HDZero AIO5 is the world's first digital video AIO, enabling bind and fly 65mm whoops to weigh less than 19.5g. AIO5 integrates a F4 flight controller, HDZero 5.8GHz digital video transmitter, SPI 2.4GHz ExpressLRS 3.0 receiver, DSHOT protocol 4-in-1 ESC, and a 5V/1A BEC. It is ideal for tiny whoop racing and freestyle.

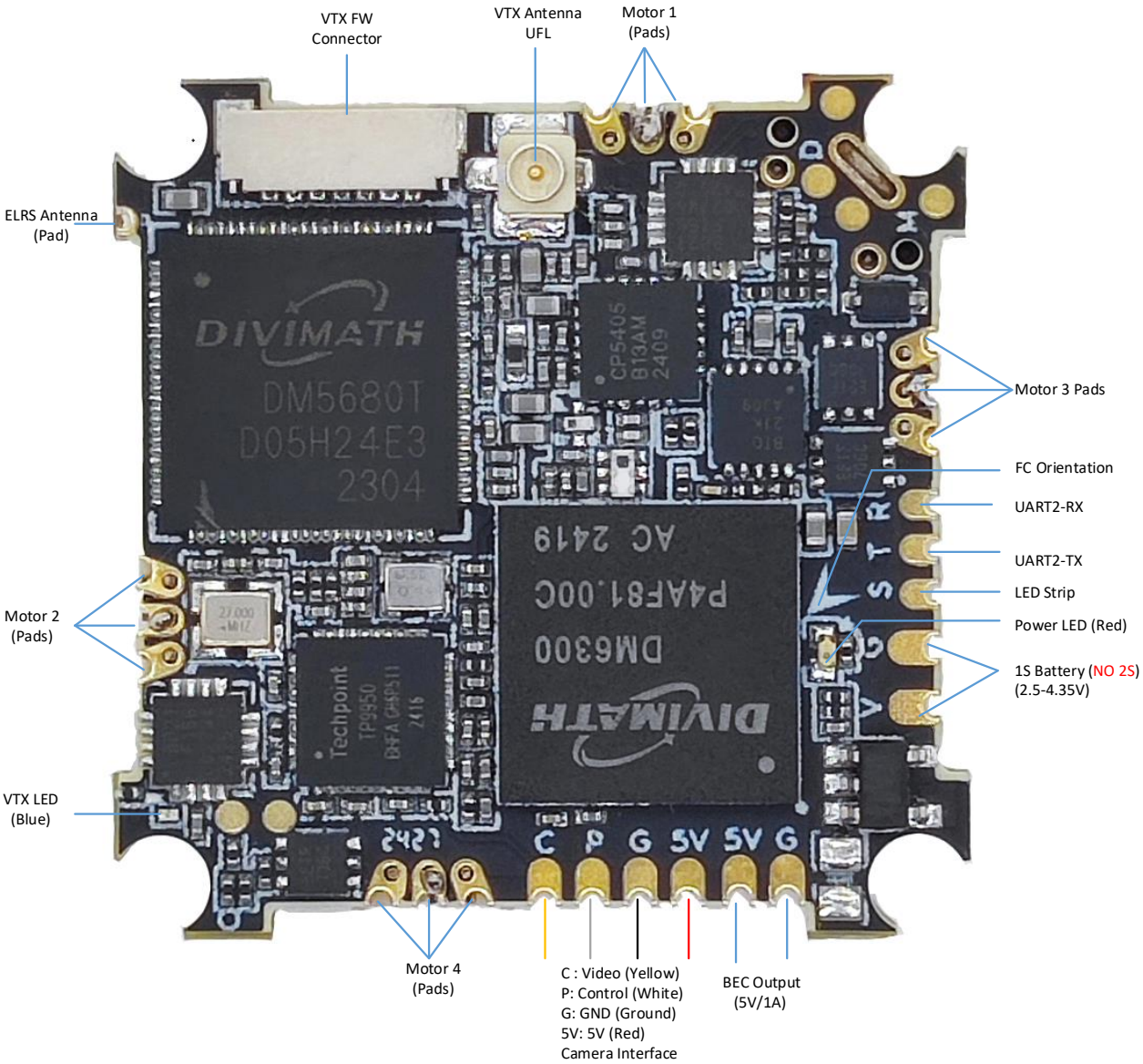
The HDZero AIO5 is an excellent collaboration between Happymodel and HDZero. It is available at major FPV resellers worldwide, and also at Happymodel and HDZero official online shops.

Specifications

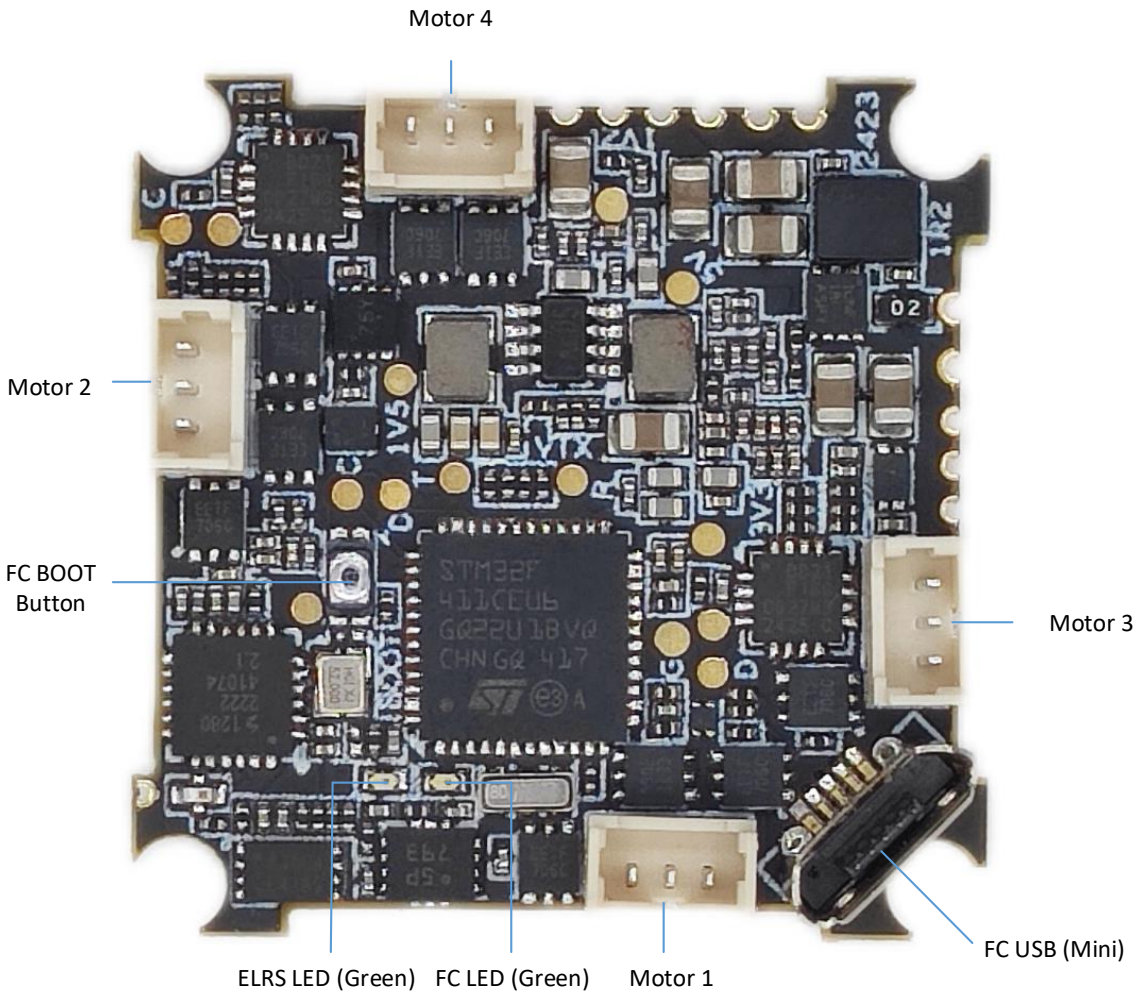
- MCU: STM32F411 (100MHz, 512K Flash)
- Gyro: BMI270/ICM42688
- On board voltage and amperage meters
- Built-in 5A(each) BLHeli_S 4-in-1 ESC
    - MCU: EFM8BB21
    - HV Current: 5A continuous peak 6A (3 seconds)
    - Factory firmware: O_H_5_48_V0.19.2.HEX
    - Dshot600 ready
- Built-in 5.8G HDZero VTX
    - RF output: 25mw/200mW
    - Supported channels: R1-R8, F2/F4, L1-L8
    - UFL connector (ultra-lite linear antenna included)
- Built-in SPI ExpressLRS 2.4GHz receiver
    - Packet rate option: 50Hz/150Hz/250Hz/500Hz
    - Pre-soldered enamel wire antenna
    - Telemetry output power: <12dBm
- Built-in 5V 1A BEC
- Flight controller firmware target: CRAZYBEEF4SX1280
- Power supply: 1S battery (2.5V – 4.35V)
- Fully compatible with the popular whoop frames
    - Board size:28.5x28.5mm with a 25.5x25.5 mounting hole size
- Weight: 5.7g(without motor plugs), 6.3g (with motor plugs)

Diagram

TOP


VTX FW Connector
VTX Antenna UFL
Motor 1 (Pads)
ELRS Antenna (Pad)
Motor 3 Pads
FC Orientation
UART2-RX
UART2-TX
LED Strip
Power LED (Red)
1S Battery (NO 2S) (2.5-4.35V)
Motor 2 (Pads)
VTX LED (Blue)
Motor 4 (Pads)
C : Video (Yellow)
P: Control (White)
G: GND (Ground)
5V: 5V (Red)
Camera Interface
BEC Output (5V/1A)
DIVIMATH
DM5680T
D05H24E3
2304
DM6300
C P G 5V 5V G

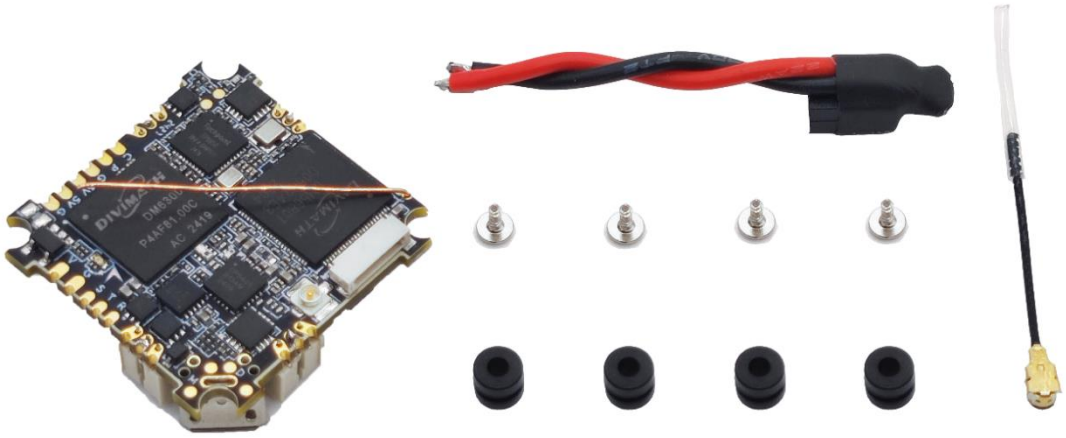
Bottom



**Motor plugs are exclusively available on retail boards.*

Included

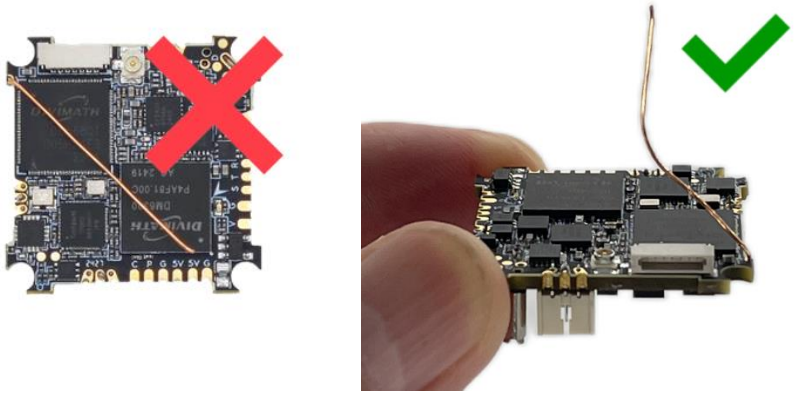
- 1x HDZero AIO5 board
- 1x Power cable with inverted angle A30 connector
- 4x screws
- 4x rubber grommets
- 1x ultra-lite linear VTX antenna



Installation Notes

ELRS antenna

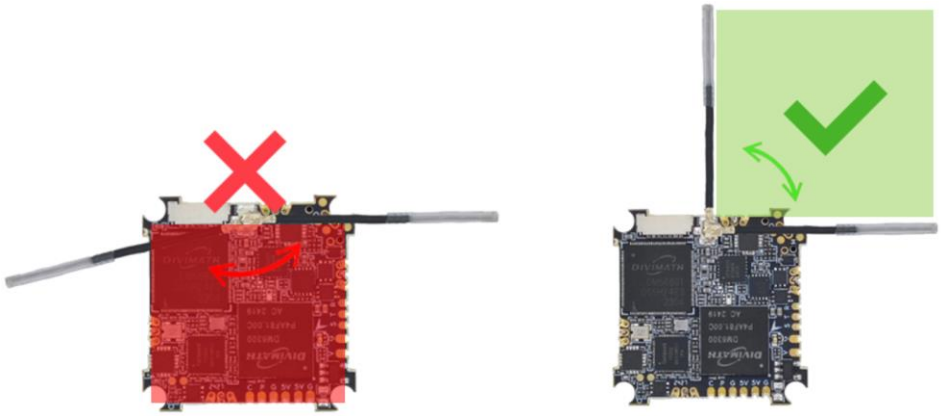
A line antenna (¼ wavelength) for the ELRS receiver is pre-soldered and positioned close to the board for low-profile and easy packaging. However, **the ELRS antenna needs to be lifted to maintain at least 3 mm of clearance from the board.**



VTX antenna

The HDZero VTX integrated into the AIO5 has a specific requirement to prevent video noise caused by the video RF signal being routed back to the onboard power amplifier.

The VTX antenna should be mounted outward, not inward, on the board.



Bind with TX radio

There are two ways to bind the receiver, as shown below:

1. Button Binding

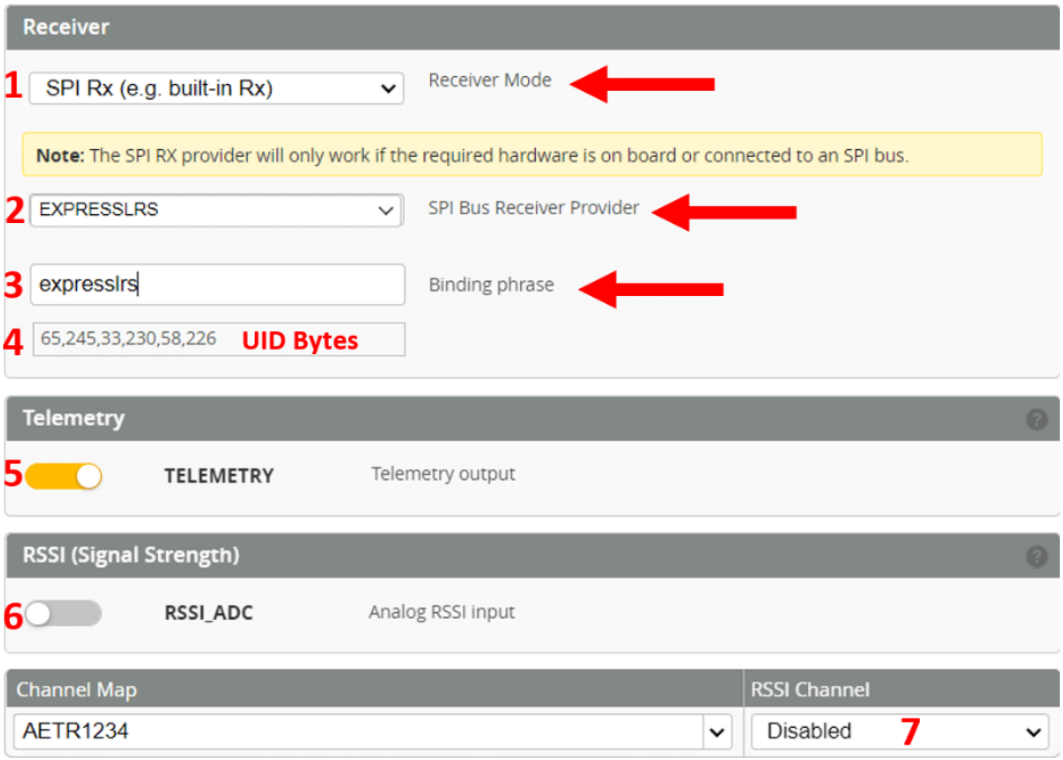
   Put the receiver into bind mode using any of these procedures:

   - "Bind" button in the Betaflight Configurator, Receiver Page (if can't be found, update the Betaflight firmware).
   - Using the CLI, type in bind rx and press enter once.
   - Using the CLI, type in set expresslrs uid = 0, press enter once, then save and reboot

   Once the SPI receiver is in binding mode (the ELRS LED will start to blink faster), insert the ELRS TX module into your OpenTX Radio transmitter, select External RF mode and set it to the CRSF protocol. You will find the ELRS menu in the Radio system (ensure the ELRS.LUA file is copied to the SD-Card tools first). Enter the ELRS menu and press [Bind]. The RX LED on the flight controller will become solid if the binding is successful.

2. Binding Phrase

   As of Betaflight 4.4 (with Betaflight Configurator version 10.9.0 or newer), your ExpressLRS Binding Phrase can be set directly on the receiver tab in Betaflight Configurator.



Proper configuration of the Betaflight Receiver tab for ExpressLRS SPI Receivers. Receiver Mode (1) should be set to SPI RX. SPI Bus Receiver Provider (2) should be set to EXPRESSLRS. Enter your binding phrase in the box (3) and it will be converted to UID bytes (4) and saved to your Betaflight config. You can also take this opportunity to enable Telemetry (5) if desired, and make sure RSSI_ADC (6) and RSSI Channel (7) are disabled as shown.

NOTE:

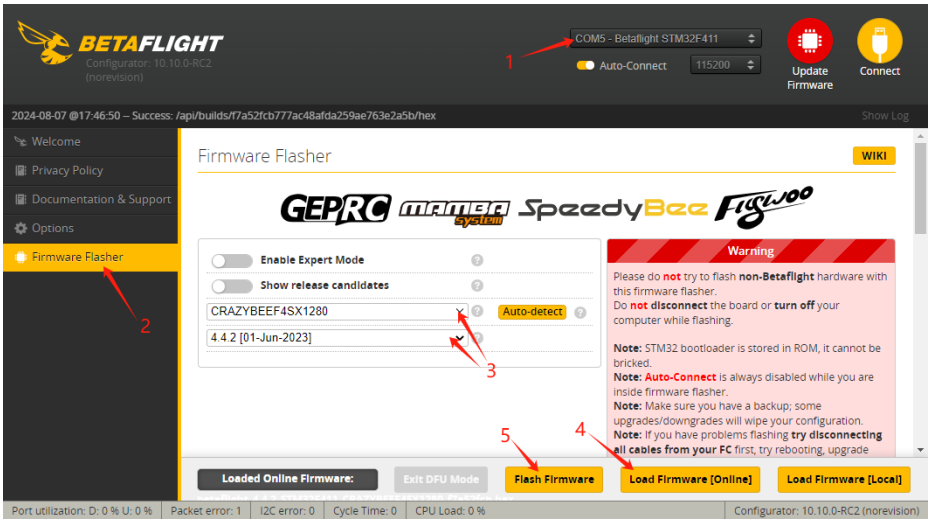
1. SPI ELRS receivers **DO NOT** support D(D250, D500), F(F500, F1000) and Full Res(100Hz Full Res, 333Hz Full Res) Modes (Packet Rates) and thus will not bind or sync with a TX module in any of these modes.
   These are the packet rates that will work: 50Hz, 150Hz, 250Hz, 500Hz.

ELRS LED status:

- **Solid** means bind successful or Connection established;
- **Faster Blink (500ms)** means in bind mode;
- **Slowly Blink (1s)** means no signal established with the TX module

Firmware

1. Flash Betaflight firmware
   - Download and install the Betaflight Configurator.
   - Launch the Betaflight Configurator
   - To flash firmware :



1. Select the target port
2. Click "Update Firmware" to enter Firmware Flasher tab
3. Select target "CRAZYBEEF4SX1280" and version, The factory version is 4.4.2[01-Jun-2023]
4. Click "Load Firmware [Online] " to download the firmware
5. Click "Flash Firmware" to Flash the Flight controller

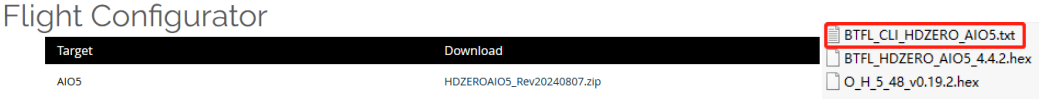
- DFU flash:

  If you have lost communication with your board follow these steps to restore communication:

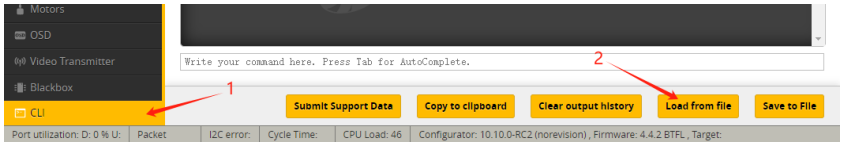
1. Power off AIO5
2. Enable 'No reboot sequence', enable 'Full chip erase'
3. Hold BOOT button and Power on via USB into PC, then release BOOT button
4. Install all STM32 drivers and Zadig if required (see USB Flashing section of Betaflight manual)
5. Close Betaflight configurator, Restart Betaflight configurator
6. Click "Update Firmware" to enter Firmware Flasher tab
7. Select target "CRAZYBEEF4SX1280" and version, The factory version is 4.4.2[01-Jun-2023]
8. Click "Load Firmware [Online] " to download the firmware
9. Click "Flash Firmware" to Flash the Flight controller

2. Execute CLI

Download the file from Flight Configurator tab at https://www.hd-zero.com/document, and unzip HDZEROAIO5_RevXYZ.zip into a temporary directory, i.e. c:\123;

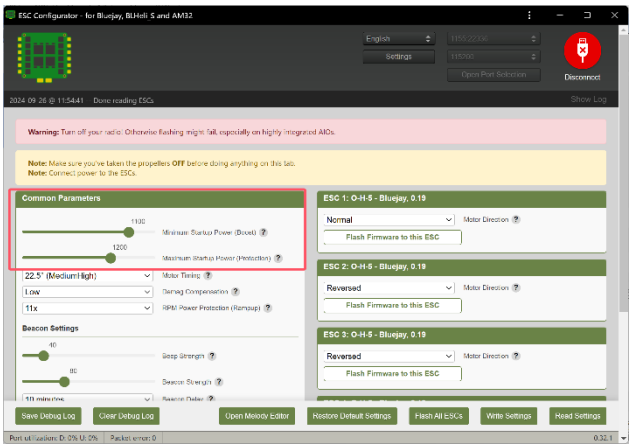


1. Switch to CLI tab
2. Click “Load from file”, and select file c:\123\BTFL_CLI_HDZERO AIO5.txt
3. Click “Execute”



3. BlueJay ESC firmware

The factory firmware: O_H_5_48_V0.19.2.HEX. To flash a new ESC firmware, here is [a YouTube tutorial](#).



Notes:

- Before flashing ESC firmware, the Radio needs to be turned off to disconnect the ELRS.
- After flashing firmware, it is needed to set the Startup Power of each ESC to 1100 for Minimum and 1200 for Maximum through https://esc-configurator.com/

Please note that heat dissipation and full charged battery are needed for flashing ESC firmware.

4. HDZero firmware

- Purchase a HDZero VTX Programmer if you don’t have one;
- Download *HDZero Programmer* application from https://www.hd-zero.com/document

Utilities

Utilities	Download	Note
Unlock_Lowband*	Unlock_Lowband.zip	Make sure your region allows low band before download.
HDZero Programmer	HDZero Programmer.zip	
Phoenix Card	PhoenixCard.zip	
VTX_Table	VTX_Table.zip	

- Plug the HDZero VTX Programmer into AIO5's VTX FW Connector. And use the USBC cable to connect the programmer tool and PC
- Launch the *HDZeroProgrammer.exe* on a Windows PC

1. Select the AIO5
2. Click "Load Online Firmware" and select the version number
3. Click "Flash VTX". "Connecting VTX ..." will be displayed at the bottom

The application will automatically download the firmware and flash it.