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User Manual

Hardware Parameter

2). Technical Specifications

Air Unit and Controller Hardware Information:

Processor: SoC - Pinecone S1

AP: 4 x large core, Cortex A53, 2.2GHz

4 x small core, Cortex A53, 1.4GHz

GPU: 4 core, Mali-T860

SDR: A7 + DSP

Storage: Air Unit LPDDR3 1GB, Controller LPDDR3 2GB

Air Unit/Controller: EMMC 4GB

Transmission Range: FCC20km, CE/SRRRC 12km

Latency: Min 110ms

Resolution: 720p/30fps, 1080p/30/60fps

Frequency Band: 2.4GHz ISM

Receive sensitivity: -99dBm@20MHz BW

Interference recovery: < 1s

HERELINK Air Unit

Model:HX4-06074

Brand:CubePilot

Frequency:2400-2483.5 MHz

Interface:

① **HDMI 2:** Micro HDMI, for video input

② **HDMI 1:** Micro HDMI, for video input (preferred)

③ **Power:** 5V - 12.6V max (3s Lipo supported) power input

④ **Micro USB:** For debug or upgrade, support OTG

⑤ **Pair/Reset:** For pairing and reset

⑥ **LED 1, 2:** To indicate pairing status and transmission status

⑦ **UART:** 3.3V / 5V UART

⑧ **S.bus:** Two 3.3V RC output

⑨ **ANT 1, 2:** MMX, for signal transmission and communication

Housing: Aluminum Weight: 95g (w. antennas)

Dimension: 78.5x30x15mm (w/o antennas)

Antenna: 2 x omni-directional antennas (2dBi)

Signal Bandwidth: 20MHz/10MHz

Power Consumption: <4W

1. Air Unit Status Indication and Buttons

LED 1 (left)

Steady Green Light: Receiving HDMI1 signal

Steady Red Light: Receiving HDMI2 signal

Steady Yellow Light: Receiving flight control data signal

Changing Green-Red Light: Receiving two video signals

Changing Yellow-Red Light:

Receiving two video signals and flight controller signal

No Light: Receiving no valid video signal or flight controller signal

LED 2 (right)

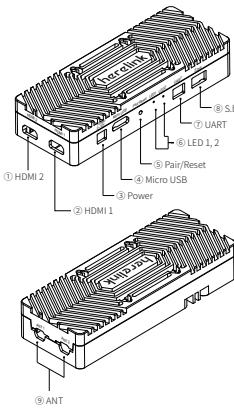
Flashing Green Light: Pairing

Steady Green Light: Receiving valid controller signal, and power is normal

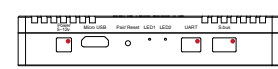
Steady Yellow Light: Unpaired/no valid signal received

Flashing Red Light: Unstable power

No Light: Air unit is not powered



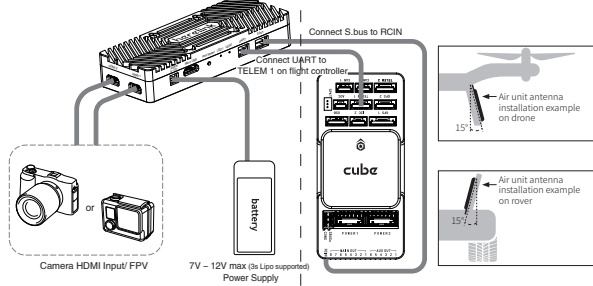
2. Air Unit Interfaces Definition



Pin #	Name	Description
1	Power	Power IN (5V - 12.6V max (3s Lipo supported))
2	GND	Ground pin

Pin #	Name	Description
1	RXD	RX of air module 3.3V / 5V TTL
2	TXD	TX of air module 3.3V / 5V TTL
3	GND	Ground pin

Pin #	Name	Description
1	S.bus out 1	RC output
2	GND	Ground pin
3	RSVD	For future use
4	GND	Ground pin



3. Air Unit Connections

- Mount the air unit securely to the drone.
- Choose the best position to attach the air unit antennas. Connect the antennas to ⑨ ANT 1, ANT 2 (MMX) on the air unit. (There shall be no metal parts or any conductor attached to antennas. Air unit antennas should be vertical. Diversity can be improved by placing antennas at $\sim 15^\circ$ degree angle as picture on Pg6) Please note that carbon fiber is conductive.
- Connect ⑧ S.bus on the air unit to RCIN on flight controller.

- Connect ⑦ UART on the air unit to TELEM 1 or TELEM 2 on flight controller.
- Connect 5V-12.6V max (3s Lipo supported) battery to the ③ power supply on the air unit.
- Connect camera to HDMI 1 (preferred) on the air unit. If you are using two cameras, connect the other one to HDMI 2. You may switch from Stream 1 and Stream 2 on the controller to display the corresponding video stream.

HERELINK Controller Unit

Model:HX4-06075

Brand:CubePilot

Frequency:2400-2483.5 MHz

Band 1:5180 MHz - 5240 MHz

Band 2:5260 MHz - 5320 MHz

Band 3:5500 MHz - 5720 MHz

Band 4:5745 MHz - 5825 MHz

Housing: Plastic Weight: 516g (w. antennas)

Dimensions: 217x106.5x31mm (w/o antennas, joysticks)

Screen: 5.46 inch, 1080P, 16 million colors,

Capacitive touch screen

Audio: 1 x built-in speaker, 2 x built-in microphone

Remote control: 2 x joystick, 1 x wheel

6 x button (w. backlight), 1 x upper right button

Communication: WIFI/GPS 2.4GHz on the controller side

LED: 2 x tricolor LED (left, right)

Interface: 1 x MicroUSB, 1 x Micro SD card slot (extendable to max. 64GB)

Antenna: 1 x detachable directional (5dBi)

1 x detachable omni-directional (2dBi), built-in WIFI antenna,

built-in GPS antenna, external GPS antenna interface

Power: 450mAh built-in Lipo Battery

Charging: Support micro USB 5V 2A charging

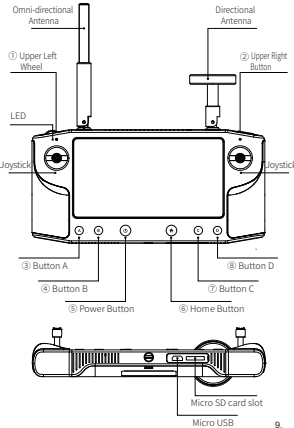
Power consumption: <4W average

(With transmission on, medium screen brightness, WIFI off, GPS off)

1. Controller LEDs/ Buttons/ Interfaces

Controller Buttons

① Upper Left Wheel: Control gimbal



- ② Upper Right Button: Take photo (configurable)
- ③ Button A: N/A (configurable)
- ④ Button B: Return to previous page (configurable)
- ⑤ Home Button: Power on/off and unlock screen
- ⑥ Home Button: Return to the ground control station
- ⑦ Button C: N/A (configurable)
- ⑧ Button D: N/A (configurable)

Controller LED (Left)

Flashing Red Light: Critical battery power

Steady Red Light: Low battery power

Steady Yellow Light: Medium battery power

Steady Green Light: Sufficient battery power

Controller Interface

Default interface for the controller is QGC. To disconnect drone, slide down system menu and turn on airplane mode. To connect drone, slide down system menu and turn off airplane mode.

To restart QGC, please click "Settings - Application - QGC" to stop the app. Then press the Home button to complete the restart.

2. Controller Antenna Assembly and Disassembly

To assemble the antenna, plug the omni-directional antenna into the top left hole of the controller and rotate to align. Then press and rotate clockwise to lock.

Plug the directional antenna into the top right hole of the controller and rotate to align. Then press and rotate clockwise to lock.

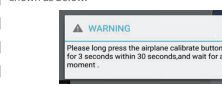
Disassemble antennas by pressing and rotating counter-clockwise. Then they can be pulled out. (Left is for omni-directional antenna; right is for directional antenna)

Pairing Air Unit and Controller

1). Controller and Air Unit Pairing Instruction

Initial Pairing:

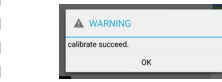
- Power on and unlock the controller. A warning will be shown as below:



- At the same time within 30s, long press the [Pair/Reset] button for 3s on the air unit to make the air unit enter pairing mode (air unit [Pair/Reset] is as shown below):

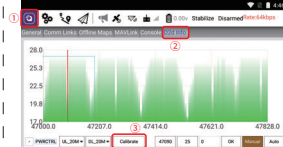


- Wait and observe QGC on the controller side. If pairing is successful, it will pop up 'calibrate succeed'. Click [OK] to complete the code matching process. If calibrate failed pops up, please restart the process.



Re-pairing:

- Click on [Q] icon on the controller
- Click [D2D Info] to enter pairing UI
- Click [Calibrate] to start pairing

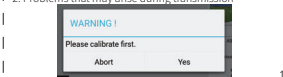


Then repeat Step2 and Step3 of "Initial Pairing"

2). Getting Video Stream to Work

- After pairing is completed, the air unit and the controller are connected successfully. Connect the air unit HDMI, turn on 1080P video input source in "Video Stream Settings" (refers to P12). The video will be displayed at the lower left corner of QGC. Click the video frame to display in full screen.

- Problems that may arise during transmission



Q1: Why is there no video transmission after the camera is connected to Herelink via HDMI? Meanwhile the controller screen shows "WAITING FOR VIDEO" and video stream at the upper right corner is changing around a few kbps?
Solution: Check if HDMI output resolution is 1080P (QGC resolution setting must be consistent with camera resolution setting). Please also check HDMI connection, or replace the HDMI cable with a new one.

Q2: The link rate in the upper right corner display kbps. Solution: Re-pair or restart machine.

3). Video Stream Settings

Click on Q icon in the upper left corner and select [Video Stream] from the drop-down menu on the right.

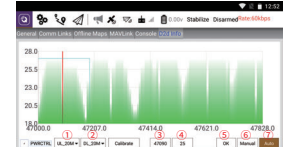


- ① **Rate:** Configure link rate (related to environment and current working mode)
- ② **Stream 2:** HDMI 2 (closer to power supply interface)
- ③ **Stream 2:** HDMI 2
- ④ **Enable Stream:** Turn on/off video display
- ⑤ **1080P Video:** Choose between video resolution. When the radio button is on: 1080P; off: 720P

- ⑥ **Grid Lines:** Grids on video display
- ⑦ **Record Stream:** Recording switch
- ⑧ **Video storage directory:**
PC: This PC\Optimus\Internal shared storage\G\GroundControl\Video
Herelink Controller: Storage\Explore\Optimus\G\GroundControl\Video
Screenshot:
Press Power button + D button at the same time.
Screen shot storage directory:
PC: This PC\Optimus\Internal shared storage\Pictures\Screenshots
Herelink Controller: Storage\Explore\Optimus\Pictures\Screenshots

4). D2d Info Settings

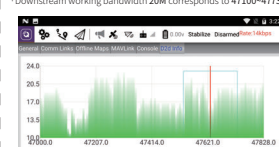
Click on Q icon in the upper left corner and select D2d Info X axis: Frequency. Red line represents the current working frequency Y-axis: SNR (signal-to-noise ratio). The larger the value is, the smaller the interference is.



- ① **Upstream working bandwidth:**
UL_1.4M / UL_10M / UL_20M
20M for less interference scenarios and long distances. 1.4M for multiple interference scenarios.

- ② **Downstream working bandwidth:**
DL_10M / DL_20M
20M for less interference scenarios and long distances. 10M for multiple interference scenarios.
- ③ **Current working frequency**
- ④ **Current working bandwidth SNR value**
- ⑤ **Confirm current setting**
- ⑥ **Manual Mode (Frequency Configurable Mode):**
User select working frequency according to the current environment.

Click Manual Mode, it will pop up "succeed". Then enter the target frequency manually in the red box as shown below, or touch the graph to select. Click OK to confirm.



Manual input frequency range is as follows:
Upstream working bandwidth 10M corresponds to 47050-47735
Downstream working bandwidth 20M corresponds to 47100-47735

After setting, UI will pop up "succeed". This means target frequency value, which is 47735, has been set.
(This value is for reference only, the actual working frequency should be set according to the environment of its own use)

- ⑦ **Auto Mode (Frequency Hopping Mode):**
It is recommended to work in this mode to automatically select the best working frequency.

Important Notes

- If you connected a GoPro 6 Black and disconnect it before video is connected to the air unit, the hot swap may result in no video output from GoPro. It is suggested to restart your GoPro or place the GoPro upside down to have the image back.
- Air unit power input: 5V - 12.6V max (3s Lipo supported). Any power range above that will burn the device.
- The temperature will rise when the air unit is connected with the controller. Temperature of the air unit can be checked on the controller side, and should be lower than 70 degrees.
- (If temperature rose over 70 degrees, installing a fan should be considered.)

FAQs

- Can language on the controller be switched? The system language can be switched in slide down menu, but QGC is default as English and cannot be switched.
- Why aren't the LEDs lit, even though the air unit are properly correctly connected? Check the power input. It should be 5V - 12.6V max (3s Lipo supported) and battery should have been charged.
- Why can't I connect to 2.4GHz WIFI? Currently, Herelink only enables 5.8GHz WIFI for internet connection. Therefore, to load maps, you will need to connect to a 5.8GHz WIFI network.

Table of Contents

Hardware Parameter	
Accessories	2
Technical Specifications	2
Air Unit	
Interfaces	3
Air Unit Status Indication and Buttons	4
Air Unit Interfaces Definition	5
Air Unit Connections	6
Controller	
Controller LEDs/ Buttons/ Interfaces	8
Controller Antenna Assembly	10
Disassembly	
Pairing Air Unit and Controller	
Controller and Air Unit Pairing	11
Instruction Initial Pairing	
Getting Video Stream to Work	12
Video Stream Settings	13
D2d Info Settings	14
Important Notes	16
FAQs	16
Warning	17

Warning
Caution: The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules and Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC/IC Radiation Exposure Statement:
This equipment complies with FCC and Canada radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Déclaration d'IC sur l'exposition aux radiations:
Cet équipement est conforme aux limites d'exposition aux radiations définies par le Canada pour des environnements non contrôlés.

Cet émetteur ne doit pas être installé au même endroit ni utilisé avec une autre antenne ou autre émetteur.

For Air Unit
This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body. Cet équipement doit être installé et utilisé à une distance minimum de 20 cm entre l'antenne et votre corps.

NCC警告

A取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更設計之特性及功能。低功率射頻器材之使用不得影響航宇安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規作業之無線電通信。低功率射頻器材須符合安全法通信或工業、科學及醫療用電波輻射性電磁場之干擾。

B應避免影響附近雷達系統之操作。

C應避免指向性天線只連導應用於固定式對點系統。