LSM 5 PASCAL
The Personal Laser Scanning Microscope

Focused on Your Success.
Your work involves the acquisition of two-dimensional and three-dimensional images? And you expect optimum quality along with high resolution? You also need to record time series? You want to acquire the image data in different orientations and reconstruct at different viewing angles without the need to remount your specimen? And you especially expect to be able to perform quantitative measurements of, for example, calcium concentrations and pH-values, areas and surface properties?

Then you should consider a very personal laser scanning microscope:

The **LSM 5 PASCAL** - a laser scanning microscope of the fifth generation which has been designed for you or your team working in routine and research.

The **LSM 5 PASCAL** is the ‘little brother’ of the leading edge LSM 510 system.

‘Little’, however, is only descriptive of its amazingly attractive price, as our engineers have made no compromises to image quality, sensitivity and flexibility!

More than 150 years of innovation in optics and around 20 years of experience in all fields of laser scanning microscopy combined with the ongoing dialog with you, the users, make the **LSM 5 PASCAL** a rewarding long-term investment. An investment which does not put a strain on your budget and which can be expanded as your applications requirements change or grow.
Maximum operating convenience...

Like all LSM units of the fifth generation, the hallmark of **LSM 5 PASCAL** is a fully motorized scanning module. All moving components, such as emission filter wheels, main and secondary dichroic beam splitters, the pinhole and the mechanical attenuators for each laser line, are computer-controlled and take up the required position making the set-up error free and without any need for cumbersome manual operation. A special benefit in practice: the position can be reset automatically at the press of a button.

...highest resolution...

In addition, the **LSM 5 PASCAL** provides image sizes of up to 2,048x2,048 pixels, scan fields of unrivaled size along with maximum linearity, 12-bit resolution per channel, high scan speeds, high-sensitivity detectors (selected photomultipliers) and short light paths from the specimen to the detector - features which are unique in its class.

...and great flexibility.

Special emphasis has been placed on the flexibility of the **LSM 5 PASCAL**. Six versions with one or two confocal channels and combinations of lasers in the blue and green spectrum and a choice of five microscope stands are available for most varied applications in the life and materials sciences. The **LSM 5 PASCAL** can be converted from an upright to an inverted microscope within minutes. Confocal microscopy is no more than a flick of the wrist away from conventional microscopy.

"The **LSM 5 PASCAL** grows with the needs of your applications: You can add a second fluorescence channel as well as a transmitted light detector. Up to 8 single emission filters per channel and the six position dichroic mirror wheels are exchangeable. Furthermore you can chose from a variety of software options."

3/1
Xanthidium cristatum (SAG 173.80), Immunofluorescence chloroplasts (red), storage vesicle (green) + DIC overlay (Lab for Experimental Phycology, Göttingen)
**LSM 5 PASCAL**  
Proven Software on a New Platform

A system is always only as good as its user interface. For this reason, the **LSM 5 PASCAL** uses proven technology as its basis: the fast and reliable software runs on a high-end PC under Windows NT and is closely related to the tried and tested software of the LSM 510. Just like the configuration of the microscope and the scan module, the software functionality can also be extended step by step.

The synchronized control of scanners, data acquisition and input/output signals by a digital signal processor (DSP) allows extremely flexible scan strategies.

Various scan functions are available for data acquisition. They include multfluorescence images free from cross talk and the scanning of any number of regions of interest (ROI) of almost all forms. The acquisition of 3D stacks combined with time series supports the researcher studying processes in living cells.

In addition to data acquisition, the software of the **LSM 5 PASCAL** provides many 2D and 3D presentation options, numerous on-line and off-line measuring functions and a very convenient image database for the management and the documentation of the images.

The software controls the motorized system components, i.e. the microscope, the scan and the laser modules. The user-friendly and intuitive user interface makes your daily work easier. As all adjustable components are controlled by the scan and laser module software, system configurations once set can be reactivated by simply pressing a button, time-consuming manual settings are now a thing of the past. Macros can be used for repeating individual work processes.

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6/1:  
"The Crop function: Fast and easy selection of a new scan area"  
OK cells, mitosis, eCFP indicates PSD95 and Alexa546 shows Actin  
(Dr. Klöcker, Uni Konstanz)

6/2:  
"Defining and modifying multiple arbitrary Regions Of Interest (ROI)"  
Cells, MnSOD shown using Cy2, GFAP indicated by Cy3, 2kx2k pixels  
(Dr. Possel, Institute of Medical Neurobiology, Magdeburg)
Benefits for your applications:

- Reproducible experiments by a simple mouse click
- Large scan fields and high resolution images up to 2,048x2,048 pixels
- Flexible scan strategies also for 3D and time series
- Continuously adjustable pinhole for optimum z resolution
- Precisely controllable laser intensities to protect your specimens and to reduce the bleaching of dyes
- Multifluorescence images without cross talk between the channels
# LSM 5 PASCAL

## Specification

### Microscopes

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>Upright</td>
<td>Axioplan 2 MOT, Axioskop 2 MOT, Axioskop 2 FS MOT, Axiovert 100 M Side/BasePort</td>
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<tr>
<td>Inverted</td>
<td>Axiovert 100 M Side/BasePort</td>
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### Scanning Module

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
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<tbody>
<tr>
<td>Scan resolution</td>
<td>1x4 to 2048x2048 pixels, user definable</td>
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<tr>
<td>Scan speed</td>
<td>2x10 levels, line frequencies from 4 up to 1300 Hz; 0.4 s per frame 512x512 pixels</td>
</tr>
<tr>
<td>Scan zoom</td>
<td>0.7x to 8x, variable with steps of 0.1</td>
</tr>
<tr>
<td>Scan rotation</td>
<td>Any angle, variable with steps of 1°</td>
</tr>
<tr>
<td>Scan field</td>
<td>18 mm diagonal in the primary image plane (with zoom factor 1x)</td>
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<tr>
<td>Pinhole</td>
<td>One pinhole with variable diameter size, adjustable</td>
</tr>
<tr>
<td>Detection</td>
<td>1 or 2 confocal RFL channels with built in highly sensitive photomultiplier tubes</td>
</tr>
<tr>
<td>Dynamic range</td>
<td>12 bit per channel</td>
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### Laser Module

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<tr>
<td>Laser lines</td>
<td>Ar laser 488, 514 nm, 25 mW - HeNe laser 543 nm, 1 mW (end of lifetime specifications)</td>
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<tr>
<td>Attenuation</td>
<td>Individual and variable intensity control of all lines</td>
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### Electronic's Module

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<tbody>
<tr>
<td>LSM 5 Control</td>
<td>Control circuitry for microscope, laser and scan module with built in high performance Digital Signal Processor (DSP)</td>
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### Computer

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<th>Feature</th>
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<tr>
<td>Monitor</td>
<td>Well equipped High-end PC with ample RAM + hard disk space, many accessories, multi user operating system Windows NT 4.0</td>
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<tr>
<td>Monitor</td>
<td>Ergonomic high contrast large screen monitor, 2nd monitor optional</td>
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</tbody>
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### Software

For image acquisition, display, processing and archiving, line and frame scan, 3D or/and time lapse recording, Multitracking and dual direction scanning, spline scanning, ROIs (region of interest), 3D projections, quantitative measurements, many options, more than 20 export file formats (LSM, TIF, BMF, JPG, PCX, GIF, ...)

Some of the components and software functions are optional.

For further details, please contact:

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Subject to change.