



KEY FEATURES

- The Drone AI Autopilot is designed with AI Recognition and Target Tracking capabilities, enabling the drone to lock onto both stationary and moving targets using advanced sensors and image recognition techniques.
- ATK:
 - Phase 1: Prepare
Combining AI and Stabilization, it reduces the difficulty of operation and improves recognition efficiency.
 - Phase 2: Locking
challenge of target tracking in traditional drones when operating in areas with signal interference, significantly enhancing mission execution efficiency
- Camera Support:
 - Visible light and Thermal imaging
- Camera Switch: (Version 2.0 AIZD Module is support)
P1 / P2



APPLICATIONS

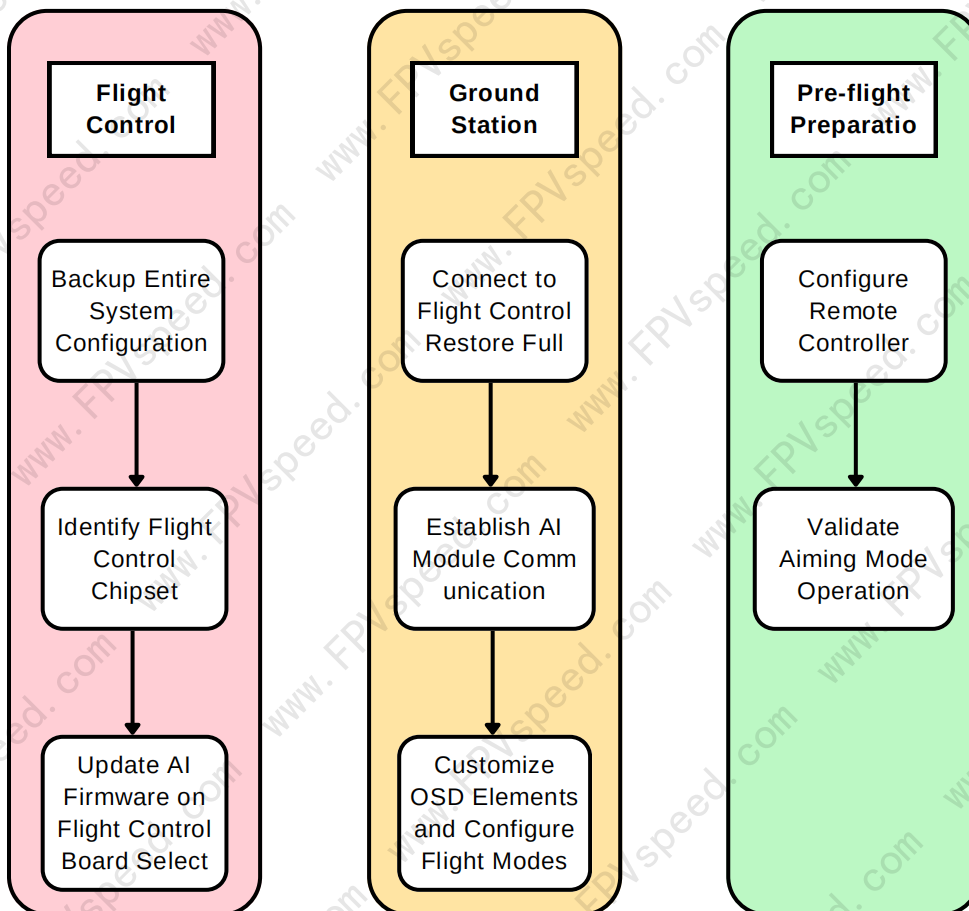
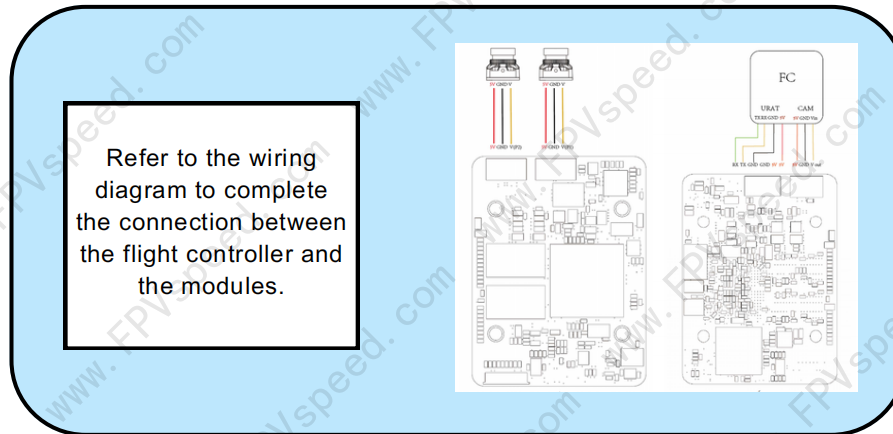
- FPV Drone Racing
- UAV Communication Systems
- Remote Vehicle Monitoring
- Wireless Video Transmission Systems

DISCLAIMER



This product is intended for civilian and commercial use only. It is strictly prohibited from being used for any military purposes or activities.

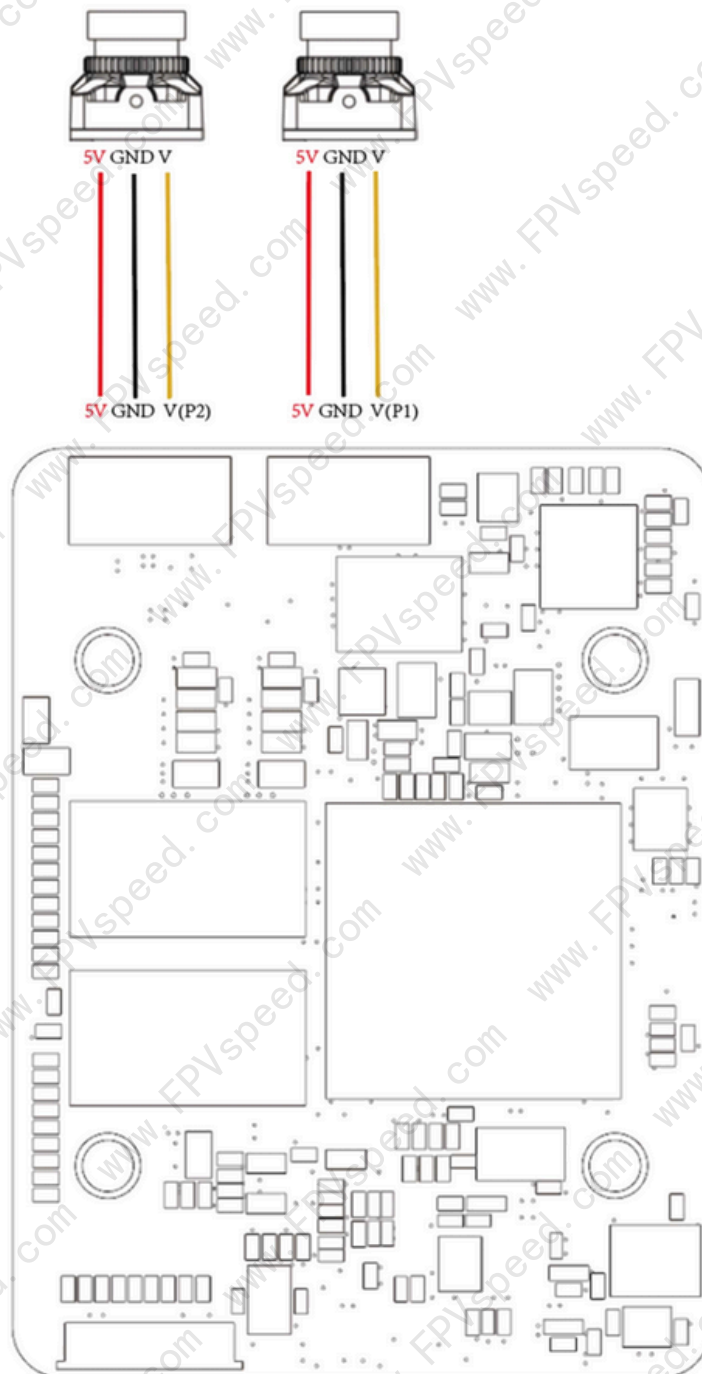
A. PRODUCT USAGE PROCESS





B. WIRING DIAGRAM

AI Module Version V2.0:



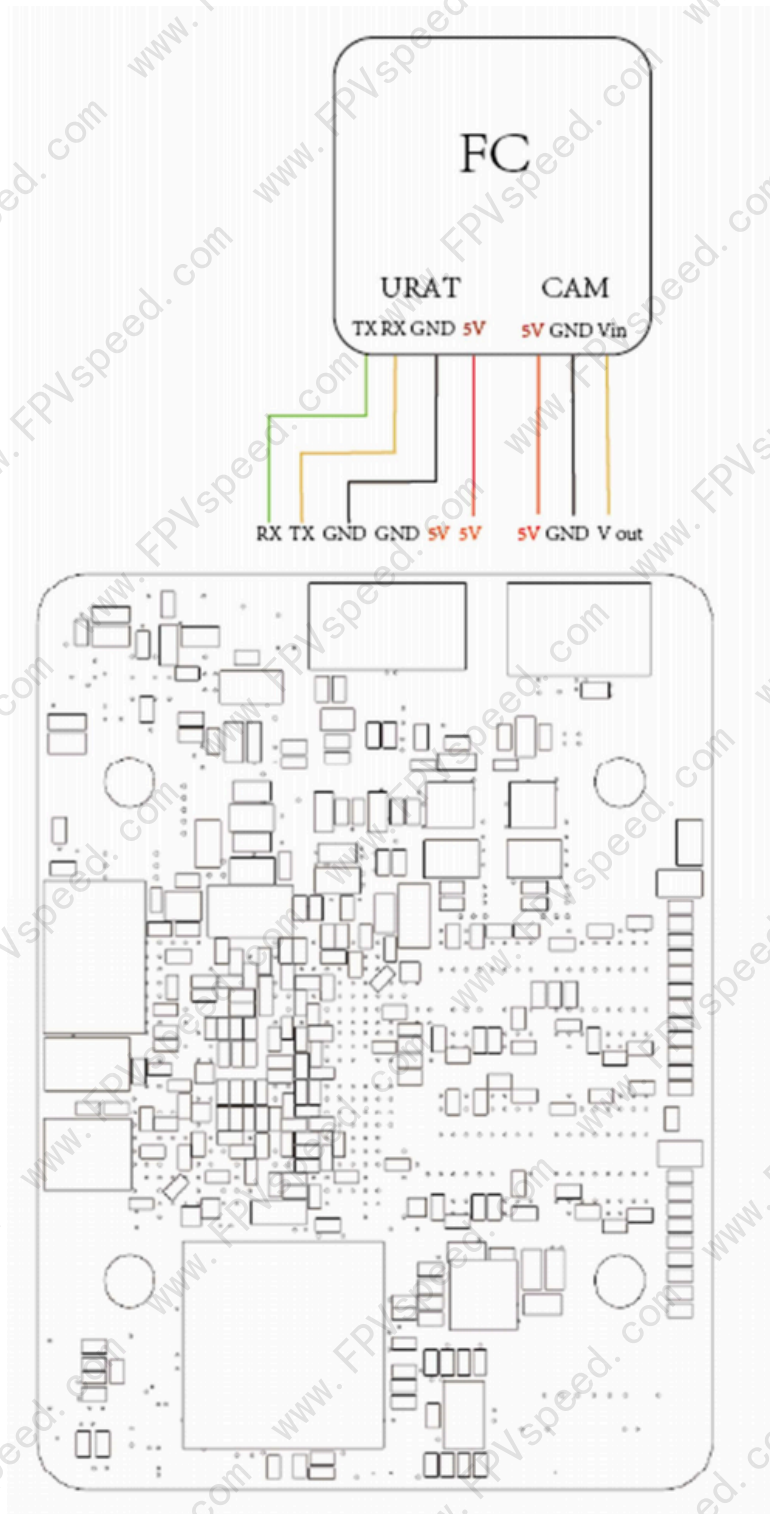


AI Recognition and Tracking

FPV AI Module

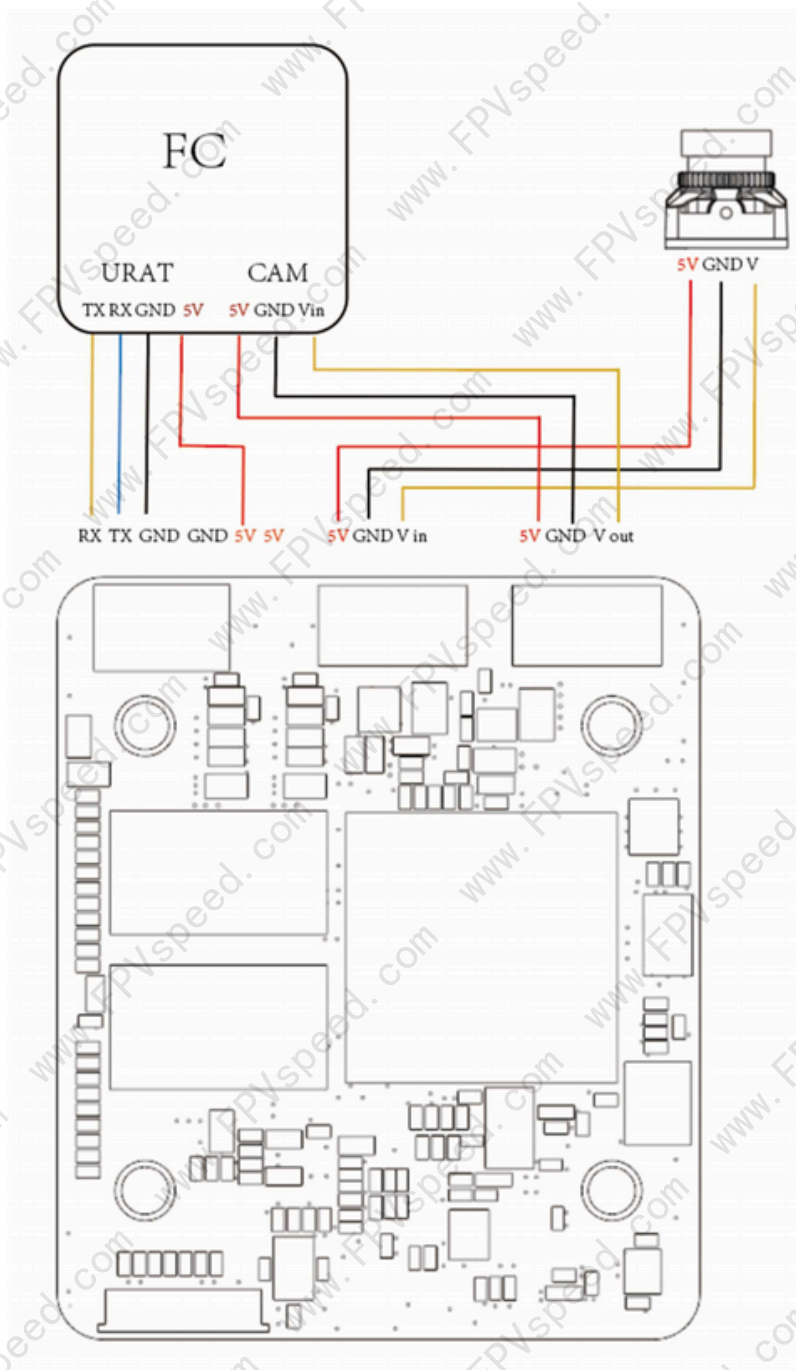
FSA02C

AIZD Module V2.0





AI Module Version V1.0:

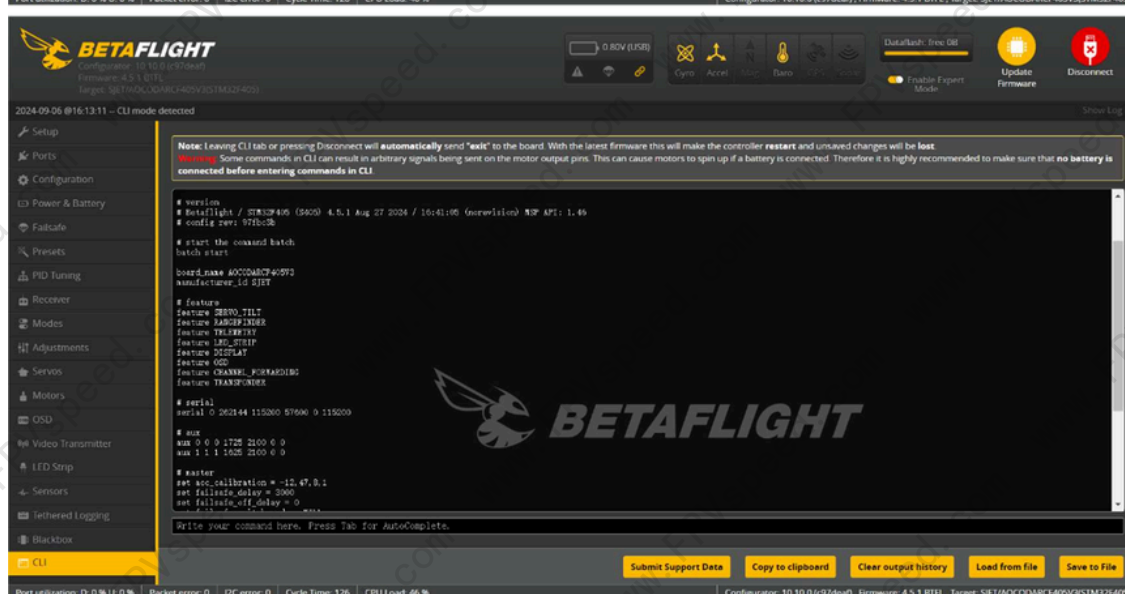




AIZD Module V2.0

- The firmware currently supports STM F405, F7xx, and H7xx series flight controllers.

- Confirm the configuration file of BF firmware (version 4.5/4.4 is supported). Perform parameter tuning and debugging of the UAV using BF 4.5.1 firmware. Use the BF ground station CLI to input the "dump" command to save the UAV's global settings to a file.





Firmware Installation:

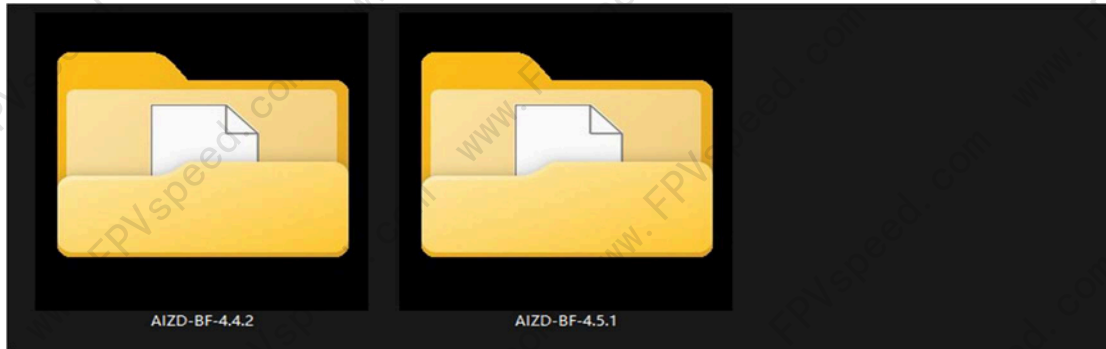
1. Access the ground station CLI and input "BL" to enter DFU mode.

The screenshot displays the Betaflight Configurator web interface. The top section shows the CLI tab with a command prompt where "BL" has been entered to enter DFU mode. Below this, the Firmware Flasher tab is visible, showing options to enable expert mode, choose a board, and select a firmware version. A warning message is present, stating: "Please do not try to flash non-Betaflight hardware with this firmware flasher. Do not disconnect the board or turn off your computer while flashing." The interface also includes a "Recovery / Lost communication" section with instructions on how to restore communication with the board.



2. Load firmware from the local computer.

Version 4.5/4.4 is supported



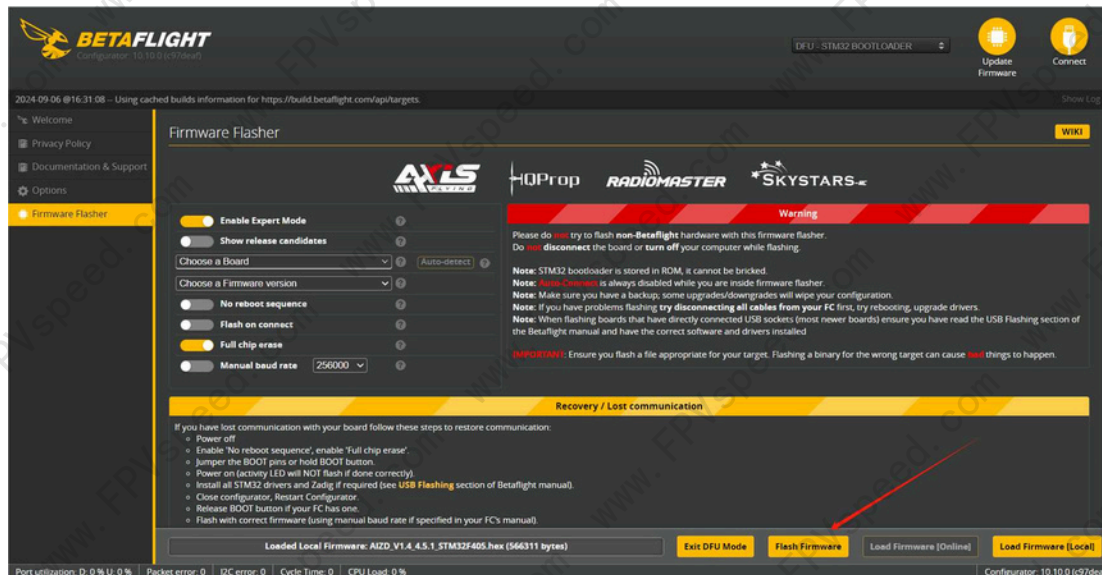
Version 4.4



Version 4.5



3. Based on the type of flight controller chip, select the corresponding flight controller firmware version. (The image above shows the F405 chip flight controller.)

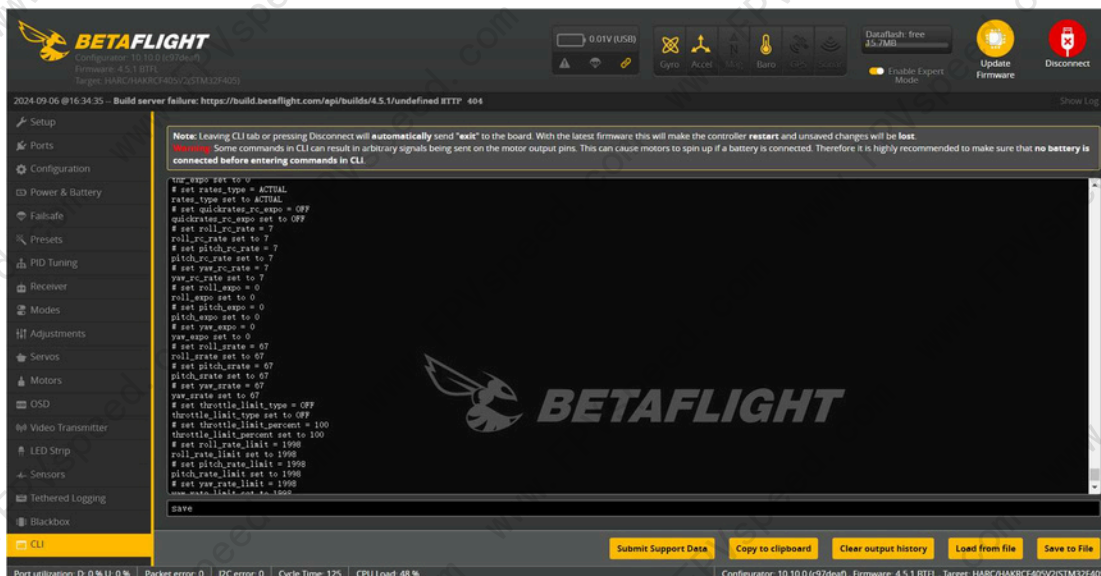




4. Execute "burn firmware" until the progress bar turns green, indicating completion.
5. Import Configuration File (to finish the configuration of the flight controller's hardware IO):
6. Import the saved configuration file from step one and copy all of its contents.

```
BTFL_cli_20240813_141057_HAKRCF405V2.txt X
C: > Users > 42078 > Desktop > BTFL_cli_20240813_141057_HAKRCF405V2.txt
6 # Betaflight / STM32F405 (S405) 4.4.3 Nov 15 2023 / 03:56:01 (738127e7e) MSP API: 1.45
7
8 # config: YES
9
10 # start the command batch
11 batch start
12
13 board_name HAKRCF405V2
14 manufacturer_id HARC
15
16 # name: -
17
18 # resources
19 resource BEEPER 1 C13
20 resource MOTOR 1 C08
21 resource MOTOR 2 C09
22 resource MOTOR 3 A08
23 resource MOTOR 4 A09
24 resource MOTOR 5 A10
25 resource MOTOR 6 B04
26 resource MOTOR 7 B00
27 resource MOTOR 8 B01
28 resource SERVO 1 NONE
29 resource SERVO 2 NONE
30 resource SERVO 3 NONE
31 resource SERVO 4 NONE
32 resource SERVO 5 NONE
33 resource SERVO 6 NONE
34 resource SERVO 7 NONE
35 resource SERVO 8 NONE
36 resource LED_STRIP 1 B03
37 resource SERIAL_TX 1 B06
38 resource SERIAL_TX 2 A02
39 resource SERIAL_TX 3 B10
Restricted Mode 0 0 0 0
```

7. Connect the flight controller to the BF ground station, enter the CLI interface, and manually input "save".



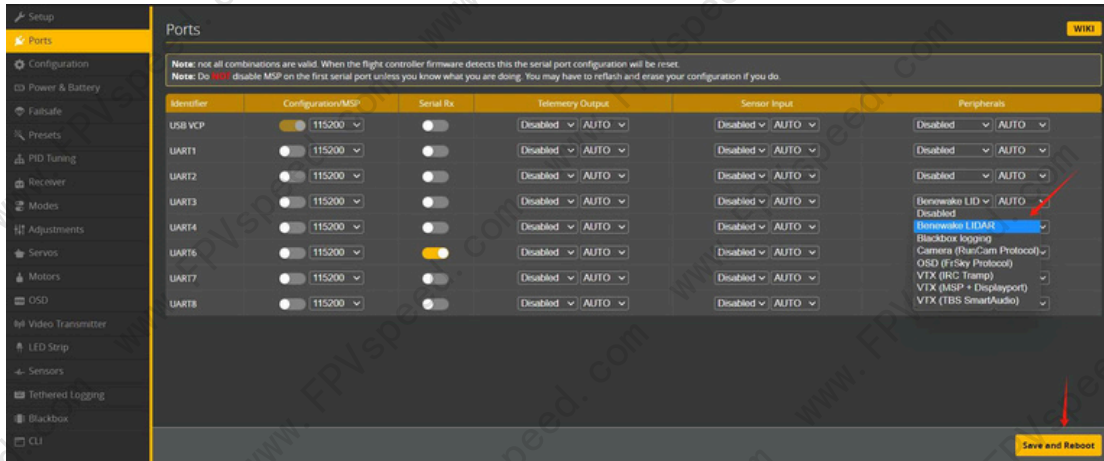
8. The above steps will complete the burning of the AIZD firmware.
AIZD version firmware has the same functions as the official BF firmware and can be used normally.



D. BASIC SETTINGS

FC Settings (Betaflight Configurator)

1. Ports UART settings: eg :



UART X-Peripherals- "Benewake LIDAR"

Save and Reboot

2. Operation Mode Settings: ARM and Stabilized mode (CH5 and CH6);
3. AUX 4 Position Trigger (only the RC channel needs to be set), which will enter target ATK mode;
4. Control force adjustment:

Camera FOV:

6.0 mm : 85
2.1 mm : 100

```
Camera 1 "T_CONTROL_G" (0~100,default"85")
Camera 2 "T_CONTROL_G2" (0~100,default"85")
cli: "
set T_CONTROL_G=85
save
"
```



5. Version 1.0 AIZD for V2.0 Firmware!

OSD Function activation: "T_OSD_EN"

(0/1)

CLI:" set T_OSD_EN=1

save

"

Remote Control Channel Settings:

Joystick: CH1~CH4
ARM: AUX1/CH5
Stabilization: AUX2/CH6
ATK: AUX4/CH8 (Three positions!)

Low Medium Off
High Prepare
Locking

Camera Switch: AUX8/CH12 (AI Module Version 2.0 is support !)

Low P1
High P2

FC Modes Setting

CH5:	LOCK	ARM
ARM	1000-----1500-----2000	
CH6:	ANGLE	ANGLE
ARM	1000-----1500-----2000	



RC Setting

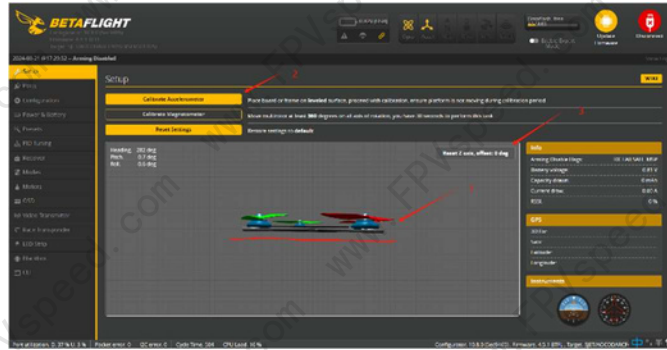
CH5:	LOCK	ARM
ARM	1000-----1500-----2000	
CH6:	ANGLE	ANGLE
ARM	1000-----1500-----2000	
CH8:	ATK (off)	ATK(prepare)
ATK	1000-----1500-----2000	
CH12:	Camera 1	Camera2
CAM	1000-----1500-----2000	





E. FLIGHT OPERATIONS:

Flight Pre-calibration:



Flight Operation:

1. ARM unlock, take off;
2. Switch flight mode to ANGLE (stabilized);
3. Aim cursor at the target;
4. Switch CH8 (AUX 4) medium (1300-1700) for ATK(prepare) mode.
5. Switch CH8 (AUX 4) high (1700-2000) for ATK(Locking) mode.
6. Switch CH8 (AUX 4) low (1000-1500) for non-ATK mode.

Note!

! In lock mode, if the target is lost, the UAV maintains its current attitude and throttle value.

F. ADDITIONAL FEATURES: (Default Not Activated):

1. Set the flight to be controlled by the tracking board after loss of control (default not activated)
Modify the original loss of control protection parameters, expand the parameter range

failsafe_delay
CLI: " set failsafe_delay = 5000 save "

// set the remote-control loss of connection protection time to 500 seconds, need to set 1-4 channels first stage protection to AUTO, other channels to HOLD Used for continued (ATK) control of the UAV after remote control loss.

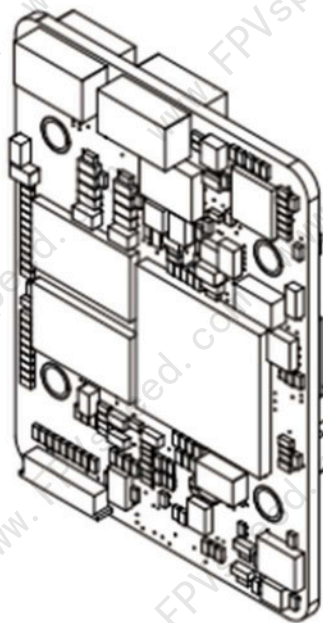
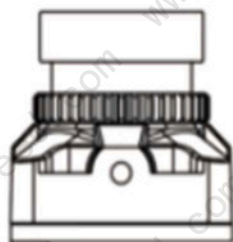


G. INVENTORY

1 * Camera(1500TVL 6mm)

1 * AI Module

1 * Accessory



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