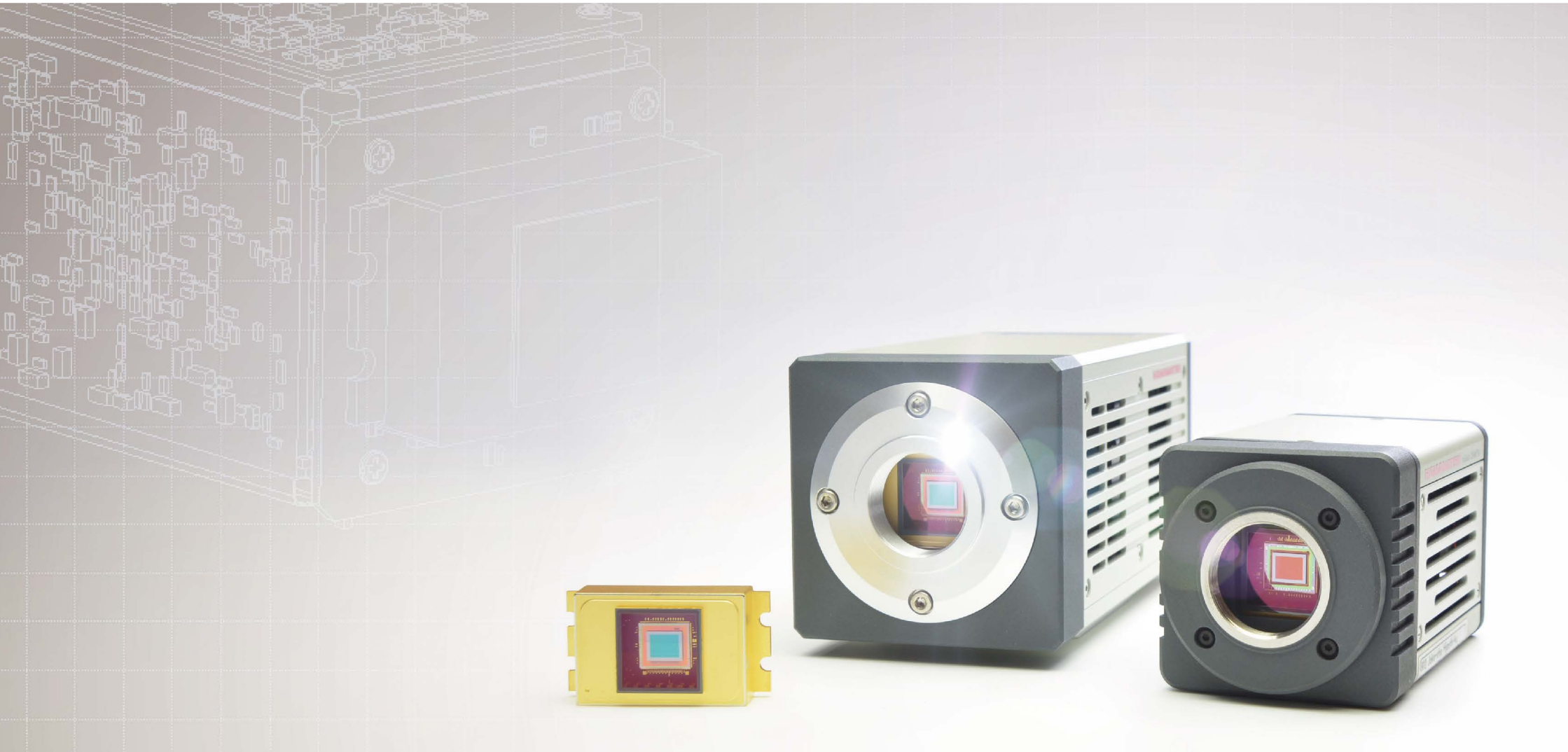


May 2025

**HAMAMATSU**  
PHOTON IS OUR BUSINESS

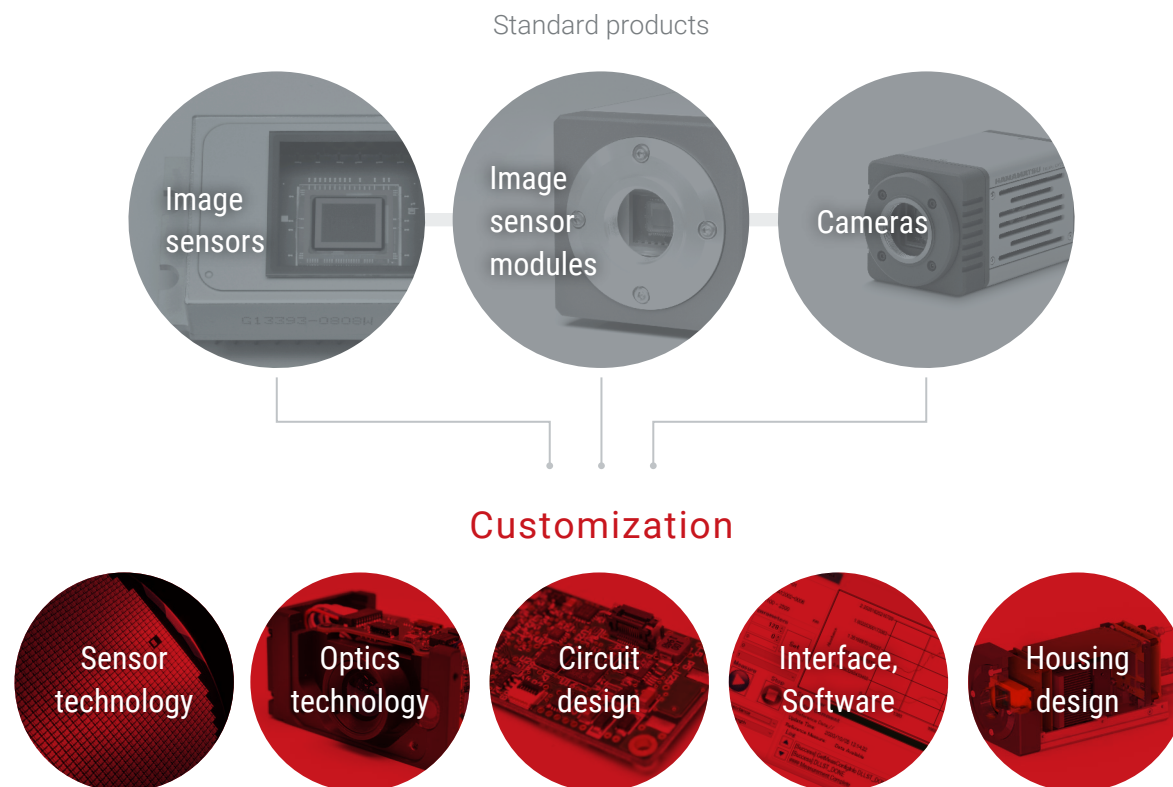
# Custom Solutions of Image Sensors / Modules / Cameras

Suggesting Custom Solutions According to Customer Requirements



## Overview

Hamamatsu offers standard products of image sensors, image sensor modules and cameras. In addition to the standard products, we design and manufacture custom products to meet customers' specifications in a wide range with various technologies.



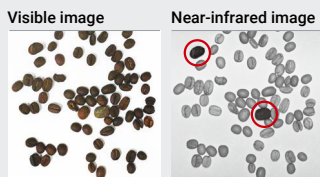
# Applications

Hamamatsu image sensors, modules and cameras are widely used for applications such as industry, life science / medical and UAV / monitoring system.

## Industry

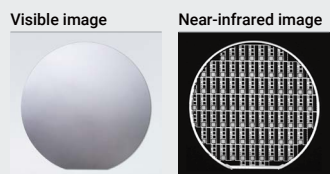
### Food / beverage inspection

Small stones mixed in coffee beans are detected.



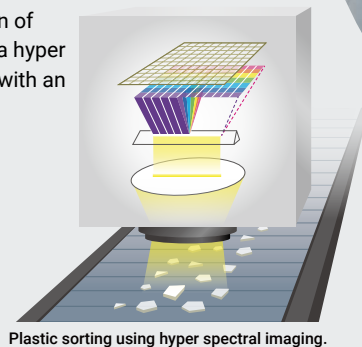
### Semiconductor inspection

The pattern formed on the Si wafer is transmissively observed from the backside.



### Recycle, Raw material inspection

Highly accurate identification of plastic is achieved by using a hyper spectrum camera equipped with an InGaAs image sensor.



Plastic sorting using hyper spectral imaging.

## Semiconductor

## Food

## UAV

## UAV / Monitoring system

### UAV (Unmanned aerial vehicle)

They are applied for UAV remote sensing for agriculture, forest management, infrastructure inspection.

### Monitoring system

They are used for monitoring system of obstacles and shape recognition for safety and security.

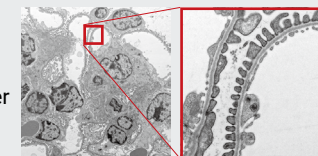
## Monitoring

## Cell observation

## Life science / Medical

### Cell observation by electron microscope / Pathological diagnosis

Micron-sized mouse kidney cells are observed under an electron microscope.



### Surface inspection

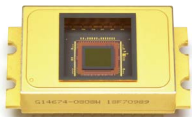


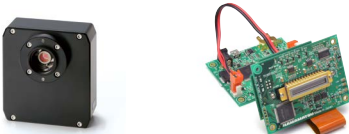
In-line inspection detects holes and scratches on the surface of the fabric.

## Applications

## Surface

# Differences of Image Sensors / Modules / Cameras

Hamamatsu offer a wide range of image sensors covering wavelengths from X-ray to near-infrared. We also provide image sensor modules that integrate these sensors with drive systems, including drive circuits and interfaces. Additionally, we offer cameras with a calibration function and software support.

		Image sensors	Image sensor modules	Cameras
				
Hardware	Image sensor	✓	✓	✓
	Driver circuit		✓	✓
	Interface		✓	✓
	Lens mount		✓	✓
	Housing	✓ *1	✓	✓ *2
	Cooling	✓ *2	✓ *2	✓ *2
	CE marking		✓	✓ *2
Software	Calibration function			✓
	DCAM-API®		✓ (C15853/C16795/C16091 series)	✓
	DCAM-SDK		✓ (C15853/C16795/C16091 series)	✓
	HAMAMATSU software		✓ (C15853/C16795/C16091 series)	✓
Note		Driver circuits (sold separately) are also available to easily evaluate and test Hamamatsu image sensors. It is also available for our original evaluation software (image acquisition only). 		

\*1: Including some products

\*2: Excluding some products

# Standard Products

These are examples of modules and cameras which incorporate a Hamamatsu image sensor.

			Image sensors		Image sensor modules		Cameras	
Area	InGaAs (QVGA)	950 nm to 1700 nm*1	G13393-0808W		▶		C14041-10U-02	
		950 nm to 1690 nm*2	G16561-0808T			C16795-01		
		1120 nm to 1850 nm*3	G16562-0808T		▶	C16795-02		
		1300 nm to 2150 nm*3	G16563-0808T			C16795-03		
		1700 nm to 2550 nm*3	G16564-0808T			C16795-04		
	InGaAs (VGA)	950 nm to 1700 nm*1	G13393-0909W		▶		C12741-03-02	
							C12741-11	
Linear	InGaAs (high-speed)	950 nm to 1700 nm*1	G14714-1024DK*4		▶	C15853-02*4		C15333-10E04-02
	InGaAs	900 nm to 1850 nm*2	G11475 series*5		▶	C16091-01/-02*5		
		900 nm to 2550 nm*2	G11478 series*5			C16091-06/-07*5		
	CMOS	400 nm to 1000 nm (RGB + NIR readout)				C16006		
	CCD (TDI)	200 nm to 1100 nm*1	S10201-04-01		▶			C10000-801
							C10000-A01	

\*1: Ta=25 °C \*2: Ta=15 °C \*3: Ta= -20 °C

\*4: Image sensor module C15853-01 integrating the InGaAs linear image sensor G14714-512DE (512 pixels, pixel size: 25 × 25 μm) and image sensor module C15853-03 integrating the InGaAs linear image sensor G14714-1024DG (1024 pixels, pixel size: 12.5 × 250 μm) are also available.

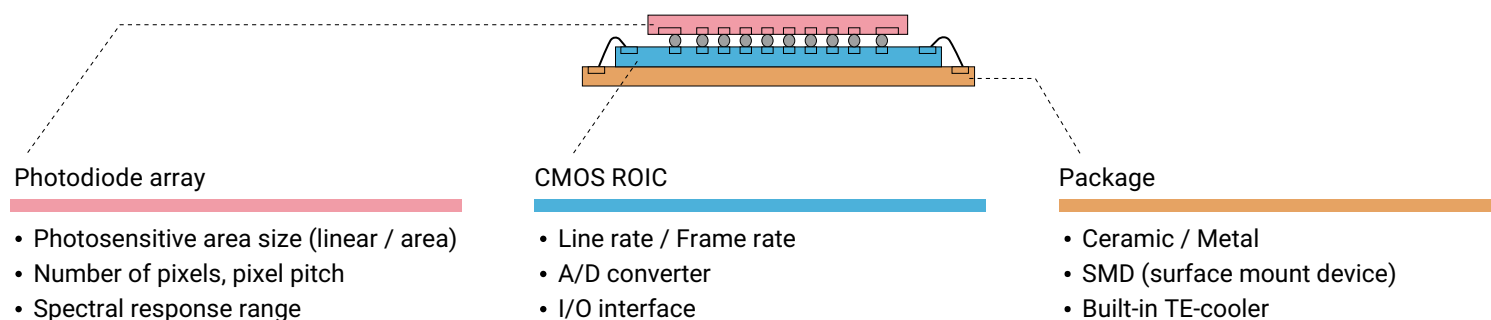
\*5: InGaAs linear image sensors G11475 to G11478 series and image sensor modules C16091-01 to -07 having various types of spectral response range from 900 nm to 2550 nm are prepared.  
For details, please refer to the datasheet.



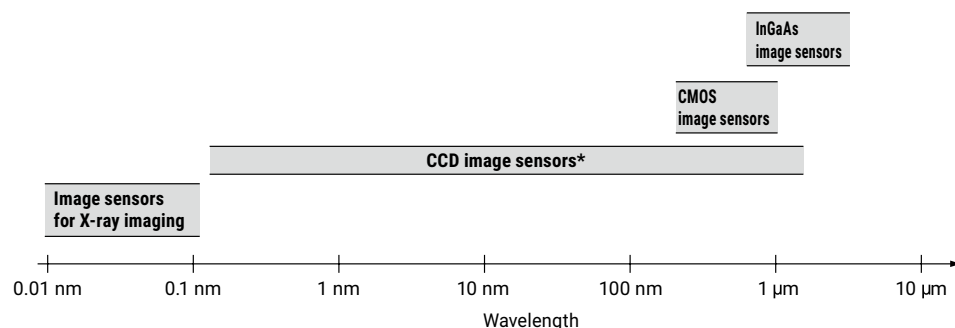
# Image Sensor Customization

Hamamatsu offers the sensor chip customization in addition to hundreds of standard image sensor products. Sensors and wafers are built from the ground up in our foundry in Hamamatsu, Japan. We have full control over the sensor design, wafer fabrication process, chip assembly, and packaging. Hamamatsu can provide the customization in many aspects including the photosensitive area pixel format, spectral response, readout ASIC, and packaging.

## Customizable specifications (InGaAs image sensors)



## Detectable spectral response range

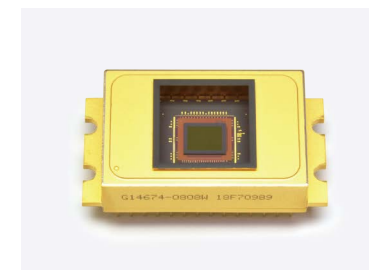


\* Including windowless type

## Package types



Ceramic

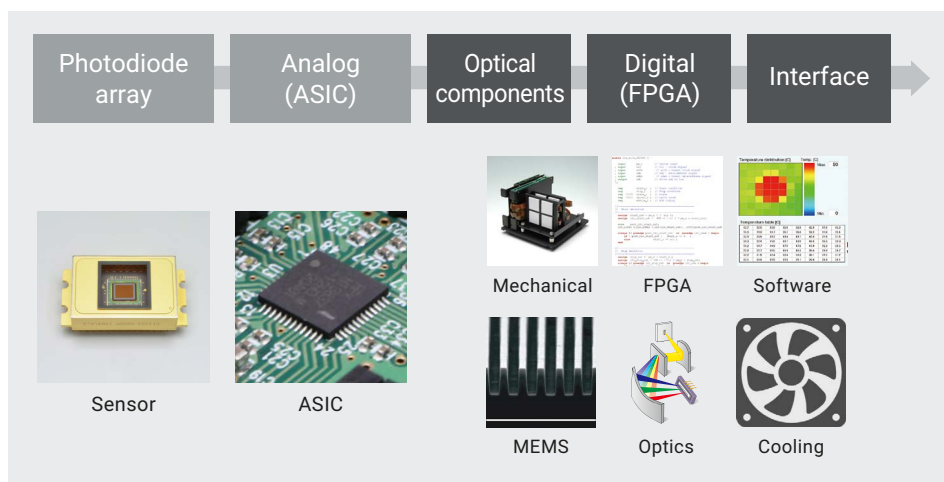


Metal, TE-cooled

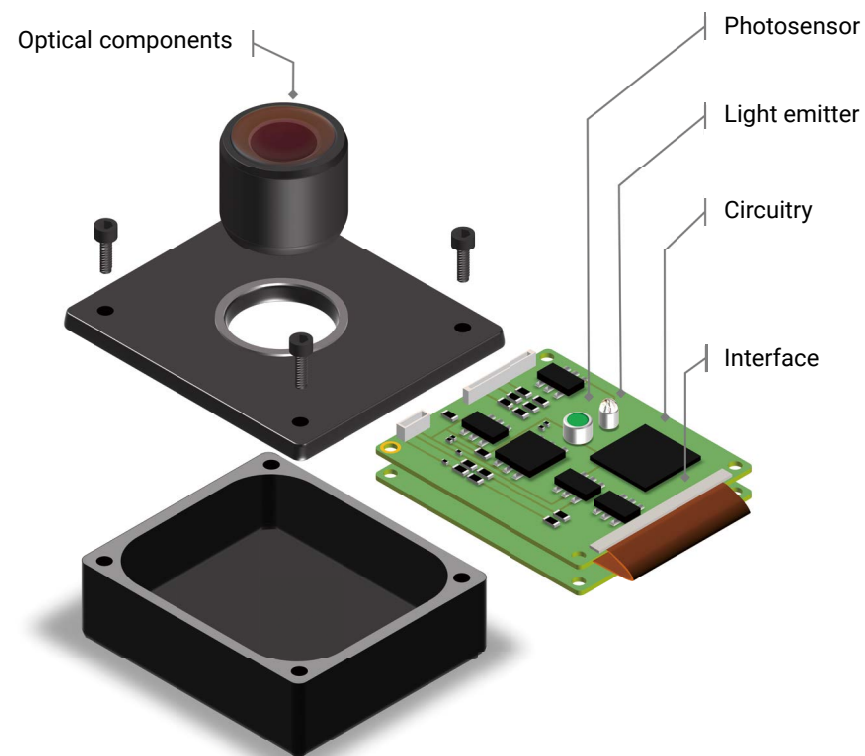
# Image Sensor Module / Camera Customization

Hamamatsu not only offers the sensor components but also offers the module solutions featuring our image sensor and other opto-semiconductor products. Customized modules can be designed, simulated, and assembled to customers' specifications by utilizing Hamamatsu's expertise in ASIC design, as well as in opto-mechanics, digital and software design.

## Hamamatsu technologies for modularization

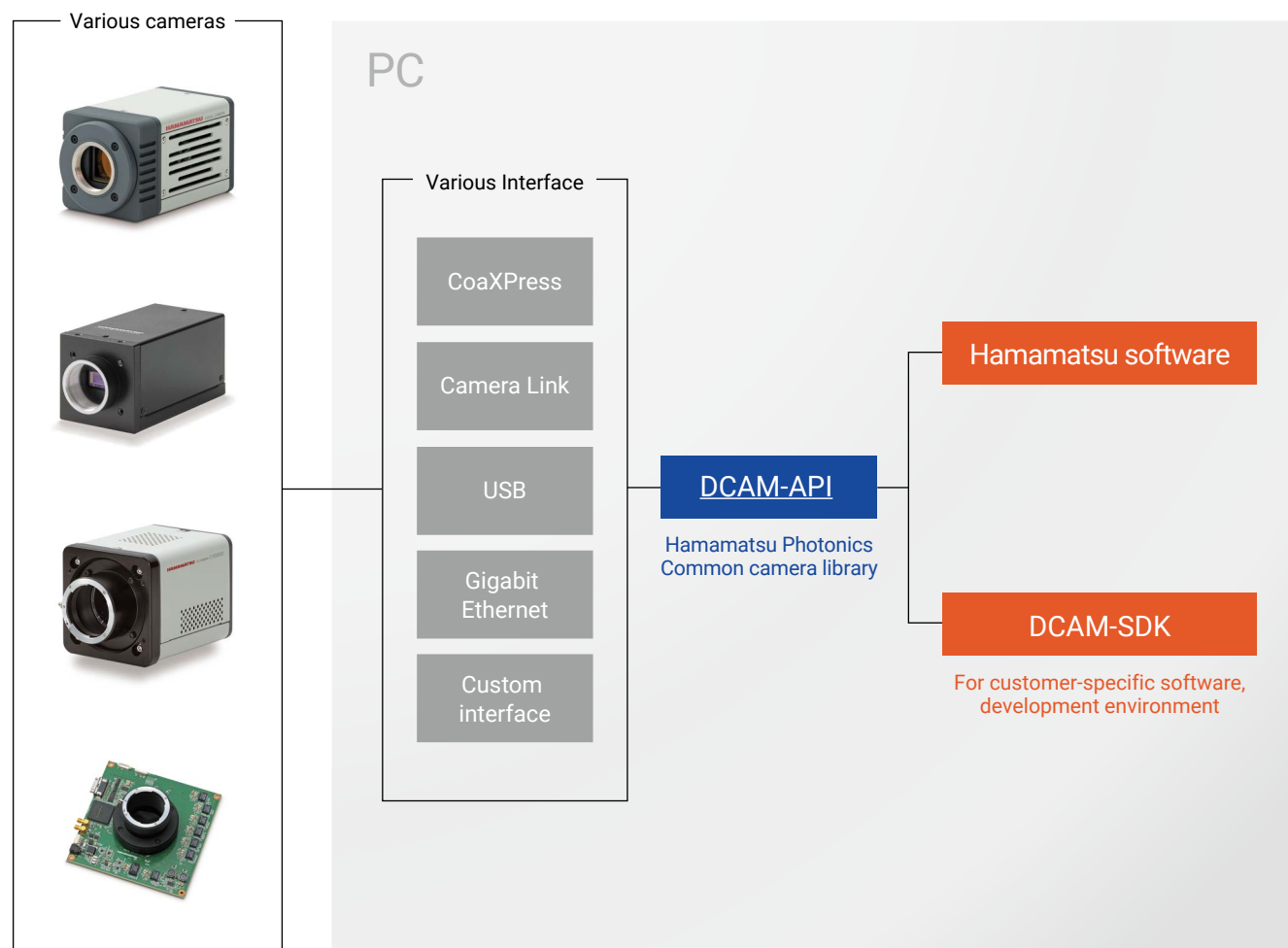


## Configuration example



## DCAM-API® / DCAM-SDK Support

We provide a common camera library “DCAM-API,” Hamamatsu Photonics software that can maximize the characteristics of your camera, and a tool “DCAM-SDK,” that allows you to build your own control software. Through DCAM-API, even if the camera or interface is changed, the software modification / change can be minimized.





## Main Products

### Opto-semiconductors

- Si photodiodes
- APD
- MPPC®
- Photo IC
- Image sensors
- PSD
- Infrared detectors
- LED
- Optical communication devices
- Automotive devices
- X-ray flat panel sensors
- MEMS devices
- Mini-spectrometers
- Opto-semiconductor modules

### Electron Tubes

- Photomultiplier tubes
- Photomultiplier tube modules
- Microchannel plates
- Image intensifiers
- Xenon lamps / Mercury-xenon lamps
- Deuterium lamps
- Light source applied products
- Microfocus X-ray sources
- X-ray imaging devices

### Imaging and Processing Systems

- Scientific cameras
- Spectroscopic and optical measurement systems
- Ultrafast photometry systems
- Life science systems
- Medical systems
- Non-destructive inspection products
- Semiconductor manufacturing support systems
- Material research systems

### Laser Products

- Single chip laser diodes
- Laser diode bar modules
- Quantum cascade lasers
- Applied products of semiconductor lasers
- Solid state lasers / Fiber lasers
- Laser related products

◦ DCAM-API (EU, Japan, U.K., U.S.A.) / MPPC (EU, Japan, Switzerland, U.S.A) are registered trademark of Hamamatsu Photonics K.K.

◦ Information in this catalog is believed to be reliable. However, no responsibility is assumed for possible inaccuracies or omission. Specifications are subject to change without notice. No patent rights are granted to any of the circuits described herein. © 2025 Hamamatsu Photonics K.K.

◦ Please thoroughly read the precautions and the prohibited uses included in the user manual before installation and use.

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