

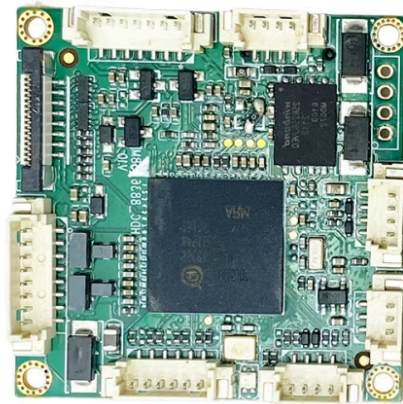
UVC USB Camera to IP Ethernet Streaming Encoder Board (H.265/H.264 1080P60)

Product Overview

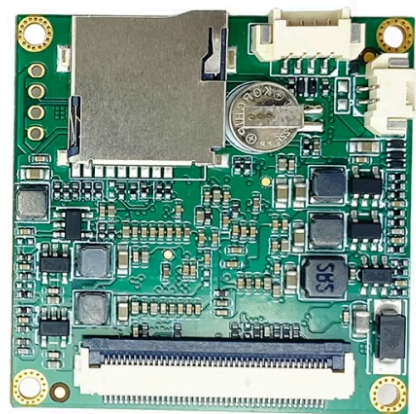
The **UVC USB Camera to IP Ethernet Streaming Encoder Board** is a high-performance video encoding module engineered to convert video feeds from USB cameras into real-time IP network streams.

Featuring advanced H.265/H.264 compression algorithms, the board guarantees ultra-low latency, outstanding image fidelity, and optimized low-bitrate transmission. Equipped with wide DC power input, standard USB ports, and full support for RTSP, ONVIF, GB28181, and P2P protocols, it serves as an ideal solution for UAVs/drones, industrial robotics, machine vision systems, and remote video conferencing setups.

Available in both 1-Channel and 2-Channel USB Video configurations, the dual-channel version supports simultaneous processing of two independent UVC USB camera video streams.



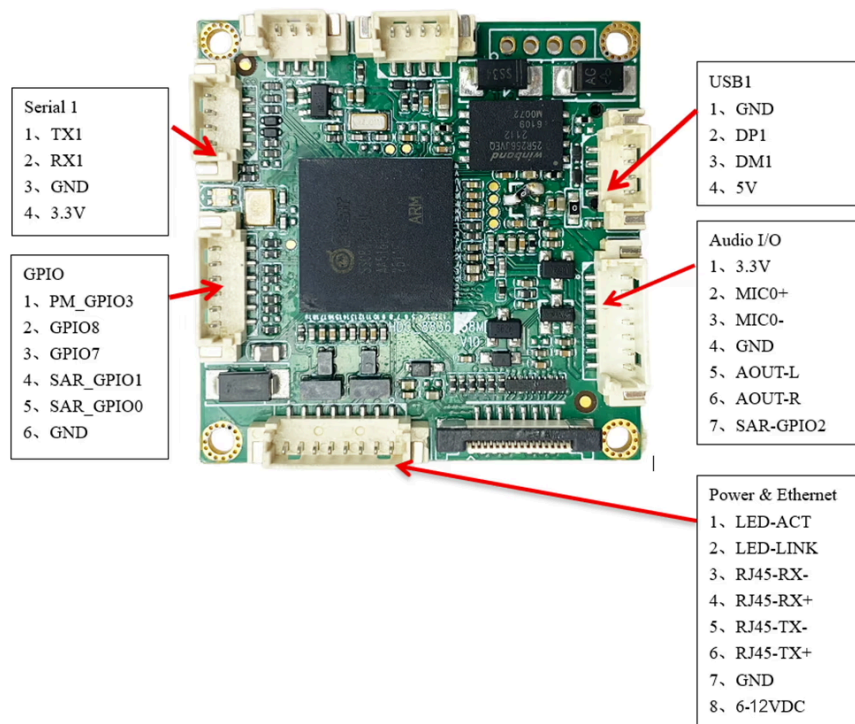
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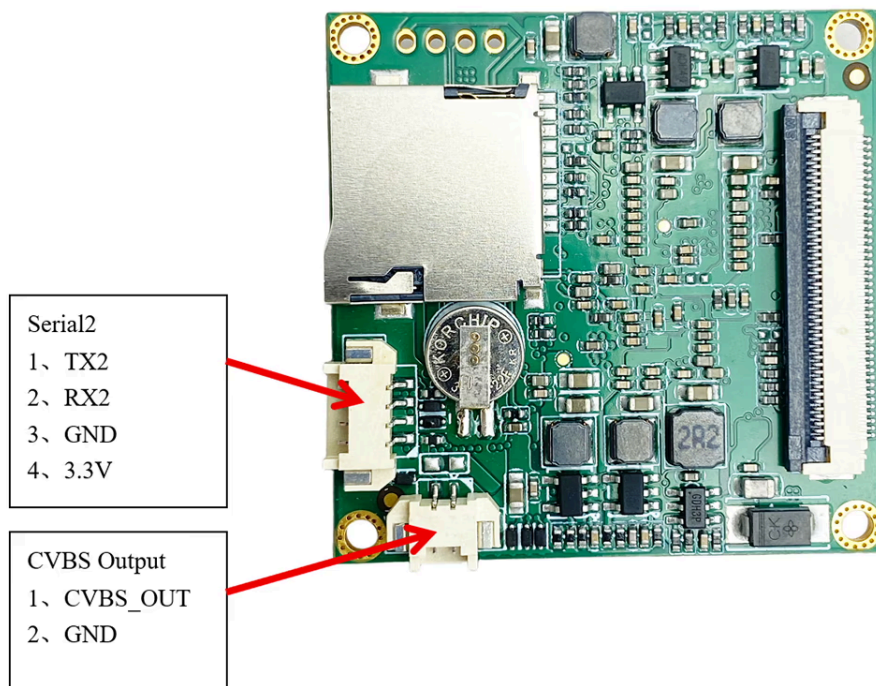


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Key Features

- **Real-Time USB to IP Encoding:** Converts video feeds from UVC USB cameras into network streams over Ethernet.
- **High-Efficiency Compression:** Supports H.265/H.264 video compression to significantly save bandwidth while maintaining HD image clarity.
- **Full HD Streaming:** Delivers Full HD 1080P@60fps encoding with optional 4K@30fps HDMI output via expansion board.
- **Versatile USB Expansion:** Standard USB port supports USB camera input or optional Wi-Fi/4G module integration.
- **Two-Way Audio Intercom:** Embedded G.711/AAC audio codec enables full-duplex voice communication.
- **Comprehensive Network Protocols:** Fully supports RTSP, ONVIF, GB28181, P2P, HTTP, RTMP, TCP/IP, and DHCP.
- **AI Processing & OSD Customization:** Integrated NPU supports custom AI algorithm deployment and OSD text/graphics overlay.
- **Flexible Power Delivery:** Compatible with DC 6–12V wide-range input or Power over Ethernet (PoE).
- **Open Player SDK:** Provides PC Player SDK source code for seamless integration into custom platforms and secondary development.
- **Compact Form Factor:** Ultra-small 38×38 mm design with built-in anti-static and surge protection.

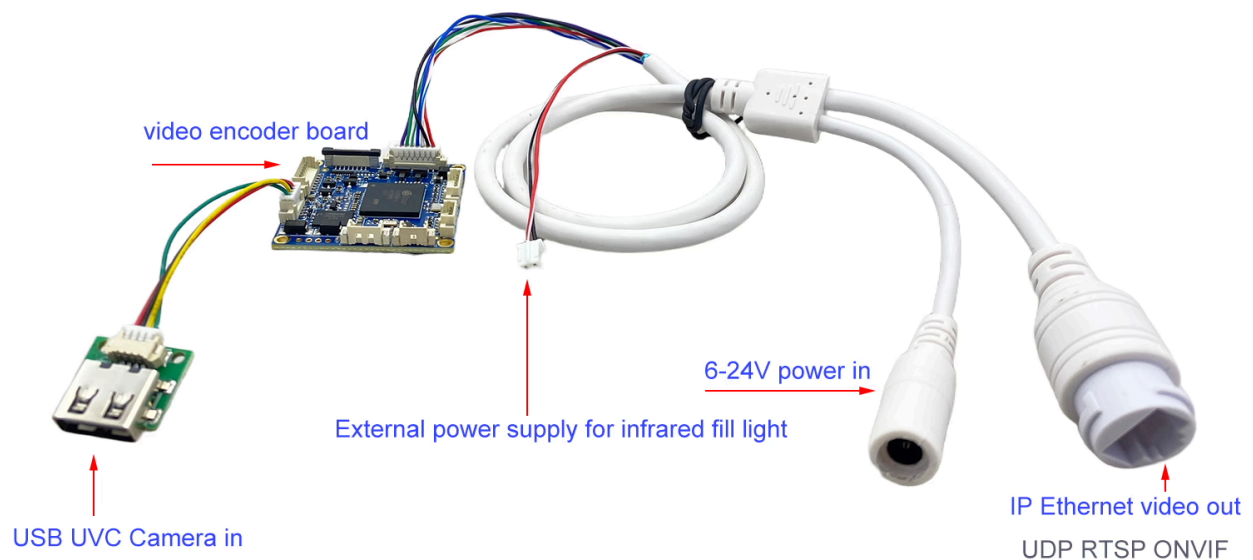




Technical Specifications

Item	Description
Model	2169-UVC-IP
Main Processor	SSC8836Q-H with 0.5 TOPS NPU
Video Encoding	H.265 / H.264 (Bitrate: 0.1–8 Mbps adjustable; Frame rate: 1–60 fps)
Resolution	Main stream: 1920×1080 / 1280×720 Sub stream: D1, VGA, 640×360
Video Input	1× USB UVC camera input (Supports up to 1080P@60fps)

Item	Description
HDMI Output	Up to 1080P@60fps (Supports 4K@30fps via add-on interface board)
Audio Codec	G.711 / AAC, supports two-way voice intercom
Network Interface	1× RJ45 (10/100M adaptive, ESD/lightning surge protection)
Network Protocols	TCP/IP, IPv4, RTSP, ONVIF, GB28181, HTTP, DHCP, RTMP, NTP
Serial Ports	2× TTL UART
Storage Interface	1× MicroSD / TF Card Slot (Up to 512GB)
Audio Ports	1× MIC Input, 1× LINE Output
Power Input	DC 6–12V or PoE Power Supply
Operating Temperature	-20°C to +70°C (Verified operation from -30°C to +50°C)
Dimensions	38 × 38 mm



Applications

- **Unmanned Systems (UAV / UGV / USV):** Real-time aerial video transmission, remote monitoring, and navigation control.
- **Industrial Robotics:** Machine vision positioning, automated inspection, and motion control systems.
- **Video Conferencing:** Converts standard webcams or USB imaging modules into high-definition IP camera nodes.
- **Digital Microscopy:** High-definition visual output for laboratory research and educational equipment.
- **Edge AI Vision:** On-device intelligent detection and analytics integration via built-in NPU.



Frequently Asked Questions (FAQ)

Q1: What is the default IP address and login credentials?

- **Default IP:** 192.168.1.188
- **Username / Password:** admin / admin
- **IP Discovery:** If the IP address is unknown, connect the board to your PC via Ethernet and run the IPCSearchTool utility to detect and configure the device.

Q2: What are the RTSP stream URLs for the dual-channel version?

The dual-channel version provides two independent RTSP video streams:

- **Camera 1:**
Main Stream: rtsp://192.168.1.188:554/0
Sub Stream: rtsp://192.168.1.188:554/1
- **Camera 2:**
Main Stream: rtsp://192.168.1.188:554/10
Sub Stream: rtsp://192.168.1.188:554/11

Q3: How do I adjust the camera resolution and frame rate?

Access the Web UI and navigate to **Audio & Video** → **Video Coding Parameter Settings**. Here you can configure parameters including Encoding Type (H.264/H.265), Resolution (e.g., 1080P), Frame Rate (0–120 FPS), I-Frame Interval, and Bitrate (32–16000 Kbps).

Q4: If my USB camera supports 4K, can I scale the streaming output down to 1080P?

Yes. In the Web UI under **Video Coding** → **Resolution**, select 1920x1080 and save the configuration. The encoder board will accept the 4K input from the camera and automatically downscale and encode it to 1080P to optimize network bandwidth.

Q5: Does the board support simultaneous analog (CVBS) and IP Ethernet outputs?

Yes. The encoder board supports concurrent CVBS analog and IP video output without manual switching, allowing real-time local analog monitoring alongside network streaming.

Q: What is the default IP configuration for the device?

A: The device's default IP address is **192.168.1.188**. If the IP address has been changed and is unknown, you can still locate the device on the network:

1. Connect the device (encoder board) to your computer using an Ethernet cable.
2. Use the utility tool **IPCSearchTool** to scan the network. **IP Search-EN-V1.0.61 Download**
<https://download.ivcan.com/software/2090-ipcsearch-en-v1.0.61.zip>
3. The tool will detect the device and display its current IP address.
4. Enter the detected IP address into a web browser.
5. You will then be able to access the device's configuration interface and live

This method allows you to regain access even if the network settings have been modified.

[illegible]

IP Search Tool Ver-1.0.61

Q: What user ID and password are needed to log in to the web interface?

A: The default login credentials for the device web interface are: **Username:** admin
Password: admin .

Q: We are interested in the Player SDK. Can we receive and display the video stream in our own software?

A: Yes. We can provide the PC Player SDK source code, which enables customers to receive and display video streams in their own software applications and perform

custom integration or secondary development as needed.

Download Link: [PC Player SDK Source Code](#)

Please note that the SDK is provided for independent development purposes only. We do not provide technical support, customization services, or engineering assistance for secondary development based on the SDK source code.

Q: Can the USB UVC Video-to-IP Encoder Board Support Dual USB Video Inputs and Two Network Streams?

A: Yes. The hardware is capable of supporting **two UVC-compliant USB video sources simultaneously**. By using the appropriate firmware and software configuration, the board can capture video from both USB cameras and transmit them through a **single Ethernet port** as **two independent network video streams**.

Features

- Dual UVC USB camera input support
- Simultaneous video capture from two USB devices
- Two independent IP video streams over one Ethernet connection
- RTSP and other network streaming protocols available (depending on software configuration)
- Suitable for surveillance, machine vision, robotics, industrial monitoring, and multi-camera applications

Q: Can you test whether your encoder board is compatible with our thermal camera before we place an order?

A: We would be happy to help verify the compatibility. However, we are unable to purchase third-party thermal cameras for compatibility testing. If you would like us to perform the verification, please purchase our encoder board and send your thermal camera to us. Our engineers will carry out the necessary compatibility tests and provide you with the test results.

Q: We have some cameras that work only with USB 3.0. Do you have an encoder board that supports USB 3.0 for our cameras?

A: At the moment, we **do not have an encoder board with USB 3.0 camera input**. However, we are **currently developing a new version that will support USB 3.0 cameras**.

The product is still under development, so we are not yet able to provide a release date.

If you are interested, please let us know your camera model and technical requirements. We will be happy to evaluate compatibility and notify you as soon as the USB 3.0 version becomes available.

Q: Can both USB ports on the Dual USB UVC Video to IP Streaming Board be used for USB cameras?

A: Yes, both USB ports are designed for USB UVC cameras. However, **each USB port has a dedicated function and should be connected to the correct camera type.** Please refer to the image below for the correct connection.

Dual USB Thermal and Visible Camera Port-Assignment to IP video stream converter

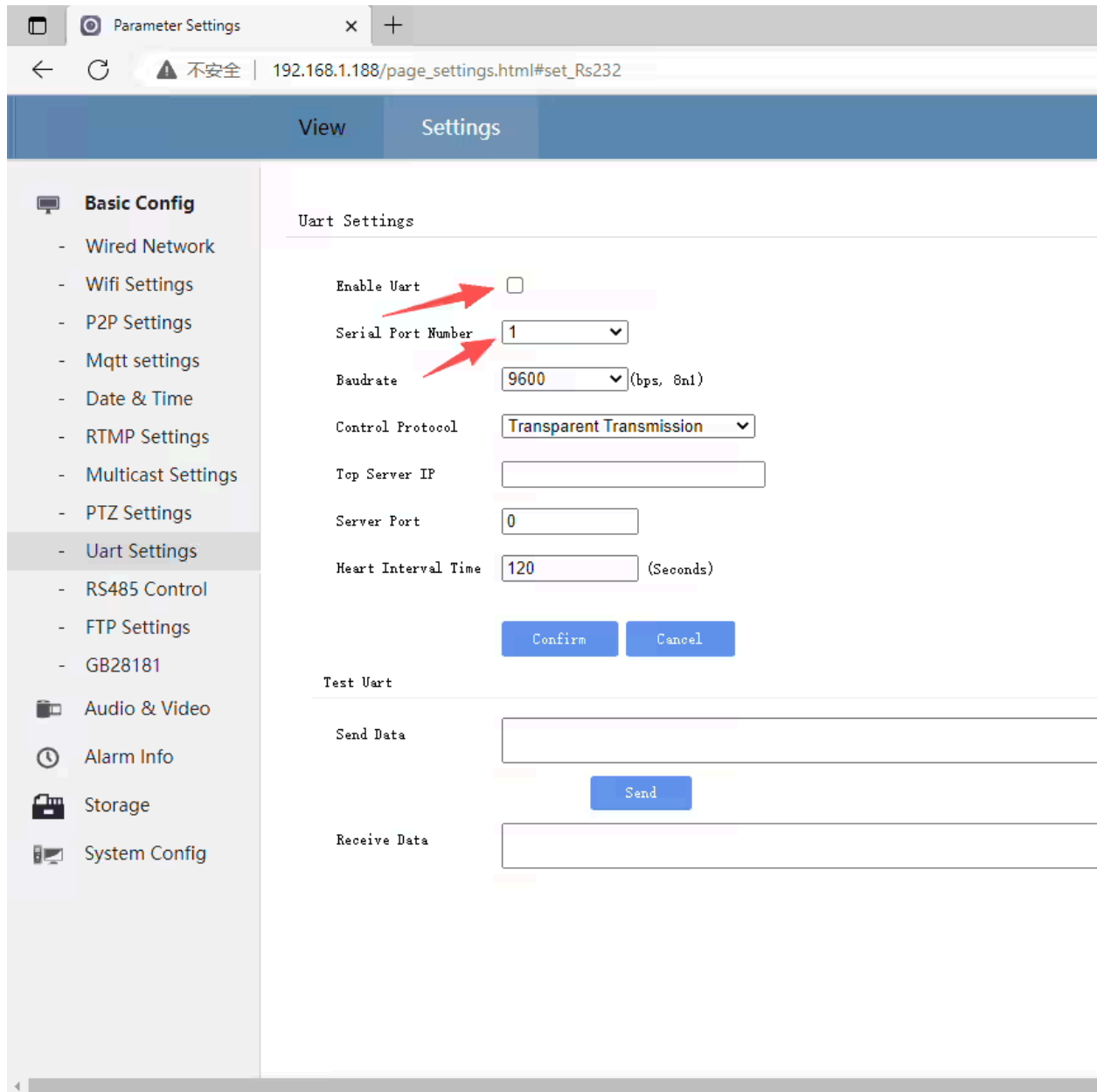
Using the recommended port assignment ensures that the system correctly identifies each video source and enables proper dual-stream operation. If the cameras are connected to the wrong USB ports, the thermal and visible video channels may not function as expected. **Note:** [Please use standard UVC-compatible USB cameras. If you plan to use other types of USB imaging devices, please contact us before ordering to confirm compatibility.](#)

Q: Can you provide the TTL connector cable (Molex connector with wires)?

A: Yes. We can provide the **UART TTL connector cable with the Molex connector** together with the board. Please let us know if you need a specific cable length or pin assignment.

Q: Is it possible to use two TTL ports at the same time? If yes, how do I configure both ports?

A: The board provides **two UART TTL ports**. However, due to the current chipset and hardware design, only **one UART TTL port can be configured for UART over Ethernet at a time**. Users can select **UART Port 1 or UART Port 2** from the Web UI settings. The selected port can send and receive serial data through the Ethernet network.



UART TTL over Ethernet configuration setting in web interface

The current version does not support **dual UART TTL ports working simultaneously as UART over Ethernet**. If your application requires two independent UART-to-Ethernet channels, please contact us for a customized hardware/software solution.

Q: How can we change the USB camera resolution and frame rate (FPS)? Do you have any GUI/setup interface for this?

A: Yes. Our dual USB encoder provides a web-based configuration interface for

adjusting video parameters. Please access the encoder's web page and go to:

Audio & Video → Video Coding Parameter Settings, In this page, you can configure the following parameters:

- **Encoding Type:** H.264 (requires reboot after modification)
- **Resolution:** For example, 1920×1080 (requires reboot after modification)
- **Frame Rate:** 30 FPS (adjustable from 0–120 FPS)
- **I-Frame Interval:** 30 (adjustable from 0–120)
- **Bit Rate:** 4000 Kbps (adjustable from 32–16000 Kbps)
- **Rate Type:** CBR (Constant Bit Rate)

The screenshot shows a web browser window with the address bar displaying "192.168.1.188/page_settings.html#set_VideoEncode". The page title is "Parameter Settings". On the left sidebar, under the "Audio & Video" section, "Video Coding" is selected. The main content area is divided into two sections: "ISP Channel Management" and "Main Stream".

ISP Channel Management:

- ISP Select: 1 (dropdown menu)
- Confirm button

Main Stream:

- Encoding Type: H.264 (dropdown menu) (Modification Reboot)
- Resolution: 1920x1080 (dropdown menu) (Modification Reboot)
- Frame Rate: 30 (slider and input field) (0~120)
- Frame Interval: 30 (slider and input field) (0~120)
- Rate: 4000 (slider and input field) (32~16000 Kbps)
- Rate Type: CBR (dropdown menu)

Sub Stream:

- Encoding Type: H.264 (dropdown menu) (Modification Reboot)
- Resolution: 1280x720 (dropdown menu) (Modification Reboot)
- Frame Rate: 0 (slider and input field) (0~120)
- Frame Interval: 0 (slider and input field) (0~120)
- Rate: -126249 (slider and input field) (32~16000 Kbps)
- Rate Type: CBR (dropdown menu)

At the bottom of the Main Stream section, there are "Confirm" and "Cancel" buttons.

Q: Our USB cameras support very high resolution, but the encoder always opens them at low resolution. Why?

A: The available resolution and FPS options depend on the modes supported by the USB camera itself. The encoder can only select the resolutions and frame rates that the USB camera provides through the USB interface. Some cameras default to a lower resolution mode when connected, or require specific drivers/software to enable higher resolutions.

If the camera supports higher resolution modes (for example 1920×1080, 2560×1440, 4K), please check the camera specifications or send us the USB camera model. We can help confirm the supported video modes and compatibility.

Q: My USB camera supports 4K resolution (3840×2160), but the output from the UVC encoder board needs to be Full HD 1920×1080. How can I configure this?

A: The UVC encoder board can receive the native resolution from the USB camera and encode the video according to the selected output resolution.

If your USB camera provides a **3840×2160 (4K)** video stream, but you need the encoded output to be **1920×1080 (Full HD)**, please configure it as follows:

1. Open the UVC board web configuration page.
2. Go to: **Video Coding** → **Resolution**
3. Select: **1920×1080**
4. Save the settings and restart the video stream if required.

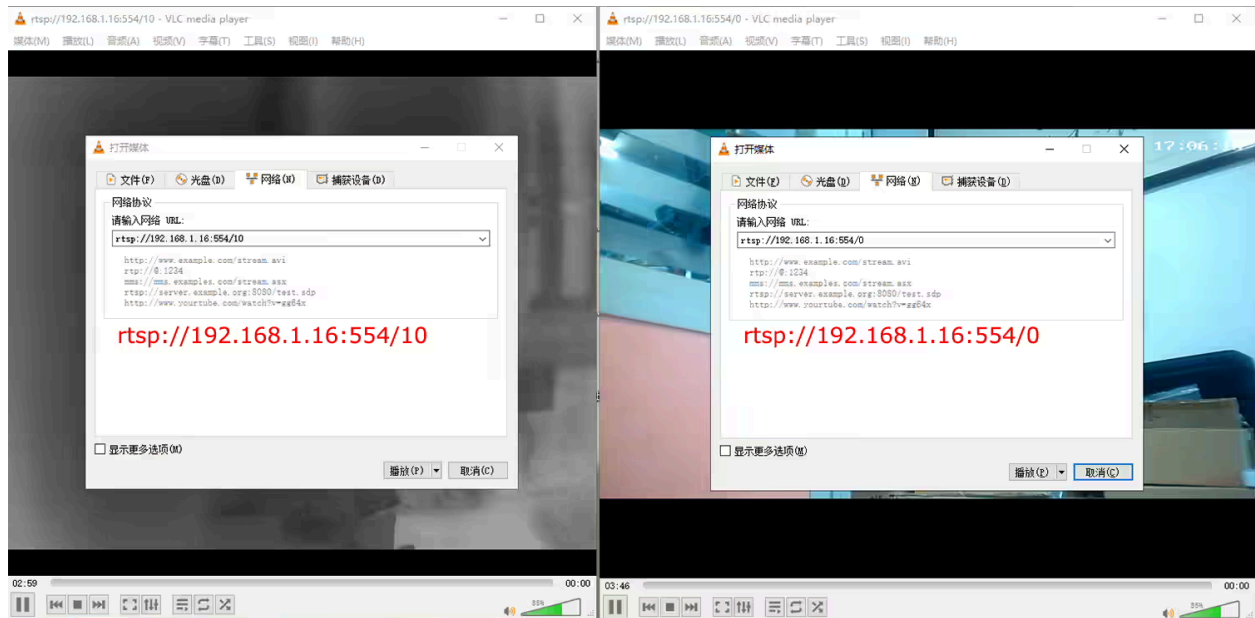
After this configuration, the USB camera can continue working as a 4K source, while the UVC encoder board will scale and encode the output video as **1920×1080**, reducing bandwidth and processing requirements.

Q: What is the RTSP URL for the second USB camera?

A: Our dual-channel USB video encoder provides two independent RTSP streams, one for each USB camera.

Camera 1 RTSP URL <rtsp://192.168.1.188:554/0>

Camera 2 RTSP URL <rtsp://192.168.1.188:554/10>



Dual USB thermal and visible camera to IP encoder RTSP address

Note: Replace **192.168.1.188** with the actual IP address of your encoder board if it has been changed.

Q: We know the main stream RTSP URLs are: `rtsp://192.168.1.188:554/0` and `rtsp://192.168.1.188:554/10` What are the corresponding sub-stream URLs?

A: The corresponding sub-stream URLs are:

- Main Stream 1: `rtsp://192.168.1.188:554/0`
→ Sub Stream 1: `rtsp://192.168.1.188:554/1`
- Main Stream 2: `rtsp://192.168.1.188:554/10`
→ Sub Stream 2: `rtsp://192.168.1.188:554/11`

Therefore, you can switch between the main stream and sub-stream using: `/0 ↔ /1` and `/10 ↔ /11`

Q1: What type of USB cameras can be used?

A1: It supports **UVC-compliant USB cameras**, including visible light and thermal imaging models. This device is designed to convert USB camera signals into IP streams.

Q2: Does it support Wi-Fi or 4G connectivity?

A2: Yes, one of the USB ports can be used for a **Wi-Fi or 4G expansion module** (extra cost).

Q3: Can it be used for AI image processing?

A3: Yes, the module integrates an **NPU (0.5 TOPS)** that supports AI algorithm customization.

Q4: Is SDK provided for software integration?

A4: Yes, we provide an **open player SDK** for PC, mobile, and embedded systems.

Q5: Can this module output HDMI video simultaneously?

A5: Yes, it supports **HDMI 1080P60 output** via an additional interface board.

Q6: What power options are available?

A6: Supports **DC 6–12V** input and **PoE power supply** for flexible deployment.

Q7. Can I connect a second USB camera via a USB hub or the USB0 port?

A7: No. The system currently supports only one USB camera input.

Even if you use a USB hub or attempt to connect through the USB0 port, the device cannot process or switch between two simultaneous USB camera inputs.

Q8. Does the system support dual-camera USB capture?

A8: No. Dual USB-camera input is not supported at this time. The system provides: One USB camera video input, and One network video stream output (IP stream), Additional USB video channels are not available.

Q9. What can be connected to the half-flex (half-pitch) cable connectors?

A9: The half-flex cable connectors are designed for factory-defined internal interfaces only, such as: Internal debugging ports, Extension modules, Specific hardware functions reserved for system integration. These connectors are not intended for externally connecting additional USB cameras or third-party devices.

Q10. Can I enable multi-camera support through firmware updates or custom settings?

A10: At present, multi-USB-camera support is not available and cannot be enabled through firmware. The hardware architecture is designed for single-camera USB input.

Q11: What is the purpose of the battery on the encoder board?

A11: The battery powers the on-board RTC (Real-Time Clock). The RTC keeps track of the system date and time even when the device is powered off, ensuring accurate timekeeping for functions such as timestamping recorded video or scheduling tasks.

Q12: What is the resolution of the analog video output?

A12: This USB-to-CVBS/video streaming encoder board outputs analog video with the following resolutions:

- **PAL:** 720 × 576 pixels
- **NTSC:** 720 × 480 pixels

Q13: Does the board provide both analog and IP outputs simultaneously? How is it determined which output is used?

A13: Yes, this USB UVC camera video encoder board supports **simultaneous CVBS (analog) and IP/Ethernet video output**. Both outputs can work at the same time, allowing you to monitor video via analog displays while streaming over the network. There is no need to switch between outputs; the board automatically provides both.

Q14: We want a working temperature range of -30°C to +50°C. Is this possible?

A14: Yes, we have conducted dedicated testing, and the board has been verified to **start up and operate normally at -30°C** and continue functioning correctly at **+50°C**