



# RFD VideoLink User Manual

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# 1 Introduction

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## 1.1 Key Features

- Selectable video resolutions up to 720p
- H.264 video compression
- Compatible with most USB Video Class (UVC) cameras
- Telemetry and video stream over MAVLink
- 5 km+ range depending on Line of Sight (LoS)
- Wireless device configuration using 2.4GHz Wi-Fi and a webpage GUI
- Hardware accelerated AES encryption with up to 256-bit key
- PPM or SBUS control signal passthrough
- Two 900MHz antenna ports with automatic diversity by default
- Two redundant power supply inputs with wide voltage range (6 to 55V)

## 1.2 Applications

- Video feed from Uncrewed Vehicles (UV) for:
  - Enhanced situational awareness
  - Search and Rescue
  - Surveillance
  - Field inspections
- Wireless remote surveillance
- Wireless industrial monitoring

### 1.3 System Overview

The VideoLink system is comprised of a receiving Ground Control Station (GCS) RFD modem and the remote RFD VideoLink Module.

The GCS modem provides a serial stream of data to a connected device, usually a computer, which can process and/or display the video and telemetry data. The ground control station modem is sometimes referred to as the local modem, local radio or groundside modem in this manual.

The RFD VideoLink Module is designed to be installed in a UAV or at a remote monitoring station together with a USB camera to generate video data. It also supports telemetry links for MAVLink compatible vehicle controllers, such as the CubePilot Orange (also known as Pixhawk). The VideoLink encodes video from a USB camera and transmits it, along with, where applicable, telemetry and RC control signal data, as a close to real-time, stream to the GCS. At times this document may refer to the modem within the VideoLink module as the remote modem or internal modem.

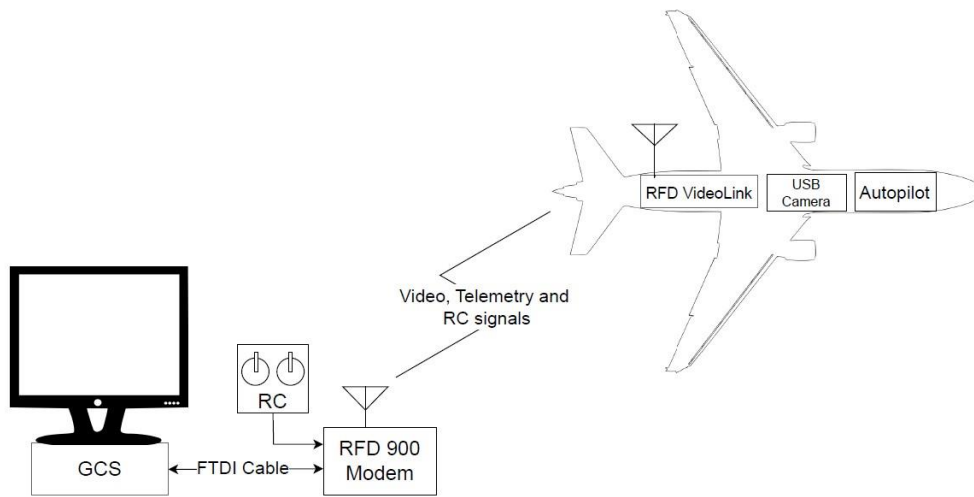


Figure 1: VideoLink system integration in UAV platform

### 1.4 Features

The RFD VideoLink Module is designed to be installed in a UAV or at a remote monitoring station together with a USB camera to generate video data. It also supports telemetry links for MAVLink compatible vehicle controllers, such as the CubePilot Orange (also known as Pixhawk). The VideoLink encodes video from a USB camera and transmits it, along with, where applicable, telemetry and RC control signal data, as a close to real-time, stream to the GCS.

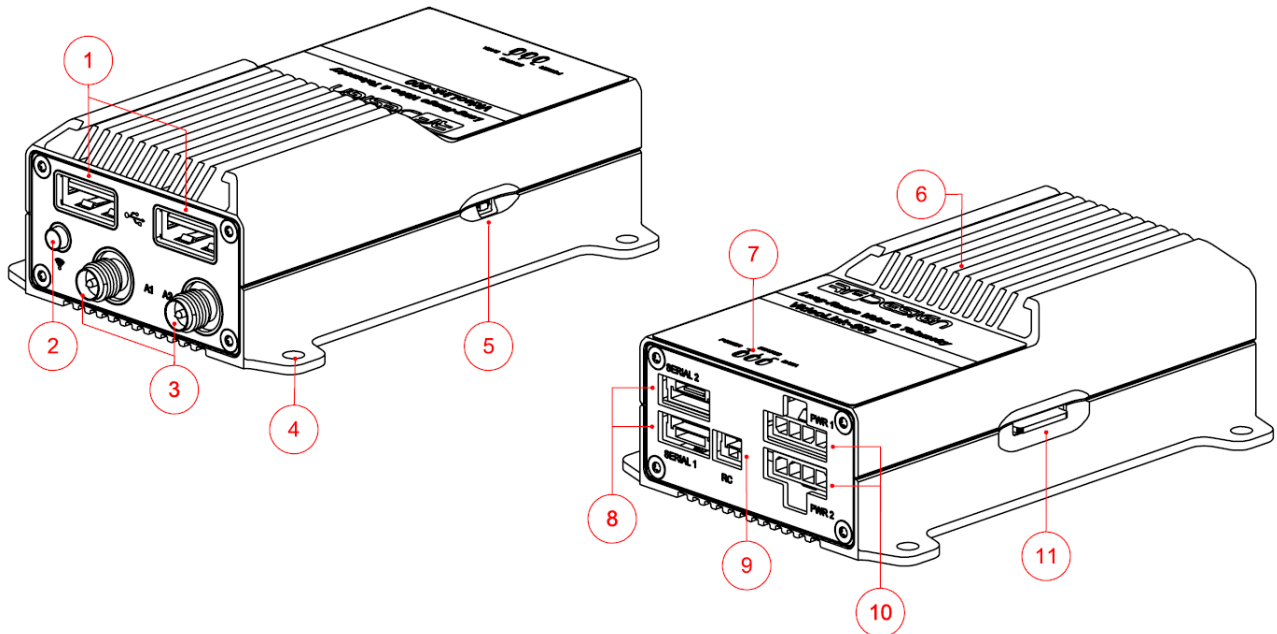


Figure 2: RFD VideoLink module feature diagram

#	Feature Description
1	USB Type A video connectors
2	2.4GHz Wi-Fi MMCX RF port
3	900MHZ RP-SMA RF ports
4	Mounting holes
5	Factory reset button

#	Feature Description
6	Integrated enclosure and heatsink
7	Indicator LEDs
8	Serial ports
9	RC port
10	Power ports
11	Micro SD card slot

## 1.5 Compatibility

The VideoLink can be paired with the following models of GCS receiver modems:

RFD900x2  
RFD900x2-AU  
RFD900x2-NZ  
RFD900x2-US

Note that receiving modems must be of hardware version 2 to be compatible with the required firmware.

Note that the VideoLink is not compatible with any RFD868 receivers.

### 1.5.1 Frequency

The VideoLink only supports modem links in the 902-928MHz range. This includes the open (aka unlocked) and region locked variants of the 900x2.

### 1.5.2 Hardware Versions

The VideoLink **is only compatible with V2 hardware modems**, i.e., 900x2 models.

The x series modems currently have two major hardware revisions. These can be identified by the text on the PCB between the antenna ports, illustrated in figure 1. This will read '9X' for V1 type hardware and '9X2' for V2 type hardware.

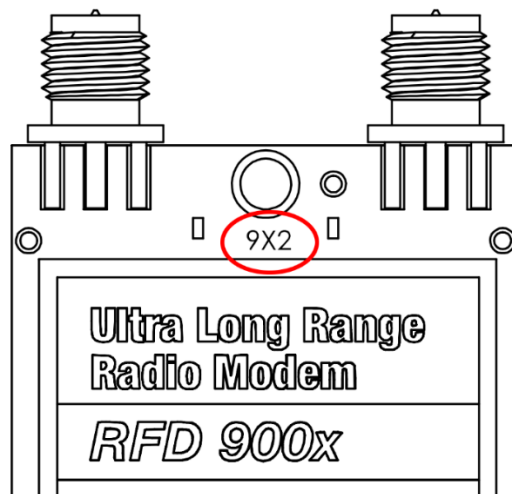


Figure 3: RFD x series modem hardware revision label

### 1.5.3 Firmware

The VideoLink system requires the use of RFD MultiComm modem firmware. For detailed information on its operation, refer to the RFD MultiComm User Manual. A link to this manual is provided in the Useful Links section at the end of this document.

The exact firmware versions of VideoLink and its internal modem can be viewed using the RFD VideoLink Web Configuration Tool.

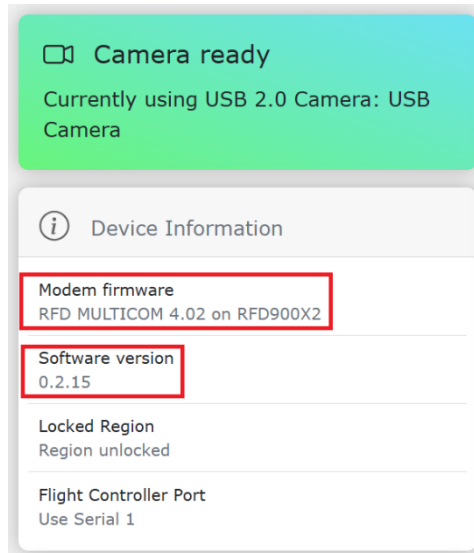


Figure 4: VideoLink Web Config Tool - VideoLink and internal modem firmware versions displayed at the top left of the page under Device Information.

Note that the VideoLink modem firmware is managed by the VideoLink device while the user must configure the GCS receiving modem firmware.

Note that the GCS receiving modem firmware version needs to match that of the VideoLink system for correct operation.

Further details on the firmware update process are explained in the Firmware Management section of this manual.

### 1.5.4 Regional Variants

It is possible to interface the RFD VideoLink with a region-locked RFD900X modem, i.e., modems that feature a product code with a dash and letter code such as RFD900x-AU. The letters after the dash indicate the region to which that modem is locked. You can initiate a region selection process at any time to align the Videolink’s internal modem with a region-locked modem by performing a factory reset.

Note that locked modem variants may impose restrictions to the parameters/settings that can be modified or the values to which those parameters may be set and this in turn may limit the maximum practical settings for video quality and frame rate.



Figure 5: Example of Australia region locked modem label

The compatible region codes are:

- AU: Restricted settings and compliance for Australia
- NZ: Restricted settings and compliance for New Zealand
- US: Restricted settings and compliance for United States of America and Canada

Note Regional variants may satisfy regulations in other areas, for instance the US modem is also compliant with regulations in Canada.

Note that ultimately it is up to the user to identify the radio frequency regulations applicable to their areas of operation and ensure their modems' parameters are set correctly.

Note that only the region-locked versions of the modems are represented to be compliant in their respective regions. Interoperable configuration does not convey regional compliance for an unlocked modem.

Modems without these country codes are fully user configurable and are often referred to as open or unlocked.

## 1.6 LED Indicators

The VideoLink module has three LED indicators which provide feedback on the device status and behaviour.

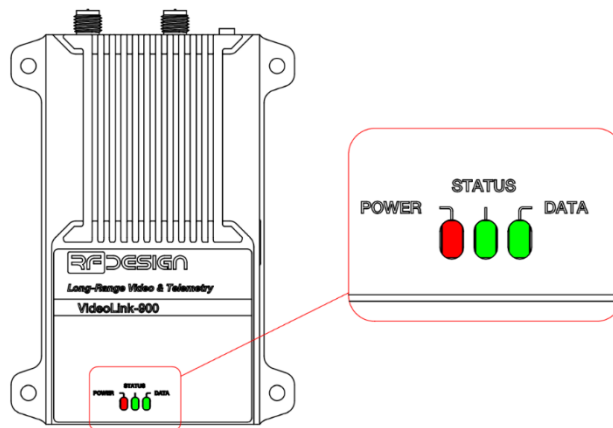


Figure 6: VideoLink LED Indicators

### Power LED (Red)

Indicates the device power state:

- A solid light indicates the VideoLink module has power.

### STATUS LED (Green)

This LED indicates the status of the video input signal:

- Solid indicates the presence of a video signal on at least one USB port.
- Flashing indicates the absence of a video signal, an error with the data signal, or a target video bitrate set to 0.

### DATA LED (Green)

Indicates the radio modem data link status:

- Solid indicates that the data link has been established.
- Flashing approximately every second indicates searching for a link.

## 1.7 Serial and RC Ports

The VideoLink module features two serial UART ports and an RC port accessible via the 6 and 2 pin JST GH connectors.

Note that these ports have 3.3V logic levels

The serial ports have hardware flow control signals and are pin compatible with 'TELEM' ports on Orange Cube Carrier Boards.

The RC port can be configured as an input or output. Current firmware supports outputting SBUS and PPM, and PPM for input. This signal can be for control of the vehicle, or subsystems such as camera gimbles

Alternatively, the RC port can be used as pin mirroring for trigger signals instead. For further information on this function see the MultiCom User Manual

Note that the system video, and RC signal latency is variable and the VideoLink is not intended for First Person View (FPV) flying or other critical control links.

## 2 Setup and Configuration

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VideoLink settings are broadly divided into those that affect the video quality and those that manage the RF link, however certain settings, such as RF link air data rate can limit the practically realisable settings of other parameters, such as video bitrate.

### 2.1 VideoLink Operating Overview

Below are the high-level steps to configure and test the VideoLink system, for use.

#### 2.1.1 System Setup

Prepare the required equipment such as:

- **GCS equipment:** e.g. RC controller, GCS laptop, and GCS modem
- **UAV equipment:** e.g. Battery, Autopilot, VideoLink unit, and USB Camera

#### 2.1.2 Determine the Desired Video Configuration

Select a video preset based on operational requirements:

- **Best Quality** – Highest video clarity for short-range use.
- **Balanced** – A good compromise between quality and range.
- **Optimized for Range** – Reduced bitrate to extend reliable transmission distance.
- **Advanced (Long Range)** – Minimal bandwidth usage for maximum range.

#### 2.1.3 Configure Modem and VideoLink Settings

- Apply the appropriate settings for the selected video preset using the VideoLink Web Configuration Tool:
  - In the Basic or Advanced tab, click **Apply Changes** (for the internal modem).
  - In the Advanced tab, click **Save To GCS File** to generate the settings for the initial GCS modem setup.
- Apply the setup file to the GCS modem using RFDTools.
- Reboot the VideoLink unit and the GCS modem.
- Observe the LED indicators on the GCS modem:
  - Solid green** indicates that the link has been successfully established.
  - Fast flashing red** indicates that RF packet data is being received.
- At close range, such as lab testing, reduced RF power may be necessary to prevent triggering receive protection and/or reset.

Note when using RC passthrough the RC frame rate is determined by the window size defined in the preset.

#### 2.1.4 Run VideoLink Desktop and Check Video Lag

- Launch VideoLink Desktop, select the correct COM port settings, and select Start Service.
- Observe the video window for latency and stability.
- Allow approximately 30 seconds for the encoder to adjust compression based on the level of motion in the video feed. Once stabilised, expected video lag is as follows:
  - High Framerate video presets: approximately 1 second
  - High Resolution video presets: approximately 2-4 seconds
  - Advanced video presets (air data rates below 200 kbps): over 3 seconds
- Longer video lag may occur when using Advanced settings due to lower data rates.

#### 2.1.5 Configure GCS Software

- Open Ground Control Software (e.g., Mission Planner).

- Set Telemetry rate according to the Video Preset in Table 3 (e.g., 4Hz or less) and upload settings to the Autopilot.
- Where applicable confirm that RC controls are responsive and video lag remains within the expected range.

### 2.1.6 In Flight Considerations

- VideoLink is designed to prioritize RC control frames over video frames to ensure responsive, uninterrupted UAV control. However, this control should be restricted to line-of-sight operations as the video feed is not real time and not considered suitable for FPV flying.
- Minor packet loss is normal during flight and may appear as brief artefacts (e.g., small squares or lines) in the video.
- VideoLink does not buffer or store video during a link outage. If the connection or video is lost, the video feed will skip ahead to the current live stream once the link or video is reestablished. During an outage the VideoLink Desktop tool displays a "Last Seen Video" counter in the bottom right corner indicating seconds since the last video packet was received.

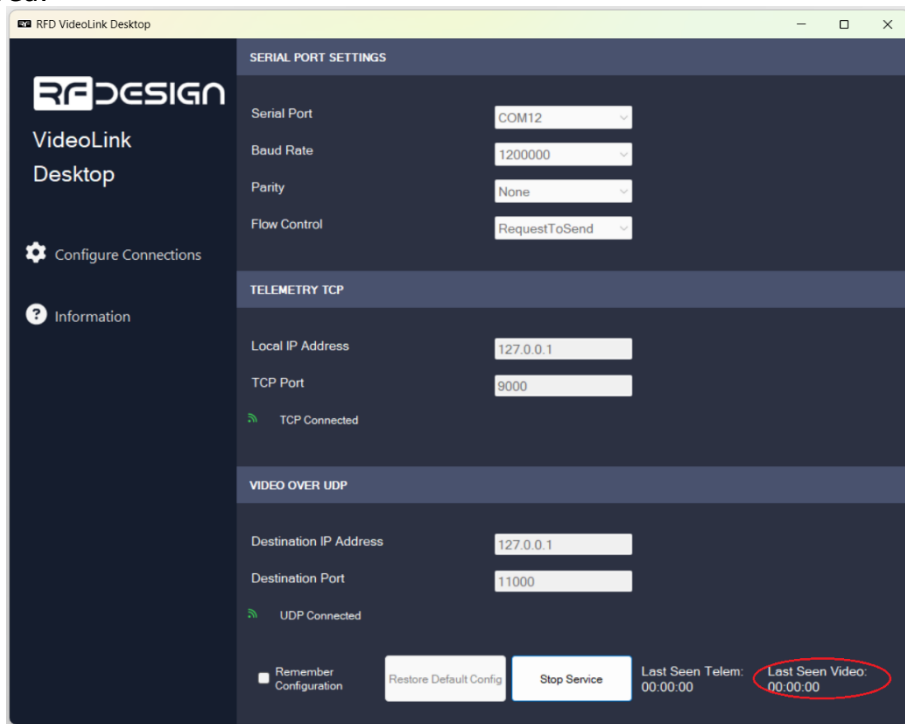


Figure 7: VideoLink Desktop Last Seen Video counter

## 2.2 Power Connection

VideoLink is equipped with two, independent, power connectors. Input voltage is from 6 to 55V. Either port can be used to supply the device and while only a single port is required for operation the device supports using both ports with separate power sources for redundancy.

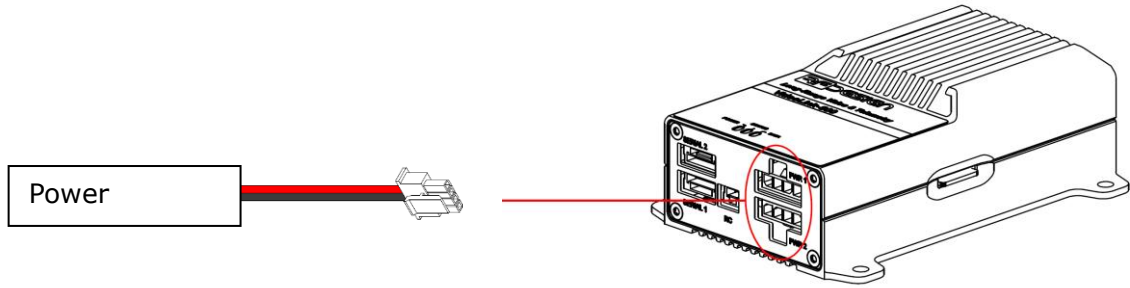


Figure 8: Connect the VideoLink power connector to either the PWR 1 (upper) or PWR 2 (lower) power port.

Note that the power ports are not protected against reverse polarity connections and such situations could damage the device.

### 2.3 Camera Connection

Two USB Type-A ports support USB devices up to version 2.0 speeds and are typically used to connect USB cameras for streaming video over the RFD900X.

These ports feature over-current protection. If the protection trips the module will need to be power cycled before the output will be enabled again. Any load should be removed and checked for electrical shorts if it causes the protection to engage.

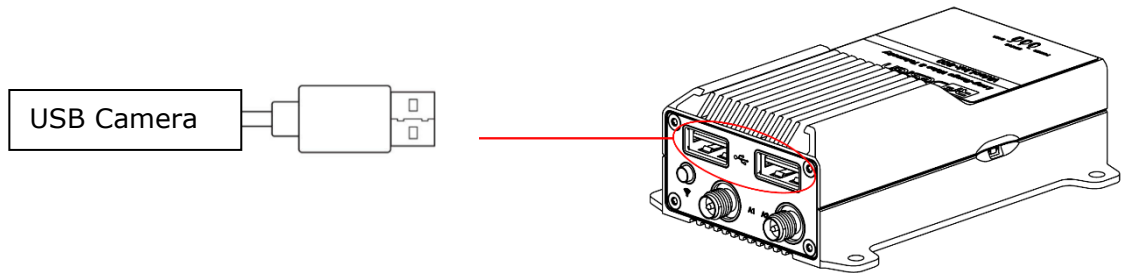


Figure 9: Connect the USB camera to the first USB port (LHS) or second USB port (RHS)

### 2.4 Flight Controller Connection

For vehicle telemetry communication and control the RFD VideoLink system has ports for serial and control signals.

Note to prevent interference with video stream the telemetry data should be connected to the VideoLink 'SERIAL 2' port.

#### 2.4.1 Serial Connection

The flight controller must be connected to the VideoLink SERIAL 2 port. This connection allows the modem to prioritise Telemetry data.

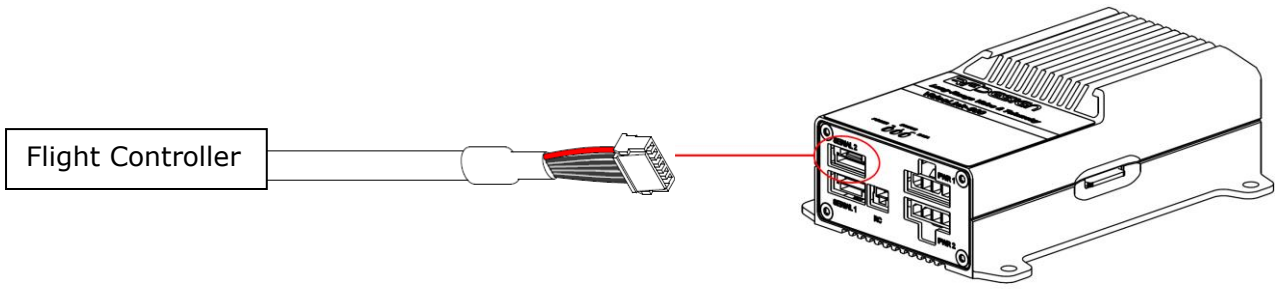


Figure 10: Flight controller serial connection to VideoLink SERIAL 2 port

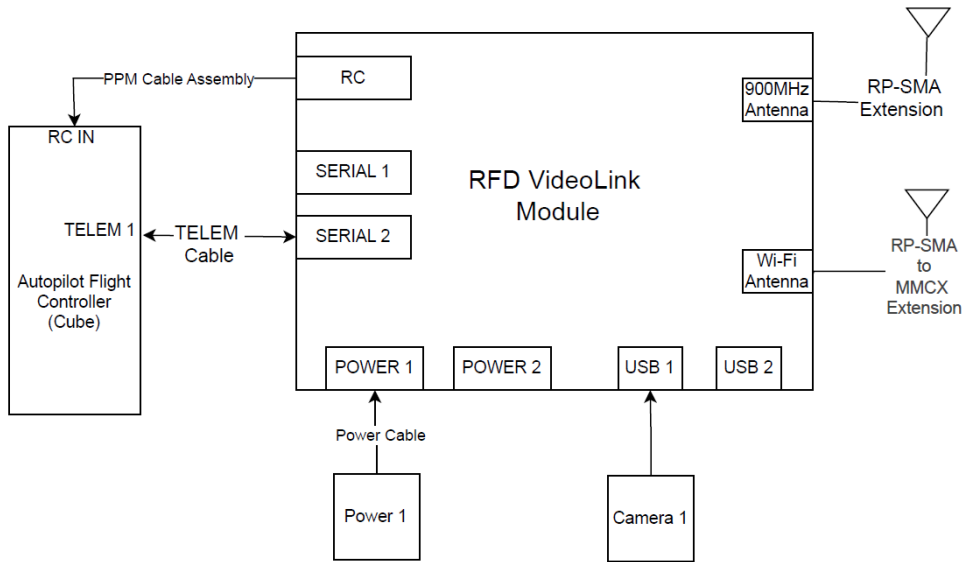


Figure 11: Basic connections of VideoLink including to flight controller.

The default baud rate for this port is 57600, matching the default baud rate of many flight controllers such as the CubePilot. The SERIAL 2 baud rate on VideoLink can be adjusted in the Advanced section of the VideoLink Web Configuration Tool:

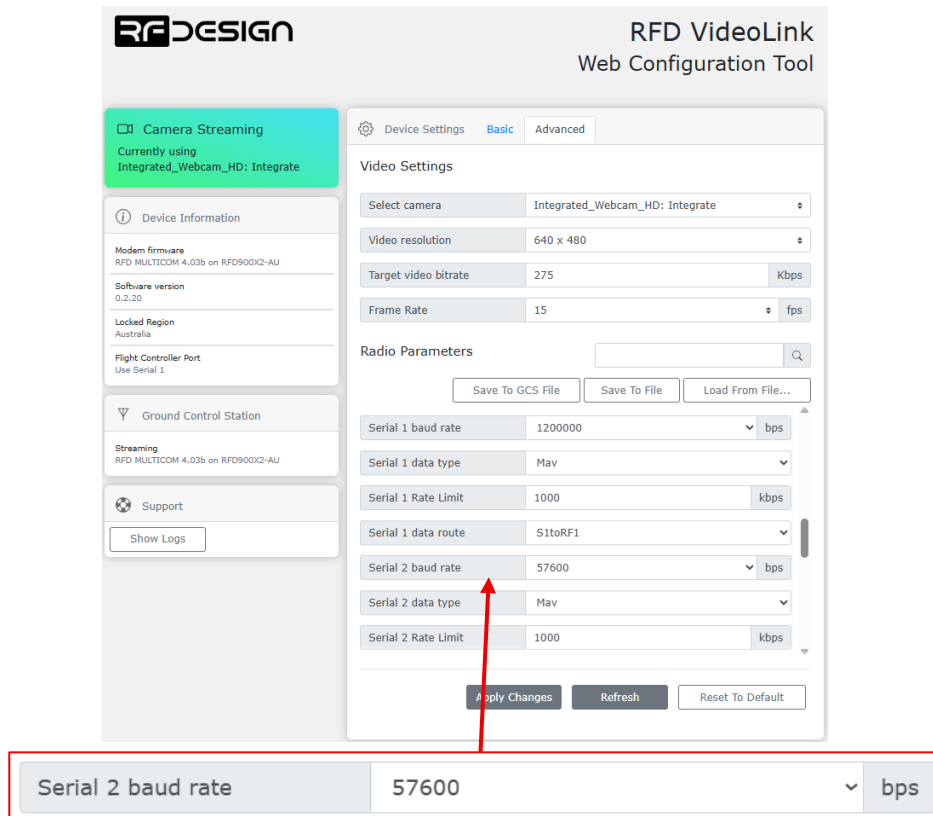


Figure 12: Configuration of flight controller serial port on the internal modem.

The serial port baud rate of the flight controller can be configured by updating the appropriate parameter via the GCS software. For example, in Mission Planner, navigate to Config → Full Parameter List and adjust the SERIALx\_BAUD (Serial x baud rate) parameter as needed.

The VideoLink SERIAL 1 port is reserved for future use and should not have devices connected in normal operation.

Hardware flow control helps to prevent the corruption of data due to input buffer overflow. It should be used where the connected device supports such a configuration.

Note proper use of flow control may require forcing the setting in the flight controller by setting the BRD\_SERx\_RTSCTS (Serial x flow control) parameter to 1.

**Modem Serial Port Routing:** Refer to the sections on VideoLink Modem Routing and GCS Modem Routing for details on how to set up serial port routing in the modems.

### 2.4.2 RC Connection (RC Passthrough)

The RC port on the VideoLink is a two-pin JST-GH connector that connects the SBUS or PPM control signal and signal ground. This can be used to control vehicle RC systems or control mechanisms such as pan and tilt control camera gimbles.

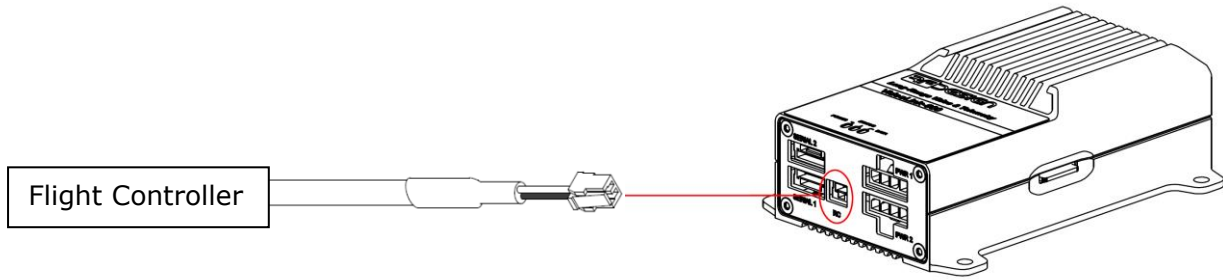


Figure 13: Connect the RC connector to the RC port

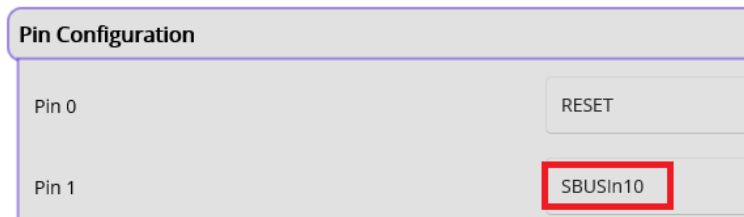
Note that the throughput requirements of the telemetry and video data may negatively affect the latency of the RC signals compared to more usual modem configurations and therefore it is not recommended to use this output for critical flight control.

Note that the video feed data and RC control signal latency are variable, and the **RFD VideoLink is not intended as an FPV flight system.**

Enabling RC passthrough requires configuring the ground station and VideoLink internal modems for input and output as desired. This can be done with the RFDTools GUI or AT Commands.

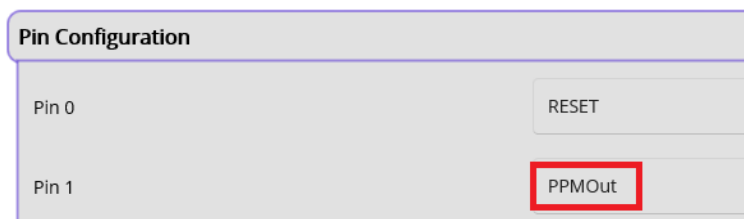
Example PPM passthrough configuration:

**GCS modem (Input)**



Set pin 1 to SBUSIn10 or PPMIn.

**VideoLink internal modem (Output)**



Set pin 1 to PPMOut.

To turn off RC passthrough, configure Pin 1 on both modems to GPI.

**2.5 RF Antenna Connection**

VideoLink provides two 50 Ω reverse polarity sub-miniature A (RP-SMA) female antenna connectors for the long-range RF signal.

Only one antenna is required for operation and can be attached to either port. If both are attached, it is best if they are mounted perpendicular to each other to provide polarisation separation increasing the effectiveness of the antenna diversity operation of the system.

We do not recommend fitting antennas directly to the RF connector. Instead, use an RP-SMA extension to connect both antennas to VideoLink.

Note that the device can safely operate without antennas attached to these ports.

Note the mechanical strength of these ports is limited and hanging excessively large antennas from these ports or subjecting them to repeated mechanical/vibrational stresses can damage the ports.

Note that the antenna ports should not be terminated with short circuits or RF loads, other than appropriate antennas, as this can cause RF signal problems and incorrect operation of the diversity feature.

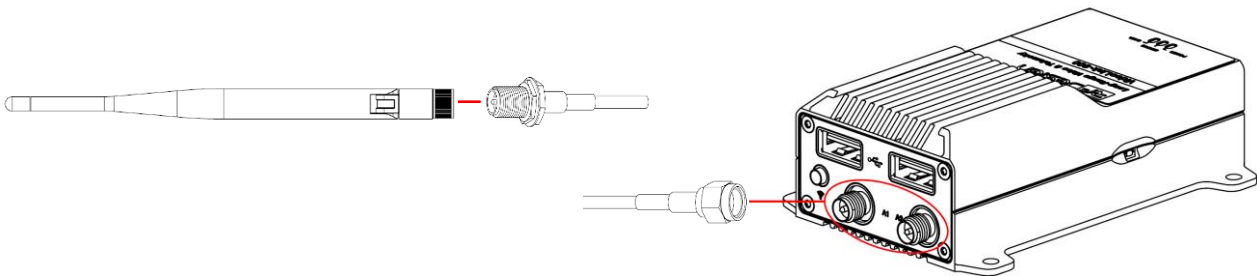


Figure 14: Connect the 900MHz 3dBi dipole antennas to the RF connector Ports A1 and A2 with the supplied RP-SMA extension cables

## 2.6 Web Configuration Tool

To simplify configuration, RFD VideoLink includes a Web Configuration Tool — an embedded webpage accessible via a web browser over Wi-Fi. This tool allows users to adjust video encoder settings, radio parameters, and Wi-Fi configurations for the RFD VideoLink module.

### 2.6.1 Connecting to VideoLink

To connect to the VideoLink device follow these steps:

1. Connect the 2.4GHz Wi-Fi antenna to the RP-SMA connector of the RP-SMA to MMCX coaxial extension cable.

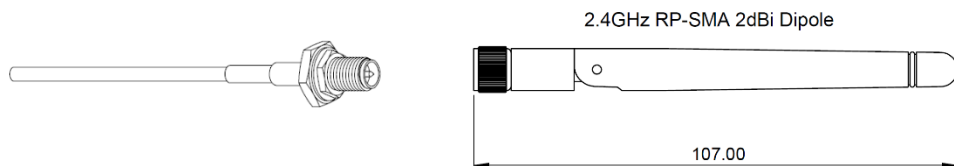


Figure 15: 2.4GHz antenna connection to extension cable

2. Connect the Micro-miniature coaxial (MMCX) end of the cable to the VideoLink port labelled with the Wi-Fi symbol. Align the cable with the connector and press firmly until it clicks into place.

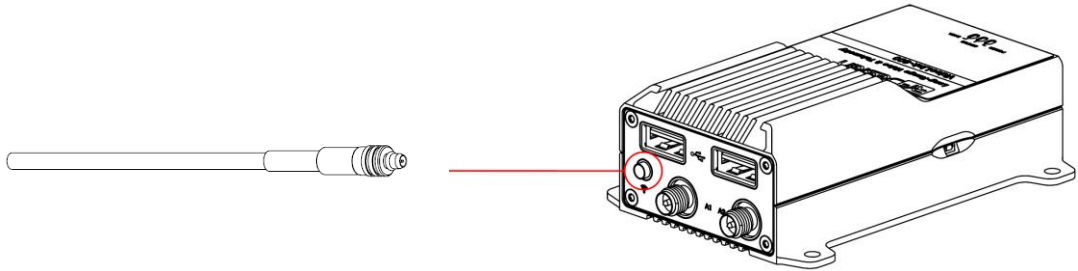


Figure 16: Extension cable to VideoLink module MMCX port

3. Connect the VideoLink power connector to either the PWR 1 or PWR 2 power port. Input voltage is from 6 to 55V.
4. Wait for the system to boot up. This process may take up to two minutes. The Wi-Fi range is about 10-20m.
5. Connect to the VideoLink Wi-Fi network. The default network name follows the format `rvl_XXXXXXXXXXXX`, where each X represents a hexadecimal character (0-9, A-F). For example, `rvl_2ccf672aab6`. The default password is "rfdvideo" (without quotation marks).

Note on windows systems, the connection may default to PIN mode. If this happens, select the "Connect using a password instead" option.

6. Open a browser and go to <http://rfdvideolink.local> or 10.42.0.1 to load the RFD VideoLink Web Configuration Tool site.

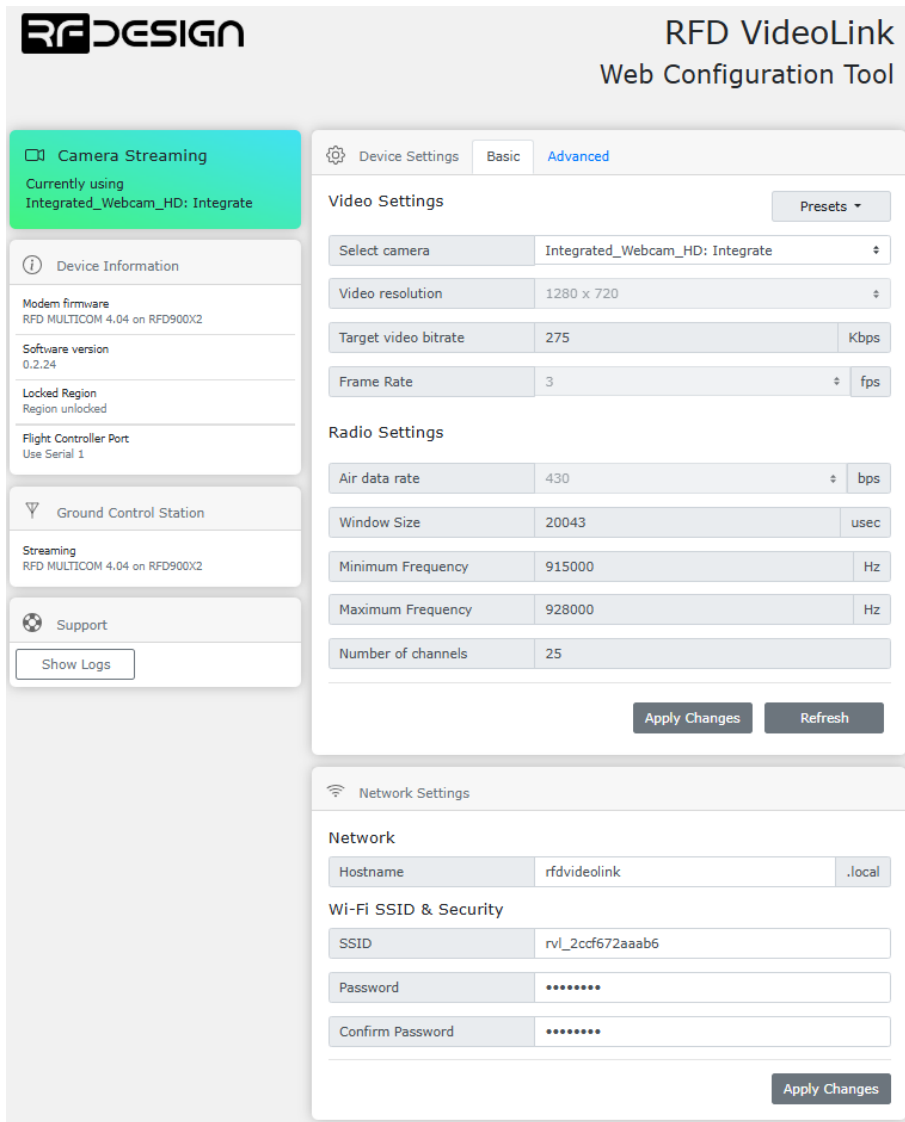


Figure 17: Screenshot of VideoLink Web Configuration Tool Basic tab.

## 2.6.2 Selecting the Operating Region

The VideoLink must be configured with the correct operating region during setup to ensure regulatory compliance and proper communication with the GCS modem.

By default, the GCS modem included with VideoLink is pre-configured at the factory to operate in the Unlocked / Australia (AU) region — using the 915–928 MHz band with 25 channels.

If your region supports this band and configuration, on first boot, simply select “Unlocked” or “Australia” during setup in the Web Configuration Tool. No further configuration of the GCS modem is required in this case.

Note that region selection is not permanent. You can repeat the process at any time by performing a factory reset.

## 2.6.3 If Operating Outside the Unlocked / AU Region

If your region does not use the 915–928 MHz band with 25 channels, you will need to configure both the VideoLink internal modem and the GCS modem to operate with appropriate regional settings. To do this:

- In the Web Configuration Tool, select the appropriate region during the Region Selection step. This sets the internal modem to the correct frequencies, bandwidth, and power settings for your region. To return to the Region Selection process you can perform a factory reset.
- Go to Advanced, then click Save To GCS File.
- Open RFDTools, connect to the GCS modem and Import the saved file.
- Click Write All to apply the settings.
- Reboot the GCS modem to complete the configuration. It will now operate with region-appropriate settings that match the internal modem.

If the internal modem is not configured correctly the device can be factory reset, or the internal modem can be manually configured using the Web Configuration Tool.

Note that locked modem variants may impose restrictions to the parameters/settings that can be modified or the values to which those parameters may be set and this in turn may limit the maximum practical settings for video quality and frame rate.

Note that only the region locked versions of the modems are represented to be compliant in their respective regions. Interoperable configuration does not convey regional compliance for an unlocked modem.

Note that ultimately it is up to the user to identify the radio frequency regulations applicable to their areas of operation and ensure their modems' parameters are set correctly.

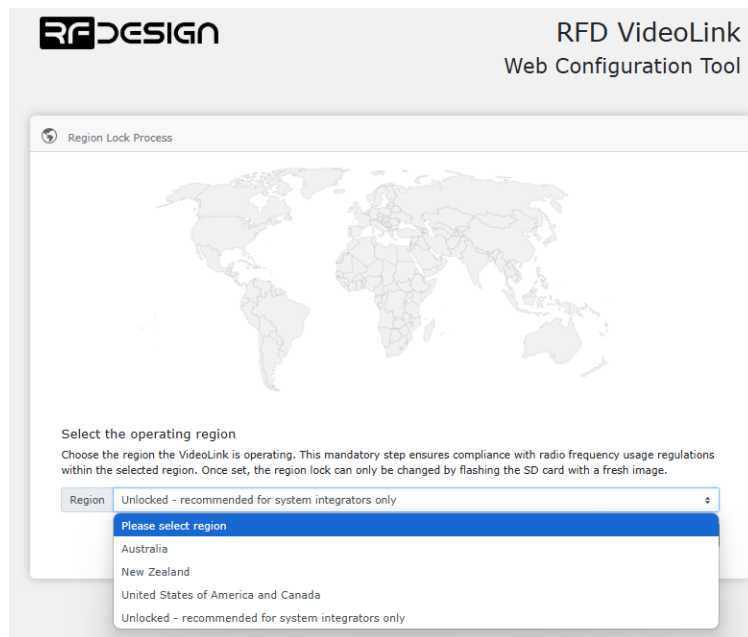


Figure 18: Screenshot of Web Configuration Tool region selection screen

#### 2.6.4 GUI Overview

An overview of the VideoLink Web Config Tool is provided below.

The tool is divided into four main sections:

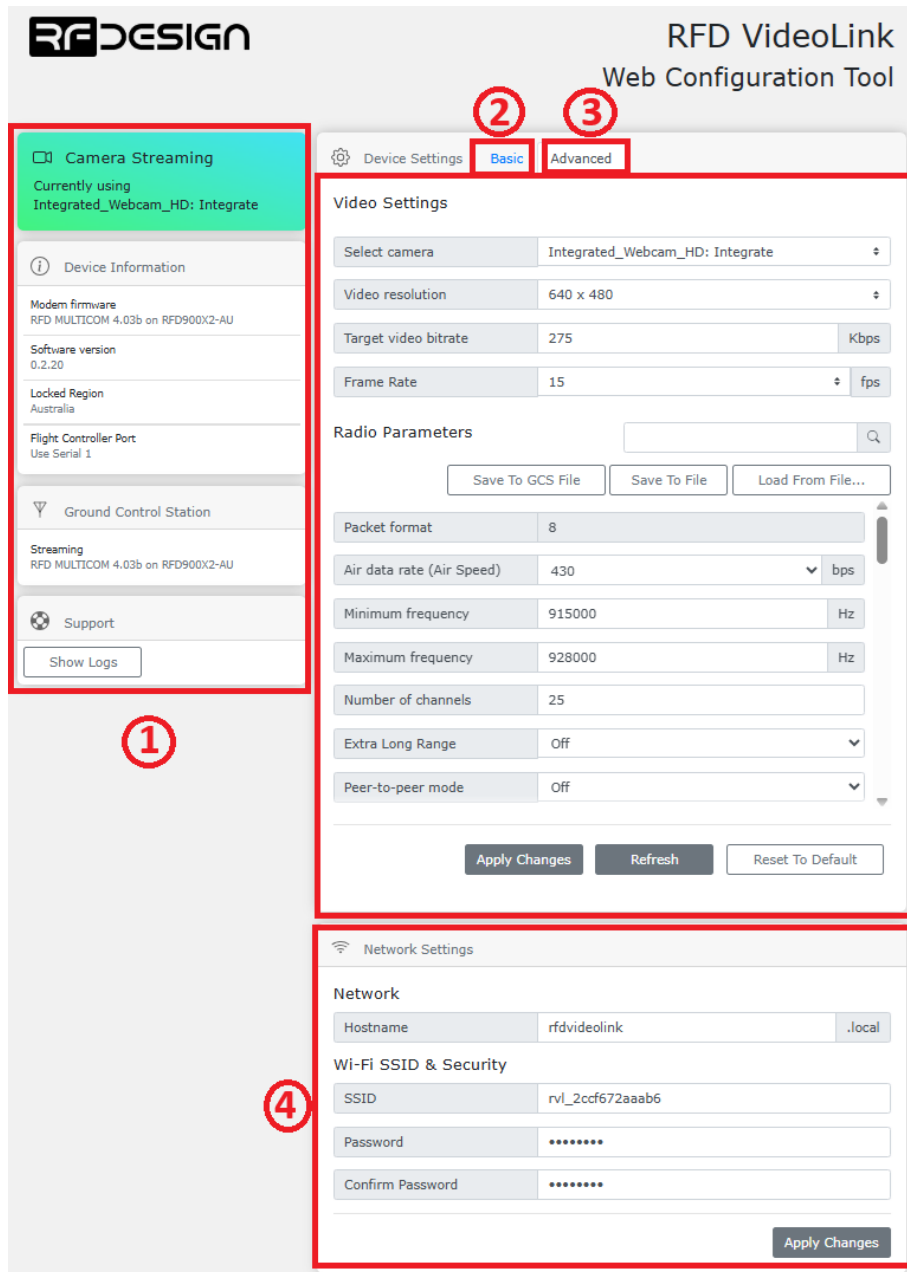


Figure 19: Configuration website overview

**1. Status and key information panel:**

The left panel displays camera status, key device information, region details, and support information. The support section includes an option to download a log file to assist with system diagnostics or technical support.

**2. Basic Tab:**

The right panel shows configuration options, depending on the selected configuration tab at the top of the screen. The Basic tab provides optimised video and modem setting presets via a Presets dropdown at the top-right side of the panel.

**3. Advanced Tab:**

The Advanced tab provides the user with full control over all video settings and internal Radio Parameters. The VideoLink Web Configuration Tool allows the user to configure all radio parameters of the internal modem.

**4. Wi-Fi panel:**

The bottom panel displays Wi-Fi Network Settings.

The latest version of RFDTools can be used to configure the GCS modem, and, when linked to the GCS modem, remotely configure the VideoLink modem. The details of this method of modem configuration are outlined in the Additional Configuration Tools section of this document.

### 2.6.5 Basic Settings

Basic modem settings and preconfigured video presets are provided under the Basic tab. These presets have been tested to balance video resolution, frame rate and target bitrate to achieve best video quality and minimal lag for a given modem air data rate. The video presets are described in further detail in the Video Presets section with a summary table.

**Video presets** can be found at the top-right corner of the Basic tab on the RFD VideoLink Web Configuration Tool. For further optimisation, start with the closest preset and adjust the frame rate or Resolution, but care should be taken when setting the target video bitrate.

VideoLink supports several configuration presets optimised for different air data rates: 1000 kbps, 430 kbps, 200 kbps, and below 200 kbps. These presets are grouped into four categories—Best Video Quality, Balanced, Optimised for Range, and Advanced. Presets below 200 kbps fall under the Advanced category and are considered experimental, intended for experienced users.

#### **Best Video Quality (1000kbps)**

- Preset 1: Highest frame rate - 800x600 25fps
- Preset 2: Highest video resolution - 1280x720 10fps

#### **Balanced (430kbps)**

- Preset 1: Highest frame rate - 640x480 15fps
- Preset 2: Highest video resolution - 1280x720 3fps

#### **Optimised for Range (200kbps)**

- Preset 1: Highest frame rate - 640x480 7fps
- Preset 2: Highest video resolution - 1280x720 2fps

#### **Advanced (125 and 64kbps)**

- Video and modem settings to be defined by advanced users with assistance from the video presents in Table 3.

The video preset selection only changes 5 modem parameters:

- Air data rate
- Minimum Frequency (dependant on air data rate and region)
- Maximum Frequency (dependant on air data rate and region)
- Number of channels is set to 25 (dependant on air data rate and region)
- Window size is set to 20043 microseconds

After the video preset selection has been made under the Basic section, further modifications are possible to the video parameters if the Advanced section is selected.

Note that caution should be used if adjusting target video bitrate, which can result in accumulating video lag over time. Refer to Advanced Video Settings for more information.

Note that the hardware encoder can generate significant heat. Mounting in a location with good airflow is recommended.

### 2.6.6 Advanced Settings

The Advanced section on the Web Configuration Tool provides access to all settings related to the video system and internal modem parameters. The user can scroll through the settings or use the search box next to the Radio Parameters section heading.

After selecting a video preset under the Basic tab, the user can fine-tune both video and modem settings by clicking on the Advanced tab. For example, if the user wishes to increase the RC passthrough frame rate beyond the value specified in the video preset, this can be done. RC passthrough frame rate is configured by adjusting the Window Size modem setting. However, it's important to consider that RC passthrough data takes priority in the data stream. As a result, increasing the frame rate will reduce the bandwidth available for video data, which can cause lag in the video stream.

To accommodate the higher RC passthrough frame rate, the user should slightly reduce the target video bitrate. This adjustment ensures adequate bandwidth allocation across both RC passthrough and video data.

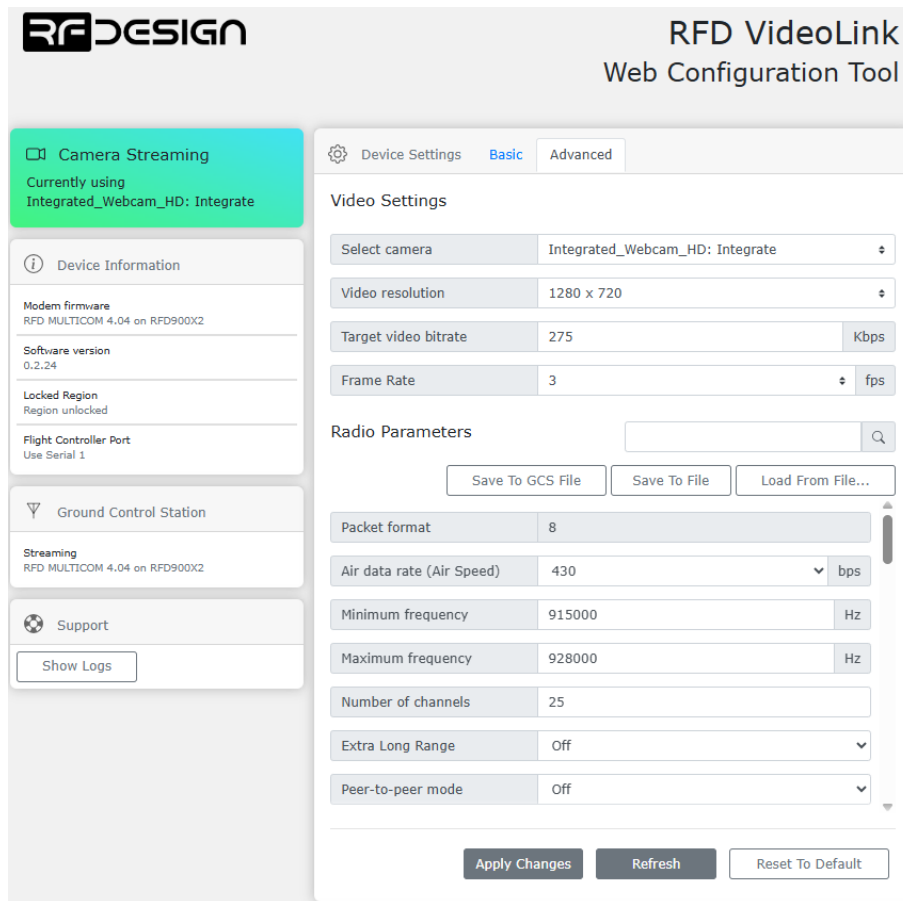


Figure 20: Web Configuration Tool Advanced settings

**Video Encoding:** The encoding algorithm is designed to maintain the set frame rate, although slight variations may still occur. The encoder has been optimised to reduce pixelation while keeping latency to a minimum.

**Target Video bitrate** is an input to the video encoding algorithm, accessible in the Advanced settings. The encoding algorithm will adjust the video quality to meet the target video bitrate. In each video preset, it has been optimized to maximize video throughput without causing

accumulated lag by sending more video data than the modems can handle. This optimisation was conducted while telemetry and RC passthrough data was enabled together with the video data. If the amount of telemetry or RC passthrough data increases beyond that shown in the Video Presets table in the below section, the target video bitrate may need to be lowered to prevent cumulative lag. VideoLink will always prioritise telemetry and RC passthrough data over video data when enabled. Generally, telemetry and RC passthrough slightly reduce the available video bandwidth across all air data rates but the effect is most noticeable at the lower rates. Setting the target video bitrate to 0 disables video transmission on the VideoLink.

Note that before applying changes to video settings in the Advanced preset, ensure the modem settings first support the required data rate for video transmission. This helps prevent lag or performance issues.

Note that setting the target video bitrate (or Telemetry and RC frame rates) higher than the recommended values in the video presets table will result in lag building up over time, as the video buffer in VideoLink fills. If the buffer fills it may also cause video artefacts.

### 2.6.7 Radio Parameters

Access to the internal modem settings in VideoLink is provided through the Advanced Configuration tab, under the Radio Parameters section of the Web Configuration Tool. From this interface, users can configure all modem-related settings, including:

- Serial Configuration (including serial routing)
- Radio Configuration
- Network Configuration
- Pin Configuration

For successful communication, the GCS modem must be configured with key settings that match those of the internal Videolink modem, such as air data rate, minimum and maximum frequencies, number of channels, and slot size.

VideoLink ships with a default video preset and associated modem parameters for that preset, but users can switch to another preset or create custom video settings by adjusting an existing preset within certain limits.

### 2.6.8 Radio Parameter Export and Import

VideoLink has a system for exporting and importing modem link settings for both the VideoLink modem and the GCS modem.

Once the desired modem configuration is selected, the user can export a generated `.ini` file to configure the GCS modem. To do this, click the "Save GCS Settings to File" button in the Advanced tab of the Web Config Tool. This file can then be imported into RFDTools and written to the GCS modem using the "Write All" button.

To preserve the internal modem's settings —such as before a hardware reset or firmware update— click the "Save to File" button. The user can later restore these settings by loading the file and clicking "Apply Changes" to reapply the configuration to the internal modem.

Refer to the Standard Setup with Example Configuration section of this user manual for an example of a specific video preset and its corresponding recommended radio parameters.

## 2.6.9 Wi-Fi and Network Settings

Network and Wi-Fi settings for Videolink can be accessed and managed under the Network Settings section of the Web Configuration Tool.

### Change the Network Hostname

1. Click on the field next to Hostname.
2. Type the new hostname.
3. Click on Apply changes.
4. A message "Changes Successfully Applied" will appear.

Note: The VideoLink Web Configuration Tool will lose connection due to the changes in Network credentials.

5. Power cycle the modem by turning it off and then on.
6. Wait approximately 60 seconds for the modem to restart.

### Change the Wi-Fi password

1. Click on the field next to Password.
2. Enter the new password.
3. Re-Enter the password in the Confirm Password field.
4. Click Apply Changes.

Note: The VideoLink Web Configuration Tool will lose connection due to the changes in Wi-Fi credentials.

5. Power cycle the modem by turning it off and then on.
6. Wait approximately 60 seconds for the modem to restart.

The Wi-Fi password can be reset to the default "rfdvideo" by pressing and holding the Hardware reset button more than 10 seconds.

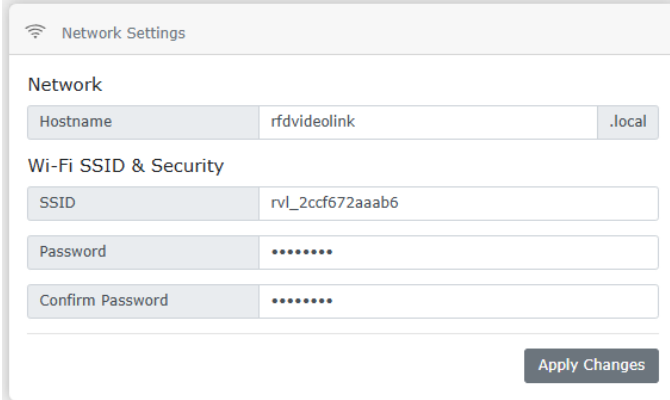


Figure 21: VideoLink Wi-Fi and Network Settings

## 2.7 Additional Configuration Tools

### 2.7.1 RFDTools

Although VideoLink internal modem settings can be configured via the Web Configuration Tool, RFDTools may also be used to set basic modem parameters —such as modem air data rate— on both the internal and GCS modems, provided they are synchronised.



- Green LED: Solid, indicating the link has been successfully established.
- Red LED: Flashes rapidly, indicating data is being transmitted.

Note if the LEDs do not appear as described reboot both the local GCS modem and VideoLink again. If connection still fails, check the settings of the local modem in RFD tools and those of the VideoLink using the Web Configuration Tool.

Note it is important that potential link-breaking changes to settings like frequency, air data rate etc. are applied and written to the remote modem before updating the local modem. This will ensure that the link can be reestablished after the local modem settings are updated.

### 2.7.2 AT & RTI Commands

AT commands are used to communicate with and control modems and set parameters. To enter AT command mode on the local modem, send the +++ command via a serial terminal connected to the radio at the correct baud rate. RFDTools has a Terminal window, which can also be used.

If successful, an OK prompt will appear, and the modem will stop displaying incoming data from the remote modem, if any. For additional information on AT commands, please refer to the RFD Multicom User Manual.

Like AT commands, RT commands can be used to communicate with and control a remote RFD modem. When the local RFD modem and VideoLink modem are synchronised, RT commands can be issued from the Terminal Window in RFDTools when the local modem is in command mode.

## 3 Standard Setup with Example Configuration

The following example configuration is used to show a basic system setup with a standard set of parameters.

### 3.1 VideoLink Internal Modem Setup

The internal modem parameters are configured using either the VideoLink Web Configuration Tool or RFDTools. The settings outlined below are essential for ensuring reliable transmission of both telemetry data and video.

#### 3.1.1 Serial 1 baud rate

The Baud rate for Serial port 1 is set to ensure efficient data flow without causing the serial data to buffer unduly. A value of 1200000 is recommended for both GCS and VideoLink. For optimum performance flow control should be enabled by ensuring that the PIN RTS and CTS are set.

#### 3.1.2 Serial 2 baud rate

The Baud rate for VideoLink Serial 2 (Aux) port defaults to 57600 to match the baud rate of the interfacing device.

For optimum performance flow control should be enabled by ensuring that pins 2,3 are set to AUXRTS, and AUXCTS respectively.

In normal operation the GCS Aux port is not used, and the modem Aux port configuration can be left in the default state.

#### 3.1.3 VideoLink Modem Routing

The modem routing specifies which serial port on the receiving modem will output incoming data. VideoLink requires specific routing configurations on each modem.

The data routes of the VideoLink modem must be configured as follows:

- Serial 1 data route as S1 to RF1 (AT parameter S1RXROUTE = 0)
- Serial 2 data route as S2 to RF1 and S1Tx (AT parameter S2RXROUTE = 2)

This configuration is illustrated below:

Serial 2 data route	S2toRF1&S1Tx	▼
Serial 1 data route	S1toRF1	▼

Figure 23: Web Configuration Tool settings for data routing. (Settings can also be made using RFDTools)

#### 3.1.4 Air Data Rate (kbps)

Also known as the bit rate or Air Speed of the radio data link. This value is set up based on the user's requirements for the mission: Best Video Quality (1000), Balanced (430), Optimised for Range (200), or Advanced (<200). Lower air data rates can improve RF sensitivity and therefore maximum possible range, however this reduces maximum video resolution and frame rate.

Note that both radios must be set to the same air data rate.

### 3.1.5 Slot Microseconds

Also known as slot size or window size, this parameter is automatically selected from the Video Presets table in the section below based on the chosen video preset. A smaller slot size increases RC frame rate but reduces available bandwidth for Video transmission. The recommended video presets are designed to strike a balance between RC responsiveness and video bandwidth.

Note that both radios must be set to the same slot size.

Note that certain slot sizes at specific air data rates can cause more artefacts.

### 3.1.6 Node ID

The Node ID for each modem must be manually set to ensure they are different. Set the VideoLink modem's Node ID to 1, designating it as the slave. For more details on master and slave configurations, refer to the RFD Multicom Firmware User manual.

### 3.1.7 Slot IDs

The Slot IDs for each modem must be manually set to ensure they are different. Set the VideoLink modem's Slot IDs value to 2, designating it as the second active entry in the bitfield. Note that RFDTools provides a graphical representation of the bitfield, where the second slot is referred to as slot "1," as shown in the screenshot below:

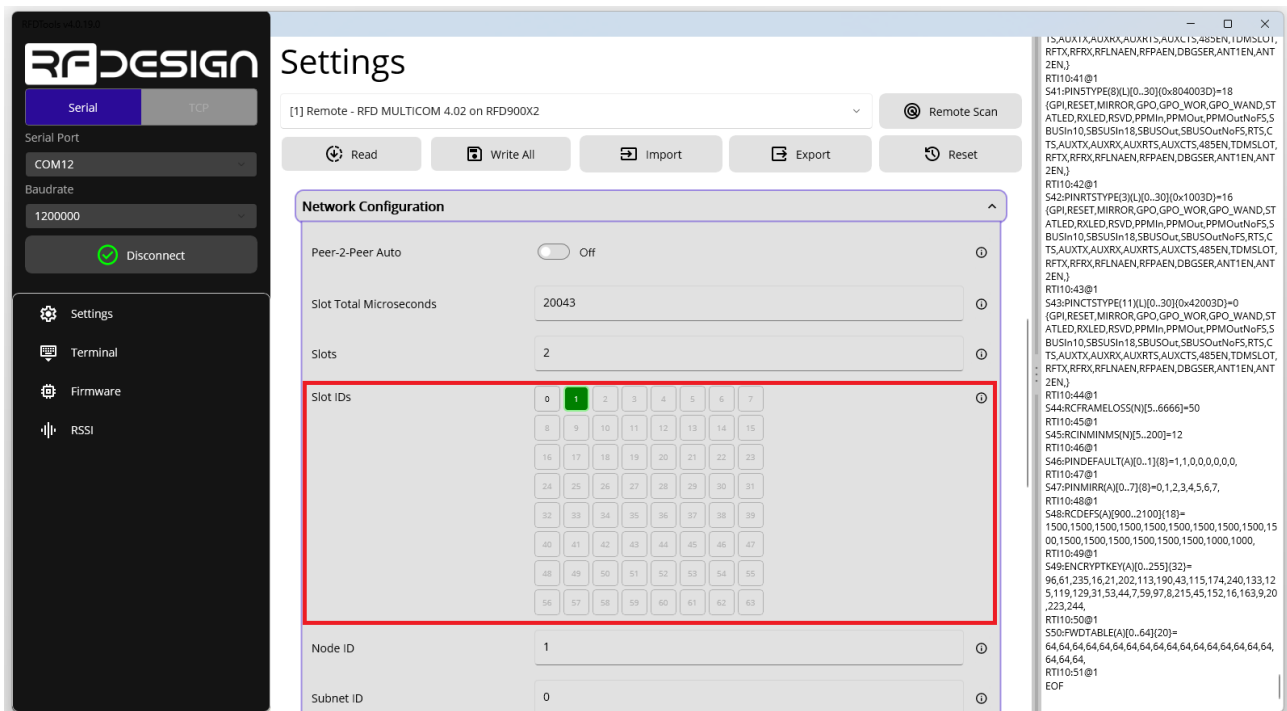


Figure 24: SlotID selection in RFDTools tools GUI

### 3.1.8 VideoLink Internal Modem Settings

Key settings for configuring the VideoLink internal modem to use one of the "Balanced 430kbps" video presets with RC passthrough are shown in the table below.

Serial Configuration		Network Configuration	
Serial 1 Baud:	1200000	Peer-2-Peer Auto:	Off
Serial 1 Data Type:	Mav	Slot Microseconds:	20043
Serial 1 Kbps Limit:	1000	Number of Slots:	2
Serial 1 RX Route: *	S1toRF1	Slot IDs: *	2
Serial 2 Baud:	57600	Node ID: *	1
Serial 2 Data Type:	Mav	Priority:	Low
Serial 2 Kbps Limit:	1000	For all other Network settings, follow the RFD Modem default settings.	
Serial 2 RX Route: *	S2toRF1&S1Tx	Pin Configuration	
Serial 2 AT-MODE:	Off	Pin 0: *	STATLED <sup>1</sup>
Radio Configuration		Pin 1: *	RC signal mode <sup>2</sup>
Minimum Frequency:	915000	Pin 2:	AUXRTS
Maximum Frequency:	928000	Pin 3:	AUXCTS
#of Channels:	25	Pin 4:	AUXRX
Bitrate (Air Data Rate):	430	Pin 5:	AUXTX
		For all other Pin settings, follow the RFD Modem default settings in the RFD MultiComm Firmware User Manual	

Table 1: Example of VideoLink internal modem setup

\* Values marked with an asterisk must be different on each modem.

For more information on the Number of Slots, Slot IDs, and unlisted modem parameters, please refer to the RFD MultiComm Firmware User Manual.

<sup>1</sup> STATLED is required to enable the "DATA" LED on the enclosure.

<sup>2</sup> May be set as PPMOut or SBUS output setting as required by the user when enabling RC passthrough. This should be left as GPI default if not using RC passthrough.

When a "Balanced 430kbps" video preset is selected in the Basic tab, the VideoLink web configuration tool automatically populates all the internal modem settings. These settings are displayed in the Advanced tab. This includes both region-specific settings (such as Min and Max frequencies and number of channels) and internal modem-specific settings (such as Serial 1 and 2 routing). The settings can be saved, prior to a factory reset for example, by clicking the

“Save to file” button in the Advanced tab. A complete list of internal modem settings for the “Balanced 430kbps” preset is provided in Appendix A.

### 3.2 CGS Modem setup

The GCS modem parameters are configured using either the VideoLink Web Configuration Tool or RFDTools. The settings outlined below are essential for ensuring reliable transmission of both telemetry data and video.

#### 3.2.1 Serial 1 baud rate

The Baud rate for Serial port 1 is set to ensure efficient data flow without causing the serial data to buffer unduly. A value of 1200000 is recommended for both GCS and VideoLink. For optimum performance flow control should be enabled by ensuring that the PIN RTS and CTS are set.

#### 3.2.2 Serial 2 baud rate

Not used

#### 3.2.3 GCS Modem Routing

The modem routing specifies which serial port on the receiving modem will output incoming data. The data routes on the GCS modem must be configured as follows:

- Serial 1 data route as S1 to RF2 (AT parameter S1RXROUTE = 1)
- Serial 2 data route as S2 to RF2 (AT parameter S2RXROUTE = 1)

This configuration is illustrated in the below screenshot from RFDTools:

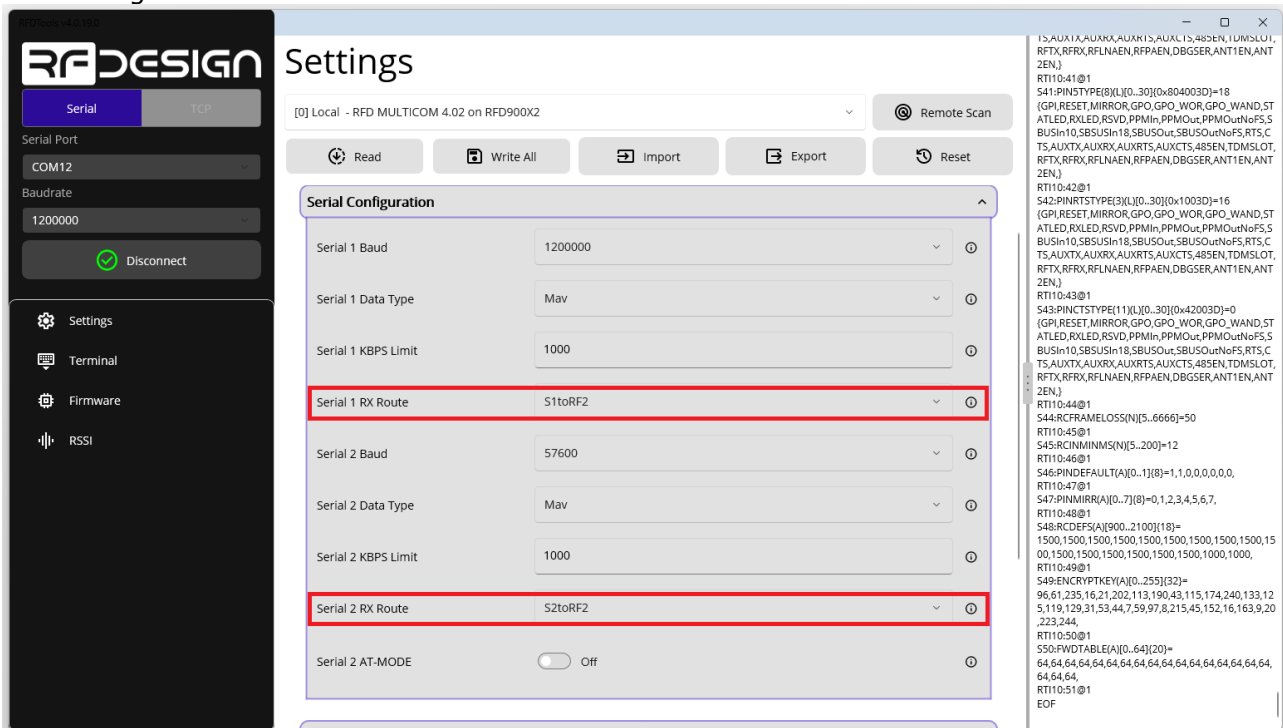


Figure 25: RFDTools settings for data routing

#### 3.2.4 Air Data Rate (kbps)

Also known as the bit rate or Air Speed of the radio data link. This value is set up based on the user’s requirements for the mission: Best Video Quality (1000), Balanced (430), Optimised for Range (200), or Advanced (<200). Lower air data rates can improve RF sensitivity and

therefore maximum possible range, however it reduces maximum video resolution and frame rate.

Note that both radios must be set to the same air data rate.

### 3.2.5 Slot Microseconds

Also known as slot size or window size, this parameter is selected from the Video Presets table in the section below based on the chosen video preset. A smaller slot size increases RC frame rate but reduces available bandwidth for Video transmission. The recommended video presets are designed to strike a balance between RC responsiveness and video bandwidth.

Note that both radios must be set to the same slot size.

Note that certain slot sizes at specific air data rates can cause more artefacts.

### 3.2.6 Node ID

The Node ID for each modem must be manually set to ensure they are different. Set the VideoLink modem's Node ID to 1, designating it as the slave. For more details on master and slave configurations, refer to the RFD Multicom Firmware User manual.

### 3.2.7 Slot IDs

The Slot IDs for each modem must be manually set to ensure they are different. Set the VideoLink modem's Slot IDs value to 2, designating it as the second active entry in the bitfield. Note that RFDTools provides a graphical representation of the bitfield, where the first slot is referred to as slot "0," as shown in the screenshot below:

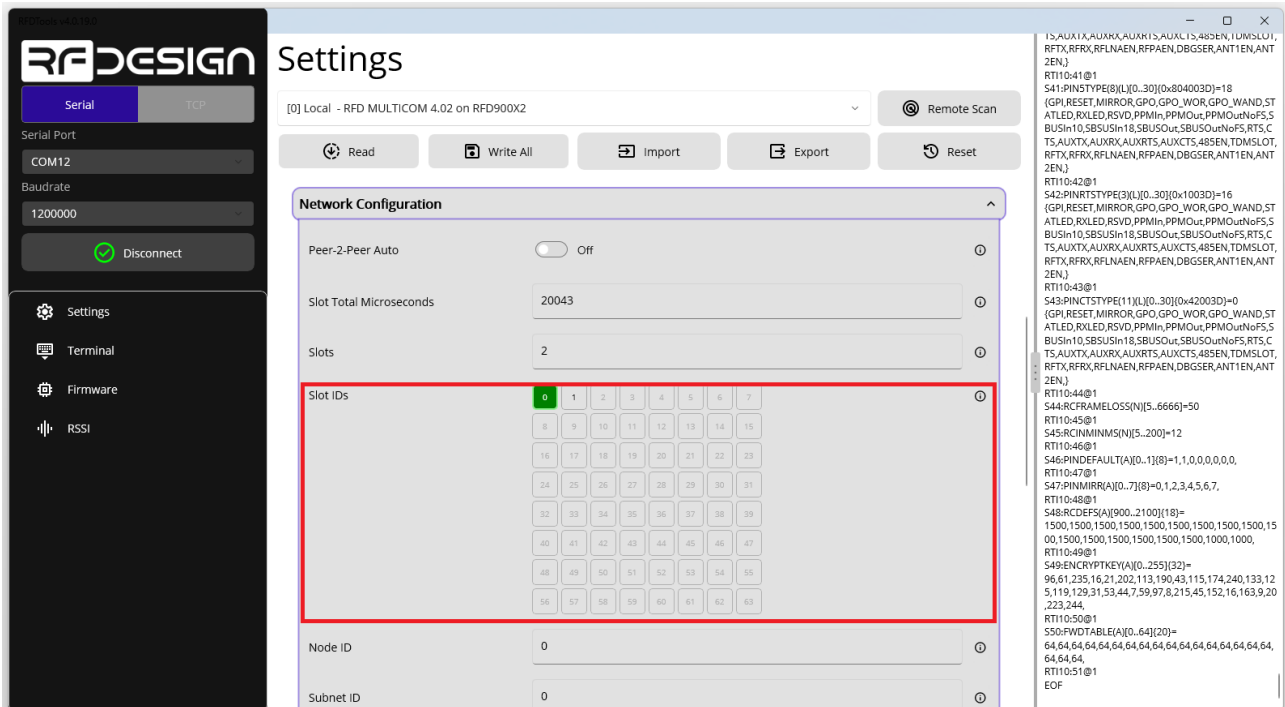


Figure 26: SlotID selection in RFDTools GUI

### 3.2.8 GCS Modem Settings

GCS modem example settings (for Balanced video preset with RC passthrough):

Serial Configuration		Network Configuration	
Serial 1 Baud:	1200000	Peer-2-Peer Auto:	Off
Serial 1 Data Type:	Mav	Slot Microseconds:	20043
Serial 1 Kbps Limit:	1000	Number of Slots	2
Serial 1 RX Route: *	S1toRF2	Slot IDs: *	1
Serial 2 Baud:	57600 (Not used)	Node ID: *	0
Serial 2 Data Type:	Mav (Not used)	Priority:	Low
Serial 2 Kbps Limit:	1000 (Not used)	For all other Network settings, follow the RFD Modem default settings.	
Serial 2 RX Route: *	S2toRF2	Pin Configuration	
Serial 2 AT-MODE:	Off	Pin 0: *	RESET
Radio Configuration		Pin 1: *	RC signal mode <sup>1</sup>
Minimum Frequency:	915000	Pin 2:	AUXRTS
Maximum Frequency:	928000	Pin 3:	AUXCTS
#of Channels:	25	Pin 4:	AUXRX
Bitrate (Air Data Rate):	430	Pin 5:	AUXTX
		For all other Pin settings, follow the RFD Modem default settings in the RFD MultiComm Firmware User Manual	

Table 2: Example of GCS modem setup

\* Values marked with an asterisk must be different on each modem.

For more information on the Number of Slots, Slot IDs, and unlisted modem parameters, please refer to the RFD MultiComm Firmware User Manual.

<sup>1</sup> May be set as PPM or SBUS input setting as required by the user when enabling RC passthrough. This should be left as GPI default if not using RC passthrough.

When a "Balanced 430kbps" video preset is selected in the Basic tab and the "Save To GCS File" button is pressed, the VideoLink web configuration tool automatically populates all the GCS modem settings and saves them to a GCS `.ini` file. This includes both region-specific settings (Min and Max frequencies and # of channels) and GCS modem-specific settings (such as Serial 1 and 2 routing). A complete list of GCS modem settings for the "Balanced 430kbps" preset is provided Appendix A.

### 3.3 Video Presets

This section provides a summary of key parameters associated with each video preset. In the video presets table below, parameters for each preset have been carefully selected based on testing to maximise bandwidth efficiency at the corresponding air data rate.

Preset Name	Modem settings (GCS and VideoLink)					VideoLink Advanced Video Settings		Comments
	Air Data Rate (kbps)	Suggested Window Size (us)	RC Frame Rate	Telemetry Rate (Hz)	GCS Modem Priority	Target Video Bitrate kbps (Max)	Highest Frame rate, Highest Video Res	
Advanced	64	99891	15	1	Low	37	320x240 3fps, 640x480 1/2fps	Advanced users
Advanced	64	99891	No RC	1	Low	40	320x240 3fps, 640x480 1/2fps	3sec constant lag, Advanced users
Advanced	125	39941	22	1	Med	75	320x240 7fps, 640x480 1fps	Medium priority for GCS modem slightly improves RC frame rate. Advanced users
Optimised for Range	200	42301	17	1	Low	140	640x480 7fps, 1280x720 2fps	<b>Basic Video Preset</b>
Balanced	430	20043	58	4	Low	275	640x480 15fps, 1280x720 3fps	<b>Basic Video Preset</b>
Best Video Quality	1000	9035	56	4	Low	600	800x600 25fps, 1280x720 10fps	<b>Basic Video Preset</b>

Table 3: VideoLink presets with corresponding modem and advanced video settings

The video presets are accessible through the Basic tab of the Web Configuration Tool. Changing from one video preset to another causes the following five modem parameters to change:

- Air data rate
- Minimum Frequency
- Maximum Frequency
- Number of channels
- Window size

Other values such as S1 BAUD are not changed. To reset all the modem values to defaults, it is necessary to click on the Reset To Default button or perform a factory reset. The modems will re-establish a link after about 10 seconds.

Note that each preset's target video bitrate is optimised to maximise video throughput without causing cumulative video lag. This balance assumes telemetry and RC frame passthrough rates specified. If these increase beyond the values shown, reduce the video bitrate to avoid excessive video buffering, which results in video signal lag. Telemetry and RC data are always prioritised.

### 3.4 VideoLink Desktop

The VideoLink Desktop application is used to split video and telemetry streams from the received data. The application is compatible only with Windows platforms.

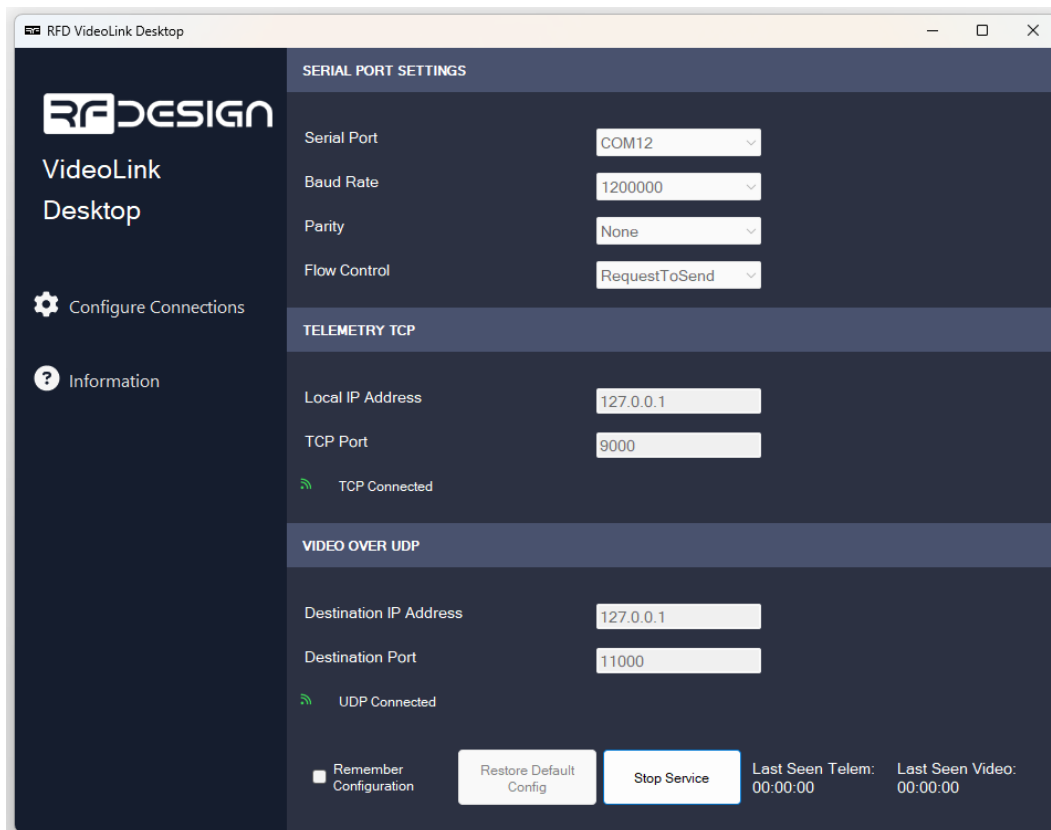


Figure 27: Screenshot of the VideoLink Desktop application

To install VideoLink Desktop:

1. Download the application from the RFDDesign website. (See the Useful Links section)
2. Run the installation wizard to install the application.
3. If required download and install Microsoft .NET Desktop Runtime 8.0.15.
4. Open the VideoLink Desktop application.
5. Configure the data ports:
  - a. Select the COM port, baud rate (default 1200000 bps), Parity (default None), and flow control (default RequestToSend)
  - b. Choose the TCP port for the telemetry link to the GCS (default 9000).
  - c. Select the UDP port for video broadcast.
  - d. Click "Start service" to begin splitting the video and telemetry streams and open the video window.
6. If a video stream is present, a window displaying the video will pop up automatically. If the window does not appear within 20 seconds, refer to the Video Troubleshooting table.

7. Connect the GCS (for example, Mission Planner) to the TCP port configured in the Telemetry TCP section.

Note that the VideoLink Desktop application does not configure the GCS modem; RFDTools is used for this purpose.

## 4 Firmware Management

The VideoLink module relies on two firmware components: the processor firmware and the internal modem firmware. New VideoLink processor firmware must first be flashed to an SD Card. A link to the VideoLink firmware page can be found in the Useful Links section of this manual. The process for updating the modem firmware is covered separately in section 4.2.

Note that installing new VideoLink firmware or performing a factory reset will trigger the Region Selection process again, which installs default modem settings for the selected region. To avoid losing your current modem configuration, it is recommended to first save the current settings using the VideoLink Web Config Tool.

### 4.1 Updating VideoLink Firmware

The process for updating the VideoLink firmware is as follows:

1. Open VideoLink Web Config Tool, select the Advanced tab, and click Save To File. This will generate an `.ini` file containing the internal modem settings, which you can save to a location of your choice.
2. Turn off the VideoLink and Remove the SD card.
3. Insert the SD card into a computer's micro-SD card slot.
4. Download the latest SD card image from the RFD website.
5. Flash the downloaded image onto an SD card using a flash tool, following the instructions provided by the tool. For Windows, Win32DiskImager or Rufus is suggested. For Linux, [balenaEtcher](#) is suggested.

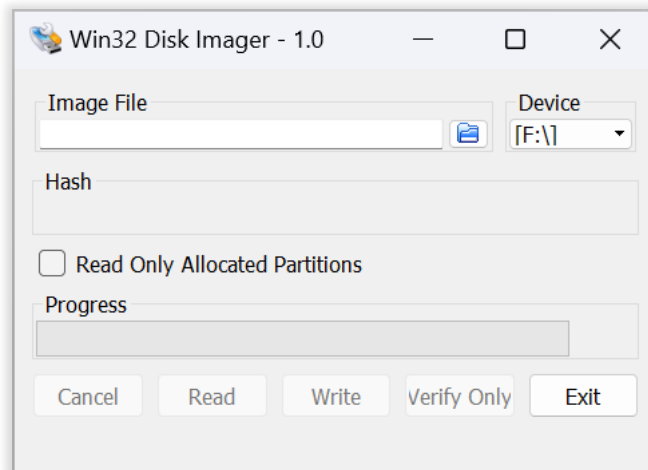


Figure 28: Screenshot of Win32 Disk Imager

6. Insert the SD card into the RFD VideoLink SD card slot and power it on.



Figure 29: Inserting SD card into slot

7. Connect to the VideoLink's Wi-Fi.
8. On first boot, the device may take up to 60 seconds to validate the product license. During this time, "Validating license" will appear next to the version number. Once validation is complete, the Region selection screen will appear. Select the appropriate operating region.
9. **Important!** After the firmware update is complete, the air data rate and slot size at either end may become misaligned. To restore these settings, load the `.ini` file saved earlier using the Web Config Tool; go to Advanced, click Load From File, find the correct file, and click Apply Changes.

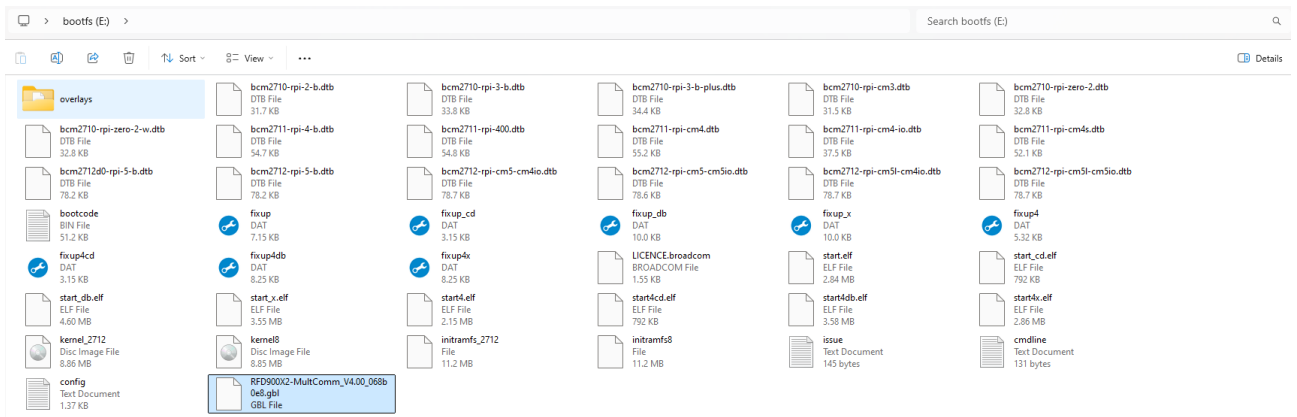
Alternatively, manually reconfigure key parameters such as air data rate and slot size. RFDTools can be used to check these values for the local (GCS) modem. These parameters must match on both ends of the link. A complete list of internal modem settings for the "Balanced 430kbps" preset is provided in Appendix A.

10. Reboot both modems and observe that a connection is established.

## 4.2 Updating VideoLink Internal Modem Firmware

The internal VideoLink modem is an unlocked RFD 900x with V2 hardware, configured with MultiComm firmware. For proper operation, the internal modem and the GCS modem must have matching firmware versions. To update the firmware on the internal modem, follow these steps:

1. A firmware version containing major firmware updates will cause the modem settings to return to default values. To avoid losing your configuration it is recommended to first save the current settings using the VideoLink Web Config Tool. Select the Advanced tab and click Save To File. This will generate an `.ini` file containing the internal modem settings, which you can save to a location of your choice.
2. Turn off the VideoLink and Remove the SD card.
3. Insert the SD card into a computer's micro-SD card slot.
4. Download the latest RFD900X2 MultiComm Firmware `.gb1` file from the RFDDesign Support page and save it to the root directory (i.e., the top level) of the SD card.



5. Re-insert the SD card into the VideoLink and power it on.
6. Connect to the VideoLink's Wi-Fi.
7. The firmware will be automatically installed. **Do not interrupt or remove power until the process is complete.** The progress of the modem firmware update can be followed on the VideoLink Web Configuration Tool page.

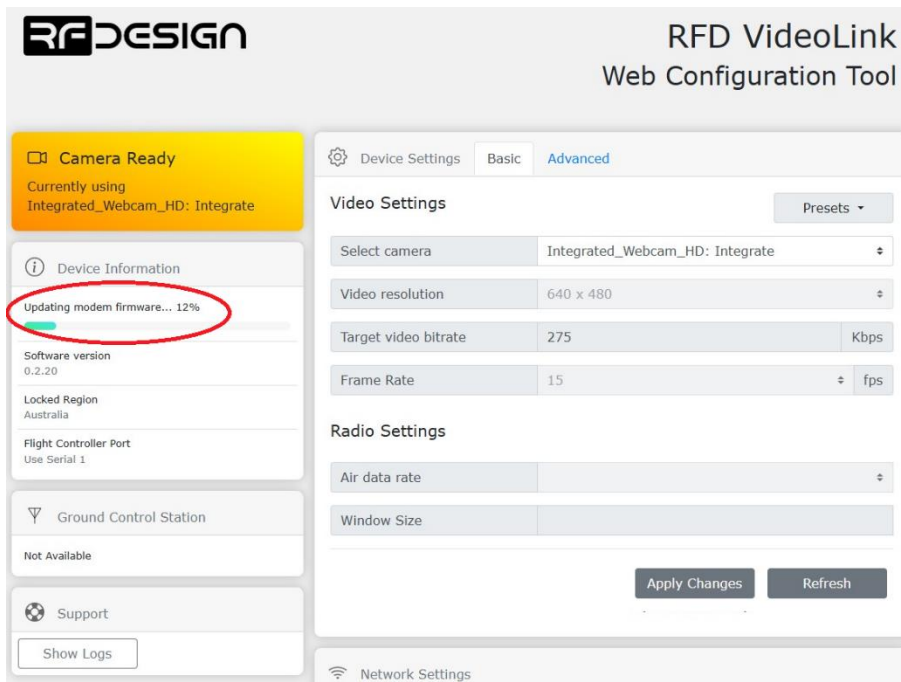


Figure 30: Progress of modem firmware update in VideoLink Web Configuration Tool

8. **Important!** After the firmware update is complete, the air data rate and slot size at either end may become misaligned. To restore these settings, open RFDTools and load the `.ini` file saved earlier using the Web Config Tool; go to Advanced, click Load From File, find the correct file, and click Apply Changes.

Alternatively, manually reconfigure key parameters such as air data rate and slot size. RFDTools can be used to check these values for the local (GCS) modem. These parameters must match on both ends of the link. A complete list of internal modem settings for the "Balanced 430kbps" preset is provided in Appendix A.

9. Reboot both modems and observe that a connection is established.

### 4.3 Updating GCS Modem Firmware

The GCS modem is an unlocked RFD 900x with V2 hardware, configured with MultiComm firmware. It is set up in the factory to behave like a Region-unlocked / AU region modem operating in the 915-928 MHz band with 25 channels. To update the firmware on the GCS modem, use the same version of RFD900X2 MultiComm Firmware .gb1 file used for the Videolink internal modem and follow these steps:

1. A firmware version containing major firmware updates will cause the modem settings to return to default values. To avoid losing your configuration it is recommended to first save the current modem settings using the VideoLink Web Config Tool. Select the Advanced tab and click Save To GCS File. This will generate an .ini file containing the GCS modem settings, which you can save to a location of your choice.
2. RFD modems feature a boot loader to facilitate field upgrade of the modem firmware via the serial port. Connect to the modem serial port with an FTDI cable and run the latest version of RFDTools. A link to this software can be found in the "Useful links" section of this manual. In RFDTools, click "Firmware", select the correct .gb1 file, and click "Flash Firmware."
3. **Important!** After the firmware update is complete, the air data rate and slot size at either end may become misaligned. To restore these settings, load the .ini file saved earlier using the Web Config Tool; open RFDTools, click on Import, find the correct file, and click Write All.

Alternatively, manually reconfigure key parameters such as air data rate and slot size. Web Config Tool can be used to check these values for the internal modem. These parameters must match on both ends of the link. A complete list of internal modem settings for the "Balanced 430kbps" preset is provided in Appendix A.

### 4.4 VideoLink Factory Reset

A factory reset will initiate the region selection process, which installs region-specific settings on the internal modem and restores the default video and Wi-Fi settings. The default password is "rfdvideo" (without quotation marks).

Before performing a factory reset, make note of the video preset currently in use. It is recommended to configure both the VideoLink and GCS modems to operate in one of the Balanced 430kbps settings before the factory reset. This ensures a smooth reconnection process as the region selection process resets the internal modem settings in the VideoLink to a default air data rate of 430kbps.

To reset VideoLink to factory settings, apply power and press and hold the side button for at least 10 seconds. A pen or small screwdriver can be used to gently press the button. Do not turn off power to the device while it is resetting. A popup window appears confirming the reset "Factory resetting. Please keep power on and wait a few minutes." After the reset, reconnect to the VideoLink Wi-Fi.

Note that this operation will not reset the groundside modem configuration, so the link may be lost during the process.

Note that installing new VideoLink firmware or performing a factory reset will trigger the Region Selection process again, which installs default modem settings based on the selected region. To avoid losing your modem configuration, it is recommended to first save the current settings using the VideoLink Web Config Tool.

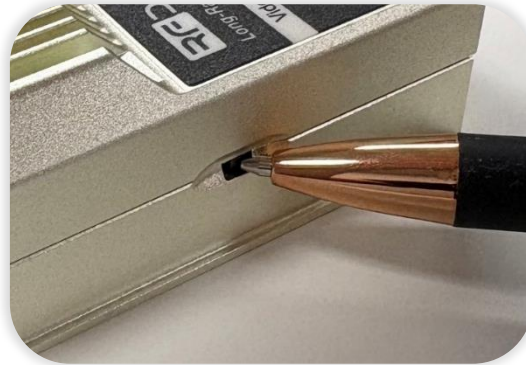


Figure 31: VideoLink Factory reset button

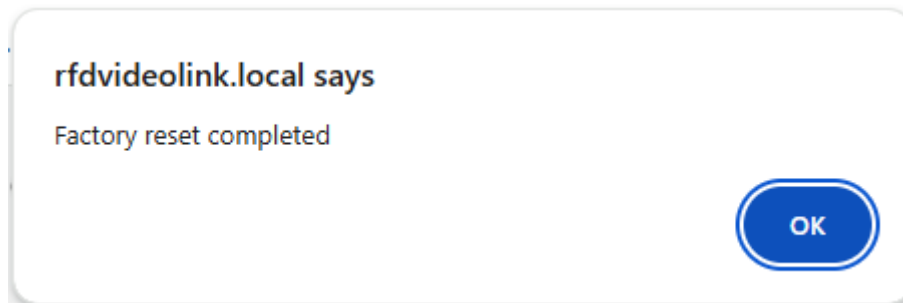


Figure 32: VideoLink factory reset completed popup.

**Note do not turn off power to the device while it is resetting.**

## 4.5 VideoLink Shutdown

It is possible to perform a soft shut down of the processor in the VideoLink module. To perform the shut down hold down the VideoLink reset button for 3-8 seconds. Please allow a minute for all processor activities to finalise then power down the module.

Note that the VideoLink internal modem will remain on even after the processor is shut down.

Note that it is not a requirement for the processor to undergo soft shutdown and the system can just be powered down directly if desired.

## 5 Technical & Operating Considerations

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### 5.1 Thermal Management

The VideoLink case acts as a heatsink. If the temperature exceeds safe limits the VideoLink processor and/or the modem can throttle their output to protect the device. Since the system can generate substantial heat, particularly for high video resolutions and RF transmission power levels, adequate ventilation is critical. It is recommended to install the VideoLink unit in a location with consistent airflow to maintain optimal performance.

### 5.2 Device Compatibility

A range of devices has been tested for compatibility. While most USB cameras are expected to be compatible with RFD VideoLink, below is a list of devices that are known to work.

Devices outside the recommended list have not been tested but may still work in conjunction with the VideoLink. If unlisted camera is chosen, ensure the camera can output streams at 480P and 720P resolutions and low frame rates.

#### *Compatible devices*

Manufacturer	Model
Arducam	B0205 Day & Night USB Camera module
Arducam	B0197 8MP Auto-Focus UVC USB Camera module
Adafruit	ADA5733 with GC0307 sensor USB camera module
DFRobot	FIT0701 USB camera module
DFRobot	FIT0892 720p USB wide-angle camera module

<sup>1</sup> The list comprises of cameras that meet a basic functionality set, including streaming of compatible video resolutions. Extended functionality such as pan-tilt-zoom (PTZ) and aperture control were not considered when creating the recommended list.

## 6 Troubleshooting

Troubleshooting and testing steps for basic issues with the VideoLink system are outlined below:

Problem	Possible Causes and Troubleshooting
<p>Artefacts and green bands in video image.</p>	<p>Settings changes applied but devices not rebooted.</p> <ul style="list-style-type: none"> <li>Power cycle both the receiver modem and VideoLink after changing radio modem settings as some settings do not take effect until rebooted.</li> </ul> <p>Incorrect modem serial speed.</p> <ul style="list-style-type: none"> <li>Ensure the serial port baud rate exceeds the air data rate (e.g., 460 is too low for 430kbps; use 1200 instead).</li> <li>Reboot modem.</li> </ul> <p>Modem Link Resetting. Radio frequency power maybe too high when separation is less than 10m.</p> <ul style="list-style-type: none"> <li>Set TXPower of both GCS and VideoLink to 10 or less during setup.</li> </ul> <p>Slot sizes restricting throughput.</p> <ul style="list-style-type: none"> <li>Set slot size to recommended value in the Video Presets table.</li> </ul> <p>Mismatch between Video Settings and air data rate.</p> <ul style="list-style-type: none"> <li>Ensure the <b>target video bitrate</b> does not exceed the recommended values for a given air data rate as per Video Presets table.</li> </ul> <p>VideoLink module hot to touch</p> <ul style="list-style-type: none"> <li>High video resolutions (e.g., 1280x720 @10fps or higher) can result in high temperature which causes hardware throttling. Increase air flow for more cooling or decrease video resolution.</li> </ul>
<p>Video has increasing lag.</p>	<ul style="list-style-type: none"> <li>Reset target video bitrate to value selected from Video Presets table.</li> <li>Serial 1 speed on Videolink internal modem has been set too low for selected air data rate.</li> <li>High video resolutions (e.g., 1280x720 @10fps or higher) can result in high temperature which causes hardware throttling. Increase air flow for more cooling or decrease video resolution.</li> <li>Reduce RC frame rate and/or telemetry rates in line with Video Presets table to ensure sufficient bandwidth for video signal.</li> <li>Reduce video frame rate.</li> </ul>
<p>VideoLink Web Configuration Tool displays "Camera not detected"</p>	<ul style="list-style-type: none"> <li>Unplug camera from USB and plug it back in.</li> <li>Switch to other USB port.</li> <li>Reboot VideoLink module.</li> </ul>

Problem	Possible Causes and Troubleshooting
VideoLink STATUS LED is flashing	<p>A flashing STATUS LED typically indicates one of the following:</p> <ul style="list-style-type: none"> <li>• The video source is not connected.</li> <li>• The VideoLink processor is not communicating with the internal modem.</li> <li>• Target Video bitrate is set to 0.</li> </ul> <p>Troubleshooting steps:</p> <ul style="list-style-type: none"> <li>• Verify that the video source is securely connected.</li> <li>• The internal modem settings (such as baud rate) may have changed while the VideoLink firmware is running. Try rebooting the device to restore communication.</li> <li>• Reinstall the modem firmware file (.gbl file).</li> </ul>
RF interference/network congestion causing packet loss.	<ul style="list-style-type: none"> <li>• Increase transmission power (maximum 30dBm)</li> <li>• Elevate antennas for better LoS</li> <li>• Use higher gain antenna</li> <li>• Change antenna polarisation</li> <li>• Lower the air data rate for better sensitivity (requires adjusting video settings to match)</li> <li>• Increase separation from and/or reduce interference sources, e.g. other radio systems, switch mode power supplies or buck or boost converters, ESCs etc.</li> <li>• Add external RF filtering between antenna and modem/VideoLink</li> </ul>
GCS modem does not show a solid green LED and rapidly flashing red LED.	<ul style="list-style-type: none"> <li>• Reboot modem and VideoLink</li> <li>• Verify that modem settings match VideoLink settings for frequency, number of channels, slots etc.</li> </ul>
COM port not appearing on PC. Or packet loss in serial connection.	<ul style="list-style-type: none"> <li>• Ensure that you have installed the VCP driver from FTDI</li> <li>• Remove any attached USB hub or reduce the number of items connected to it. Some USB hubs particularly those with HDMI ports, may cause packet loss.</li> </ul>
VideoLink Desktop Displays "Stream Not Available" after the "Start Service" button is pressed.	<ul style="list-style-type: none"> <li>• Ensure that you have installed the VCP driver from FTDI</li> <li>• Remove any attached USB hub or reduce the number of items connected to it. Some USB hubs particularly those with HDMI ports, may cause packet loss.</li> </ul>
VideoLink Desktop - Clicking the Start Service button does not open the video window.	<ul style="list-style-type: none"> <li>• If using a USB hub to connect the GCS modem's FTDI cable, disconnect and then reconnect the hub to the PC.</li> <li>• Manually adjust the video settings in the Web Configuration Tool to clear any accumulated video in the VideoLink buffer.</li> <li>• Reboot the VideoLink and receiver modem then close and reopen the VideoLink Desktop.</li> </ul>

<p>VideoLink Desktop – Displays message “Access to the path “COMxx” is denied.”</p>	<ul style="list-style-type: none"> <li>• Disconnect other applications from the modem COM port. e.g., RFDTools.</li> </ul>
<p><b>Problem</b> <span style="float: right;"><b>Possible Causes and Troubleshooting</b></span></p>	
<p>Received Video is a black screen.</p>	<ul style="list-style-type: none"> <li>• Ensure that the video source (USB Camera or PC) is not in sleep mode.</li> <li>• Try a different video source.</li> <li>• If using a USB hub to connect the GCS modem’s FTDI cable, disconnect and then reconnect the hub to the PC.</li> <li>• Connect directly to USB port bypassing any hub.</li> </ul>
<p>RFDTools displays “Connection Failed” when Connect is clicked.</p>	<ul style="list-style-type: none"> <li>• Disconnect other applications from the modem COM port. e.g. click “Stop Service” in VideoLink Desktop.</li> </ul>
<p>Mission Planner fails to connect.</p>	<p>If Mission Planner fails to connect to the autopilot or retrieve parameters, check that the Serial 1 RX Route on the GCS modem is set to S1toRF2.</p> <p>Also check that the Serial 2 RX data route on the VideoLink internal modem is set to S2toRF1&amp;S1Tx.</p>

## 7 Reference

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### 7.1 Useful Links

#### **VideoLink Firmware and Documentation**

<https://rfdx.atlassian.net/wiki/spaces/TS/pages/689831937/RFD+VideoLink>

#### **RFD 900x Modem Firmware and Documentation**

<https://rfdx.atlassian.net/servicedesk/customer/portal/1/article/452231169>

#### **RFDTools**

<https://rfdx.atlassian.net/servicedesk/customer/portal/1/article/242712577>

#### **RFD Store**

<https://store.rfdesign.com.au>

#### **FTDI VCP Driver (Windows)**

<https://ftdichip.com/drivers/vcp-drivers/>



## Glossary

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**AES:** Advanced Encryption Standard. A data encryption protocol meeting the specifications established in the ISO/IEC 18033-3 standard.

**Baud:** Unit of measurement of symbol rate. This is an indication of data transfer speed of serial/UART connections.

**CTS:** Clear to Send. UART hardware flow control flag.

**FTDI:** Future Technology Devices International, a supplier of electronic components synonymous with their UART to USB converter chips and the cables which use such components.

**GPIO:** General Purpose Input Output. A microcontroller pin that can be configured for various input and output functions.

**LED:** Light Emitting Diode. A semiconductor device that converts electrical power to light.

**LoS (aka LOS):** Line of Sight. This refers to the distance that a radio signal can reach uninterrupted by obstructions or the radio horizon.

**MAVLink:** Micro Air Vehicle Link. A protocol for telemetry data exchange between compatible ground control software and autonomous vehicle controllers.

**PPM:** Pulse Position Modulation. This is an encoding standard used by radio controllers to send data about the position of multiple servo motors.

**RF:** Radio Frequency. A term used to describe a portion of the electromagnetic spectrum. Commonly encompassing frequencies between a few tens of kilohertz and a couple of hundred gigahertz.

**RFD:** RFDesign. The Australian company who design, build and support the x series modems among other products.

**RFDTools:** An RFDesign utility for configuring RFD900 series modems, updating firmware, and performing diagnostics over serial links.

**RP-SMA:** Reverse Pole Sub-miniature type A. A common form of RF connector on consumer electronics. It offers a reasonable compromise between overall size and rated connection cycles.

**RTS:** Request to Send. UART hardware flow control flag.

**RX:** Receive.

**SBUS:** Serial Bus protocol created by Futaba. This is an encoding standard used by radio controllers to send data about the position of multiple servo motors.

Serial: A synonym of UART, a protocol for sending and receiving data in a sequential manner.

**TX:** Transmit.

**UART:** Universal Asynchronous Receive Transmit. Hardware that manages serial data transfer between connected devices.

**USB:** Universal Serial Bus. An industry standard for data communication and power delivery between devices. Most commonly found in type A and C connectors.

**UVC:** USB Video Class (UVC). A type of USB standard that allows devices like webcams, camcorders, and video converters to stream video over a USB connection.

**UV:** Uncrewed Vehicle a vehicle system that is remotely or autonomously operated without human crew or controllers physically on board.

**UAV:** Uncrewed Autonomous Vehicle an vehicle system that is remotely or autonomously operated without human crew physically on board.

## Revision History

Version	Date	Changes
1.0	04/07/2025	First release version