



REACH
ROBOTICS

Reach X Camera User Manual

V1.2

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1 Introduction

This manual is designed help users of the Reach X Camera get familiar with the integration and usage of the system.

Reach Robotics website and Help Centre

Our website, www.reachrobotics.com, holds all our documentation as well as FAQs, knowledge articles, and downloads. You can find some quick links below:

- [Datasheets and manuals](#)
- [FAQs](#)
- [Product theory](#)
- [Software downloads](#)

Reach Robotics contacts





If you can't find what you're looking for on our website or Help Centre, please get in touch with Reach Robotics Support at support@reachrobotics.com. You can also get in touch with us at sales@reachrobotics.com (for all sales enquiries), or info@reachrobotics.com (for any other enquiries).

Feedback

If anything in our manuals, FAQs or knowledge articles is out-of-date, poorly explained, or erroneous, please don't hesitate to let us know. We always appreciate the opportunity to improve our documentation for the benefit of all users.

2 Safety Information

2.1 Hazard Classification

 DANGER	<p>Denotes a hazard with a high degree of risk that will result in death or serious injury if not mitigated or avoided.</p>
 WARNING	<p>Denotes a hazard with a medium degree of risk that will result in death or serious injury, or serious damage to the product, if not mitigated or avoided.</p>
 CAUTION	<p>Denotes a hazard with a low degree of risk that will result in moderate or minor injury, or damage to the product, if not mitigated or avoided.</p>
 INFO	<p>Denotes important information about a product or procedure.</p>

3 Connecting the Camera

3.1 Camera Installation

If purchased separately from the manipulator, the Reach X camera must be physically installed on the arm by the user. The camera module is connected to the manipulator using the same spring and pad connectors as the other Reach X joints, and acts as a replacement for the A/B interconnect module.



This procedure exposes delicate internal connectors, O-rings and sealing surfaces. Special care must be taken to keep connectors undamaged and to keep O-rings and sealing surfaces clean from dirt and debris to avoid leaks.



If you are installing the camera on an **Advanced Intervention System**, ensure it is installed on the **Port** manipulator.

Materials required

- Reach X 5- or 7-function manipulator
 - Camera module
 - Reach X comms cable
 - Power supply
 - Ethernet cable
 - Computer
 - R3D and Reach Control software
 - 2.5 hex screwdriver
 - T10 screwdriver
 - Reach X service kit
1. Firstly, connect the Reach X manipulator to your computer, and open the R3D software. Take a look at the [Reach X Integration Manual](#) for instructions if required.
 2. When the manipulator is connected, open the climate panel so you can monitor the pressure readings for all the joints.

Device	Temp	Pressure	Humidity	Mode
A	37.574	0.351	36.236	STANDBY
Factory:	21.000	1.000	0.000	
B	40.238	0.338	29.570	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
C	39.959	0.325	38.440	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
D	39.735	0.324	36.851	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
E	40.676	0.323	39.356	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
F	43.041	0.329	37.561	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
G	43.716	0.331	40.015	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
MCU	59.281	0.350	22.850	STANDBY
Factory:	51.372	0.316	24.450	

- Release vacuum in Joints A and B by removing the seal screws from the vacuum ports using a T10 screwdriver - keep these in a clean safe place. Check the climate panel in R3D to ensure the pressure has reached 1 bar (1 atm), then disconnect the arm from comms and power.



Manipulators

1 192.168.1.3 6789 RX V5 Select Jaws

Device	Temp	Pressure	Humidity	Mode
A	32.947	1.020	40.238	STANDBY
Factory:	21.000	1.000	0.000	
B	35.132	1.022	39.000	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
C	39.959	0.325	38.605	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
D	39.735	0.324	37.174	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
E	40.676	0.323	39.705	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
F	43.041	0.329	37.992	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
G	43.716	0.331	40.131	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
MCU	59.281	0.350	23.404	STANDBY
Factory:	51.372	0.316	24.450	

If vacuum is not releasing, you may need to slowly undo the valve nuts beneath the seal screws. Ensure that these are **replaced in the vacuum ports** immediately after vacuum is released, otherwise you will not be able to re-pull vacuum in the arm.



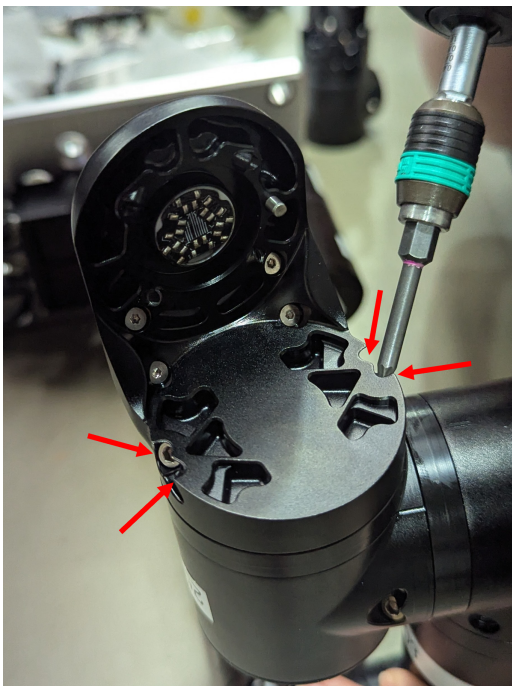
CAUTION



- Undo the four bolts that connect the A joint to the A/B interconnect module. Remove the A joint and keep in a safe clean place with the removed bolts.



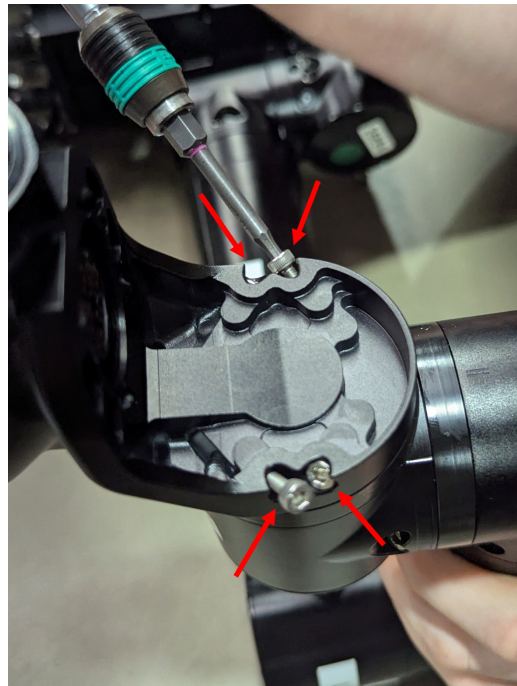
- Next, remove the four bolts that connect the A/B interconnect module to the B joint, and store the bolts with the A joint/A bolts. Carefully remove the A/B interconnect module by pulling straight up and store it in a safe place for future use. Do not try to twist the joint, as the dowel pin will prevent this.



6. Check the connectors on the camera module and the B joint for any damage, and grease the O-ring on the camera module after checking it for debris.



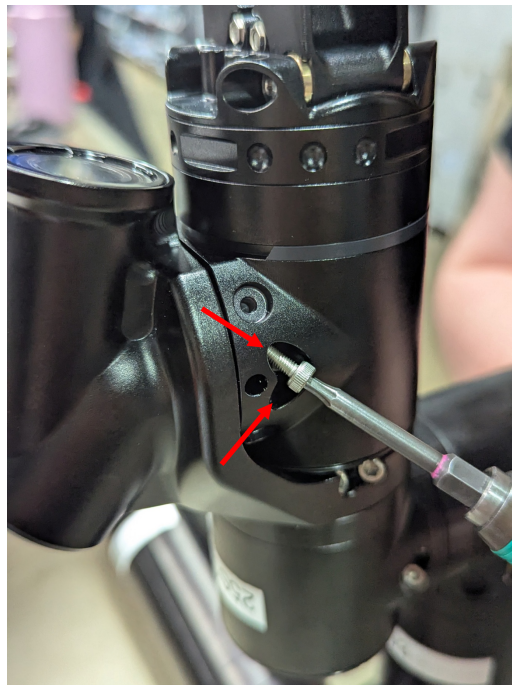
7. Carefully align the camera module with the B joint, using the dowel pin as a guide, and push the joints together. Replace the 4 bolts, tightening them in a star pattern to avoid skewing the alignment. Torque the bolts to **1.2Nm**.



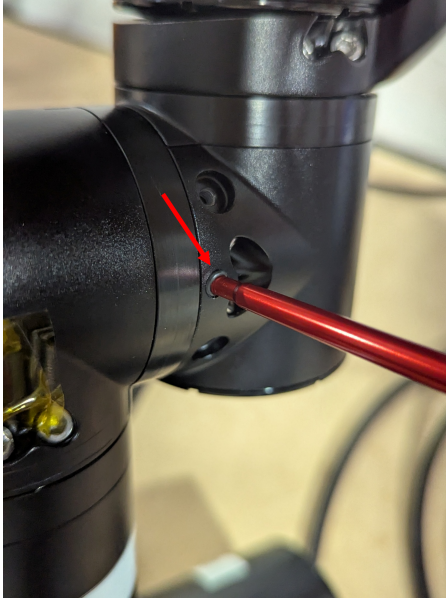
8. Check the connectors and O-rings on the camera module and A joint. Grease the O-rings, then replace the A motor, aligning it with the camera module using the dowel pin.



9. Replace the bolts in the A motor, again tightening in a star pattern. Torque the bolts to **1.2Nm**.

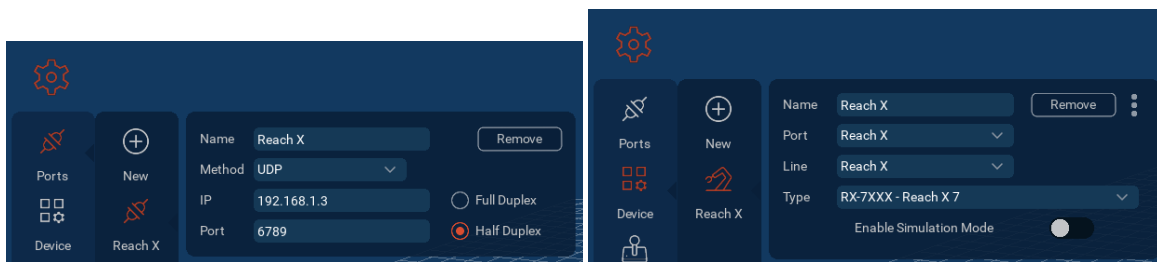


- Reconnect the arm to R3D and open the climate panel. Using the hand pump from the Service Kit, insert the nozzle into the Joint B vacuum port and pump out the air while watching the climate panel. When the pressure in Joint B gets to ~ 0.3 bar, **quickly** remove the nozzle and replace the seal screw, tightening it with a torque of **0.24-0.3Nm** to retain the vacuum.

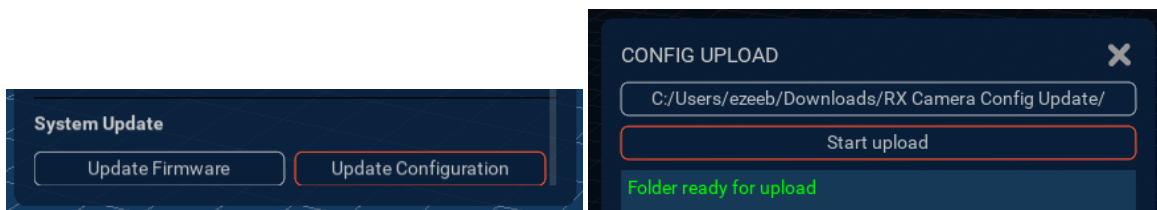


Manipulators				
1 192.168.1.3 6789 RX V5 Select Jaws				
Device	Temp	Pressure	Humidity	Mode
A	37.501	0.338	36.750	STANDBY
Factory:	21.000	1.000	0.000	
B	40.170	1.022	28.549	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
C	39.912	1.024	38.389	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
D	39.665	1.024	36.806	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
E	40.611	1.023	39.315	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
F	42.923	1.028	37.568	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
G	43.589	1.030	39.957	VELOCITY_CONTROL
Factory:	21.000	1.000	0.000	
MCU	59.167	1.050	22.635	STANDBY
Factory:	51.372	0.316	24.450	

- Repeat the vacuum pulling procedure for Joint A to ensure the entire arm is held under vacuum.
- Close the R3D software and open the Reach Control software. Connect the arm to Reach Control by adding and configuring a port (**Settings > Ports > New**), then adding and configuring a new device (**Settings > Device > New**).



- Expand the Device panel using the ellipsis [...], then scroll down to the bottom of the panel. Select **Update Configuration**. In the panel that opens, select the folder containing the **B.json** file you were provided and click **Start Upload**. Contact Support if you do not have access to the B.json file.



14. Once the panel displays a success message, close Reach Control and power cycle the arm. Reconnect the arm to R3D and verify that the camera is present on the 3D model of the arm. If it isn't present, change the jaw selection to any other jaws to force a config reload, then change them back to the installed jaws.
15. Perform a full Acceptance Test as per the Reach X Integration Manual to ensure the arm is functioning as expected.

3.2 Ethernet Connection

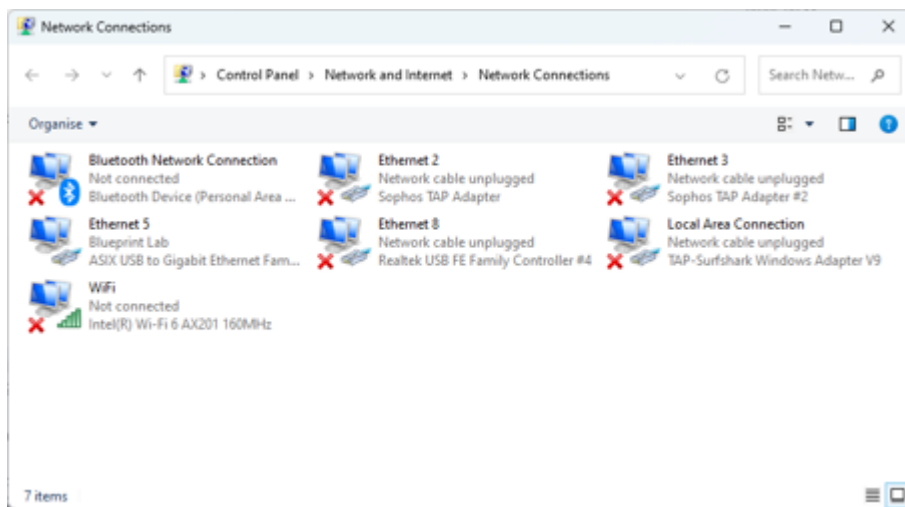
The RX camera has a default IP address of **192.168.1.10**. To access the camera stream, both the connected Ethernet port and the Reach X manipulator on which the camera is installed must be on the same subnet.



INFO

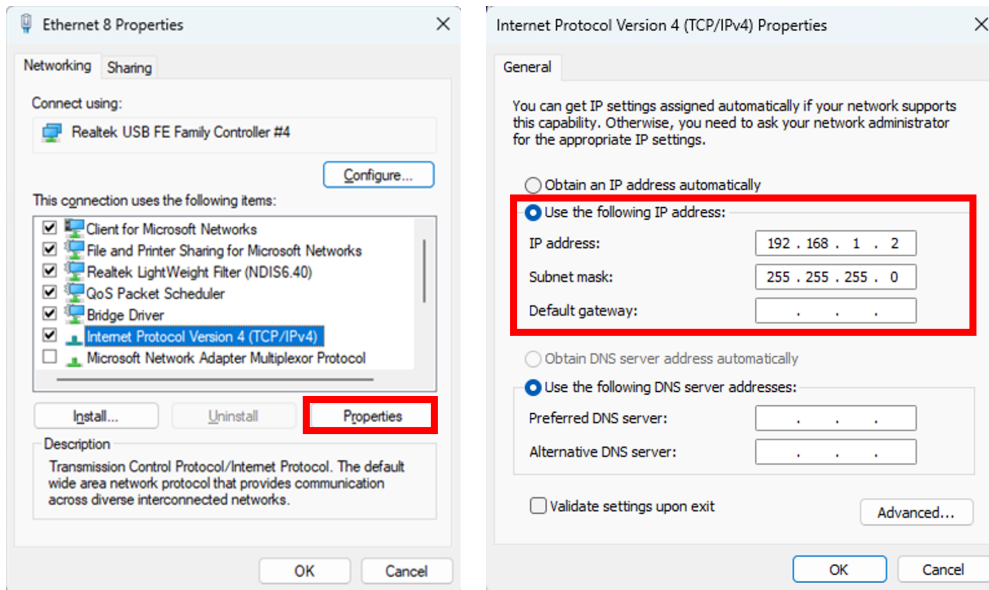
Previous users of Reach Robotics IP cameras should note the difference in IP address: 192.168.**1**.10, rather than 192.168.**2**.10.

Go to **Control Panel > Network and Internet > Network and Sharing Centre > Change adapter settings**, then right click on the manipulator Ethernet port and select **Properties**.



In the window that opens, select **Internet Protocol Version 4** and click **Properties**. Another window will open, where you can enter an IP address for the Ethernet port. This address should be set to **192.168.1.xx**, where **xx** represents a port number that has not been used. This number should not be 10, as this is taken by the camera.

The subnet mask should enter automatically. If not, it should be entered as **255.255.255.0**. Click OK in each window to complete this step.

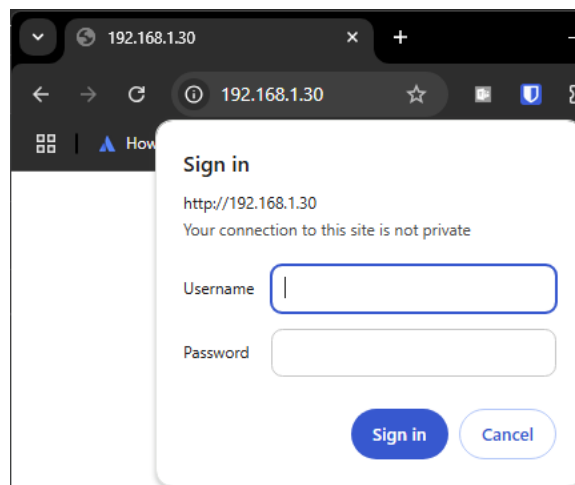


4 Configuring the Camera

4.1 Access Web Browser Interface

Any camera configuration must be completed in the camera module’s web browser interface. With the manipulator connected, open a web browser and enter the camera’s default IP address in the address bar. A sign in window will open; sign in with the following credentials:

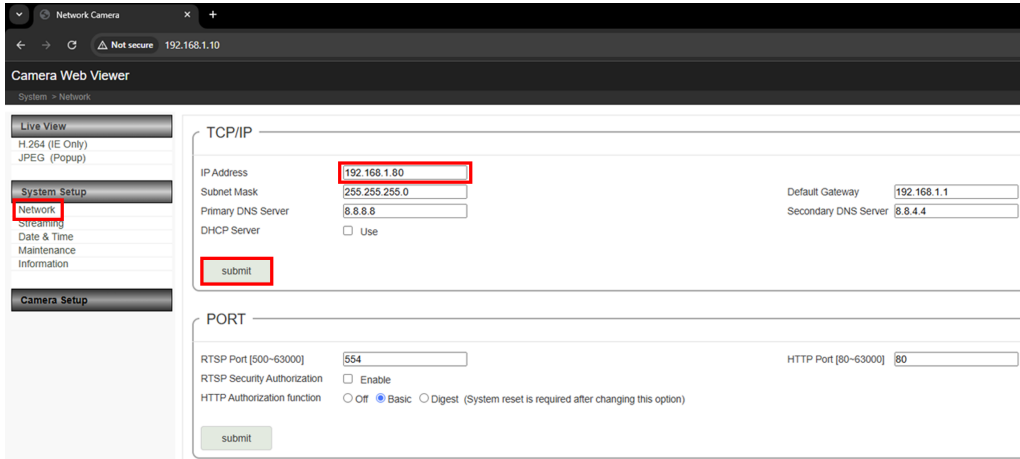
- **Username:** admin
- **Password:** admin



Once you are logged in to the web browser interface, you will see the default camera feed and be able to configure different camera settings.

4.1.1 Change IP Address

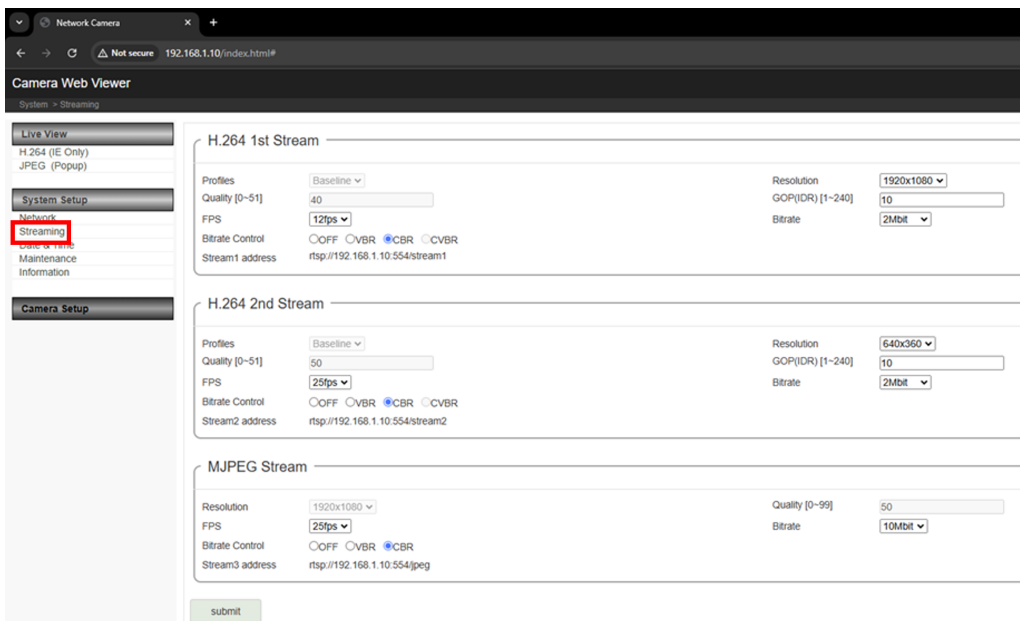
If the manipulator IP address needs to be changed, the camera IP address should be changed first to match the new subnet. To change the IP address, go to **Network**, edit the IP address, then click **Submit**.



The web browser interface will stop working once the IP address has changed. To restore it, change the IP settings on the Ethernet port to match the new subnet. Once this has been done, enter the new IP address in your browser and log back in to the interface.

4.1.2 Configure Camera Stream

The camera has three video streams, a Mainstream, a Substream, and an MJPEG stream. Go to **Streaming** to access the settings for each stream.



Under each stream can be found the **stream address**, which is required for viewing the stream in different programs.

H.264 1st Stream

Profiles: Baseline

Quality [0-51]: 1

FPS: 12fps


Bitrate Control: OFF VBR CBR CVBR

Stream1 address: rtsp://192.168.1.30:554/stream1

Resolution: 1920x1080

GOP(IDR) [1-240]: 1

Bitrate: 1Mbit



INFO

Previous users of Reach Robotics IP cameras should note the difference in stream address: `rtsp://192.168.1.10:554/stream1`, rather than `rtsp://admin:@192.168.2.10:554/stream=0`

The settings for each stream can be set independently. Use the following table to assist in changing the settings.

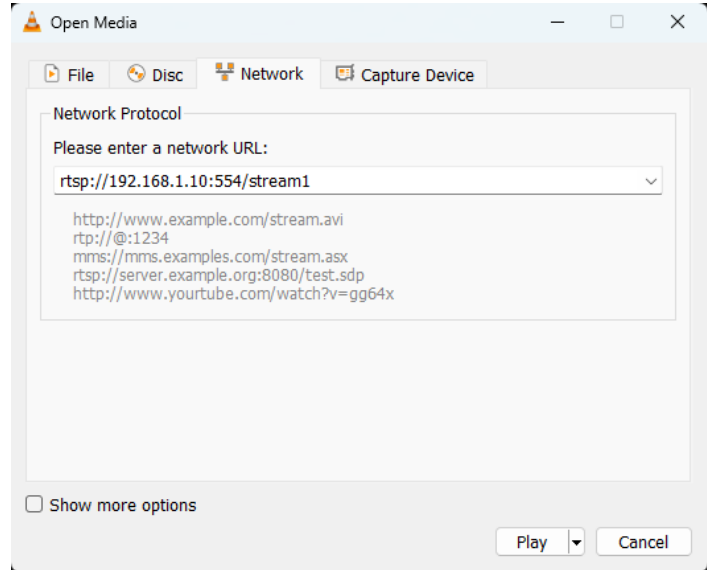
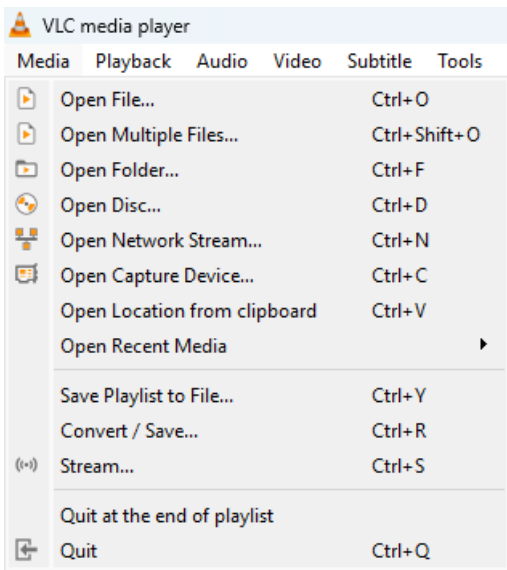
Setting	Range	Notes
Quality	0-51	A lower number corresponds to better quality
FPS	12-25	Frames per second; a higher number corresponds to better quality and increased data being sent
Bitrate control	OFF, VBR, CBR, CVBR	Variable bitrate, constant bitrate, constrained variable bitrate
Resolution	1920x1080	Resolution of the image in the camera stream
GOP(IDR)	1-240	Group of pictures; better to be low
Bitrate	1Mbit	A lower number corresponds to more data being sent and lower quality

5 Viewing Camera Feed

5.1 VLC Media Player

To view the camera feed with VLC Media Player, select the **Media** drop down menu, and then select **Open Network Stream**. Enter the address `rtsp://192.168.1.10:554/stream1` to access the Mainstream.

Ensure the IP address is correct if it has been changed, and the desired stream is used. The Substream can be accessed by setting **stream2** in the feed address. Resolution information can be viewed in **Tools > Codec Information**.



5.1.1 Connecting to UDP Stream

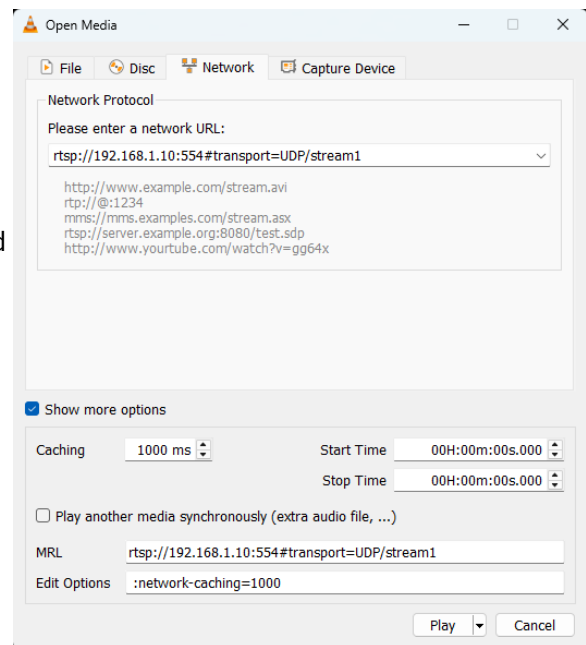
It is possible to use a UDP connection to access the camera feed in VLC Media Player. This communication protocol is faster and more robust against data loss. To use a UDP connection, enter the camera address as **rtsp://192.168.1.10:554#transport=UDP/stream1**. This method will work for Stream 1 and Stream 2.

5.1.2 Latency Issues

Users may experience some latency issues or “lag” when viewing the camera feed through VLC Media Player. This can be addressed by lowering the caching value.

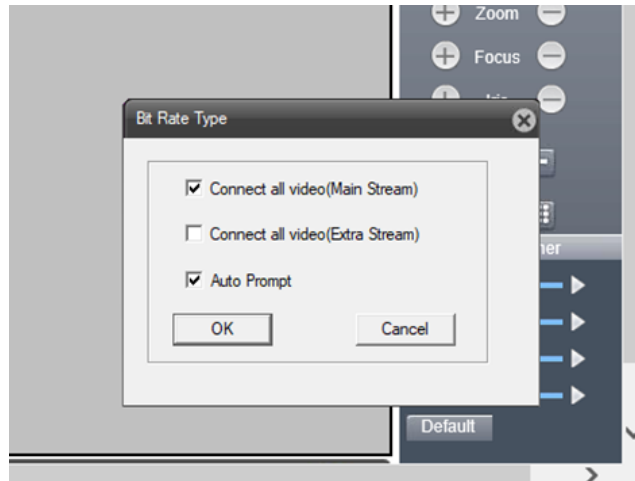
Go to **Media > Open Network Stream** and check the **Show more options** box. The window will extend and show an option for changing the cache rate. Reduce this value to between 500ms and 200ms, click **Play** and check the feed to confirm if the latency is acceptable.

Be aware that if the cache value is too low, the feed may freeze. The optimal value can vary between machines so try a few variations to find the optimal level for your set up.



5.2 Web Browser

When the web browser interface is logged into the camera, you'll be prompted with the following screen. You can display the mainstream by clicking **OK** to the default settings. The secondary stream can be shown by selecting **Connect all video (Extra Stream)**.



5.3 GStreamer

GStreamer is a software library for handling media, and may be used by those who wish to access the camera stream in their own program rather than using VLC or another proprietary software.

To get a low-latency stream through GStreamer, use the code below:

```
sudo gst-launch-1.0 rtspsrc location=rtsp://192.168.1.10:554/stream1
latency=0 buffer-mode=auto do-retransmission=false drop-on-latency=true
protocols=udp ! decodebin ! autovideosink
```

For more information, please see the [GStreamer website](#).

6 Maintenance

Preventative maintenance is strongly recommended to keep your Reach Robotics product functioning as intended and to avoid unscheduled downtime and expensive repairs. Follow the steps in this section to prolong the life of your product.

It is recommended to test the IP camera during any acceptance tests carried out on paired manipulators.

6.1 General Product Care

Reach Robotics products are intended for use in water or air. Other fluids may have an adverse effect on the materials used in their production.

Cleaning

- Units should be cleaned thoroughly after every deployment, dry or wet.
- After immersion in salt-water, wash units in fresh water to prevent salt deposits and corrosion.
- After immersion in water with high suspended sediment, or if the unit has come into prolonged contact with the seafloor, ensure all debris is removed from the unit, focusing particularly on joint closures and moving parts to preserve sealing surfaces.
- Do not use harsh chemicals to clean any Reach Robotics products.

Replacements

- If your unit has sacrificial zinc anodes, these should be replaced when corroded.

Connector care

- Keep connectors protected at all times when not in use.
- Do not expose connectors to heat or direct sunlight for extended periods.
- Regularly check connector pins for signs of damage or corrosion.
- Ensure female connectors are free of debris – flush with compressed air if necessary.
- Apply silicon grease to both male and female connectors prior to every mating – ensure female connector sockets are greased to 1/10-1/3 of socket depth.

Cable care

- Avoid exceeding the minimum bend radius.
- When de-mating connectors, pull the connector rather than the cable to remove it.
- Consider strain relief methods if using externally powered tools at the end-effector of the unit.

6.2 Repairs

If your Reach Robotics equipment becomes damaged or faulty, it may need to be returned to Reach Robotics for investigation and repair under a **Return Merchandise Authorisation (RMA)**. Only a Reach Robotics engineer may authorise a return to our factory; the requirement may be determined through a phone call, email, or video call/remote access to the unit. If you suspect that an RMA may be required, please fill in this form and someone from Support will be in touch:

[Request an RMA](#)

RMA Process

1. Reach Robotics Support will request details of the issue to determine whether a return is necessary.
2. If so, an RMA Number (RMAXXX-YYMMDD) will be issued to you, and the Reach Robotics engineer will request shipping details so we can organise a pickup of the equipment.
Do not send the equipment prior to being issued an RMA Number.

3. The equipment will be shipped to Reach Robotics Headquarters in Sydney, Australia (see Notes).
4. Our Production team will conduct an initial investigation on the unit, based on the information provided. This will take an estimated 1-2 weeks. Any delays due to the complexity of the problem will be communicated to you.
5. After the initial investigation, Reach Robotics Support will contact you with the findings of our Production team. If the unit is not under warranty, a quote for the investigation, repair work and shipping costs will be included. If the unit is under warranty, you will be notified, and the repairs will be carried out free of charge.
6. To authorise a non-warranty repair, send a PO for the work to Reach Robotics Support (see Notes). Once this is received, the repair work will start, and our Accounts team will send an invoice to you.
7. Typical repair times vary post-investigation, and the exact length of time required for the repair will depend on the product being repaired, the complexity of the repair, and the availability of spare parts.
8. Any delays to the expected shipping date will be communicated to you. Priority service may be possible; please discuss this with your usual Reach Robotics Sales Engineer.
9. When the repair is completed, our Warehouse Manager will organise returning shipping and contact you with a ship date and tracking information (see Notes).



CAUTION

Health and Safety

- Any unit returned to Reach Robotics must be safe for our staff to handle and cleaned thoroughly to comply with Australian biosecurity regulations. We require you to declare if the unit may be contaminated. If the unit has been in contact with any contamination, you must provide proof that the unit is safe to handle.
- Possible contamination sources include nuclear radiation, sewage, hazardous chemicals, biowaste, marine/freshwater life, or soil/mud.
- Reach Robotics reserves the right to refuse to handle any contaminated goods and return them to you at your own expense.

Notes

- Standard Warranty of 1-year from date received is provided on all new Reach Robotics Products. There is no warranty extension for units following an RMA unless extended warranty has been purchased prior to the RMA being raised.
- An investigation fee is chargeable on all non-warranty RMAs. This is payable even if you choose not to have your unit repaired.
- If the nature of the repair is such that you feel it is uneconomical to carry out the work, a discount on a new unit may be possible; please discuss this with your usual Reach Robotics Sales Engineer. This remains at Reach Robotics' discretion, and no discount is guaranteed.
- All RMAs are shipped EXW. Any insurance desired by the customer is the customer's responsibility and Reach Robotics can take no responsibility for shipment losses or damages.
- If you do not make a decision regarding repairing, replacing, or scrapping your RMA within 12 months of its arrival at Reach Robotics, we reserve the right to charge storage fees on a weekly basis dependent on RMA unit type.

7 Revision History

Version	Date	Author	Notes
V1.0	19/05/2025	Ellie Best	Initial version
V1.1	05/06/2025	Ellie Best	Jaw change to force camera in R3D
V1.2	19/06/2025	Ellie Best	AIS install on port only