

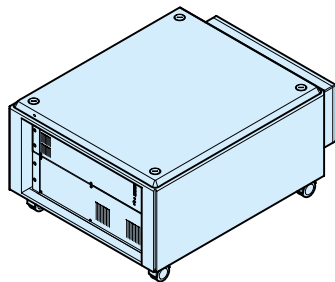
# Specification LSM 7 MP

<b>Microscopes</b>	
<b>Stand</b>	Upright: Axio Examiner (also with rear port)
<b>Z drive</b>	Smallest increments: Axio Examiner: < 30 nm
<b>XY stage (option)</b>	Motorized XY-scanning stage, with Mark & Find function (xyz) and Tile Scan(mosaic scan); travel range 114 x 75 mm
<b>Accessories</b>	Digital microscope camera AxioCam
<b>Excitation and detection</b>	
<b>Models</b>	Scanning module with direct coupling port for a multiphoton laser; two scanning modules on one microscope possible
<b>Scanners</b>	Two independent, galvanometric scan mirrors with ultrashort line and frame flyback
<b>Scan resolution</b>	4 × 1 to 6144 × 6144 pixels; also for multiple channels; continuously variable
<b>Scanning speed</b>	14 × 2 speed stages; up to 12.5 frames/sec with 256 × 256 pixels; 5 frames/sec with 512 × 512 pixels (max. 77 frames/sec, 512 × 32); min 0.38 ms for a line of 512 pixels; up to 2619 lines per second
<b>Scan zoom</b>	0.67 × to 40 ×; digital variable in steps of 0.1
<b>Scan rotation</b>	Free rotation (360 degrees), in steps of 1 degree variable; free xy offset
<b>Scan field</b>	18 mm field diagonal (max.) in the intermediate plane, with full pupil illumination; direct coupling of pulsed NIR lasers of various makes (incl. models with prechirp compensation); fast intensity control via AOM; NIR-optimized objectives and collimation
<b>Detection</b>	Up to 5 non-descanned detectors for detecting reflected fluorescence; up to 5 non-descanned detectors for detecting transmitted fluorescence; GaAsP NDD detector; transmitted light channel with PMT
<b>Data depth</b>	8-bit, 12-bit, or 16-bit selectable; parallel read-out of all available channels
<b>Electronics module</b>	
<b>Real-time electronics</b>	Control of the microscope, the AOM, the scan module, and other accessory components; control of the data acquisition and synchronization by real-time electronics; over-sampling read-out logic for best sensitivity; data communication between real-time electronics and user PC via Gigabit Ethernet interface with the possibility of online data analysis during image acquisition
<b>User PC</b>	Workstation PC with abundant main and hard disk memory space; ergonomic, high-resolving 16:10 TFT flat panel display; various accessories; operating system Windows VISTA; multiuser capable
<b>Standard software (ZEN)</b>	
<b>System configuration</b>	Workspace for comfortable configuration of all motorized functions of the scanning module, the lasers, and the microscope; saving and restoring of application-specific configurations (ReUse)

<b>Standard software (ZEN)</b>	
<b>Acquisition modes</b>	Spot, line/spline, frame, z-stack, time series and all combinations (xyz t); online calculation and display of ratio images; averaging and summation (line/frame-wise, configurable); step scan (for higher frame rates)
<b>Crop function</b>	Convenient and simultaneous selection of scanning areas (zoom, offset, rotation)
<b>Real ROI scan, spline scan</b>	Scanning of up to 99 arbitrarily shaped ROIs (Regions of Interest); pixel-precise switching of the laser; ROI definition in z (volume); scan along a freely defined line
<b>ROI bleach</b>	Localized bleaching of up to 99 bleach ROIs for applications such as FRAP (Fluorescence Recovery After Photobleaching) or uncaging; use of different speeds for bleaching and image acquisition
<b>Multitracking</b>	Change of excitation lines at sequential acquisition of multicolor fluorescence
<b>Channel unmixing</b>	Generation of crosstalk-free multicolor fluorescence images with simultaneous excitation
<b>Visualization</b>	XY, orthogonal (xy, xz, yz); cut (3D-section); 2.5D for time series of line scans; projections (maximum intensity); animations; depth coding (false colors); brightness; contrast and gamma settings; color selection tables and modification (LUT); drawing functions
<b>Image analysis and operations</b>	Colocalization and histogram analysis with individual parameters; profile measurements on any line; measurement of lengths, angles, surfaces, intensities, etc; operations: addition, subtraction, multiplication, division, ratio, shift, filtering (low-pass, median, high-pass, etc.)
<b>Image archiving, exporting, and importing</b>	Functions for managing of images and respective recording parameters; over 20 file formats (TIF, BMP, JPG, PSD, PCX, GIF, AVI, Quicktime, etc.) for export

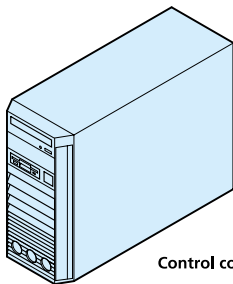
<b>Optional software</b>	
<b>LSM Image VisArt plus</b>	Fast 3D- and 4D-reconstruction; animation (different modes: shadow projection, transparency projection, surface rendering); package 3D for LSM with measurement functions
<b>3D deconvolution</b>	Image restoration on the basis of calculated point-spread function (modes: nearest neighbor, maximum likelihood, constraint iterative)
<b>Physiology/ion concentration</b>	Extensive analysis software for time-series images; graphical mean of ROI analysis; online and off-line calibration of ion concentrations
<b>FRET plus</b>	Recording of FRET (Fluorescence Resonance Energy Transfer) image data with subsequent evaluation; supports both the acceptor photobleaching and sensitized emission methods
<b>FRAP</b>	Recording of FRAP (Fluorescence Recovery After Photobleaching) experiments with subsequent analysis of the intensity kinetics
<b>Visual macro editor</b>	Creation and editing of macros based on representative symbols for programming of routine image acquisitions; package multiple time series with enhanced programming functions
<b>VBA-Macro-Editor</b>	Recording and editing of routines for the automation of scanning and analysis functions
<b>ICS image correlation spectroscopy (PMT)</b>	Single molecule imaging and analysis for all LSM 7 systems with PMT detectors (publ. by Gratton)

# System Overview LSM 7 MP

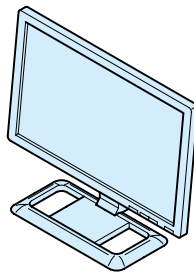


Electronic rack LSM 7 MP

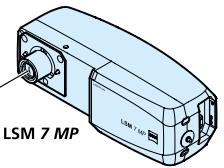
System table NLO  
with passive absorption;  
1500 x 1200 x 750 mm (l x d x h)



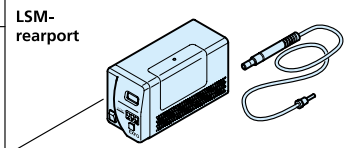
Control computer



LCD TFT flat screen  
monitor 30"

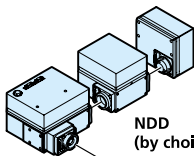


LSM 7 MP



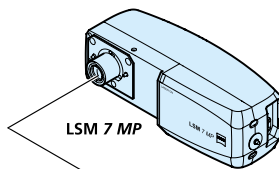
LSM-  
rearport

XCite 120 or HXP 120  
fiber coupled illuminator

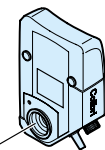


NDD  
(by choice)

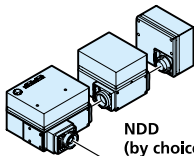
AxioCam HR  
AxioCam MR



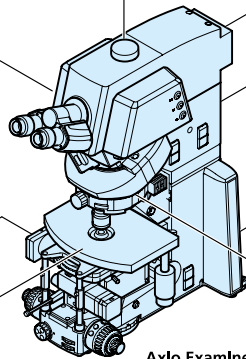
LSM 7 MP



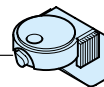
Illumination system Collibri  
with HXP 120 fiber coupled illuminator



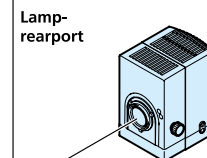
NDD  
(by choice)



Axio Examiner

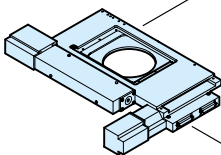


GaAsP  
NDD module



Lamp-  
rearport

HBO 100 illuminator  
with power supply  
(manual or self-adjusting)



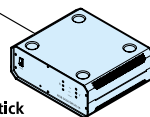
Scanning stage  
for Axio Examiner



T-PMT



Switching mirror mot



Controller incl. joystick



Lamp housing HAL 100  
Power supply 12V DC 100 W,  
stabilized