




Cell Observer SD

Fast and Sensitive Confocal Imaging

Product Information

Interactive PDF

INTERNET-LINK 

VIDEO/ANIMATION 

Release 1.0



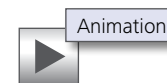
We make it visible.

Cell Observer SD
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Clearer Images. Clearly Faster. Cell Observer SD Combines the Best Technologies.

With Cell Observer SD, you have it all: The image quality of Axio Observer and Axio Examiner. Spinning disk technology from Yokogawa CSU-X1. The dual camera technology of ZEN software. This symbiosis of optics, hardware and software in one system makes your confocal live cell imaging uniquely accurate: you control your Cell Observer SD precisely in the millisecond range. By streaming image data, you will acquire your images in breathtakingly short times. You can also document two fluorescence channels of your sensitive samples simultaneously and get even more valuable data.



Cell Observer SD: Simpler. More Intelligent. More Integrated.

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Excellent Optics.

Image quality without compromises.

A tube lens developed by Carl Zeiss especially for Cell Observer SD gives even better color correction and higher contrast.

LCI objectives also work with a correction ring that makes the best image quality possible under your demanding conditions. Consequently, DirectFRAP – our solution for laser manipulation – is coupled into the illumination beam path. This leaves the imaging beam path free of additional components, delivering uncompromised image quality.

Two Channels simultaneously.

A true Cell Observer.

Document and quantify dynamic processes in living samples with the proven Cell Observer HS technology. Your system reads two hardware-triggered, highly sensitive cameras simultaneously to give you the benefit of the highest precision in timing. Observe dynamic cell processes with high frame rates, thanks to streaming technology.

A Universe of Options.

Combine freely to Your Requirements.

Combine Cell Observer SD according to your needs with motorized scanning stages, Z-Piezo inserts, stage-top incubation and DirectFRAP. All components are seamlessly integrated and managed with millisecond accuracy. You control environmental conditions when acquiring living cells with completely software-run incubation.



Your Insight into the Technology Behind It

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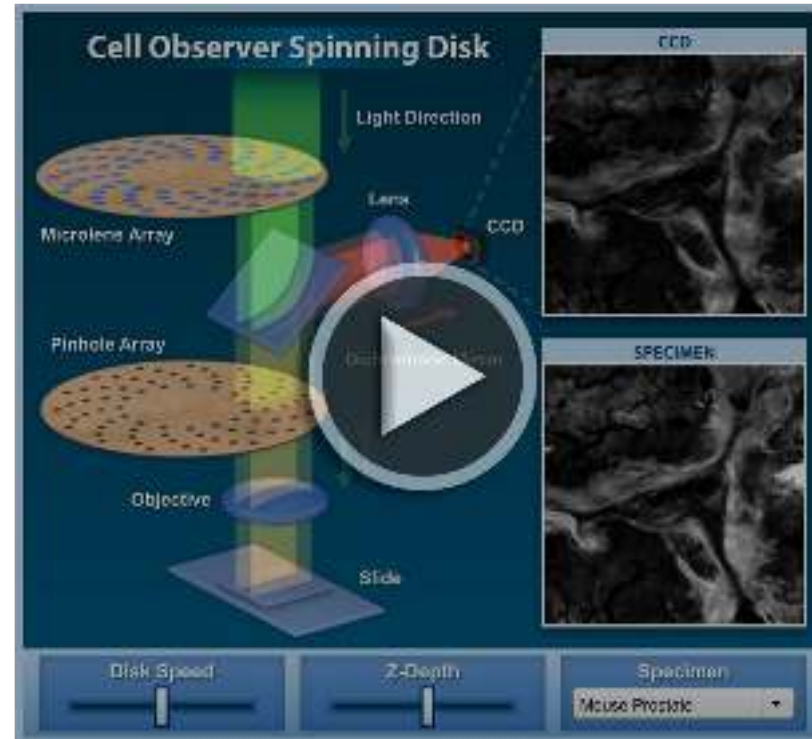
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Cell Observer SD Captures Hundreds of Image Points Simultaneously

Use Cell Observer SD to project and capture excitation light simultaneously through hundreds of circular apertures arranged in a spiral shape on the rotating disk of Yokogawa CSU-X1. With a rotation by 30 degrees, the disk covers the complete field of view of your camera and blocks out-of-focus emission light almost completely.

Yokogawa CSU-X1 is equipped with a tandem disk system: the rotating disk with circular apertures has a second disk in front of it. Microlenses located on this disk focus the excitation light through the circular apertures and thus use it efficiently.

As a result, frame rates are clearly higher than with traditional single point scanners and you can detect fluorescence using EMCCD cameras with high quantum efficiency. Illumination intensity and phototoxicity are reduced to a minimum.



Animation from www.zeiss.com/campus, © Mike Davidson, FSU, Tallahassee

<http://zeiss-campus.magnet.fsu.edu/articles/spinningdisk/index.html>

Tailored Precisely to Your Applications

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Typical applications, typical samples	Task	Cell Observer SD provides
Life Cell Imaging of cultivated cells	Examination of cellular and biophysical regulations-, growth- and signal mechanisms	<p>Time lapse, two cameras simultaneously</p> <p>Frame rates up to 30 images per second and camera (full frame)</p> <p>Depending on selected camera support of Overlap Read Out and exposure times under 30ms; no reducing of image rate of camera</p> <p>Flexible selection of up to 6 laser lines</p> <p>Fast manipulation of biophysical processes with DirectFRAP laser manipulation module</p> <p>Stabilization of focus position below axial resolution limit, no influence on image quality (Definite Focus)</p>
	Research of cell-cell communication or signal mechanisms, which involve several cell organelles	<p>Fast 3D image stacks with piezo focussed objectives or stage inserts</p> <p>Optical sectioning increases axial resolution (z resolution) to 0.3 μm</p> <p>Support of vast range of CCD and EMCCD cameras, matching resolution and image field of chosen objectives</p> <p>Long Distance and LCI objectives with correction collar to compensate spherical aberrations, caused by specimen preparation or temperature gradients</p> <p>Precise synchronization of external devices within milliseconds, using trigger signals</p>
In Situ Imaging of organotypic tissue cultures and tissue sections	Observation of intra- and intercellular processes in physiological conditions	<p>Plan-APOCHROMAT objectives for highest best contrast and resolution</p> <p>Acquisition of IR-DIC and IR-Dodt contrast images in transmitted light</p> <p>Integrated and flexible incubation solutions from stage-top to large incubators</p>

Cell Observer SD At Work

Cell Observer SD

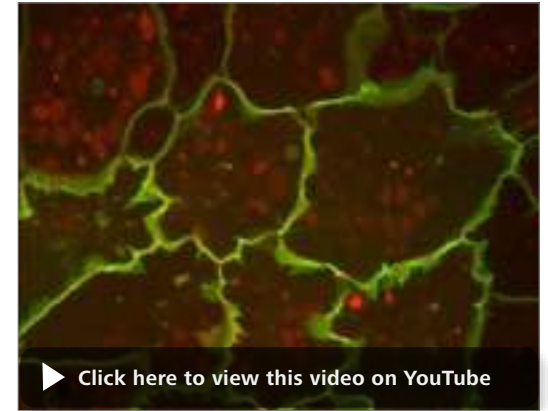
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- Image subcellular trafficking in 3D over time with maximum acquisition speed
- Visualize cytoskeletal dynamics with highest sensitivity
- Carry out photobleaching experiments with DirectFRAP
- Perform functional imaging of cellular signal transduction with high temporal resolution
- Perform confocal live cell imaging with highest sensitivity



Zebrafish blood



Xenopus explant



Drosophila embryo



Tobacco cells

Cell Observer SD – Imaging System: A Flexible Choice of Components

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1 Microscope

- Inverted: Axio Observer.Z1, D1
- Upright: Axio Examiner.Z1, D1
- Spinning Disk Unit
- Single camera, manual system:
CSU-X1M 1800
CSU-X1M 5000
- Dual camera, manual system:
CSU-X1M 1800 dual cam
CSU-X1M 5000 dual cam
- Fully motorized configuration:
CSU-X1A 5000
- Scalable and laser-safe incubation modules

2 Objectives

- Plan-APOCHROMAT
- LCI Plan-NEOFLUAR
- LCI Plan-APOCHROMAT
- W Plan-APOCHROMAT
- W N-ACHROPLAN

3 Illumination

- Choose 6 out of 7 laser lines
(see technical specifications for power):
405 / 458 / 488 / 514 / 532 or 561 / 635 nm
- Fast emission filter wheel
- DirectFRAP laser manipulation
for photoactivation and photobleaching

4 Cameras

- Dual Camera acquisition with CCD and EMCCD cameras for best detection sensitivity
- AxioCam HRm, AxioCam MRm
 - QImaging Rolera EM-C2, Hamamatsu ImageEM, Roper eVolve and QuantEM, Andor iXON3 (DU-897/DU-885)

5 Software

Recommended modules for ZEN system:

- Multi Channel, Z Stack, Time lapse, Tiles & Positions, Extended Focus (Acquisition)
- Deconvolution, 3D VisArt, Colocalization (Processing)
- Image Analysis, Measurement (Analysis)

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Microscope	Axio Observer.Z1	Axio Observer.D1	Axio Examiner.Z1	Axio Examiner.D1
Stand	inverted, motorized	inverted, coded	upright, motorized	upright, motorized lower microscope body
Dimensions	ca. 295 × 805 × 707 mm	ca. 295 × 805 × 707 mm	335 mm x 630 mm x 470 mm	335 mm x 630 mm x 470 mm
Weight	ca. 36 kg	ca. 30 kg	ca. 28 kg	ca. 28 kg
Eyepieces	Field number 23 (E-Pl 10x/23 br foc), Diameter: 30 mm			
Objectives	Axio Observer.Z1	Axio Observer.D1	Axio Examiner.Z1	Axio Examiner.D1
Nosepiece turret (M27x0,75)	6x H DIC ACR mot, 6x H DIC mot	6x H DIC cod.	2x DIC cod., 4x DIC cod.	2x DIC cod., 4x DIC cod.
Contrast Methods	Axio Observer.Z1	Axio Observer.D1	Axio Examiner.Z1	Axio Examiner.D1
Reflector turret	6x mot ACR, 6x mot, 6x cod.	6x mot ACR, 6x mot, 6x cod.	5x man/5x mot	5x man/5x mot
Operational data	Axio Observer.Z1	Axio Observer.D1	Axio Examiner.Z1	Axio Examiner.D1
Line voltage ranges	VP232-2, 100 to	VP232-2, 100 to	100 to 127, 200 to	VP232-2, 100 to
Change of instrument voltage setting is not necessary!	240 VAC (+/- 10%)	240 VAC (+/- 10%)	240 VAC (+/- 10%)	240 VAC (+/- 10%)
Line frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Power consumption with internal power supply units	280VA	280VA	260VA	260VA
Intended site	Closed spaces			
Protection class/Protection type	I, IP 20			
Electrical safety	in compliance with DIN EN 61010-1 (IEC 61010-1) under consideration of CSA and UL directives			
Safety of laser devices	in accordance with DIN EN 60825-1 (IEC 60825-1)			
Overvoltage category	II			
Radio interference suppression	in accordance with EN 55011 class B			
Noise immunity	in accordance with DIN EN 61326-1			

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Accessories		Dimensions (width x depth x height)	Weight
Spinning Disk Unit	Single camera, manual system CSU-X1M 1800 spinning disk unit: Microlense-enhanced Nipkow-disk confocal unit, fixed disk speed 1800 rpm, manual shutter control and fixed dichroic, coupling fiber	ca. 324 mm x 213 mm x 304 mm	7.5 kg
	CSU-X1M 5000 spinning disk unit: Microlense-enhanced Nipkow-disk confocal unit with control unit, disk speed adjustable 1500 - 5000 rpm, automatic shutter control and fixed dichroic, coupling fiber	ca. 324 mm x 213 mm x 304 mm	7.5 kg
	Dual camera, manual system CSU-X1M 1800 dual dam spinning disk unit: Microlense-enhanced Nipkow-disk confocal unit, fixed disk speed 1800 rpm, manual shutter control and fixed dichroic, second camera port for simultaneous dual channel acquisition, coupling fiber	ca. 324 mm x 301 mm x 175 mm	9.5 kg
	CSU-X1M 5000 dual cam spinning disk unit: Microlense-enhanced Nipkow-disk confocal unit with control unit, disk speed adjustable 1500 - 5000 rpm, automatic shutter control and fixed dichroic, second camera port for simultaneous dual channel acquisition, coupling fiber	ca. 324 mm x 301 mm x 175 mm	9.5 kg
	Fully motorized configuration CSU X1A 5000 spinning disk unit: Microlense-enhanced Nipkow-disk confocal unit with control unit, disk speed adjustable 1500 - 5000 rpm, automatic shutter control, three position motorized dichroic changer and 6 position high speed emission filter wheel, coupling fiber	212 mm x 438 mm x 132 mm	9.4 kg
Filter wheel		599 mm x 700 mm x 692 mm	1.9 kg

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Laser Modules	
Laser wavelengths	405 - 640 nm
Laser class	3B
	Ar/Multiline 458/488/514
	25 mW resp. 100 mW
	Diode laser 405 nm
	50 mW
	DPSS Laser 488 nm
	20 mW or 100 mW
	Diode laser 532 nm
	20 mW or 75 mW
	Diode laser 561 nm
	20 mW or 40 mW
Laser power	Diode laser 635 nm
	30 mW
Advisory notice regarding work with your own laser	Use only a class 3B laser (with a total output power not greater than 300 mW). Contact Carl Zeiss MicroImaging GmbH if you intend to select a laser with a wavelength that is different from those specified above. Customers using their own lasers will be solely responsible for overall laser safety of Cell Observer SD system. They must check for further required laser safety precautions and validity of all laser warning labels affixed to the system, including the microscope.
Laser power supply unit (25 mW)	
Line voltage	115/230 V AC
Line frequency	50/60 Hz
Power	max. 3 kVA
Laser power supply unit (100 mW)	
Line voltage	200 bis 240 V AC
Line frequency	50/60 Hz
Max. power consumption	16 A

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Multi-Lasermodule

Dimensions	600 mm x 700 mm x 692 mm	
Weight	90 kg	
Line voltage for 120 V fan module	108 to 132 V AC	
Line voltage for 230 V fan module	207 to 253 V AC	
Line voltage laser module	108 to 132 V AC/ 207 to 253 V AC	
Line frequency	50/60 Hz	
Power	max. 600 VA	
Protection class	I	
Protection type	IP20	
Overtoltage category	2	
Fuses according to IEC 127	Laser module TIRF 120 V	2x T6,3 A/E; 250 V, 5 x 20 mm
	Laser module TIRF 230 V	2x T3,15 A/E; 250 V, 5 x 20 mm

SVB 1 (Signal distribution box)

Dimensions	220 mm x 250 mm x 85 mm	
Line voltage	100 to 240 V \pm 10 % : Change of instrument voltage setting is not necessary!	
Line frequency	50/60 Hz	
Max. power consumption	20 VA	
Fuses	2x T1,0 A/H	
Intended site	closed rooms	
Protection class	I	
Protection type	IP 20	
Electrical safety	in compliance with DIN EN 61010-1 (IEC 61010-1) under consideration of CSA and UL directives	
Overtoltage category	II	
Radio interference suppression	in accordance with EN 55011 class B	
Noise immunity	in accordance with DIN EN 61326-1	

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Control Box CSU-X1

Dimensions	112 mm x 226 mm x 100 mm
Weight	1.9 kg
Line voltage	100 to 240 V \pm 10 %: Change of instrument voltage setting is not necessary
Line frequency	50/60 Hz
Max. power consumption	max. 200 VA
Fuses	automatic circuit breaker
Intended site	closed rooms
Protection class	I
Protection type	IP 20
Electrical Safety	in compliance with DIN EN 61010-1 (IEC 61010-1)
Overvoltage category	II
Noise immunity	in accordance with DIN EN 61326-1

HXP 120 C

Line voltage	100 to 240 V \pm 10 %: Change of instrument voltage setting is not necessary
Line frequency	50/60 Hz
Max. power consumption	max. 210 VA
Fuses	2x T 2,5 A/H
Intended site	closed rooms
Protection class	I
Protection type	IP 20
Electrical safety	in compliance with DIN EN 61010-1 (IEC 61010-1)

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Definite Focus Controller

Dimensions	220 mm x 250 mm x 85 mm
Line voltage	100 to 240 V \pm 10 %: Change of instrument voltage setting is not necessary!
Line frequency	50/60 Hz
Max. power consumption	60 VA
Fuses	2x T 2,0 A/H
Intended site	closed rooms
Protection class	I
Protection type	IP 20
Electrical Safety	in compliance with DIN EN 61010-1 (IEC 61010-1) under consideration of CSA and UL directives
Overvoltage category	II
Radio interference suppression	in accordance with EN 55011 class B
Noise immunity	in accordance with DIN EN 61326-1

Power supply for CSU-X1 spinning disk unit

Supply voltage	100 to 240 VAC (\pm 10 %); 50/60 Hz
Max. power consumption	max. 38 VA

Optical-mechanical data

Scanning field	Standard 10 mm x 7 mm
Mechanical port for microscope	C-Mount

Optical Fiber

Fiber type	polarization-preserving mono mode fiber
Transmission	\geq 50 %
Permissible wavelength range	405 to 650 nm
Beam diameter at inlet opening	0.65 mm
Type of fiber connection	FCP

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Environmental conditions		
Transport (in packaging)	Permissible ambient temperature	-20 to +70 °C
	Permissible relative air humidity (no condensation)	5 % to 95 %
Storage	Permissible ambient temperature	+5 to +40 °C
	Permissible relative air humidity (no condensation)	5 % to 95 %
Operation	Permissible ambient temperature	+15 to +40 °C
	Permissible relative air humidity	20 % to 75 %
	Atmospheric pressure	800 hPa to 1060 hPa
	Max. altitude of installation site	max. 2000 m
	Pollution degree	2

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Count on Service in the True Sense of the Word

Because the Carl Zeiss microscope system is one of your most important tools, we make sure it is always ready to perform. What's more, we'll see to it that you are employing all the options that get the best from your microscope. You can choose from a range of service products, each delivered by highly qualified Carl Zeiss specialists who will support you long beyond the purchase of your system. Our aim is to enable you to experience those special moments that inspire your work.

Repair. Maintain. Optimize.

Attain maximum uptime with your microscope. A Carl Zeiss maintenance contract lets you budget for operating costs, all the while avoiding costly downtime and achieving the best results through the improved performance of your system. Choose from service contracts designed to give you a range of options and control levels. We'll work with you to select the service program that addresses your system needs and usage requirements, in line with your organization's standard practices.

Our standard preventative maintenance and repair on demand contracts also bring you distinct advantages. Carl Zeiss service staff will analyze any problem at hand and resolve it – whether using remote maintenance software or working on site.

Enhance Your Microscope System

Your Carl Zeiss microscope system is designed for a variety of updates: open interfaces allow you to maintain a high technological level at all times. As a result you'll work more efficiently now, while extending the productive lifetime of your microscope as new update possibilities come on stream.

Please note that our service products are always being adjusted to meet market needs and may be subject to change.



Profit from the optimized performance of your microscope system with a Carl Zeiss service contract – now and for years to come.

www.zeiss.com/microservice

The moment your data change scientific minds.
This is the moment we work for.

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Carl Zeiss Microscopy GmbH

07740 Jena, Germany

BioSciences

microscopy@zeiss.com

www.zeiss.com/cellobserver-sd



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