CMOS Camera Module

You can find CMOS camera module that you need !

USB, Digital Camera Series

■ Compact, High image quality, High performance and Low power consumption

■ Support small lots production from a few hundreds per month

■ Quick technical support by our experienced engineers

■ Reliable Quality Assurance System

Intelligent Camera Module

■ Integrate camera and processor, image processing function realized in the camera module

■ Only image processing result data can be output (captured image is transferrable through USB/LAN)

■ Supply of product with specified image processing software installed

■ Customer's software can be installed by development kit

Custom Camera
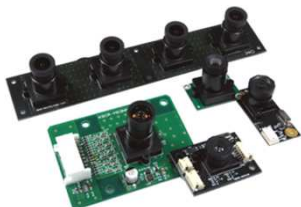
■ Support full custom/semi custom development

■ Support consistent development together with image processing system

■ Abundant development result mainly for industrial application

Trust and Result by in-house production

■ Integrated production by our own factory in Japan
■ Clean room dedicated for camera
■ Maintain high reliability and stable supply over middle to long term

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Ver.4.40

USB Camera

KBCR-S01TU

2M pixels **Fall of 2019**

PCB Dimension 40 mm × 30 mm

Image Sensor	1/2.7-inch Color Sensor (Rolling shutter)
Total number of [pixels]	1920×1080 / 1280× 720
Image area [mm]	5.76×3.24
Output signal format	USB3.1-Gen1（YUV）
External connection	USB3 MicroB connector
Function	Auto Exposure Control, Auto Gain Control, Auto White Balance, Various image adjustment functions(software control)
Power supply voltage[V] / Power consumption[W]	5.0 / T.B.D

＊Specification may be changed, because of under development.

KBCR-S02MU

1.3M pixels

PCB Dimension 45 mm × 32 mm

Image Sensor	1/3-inch Color Sensor (Rolling shutter)
Total number of [pixels]	1280×1024
Image area [mm]	4.80 ×3.84
Output signal format	USB2.0（YUV/MJPEG）
External connection	USB mini B connector
Function	Auto Exposure Control, Auto Gain Control, Auto White Balance, Various image adjustment functions(software control)
Power supply voltage[V] / Power consumption[W]	5.0 / 1.00(MAX)
Operation temp.[℃] /Storage temp. [℃]	−10 ～ +60 / −20 ～ +80 （excluding lens）

KBCR-S03MU

1.2M pixels

PCB Dimension 15 mm × 40 mm

Image Sensor	1/4-inch Color Sensor (Rolling shutter)
Total number of [pixels]	1280×960 / 640×480
Imaging area [mm]	3.84 ×2.88
Output signal format	USB2.0（YUV/MJPEG）
External connection	5pin connector
Function	Auto Exposure Control, Auto Gain Control, Auto White Balance, Various image adjustment functions(software control)
Power supply voltage[V] / Power consumption[W]	5.0 / 1.00(MAX)
Operation temp.[℃] /Storage temp. [℃]	−10 ～ +60 / −20 ～ +70 (excluding lens)

KBCR-S07VU

0.3M pixels

PCB Dimension 15 mm × 40 mm

Image Sensor	1/4-inch Color Sensor (Rolling shutter)
Total number of [pixels]	640×480
Imaging area [mm]	3.6 ×2.7
Output signal format	USB2.0（YUV/MJPEG）
External connection	5pin connector
Function	Auto Exposure Control, Auto Gain Control, Auto White Balance, Various image adjustment functions(software control)
Power supply voltage[V] / Power consumption[W]	5.0 / 0.5(MAX)
Operation temp.[℃] /Storage temp. [℃]	−20 ～ +60 / −20 ～ +70 （excluding lens）

KBCR-S51VUF

0.3M pixels

PCB Dimension 34 mm × 34 mm

Image Sensor	1/3-inch Monochrome Sensor (Global shutter)
Total number of [pixels]	640×480
Imaging area [mm]	3.84 ×2.88
Output signal format	USB2.0（YUV）
External connection	5pin connector
Function	Auto Exposure Control, Auto Gain Control, Various image adjustment functions(software control)
Power supply voltage[V] / Power consumption[W]	5.0 / 0.75(MAX)
Operation temp.[℃] /Storage temp. [℃]	−20 ～ +60 / −20 ～ +80 （excluding lens）

Industrial embedded camera
Digital/NTSC Output Camera

KBCR–S03TG

2M pixels

In development

PCB Dimension 40 mm × 30mm

Image Sensor	1/2.7–inch Color Sensor (Rolling shutter)
Total number of [pixels]	1920×1080 / 1280×960 / 1280×720
Imaging area [mm]	5.76×3.24
Output signal format	YUV4:2:2
External connection	60pin connector
Function	Auto Exposure Control, Auto Gain Control, Various image adjustment functions by I2C
Power supply voltage[V] / Power consumption[W]	5.0 / T.B.D

＊Specification may be changed, because of under development.

KBCR–S01TL

2M pixels　**Fall of 2019**

PCB Dimension 32 mm × 32 mm

Image Sensor	1/2.8–inch Color Sensor (Rolling shutter)
Total number of [pixels]	1920×1080 / 1280×720
Imaging area [mm]	5.6×3.1
Output signal format	RAW10bit（Low voltage LVDS serial 150mVp–p：DDR–4ch）
External connection	30pin connector
Function	Wide dynamic range
Power supply voltage[V] / Power consumption[W]	3.3、1.8 / 1.0(MAX)
Operation temp.[℃] /Storage temp. [℃]	−10 ～ +60 / −20 ～ +70（excluding lens）

KBCR–S07VG

0.3M pixels

PCB Dimension 24 mm × 27 mm

Image Sensor	1/4–inch Color Sensor (Rolling shutter)
Total number of [pixels]	640×480
Imaging area [mm]	3.6×2.7
Output signal format	YUV4:2:2（8bit）
External connection	24pin connector
Function	Auto Exposure Control, Auto Gain Control, Auto White Balance Various image adjustment functions by I2C
Power supply voltage[V] / Power consumption[W]	3.3 / 0.43(MAX)
Operation temp.[℃] /Storage temp. [℃]	−20 ～ +60 / −20 ～ +70（excluding lens）

KBCR–S51VG

0.3M pixels

PCB Dimension 32 mm × 24 mm

Image Sensor	1/3–inch Monochrome Sensor (Global shutter)
Total number of [pixels]	752×480
Imaging area [mm]	4.51×2.88
Output signal format	Monochrome RAW 10bit
External connection	24pin connector
Function	Auto Exposure Control, Auto Gain Control Various image adjustment functions by I2C
Power supply voltage[V] / Power consumption[W]	3.3 / 0.27(MAX)
Operation temp.[℃] /Storage temp. [℃]	−10 ～ +60 / −20 ～ +70（excluding lens）

KBCR–S02NT

0.3M pixels　**Fall of 2019**

PCB Dimension 32 mm × 32 mm

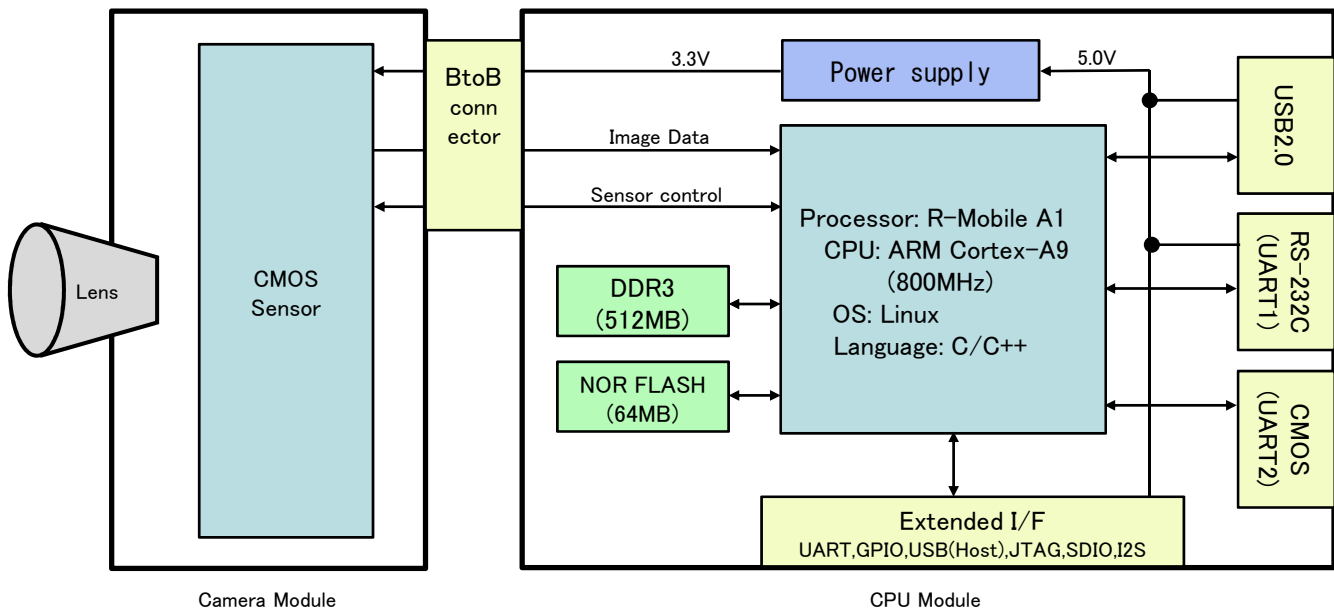| Image Sensor	1/4–inch Color sensor (Rolling shutter)
Total number of [pixels]	640×480
Imaging area [mm]	3.6×2.7
Output signal format	NTSC composite
External connection	7pin connector
Function	Auto Exposure Control, Auto Gain Control, Auto White Balance
Power supply voltage[V] / Power consumption[W]	5～12 / 0.5(MAX)
Operation temp.[℃] /Storage temp. [℃]	−10 ～ +60 / −20 ～ +70（excluding lens）

Intelligent Camera Module

Function Summary

- ■ Integrate a camera with a high-speed processor and configure various image processing functions in the module
- ■ Camera image transfer method is UVC1.0 (USB Video Class)
- ■ Output only the results information of image processing without outputting image data.
  (It reduces load of camera connected equipment)
- ■ Adopted a low-noise CMOS sensor and support exposure, gain and white balance adjustment.
- ■ Correspond for small lot, long-term and stable supply for industrial purposes.
- ■ Offer full technical support and semi-customized development.
  (Lens selectable, customized camera application development is possible)

Applications

- ■ Marketing tool for shopping mall, retail (i.e., analyzing customer / consumer.
  preferential treatment for regular customer etc.)
- ■ Monitor and security (Entering/leaving room control)   ■ Vending and Ticketing machine   ■ Digital signage
- ■ Inspection and recognition (Printing / Defect inspection, Character and 1D/2D barcode / QR code reading)

Block Diagram

Lens

CMOS Sensor

BtoB connector

3.3V

Power supply

5.0V

Image Data

Sensor control

Processor: R-Mobile A1
CPU: ARM Cortex-A9
(800MHz)
OS: Linux
Language: C/C++

DDR3 (512MB)

NOR FLASH (64MB)

USB2.0

RS-232C (UART1)

CMOS (UART2)

Extended I/F
UART,GPIO,USB(Host),JTAG,SDIO,I2S

Camera Module

CPU Module

Software Development Kit(SDK)

User can develop software with System Development Kit.

【SDK Contents】
1. Extention board x 1 *SD slot, USBHost
2. USB-Serial conversion adopter for development x 1
3. D-Sub9/8pin - Serial conversion cable   x 1
4. USB cable   x 2（A male miniB）
5. AC adaptor (5V/2.0A)   x 1
6. Jumper socket   x 3
7. DVD-ROM for development   x 1
8. Lens

KBCR-iC01MG	Lens x 2pcs（HPB1007, HPB1027）
KBCR-iC01VG	Lens x 2pcs（HPB1007, HPB1027）
KBCR-iC51VG	Lens x 1pce（HPB1014）

※ SDK and optional product is sold as a set with the camera module.

Optional Products

■ Network module

PoE Wired LAN board

Wired LAN board

Wireless LAN board
・IEEE802.11b/g/n
（max.72.2Mbps）

■ Box

・Support PoE Wired LAN board only.
・Photo is with diffuser for LED.

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Intelligent Camera Standard

KBCR-iC01MG

1.2M pixels

PCB Dimension 50 mm × 50
* Lens recommended for ¼ sensor or more

Basic Characteristics	
Image Sensor	1/4-inch Color Sensor（Rolling shutter）
Total number of [pixels]	1280×960
Image area [mm]	3.84×2.88
Output signal format	YUV4:2:2
Interface	USB2.0, RS-232C, LAN（Wired）
Image adjustment function	Auto Exposure Control, Auto Gain Control
Power supply voltage [V]	5.0
Power consumption [W]	2.00(MAX)
Operation temp. [℃]	−10 ～ +60

KBCR-iC01VG

0.3M pixels

PCB Dimension 50 mm × 50
* Lens recommended for ¼ sensor or more

Basic Characteristics	
Image Sensor	1/4-inch Color Sensor（Rolling shutter）
Total number of [pixels]	640×480
Image area [mm]	3.84×2.88
Output signal format	YUV4:2:2
Interface	USB2.0, RS-232C, LAN（Wired, Wireless）
Image adjustment function	Auto Exposure Control, Auto Gain Control, Auto White Balance
Power supply voltage [V]	5.0
Power consumption [W]	1.50(MAX)
Operation temp. [℃]	−10 ～ +60

KBCR-iC51VG

0.3M pixels

PCB Dimension 50 mm × 50
* Lens recommended for 1/3 sensor or more

Basic Characteristics	
Image Sensor	1/3-inch Monochrome Sensor（Global shutter）
Total number of [pixels]	752×476
Image area [mm]	4.51×2.88
Output signal format	Monochrome 8bit
Interface	USB2.0, RS-232C, LAN（Wired, Wireless）
Image adjustment function	Auto Exposure Control, Auto Gain Control
Power supply voltage [V]	5.0
Power consumption [W]	1.50(MAX)
Operation temp. [℃]	−10 ～ +60

KBCR-iC07VG

0.3M pixels *NEW*

PCB Dimension 50 mm × 50 mm
（Camera PCB：27mm × 24 mm）
* Lens recommended for ¼ sensor or more

基本特性	
Image Sensor	1/4-inch Color Sensor（Rolling shutter）
Total number of [pixels]	640×480
Image area [mm]	3.6×2.7
Output signal format	YUV4:2:2
Interface	USB2.0, RS-232C, LAN
Image adjustment function	Auto Exposure Control, Auto Gain Control
Power supply voltage [V]	5.0
Power consumption [W]	2.00(MAX)
Operation temp. [℃]	−10 ～ +60

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Intelligent Camera Standard

## Image Processing Camera Line up

Compact / Low power consumption！ Usable to various application by replacing software

Print Inspection System   KBCR-iC51VG/iC01MG   SP-CR2/P

Print Inspection system correspond to Character/Barcode/2D barcode reading/inspection.
By using the included Window application dedicated for inspection, it enables early introduction
of print inspection into product line.

- Reading inspection of Character/Barcode/2D code.
- Storage/Aggregation/Trace of inspection result is possible.
- Automatic trigger & positioning by image processing
- LED light built-in (dimmable)
- PoE (power supply/communication, with one LAN cable)
- Notification to external equipment when NG occurred (Relay output)
- Lens selectable depend on application/environment
- 2 types of camera resolution
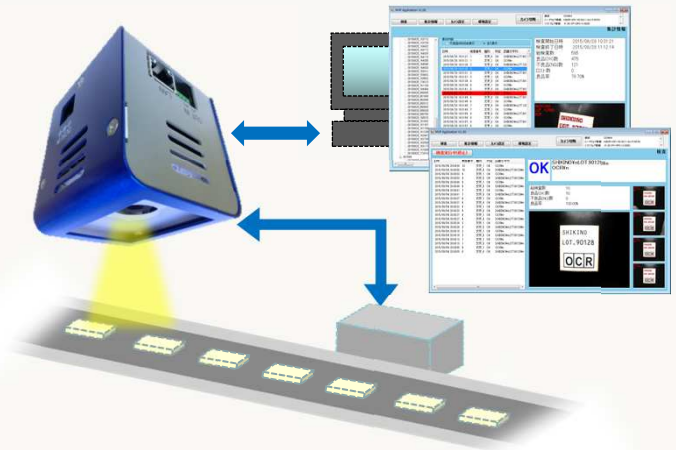
KBCR-iC51VG SP-CR2/P   `0.3M pixel`

Eliminate distortion caused by moving object by adopting global shutter.
Character/Barcode on the conveyer moving with high speed can be inspected.

KBCR-iC01MG SP-CR2/P   `1.2M pixel`

High resolution camera enables read small letters.
In addition, since capturing area can be wider, freedom of work position is improved.

Face Detection (Age and gender)

KBCR-iC01VG SP-FD1

Output information data of number of
faces(people), age, gender and staying
time(face detecting time). Judging by face
contours, wrinkles and stains.

Age: 30-39
Time: 00:01:50

Age: 20-29
Time: 00:02:00
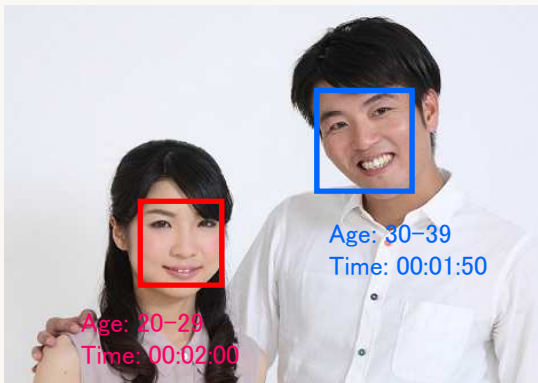
Character Recognition Camera

KBCR-iC51VG/iC01MG   SP-CR2/A

Offer camera module part of Print Inspection System.
Can be installed into various inspection system and
character / barcode reading equipment

- Correspond to reading of English letters, numbers and symbol (not correspond to Japanese language)
- Correspond to reading of each type of 1D/2D code
- Minimum PCB construction : 2 PCBs Possible to specify various potion (for ex., PoE/LED etc.)
- Communication I/F: USB/LAN/RS-232C

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Intelligent Camera Lite
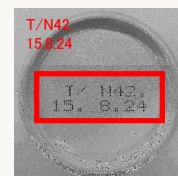
Feature

- Ultra compact Intelligent Camera Module
- Possible to use as LAN camera module
- FFC connection with camera and CPU board improved installation freedom.
- Installed Image Processing Processor (Renesas RZ/A1H: ARM Coretex-A9 400MHz)
- High speed start up, High frame rate (Max:60fps) *compared with conventional product
- Installed distortion correction function and JPEG HW IP
- Correspond to PoE power supply (option)

KBCR-iC11VG

0.3M pixels

Image Sensor	1/4 -inch Color Sensor (Rolling shutter)
Total number of [pixels]	640 X 480
Imaging area [mm]	3.6 X 2.7
Output signal format	USB2.0（MJPEG 60fps/YUV 12fps, LAN（UDP MJPEG 60fps）
External connection	USB miniB connector, LAN connector
Option PCB	LAN PCB(Wired), PoE LAN PCB(Wired), IR LED PCB
Power supply voltage[V] / Power consumption[W]	5.0 / 1.00(MAX)
Operation temp.[℃] /Storage temp. [℃]	-20 ～ +60 / -20 ～ +80 (excluding lens)

Product Lie up

QR code recognition camera module

KBCR-iC11VG-CR3x

QR code reading function installed.
Reading accuracy is dramatically improved
by distortion correction function.

- Correspond for QR in smartphone
- Compact and ideal for embedded use
- Suitable for various installation
  condition by wide to narrow view angle lens

Improved reading accuracy
by distortion correction function

Readable even from far to nearby

Distortion Correction function installed USB/LAN Camera

KBCR-iC11VG-N1U/N1L/N1P

Correct distortion in the camera and output
Support image processing at latter stage

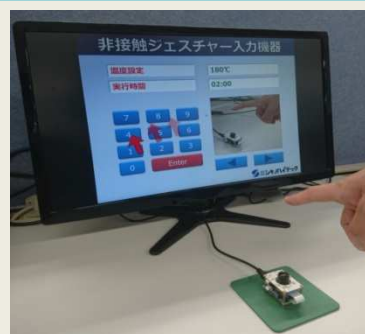**Before correction**   **After correction**

Non-contact Gesture input device

KBCR-iC11VG-GM1U-IRL

Resolve troubles
caused by "contact"
by non-contact
operation

Easy gesture input
with USB connection

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List of Lenses

Camera lens series

P/N	Sensor size	focus f[mm]	F/No.	Angle of view[°] *1 Vertical	Angle of view[°] *1 Horizontal	Angle of view[°] *1 Diagonal	TV Distortion	Optical length [mm] *2	Construction	Mount[mm] *3	Holder *4
HPB2010	″1/4	4.80	2.6	34	44	52	−1%	11.0	2P	M12×P0.5	Standard
HPB1007		2.90	2.0	54	74	94	−17%	21.2	4G		Standard
HPB2033		2.20	2.0	72	93	112	−16%	15.1	2P		Standard
4N256		2.09	2.3	69	88	103	−4%	11.2	2P		Custom *5
HPB1027		1.95	2.2	94	126	168	−39%	20.1	6G		
DW178720 *6		1.8	2.0	88.1	118.8	151.4	−23.1%	21.8	7G		
CAR−12		1.7	2.5	94	128	167	−36%	14.2	2P3G		Standard
HPB3041_C4		1.19	2.4	99	119	134	−9%	13.9	2P2G		
HPB3041_C7 *6		1.19	2.4	99	119	134	−9%	13.9	2P2G		
4N321		1.05	2.0	142	194	206	±5%	11.8	4P1G		
4K269		0.82	2.6	156	191	195	+2%	12.5	5P	M9×P0.5	Custom *5
4N313	″1/3.7	1.12	2.2	110	136	167	−16%	9.6	3P	M8×P0.5	
DW9607CM	″1/3	6.00	2.0	30	40	53	−1%	19.5	4G	M12×P0.5	Standard
DW9305CM		4.30	1.8	47	64	78	−8.6%	17.3	5G		
HPB1014		3.80	2.4	54	74	96	−11%	22.3	4G		
HPB1047		2.50	2.8	66	118	137	−26%	22.9	6G		
HPB1047_C1 *7		2.50	2.8	66	118	137	−26%	22.9	6G		
HPB1022		2.50	2.5	84	116	152	−34%	18.1	6G		
HPB1033		2.30	2.6	91	124	160	−24%	16.8	6G		
AS133		2.09	2.0	89	115	137	−11%	18.0	3P3G		
BW3ML56B	″1/2.8	5.60	2.0	38	50	61	+0.6%	22.2	8G		
HPB1005_B3	″1/2	9.30	2.8	33	43	53	−2%	14.5	5G		
HPB1005_D2	″1/2	9.30	8.0	33	43	53	−2%	14.5	5G		

*1　Angle of view in the table is the view angle correspond to the Sensor size in the table. View angle will be smaller when installed smaller size sensor than correspond sensor.

*2　Optical length: Please refer to the right figure.

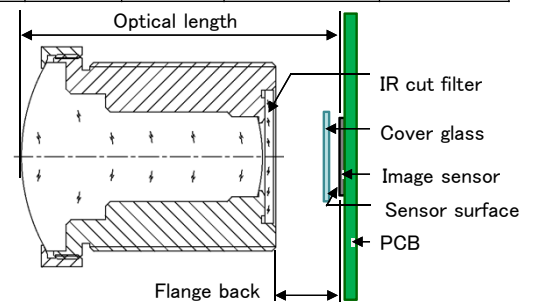*3　Please contact us for C/CS mount.

*4　Suitable lens holder sometimes differs depend on lens. Please contact us.

*5　Necessary of custom development of lens holder.

*6　With visible light cut filter.

*7　HPB1047_B6_C1 is without IR cut filter.

※ IR: Please contact us because some items are not available for IR.

Development example: Custom Camera/System

Camera specification Number of pixels	Camera specification Output format	Camera specification I/F	Application	Feature/Remark
VGA（640 x 480）	Digital（YUV）	USB2.0	Wearable terminal	Compact（10x10mm）
NTSC（720 x 480）	NTSC/PAL	Custom	Medical	Compact（φ17mm cylinder）
720p（1280 x 720）	Digital/MJPEG	HDMI/USB3.0	Automotive (for evaluation use)	HDR/NIR(near infrared)
SXGA（1280 x 1024）	H.264	Ethernet（RTSP）	Security system	PTZ, Multiple camera interlocking drive
SXGA（1280 x 1024）	Digital（RGB−Raw）	USB2.0	Robot	Global shutter, Stereo camera
SXGA（1280 x 1024）	YUV、MJPEG	IEEE802.11ac	Industrial use	Battery operated, WLAN
2M（2048 x 1088）	Digital（Raw）	LVDS（@340fps）	Automotive (for evaluation use)	High resolution, High frame rate
5M（2592 x 1944）	Digital（YUV）	GigE	Industrial use	PTZ, Multiple camera interlocking drive
1G（10Mp x 100）	Digital（YUV）	USB3.0	Industrial use	Camera array