Betaflight - Configurator App, select your COM port and Baud Rate (keep at default of 115200).

（4）Click "Connect". A GREEN LED will light on the flight controller indicating a successful connection between it and the configurator.
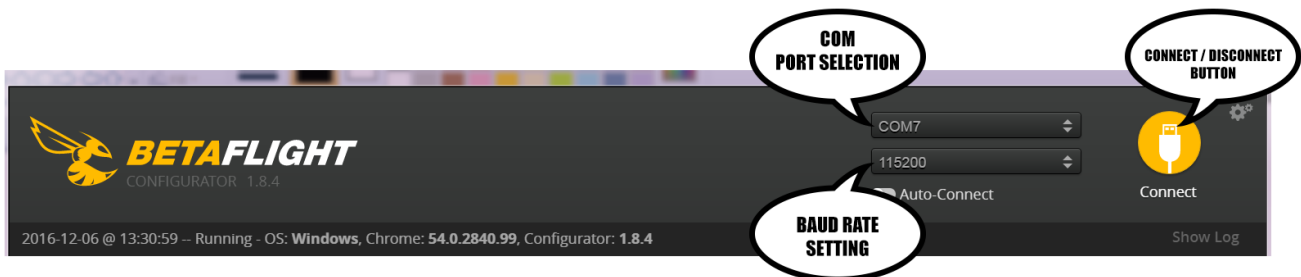


# 2. Flight Controller Setting (Basic)

# Accelerometer and Magnetometer Calibration

Please select "SETUP"
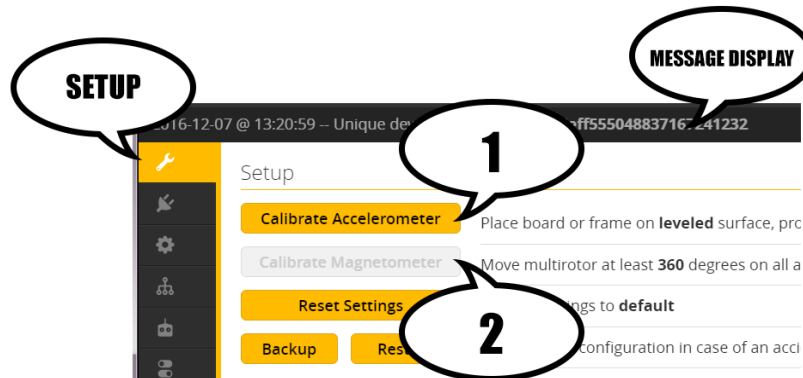


①Calibrate Accelerometer

②Calibrate Magnetometer (If Supported)

（1）**Calibrate Accelerometer:** Place the Nighthawk Pro 200 on a leveled surface, then select "Calibrate Accelerometer." Once the accelerometer calibration is complete, date will be saved automatically. Note: Starting or ending accelerometer calibration will be shown in the "Message Display." (Make sure not to move the Nighthawk Pro 200 during calibration)

（2）**Calibrate Magnetometer:** Select "Calibrate Magnetometer." Make sure to rotate the Nighthawk Pro 200 360 degree in all axis within 30sec (Axis include: Roll axis, pitch axis and yaw axis). Note: Starting or ending magnetometer calibration will be shown in the "Message Display."

# 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**" Tab

　　①Please check the box for "Motor Test Mode"

　　②Move the "Master Slider" to MAXIMUM

（3）Power the unit using a 3S or 4S LiPo. After plug-in the MAXIMUM throttle confirmation will sound, move the "Master Slider" to minimum and wait for the MINIMUM throttle confirmation sound. After the minimum throttle confirmation sound, you will hear a final confirmation sound. **ESC calibration is complete.**
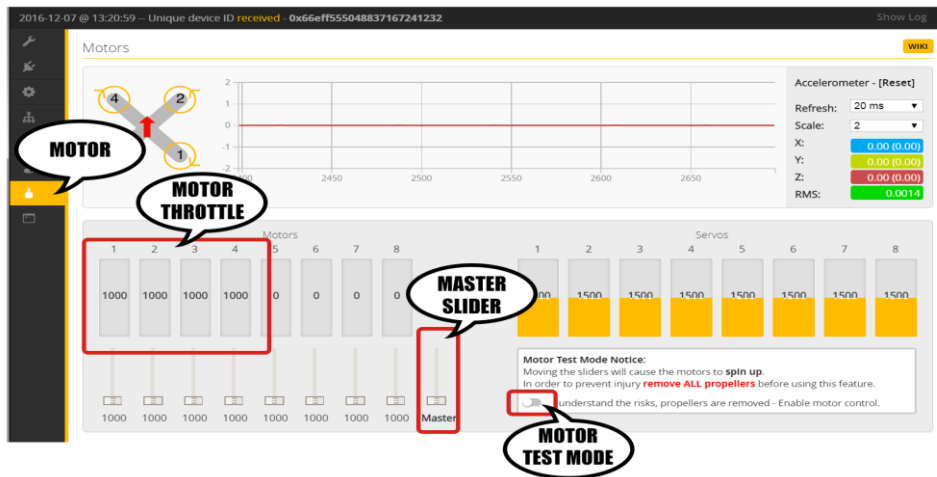


## MODE SELECTIONS
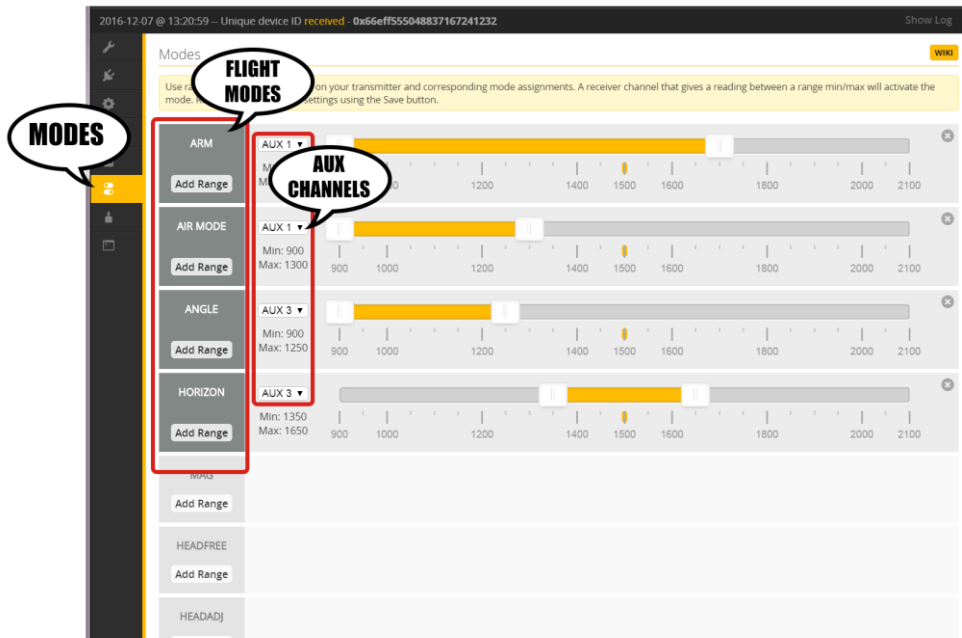


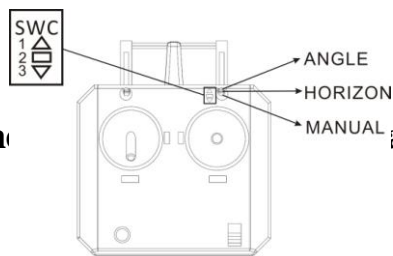（1）Please select "Modes"

　　①Flight Modes: ARM, ANGLE, HORIZON, MAG, HEADFREE, etc. If need to add another mode, please click "Add Range." When desired mode is selected, AUX Channel drop-down box will appear on the right.

　　②AUX Channel Select for Modes.

（2）AUX Channel for Modes: Click the "Add Range" button to add a Flight Mode. Select an available auxiliary

channel using the drop-down box on the right. You can use the slider to set a ppm range your auxiliary channel will operate. Check your settings you have made in modes and save them by clicking "SAVE" on the bottom-right corner. When a desired mode is selected by a switch on the AUX channel, selected mode name will be highlighted and yellow indicator will correspond with transmitted ppm value. (NOTE: Some modes need to be selected at the same time to function correctly. Some modes will only be shown when the corresponding sensors are connected or active, for example, the "Baro" mode will not appear if there is no barometer sensor connected or active.)

**RTF MODE SELECTION DIAGRAM (Does not apply to PNP)**

The radio in RTF version has a fail-safe function. SWC switch is the flight mode selection switch. SWC switched to position 1 is ANGLE. Position 2 is HORIZON and 3 is MANUAL. Please refer to the diagram below.



**Caution: We do not recommend avoid big current interference with the compass.**

**COPTER TESTING**

 **Please make sure to REMOVE PROPELLERS before performing test**

（1）Connect Radio Receiver and flight controller

（2）Please select "Raw Sensor Data"

（3）Rotate copter to check all sensor are correct (sensor data should change according to copter rotation)

（4）Please select "Motor Test Mode"

（5）Turn on Radio Transmitter

（6）Connect battery with XT60 connector to power on the copter.

（7）Use Radio Transmitter to arm motors, and the flight controller light indicators will turn green.

**Process to Arm and Disarm motors are shown below (Mode 2 Transmitter used as example)**

（8）Move throttle stick UP

（9）Use the transmitter sticks to control pitch, roll and yaw. Observe the Motor Throttle bars under "Motor" tab and confirm the output values correspond correctly to your input commands.

（10）Test motor direction: To determine the motor direction, use a piece of paper to rub on side of bell. Please be careful and confirm correct direction per motor. (Motor direction should be the same as the figure shown below)
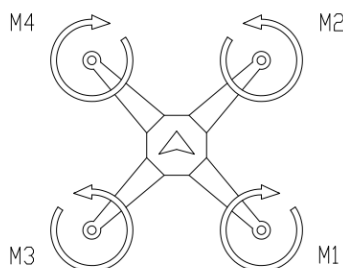


# Step 4: Installation

 *Caution:*

*TO PREVENT THE VIDEO TRANSMITTER FROM BURNING OUT, IT IS HIGHLY RECOMMENDED TO INSTALL THE VIDEO TRANSMITTER ANTENNA ONTO THE UNIT BEFORE PLUGGING IN THE MAIN BATTERY.*

## Video Transmitter

Video Transmitter channel button is located in the rear of the copter.

1) Long press 2S to enter BAND selection
2) Short press to select a BAND (ABCDHL). Long Press 2S to select and continue onto Frequency Channel selection.
3) Short press to select a Frequency Channel within the selected band. Long Press 2S to select and exit. (Note: Video Transmitter automatically times out and saves settings after Frequency Channel selection.

** 25mw/600mw VTx power switch is located on the side of the Video Transmitter. Toggling the switch towards the front end of the copter is 25mw. Toggling the switch towards the rear end of copter is 600mw. The default power output is 25mw.

| CH<br>FR | | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|---|---|---|---|---|---|---|---|---|---|
| FR | FR1(A) | 5865MHz | 5845MHz | 5825MHz | 5805MHz | 5785MHz | 5765MHz | 5745MHz | 5725MHz |
| | FR2(B) | 5733MHz | 5752MHz | 5771MHz | 5790MHz | 5809MHz | 5828MHz | 5847MHz | 5866MHz |
| | FR3(C) | 5705MHz | 5685MHz | 5665MHz | 5645MHz | 5885MHz | 5905MHz | 5925MHz | 5945MHz |
| | FR4(D) | 5740MHz | 5760MHz | 5780MHz | 5800MHz | 5820MHz | 5840MHz | 5860MHz | 5880MHz |
| | FR5(H) | 5658MHz | 5695MHz | 5732MHz | 5769MHz | 5806MHz | 5843MHz | 5880MHz | 5917MHz |
| | FR6(L) | 5362MHz | 5399MHz | 5436MHz | 5473MHz | 5510MHz | 5547MHz | 5584MHz | 5621MHz |

## Step 5: Test flight

After completion of initial setup and testing, It is finally time to take flight. Turn on the Radio Transmitter and connect a 3S-4S LiPo to the copter. Place the Nighthawk Pro 200 in the center of the test flight field (Safe flying zone). As soon as the Flight controller completes it's initial system startup and self checking, an LED will indicate solid blue when ready to Arm. **(Before arming motors, please make sure nothing is around the copter within 5m. (Please refer to Appendix - Self checking light status)

⚠ *Note:*

*Radio and Video transmission may be influenced by electromagnetism within your flight area. Please test the maximum range between your Radio and Video links before actual flight.*

# ESC Instruction

Nighthawk Pro 200 uses **EMAX Lightning_S 25A (BLHeli_S) ESCs**.

For more information, please visit "http://www.yinyanmodel.com/en/DownList.asp " to download manual.

# Flight Controller Instruction

Nighthawk Pro 200 flight controller is based on SP Racing F3 ACRO hardware.

For more information, please visit "http://www.yinyanmodel.com/en/DownList.asp" to download manual.

# Transmitter Joystick Command

Transmitter Joystick Commands (Mode 2 Transmitter used as example)
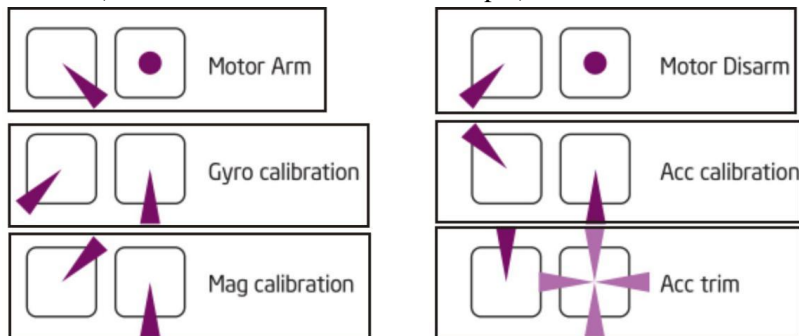


# General Troubleshoot

1    Flight Controller LED Indicators not lighting after connecting to a computer:

-Please check if the computer has the correct Driver installed

-Please check proper voltage is entering the flight controller and Micro USB is compatible

2    Copter LED flashes Green and motors do not arm:

-Please redo Accelerometer Calibration

3    Copter cannot lift off the ground:

-Please check Propeller direction

-Please check Battery voltage

4    Copter arms but one or more motors are not spinning:

-Please check connection between motor and ESC.

5    No Video feed on monitor or goggles:

-Please check Video Transmitter and Receiver connections

-Please check if proper video BAND and CHANNEL are selected

6    RGB Lights are not on:

-Please check LED light power switch is turned ON

-Please check for secure power/signal connections

7    Copter drifts in the Roll and/or Pitch axis:

-Please redo Accelerometer Calibration or use Acc Trim Stick command to tune accelerometer

# Appendix

| Self Checking Light Status |
| --- |
| Red LED and Green LED flashing ->Red LED flashing, Green LED off->Red LED off, Green LED flash couple time |

then off (if Red LED off then solid, mean flight mode is engaged) ->Self Checking Completed.

**Bootloader Mode**

Entering Bootloader Mode:

（1）Use tweezers or a metal tool to short the "BOOT" pads on the Flight Controller board.

（2）Power the Flight Controller board by USB (5v). Only POWER light will be ON at this time. Then disconnect the "BOOT" pad. If during this period the other 2 LEDs light or you cannot continue to the next step, please repeat the operation.

（3）After entering boot mode, perform firmware update.

# Thank you for purchasing an EMAX Product.

⚠️　　*Caution: Safety comes first! Make sure to fly in safe zone! This product may not be suitable for people under the age of 18.*