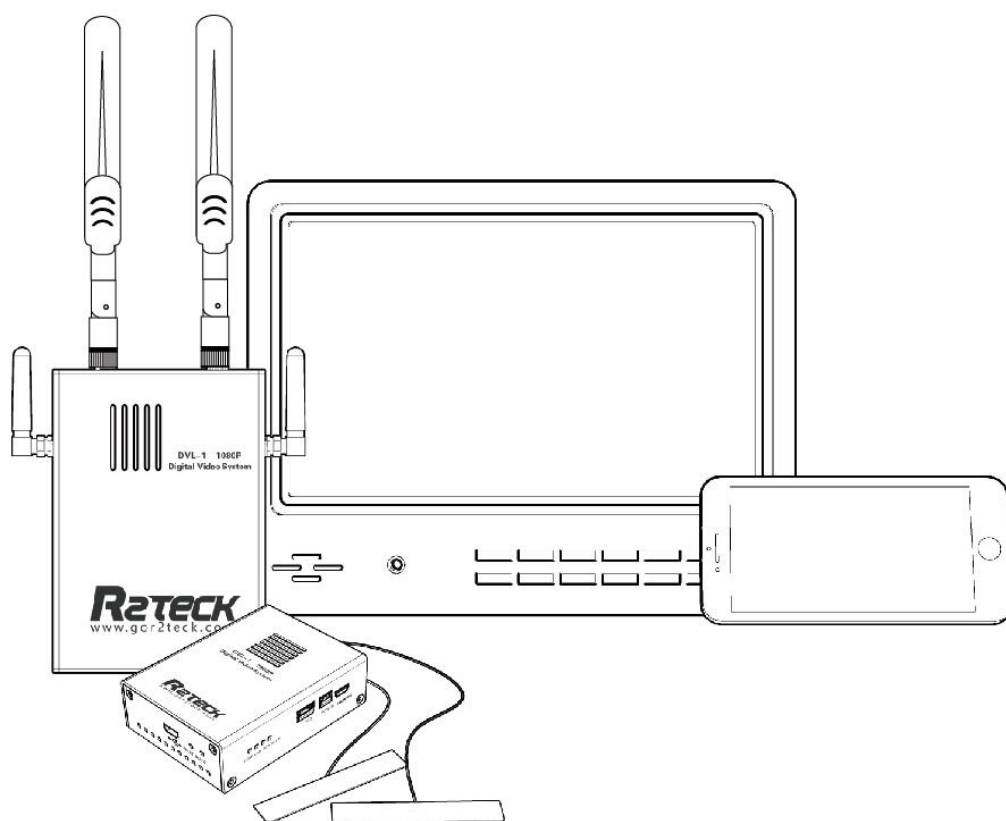# R2TECK

1080P Full-HD Digital Video Transmission System

USER MANUAL

WUXI R2TECK TECHNOLOGY CO., LTD

R2TECK

Content

1. Easy way to start the device

1.1 Operating steps and instructions.

1.1.1 Air system

➢ Install the antennas.
➢ Install the HDMI camera cable.
➢ Install OSD cable (optional)
➢ Connect camera to the power, select the correct video format.
➢ Connect air system to the power.

There should be below instructions if the air system works well.

WORK light flash regularly.

HDMI light turn-on

OSD light turn-on (if installed the OSD device)

LINK light turn-on if the air system connect to ground system.

1.1.2 Ground system

➢ Install the antennas
➢ Install the monitor by HDMI cable. (optional)
➢ Turn off the ground system power button, then connect to the power (battery of 12V-DC power), turn on the ground system power button again.
➢ Turn on the power.

There should be below instructions if the ground system works well.

WORK light flash regularly

HDMI light turn-on(if installed the HDMI monitor).

LINK light turn-on if the air system connect to air system.

HDMI monitor instruction (if installed the HDMI monitor):

The monitor shows logo "R2TECK" after ground system connect to the power.

After that, the monitor shows progress bar: Start-up / Selfcheck / Link.

Monitor real-time display the camera video and OSD data when the air system connect to the ground system. (if OSD device is installed)

1.1.3 Mobile

➢ The mobile connect the wifi network "R2TECK_DVL1", WIFI password "12345688"
➢ wait for connecting
➢ Run the APP (if the APP is already running, turn off it first then run again)
➢ The mobile real-time display the camera video, the MOBILE light on the ground system turn-on.

Attention: Currently only allow working one mobile, if want to change the mobile, please follow below process:

Disconnect the mobile with ground system wifi network.

Wait ground system MOBILE light turn off.

Repeat the above 4 steps.

HDMI cable connect

Camera

Air System

Monitor

Ground System

HDMI cable connect

WIFI connect

Mobile
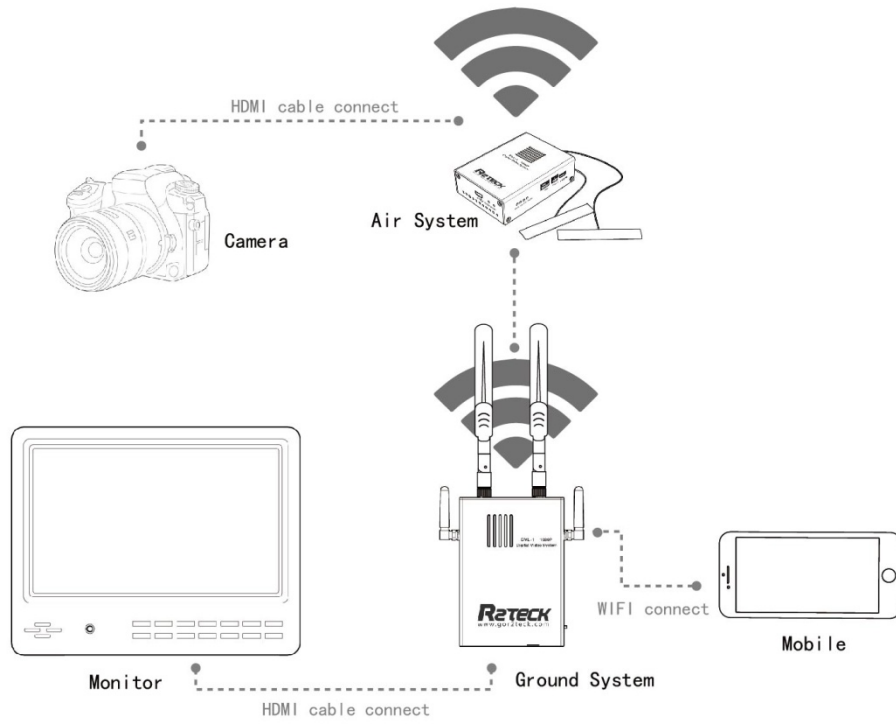
1.1.3.1

2. Specification

Here list the detailed specification about DVL1

Function specification	
Communication distance (outdoor, no obstruction)	100mv ground distance ≥ 800m 500mv ground distance ≥ 1500m (double distance in air) If change to the wide angel directional patch antenna, the distance will be double.
Output Power	60mW
Sensitivity	-95dbm±2dbm
Frequency	5G
Physics specification	
working temperature	-10~60℃
storage temperature	-20~50℃
dimension (including the shell, not including the antennas)	Air system: L.76mm x W. 54mm x H. 22mm Ground system: L.105mm x W. 74mm x H. 26mm
Weight (including the shell, not including the antennas)	Air system: 86g Ground system: 174g
Hardware function support	
Air system working voltage	2S~3S，12V-DC
Ground system working voltage	2S~3S，12V-DC

3 Introduction

3.1 Disclaimer

Thanks for purchasing the DVL1 from Wuxi R2TECK. Everyone need to read and understand this disclaimer before using the DVL1. You are supposed to be accepted the disclaimer once the product is started to use. Please comply with the installation and using process indicated in this use manual. Wuxi R2TECK will not be responsible for the consequence of the improper use, improper install, improper modify.

The product name, brand mentioned here are belong to R2TECK.

3.2 Profile

This use manual as the instruction of Full-HD Digital Video Transmission system DVL1, the components and functions mentioned here may not be the standard spec. please check the enclosed list with the product, please contact with the dealer if you have any question

The right of the manual write, modify and release only belong to Wuxi R2TECK, Without the authorization of Wuxi R2TECK, this use manual could not be copied or modified or released

The information in this manual is only for DVL1 Full-HD Digital Video Transmission System.

This manual is subject to change without prior notice.

Version	
profile code & version	release date
RR.H.0001.0017.V01	2016.9

3.3 Intended usage

DVL1 use for wireless Full-HD Digital Video transmission

3.4 Caution

⚠ The effectiveness of the use recorder is subject to if comply with operate and maintain direction in this manual.

Before start the product, the staff must make sure the operate process and condition is correct. specially to check the product cables are good or not, if the cable is damaged, please change it before start the product.

⚠ DVL is intended to use on the UAV and other Full-HD digital video transmission. DVL1 may not be reached the defined function if it works in the improper temperature, improper humidity and improver air pressure.
DVL1 should not work when it is wet. Have to make sure it is dry when you use it.

⚠ DVL1 is the high precise product, it is forbid to beat and clash.

⚠ Product life time is 2 years, quality warranty is 1 year.

⚠ Manufacture and dealer are responsible for the product maintenance, without the authorization, please don't fix the product and don't modify the product.
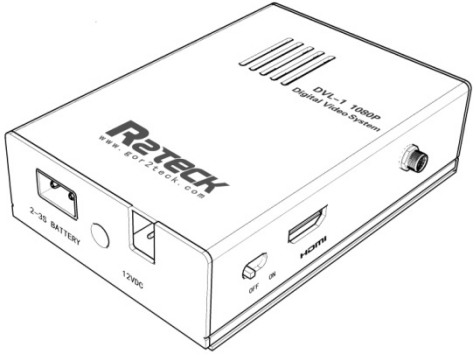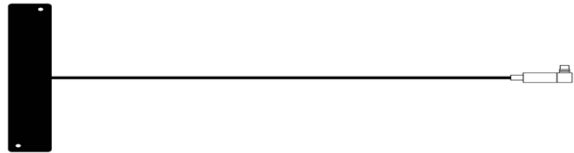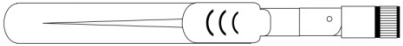
4. Product overview

4.1 Brief introduction

DVL1 is the 1080p full-HD Digital Video transmission system which including air part and ground part, it transmit the video, image, OSD and more information by the wireless communication mode. DVL is perfect for all fields video transmission because of the light weight, low power, long distance, low latency. Please install the air system on the aircraft, connect the ground system to the monitor or mobile phone to monitoring the video and OSD.
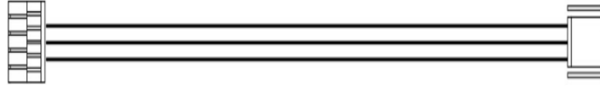
4.2 Standard spec

4.2.1 product main part
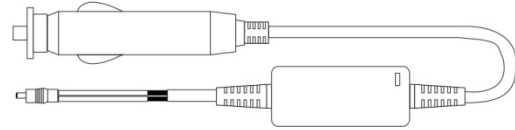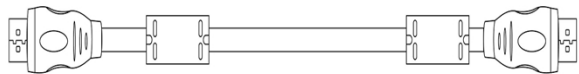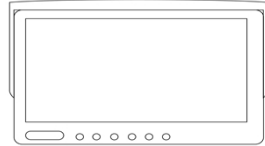
Air system x 1	Ground system x 1
Air system antenna x 2	Ground system antenna x 2
	Ground system mobile antenna x 2

4.2.2 Air system cable

Air system power cable x 1 (standard)	
Air system power cable 12V	
Flight controller APM OSD cable x 1	
APM flight controller system OSD data cable	
Flight controller pixhawk OSD cable x 1	

pixhawk flight controller system OSD data cable	
HDMI cable (D-D) x 1	
Camera HDMI cable	
HDMI cable (D-C) x 1 (optional)	
Camera HDMI cable	

4.2.3 Ground system cable

Power adapter x 1 (optional)	
Vehicle power 12V-DC for ground system	
HDMI cable x 1 (optional)	
Monitor HDMI cable	
Monitor x 1 (optional)	
For video receive and monitoring	
Ground system tripod x 1 (optional)	
Ground system tripod	
Extension tripod x 1 (standard)	
Extension bar	
Battery bin x 1	
Directly charging the ground system in battery bin..	

5. Port definition

5.1 Air system port

5.1.1 Back side
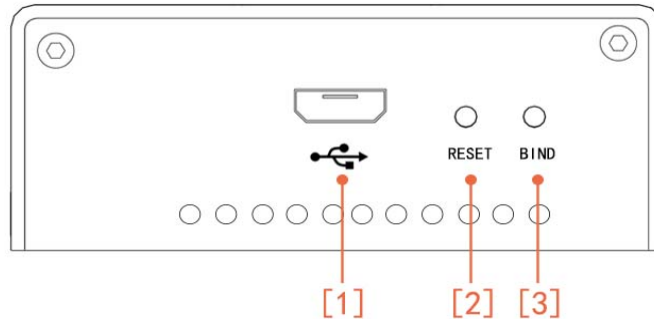
5.1.1.1

[1]: For Firmwire upgrade by connect to the PC.
[2]: For restore factory setting
   Press the button more than 5 seconds, 4 lights (HDMI, LINK, OSD, WORK) are all turn-off, 4 lights flash as 0.5Hz frequency, that means factory setting restore is finished.
[3]: For bind the air system and ground system.
   Press the button more than 5 seconds, 4 lights (HDMI, LINK, OSD, WORK) are all turn-off, then 4 lights flash one by one, when the LED light works well that means they are well bind.

5.1.2 Right side port
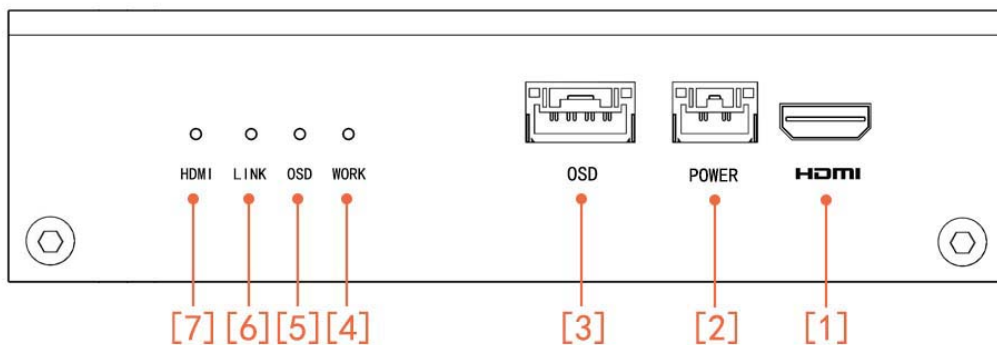
5.1.2.1

[1]: HDMI port, for connecting with the camera.
[2]: Power port, for air system get the power DC-12 V or 2S~3S from the aircraft.
[3]: OSD port, for connecting with the flight controller systerm to get the OSD data.
[4]: Work light, for monitoring the air system working status.

9

Light status	Description	Action
Flash regularly	air system works well	NA
other status	air system does not work	Connect the system to the power again, or contact with the customer service.

[5:]OSD light, for monitoring OSD connect status

Light status	Description	Action
Turn-on	OSD is well connected the flight controller system	NA
Turn-off	OSD is not well connected the flight controller system	check if the cable connect correctly or not

[6]:Link light, for monitoring the status of connect with the ground system

Light status	Description	Action
Turn-on	Connect with ground system well	NA
Turn-off	Does not connect with ground system	1. Please wait for connecting 2. Make sure the ground system is connected the power. 3. Bind the air system and ground system again 4. Connect the power again

[7]: HDMI light, for monitoring the camera status

Light status	Description	Action
Turn-on	Camera connect well	NA
Turn-off	Camera does not connect	check camera cable position
Flash	Camera output format is not correct	check camera output format setting

5.1.3 Front side port
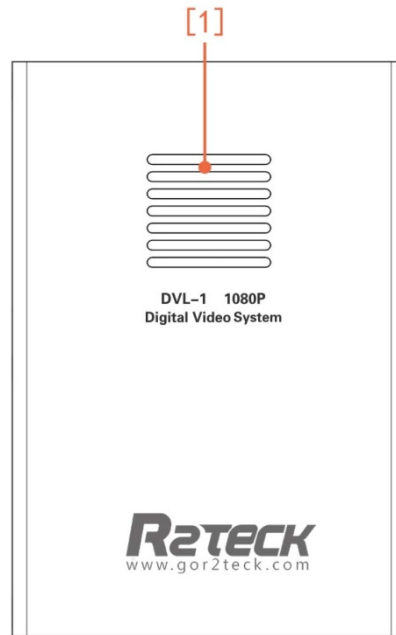
5.1.3.1

Cooling fan: Pay attention to not cover the cooling fan.

5.2 Ground system port

5.2.1 Bottom side port
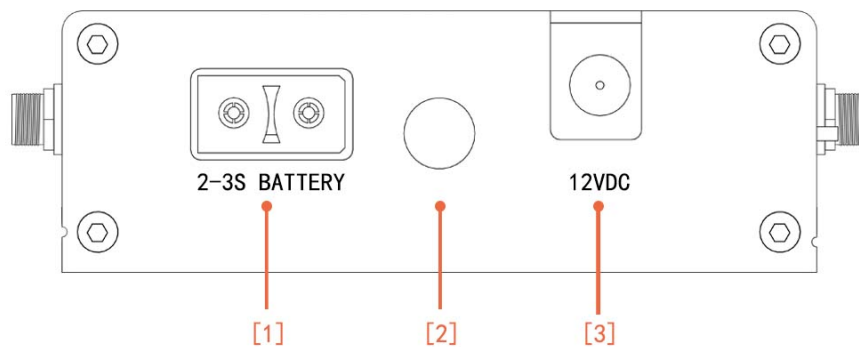
5.2.1.1

[1]: Battery port, for connect with 2s/3s battery.

[2]: fix hole, for fixing the ground system on the tripod.

[3]: DC power port, for ground system to connect with the DC power, suggest output power is more than 1A.

5.2.2 Left side port
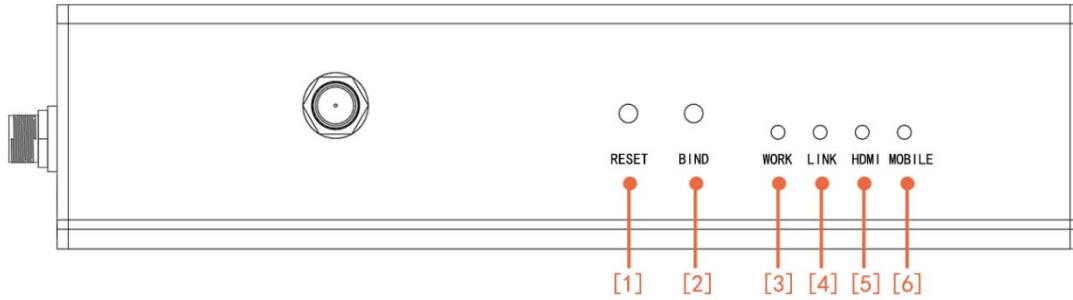
5.2.2.1

[1]: For reset to factory setting.

Press the button more than 5 seconds, 4 lights (HDMI, LINK, OSD, WORK) are all turn-off, 4 lights flash as 0.5Hz frequency, that means factory setting restore is finished.

[2]: For bind the air part and ground part.

Press the button more than 5 seconds, 4 lights (HDMI, LINK, OSD, WORK) are all turn-off, then stop press the button, 4 lights flash one by one, when the LED light works well that means they are well binded.

[3]: Monitor the ground system work status

Light status	Description	Action
Flash regularly	Ground system works well	NA
Other status	Ground system does not work well	Connect the power again or contact with the customer service

[4]: Monitor air system and ground system connect status

Light status	Description	Action
Turn-on	Connect with air system	NA
Turn-off	Des not connect with air system	1. Please wait for connecting 2. Make sure the air system is connecting the power. 3. Bind the air system and ground system again. 4. Connect the power again

[5]: monitor the display device status

Light status	Description	Action
Turn-on	Display device connect well	NA
Turn-off	Display device does not connect	Check Display device cable position

[6]: Monitor mobile connect status

12

Light status	Description	Action
Turn-on	Mobile connect well	NA
Turn-off	No mobile connect	Make sure the mobile connect with the network, turn off the software then turn on again.

5.2.3 Right side port
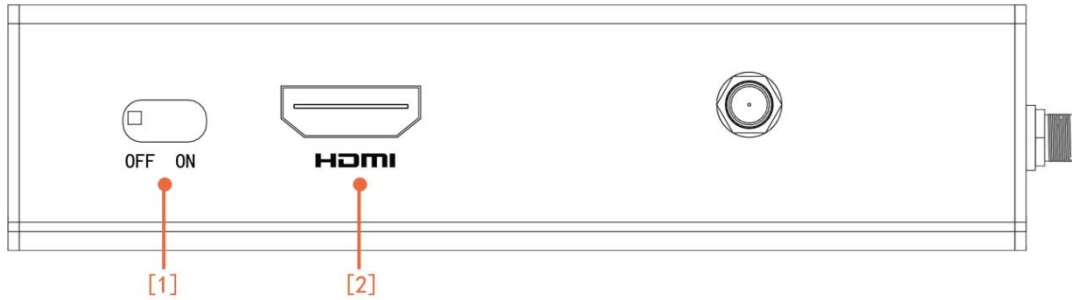
5.2.3.1

[1]: Power button, ON (the system connect the power), OFF (the system without the power)

[2]: HDMI port, for connect with the monitor.

5.2.4 Front side port
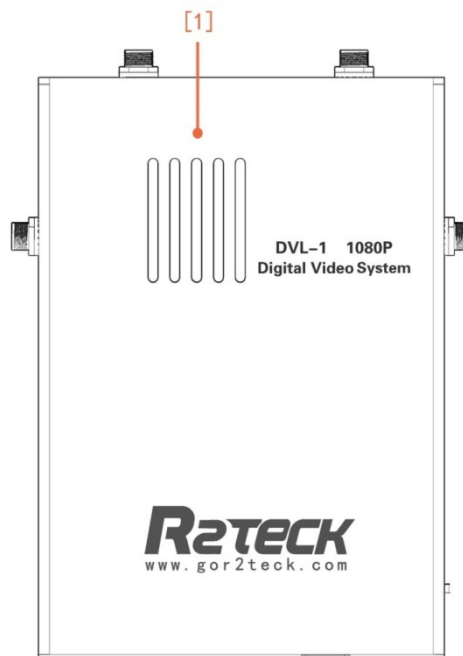
5.2.4.1

Air vent: Pay attention to not cover the air vent.

6. Installation

6.1 Air system installation

6.1.1 Antenna installation

➢ take out two pcs air system antenna.
➢ Install them on the air system antenna holes.
  Attention: One antenna should be in two opposite direction, the feeder cable should be horizontal to the ground, the antennas should be perpendicular to the ground.
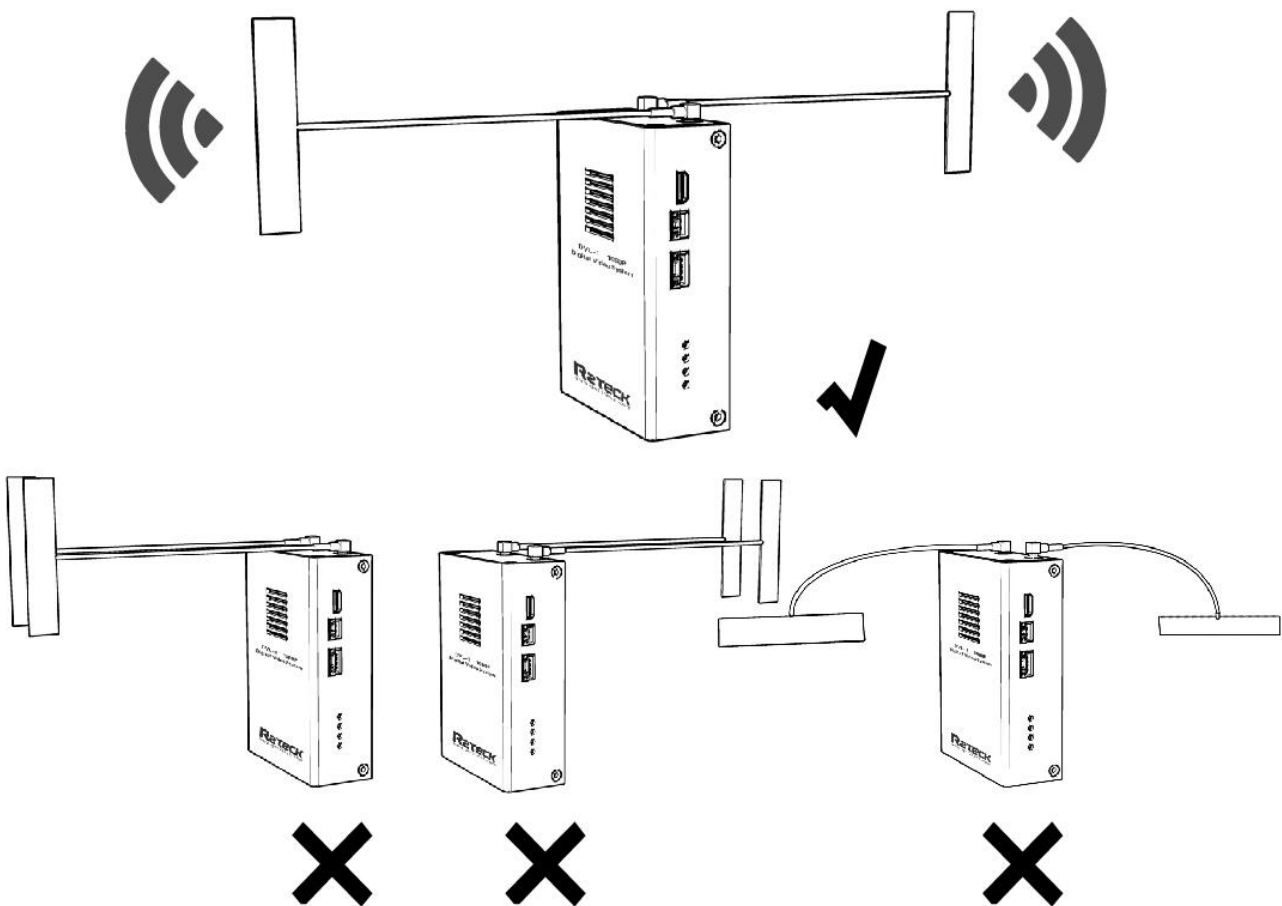
6.1.1.1

6.1.2 HDMI cable installation

There are two types HDMI cable (D-D / D-C), select the correct HDMI cable according to the camera HDMI port, one end of cable connect to the camera, another end of cable connect to the air system.

6.1.3 OSD cable installation

Two OSD cables connect to APM flight controller, the cable port with 4 pins
Three OSD cables connect to pixhawk flight controller, the cable port with 6 pins

One end of OSD cable connect with flight controller, another end of cable connect to air system.

6.1.4 power cable installation

one end with terminals of the cable connect with air system power port, another end of cable connect with power 12V-DC, the red cable is positive, the black is negtive.

6.2 Ground system installation

6.2.1 Antennas installation

Prepared 4pcs ground system antennas, 2pcs of each style, fix them on the ground system according the photo below:
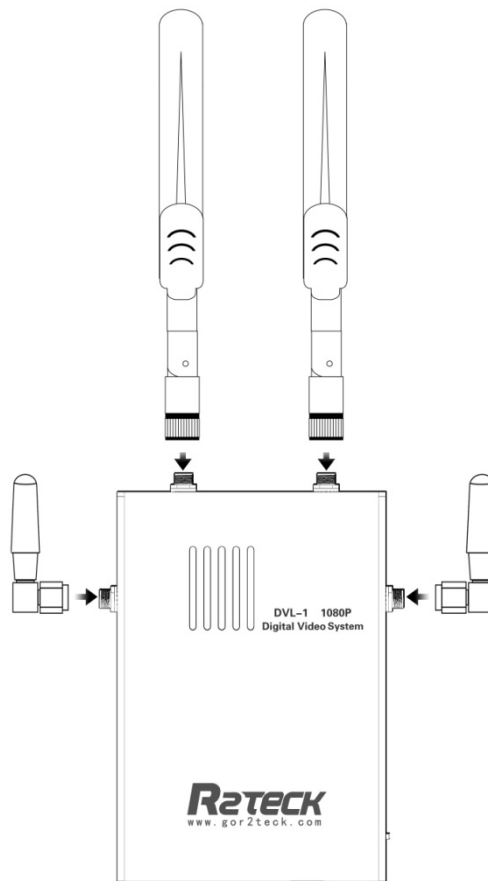
6.2.1.1

6.2.2 HDMI cable installation

One end of HDMI connect to the monitor, another end of HDMI connect to the ground system.

6.2.3 Power cable installation

Both of DC and AC power are supported by the ground system.

Support 2s-3s model battery

Support 12V-DC power, suggest the output power is more than 1A.

Connect to the power according to the requirement.

6.2.4 Mobile APP installation

Currently only support IOS mobile with version not lower than 8.0, android system

will be released later.

- ➢ open the website: http://fir.im/r2app
- ➢ Click "download"
- ➢ Wait for download finishing.
- ➢ Open the mobile "Setting" - "General" - "Profile & Device Management"
- ➢ Open the software, allow to access the album.

Mobile APP is well installed!

7. Bind and reset

7.1 reset

Function explanation: The function is for restore the device specification and bind ID to factory setting.

Process: the device LED light shows correctly, press RESET button more than 5 seconds, all the LED light turn off, release the button. All the LED light flash regularly, means the device start the restore progress. when all the LED lights shows correctly that means restore factory setting progress is finished.

Attention: when the device restored factory setting, that means different set of air system and ground system could be connected, in order to avoid mixing the device, manufacture suggest to pair up the device after restore factory setting. Restore factory setting progress could be worked in air system or ground system separately, no need to connect them together or restore them at same time. When the air system is connecting with the ground system, the video will be paused one time during the restore factory setting progress, the video will work correctly when the progress is finished.

7.2 Bind

Function explanation: bind function if for the device restore factory setting, and bind one air system with one ground system.

Process: the device LED light shows correctly, press two BIND buttons on air system and ground system together and keep more than 5 seconds, all the LED light turn off, release the button. All the LED light flash one by one regularly, means the device start the bind progress. when all the LED lights shows correctly that means bind progress is finished.

Attention:

When the air system is connecting with the ground system, the video will be paused two times during the bind progress, the video will work correctly when the progress is finished. one air system only work together with the bind ground system after processed the bind function. Bind progress should be worked on the air system and ground system at same time, please turn off other devices during bind progress in order to avoid mismatching errors.

All the buttons on the air system and ground system will be worked after the device started 30 seconds later, the LED lights flash high speed means the buttons are not available now.

8. APP instruction

8.1 OSD setting

Click OSD button, select "Turn-on" or "Turn off", match to the "Display" or "Not display"
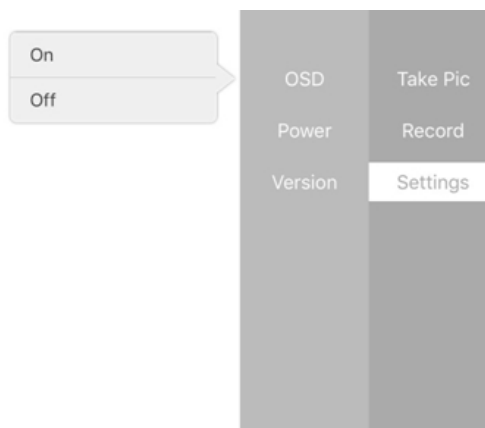
8.1.1

9. Troubles solution

Below is the device maintenances about DVL1, to help the users whom don't have professional testing equipments and technology to solve the simply troubles.

9.1 Trouble symptoms / diagnosis / solution

Symptoms	Diagnosis		Solution
No video	Did not follow the process		Follow the process as chapter 1
	Air system	HDMI light flash	1. video format does not correct, check if the camera is supported by DVL1 and select the correct video format, the camera list as appendix 2. Camera HDMI cable is bad contacted, connect the HDMI cable again.
		HDMI light turn-off	Camera HDMI cable is bad contacted, connect the HDMI cable again.
		WORK light is abnormal (not flash regularly)	Connect the power again.
		LINK light turn-off	Connect the power again
	Ground system	HDMI light turn-off	Camera HDMI cable is bad contacted, connect the HDMI cable again.
		WORK light is abnormal (not flash regularly)	Connect the power again.
		LINK light turn-off	Connect the power again.
	Bind abnormal	LINK light turn-off	If the above solutions do not work, please restore factory setting Restore factory setting succeed, suggest to process the bind progress. Action and instruction as chapter 7
Blue screen	Air system HDMI bad contact		Please make sure HDMI cable works and connect with the device well.

Video pause	HDMI cable problem		Change a new HDMI cable
	Out of allowed distance		Back to the allowed distance
OSD abnormal	OSD format not support		Check OSD device supported by DVL1 or not, the OSD list as appendix.
	OSD cable bad contact		Connect the air system OSD cable again.
Flight controller voltage VT data abnormal	power did not calibrate		please calibrate the flight controller voltage according to ground station software in advance.

If the above solutions do not work, please contact with the customer service.

10. Appendix

10.1 Video input format requirement

Signal type	Video format	Resolution	Remark
HDMI	PAL, NTSC	1080p@60fps 1080p@50fps 1080p@25fps 1080i@60fps 1080i@50fps 720p@60fps 720p@50fps 720p@25fps	IF want to change the resolution, you have to re-start the both of the air system and ground system.

If the device is in the above list, the device is supported.

10.2 OSD flight controller compatibility

10.2.1 APM

One end of OSD cable connect to APM flight controller port, another end of OSD cable connect to the air system OSD port.

Digital transmission port
insert 3DR digital transmitter directly

USD cable port

Voltage and current sensor

I2C port

GPS port
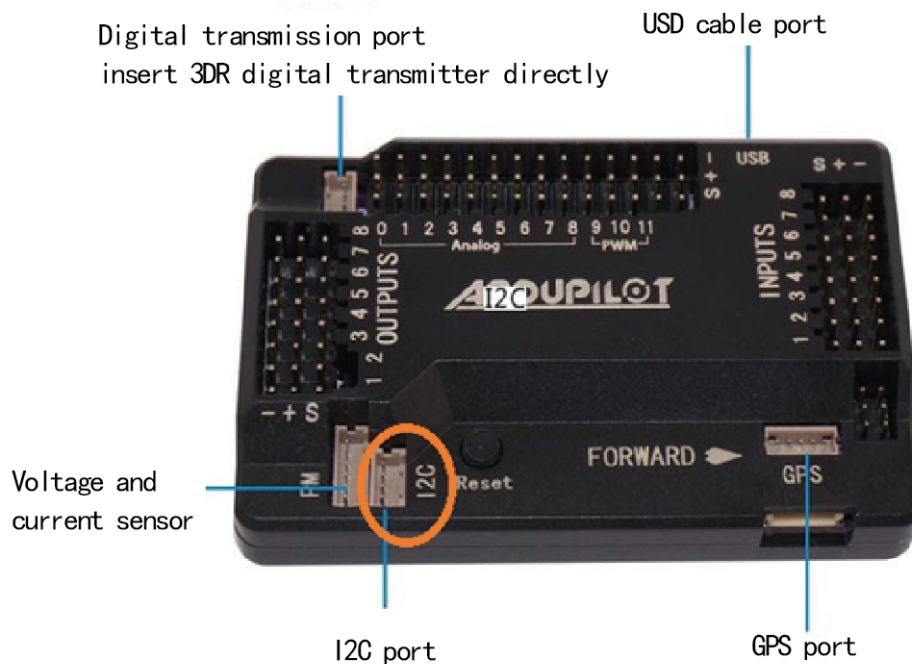
10.2.1.1

10.2.2 APM2.8

Set up it according to the file 《APM_V2.8.0》 which you can search it on website. connect two pins (MUX_TX0/OSD) pads as below picture:

10.2.2.1

If the OSD data is still not able to get according to above process, please follow below instructions

PC install Mission planner 1.3.2 (must be the ground station software), connect the flight controller to PC by USB cable, click OSD "Enable Telemetry" button, finish the OSD data output setting

10.2.3 PIXHAWK

one end of OSD cable connect to PIXHAWK flight controller TELEM2 port, another end of OSD cable connect to air system OSD port.

10.2.3.1

10.2.4 Monitor OSD content

Beside the video, on the top side and bottom side of the monitor display the OSD data.

SP： Video signal intensity

SQ： Video signal quality

VT： Flight controller battery voltage

PW： Transmitting power

PH： Flight altitude according to aerostatic press

GH： Flight altitude according to GPS

GN： Aircraft latitude

GE： Aircraft longitude

DS： The distance between aircraft with takeoff point

11 contact info

Thanks for purchasing our device again. If you have any suggestion or need technical support, please visit our website or send us the email, also welcome to call us.

WUXI R2TECK TECHNOLOGY CO., LTD

Address：Room307,Building of Cetus,Wuxi software park,111th Linghu avenue,new district ,Wuxi city,Jiangsu Province

P.C.：214000

Tel：0510-81012344

Fax：0510-81012344

Web：http://www.gor2teck.com

Email：sales1@gor2teck.com

FCC Caution：

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.