

# TDI camera C10000-801



The C10000-801 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 1600 : 1
- 12 bit / 8 bit selectable A/D converter
- Bidirectional scanning operation
- Frame readout mode for easy focusing
- Real time shading correction with internal DSP

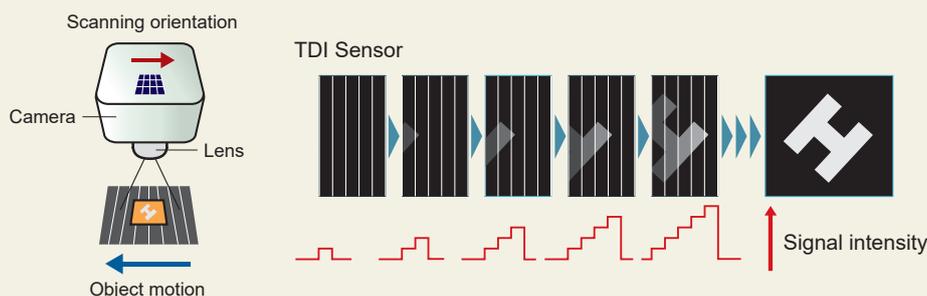
## Applications

- 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 scanning technology 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.



## Specifications

Product number	C10000-801
Device structure	Back-thinned type
Effective number of pixels	2048 (H) × 128 (V)
Cell size	12 μm (H) × 12 μm (V)
Effective area	24.58 mm (H) × 1.536 mm (V)
Lens mount	F-mount
Camera Link connector	Mini-Camera Link (SDR) × 1
Readout mode	TDI readout mode / frame readout mode *1
TDI transfer direction	Bidirectional transfer
TDI output channel	4 TAP (512 × 128)
Anti-blooming	Yes (100 times of the full well capacity)
TDI pixel clock rate	30 MHz
TDI line rate	0.457 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 (rms typ.)	50 electrons
Dynamic range	1600 : 1
Binning	2×2, 4×4
Analog enhancement gain	1 time to 5 times (16 steps)
Digital output	12 bit / 8 bit *3
Image processing	Real-time shading correction / Back ground subtraction
Interface	Camera Link base configuration
Camera control	Serial control in Camera Link
Camera output clock	60 MHz
Camera output channel	2 TAP (1024 × 128)
Power requirements	AC100 V to AC240 V, 50 Hz/60 Hz
Power consumption	Approx. 55 VA
Ambient operating temperature	0 °C to +40 °C
Ambient operating humidity	30 % to 70 % (with no condensation)
Ambient storage temperature	-10 °C to +50 °C
Ambient storage humidity	90 % or less (with no condensation)

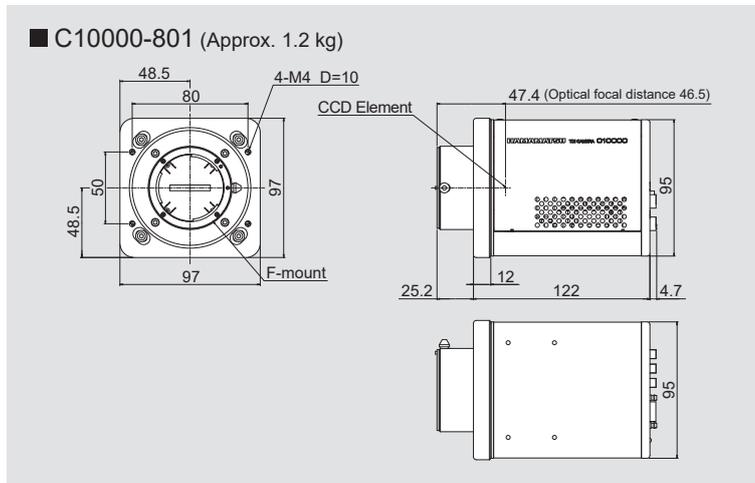
\*1 Frame readout mode is useful for easy focusing, but it is not suitable for measurement.

Please consult with our sales office for details.

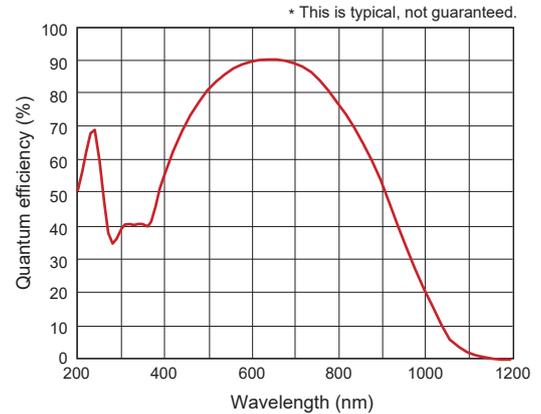
\*2 Internal TDI line rate is set by 33 ns step.

\*3 Selectable by serial command

## Dimensional outlines (Unit: mm)

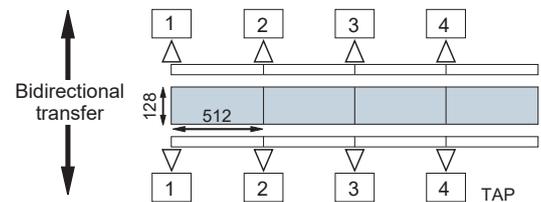


## Spectral response



\* Without sapphire window. With the sapphire window, the spectral response is decreased due to the transmittance characteristics of the window.

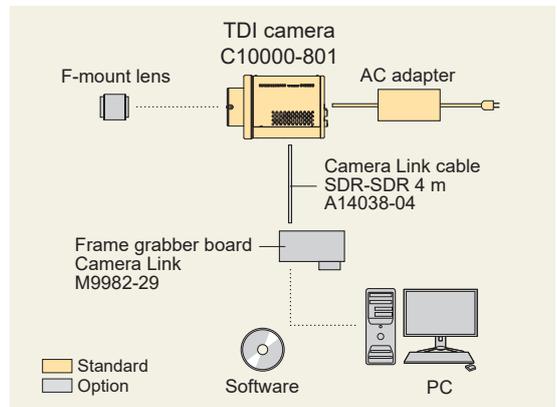
## TDI sensor structure



## Options

Product number	Product name
A12106-05	External trigger cable SMA-BNC 5 m
A12107-05	External trigger cable SMA-SMA 5 m
A14038-04	Camera Link cable SDR-SDR 4 m
M9982-29	Frame grabber board Camera Link

## System configuration



- The product and software package names noted in this brochure are trademarks or registered trademarks of their respective manufacturers.
- Subject to local technical requirements and regulations, availability of products included in this brochure may vary. Please consult your local sales representative.
- The product described in this brochure is designed to meet the written specifications, when used strictly in accordance with all instructions.
- The spectral response specified in this brochure is typical value and not guaranteed.
- Specifications and external appearance are subject to change without notice.

© 2024 Hamamatsu Photonics K.K.

## HAMAMATSU PHOTONICS K.K. [www.hamamatsu.com](http://www.hamamatsu.com)

### Systems Division

812 Joko-cho, Chuo-ku, Hamamatsu City, 431-3196, Japan, Telephone: (81)53-431-0124, Fax: (81)53-433-8031, E-mail: [export@sys.hpk.co.jp](mailto:export@sys.hpk.co.jp)

U.S.A.: HAMAMATSU CORPORATION: 360 Foothill Road, Bridgewater, NJ 08807, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218

Germany: HAMAMATSU PHOTONICS DEUTSCHLAND GMBH: Arzbergerstr. 10, 82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-265-8 E-mail: [info@hamamatsu.de](mailto: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](mailto:infos@hamamatsu.fr)

United Kingdom: HAMAMATSU PHOTONICS UK LIMITED: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire, AL7 1BW, UK, Telephone: (44)1707-294888, Fax: (44)1707-325777 E-mail: [info@hamamatsu.co.uk](mailto:info@hamamatsu.co.uk)

North Europe: HAMAMATSU PHOTONICS NORDEN AB: Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46)8-509 031 00, Fax: (46)8-509 031 01 E-mail: [info@hamamatsu.se](mailto:info@hamamatsu.se)

Italy: HAMAMATSU PHOTONICS ITALIA S.R.L.: Strada della Moia, 1 int. 6, 20044 Arese (Milano), Italy, Telephone: (39)02-93 58 17 33, Fax: (39)02-93 58 17 41 E-mail: [info@hamamatsu.it](mailto:info@hamamatsu.it)

China: HAMAMATSU PHOTONICS (CHINA) CO., LTD.: 1201 Tower B, Jiaming Center, 27 Dongsanhuan Beilu, Chaoyang District, 100020 Beijing, P.R. China, Telephone: (86)10-6586-6006, Fax: (86)10-6586-2866 E-mail: [hpc@hamamatsu.com.cn](mailto:hpc@hamamatsu.com.cn)

Taiwan: HAMAMATSU PHOTONICS TAIWAN CO., LTD.: 13F-1, No.101, Section 2, Gongdao 5th Road, East Dist., Hsinchu City, 300046, Taiwan(R.O.C.), Telephone: (886)3-659-0080, Fax: (886)3-659-0081 E-mail: [info@hamamatsu.com.tw](mailto:info@hamamatsu.com.tw)

Cat. No. SCAS0085E06  
JAN/2024 HPK  
Created in Japan