From Eye to Insight

Leica MICROSYSTEMS

Mica – the world's first Microhub

Technical Documentation | March 2022



SPECIFICATIONS

			Mica Widefield	Mica Widefield Live Cell	Mica WideFocal	Mica WideFocal Live Cell
TRANSMITTED LIGHT CONTRAST	Integrated modulation contrast (IMC), automatically adjusted and brightfield contrast in RGB or gray scale mode		x	x	x	x
INCIDENT FLUORESCENCE ILLUMINATION	**LED**					
	365 nm	100 mW (direct LLG output)	x	x	x	x
	470 nm	170 mW (direct LLG output)	x	x	x	x
	555 nm	170 mW (direct LLG output)	x	x	x	x
	625 nm	170 mW (direct LLG output)	x	x	x	x
FluoSync WIDEFIELD DETECTION	**FluoSync Widefield Unit**					
	Simultaneous detection channels	4	x	x	x	x
	Emission separation	FluoSync™	x	x	x	x
	Detector type	5 MP CMOS, all detectors automatically aligned with 0.3 px precision	x	x	x	x
	Digitalization resolution	12 Bit	x	x	x	x
	Max. system frame rate	4 fluorophores simultaneously acquired at 25 fps (Mica High Power Workstation) or 10 fps (Mica Workstation)	x	x	x	x
	Quantum efficiency (QE)	61% @ 450 nm, 64% @ 500 nm, peak: 67% @ 536 nm, 46% @ 700 nm	x	x	x	x
	Spectral detection range	420 - 705 nm with high photon transmission due to fixed quad-band distribution on the 4 detection channels	x	x	x	x
	Readout noise	2.3 e^-	x	x	x	x

	Full well depth	10970 e^-	x	x	x	x
CONFOCAL ILLUMINATION	**Laser diode**					
	405 nm	10 mW direct fiber output			x	x
	488 nm	10 mW direct fiber output			x	x
	561 nm	2 mW direct fiber output			x	x
	638 nm	10 mW direct fiber output			x	x
	Illumination modulation	All diodes are directly modulated. Global neutral density filters to automatically adjust dynamic range to match the sample.			x	x
	Laser Safety	Laser class 1			x	x
FluoSync CONFOCAL DETECTION	**FluoSync Confocal Unit**					
	Simultaneous detection channels	4			x	x
	Emission separation	FluoSync™			x	x
	Detector type	HyD FS			x	x
	Detection mode	Analog			x	x
	Digitalization resolution	8 / 12 Bit			x	x
	Photon detection efficiency (PDE)	20% @ 400 nm, 30% @ 500 nm, 40% @ 600 nm, 31% @ 700 nm			x	x
	Spectral detection range	415 - 750 nm with high photon transmission due to fixed quad-band distribution onto the 4 detection channels			x	x
	Imaging	Simultaneous or frame sequential			x	x
	UV/405 nm correction	Unified concept with CS2 optics			x	x

	Pinhole	Stable single pinhole (maintenance-free)			x	x
	Pinhole-diameter control	Automatically adjusted			x	x
SCANNER XY	**Scanner**					
	Scanning concept	XY scanner with scanning at low inertia			x	x
	Maximal line frequency	3600 lines/s			x	x
	Line frequency	Automatically adjusted			x	x
	Frame rate	3 fps (800 px x 672 px); 10 fps (192 px x 168 px)			x	x
	Maximal accessible frame resolution	3552 px x 2972 px			x	x
	Scan zoom	1 – 6x			x	x
	Field diameter	18 mm			x	x
	Scan modes	xyz, xyt, xyzt			x	x
ENVIRONMENTAL CONTROL	**Incubator**	**Complete sample space is under environmental control**		x		x
	Temperature	Room temperature +3 °C to 45 °C, accuracy: ± 0.1 °C		x		x
	CO_2	0 to 10 %, accuracy: ± 0.1 %		x		x
	Humidity	65% - feedback controlled to minimize media evaporation while avoiding condensation		x		x
HYPOXIA UPGRADE	**Stage-top**	**Replaces standard incubator, can be used with and without oxygen control**		**Opt.**		**Opt.**
	Temperature	Room temperature +3 °C to 45 °C, accuracy: ± 0.1 °C		**Opt.**		**Opt.**
	CO_2	0 to 10 %, accuracy: ± 0.1 %		**Opt.**		**Opt.**
	O_2	1% to air, accuracy: ± 0.1 %		**Opt.**		**Opt.**
	Humidity	Gas is humidified by means of a water vapor semi-permeable tube immersed in a water bath		**Opt.**		**Opt.**

SCANNING STAGE	**XY STAGE**					
	Travel range	127 mm x 83 mm	x	x	x	x
	Resolution	< 0.02 µm	x	x	x	x
	Reproducibility	< 1 µm	x	x	x	x
	Max. speed	37 mm/sec	x	x	x	x
OBJECTIVE PACKAGES	**Objectives included**	**PL FLUOTAR 1.6x/0.05 PL FLUOTAR 10x/0.32**	x	x	x	x
	Recommended objectives	HC PL APO 20x/0.75 CS2	x	x	x	x
		HC PL APO 63x/1.40 OIL CS2 (for fixed samples)	x	x	x	x
		HC PL APO 63x/1.20 W CS2 motCORR (for live cells)	x	x	x	x
IMMERSION DISPENSION	**Closed loop water dispenser**	**Forming and maintaining water immersion for one objective is feedback controlled and does not require any interaction**	**Opt**	x	**Opt**	x
THUNDER	**Methods**	**ICC, SVCC, LVCC**	x	x	x	x
LIGHTNING	**Methods**	**Basic, upgradeable to LIGHTNING Expert**			x	x
VIBRATION ISOLATION	**Anti-vibration table**	**Passive**	x	x	x	x
MICROSCOPE FOCUS	**Focus options**					
	Autofocus	Reflection-based Adaptive Focus Control (AFC). Image Based Autofocus for transmitted light and fluorescence images. Can be combined with AFC.	x	x	x	x
	Z-drive	Minimum step size 50 nm	x	x	x	x

CORE FUNCTIONALITIES	Name	Description				
	FluoSync™	FluoSync™ detection hardware with fully integrated digital spectral hybrid unmixing for the acquisition of up to 4 labels simultaneously	x	x	x	x
	OneTouch	Sets all technical excitation and detection parameters according to the experimental demands automatically or with a single click on-demand	x	x	x	x
	Focusing	Keeps sample in focus throughout the experiment with a simple selection out of 3 focus strategies	x	x	x	x
	3D Imaging	Allows acquisitions of 3D volumes in widefield and confocal	x	x	x	x
	Mixed TL&CLSM	Combines transmitted light with confocal imaging	x	x	x	x
	Mixed TL&WF	Combines transmitted light with widefield imaging	x	x	x	x
	Sample Finder	Quickly and automatically generates an in-focus overview of the relevant sample areas	x	x	x	x
	Navigator	Powerful package including Assay Editor, Stitching and Mark and Find license. Uses overview for navigation and for defining positions and regions in any shape. Displays all acquired images in spatial relation to all other images.	x	x	x	x
	Objective Collision Prevention	Prevents the objective from colliding with a microtiter plate to protect the objective and sample	x	x	x	x
	Learn & Results	Aivia-powered pixel classifier: easy to train, it generates fast and reproducible image segmentation results. The software generates beautifully visualized results with full traceability of the data points to the source in the image.	x	x	x	x

SOFTWARE LICENCES	Article number	Name				
	1596210255	LAS X STELLARIS Base License	x	x	x	x
	1596210227	THUNDER 3D DCV	x	x	x	x
	1596210224	THUNDER OTF functional only in combination with High Power Workstation	x	x	x	x
	1596210259	Learn & Results	x	x	x	x
	1596210050	3D Visualization Basic	x	x	x	x
	1596210204	LAS X Assay Editor Pre-configured specimen carriers	x	x	x	x
	1596210063	Environmental Control	x	x	x	x
OPTIONAL SOFTWARE LICENCES	**Article number**	**Name**				
	158203204	LAS X LIGHTNING Expert Customizable image information extraction by adaptive deconvolution	Opt.	Opt.	Opt.	Opt.
	11640853	LAS X 3D Visualization Advanced	Opt.	Opt.	Opt.	Opt.
	11640820	3D Analysis (requires 11640853)	Opt.	Opt.	Opt.	Opt.

X - included
Opt. - optional

SPACE REQUIREMENTS

Inverted Stand (options)

The Microhub may differ from the illustration. Configurational variants can be configured by combining a fixed core unit of Mica WF with the upgrade to confocal (confocal module) and the upgrade to a live cell compatible system. The two upgrades are not exclusive but can be combined. Detailed room requirements can be found in the corresponding Mica Room Requirement document. In terms of live cell conditions, please see the white paper Okolab "Indoor CO2 Concentration limits".

Dimensions of the Microhub (width x depth x height)

without incubator
69 cm x 79 cm x 140 cm + work table*
(27.2" x 31.1" x 55.1" + work table*)

with incubator
69 cm x 85 cm x 140 cm + work table*
(27.2" x 33.5" x 55.1" + work table*)

*Work table: min. 90 cm x 80 cm
(min. 35.4" x 31.4")

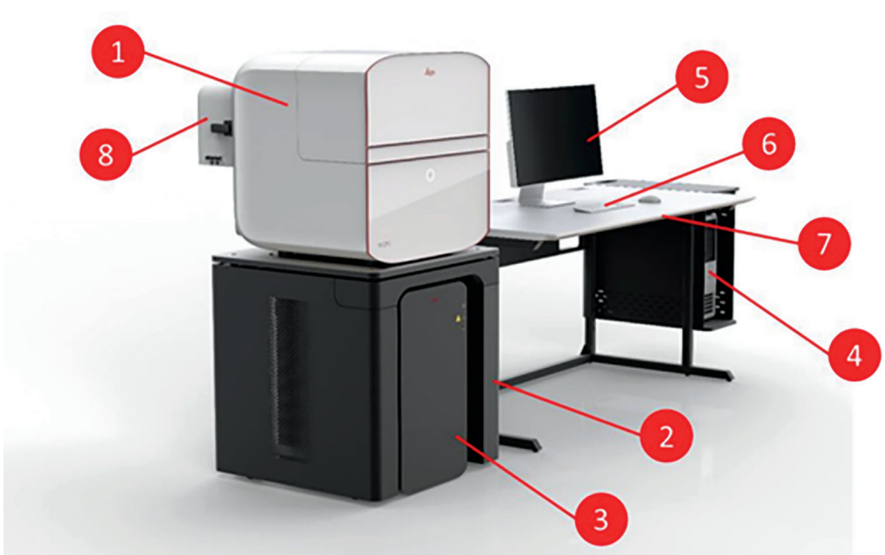


Figure 1: Microhub with inverted imager, incubator, and the flexible supply unit under the anti-vibration table. Small computer table.

1	Microhub
2	Anti-vibration table
3	Supply Unit
4	Workstation
5	Monitor
6	Mouse, keyboard, Smart Move
7	Work table (optional)
8	Incubator

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