

Multi-channel Detectors

Solar Laser Systems offers a line of spectroscopic multi-channel detectors for monochromators and spectrographs (listed in the tables below or other upon the prior agreement with the manufacturer).

Detectors providing data transfer via Full-Speed USB interface (up to 12 Mbit/sec) are powered via the USB port from a PC. Powering of detectors with High-Speed USB interface is provided from an external unit. Power consumption is <6W for non-cooled detectors and <25W for cooled detectors. The thermostabilization system with a built-in Peltier-cooler ensures crystal temperature precision of $\pm 0.1^{\circ}\text{C}$.

Parameters of sync pulses

- polarity positive
- amplitude 3-5V
- FWHM pulse duration ~10mks

Requirements to external sync pulse:

- polarity positive
- amplitude 3-15V
- FWHM pulse duration 5-20mks
- Rise time.....~10mks

Model	UC-12T2 (UC-14T2)	UC-12T3 (UC-14T3)	UC-14H83	U2C-16H591
Sensor type	TCD 1205 D	TCD 1304 AP	S8378-1024Q	S5931-1024S
Number of pixels	2048	3648	1024	1024
Pixel size, μm^2	14 × 200	8 × 200	25x500	25x2500
Active area, mm	28.6	29.1	25.6	25.6
Spectral response range, nm	200 - 1200	200 - 1100	200 - 1000	200 - 1000
Photo sensitivity	80 V/lx·s	160 V/lx·s	4.4 (22) ⁽¹⁾ V/lx·s	0.23 A/W
Peak sensitivity wavelength, nm	580	540	500	600
Photo response non-uniformity, ⁽²⁾ %	±5	±5	±3	±3
Antiblooming ⁽³⁾	Yes	No	Yes	Yes
ADC Resolution	12 (14) ⁽⁴⁾	12 (14) ⁽⁴⁾	14	16
Readout noise, ADC count, rms	<4.4 (18) ⁽⁴⁾	<3.5 (14) ⁽⁴⁾	<4.4(16) ⁽¹⁾	<5
Data rate (max), kHz	500	500	500	125
Frame readout time (min), ms	4.2	7.4	2.1	8.2
Exposure time (min), ms	4.2	7.4	4.2	16.4
Exposure time (max) not less, ⁽⁵⁾ s	4	0.5	5	200
Cooling temperature, $^{\circ}\text{C}$	Non-cooled	Non-cooled	Non-cooled	-10
Operation temperature, $^{\circ}\text{C}$	10 - 30	10 - 30	10 - 30	10 - 30
Computer interface	Full-Speed USB	Full-Speed USB	Full-Speed USB	High-Speed USB
Synchronizations	IN/OUT	IN/OUT	IN/OUT	IN/OUT
Size, mm ³	66 × 86 × 32	66 × 86 × 32	66 × 86 × 32	70x80x144

⁽¹⁾ Image sensor provides two operational modes: high dynamic or high sensitivity (value in brackets).

⁽²⁾ Signal level is 50% of saturation.

⁽³⁾ Antiblooming: the ability to prevent the spilling of excess photocharges from a saturated photoelement to neighboring elements.

⁽⁴⁾ 14 bit ADC Resolution for both TCD1304AP and TCD1205D image sensors (values in brackets) is recommended when experimental conditions allow averaging over tens measurements to be performed thus providing fourfold improvement of weak line detection limit as compared with 12 ADC detectors.

⁽⁵⁾ Max exposure time is a time for which dark signal reaches 10% of the dynamic range.

Model	U2C-16H902S	U2C-16H904S	U2C-16H912	U2C-16H914
Sensor type	G9202-512S	G9204-512S	G9212-512S	G9214-512S
Number of pixels	512	512	512	512
Defective pixels ⁽¹⁾	No	No	≤5	≤5
Pixel size, μm ²	25 × 250	25 × 500	25 × 250	25 × 500
Active area, mm	12,8	12,8	12,8	12,8
Spectral response range, nm	0.9 – 1.67	0.9 – 1.67	0,9 – 1.67	0.9 – 1.67
Peak sensitivity wavelength, nm	1.55	1.55	1.55	1.55
Photo response non-uniformity,% ⁽²⁾⁽⁵⁾	±5	±5	±5	±5
Antiblooming ⁽³⁾	Yes	Yes	Yes	Yes
ADC Resolution	16	16	16	16
Readout noise, ADC count, rms ⁽⁵⁾	<6	<6	<6	<6
Data rate (max), kHz	125	125	125	125
Frame readout time (min), ms	4.1	4.1	4.1	4.1
Exposure time (min), ms	8.2	8.2	8.2	8.2
Exposure time (max) not less, ^{(4) (5)} s	5	5	5	5
Cooling temperature, °C	-10	-10	-10	-10
Operation temperature, °C	10 - 30	10 - 30	10 - 30	10 - 30
Computer interface	Hi-Speed USB	Hi-Speed USB	Hi-Speed USB	Hi-Speed USB
Synchronizations	IN/OUT	IN/OUT	IN/OUT	IN/OUT
Size, mm ³	70 × 80 × 143	70 × 80 × 143	70 × 80 × 143	70 × 80 × 143

⁽¹⁾ Total number of pixels with dark current, sensitivity nonlinearity and readout noise exceeding maximum value. The first and last pixels are not counted.

⁽²⁾ Signal level is 50% of saturation. Exposure time is 10ms.

⁽³⁾ Antiblooming: the ability to prevent the spilling of excess photocharges from a saturated photoelement to neighboring elements.

⁽⁴⁾ Max exposure time is time when dark signal reaches 10% of the dynamic range

⁽⁵⁾ All image sensors provide two operational modes: high dynamic or high sensitivity. Parameters in the above table are indicated for the high dynamic mode.

Model	U2C-16H7306	U2C-16H7307	U2C-16H7308	UC-16H7316	UC-16H7317	UC-16H7318
Sensor type	S7030-1006	S7030-1007	S7030-1008	S7031-1006	S7031-1007	S7031-1008
Number of pixels						
Number of active pixels	1024 × 58	1024 × 122	1024 × 250	1024 × 58	1024 × 122	1024 × 250
Pixel size, μm ²	24 × 24	24 × 24	24 × 24	24 × 24	24 × 24	24 × 24
Active area, mm ²	24.6 × 1.4	24.6 × 2.9	24.6 × 6.0	24.6 × 1.4	24.6 × 2.9	24.6 × 6.0
Spectral response range, nm	200 ÷ 1100	200 ÷ 1100	200 ÷ 1100	200 ÷ 1100	200 ÷ 1100	200 ÷ 1100
Peak sensitivity wavelength, nm	650	650	650	650	650	650
Quantum efficiency at peak sensitivity, %	>90	>90	>90	>90	>90	>90
Photo response non-uniformity, ⁽¹⁾ %	±3	±3	±3	±3	±3	±3
Antiblooming ⁽²⁾	No	No	No	No	No	No
ADC Resolution	16	16	16	16	16	16
Readout noise, ADC count, rms	<7	<7	<7	<7	<7	<7
Data rate (max), kHz	125	125	125	125	125	125
Frame readout time (min) @ area scanning mode, s	0.54	1.07	2.14	0.54	1.07	2.14
Frame readout time @ line binning mode (min), ms	9.12	9.89	11,42	9.12	9.89	11.42
Exposure time (min), ms	16.7	16.7	16.7	16.7	16.7	16.7
Exposure time (max) not less, ⁽³⁾ s	2	2	2	160	160	160
Cooling temperature, °C	Non-cooled	Non-cooled	Non-cooled	-10	-10	-10
Operation temperature, °C	10 ÷ 30	10 ÷ 30	10 ÷ 30	10÷30	10÷30	10÷30
Computer interface	Hi-Speed USB	Hi-Speed USB	Hi-Speed USB	Hi-Speed USB	Hi-Speed USB	Hi-Speed USB
Synchronizations	IN/OUT	IN/OUT	IN/OUT	IN/OUT	IN/OUT	IN/OUT
Size, mm ³	70×80×143	70×80×143	70×80×143	70×80×143	70×80×143	70×80×143

⁽¹⁾ Signal level is 50% of saturation.

⁽²⁾ Antiblooming: the ability to prevent the spilling of excess photocharges from a saturated photoelement to neighboring elements.

⁽³⁾ Max exposure time is time when dark signal reaches 10% of the dynamic range.