



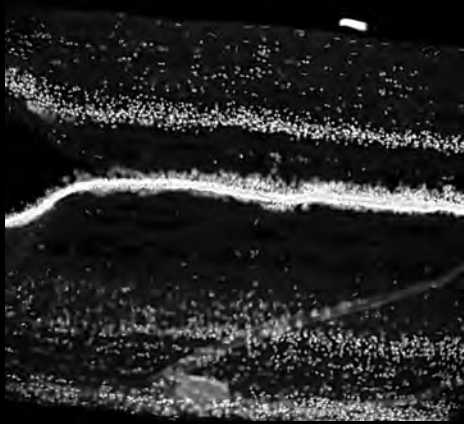
ORCA-**fusion**



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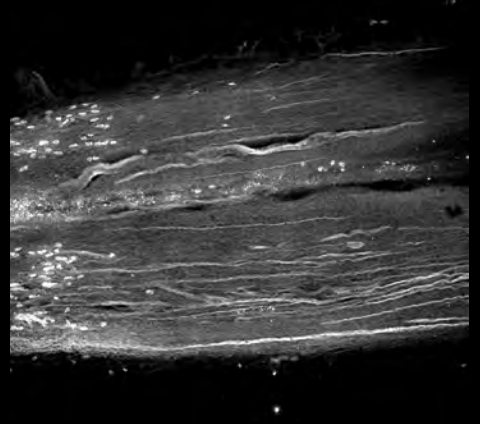
The ORCA-Fusion, built from the sensor up, balances the complex nuances of camera features to provide beautiful images and robust data at all light levels, but especially in tough low-light conditions. The exceptionally low and highly uniform read noise of



A



B



C

the ORCA-Fusion means that when the sample emits even just a handful of photons, either by default or by experimental design, they are not lost in the noise, but detected and reliably quantified. After all, when you want to hear a whisper it's best to be in a quiet place.

Camera
ORCA-Fusion

Product Number
C14440-20UP

Pixel Size
6.5 x 6.5 μm

Effective number of pixels
2304 x 2304

Effective Area
14.976 x 14.976 mm

FUSION IMAGES

A. Image of a regenerated lamprey spinal cord labeled with DAPI, which reveals the distribution of cells throughout the spinal cord. The brightest signal in the center of the spinal cord is the central canal. Credits: E. Guadarrama and J. Morgan (Marine Biological Laboratory).

B. Plant tissue culture induced to make xylem. Fluorescent bands are cell wall thickenings needed to reinforce the cell wall for water transport. Credits: Sample prepared by T. Baskin, UMass Amherst and provided by R. Oldenbourg, Marine Biological Laboratory.

C. Image of a regenerated lamprey spinal cord labeled with a neurofilament antibody, which reveals numerous regenerating axons. Credits: E. Guadarrama and J. Morgan (Marine Biological Laboratory).

| | |
|--|------|
| Readout noise (electrons, rms) ^{*1} | |
| Fast scan | 1.4 |
| Standard scan | 1.0 |
| Ultra quiet scan | 0.7 |
| Quantum efficiency ^{*1} | |
| @ 400 nm | 65 % |
| @ 550 nm | 80 % |
| @ 700 nm | 70 % |
| @ 800 nm | 50 % |
| Full well capacity ^{*1} | |
| 15,000 electrons | |
| Dynamic range ^{*1} | |
| 21,400:1 ^{*2} | |
| Conversion factor ^{*1} | |
| 0.24 electrons / count | |

| | |
|---------------------|---|
| Cooling Temperature | |
| With forced-air | -5°C (Ambient temperature: +25°C) ^{*3} |
| Water cooled | -5°C (Water temperature: +25°C) ^{*3} |

| | |
|---|-----|
| Dark current (electrons/pixel/second) ^{*1} | |
| @ -5°C | 0.5 |
| @ -15°C | 0.2 |
| Dark offset | |
| 100 counts | |

| | |
|-----------------------------------|-------------------|
| Dark signal non-uniformity (DSNU) | 0.3 electrons rms |
|-----------------------------------|-------------------|

| | |
|--|------------|
| Photo response non-uniformity (PRNU) | |
| @7500 electrons | 0.06 % rms |
| Linearity error ^{*1} (EMVA 1288 standard) | |
| 0.5 % | |

| | |
|---------------|--|
| Readout modes | Full resolution, digital binning (2 x 2, 4 x 4), sub-array, lightsheet |
|---------------|--|

| | |
|--|--|
| Readout times at full resolution ^{*4} | |
| Fast scan | 11.22 ms (89 fps with CoaXPress or 31.6 fps with USB3.0) |
| Standard scan | 42.99 ms (23.2 fps with CoaXPress or USB3.0) |
| Ultra quiet scan | 184.4 ms (5.4 fps with CoaXPress or USB3.0) |

| | |
|---------------------------------|---|
| Lightsheet readout (fast scan) | |
| Row interval time | 4.868 μs to 963.8 μs ^{*4} |
| Readout time at full resolution | 11.22 ms to 2.221 s ^{*4} |
| Readout modes | Full resolution, sub-array |
| Readout directions | Top to bottom readout / Bottom to top readout |

| | |
|------------------|-------------------------------|
| Exposure times | |
| Fast scan | 17 μs ~ 10 s (4.87 μs step) |
| Standard scan | 65 μs ~ 10 s (18.65 μs step) |
| Ultra quiet scan | 280 μs ~ 10 s (80.00 μs step) |

| | |
|--------------------------------------|---|
| Trigger modes | |
| Trigger delay function | Edge, Level, Sync readout, Start, Global reset edge, Global reset level, programmable |
| Trigger output | Yes |
| Trigger output | Global exposure timing, trigger ready, low, high |
| Input trigger connector | SMA x1 |
| Output trigger connectors | SMA x 3 |
| Master pulse mode | |
| Free running / start trigger / burst | |

| | |
|--|--|
| Digital output | |
| 16 bit ^{*5} / 12 bit / 8 bit | |
| Interface | |
| CoaXPress (6.25Gbpsx2 lane) and USB3.0 Super Speed ^{*6} | |
| Lens mount | |
| C-mount (Standard) / F-mount (Part Number TBD) | |
| Software | |
| HCLImage, LabVIEW, MATLAB, μManager | |

^{*1} Typical value

^{*2} Calculated from the ratio of the full well capacity and the readout noise

^{*3} Dark current depends on cooling temperature

^{*4} Valid to 4 digits and rounded up to 5th digit

^{*5} With standard scan, A/D = 14 bits + 2 bits for linearity correction

^{*6} USB 3.1 Gen 1 compatible

ORCA-Fusion

CAMERA SPECS

LOW NOISE AND EXCEPTIONAL
READ NOISE UNIFORMITY



HIGH RESOLUTION
2304 x 2304
5.3 Megapixels

HIGH SPEED
100 fps
At 2304 x 2048 ROI

DYNAMIC RANGE
21,400:1

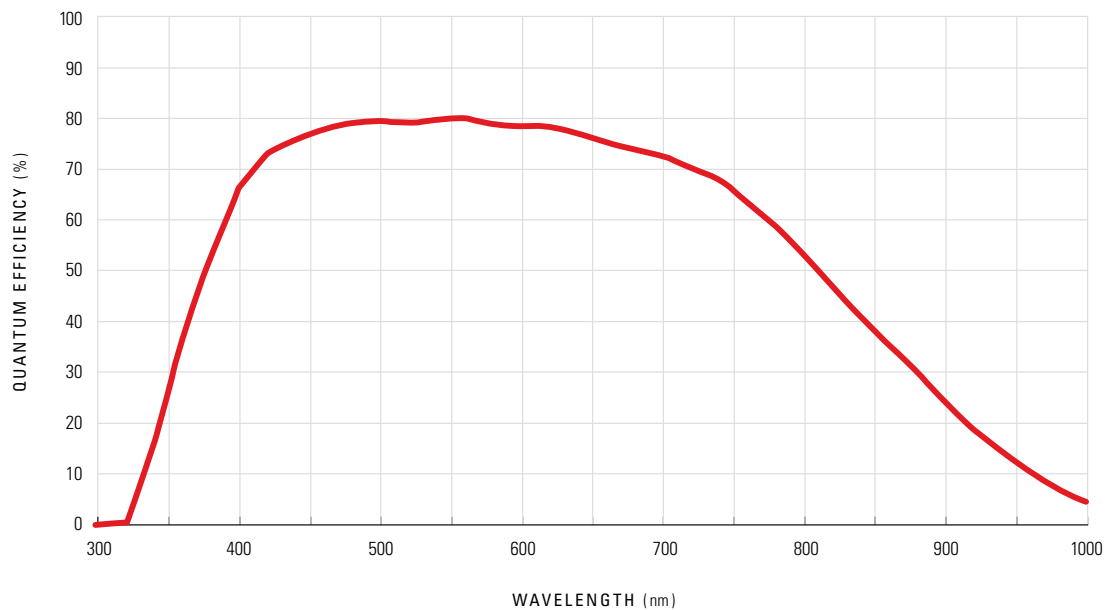
PIXEL SIZE
6.5 x 6.5 μm

READ NOISE
0.7 electrons, rms
Ultra Quiet Scan

PRNU
0.06 % rms
@ 7500 electrons

DSNU
0.3 electrons rms

PEAK QE
80 %





ORCA-Fusion

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