herelink
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/SRRC 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
Interfaces:
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

2.

⑧ **S.bus**: Two 3.3V RC output
⑨ **ANT 1, 2**: MMCX, 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 Green-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
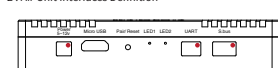Steady Green Ligh: Receiving valid controller signal, and power is normal
Steady Yellow Light: Unpaired/no valid signal received
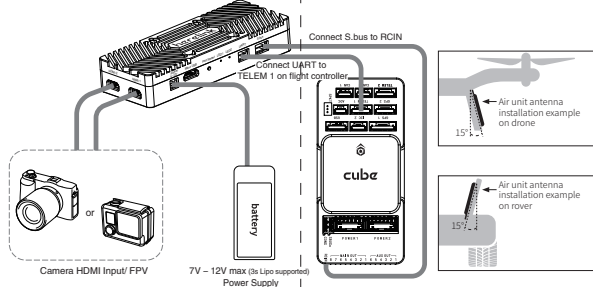Flashing Red Light: Unstable power
No Light: Air unit is not powered

3.

⑧ S.bus
⑦ UART
⑥ LED 1, 2
⑤ Pair/Reset
④ Micro USB
③ Power
① HDMI 2
② HDMI 1
⑨ ANT

4.
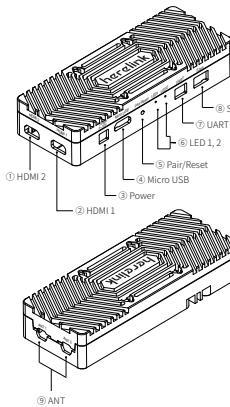
2 . Air Unit Interfaces Definition

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

UART	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

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

5.

Connect S.bus to RCIN
Connect UART to TELEM 1 on flight controller
Camera HDMI Input/ FPV
7V – 12V max (3s Lipo supported) Power Supply

Air unit antenna installation example on drone
Air unit antenna installation example on rover

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 (MMCX) 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 improvd by placing antennas at ~~15 degree angle as picture on P6) Please note that carbon fiber is conductive.
· Connect ⑧ S.bus on the air unit to RCIN on flight controller.

6.

· 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.

7.

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. blacklight), 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
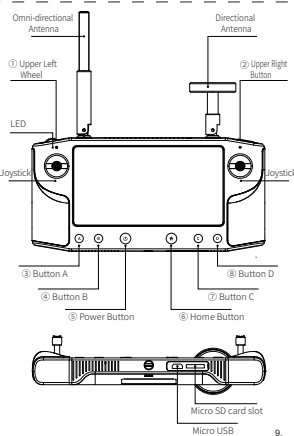Power: 4950mAh built-in Lipo Battery
Charging: Support micro USB 5V 2A charging
Power consumption: < 4W average
(With transmission on, medium screen brightness, WIFI off, GPS off)

1. Controller LEDs/ Buttons/ Interfaces
Controller Buttons
① **Upper Left Wheel**: Control gimbal

8.

Omni-directional Antenna
Directional Antenna
① Upper Left Wheel
② Upper Right Button
LED
Joystick
Joystick
③ Button A
④ Button B
⑤ Power Button
⑥ Home Button
⑧ Button D
⑦ Button C
Micro SD card slot
Micro USB

9.

② **Upper Right Botton**: Take photo (configurable)
③ **Button A**: N/A (configurable)
④ **Button B**: Return to previous page (configurable)
⑤ **Power 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 OGC, 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 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)

10.

Pairing Air Unit and Controller
1). Controller and Air Unit Pairing Instruction
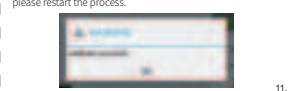**Initial Pairing:**
1. Power on and unlock the controller. A warning will be shown as below:

2. 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):
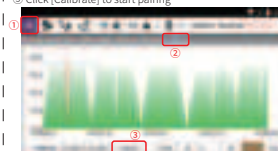

3. Wait and observe QGC on the controller side. If pairing is successful, it will pop up calibrate succeed. Click [OK] to complete the code matching process. If calibrate failed pops up, please restart the process.


11.

Re-pairing:
① Click on [Q] icon on the controller
② Click [D2D Info] to enter pairing UI
③ Click [Calibrate] to start pairing

Then repeat Step2 and Step3 of "Initial Pairing"

2). Getting Video Stream to Work
1. 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.

2. Problems that may arise during transmission

12.
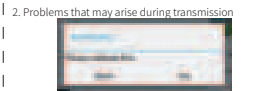
Q1: Why is there no video transmission after the camera is connected to Herelink via HDMI? Meanwhile the controller screen shows "WAITING FOR VIDEO" and video stream at the upper right corner is changing around a few kbps?
Solution: Check if HDMI output resolution is 1080P (QGC resolution setting must 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 0kbps
Solution: Re-pair or restart machine.

3). Video Stream Settings
Click on the airplane icon at the upper left corner and select [Video Stream] from the drop-down menu on the right.
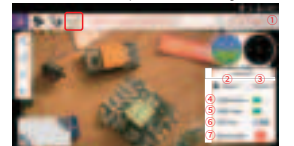
① **Rate**: Configure link rate (related to environment and current working mode)
② **Stream 1**: HDMI 1 (closer to power supply interface)
③ **Stream 2**: HDMI 2
④ **Enable Stream**: Turn on/off video display
⑤ **1080P Video**: Choose between video resolution. When the radio button is on: 1080P; off: 720P

13.

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

14.

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 **47050~47785**
· Downstream working bandwidth **20M** corresponds to **47100~47735**
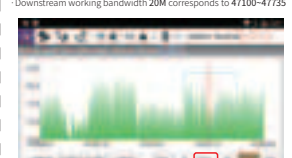
After setting, UI will pop up "succeed". This means target frequency value, which is 47751, has been set.
(This value is for reference only, the actual working frequency should be set according to the environment of its own use)

15.

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

Important Notes
1. 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.
2. Air unit power input: 5V - 12.6V max (3s Lipo supported). Any power range above that will burn the device.
3. 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
1. 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.
2. 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.
3. Why can't 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.

16.