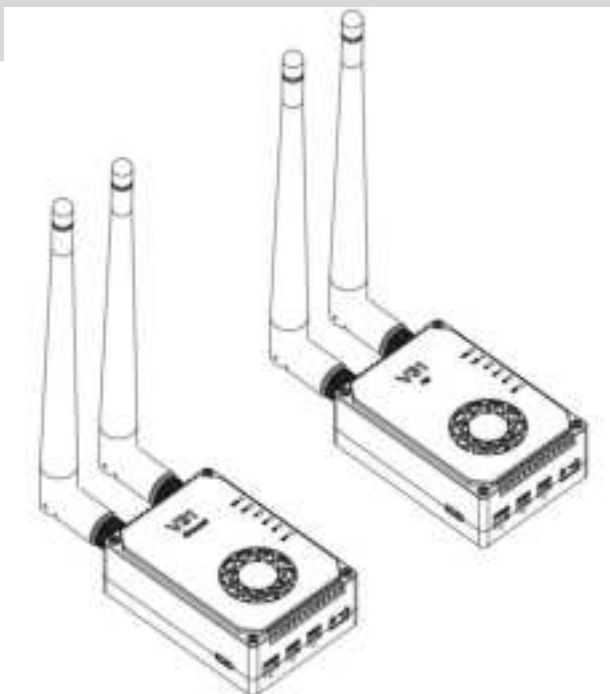


V31

Video&Data&RC Link

User Manual

V1.0.2



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1. Disclaimer

Thank you for purchasing the V31 video&data&RC link. Please use it following the local radio control regulations and read this statement carefully before using it. Once used, it shall be deemed to endorse and accept all contents of this statement. Please strictly follow this instruction to install and use the product. The supplier will not bear any legal liability for any result or loss caused by improper use, installation, final assembly or modification of the product.

2. Product Precautions

1. V31 airborne unit and ground unit need external power supply input DC7.4-30V (lithium battery 2s-6s), please follow the specification to power the radio.
2. Be sure to install the antenna before powering up to avoid damaging the circuit.
3. Ensure that the antennas are free from obstruction and bending, and keep them as far away from large metal objects as possible to avoid blocking communication for the above reasons.
4. Please do not disassemble or modify the V31. If you encounter any problems that cannot be solved during installation or use, please contact ***Chinowing Technology Co., Ltd.***
5. Make installation with proper distance between electronic devices to minimize electromagnetic interference.
6. Before use, make sure that all wiring is securely fastened and that all components are working properly.
7. Please check the surrounding environment to ensure that there is no interference from other devices in the same frequency band before use, otherwise, the data transmission of V31 may be seriously affected
8. If you encounter any problem during the installation or use, please contact us or visit our website at www.chinowing.com for technical support.

3. Product Introduction and Parameters

V31 Digital video and data transmission module is the wireless digital data link based on LTE wireless communication, adopting OFDM and MIMO technology. It can transmit telemetry data and real-time video streaming and has 2*SBUS ports, able to provide control of the drone and the payload.

There are 2 frequencies for choice, 800MHz and 1.4GHz.

High integration greatly reduces the power consumption and the dimension of the product, which can satisfy the requirement of UAV, UGV, etc.

Item	Parameters	Description
Frequency band	800MHz 1.4GHz	806-826MHz 1427.9-1447.9MHz
RF power	2w, 5w	adjustable
Transmission range	V31C: 5km grade(ground to ground) V31: 20km grade(air to ground) V31 Plus: 30km grade(air to ground) V31 Pro: 50km grade(air to ground)	LOS condition
S-BUS port	2*S-BUS ports	NA
Serial port	1*serial port (default: TTL; optional: RS232)	Full duplex, baud rate adjustable
Video latency	200-300ms	
Power supply voltage	DC 7.4-30V	2S-6S battery

Bandwidth	1.4-20M	1.4M/3M/5M/10M/ 20M
Video input/output	LAN	Connecting IPC device/PC
Power supply interface	XT30	
Antenna	ZYJB antenna&fiber glass epoxy antenna	
Dimension	80mm*56mm*25mm	
Weight	160g(exclude antenna)	
Operation temperature	-20°C-+50°C	

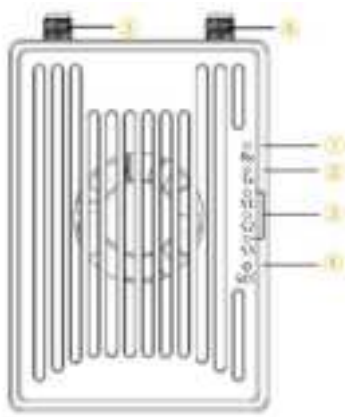
4. Item list

Main modules			
Ground unit x 1		Airborne unit x 1	
			
Accessories			
Power	LAN-port-to-	GH signal wire 3pin* 4	Antenna*4

supply cable *2	4-pin wire *2	GH signal wire 4pin*2	
Power for 2 modules (DC7.4-30V)	Used for parameters configuration	Used for TTL and SBUS port	SMA
			

5. Interface instruction

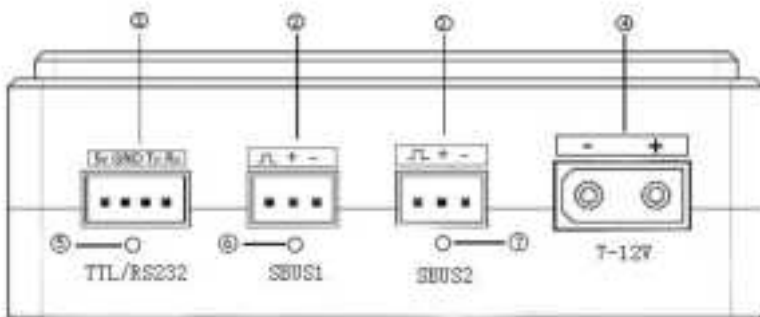
Front view



- ①Data receiving indicator: light will flicker in the condition of data receiving.
- ②Data transmitting indicator: light will flicker in the condition of data transmitting.

- ③Signal strength indicator: green light indicates signal strength; red light indicates abnormal antenna bottom noise.
- ④SET button: used for firmware upgrading, serial port baud rate setting, out-of-control protection settings
- ⑤SMA antenna connector: main antenna, able to transmit and receive signal.
- ⑥SMA antenna connector: secondary antenna, able to receive signal.

Side view



- ①TTL port: full duplex serial port(RS232 optional)
- ②S-BUS1port: SBUS input(ground unit);SBUS output(airborne unit)
- ③S-BUS2 port: SBUS input(ground unit);SBUS output(airborne unit)
- ④Power supply port: 7.4-30V
- ⑤TTL/RS232 signal indicator: light will flicker when there is data input.
 - ❖ Indicator flashes in light blue, it is TTL signal.
 - ❖ Indicator flashes in green, it is RS232 signal.
- ⑥SBUS1 indicator:
 - ❖ Ground unit: SBUS1 indicator will flicker when there is data input of SBUS1.
 - ❖ Airborne unit: SBUS1 indicator will flicker when there is data output of SBUS1.
- ⑦SBUS2 indicator:
 - ❖ Ground unit: SBUS2 indicator will flicker when there is data input of SBUS2.

- ❖ Airborne unit: SBUS2 indicator will flicker when there is data output of SBUS2.



LAN port: for video input or output

USB port: debugging interface. After the driver is installed, a virtual NIC can be used

6. Product Instruction

Power on the airborne unit and ground unit. After the successful connection of the two modules(signal indicator is constant, this process takes about the 30s), the device can work normally, and all parameters have been configured well. If you want to modify the baud rate of the serial port and the IP address of the network port, please refer to the corresponding steps.

Note! The products are factory configured and ready for use. Default configuration parameters.

User name: admin123

Password: admin123

LAN port IP: 192.168.168.12 (airborne unit); 192.168.168. 11(ground unit)

Secret key: 88

Wireless parameters: frequency: 1.4G/800MHz; frequency hopping mode: enabled; bandwidth: 20M

Serial port parameters: baud rate: 115200; 8 data bits; 1 stop bit; no parity

6.1 S-BUS port operation

1. Connect the SBUS port of V31 ground unit with the SBUS signal source of RC receiver. The

- SBUS indicator will flash quickly when there is data input.
2. Connect the SBUS port of V31 airborne unit to the device you need to control.
 3. V31 can control aircraft, gimbal and other devices as long as the link is connected.

6.2 Indicator light instruction

Indicator	Status	Define
TXD	Flashing	There is data transmitting
	OFF	There is no data transmitting
RXD	Flashing	There is data receiving
	OFF	There is no data receiving
TTL/RS232	Flashing	Serial port data is in the communication
	OFF	No serial port data
SBUS 1	Flashing	SBUS1: there is signal transmission
	OFF	SBUS1: there is no signal transmission
SBUS 2	Flashing	SBUS2: there is signal transmission
	OFF	SBUS2: there is no signal transmission
LAN	Flashing	The LAN port has been connected.
Signal strength indicator RS1, RS2, RS3	RS1&RS2&RS3 ON	Strong signal
	RS1&RS2 ON, RS3 OFF	Moderate signal
	RS1 ON,RS2&RS3 OFF	Weak signal
	RS1, RS2, RS3 OFF or Show the running horse lights	No connection
Bottom noise fault (S1, S2, S3, red)	S1 flash(red)	Failure connection of the main antenna

	S2 flash(red)	Failure connection of the secondary antenna
	Short press SET key<3S, S3 ON(red)	Indicating 800MHz frequency
	Short press SET key<3S, S2, S3 ON(red)	Indicating 1.4GHz frequency
S1&S2&S3	Sharp-flash	Outputting Failsafe protection data

6.3 Abnormal bottom noise

When S1 red light is flashing, the main antenna has poor bottom noise; when S2 red light is flashing, the secondary antenna has poor bottom noise.

Please check whether there is any abnormality of the corresponding antenna, feeder line, connection and installation position when there is bottom noise fault phenomenon, otherwise it will affect the transmission distance.

The bottom noise prompt function is suitable for the pre-flight check, like indoor installation and debugging. It works in the range of 200 meters between Tx and Rx after V31 link successful connection. This function will be closed automatically after the range is more than 200 meters.



For the bottom noise test, pls try to avoid going through walls, etc, in case of inaccurate results. Pls, do it in the LOS condition.

6.4 Check the frequency

V31 has 2 frequencies for choice, 800MHz, 1.4GHz.

For frequency checking, pls press the SET button <3 seconds when power on, S3 indicator light Red indicates 800MHz; S2, S3 indicator lights Red indicates 1.4GHz.

6.5 Serial port use

The default baud rate of the serial port is 115200. Pls, follow the below methods to connect the flight control and ground station software.

1. Connect flight control to the airborne unit. Pls kindly be noted the line sequence as well as the baud rate of the flight control port must be the same as the baud rate of the serial port.
2. Connect the ground station software to the ground unit. Pls kindly be noted that the line sequence as well as the baud rate of the port selected by the ground station software must be the same as the baud rate of the serial port.

6.6 Serial port baud rate change

Press and hold the SET key after the module is powered on(about 3 seconds). When RX and TX light up, release the key, which indicates that the module has entered the mode of changing the baud rate. After entering the mode, press the SET key briefly (<1 second) to switch the baud rate. The corresponding LED ON represents the corresponding baud rate value.

Details are as follows:

Indicator status	Baud rate
Rx continuously ON	9600bps
Tx continuously ON	19200bps
S1 continuously ON	38400bps
S2 continuously ON	57600bps

S3 continuously ON

115200bps

After finishing the setting, long press the SET key (about 2 seconds). When TX and RX light up at the same time, pls release the key. After release, the indicator will return to the normal working state. After the modification is completed, the baud rate needs to be re-powered to take effect.

 **Note:** when changing the baud rate, it needs to be the same for the airborne unit, ground unit, flight control, or other devices for normal communication.

7. LAN Port Operation

Pull-streaming video can be acquired using the LAN port

1. Default IP address:

airborne unit: 192.168.168.12; ground unit: 192.168.168.11

2. Connect the LAN port of the airborne unit to IPC devices.

3. Connect your computer to the LAN port of the ground unit, and make sure that the IP address of your computer's local connection is on the same network segment as the camera.

①Open Computer network sharing center

②Open the Change Adapter option



- ③ Select the local connection to the ground unit and right-click on it to view the properties.



- ④ Select Internet IPV4 protocol, set the fixed IP, and set the IP to the same network segment as the camera, e.g.: the camera IP is 192.168.167.10, set the local IP to 192.168.167.xxx (0~255) except 10. When the modification is finished, click "OK".



- ⑤ Capture and play the video data using streaming software such as VLC Media Player.



- ❖ Pls, ignore the IP address of V31 when setting the IP address in getting video by pull

stream. Just change the local IP address of the computer to the same network segment as the LAN camera.

- ❖ For more tutorials, please refer to our website www.chinowing.com.

8. USB Port Operation

The USB port incorporates a virtual network card function that can be used for video and data output. Before using the USB port, the user must install the appropriate driver. The steps are as follows:

1. Install V31 CODEDRIVER driver
2. The installation process may be intercepted by the security guard, please close the security guard or trust this operation. After the successful installation, connect the USB port to the PC, and open Computer->Management, you can see 5 ports will appear in the port management interface(not open for use yet). < Remote NDIS-based Internet Sharing Device> will appear in the interface of the network adapter, indicating that the USB port connection is successful.

Note: Please do not use the USB port until the device is successfully connected. Otherwise, the signal strength indicator may appear abnormal.



3. Open the Network Sharing Center and set the local connection to get static IP.

9. Network Function

V31 Radio supports network communications and is a point-to-multipoint product that supports up to 16 slave devices. The ground unit can be set as the master and the airborne unit as the slave. The ground unit can be connected to max 16 airborne units, and through the TTL interface, the ground unit can transmit data to 16 airborne units. The data transmitting and receiving can be realized through LAN port between airborne units. Operation steps are as follow:

1. Set the ground unit as the master device.



2. Set the airborne unit as the slave device



3. The IP address of the ground unit and other airborne units must be in the same network segment, and cannot have the same IP address to avoid IP conflicts and inaccessibility. For example, the ground unit IP is 192.168.168.11, other airborne unit IP is 192.168.168.12, 192.168.168.13...
4. Data is input from the TTL interface of the ground unit and data can be received by the TTL interface of each airborne unit.
5. The airborne unit accesses other IP-connected devices of the other airborne unit(e.g., LAN camera, etc.) via a network interface IP.
 - a. The IP address of the camera connected to the airborne unit is 192.168.167.20;
 - b. Other airborne units connect to PC via Ethernet port, set local connection to static IP, IP is on same network segment as camera, eg.192.168.167.30;



- c. Use pull stream software to play the video.

10. Module Configuration

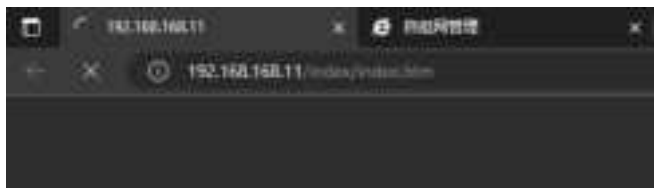
Take <airborne unit LAN port IP: 192.168.168.12; Ground unit LAN port IP:

192.168.168.11> for example:

- ①Power on the modules. Wait for the module to start for about 30s, connect the PC to the LAN port of the ground unit through the network cable to access the airborne unit directly from the ground unit, or connect the airborne unit to the computer separately.
- ②Set the local IP to static IP in the computer network sharing center, IP should be the in the same network segment with airborne unit IP, for example.192.168.168.15.



- ③Open a browser and enter IP in the address bar: 192.168.168.11

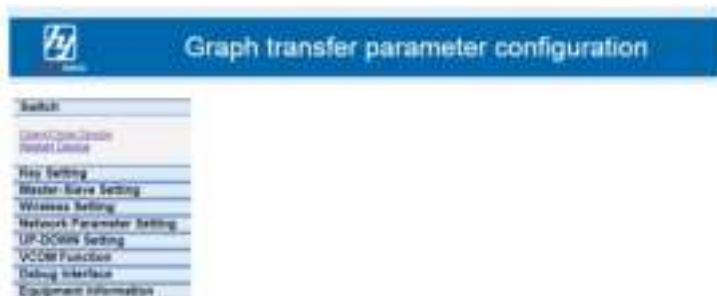


- ④Pop up the login interface and click on the administrator login, **user name: admin123, password: admin123.**

If the login doesn't work or writes "This browser does not support ActiveObject, download another browser (e.g. Sogou or Microsoft Edge) or update your browser version and try again.



- ⑤ After successful login, the module configuration interface will appear.



- < **Key Settings Management** > allows the user to set the secret key, which must be the same between the airborne unit and the ground unit for communication.



- It is recommended that you do not modify the < **Master-Slave Settings** > of

the <**Wireless Settings**> to avoid the possibility of poor communication quality due to improper settings.

- <**Wireless Setting**> can modify the frequency band, bandwidth, power and frequency hopping. When modifying the frequency band and bandwidth, please make sure the frequency band and bandwidth of the airborne unit and ground unit should be the same, the antenna model used is consistent with the frequency band. In different sub-model, the max power is different.



- <**IP Address Change Management**> can modify IP addresses. It is not recommended to change the IP address randomly. If the user wants to change it, please make sure that the ground unit and the airborne terminal are on the same network segment.



- **<UP- Down Settings Management>** allows the user to change the ratio of uplink rate to downlink rate. If there is not any question, it is not recommended to modify it. If it is needed, the airborne unit setting is valid,



- **<1D4U>** means the ratio of downlink and uplink is 1:4.(master node to slave node is DOWN, slave node to slave node is UP).



To ensure smooth video play, there are different parameters settings in different application scenarios:

Scenario 1:



Scenario 2:



Scenario 3:



- The <Debug Interface> should be modified at the developer's guidance. If the user needs a fixed-frequency point output, use the AT command:
AT^DRPS.
- ❖ The first parameter is the frequency point range, please set it according to the frequency point range of different frequency bands.
- ❖ The second parameter is the bandwidth, 1 is 3M; 2 is 5M; 3 is 10M; 5 is 20M;
- ❖ The third parameter is the power, which ranges from <40db ~ 25dbm>.

As shown below: 4D1U



⑥<Equipment Information> shows the current module version number. Please make sure that the version number of the airborne unit and ground unit is the same.

11. Remote Control Fail-Safe Protection Setting

If the RC fail-safe protection is needed to be set, pls follow the below steps:

11.1 Write fail-safe protection data

After the successful connection of the airborne unit and ground unit, press and hold the **SET** button about 5S when there is SBUS data transmission.

When RX, TX, S1, S2, S3 all lights ON, it means entering ***Failsafe data setting*** mode, and then release the **SET** button.

Press the **SET** button briefly to switch to **write failsafe data** or **turn off fail-safe**, when RX and TX flash, it means the setting is successful.

Press and hold the **SET** button until RX, TX, S1, S2, S3 all lights are ON, which means Failsafe data has been saved and exit setting mode.

After finishing the setting, the current RC value can be stored in the airborne unit as a failsafe value, and will not be lost after power failure. S1, S2 and S3 will flash when failsafe data is output. Please test whether the Failsafe data is written successfully by the flight control, GCS or servo.

SET operation (proceed in the below order)	LED status	Mode
Long press > 5s	All lights ON	Enter fail-safe setting
Short press < 1s	RX, TX flashing	Write fail-safe data
Short press < 1s	All lights OFF	Turn off fail-safe data
Long press > 5s	All lights ON	Exit fail-safe setting mode

11.2 Trigger Fail Safe Value

If the airborne unit does not receive SBUS data from the ground unit for 3 seconds, the airborne unit will keep outputting the Fail safe value written before, and the S1, S2, and S3 signal lights will flash until it receives SBUS data from the ground.

11.3 Turn off Fail-Safe Value

Long press the **SET** key (about 5S) after powering on the airborne unit. When all lights are ON, it means the Failsafe data setting mode has been entered, then release the **SET** key. Press the **SET** button briefly to switch to **<write fail-safe data>** or **<turn off fail-safe>**. When RX, TX, S1, S2 and S3 are off, it means turning off fail-safe function. Press and hold the **SET** button until RX, TX, S1, S2 and S3 are ON, it means fail-safe data is off.

11.4 Reset fail-safe data

If the user needs to reset the SBUS fail-safe data, it enters fail-safe setting mode when there is RC SBUS data transmission. First, short press the **SET** button to cancel the fail-safe data set previously, then short press the **SET** button briefly. When the RX and TX lights flash, it means successful setting.



- ❖ By default, there is no fail-safe data output from the radio, it will continue to output the last received SBUS data after the data link is disconnected.
- ❖ Only the S-BUS channel that has input at that time will be triggered and deactivated fail-safe function. For example, if the S-BUS1 channel has data transmission and the S-BUS2 channel has no data transmission, pressing the key will only trigger and deactivate S-BUS1 fail-safe data.
- ❖ To set up fail-safe for both S-BUS1 and S-BUS2 at the same time, both S-BUS1 and S-BUS2 are required to have remote SBUS data transmission.

12. Firmware Version View

To serve our customers better, our R&D team never stops the work. We are upgrading the firmware and software, so please check the firmware version when you use it and refer to our website for the latest version of the software and firmware.

The version of the parameters setting software can be seen directly on the PC when you configure the parameters, and the firmware version can be viewed through the following steps

1. Connect the radio to the PC via a USB cable, and a COM port will appear on the PC side.
2. Install the serial port debugging assistant on your PC and open this port.
Port configuration parameters: 115200, 8N1. string display mode
3. After powering on V31, the serial assistant will show the following firmware version information <V31SX-1.0---V31SX-0.0.2---sysbaud: 115200>.
4. V31RX indicates the airborne unit, the first version number indicates the hardware version number of the firmware, and the second version number indicates the software

version number of the firmware. As the above version number represents the V31 airborne unit, the hardware version number is 1.0, and the software version number is 0.0.2.

13. Firmware Upgrading

Please use the firmware upgrade tool to upgrade the firmware separately for the ground unit and airborne unit.

- 1. Connect V31 to the computer with the matched configuration cable TTL-to-USB cable. (White - TX, Black - G, Green - RX)
- 2. Long press the set key to power on, then release the key when the RX and TX indicators are continuously ON. Open the upgrade software within 1 minute. The corresponding message will pop up, which means it enters upgrade mode.

- 3. Open  Upgrade software.



- 4. Click  and the device information on the LAN will be displayed automatically



5. Click  Open the correct firmware that is downloaded and if it is correct, it will show that the firmware file recognition is complete.



6. Click  , until the firmware write is complete. It means successful upgrading.



14 Common Questions

1. Show weak signal strength

Check whether the antennas are connected well, and whether there are other high-powered devices nearby, and adjust the distance between the devices and the orientation of the antennas.

2. Unable to stream video in the video player

Please make sure that the IP address of the receiver is in the same network segment as the IP camera.

3. Receiver SBUS has signal output, but the serial port is not connected, or the

transmitted signal is garbled.

Please check if the baud rate of the serial port of the remote control and the receiver is the same; and set the baud rate to the corresponding baud rate of the ground station software.

4. Interference when more than two sets of device are turned on at the same time

Please check that the ID (key) must be different from each set, and set it differently to avoid co-frequency interference.

5. Significant packet loss and high latency of video transmission

- a. Check and confirm the antennas are connected well
- b. Check and confirm module versions are consistent
- c. Check whether the module wireless setup parameter is consistent.
- d. Check that other devices, device cables, and computer interfaces are working properly.
- e. Check the settings of image streaming software or change other player