7-Nano Controller

Product manual

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CUAV Tech Inc.,Ltd

Disclaimer

Read the content in this manual carefully before use to ensure that you can use this product correctly and safely. Please strictly follow the manual to install and use this product; our company shall not be liable for any damage or injury caused by improper use. For the needs of development and improvement, our company reserves the right to modify and refine product details and user instructions, and the relevant information shall be subject to the data provided by our staff. The content in this manual is provided based on the status of the product at the time of manufacture. Unless otherwise specified by applicable laws, our company makes no express or implied warranty of any kind regarding the accuracy, reliability and content of this document.

This product is only a pure hardware component for experimental unmanned systems, and the operating software is provided by a third party; moreover, we cannot control the user's intended use of the product. Our company only has the obligation to provide after-sales service within the product warranty period, and we do not provide reliability guarantees for any use cases. Our company shall not be liable for any direct, indirect, consequential, or accidental injury losses or penalties caused for any reason and under any circumstances. Once the product is used, it shall be deemed that you have recognized and accepted the contents of this statement.

Online documentation

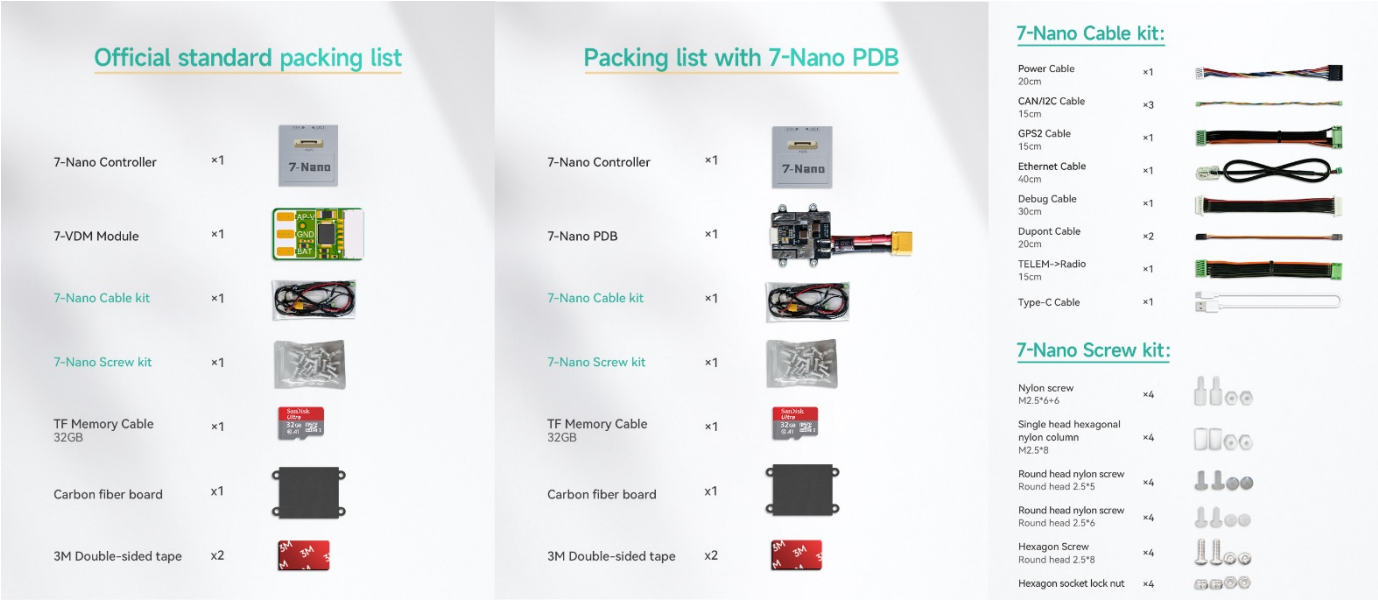
Please visit the CUAV docs for detailed tutorials and firmware downloads of this product: http://doc.cuav.net

Download ground control station

QGroundControl
https://docs.qgroundcontrol.com/en/getting_started/download_and_install.html

Mission Planner:
https://firmware.ardupilot.org/Tools/MissionPlanner/MissionPlanner-stable.msi

Parts List



Hardware specifications

Item	Parameter
Processor	STM32H753
Accelerometer	IIM-42652 BMI088
Gyroscope	IIM-42652 BMI088
Compass	IST8310
Barometer	ICP-20100/BMP581
Interfaces	
I2C	3
PWM out	14（Configurable for 3.3V/5V）
RC in	1 (Support PPM, SBUS, and DSM)
Rssi input	PWM or 3.3V analog voltage
Can	2
Power A	1
GPS& Safety Switch	1
GPS2	1
ADC	ADC3.3&ADC6.6
DEBUG	1
USB	Type-C
Ethernet	1

Controller Working environment and physical Spec	
Rated Voltage	4.5 ~ 5.5 V
USB Voltage	4.75 ~ 5.25 V
Servo Voltage	0 ~ 10v
Working Temp	-20 ~ 85°c
Size	30.75 x 31.8 x25.75mm
Size	33.8g
7-Nano PDB Power Module	
Rated Voltage	12-70V
Detection Current(MAX)	79.2A
BEC OUT	5.3V/4A
Voltage and Current Accuracy	±0.2V/0.5A
Splitter	Divided into six
Interfaces	XT60/GH1.25 6Pin
Weight	17g

Support firmware

7-Nano controller runs perfectly with ArduPliot 4.5.6/PX4 V1.15.0 and above firmware.

Firmware and source code

7-Nano supports PX4 and ArduPilot firmware. The compiled firmware is:
Download and write firmware tutorial:
https://doc.cuav.net/controller/7-nano/zh-hans/

If you want to modify the code; you can download the source code through the link below
ArduPilot Github
https://github.com/ArduPilot/ardupilot

PX4 Github
https://github.com/PX4/PX4-Autopilot

Compile firmware command(ArduPilot):
`./waf configure --board CUAV-7-Nano  //Compile CUAV-7-Nano branch firmware`

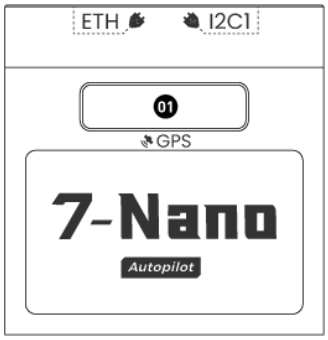
```
./waf copter --upload                    //Write the firmware to the controller
```

Compile firmware command(PX4):

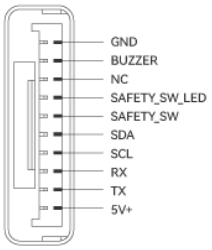
```
make cuav_7-nano_default                 //Compile cuav_7-nano branch firmware
```

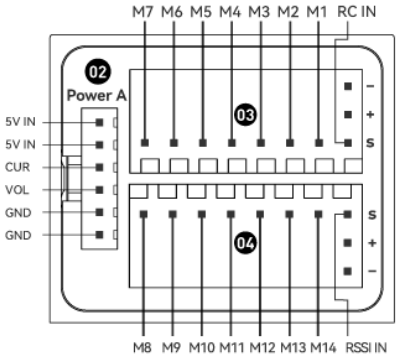
Pinouts

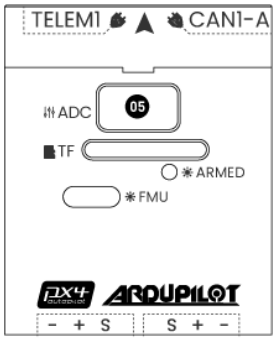
The 7-Nano interface is designed using the Pixhawk standard pinout. This may be incompatible with other interface definitions or cables. Please carefully read the interface specifications and use the original product wiring. Any damage to the device caused by wiring that does not follow the interface specifications is the user's sole responsibility.

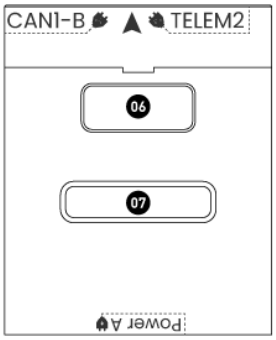


01 GPS&SAFETY
(USART 1)

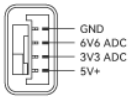




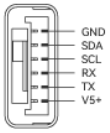




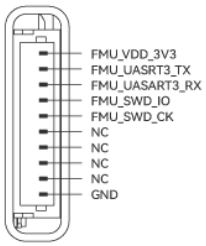
05 ADC



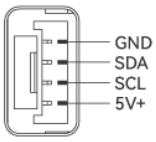
06 GPS2 (UART 8)



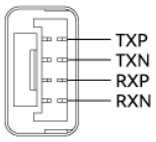
07 FMU DEBUG
(USART 3)



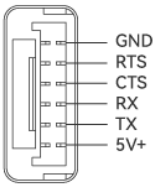
08 I2C1

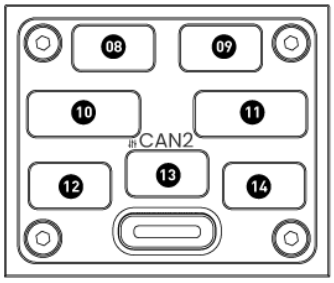


09 ETH

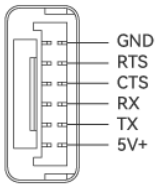


10 TELEM1 (UART 7)

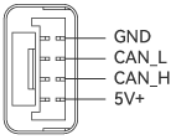




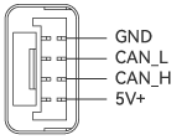
11 TELEM2 (UART 5)



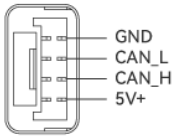
12 CAN1-A



13 CAN2

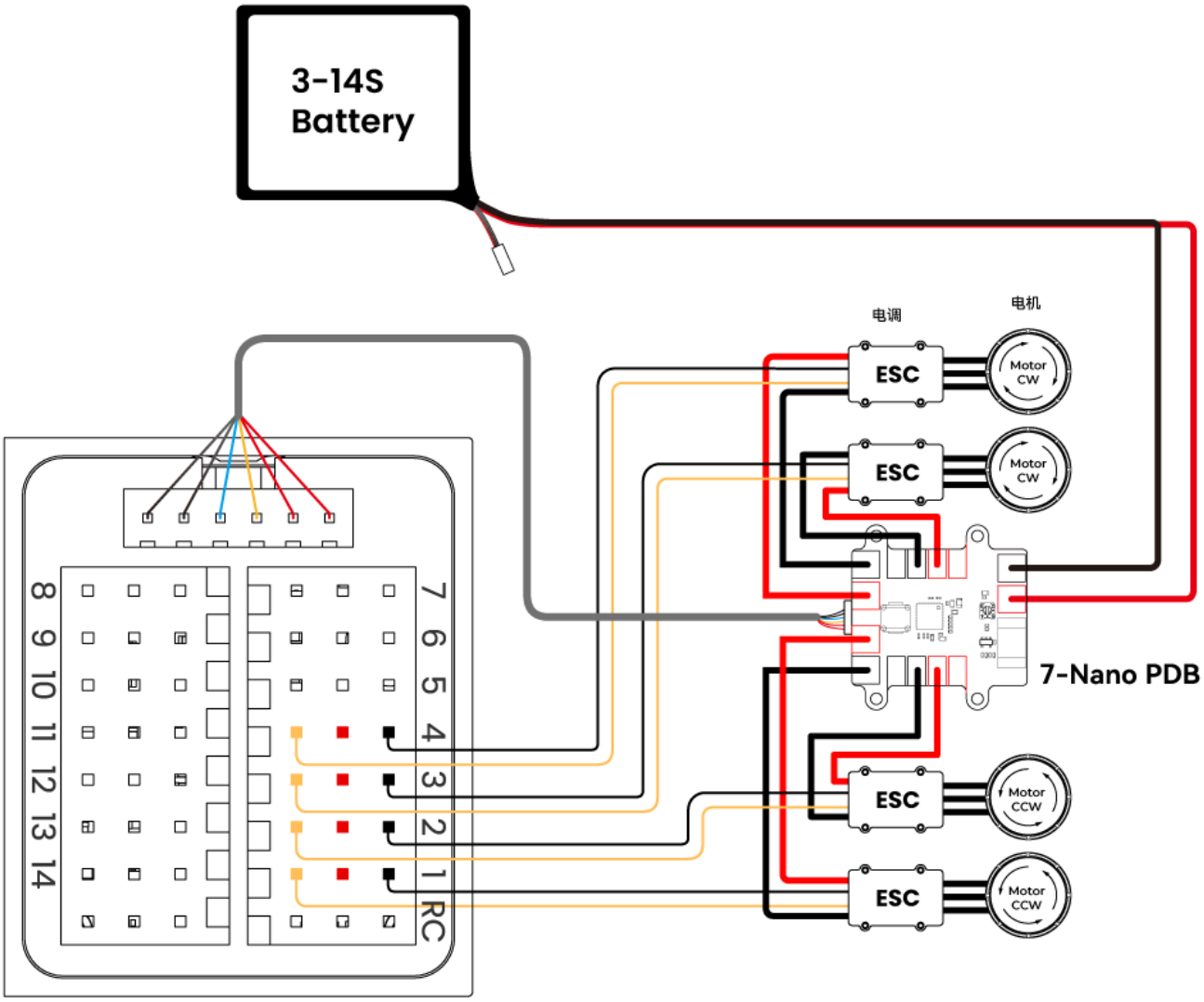


14 CAN1-B



Hardware connection diagram

Take the quadcopter as an example:



Product connection

Interface	Connected accessories
POWER A	Connect the 7-Nano PDB; it features power input and AD voltage-current detection functions.
M1~M14	PWM signal output port, which can be used to control motors or servos; and M1~M8 can be configured as 5V PWM.
RC IN	Connect the backlight for one-way protocols such as SBUS/DSM/PPMD (for ELRS/CRSF, it should be connected to any UART instead of RCIN).

RSSI	Used to connect the signal strength return module
GPS&SAFETY	Connect the Neo series GPS or C-RTK series RTK; it includes interfaces for GPS, safety switch, and buzzer.
GPS2	Used for FMU chip debugging, reading DEBUG device information; for Ardupilot, it can be configured for other UART purposes.
ADC	It includes ADC3.3 and ADC6.6, which can be used for analog level signal detection.
TF CARD	Insert an SD card to enable the log storage function.
ETH	Ethernet interface, which can be used to connect Ethernet devices such as companion computers.
I2C	Connect external I2C devices such as an external compass, which is used for communication between the controller and I2C devices.
TELEM1/TELME2	Connect telemetry modules, etc., for MAVLink data interaction
CAN1-A/B	Connect to a computer to enable communication between the controller and the computer, such as firmware loading.
CAN2	Connect DroneCAN devices such as CAN GPS, which is used for communication between the controller and DroneCAN devices (e.g., connecting NEO3 pro Dronecan GPS).
TYPE C	USB interface, which can be used for operations such as connecting to a ground station and firmware flashing.

Certification

Product has passed CE certification

Product has passed CE certification

CUAV has passed ISO 9001 quality management system certification

More information

CUAV official website：www.cuav.net

For more usage and assembly instructions, please visit the document center：doc.cuav.net