




Product Information

## ZEISS Axio Scan.Z1

Your Fast and Reliable Slide Scanner for Brightfield and Fluorescence

INTERNET-LINK 

VIDEO/ANIMATION 

Version 1.1



We make it visible.

# The Slide Scanner ZEISS Axio Scan.Z1 Energizes Your Workflow

## ZEISS Axio Scan.Z1

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### › In Brief

#### › The Advantages

#### › The Applications

#### › The System

#### › Technology and Details

#### › Service

Digitize your specimens with Axio Scan.Z1 – the reliable, reproducible way to create high quality virtual slides. The excellence of the components guarantees the excellence of the image – just as you would expect from a ZEISS device. And the quality of the virtual slides remains consistently high, even when capturing fluorescence images at unprecedented speed.

This outstanding image quality is based on plan-apochromatic objectives with numerical aperture up to 0.95. Highly automated and very simple to operate, Axio Scan.Z1 tackles the most demanding research tasks as easily as it handles your routine work, controlled by familiar ZEN software from ZEISS: operation is designed specifically for the workflow of capturing virtual slides for your research tasks. ZEN image analysis tools process your data accurately.

Virtual slides are organized in a web-based database where you can view your data at any time, regardless of where you are or what operating system you are using. Share your images online with colleagues and organize entire projects, even when you are on the go.



# ZEISS Axio Scan.Z1: Simpler. More Intelligent. More Integrated.

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### Fluorescence Images:

#### High Speed. Top Quality.

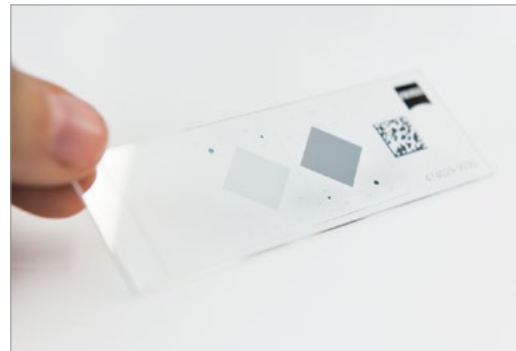
Now you can digitize up to five fluorescence channels using three synchronized high-speed filter wheels for excitation, beam splitting and emission. Using standard filter cubes it is possible to capture up to 9 fluorescence channels. Even so, speed alone is not enough. With its sensitive cameras, highly corrected optics and perfected light sources, Axio Scan.Z1 achieves the best possible image quality. The fast LED light source Colibri.2 treats your samples very gently. You can switch excitation wavelengths in milliseconds and when using tri-band and quadband filter sets, no mechanical components will move in the optical beam path.



### Calibration Guarantees

#### Reliable Reproducibility

Calibrate your Axio Scan.Z1 automatically from geometric calibration through to color calibration. Virtual slides will be reproduced precisely at any time: comparability between systems and over time is always guaranteed.



### The Modular Tray Concept:

#### Allow Your System to Grow

Decide how many slides, what detection modes and what camera you want to use at the outset, then retrofit your Axio Scan.Z1 as required: as your tasks grow, it grows alongside them. The tray design affords you maximum freedom with very broad tolerances for the slides, giving you the capacity for digitizing specimen slides of 26 mm x 76 mm and 52 mm x 76 mm.



# Your Insight into the Technology Behind It

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## Fast Filter Wheels and Colibri.2 for Rapid Imaging

Speed and gentle treatment are what counts when it comes to fluorescence specimens. That's why Axio Scan.Z1 employs fast filter wheels and can change channel in less than 50 milliseconds. Using triband and quadband filter sets with Colibri.2 as a fluorescence light source, Axio Scan.Z1 makes millisecond-fast switches. Highly sensitive cameras achieve perfect image quality with the shortest possible exposure times and maximum specimen protection.



## Freely Definable Profiles:

### Flexibility Meets Ease of Operation

Axio Scan.Z1 affords you maximum freedom in the choice of components as well as in controlling your imaging. You will always have access to all the settings yet it's very easy to operate, thanks to automated and monitored profiles for your experiments.



## Tailored Precisely to Your Applications

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| Typical Applications / Typical Samples                                 | Task   | What ZEISS Axio Scan.Z1 does for you   |
|--|--|--|
| The pathogenesis of Alzheimer's and other age-related diseases         | Developing analytical models for amyloid deposition (plaques)  | High-resolution virtual slides in brightfield with image analysis  |
| Cancer research  | Researching the basics of cancer   | Excellent image quality in fluorescence combined with high throughput thanks to fast filter wheels and sensitive cameras |
| ADME/Toxicology  | Automated image analysis workflow and peer reviews with colleagues at other locations                                  | Findings are reproducible thanks to automated calibration, image analysis, and remote viewing                            |
| Fluorescence in-situ hybridization (FISH)                              | Determining the number of single sequence copies in the genome   | Multichannel fluorescence, extended depth of field   |
| Target identification and characterization                             | Identifying and characterizing targets for pharmaceutical active substance searches                                    | Sensitive fluorescence imaging combined with gentle treatment of specimens, image analysis functions                     |
| Immunological response to allografts and xenografts                    | Identifying specific cell phenotypes and developing an understanding of cellular interactions in tissues               | High dynamic range and zero artifact imaging   |
| Research in the area of neurotraumas                                   | Quantifying brain injury measurements, including functional pathways of regeneration and microglia                     | Z stack imaging and robust digitization of the samples with high throughput  |
| Tissue microarrays (TMA)   | Resource-friendly use of reagents and tissues with increased throughput  | Reliable sample detection and robust scanning process  |
| Contract research in the biomedical field                              | Use of slides that are hard to standardize and various applications  | Flexible and configurable imaging options and tray concept   |
| Organization of expert networks  | Organizing the efficient exchange of information from experts around the world (e.g., cancer centers, tumor databases) | Database with integrated platform-independent access to images and documents   |
| Inter-study group information management                               | Sustained organization of the data pool in local study groups and evaluation of research findings                      | Multi-user access to database with specific access rights  |
| Exchange of information during spur of the moment discussions/meetings | Discussing findings with peers spontaneously, irrespective of location   | Excellent image quality and remote data access, including by iPad  |
| Publishing projects online   | Making own data and images accessible to other people  | Project-based web-centric database system with integrated web-viewing  |

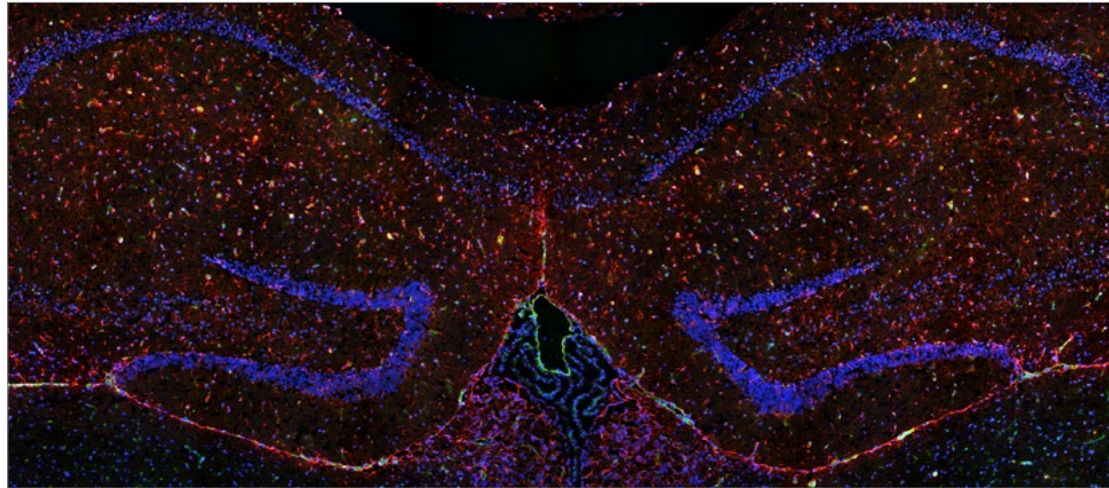


# ZEISS Axio Scan.Z1 at Work

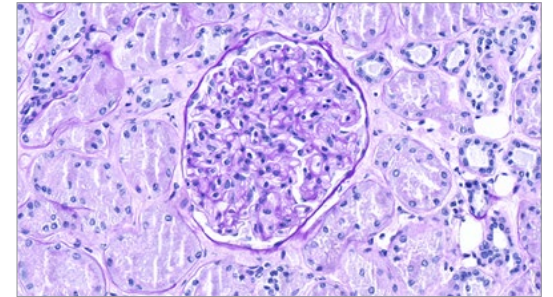
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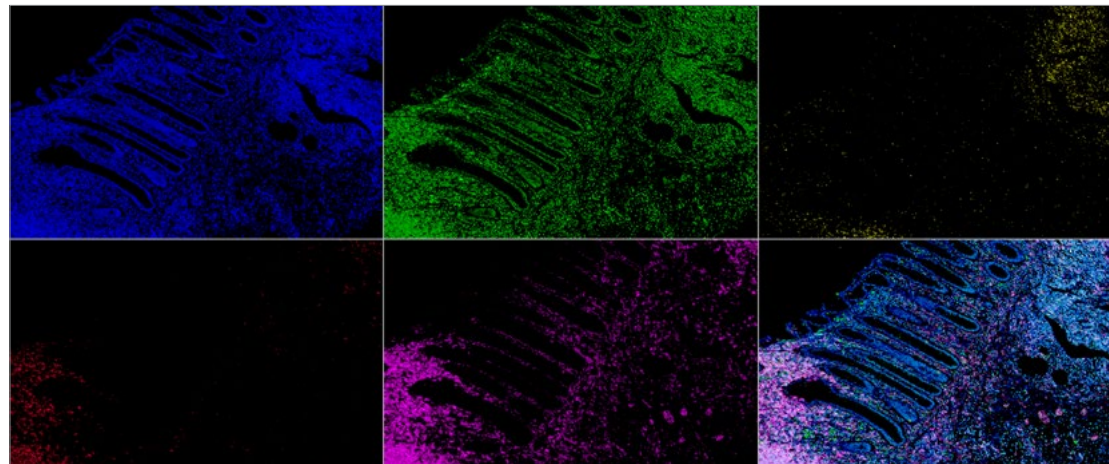
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Mouse brain, 5  $\mu$ m, cryo section, qDOT labeled: DAPI, CD31(endothel), GFAP (astrocytes)  
Courtesy of Dr Kumiko Isse, Department of Pathology, University of Pittsburgh, USA; Thomas E. Starzl,  
Transplantation Institute, USA



Kidney section, 4  $\mu$ m, PAS (Periodic acid-Schiff reaction) stained glomerulus. Courtesy of Dr Kumiko Isse,  
Department of Pathology, University of Pittsburgh, USA;  
Thomas E. Starzl, Transplantation Institute, USA



Colon tissue, 4  $\mu$ m, qDOT labeled: DAPI, CD56, CD3, CD68 and CD20  
Courtesy of Dr Kumiko Isse, Department of Pathology, University of Pittsburgh, USA; Thomas E. Starzl,  
Transplantation Institute, USA

# Expand Your Possibilities

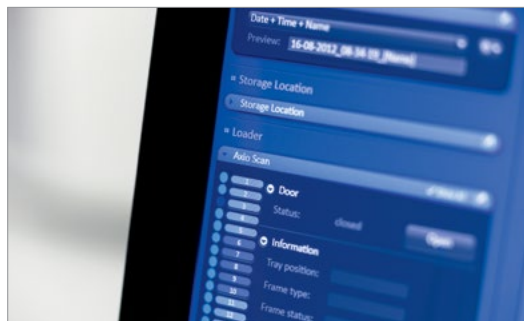
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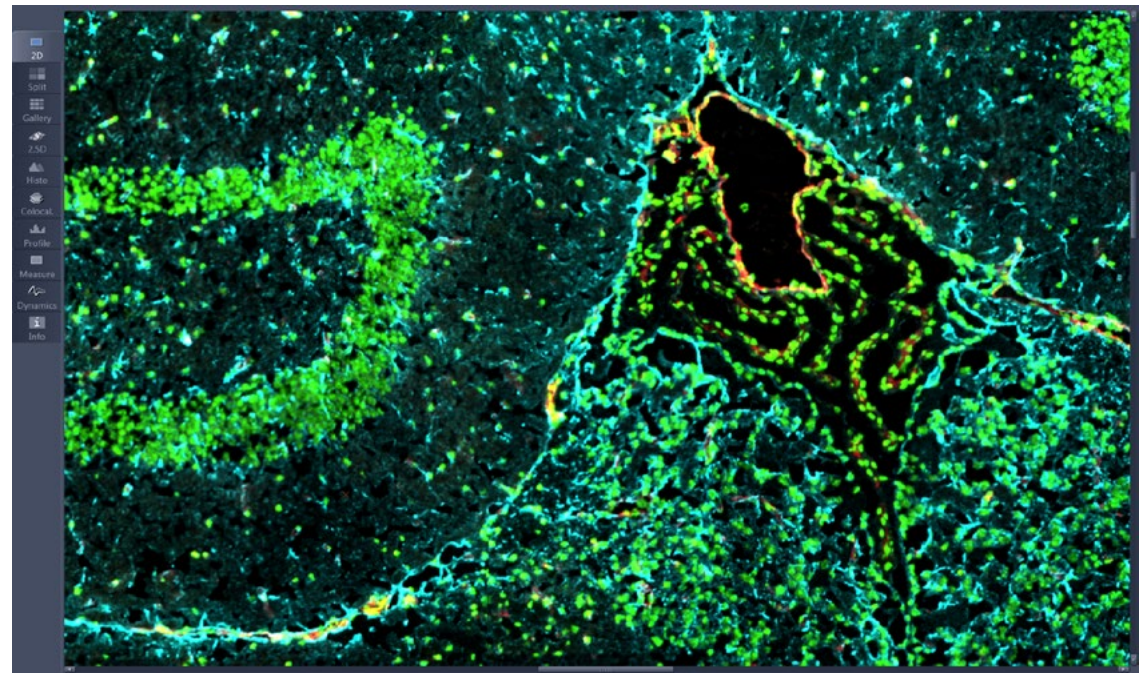
## ZEN Software: Versatile and Easy

Advanced imaging software brings real benefits to biomedical research, coping with your wide-ranging and complex tasks while remaining easy to operate. ZEN imaging software from ZEISS is founded upon an intuitive user concept. You define the functions for users and user groups according to knowledge and responsibilities. ZEN then responds by proposing settings and following up with action where appropriate. Smart Setup, for example, provides you with an intuitive interface and workflow even for complex fluorescence samples. Just choose the dyes and ZEN will propose all the other settings. That way you can work quickly and safely – especially when several peers are accessing one device.



## Seamless Imaging: Capture and Process

ZEN lets you capture virtual slides as well as analyze them and then continue processing the image data – all on the one and same platform. A wizard sorts the image analysis functions and you can create an algorithm with just a few mouse clicks. ZEN makes your images sharper and smoother, reinforcing contours and contrasts, and you can also control brightness and color. Meanwhile deconvolution produces crystal clear images that correspond to an optical section, free of out-of-focus light.





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### Open Platform:

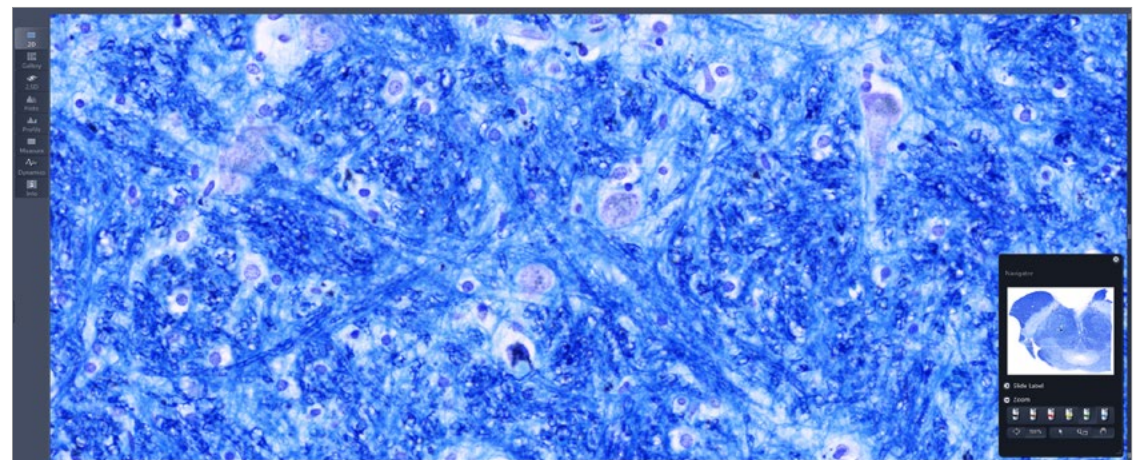
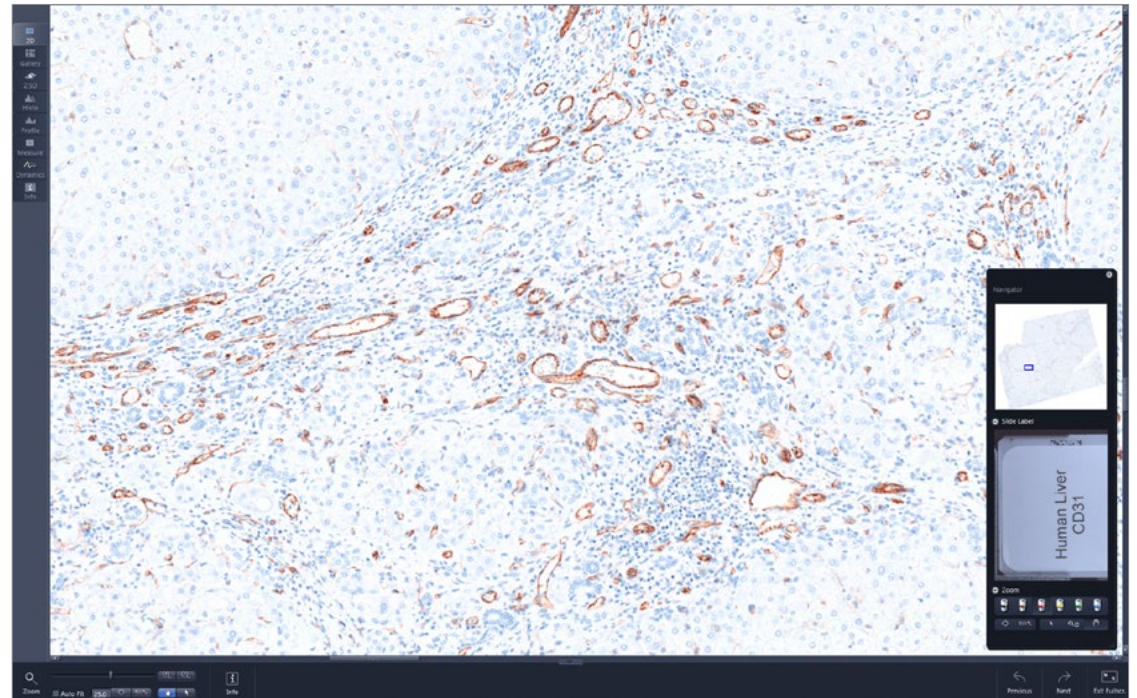
#### You Dispose of Your Images

You will usually capture a large number of slides with Axio Scan.Z1. These images are valuable, of course, and you will naturally want to be able to evaluate them in future analyses. ZEN works with an open and documented interface that lets you access your data with your own programs. Unlike a closed platform, this means you can export the images and continue using the data in any way you choose.

### Images with Metadata:

#### Ready at the Click of a Button

In addition to image data, ZEN stores metadata, putting away a complete record of all the operations in a log file so you can retrieve the data at the click of a button. This facilitates documentation and supports preventive maintenance, thus reducing unscheduled outages.





# Expand Your Possibilities

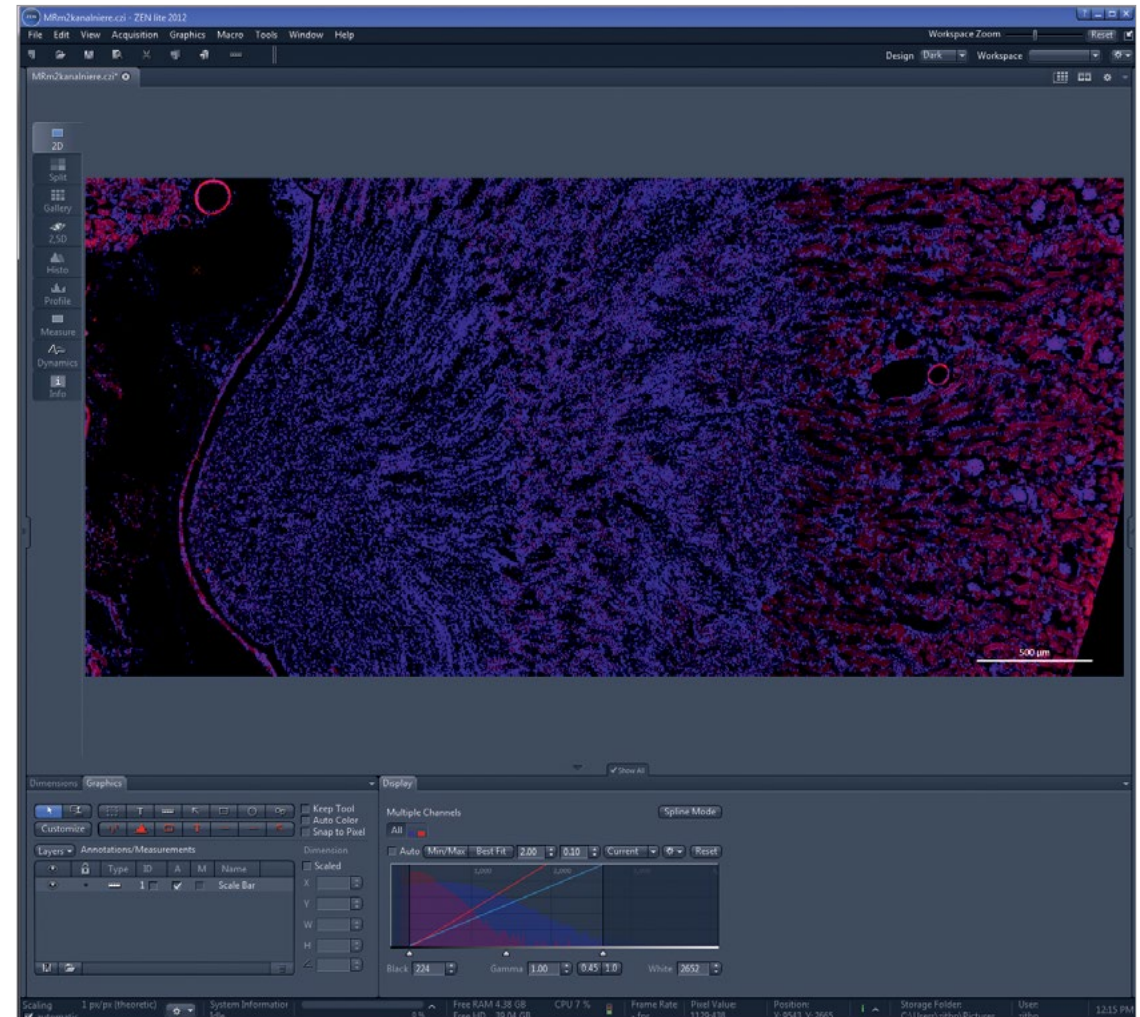
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## ZEN lite: Free Basic Software from ZEISS

Axio Scan.Z1 comes complete with ZEN lite, the standard software package for editing and viewing your images. You can use the overview screen to navigate to your regions of interest, tracing the regions you've visited at any time. Even the labeling area of the slide is always visible. Make annotations at will with circles, rectangles, lines, arrows, text, contours and profiles. Compare up to 16 images and then link them for navigation, thus - for example - creating a way to make a direct comparison with serial sections. You can process the CZI file format from ZEISS as well as images in TIFF, JPEG, PNG and GIF format. Choose 2D or other views, or use the gallery. Use sharpen, blur, geometric functions and color adjustments in single and batch mode. With ZEN lite, you can carry out simple interactive measurements and export your measurements (such as lengths, areas and angles) as data tables for your spreadsheet program. Rounding off the ZEN lite solution are the zooming workspace, design schemas for darkened and bright areas as well as reports.



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### ZEN browser: It's Easy to Organize Your Data

Virtual slides provide you with a multitude of valuable data so you will need plenty of storage space and a good filing structure to achieve high throughput. ZEN browser organizes your data online and cross-platform via an intuitive web interface. That keeps your images filed together with metadata and supporting documents.

The user management function restricts access to authorized individuals only. Simply go to [www.zeiss.com/zen-browser](http://www.zeiss.com/zen-browser) to access our demo server with impressive Axio Scan.Z1 imaging data.

Use the free ZEN browser app for iPads to access your image database via a mobile front end. Download the app to your iPad via [www.appstore.com/zenbrowser](http://www.appstore.com/zenbrowser). Now you can access your data wherever work takes you: just imagine presenting your latest virtual specimen to an astonished colleague at the next conference! You can insert annotations and view images in transmitted light and multichannel fluorescence images with a Z stack.

The CZI format from ZEISS provides a wealth of benefits, and is supported by a growing number of other manufacturers. For an updated list, please visit [www.zeiss.com/czi](http://www.zeiss.com/czi).



# ZEISS Axio Scan.Z1: Your Flexible Choice of Components

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### 1 Microscope

- Axio Scan.Z1
- Magazines for 12 or 100 slides
- Trays for four 26 mm x 76 mm slides or two 52 mm x 76 mm slides

### 2 Objectives

- N-Achroplan (2.5x, 10x, 20x, 40x)
- Fluor (2.5x)
- Plan-Apochromat (10x, 20x, 40x)

### 3 Illumination

- Transmitted light: LED (wavelength 400 to 700 nm, maximum at 460 nm)
- Fluorescence: 365 nm, 385 nm, 420 nm, 445 nm, 455 nm, 470 nm, 505 nm, 530 nm, 590 nm, 615 nm, 625 nm or neutral white: 540 - 580 nm, HXP 120 V
- Filter wheels:
  - 10-position ACR for filter cubes or
  - 6-position high-speed excitation
  - 6-position high-speed beamsplitter
  - 6-position high-speed emission

### 4 Cameras

- Hitachi HV F202
- AxioCam MRm
- Hamamatsu Orca flash 4.0

### 5 Software

- ZEN slidescan
- ZEN lite
- ZEN browser
- ZEN 2012 (blue edition) image analysis modules

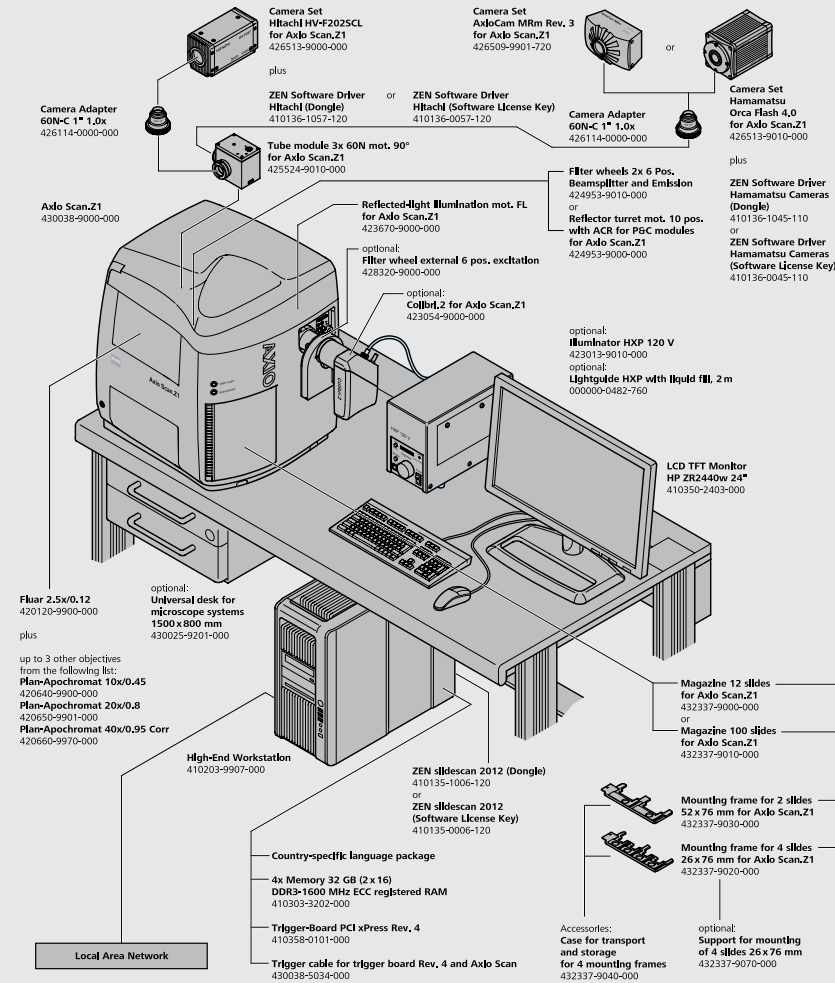
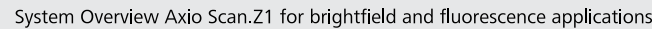


## ZEISS Axio Scan.Z1: System Overview

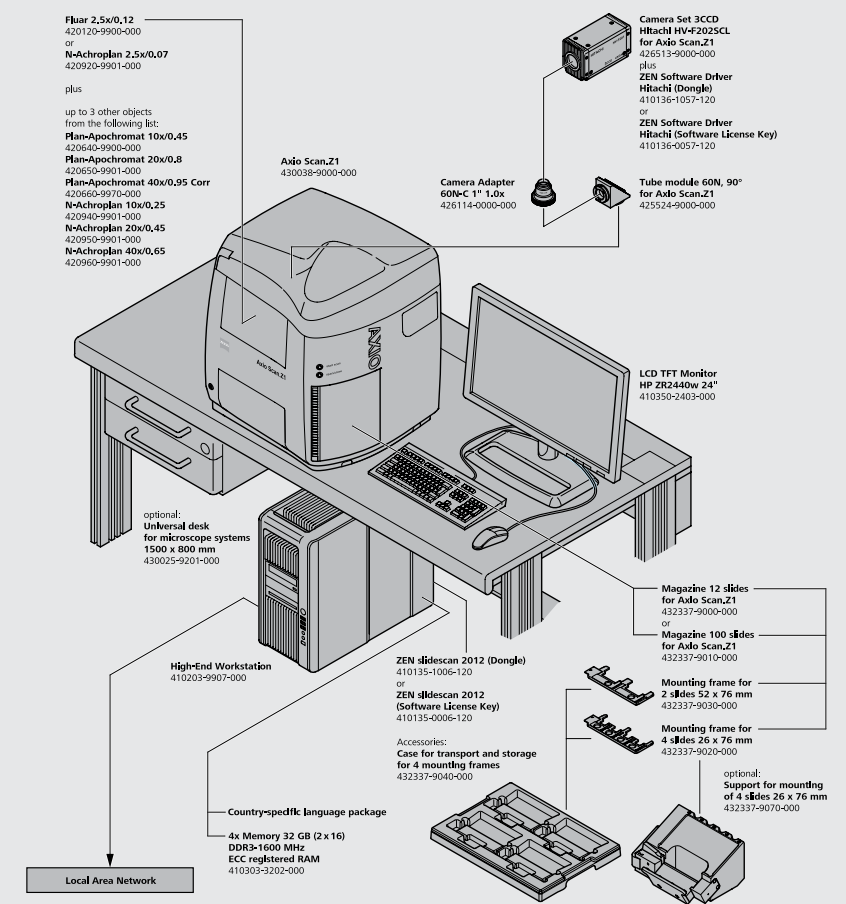
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## System Overview Axio Scan.Z1 for brightfield applications



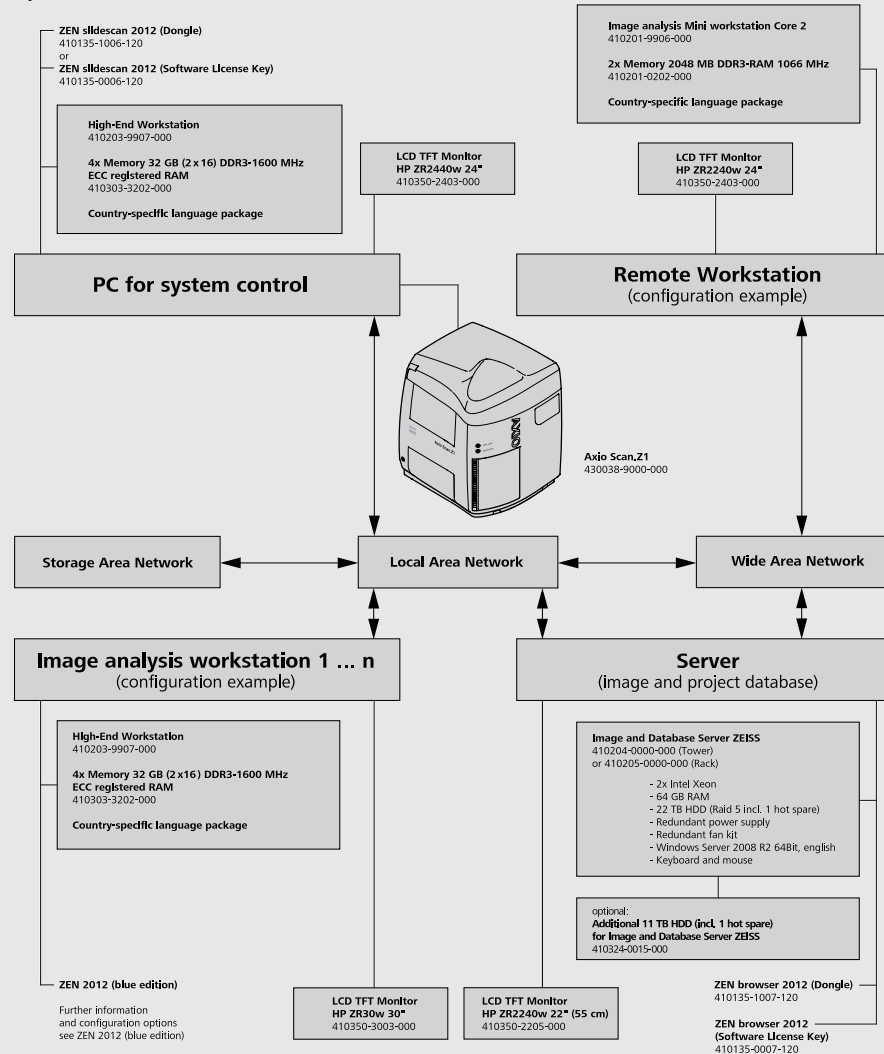
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System Overview of Axio Scan.Z1 network solution



# Technical Specifications

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### Dimensions (width x depth x height)

|  |                                  |
|--|----------------------------------|
| Axio Scan.Z1 (brightfield)                                 | approx. 695 mm x 579 mm x 813 mm |
| Axio Scan.Z1 (brightfield and fluorescence with Colibri.2) | approx. 912 mm x 579 mm x 813 mm |

### Mass

|   |                |
|---|----------------|
| Axio Scan.Z1 (brightfield, 12 slides)                                     | approx. 98 kg  |
| Axio Scan.Z1 (brightfield and fluorescence with Colibri.2 and 100 slides) | approx. 112 kg |

### Environmental conditions for transport (in packaging)

|                                 |                  |
|---------------------------------|------------------|
| Permissible ambient temperature | -40 °C to +70 °C |
|---------------------------------|------------------|

### Storage

|  |                    |
|--|--------------------|
| Permissible ambient temperature                      | +10 °C to +40 °C   |
| Permissible relative humidity (without condensation) | max. 75 % at 35 °C |

### Operation

|                                   |                     |
|-----------------------------------|---------------------|
| Permissible ambient temperature   | +10 °C to +30 °C    |
| Permissible relative humidity     | max. 75 % at 30 °C  |
| Highest permitted altitude of use | max. 2000 m         |
| Atmospheric pressure              | 500 hPa to 1060 hPa |
| Degree of pollution               | 2                   |

### Operating data

|  |  |
|--|--|
| Operational area   | closed spaces  |
| Protection class   | I  |
| Ingress protection rating  | IP 20  |
| Electrical safety  | conforms to DIN EN 61010-1 (IEC 61010-1) in consideration of CSA and UL directives |
| Overvoltage category   | II   |
| RFI suppression  | under EN 55011 class A   |
| Noise immunity   | under DIN EN 61326-1   |
| Input voltage, basic unit (Mains voltage does not need to be converted!) | 100 V AC to 240 V AC   |
| Power frequency  | 50 / 60 Hz   |
| Power consumption  | max. 260 VA  |
| Fuses  | 2x T 5.0 A/H 250 V, 5 x 20 mm  |



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# Technical Specifications

**Pixel resolution (example: Hitachi HV F202)**

|     |               |
|-----|---------------|
| 10x | 0.44 µm/pixel |
| 20x | 0.22 µm/pixel |
| 40x | 0.11 µm/pixel |

**Reflector turret**

Reflector turret with ACR for push and click filter sets

|                    |                                  |
|--------------------|----------------------------------|
| Number of channels | 10                               |
| Type               | optically encoded (no detents)   |
| Switching time     | approx. 400 ms (from eye to eye) |

**High-speed filter wheels for single filter or beamsplitter**

|                    |  |
|--------------------|--|
| Number of channels | 6  |
| Type               | optically encoded (no detents)<br>separate control of excitation, beamsplitter and emission filter wheel |
| Switching time     | approx. 50 ms (from eye to eye)  |

**Motorized condenser wheel**

|                     |                                |
|---------------------|--------------------------------|
| Number of positions | 9                              |
| Type                | optically encoded (no detents) |

**Contrasting techniques**

|                               |                              |                              |
|-------------------------------|------------------------------|------------------------------|
| Transmitted light-brightfield | Reflected light-fluorescence | Ring Aperture Contrast (RAC) |
|-------------------------------|------------------------------|------------------------------|

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### Fluorescence light sources

Colibri.2

HXP 120 V

### Transmitted light source

VIS-LED

### Thumbnail generation

Labeling area

Separate camera with reflected light illumination

Specimen area (brightfield)

Separate camera with transmitted light illumination

Specimen area (fluorescence)

2.5x objective with transmitted light illumination (RAC) or reflected light illumination (fluorescence)

### Z stack

Imaging of Z stacks and application of the extended depth of field

### Bar codes and optical character recognition

#### List of readable 1D bar codes

Code 11 (ASCII encoding)

Code Interleaved 2of5

Code 39 (ASCII encoding)

Path code

Code 39 Extended (ASCII encoding)

EAN-8 (Numeric encoding)

Code 93 (ASCII encoding)

EAN-13 (Numeric encoding)

Code128 (UCC/EAN128) (ASCII encoding)

UPC-A (Numeric encoding)

Codebar (ASCII encoding)

UPC-E (Numeric encoding)

#### List of readable 2D bar codes

DataMatrix (Numeric encoding, Alpha encoding, AlphaNumericPunc encoding, AlphaNumeric encoding, ASCII encoding, ISO8 encoding)

PDF417 (Standard encoding type) AlphaNumeric encoding, ASCII encoding

QR Code (QR code Model 1, 2 encoding)

Micro QR Code

### Optical Character Recognition (OCR)

#### Compression

Lossless or compression with JPEGXR (quality can be adjusted)

### Optional software components

Image analysis

ZEN 2012 (blue edition) image analysis modules

Database and remote viewing

ZEN browser 2012

Image viewing

ZEN lite 2012 (freeware)

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| Magazine   |                                  |                            |                   |
|--|----------------------------------|----------------------------|-------------------|
| Capacity   | 12 slides (26 mm x 76 mm)        | 100 slides (52 mm x 76 mm) |                   |
| Tray   | for 4 slides 26 mm x 76 mm       | for 2 slides 52 mm x 76 mm |                   |
| Usable slides  | Length                           | Width                      | Thickness         |
| 26 mm x 76 mm (DIN ISO 8037/1 and A-A 50831)   | 73.5 mm ... 76.5 mm              | 24 mm ... 26 mm            | 0.8 mm ... 1.3 mm |
| 52 mm x 76 mm (DIN ISO 8037/1)   | 73.5 mm ... 76.5 mm              | 50 mm ... 52 mm            | 0.8 mm ... 1.3 mm |
| Speed  |                                  |                            |                   |
| Brightfield 15 mm x 15 mm @ 0.22 µm/pixel  | 4 min                            |                            |                   |
| Objectives   |                                  |                            |                   |
| Number of usable objectives  | up to 4 with automatic switching |                            |                   |
| Cameras  |                                  |                            |                   |
| Number of cameras  | up to 2 with automatic switching |                            |                   |
| List of usable cameras   |                                  |                            |                   |
| Hitachi HV F202 (brightfield), AxioCam MRm (fluorescence), Hamamatsu Orca flash 4.0 (fluorescence) |                                  |                            |                   |
| Please note: Axio Scan.Z1 is a research device and not to be used for clinical diagnosis.          |                                  |                            |                   |



# Count on Service in the True Sense of the Word

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Because the 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 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.**

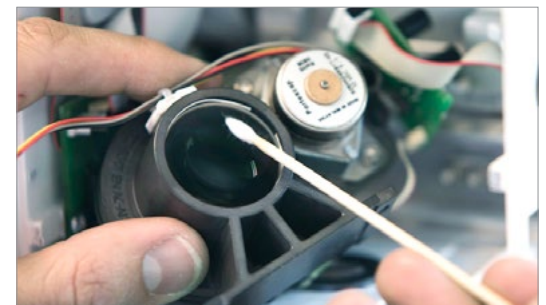
Attain maximum uptime with your microscope. A ZEISS maintenance contract lets you budget for operating costs, all the while avoiding costly downtime and achieving the best results through the improved performance of your system. Choose from service contracts designed to give you a range of options and 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. 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 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 ZEISS service contract – now and for years to come.*

[www.zeiss.com/microservice](http://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

07745 Jena, Germany

BioSciences

microscopy@zeiss.com

www.zeiss.com/axioscan



We make it visible.