OLYMPUS

Your Vision, Our Future

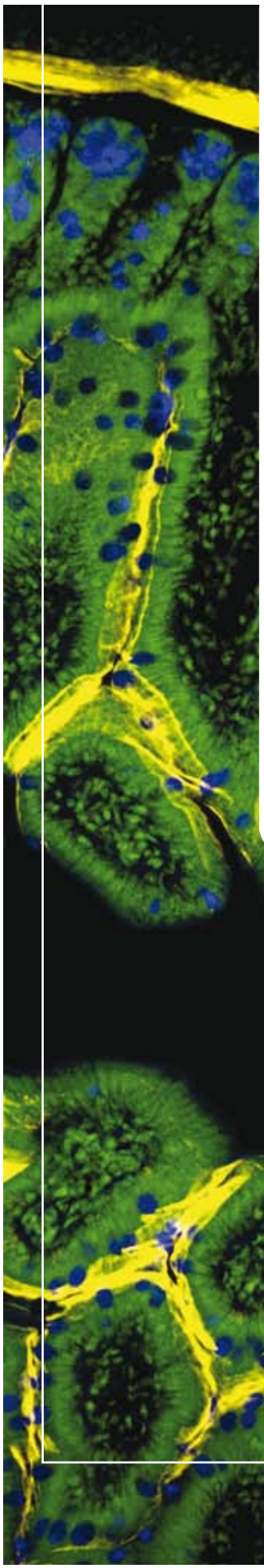
Digital Microscope Cameras

Camera Overview

Color, B&W and Universal

Release Information | 08.08

The Flexibility of Choice



THE FLEXIBILITY OF CHOICE

Your project needs the right camera

It is always preferable to have a choice, and this is definitely true when it comes to matching your digital imaging requirements with your project work. Sometimes you'll want dazzling colour fidelity and at other times you'll need pixel-precise black and white capture. There are also those occasions when you would like a microscope camera that can do both. Add to this selection the ability to choose from a range of image sizes and resolutions, and the Olympus digital microscope camera range really does offer you the flexibility of choice.

Perfect color match - SC20, UC30, UC50, XC10, XC50, DP25

Stay true to the colors: color fidelity has been the unreachable zenith of digital microscope cameras until now – the Olympus color camera range provides color match and resolution capabilities for every application.

The right 'black and white - XM10

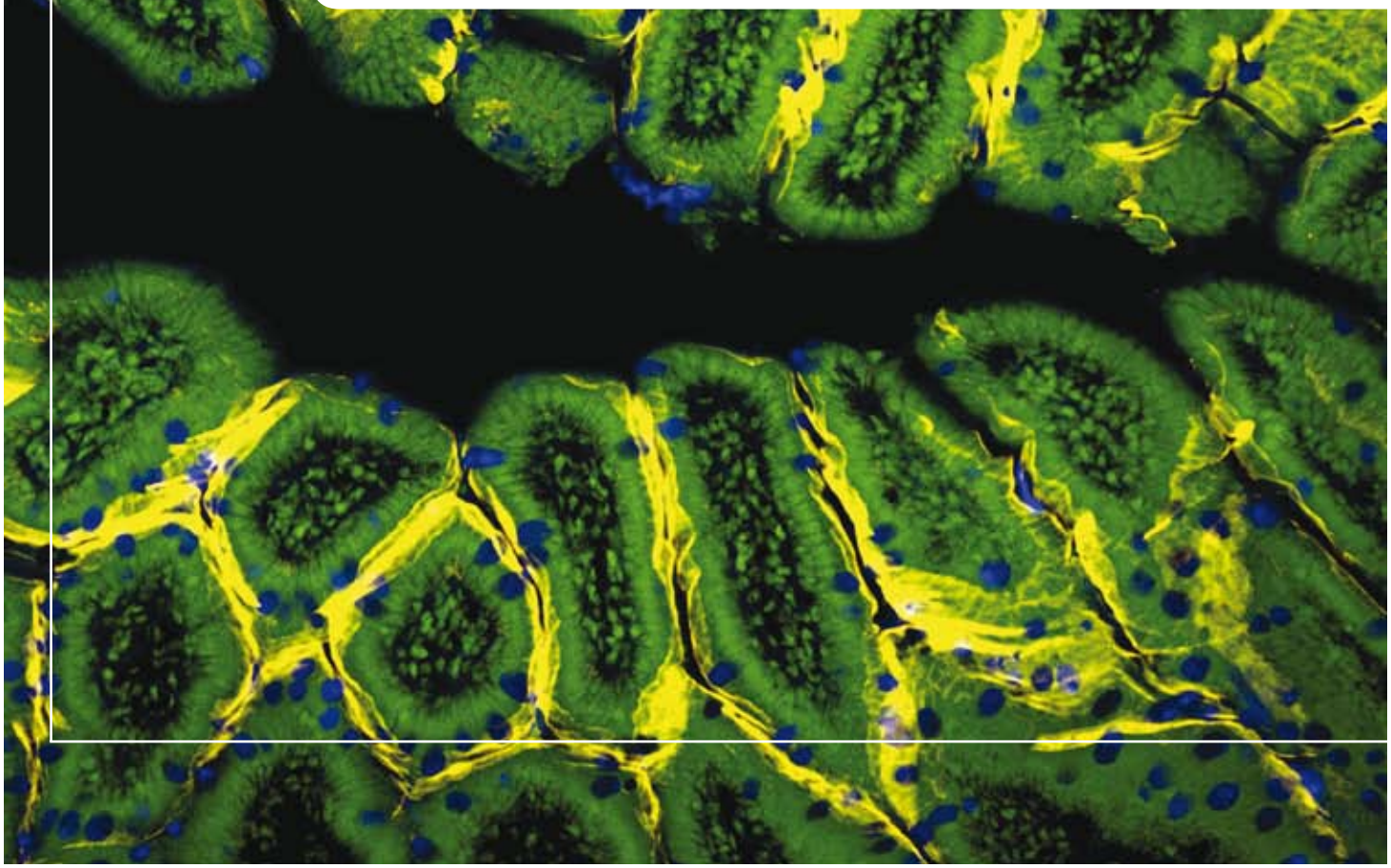
It's all about sensitivity: capturing the smallest intensity differences in every single pixel to build up the perfect picture of the fluorescent scene on the slide.

Multi-talented all-rounders - XC10

The best of both worlds: the versatility to image using both color and B&W, providing a dependable workhorse for all imaging procedures.

Your vision: our future

Olympus is dedicated to making digital imaging solutions to support your work at all levels. We have therefore developed a comprehensive range of digital cameras to make the most of any application, whatever the microscope.



PIXEL-PERFECT WHATEVER THE COLOR

For a researcher, successful imaging can be the difference between 'moving up' or 'moving out'! Consistently identifying and recording the differences or similarities between samples requires perfection down to the pixel. For many studies, there is also a requirement for a true indication of the gross and subtle variations in colour. Olympus has developed a range of cameras and processing algorithms that provide pixel-perfect images whatever the colours involved.

A winning camera line-up

Olympus has updated its entire camera line-up to ensure that the right camera can be matched up with each application.

The camera range offers an excellent balance of features from highest sensitivities to pinpoint resolutions and high speeds. More specific specialisations are also accommodated: For example, a number of Olympus colour cameras utilise the Olympus True Color (OTC) online algorithm for outstanding color fidelity according to ICC profiling standards.

The proven reliability, high build quality and ease of use are overriding features for all the cameras. Combined with the full integration into our software programs, these features put the user in complete control of all their imaging requirements, whatever they may be. Truly, a winning camera line-up!

True colour – from specimen to monitor

Olympus True Color (OTC) technology gives you the real image – from the specimen through the PC to the monitor. OTC uses internal ICC profiles to govern the relationship between the input colours from the specimen and through the camera, with the output colours from a display device, such as a monitor or printer.

As a result, the system-inherited color tendencies are corrected towards a reference standard. This correction process is performed as images are transferred between the camera and the display, as well as when images are handled by oursoftware programs.

By using the full data transfer bandwidth of FireWire, the OTC technology can be used with the system in 'live mode' to ensure the best possible color representation at the highest speed. This online color correction uses profiles based on Olympus' extensive microscopy and imaging application experience. As a consequence, all of your sample information is guaranteed to be displayed optimally at all stages.

C **Color cameras**

Versatile range for different applications

D **Black-and-white camera**

For life science applications

E **Universal cameras**

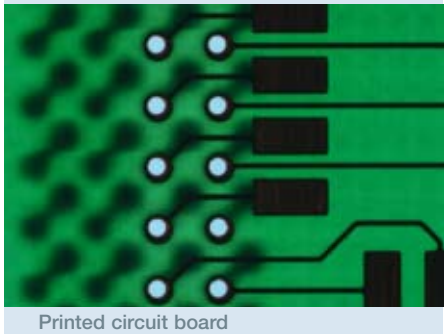
For color and black-and-white reproduction

PERFECT COLOR MATCH

Color: an exact science

Color reproduction presents microscope camera manufacturers with a very complex set of issues. Besides the color itself, the intensity and weighting within the given spectral range has to be taken into account and Olympus has worked very hard to produce a range of cameras that provide perfectly balanced solutions for each and every application.

A SC20
2-megapixel CMOS camera



Printed circuit board

SC20

A The Olympus SC20 uses a 2-megapixel CMOS chip which is excellent for standard brightfield applications and is superb for simple digital documentation purposes. In conjunction with its excellent cost/performance ratio, the SC20 is the ideal introductory model for digital image acquisition for light microscopes.

The SC20 has been designed for fast frame rates, so even at full resolution (1.596 x 1.196, 10 bit analog digital conversion), the camera can deliver 10 fps and, with the use of 2x pixel binning, this can exceed 32 fps.

The SC20 uses the standard C-mount adaptor for optical coupling, and data transfer and power requirements are dealt with by a single high-speed USB 2.0 cable. This ensures that both hardware and software integration into any system is easy. SC20 is fully compatible with the Olympus life sciences and Olympus materials science imaging software environments.

UC30

B The Olympus UC30 offers an excellent 3.2-megapixel resolution and fast frame rates with the added benefit of 2x and 3x color binning, making it ideal for entry-level imaging requirements in both life and materials sciences. The CCD chip provides 2.080 x 1.544 pixels with 14 bit analog digital conversion and supports a number of different frame rates. The UC30 supports the Olympus True Color (OTC) technology for color fidelity.

The color CCD chip ensures users can see more and, as a result, measurements can be carried out with great precision and sensitivity, providing detection of even very weak signals. The camera also offers three frame rates: Search mode uses 3x pixel binning to offer nearly 35 images per second at 688 x 512 pixels. This makes finding suitable areas of a sample very easy. Focus mode uses 2x pixel binning to offer 14 images per second at 1.040 x 772 pixels. This ensures that focusing can be carried out quickly and accurately. Full-resolution mode offers 7 images per second at 3.2-megapixel resolution. These modes enable users to quickly find, focus and image exactly what they are looking for with good colour fidelity. Furthermore, the UC30 offers a broad exposure range (0.1 ms–10 s) and a black-and-white acquisition mode at 1.040 x 772 pixels.

The UC30 can be quickly and easily mounted onto all light microscopes with a C-mount adaptor. Furthermore, FireWire™ technology guarantees that installation onto a PC or laptop equipped with a FireWire™ port is simple, rapid and flexible, with power and data all from one cable.

The UC30 can be fully operated via the life sciences and materials science families of Olympus imaging software. This ensures that it can be used to its maximum capacity very easily and enables innovative solutions to all challenges, including image commenting, archiving, report generation and emailing.

XC30

C The XC30 is similar to the UC30, but has the powerful benefits of Peltier cooling. As a result of the cooling, the performance of the XC30 is perfectly balanced in terms of background noise and color fidelity via OTC. This is especially relevant to pathology and histology applications. The versatile CCD can also be used for high-intensity fluorescence.

The Peltier cooling mechanism maintains the CCD chip at a constant 10 °C (at 25° ambient temperature) to guarantee perfect color images that are rich in contrast, with excellent color fidelity and extremely low background noise. The cooling also enables the exposure range to be expanded to cover 100 µs–160 s.

The 2.080 x 1.544-pixel CCD chip offers 14 bit analog digital conversion and can be switched between various frame rates for easier use. As well as the 2x and 3x pixel binning capabilities, the XC30 also offers a partial-readout mode where a segment of the entire field of view can be defined by the user and only this image segment is read out by the camera. This enables faster focusing and imaging of the features of interest, within the field of view.

As with the UC30, the XC30 can be fully operated using the Olympus imaging software families. This makes it both easy and quick to use to its maximum capacity, ensuring that it provides the best solution to all challenges including image labelling, commenting and archiving, report generation and emailing.

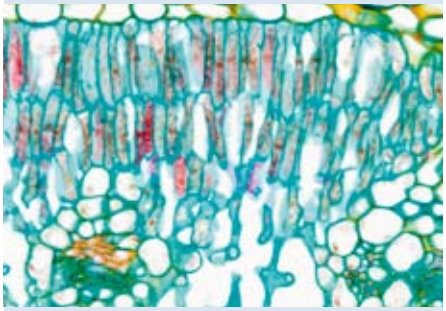
B UC30

Routine excellence

PtK cells, differential interference contrast

C XC30

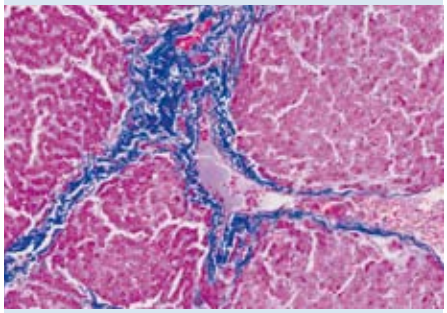
Bright, even illumination



Oleander leaf section

D UC50

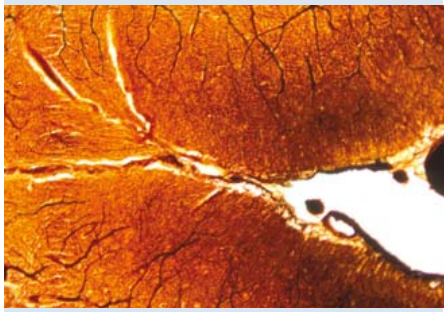
5-megapixel cooled camera head



Liver section, malign

E XC50

Bright, even illumination



Cellebellum setction, pig

UC50

D The Olympus UC50 offers a high resolution of 5 megapixels and provide a wide dynamic range along with a number of different frame rates using pixel binning and partial readout modes.

The 2.576 x 1.932-pixel CCD chip used in the UC50 offers 14 bit analpg digital conversion and can be used for variable exposure times between 0.1 ms and 160 s. These features as well as color fidelity via OTC and superior contrast make the UC50 a great universal high-resolution color camera.

The UC50 supports three different binning modes: 2x, 4x and 6x, as well as a partial-readout mode which is used to concentrate and retrieve the information from a region of interest (ROI) within an image. At full resolution, the UC50 provides a live frame rate of 4.5 fps, which increases to 24.5 fps using the 6x binning mode.

Using the standard C-mount adaptor and FireWire™ connectivity, the UC50 is easy to integrate into any system and ensures a tidy working space. Furthermore, the camera can be fully operated using the Olympus imaging software families, which also offer a host of image processing, storage and measurement functions. In addition, the software uses real-time functions to ensure that the entire dynamic range is exploited, for optimally balanced contrast and superior image quality.

XC50

E The XC50 is similar to the UC50, but has the powerful benefits of Peltier cooling. As a result of the cooling, the performance of the XC50 is perfectly balanced in terms of background noise and color fidelity. The versatile CCD can also be used for high-intensity fluorescence or is especially relevant to pathology and histology applications. The XC50 supports the Olympus True Color (OTC) technology for color fidelity.

The Peltier cooling mechanism maintains the CCD chip at a constant 10 ˚C (at 25° ambient temperature) to guarantee perfect colour images that are rich in contrast, with excellent colour fidelity and extremely low background noise. The cooling also enables the exposure range to be expanded to cover 100 µs–160 s.

The 2.576 x 1.932-pixel CCD chip can be switched between various frame rates for easier use. As well as the 2x and 3x pixel binning capabilities, the XC50 also offers a partial-readout mode where a segment of the entire field of view can be defined by the user and only this image segment is read out by the camera. This enables faster focusing and imaging of the features of interest, within the field of view.

As with the UC50, the XC50 can be fully operated using the Olympus imaging software families. This makes it both easy and quick to use to its maximum capacity, ensuring that it provides the best solution to all challenges including image labelling, commenting and archiving, report generation and emailing.

DP25

F The DP25 5-megapixel color digital microscopy camera takes imaging to the next level through the integration of superior technologies, such as ICC profiles for color fidelity and field update algorithms for fast frame rates. As a result, the Olympus DP25 is an easy-to-operate digital color camera system for a broad range of microscopy and imaging processes such as image documentation, reporting and analysis.

The CCD-chip has a maximum resolution of 2.560 x 1.920 pixels and, with three binning levels (2x, 3x and 4x), can be used in live mode with various frame rates from 8 fps (full resolution) to 32 fps (4x binning), ensuring the correct balance between frame rate and display quality for each and every application.

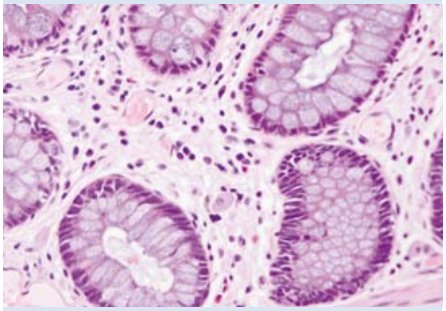
The extensive dynamic range of the DP25 ensures that all images are of outstanding quality. This is supported strongly by the application of real-time true colour optimisation. As a result, images look natural, with very high fidelity to the actual colors in the sample.

The DP25 draws on Olympus's extensive experience to provide intuitive installation and set-up. It uses the standard C-mount optical coupling for easy installation to all microscopes, and data transfer and power are provided by FireWire™ technology, guaranteeing that the DP25 is simple to install. Using the camera is just as simple since there is a choice of either automatic exposure routines or manual control and all acquired images are calibrated automatically. In addition, images can be prepared as desired with post-acquisition geometry, enhancement and filtering functions

Furthermore, the DP25 is seamlessly integrated into all Olympus analysis imaging families.

F DP25

Colour performance camera

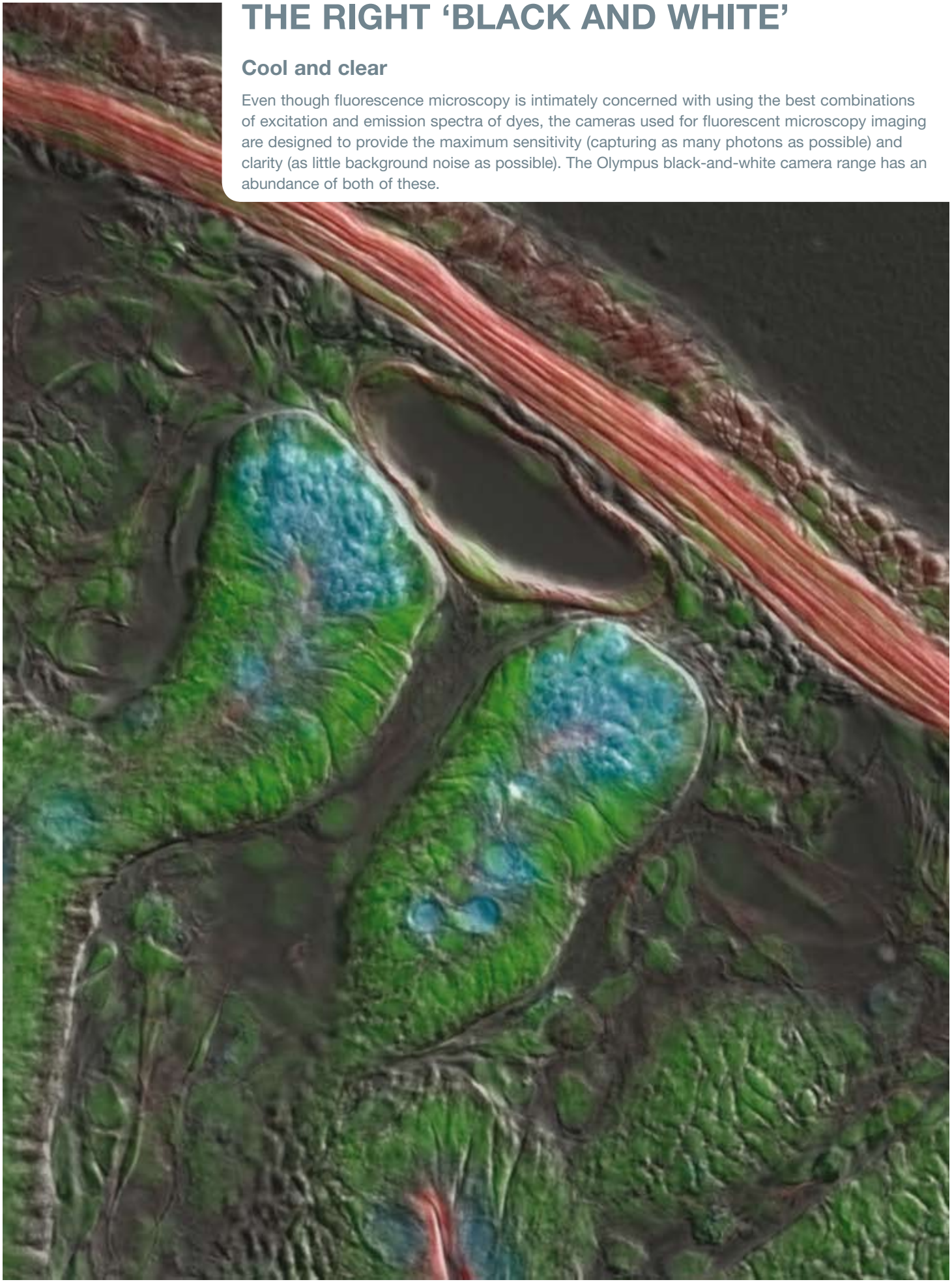


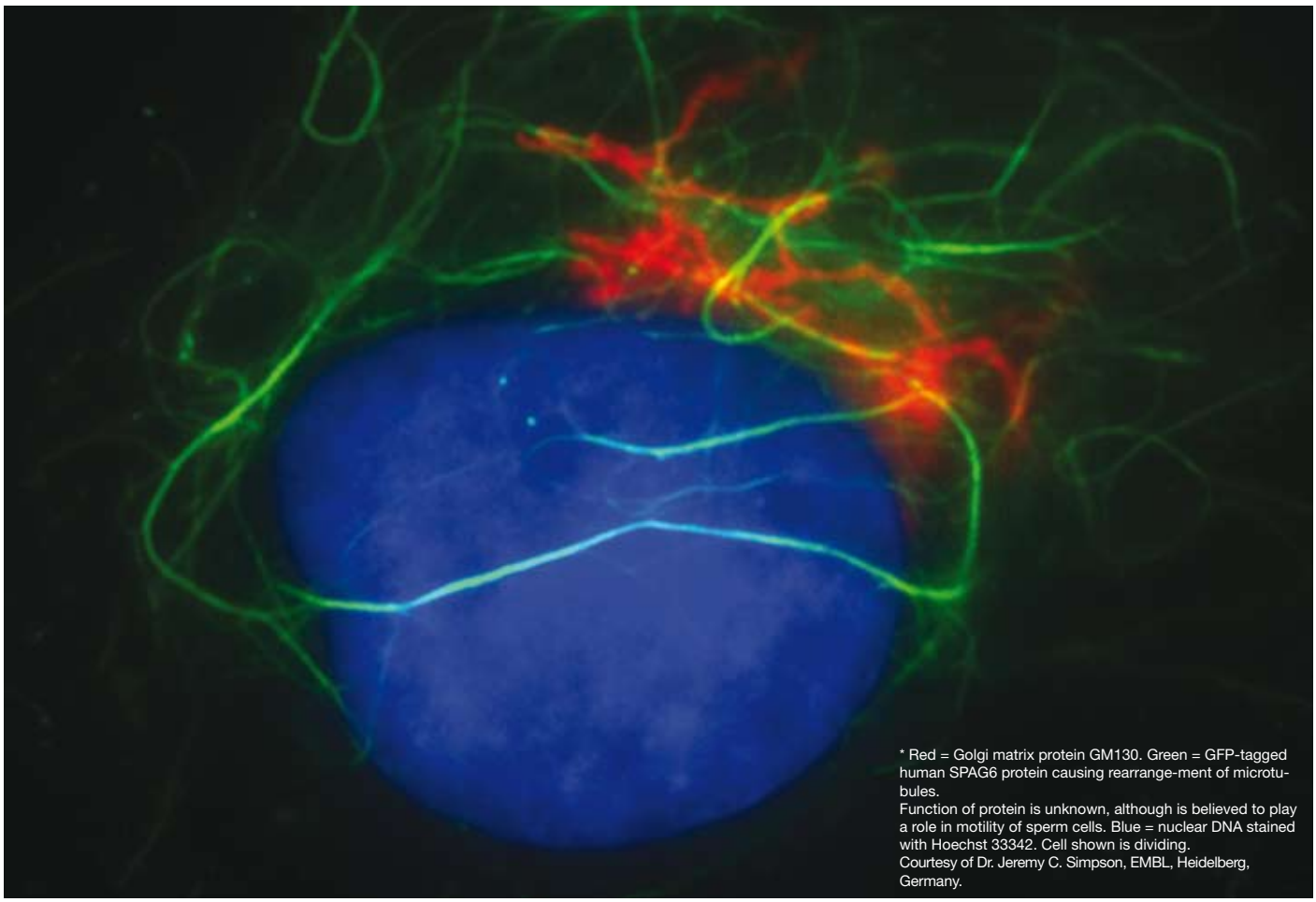
Intestine section

THE RIGHT ‘BLACK AND WHITE’

Cool and clear

Even though fluorescence microscopy is intimately concerned with using the best combinations of excitation and emission spectra of dyes, the cameras used for fluorescent microscopy imaging are designed to provide the maximum sensitivity (capturing as many photons as possible) and clarity (as little background noise as possible). The Olympus black-and-white camera range has an abundance of both of these.





* Red = Golgi matrix protein GM130. Green = GFP-tagged human SPAG6 protein causing rearrange-ment of microtu-bules.
Function of protein is unknown, although is believed to play a role in motility of sperm cells. Blue = nuclear DNA stained with Hoechst 33342. Cell shown is dividing.
Courtesy of Dr. Jeremy C. Simpson, EMBL, Heidelberg, Germany.

XM10

G The XM10 offers all of the properties required to provide dependable fluorescence microscopy images: high resolution, extremely fine sensitivity, a cooled CCD chip, variable exposure times and an optional external trigger function.

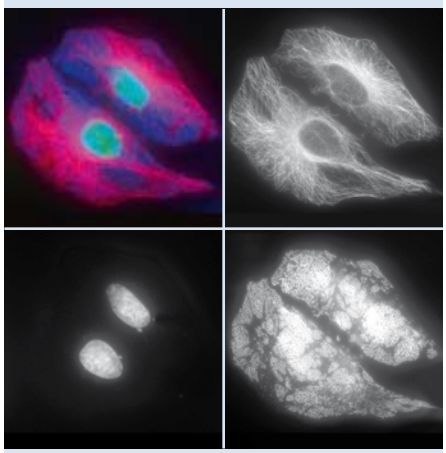
The XM10 uses a 1.376 x 1.032-pixel CCD chip cooled to 10 ˚C (at 25 °C ambient) with a 14 bit analog digital conversion. It offers three binning modes: 2x, 4x and 8x, resulting in increased sensitivity and frame rates of up to 80 fps in live mode. This makes it easier to focus and locate areas of interest while conserving highly sensitive fluorescence samples. At full resolution, the XM10 is ideal for all fluorescence acquisitions since it is extremely sensitive, low in noise and supports long integration times of up to 160 seconds. The chip has a pixel size of 6.45 µm x 6.45 µm, which, in combination with the camera cooling, ensures the XM10 is ideal for recording even the faintest fluorescence signals in your specimen.

The XM10 makes a great addition to any microscopy system not only because of its great features, but also since it is easy to integrate using a standard C-mount adaptor to connect to the microscope and the high-speed data transfer and power capabilities of the FireWire™ interface.

The XM10 is fully supported by the Olympus imaging software families, ensuring that whatever the application, the information is not only fully collected, but also properly analysed, processed and displayed.

G XM10

Bright, even illumination



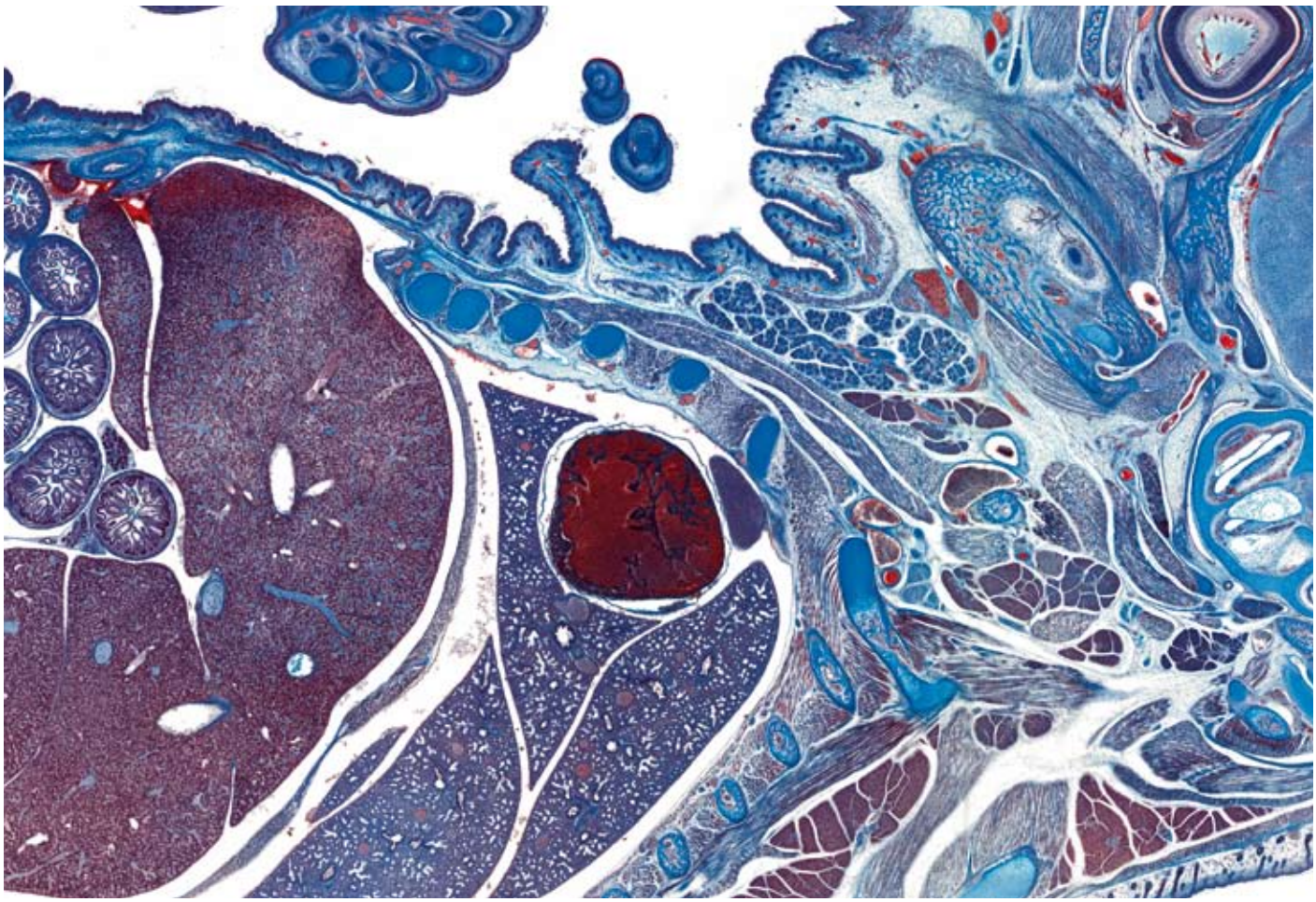
Human HeLa cells: Red: alpha-tubulin subunit of microtubule cytoskeleton, green: nuclear DNA stained with Hoechst 33342, blue: GFP-tagged synaptotagmin III, clustered in patches on the cell surface

Image courtesy of Dr Jeremy C. Simpson, Cell Biology & Biophysics, EMBL, Heidelberg, Germany

MULTI-TALENTED ALL-ROUNDERS

Trendsetters

When there is a requirement for two or more seemingly distinct technologies in one instrument, there is often a compromise reached whereby the product is good but not great. The Olympus universal microscopy imaging cameras reverse this trend, though, with a multi-talented camera which excel at every task.



XC10

H With an excellent image quality, high sensitivity and long integration times, the XC10 Peltier-cooled color camera offers every user a flexible general-purpose imaging set-up. The XM10 supports the Olympus True Color (OTC) technology for color fidelity.

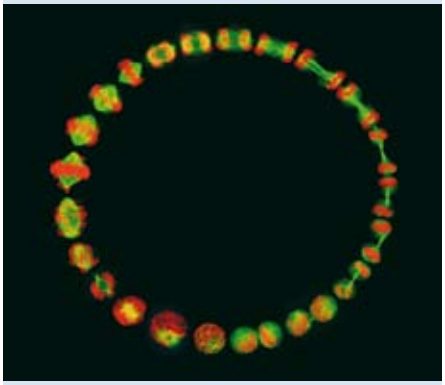
The powerful 1.376 x 1.032 pixel CCD chip offers the clarity of 14 bit analog digital conversionl and has the ability to provide very high frame rates via the use of pixel binning. In the 2x binning mode, the camera provides more than 23 fps, which increases to nearly 40 fps when using 4x binning. These make the XM10 ideal for applications that require fast image acquisition of dynamic objects. In addition, the high image frequency can be used to focus samples or locate areas of interest directly on the PC screen.

The high sensitivity of the XC10 is the result of a large pixel size of 6.45 x 6.45 µm. This defines the camera's ability to be a well-equipped all-rounder; not only perfect for colour imaging, but also to meet high expectations in sensitive fluorescence applications. The Peltier-cooled CCD maintains a temperature of 10° (at 25 °C ambient temperature), enabling this multifunctional camera to provide colour and black and white images that are rich in detail and contrast with extraordinarily low background noise. Also adding to the XC10's appeal is the extensive exposure time range (100 µs–160ms), ensuring that both strong and weak signals are captured with equal fidelity.

With the ease of both C-mount optical coupling and FireWire™ data and power connectivity, integrating the XC10 into your imaging system is easy.

H XC10

Sensitive, cooled CCD



States of mitosis. Red: DNA with propidium iodide; Green: microtubules with anti-alpha-tubilin antibody conjugated with Alexa488.
Courtesy of Per Holmfeldt, Martin Gullberg Laboratory, Dept. Molecular Biology, Umea, Sweden

Camera specifications

Color cameras

	SC20	UC30	UC50	XC30	XC50	DP25
Image sensor	Color CMOS	Color CCD	Color CCD	Color CCD	Color CCD	Color CCD
Sensor type	Micron MT9D001	Sony ICX 252 AQ	Sony ICX 282 AQ	Sony ICX 252 AQ	Sony ICX 282 AQ	Sony ICX 282 AQF
Sensor size	1/2 inches	1/1.8 inches	2/3 inches	1/1.8 inches	2/3 inches	2/3 inches
Resolution (max.)	1,596 x 1,196 pixels	2,080 x 1,544 pixels	2576 x 1932 pixels	2,080 x 1,544 pixels	2,576 x 1,932 pixels	2,560 x 1,920 pixels
Pixel size	4.2 µm x 4.2 µm	3.45 µm x 3.45 µm	3.4 µm x 3.4 µm	3.45 µm x 3.45 µm	3.4 µm x 3.4 µm	3.4 µm x 3.4 µm
Binning	2x, 4x	2x, 3x	2x, 4x, 6x	2x, 3x	2x, 4x, 6x	2x, 3x, 4x
Readout speed	24 MHz	24.5 MHz	24.5 MHz	24.5 MHz	20 MHz	24.5 Mhz
ADC[*1]	10 bit	14 bit	14 bit	14 bit	14 bit	14 bit
Exposure time	0.1 ms–1 s	0.1 ms–10 s	0.1 ms–160 s	0.1 ms–160 s	1 ms–160 s	0.2 ms–16 s
Live frame rates[*2]	9.8 fps at 1,596 x 1,196	7.0 fps at 2,080 x 1,544	4.5 fps at 2576 x 1932	7.0 fps at 2,080 x 1,544	4.5 fps at 2,576 x 1,932	8 fps at 2,560 x1,920
	32 fps at 796 x 596	13.6 fps at 1,040 x 772	8.8 fps at 1288x966	13.6 fps at 1,040 x 772	9 fps at 1,288 x 966	8 fps at 1,280 x 960
	93 fps at 396 x 296	35 fps at 688 x 514	16.5 fps at 640x480	35 fps at 688 x 514	16.5 fps at 640 x 480	24 fps at 854 x 640
			24.5 fps at 424x318		24.5 fps at 424 x 318	32 fps at 640 x 480
Cooling system	No	No	No	Peltier 10 °C	Peltier 10 °C	No
				at 25 °C ambient	at 25 °C ambient	
Readout noise	n.a.	<10 e^-	<10 e^-	<10 e^-	<10 e^-	<10 e^-
External trigger	No	No	No	No	No	No
Data transfer	USB 2.0	FireWire™ IEEE 1394a	FireWire™ IEEE 1394a	FireWire™ IEEE 1394a	FireWire™ IEEE 1394a	FireWire™ IEEE 1394a
OTC support[*3]	Yes	Yes	Yes	Yes	Yes	Yes
Partial readout	Yes	Yes	Yes	Yes	Yes	Yes
Remarks	–	–		–	–	Field update technology
						ICC online color optimisation
Operating system	Windows XP/Vista	Windows XP/Vista	Windows XP/Vista	Windows XP/Vista	Windows XP/Vista	Windows XP SP2
Application	MS	LS MS	LS MS	LS	LS MS	LS MS

Black-and-white cameras

	XM10
Image sensor	Monochrome CCD
Sensor type	Sony ICX 285 AL
Sensor size	2/3 inches
Resolution (max.)	1,376 x 1,032 pixels
Pixel size	6.45 µm x 6.45 µm
Binning	2x, 4x, 8x
Readout speed	24.5 MHz
ADC[*1]	14 bit
Exposure time	0.1 ms–160 s
Live frame rates[*2]	25 fps at 688 x 516
	50 fps at 344 x 258
	25 fps at 172 x 129
	80 fps at 172 x 129 pixels
Cooling system	Peltier 10 °C at 25 °C ambient
Readout noise	<10 e^-
External trigger	Optional
Data transfer	FireWire™ IEEE 1394a
OTC support[*3]	Yes
Partial readout	Yes
Remarks	–
Remarks	–
Operating system	Windows XP/Vista
Application	LS

Universal cameras

	XC10
Image sensor	Color CCD
Sensor type	Sony ICX 285 AQ
Sensor size	2/3 inches
Resolution (max.)	1,376 x 1,032 pixels
Pixel size	6.45 µm x 6.45 µm
Binning	2x, 4x
Readout speed	20 MHz
ADC[*1]	3 x 12 bit
Exposure time	0.1 ms–160 s
Live frame rates[*2]	12.4 fps at full resolution
	22.9 fps at 2x binning
	39.3 fps at 3x binning
Cooling system	Peltier 10 °C at 25 °C ambient
Readout noise	<10 e^-
External trigger	Optional
Data transfer	FireWire™ IEEE 1394a
OTC support[*3]	Yes
Partial readout	Yes
Remarks	–
Operating system	Windows XP/Vista
Application	LS MS

[*1] Analog Digital Conversion. Actual bit depth of the camera is depending on used software

[*2] Conditions for performance measurement: SC20: Pentium D, 3 GHz Hyperthreading at 1 ms exposure time. All other cameras: Dual Ahtlon AMD 2,6 GHz with ICC profiles at 1 ms exposure time

[*3] Olympus True Color optimization algorithms

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