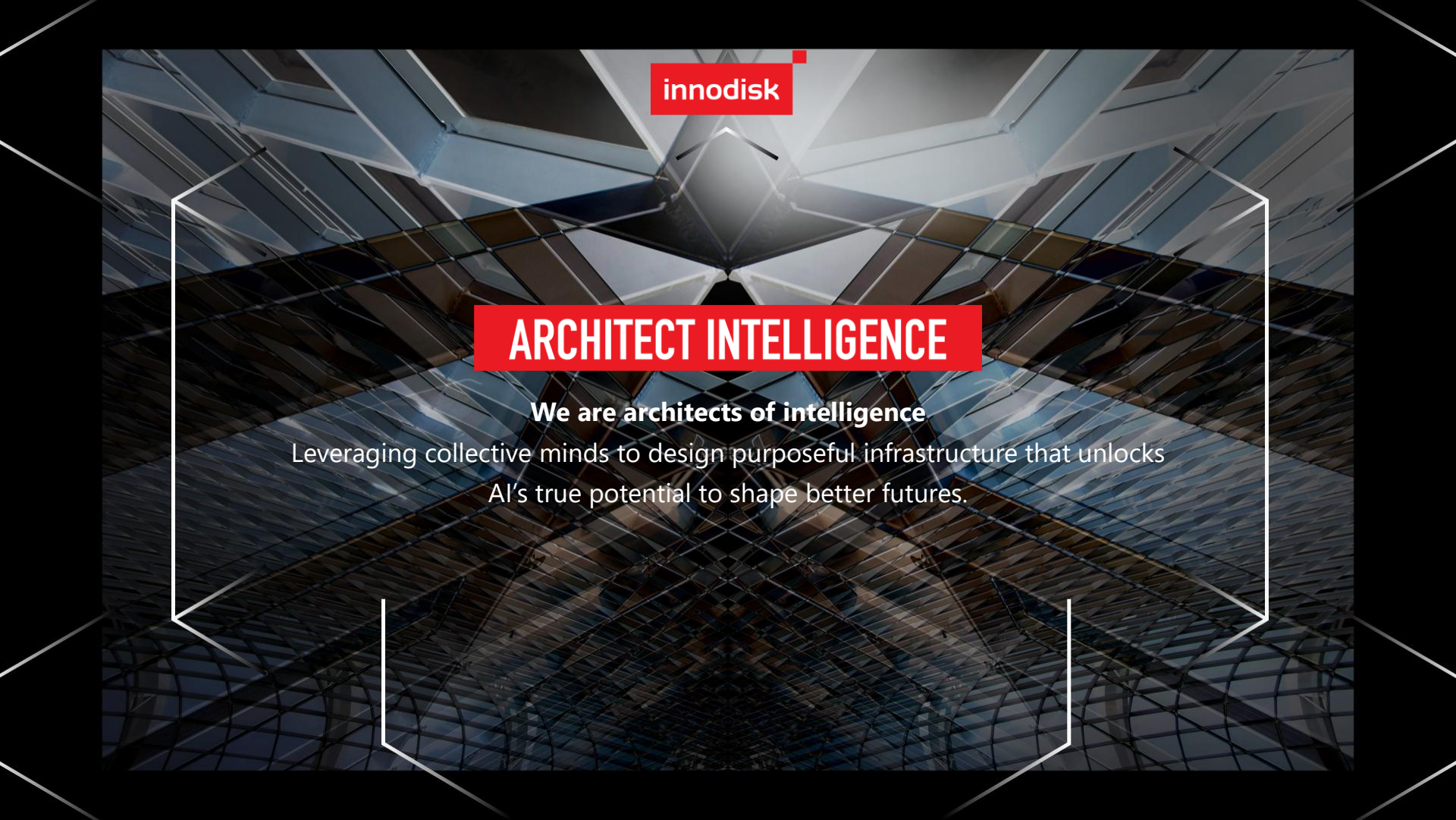
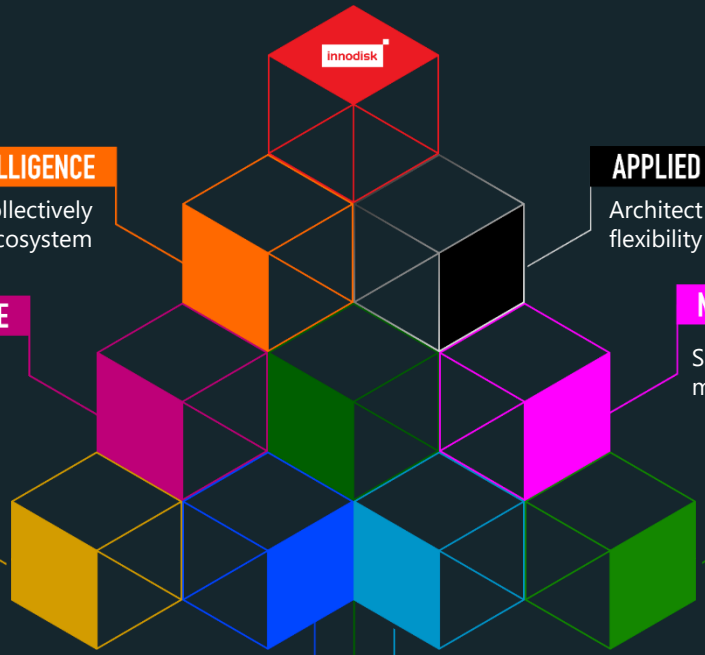
Innodisk Camera Module Introduction

PM Malcolm/ Leo/ Steven 2025/Jan


innodisk
ARCHITECT INTELLIGENCE
We are architects of intelligence
Leveraging collective minds to design purposeful infrastructure that unlocks
AI's true potential to shape better futures.



COLLECTIVE INTELLIGENCE

Partners' solutions collectively create an intelligence ecosystem

APPLIED INTELLIGENCE

Architect your intelligence solutions with flexibility that apply to achieve goals

MACHINE-LEARNING INTELLIGENCE

AI training and inference maximize the value of insights in each application field

MANAGEMENT INTELLIGENCE

Software and services improve efficiency in managing objects in real-world situations

SENSING INTELLIGENCE

Sensors continuously monitor operational information from physical environments

COMPUTING INTELLIGENCE

Accelerated computing technologies streamline processing and analytics

DATA INTELLIGENCE

Optimized memory and storage solutions for secure data capture and empowering intelligence

EXTENDED INTELLIGENCE

Modularized peripherals expand the capabilities of existing solutions

CONNECTING INTELLIGENCE

Enable real-time transmissions between all innovative applications/scenarios

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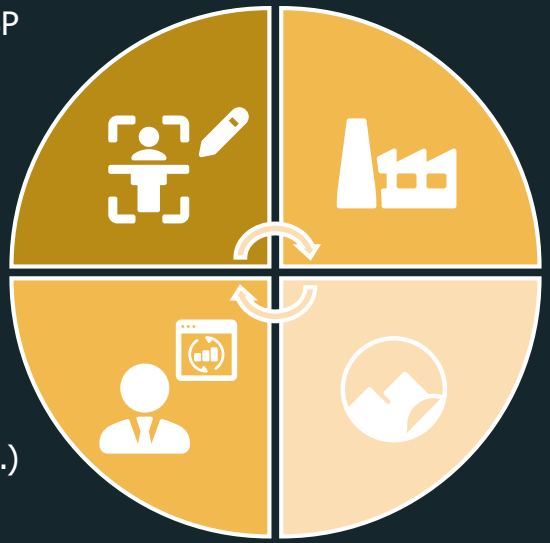
SENSING INTELLIGENCE

Innodisk Camera Strength

Design

- Integrate from lens, sensor, ISP to camera module.
- Customized services upon request.
- MIPI camera driver development.



Manufacturing

- Produce in Innodisk manufacturing site.
- Mass production tool.
  - High traceability
  - High consistency

Reliability

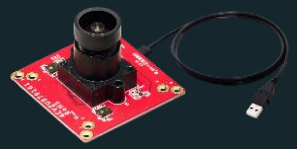
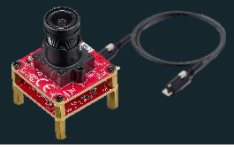
- Test report(chamber, EMI…etc.)
- Image quality report
  - Lab verification
  - Outdoor verification

Image Quality

- Optimized for different applications.
- Customized services upon request.

CAMERA INTERFACE

Comparison chart

	USB 2.0	MIPI CSI-2	MIPI over Type-C (EXCLUSIVE)	GMSL2
				
Cable Length	3-5m	0.3-0.5m	1m+	15m
Bandwidth	0.48Gbps	5Gbps (2-lane) 10Gbps (4-lane)	5Gbps (2-lane) 10Gbps (4-lane)	5Gbps (2-lane) 10Gbps (4-lane)
Flexibility	High USB connectivity	Low (Mostly build-in a system)	High Custom Type-C connectivity	High Fakra connectivity
Driver	UVC (USB video Class)	Driver customize	Driver customize	Driver customize
Resolution	2MP@5fps 5MP@3fps	2MP@120fps 5MP@60fps 8MP(4K) @30fps	2MP@120fps 5MP@60fps 8MP(4K) @30fps	2MP@120fps 5MP@60fps 8MP(4K) @30fps

USB CAMERA PRODUCT DEVELOPMENT ROADMAP

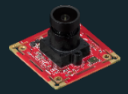
2MP

EV2U-SGR1-MMC1
USB 2.0
2M@ 30 FPS
Low Light

EV2U-RMR1-UMCB
USB 2.0
2M@ 30 FPS

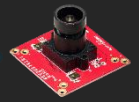
EV2U-RMR2-MMC1
USB 2.0
2M@ 30FPS

EV2U-SSM1-RLCF
USB 2.0
2M@ 30 FPS
Low Light



EV2U-LOM1-RHCF
USB 2.0
2M@ 30 FPS
HDR /120db

8MP

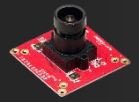


EV8U-LSM1-RLCF
USB 2.0
8M@ 30 FPS
Low light

POC: 2025 Q1

EV8U-LSM1-RLCN
USB 2.0
8M@ 30 FPS
Low light
Night Vision

POC: 2025 Q1

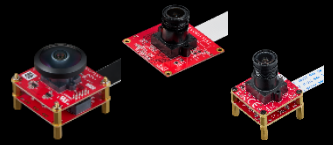


EV8U-LSM1-RLCA
USB 2.0
8M@ 30 FPS
Low light
Auto Focus

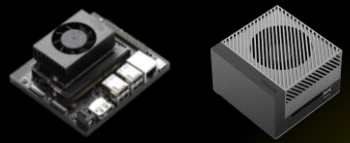
POC: 2025 Q2

MIPI CSI-2 Camera Solution & Target Market

MIPI CSI-2 Camera Modules **offer high bandwidth, low power consumption, and low latency**, making them ideal for fast, efficient image and video processing. When paired with platforms like NVIDIA Jetson, these modules excel in edge and embedded market applications, such as recognition and monitoring. Their integration allows for real-time data processing and decision-making, crucial for tasks that require quick and accurate visual analysis.



MIPI

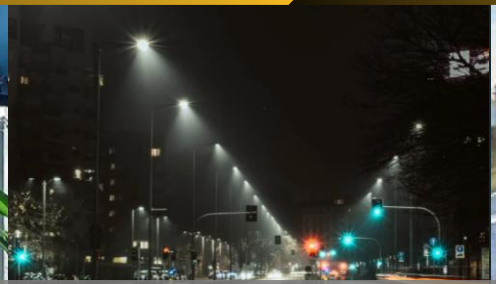


- ✓ Smart Office
- ✓ Smart Gate
- ✓ Smart City
- ✓ Highway Monitoring

Camera Module | Host Platform | Vertical Application

Meeting Room

Gate Control

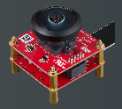


Smart City

Highway

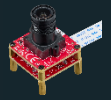
MIPI CSI-2 CAMERA PRODUCT DEVELOPMENT ROADMAP

2MP



EV2M-GOM1-MUCA
MIPI CSI-2
2M@ 30 FPS
Fisheye

EV2M-OOM1-UHCA
MIPI CSI-2
2M@ 60 FPS
Global Shutter

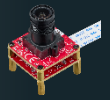


EV2M-OOM2-RLCF
MIPI CSI-2
2M@ 30 FPS
Low Light

POC: 2024 Q4

EV2M-CSM1-RHCF
MIPI CSI-2
2M@ 120 FPS
HDR, Low light

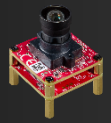
EV2M-ZOM1-GSCV
MIPI CSI-2
2M@ 60 FPS
Global Shutter, Varifocal



EV2M-OOM3-RHCF
MIPI CSI-2
2M@ 30 FPS
HDR/ 120db

POC: 2024 Q4

5-8MP



EV8M-OOM1-RHCF
MIPI CSI-2
8M@ 30 FPS
HDR/ 120db

EV5M-CSM1-RTCF
MIPI CSI-2
5M@ 30 FPS
HDR, Low light

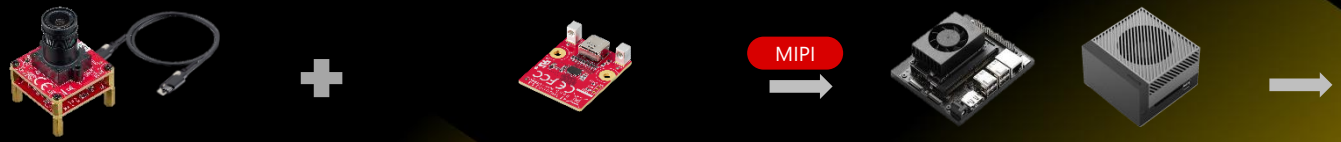
EV8M-CSM1-RTCF
MIPI CSI-2
8M@ 30 FPS
HDR, Low light

13MP

EVDM-OOM1-RHCF
MIPI CSI-2
13M@ 20 FPS
HDR

MIPI over Type-C Camera Solution & Target Market

MIPI over Type-C Camera Modules provide **all the advantages of MIPI**, such as high bandwidth, low power consumption, and low latency, while **also offering extended cable length and the ability to connect externally to enclosures**. This makes them an ideal solution for applications in AMR, forklifts, and robotics. When integrated with platforms like NVIDIA Jetson, they excel in edge and embedded markets, enabling real-time recognition and monitoring with flexibility and enhanced connectivity.



- ✓ Off-road vehicles
- ✓ Robotics
- ✓ AMR
- ✓ Smart Gate

Camera Module | Adapter Board | Host Platform | Vertical Application


Forklift

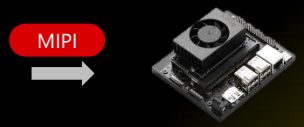

Robotics


AMR


Smart Gate

GMSL2 Camera Solution & Target Market

GMSL2 Camera Modules offer high bandwidth and low latency, similar to MIPI, with the added benefit of **supporting long cable connections and external setups.** They feature **IP67 waterproof and dustproof protection**, making them perfect for rugged environments like aftermarket automotive systems, large AMRs, and off-road vehicles. Paired with NVIDIA Jetson, these modules provide reliable real-time monitoring and recognition in harsh conditions, ideal for edge and embedded applications.



- ✓ Off-road vehicles
- ✓ Robots
- ✓ AMR
- ✓ Smart Farming

Camera Module | Adapter Board | Host Platform | Vertical Application


Off-road vehicle


Robotics


AMR

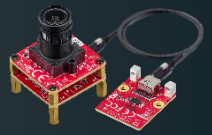

Smart Farming

MIPI over Type-C/ GMSL CAMERA PRODUCT DEVELOPMENT ROADMAP

2MP

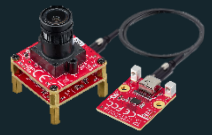
EV2C-GOM1
MIPI over Type-C
2M@ 30 FPS
Fisheye

POC: 2024 Q4



EV2C-OOM2
MIPI over Type-C
2M@ 30 FPS
Low Light

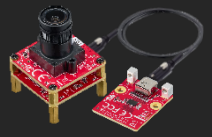
POC: 2025 Q1



EV2C-OOM3
MIPI over Type-C
2M@ 30 FPS
HDR

POC: 2025 Q1

8MP



EV8C-OOM1
MIPI over Type-C
8M@ 30 FPS
HDR

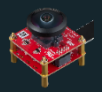
POC: 2025 Q1

13MP

EVDF-OOM1
GMSL2
13M@ 20 FPS
HDR

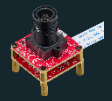
POC: 2024 Q4

MIPI (AI Platform)

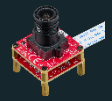


EV2M-GOM1
Fisheye calibration

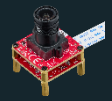
EV2M-OOM1
Global shutter



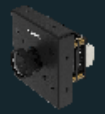
EV2M-OOM2
Low light



EV8M-OOM1
HDR

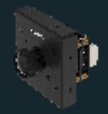


EVDM-OOM1
High resolution

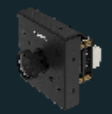


EV2M-CSM1
HDR, Low light

EV2M-ZOM1
Global shutter
Verifocal



EV5M-CSM1
HDR, Low light



EV8M-CSM1
HDR, Low light

NVIDIA

Jetson AGX Orin

Jetson Orin NX

Jetson Orin Nano

Intel

Intel® Core™ Ultra processor

Raptor Lake 13th

Alder Lake 12th

PRODUCT DRIVER SUPPORT TABLE

Updated:	2024/12/20			NVIDIA (JetPack 6.1)			INTEL (Linux Ubuntu)		
Model Name	Interface	Resolution	Frame Rate	Orin Nano	Orin NX	AGX Orin	Alder Lake 12th	Raptor Lake 13th	Core™ Ultra processor
 EV2M-GOM1-MUCA	MIPI CSI-2	2MP	30 FPS	✔	✔	✔	✔	✔	✔
 EV2M-ZOM1-GSCV	MIPI CSI-2	2.3MP	60 FPS	✔	✔	✔	TBD	TBD	TBD
 EV2M-OOM1-UHCA	MIPI CSI-2	2.3MP	60 FPS	✔	✔	✔	✔	✔	✔
 EV2M-OOM2-RLCF	MIPI CSI-2	2MP	60 FPS	✔	✔	✔	✔	✔	✔
 EV2M-OOM3-RHCF	MIPI CSI-2	2MP	30 FPS	✔	✔	✔	TBD	TBD	TBD
 EV2M-CSM1-RHCF	MIPI CSI-2	2MP	120 FPS	✔	✔	✔	TBD	TBD	TBD
 EV5M-CSM1-RTCF	MIPI CSI-2	5MP	30 FPS	✔	✔	✔	TBD	TBD	TBD
 EV8M-CSM1-RTCF	MIPI CSI-2	8MP	30 FPS	✔	✔	✔	TBD	TBD	TBD
 EV8M-OOM1-RHCF	MIPI CSI-2	8MP	30 FPS	✔	✔	✔	✔	✔	✔
 EVDM-OOM1-RHCF	MIPI CSI-2	13MP	20 FPS	✔	✔	✔	✔	✔	✔
 EVDF-OOM1-RHCF	GMSL2	13MP	20 FPS	✔	✔	✔	TBD	TBD	TBD

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Low light/ Starvis

Low light/ Starvis is a camera sensor technology that allows cameras to capture **bright and clear images in very low light**, similar to how our eyes adjust in the dark. This sensor is designed to work well even when there's little light available, making it ideal for use in outdoor monitoring, industrial inspections, and traffic systems.

Low light/ Starvis is especially valuable in applications that require clear visuals at night or in dim environments, ensuring reliable performance in challenging lighting conditions.

Starvis Low Light Sensor

VS

Other Sensor

Scene: Smart Parking

Scene: Security

Scene: Traffic Systems

Scene: Inspection

EV2U-SSM1-RLCF
USB 2.0
2M@ 30 FPS
Low light

EV2M-CSM1-RHCF
MIPI CSI-2
2M@ 120 FPS
HDR, Low light

EV5M-CSM1-RTCF
MIPI CSI-2
5M@ 30 FPS
HDR, Low light

EV8M-CSM1-RTCF
MIPI CSI-2
8M@ 30 FPS
HDR, Low light

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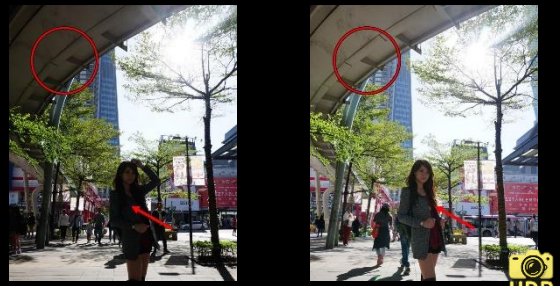
HDR (High Dynamic Range)

HDR is a camera technology that captures a **broader range of brightness in challenging lighting**. By merging multiple shots with different exposures, HDR produces an image that accurately represents both bright and dark areas.

The dynamic range, measured in decibels (dB), shows the contrast between the brightest and darkest parts the sensor can capture, with **higher dB values indicating a wider range.** The human eye has a dynamic range of about 120 dB.



Scene: Outdoor Facial Recognition

Scene: Indoor + Outdoor

EV2U-LOM1-RHCF
USB 2.0
2M@ 30 FPS
HDR/ 120db

EV8M-OOM1-RHCF
MIPI CSI-2
8M@ 30 FPS
HDR/ 120 db

EVDM-OOM1-RHCF
MIPI CSI-2
13M@ 20 FPS
HDR/ 69db

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External Trigger

External trigger is a feature in camera modules that allows **precise control** over image capture by **synchronizing** the camera with external signals. This function is especially useful in systems requiring coordinated streaming from two or more cameras, ensuring they capture images simultaneously.

With external triggers, users can achieve greater control in applications like industrial inspections, where timing is critical. This ensures cameras work together seamlessly, improving accuracy and consistency in multi-camera setups.

Scene: Inspection

Scene: AMR Navigation

Scene: Pick-and-Place

Scene: Multi-Camera Sync

EV2U-SSM1-RLCF
USB 2.0
2M @ 30 FPS
External Trigger
Low light

EV2M-OOM2-RLCF
MIPI CSI-2
2M @ 60 FPS
External Trigger
Low light

EV2M-OOM3-RHCF
MIPI CSI-2
2M @ 30 FPS
External Trigger
HDR/ 120 db

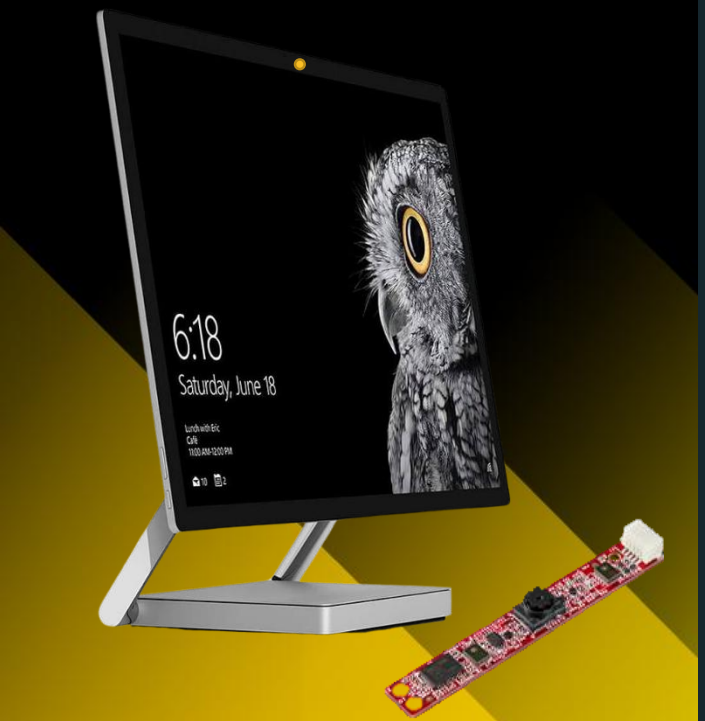
EV8M-OOM1-RHCF
MIPI CSI-2
8M @ 30 FPS
External Trigger
HDR/ 120 db

innodisk

Case Study

SENSING INTELLIGENCE

CASE STUDY
All-in-one PC



Customers : Industry PC Solution Provider

Product : EV2U-RMR2-MMC1
USB 2.0 2MP Fixed Focus Camera Module

Highlight : Consistent Quality,
Customized Hardware Service

By delivering consistent product quality and stable supply, Innodisk cameras help customers overcome the challenges of unreliable products they previously used. Additionally, Innodisk provides hardware customization to seamlessly integrate into customers' product designs, enabling them to achieve higher-quality video capture and enhanced system performance.

CASE STUDY
Smart Inventory

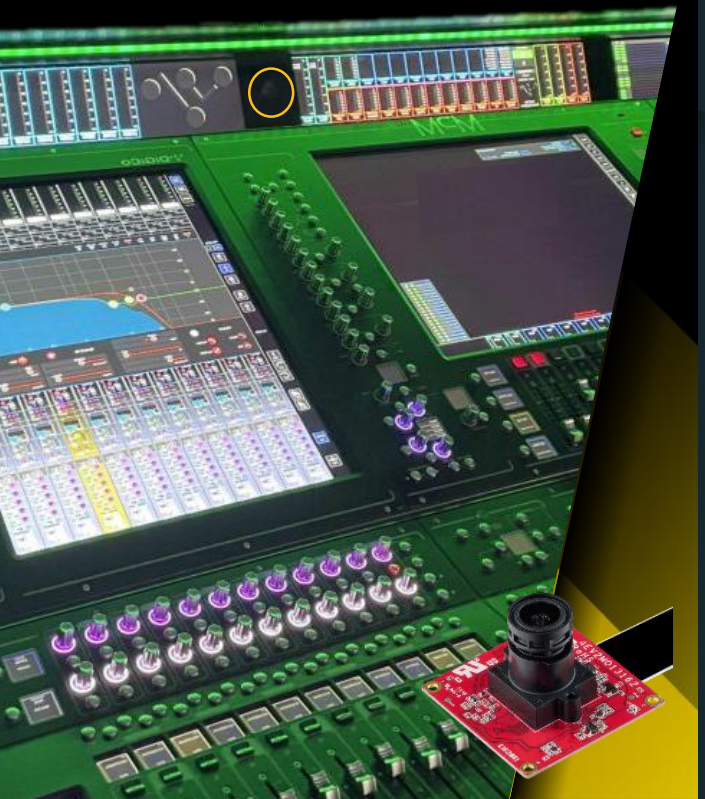
Customers : Industry Automation Solution Provider

Product : EV2U-SGR1-MMC1
USB 2.0 2MP Fixed Focus Camera Module

Highlight : Custom Firmware Service,
Lens Selection Service

With ISP-equipped cameras and custom firmware, Innodisk helped customers connect multiple USB cameras within a single system, ensuring seamless performance across various resolutions and frame rates. Additionally, Innodisk provided a versatile lens selection to meet customers' Field of View needs, enabling optimized system functionality for intelligent warehouse pick-and-track operations.

CASE STUDY
Multimedia Mixer



Customers : Creative Mixing Solution Provider

Product : EV2M-OOM1-UHCA
MIPI CSI-2 2MP Fixed Focus Camera Module

Highlight : Platform Integration Service

By providing seamless camera and system driver integration, Innodisk helped customers overcome the challenge of finding the right camera for their platform, enabling them to successfully integrate the solution into their high-performing product and broadcast artist performances to a global audience.

CAMERA DESIGN SERVICE

Hardware
PCBA, Size

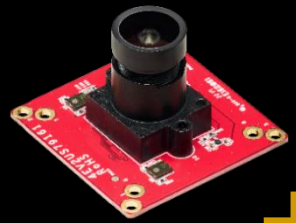
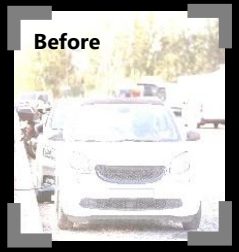
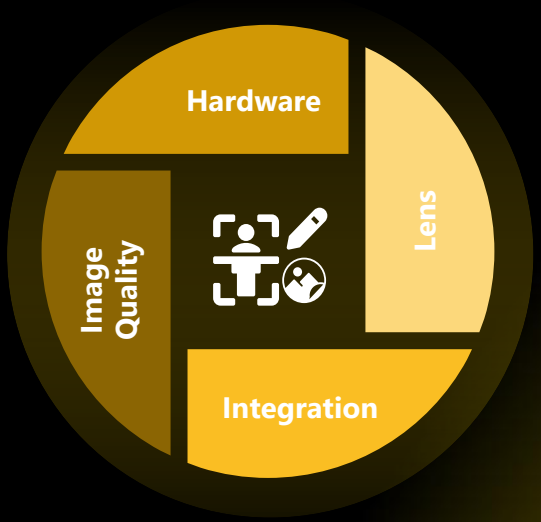


Image Quality Tuning





Versatile Lens Selection

Platform Integration

Vision as Service
Step up your needs

Camera

Image Quality

3A

Platform Driver

Customers

Application

CAMERA MODULE SELECTOR

*Housing ▲: Optional Choice

	Updated:	2025/01/06													
Item	Interface	Model Name	Resolution	Frame Rate	HDR	Global Shutter	Low Light	DMIC	External Trigger	*Housing	Feature	FOV (D/H/V)	Dimension L x W (mm)	Lens	Sample Ready
1	USB 2.0	 EV2U-SGR1-MMC1	2MP	30 FPS			✔	✔				121°/102°/54°	38 x 38 32 x 32	M12	✔
2		 EV2U-RMR1-UMCB	2MP	30 FPS				✔				77°/69°/42°	60 x 8	M5	✔
3		 EV2U-RMR2-MMC1	2MP	30 FPS				✔				86°/72°/38°	58 x 25	M12	✔
4		 EV2U-SSM1-RLCF	2MP	30 FPS			✔	✔	✔	▲		121°/102°/54°	38 x 38 32 x 32 41 x 41(H)	M12	✔
5		 EV2U-LOM1-RHCF	2MP	30 FPS	✔			✔		▲		TBD	38 x 38 32 x 32 41 x 41(H)	M12	2025/ 02
6		 EV8U-LSM1-RLCF	8MP	30 FPS			✔	✔		▲		89°/81°/51°	38 x 38 41 x 41(H)	M12	2025/ 02
7		 EV8U-LSM1-RLCN	8MP	30 FPS			✔			▲	Night Vision	106°/89.5°/48.4°	38 x 38 41 x 41(H)	M12	2025/ 03
8		 EV8U-LSM1-RLCA	8MP	30 FPS			✔	✔		▲	Auto Focus	TBD	38 x 38 41 x 41(H)	M12	TBD

CAMERA MODULE SELECTOR

*Housing ▲: Optional Choice

	Updated:	2025/01/06													
Item	Interface	Model Name	Resolution	Frame Rate	HDR	Global Shutter	Low Light	DMIC	External Trigger	*Housing	Feature	FOV (D/H/V)	Dimension L x W (mm)	Lens	Sample Ready
9	MIPI CSI-2	 EV2M-GOM1-MUCA	2MP	30 FPS						▲	Fisheye Dewarping	230°	38 x 38 46 x 46(H)	M12	✔
10		 EV2M-ZOM1-GSCV	2.3MP	60 FPS		✔					Varifocal	128°/103°/61°	42 x 42	M12	✔
11		 EV2M-OOM1-UHCA	2.3MP	60 FPS		✔				▲		104°/86°/46°	38 x 38 46 x 46(H)	M12	✔
12		 EV2M-OOM2-RLCF	2MP	60 FPS			✔		✔	▲		122°/113°/75°	30 x 30 39 x 39(H)	M12	✔
13		 EV2M-OOM3-RHCF	2MP	30 FPS	✔				✔	▲		96°/88°/57°	30 x 30 39 x 39(H)	M12	2025/ 02
14		 EV2M-CSM1-RHCF	2MP	120 FPS	✔		✔			✔		107°/93°/52°	46 x 46(H)	M12	✔
15		 EV5M-CSM1-RTCF	5MP	30 FPS	✔		✔			✔		126°/97°/73°	46 x 46(H)	M12	✔
16		 EV8M-CSM1-RTCF	8MP	30 FPS	✔		✔			✔		148°/125°/67°	46 x 46(H)	M12	✔
17		 EV8M-OOM1-RHCF	8MP	30 FPS	✔				✔	▲		107°/100°/67°	30 x 30 39 x 39(H)	M12	✔
18		 EVDM-OOM1-RHCF	13MP	20 FPS	✔					▲		91°/71°/52°	30 x 30 39 x 39(H)	M12	✔

CAMERA MODULE SELECTOR

*Housing ▲: Optional Choice

	Updated:	2025/01/06													
Item	Interface	Model Name	Resolution	Frame Rate	HDR	Global Shutter	Low Light	DMIC	External Trigger	*Housing	Feature	FOV (D/H/V)	Dimension L x W (mm)	Lens	Sample Ready
19	MIPI over Type-C	 EV2C-GOM1-RSCO	2MP	30 FPS							Fisheye Dewarping	230°	38 x 38	M12	✔
20		 EV2C-OOM2-RLCF	2MP	30 FPS			✔			▲		122°/113°/75°	30 x 30 41 x 41(H)	M12	2025/ 01
21		 EV2C-OOM3-RHCF	2MP	30 FPS	✔					▲		96°/88°/57°	30 x 30 41 x 41(H)	M12	2025/ 03
22		 EV8C-OOM1-RHCF	8MP	30 FPS	✔					▲		107°/100°/67°	30 x 30 41 x 41(H)	M12	2025/ 01
23	GMSL2	 EVDF-OOM1-RHCF	13MP	20 FPS	✔					✔IP67		91°/71°/52°	42 x 41(H)	M12	✔

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