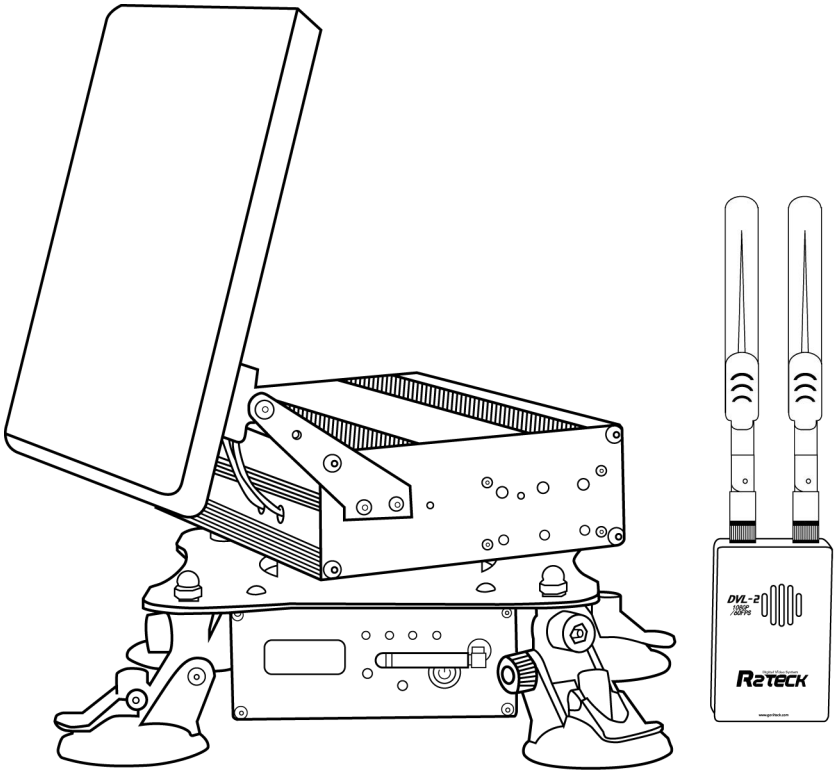
R2TECK

Digital Video Transmission System

DVL-2

USER MANUAL



Content

1. Easy way to start the device

1.1 Operating steps and instructions

1.1.1 OSD module

- Install GPS module.
- Install voltage monitoring cable.
- Install OSD Data output cable.
- Install Mavlink data cable. (optional, if you do not need, just go to next step.)
- Turn on the power (Transmitter supply the power).

There should be below instructions if the OSD module works well.
Power indication LED3 red light turn-on, LED2 blue light flash.
LED3 blue light turn-on if 4 satellites could be searched

1.1.2 Transmitter

- Install the antennas.
- Install the HDMI camera cable.
- Install OSD data output cable.
- Connect camera to the power, select the correct video format.
- Place the Transmitter in horizontal position, connect transmitter to the power.

There should be below instructions if the transmitter works well.
WORK light flash regularly.
HDMI light turn-on
LINK light turn-on if the transmitter connect to receiver.

1.1.3 Receiver

- Install the antennas
- Install the monitor by HDMI cable. (optional)
- Install USB-to serial port adapter. (optional)
- Install GPS on the receiver.
- Connect to the power. (battery of 12V-DC power)
- Turn on the power.

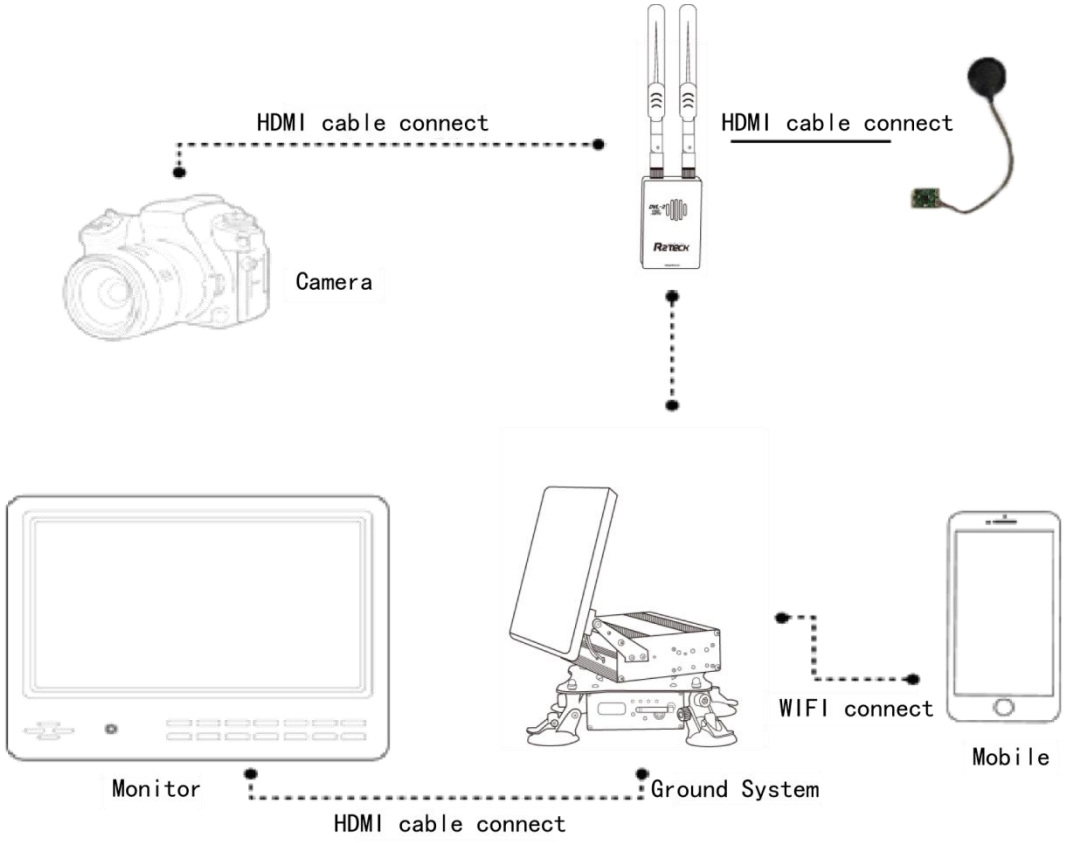
There should be below instructions if the receiver works well.
Upper cabin: Power light turn-on, MODE light flash twice. Will start sensor calibration when upper cabin clockwise rotation on 2~3 weeks and then Counterclockwise rotation 2 to 3 weeks. Antennas point to North if calibrate success (for the North please refer compass). Please press LEFT FINE-TUNE and RIGHT FINE-TUNE button for adjustment the direction if have deviation.
Below cabin:
WORK light flash regularly
HDMI light turn-on(if installed the HDMI monitor).
LINK light turn-on if the transmitter connect to transmitter.
HDMI monitor instruction (if installed the HDMI monitor):

The monitor shows logo "R2TECK" after receiver connect to the power.
After that, the monitor shows progress bar: Start-up / Selfcheck / Link.
Monitor real-time display the camera video when the transmitter connect to receiver.
Wait upper cabin GPS light turn-on.
When the monitor display is normal, place the transmitter and receiver to the same position. Press POSITION CONFIRM button 2 seconds to confirm the coordinate of starting point. GPS light flash means the coordinate successful be confirmed.
After that, don't move the receiver position (please confirm the coordinate again in offline status if move the receiver position).
Make transmitter from receiver more than 10 meters away, press MODE button 2 seconds, will switch from offline mode to tracking mode. MODE light turn-on.

1.1.4 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 receiver turn-on.

Attention: Currently only allow working one mobile, if want to change the mobile, please follow below process:
Disconnect the mobile with receiver wifi network.
Wait receiver MOBILE light turn off.
Repeat the above 4 steps.
IOS App installation: In App store, search the key word "r2teck" and download.
Android installation: In 360 mobile assistant, search the key word "r2teck" and download.
In Google play, search the key word "r2teck" and download.



1.1.3.1

2. Specification

Here list the detailed specification about DVL2

2.1.1

Function specification	
Communication distance (outdoor, no obstruction)	800mw ground distance ≥ 6000m
Output Power (EIRP)	25mw-800mw adjustable
Sensitivity	-95dbm±2dbm
Frequency	5G
Physics specification	
working temperature	-10~60℃
storage temperature	-20~50℃
dimension (including the shell, not including the antennas)	Transmitter: L.75.5mm x W. 54.5mm x H. 22mm Receiver: L.330mm x W. 395mm x H. 360mm
Weight (including the shell, not including the antennas)	Transmitter: 102g Receiver: 4.6kg
Hardware function support	
Transmitter working voltage	2S~3S，DC-12V
Receiver working voltage	3S，DC-12V
Receiver working current	＞2A (DC-12V)

2.1.2 OSD Specification & Functions

Physical Parameters:	
Weight of OSD Data collect module	3.9g
Volume of OSD Data collect module	38*27*5.6(mm)
GPS module weight	29g
GPS module volume	54*15(mm)
Power Supply:	
Voltage of Data collection module	DC 5.0V±5%
Voltage of GPS module	DC 5.0V±5%

3 Introduction

3.1 Disclaimer

Thanks for purchasing the DVL2 from Wuxi R2TECK. Everyone need to read and understand this disclaimer before using the DVL2. 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 DVL-2, 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 DVL2 Full-HD Digital Video Transmission System.

This manual is subject to change without prior notice.

Version	
profile code & version	release date
RR.H.0002. 0017. V01	2017.11

3.3 Intended usage

DVL-2 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-2 is intended to use on the UAV and other Full-HD digital video transmission. DVL-2 may not be reached the defined function if it works in the improper temperature, improper humidity and improver air pressure.
DVL-2 should not work when it is wet. Have to make sure it is dry when you use it.

DVL-2 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.

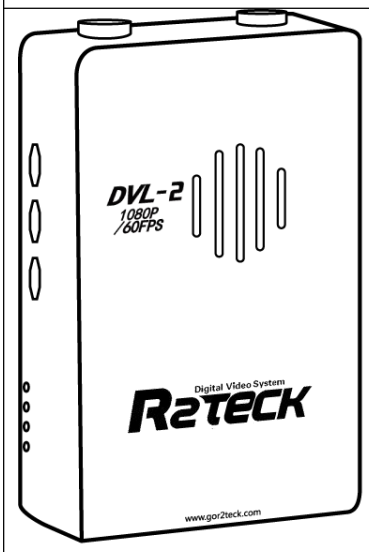
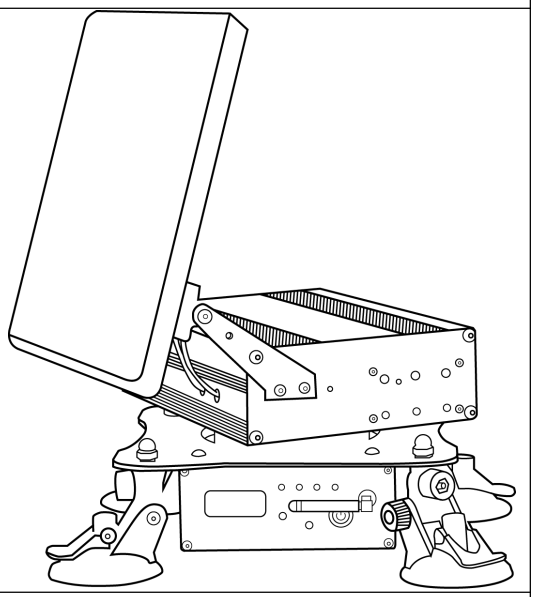
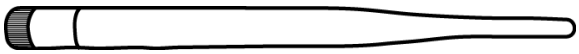
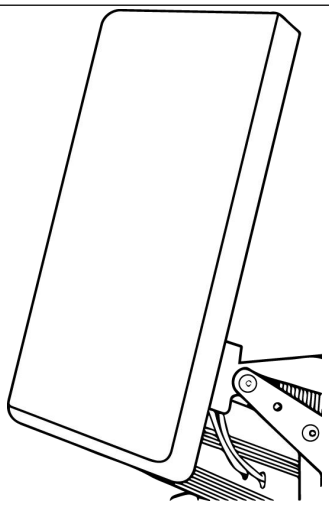
4. Product overview

4.1 Brief introduction

DVL-2 is the auto antenna tracker 1080p full-HD Digital Video transmission system which including OSD module、air part and ground part, it transmit the video and image by the wireless communication mode. DVL-2 is perfect for the transmission distance because of the receiver antennas can be automatically adjusted. Please install the transmitter and OSD module on the aircraft, connect the receiver to the monitor or mobile phone to monitoring the video.

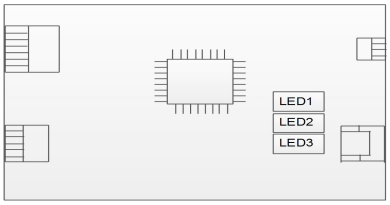
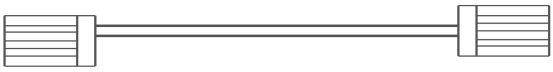
4.2 Standard spec

4.2.1 product main part

Transmitter x 1	Receiver x 1
	
Transmitter antenna x 2	Receiver antenna x 2
	

	Receiver mobile antenna x 2
	

4.2.1 OSD module part

OSD Data collection module	×1	
GPS module	×1	
Voltage monitoring cable	×1	
OSD Data output cable	×1	
Mavlink data cable	×1	

4.2.3 Receiver cable

Transmitter power cable x 1 (standard)	
Transmitter power cable 12V	
HDMI cable (D-D) x 1	
Camera HDMI cable	

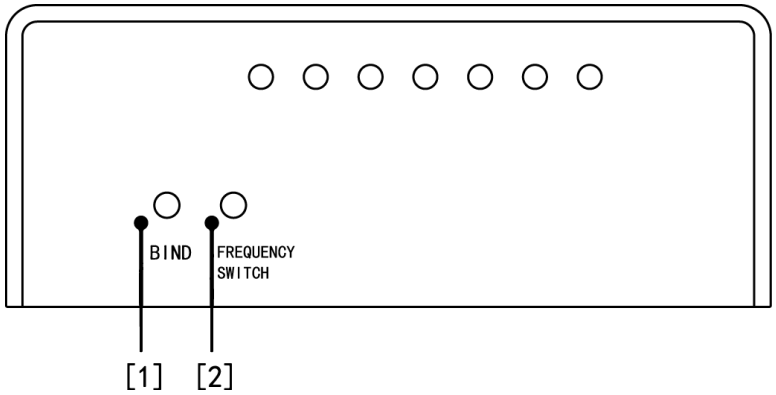
4.2.3 Transmitter cable

USB to serial adapter x 1 (Standard)	
Receiver Mavlink data cable (Red: VCC; Black: GND; White: TX; Green: RX)	

5. Port definition

5.1 Transmitter port

5.1.1 Back side



5.1.1.1

[1]: For frequency switch setting

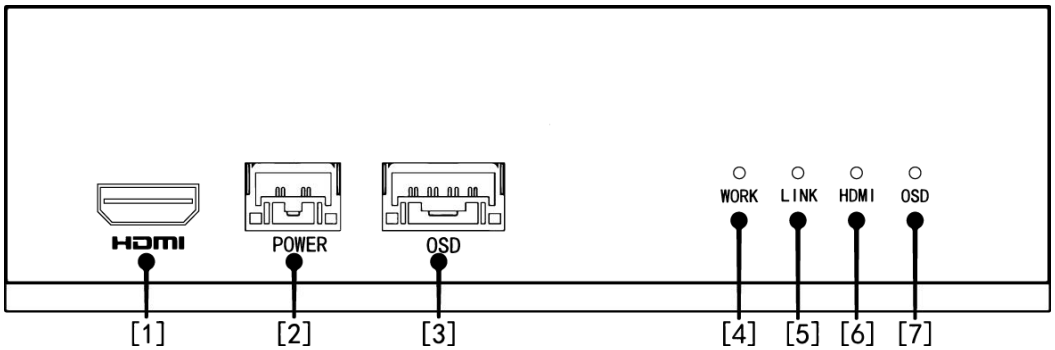
Press the button more than 5 seconds, 4 lights (HDMI, LINK, OSD, WORK) are all turn-off, release the key, 4 lights flash as 0.5Hz frequency, and then 4 lights back to normal state, that means channel change is finished. If devices not connected yet after 10 seconds of frequency switch process, please switch again. The frequency supported by device as below：

5180	**5220**	**5260**	**5320**	**5520**	**5540**	**5560**
5580	**560**	**5620**	**5640**	**5660**	**5680**	**5700**

[2]: For bind the transmitter and receiver.

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. This may takes 2 minutes. If the connection has not been resumed after 2 minutes, repower on both ends, and don’t need rebind.

5.1.2 Right side port



5.1.2.1

[1]:HDMI port, for connecting with the camera.
[2]:Power port, for transmitter get the power DC-12 V or 2S~3S from the aircraft.
[3]:OSD port, for connecting with OSD module.
[4]: Work light, for monitoring the transmitter working status.

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

[5]:Link light, for monitoring the status of connect with the receiver.

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

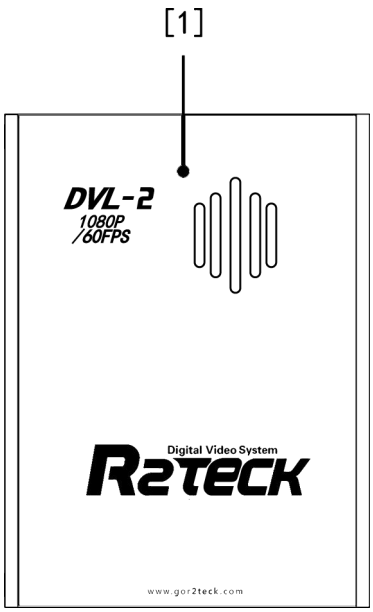
[6]: HDMI light, for monitoring the camera status.

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

[7]: OSD light, for monitoring the OSD status.

Light status	Description	Action
Turn-on	OSD module connect well	NA
Turn-off	OSD module does not connect	check camera cable position

5.1.3 Front side port

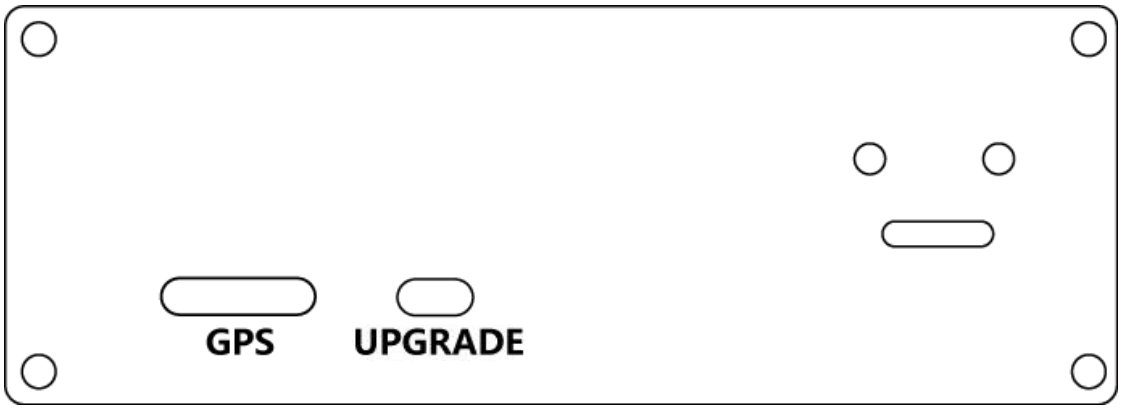


5.1.3.1

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

5.2 Receiver port

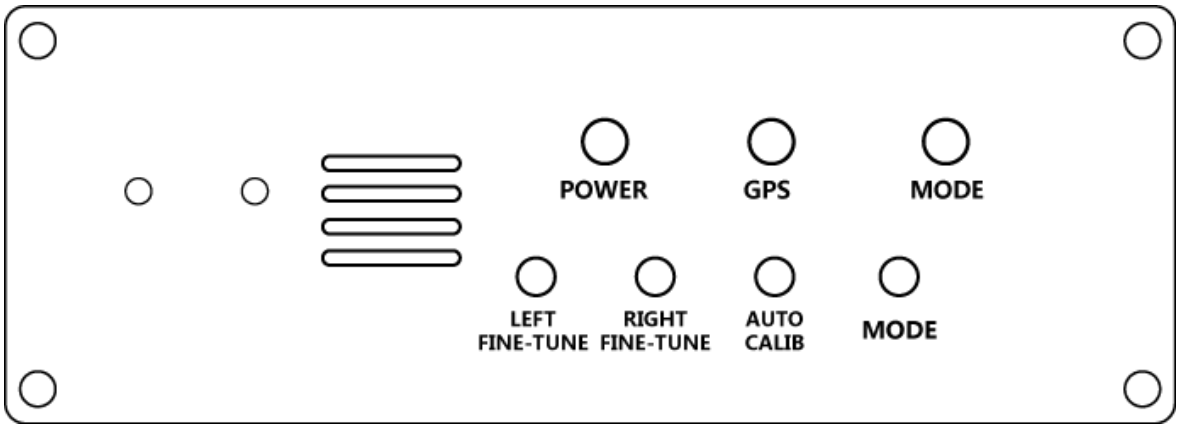
5.2.1 Upper cabin right side port



5.2.1.1

[1]: Upgrade port, for update the control panel software.
[2]: GPS port, for position the receiver. Connect with the receiver GPS module. The two ports are GPS data reception and electronic compass. (For tracking the receiver direction)

5.2.2 Upper cabin left side port



5.2.2.1

[1]: For MODE button, press MODE button 2seconds, MODE light turn-off (The tracking direction can be adjustable by hand) in offline status, MODE green light turn-on in tracking status.

[2]: For LEFT FINE-TUNE button: When the antenna refers to the north direction to the right, please press this button to adjust. (In offline status)

[3]: For RIGHT FINE-TUNE button: When the antenna refers to the north direction to the left, please press this button to adjust. (In offline status)

[4]: For AUTO CALIB button: Press this button 2seconds, the MODE light will flash twice and release the key, start auto calibration. (In offline status)

[5]: Power light

Light status	Description	Action
Turn on	Receiver power supply normal	NA
Turn off	Receiver power supply abnormal	Check power cable position

[6]:S-GPS light

Light status	Description	Action
Turn on	Transmitter GPS satellite quantity more than 7pcs	NA
Turn off	Transmitter GPS satellite quantity less than 7pcs	Please wait 5 seconds after powering.

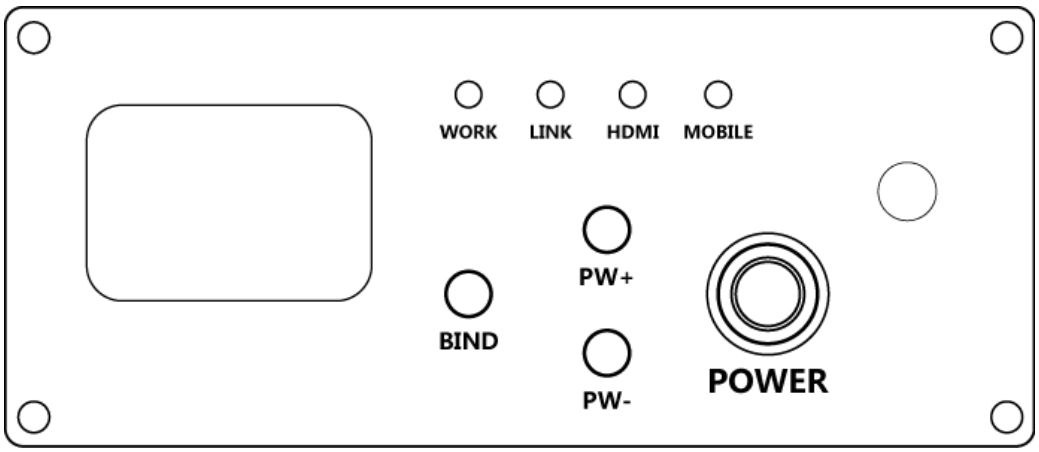
[7]:G-GPS light

Light status	Description	Action
Turn on	Transmitter GPS satellite quantity more than 7pcs	NA
Turn off	Transmitter GPS satellite quantity less than 7pcs	Please wait 5 seconds after powering.

[8]: MODE light

Light status	Description	Action
Green light Turn on	Tracking status	NA
Turn off	Offline status	NA
Green light flash twice	Auto calibration	NA
Red light turn on	Calibration failed	Power again

5.2.3 Below cabin right side port



5.2.3.1

[1]: For Bind the Transmitter and receiver.

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. This may takes 2 minutes. If the connection has not been resumed after 2 minutes, repower on both ends, and don't need to rebind.

[2]: For PW+ button, increase the transmitting power, max 800mW. When display "PW: xxx OK" on the monitor means successfully set.

[3]: For PW- button, decrease the transmitting power, min 25mW. When display "PW: xxx OK" on the monitor means successfully set.

[4]: For Power button.

[5]: For monitor: display below data

SP data: (SP:00;

Power data: (PW:0);

Transmitter voltage (VOLTAGE:00.00);

Receiver voltage (VOLTAGE2：00.00);

Frequency (FREQ:xxxx).

[6]: Monitor the receiver work status

Light status	Description	Action
Flash regularly	Receiver works well	NA
Other status	Receiver does not work well	Connect the power again

[7]: Monitor the transmitter and receiver connect status

Light status	Description	Action
Turn on	Connect with transmitter	NA
Turn off	Does not connect with transmitter	1. Please wait for connecting 2. Make sure the transmitter is connecting power 3. Bind the transmitter and receiver again 4. Connect the power again

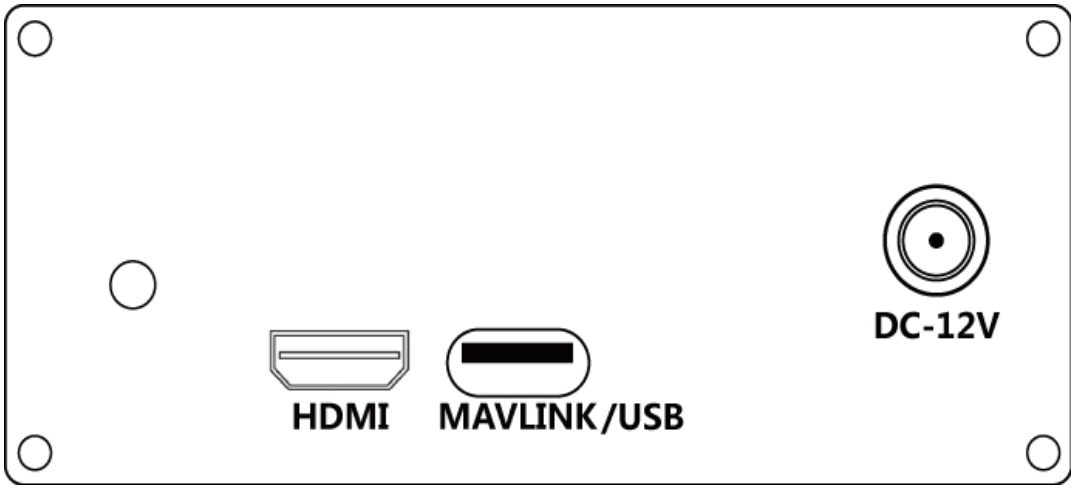
[8]: Monitor the display device status

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

[9]: Monitor mobile connect status

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 Below cabin left side port



5.2.4.1

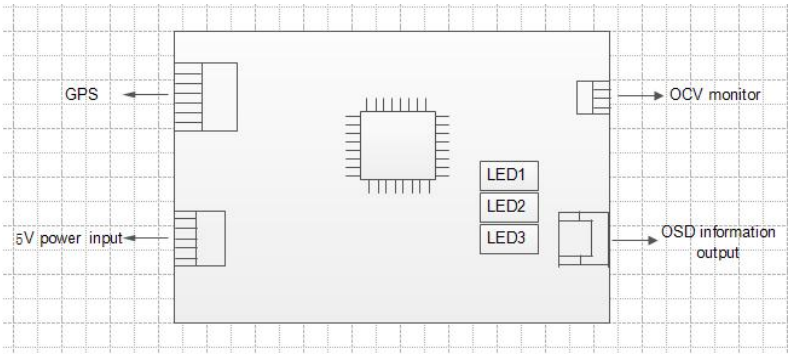
[1]: HDMI port, for connect with the monitor.

[2]: MAVLINK/USB port, for transmit mavlink data. Baud rate 57600, Fream: 0xFE.

[3]: DC power port, for transmitter to connect with the DC power, suggest output power is more than 2A.

5.3 OSD Interface definition

5.3.1 OSD module front side Interface Definition



5.3.1.1

- GPS Connection port: Connect with GPS module
- Voltage Monitoring Interface: Voltage range (DC 0-36V) could be monitored through OCV cable.
- OSD Data output Interface: 1 port connect with data collection module, the other port connect with OSD interface of the transmitter. Connecting with DC 5V power
- LED3light:

Light status	Description	Action
Turn on	OSD power supply is normal	NA
Turn off	OSD power supply is abnormal	Please check 5V power cable status or connect with customer service.

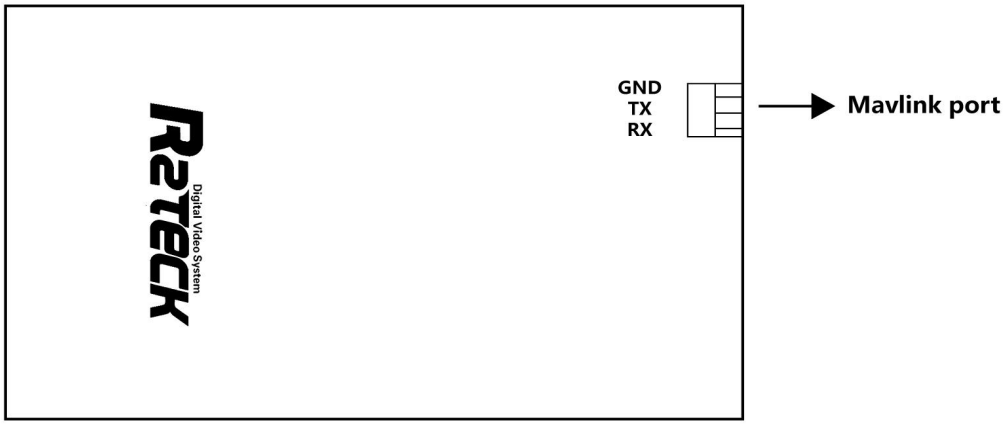
- LED2 light

Light status	Description	Action
Flash regularly	OSD module output data is normal	NA
Other	OSD module output data is abnormal	Check the GPS cable connection status or connect with customer service.

- LED1 light

Light status	Description	Action
Turn on	More than 4 satellites could be searched	NA
Turn off	Less than 4 satellites	Waiting 50 seconds or connect with customer service.

5.3.2 OSD module back side Interface Definition



5.3.2.1

Mavlink port, for transmit mavlink data, Baud rate 57600, Fream: 0xFE.

6. Installation

6.1 Transmitter installation

6.1.1 Antenna installation

- Take out two pcs transmitter antenna.
- Install them on the transmitter antenna holes.

6.1.2 HDMI cable installation

One port of cable connects to the camera, another port of cable connects to the transmitter.

6.1.3 power cable installation

one port with terminals of the cable should be connected with transmitter power port, the other port of cable should be connected with power 12V-DC, the red cable is positive, the black is negative.

6.1.4 OSD cable installation

Connect the OSD data output port of OSD module with the OSD port of transmitter.

6.2 Receiver installation

6.2.1 HDMI cable installation

One port of HDMI cable connect to the monitor, the other port of HDMI cable connect to the receiver.

6.2.2 GPS installation

Connect the GPS module on the GPS port of upper cabin side. (Keep horizontal)

6.2.3 Power cable installation

Supported DC power by the receiver.
Support 12V-DC power, suggest the output power is more than 2A.

6.2.4 Mobile APP installation

IOS App installation: In App store, search the key word “r2teck” and down load.
(* We recommend users take priority for iphone not ipad, as the ipad display screen differs too much, which makes the Video resolution not the best performance. Pls choose “ only support by Iphone” when you are using Ipad for downloading the APP.)

For Android Users: Pls go to “Google Play” get “r2teck” then download.
For Android Users: Pls go to Google play, search the key word “r2teck” and download.

7. Bind and Frequency switch

7.1 Frequency switch

This feature is implemented at the transmitter

For channel switch setting

Press the button more than 5 seconds, 4 lights (HDMI, LINK, OSD, WORK) are all turn-off, release the key, 4 lights flash as 0.5Hz frequency, and then 4 lights back to normal state, that means channel change is finished.

7.2 Bind

Function explanation: bind function bind one transmitter with one receiver.

Process: the device LED light shows correctly, press two BIND buttons on transmitter and receiver 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 of both side shows correctly that means bind progress is finished.

Attention:

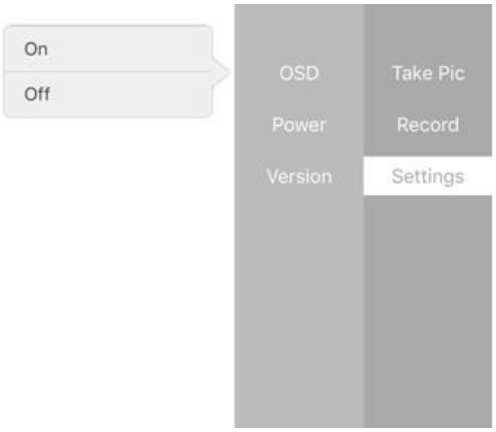
When the transmitter is connecting with the receiver, the video will be paused two times during the bind progress, the video will work correctly when the progress is finished. one transmitter only work together with the bind receiver after processed the bind function. Bind progress should be worked on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

All the buttons on the transmitter and receiver 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

8.2 Power setting

Click "setting" button to adjust the power, if click 100mw, then the video top right corner shows "PW: 100 OK", means output power setting is succeed.

8.2.1

9. Troubles solution

Below is the device maintenances about DVL-2, to help the users whom don't have professional testing equipments and technology to solve the simply troubles.

9.1 Transmitter and receiver trouble symptoms / diagnosis / solution

9.1.1

Symptoms	Diagnosis		Solution
No video	Did not follow the process		Follow the process as chapter 1
	Transmitter	HDMI light flash	1. video format does not correct, check if the camera is supported by DVL2 and select the correct video format, the camera list as appendix 2. Camera HDMI cable 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
	Receiver	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	Transmitter 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

The sensor calibration failed.	Strong magnetic disturbance in the atmosphere.	Turn off Receiver, and Change the place ,then charge it again.
Direction Track is not correct	Antenna direction not correct	Confirm whether the antenna direction to north or not after the sensor is calibrated direction. You could use Compass function in the mobile to adjust it.If not correct pls use left and right adjust button in the Receiver.
	GPS installation direction not correct in the Receiver	Make sure the GPS module and Receiver in the same horizontal level
Receiver antenna rotating or point deviation	Transmitter and receiver is too close. Transmitter and Receiver are too close with each other, GPS location has deviation	Make sure the distance of Tx more than 10 meters, the deviation will eliminate

9.2 OSD module trouble symptoms / diagnosis / solution

9.2.1

symptoms	Diagnosis	Solution
Power light LED1 turn-off	Power supply is abnormal	1. Please check 5V power cable is connected well or not status . 2. Please check whether the supply voltage within (6.5V~40.0V) or not.
LED2 light has no flash	GPS module is connected abnormal.	Check the GPS cable connection is connected well or not.
VOLT voltage is 0 V	Power Voltage supply is abnormal.	1. Check power supply cable is connected well or not status. 2. Check whether monitoring voltage monitored voltage is within 0~36(V) or not.
OSD indication light of Air system is turn-off.(DVL-2)	The air system of DVL-2 could not receive the OSD MODULE data.	1. Check OSD data output cable is normal or not. 2. DVL2 of the air system needs to be powered again. 3. OSD MODULE needs to be powered again.
The quantity of GPS parameter in the display is 0.	GPS is not positioned normally.	1.Chech the supply voltage (DC 5V) and the connection cable is normal or not, 2.When GPS is not used for long time, the battery power memory is too low and ephemeris data lost, RESOLUTION: The GPS need to re-download

		ephemeris data, the first boot speed will slow down, GPS cold start is generally 1 minutes or so. 3.As GPS satellite orbits all the time, GPS signals could be effected by different time and places and air cover like clouds layer, very tall buildings. RESOLUTION: Change places or Period.
Display Parameter D(Distance) is 0 or wrong.	The distance is not obtained correctly.	1.After OSD MODULE powered on, The starting place should be saved (Don't move the GPS's position) when GPS latitude and longitude values are stable, which the values could be displayed ,then the distance starts account. 2. The distance is re-accounted again or the value is incorrect, the air system of DVL-2 and OSD MODULE should be re-charged again.

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 transmitter and receiver.

10.2 Monitor OSD content

Beside the video, on the top side and bottom side of the monitor display the OSD data.
SP: Video signal intensity
VOLT: Voltage of Transmitter
PW: Transmitting power
FREQ: Current frequency
H: Hight of Transmitter
Lat: Latitude of Transmitter
Lng: Longitude of Transmitter
D: Distance of Transmitter moved(unit: m)
：Number of satellites