

# ORCA II<sup>®</sup>

## Digital CCD camera C11090-22B



### FEATURES

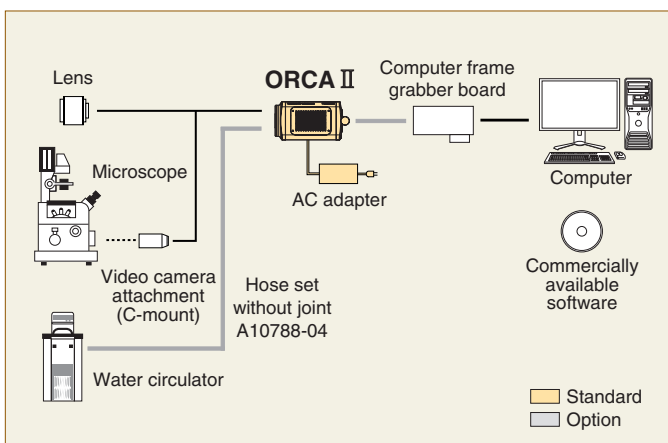
- **High resolution format**  
(1024 × 1024 pixels)
- **High quantum efficiency from UV to NIR**
- **Low readout noise**  
(6 electrons rms. typ.)
- **Dual readout mode**  
(high-resolution and high-speed readout mode)
- **Programmable trigger signal output**
- **Sub-array and binning readout mode**
- **IEEE1394b interface**

The ORCA II has a specialty feature of low noise and high-sensitivity. Maximum cooling down to -90 °C enables dark current as low as 0.0012 electrons/pixel/second and the 1024 × 1024 pixels BT-CCD (Back-thinned CCD) provides 1M pixel resolution and high quantum efficiency of over 90 % peak and broad sensitivity from UV to NIR. This camera is especially suitable for applications which require to detect faint light with long exposure time and low noise.

### APPLICATIONS

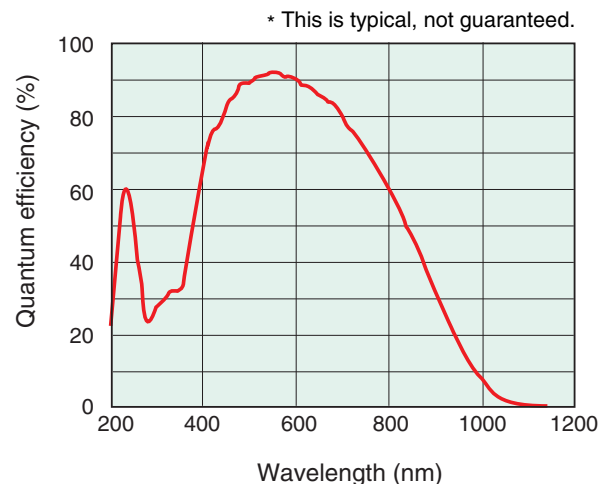
- **Luminescence and fluorescence imaging**
- **High resolution video microscopy**
- **Semiconductor imaging**
- **X-ray applications**
- **Neutron radiography**
- **Scintillator readout**

### SYSTEM CONFIGURATION



\* Please contact your local Hamamatsu representative or distributor regarding actual configuration.

### SPECTRAL RESPONSE



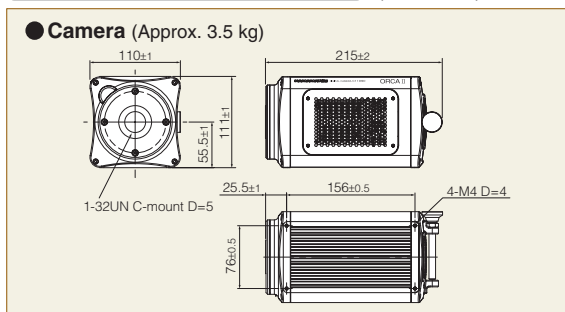
## SPECIFICATIONS

Type number		C11090-22B	
Camera head type		Hermetic vacuum-sealed air/water-cooled head <sup>*1</sup>	
Imaging device		Back-thinned frame transfer CCD	
Effective number of pixels		1024 (H) × 1024 (V)	
Cell size		13 μm (H) × 13 μm (V)	
Effective area		13.3 mm (H) × 13.3 mm (V)	
Pixel clock rate	High-precision readout	312.5 kHz	
	High speed readout	5 MHz	
Cooling method/ temperature <sup>*2</sup>	Forced-air cooled	at temperature control	
	Water cooled <sup>*3</sup>	at temperature control	-65 °C stabilized (0 °C to +30 °C)
		at maximum cooling typ.	-75 °C (Water temperature : +20 °C)
		-90 °C (Water temperature: lower than +10 °C)	
Readout noise <sup>*4</sup> (typ.)		6 electrons rms	
Full well capacity (1×1)		80 000 electrons	
Dark current (typ.)	Forced-air cooled (-65 °C)	0.0065 electron/pixel/s	
	Water cooled (-75 °C)	0.0012 electron/pixel/s	
Dynamic range <sup>*5</sup>		13 333:1	
A/D converter		16 bit	
Analog gain	High-precision readout	×1, ×4, ×18	
	High speed readout	×1 to ×6	
Exposure time <sup>*6</sup>	Internal synchronous mode	High-precision readout <sup>*7</sup>	3.53 s to 120 min (312.5 kHz)
		High speed readout	307 ms to 120 min (5 MHz)
	External synchronous mode	High-precision readout	400 ms to 120 min
		High speed readout	20 ms to 120 min
Binning		2 × 2, 4 × 4, 8 × 8	
Sub array readout		Every 8 lines (horizontal, vertical) size and position can be set	
External trigger mode <sup>*8</sup>		Edge trigger, Level trigger, Start trigger, Synchronous readout trigger	
External synchronization function		Trigger readout delay, Thin out of encoder pulses	
Trigger output <sup>*8</sup>		Exposure timing output, Programmable timing output (Delay and pulse length are variable.), Trigger ready output	
Interface		IEEE1394b	
Lens mount		C-mount	
Input power supply		AC 100 V to 240 V, 50 Hz / 60 Hz	
Power consumption		Approx. 120 VA	
Ambient storage temperature		-10 °C to +50 °C	
Ambient operating temperature		0 °C to +40 °C	
Performance guaranteed temperature		0 °C to +30 °C	
Ambient operating humidity		70 % max. (with no condensation)	

Binning		1×1	2×2	4×4	8×8
Frame rate (frames/s)	High-precision readout	0.28	0.55	1.04	1.88
	High speed readout	3.15	4.85	6.64	8.13

- \*1: The hermetic sealed head maintains a high degree of vacuum, 10<sup>-8</sup> Torr, without re-evacuation.  
 \*2: Thermal electric cooling +air or water cooling (Change with DIP SW). The cooling temperature may not reach to this temperature; it depends on the operation condition.  
 \*3: Water volume 0.5 liter/min.  
 \*4: High precision mode  
 \*5: Calculated from the ratio of the full well capacity and the readout noise.  
 \*6: Image smearing may appear when the exposure time is short.  
 \*7: Using DCAM-API, the value is 400 ms to 6.45 s.  
 \*8: C-MOS 3.3 V with reversible polarity.

## DIMENSIONAL OUTLINES (Unit : mm)



## OPTIONS

- IEEE1394b cable 9P-9P 4.5 m : A12344-05
- Hose set without joint : A10788-04
- External trigger cable SMA-BNC 5 m : A12106-05
- External trigger cable SMA-SMA 5 m : A12107-05
- Base plate common for ImagEM<sup>®</sup> X2 chassis : A12263-01

- ★ ORCA is registered trademark of Hamamatsu Photonics K.K. (France, Germany, Japan, U.K., U.S.A.)
  - ★ Product and software package names noted in this documentation are trademarks or registered trademarks of their respective manufacturers.
  - Subject to local technical requirements and regulations, availability of products included in this promotional material may vary. Please consult your local sales representative.
  - Information furnished by HAMAMATSU is believed to be reliable. However, no responsibility is assumed for possible inaccuracies or omissions.
- Specifications and external appearance are subject to change without notice.

© 2015 Hamamatsu Photonics K.K.

**HAMAMATSU PHOTONICS K.K.** [www.hamamatsu.com](http://www.hamamatsu.com)

**HAMAMATSU PHOTONICS K.K., Systems Division**

812 Joko-cho, Higashi-ku, Hamamatsu City, 431-3196, Japan, Telephone: (81)53-431-0124, Fax: (81)53-435-1574, E-mail: [export@sys.hpk.co.jp](mailto:export@sys.hpk.co.jp)

U.S.A.: Hamamatsu Corporation: 360 Foothill Road, Bridgewater, N.J 08807, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218 E-mail: [usa@hamamatsu.com](mailto:usa@hamamatsu.com)

Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-265-8 E-mail: [info@hamamatsu.de](mailto:info@hamamatsu.de)

France: Hamamatsu Photonics France S.A.R.L.: 19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: (33)1 69 53 71 00, Fax: (33)1 69 53 71 10 E-mail: [infos@hamamatsu.fr](mailto:infos@hamamatsu.fr)

United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, UK, Telephone: (44)1707-294888, Fax: (44)1707-325777 E-mail: [info@hamamatsu.co.uk](mailto:info@hamamatsu.co.uk)

North Europe: Hamamatsu Photonics Norden AB: Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46)8-509-031-00, Fax: (46)8-509-031-01 E-mail: [info@hamamatsu.se](mailto:info@hamamatsu.se)

Italy: Hamamatsu Photonics Italia S.r.l.: Strada della Moia, 1 int. 6 20020 Arese (Milano), Italy, Telephone: (39)02-93581733, Fax: (39)02-93581741 E-mail: [info@hamamatsu.it](mailto:info@hamamatsu.it)

China: Hamamatsu Photonics (China) Co., Ltd.: B1201 Jiaming Center, No.27 Dongsanhuan Beilu, Chaoyang District, Beijing 100020, China, Telephone: (86)10-6586-6006, Fax: (86)10-6586-2866 E-mail: [hpc@hamamatsu.com.cn](mailto:hpc@hamamatsu.com.cn)

Cat. No. SCAS0103E02  
 MAR/2015 HPK  
 Created in Japan