

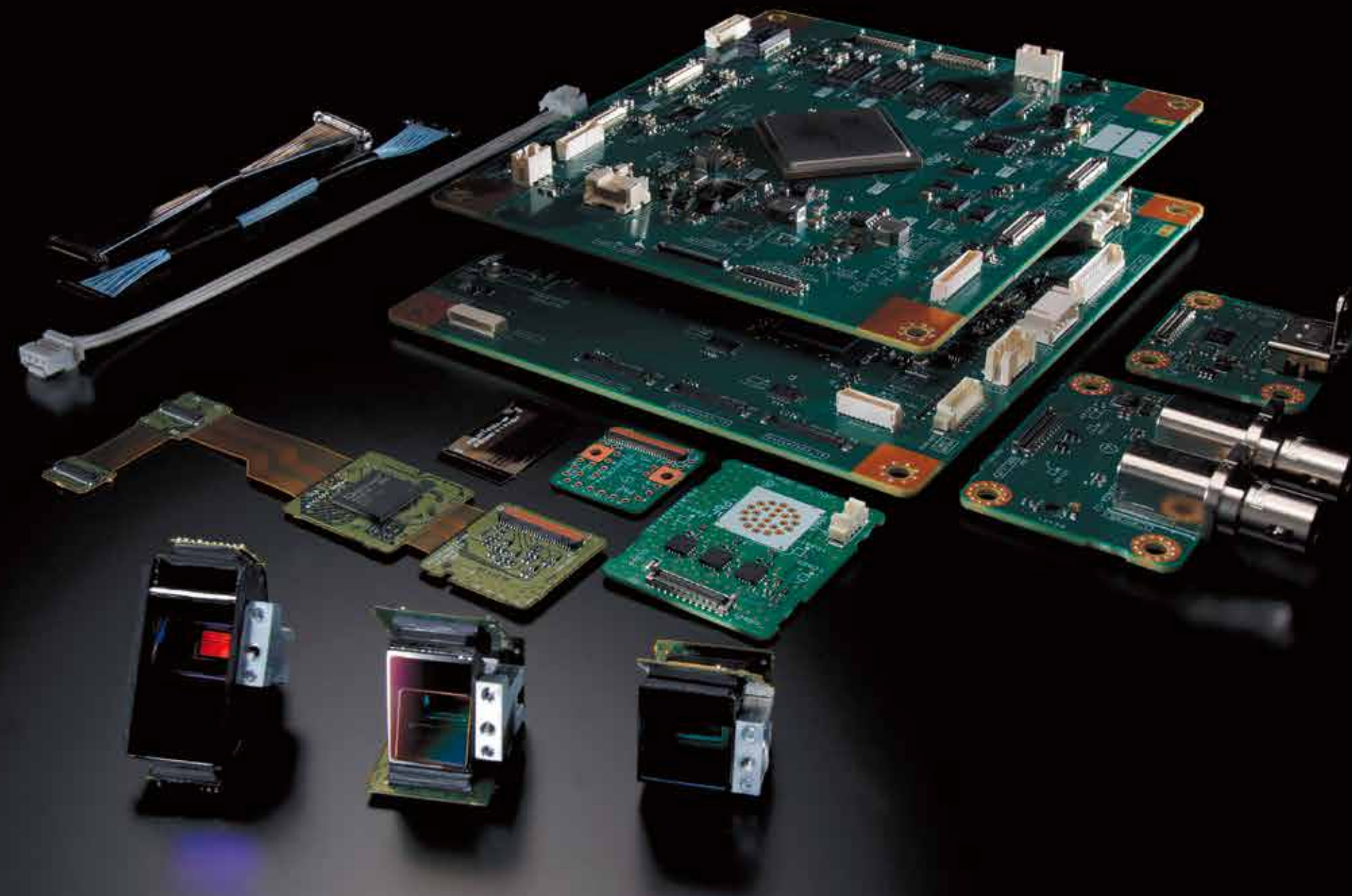


Important
– In case Final Product, which equips the Product(s), is used under insertion in the human body, i-PRO shall not be responsible for Safety.
– Quality and Safety shall be ensured by Buyer of the Product(s), and the Buyer shall be responsible for that usage.
– Masses and dimensions are approximate.
– Specifications are subject to change without notice.

Contact mvglobalsalesall@i-pro.com

2023-09-001-MV

Preriminary



Modular Design for Medical Vision Cameras



See what you have been missing.

Precision is our expertise – capturing real-life imaging, allowing you to see colors clearly and beyond.

It is becoming more difficult to develop reliable medical products quickly because of the diverse development requirements and the sophistication of mounting technology. In addition, the needs of medical practitioners and patients also must be met by supplying doctors and nurses with user-friendly devices that are less invasive for their patients.



Flexible imaging options that solve your diverse project needs.

Your partner for quick & unique solutions to your problems.

In order to accommodate and serve the demands of our customers,
we offer a diverse camera selection where you can choose from a wide variety of products
or individual modules to full system solutions.
Our camera lineup is based on sensors, special characteristics, bonding, optical length and a lot more.
We adapt to your needs.



Surgical Microscope Camera



Built-in Camera Module



Endoscope Camera



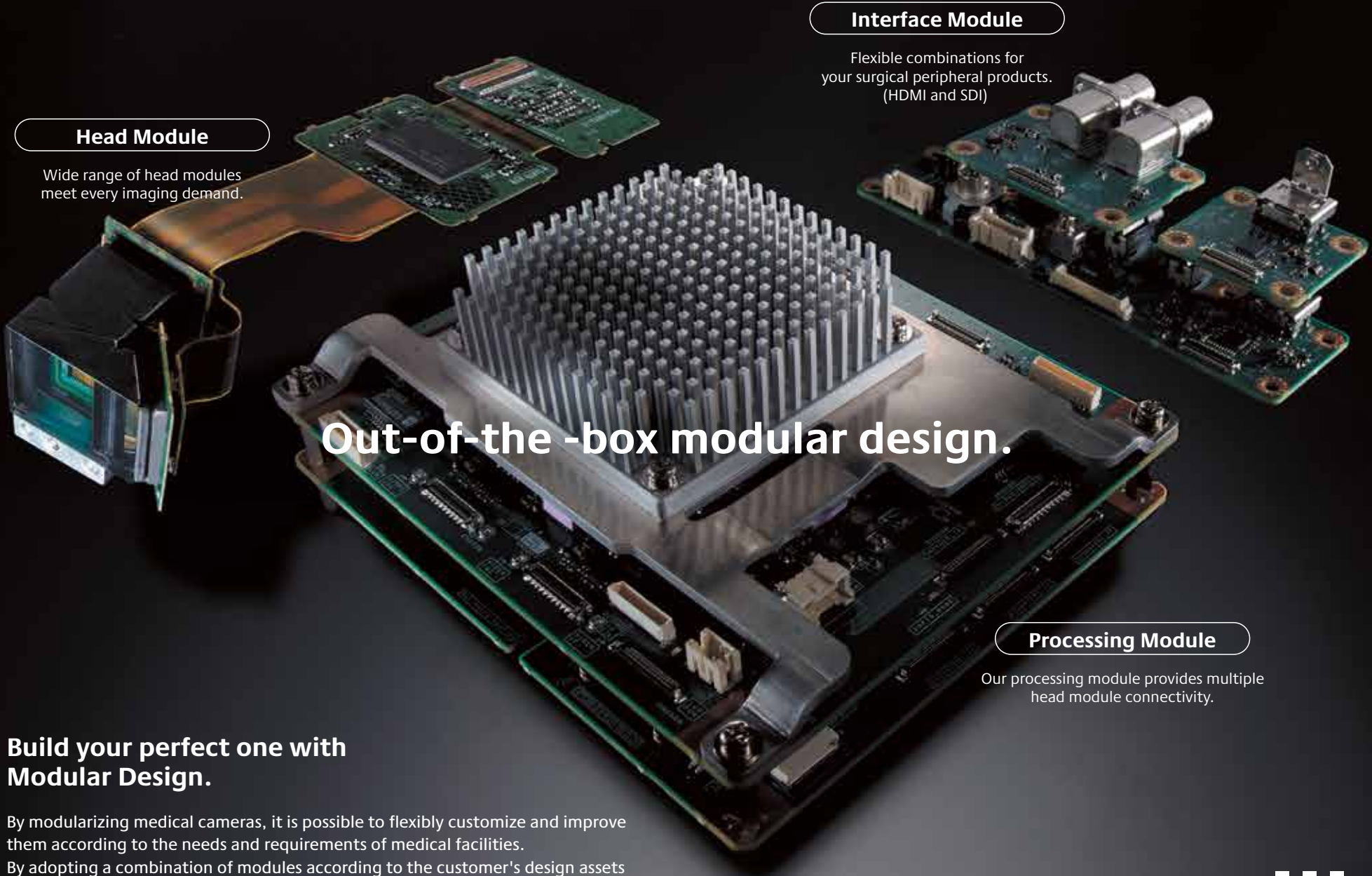
Slit Lamp Camera

For example, do you have a problem like this?

**Complex to develop
and time- and resource-consuming.**

The development of medical cameras presents various challenges, such as high-quality image processing, durability, hygiene, data management, medical regulations and security, adaptability to medical facilities, and cost efficiency. It's complicated.

Complex and costly develop.



**Build your perfect one with
Modular Design.**

By modularizing medical cameras, it is possible to flexibly customize and improve them according to the needs and requirements of medical facilities. By adopting a combination of modules according to the customer's design assets and development resources, we maximize the customer's investment and time value.



Flexible imaging options to solve your complex project needs.

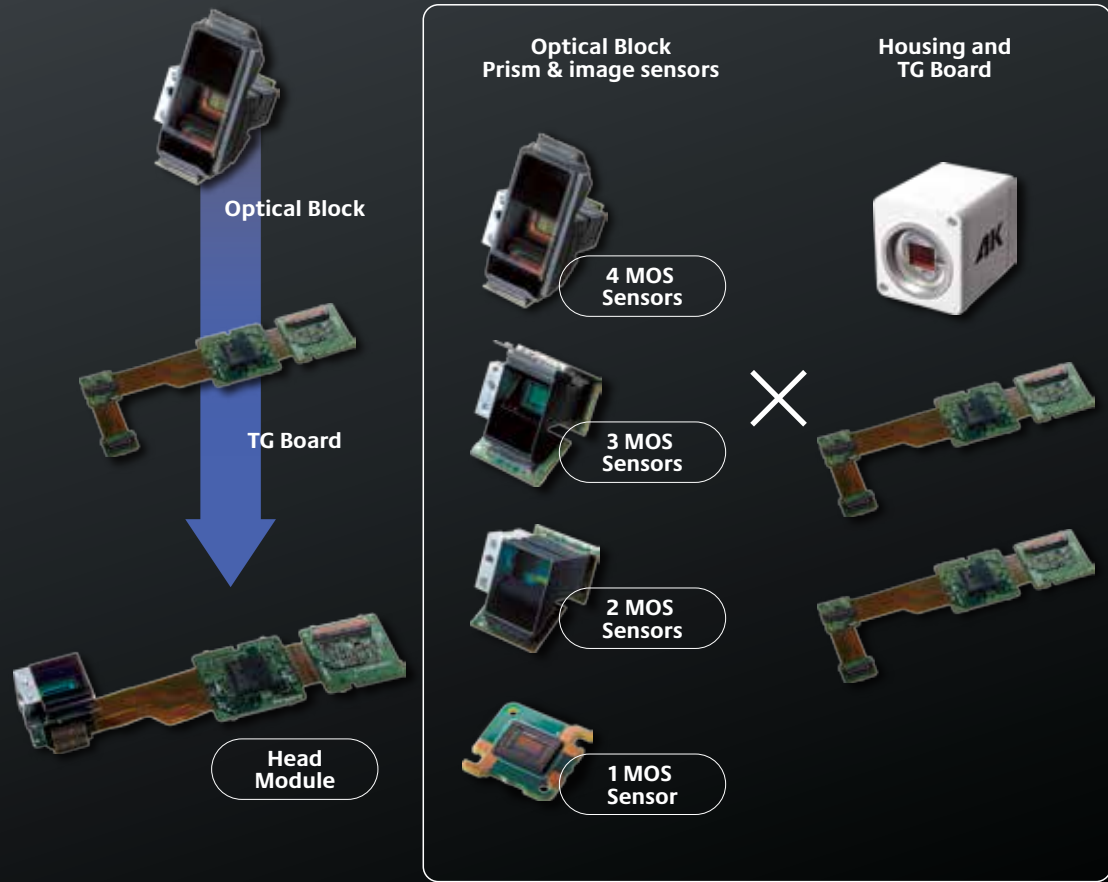
Select the perfect unit for your equipment from more than 3,000 possible combinations without a minimum order quantity.

→ You pick and choose your modules for your design to make it unique and a market differentiator.

Head Module

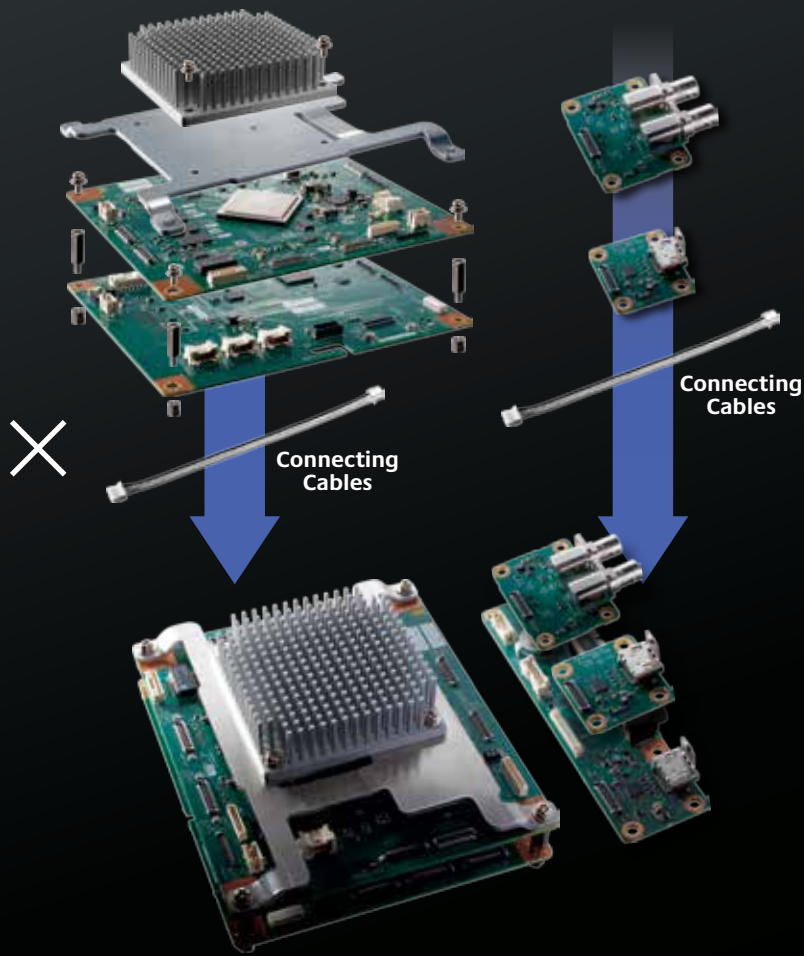
Head Module

Wide range of fead modules meet every imaging demand.



Processing Module

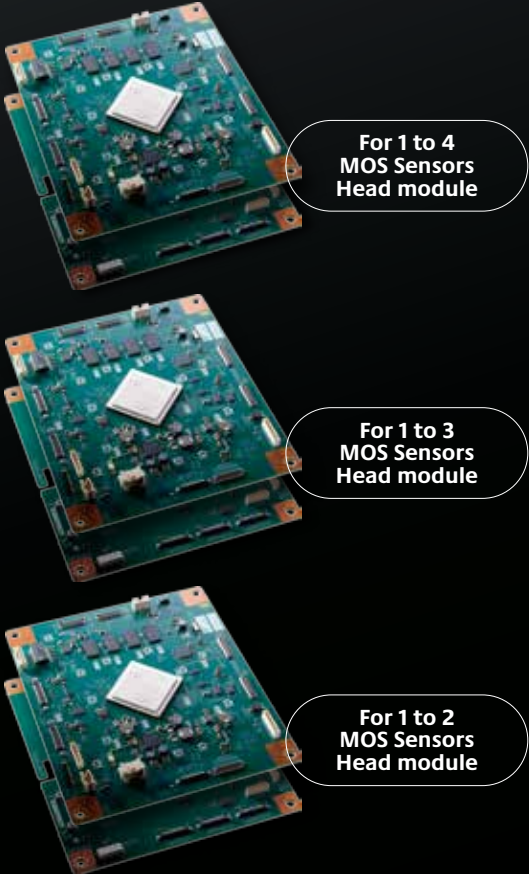
Interface Module



Camera Control Unit

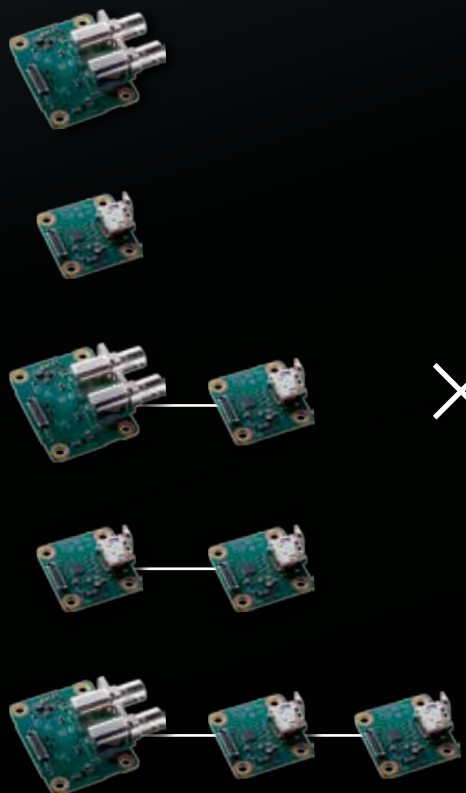
Processing Module

Our processing module provides multiple head module connectivity.



Interface Module

Flexible combinations for your surgical peripheral products. (HDMI and SDI)



Connection cables

Variety of connection cable length makes your design flexible.





Doctors demand even higher image quality.

For example, do you have a problem like this?

Clear, detailed images are critical to surgical precision.

In order to perform minimally invasive and safe surgeries, it is important to accurately capture details, textures, and subtle changes. By sharing clear, detailed images of the surgical field with doctors and staff, the accuracy of surgery is increased.



See what you have been missing.

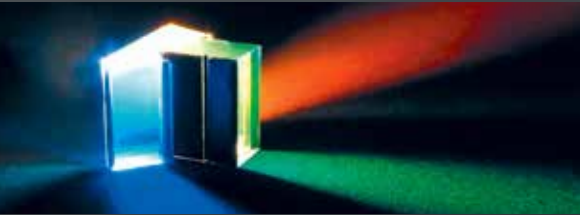


High-precision and realistic images. Find out what you couldn't see.

When using our cameras in the surgical field, images are clearly visible because our cameras can capture NIR images that allow you to see things that cannot normally be seen by the human eye. By providing a wide variety of camera module variations, we have made it possible to find things that are not clearly visible.



i-PRO CORE TECHNOLOGY is included in a variety of cameras.



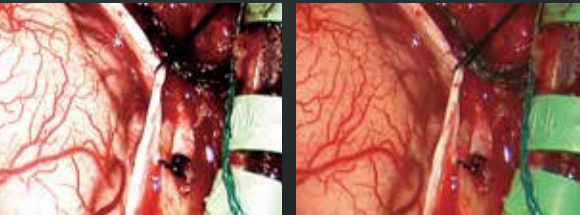
Prism Spectroscopy and High-Resolution Technology.

- Ultra-fine, multi-chip, pixel shift method.
- High-color reproduction, high resolution and high sensitivity.



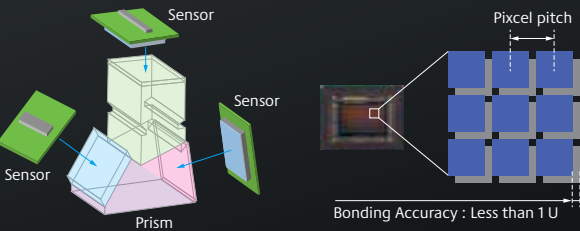
ICG Imaging and Wavelength Spectroscopy Technology.

- Patented 4MOS basic structure.
- Simultaneous shooting of visible light and NIR light.
- Support various outputs.



Wide Dynamic Range (WDR).

- Even in scenes where bright and dark subjects coexist, it suppresses crushed shadows in dark areas and clipped whites in bright areas, achieving a more natural and realistic rendering.



High-precision Bonding Technology.

- Submicron-ordered precision bonding technology maintains accuracy of 1 μm or less even after autoclave sterilization.



High Heat Resistance Reliability.

- Even after conducting a thermal shock test for 1,000 cycles, the adhesive position doesn't shifted, thus the resolution doesn't shift either.

Head Module

Options are available to meet all medical needs,from visible light to near infrared.

Choose a camera according to what you value (prism function, small size, light weight, sensitivity, and/or resolution).

Optical Block options

Fluorescence imaging series

Fluorescence Imaging Camera Series (2MOS-4MOS)



IR Imaging	Yes	Yes	Yes	Yes
Color Reproduction	Good	Good	Good	Excellent
Dynamic Range	Good	Good	Excellent	Great
Resolution	Good	Excellent	Good	Good
Sensitivity	Good	Fair	Good	Great

Visible light imaging series

Visible Light Camera Series (1MOS-3MOS)



IR Imaging	—	—	—
Color Reproduction	Good	Good	Excellent
Dynamic Range	Good	Excellent	Great
Resolution	Good	Good	Good
Sensitivity	Good	Good	Great

■ TG board options.

The circuit board is dedicated to each number of image sensors; therefore, use the circuit board specified for the optical block used.



■ Housing options.

Housing is offered.



■ 4K camera.

All the cameras introduced here are 4K image quality.



For example, do you have a problem like this?

Different medical departments require different camera specifications, but different systems can be costly.

The operating room is small, and the equipment not used during the surgery is often put out in the corridor. As the number of systems with different operations increases, the burden on the medical engineers also increases.

Various required specifications for each procedure.

Solution!



One platform for all.

**Compatible with various camera heads.
Multi-head function.**

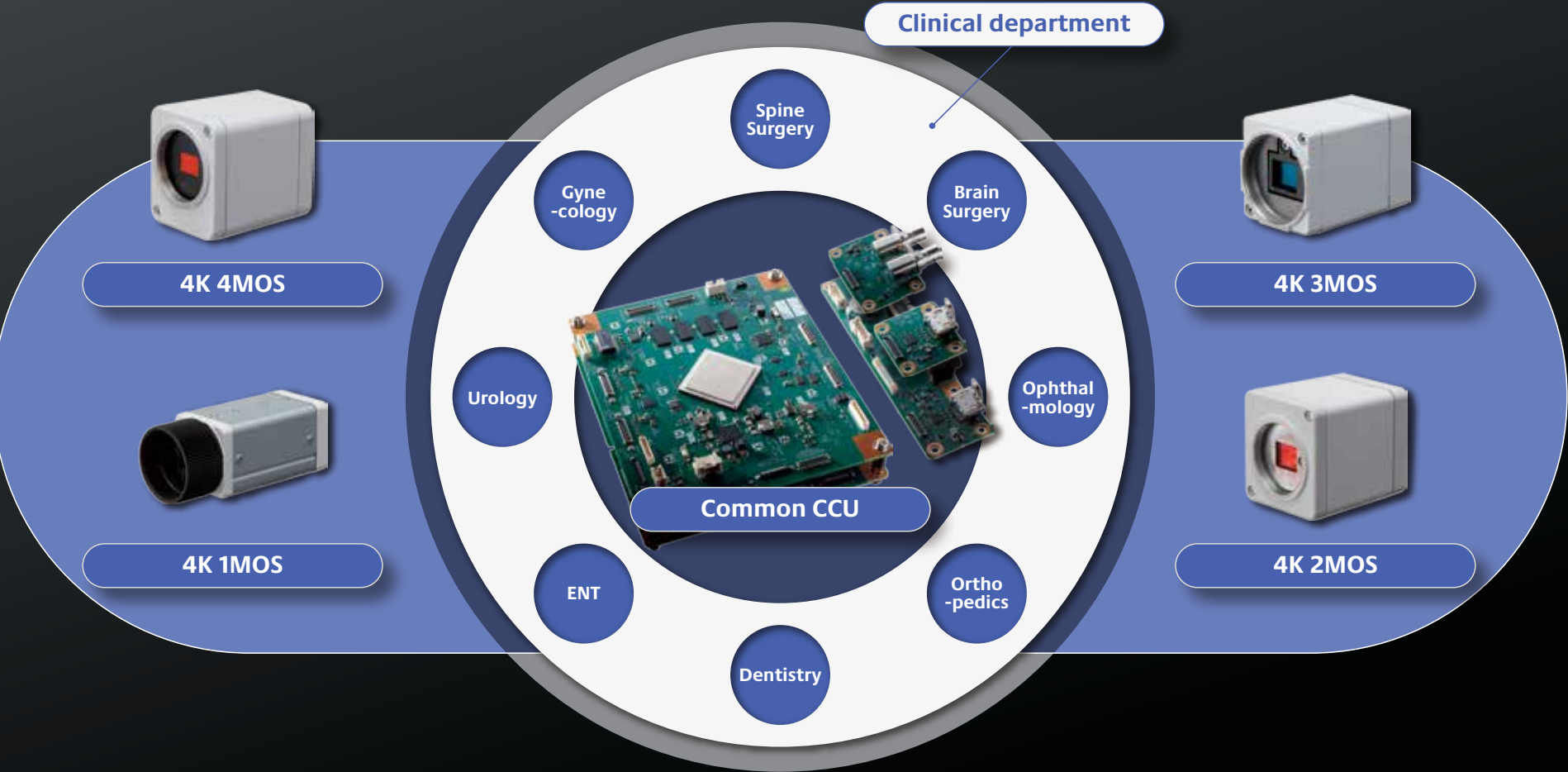
One camera control unit can flexibly switch between different camera heads. This enables flexible console design to meet the multiple uses required by each clinical department. It also reduces development time and simplifies product inventory management.



CCU with Multi-Head function.

With a multi-head compatible system, simply change the camera head in the operating room according to the application.

A single CCU completes up to 4 roles.
In response to the diverse needs of the medical field,
It contributes to improving the efficiency of medical practice and the quality of surgery.



Processing Module

Processing Module - Head Module combinations

The package provides the minimum configuration module required for the basic configuration as the assembly options.
The basic configuration has 3 patterns depending on the connected camera heads.

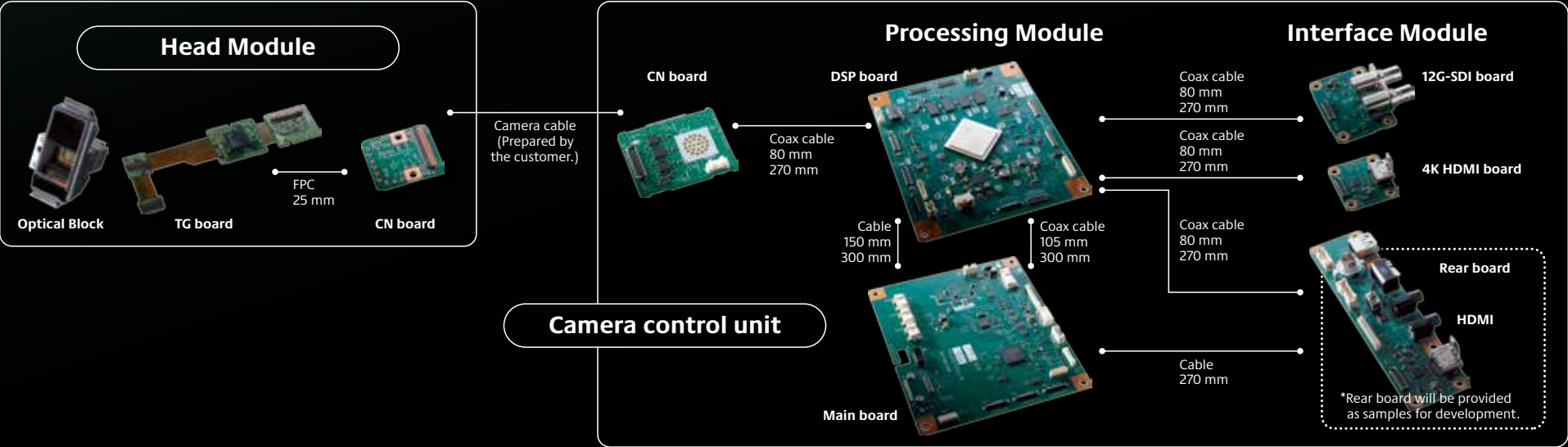


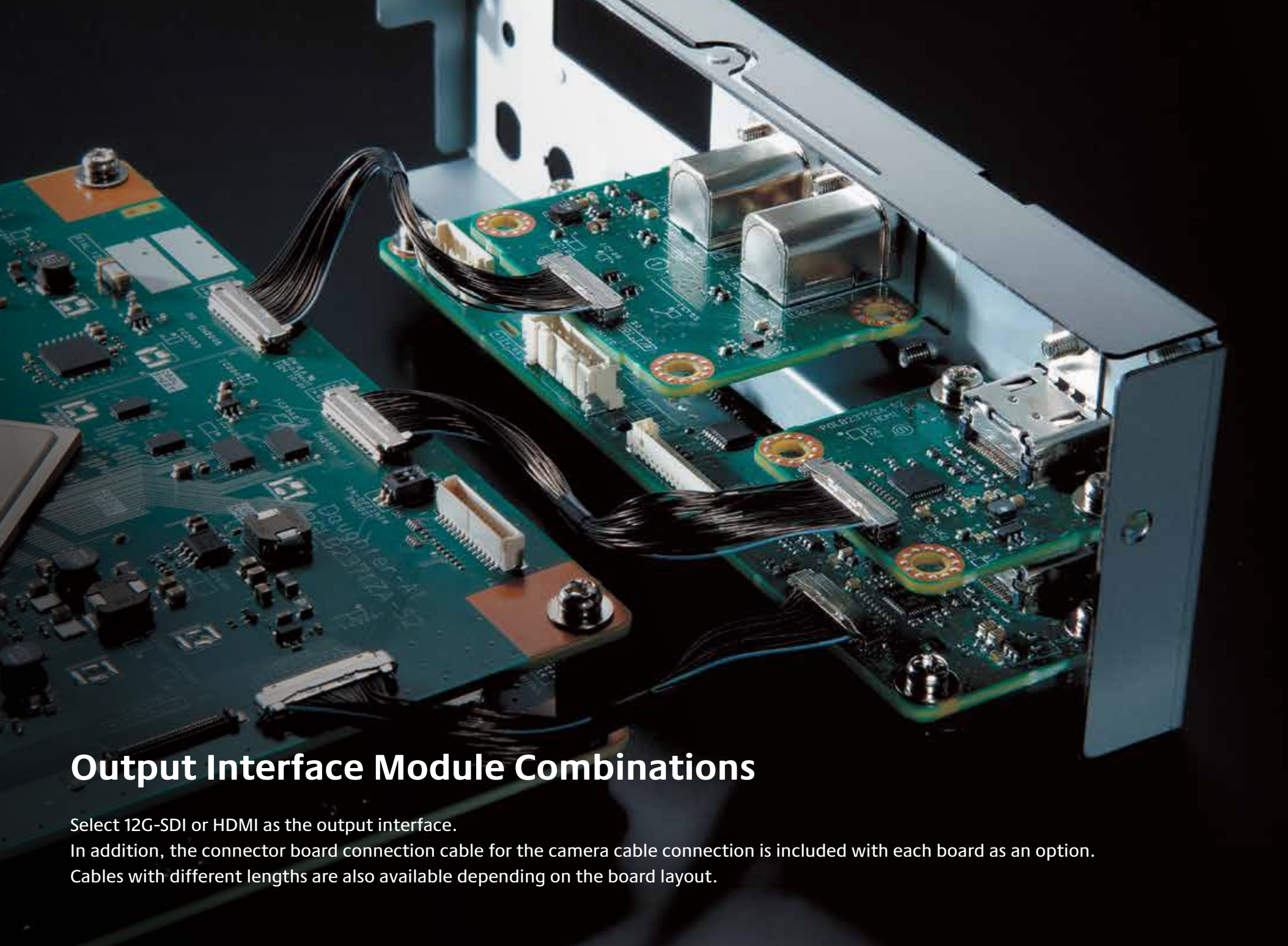
Head module	Processing module For 1-2 MOS Head module.	Processing module For 1-3 MOS Head module.	Processing module For 1-4 MOS Head module.	Evaluation Board
4K1MOS	✓	✓	✓	—
4K2MOS IR	✓	✓	✓	—
4K3MOS	—	✓	✓	—
4K3MOS IR	—	—	✓	—
4K3MOS High Res.-IR	—	—	—	✓
4K3MOS WDR-IR	—	—	—	✓
4K2MOS WDR	—	—	—	✓

Connecting Cables

Flexible Connecting cable options to meet your design

We provide flexibility for your cable design and connections to meet your project requirement.
Saving you time and money.





Output Interface Module Combinations

Select 12G-SDI or HDMI as the output interface.
In addition, the connector board connection cable for the camera cable connection is included with each board as an option.
Cables with different lengths are also available depending on the board layout.

Interface Module

■ Connect to Processing Module

Select output interface according to your system.


Terminal connector 1

Terminal connector 2

Terminal connector 3


■ 12G-SDI output module

provides 2 ports of 12G-SDI.



■ 4K HDMI output module


provides 1 port of HDMI2.0.



■ Rear Board

provides DIP switch, remote interface, foot switch and HDMI2.0 port.

*Rear Board will be provided as samples for development.



Combinations	Terminal connector 1	Terminal connector 2	Terminal connector 3
1	12G-SDI x 2	—	—
2	—	4K HDMI	—
3	12G-SDI x 2	4K HDMI	—
4	—	4K HDMI	4K HDMI
5	12G-SDI x 2	4K HDMI	4K HDMI

HOW TO CHOOSE

Camera Head

This section explains the basic procedure for selecting a camera head.

1. Select the function you want to implement.
(Prism Function)

IR WDR High Resolution

See page 12. Please wait for the final version of the catalog for details.

2. Select the number of sensors.
1 MOS - 4MOS



We do not supply 1MOS sensor boards alone.

See page 12. Please wait for the final version of the catalog for details.

3. Choose the range of components you need.

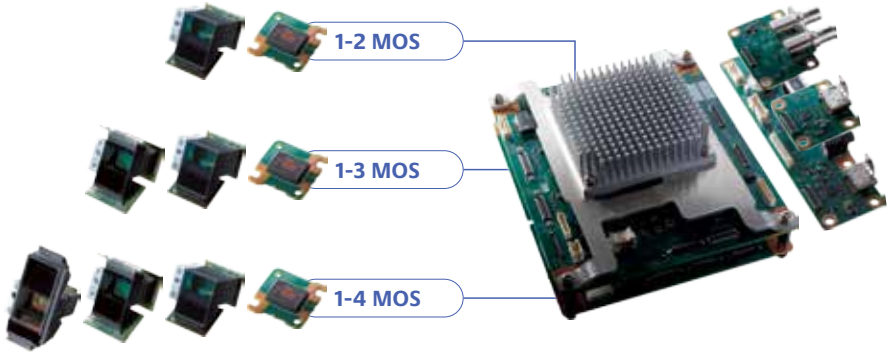
Optical Block only	with TG & FPC	with TG, FPC & CN board	With Housing	BCF

Please wait for the final version of the catalog for details.

Camera Control Unit

This section explains the basic procedure for selecting a CCU.

1. Decide which camera head to connect.



See page 16. Please wait for the final version of the catalog for details.

2. Choose the range of components you need.

Main+DSP+Heat Sink+ Cable (M-D)	Main+DSP+Heat Sink+ Cable (M-D) +CN board + Coax (DN-D)
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See page 16. Please wait for the final version of the catalog for details.

3. Select the output boards.

12G-SDI, 4K HDMI
5 combinations

Necessary cables are included in the product.
If the cable length doesn't fit your board layout,
choose another cable length.

See page 18. Please wait for the final version of the catalog for details.

Product Line-up

Fluorescence imaging series	Sensor	Function	Optical Block	1/3 sensor Prism Assembly Options		
	4MOS	RGB-IR	GP-H443FA *1	with TG	with TG & CN	Box type
				GP-UH832H / HU1 / HU2		GP-UH832HX / HX1 / HX2
	3MOS	Visible-WDR-IR	GP-H343YA* *2	GP-H343YB *2	GP-H343YC *2	GP-H343YX
	3MOS	Visible-High Res.-IR	GP-H343JA* *2	GP-H343JB *2	GP-H343JC *2	GP-H343JX
	2MOS	Visibler-IR	GP-H243RA	GP-H243RB	GP-H243RC	GP-H243RX *1

Visible light imaging series	Sensor	Function	Optical Block	1/3 sensor Prism Assembly Options		
	3MOS	Visible	GP-H343FA *1	with TG	with TG & CN	Box type
				GP-UH532HUA		GP-UH532HA / HACH
	2MOS	Visible-WDR	GP-H243WA* *2	GP-H243WB *2	GP-H243WC* *2	GP-H243WX *2
	1MOS	Visible		GP-KH432HU		GP-KH432HX / HXA / HXW

* 1: The timing of shipment is to be discussed. * 2: For more information, please contact our sales representatives.
* 3: GP-KH432 Box type camera head cannot be directly connected to the modular design CCU (GP-CS□□□□). It is necessary to change the CN board on the head side to the dedicated CN board (GP-MHC41□□0-0.)

Head Module Lineup

Camera Head Module Lineup		Band Cut Filter		TG board		FPC (TG-CN board)		CN board	CN board (STD) for GP-KH432H (Hirose) CN board (STD) for GP-KH432H (Lemo) CN board for GP-UH532H (Lemo) CN board for GP-UH832H (Lemo)
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CCU Module Lineup

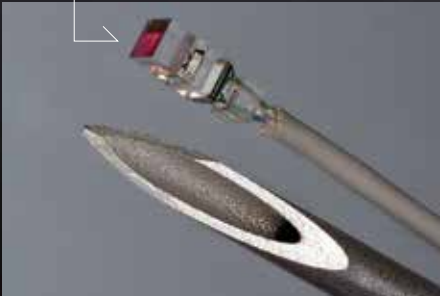
Input Interface		CN board (Lemo)
Main + DSP		DSP board
		Main board
Output interface		12G-SDI
		4K HDMI
Cable		Coaxial Main-DSP (105 mm), (270 mm)
		Coaxial Main-DSP (80 mm), (270 mm)
		Cable Main-DSP (150 mm), (300 mm)
		Cable Main-Rear (270 mm)



World's smallest class

Ultra Small Camera

World's smallest advanced camera module! With an amazing 0.5 mm size, the super-resolution function achieves high-image quality equivalent to 518,400 pixels.(720p) Built-in isolation circuit that considers medical standards, this highly reliable camera is produced in Japan with cutting-edge technology for every application.

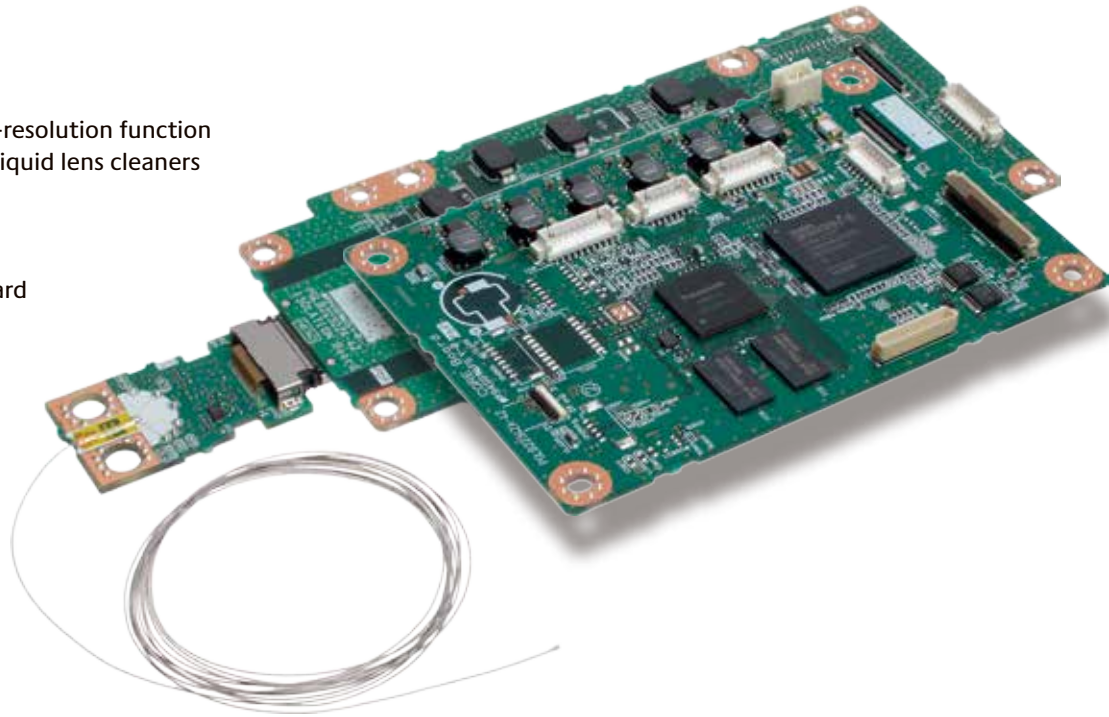
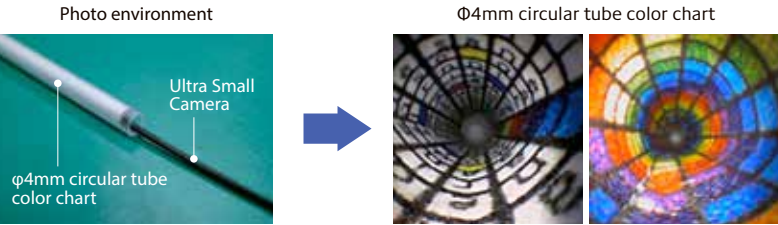


Size comparison with needle 22G (0.72 mm)

Main features

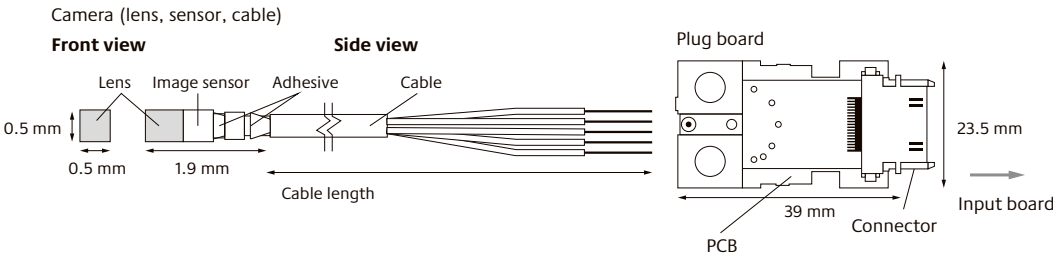
- World's smallest size advanced camera module (0.5 mm × L 1.9 mm)
- Achieves high-image quality equivalent to 518,400 pixels with the super-resolution function
- Resistant to fogging and dirt, with a lens surface that absorbs well with liquid lens cleaners
- 60 fps sensor drive for smooth motion
- Equipped with an electronic shutter that responds quickly to the brightness and darkness of the subject
- A built-in isolation circuit considering medical standards in the input board
- Reliable domestic production in Japan

See what you can't see with the naked eye



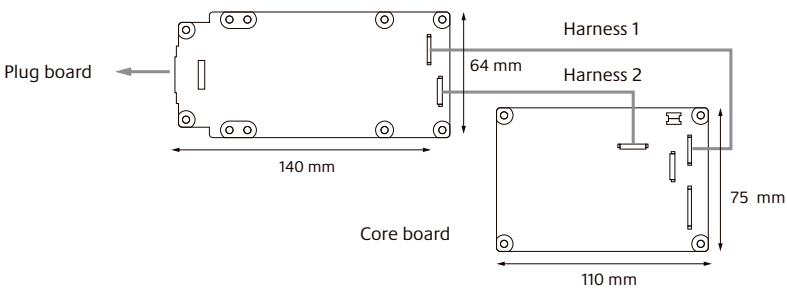
Camera module

Product Number	Specification										
	Cable	Lens		Image sensor							
	Length	Angle of view	Depth of field	Size	Number of pixels	Frame rate	Electronic shutter				
GP-KH510H1R1	1 m	117 °	1.5 mm - ∞	1/37 type CMOS sensor 0.5 x 0.5 mm	200 x 200	60 fps	AUTO / MANUAL				
GP-KH510H1R2	2 m										
GP-KH510H1R3	3 m										
GP-KH510H1R4	4 m										
GP-KH510H2R1	1 m	95 °	1.6 mm - ∞								
GP-KH510H2R2	2 m										
GP-KH510H2R3	3 m										
GP-KH510H2R4	4 m										



Signal processing board

Product Number	Specification			
	Power supply	Video output	Communication	Frame rate
GP-KH510CB	12V DC	Digital parallel YC 10 bit	Serial	30 fps



COMPANY INFORMATION

Company Name

Established

Representatives

Lines of Business

Number of Employees

Location Addresses

i-PRO Co., Ltd.

2019

Masato Nakao
Shohei Ozaki

Development, manufacture and sales of devices and modules for the security, medicine and industrial fields. Providing solutions including system integration, construction, maintenance and related services.

Approx. 1400 (including group companies)

2-15-1 Konan, Minato-ku, Tokyo, Japan
7-9-66 Hakozaki, Higashi-ku, Fukuoka City, Fukuoka, Japan

Group Companies

Americas

Houston

Anaheim

Canada

EMEA

Amsterdam

Asia Pacific

Singapore

Brisbane

China

: i-PRO Americas Inc.

: 8550 Fallbrook Road, Suite 200, Houston, TX 77064, USA

: 2390 E. Orangewood Ave., Suite 490, Anaheim, CA 92806, USA

: 5750 Explorer Drive, Suite 101, Mississauga, Ontario, Canada

: i-PRO EMEA B.V.

: Laarderhoogtweg 25, 1101 EB Amsterdam, Netherlands

: i-PRO APAC Pte. Ltd.

: 114 Lavender #01-36,51,52, CT Hub 2, Singapore 338729

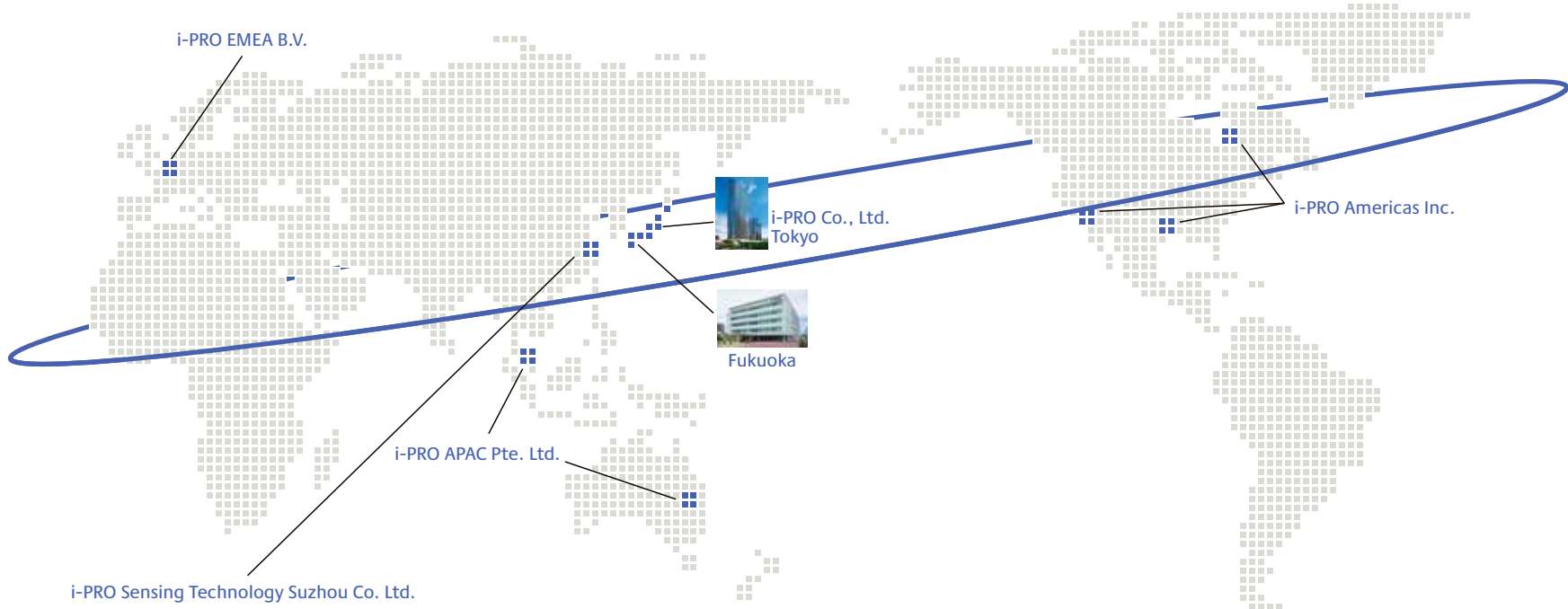
: 10/10 Depot Street, Banyo QLD, Australia 4014

: i-PRO Sensing Technology (Suzhou) Co., Ltd.

: 1478 Binhe Road, Huqiu district, Suzhou, Jiangsu province

i-PRO Co., Ltd.

i-pro.com



We strive to capture moments of underlying truth to better support the decisions of those professionals who protect and save lives, providing a safer and more peaceful world.

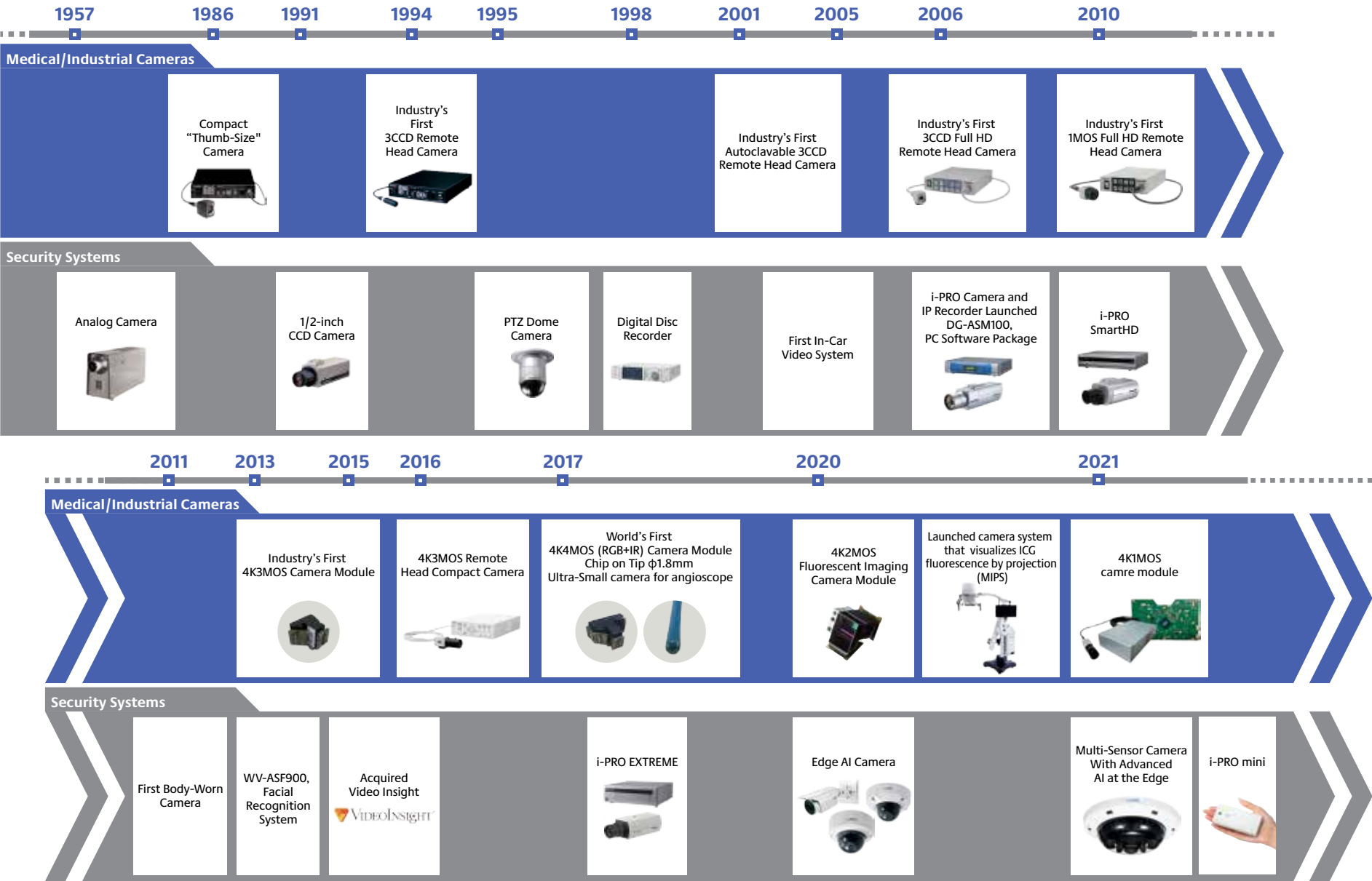
We have taken on this challenge to develop technological solutions that extend human senses with innovations that inform and protect, even in the most challenging environments.

We envision a future where it's possible to prevent unfortunate events. A future striking unmet medical conditions to improve the lives of millions of people.

We will be a trusted partner, focusing on the needs of our partners and customers to help create a safer and more peaceful world.

PRODUCT & TECHNOLOGY MILESTONES

i-PRO Co., Ltd., is a global leader of advanced sensing technologies in the fields of Intelligent Surveillance, Public Safety and Industrial/Medical Imaging. Established in 2019, i-PRO was built on a legacy of over 60 years of innovation with Panasonic. The company's products, software and services extend human senses to capture moments of truth with innovations that inform and protect. In order to help create a safer world, i-PRO supports the work of professionals who protect and save lives.



Bringing together all our know-how to embody the needs of our customers.

i-PRO medical cameras are developed and manufactured in Japan.



We conduct various reliability tests in-house to meet the strict requirements for medical devices and ensure that our customers, who are medical device manufacturers, can use our products safely and stably.



At the i-PRO Factory, we manufacture ultra-precise, high-accuracy products in order to guarantee the high quality demanded for medical use.



In a dust-free clean room, we perform adhesion, assembly, and prototyping evaluation of optical modules for small-diameter cameras and prism modules.



Our camera products are manufactured responsibly at our own factory in Japan. At our factory, we have acquired the following certifications, consider the environment and information security, and manufacture and supply high-quality products safely and stably.

ISO9001:2015 / ISO14001:2015 / ISO/IEC27001:2013 / UL

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Precautions for use of this products in the Products.

Please observe the following when using the Product(s). We shall not be liable for any damages incurred by you or a third party as a result of the use of the Product(s) if you or a third party uses the Product(s) in violation of any of the following items.

- Please follow the correct usage of the Product(s).
- Please do not disassemble or modify the Product(s).
- Do not use the Product(s) in any application where it may cause injury to life or body, or serious property damage.
- Do not use the Product(s) for operation control in aerospace, mass transportation systems, nuclear facilities, or military applications.
- When the customer releases Product(s) with HDMI interface, the licensing of HDMI must be obtained by the customer as a customer’s finished product.

Disclaimer of warranty

IN NO EVENT SHALL i-PRO BE LIABLE TO ANY PARTY OR ANY PERSON, EXCEPT FOR REPLACEMENT OR REASONABLE MAINTENANCE OF THE PRODUCT(S), FOR THE CASES, INCLUDING BUT NOT LIMITED TO BELOW:

- Any Defects found after the point of incoming inspection by the customer are responsible of the customer. i-PRO shall not accept the Product(s) return for those defectives.
- In under circumstance that the customer or End User of Finished Product is damaged with the Product(s) in use whether by correct use or not, i-PRO shall not be responsible for the damage. Quality responsibility of Finished Product belongs to the customer.
- The Product(s) is installed to Final Product by the customer. Responsibility for Safety of Final Product, which equips the Product(s), shall belong to the customer.
- In case Final Product, which equips the Product(s), is used under insertion in the human body, i-PRO shall not be responsible for Safety. Quality and Safety shall be ensured by Buyer of the Product(s), and the Buyer shall be responsible for that usage.
- MOS image sensor used in the Product(s) may cause some loss of pixels in it due to usage or storage environment. That shall be exemption from liability for i-PRO , and responsibility for implementation of blemish compensating functionality in Finished Product, which equips the Product(s), shall belong to the customer.
- Inconvenience or any loss arising when images are not displayed, due to any reason or cause including any failure or problem of the Product(s).
- In no event shall i-PRO be liable to the customer or End User of Finished Product for any lost profits or for special, indirect, punitive, incidental, exemplary or consequential damages.