

Cooled TDI Camera C9260-920T, -930T Series



The Cooled TDI Camera C9260-920T, -930T series are useful for a wide range of imaging applications requiring high speed operation with high sensitivity. 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.

C9260-920T,-930T series integrate high quality rectangular CCD manufactured by Hamamatsu Photonics. Front illuminated and back-thinned cooled sensor combined with a wide range of resolutions making this camera ideal for all applications from UV to NIR.

USB 2.0 and IEEE1394 standard interfaces allow easy integration in your system. In addition to TDI (Time Delay Integration) readout mode, C9260-920T,-930T can support full line binning readout mode for spectroscopy applications as factory setting option.

PRINCIPLE OF TDI

What is TDI (Time Delay Integration) readout ?

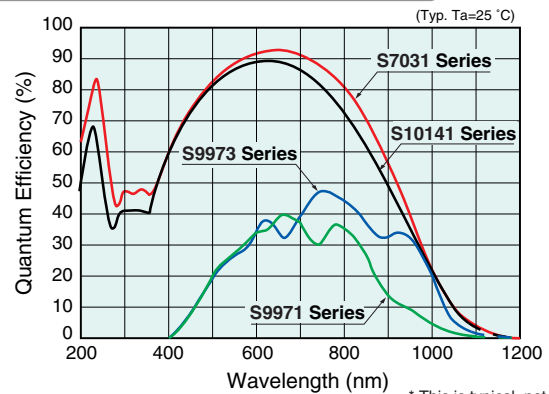
Time Delay Integration is a method of scanning in which a frame transfer device produces a continuous video image of a moving object by means of a stack of linear arrays aligned with and synchronized to the movement of the object to be imaged. In such a way that, as the image moves from one line to the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

APPLICABLE CCD SENSORS

Type number	Sensor type	Window material	Pixel number	Pixel size	Effective area	Read out noise (typ.)
S7031-1006S	Back-thinned CCD	AR coated sapphire glass	1024 × 58	24 μm × 24 μm	24.576 mm × 1.392 mm	50 electrons r.m.s.
S7031-1007S	Back-thinned CCD	AR coated sapphire glass	1024 × 122	24 μm × 24 μm	24.576 mm × 2.928 mm	50 electrons r.m.s.
S7031-1008S	Back-thinned CCD	AR coated sapphire glass	1024 × 250	24 μm × 24 μm	24.576 mm × 6.000 mm	50 electrons r.m.s.
S9971-1006	Front illuminated CCD	Sapphire glass	1024 × 60	24 μm × 24 μm	24.576 mm × 1.440 mm	*
S9973-1007	Front illuminated high IR sensitivity CCD	Sapphire glass	1024 × 124	24 μm × 24 μm	24.576 mm × 2.976 mm	30 electrons r.m.s.
S10141-1107S	High resolution back-thinned CCD	AR coated sapphire glass	2048 × 122	12 μm × 12 μm	24.576 mm × 1.344 mm	20 electrons r.m.s.

* Please consult with us.

SPECTRAL RESPONSE (without window)



* This is typical, not guaranteed.

FEATURES

- TDI readout mode
- Front illuminated or Back-thinned Hamamatsu CCD
- High sensitivity from UV to NIR
- Cooled down to 0 °C
- Line Resolution up to 2048 pixels
- USB 2.0 or IEEE1394 16 bit interface
- 250 kHz pixel clock
- 169 Hz line rate (5.9 ms/line)
- Full line binning for spectroscopy applications (factory setting option)

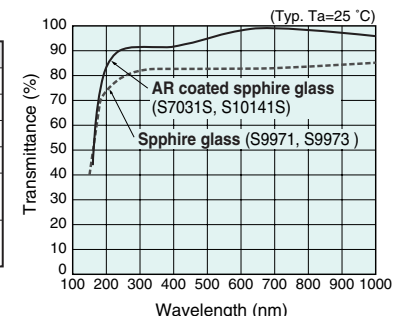
APPLICATIONS

- High speed imaging for low light application
- High speed scanning for a large size sample
- Continuous imaging of high-speed moving object

APPLICATIONS FOR SPECTRAL READOUT MODE

- All OEM Spectroscopy applications
- Fluorescence spectroscopy
- Raman spectroscopy
- Semiconductor inspection

SPECTRAL TRANSMITTANCE



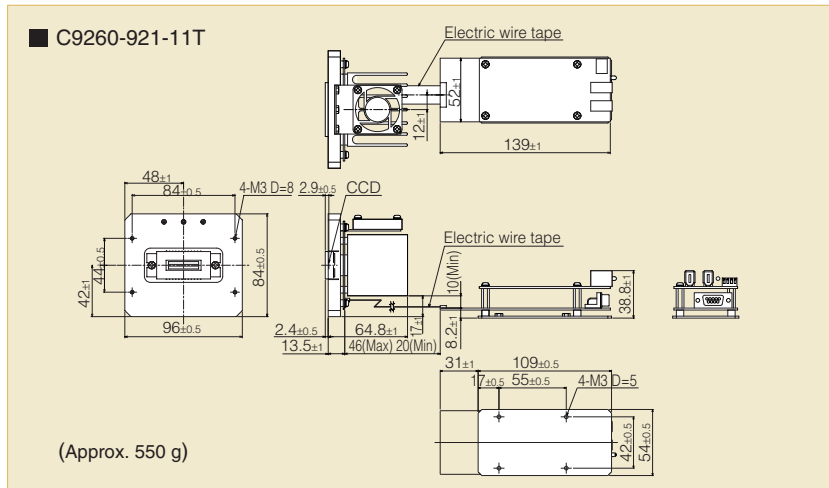
SPECIFICATIONS

● Camera

Type number	C9260-921-11T	C9260-921-12T	C9260-921-13T	C9260-931-11T	C9260-931-12T	C9260-931-13T
Camera type	Board type					
Imaging device	S7031-1006S	S7031-1007S	S7031-1008S	S7031-1006S	S7031-1007S	S7031-1008S
Effective number of pixels	1024 × 58	1024 × 122	1024 × 250	1024 × 58	1024 × 122	1024 × 250
Pixel clock	250 kHz					
TDI line rate	2.5 Hz (400 ms/line) to 169 Hz (5.9 ms/line)					
Full line binning readout time**	7.2 ms	8.5 ms	11.1 ms	7.2 ms	8.5 ms	11.1 ms
Frame readout time	354.6 ms	711.7 ms	1433.6 ms	354.6 ms	711.7 ms	1433.6 ms
Read out noise (typ.)	50 electrons r.m.s.					
Full well capacity (typ.) (Gain Hi)	240 000 electrons					
Full well capacity (typ.) (Gain Lo) at full line binning readout	600 000 electrons					
Cooling method	One stage TE-cooler mounted in the CCD package					
Cooling temperature at 20 °C ambient temperature	0 °C					
Dark current max. at 20 °C ambient temperature	100 electrons/pixel/s					
A/D converter	16 bit					
Exposure time	5 ms to 20 s					
High gain	Full well of CCD matches the A/D saturation level					
Low gain	a half of high gain					
Data transfer I/F	IEEE 1394a-2000			USB2.0 High speed mode (equivalent)		
Input voltage, Supply current	+12 V ± 1 V DC, Approx. 1 A					
Voltage ripple	Less than 50 mV p-p					
Ambient storage temperature	-10 °C to +50 °C					
Ambient operating temperature	+10 °C to +35 °C					
Ambient operating humidity	70 % max. (with no condensation)					

** Full line binning readout mode is an option, and it is factory setting instead of TDI readout.
For other CCD types, please contact Hamamatsu.

DIMENSIONAL OUTLINES (Unit : mm)



● Pin Assignment

Pin Number	Signal
1	-
2	-
3	Trigger IN (TTL)
4	-
5	-
6	+12 V
7	+12 V
8	GND
9	GND

● Software Support

- DCAM-API support

* Product and software package names noted in this documentation are trademarks or registered trademarks of their respective manufacturers.

- Subject to local technical requirements and regulations, availability of products included in this promotional material may vary. Please consult with our sales office.
- Information furnished by HAMAMATSU is believed to be reliable. However, no responsibility is assumed for possible inaccuracies or omissions.

Specifications and external appearance are subject to change without notice.

© 2007 Hamamatsu Photonics K.K.

HAMAMATSU

<http://www.hamamatsu.com>

HAMAMATSU PHOTONICS K.K., Systems Division

812 Joko-cho, Higashi-ku, Hamamatsu City, 431-3196, Japan, Telephone: (81)53-431-0123, Fax: (81)53-433-8031, E-mail:sales2@sys.hpj.co.jp

U.S.A. and Canada: Hamamatsu Corporation, Systems Division: 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/E 20020 Arese (Milano), Italy, Telephone: (39)02-935 81 733, Fax: (39)02-935 81 741, E-mail: info@hamamatsu.it

Cat. No. SCAS0036E02

JUN/2007 HPK

Created in Japan (PDF)