

# HAMAMATSU

DATA SHEET

(512 × 512 pixels BT(back-thinned) CCD)

## BT(Back-thinned)-CCD Cooled Digital Camera ORCA II-BT-512

4 stage peltier type



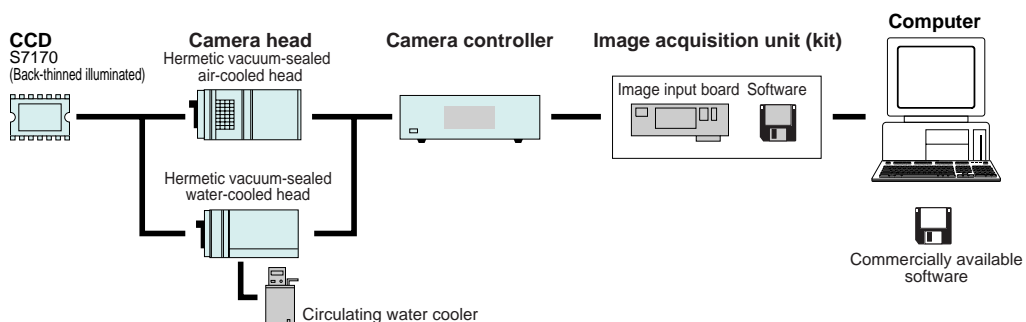
▲ Hermetic vacuum sealed air-cooled head type

The ORCA II-BT-512 features an original and unique Hamamatsu S7170 CCD chip packaged in a proprietary permanently sealed vacuum chamber evacuated to  $10^{-7}$  Torr. This high resolution, back thinned, back illuminated CCD offers very high quantum efficiency over the spectrum from 200 nm to 1000 nm. With a huge full well capacity, low read noise and MPP (Multi-Pinned Phase) technology in the drive circuits to reduce dark current, this camera will produce rapid exposures and very high dynamic range images. Dual mode digitization offers a software selectable choice of speed or very low noise readout methods with 12 bit to 16 bit precision. Special analog contrast enhancement circuits increase versatility for even the most difficult imaging conditions.

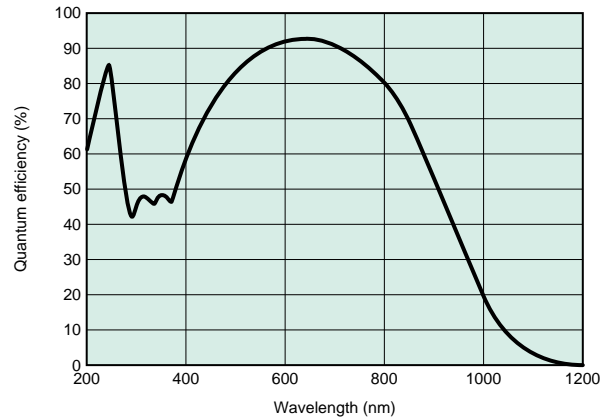
### APPLICATIONS

- Luminescence and Fluorescence
- Video microscopy
- Semiconductor imaging
- X-ray applications
- Neutron radiography
- Scintillator readout

### SYSTEM CONFIGURATION



### SPECTRAL RESPONSE CHARACTERISTIC



\* This is typical, not guaranteed.

### FEATURES

- High resolution format (512 × 512 pixels)
- High cooling performance with 4-stage peltier device
- High quantum efficiency from UV to NIR
- Very large full well capacity (230000 electrons typ.)
- Low readout noise design (7 electrons r.m.s. typ.)
- Software selectable dual digitizers
- Analog contrast enhancement

### TYPE NUMBER

C4742-98-26L  2

Cooling method  
A: Air-cooling  
W: Water-cooling

## SPECIFICATIONS

Type number	C4742-98-26LA2	C4742-98-26LW2
Camera head type	Hermetic vacuum sealed air-cooled head	Hermetic vacuum sealed water-cooled head
Circulating water cooler (sold separately)	-	Required
Mechanical shutter	Built-in (Control: OPEN / CLOSE / AUTO)	
Imaging device	S7170 full-frame transfer CCD	
Effective no. of pixels	512 (H) × 512 (V)	
Cell size	24 μm (H) × 24 μm (V)	
Effective area	12.29 mm (H) × 12.29 mm (V)	
Pixel clock rate	156 kHz/pixel (High-precision readout) / 2.5 MHz/pixel (High-speed readout)	
Frame rate	0.55 frame/s (High-precision readout) / 6.34 frame/s (High-speed readout)	
Readout noise (r.m.s.) (High-precision readout) typ.	7 electrons	
Full well capacity	230000 electrons	
Dynamic range* (High-precision readout)	32 875 : 1	
Cooling method	Peltier cooling / forced-air-cooling + hermetic sealing	Peltier cooling / water-cooling + hermetic sealing
Cooling temperature**	- 65 °C	- 75 °C
Dark current	0.17 electrons/pixel/s	0.032 electrons/pixel/s
A/D converter	16 bit (High-precision readout) / 12 bit (High-speed readout)	
Output signal (High-precision readout)	RS-422A 16 bit parallel output	
Exposure time	20 ms to 7200 s	
External control	RS-232C	
Sub-array	Yes	
External trigger	Yes	
Contrast enhancement	1, 4, 16 times (High-precision readout) / 1 to 6 times (High-speed readout)	
Lens mount	C-mount	
Line voltage	AC 100 V / AC 117 V / AC 220 V / AC 240 V, 50 Hz/60 Hz	
Power consumption	approx. 220 V·A	
Ambient storage temperature	-10 °C to +50 °C	
Ambient operating temperature	0 °C to +40 °C	
Ambient operating/storage humidity	70 % max. (with no condensation)	

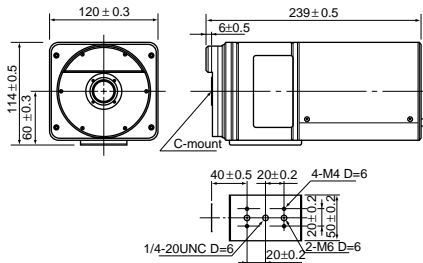
Binning		1 × 1	2 × 2	4 × 4	8 × 8	Subarray	256 × 256	128 × 128	
		Frame rate	High-precision readout	6.34 frame/s	9.84 frame/s		13.6 frame/s	16.8 frame/s	Frame rate
	High-speed readout	0.55 frame/s	1.07 frame/s	2.05 frame/s	3.75 frame/s		High-speed readout	1.86 frame/s	5.17 frame/s

\* Calculated from the ratio of the full well capacity and the readout noise.

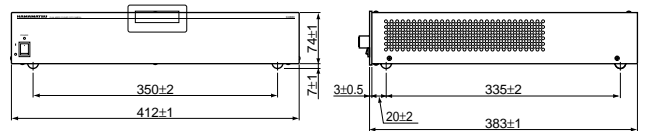
\*\* Air-cooled head; outside air temperature at +20 °C  
Water-cooled head; water temperature at +15 °C

## DIMENSIONAL OUTLINES (Unit: mm)

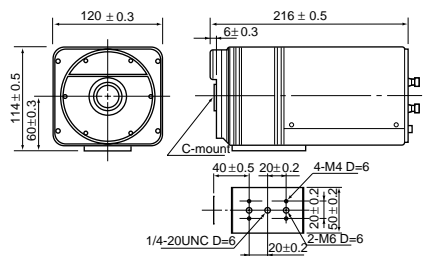
- Hermetic vacuum sealed air-cooled head (approx. 2.5 kg)



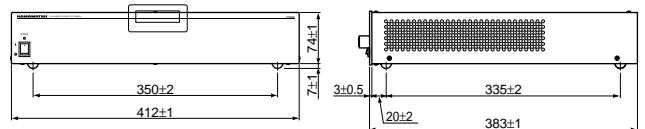
- Camera controller (approx. 8.5 kg)



- Hermetic vacuum sealed water-cooled head (approx. 2.5 kg)



- Camera controller (approx. 8.5 kg)



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Cat. No. SICS1134E01  
APR/2005 HPK  
Created in Japan (PDF)