

Pixhack English guide



Pixhawk, a 32-bit open source hardware flight control, based on Pixhawk hardware architecture platform, designed and produced by CUAU. As the main architectural hardware the same with pix, so fully compatible with the 3DR APM firmware and pix native firmware.

Based on original pix, Pixhawk Optimized the power supply chip, reduced unnecessary interface, adjusted and optimized the interface, changed the plug wire direction.

The highlights of Pixhawk is the IMU separation of innovative design, built-in small general damping structure, and adopted the CNC milling into an organic whole type craft, anti-interference and stability has a qualitative improvement.

After a year design, countless versions of optimization and testing, Pixhawk has reached more than a stable and ideal effect.

The hardware parameters introduction:

The processor :

- 1, 32-bit 2M flash STM32F427 Cortex M4, With hardware floating-point processing unit
Frequency: 168MHZ, 256K RAM
- 2, 32-bit STM32F103 backup co-processor .

Built-in sensors:

Pixhawk using separation of innovative design, built-in damping commonality, general aircraft don't need to do shock treatment (if the vibration is too large and with high frequency then still need to do damping)

- 1, L3GD20 three-axis digital 16 bit gyroscope
- 2, LSM303D three-axis ,14 bit accelerometer/ magnetometer
- 3, MPU6000 6 axis accelerometer/magnetometer
- 4, MS5611 High precision barometer

Work environment and the voltage:

Temperature range: - 5 ~ 50 degrees

PM sensor , operating voltage : 2-6S

PM sensor output voltage : 5.4V 3A

PWM OUT input power supply voltage : 9V Highest (support high pressure actuator, and the original Pixhawk does not support the power supply above 5.5 V)

Two-way power supply automatic redundancy(PM interface and PWM OUT interface) ,PM interface preferred power supply, malfunction automatically switch to the PWM OUT interface power supply.

Appearance size:

Main flight control size : 68mmX44mmX15MM

Weight : 68g

Data interface :

- 1, five UART, A compatible with high voltage , two with the hardware flow control
- 2, One CAN
- 3, Spektrum DSM/DSM2/DSM-X Satellite receiver compatible with the input
- 4, Futaba SBUS compatible with the input and output
- 5, PPM signal input
- 6, RSSI (PWM or voltage) input
- 7, I2C Protocol device extension
- 8, Reserve a SPI interface
- 9, 3.3 and 6.6 VADC input
- 10, External MICRO USB interface
- 11, 13 PWM/Actuator output
- 12, Multitone buzzer and unlocking button state , led interface

Peripheral device :

- 1, Support Fixed wing, Multicopter , Helicopter , Car , Boat firmware
- 2, Support the receiver types: S-Bus, DSM2, PPM . Note: If it is a common PWM receiver, then need a PPM encoder .
- 3, Recommend the battery type: 2S ~ 6S lithium polymer battery
- 4, System configuration requirements: Windows XP SP3/7/8 (32 or 64 bit)
- 5, Support external CUAU products : MINIM OSD , CUAU 3DR Radio , DIGI XTend , CUAU RTB BOX , MAAT tracking antenna , Optical flow sensor .

Interface introduction :



On the left :

PPM - support PPM has already sbus input

SBUS - SBUS conversion output

MAIN OUT- Main output port S1-S8, Specific wiring please take reference to the below flight control output map

FS1-FS5- extension output interface, temporarily no definition

On the right :

POWER- PM Voltage current module port

DBUS OP - data extension

SERIAL4/5- Serial port 4 and 5 extension

RADIO- data transmission or OSD extension telem1

GPS - GPS extensions contain electronic compass

ADC&JR- ADC 3V3 Output and JR, the remote control input extension

SAFETY- unlock switch and safety button

Pixhack --The front interface detailed definition ver 1.86

SAFETY: Buzzer and unlock switch, interface

ADC&JR:Used to extend JR receiver and previous analog sensors, such as the airspeed and ultrasound

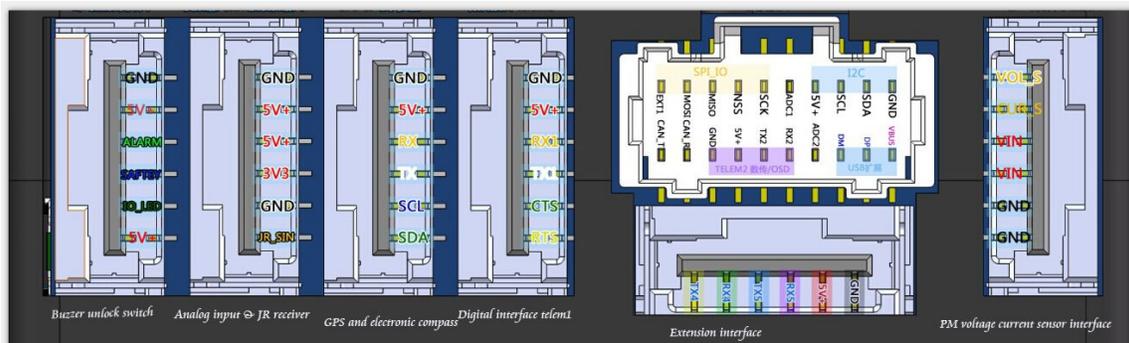
GPS: Used to extend the GPS, built-in I2C definition, all the GPS and compass only need to insert one cable

RADIO: 57600 baud rate ,Mavlink protocol, Can pick up data transmission or mavlink OSD

DBUS OP: The data bus extension, Specific definition see below,For example you can extend: USB,I2C,SPI,CAN,SERIAL2 etc.

SERIAL4/5:An interface containing two serial ports, SERIAL5 can external the second GPS ,SERIAL4 can DEBUG output (according to the software version, some firmware has no DEBUG output)

POWER: Voltage current sensor PM interface, please note that don't connect the PM sensor to other interface, or it will cause burning.



LED and buzzer meaning:

- The red and blue lights flash: initialization. Please wait a moment.
- Yellow light double flash: errors. System refused to unlock.
- Blue lights flash: already locked, GPS searching the star. Automatic navigation, hover, and return to the starting point mode need GPS lock.
- Green light flash: Has been locked, GPS lock have been obtained. Ready to unlock. From the locked state to unlock, there will be a quick reminder with two sounds.
- Green light long with single long sound : GPS lock and unlock. Ready to take off !
- Yellow light flash: remote fault protection is activated.
- Yellow light flash with fast repeated sound: battery fault protection is activated
- Yellow light blue lights flash with high - high - high - low sound: GPS data anomalies or GPS fault protection is activated.

Pixhack safety switch meaning (green LED):

- Fast, continuous flash: execution system self-check. Please wait a moment.
- Intermittent flash: System is ready.. Please press the safety switch button to activate the system.
- Often bright: ready to unlock. Can perform the unlock procedure.

Commonly used website:

<http://copter.ardupilot.com/> Fixed wing

<http://plane.ardupilot.com/> Multicopter

<http://ardupilot.com/> Main website

Download station (download and install automatically in Chinese, no need to install other driver, ground station can automatically install the driver)

<http://ardupilot.com/downloads/?category=35>

APM Planner 2.0 cross-platform ground station, Windows choose the version of Windows

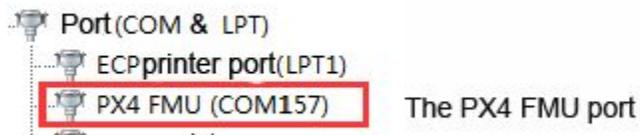
<http://ardupilot.com/downloads/?did=82>

MissionPlanner the classic apm station

The installation process does not explain. If lack of hint. Please download the corresponding versions on website .

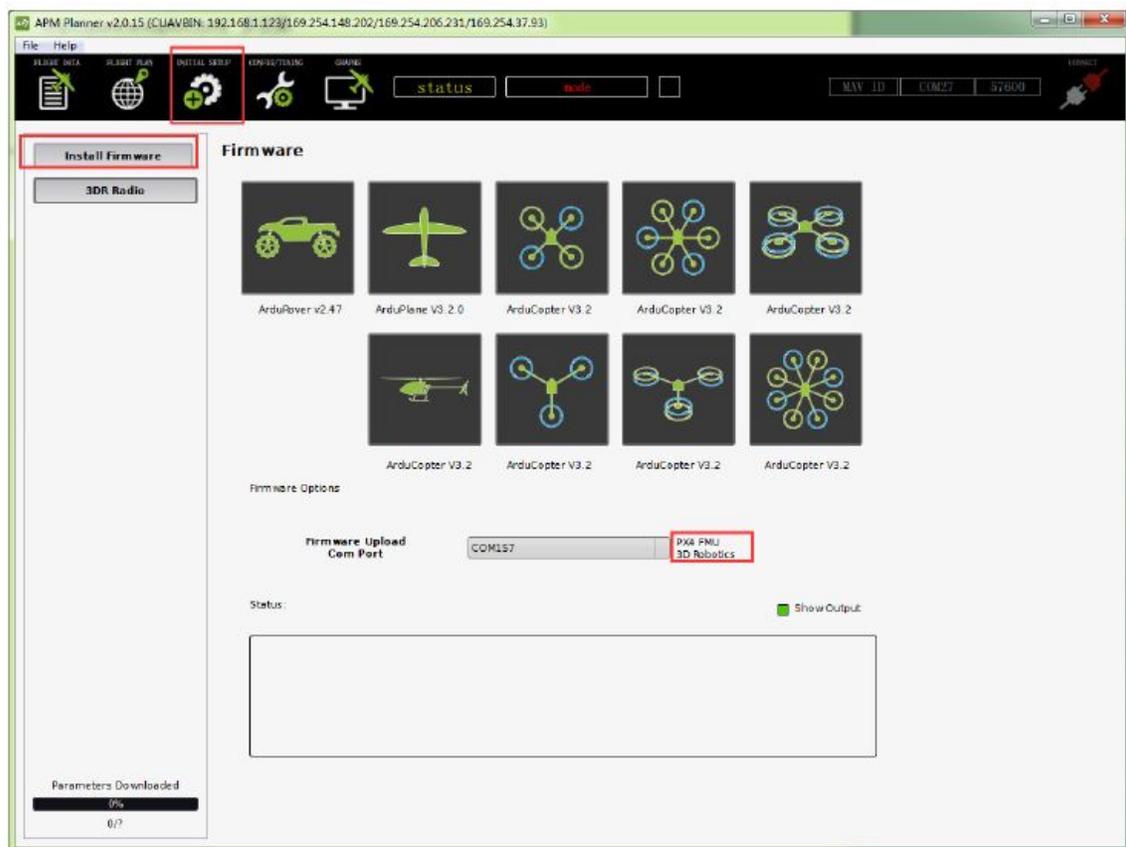
Download the firmware to the flight control:

APM Planner 2.0, for example, install the ground station, insert pixhack, should appear



Open MP 2.0 ground station

Ground station will automatically detect flight control ports, and display the version of the hardware

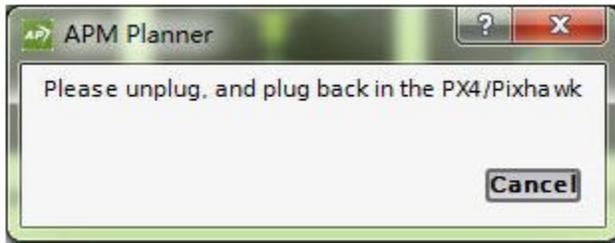


Then click on the corresponding flight control icon to go

Note: cross model and X model, are the same firmware, after download, you can set the corresponding flight mode (the default is X mode)

And then will be automatically downloaded from the Internet.

Tip:



Click on the FMU reset or reinsert pixhawk can automatically burn firmware to the flight control
And then automatically Erasing the board flight control firmware, finally prompt PX4 flashing is complete, burn out!

Because the server firmware is abroad, may failed.If unable to download firmware, you can try to use QGC ground station to burn the firmware, local methods refer to another document: "pix Burn local firmware"

Installed to the flight control and the initial calibration:

A basic flight system must contain the following parts:

- 1, Main control: pixhawk flight control
- 2, The remote control: over 7 channels remote control, if it not futaba, JR or receiver with a PPM, need to connect the PWM switch to the PPM encoder (JR compatibility to be test)
- 3,GPS and electronic compass
- 4, Wireless digital , Recommend the XBEE or 3DR Digital, Best choose XTEND
- 5,PM voltage current sensor built-in BEC
- 6, The complete aircraft contains the aerial carrier, motor , ESC ,propeller, etc .
Optional OSD video overlay system (AV camera + OSD + figure digital) , MAAT tracking antenna, etc.