

AIM-Edge ucon Open AI Camera
Development Kit

User Manual

30 November 2023
Version 1.10

Content

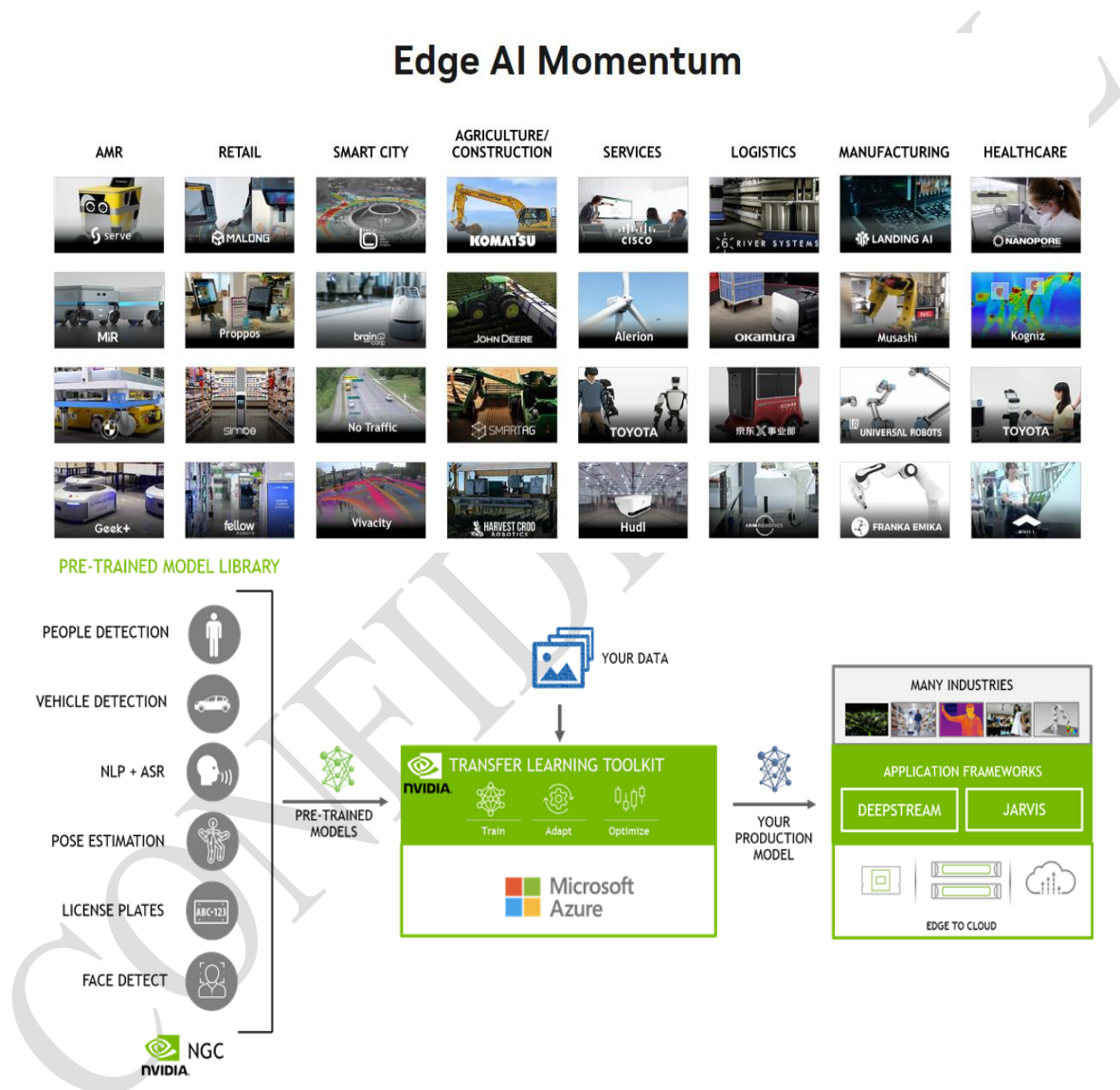
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Revision History

Date	Version	Modification
2023/6/13	1.0	Creation
2023/6/20	1.1	1. Add CE to certification list (planned) 2. Correct page number
2023/7/4	1.2	1. Add parameter for using UCON as IP Camera
2023/7/26	1.3	1. Declare ONVIF profile G/S support for the internal camera module 2. Add VCCI certification
2023/9/14	1.4	Correct CGI command port 80 (no need to be specified)
2023/9/25	1.5	1. Change UCON to AIM-Edge ucon 2. Remove PanoViewer installation, preview can use MJPEG directly 3. Upgrade to Jetpack 5.1.2
2023/10/17	1.6	Remove ICR command and state the IR LED & ICR is controlled by photosensor automatically
2023/11/2	1.7	Correct DC-In adapter voltage
2023/11/20	1.8	Update product photos
2023/11/22	1.9	1. Add Static IP & DHCP mode setting procedures 2. Adjust page number 3. Correct PoE source to 802.3bt 4. Specify RTSP stream port is 554
2023/11/30	1.10	Add installation process

1. Open AI Camera

This is based on NVidia Orin Nano to provide the Open AI Camera; the open AI camera can let developer to quick use the Nvidia HW platform and SW development environment to development to fit for variety application usage.



System architecture

2. Product Specification

AIM-Edge ucon is a 2M AF PoE AI Camera with NVidia Jetson Orin Nano 4GB/8GB in it.

Item		Product Specification
System	SoM	NVidia Orin Nano 4GB/8GB
	OS	Ubuntu 20.04
	Memory	4GB/8GB LPDDR5 (Built in SoM)
	Storage	M.2 Key-M PCIe NVMe SSD
Camera	Image Sensor	Sony Starvis™ IMX462 Sensor size: 1/2.8" progressive CMOS sensor Pixel: 2 Mega pixel
	Lens focal length	Motorized MFZ lens, 2.8-12mm
	View angle	FOV: H: 101.7~33.5 V:52.5~18.8 D: 125~38.5
	Minimum illuminator	Color: 0.01 lux (AGC on) B/W: 0.005 lux (AGC on)
	ICR	Built in ICR (IR cut removal) for true day and night
	IQ	<ul style="list-style-type: none"> ● Auto exposure, manual exposure (1/30~1/20,000s) Support Day, night mode different parameter ● Back light control ● Auto white balance: auto, manual (different level selectable) ● Auto gain control, manual gain value ● 2D de-noise and 3D-denoise (different level selectable)

		<ul style="list-style-type: none"> • IQ: Brightness, contrast, hue, sharpness, gama • True WDR (wide dynamic range) and digital WDR
	IR LED	10W
I/O	Ethernet	GBE/802.3bt PoE PD x 1
Power	PoE PD	IEEE 802.3bt
	DC-IN	12V/6A
Environment	Operating Temp	-20~60°C
	Storage Temp	-30~70°C
	Certifications	IP66, FCC, BSMI, CE, VCCI
Appearance	Dimensions	L:295mm x W:110mm(with cap) x H:120mm(with base and cap)
	Weight	2.8kg (not included wall mount)

3. ID Overview





4. Installation Process

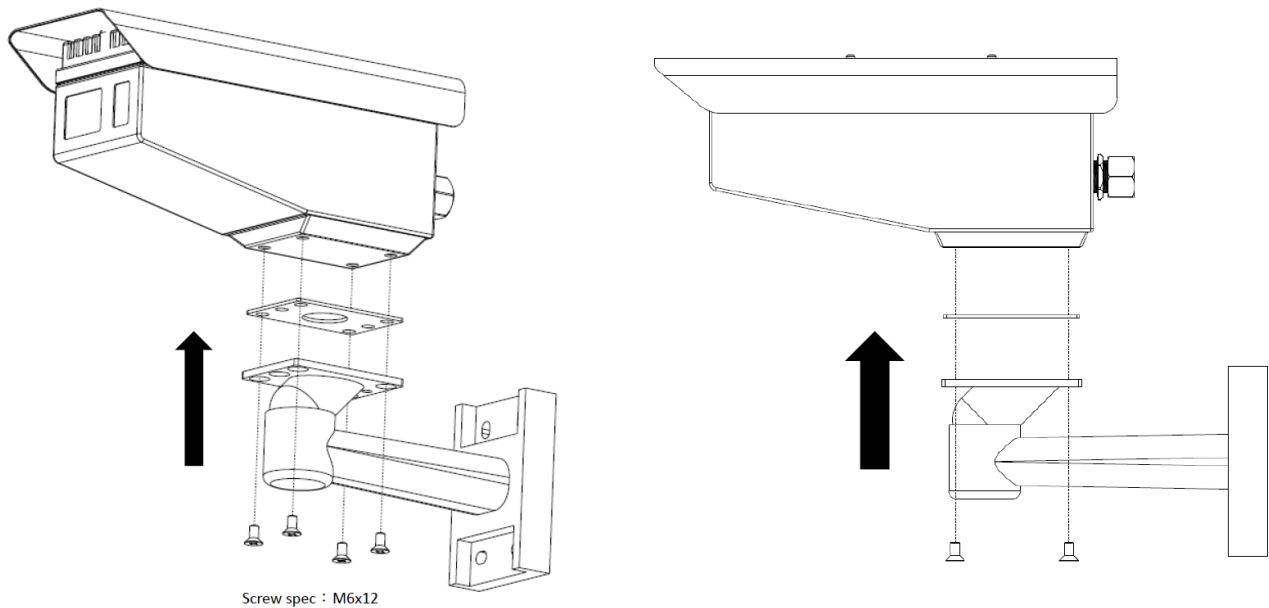
The unit can be installed with an included mount.

Four screws (4x M6x12) are used to attach the mount to the device.

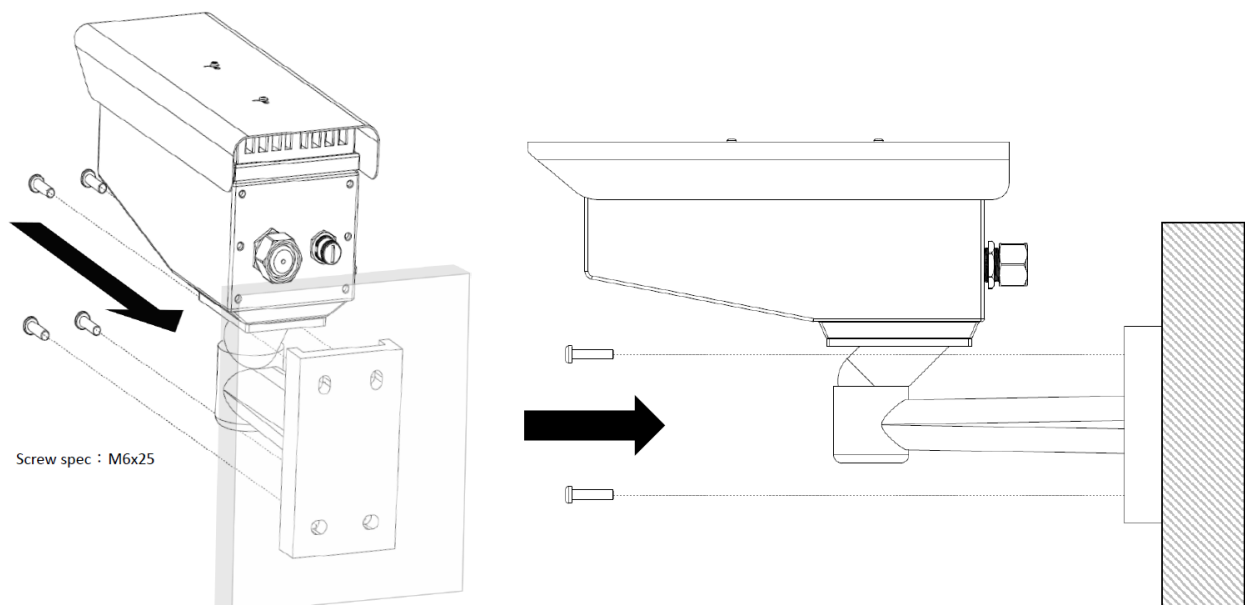
Four screws (4x M6x25) are used to attach the mount to the mounting surface.

The mount has several axes to enable control over the field of view of the device.

Step1: Combine the unit with the mount

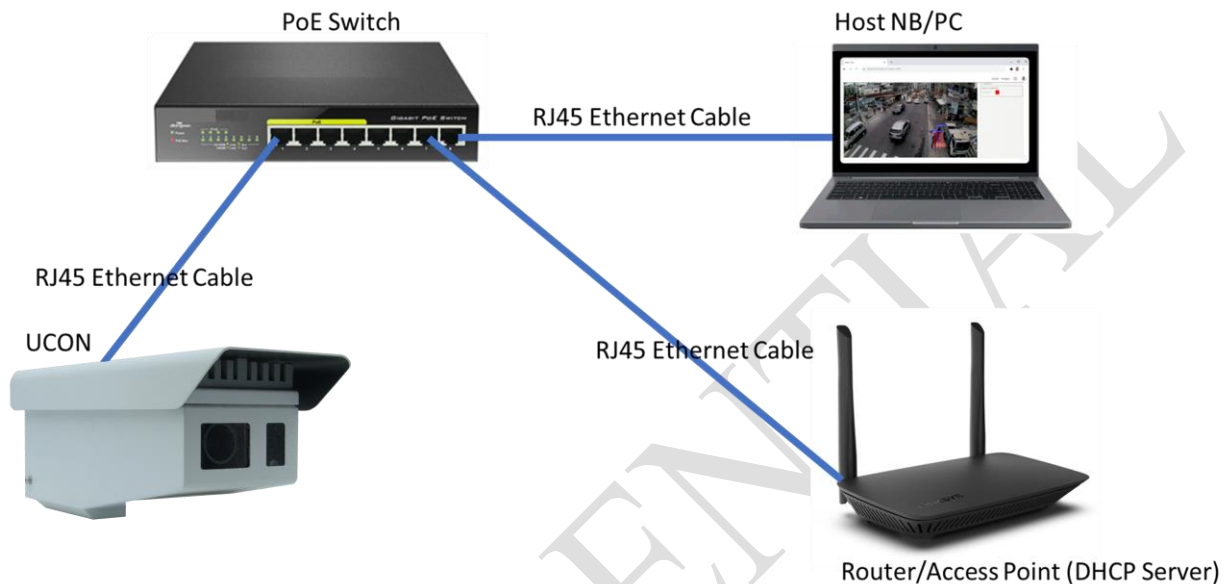


Step2: Install the unit with mount to the wall



5. Getting Started

5.1. Solution Overview



5.2. Power Up

1. Using PoE PD: Connect IEEE 802.3bt PoE Source (PoE Switch or PoE injector) to ucon Ethernet port with RJ45 Ethernet cable, the camera should power on directly.
2. Using DC-In: Connect the 12V DC-in to the power connector of ucon, and plug the power adapter into an appropriately rated electrical outlet. The camera should power on directly.

5.3. Login to AIM-Edge ucon

1. AIM-Edge ucon Ethernet port is set to DHCP mode on default, it will try to get IP address from router in LAN directly after power on.
2. Please check the LAN router/access point Web control interface to know the IP assigned to ucon, the ucon device name should be “AIM-dev-xxxx” as the screenshot below.



3. Connect to AIM-Edge ucon from Host NB/PC with `ssh` (Username: `aim` /Password: `aim12345`).

5.4. NVidia Jetpack SDK Support

1. AIM-Edge ucon has **NVidia Jetpack 5.1.2** built-in, and user can develop or install software applications on it. Here below list the NVidia Jetson libraries pre-installed.

NVIDIA Jetson Libraries	<ul style="list-style-type: none"> – Python: 3.8.10 – CUDA: 11.4.315 – cuDNN: 8.6.0.166 – TensorRT: 8.5.2 – VPI: 2.3.9 – Vulkan: 1.3.204 – OpenCV: 4.5.4 - with CUDA: NO – DeepStream: 6.3.0
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5.5. RTSP/CGI Command & Examples

Here below are the RTSP & CGI commands can be used in user application and examples.

1. Get RTSP video stream (default port is 554):

<rtsp://admin:admin@192.168.101.100:554/onvif-media/media.amp?streamprofile=Profile1&audio=0>

2. Take Snapshot: <http://192.168.101.100/image.cgi?profilename=Profile1>

3. Zoom In/Out: http://192.168.101.100/cgi/ptzdc.cgi?command=set_zoom_step&zoom_step=xxx
(0-2342)

4. Record Video: `gst-launch-1.0 rtspsrc protocols=tcp`

`location="rtsp://admin:admin@192.168.101.100:554/onvif-media/media.amp?streamprofile=Profile1
&audio=0" ! rtph264depay ! h264parse ! mpegtsmux ! filesink location=file.mp4`

The IR LED & ICR is controlled by photosensor on IR LED board automatically, no control command is available.

Besides, the internal camera module also supports ONVIF profiles G/S, user application can follow ONVIF standard to access the camera module.

5.6. Use AIM-Edge ucon as IP Camera

1. AIM-Edge ucon can be used as a normal IP camera, the camera RTSP Video streaming can be retrieved by the URL

(rtsp://admin:admin@ucon_IP:5050/onvif-media/media.amp?streamprofile=Profile1&audio=0) from Host NB/PC. Please check section 5.3 to know how to get UCON IP address.

5.7. AIM-Edge ucon Camera Web Interface

1. The AIM-Edge ucon Camera can be controlled via Web interface from Windows Host NB/PC, just use Chrome browser to launch URL (http://ucon_IP:5058) with username: **admin** and password: **admin**. The camera web interface is as below.



5.8. Set AIM-Edge ucon Device IP mode

AIM-Edge ucon Ethernet port is set to DHCP mode on default. To set ucon device as static IP & set back to DHCP mode please follow the steps below.

1. Use ssh to login to ucon from Linux NB/PC (Username: **aim** /Password: **aim12345**).
2. Check network interfaces by the command below, the output should be as the screenshot below. The **eth0** is the network interface to outworld, and the corresponding name is "**Wired Connection 1**", this name will be used while setting static IP afterward.

nmcli c show

```
aim@tegra-ubuntu:~$ nmcli c show
NAME                                UUID                                TYPE      DEVICE
Wired connection 1                  599371ee-a1d0-3ea5-b8e0-1f29d421efee ethernet  eth0
t4tbr0                             787e0eab-8f9b-4c1b-a937-d10b30d2c03f bridge   t4tbr0
docker0                             75abc319-8ae7-4d30-b58f-1d52ce00c4a2 bridge   docker0
Wired connection 2                  f5137647-bca9-333b-9d5e-298c6d343af3 ethernet  --
```

3. Set static IP, here below is an example.

Static IP address: 172.16.0.149
 Netmask: 255.255.255.0 (Prefix:24)
 Gateway address: 172.16.0.1
 DNS address: 8.8.8.8

Use the command below to set static IP as above.

```
sudo nmcli c mod Wired\ connection\ 1 "ipv4.method" "manual" "ipv4.address"
"172.16.0.149/24" "ipv4.gateway" "172.16.0.1" "ipv4.dns" "8.8.8.8"
```

After the command is issued, the IP address change will not take effect immediately, user can check the modification with the command below.

nmcli connection show Wired\ connection\ 1 | egrep -i ipv?4

```
aim@tegra-ubuntu:~$ nmcli connection show Wired\ connection\ 1 | egrep -i ipv?4
ipv4.method:                manual
ipv4.dns:                    8.8.8.8
ipv4.dns-search:             --
ipv4.dns-options:            --
ipv4.dns-priority:           0
ipv4.addresses:              172.16.0.149/24
ipv4.gateway:                172.16.0.1
ipv4.routes:                 --
ipv4.route-metric:           -1
ipv4.route-table:            0 (unspec)
ipv4.routing-rules:          --
ipv4.ignore-auto-routes:     no
ipv4.ignore-auto-dns:        no
ipv4.dhcp-client-id:         --
ipv4.dhcp-iaid:              --
ipv4.dhcp-timeout:           0 (default)
ipv4.dhcp-send-hostname:     yes
ipv4.dhcp-hostname:          --
ipv4.dhcp-fqdn:              --
ipv4.dhcp-hostname-flags:    0x0 (none)
ipv4.never-default:          no
ipv4.may-fail:               yes
ipv4.dad-timeout:            -1 (default)
```

After the modification is verified OK, user can use the command line below to restart the network interface to let the IP setting works.

```
sudo ifconfig eth0 down; sleep 10; sudo ifconfig eth0 up
```

After the static IP is set, the Linux host NB/PC also needs to change its own IP to the same IP subdomain (172.16.0.xxx in the example above) to reconnect to the ucon device.

4. To set back to DHCP, user can use the command below.

```
sudo nmcli c mod Wired\ connection\ 1 "ipv4.method" "auto" "ipv4.address" ""  
"ipv4.gateway" "" "ipv4.dns" ""
```

After the command is issued, the IP address change will not take effect immediately, user can check the modification with the command below.

```
nmcli connection show Wired\ connection\ 1 | egrep -i ipv?4
```

```
aim@tegra-ubuntu:~$ nmcli connection show Wired\ connection\ 1 | egrep -i ipv?4  
ipv4.method: auto  
-----  
ipv4.dns: --  
ipv4.dns-search: --  
ipv4.dns-options: --  
ipv4.dns-priority: 0  
-----  
ipv4.addresses: --  
ipv4.gateway: --  
-----  
ipv4.routes: --  
ipv4.route-metric: -1  
ipv4.route-table: 0 (unspec)  
ipv4.routing-rules: --  
ipv4.ignore-auto-routes: no  
ipv4.ignore-auto-dns: no  
ipv4.dhcp-client-id: --  
ipv4.dhcp-iaid: --  
ipv4.dhcp-timeout: 0 (default)  
ipv4.dhcp-send-hostname: yes  
ipv4.dhcp-hostname: --  
ipv4.dhcp-fqdn: --  
ipv4.dhcp-hostname-flags: 0x0 (none)  
ipv4.never-default: no  
ipv4.may-fail: yes  
ipv4.dad-timeout: -1 (default)
```

After the modification is verified OK, user can use the command line below to restart the network interface to let the IP setting works.

```
sudo ifconfig eth0 down; sleep 10; sudo ifconfig eth0 up
```

6. Limitation

1. IR LED function is controlled by camera module by ALS value automatically.

7. Reference

NVidia Jetpack SDK: <https://developer.nvidia.com/embedded/jetpack>

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