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Disclaimer

Please read the disclaimer carefully before using the product. By using this product, you hereby agree to this disclaimer and signify that you have read them fully. This product is not suitable for people under age of 18.

Warnings

1. Please following the instruction manual to install and operate Nighthawk Pro
2. Do NOT use Nighthawk Pro while drunk, taking drugs, dizziness, fatigue, nausea and any other conditions no matter physically or mentally that could impair your ability.
3. Must fly in safe zone (Area larger than 2500 square meter)
4. Do NOT modify or overload the system with inappropriate parts or accessories.
5. Do NOT fly at adverse weather conditions (Such as wind speed exceeding 10m/s, snow, rain, thunder and fog)
6. Do NOT fly in high electromagnetic environment.

Certifications

Nighthawk have certified by CE, FCC, RoHs.

Features Highlight

1. Independent designed solid, durable and stable frame, centroid and center of gravity are nearly the same even battery installed
2. Prebuilt frame and extra accessories. Built with powerful Emax power system and open source flight controller to ensure power and customizable (ARF model can fly after battery and propellers installed)
3. The sturdy copter frame has extensive flight test and endurance test.
4. Bright OBD your LED, different LED color can use distinguish copters when group flying (LED power consumption is 4W, which might decrease flying time.)
5. All in one design to combine ESC, BEC, and flight controller for easy installation and easy replacement. Plug and play motor, easy for swapping motor and no soldering needed.
6. Independent. Independent ESC and flight controller and power supply. ESC switches to perform single ESC calibration and boot pad to perform software and firmware upgrade.
7. Flight controller use 32bit ARM micro processor, fast process speed to ensure fast respond
8. Gyroscope, magnetometer, and accelerometer and barometer expansion port. With CPPM receiver GPS feature can be expanded. (GPS module sold separately)
9. Support ANGLE, HORIZON, HEADFREE, MAG, HEADADJ ...etc modes.
11. Low voltage monitoring and low voltage warning. (Buzzer sold separately)
12. Use Emax 12A ESC, support open source BLHeli and ONESHOT feature; flight controller is based on NAZE32 Skyline32, support open source configurator Baseflight and Cleanflight
13. Extra power output and power output switch for LED, tracker and other expansion.
Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ARF</th>
<th>RIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size &amp; Weight</td>
<td>Package (L<em>W</em>H): 310<em>300</em>100 (mm)</td>
<td>470<em>300</em>100 (mm)</td>
</tr>
<tr>
<td></td>
<td>Nighthawk (L<em>W</em>H): 250<em>260</em>75mm</td>
<td>250<em>260</em>75mm</td>
</tr>
<tr>
<td>Weight (g)</td>
<td>Outer packing box: 295g, inner holder: 180g</td>
<td>Outer packing box: 445g, inner holder: 240g</td>
</tr>
<tr>
<td>Flight weight (g)</td>
<td>440g (Not included Battery)</td>
<td>450g (Not included Battery)</td>
</tr>
</tbody>
</table>

In the Box

1. User Manual
2. Nighthawk Pro

3. Accessories

<table>
<thead>
<tr>
<th>Accessories Type</th>
<th>Accessories Name</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Propeller</td>
<td>CW Propellers</td>
<td>2PCS</td>
</tr>
<tr>
<td></td>
<td>CCW Propellers</td>
<td>2PCS</td>
</tr>
<tr>
<td>B. Battery &amp; wire accessories</td>
<td>Battery Strap</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>Velero</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>Receiver wire mesh (RTP preassembled)</td>
<td>1PC</td>
</tr>
<tr>
<td>C. Chassis Accessories</td>
<td>8Pin PVC Connector (RTP preassembled)</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>6 Pin PVC Connector</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>5 Pin PVC Connector</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>2Pin PVC Connector (Red &amp; Brown)</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>2Pin PVC Connector (Orange &amp; Red)</td>
<td>1PC</td>
</tr>
<tr>
<td>D. Video accessories</td>
<td>Antenna</td>
<td>1PC</td>
</tr>
<tr>
<td>E. Flight controller accessories</td>
<td>Cable</td>
<td>1PC</td>
</tr>
<tr>
<td>F. Receiver Accessories</td>
<td>Receiver antenna base</td>
<td>1PC</td>
</tr>
<tr>
<td>G. MOBIFUS accessories</td>
<td>MOBIFUS Plate</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>Shock absorber</td>
<td>5PCS</td>
</tr>
<tr>
<td>H. Motor Accessories</td>
<td>Inclined motor mounting base</td>
<td>4PCS</td>
</tr>
<tr>
<td></td>
<td>M2.5*8 screw</td>
<td>17PCS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessories Type</th>
<th>Accessories Name</th>
<th>QTY</th>
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</thead>
<tbody>
<tr>
<td>I. Camera Accessories</td>
<td>camera mounting plate</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>M2.5*8 Nylon screw</td>
<td>5PCS</td>
</tr>
<tr>
<td></td>
<td>M3*19 screw</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>M3*10 screw</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>M3*8 screw</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>M3*4 screw</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>M3*4 Self tap screw</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>M3*4 Self tap screw</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>M2.5*4 Self tap screw</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>M2.5*4 Self tap screw</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>M2.5 nylon nut</td>
<td>1PC</td>
</tr>
<tr>
<td></td>
<td>M3 nylon nut</td>
<td>1PC</td>
</tr>
</tbody>
</table>

Note: Quadcopter with inclined motor mounting bases must choose flight mode, or the quadcopter cannot fly forward after taking off.
Required Tools and Equipments

1. Battery with XT60 connector (Suggested battery size: 3S 1300-2200mAh, 4S 1300-1800mAh only) For
   fly safety and main board power range, suggest propellers 5-6 inches under 3S and propellers 6 inches
   under 4S.
2. 1.5mm, 2.0mm, 2.5mm hex driver, tweezers, needle nose pliers, scissors, etc...
3. Computer or Laptop
4. Monitor and/or goggles.
5. Transmitter (ARF model ONLY)

Installation Steps

Step 1 Preparation

Take out the frame from the package and put it on a horizontal plane (like table). Plug it to computer by USB cable.

Step 2 Driver and Configuration Software Installation

1. Install Driver

   Please install the drive program to your computer if you do not have it already.
   (1) Please choose the compatible driver for your computer, link
   (2) Install the drive 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 CleanFlight - Configurator
   Note: Installing Baseflight Configurator is similar to Cleanflight Configurator, we will not discuss it in this manual.

Step 3 Receiver Connection Diagram

Radio and Flight Controller Connection (ARF model ONLY)

PPM Receiver PWM Receiver 8Pin Cable

<table>
<thead>
<tr>
<th>GND</th>
<th>GND</th>
<th>Brown</th>
<th>Blue</th>
<th>Orange</th>
<th>White</th>
<th>Red</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>+5V</td>
<td>+5V</td>
<td>Brown</td>
<td>Blue</td>
<td>Orange</td>
<td>White</td>
<td>Red</td>
<td>Black</td>
</tr>
<tr>
<td>PPM</td>
<td>A1</td>
<td>L1</td>
<td>L2</td>
<td>L3</td>
<td>L4</td>
<td>L5</td>
<td>L6</td>
</tr>
<tr>
<td>TX</td>
<td>TH</td>
<td>RED</td>
<td>JU1</td>
<td>HU1</td>
<td>U1</td>
<td>U2</td>
<td>U3</td>
</tr>
<tr>
<td>RX</td>
<td>U2</td>
<td>U3</td>
<td>RX</td>
<td>RX</td>
<td>RX</td>
<td>RX</td>
<td>RX</td>
</tr>
<tr>
<td>D1</td>
<td>D2</td>
<td>D3</td>
<td>D4</td>
<td>D5</td>
<td>D6</td>
<td>D7</td>
<td>D8</td>
</tr>
</tbody>
</table>

RC Input Connector

| GND | +5V | D0  | D1  | D2  | D3  | D4  | D5  |

Step 4 How to use Cleanflight Configurator

Only CleanFlight Configurator will be discuss below. If customers use Baseflight components, please download
Baseflight Configurator to configure your Baseflight controller.
Note: RTF version only need to follow the accelerometer and magnetometer calibration and ESC calibration. ARF will
need to follow the accelerometer and magnetometer calibration, ESC calibration, Mode selection and transmitter
 calibration.

1. Flight Controller and Configurator

   (1) Please switch the ESC switch to ON
   (2) Connect flight controller to computer with Micro USB cable, blue light will lit on flight controller and start self checking. (Please refer to Appendix - Self checking light status)
   (3) In Cleanflight Configurator App, select COM port and Baud Rate
   (4) Click “Connect”, flight controller and configurator and connected when the button change to green.

   COM Port Selection Baud Rate Setting Connect Button

2. Flight Controller Setting (Basic)

Accelerometer and Magnetometer Calibration
Please select "SER".

1. Calibrate Accelerometer
2. Calibrate Magnetometer

(1) Calibrate Accelerometer: Place board or frame 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 board or frame during calibration)

(2) Calibrate Magnetometer: Select "Calibrate Magnetometer", make sure to rotate the board or frame 360 degrees in all axis within 30sec (rotate axis included: 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 perform ESC Calibration!

1. Please select "Configuration", change Max Throttle to 2000 and save
2. Please select "Motors"
   - Please check the box for Motor Test
   - Move the master slider to MAXIMUM
   - Power the unit, after the MAXIMUM throttle confirmation sound (BEEP, BEEP), move the slider to minimum and wait for the MINIMUM throttle confirmation sound (long BEEP----), then you will hear the confirmation of battery cell (if you using 3 cell battery will be BEEP, BEEP, BEEP), once the unit is ready confirmation sound ("1 2 3"). ESC calibration is completed.

Mode Selections

1. Please select "Modes"
   - Modes: ARM, ANGLE, HORIZON, MAG, HEADFREE, etc. If need to add another mode, please click "Add Range", Meanwhile, the right-hand of the channel selection drop-down box will open.

2. AUX Channel Select for Modes
   - AUX channel for Mode: Click the button "Add range" to add a Flight Mode. Meanwhile, select some channel as this flight mode channel in the right channel selection drop-down box, and select a range of settings by the slider, then click the lower right corner of the "Save" button. Then check the box and save the setting by click the "SAVE" at right bottom corner. When mode is selected by switch the AUX channel, selected mode name will highlighted green, other will highlighted red on the screen. Red LED (Mode indicator) will lit. Some mode need to be selected at the same time to function correctly. Some modes will only be shown when the corresponding sensors are connected, for example, the Baro mode will not appear if there is not a barometer connected. Some modes should be selected at the same time to be effective.

RTF mode selection diagram (ARF no need)
The radio in RTF version has the fail-safe function. SWC switch is 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.

Note: We suggest donot select MAG to avoid the big current interference to compass.

Copter Testing
Please make sure to REMOVE PROPELLERS before perform ESC Calibration!

1. Connect 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 Testing"
5. Turn on transmitter
6. Connect battery to power on the copter
7. Use transmitter to arm motor, flight controller light indicator will turn green. Arm and disarm motor are shown below (Mode 2 transmitter as example below)
Step 5 Installation

Caution:

1. Because the power cannot transmit in time, to avoid video transmitter burnt out, please install the antenna before power on when testing and using video transmitter.

2. This light is high-heating to ensure the brightness. Please donot touch when using it or may be scalded. Caution high temperature!

Video Transmitter Channel

Video transmitter channel switches are located at the bottom and rear of the copter, channel can be change to corresponding channel to monitor and/or goggle. 200mw power switch is located at the side of FPV. Switching to copter head is 200mw and to tail is 200mw. The default is 200mw.

Frequency table

<table>
<thead>
<tr>
<th></th>
<th>CB1</th>
<th>CB2</th>
<th>CB3</th>
<th>CB4</th>
<th>CB5</th>
<th>CB6</th>
<th>CB7</th>
<th>CB8</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE1</td>
<td>5845MHz</td>
<td>5845MHz</td>
<td>5825MHz</td>
<td>5805MHz</td>
<td>5785MHz</td>
<td>5765MHz</td>
<td>5745MHz</td>
<td>5725MHz</td>
</tr>
<tr>
<td>PE2</td>
<td>5955MHz</td>
<td>5955MHz</td>
<td>5935MHz</td>
<td>5915MHz</td>
<td>5895MHz</td>
<td>5875MHz</td>
<td>5855MHz</td>
<td>5835MHz</td>
</tr>
<tr>
<td>PE3</td>
<td>5765MHz</td>
<td>5765MHz</td>
<td>5745MHz</td>
<td>5725MHz</td>
<td>5705MHz</td>
<td>5685MHz</td>
<td>5665MHz</td>
<td>5645MHz</td>
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<tr>
<td>PE4</td>
<td>5675MHz</td>
<td>5675MHz</td>
<td>5655MHz</td>
<td>5635MHz</td>
<td>5615MHz</td>
<td>5595MHz</td>
<td>5575MHz</td>
<td>5555MHz</td>
</tr>
</tbody>
</table>

Step 6 Test flight

After completion of copter installation and testing, please place copter in the center of the test flight field, turn on transmitter then connect the battery to power copter. (If needed, switch the LED power to ON to power LED) Flight controller light will turn to solid blue, and motor will sound one long "beep---", then short "beep-" (number of short "beep" depends on battery cell), then sound ("1 2 3"), and wait for copter self checking to complete. After
Step 7 Upgrade Accessories Installation

Inclined Camera Mounting Plate Installation
(1) Place camera to inclined camera mounting plate
(2) Use M2.3X6.5mm self tap screw to secure the camera
(3) Remove top board
(4) Insert camera with inclined mounting plate to the middle board
(5) Install the top board with M3.0X6.0mm screw with hex driver.

Camera Mounting Plate Installation
(1) Place camera to camera mounting plate
(2) Use M2.2X8.0mm nylon screws and M2.5 nylon nut to secure the camera.
(3) Remove top board
(4) Insert camera with mounting plate to the middle board
(5) Install the top board with M3.0X6.0mm screw with hex driver.

MOBIUS Accessories Installation
Nighthawk Pro

Main Control Board

ESC Instruction


Note: To calibrate single ESC, make sure to switch ESC SWITCH to OFF (Please refer to Appendix - ESC Calibration)

Flight Controller Instruction


Transmitter Joystick Command

Transmitter Joystick Command (Mode 2 transmitter as example below)
Frequently Asked Questions

1. After power, flight controller indicator not lit on, but ESC indicator lit, please check if ESC switch is switch to ON.
2. After connected micro USB to computer and flight controller, if the flight controller LED light are not on, please check if the computer has installed the driver, check ESC SWITCH is switched to ON position and check if micro USB connection.
3. If copeter motor sound "beep-beep-beep" after connected the battery, please redo ESC Calibration.
4. If green LED light flashing and motor not able to arm, please redo Accelerometer Calibration.
5. If copeter cannot lift off the ground, please check battery voltage.
6. If copeter motor arm but motor is not spinning, please check connection between motor and ESC.
7. If no video feed on monitor or goggle, please check video transmitter and receiver channel are tuned to the same channel and power output switch for video transmitter to switch to ON.
8. If LED light is on, please check power output switch for LED light is switched to ON and make sure connection are secured.
9. If copeter is drifting in roll and/or pitch axis, please redo Accelerometer Calibration or use Acc Trim Sticks command to tune accelerometer.
10. If copeter is not moving in correct direction, please redo Magnetometer Calibration.

Appendix

**ESC Calibration**

To calibrate single ESC:
1. Switch ESC SWITCH to OFF position.
2. Calibrate M1 ESC: Since 3pin connector of M1 have BEC, connect M1 connector directly into THR on the receiver. Connector and Receiver connection see below:

   **Receiver**
   - AIL
   - ELE
   - THR
   - RUD
   - AUS
   - AUS2

   **6Pin cable**
   - Brown
   - Red
   - Green
   - White
   - Black
   - Brown

   **ESC calibration port**
   - GND
   - +5V
   - M1
   - M2
   - M3
   - M4

3. Calibrate M2 ESC: Since M2 connector have no BEC, connect M2 connector directly into THR on receiver and connect M1 connector into other channels to supply power for receiver. Connector and Receiver connection see below:

   **Receiver**
   - AIL
   - ELE
   - THR
   - RUD
   - AUS
   - AUS2

   **6Pin cable**
   - Brown
   - Red
   - Green
   - White
   - Black
   - Brown

   **ESC calibration port**
   - GND
   - +5V
   - M1
   - M2
   - M3
   - M4

4. Calibrate M3 and M4 ESC: Same as Calibrate M2 ESC (instead of M2 use M3 and M4)

**Buzzer**

To ensure buzzer to sound while battery voltage is low, connect buzzer and buzzer connector then make sure battery inspection connector is connected with battery and enable buzzer and battery voltage monitoring in the "Configuration". Buzzer connection see below:

**Buzzer Connector**
- Orange
- Brown

**Battery Voltage Monitoring**

To enable battery voltage monitoring, connect battery with battery inspection connector then enable battery voltage monitoring in the "Configuration". Please make sure positive and negative connection, otherwise reverse polarity will damage the main controller board. Battery inspection connection see below:

**Battery Inspection**
- VCC
- GND

**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. Using a tweezers or metal tool to short connect the "BOOT" pad on the control board.
2. Power the control board by USB, only POWER light will on at this time. Then disconnect the "BOOT" pad. If during this period the other 2 lights lit or cannot continue to the next step, please repeat the operation.
3. Next perform firmware update.

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Version Upgraded Note:

--Radio receivers in RTF version V1.2 are upgraded to PPM signal receivers from PWM signal receivers which have the failsafe function.

--The preloaded firmware on flight control is changed to cleanflight from baseflight.

Safety first, make sure to fly in safe zone! This product is not suitable for people under age of 18.

Happy Flying!!