

MICRO IP CAMERA OPERATOR MANUAL I V1.3

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1 CONNECTING MICRO IP CAMERA

1.1 ELECTRICAL CONNECTION

The Micro IP cameras use Ethernet to connect to your computer or ROV. The Ethernet connection requires four pins on the supplied Breakout Board or your own breadboard, those pins being R-, R+, T- and T+.

• RAC-1000

The RAC-1000 Micro IP camera is typically used with the Reach Alpha manipulators. This camera comes with an unterminated Impulse whip cable containing 6 wires including power, ground and the 4 Ethernet connections. The pinout for this cable is shown below:



To connect the RAC-1000, the unterminated whip cable must be connected to both an Ethernet cable and a 12-48V power source. The Ethernet cable can then be connected directly to your computer to view the camera feed.

• RB-1057

The RB-1057 camera is designed for compatibility with the Reach Bravo manipulators. This camera can be mounted directly onto the wrist module, with all cabling connected internally. If the Ethernet cables need to be accessed, their termination locations on the breakout board can be seen below.

2 VIEWING CAMERA FEED IN REACH CONTROL

STEP 1

Check the IP address of the Ethernet port you have connected the camera to, and ensure it is set to the same subnet as the camera. To do this go to Control Panel → Network and Internet → Network and Sharing Center → Change adapter settings on your computer, right click on the 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 this Ethernet port. This address should be set to [192.168.2.XX], where XX represents a port number that has not been used. This number should not be 10, as this is the address for the camera. The subnet mask should enter automatically, if not it should be entered as [255.255.255.0]. Click "OK" in each window, and this step is complete.



Network Connections	- 0
- 🔶 🕤 🛧 👻 - Network an 🦻 Network Connections	✓ [™]
rganize - Disable this network device Diagnose this con	nnection Rename this connection * 📓 - 🔲
Bluetooth Network Connection Not connected Bluetooth Device (Personal Area Ethernet Intel(R) E	ified network Ethernet Connection (4) I Wi-Fi Intel(R) Dual Band Wireless-AC 82
Ethernet Properties ×	Internet Protocol Version 4 (TCP/IPv4) Properties ×
letworking Sharing	General
Connect using: Intel(R) Ethemet Connection (4) I219-LM	You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Configure This connection uses the following items: Client for Microsoft Networks Glient for Microsoft Networks Glient for Microsoft Networks Glient for Microsoft Networks Glient Protocol Version 4 (TCP/IPv4) Microsoft Network Adapter Multiplexor Protocol Microsoft LLDP Protocol Driver Microsoft LLDP Protocol Driver Install Uninstall Properties Description Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.	 Obtain an IP address automatically Use the following IP address: IP address: IP address: Subnet mask: Default gateway: Obtain DNS server address automatically Obtain DNS server address automatically Use the following DNS server addresses: Preferred DNS server: . Alternate DNS server: . Validate settings upon exit
OK Cancel	OK Cancel

STEP 2

Open Reach Control on the same computer. Click on the gear icon in the top left-hand corner of the screen, followed by **Tools**

→ Camera Stream. Note that the IP address within the "Video Source" field should be <u>rtsp://admin:@192.168.2.10:554/stream=1</u>.



STEP 3

Toggle the **"Enable**" switch below **"Camera Stream**" to open the camera feed. If the camera is connected correctly, the feed should appear in the white window. This window can be resized by dragging the top left corner.



2.1 ACCESSING MAINSTREAM

If a higher resolution is desired, the stream can be set to 0 to access the mainstream. This can be changed in the video source field by entering <u>rtsp://admin:@192.168.2.10:554/stream=0</u>. The mainstream has a resolution of 1920x1080. More information about feed resolution can be found in <u>Section 3.6</u>.

3 VIEWING FEED THROUGH WEB BROWSER

3.1 SETTING UP THE WEB BROWSER INTERFACE

This section describes how to access the camera feed using the ActiveX plugin for Internet Explorer/Microsoft Edge. This plugin can also be used to change properties of the camera including the IP address and resolution. If using Microsoft Edge, it must be set up in Internet Explorer Mode for the plugin to work (see instructions below).

Open Microsoft Edge and go to "Settings" (three dots in the top right corner).



Go to the "Default Browser" section. Change the option to let sites be reloaded in Internet Explorer Mode (IE Mode).



Press "Add" then type in the corresponding log in page (<u>http://192.168.2.10/login.asp</u>). Change the address to the IP of the camera if you have had it changed.

Add a page				
Enter a URL:				
http://192.168.0.10/login.asp				
Add	Cancel			

7

3.2 INSTALLING THE ACTIVEX PLUGIN

Using Internet Explorer/Microsoft Edge, enter the camera's IP address [192.168.2.10]. If you have the ActiveX plugin installed, the camera login page will show (left). Otherwise, you'll be prompted to download and install the ActiveX plugin (right). Contact Reach Robotics Support if you are unable to download the plugin.



If you see the screen on the right, follow installation instruction for ActiveX (Net Surveillance) application.



Refresh the browser and log into the camera interface (Username: admin, Password: <not set>).

Note 1: Internet Explorer or Microsoft Edge MUST be used since the ActiveX plugin is not compatible with other browsers.

Note 2: You may need to change the language of the camera to English. Language: 简体中文 🔽

3.3 HOW TO VIEW THE CAMERA STREAM

When the 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)**".



Note: The secondary stream is used by the Reach Control interface.

3.4 HOW TO EDIT GUI DISPLAY SETTINGS

Open "Device Config" and navigate to the "Settings" gear icon.



Select "**GUI Display**". The Channel and Time titles can be removed by toggling the corresponding tick boxes. These tick boxes are highlighted for the secondary stream in the image below.

Device config			8	O Device config	8
Setting -> System				Setting -> System -> GUI Display	
General	Encode	Network	NetService	CAM Name Setting Time Title I Channel Title I Video Status I Alarm status I Anti-jitter I Transparency 175	
GUI Display	PTZ Config	RS232	Camera param.	Channel 1 Region Cover Time Title Channel Title Setting	
۲	*	i		Refresh OK Cancel	

Select "OK" to save the changes and verify that they are saved by opening the camera stream.

3.5 HOW TO CHANGE CAMERA IP ADDRESS

The IP address of the camera can be changed through ActiveX. This is useful if the **subnet** (circled in orange) needs to be changed to match the rest of the network. To change the IP address, going into "**Device Config**" as shown above, click the "**Settings**" gear icon. From there select "**Network**". This will bring up a panel showing the IP address of the camera.

Device config			e	Device config Softing > Sustam > Mahurada
General	Encode	Network	NetService	Defining - dystem -> Ver NetCard IP Address 192 168 2 9 Subnet Mask 255 255 0 0 Gateway 192 166 2 1 Use DNS server address below 114 114 114 Primary DNS 114 114 14
GUI Display	PTZ Config	<i>ی</i> RS232	Samera param	Media Port 34567 HTTP Port 80 Onvilf port 8899 Device Info 00: 12: 42: 2f : e3: fc Onvilf check Image: Convil check Image: Convil check Image: High Speed Download Transfer Policy Quality Preferred Image: Convil check Refresh OK Cancel
۱	🗱 🌋			

Ensure that the subnet is changed in both the IP address and the Gateway, then click "**OK**". The video feed will disappear since the IP address has changed. To restore the feed, the IP address must be changed in your computer settings as well to match the new address. Once this has been done, enter the new IP address in your browser. The ActiveX video feed should reappear.

Network Connections				_]
- 🔿 🔻 🛧 👻 - Network an 🦻 Network Connec	tions 🗸	U			
organize - Disable this network device Diagnos	e this connection	Rename this connection	n »	- ·	
Bluetooth Network Connection Not connected Bluetooth Device (Personal Area	Ethernet Unidentified net Intel(R) Ethernet	work Connection (4) I	Wi-Fi Blueprint Lab Intel(R) Dual Ban	d Wireless-A	C 82
Ethernet Properties	× Inter	net Protocol Version 4 (TCP/	IPv4) Properties		×
Vetworking Sharing	Gen	eral			
Connect using: Intel(R) Ethemet Connection (4) I219-LM	Yo th fo	u can get IP settings assigned a is capability. Otherwise, you ner r the appropriate IP settings.	automatically if your n ed to ask your networ	etwork suppor rk administrato	rts r
Configure This connection uses the following items: Image: Client for Microsoft Networks Image: Client for Microsoft Networks		Obtain an IP address automa Use the following IP address	atically		
 ✓ Tile and Printer Sharing for Microsoft Networks ✓ QoS Packet Scheduler ✓ Internet Protocol Version 4 (TCP/IPv4) 		IP address: Subnet mask: Default gateway:	255.255.25	2 . 1 55 . 0	
Image: Microsoft Network Adapter Multiplexor Protocol Image: Microsoft LLDP Protocol Driver Image: Internet Protocol Version 6 (TCP/IPv6)	~	Obtain DNS server address a	automatically		
Install Uninstall Properties		Preferred DNS server:			
Description Transmission Control Protocol/Internet Protocol. The defau wide area network protocol that provides communication across diverse interconnected networks.	ł	Alternate DNS server:		Advanced.	
OK Ca	ancel		ОК	Car	ncel

3.6 HOW TO CHANGE RESOLUTION

The camera has two video streams, a mainstream and a substream. The resolution of the mainstream is 1920x1080 and the resolution of the substream can be either 720x480 or 360x240, depending on what you select. To switch between the substream and the mainstream, select the desired stream in the top left corner of the display.



To change the resolution of the substream, in the "**Device Config**" panel, click on the "**Settings**" cog, and then select "**Encode**".

In the second drop-down menu next to "**Resolution**" you can select either D1 or CIF. The resolution of D1 is 720x480, and CIF is 360x240. This changes the stream 1 (substream) properties of the camera.

Setting -> System	Setting -> System -> Encode				
Channel	1				
Channel					
Compression	III.203X				
Resolution	1080P 💌	D1 V			
FPS	25 💌	D1 CIF			
Bit Rate Type	VBR 👻	VBR			
Quality	General 💌	General			
Bit Rate(Kb/S)	3072 💌	572 🔽			
I Frame Interval	2 💌	2			
Video/Audio					

4 VIEWING FEED WITH 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 same address as used for the Reach Control feed: https://admin:@192.168.2.10:554/stream=0. Ensure the IP address is correct if it has been changed, and the desired stream is used. The substream can be accessed by setting stream=1 in the feed address. Resolution information can be viewed in Tools \rightarrow Codec Information.

📥 rtsp://192.168.3.9:554/stream=0 -	- VLC media player	🛓 Open Media — 🗆 🗙		
Media Playback Audio Video	Subtitle Tools V	🗈 File 💊 Disc 👫 Network 🖽 Capture Device		
▶ Open File Ctrl+O ▶ Qpen Multiple Files Ctrl+Shift+O ▶ Open Folder Ctrl+F ♥ Open Disc Ctrl+D ♥ Open Naturark Stream Ctrl+N		Network Protocol Please enter a network URL: rtsp://admin:@192.168.2.10:554/stream=0 http://www.example.com/stream.avi rtp://@:1234 mms://nms.examples.com/stream.asx rtsp://server.example.org:8080/test.sdp		
 Open <u>Capture Device</u> Open <u>Location from clipboard</u> Open <u>Recent Media</u> 	Ctrl+C Ctrl+V	http://www.yourtube.com/watch?v=ggG4x		
Save Playlist to <u>F</u> ile Conve <u>r</u> t / Save ((*) <u>S</u> tream	Ctrl+Y Ctrl+R Ctrl+S			
Quit at the end of playlist	Ctrl+Q	Show more options Play Cancel		

4.1 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 https://admin:@192.168.2.10:554#transport=UDP/stream=0. This connection method can also be used in Reach Control the same way, by entering the address with the addition of **#transport=UDP**. This method will work for stream 0 and stream 1.

Camera Stream					
Enable:					
Video Source:	rtsp://admin:@192.168.2.10:554#transport=U	IDP/stream=1			
Rotation Correct	ion				
Enable:					
Product:	RIGHT ARM	🗕 Offset (degs):	85.944		

4.2 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. In the same window shown above, where the camera address was entered, check the "Show more options" box. The window will extend and show an option for changing the cache rate, shown below. 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.

📥 Open Media — 🛛						×	
🕨 File 🤇	🦻 Disc	🚏 Network	📑 Capture	e Device			
Network Pr	Network Protocol						
Please enter a network URL:							
rtsp://adm	nin:@192.:	168.2.10:554#tr	ansport=UDP	/stream=0		~	
http://wv rtp://@:1 mms://mr rtsp://sen http://ww	vw.example 234 ns.example: ver.example	com/stream.avi s.com/stream.asx e.org:8080/test.sdj e.com/watch2v=q	p 064x				
nccp.//ww	www.yourcub	e.com/watch:v-g	goux				
Show more	options						
Caching	1000 m	ns 🜲	Start Time	00H:00	m:00s.00	0 🗘	
			Stop Time	00H:00r	m:00s.00	0 🗘	
Play another media synchronously (extra audio file,)							
MRL	rtsp://admin:@192.168.2.10:554#transport=UDP/stream=0						
Edit Options	:network-caching=1000						
				Play 🔻	Can	cel	

5 VIEWING FEED WITH GSTREAMER

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

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

sudo gst-launch-1.0 rtspsrc location=rtsp://admin:@192.168.2.11:554/stream=1 latency=0 buffer-mode=auto doretransmission=false drop-on-latency=true ! decodebin ! autovideosink

For more information, please see the GStreamer website.

6 VERSION CONTROL

Version	Date published	Edited by	Updates made
V1.0	2022	James Spinks	Initial version
V1.1	13/07/2022	James Spinks	Reach Robotics branding
V1.2	17/08/2022	John Sumskas	Addition of Microsoft Edge browser instructions
V1.3	30/03/2023	Ellie Best	Update of RC screenshots
			Addition of GStreamer code