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HAMAMATSU

DATA SHEET

Fast Scan Multi Format Cooled CCD Camera C4880-80



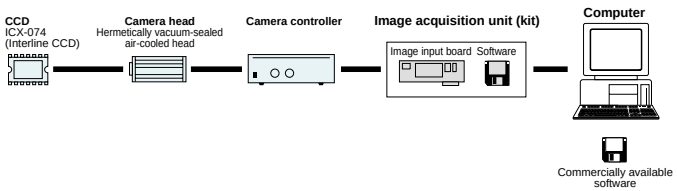
▲ Naturally air-cooled head

These low noise/high frame rate camera systems maintain the superb noise characteristic of the conventional cooled CCD camera, while at the same time adding high speed.
In order to achieve both high speed and a low noise characteristic, a progressive scan interline CCD is used, which eliminates the need for a mechanical shutter. This means that problems such as vibration caused by the mechanical shutter at high frame rates, and the lifetime of the mechanical shutter, have been completely eliminated. In addition, taking advantage of the low dark current characteristic of the CCD used in these models, cooling can be suppressed to the minimum necessary level, and by switching from a conventional forced cooling system to a system which discharges heat by natural means, operation is significantly improved.

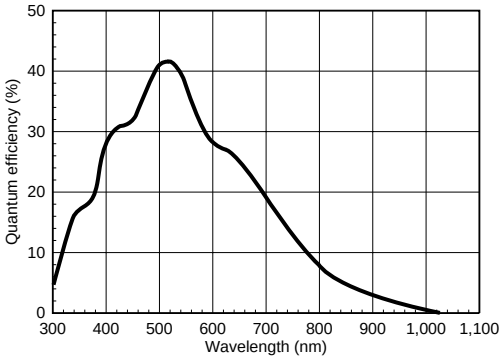
APPLICATIONS

- **Faint light observation under a microscope**
- **Continuous imaging of high-speed moving objects**
- **Kinetic changes in light intensity**

SYSTEM CONFIGURATION



SPECTRAL RESPONSE CHARACTERISTICS



* This is typical, not guaranteed.

FEATURES

- **Progressive scan interline CCD used with no mechanical shutter**
- **Two scan modes as well as sub-array and binning functions available**
- **Maximum frame rate of up to approximately 500 frames/sec**
- **Fast scan readout with low noise**
- **Full computer control**

TYPE NO.

C4880-80-□□ A

Bit number on A/D converter
12: Fast scan mode 10-bit
High precision scan mode 12-bit
14: Fast scan mode 10-bit
High precision scan mode 14-bit
22: Fast scan mode 12-bit
High precision scan mode 12-bit
24: Fast scan mode 12-bit
High precision scan mode 14-bit

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SPECIFICATIONS

Model name		C4880-80-□□-A
Camera head type		Naturally air-cooled head
Circulating water cooler (sold separately)		–
Vacuum pump (sold separately)		–
Imaging device		ICX-074 Model 1/2 full-pixel scanning interline CCD
Effective no. of pixels		656 (H) × 494 (V)
Cell size		9.9 (H) × 9.9 (V) µm
Effective area		6.49 (H) × 4.89 (V) mm
Readout noise	Min.	5 electrons r.m.s.
	Typ.	7 electrons r.m.s.
Full well capacity		30,000 to 50,000 electrons
Dynamic range	Typ.	4,300 : 1
	Max.	10,000 : 1
Frame rate	High-precision scan mode	1Hz (1 × 1 binning), 310Hz (32 × 32 binning)
	Fast scan mode	28Hz (1 × 1 binning), 529Hz (32 × 32 binning)
Cooling method		Peltier cooling / natural air cooling
Cooling temperature		0˚C (Cools the CCD element to 20˚C less than the ambient temperature)
CCD cooling control		Normally ON
Dark current		3 electrons/pixel/sec
Exposure time		1/8,000 sec to 10 sec
A/D converter		12 / 14 bits
Lens mount		C-mount
Mechanical shutter		–
Variable analog gain		Front panel dial / software-controlled switching, 1 - 10 times (high-speed scan)
Variable offset		Front panel dial / software-controlled switching (fast scan)
Amp gain		2 steps (fast scan), 3 steps (precision scan)
Binning scan		Yes
Sub-array scan		1/1, 1/2, 1/4, 1/8 (H) × any desired number (V)
Super-pixel scan		2 × 2, 4 × 4, 8 × 8, 16 × 16, 32 × 32
External trigger input		Yes
Output signal (digital output)		Parallel digital output (conforms to RS-422)
External control		RS-232C
Ambient storage temperature		-10 to +50 ˚C
Ambient operating temperature		0 ˚C to +40 ˚C
Ambient operating/storage humidity		70% max. (with no condensation)
Line voltage		100 / 117 / 220 / 240 VAC, 50/60 Hz
Power consumption		Approx. 115 VA

■ High-precision scan mode

● Full frame readout

Binning number	1 × 1	2 × 2	4 × 4	8 × 8	16 × 16	32 × 32
No. of pixels (H × V)	656 × 494	328 × 247	164 × 123	82 × 61	41 × 30	20 × 15
Frame rate (Hz)	1	4	14	45	133	310

● Sub-array scan (100 × 100 area)

Binning number	1 × 1	4 × 4
No. of pixels (H × V)	100 × 100	25 × 25
Frame rate (Hz)	25	127

■ Fast scan mode

● Full frame readout

Binning number	1 × 1	2 × 2	4 × 4	8 × 8	16 × 16	32 × 32
No. of pixels (H × V)	656 × 494	328 × 247	164 × 123	82 × 61	41 × 30	20 × 15
Frame rate (Hz)	28	53	102	189	328	529

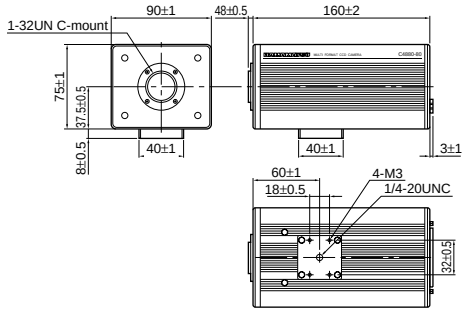
● Sub-array scan (100 × 100 area)

Binning number	1 × 1	4 × 4
No. of pixels (H × V)	100 × 100	25 × 25
Frame rate (Hz)	90	170

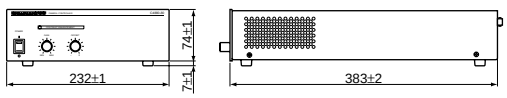
Note: Values for scan speeds are typical values. Please consult with HAMAMATSU for further information.

DIMENSIONAL OUTLINES

● Camera head (approx. 1.3 kg)



● Camera controller (approx. 6.3 kg)



ISO 9001 Certificate: 09 105 79045

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