

ALEX^S

greateyes

DISCOVER WHAT
THE EYE CAN'T SEE

Full-Frame Deep Cooling Scientific CCD Camera for Spectroscopy Applications



Typical Applications

- EUV Lithography
- Soft X-Ray Spectroscopy
- Plasma Emission Spectroscopy
- High Harmonic Generation Spectroscopy
- NEXAFS Spectroscopy
- Resonant Inelastic X-Ray Scattering

Key Specifications

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



BERLIN IS UNIQUE, AND SO IS ALEX WILL YOU BE TOO?



Straight out of Berlin comes **ALEX**, greateyes' new platform for your spectroscopy applications in the VUV, EUV, soft and hard X-Ray range. **ALEX** integrates cutting-edge low-noise electronics and ultra-deep cooling technology while keeping a compact camera design. Multiple readout speeds can be selected supporting pixel rates from 50 kHz up to 5 MHz. True 18-bit AD conversion allows to exploit the full dynamic range of the CCD sensor for highest performance and SNR. **ALEX** is ideally suited for detection of very weak signal intensities where a low-noise floor is paramount. **ALEX** offers unprecedented possibilities for your measurements of tomorrow. The nanoscopic soft X-ray image of a diatom on the front page was made by the group for Imaging and Coherent X-rays of Max Born Institute in collaboration with the X-ray microscopy division of Helmholtz-Zentrum Berlin (BESSY).



Features & Benefits

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

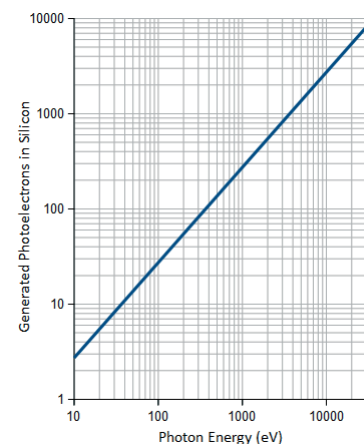
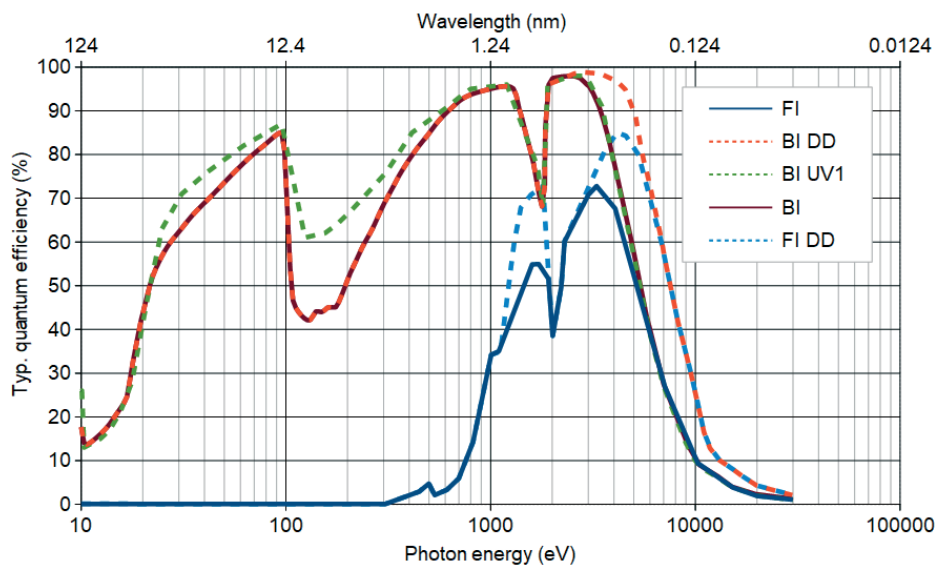


Common specifications

| | |
|-------------------------------|---|
| Pixel readout frequency | 50 kHz, 250kHz, 1 MHz, 3 MHz (5 MHz for visualization mode; up to 6 speeds) |
| Readout modes | 2 output nodes |
| AD converter resolution | 18-bit |
| Linearity | Better than 99% |
| CCD epitaxial thickness | 15 µm standard, 40 µm for deep depletion (DD) models |
| Flange types | ISO-F DN63, knife-edge sealed CF DN63, CF DN100, CF DN160 |
| Vacuum compatibility | With CF flange: 10 ⁻¹⁰ mbar (UHV capability) |
| Bakeout temperature | Max. +80 °C |
| Distance flange - focal plane | 6 mm for CF DN63, 8 mm for CF DN100 (can be customised) |
| 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 | Sync 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 typical), 47-63 Hz (50/60 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") × 10.9 cm (4.29") (W × H × L, camera body) |
| Weight | 2.9 Kg (with CF DN63 flange) |



The Berlin TV Tower (the tallest building in Germany) and the ALEX square below it are symbols of Berlin and beloved by Berliners.



The mean energy of a photon to generate an electron-hole pair in silicon is 3.66 eV.



Step 1: Choose your camera model

| | ALEX 1024 256 | ALEX 2048 512 |
|-----------------------------------|--|--|
| Sensor code | FI FI DD BI UV1 BI DD | FI BI BI UV1 |
| Nominal pixel format | 1024 × 256 | 2048 × 512 |
| Image area | 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 ⁻ |
| Typ. read noise (e ⁻) | FI BI DD | FI / BI |
| @ 50 kHz | 4.2 6.0 5.7 | 3.5 |
| @ 1 MHz | 12.0 13.1 12.3 | 7.2 |
| @ 3 MHz | 22.0 23.0 22.5 | 11.3 |
| Dark current @ -100°C | 0.0004 e ⁻ /pixel/s 0.005 e ⁻ /pixel/s (DD) | 0.00025 e ⁻ /pixel/s |
| 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), enhanced back-illuminated (BI UV1) | |
| 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 | |



Step 2: Select interface vacuum flange

| Order code | Description |
|------------|---|
| CF1 | Knife-edge sealed CF DN63 flange with threaded holes |
| CF2 | Knife-edge sealed CF DN100 flange with through holes |
| CF4 | Rotatable, knife-edge sealed CF DN100 flange with through holes |

We also provide quick release, rotatable and other flanges of various sizes, please let us know your requirement.



Step 3: Choose your accessories and software

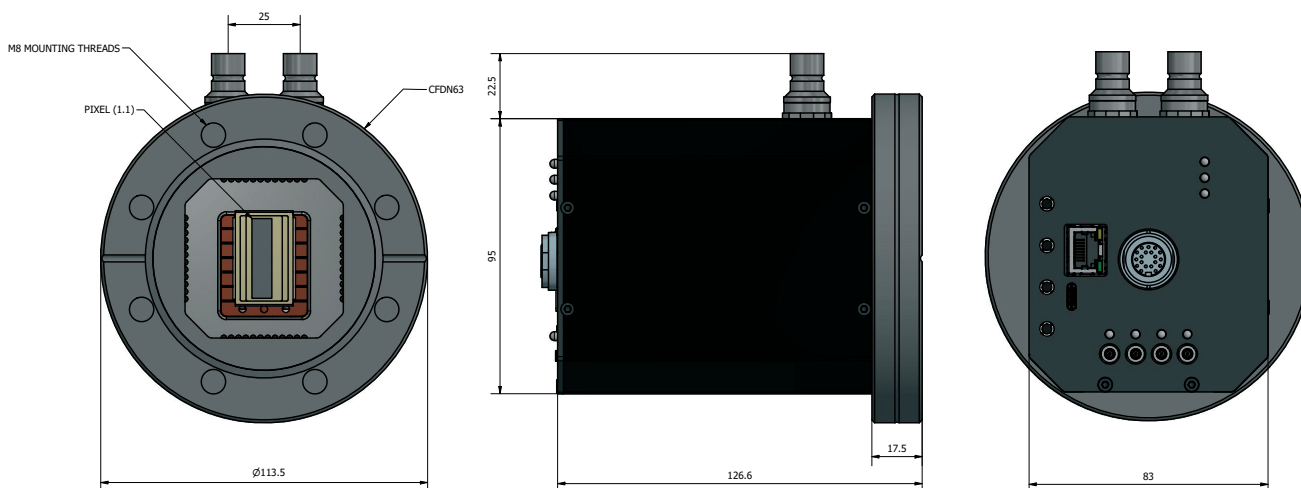
| Order code | Description |
|--|---|
| <i>A) Accessories for imaging purposes</i> | |
| GE-SR35 | 35mm shutter, including shutter driver module |
| <i>B) Accessories for enhanced cooling performance</i> | |
| GE-CR01 | Compact recirculator operating at room temperature for deep camera cooling |
| GE-CR02 | Recirculating water chiller, temperature range -5°C to 30°C for ultra-deep camera cooling |
| <i>C) Software development kit (SDK) and drivers</i> | |
| GE-LAB01 | LabVIEW driver |
| GE-EP | EPICS driver |
| GE-LX01 | Linux driver |
| GE-PYT01 | Python SDK |



Step 4: Flexible customisation service

With direct and fast response, we provide various customisations and OEM services. For example, other sensor types, the alteration of sensor position/tilt, the modification of camera housing or cooling system, etc. Let us know what **ALEX** you require.

TECHNICAL DRAWINGS



Items included with your camera

| | |
|-----------|---|
| GE-VI01 | greateyes Vision software suite for Windows |
| GE-SDK01 | SDK for Windows (based on C/C++) |
| GE-USB5m3 | 5m USB 3.0 cable type A to type C |
| GE-GigE5m | 5m Ethernet cable |
| GE-StoB2m | 2m SMB to BNC connection cable |
| GE-POW01 | Camera power supply with cabling |
| GE-ManCam | Camera instruction manual on storage device |



北京众星联恒科技有限公司

BEIJING TOP-UNISTAR SCIENCE & TECHNOLOGY CO., LTD

地址: 北京市海淀区信息路1号国际创业园西区2号楼1305
 电话: 010 - 86467571
 传真: 010 - 62962792
 邮箱: sales@top-unistar.com
 网址: www.top-unistar.com