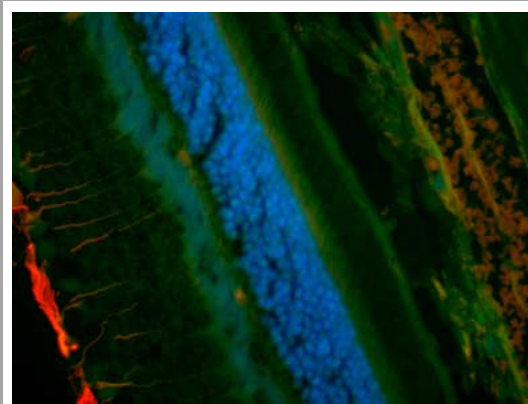




▲ Front cable mount model (Type number : C7780-10)

The ORCA-3CCD cooled digital color camera incorporates three cooled CCD chips, providing the rapid readout, high-resolution and superior S/N ratio of the Hamamatsu ORCA digital camera series. The three color CCDs employ an RGB prism to achieve extremely high quality color representation without color blur, performance difficult to achieve with a single-CCD camera. The CCDs used are the same as those used in the ORCA ER, providing proven high quantum efficiency and high resolution, cooled to 0°C for high sensitivity detection. It is suitable for a wide range of applications, from brightfield (ie.stained pathological specimens) to fluorescent specimens using GFP and fluorescent antibodies.



▲ Rat Retina triple labeled with GFAP--Cy3, S-100--FITC and DAPI  
Sample courtesy of Inspire Pharmaceuticals Durham,NC (Mr.Ward Peterson)

### FEATURES

- Total 4.13 million pixels
- Total 36 bit color resolution
- Cooling temperature of 0 °C
- Individual R,G,and B exposure settings
- 8 × 8 binning capability
- 9.1 Hz full speed display
- Low readout noise design (13 electrons r.m.s. typ.)

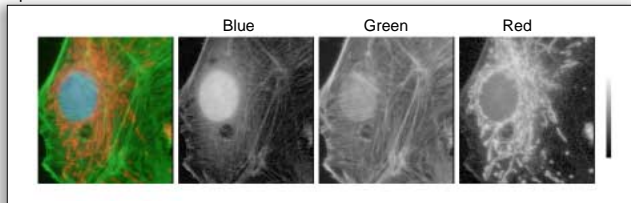
### APPLICATIONS

- Color digital time-lapse recording
- Fluorescence Resonance Energy Transfer(FRET) studies
- Fluorescence In Situ Hybridization (FISH) studies
- Histology, Pathology and Cytology

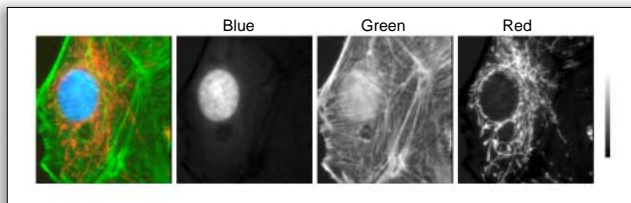
## ● High performance R,G,and B separation

The ORCA-3CCD incorporates three color CCDs with a RGB prism to achieve color separation superior to that available with a conventional single CCD with mosaic filter for microscope use.

Trichrome stained DAPI (blue), BODIPY FL (green), and MitoTracker (red) specimens were observed simultaneously using a D-F-T triple band mirror cassette. Separation of the color image into B, G, and R revealed admixture of BODIPY FL (green) fluorescence in the B (blue) and R (red) channels when using the single CCD with mosaic filter, however when the ORCA-3CCD was used, skillful matching of the fluorescent dyes with the wavelength separation prism achieved excellent color separation.



▲Color separation of single CCD with mosaic filter



▲Color separation of ORCA-3CCD

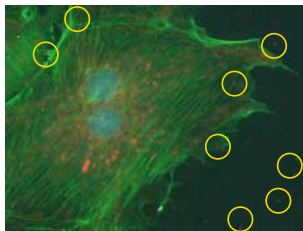
## ● Total 4.13 million pixels

The use of three color CCDs in the ORCA-3CCD eliminates the deterioration in B (blue) and R (red) resolution which tends to occur with single color CCDs.

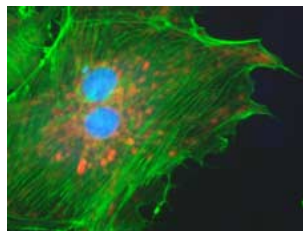
The high spatial resolution of approximately 1,300,000 pixels for each of the R, G, and B channels allows acquisition of highly detailed fluorescing images.

## ● Cooling temperature of 0 °C

The ORCA-3CCD employs Hamamatsu's own cooling technology\* to lower the temperature of the CCDs to 0°C. This significantly reduces the noise characteristics often associated with long exposures, thus allowing observation of faint levels of fluorescence.

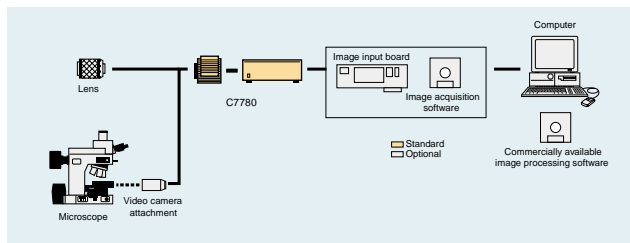


▲ Non-cooled digital color camera  
Yellow circles : Location of dark noise



▲ ORCA3CCD

## ■ SYSTEM CONFIGURATION



## ■ SPECIFICATIONS

Type number	C7780*
Sensor structure	3 chip CCD with RGB prism
Imaging device	Progressive scan interline CCD
Effective no. of pixels	1344 (H) × 1024 (V)
Cell size	6.45 μm × 6.45 μm (square format)
Effective area	8.67 mm × 6.60 mm (2/3-inch format)
Pixel clock rate	16 MHz/pixel
Frame rate	9.1 Hz
2 × 2 binning	17.9 Hz
4 × 4 binning	31.5 Hz
8 × 8 binning	49.2 Hz
Readout noise (r.m.s.)	13 electrons
Full well capacity	18,000 electrons
Dynamic range**	1,384 : 1
Cooling method	Peltier cooling with air radiation
Cooling temperature	0 °C at 20 °C ambient temperature
Dark current	0.5 electron/pixel/sec
A/D converter	12 bit
Output signal (digital output)	12-bit, 10 bit and 8 bit × 3 channels parallel output
Exposure time	128 μsec to 10 sec
External control	RS-232C (full remote for all camera functions)
Sub array	yes
External trigger	yes
Lens mount	2/3-inch bayonet mount (flange back 48mm)
Line voltage	100 / 117 / 220 / 240 V, 50/60 Hz
Power consumption	77 VA
Ambient storage temperature	-10 to + 50 °C
Ambient operating temperature	0 to + 40 °C
Ambient operating/storage humidity	70% max. (no condensation)

\* "ORCA 3CCD Digital Color Camera w/front cable mount" for the C7780-10

"ORCA 3CCD Digital Color Camera w/rear cable mount" for the C7780-20

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

## ■ OPTIONAL

Image input board	<ul style="list-style-type: none"> <li>● PC-DIG</li> <li>● Phoenix 66M version</li> </ul>
Image acquisition software	<ul style="list-style-type: none"> <li>● AquaCosmos</li> <li>● Photoshop plug-in</li> <li>● Image Pro Plus plug-in</li> <li>● Sample software</li> </ul>



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Cat. No. SICS1094E03  
MAY/2002. HPK  
Created in Japan (PDF)