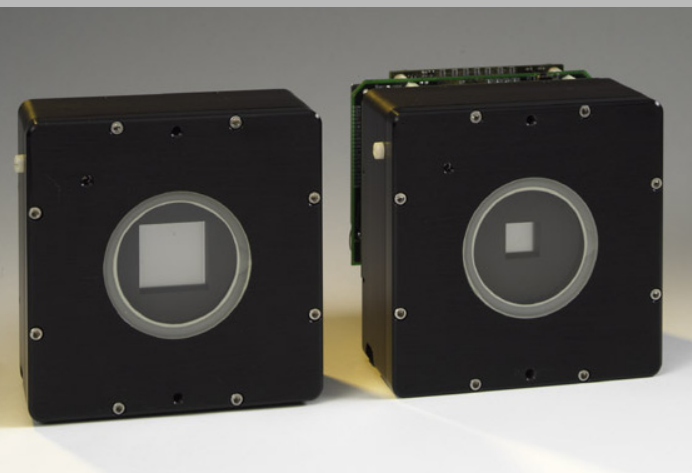


Thermo Scientific SpectraCAM™

The Thermo Scientific SpectraCAM scientific grade imaging system is based on the new random access Charge Injection Device (RACID) imager architecture featuring low noise, arbitrary pixel selection and read-out, Non Destructive Read-out capabilities, and collective pixel readout or binning, and is available in either 1024 x 1024, or 540 x 540 pixel format.

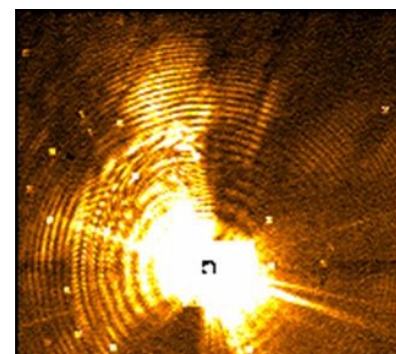


Designed for Versatility

Designed for applications requiring extremely wide linear dynamic range, or adaptive exposure control, the Thermo Scientific SpectraCAM imaging system uses unique random access integration techniques employing true pixel addressability, Non-Destructive ReadOut (NDRO), collective read or binning, and selective Region of Interest (ROI) clearing to provide high dynamic range that may exceed 10(8) or 28bits allowing the user to read very dim signals in the presence of highly illuminated ones. Additional unique camera features included in the system are artificial intelligence (AI) algorithms for the readout or injection of ROIs based on the experimentally observed signal. The 16bit thermo electrically cooled SpectraCAM™ system is available in either a purged, or hermetically sealed configuration for single use or OEM applications.

Performance Options

The random access CID is sensitive from 165nm - 1100nm, and is capable of direct X-Ray imaging. Application specific coatings such as GdO₂S for imaging of mid to high level X-Rays, as well as LUMOGEN coating for extended UV range below 165nm are available. The camera controller is based on PENTIUM® CPU/PC104+ architecture enabling dynamic control of ROI data acquisition algorithms and real-time video



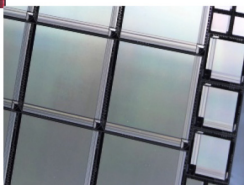
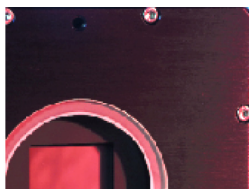
processing. The camera software supports export of data in various imaging (.FITS, .TIF, .JPEG, and .CID) and spreadsheet formats. Along with programmable position and size, each ROI may be individually programmed for binning and NDRO.

Features:

- . CID (Charge Injection Device) Imager technology
- . High Linear Dynamic Range, up to 28bits (with 100 NDRO's)
- . True Random Pixel Addressability
- . Non-Destructive Pixel Readout
- . Wide Wavelength Response (165 - 1000nm)
- . Collective Non-Destructive Readout of selectable Binned Regions
- . Virtually No Blooming Under Severe Light conditions
- . Contiguous Pixel Structure with High Fill Factor

Applications:

- . Spectroscopy
- . Biological Imaging
- . Other Scientific Applications



The SpectraCAM imaging system is part of a line of scientific grade cameras and imagers with applications spanning a full spectrum of industries and applications. Thermo Scientific CIDTEC Cameras & Imagers has been in business for over 25 years with imaging products in scientific, machine vision, aerospace, medical, and radiation hardened markets.

SpectraCAM86, and SpectraCAM84 scientific imaging systems

Imagers: CID86: 540 x 540 pixels CID84: 1024 x 1024 pixels	Pixel Full Well >500,000 e >500,000 e
Readout Noise <240e single read @ 50KHz <24e with 128 NDRO's	Binning Independent horizontal and vertical columns and 4 rows may be read collectively and Non destructively (NDRO).
Pixel Size: 27microns by 27 microns	Dark Current: <7 e per second per pixel at -45
Linearity +/- 3% from 3% to 80% of saturation	ROI <20usec. delay between ROI selection
Quantum Efficiency >45% @ 550nm and >30% @ 200nm *Deep UV and X-Ray converter coatings available for use below 165nm	Cooling: 3 stage TE cooler with water recirculation
Readout Speed Selectable: Slow Scan 50 kHz Fast Scan 200kHz	Sealed, (SpectraCAM84 only): Hermetic sealed 3 years, Integrated water jacket Purge: Purified Argon or Nitrogen at 60 - 80 mL/min

RAI (Random Access Integration) Software Drivers

Fixed Exposure Time: User programmed ROIs integrated for user-selected exposure time analogous to CCD exposure.

Random Access Integration: Integration time automatically varied at ROI site based on experimentally observed signal. Using non-Destructive read, collective read, and ROI clear features, intensely illuminated ROIs are integrated for multiple short integration times while weakly illuminated ROIs are simultaneously allowed to integrate for longer periods, allowing for the extension of the dynamic range up to 10⁷ or 28 bits.

TRS (Time Resolve) Software Drivers (OPTIONAL)

TRS Drivers allow for the observation of ROI signal profile with respect to time for multiple ROIs. The algorithms allow user programmable time resolution as short as 100 microseconds for a single ROI. The algorithms are specifically designed for time-resolved techniques such as gas and liquid chromatography, flow injection analysis, and laser or spark ablation.

AutoIntegrate Drivers (OPTIONAL)

AutoIntegrate drivers allow the user to automatically combine the complete field of view offered by a full-frame "Fixed-Time" exposure with the extended dynamic range of the "Random Access Integration" algorithms described above, allowing for 10⁷ dynamic range (24-bits) on a full-frame image without compromising precision.

