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Find the *Hamamatsu C4742-98-24NR* at our website: ***Click HERE***

# Cooled Digital Camera: ORCA II (Model C4742-98)



The ORCA II Dual Scan Cooled CCD Camera is newly designed to combine high resolution, low noise, and high sensitivity with readout versatility. The ORCA II has two independent clock rates:

- 1.25MHz clock rate for high precision imaging, achieving 3 to 5 electrons read-out noise
- 10 MHz clock readout for high frame rate imaging (up to 5.3 Hz)

In addition, various pixel formats are attainable by adjusting binning or sub-array functions to achieve even faster frame rates.

The ORCA II incorporates a CCD with an effective 1280 x 1024 pixel array and **progressive scan interline** design to eliminate the need for a mechanical shutter. This permits high resolution and high speed measurement without the vibration often seen when using a mechanical shutter. The combination of Hamamatu's unique **hermetic vacuum sealing**, and peltier cooling, with air radiation, enables the CCD chip to operate at -40 to -50 °C. Vacuum levels of $10^{-5}$ Torr or better keeps the temperature consistent for extended periods of time. This suite of features drastically reduces the dark current of the CCD chip, making the camera the ideal choice for high sensitivity scientific measurements that require long exposure times.

AIA standard digital output ensures compatibility with a large selection of commercially available **frame grabber boards**. Control commands common to the ORCA make it easy for the various **commercially available software** to be adapted for the ORCA II.

## Features

- Dual scan modes with independent clock rates
- A/D converter
  - High scan mode: 12bit
  - High precision mode: 12bit or 14bit
- Various pixel formats with binning and sub-array
- Less read-out noise: 3 to 5 electrons r.m.s. typ
- High frame rate:
  - 5.3 frames/sec for full resolution
  - 28.8 frames/sec with 8 x 8 binning
- High Resolution of with 1280 x 1024 effective pixels
- **Progressive Scan Interline CCD** chip with no mechanical shutter
- Less dark current with -40 to -50 °C cooling
- High level of vacuum for extended period with hermetic vacuum sealing
- Unique Analog Gain and Offset for Contrast Enhancement
- Full remote control from PC

## Specifications and Additional Information

- **System Configuration**
- **Spectral Response Characteristics**
- **Specifications**
- **Camera Options and Part Numbers**

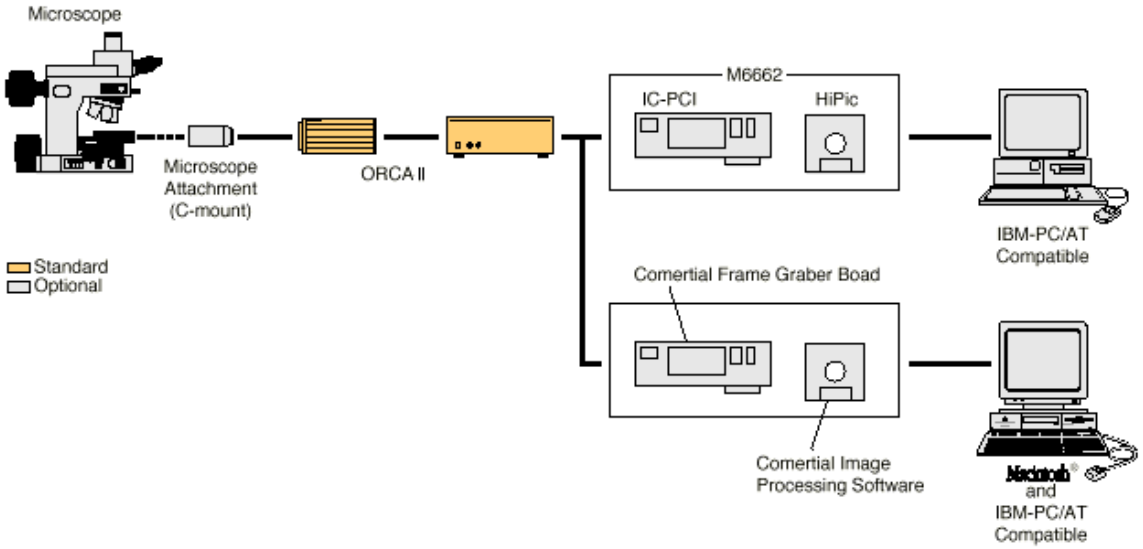
## Applications

- Fluorescent antibody techniques
- DNA cytometry
- Brightfield, DIC, Phase Contrast and Dark-field images
- Particle tracking
- Calcium Imaging
- Multi-mode Imaging
- Green Fluorescent Protein
- **FISH**

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# ORCA II - System Configuration




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# ORCA II - Specifications

| **Frame rate with binning (frames/sec)** | | | | |
|---|---|---|---|---|
| **Scan mode** | **No binning** | **2 x 2** | **4 x 4** | **8 x 8** |
| Fast scan mode | 5.3 | 10.1 | 17.8 | 28.8 |
| High precision scan mode | 0.8 | 1.6 | 3.0 | 5.2 |
| **Frame rate with sub-array (frames/sec)** | | | | |
| **Number of lines (no binning)** | **48 lines** | **96 lines** | **200 lines** | **496 lines** |
| Fast scan mode | 46.3 | 33.7 | 21.4 | 10.3 |
| High precision scan mode | 9.8 | 6.4 | 3.7 | 1.6 |
| **CCD Imager** | | | | |
| Pickup device | Progressive scan interline CCD | | | |
| Effective number of pixels | 1280 (H) x 1024 (V) | | | |
| Cell size | 6.7mm x 6.7mm (square format) | | | |
| Effective size | 8.58mm x 6.86mm (2/3 inch format) | | | |
| Features | Vertical overflow drain structure, anti-blooming function | | | |
| **Camera** | | | | |
| Readout noise | High scan mode: 10 electron r.m.s. typ. | | | |
| | High precision mode: 3 to 5 electron r.m.s. typ | | | |
| Cooling method | Peltier cooling, air radiation system | | | |
| Mean dark current | 0.001 electrons/pix/sec | | | |
| Lens mount | C mount | | | |
| **Digital Output** | | | | |
| Type | RS-422A Digital Output | | | |
| Synchronization method | Internal/External | | | |
| Gamma | 1 | | | |
| Dynamic Range | High scan mode: 1800 to 1 | | | |
| | High precision mode: 6000 to 1 (10,000:1 with binning) | | | |
| Clock Rate | High scan mode: 10MHz | | | |
| | High precision mode: 1.25 MHz | | | |
| Frame Rate | High scan mode: 5.3Hz | | | |
| | High precision mode: 0.8 Hz | | | |
| **Size and Weight** | | | | |
| Camera head | 120mm x 114mm x 239mm, approx. 2.5Kg | | | |
| Control unit | 412mm x 74mm x 383mm, approx. 8.5Kg | | | |

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# ORCA Camera Options and Part Numbers

## ORCA 100 Series

- **Primary Features**
  - 14.7 MHz readout rate with 10 electrons read noise
  - UV versions have no microlenses, MAX QE is less than 10%
  - Cooled to 5 degrees C, thermal noise only 1 electron/pixel/second
  - Interline transfer and Hyper HAD technology

- **Types by Part Number**
  - C4742-95-10NR ORCA 100, 1.3MB Digital, 10 Bit
  - C4742-95-10NRB ORCA 100, 1.3MB Digital, 10 BIT, 8x8 Binning
  - C4742-95-12NR ORCA 100, 1.3MB Digital, 12 BIT
  - C4742-95-12NRB ORCA 100, 1.3MB Digital, 12 BIT, 8X8 Binning
  - C4742-95-10NRU ORCA 100, 1.3MB Digital, 10 BIT, UV Version
  - C4742-95-12NRU ORCA 100, 1.3MB Digital, 12 BIT, UV Version
  - C4742-95-10NRC ORCA 100, 1.3MB Digital, 10 BIT, 8X8 Binning , UV
  - C4742-95-12NRC ORCA 100, 1.3MB Digital, 12 BIT, 8X8 Binning , UV

## ORCA II Series

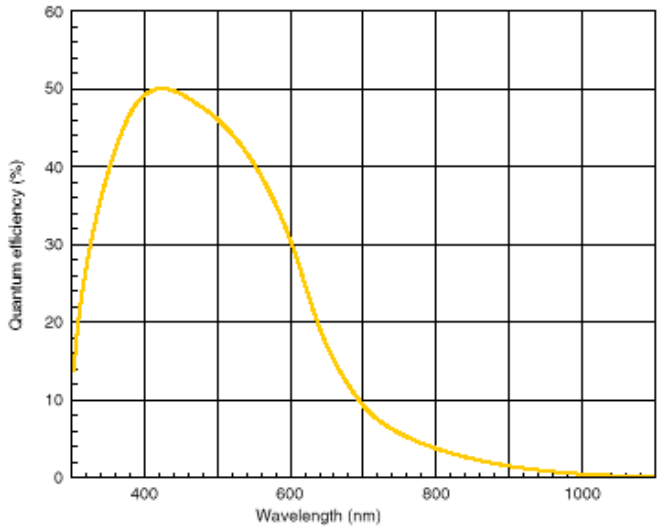
- **Primary Features of ORCA II**
  - 1) Fast Scan mode offers 10 MHz readout rate with 10 electrons read noise
  - 2) High Precision mode offers 1.25 MHz readout rate with 3-5 electrons read noise
  - 3) Waterless cooling to -40C or better reduces thermal noise to 0.001 electrons/pixel/second
  - 4) Interline transfer and Hyper HAD technology
  - 5) High Dynamic Range Mode offers 10,000:1 Dynamic Range

- **Types of ORCA II by Part Number**
  - C4742-98-22NR ORCA II, 1.3MB Digital, 12 BIT Fast Scan/12 Bit High Precision
  - C4742-98-24NR ORCA II, 1.3MB Digital, 12 BIT Fast Scan/14 Bit High Precision

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# ORCA II - Spectral Response Characteristics




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