



# Leica DFC360 FX

High Speed Camera System for Fluorescence Microscopy

Living up to Life

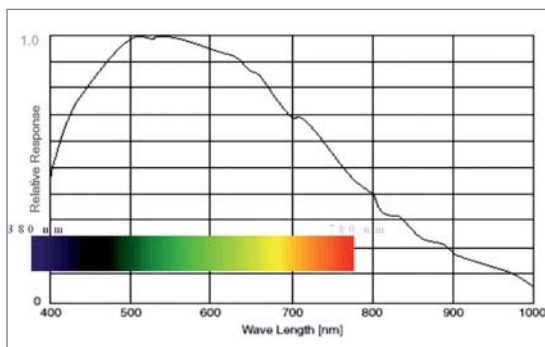
*Leica*  
MICROSYSTEMS

# Ultrafast High-Resolution Fluore

## Leica DFC360 FX – High-End Live Cell Imaging

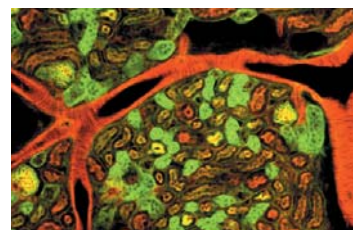
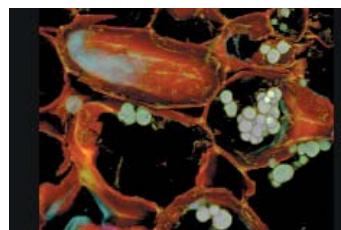
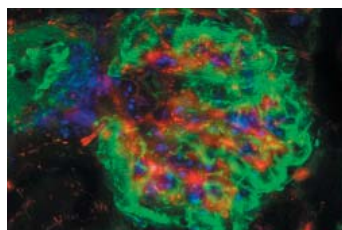
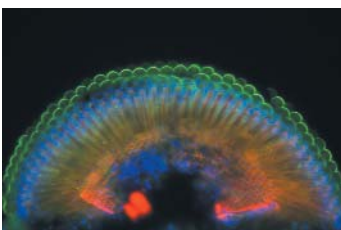
Speed is often the deciding factor for successful imaging in demanding high-resolution image documentation of living cells, molecular processes and rapidly fading fluorescence specimens. The monochrome digital camera Leica DFC360 FX is designed to produce brilliant images at maximum temporal resolution. Thanks to state-of-the-art CCD technology, the high-end Progressive Scan Camera achieves maximum frame rates of 20 frames per second for full frame up to more than 100 frames per second in binning mode. The highly sensitive sensor and active Peltier cooling ensure a high dynamic range even for low light intensities.

The Leica DFC360 FX will convince even the most demanding user with its performance on PC and MAC systems, intuitive Leica Imaging Software and optimal integration into high-end fluorescence systems from Leica Microsystems. The Leica DFC360 FX is the ideal solution for excellent results in live cell imaging.



## Enjoy all of these advantages every day:

- Fast data transmission via FireWire IEEE1394b
- 20 frames per second and up to more than 100 frames per second for binning mode due to overlapping mode and interline sensor
- Highly sensitive 1.4 megapixel CCD in the visible and infrared spectrum
- Ideal for living cells and rapidly fading fluorescence specimens
- High linearity over the whole dynamic range and minimum noise
- Temperature-controlled Peltier cooling
- The progressive scan of each exposure provides complete full images without disturbing horizontal skipping artefacts
- 12 or 8 bit digitization option allows the selection of the right degree of detail for the particular application.
- Partial Scan Mode: Ultrafast read-out of definable areas at full resolution, also in overlapping mode and in combination with binning
- Camera power supply via FireWire IEEE1394 b
- Trigger port for exact synchronization (e.g. via CTR7000)
- Shutter speeds from 4 $\mu$ s to 10 minutes
- Long integration times and up to tenfold signal amplification
- Easy installation on to the microscope
- Connection of PC and MAC via TWAIN and FireCam
- Full system integration in Leica Application Suite (LAS) and Leica Application Suite Advanced Fluorescence (LAS AF)



# Fluorescence Image Recording

## Leica Imaging – Ultrafast Image Recording

Extremely high frame rates determined only by the necessary shutter speed: With the overlapping mode, the 2/3" Progressive Scan CCD sensor reads out imaging data while the next exposure is being taken. The optimized sensitivity of the sensor allows shorter exposure times for rapidly fading fluorescence specimens and a significant reduction of the excitation light for sensitive living cells. Microlenses on each chip ensure a high quantum yield right into the near infrared range.

The light sensitivity and the frame rate can be further enhanced by binning for example over 100 fps with 8x8 binning. If the picture area is reduced for detailed analysis, the recording speed increases. Binning and region of interest can be used, as can multi-channel experiments with different amplifications, in the fast overlapping mode.

The active Peltier cooling minimizes the dark current and guarantees noise-free images even at low light intensities. With shutter speeds of 4  $\mu$ s to 10 minutes and up to tenfold signal amplification, the Leica DFC360 FX offers maximum flexibility.

## Convenient, Intuitive Operation

The Leica Application Suite LAS enables intuitive, convenient image acquisition and image processing. Leica's LAS AF Advanced Fluorescence Software is ideal for swift and effective control of experiments such as z-stack, multi-channel fluorescence with overlay, 3D deconvolution, time-controlled analysis and many other applications. Ultrafast, uncomplicated data transmission is ensured by the FireWire1394b interface.

## Convincing System Solutions

Harnessing high-end CCD technology for high-resolution, ultrafast fluorescence image recording, the Leica DFC360 FX provides the ideal solution for excellent live cell imaging results. Integrated imaging systems such as the Leica AM TIRF MC or Leica AF6000 LX offer optimally matched components and therefore perfect time and light management. The Leica DFC360 FX proves its full performance potential with ultrafast fluorescence filter wheels, high-precision light sources and perfect sequencer synchronization, satisfying even such demanding applications as Ca<sup>++</sup> and FRET experiments.



# Leica DFC360 FX– Technical Data

<b>Camera type</b>	Ultrafast, high-sensitivity monochrome digital camera with cooling and control software for fluorescence microscopy		
Camera body Aluminum	dimensions (L x W x D) 132mm x 74mm x 71mm, weight 470g		
<b>Shutter speed</b>	4µs – 600s, step 1µs		
Cooling	Peltier cooling element		
<b>Cooling temperature</b>	Δ – 20°C to ambient temperature		
External manual shutter release	Yes		
<b>Flash synchronization</b>	Yes		
Shading Correction	Yes		
<b>Sensor</b>			
CCD-Sensor	2/3" – CCD ICX285 Progressive Scan Interline Transfer		
<b>Sensor area</b>	9.0 mm x 6.7 mm		
Pixel size	6.45 µm x 6.45 µm		
<b>Full-well capacity</b>	18000 electrons		
Read-out noise	σ < 3 LSB (12 Bit) typical		
<b>Dark current</b>	0.75 electrons/pixel/second		
Signal-to-noise ratio	> 1250:1; 62 dB		
<b>Bildformate</b>	<b>Pixel</b>	<b>FireWire IEEE1394a [Frames/s]</b>	<b>FireWire IEEE1394b [Frames/s]</b>
Full Frame	1392 x 1040	10	20
Binning 2 x 2	696 x 520	19	39
Binning 3 x 3	464 x 346	29	58
Binning 4 x 4	348 x 260	35	71
Binning 8 x 8	172 x 130	54	109
A/D converter	12 / 8 bit		
Analogous amplification	1 x – 10 x		
<b>Software</b>			
Operating systems supported PC	Win2000, Win XP		
Operating systems supported MAC	Mac OS X 10.4 and above (Intel-CPU recommended)		
Software PC	Leica DFC Twain, Leica Image Maker, Leica Application Suite (LAS), Leica Application Suite Advanced Fluorescence (LAS AF), Leica MMAF		
Software MAC	Leica FireCam		
<b>Interfaces</b>			
Optical	C-Mount		
Recommended Video-Adapter	0,7x		
Data	FireWire IEEE1394b, 800 MBit / Sek., 9-pin (downstream-compatible with FireWire 1394a, 6-pin via FireWire bilingual cable)		
Power supply	12 V via FireWire		
Energy consumption	5 W		
<b>Miscellaneous</b>			
Minimum configuration Computer PC	PC Pentium 4, 1 GB RAM, 24 Bit True Color, FireWire onboard or 1 freier PCI-slot		
Minimum configuration Computer MAC	G4 or Intel CoreDuo, 1GB RAM		
Operating temperature	+5 bis +35°C		
Relative humidity	max. 80%, non-condensing		

## Components

		Scope of delivery:
11 547 000	Leica DFC360FX	Leica DFC360FX camera Leica FireCam software Leica TWAIN software Leica LAS software
11 600 255	High-Speed FireWire-Kit required for usage of LAS AF based systems	FireWire1394b PCI-Karte (32bit, OHCI) FireWire1394b-cable, 9-pin
11 600 253	FireWire1394b-Kabel	FireWire1394b-cable, 9-pin
11 600 254	FireWire Bilingual-Kabel	FireWire bilingual cable von 1394b auf 1394a
12 730 188	FireWire-Notebook-Kit	Notebook Kit Notebook adapter (bilingual cable required)