# USB3 Vision camera series

ximea

smallest single board design • lowest power consumption • ultra-fast


**xiQ**

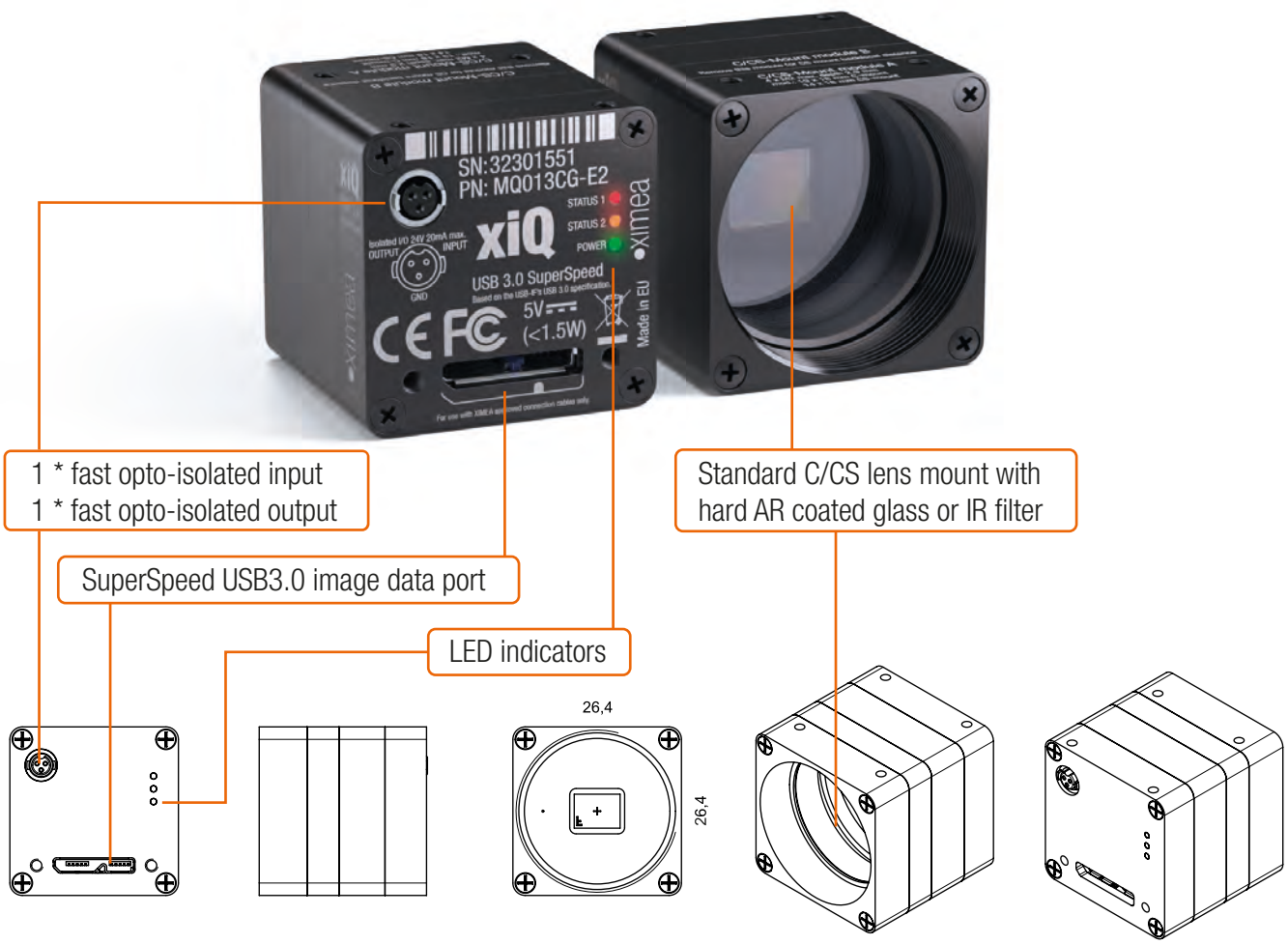
board level and housed cameras

# **xiQ** - quick facts

**xiQ** [ksi-kju: or sai-kju:] is an ultra-compact USB3 Vision Standard compatible industrial camera family with outstanding features:

- Extremely small footprint
- Lowest thermal dissipation
- Single PCB, board level versions available: perfect for OEM integration

| | |
|---|---|
| Industry standard interface | Compliant with USB 3.0 SuperSpeed specification |
| AIA standard compatibility | USB3 Vision Standard Compliant |
| Small | Fits into places where no other camera can fit |
| Cool | Due to low power consumption, 0.9 to 1.8 W, supplied via USB3.0 interface |
| Effective | 5 Gb/s interface up to 400 Mpix/s data throughput |
| Fast | High speed, high frame rate: >500 fps at VGA and 90 fps at 4 Mpix resolutions |
| Robust | Full metal housing, no sheet metal covers |
| Lightweight | Facilitates increased performance of robotic arms and gimbals |
| Lens mount | Standard C-mount, convertible to CS mount or board level without mount |
| Connectivity | Programmable opto-isolated input and output, 3 status LEDs |
| Compatible | Support for Windows, Linux and Mac OS X, largest range of Image Processing Libraries |
| Software interfaces | GenICam / GenTL and highly optimized xiAPI SDK |
| Auto adjustments | Auto white balance, auto gain, auto exposure |
| Sensor Technology | Most recent generation of CMOS sensors with global shutter |
| Economical | Excellent value and price, low TCO and fast ROI |



# **xiQ** - leading vision libraries supported

- Quick integration with third-party software using our easy-to-learn API/SDK and many examples made for AQSENSE SAL3D, Open CV, Aforge.NET, etc.
- All XIMEA cameras are plug-and-play compatible with most of the major image processing libraries on the market, including **MVTec HALCON, National Instruments LabVIEW, MathWorks MATLAB, STEMMER IMAGING Common Vision Blox, OpenCV and many others**.
- Support for GenICam/GenTL ensures forward compatibility with emerging image processing libraries, frameworks and packages.
- One-stop support of the camera and vision libraries integration.
- Open online community: Share experience, exchange knowledge and solutions at www.ximea.com/community.

## Compatible with more than 30 popular machine vision libraries:

Please check website for up-to-date list:

# **xiQ** - series camera specifications

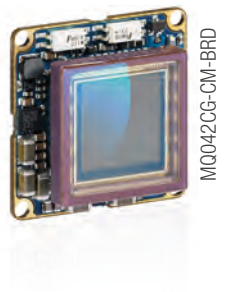
## Sensors and models:

| Model [1] | | Sensor | Resolution | Pixel size [µm] | ADC [bits] | DR [dB] | Optical size | Sensor size/ diagonal [mm] | FPS [3] | Max. power consumption |
|---|---|---|---|---|---|---|---|---|---|---|
| MQ003MG-CM | b/w | CMOSIS CMV300 | 648x488 VGA | 7.4 | 10 | 60 [2] | 1/3" | 4.8 x 3.6 5.9 | >500 | 1.3 |
| MQ003CG-CM | Color | | | | | | | | | |
| MQ013MG-E2 | b/w | E2V EV76C560 | 1280x1024 1.3 MP | 5.3 | 10 | >60 | 1/1.8" | 6.9 x 5.5 8.7 | 60 | 0.9 |
| MQ013CG-E2 | Color | | | | | | | | | |
| MQ013RG-E2 | b/w NIR | E2V EV76C661 | | | | | | | | |
| MQ013MG-ON | b/w | Onsemi PYTHON1300 | 1280x1024 1.3 MP | 4.8 | 10 | >56 | 1/2" | 6.2 x 5.0 7.9 | 172 | 1.4 |
| MQ013CG-ON | Color | | | | | | | | | |
| MQ022MG-CM | b/w | CMOSIS CMV2000 | 2048x1088 2.2 MP | 5.5 | 10 | 60 [2] | 2/3" | 11.3 x 6.0 12.8 | 170 | 1.8 |
| MQ022CG-CM | Color | | | | | | | | | |
| MQ022RG-CM | b/w NIR | | | | | | | | | |
| MQ042MG-CM | b/w | CMOSIS CMV4000 | 2048x2048 4.2 MP | 5.5 | 10 | 60 [2] | 1" | 11.3 x 11.3 15.9 | 90 | 1.8 |
| MQ042CG-CM | Color | | | | | | | | | |
| MQ042RG-CM | b/w NIR | | | | | | | | | |

**Note 1:** Please add „-BRD" to address the board level cameras **Note 2:** HDR mode available **Note 3:** RAW, 8 bit, full resolution. PYTHON1300: 210 FPS in „Zero ROT" mode

## Interfaces, connectors, environmental:

| Description | Value |
|---|---|
| Optimum ambient temperature | +10 to +25 °C |
| Ambient temperature operation | -10 to +55 °C (non condensing humidity) |
| Environment | Ingress Protection IP40 |
| USB3.0 connectors | Standard USB3.0 Micro-B connnector with thumbscrews |
| I/O & sync connector | Hirose SR38-4R-3S(71) with optional locking nut |


MQ042CG-CM-BRD

## Compatibility:

Standard **Windows, Linux & MacOS** operation systems ● GenICam / GenTL ● Single SDK/API for all XIMEA camera models.



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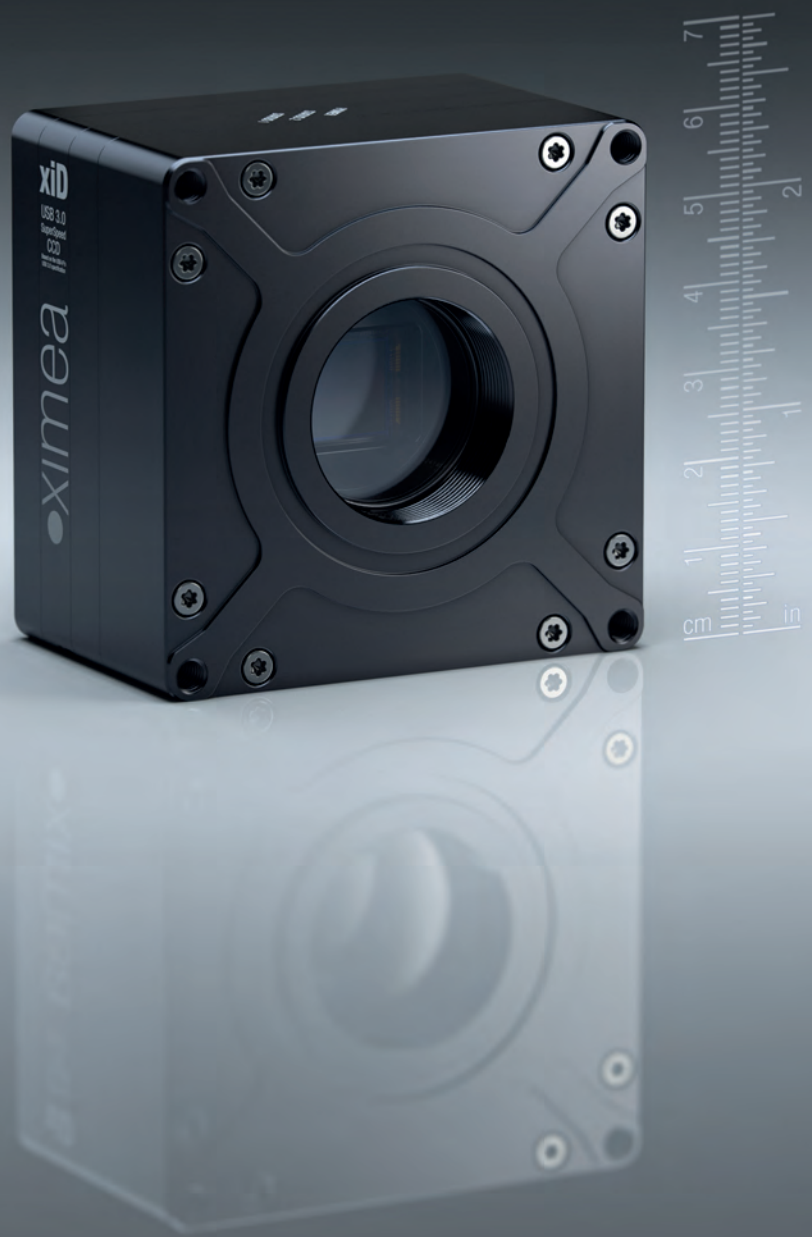
# USB3 High-end CCD camera series

ximea

single board design • USB3.0 bus powered • fastest multi-tap readout




## xiD

board level and housed cameras

# **xiD** - series camera specifications

**xiD** is an ultra-compact USB3.0 camera family using the most recent CCD sensors for industrial and scientific purposes with outstanding features:

- ultra-low read-out noise, clear 14 bits/pixel images in all modes
- partial readout and several binning modes with enhanced sensitivity and highest frame rates
- board level cameras available

## Sensors and models:

| Model [1] | Sensor | Resolution | Pixel size [µm] | ADC [bits] | DR [dB] [2] | FWC [e-] | Sensor size [mm] | Diagonal [mm] | Power [W] | FPS [3] |
|---|---|---|---|---|---|---|---|---|---|---|
| MD028xU-SY | SONY ICX674 | 1934 x 1456, 2.8 MP | 4.54 | 8,10,12,14 | 71.1 | 20000 | 8.8 x 6.6 | 11 | 3.6 W | 56.9 |
| MD061xU-SY | SONY ICX694 | 2754 x 2204, 6.1 MP | 4.54 | 8,10,12,14 | 71.8 | 19500 | 12.5 x 10.0 | 16 | 3.9 W | 28.4 |
| MD091xU-SY | SONY ICX814 | 3384 x 2708, 9.1 MP | 3.69 | 8,10,12,14 | 68.4 | 12000 | 12.5 x 10.0 | 16 | 4.2 W | 19.5 |
| MD120xU-SY | SONY ICX834 | 4242 x 2830, 12.0 MP | 3.1 | 8,10,12,14 | 63.1 | 10000 | 13.2 x 8.8 | 15.8 | 4.5 W | 15.3 |

**Note 1:** various models available: x = C color, M mono **Note 2:** 26 MHz readout frequency **Note 3:** 52 MHz, 4 taps, RAW14 bits; + 20% in overclocked mode, 12bit packed

- Sony “EXview HAD CCD II” pixel technology with improved light efficiency for the near-infrared spectrum
- XIMEA‘s proprietary CLEANPATH - readout and sensor driving circuitry, enabling scientific imaging with extremely low readout noise and high fidelity in color reproduction.
- Global shutter CCD with interline transfer - 1, 2 or 4 tap readout with 14 bit ADC
- No selected grades - all cameras are scientific grade

## Compatibility:

Standard **Windows, Linux & MacOS** operation systems • USB3.0 • GenICam / GenTL • Single SDK/API for all XIMEA camera models. Compatible with the widest range of vision libraries. Please check website for up-to-date list!



## Contact:

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# Subminiature USB2 cameras

ximea

smallest industrial grade camera • lowest power consumption • 5 Mpix


## xiMU

board level and housed cameras

# **xiMU** - quick facts

**xiMU** [ksi-mju: or sai-mju:] is a subminiature USB 2.0, triggerable, fully industrial grade camera family with outstanding features:

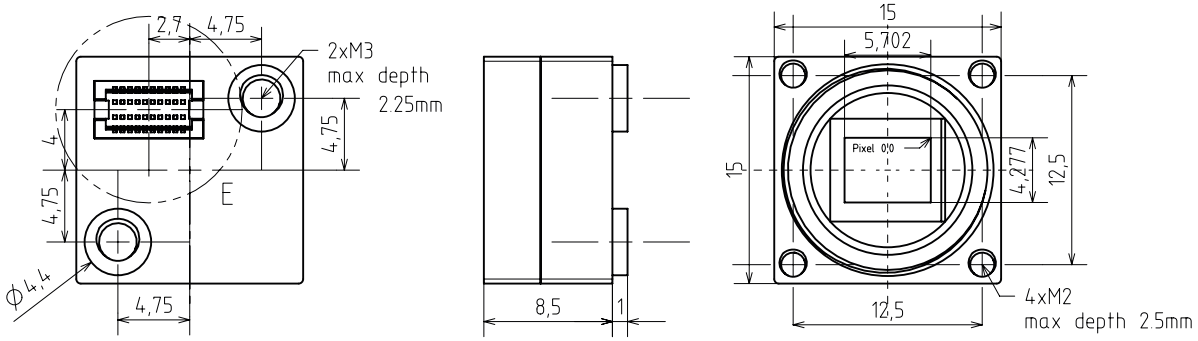
- Incredibly small: World smallest USB camera with GenICam/GenTL support.
- Low thermal dissipation
- Single PCB, board level version available

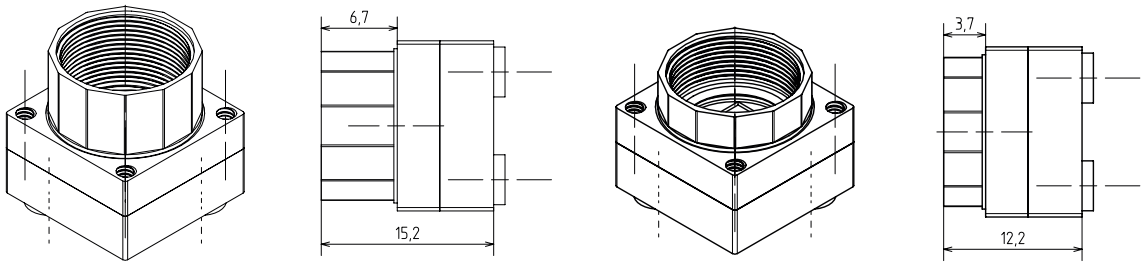
| | |
|---|---|
| Sensor Technology | CMOS, rolling shutter with Global Reset Release |
| Acquisition Modes | Continuous, software trigger, hardware trigger |
| Partial Image Readout | ROI, Skipping and Binning modes supported |
| Image data formats | 8, 10 or 12 bit RAW pixel data |
| Color image processing | Host based de-Bayering, sharpening, Gamma, color matrix |
| Hot/blemish pixels correction | On camera storage of pixel coordinates, host assisted correction |
| Auto adjustments | Auto white balance, auto gain, auto exposure |
| Flat field corrections | Host assisted pixel level shading |
| General Purpose I/O | 4x I/O lines (bidirectional) |
| Synchronization | Hardware trigger input, software trigger, exposure strobe output, busy output |
| Housing and lens mount | Standard S-mount (M12). Two lens mount adapters available |
| Power requirements | Typ. 0.6 W, supplied via USB 2.0 interface |
| Operating systems | Windows, Linux Ubuntu, MacOS (>10.8) |
| Software support | xiAPI SDK, adapters and drivers for various image processing packages |
| USB standard compatible | USB 2.0, Universal Serial Bus Specification |


1 : 1 real size scale

MU9Px-MH

MU9Px-MBRD
(board level)




MU9Px-MH with long S-mount adapter

MU9Px-MH with short S-mount adapter

# **xiMU** - leading vision libraries supported

- Quick integration with third-party software using our easy-to-learn API/SDK and many examples made for AQSENSE SAL3D, Open CV, Aforge.NET, etc.
- All XIMEA cameras are plug-and-play compatible with most of the major image processing libraries on the market, including **MVTec HALCON, National Instruments LabVIEW, MathWorks MATLAB, STEMMER IMAGING Common Vision Blox, OpenCV and many others**.
- Support for GenICam/GenTL ensures forward compatibility with emerging image processing libraries, frameworks and packages.
- One-stop support of the camera and vision libraries integration.
- Open online community: Share experience, exchange knowledge and solutions at www.ximea.com/community.

## Compatible with more than 30 popular machine vision libraries:

Please check website for up-to-date list.

# **xiMU** - series camera specifications

## Sensors and models:

| Model | | Sensor | Resolution | Pixel size [µm] | ADC [bits] | DR [dB] | optical size | Sensor size/ diagonal [mm] | max. power consumption |
|---|---|---|---|---|---|---|---|---|---|
| MU9PM-MH [1)] | b/w | Aptina MT9P031 | 2592 x 1944 5 MP | 2.2 | 8,10,12 | 70 | 1/2.5“ | 5.7 x 4.3 7.1 | 0.7 W |
| MU9PC-MH [1)] | color | | | | | | | | |

**Note 1:** Please replace „-MH“ with „-MBRD“ in the model name to address the board level camera

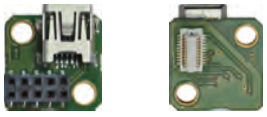
## Read out modes:

| Standard mode | Binning/skipping | Pixels | FPS |
|---|---|---|---|
| 0 | 1x1 | 2592 x 1944 | 5.8 |
| 1 | 2x2 bin | 1296 x 972 | 17 |
| 2 | 4x4 bin | 648 x 486 | 36 |
| 3 | 2x2 skip | 1296 x 972 | 22 |
| 4 | 4x4 skip | 648 x 486 | 83 |
| 5 | 6x6 skip | 430 x 324 | 163 |
| 6 | 7x7 skip | 368 x 376 | 200 |
| 7 | 7x7 skip/clip | 320 x 240 | 232 |

## Interfaces, connectors, environmental:

| Description | Value |
|---|---|
| Optimum ambient temperature | +10 to +25 °C |
| Ambient temperature operation | -10 to +55 °C (non condensing humidity) |
| Environment | Ingress Protection IP40 |
| Size, Weight | MU9Px-MH: Height * width * depth : 15 x 15 x 8.5 mm, 3.4 g |
| | MU9Px-MBRD: Height * width * depth : 14 x 13.2 x 5.5 mm (with connector), 1.2 g |
| Connector mounted on the PCB | HRS DF12E(3.5)-20DP micro connector with USB 2.0 High-speed and digital I/O |

## Accessories:

| Item-P/N | Description | Illustration |
|---|---|---|
| MU-MINIUSB | Mini-USB Extension Board for MU9Px-MH |  |

## Compatibility:

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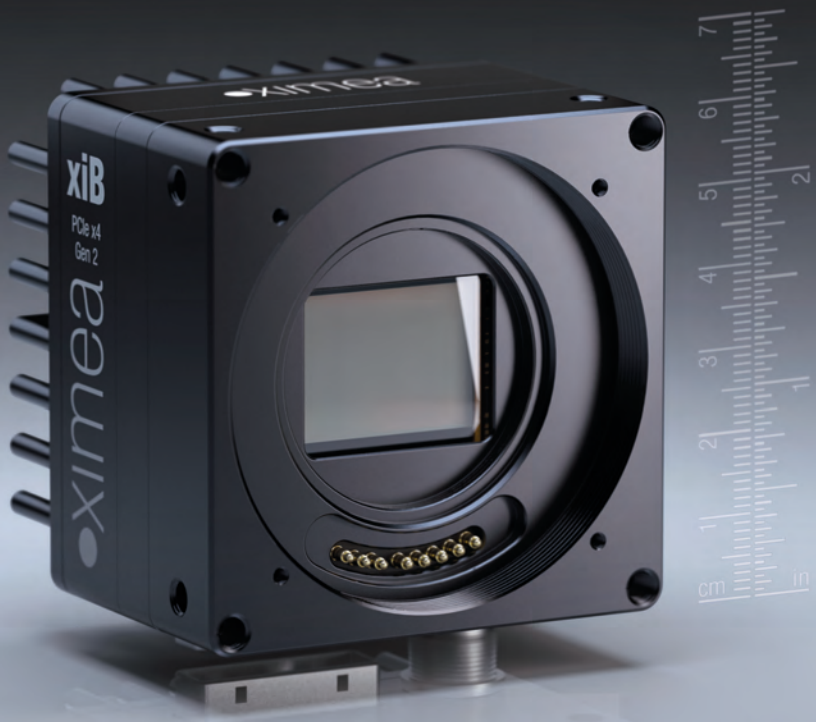
# High-speed PCIe cameras

ximea

fastest image transfer • high resolution • no frame grabber required




**xiB**

housed cameras with PCIe interface

# **xiB** - series camera specifications

**xiB** is a compact camera using the most recent high resolution CMOS sensors with outstanding features:

- PCIe x4 Gen2 interface for direct access to and from the computer memory with up to 20 Gbit / sec
- No frame grabber required
- Most recent high resolution CMOSIS sensors
- Robust PCIe and Power/GPIO connectors, slim design
- Integrated Canon EF lens interface for control of dynamic aperture and focus.
- Windows and Linux support with DMA (direct memory access) image data transfer
- Compact housing: 60 x 60 x 38 mm

## Sensors and models:

| Model [1] | Sensor | Resolution | Pixel size [um] | ADC [bits] | DR [dB] | FWC [e-] | Diagonal [mm] | Power [W] | FPS |
|---|---|---|---|---|---|---|---|---|---|
| CB120xG-CM | CMOSIS CMV12000 | 4096 x 3072, 12 MP | 5.5 | 8,10,12 | 60 | 13500 | 28 | 6.5 | 130, 103, 86 [2] |
| CB200xG-CM | CMOSIS CMV20000 | 5120 x 3840, 20 MP | 6.4 | 12 | 66 | 15000 | 41 | 6 | 32 |

**Note 1:** various models available: x = C for color, M for monochrome. CB120RG-CM: NIR-enhanced version upon request

**Note 2:** RAW 8 bits, 10 bits and 12 bits

## Compatibility:

Standard **Windows, Linux & MacOS** operation systems ● GenICam / GenTL ● Single SDK/API for all XIMEA camera models.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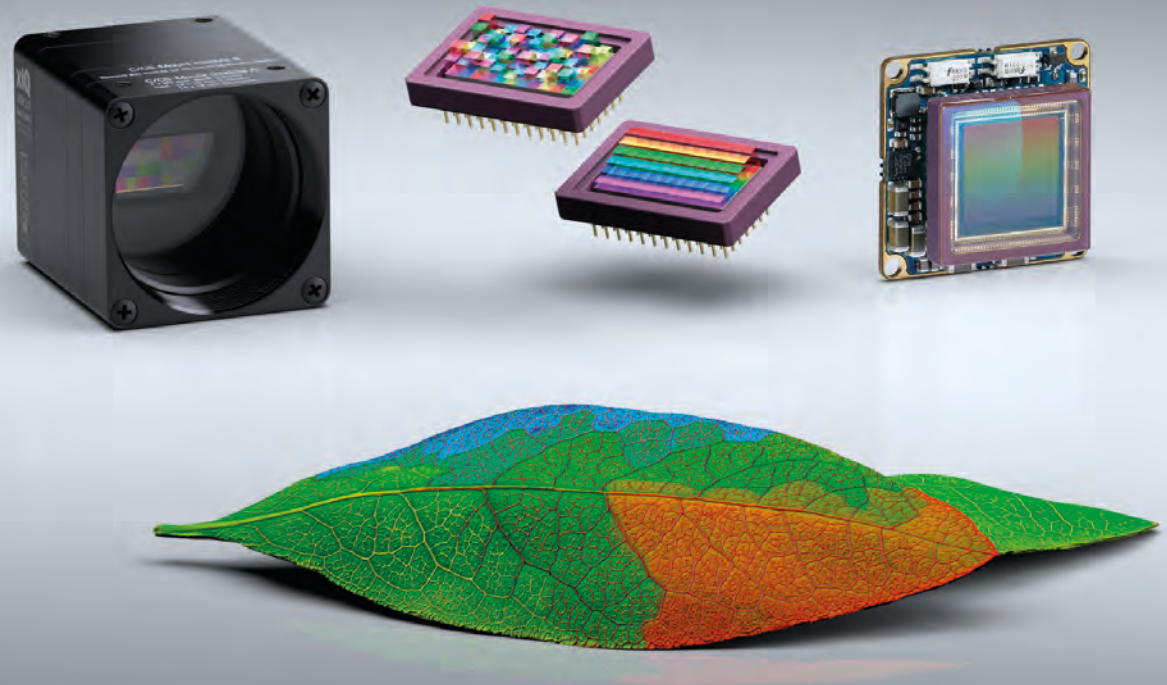
# Hyperspectral imaging cameras

ximea

linescan and snapshot • 16 to 150 bands • 170 frames/sec

in partnership with

imec



# xiSpec

USB3 Vision hyperspectral cameras

# **xiSpec** - hyperspectral imaging cameras

**xiSpec** is a family of miniature Hyperspectral Imaging (HSI) cameras for advanced applications:

- Precision Agriculture
- Medical Imaging
- Remote Sensing
- Life science instrumentation
- Microscopy and Endoscopy
- Mineralogy
- Environmental Monitoring
- Food inspection
- Optical sorting

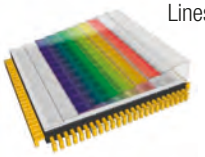
## Sensors and models:

| Model | Type | Spectral range [nm] | Bands | Availability |
|---|---|---|---|---|
| MQ022HG-IM-LS100-NIR | Linescan | 600-975 | 100+ | now |
| MQ022HG-IM-LS150-VISNIR | Linescan | 470-900 [1)] | 150+ | coming soon |
| MQ022HG-IM-SM4X4-VIS | Snapshot Mosaic | 470-630 | 16 | now |
| MQ022HG-IM-SM5X5-NIR | Snapshot Mosaic | 600-975 (typically 600-950/975) [2)] | 25 | Now |

**Note 1:** Planned

**Note 2:** Sensor specific, let's talk about your requirements

Linescan



Snapshot Mosaic

- The sensor technology used in our HSI-cameras is based on standard CMOS area sensors, with a native resolution of 2048*1088 pixels.
- Hyper spectral filters are added at wafer-level on top of the pixel structure of the sensor.
- All xiSpec cameras can be used with an UAV / drone. The weight of the camera is about 32g (without lens). It's the smallest and lightweight hyperspectral imaging camera, with an incredible low power consumption.
- An image stream of up to 170 full frame images can be delivered.

## Starter kits:

Starter kits including lenses, filters, cables, and a Lite Diffuse Reflectance target are available.

## Compatibility:

Standard **Windows, Linux & MacOS** operation systems • USB3.0 • GenICam / GenTL • Single SDK/API for all XIMEA camera models. Compatible with the widest range of vision libraries. Please check website for up-to-date list!

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# High-end cameras

ximea

outstanding performance for scientific purposes • minimal size


# xiCe|xiRAY

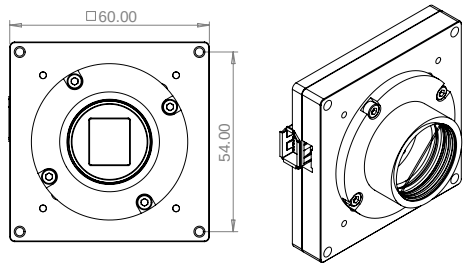
cooled and uncooled cameras

# **xiCe, xiRAY** - quick facts

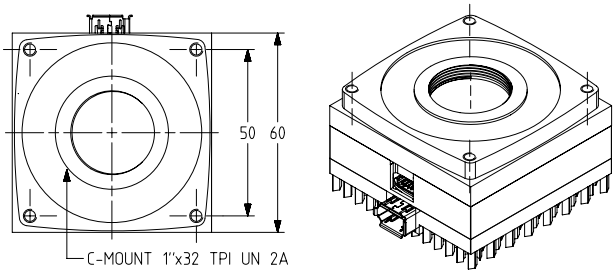
**xiCe and xiRAY** are ultra-compact camera families for scientific and special industrial purposes with outstanding specifications and extra features:

- ultra-low read-out noise, clear 14 bits/pixel images in all modes
- partial readout and several binning modes with enhanced sensitivity and higher frame rates
- TEC Peltier cooled versions and board level versions of cameras are available

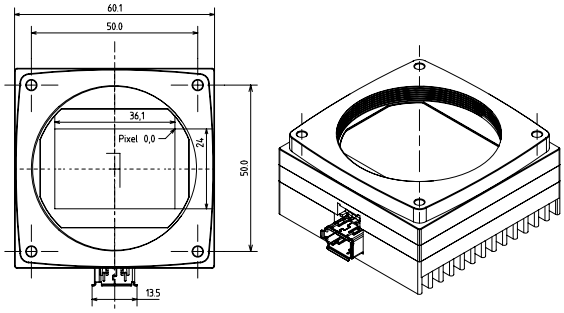
| | |
|---|---|
| Sensor technology | CCD |
| Small | Fits into places where no other similar grade of camera can fit |
| Robust | Full metal housing, no sheet metal covers |
| Connectivity | Programmable input and output |
| Compatibility | Support for Windows and Linux, various Image Processing Libraries |
| Software interfaces | GenICam / GenTL and highly optimized xiAPI SDK |
| Economical | Excellent value and price, low TCO and fast ROI |
| Auto adjustments | Auto white balance, auto gain, auto exposure |
| System integration | Single board design, perfect for OEM integration |



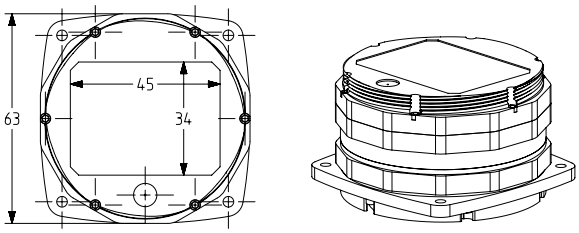

MR285 uncooled - standard housing




MR4021/MR4022 uncooled - standard housing




MR11002/MR16000 uncooled - standard housing




xiCOOL, xiRAY - standard cooled housing

## Details X-ray cameras, xiRAY models:

| | | | | |
|---|---|---|---|---|
| **Fiber optics** | **Magnification** | 1:1 | **Fiber center to center distance** | 6 µm |
| | **Field of view** | 36 x 24 mm | **FO plate thickness** | 5 mm |
| | **Radiation hardened** | yes | **Extra-Mural Absorption** | Enhanced Statistical |
| **Scintillator** | **Phosphor composition** | P43, $Gd_2O_2S:Tb$ | **Thickness** | ~22 µm |
| | **Energy range** | Min: 5 KeV, Max 100 KeV | | |
| **Cooling system** | **Type** | TEC Peltier cooler | **Dissipation** | Heatsink, optional fan |
| | **Temperature** | +12°C | **Power supply / Control** | Internal |
| **Physical** | **Dimensions** | 63 x 63 x 63mm | **Operating Temperature** | -5..+50°C |
| | **Power consumption** | 6W max | | |

# **xiCe, xiRAY** - leading vision libraries supported

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- Open online community: Share experience, exchange knowledge and solutions at www.ximea.com/community.

## Compatible with more than 30 popular machine vision libraries:

Please checke webstie for up-to-date list:

# **xiCe, xiRAY** - series camera specifications

## MR, Sensors and models, optional Peltier cooled:

| Model [1] | Cooled | | Sensor | Resolution | Pixel size [µm] | ADC [bits] | DR [dB] | Sensor size | FPS [2] |
|---|---|---|---|---|---|---|---|---|---|
| MR285MU-BH | MR285MC-BH | b/w | SONY ICX285 | 1376 x 1032 1.4 MP | 6.45 | 8,10,12,14 | 70 | 10.2 x 8.3 mm 2/3" | 15 |
| MR285CU-BH | MR285CC-BH | color | | | | | | | |
| MR4021MU-BH | MR4021MC-BH | b/w | Truesense KAI-4021 | 2048 x 2048 4.2 MP | 7.4 | 8,10,12,14 | 70 | 15.2 x 15.2 mm 1" | 5.5 |
| MR4021CU-BH | MR4021CC-BH | color | | | | | | | |
| MR4022MU-BH | MR4022MC-BH | b/w | Truesense KAI-04022 | 2048 x 2048 4.2 MP | 7.4 | 8,10,12,14 | 75 | 15.2 x 15.2 mm 1" | 5.5 |
| MR4022CU-BH | MR4022CC-BH | color | | | | | | | |
| MR11002MU-BH | - | b/w | Truesense KAI-11002 | 4008 x 2672 11 MP | 9.0 | 8,10,12,14 | 70 | 36.1 x 24.0 mm | 2.1 |
| MR11002CU-BH | - | color | | | | | | | |
| MR16000MU-BH | - | b/w | Truesense KAI-16000 | 4872 x 3248 16 MP | 7.4 | 8,10,12,14 | 70 | 36.1 x 24.0 mm | 1.4 |
| MR16000CU-BH | - | color | | | | | | | |

**Note 1:** Please replace „-BH" with „-BRD" for board level cameras; not applicable for cooled models and MR402x

**Note 2:** RAW, 14 bit, full resolution

## xiCOOL, Sensors and models, Peltier cooled:

| Model | | Sensor | Resolution | Pixel size [µm] | ADC [bits] | DR [dB] | Sensor size | FPS [1] |
|---|---|---|---|---|---|---|---|---|
| MH110MC-KK | b/w | Truesense KAI-11002 | 4008 x 2672, 11 MP | 9.0 µm | 8,10,12,14 | 70 | 36.1 x 24.0 mm | 2.1 |
| MH110CC-KK | color | | | | | | | |
| MH160MC-KK | b/w | Truesense KAI-16000 | 4872 x 3248 16 MP | 7.4 µm | 8,10,12,14 | 70 | 36.1 x 24.0 mm | 1.4 |
| MH160CC-KK | color | | | | | | | |

**Note 1:** RAW, 14 bit, full resolution

## xiRAY, Sensors and models, fiber optics coupled, Peltier cooled:

| Model | | Sensor | Resolution | Pixel size [µm] | ADC [bits] | DR [dB] | Sensor size | FPS [1] |
|---|---|---|---|---|---|---|---|---|
| MH110XC-KK | b/w | Truesense KAI-11002 | 4008 x 2672, 11 MP | 9.0 µm | 8,10,12,14 | 70 | 37,2 x 25.7 mm | 2.1 |
| MH160XC-KK | b/w | Truesense KAI-16000 | 4872 x 3248, 16 MP | 7.4 µm | 8,10,12,14 | 70 | 36.1 x 24.0 mm | 1.4 |

**Note 1:** RAW, 14 bit, full resolution

## Interfaces, connectors:

| Value | Description |
|---|---|
| Firewire connector | IEEE 1394A |
| I/O & sync connector | Hirose SR38-4R-3S(71) (MH models only) |

## Compatibility:

Standard **Windows and Linux** operation systems • GenICam / GenTL • Single SDK/API for all XIMEA camera models.



## Contact:

Please visit **ximea.com** for complete product information.
E-mail our sales team at **sales@ximea.com** for your price and further information.

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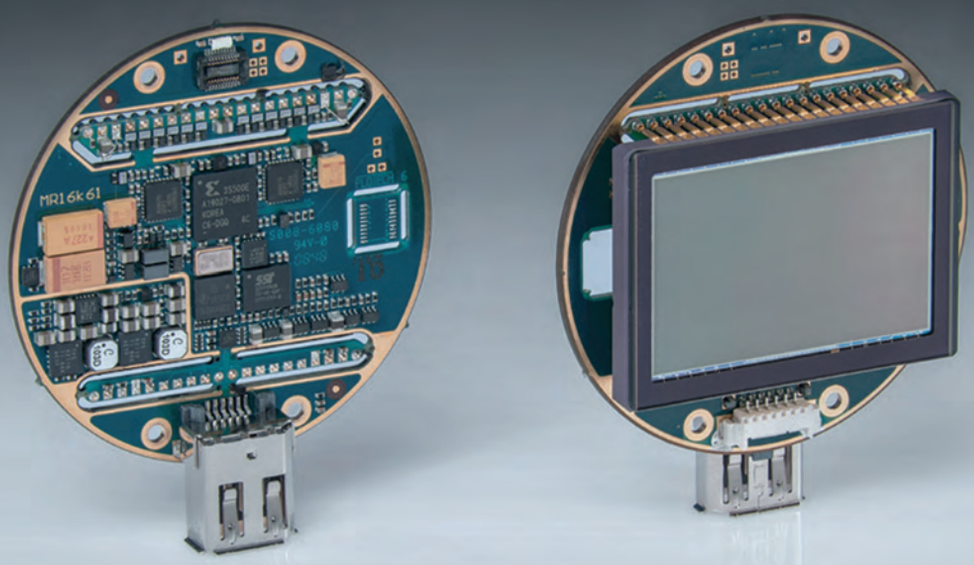
# OEM cameras & custom engineering

ximea

cameras for special requirements • minimal size and power consumption



**OEM**

customized & tailor made cameras

# **OEM & custom engineering** - when mainstream is not enough

Starting from scratch or using any existing XIMEA product as a seed, we provide services all the way up to full custom development and manufacturing.

XIMEA is the leading innovator and producer of digital cameras for industrial and scientific purposes with 20+ years of custom engineering experience, with hundreds of thousands of installed cameras all over the world and at major Fortune 500 companies.

- Proprietary technology for CCD sensor handling and cooling provides low noise readout and reduced power consumption.
- Ultra-low noise signal conditioning and acquisition.
- Single board hardware development, minimal size and power consumption.
- Variety of communication technologies: USB 2.0, USB 3.0, FireWire IEEE1394, Ethernet, CameraLink, PCIe x4 / x8
- Hardware, FPGA, firmware and software co-development, multi-platform software development, maintenance and support.
- Assortment of state of the art CAE and CAD tools on regular maintenance.
- Leading edge measuring and test instruments.
- Ultra-High Vacuum equipment and technologies, ultra precision machining. All in-house.
- Guaranteed success.

## Compatibility:

Standard **Windows, Linux & MacOS** (USB2 and USB3) operation systems • USB3.0 • GenICam / GenTL • Single SDK/API for all XIMEA camera models. Compatible with the widest range of vision libraries. Please check website for up-to-date list!



## Contact:

Please visit **ximea.com** for complete product information.
E-mail our sales team at **sales@ximea.com** for your price and further information.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