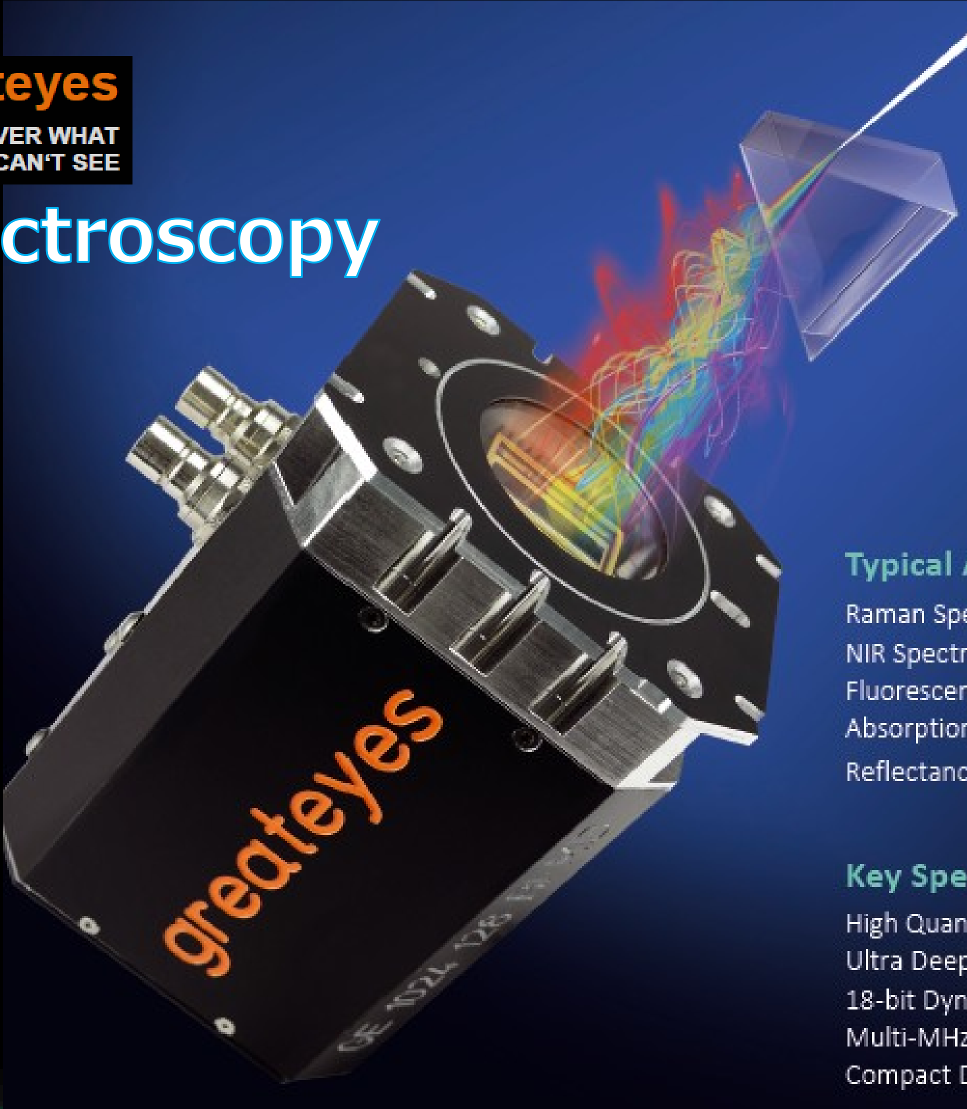
greateyes

DISCOVER WHAT
THE EYE CAN'T SEE

Spectroscopy



Typical Applications

- Raman Spectroscopy
- NIR Spectroscopy
- Fluorescence Spectroscopy
- Absorption, Transmission, Reflectance Spectroscopy

Key Specifications

- High Quantum Efficiency
- Ultra Deep Cooling to -100 °C
- 18-bit Dynamic Range
- Multi-MHz Readout
- Compact Design

Imaging

Typical Applications

- In-vivo Fluorescence Bioimaging
- Astronomy
- LIBS Spectroscopy
- Neutron Tomography
- EL / PL Imaging
- Ultracold Quantum Studies

Key Specifications

- High Quantum Efficiency
- Ultra Deep Cooling to -100 °C
- 18-bit Dynamic Range
- Multi-MHz Readout
- Compact Design

フジトク株式会社
FUJITOK CORPORATION

Full-Frame Deep Cooling Scientific CCD Camera for Spectroscopy

ELSE^{S}

Features & Benefits

- **Ultra deep TE cooling to -100 °C**
  lowest dark current for better detection limit
- **Hermetic vacuum seal**
  low camera maintenance and sensor protection
- **GigE & USB 3.0 data interface**
  local or remote network operation – your choice!
- **Multiple sensor options**
  UV, VIS or NIR coatings for different sensor formats
- **High QE up to 98%**
  very sensitive sensors for low light applications
- **User selectable gain**
  balance your detector for best SNR and dynamic range
- **Fast readout speeds up to 5 MHz**
  fast frame rates paired with low-noise electronics
- **Flexible software options**
  camera software and SDKs available

Common specifications

Pixel readout frequency	50 kHz, 250kHz, 1 MHz, 3 MHz (5 MHz for visualization mode; up to 6 speeds)
AD converter resolution	18-bit
Linearity	Better than 99%
Window material	MgF_2 or UVFS for UV sensitive models, otherwise BK7
Distance flange - focal plane	10.0 mm
CCD sensor cooling	-100°C to 20°C, forced air or liquid cooling
Temperature monitoring	Two thermistors at CCD sensor and thermoelectric cooler (hot side)
Data link	Gigabit Ethernet, USB 3.0
Software	greateyes Vision software for Windows 7 / 10
SDK and drivers	DLL for Windows; LabVIEW, EPICS, Linux driver (optional)
TTL interface signals	Exposure out, shutter out, external trigger in
Operating conditions	Temperature: 0°C to 35°C ambient, relative humidity <80% (non-condensing)
Power supply	80-264 VAC (115/230 VAC typical), 47-63 Hz (50/60 Hz typical), max. 1.1 A (230 VAC), 1.9 A (115 VAC)
Certification	CE
Dimensions	8.3 cm (3.27") × 10.0 cm (3.94") × 13.1 cm (5.16") (W × H × L)
Weight	1 800 g

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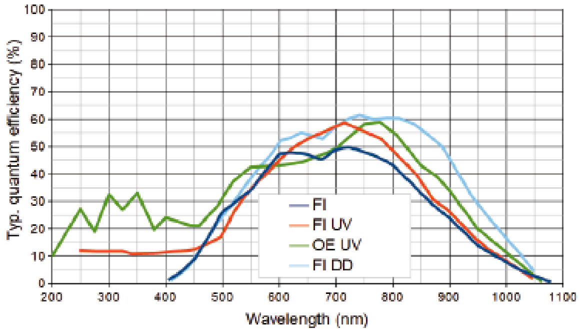
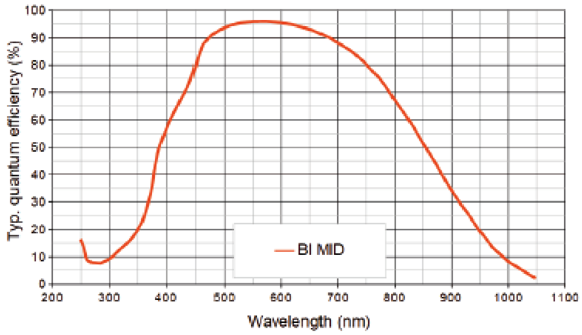
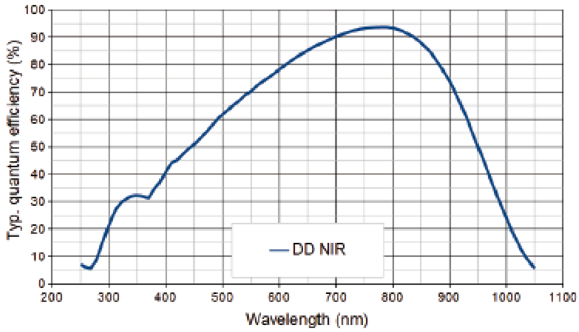
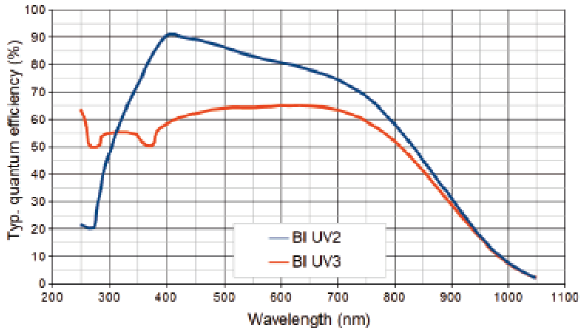
ELSE^S

VIS/NIR分光CCD 量子効率効率









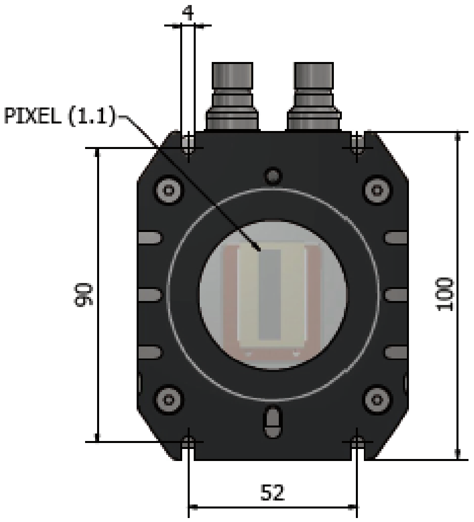
モデル

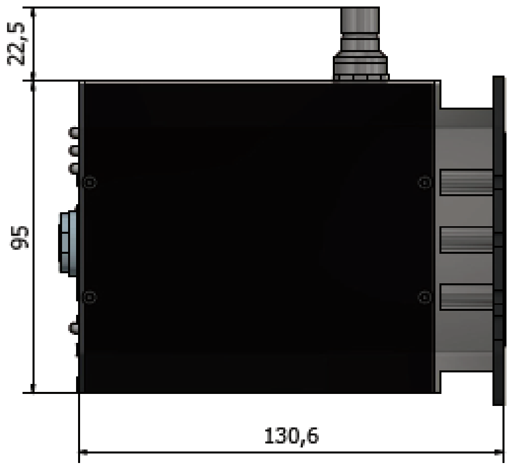
	ELSE 1024 128	**ELSE 1024 256**	**ELSE 2048 512**
Enhanced UV sensitivity		**OE UV** **BI UV2, BI UV3**	**FI UV** **BI UV2, BI UV3**
Enhanced VIS sensitivity	**BI MID**	**FI** **BI MID**	**FI** **BI MID**
Enhanced NIR sensitivity	**DD NIR**	**FI DD** **DD NIR**	
Nominal pixel format	1024 × 128	1024 × 256	2048 × 512
Image area	26.6 mm × 3.3 mm	26.6 mm × 6.7 mm	27.6 mm × 6.9 mm
Pixel size	26 µm × 26 µm		13.5 µm × 13.5 µm
Full well capacity	500 ke$^-$ / 700 ke$^-$ (DD)		100 ke$^-$
Register well capacity	1 000 ke$^-$ / 1 400 ke$^-$ (DD)		400 ke$^-$
Dark current @ -100°C	0.0004 e$^-$/pixel/s 0.005 e$^-$/pixel/s (DD)		0.00025 e$^-$/pixel/s
Typ. read noise (e$^-$) @ 50 kHz @ 1 MHz @ 3 MHz	BI / DD 5.5 13.1 23.0	FI BI DD 4.2 6.0 5.7 12.0 13.1 12.3 22.0 23.0 22.5	FI / BI 3.5 7.2 11.3
User selectable gain	0.3 counts/e$^-$ (low noise mode)		0.4 counts/e$^-$ (high capacity) 1.2 counts/e$^-$ (low noise)
CCD sensor type	Front-illuminated (FI), back-illuminated (BI), deep depletion fringe suppression (DD), open-electrode (OE)		
Antireflective coating	UV (UV2, UV3), midband (MID), multiband (MU2), near-infrared (NIR)		
Blemish specifications	Grade 0 or grade 1 (standard) as specified by sensor manufacturer. For more information, please see: https://www.greateyes.de/en/glossar.html		

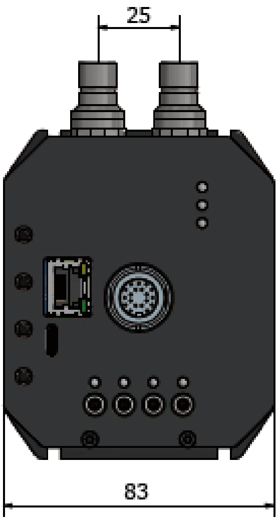
分光用アクセサリー、ソフトウエア

Order code	Description
A) Accessories for imaging purposes	
GE-M42	M42 lens adapter (integrated filter holder optional)
GE-FM01	F-mount lens adapter (integrated filter holder optional)
GE-SR35	35mm shutter, including shutter driver module
B) Accessories for enhanced cooling performance	
GE-CR01	Compact recirculator operating at room temperature for deep camera cooling
GE-CR02	Recirculating water chiller, temperature range -5°C to 30°C for ultra-deep camera cooling
C) Software development kit (SDK) and drivers	
GE-LAB01	LabVIEW driver
GE-EP	EPICS driver
GE-LX01	Linux driver

分光用CCD外観寸法







Full-Frame Deep Cooling Scientific CCD Camera for Imaging

ELSE^{i}

Features & Benefits

- **Ultra deep TE cooling to -100 °C**
  lowest dark current for better detection limit
- **Hermetic vacuum seal**
  low camera maintenance and sensor protection
- **GigE & USB 3.0 data interface**
  local or remote network operation – your choice!
- **Multiple sensor options**
  UV, VIS or NIR coatings for different sensor formats
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  very sensitive sensors for low light applications
- **User selectable gain**
  balance your detector for best SNR and dynamic range
- **Fast readout speeds up to 5 MHz**
  fast frame rates paired with low-noise electronics
- **Flexible software options**
  camera software and SDKs available

Common specifications

Pixel readout frequency	50 kHz, 250kHz, 1 MHz, 3 MHz (5 MHz for visualization mode; up to 6 speeds)
Readout modes	2 output nodes for 1 Mpx and 4 Mpx camera, 4 output nodes for 16 Mpx camera
AD converter resolution	18-bit
Linearity	Better than 99%
Window material	MgF$_2$ or UVFS for UV sensitive models, otherwise BK7
Flange - focal plane	10.0 mm (1 Mpx & 16 Mpx); 9mm (4 Mpx)
Temperature monitoring	Two thermistors at CCD sensor and thermoelectric cooler (hot side)
Data link	Gigabit Ethernet, USB 3.0
Software	greateyes Vision software for Windows 7 / 10
SDK and drivers	DLL for Windows; LabVIEW, EPICS, Linux driver (optional)
TTL interface signals	Exposure out, shutter out, external trigger in
Operating conditions	Temperature: 0°C to 35°C ambient, relative humidity <80% (non-condensing)
Power supply	1 Mpx & 4 Mpx: 80-264 VAC (typ. 115/230), 47-63 Hz (typ. 50/60), max. 1.1 A (230 V) / 1.9 A (115 V) 16 Mpx: 85-264 VAC (typ. 115/230), 47-63 Hz (typ. 50/60), max. 1.9 A (230 V) / 3.8 A (115 V)
Certification	CE
Dimensions	8.3 cm (3.27") × 10.0 cm (3.94") × 13.1 cm (5.16") (W × H × L, 1 Mpx & 4 Mpx) 13.7 cm (5.39") × 13.7 cm (5.39") × 17.1 cm (6.71") (W × H × L, 16 Mpx)
Weight	2.2 kg (1 Mpx & 4 Mpx), 5.4 kg (16 Mpx)

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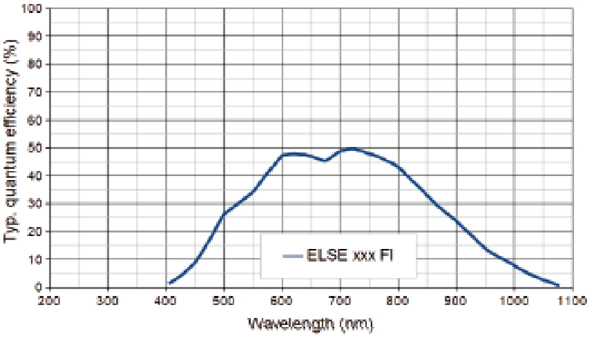
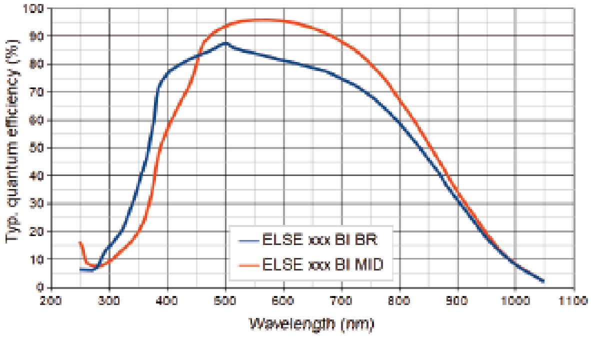
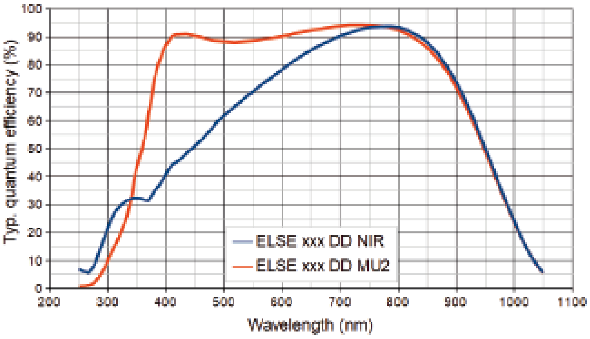
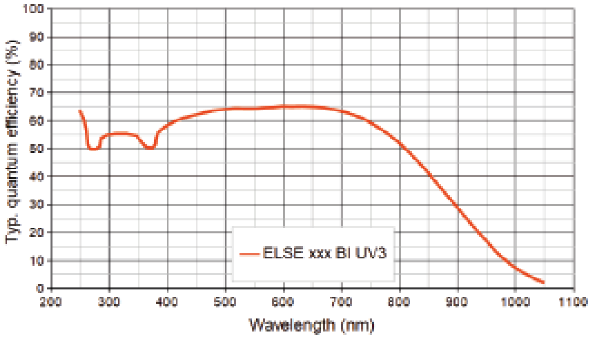
ELSEi

VIS/NIRイメージングCCD 量子効率曲線

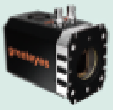








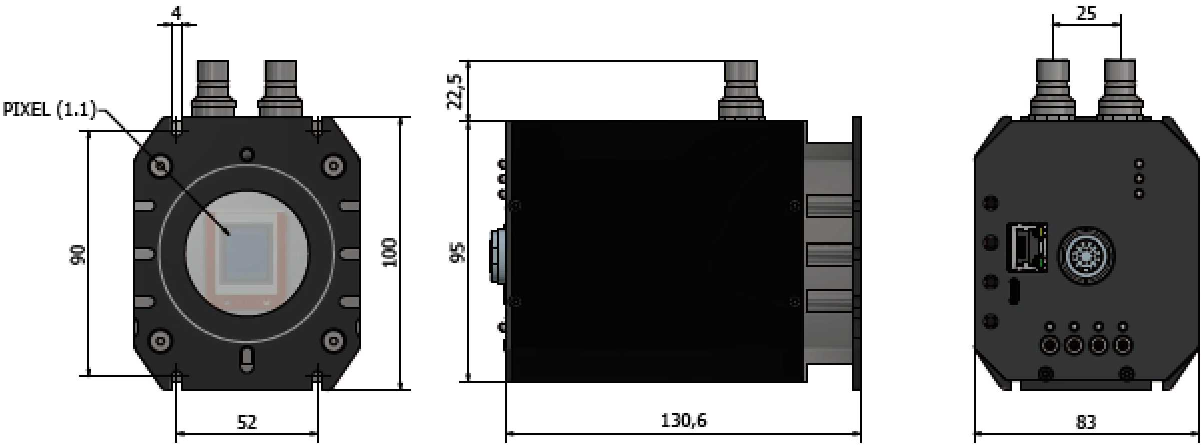
モデル

ELSEi Series	 **ELSE 1024 1024**		**ELSE 2048 2048**		**ELSE 4096 4096**	
Enhanced UV sensitivity	**BI UV3**			**BI UV3**		
Enhanced VIS sensitivity	**FI** **BI BR** **BI MID**		**FI** **BI MID**		**FI** **BI BR** **BI MID**	
Enhanced NIR sensitivity		**DD NIR** **DD MU2**		**DD NIR**		**DD MU2**
Nominal pixel format	1024 × 1024		2048 × 2048		4096 × 4096	
Image area	13.3 mm × 13.3 mm		27.6 mm × 27.6 mm		61.4 mm × 61.4 mm	
Pixel size	13 µm × 13 µm		13.5 µm × 13.5 µm		15 µm × 15 µm	
CCD sensor cooling	-100 °C to 20 °C		-80°C to 20 °C		-90°C to 20 °C	
Full well capacity	100 ke$^-$	120 ke$^-$	100 ke$^-$	150 ke$^-$	150 ke$^-$	350 ke$^-$
Register well / Output node	400 ke$^-$ / -		400 ke$^-$ / -	600 ke$^-$ / -	- / 900 ke$^-$	- / 600 ke$^-$
Typ. read noise (e$^-$) @ 50 kHz @ 1 MHz @ 3 MHz	 2.5 6.5 9.0		 3.8 8.7 13.6		 4.7 9.5 17.0	 2.5 6.3 10.5
Dark current (e$^-$/pixel/s)	@ -100 °C 0.00015	 0.0005	@ -80 °C 0.0003	 0.01	@ -90 °C 0.00008	 0.004
User selectable gain	0.65 counts/e$^-$		0.5 counts/e$^-$ (low noise) 1.5 counts/e$^-$ (high capacity)		0.4 counts/e$^-$ (low noise) 1.2 counts/e$^-$ (high capacity)	
CCD sensor type	Front-illuminated (FI), back-illuminated (BI), deep depletion fringe suppression (DD)					
Antireflective coating	UV (UV3), broadband (BR), midband (MID), near-infrared (NIR), multiband (MU2)					
Blemish specifications	Grade 0 or grade 1 (standard) as specified by sensor manufacturer. For more information, please see: https://www.greateyes.de/en/glossar.html					

イメージング用アクセサリー、ソフトウエア

Order code	Description
A) Accessories for imaging purposes	
GE-CM01	C-mount lens adapter for 1 Mpx camera (integrated filter holder optional)
GE-M42	M42 lens adapter for 1 Mpx & 4 Mpx cameras (integrated filter holder optional)
GE-FM01	F-mount lens adapter for 1 Mpx & 4 Mpx cameras (integrated filter holder optional)
GE-SR25	25mm shutter for 1 Mpx camera, including shutter driver module
GE-SR45	45mm shutter for 4 Mpx camera, including shutter driver module
B) Accessories for enhanced cooling performance	
GE-CR01	Compact recirculator operating at room temperature for deep camera cooling
GE-CR02	Recirculating water chiller, temperature range -5°C to 30°C for ultra-deep camera cooling
C) Software development kit (SDK) and drivers	
GE-LAB01	LabVIEW driver
GE-EP	EPICS driver
GE-LX01	Linux driver
GE-PYT01	Python SDK

イメージング用CCD外観寸法



*Only valid for ELSE 1024 1024 and ELSE 2048 2048. For the drawing of ELSE 4096 4096, please send us an equiry.

もっと先へ、もっと便利に。
光の可能性を追求する未来創造型企業
－フジトクグループ

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