TDI Camera
C10000-401

Time Delay Integration Camera

The C10000-401 TDI camera is useful for a wide range of imaging applications requiring high speed operation with high sensitivity simultaneously. TDI is a special image acquisition method that has been used extensively in machine vision applications for industrial inspection. TDI imaging is appropriate for applications where it is desired to record a linear process over time, or where the aspect ratio of the subject being imaged is significantly asymmetric. TDI is particularly useful for low light level scanning applications for which a typical line scan camera can not make a useful image. Also, frame readout mode is available for easy focusing.

FEATURES

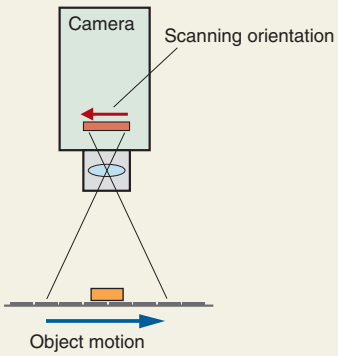
- **High resolution / high sensitivity**
  (Horizontal spatial resolution with 128(V) TDI stages)
  - 2048(H) × 128 (V) , 4 TAP
- **Line rate up to 50 kHz**
- **High speed imaging combined with high sensitivity and low noise**
- **Great spectral response for UV-NIR with back thinned CCD**
- **100× anti-blooming with lateral overflow drain**
- **Dynamic range of 800 : 1**
- **12 bit / 8 bit selectable A/D converter**
- **Bi-directional scanning operation**
- **Frame readout mode for easy focusing**
- **Real time shading correction with internal DSP**

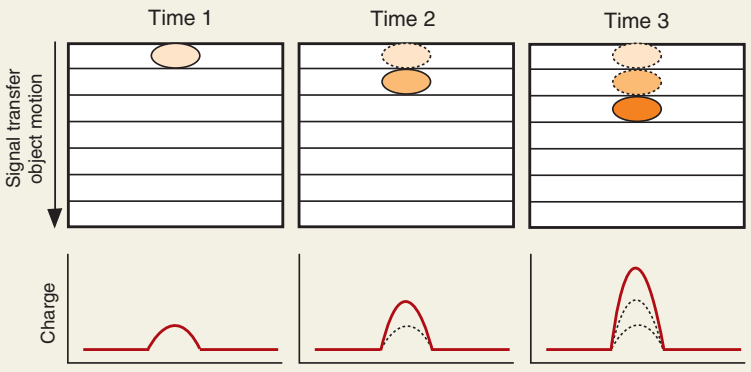
APPLICATIONS

- **High speed imaging for low light applications i.e. fluorescence imaging**
- **Electronics manufacturing and inspection**
- **Semiconductor inspection**
- **High speed scanning for a large size sample i.e. flat panel displays**

OPERATING PRINCIPLE OF TDI

TDI (Time Delay Integration):
Time Delay Integration is a technology of scanning in which a frame transfer device produces a continuous video image of a moving object by means of a stack of linear arrays aligned with and synchronized to the motion of the object to be imaged in such a way that, as the image moves from one line to the next, the integrated charge moves along with it, providing higher resolution at lower light levels than is possible with a line-scan camera.





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SPECIFICATIONS

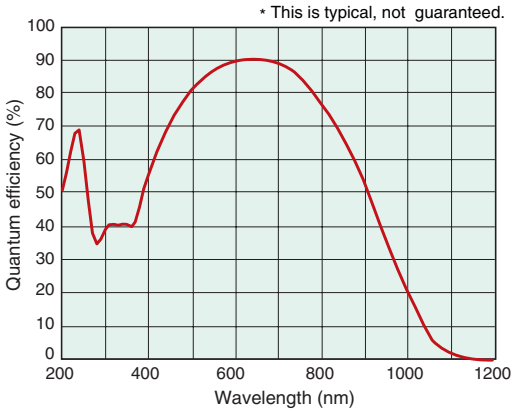
Type number	C10000-401
Pixel number	2048 (H) × 128 (V)
Device structure	Back thinned type
Cell size	12 µm(H) × 12 µm(V)
Effective area	24.58 mm(H) × 1.536 mm(V)
Readout mode	TDI readout mode or frame readout mode*1
TDI transfer direction	Bi direction
TDI output channel	4 TAP (512 × 4)
Anti-blooming	Lateral overflow drain (100×)
TDI pixel clock rate	30 MHz
TDI line rate	0.45 kHz to 50 kHz
TDI line rate control	Internal setting by serial command*2 / External trigger
Full-well capacity (typ.)	80 000 electrons
Readout noise (typ.)	100 electrons r.m.s.
Dynamic range (typ.)	800 : 1
Binning	2 × 2
Analog enhancement gain	1 time to 5 times (16 steps)
A/D converter	12 bit / 8 bit *3
Image processing	Real-time shading correction
Interface	Base Configuration
Camera control	Serial control in Camera Link
Camera output clock	60 MHz
Camera output channel	2 TAP (1024 × 2)
Camera Link connector	Mini-Camera Link (SDR) × 1
Lens mount	F-mount
Power / Power consumption	DC +12 V / 20 W
Ambient storage tenmperature	-10 ℃ to +50 ℃
Ambient operating temperature	0 ℃ to +40 ℃
Ambient operating / storage humidity	70 % max. (with no condensation)

*1 Frame readout mode is useful for easy focusing, but it is not suitable for measurement. Please consult with our sales office for details

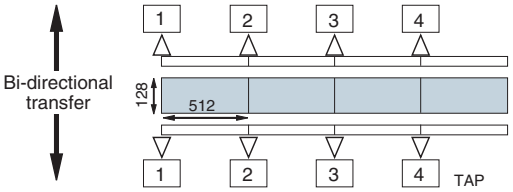
*2 Internal TDI line rate is set by 33 ns step.

*3 Selectable by serial command.

SPECTRAL RESPONSE

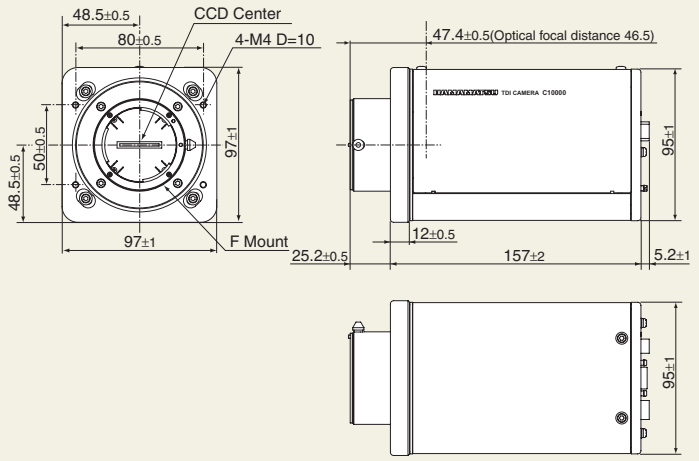


TDI SENSOR STRUCTURE



DIMENSIONAL OUTLINES (Unit : mm)

● **C10000-401 (Approx. 1.4 kg)**



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HAMAMATSU http://www.hamamatsu.com

HAMAMATSU PHOTONICS K.K., Systems Division
812 Joko-cho, Higashi-ku, 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 Corporation: 360 Foothill Road, Bridgewater, N.J. 08807-0910, U.S.A., Telephone: (1) 908-231-0960, 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.: 19, 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) 1707-325777, 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 int.6-200020 Arese (Milano), Italy, Telephone: (39)02-935 81 733, Fax: (39)02-935 81 741, E-mail: info@hamamatsu.it

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