LARGE FORMAT SCIENTIFIC CCD CAMERAS
for UV, VIS, NIR Imaging and Spectroscopy

DATA SHEET:

GE 2048 2048 series

SPECTRAL RANGES:

Ultraviolet (UV)

Visible (VIS)

Near-infrared (NIR)

GE 2048 2048 series

2048 × 2048 pixels, 27.6 mm × 27.6 mm image area, 13.5 µm × 13.5 µm pixel size

Based on a unique platform concept, greateyes offers a portfolio of large format scientific cameras for imaging and spectroscopy in the UV, VIS and NIR range. The deep-cooled, high-performance cameras combine scientific CCD sensors with ultra-low noise electronics for optimal detection of weak photon signals. Select among different sensor technologies and various sensor coatings to find the best solution for your imaging or spectroscopic application.

The full-frame CCD sensors are integrated in hermetically sealed vacuum chambers with single optical windows. Deep cooling of the sensor is achieved by means of multi-stage thermoelectric coolers. The cameras are equipped with a rich set of functionalities including flexible binning operation, various trigger and synchronisation modes, software adjustable gain settings as well as temperature monitoring of the sensor and heat radiation system.

Key features

Scientific low-noise CCD sensors	Flexible binning modes	Quantum efficiency up to 98%
Full well capacity up to 150 ke⁻	Software adjustable gain setting	Deep cooling to -60°C
Scientific low-noise CCD sensors	Temperature monitoring	16-bit dynamic range
Wide spectral sensitivity	Compact size	greateyes Vision software included
SDK & LabVIEW and EPICS drivers	Ext. trigger, shutter, sync signals	Liquid and forced air cooling

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THE EYE CAN'T SEE

SPECIFICATIONS

Model specifications

	GE 2048 2048 FI GE 2048 2048 BI MID	GE 2048 2048 BI UV3 GE 2048 2048 DD NIR
Nominal pixel format	2048 × 2048	2048 × 2048
Image area	27.6 mm × 27.6 mm	27.6 mm × 27.6 mm
Pixel size	13.5 µm × 13.5 µm	13.5 µm × 13.5 µm
Full well capacity	100 ke$^-$	150 ke$^-$
Register well capacity	400 ke$^-$	600 ke$^-$
Typ. read noise (e$^-$) @ 500 kHz @ 1 MHz @ 3 MHz	FI / BI 6.3 8.5 14.1	BI / DD 6.3 8.5 14.1
Dark current @ -80°C	0.0003 e$^-$/pixel/sec	0.05 e$^-$/pixel/sec
Gain	1 counts/e$^-$ (high) 0.4 counts/e$^-$ (low)	1 counts/e$^-$ (high) 0.4 counts/e$^-$ (low)
CCD epitaxial thickness	15 µm	15 µm or 40 µm (DD)
CCD sensor type	Front-illuminated (FI), back-illuminated (BI), deep depletion fringe suppression (DD)	
Sensor coating	Antireflective UV (UV2, UV3), broadband (BR), midband (MID), near-infrared (NIR) coating	
Blemish specifications	Grade 0 or grade 1 (standard) as specified by sensor manufacturer	

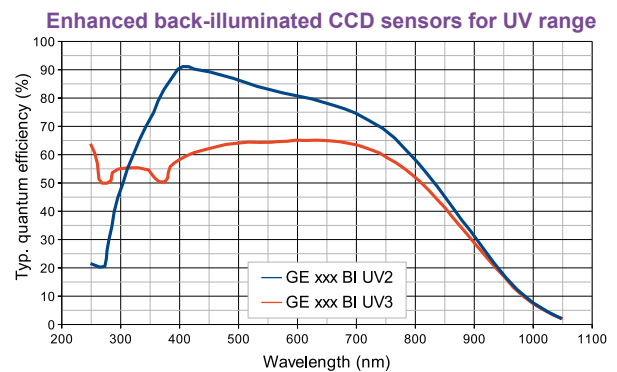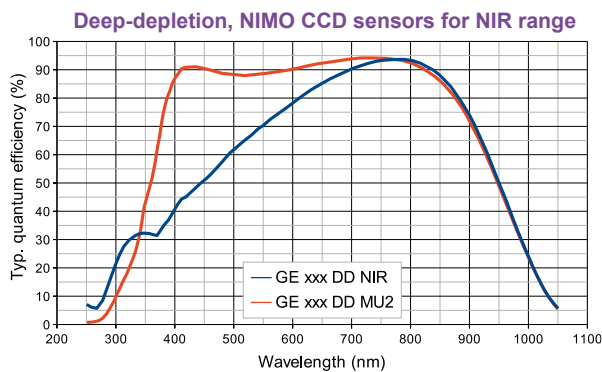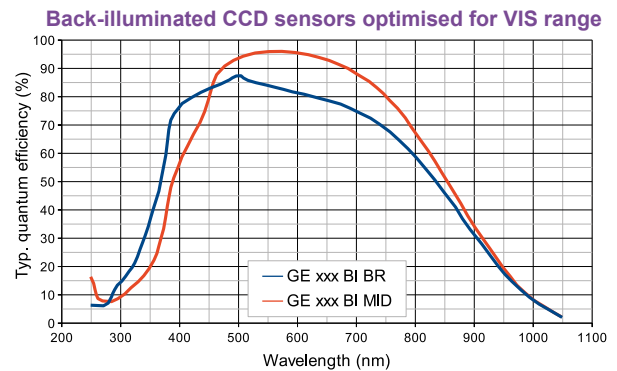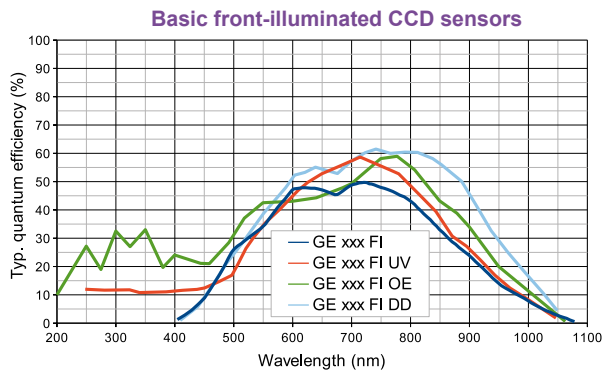### Common specifications

Pixel readout frequency	500 kHz, 1 MHz, 3 MHz
AD converter resolution	16-bit, 18-bit (optional)
Linearity	Better than 99%
Window material	MgF$_2$ or UVFS for UV sensitive models, otherwise BK7
Distance flange - focal plane	9.0 mm
CCD sensor cooling	-60°C to 20°C, forced air or liquid cooling
Temperature monitoring	CCD sensor and thermoelectric cooler (hot side)
Data link	USB, Gigabit Ethernet (optional)
Software	greateyes Vision software for Windows XP / Vista / 7 / 10
SDK and drivers	DLL for Windows XP / Vista / 7 / 10, LabVIEW, EPICS, Linux driver
TTL interface signals	Sync out, shutter out, external trigger in
Operating conditions	Temperature: 0°C to 35°C ambient, relative humidity <80% (non-condensing)
Power supply	110-240 VAC, 50-60 Hz, max. 1 A
Certification	CE
Dimensions	9.7 cm (3.82″) × 9.1 cm (3.58″) × 13.6 cm (5.35″) (W × H × L)
Weight	1 700 g

STEP 1: Choose camera model by order code

Order code	Description
GE 2048 2048 FI	Front-illuminated CCD sensor
GE 2048 2048 BI MID	Back-illuminated CCD sensor with antireflective midband coating
GE 2048 2048 BI UV3	Back-illuminated CCD sensor with antireflective UV coating
GE 2048 2048 DD NIR	Deep depletion fringe suppression CCD sensor with antireflective near-infrared coating

Basic front-illuminated CCD sensors

GE xxx FI
GE xxx FI UV
GE xxx FI OE
GE xxx FI DD

Back-illuminated CCD sensors optimised for VIS range

GE xxx BI BR
GE xxx BI MID

Deep-depletion, NIMO CCD sensors for NIR range

GE xxx DD NIR
GE xxx DD MU2

Enhanced back-illuminated CCD sensors for UV range

GE xxx BI UV2
GE xxx BI UV3

STEP 2: Select accessories and software by order code

Order code	Description
A) Subpixel resolution enhancement	
New GE-S xxx xxx series	Increased spatial resolution (See scientific superresolution camera data sheet for details)
B) Accessories for imaging purposes	
GE-FM01	F-Mount lens adapter with integrated filter holder for 50 mm round or square filters
GE-FM02	F-Mount lens adapter with integrated filter holder and bistable elecronic shutter
GE-DR01	Electronic shutter driver
GE-M42M01	M42-Mount lens adapter
C) 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
D) Software development kit (SDK) and drivers	
GE-SDK01	SDK for Windows (based on C/C++)
GE-LAB01	LabVIEW driver
GE-EP	EPICS driver
GE-LX01	Linux driver

STEP 3: For customisation of the camera, please let us know your requirements.

TECHNICAL DRAWINGS
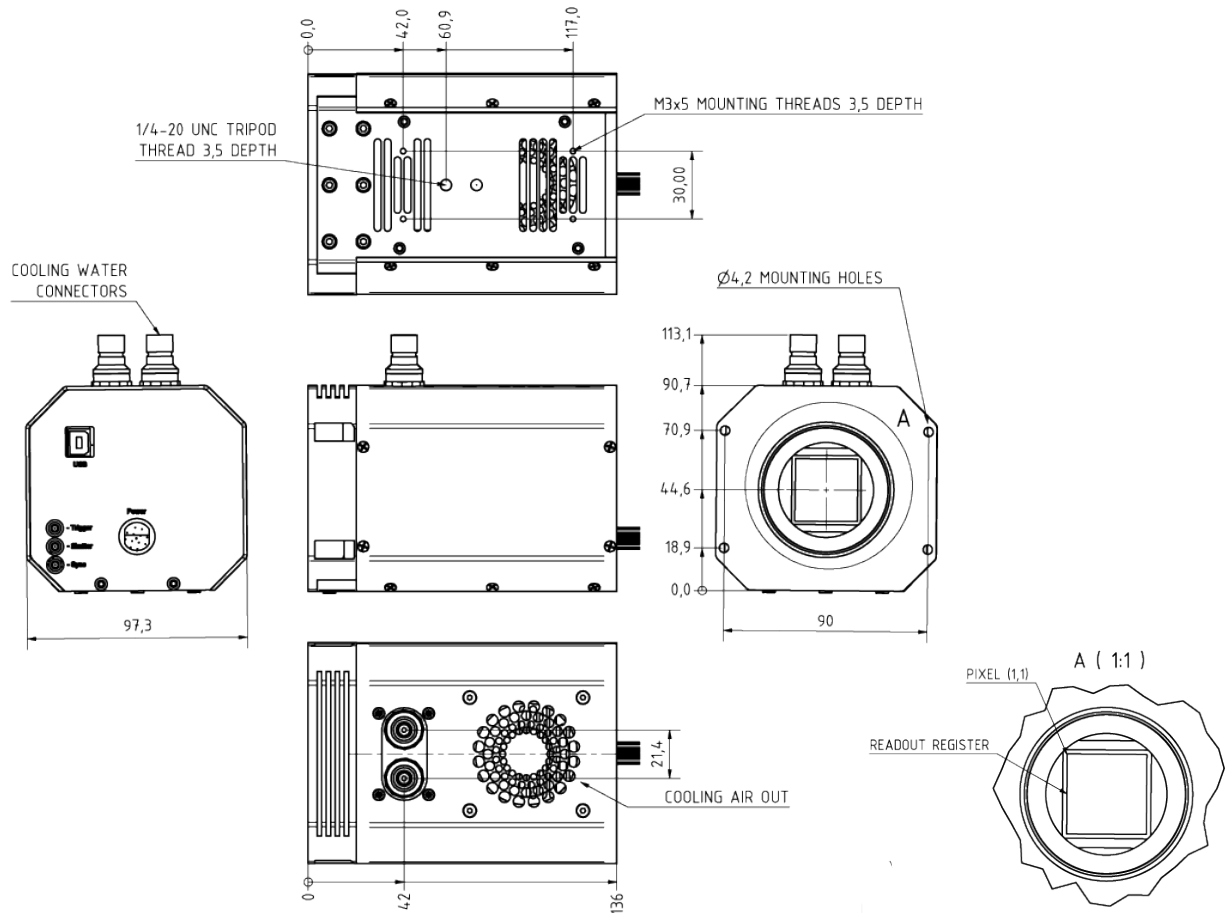
Items delivered together with each camera

GE-VI01	greateyes Vision software suite for Windows
GE-StoB2m	2m SMB to BNC connection cable
GE-USB5m	5m USB 2.0 cable type A to type B
GE-POW01	Camera power supply with cabling
GE-ManCam	Camera instruction manual on storage device

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