NEW

ORCA®-Quest IQ

qCMOS® camera C15550-23UP

Powering new discoveries

The ORCA-Quest IQ features Camera Link output
with the low-noise performance of the ORCA-Quest series.

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Powering new discoveries

ORCA-Quest IQ, the latest addition to the ORCA-Quest series, inherits the core features of the series while evolving into a more versatile camera by enabling image output to external devices via Camera Link.*1

The Camera Link output allows the camera to support advanced applications such as quantum technology, adaptive optics, and super-resolution microscopy. These applications require a control system through a Camera Link interface for image acquisition, processing, and high-speed feedback to peripheral devices.

LOW READOUT NOISE
0.30 ELECTRONS RMS
ULTRA QUIET SCAN

HIGH RESOLUTION
4096 × 2304
9.4 MEGAPIXELS

HIGH QE
85 % @460 nm

Frame rate: Camera Link Standard Base/Full Configuration

Camera Link, with a history dating back to the early 2000s, uses LVDS (Low Voltage Differential Signaling), which is highly resistant to electrical noise. This standard offers high reliability and stable operation even in noisy environments, and is still widely adopted in many frame grabber boards and image processing equipment. ORCA-Quest IQ supports base/full configuration standards to meet the various needs of our customers.

Base Configuration *1 *2

Binning	X (pixels)	Y (pixels)	Frame rate (frames/s)
1 × 1	4096	2304	7.19
	2048	2048	16.1
	1024	1024	64.7
	512	512	259
	256	256	1030
	256	4	19 800
2 × 2	2048	1152	28.7
4 × 4	1024	576	115

Full Configuration *1 *3

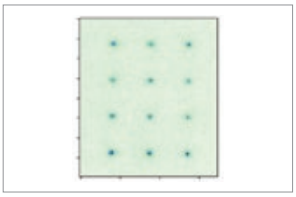
Binning	X (pixels)	Y (pixels)	Frame rate (frames/s)
1 × 1	4096	2304	28.7
	2048	2048	64.7
	1024	1024	259
	512	512	532
	256	256	1040
	256	4	19 800
2 × 2	2048	1152	115
4 × 4	1024	576	120

*1: When using the Camera Link output function, camera control is limited to USB 3.1 Gen1.
*2: Single Camera Link cable connection.
*3: Dual Camera Link cable connection.

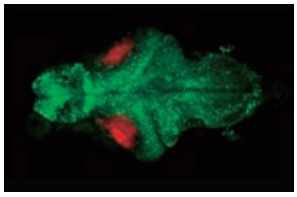
The ORCA-Quest series, achieve the ultimate in quantitative imaging

The ORCA-Quest is a camera with a qCMOS image sensor developed using our unique design technology and the latest manufacturing techniques. It is also the world's first camera that achieves the ultimate in quantitative imaging by photon number resolving.
The ORCA-Quest series continues to evolve, featuring advanced camera technologies such as low readout noise of 0.3 electrons rms, stability against temperature and time, individual pixel value calibration, and real-time correction.

Quantum



Life science



Explore our customer case studies.
https://camera.hamamatsu.com/all/en/application_and_case_study.html

Specification

Product number		C15550-23UP
Imaging device		qCMOS image sensor
Effective number of pixels		4096 (H) × 2304 (V)
Pixel size		4.6 µm (H) × 4.6 µm (V)
Effective area		18.841 mm (H) × 10.598 mm (V)
Quantum efficiency (typ.)		85 % (peak QE)
Full well capacity (typ.)		7000 electrons
Readout noise (typ.)	Standard scan	0.43 electrons (rms), 0.39 electrons (median)
	Ultra quiet scan	0.30 electrons (rms), 0.25 electrons (median)
Dynamic range (typ.) *1		23 000 : 1 (rms), 28 000 : 1 (median)
Dark signal non-uniformity (DSNU) (typ.) *2		0.06 electrons
Photoresponse non-uniformity (PRNU) (typ.) *2*3		<0.1 %
Linearity error	EMVA 1288 standard (typ.)	0.5 %

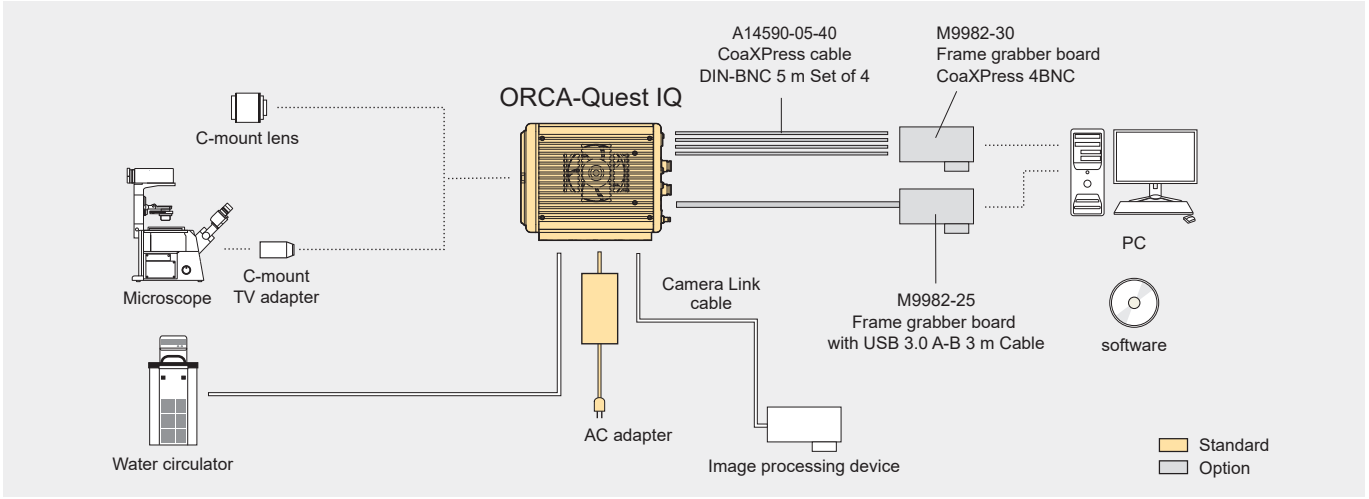
Cooling	Sensor temperature	Dark current (typ.)
Forced-air cooled (Ambient temperature: +25 °C)	−10 °C	0.032 electrons/pixels/s
Water cooled (Water temperature: +25 °C) *4	−10 °C	0.032 electrons/pixels/s
Water cooled [max cooling (Water temperature: +20 °C, Ambient temperature: +20 °C)] *4	−25 °C (typ.)	0.012 electrons/pixels/s

At Normal area readout		
Readout mode		Full resolution, Digital binning (2×2, 4×4), Sub-array
Frame rate at full resolution	Standard scan *5	120 frames/s (CoaXPress), 28.7 frames/s (Full Configuration) *6, 7.19 frames/s (Base Configuration) *6
	Ultra quiet scan	25.4 frames/s (CoaXPress), 25.4 frames/s (Full Configuration) *6, 7.19 frames/s (Base Configuration) *6
Exposure time	Standard scan *5	7.2 µs to 1800 s
	Ultra quiet scan	33.9 µs to 1800 s *7
Trigger input	External trigger input mode	Edge / Global reset edge / Level / Global reset level / Sync readout / Start
	Software trigger	Edge / Global reset edge / Start
	Trigger delay function	0 s to 10 s in 1 µs steps
At Lightsheet readout (Patented) *8		
Readout mode		Full resolution, Sub-array
Readout direction		Forward readout / Backward readout / Bidirectional readout / Reverse bidirectional readout
Row interval time		7.2 µs to 237.6 µs
Exposure time		7.2 µs to 273.7 ms
Trigger input	External trigger input mode	Edge / Start
	Software trigger	Edge / Start
	Trigger delay function	0 s to 10 s in 1 µs steps

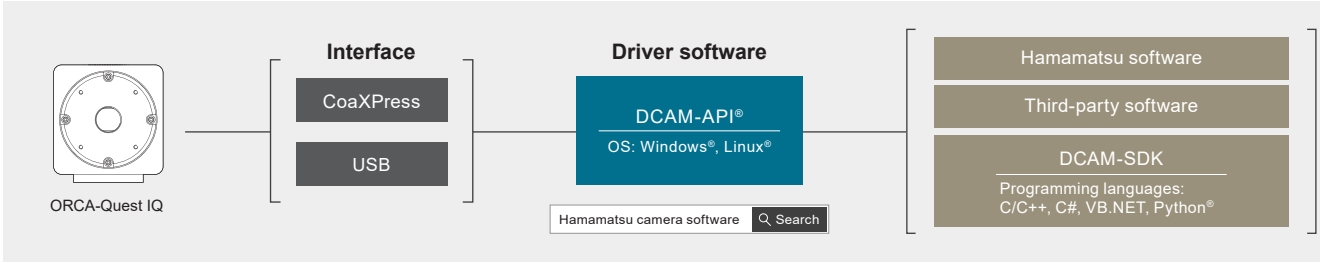
Trigger output		Global exposure timing output / Any-row exposure timing output / Trigger ready output / 3 programmable timing outputs / High output / Low output
Master pulse	Pulse mode	Free running / Start trigger / Burst
	Pulse interval	5 µs to 10 s in 1 µs step
	Burst count	1 to 65 535
Digital output		16 bit / 12 bit / 8 bit
Image processing function		Defect pixel correction (ON or OFF, hot pixel correction 3 steps)
Interface		USB 3.1 Gen 1 *9, CoaXPress (Quad CXP-6)
Image output dedicated interface *10		Camera Link (SDR-26): Base Configuration / Full Configuration
Trigger input connector		SMA
Trigger output connector		SMA
Lens mount		C-mount
Power supply		AC100 V to AC240 V, 50 Hz/60 Hz
Power consumption		Approx. 155 VA
Ambient operating temperature		0 °C to +35 °C
Ambient operating humidity		30 % to 80 % (With no condensation)
Ambient storage temperature		−10 °C to +50 °C
Ambient storage humidity		90 % Max. (With no condensation)

*1: Calculated from the ratio of the full well capacity and the readout noise in Ultra quiet scan.
*2: In Ultra quiet scan.
*3: At 3500 electrons, the center 1500 × 1500 area of the image sensor, 1000 times integration.
*4: Water volume is 0.46 L/m.
*5: Normal area readout mode only.
*6: When using the USB interface, images are output from both the USB and Camera Link interfaces simultaneously, and the sensor's operating rate is limited by the speed of the Camera Link interface.
At full resolution, if the sensor's operating rate exceeds 17.6 frames/s the frame of the image acquired via the USB interface may be lost.
*7: For both global reset edge trigger and global reset level trigger, the minimum exposure time is 67.8 µs.
*8: For more patent information, please refer to our website. https://www.hamamatsu.com/all/en/product/cameras/cmos-cameras/lightsheet-readout-mode.html
*9: Equivalent to USB 3.0 Gen 1.
*10: Images are output from the Camera Link I/F only when the camera is controlled via the USB I/F. Camera control via the Camera Link I/F is not possible.

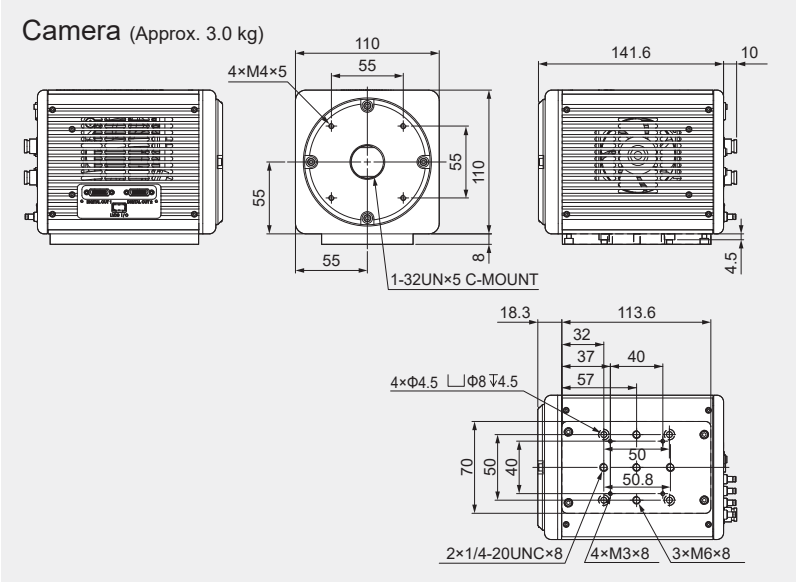
System configuration



Software and interface



Dimensional outlines (Unit: mm)



Option

Product number	Product name
M9982-30	Frame grabber board CoaXPress 4BNC
A14590-05-40	CoaXPress cable DIN-BNC 5 m Set of 4
A14590-10-40	CoaXPress cable DIN-BNC 10 m Set of 4
M9982-25	Frame grabber board with USB 3.0 A-B 3 m Cable
A12106-05	External trigger cable SMA-BNC 5 m
A12107-05	External trigger cable SMA-SMA 5 m

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