

TemCam- F415MP

Slow scan CCD camera (4k, 15 μ m, 16bit)

TemCam-F415MP is a 4k x 4k TVIPS camera with an active area of 61 x 61 mm², moving into dimensions which have been limited to film so far. It is the perfect solution for all kinds of high resolution applications in materials and life science.

TemCam-F224HD

Slow scan CCD camera
(2k, 24 μ m, 16bit)

TemCam-F224HD is a 2k x 2k TVIPS camera with an active area of 49 x 49 mm². It is the perfect solution for applications in materials and life science, requiring maximum dynamic range and ultimate low dose capabilities.

Near-axis flange

TVIPS has designed a special flange which combines TemCam-F415MP/ F224HD with FastScan-F114NX, a high-quality fiber-optically coupled CCD camera operating at video rate. Due to disadvantages of side-mounted cameras, this is an interesting option to monitor the TEM image and its FFT in real-time, for the main purpose of alignment, demonstration or low dose search.

CCD cooling

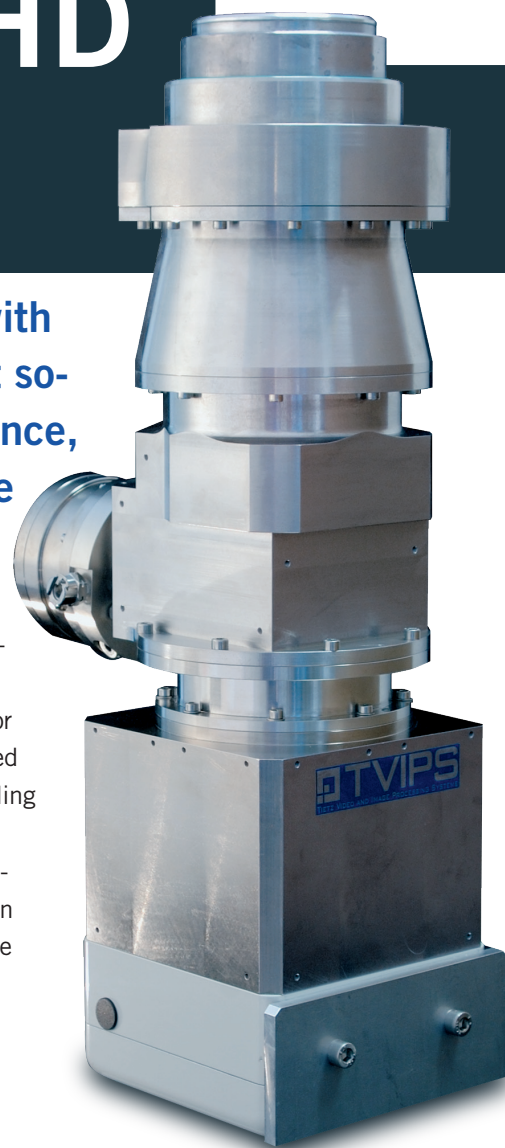
For optimum performance, the Peltier-cooled CCD chip (regulated at -25°C) is located in a vacuum housing separated from the microscope vacuum. The scintillator surface is kept close to room temperature. This design avoids contamination and allows venting the camera chamber without turning off the CCD camera.

Fiber optical coupling

Fiber optical coupling of the electron-sensitive polycrystalline phosphor layer (scintillator) with the CCD sensor increases the amount of light collected in comparison with lens-optical coupling and, as a result, the sensitivity of the camera. This design results in a significant discrimination of single electron events which is important for low dose application.

Optimized scintillators

TVIPS optimizes the scintillator for individual demands. Resolution and sensitivity can be customized for high tensions up to 400 kV. Two standard types are available: optimized for high resolution (HR) or for high sensitivity (HS).



TemCam-F415 with FastScan-F114NX
in near-axis position with FEI flange

TemCam-F224HD and 415MP

TemCam-415MP

Selectable readout architecture

A split readout architecture has been adopted to accommodate high frame rates through four output ports, and single readout mode through one output channel in order to achieve homogenous noise figure over the whole imaging area.

TemCam-F224HD

Large pixel size

The active pixel area of a 24 μm pixel is 2.9x larger than a 14 μm pixel resulting in a higher full well capacity of the CCD chip and hence extending the dynamic range. Also, the resolution of a 24 μm pixel camera is improved in comparison to a 14 μm pixel camera with the same number of pixels.

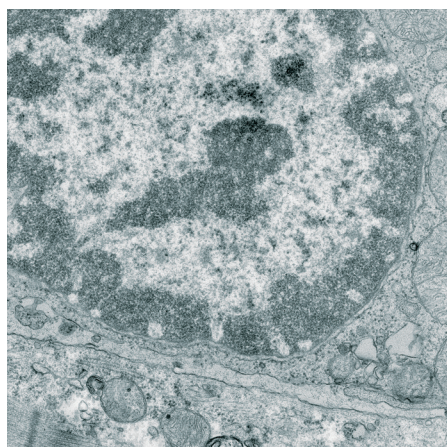
Selectable on-chip amplifiers:

The CCD sensor has two selectable on-chip output amplifiers designed to meet two different needs. The first one is a low noise amplifier with high sensitivity for low dose applications. The second one is a high capacity amplifier for high dynamic applications (e.g. diffraction patterns).

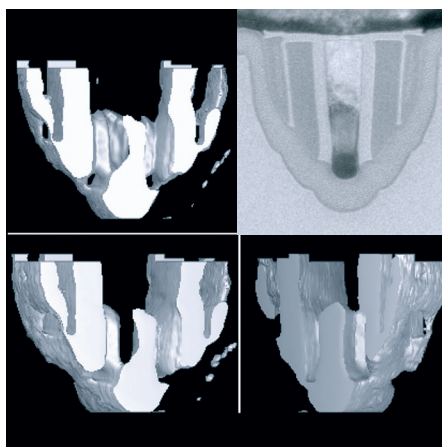
	TemCam-F224HD	F415MP
CCD type (architecture)	Full frame	
CCD format	2048 x 2048	4096 x 4096
CCD pixel size (μm^2)	24 x 24	15 x 15
Field of view (mm^2)	49.2 x 49.2	61.4 x 61.4
Readout rate @ digitization	1 MPixel/sec @ 16 bit	4 x 1 MPixel/sec @ 16 bit
Frame rate @ full resolution	0.2 fps (5 sec)	0.15 fps (6 sec)
Frame rate @ 2x binning	0.6 fps (1.7 sec)	0.4 fps (2.5 sec)
Post-magnification	1.4x - 1.7x	
Electron-optical coupling	1:1 fiber-optics	
Scintillator type	Polycrystalline phosphor	
CCD cooling	< -25°C (regulated)	
CCD binning factors	1x, 2x, 4x, 8x	
Gain factors (analog)	1x, 2x, 4x	
Full well capacity (CCD electrons)	570 000	100 000
Dynamic range (max./noise)	25 000:1	7 500:1
Non-linearity	< 1 %	
Sensitivity for primary electrons (120 kV scintillator)	100 counts ¹	50 counts ¹
SNR (for a single 120 keV electrons)	> 12:1	> 10:1
Resolution (NTF at Nyquist freq.)	> 22 %	> 12 %
Anti-blooming	yes	
Bottom mounted	on-axis	
System requirements	Windows XP, PCI interface	
Options	FastScan-F114NX in near-axis position, motorized beam stop	
Software	EM-Menu 4, Tomography, Single Particle Data Collection	

¹ gain 4x

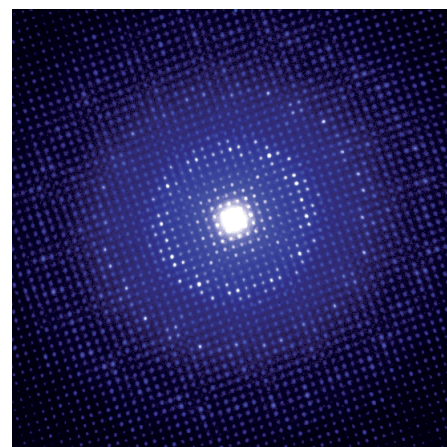
Data in this brochure are typical and not binding.



Plastic embedded cell section



Gate contact of a MOS transistor (upper right: zero-degree projection)



Diffraction pattern of a mayanite crystal in precession mode

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