

HAMAMATSU

DATA SHEET

Fast Scan Multi Format Cooled CCD Camera C4880-80



▲ Naturally air-cooled head

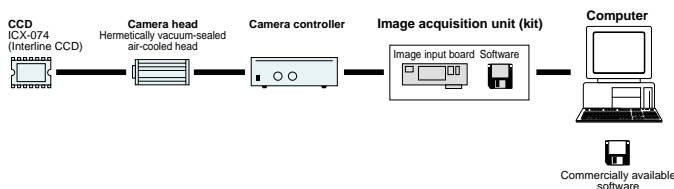
These low noise/high frame rate camera systems maintain the superb noise characteristic of the conventional cooled CCD camera, while at the same time adding high speed.

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.

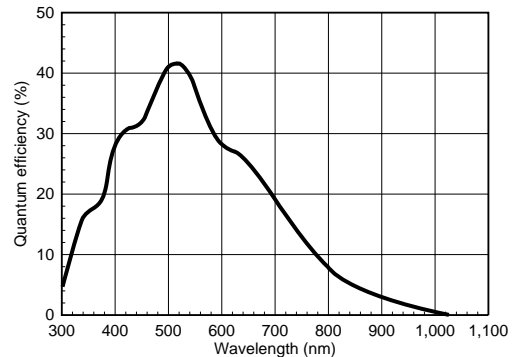
APPLICATIONS

- 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

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. Typ. | 5 electrons r.m.s. 7 electrons r.m.s. |
| Full well capacity | 30,000 to 50,000 electrons | |
| Dynamic range | Typ. Max. | 4,300 : 1 10,000 : 1 |
| Frame rate | High-precision scan mode Fast scan mode | 1Hz (1 × 1 binning), 310Hz (32 × 32 binning) 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 |

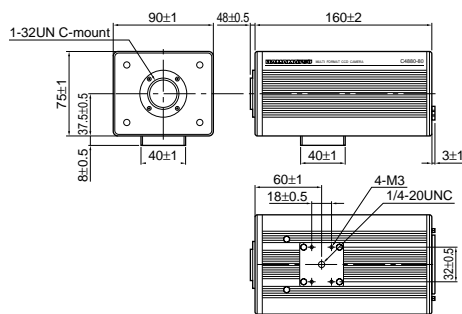
Sub-array scan (100 × 100 area)

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

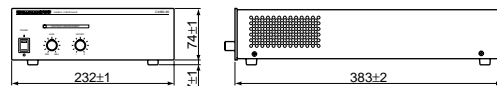
Note: Values for scan speeds are typical values. Please consult with HAMAMATSU for further information.

DIMENSIONAL OUTLINES

Camera head (approx. 1.3 kg)



Camera controller (approx. 6.3 kg)



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HAMAMATSU

Homepage Address <http://www.hamamatsu.com>

HAMAMATSU PHOTONICS K.K., Systems Division
812 Joko-cho, Hamamatsu City, 431-3196, Japan, Telephone: (81)53-431-0124, Fax: (81)53-435-1574, E-mail: export@sys.hpk.co.jp

U.S.A. and Canada: Hamamatsu Photonic Systems: 360 Foothill Road, Bridgewater, N.J. 08807-0910, U.S.A., Telephone: (1)908-231-1116, Fax: (1)908-231-0852, E-mail: usa@hamamatsu.com

Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-2658, E-mail: info@hamamatsu.de

France: Hamamatsu Photonics France S.A.R.L.: 8, 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

United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road Welwyn Garden City Hertfordshire AL7 1BW U.K., Telephone: (44) 1707-294888, Fax: (44) 1701-325777, E-mail: info@hamamatsu.co.uk

North Europe: Hamamatsu Photonics Norden AB: Smidesvägen 12, SE-171-41 Solna, Sweden, Telephone: (46)8-509-031-00, Fax: (46)8-509-031-01, E-mail: info@hamamatsu.se

Italy: Hamamatsu Photonics Italia S.R.L.: Strada della Moia, 1/E 20020 Arese (Milano), Italy, Telephone: (39)02-935 81 733, Fax: (39)02-935 81 741, E-mail: info@hamamatsu.it

Cat. No. SICS1045E04
MAR/2002 HPK
Created in Japan (PDF)