

Aperio LV1 IVD Live View and Desktop Scanner

User's Guide



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23LV100IVD

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1 Introduction

The Aperio LV1 IVD is intended to be used to remotely view glass slides and remotely and robotically control the LV1 IVD while viewing glass slides. The Aperio LV1 IVD can also be used to digitize traditional glass microscope slides through a scanning process and to compress and view the digital whole slide images. This equipment is intended to be used by trained, knowledgeable, licensed operators/technicians. Appropriate good laboratory practices or other policies and procedures required by your institution must be followed in support of slide preparation, processing, storage, and disposal.

Use this equipment only for this purpose and in the manner described in this guide. Using this equipment in a manner not described in this guide could void your hardware service agreement.

The Aperio LV1 IVD Live View and Desktop Scanner has been manufactured to the highest quality standards.

Note that annual servicing is required to maintain scanner performance.

For assistance with this product, contact Leica Biosystems Technical Services (see Customer Support). Also note that training is available from Leica Biosystems.

Safety Precautions

Handling and Lifting the Instrument

- ▶ Heavy instrument. Do not handle or lift the instrument alone. At least two persons are needed to safely lift the instrument.
- ▶ Only lift the instrument by its base and do not apply too much force anywhere else on the housing.
- ▶ Do not operate the instrument when the side door is open.
- ▶ The instrument must be turned off and the power cord unplugged before opening the side door.
- ▶ Even though the instrument is tested for correct calibration after transport, it is advised to avoid all unnecessary shocks, such as dropping the instrument.

Biological Safety

- ▶ Consult the material safety data sheets for the stains and reagents you are using, and following your institution's biological material safety policies and procedures regarding safely handling biological materials. It may be necessary to wear appropriate gloves or gowns.



If infectious samples are brought into or in contact with the instrument, it is advised to disinfect the sample tray and instrument housing, although it is extremely unlikely that the internal parts of the instrument will become contaminated. Note that the internal instrument components can only be decontaminated by authorized, trained personnel. Contact Leica Technical Services for assistance.

Instrument Maintenance

For optimal performance it is recommended to have routine maintenance performed by a trained service person once a year after the warranty period has expired.

PC Safety and Backup

- ▶ The Aperio LV1 Live View and Desktop Scanner is delivered with a high quality PC, but there is no mechanism for backup or other data redundancy installed.
- ▶ There is no installed software to protect the PC or data from malware.

When using the Aperio LV1 Live View and Desktop Scanner, you are responsible for data safety and backup.

Cybersecurity Recommendations



CAUTION: The workstation used with this product is vulnerable to malware, viruses, data corruption, or privacy breaches. Refer to the recommendations below to protect the workstation from such problems.

- ▶ Only allow authorized personnel physical access to the workstation.
- ▶ Use strong passwords and change your password periodically.
- ▶ Verify the Windows firewall on your workstation is enabled.
- ▶ If your product comes with a default password already set, be sure to change the password.
- ▶ Set your Windows screensaver to time out when inactive and to require a login to re-activate the workstation. Contact your IT department if you need assistance with this.

- ▶ Encryption of the hard drive of the workstation is recommended to protect against sensitive data exposure or theft. BitLocker Drive Encryption is installed on your workstation and can be enabled. Contact your IT department if you need assistance with this.
- ▶ Windows Defender antivirus software is installed on the workstation. We recommend that you run periodic antivirus scans. Virus scans should be configured to run during non peak hours as they are very CPU intensive and can interfere with product use. Update the antivirus software when updates are available.
- ▶ The workstation is vulnerable to malware and viruses from physical media such as CDs, DVDs, or USB drives. To reduce the risk of data corruption or unauthorized setting changes, only use physical media such as CDs, DVDs, or USB drives that are known to be free from viruses or malware. Contact your IT professional for assistance.
- ▶ Periodically back up the contents of the workstation hard disk.
- ▶ When connecting to Aperio eSlide Manager, make sure SSL encryption is enabled to protect the privacy of your data. Contact your IT department if you need assistance with this.
- ▶ To prevent unwanted physical access to the LV1 IVD workstation ports (including USB ports), we recommend placing the installed and configured LV1 IVD workstation into a securely locking computer cabinet that includes a fan.
- ▶ If using Team Viewer to remotely view images on the LV1 IVD:
 - Protect the Team Viewer password from use by others
 - Change the Team Viewer default password to a new password
 - Close the Team Viewer when finished with a session.
 - Periodically change your password and use strong passwords.

Barcode Reading

Barcodes with poor quality can lead to errors in the decoding of the barcode.

Use code types with error check or correction and use labels with good contrast and large, well defined print.

Action in Case of Malfunction



WARNING: In case of malfunction, you may need to open the instrument access door. Call Leica Technical Services first for assistance. See [Opening the Access Door](#) for instructions.

- ▶ If an error message is shown, read and copy/save the message for later use.
- ▶ Read the manual to see if this kind of malfunction is known, described and can be solved by the user. See [Troubleshooting Steps](#) for information.
- ▶ Contact Leica Technical Services (see Customer Support at the beginning of this guide).

General Description

Delivery Contents

- ▶ Aperio LV1 IVD Live View and Desktop Scanner
 - 1x Slide Tray
 - 2x USB cable A→B
 - 1x Camera link cable
 - Multiple country-specific power cords (please use the power cord appropriate for your geographical area)
- ▶ *Aperio LV1 IVD Live View and Desktop Scanner User's Guide*
- ▶ *Aperio LV1 IVD Live View and Desktop Scanner Quick Installation Guide*
- ▶ PC including mouse and keyboard
- ▶ Monitor including cables

Technical Specifications

Feature	Details
Description	Upright Live View and Desktop Scanner Closed desktop instrument for use under room lighting condition
Mains Power Switch	Located on rear of instrument.
Sample Holder	Four microscope slides

Feature	Details
Slides Accepted	<p>The tissue smear is embedded between supported slide and coverslip.</p> <ul style="list-style-type: none"> ● Minimum slide size: 24.7mm (wide) x 74.7mm (long) x 1mm (thick) ● Maximum slide size: 26.3mm (wide) x 76.5mm (long) x 1.5mm (thick) <p>The coverslip/label shall not protrude beyond the edge of the glass microscope slide. The entire coverslip and label must be glued to the glass microscope slide. There shall be no lifted edges or parts of the coverslip/label. The outer surface of the slide shall be dry. No liquid shall flow out of the specimen area.</p> <p>Slides are typically prepared using:</p> <ul style="list-style-type: none"> ● Glass coverslip with mounting media, Eukitt or water ● Film coverslip with integrated glue <p>Maximum tissue/smear thickness (including mounting media) is 130 µm.</p>
Coverslips Accepted	<p>Supports coverslip with thickness of 100–170 µm, made of typical coverslip material: Standard microscope cover glass or Cellulose Tri-Acetate film (microscope cover film).</p>
Specimen Area	<p>≤50mm x 22mm</p>
Label Area	<p>20mm x 22mm. Handwritten/printed non-transparent, matt (paper-like reflecting) sticker.</p> <p>Maximum sticker thickness: 200 µm</p> <p>Minimum label size shall be 12mm x 25mm (for detecting the presence of the slide). Labels shall not protrude beyond the edge of the slides or be lifted.</p>

Feature	Details
Microscope Optics	EC Plan Neofluar 1.25x objective EC Plan Neofluar 5x objective EC Plan Neofluar 20x objective EC Plan Neofluar 40x objective Magnifications available to the user in the software: Overview: $\approx 10 \mu\text{m}/\text{pixel}$ 2.5x: $2.16 \mu\text{m}/\text{pixel}$ 5x: $1.08 \mu\text{m}/\text{pixel}$ 10x: $0.54 \mu\text{m}/\text{pixel}$ 20x: $0.27 \mu\text{m}/\text{pixel}$ 40x: $0.138 \mu\text{m}/\text{pixel}$ 63x: $0.086 \mu\text{m}/\text{pixel}$ (digital zoom)
Brightfield Imaging	12 Megapixel color digital camera Display update rate: 15 fps High power LED illumination
Label/Barcode Imaging	Epi-illumination imaging of all label regions of all inserted slides using a digital camera
Motorized Components	X-Y stage for sample movement in manual and scanning mode Fast focus drive Motorized objective changer, 3 positions minimum
Focusing System	Patented IR-autofocus autonomously focuses on glass-sample interface Image-based autofocus Manual focusing in live microscopy mode
Scan Speed	90 sec/slide, 15x15 mm, at $0.27 \mu\text{m}/\text{pixel}$ (20x) and 180 sec/slide, 15x15 mm, at $0.138 \mu\text{m}/\text{pixel}$ (40x)

Feature	Details
Application Software	Software: <ul style="list-style-type: none"> ● Real-time, remote viewing of microscope slides ● Case sharing, side-by-side specimen comparisons ● Scanner mode (Automated Whole Slide Imaging) ● Viewer ● Label, barcode reading ● Centralized SQL database ● Annotations, measurements ● Export images to 3rd party software ● HIS/LIS connectivity via HL7 protocol prepared
Dimensions	W x L x H = 425mm x 540mm x 440mm
Weight	28 kg
Power	Universal 100–240VAC +- 10%, 50/60Hz, 4–2 Ampere Transient overvoltage up to category II Temporary overvoltage occurring on the mains supply Power chord for min. 300V and a diameter of 3x18 AWG
Operating Conditions	It is safe to operate the instrument between 5–40°C. The device fulfills its performance specification between 15–25°C, Relative humidity (RH) of max. 80% at <= 31°C, linearly reducing to max. 50% RH at >= 40°C.
Storage Conditions	+5 to 40°C, 5 to 85% RH
Transport Conditions	–25 to +50°C, Max. 85% RH Shipment on pallet, tested according to ISTA 2B
Degree of Pollution	II

Feature	Details
LV1 Workstation	<p>A small form factor desktop PC such as a Dell Optiplex or equivalent.</p> <ul style="list-style-type: none"> ● Core i5-12600 CPU or equivalent ● 16GB RAM ● SSD/HDD combination minimum 2TB ● USB2, 4x min. ● Dual monitor output, Display Port (DP) ● 1000 Base-T Ethernet ● Prepared for image transfer via Camera Link framegrabber ● Keyboard (US English) and mouse ● Windows 10 Enterprise, 64-Bit pre-installed, English ● Power cord
Monitor	<p>Display type: LCD (flat panel recommended) Resolution: 1920 x 1080 or greater Screen size: 24" or larger Color depth: 16.7 million colors or greater Brightness: 250 cd/m² to 300 cd/m² (typical brightness) Contrast ratio: 1000:1</p>
Quality Requirements	<p>The product is designed and produced under a Quality Management System which conforms to ISO 9001 and ISO 13485.</p> <p>The product complies with the following:</p> <ul style="list-style-type: none"> ● EU low voltage directive 2006/95/EC and the EMI/RFI directive 2004/108/EC ● Safety requirements for electrical laboratory equipment UL CAN/CSA-C22.2 No. 61010.1-04/IEC 61010-1:2010 (Third Edition) ● EMC requirements of FCC (47CFR Part 15) and IEC 61326-2-6:2013
Environmental	<p>RoHS conform (Restriction of Hazardous Substances) according to EU Directive 2011/65/EC</p>

Feature	Details
Bandwidth Requirements	<p>The recommended minimum bandwidth to use the Aperio LV1 IVD is with an internet connection of 50 megabits per second (Mbps) or higher, as this is how the system was validated. The minimum bandwidth includes an upload speed of at least 50 Mbps and a download speed of at least 50 Mbps, both where the physical Aperio LV1 IVD is connected and where the remote user is connected remotely to control the Aperio LV1 IVD.</p> <p>If the bandwidth speed is lower than 50 Mbps, the user can expect a slower refresh rate of the images being remotely viewed. Consequently, it is recommended to confirm if a refresh rate slower than 50 Mbps is acceptable to the potential users of the Aperio LV1 IVD by conducting a live demonstration in the real IT environment in which the LV1 IVD will be used.</p>

Product Features

- ▶ Automated microscopy
- ▶ Digital imaging
- ▶ Easy to use, closed desktop instrument
- ▶ Convenient live control over sample and magnification
- ▶ Annotation and measuring tools
- ▶ Automatic barcode reading on slides
- ▶ Fast tile-scanning with immediate stitching
- ▶ Various profile based and interactive scanning options

Applicability of This Manual

- ▶ Product: Aperio LV1 IVD, Part No. 23LV100IVD
- ▶ Software: Aperio LV1 IVD Application v 5.0.0 and later

Intended Use Statement

The Aperio LV1 IVD Live View and Desktop Scanner is a capture and viewing (local and remote) system of glass slides that are viewed by pathologists for their diagnostic opinion. It is intended as a primary in vitro diagnostic aid used by pathologists when providing a pathology opinion of submitted samples*, including for consultations.

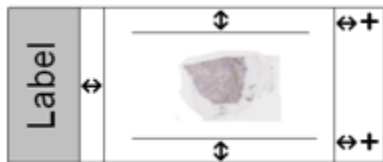
*Not intended for use if examination of samples requires greater than a 40x dry objective.

Sample Specification

The preparation of the slide is important for its scan quality and ease of scanning or automated microscopy. The slides should be in clean and good condition—no air pockets under the coverslip, no dirt, no fingerprints, no markings, no writing, no extra adhesive, no broken slides, no chips, no scratches, no overhanging coverslip, etc. Prior to loading slides, please ensure that all slides are fully cured (that is, not “wet”). For best results, all slides scanned should have coverslips.

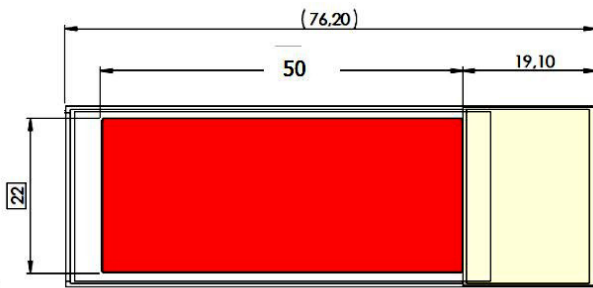
Make sure there is no glue around the edges of a slide that would cause it to stick or catch in the scanner stage area. The coverslip/label shall not protrude beyond the edge of the glass microscope slide. There shall be no lifted edges or parts of the coverslip/label. The outer surface of the slide shall be dry; no liquid shall flow out of the specimen area.

The tissue ideally should be located in the middle of the slide a distance from the edges of the slide, the label and any other markings. It is helpful for the tissue to be placed consistently in the same location and orientation on the slide. Some of the mechanical problems of a slide can be resolved by cleaning the slide with a cotton tissue or trimming the sides with a razor blade. Permanent problems with a slide may require the preparation of a new slide.



- ▶ Keep the glue attaching the coverslip to a minimum. Excess glue makes it hard for the tissue finder to distinguish between actual tissue and the glue. If a focus point lands on the glue, slide focus will not be accurate.
- ▶ Before scanning the slide, make sure it is very clean. Wipe it with a clean cotton rag (don't use chemical cleaners).
- ▶ Samples must be embedded in Mounting Media, Eukitt or water between a supported slide and a supported coverslip.
- ▶ Maximum dimensions for supported slides: (width x length x thickness): 26.3 mm x 76.5 mm x 1.5 mm.
- ▶ Minimum dimensions for supported slides: (width x length x thickness): 24.7 mm x 74.7 mm x 1 mm.
- ▶ Supported coverslips have a thickness of 100–170 μm (170 μm for optimum optical results). Cellulose tri-Acetate film is supported as a replacement for cover glass.

The specimen area of the slide can be imaged in high resolution, which is 50x22 mm adjacent to the label area.



When using coverslips that are not fixed to the slide (for example, freshly prepared sections) the coverslip shall not be closer to the slide short end than 4mm. Coverslips closer than 4mm to the slides edge could be touched and displaced by the instruments slide clamping mechanism.

The outer corners of the label area of the slide are covered by the instruments slide clamping mechanism. The covered regions do not intrude more than 4 mm into the label area. Ensure that label text, especially barcodes, are not covered by the instrument's slide clamping mechanism.

For more details on label, coverslip, and slide dimensions, see [Technical Specifications](#).

Side Access Door

A side access door has been provided to allow you to clean the instrument objectives or to recover slides if needed.



Only trained, authorized personnel can repair this instrument. If you access the inside of the instrument using the side door, first make sure the instrument is turned off and unplug the power cord. See [Opening the Access Door](#) for instructions.

Cleaning

The instrument housing can be cleaned with standard laboratory detergents and disinfectants. Avoid getting fluids into the instrument. The instrument interior must be cleaned only if necessary. See [Cleaning the Scanner Interior](#).

2 Preparing for Installation

This chapter discusses installing the Aperio LV1 IVD Live View and Desktop Scanner. For assistance, contact Leica Technical Services (see Customer Support).



*Please see the **Aperio LV1 IVD Live View and Desktop Scanner Quick Installation Guide** for information on unpacking and installing the LV1 IVD product. This chapter contains important information you should know on preparing the site for installation, along with cautions and warnings.*

Unpacking

The instrument is delivered on a pallet. Even though the instrument is tested for correct calibration after transport, please avoid all unnecessary shocks such as dropping the instrument. Do not handle or lift the instrument alone. At least two persons are needed to safely lift the instrument. Handle the instrument by its base and do not apply too much force anywhere else on the housing.

Instrument Number and Software Version

The serial number and Software application number can be seen in [Live View](#) and in other modes. Hover the cursor over the Aperio LV1 IVD logo to see a small window with version information.

The instrument number is also indicated on the label on the rear of the LV1 IVD.

Installation Site

Instrument Position and Spacing

- ▶ This instrument is for indoor use only.
- ▶ Do not operate the instrument in places higher than 2000 meters above mean sea level.
- ▶ Place the instrument on a solid, horizontal surface in a clean, dry, temperature controlled room.
- ▶ Verify that the electromagnetic environment is suitable for the use of the instrument. Do not use this instrument in close proximity to sources of strong electromagnetic radiation (e.g., unshielded intentional RF sources) as these can interfere with proper operation.



Be sure to keep the instrument back clear (at least 10 cm/4 inches) to ensure adequate airflow to and from the ventilation fans. Cables shall be accessible and not sharply bent. Effective airflow to and from the instrument must be ensured. There must be enough room behind the instrument so you can easily disconnect the power cord in case you need to quickly shut off the instrument.

Vibration

Note that vibration will affect the image quality. Place the PC and monitor on a very solid or separate table if available.

Dust and Pollution

Avoid extensive exposure to dust. Dust will eventually get into the instrument and affect image quality. It is advised to keep the instrument flap shut to keep dust out of the housing. A filter is installed on the air fan on the rear side of the housing. Especially in a dusty environment, check that the filter is not clogged, and that air can flow into the housing.

Temperature

In addition to the specifications given in [Technical Specifications](#), do not expose the instrument to direct sunlight. Fast temperature changes ($>2^{\circ}\text{C}$ in 3 minutes) can affect image quality during automated imaging.

Power

Connect the power cord to a mains outlet with 100–240VAC/50–60Hz. The instrument may only be operated on a grounded power outlet.



Connect the instrument power cord to a surge-protected 4–6 outlet power strip placed in close proximity to the work surface and easily accessible.

To protect the scanner, Leica Biosystems recommends using a UPS (uninterruptible power supply) rated at 2200VA with power conditioning that protects connected loads from electrical surges and spikes, lightning and other power disturbances. The UPS allows the scanner to run for an additional 30 minutes, giving you time to safely shut it down.

3 Getting Started

This section is intended to assist you in starting to work with the Aperio LV1 IVD Live View and Desktop Scanner once it is installed. It guides you through the first steps, up to live imaging. For details about Scanner Mode, Settings and the Slide List please refer to the appropriate sections.

Logging In

When you start the PC connected to the LV1 IVD, you are asked to enter a Windows password. If this is the first time anyone has logged in to the PC, obtain the default password from your Leica Biosystems Technical Service representative. For security reasons you should change the Windows password to a password chosen by you, following the instructions in your Windows documentation.

Switch on the Aperio LV1 IVD Live View and Desktop Scanner

Turn on the Aperio LV1 IVD Live View and Desktop Scanner by pressing the power button (1) at the front of the instrument. Be sure that the power switch on the rear of the instrument is on and that the instrument is connected to power.



- ▶ After a short initialization, the power indicator (1) changes from orange to green.
- ▶ The **Eject** button (2) ejects the slide. As soon as the Aperio LV1 IVD application is started, the **Eject** button on the front of the LV1 IVD is disabled to prevent accidental tray ejection.
- ▶ The error indicator (3) is lit when the instrument is in a failure state.
- ▶ The Busy LED (4) is active during instrument initialization or during other processes when the instrument is temporarily busy.

Turn Off the LV1 IVD

Press the power button (1) at the front of the instrument and hold it for 3 seconds to turn off the LV1 IVD.

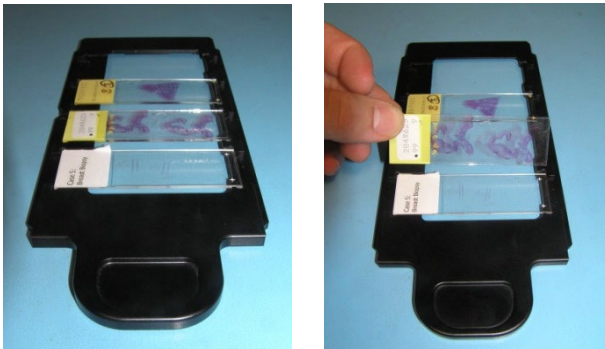
Slide and Tray Loading

To start the LV1 IVD application, go to the Windows Start menu and select **Aperio LV1 Console**.

- ▶ In the LV1 IVD software application, click the **Eject** icon so that the instrument is ready to accept a tray.
- ▶ Place 1–4 slides in the slide tray, with coverslip up.
- ▶ The labels must be to the left.



Keep the slides clean to achieve the highest possible image quality.

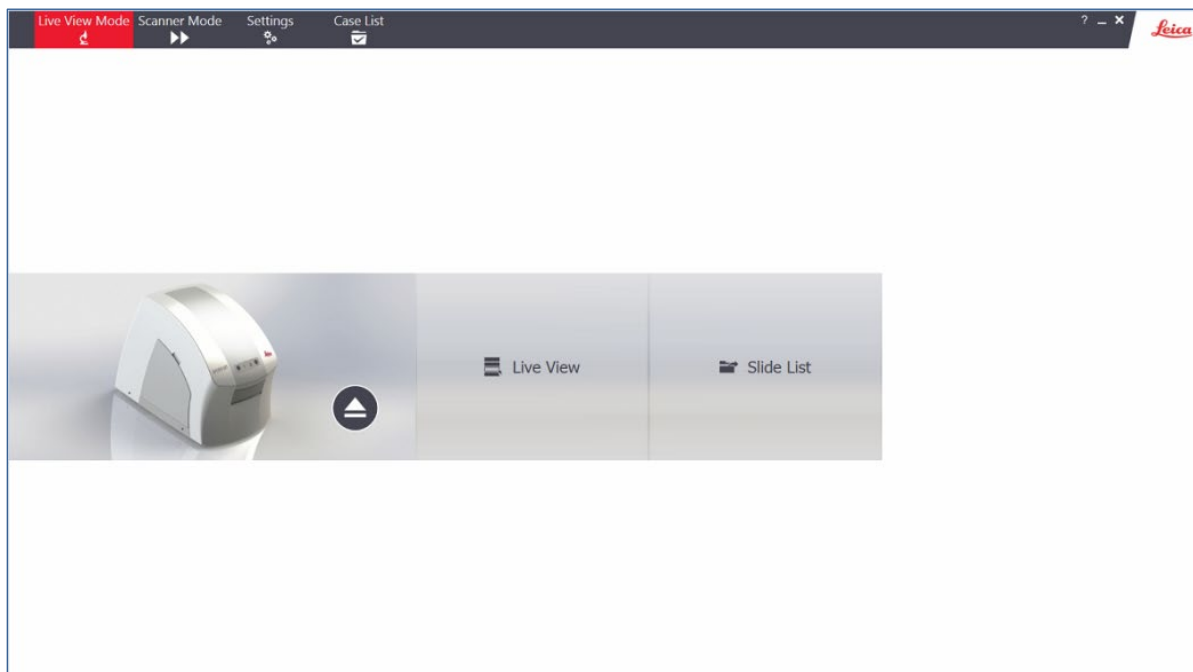


*As soon as the Aperio LV1 IVD application is started, the **Eject** button on the LV1 IVD front panel is disabled to prevent accidental tray ejection.*

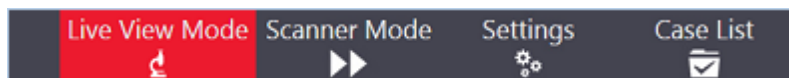
- ▶ Make sure that the slides are properly seated in the slots and do not tilt.
- ▶ The tray carrier should be visible in the open front of the instrument.
- ▶ Insert the slide tray into the guide until it clicks into place. It will be automatically drawn in.

Start Screen

When you start the Aperio LV1 IVD application, the main screen gives links to the areas you will use the most often: Live View and Slide List.



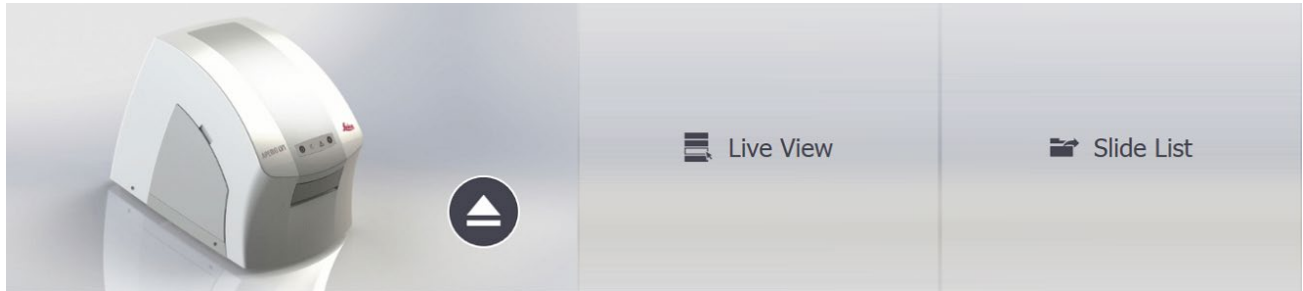
At the top of the window, you can choose between several modes or start the Settings dialog.



- ▶ **Live View Mode** – Use Live View for live examination like a conventional microscope with the benefits of digital imaging. See [Live View](#).
- ▶ **Scanner Mode** – Automatically scan and digitize multiple slides. See [Scanning Mode](#).
- ▶ **Case List** – See the list of scanned slides and optionally upload them to eSlide Manager. See [Case List](#).
- ▶ **Settings** – Set preferences for the application. Also create a scanning profile—Refer to the Settings section [Scanner](#).

4 Live View

There are three buttons in Live View.



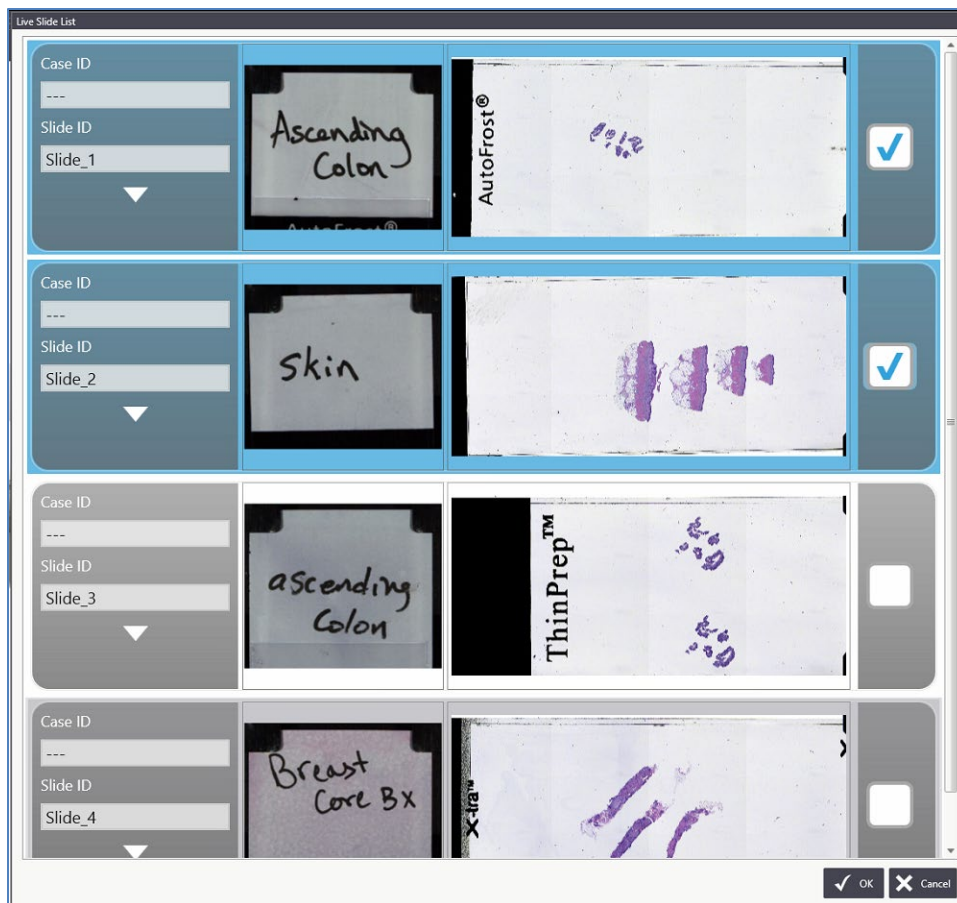
- ▶ **Live View** will start live microscopy, starting with the [Live View Main Window](#).
- ▶ You can browse image data that has been previously stored by clicking [Slide List](#).
- ▶ The **Eject** button on the left controls the insertion or removal of the slide tray.



In Live View, when a tray is inserted, the tray is automatically pulled in as soon as it is detected and the instrument displays the [Live Slide List](#).

Live Slide List

Upon insertion of the tray or clicking on the **Live View** icon, the Apero LV1 IVD Live View and Desktop Scanner generates overview images of all slides and displays them on the screen in the Live Slide List.



Tips on Using the Live Slide List

- ▶ The instrument images the label area of each slide and reads barcodes if a barcode profile is predefined; in this case, a Case ID is parsed from the barcode. Alternatively, you can enter a Case ID for each slide, or the instrument assigns a default. For a detailed description of the label interpretation please refer to [Label Recognition](#).
- ▶ Click on the label image to rotate it in 90° steps for better readability. The default label orientation can be configured in the settings.
- ▶ Double click on a slide to examine it immediately in the [Live View Main Window](#). Alternatively, select the check boxes next to the desired slides and click **OK** to examine them simultaneously in the Live View Main Window.
- ▶ Click the down-arrow beneath the Case ID/Slide ID boxes to enter more information on the slide.



Slide information

Case ID

Slide ID Slide_1

Stain

Body Site

Comment

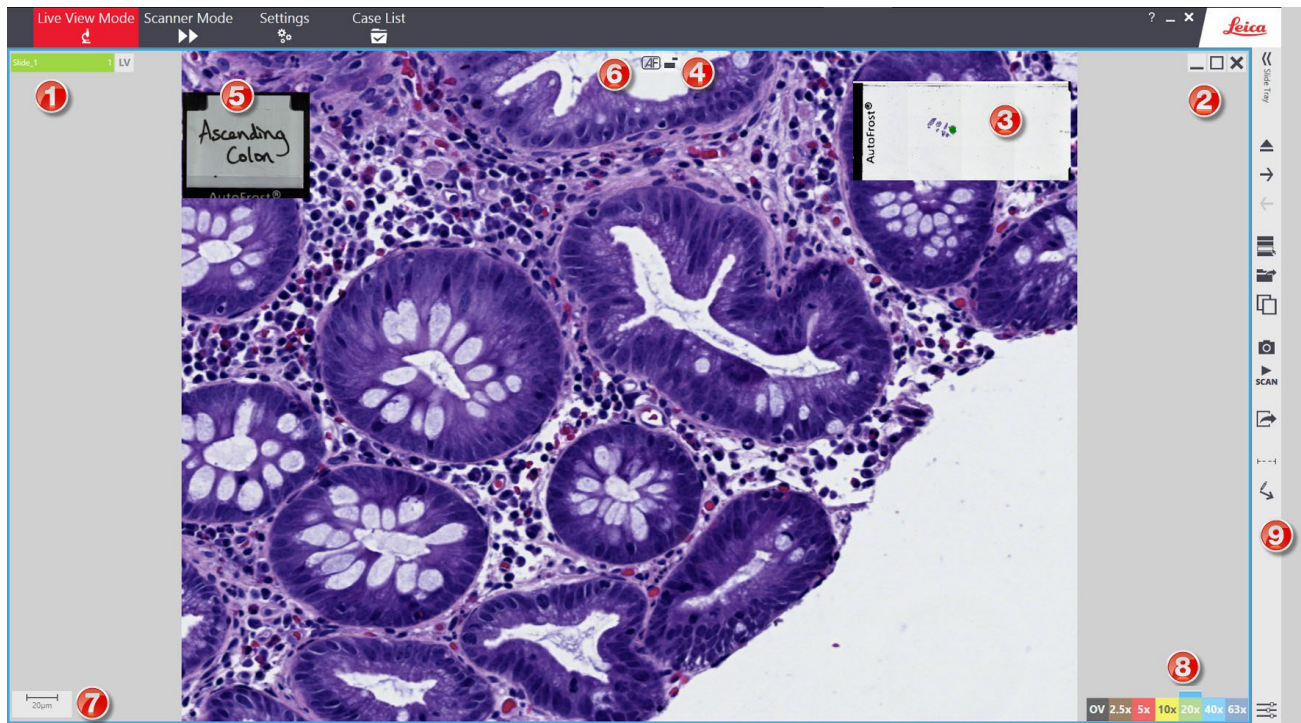
Code 0

OK Cancel

- ▶ Refer also to [Add Live Slide](#) for information on returning to the Live Slide List to select additional slides to display in the Live View Main Window.

Live View Main Window

The image area shows the selected slide or slides. One slide at a time is “active” with live imaging. (The active slide shows Windows controls and the Auto Focus/Slide Map unfold tools.) Click another slide to make it active. During navigation through the sample and changing the magnification, major information and control icons remain visible.



- ▶ The Case ID/Slide ID field (1). This indicates whether the image is live from the instrument (“LV” with green bar) or whether it is a digital scanned image (“SC” with blue bar). See [Add View](#) for information on duplicating multiple views of the slide.
- ▶ Basic controls to minimize, maximize or close a slide view (2)

- ▶ A Slide Map provides overview of the available slide area or scan (3) The Slide Map can be enlarged by clicking on the Fold/Unfold Slide Map button (4) at the top of the view.



- ▶ The slide label is shown, overlaying the main image (5).
- ▶ Autofocus options are available in the main image. Repeat or disable autofocus during live microscopy (6).

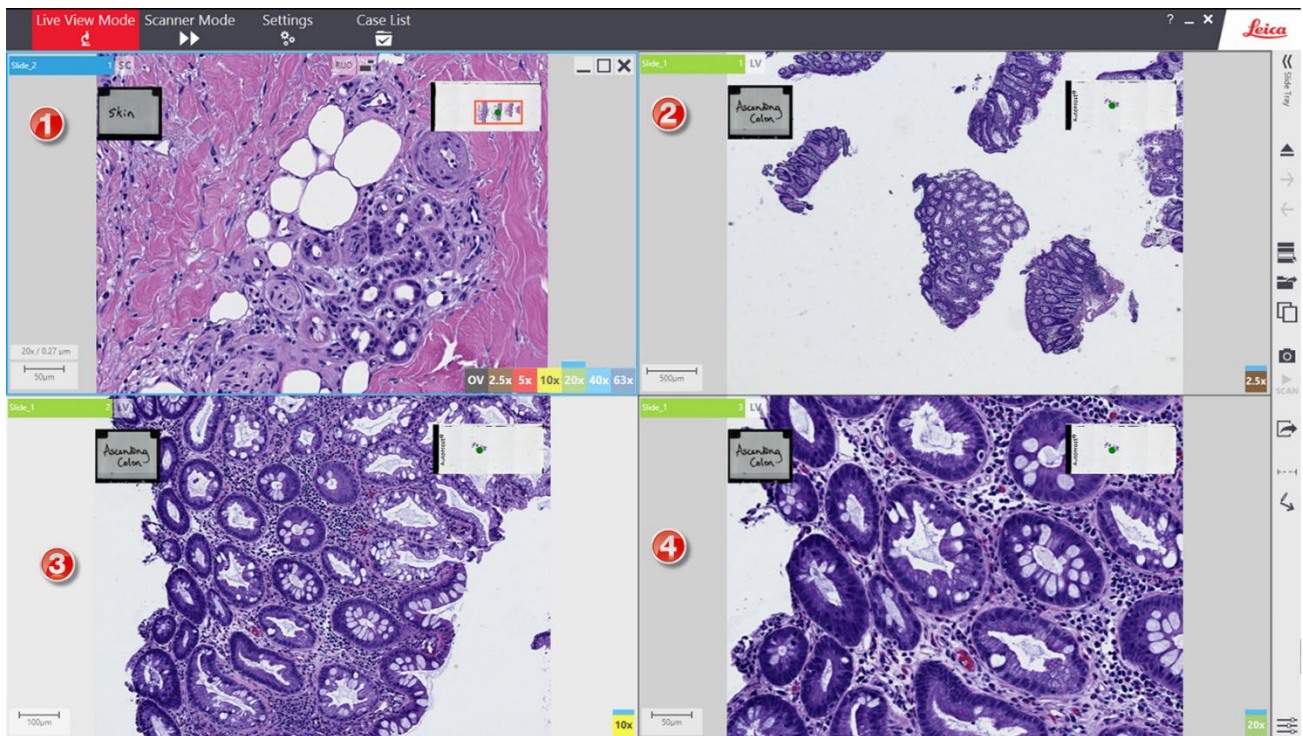
See [Focus Adjustment](#) for more information.

- ▶ A scale bar is shown (7).
- ▶ Directly choose magnification by clicking on the magnifications buttons (8). **OV** refers to the overview magnification, which shows the entire image. The active magnification is highlighted.
- ▶ Further functions are available using the Toolbar (9) see [Live View Side Menu](#).

Using the tools discussed later in [Live View Side Menu](#), you can add additional views of the same slide, add additional slides from the Live Slide List, add views of scanned slides saved as digital images, and draw annotations and measurements on the slide views.

Below is an example of Live View Main Window that contains several slide images:

- 1) Digital slide (scanned image), labeled “Slide_2 1.” Note the blue bar and the code SC indicating this is a scanned image.
- 2) Live view slide labeled “Slide_1 1.” Note the green bar and the code LV indicating this is a live view image.
- 3) Additional view of Slide_1 labeled “Slide_1 2”
- 4) Additional view of Slide_1 labeled “Slide_1 3”



Navigating the Slide

The microscope movements are controlled using the mouse and keyboard.

Magnification (Zoom)

- ▶ Left Mouse click: Zoom into image (increase magnification)
- ▶ Right Mouse click: Zoom out of image (decrease magnification)
- ▶ Magnification buttons: Directly switch to a desired magnification by clicking the color coded buttons on the lower right of the screen.

Focus Adjustment

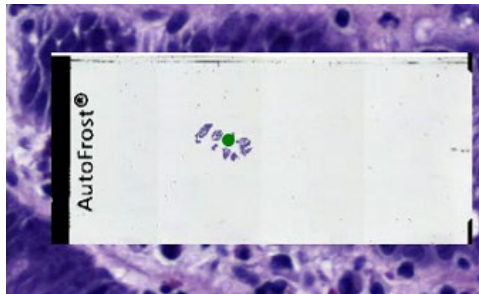
- ▶ Mouse wheel: Adjust image focus in live images. (Focusing is not available in the Overview magnification.)

- ▶ Or use the Focus Tool at the top of the view window to select Auto Focus, Manual Focus, or Reset Focus:

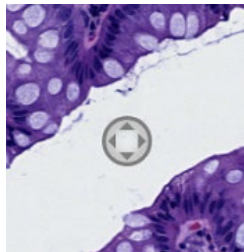


Navigation

- ▶ Hand Panning: Click+hold and drag the image in the desired direction.
- ▶ Use the arrow keys on the keyboard to screen through the slide tile by tile (horizontally or vertically). Adjacent fields of view are displayed. This function is especially useful when you want to screen a sample systematically in higher resolution.
- ▶ You may click and hold the navigation locator (green dot/rectangle) in the Slide Map and move it around; the microscope plate will move accordingly.



- ▶ By clicking in the Slide Map, the current view jumps to the corresponding position on the sample.
- ▶ By pressing the mouse-wheel-button, the cursor turns into a 4-arrow symbol. In this mode the image position follows the mouse movements. Deactivate this mode by pressing the mouse-wheel-button again.



Live View Side Menu

Additional functions are accessible via a toolbar located on the right side, next to the main view.

Insert/Eject Slide Tray



Next/Previous Slide

When multiple slides are available in the slide tray, examine them one at a time, switching to the next or previous slide using these two icons.



Add Live Slide

When adding a live slide, you see all available slides. Select the slide(s) to be added to the main view. See [Live Slide List](#). Up to four microscope slides can be viewed and compared live in the Live View Window.



This feature is useful when comparing multiple stains or consecutive sections (H&E and IHC for instance).

The added live slides can be examined as described for a single slide. You may switch between different live views and adjust sample position independently.

Add View



To examine multiple positions or areas on the same sample, simply add another scene of the active sample (either a live or a scanned slide). The different sample positions are shown side-by-side and can be compared. This is especially useful when examining tissue micro arrays.

All added scenes can be navigated and controlled as described previously.

Repeated use of this tool is possible up to a maximum number of 16 images shown in the main view.

Add Digital Slide

As with live slides, previously scanned digital slides can be added to the main view. Please refer to [Slide List](#) for details.



Interactive Scan

A desired area or the current field-of-view (Mini Scan) of the active slide can be scanned upon demand. Please refer to [Scanning from the Live View Main Window](#).



Screenshot Tool

Please refer to [Screenshot Tool](#).



Export Tool

Please refer to [Export Tool](#).



Image Adjustment

Here you can change the appearance of the image on the screen. Brightness, Gamma, contrast, and color balance.



In addition, there are some image processing options which are useful in certain situations. Three different filters can help to enhance image details. The amplification filter is particularly useful for cytology samples, where its implementation will produce a “phase contrast” type of effect. Check the “sharpen” box to have the filter affect the live image.

The circle in the upper right corner resets all image adjustments to the default values.



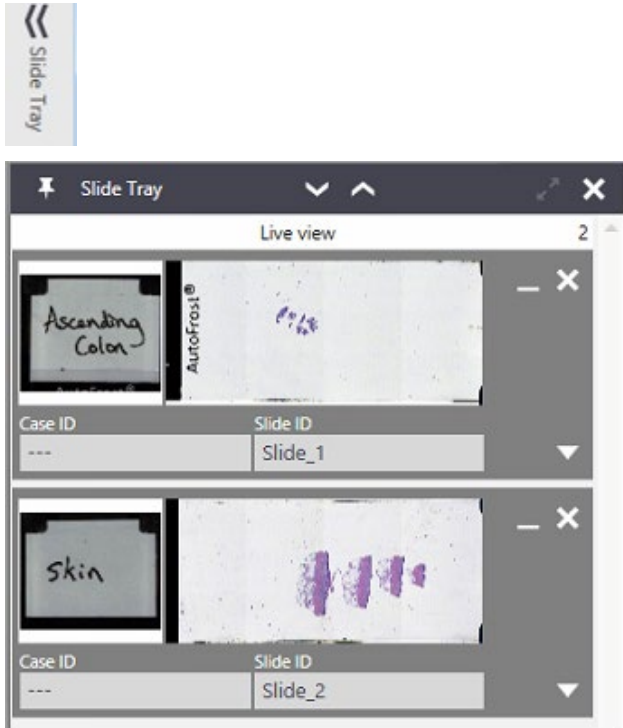
Additional Side Menu Tools

- ▶ For information on using the Slide Tray, see [Slide Tray](#).
- ▶ For information on exporting images, see [Image Export Options](#).
- ▶ For information on drawing annotations and measurements, see [Annotation and Measurement](#). Also see [Working with Annotations and Measurements](#).
- ▶ For information on performing an interactive scan, see [Scanning from the Live View Main Window](#).

Slide Tray

Slide and View Management

Click the **Slide Tray** icon to open the Slide Tray, which contains images and info on all of the live or digital slides shown in the [Live View Main Window](#).



The Slide Tray lists all live and digital slides in the [Live View Main Window](#). The Slide Tray allows you to manage all slides, scenes (multiple views opened for a single slide), annotations and comments related to the displayed slides.

The Slide Tray is hidden by default. To trigger the Slide Tray to unfold, click the **Slide Tray** icon.

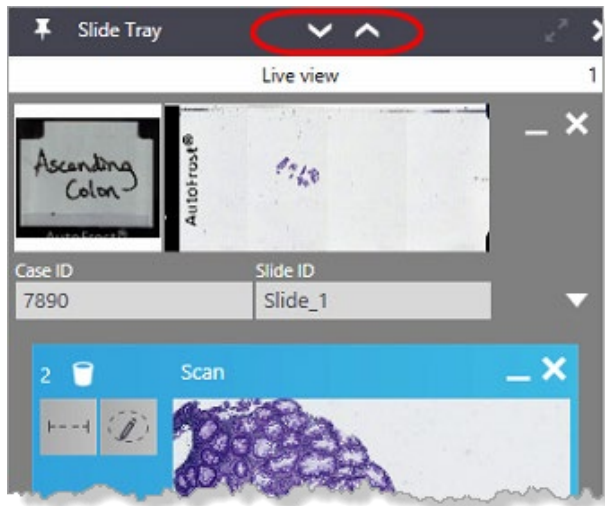
The Slide Tray will automatically be hidden if the cursor moves away from the Slide Tray tab. It is also possible to pin the Slide Tray in place using the Pin icon in the upper left corner of the Slide Tray window. The Slide Tray can be pinned by default in the folded out position by selecting this option in the appropriate settings section ([Display – Pin Slide Tray](#)).

Clicking on a specific thumbnail makes this scene active on the [Live View Main Window](#). It is enlarged in the Slide Tray to symbolize the selected scene. An additional left click on the thumbnail image will replace the overview image with the meta-information available for this live or digital slide.

Expanding the Slide Tray

At the top of the slide tray are two arrow symbols.

- ▶ Click the down arrow to expand the area of the slide to show more information on the slide, including measurements and annotations. (See [Working with Annotations and Measurements](#).)
- ▶ Click the up arrow to collapse the slide area.



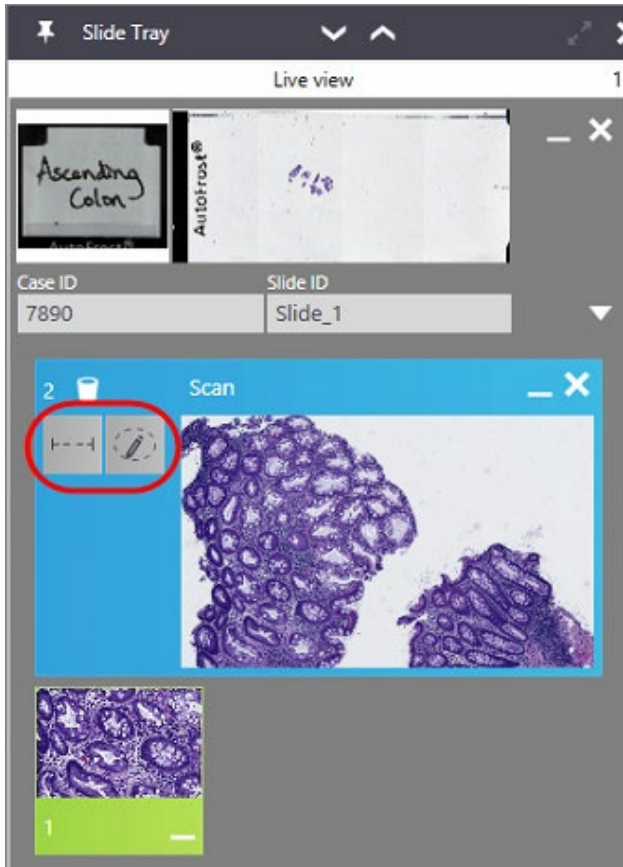
Viewing Slide Info

For any slide shown in the Slide Tray, click the down arrow next to the Slide ID to review information on the slide.

You entered this information when you selected the slide in the [Live Slide List](#) before you displayed it in the [Live View Main Window](#).

Working with Annotations and Measurements

For each slide (live or digital), if annotations and/or measurements are added to a particular image (see [Annotation and Measurement](#)), all annotations are shown in the legend field of the appropriate image as icons.



- ▶ Hover the cursor above a legend icon to see the name of the annotation. This is the name as set for the annotation in its context menu. Please compare [Annotation and Measurement](#).
- ▶ A single click on an icon will bring the related annotation to the center of the display
- ▶ A double click on an icon will allow easy selection of the object in the image, for instance to modify its properties (shift + right click) such as name, color, or to delete it.

A red outline for a text icon in the Slide Tray area denotes that the text is currently hidden in the main Live View Main Window.

Scanning from the Live View Main Window

Note: Running additional software can slow down scanning performance. It is advised to shut down all unnecessary programs.



With Aperio LV1 IVD Live View and Desktop Scanner you can interactively define parts of the slide or the sample to be digitized directly in the Live View Main Window. (There is a separate [Scanning Mode](#) for automated Slide Scans.)

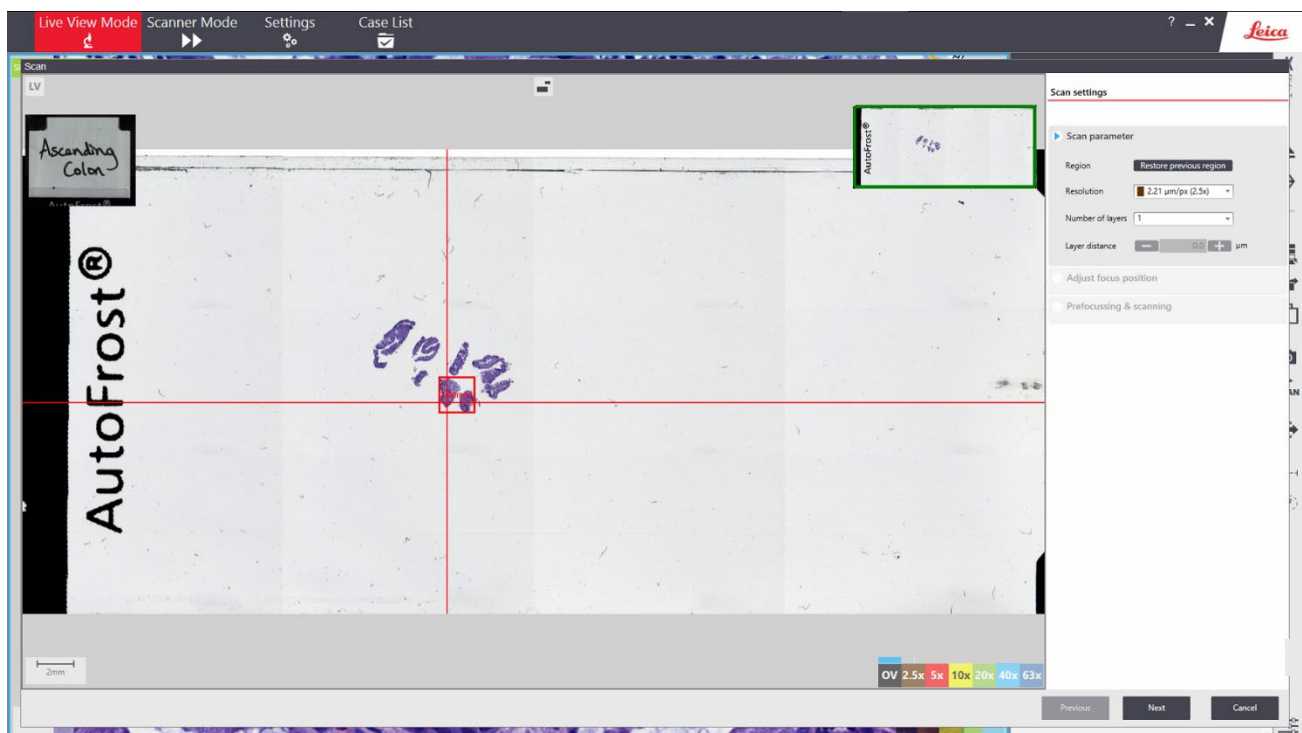
Click the **Scan** button in the Live View Main Window side menu to start the digitization of the current slide or a smaller area of it. A wizard starts that guides you through the definition of area, required resolution, number of z-planes, etc.

Selecting the Area to Scan and Setting Scan Parameters

Starting with the overview image, a red frame highlights the current field-of-view. You can use this area or adjust the frame-size by clicking and dragging the red frame.

You can define the scan resolution (magnification), number of z-planes and distance between planes.

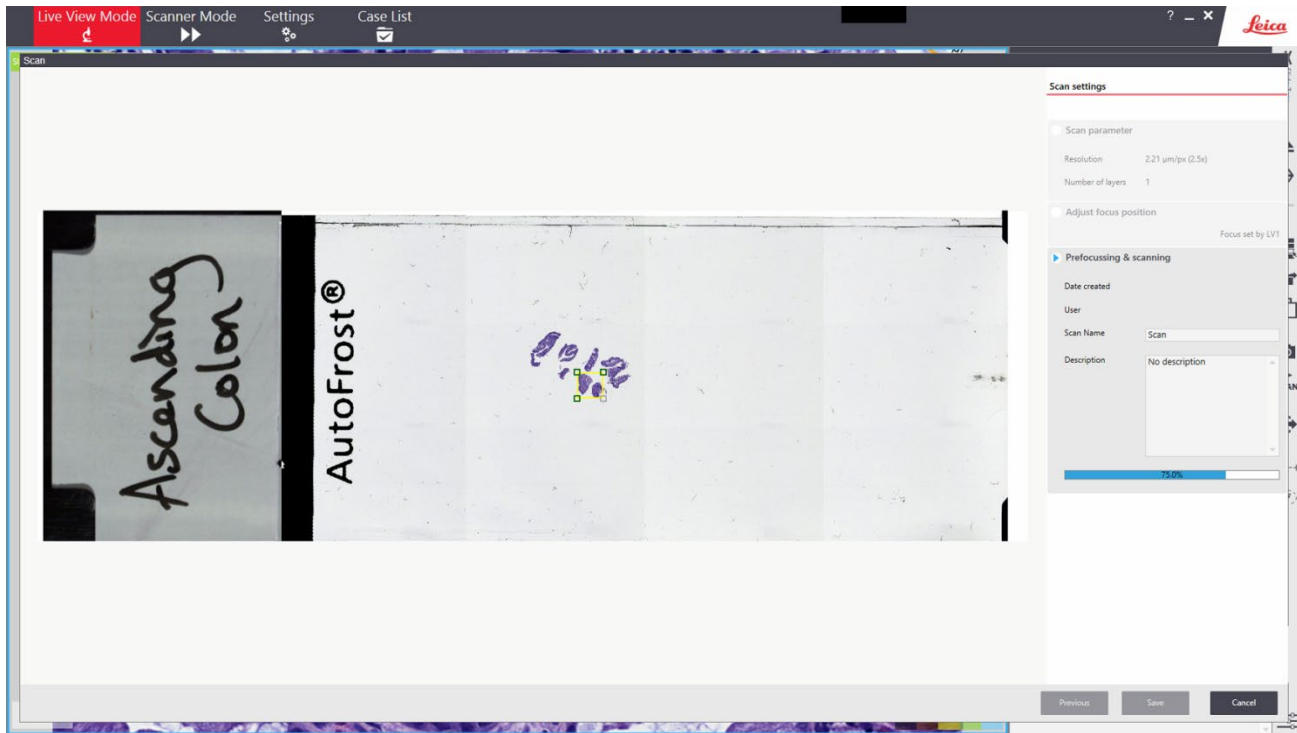
On the right hand side, the steps of the wizard progress are shown.



Confirm your selection by clicking **Next**.

Scanning

Click **Next** to start the digitization.



With a magnification of $>2.5x$ the scanning process starts with a focus map in areas of detected sample (tissue detection).

Note: In case of low contrast samples tissue detection can fail, leading to slow focusing, non-optimal focus or scan failure. Avoid dust, bubbles and artefacts in the slide preparation and low sample contrast.

During digitization the comment field of the scan can be edited, adding a title, notes, and so on. During accumulation the image can immediately be examined by zooming in and panning. Scanning can be cancelled at any time if the image is not acceptable, or to redefine the area.

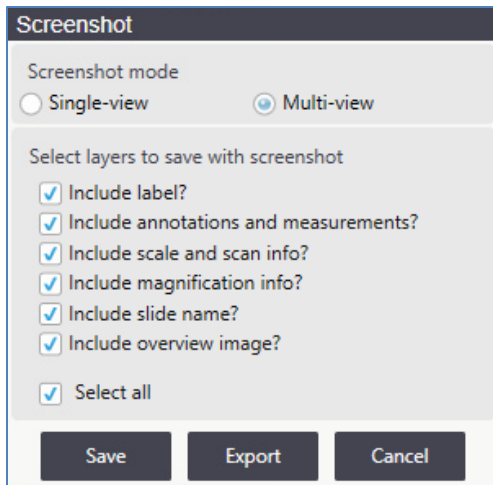
Image Export Options

Screenshot Tool



This tool generates a snapshot of your current display.

You may define which elements are contained in that snapshot. Allow/disable Slide Map, label or annotations. Choose between exporting the currently active view or all visible views (Multiview) to export.



The snapshot is saved at the location and file format of choice. See also the Settings section [Screenshot – Default Screenshot Image Format](#) and the following sections relating to screenshots.

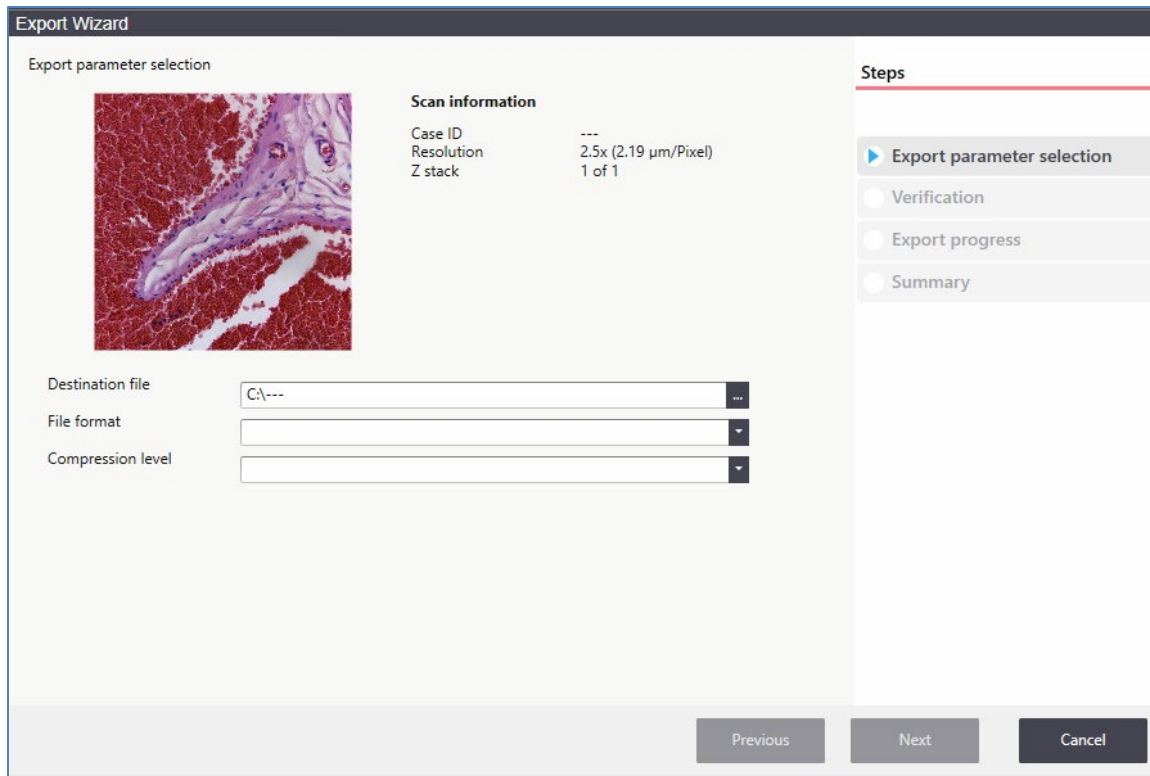
Export Tool

Exports the current field of view as a high resolution image. In the case of a live image, the resolution depends on the current objective.



Note: Use of this function can result in export of very large files. For example, 40x images of the entire slide area can be easily larger than 20GB.

A dialog guides you through multiple steps.




Export to different file formats is available (TIFF, BigTIFF, JPEG2000, Aperio .SVS format). Three compression levels are available to reduce export file size. The Export function is especially useful when image data is to be used in third party software.

The same export options are available in the [Slide List](#) using the **Export** button.

Annotation and Measurement


The **Annotation** and **Measurement** icons are used to add shapes, text, and measurements to the image. For information on managing these drawn objects in the Slide Tray, see [Working with Annotations and Measurements](#).

Annotation

Clicking the **Annotation** icon  shows annotation tools for drawing lines and areas or adding text on the images.



Measurements

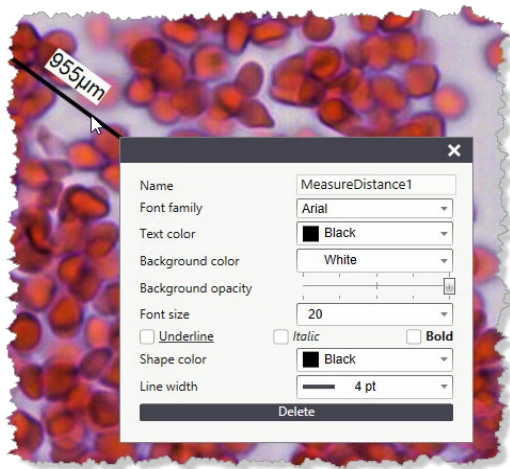
Clicking the **Measurement** icon  shows measurement tools for the measurement of distances or areas. You can measure circles, squares and freehand selections.



Existing annotations or measurements can be edited or corrected. Press [shift + left click] on the object to activate it.

An activated object can be repositioned, resized or can be deleted by pressing the Delete key.

Press Shift + right-click on an object to open a context menu. Here standard properties of the selected drawing, measurement or text field can be changed and the object can be given a name.



Each drawing, measurement, or text object is added to the Slide Tray. It can be selected and relocated using the Slide Tray (see [Slide Tray](#)).

Slide List

Scanned slides and slides that have been examined in Live View Mode are represented in the Slide List.

The screenshot displays the Slide List interface. At the top, there is a 'Refresh' button and a 'Keyword search' field. Below this is a table with columns: Case ID, Slide ID, Code, Body Site, Stain, Number of scans, Created by, Modified by, Date created, Date modified, and Data size (MB). The table contains several rows of slide data. Below the table, there are three sections: 'Slide information' (with a thumbnail and metadata), 'Scan information' (with a thumbnail and scan details), and 'Scan Information' (with a table of scan details). At the bottom, there are buttons for 'Delete', 'Import', 'Export', 'Open', and 'Close'. Red callouts 1, 2, 3, and 4 point to the Refresh button, Slide information section, Scan information section, and Scan Information section, respectively.

Case ID	Slide ID	Code	Body Site	Stain	Number of scans	Created by	Modified by	Date created	Date modified	Data size (MB)
8811	Slide_2	0			1	User	User	7/28/2015 7:23 PM	7/28/2015 10:09 PM	45.43
7890A	Slide_3	0			2	User	User	7/28/2015 7:23 PM	7/28/2015 10:09 PM	26.00
6425	Slide_2	0			1	User	User	7/28/2015 7:23 PM	7/28/2015 10:09 PM	52.63
7890	Slide_1	0	Colon	Hematoxylin & Eosin	2	User	User	7/28/2015 7:23 PM	7/28/2015 10:09 PM	11.96
---	Slide_1	0			1	User	User	7/25/2015 12:38 AM	7/25/2015 1:00 AM	11.32
---	Slide_4	0			1	User	User	7/24/2015 5:30 PM	7/24/2015 5:32 PM	89.49

Slides or single scans can be opened for viewing, deleted, exported or imported using the corresponding buttons at the bottom of the Slide List.

Import is available for Aperio .svs slide files.

Export can be done to different file formats and with three compression levels. (See also [Export Tool](#)).

Slide Gallery (1)

In the slide gallery, all slides are listed and important information is sorted into columns. Each column can be used to sort the available slides, for example according to user, creation date or file-size.

A search tool is available in the upper right corner. Simple keyword searches can be done. When clicking on the arrow button, filters can be applied to the columns of the gallery. Multiple filters can be combined by clicking on “+” to find the slides of interest.

Slide Information Field (2)

The slide information field shows the metadata belonging to the selected slide.

Scan Gallery (3)

Multiple scans belonging to one slide are listed here. You can sort them according to name, size, and so on. A small thumbnail image represents the selected scan area.

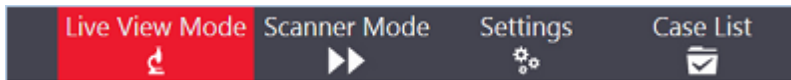
Scan Information Field (4)

This field shows information pertaining to the active scan in detail. Annotations, measurements or text added to the selected scan are listed.

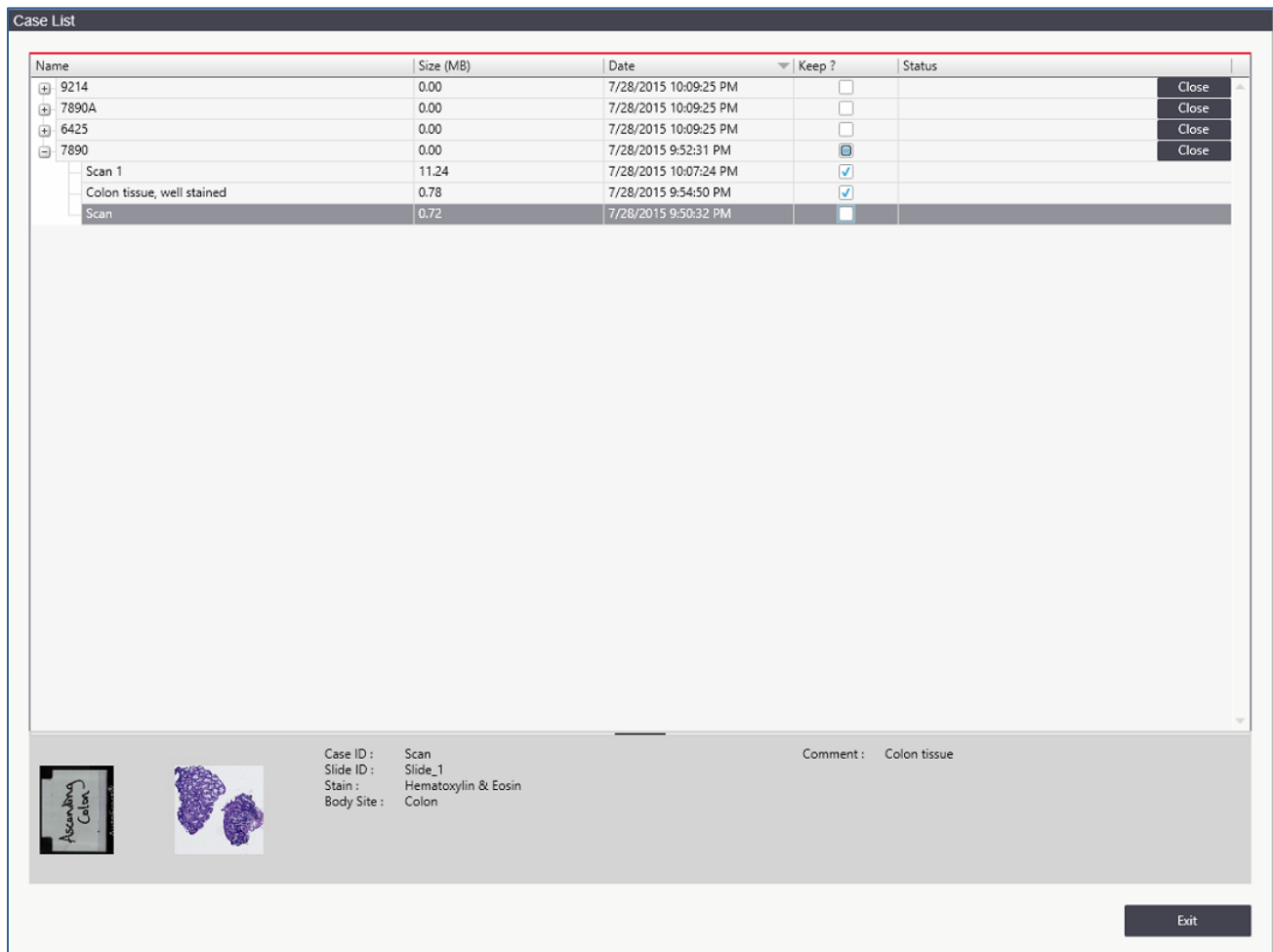
5 Case List

This section discusses using the Case List to review cases and, optionally, to upload cases to Aperio eSlide Manager.

To open the Case List, click **Case List** on the main menu that displays at the top of each window:



The Case List appears:



The Case List window displays a table with the following data:

Name	Size (MB)	Date	Keep ?	Status
9214	0.00	7/28/2015 10:09:25 PM	<input type="checkbox"/>	
7890A	0.00	7/28/2015 10:09:25 PM	<input type="checkbox"/>	
6425	0.00	7/28/2015 10:09:25 PM	<input type="checkbox"/>	
7890	0.00	7/28/2015 9:52:31 PM	<input checked="" type="checkbox"/>	
Scan 1	11.24	7/28/2015 10:07:24 PM	<input checked="" type="checkbox"/>	
Colon tissue, well stained	0.78	7/28/2015 9:54:50 PM	<input checked="" type="checkbox"/>	
Scan	0.72	7/28/2015 9:50:32 PM	<input type="checkbox"/>	

Below the table, a detailed view for the selected case is shown:

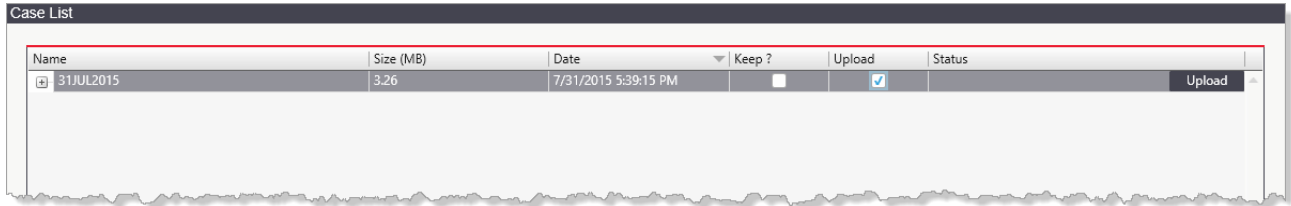
- Case ID : Scan
- Slide ID : Slide_1
- Stain : Hematoxylin & Eosin
- Body Site : Colon
- Comment : Colon tissue

The detailed view also includes a thumbnail of the slide and a small image of the tissue. An 'Exit' button is located at the bottom right of the window.

You can review the scans you have made on this page. Click a Case ID to see information on that slide at the bottom of the page.

Uploading Cases to Aperio eSlide Manager

If the Aperio LV1 IVD has been configured to connect to eSlide Manager, you will see an additional **Upload** column on this page:



Name	Size (MB)	Date	Keep ?	Upload	Status
31JUL2015	3.26	7/31/2015 5:39:15 PM	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Upload

To upload a case to eSlide Manager, select the **Upload** check box for that case, click the **Upload** button, and the upload begins. A progress bar displays in the Status column showing the upload status.

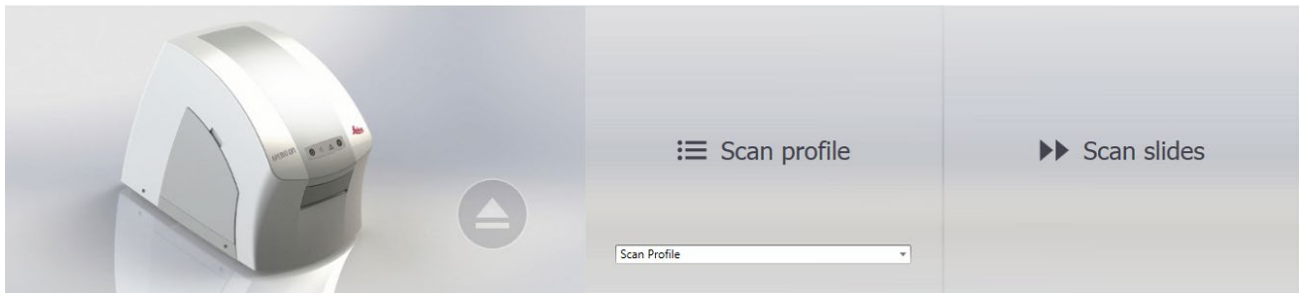
To retain the case on the LV1 IVD PC after uploading it to eSlide Manager, select the **Keep** check box next to the case before uploading it; otherwise, it will be deleted from the LV1 IVD PC after being uploaded.

6 Scanning Mode

Note: Running additional software can slow down the instruments scanning performance. It is advised to shut down all unnecessary programs. In an extreme case, running additional software can lead to an out of RAM failure.

The scanning mode offers the ability to scan many slides without interruption as quickly as possible.

By clicking on **Scanner Mode** in the Aperio LV1 IVD application top menu you change to the scanning mode menu.



Scan Slides

Start detection and scan of all slides present in the slide tray.

Note: In case of low contrast samples, tissue detection can fail, leading to slow focusing, non-optimal focus or scan failure. Avoid dust, bubbles and artifacts in the slide preparation and low sample contrast.

For information on performing an interactive scan (that does not use the scan profile) in the Live View Main Window, see [Scanning from the Live View Main Window](#).

Scan Profile

Select a pre-defined profile for scanning here. These profiles determine tissue detection, scan area, resolution etc. of the scan. Scanning profiles are generated in the settings section. (read [Auto Scan](#)) The profile selected here is also applied in automatic scanning.

Eject

Click here to eject the slide tray.

Automatic Scanning

When in scanning mode, inserted slide trays are detected and pulled in automatically. Subsequently, the instrument starts scanning all available slides automatically, using the profile selected in the scanning mode main menu.

7 ImageScope Quick Reference

If you transfer eSlides to Aperio eSlide Manager, you will want to use the Aperio ImageScope viewer to view those eSlides. Here are some quick tips for using the ImageScope eSlide viewer. For details, see the *Aperio ImageScope User's Guide*.

Although the basic function of ImageScope is to allow you to view eSlides, ImageScope offers much more:

- ▶ View eSlides from any workstation on the network.
- ▶ Share and discuss eSlides in real time in multiple remote locations by using eSlide conferencing.
- ▶ View multiple eSlides concurrently.
- ▶ Apply image adjustments in real time for contrast, brightness, and gamma.
- ▶ Analyze entire eSlides or selected regions using algorithms.
- ▶ View, annotate, and analyze scanned z-stack images.
- ▶ Rotate eSlide images and labels.
- ▶ Use Aperio Integrated Color Management to view eSlides to ensure the eSlides are displayed in accurate color.
- ▶ Use the Image Quality (IQ) feature to optimize viewing of an eSlide based on its stain.
- ▶ Add and manage various types of eSlide image annotations.
- ▶ Instantly pan and zoom to any region of the slide.
- ▶ Extract a region or selected regions of an eSlide to a file in a choice of formats.

Installation

Important! To successfully install ImageScope, you must first log into Windows as a user with administrative privileges.

1. Double-click My Computer or open Windows Explorer and navigate to the ImageScope installer file. (This file may have been downloaded from the www.LeicaBiosystems.com/Aperio web site, may have been provided on CD, or may reside on your network; contact your network administrator for help if you have trouble finding it.)

If you are installing ImageScope on your DSR (Digital Slide Repository), use the installer DSRInstall; if installing ImageScope on a user's workstation, use ClientInstall.

2. Double-click the .exe file to start the installation wizard.
3. Follow the instructions on your screen to accept the terms of the license agreement and install ImageScope.

Starting Aperio ImageScope Viewer

To start ImageScope, click **Start** on the Windows taskbar, point to **All Programs > ScanScope**, and select **ImageScope**.

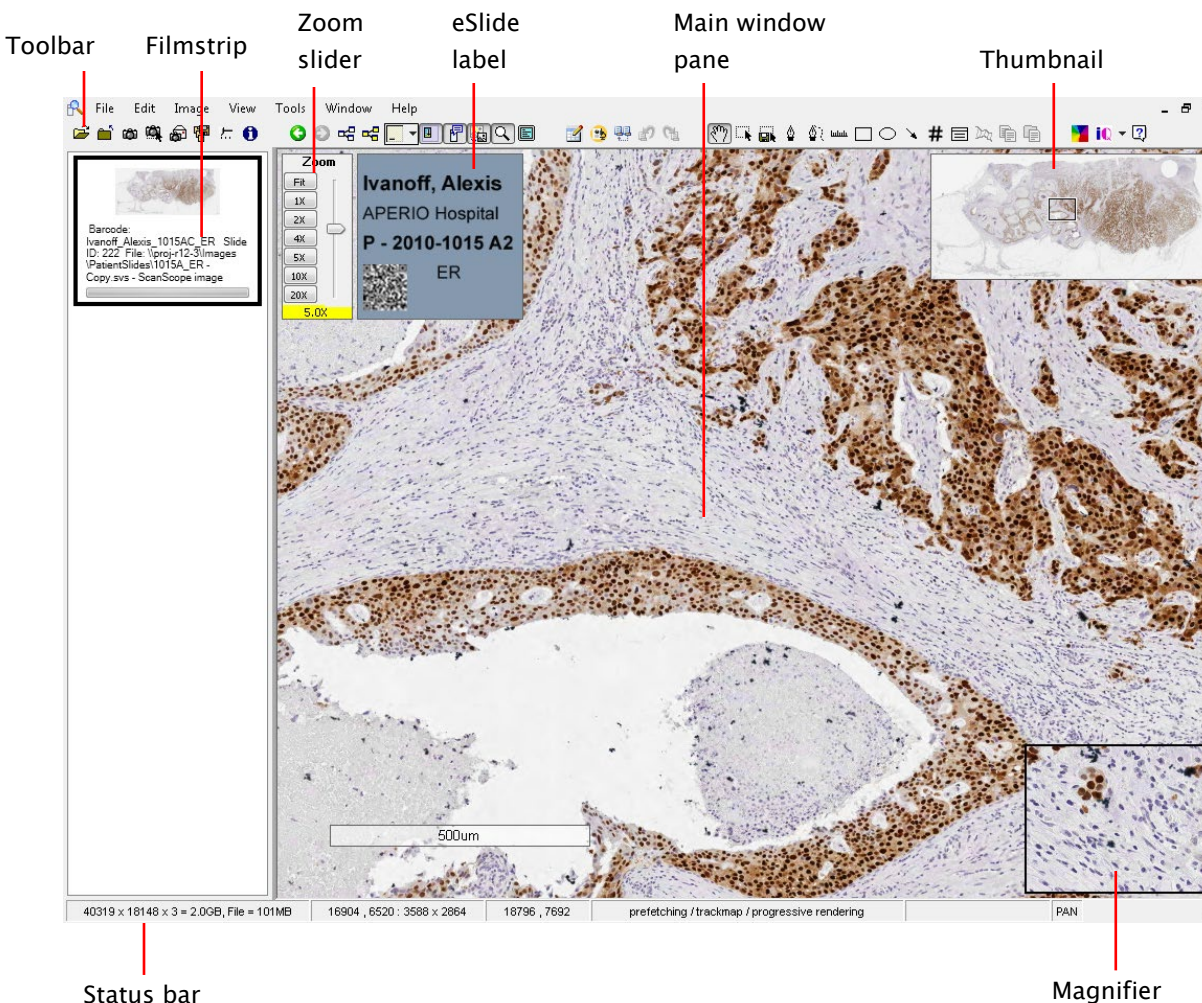
Opening an eSlide

There are three ways to open an eSlide in ImageScope:

<p>Open a local eSlide <i>(From your workstation or local network via Microsoft file sharing)</i></p>	<p>Go to the ImageScope File menu and select Open Image. Select the image you want to open. <i>NOTE: If you open a local image instead of an image in eSlide Manager, Smart sync, Tracking, and IQ are not supported for that image.</i></p>
<p>Open a remote eSlide <i>(From an eSlide Manager server)</i></p>	<ol style="list-style-type: none"> 1. Go to the ImageScope File menu and select Access Remote Server. 2. Enter the name of the server on which eSlide Manager resides, set the Port value to 82, and then click Connect. 3. When prompted, enter your eSlide Manager user name and password. 4. From the table of eSlides on the eSlide Manager site, click ImageScope beneath the image you want to view.
<p>View an eSlide from within eSlide Manager</p>	<ol style="list-style-type: none"> 1. Log into eSlide Manager with your eSlide Manager user name and password. 2. Use the eSlide Manager List commands to see the eSlides on your site.

After you open an eSlide, it appears in the Aperio ImageScope main window.


Aperio ImageScope Main Window




- ▶ **Toolbar** – Many of the ImageScope commands and features are available on the toolbar. See [Toolbar Quick Reference](#) later in this chapter for details.
- ▶ **Filmstrip** – The filmstrip shows what slides are open. Click an image in the filmstrip to view it in the main window.
You can view multiple slides at the same time by going to the **Windows** menu and selecting **Tile Horizontal** or **Tile Vertical**. To show or hide the filmstrip, go to the **View** menu and select **Filmstrip**.
- ▶ **Zoom slider** – You can magnify or shrink the current view.
- ▶ **Focus slider** (not shown) – Appears with z-stack eSlide images only. Used to view different focal areas (z-stack layers) on a z-stack image.
- ▶ **Label Window** – If a photo of the slide label is associated with the eSlide, you can see it in the Label window. To show or hide the label, go to the **View** menu and select **Label**.

- ▶ **Thumbnail Window** – The thumbnail shows the entire image. A black rectangle shows the portion of the image that is currently displayed in the main window. To resize the thumbnail, drag its lower left corner. To show or hide the thumbnail, go to the **View** menu and select **Thumbnail**.
- ▶ **Magnifier Window** – Move this window to the area you are interested in to see a magnified view or just move your cursor to the area of interest. The magnifier has a default magnification of twice the resolution of the image in the main window. To resize the magnifier, drag its lower left corner. To show or hide the magnifier, go to the **View** menu and click **Magnifier**.

Moving the Viewing Area

Click and hold the left mouse button and drag the mouse pointer across the eSlide to pan around the image. The pointer turns into a closed fist, . Panning moves the slide in the direction you are dragging. You can set the ImageScope Options to pan in reverse or change the panning speed. For more information, see the *Aperio ImageScope User's Guide*.

Other methods of moving the viewing area include:

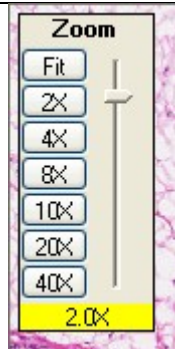
- ▶ **Autopanning** – With the cursor at the center of the main viewing area, click the scroll wheel on your mouse or right-click and select **Autopan** from the menu that appears. Move the mouse in any direction to automatically pan in that direction very quickly. To stop autopanning, click anywhere on the eSlide.
- ▶ **Scrolling** – As you move your cursor toward the edge of the ImageScope main window, the cursor changes to an arrow: ; click and hold the mouse button down to scroll in that direction. To stop scrolling, release the mouse button.
- ▶ **Thumbnail** – Click in the thumbnail to move the main image to that part of the slide or drag the rectangle in the thumbnail window to move to another area of the eSlide.
- ▶ **Page Panning** – Use the keyboard arrow keys to move an entire screen page at a time (for example, Shift + Right-arrow to move a page to the right).

Changing Viewing Magnification

Double-clicking on the image in the main window immediately zooms that image to the maximum magnification. Double-click again to return to the most recently used magnification that was not the maximum magnification.

Other methods of changing viewing magnification include:

Zoom slider




- Click **Fit** to fit the entire eSlide within the main viewing area.
- Click a setting to zoom in using that zoom level.
- Drag the slider up or down to change the zoom level.
- Click the image in the main window and roll the scroll wheel to move the slider.

Keyboard shortcuts

Use Ctrl+Minus key to zoom out, and Ctrl+Plus key to zoom in.

Zoom Navigation

To zoom into a particular area of the eSlide, click  on the ImageScope toolbar. Click and drag in the main image window to draw a rectangle to outline the zoom area.

Annotating


The annotation drawing tools, shown below, are described in [Toolbar Quick Reference](#) later in this chapter.



Annotations are saved in different layers, with different colors, so each group of people can have its own annotations.

Viewing and Navigating a Z-Stack Image

ImageScope enables you to view, annotate, and analyze specific layers of a scanned z-stack image. ImageScope opens a z-stack image to the best focused layer, as determined when the slide is scanned. When viewing z-stack images:

- ▶ Use the Focus slider to view different layers of the z-stack image. The number at the bottom of the slider represents the current focus point.
- ▶ Click  to view image information, including information for each z-stack layer.
- ▶ Annotations you draw on the z-stack image are stored on the current z-stack layer.
- ▶ Results for analysis performed on the z-stack image are stored in the corresponding z-stack layer.

For more information on viewing and analyzing z-stack images, see the *Aperio ImageScope User's Guide* and the *Aperio Image Analysis User's Guide*.

Image Analysis

To analyze an image, open the image in ImageScope.

1. Go to the ImageScope **View** menu and select **Analysis**.
2. On the algorithms window, select the algorithm you want to use and set the parameters for your use.
3. Select whether you will analyze the entire image or just the area defined by annotations, and click **Analyze**.

For server-side batch analysis in eSlide Manager or for information on analyzing eSlides directly in eSlide Manager, see the *Aperio Image Analysis User's Guide*.







Clinical Viewing Mode





















Clinical Viewing mode provides a simple toolbar that contains only the tools used in a clinical environment.















- ▶ To use the clinical toolbar, go to the **View** menu and select **View Clinical Toolbar**. (See [Toolbar Quick Reference](#) below to see which tools are available in the clinical toolbar.)
- ▶ To return to the full toolbar, go to the View menu and select **View Standard Toolbar**.

Toolbar Quick Reference

* These tools are shown in clinical viewing mode.



Tool	Description
	Go to the Open Image window where you can browse for a local eSlide to open for viewing.
	Close the eSlide that is currently being viewed in ImageScope.
	Export images of a specified area on the eSlide. You can export the raw eSlide image, the eSlide with annotations, and the mark-up image.
	Create a snapshot image of the current ImageScope window, including any annotations. You can save the image as a TIFF or JPEG file.
	Send the snapshot image in an email.
	Save an Image View as a .sis file; an Image View includes the entire set of eSlides currently open in ImageScope.














Tool	Description
	Go to the Image Adjustment window, where you can make color and other adjustments to the eSlide you are currently viewing.
	Go to the Image Information window, which displays information about the eSlide currently being viewed.
	Go to the previous view of the eSlide.
	Go to the next view of the eSlide (only enabled if you first used the back arrow to go to a previous view).
	*Manually synchronize navigation for all eSlides currently being viewed. (Used when multiple eSlides are open in the ImageScope window.)
	*Use smart synchronization for multiple eSlides being viewed. Corresponding regions in the eSlide images are synchronized. (Same icon as for manual synchronization, but colored yellow.) This feature is not available when viewing local eSlides.
	Show or hide axes or axes and grid.
	Show or hide the zoom slider.
	Show or hide the eSlide label.
	Show or hide the thumbnail window.
	Show or hide the magnifier window.
	Display on the full monitor screen. (Or turn off if already in full-screen mode.)
	*Open the Annotations window where you can create multiple annotation layers and organize and add descriptions to annotations.
	For customers using Image Analysis, open the Analysis window.
	Open the Annotation Link Manager window where you can link annotations or eSlides to create a viewing sequence.
	Go to the previous link (if a previous link exists.)
	Go to the next link (if a next link exists).
	Move the eSlide by panning different directions.
	Zoom the selected area of the eSlide.
	*Extract a region of an eSlide.



Tool	Description
	*Draw a free-form annotation.
	Draw a free-form annotation to be excluded from analysis. (This creates a negative annotation.)
	*Measure an object on an eSlide.
	*Draw a rectangular region (or a square if you hold down the Shift key while you draw).
	Draw an elliptical annotation (or a circle if you hold down the Shift key while you draw).
	*Draw an arrow pointing to an area of interest.
	Mark the eSlide image with annotations.
	*Select an image for a report. This feature is only useful if you have eSlide Manager Reporting option installed and the report template you are using uses images.
	Measure the distance (μm) between two free-form line annotations.
	Copy the selected annotation. You can paste the annotation in any open eSlide. If you have run analysis on the annotation, only the annotation is copied (not the analysis results).
	Paste the copied annotation region in the active eSlide.
	Turn Integrated Color Management on or off. Only useful if the image contains an embedded ICC profile.
	*Turn Image Quality (IQ) mode on or off. (This feature is not available when viewing local eSlides.)
	*See help information for Aperio ImageScope.

Keyboard Shortcuts

Key Sequence	Command	Toolbar Icon	Action
Arrow key	None	None	Nudge image
Ctrl + Plus key	None	None	Zoom in
Ctrl + Minus	None	None	Zoom out
Ctrl	None	None	Press while drawing an annotation to draw the annotation in a predefined size.

Key Sequence	Command	Toolbar Icon	Action
Ctrl+A	Image > Adjustments		Displays the Image Adjustments window where you can make image adjustments to the main image or to the z-stack image, as well as load and save adjustments.
Ctrl+B	None		Enables/disables integrated color management
Ctrl+C	Edit > Copy		If an annotation is selected, copies the selected annotation and enables you to paste it on the eSlide image.
	Edit > Copy	None	If no annotation is selected, copies the current view of the eSlide image and places it on the Windows clipboard.
Ctrl+D	View > Digital Slide Conferencing Window	None	Opens the Digital Slide Conferencing window where you can create or join an eSlide conference.
Ctrl+E	Image > Rotate Image	None	Opens image rotation toolbar
Ctrl+F	None	None	Turns image prefetching on/off.
Ctrl+F4	File > Close Image		Closes the image currently open in ImageScope.
Ctrl+G	View > Analysis	None	Runs an algorithm analysis on a local or remote eSlide.
Ctrl+I	Tools > Options > Performance	None	Turns interpolating on/off (used for viewing 3D images).
Ctrl+J	Tools > Options > Performance	None	Turns progressive rendering on/off.
Ctrl+K	Image > Keep Open	None	Turns Keep Open option on/off.
Ctrl+L	Tools > Logging	None	Turns logging on/off.
Ctrl+M	None	None	Shows/hides track map
Ctrl+Shift+M	None	None	Shows/hides cache map.
Ctrl+N	View > Annotations Window		Opens the Annotations window where you can work with annotation layers for the current image.

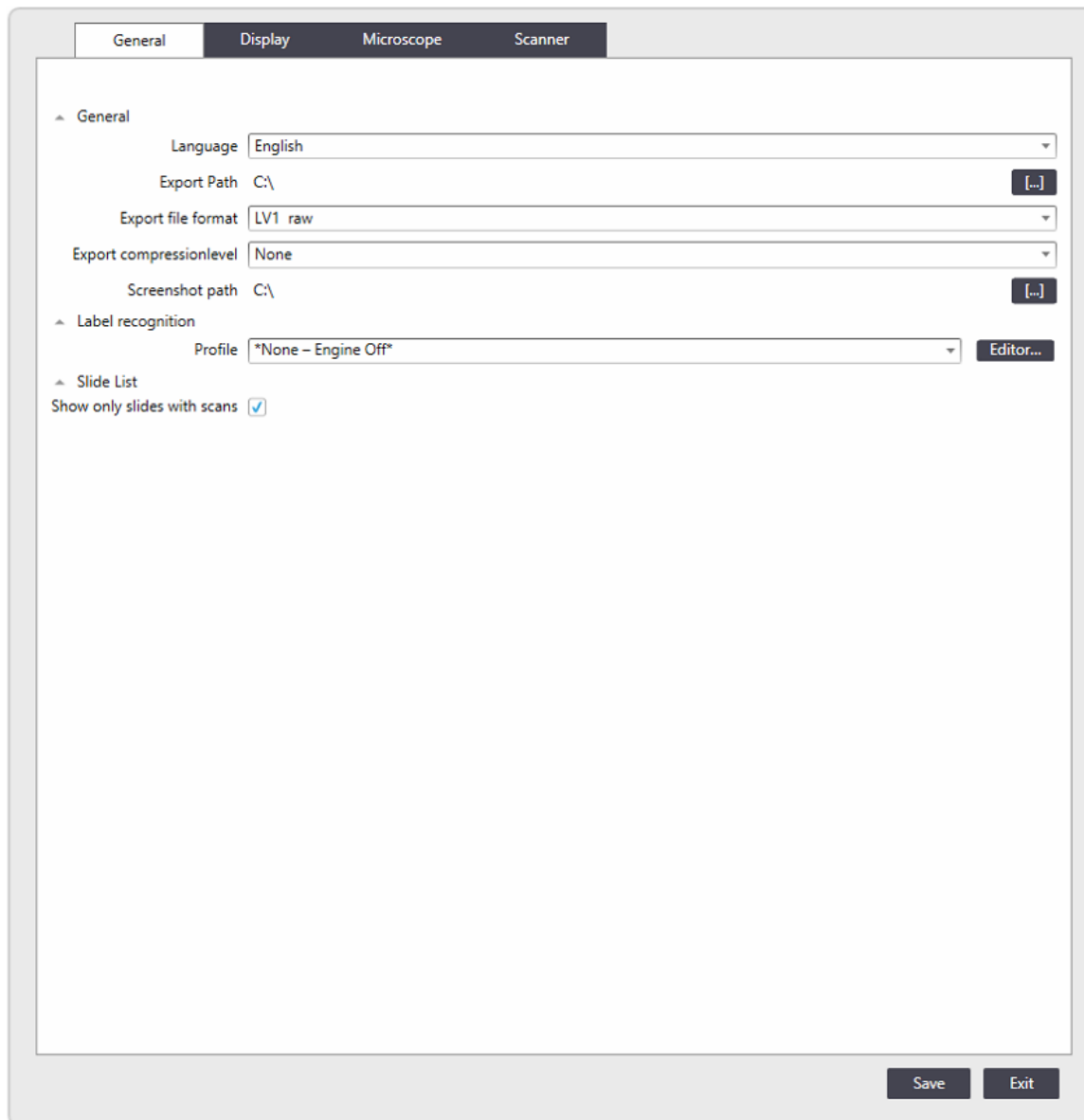
Key Sequence	Command	Toolbar Icon	Action
Ctrl+O	File > Open Image		Displays the Open Image window where you can browse for a local image file to open.
Ctrl+P	Tools > Options	None	Opens the Options window to set general, navigation, annotation, performance, and HTTP proxy options.
Ctrl+Q	Image > Quality		Turns IQ on/off.
Ctrl+R	File > Access Remote Server	None	Connects to an Aperio ePathology ImageServer where you can select an image to view.
Ctrl+S	Tools > Options > Performance	None	Turns pixel smoothing on/off.
Ctrl+Shift	None	None	Moves all annotations.
Ctrl+T	View > Thumbnail		Shows/hides the thumbnail window.
F1	Help > Help		Opens ImageScope help.
F2	None		Activates the Pen annotation tool.
F3	None		Activates the Negative pen annotation tool.
F4	None		Activates the Ruler annotation tool.
F5	None		Activates the Rectangle annotation tool.
F6	None		Activates the Ellipsis annotation tool.
F7	None		Activates the Arrow annotation tool.
F8	View > Annotation Link Manager		Opens the Annotation Link Manager window, where you can link slide annotations in a specific viewing order.
F9	None		Activates the Counter annotation tool.
F11	View > Full Screen		View ImageScope on your entire monitor screen.
Shift	None	None	Press while drawing annotations: ellipse becomes a circle; rectangle becomes a square.
Shift+Arrow	None	None	Moves one screen at a time.

Key Sequence	Command	Toolbar Icon	Action
Shift+Ctrl	None	None	Press while drawing an annotation or using the extract region tool to create a region of the same aspect ratio as the predefined fixed annotation size.
Shift+F7	View > Previous Annotation Link		If annotation links have been set using the AnnotationLink Manager, this moves to the previous annotation in the viewing sequence.
Shift+F8	View > Next Annotation Link		If annotation links have been set using the Annotation Link Manager, this moves to the next annotation in the viewing sequence.

8 Settings

This section contains information on all of the selections available in the Settings mode.

General



The screenshot displays the 'Settings' application window with the 'General' tab selected. The window has a title bar with four tabs: 'General', 'Display', 'Microscope', and 'Scanner'. The 'General' tab is active and contains the following settings:

- General**
 - Language: English
 - Export Path: C:\
 - Export file format: LV1 raw
 - Export compressionlevel: None
 - Screenshot path: C:\
- Label recognition**
 - Profile: *None – Engine Off*
- Slide List**
 - Show only slides with scans:

At the bottom right of the window, there are two buttons: 'Save' and 'Exit'.

Language

You can choose from a number of supported languages for the Aperio LV1 IVD application. Changes take effect after restarting the Aperio LV1 IVD application.

Export Path

This parameter defines the default path used in the [Export Tool](#) and [Slide List](#). It is also possible to change this path in the export dialog itself.

Export File Format

This parameter defines the default file format used in the [Export Tool](#) and [Slide List](#). It is also possible to change this format in the export dialog itself.

Export Compression Level

This parameter defines the default image compression level used in the [Export Tool](#) and [Slide List](#). It is also possible to change the level in the export dialog itself.

Screenshot Path

This parameter defines the default path for saving screenshots from the Live Slide View. See [Screenshot Tool](#). It is also possible to change the path in the screenshot dialog itself.

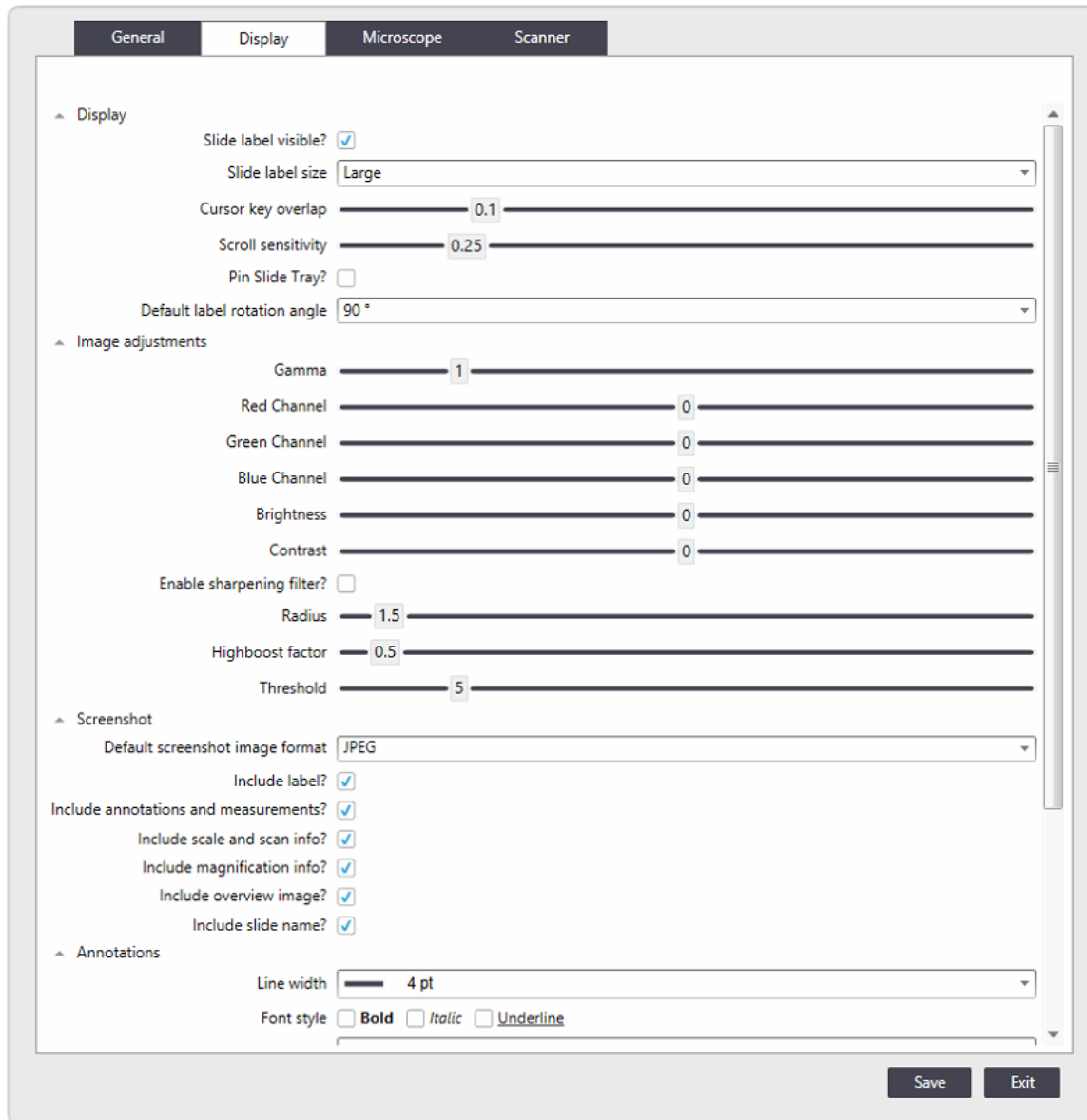
Label Recognition – Profile

This drop down menu contains the barcode interpretation profiles available. Choose an appropriate profile or click **Editor** to open the Label Recognition Editor to create a barcode profile. Refer to [Label Recognition](#) to read about creating barcode profiles.

Slide List – Show only slides with scans

When selected, only slides containing scan data appear in the Slide List. This can also be toggled in the [Slide List](#) itself.

Display



Display - Slide Label Visible?

You can define if the slide label in the main view (see [The Live View Main Window](#)) is visible by default.

Display – Slide Label Size

The label image can be displayed in the Live View Main Window in two sizes.

Display – Cursor Key Overlap

Define the overlap of adjacent field of views when using the cursor/arrow keys to examine the sample tile-by-tile in Live View mode. 0.1 means that 10% of adjacent images overlap. 0.5 means a 50% overlap. See [Navigating the Slide](#).

Display – Scroll Sensitivity

Scroll bars sensitivity can be adjusted here.

Display – Pin Slide Tray

With this option activated, the Slide Tray is always unfolded and does not hide when the mouse moves away. See [Slide Tray](#).

Display – Default Label Rotation Angle

The slide label image can be rotated for better readability in the Live View Main window. The default rotation angle can be defined here.

Image Adjustments

In this section the default image display parameters are set.

- ▶ Gamma – adjust image gamma in the main view
- ▶ Color – adjust image colors using the red, green and blue slider
- ▶ Brightness – adjust brightness
- ▶ Contrast – increase/decrease contrast

Enabling sharpening filter – when checked, a sharpening filter is applied which can be fine-tuned using:

- ▶ Radius
- ▶ Highboost factor
- ▶ Threshold

See also [Image Adjustment](#)

Input – Invert Mouse Wheel

As the default behavior, the microscope`s objective is moved towards the sample when the mouse wheel is rotated forward. Here you can invert this behavior.

Screenshot – Default Screenshot Image Format

This defines the format in which screenshots are saved.

Screenshot – Screenshot Mode

When generating a screenshot you can either save the single-view of the active scene or the multi-view of all open scenes. Here the default mode is defined. See [Screenshot Tool](#).

Screenshot

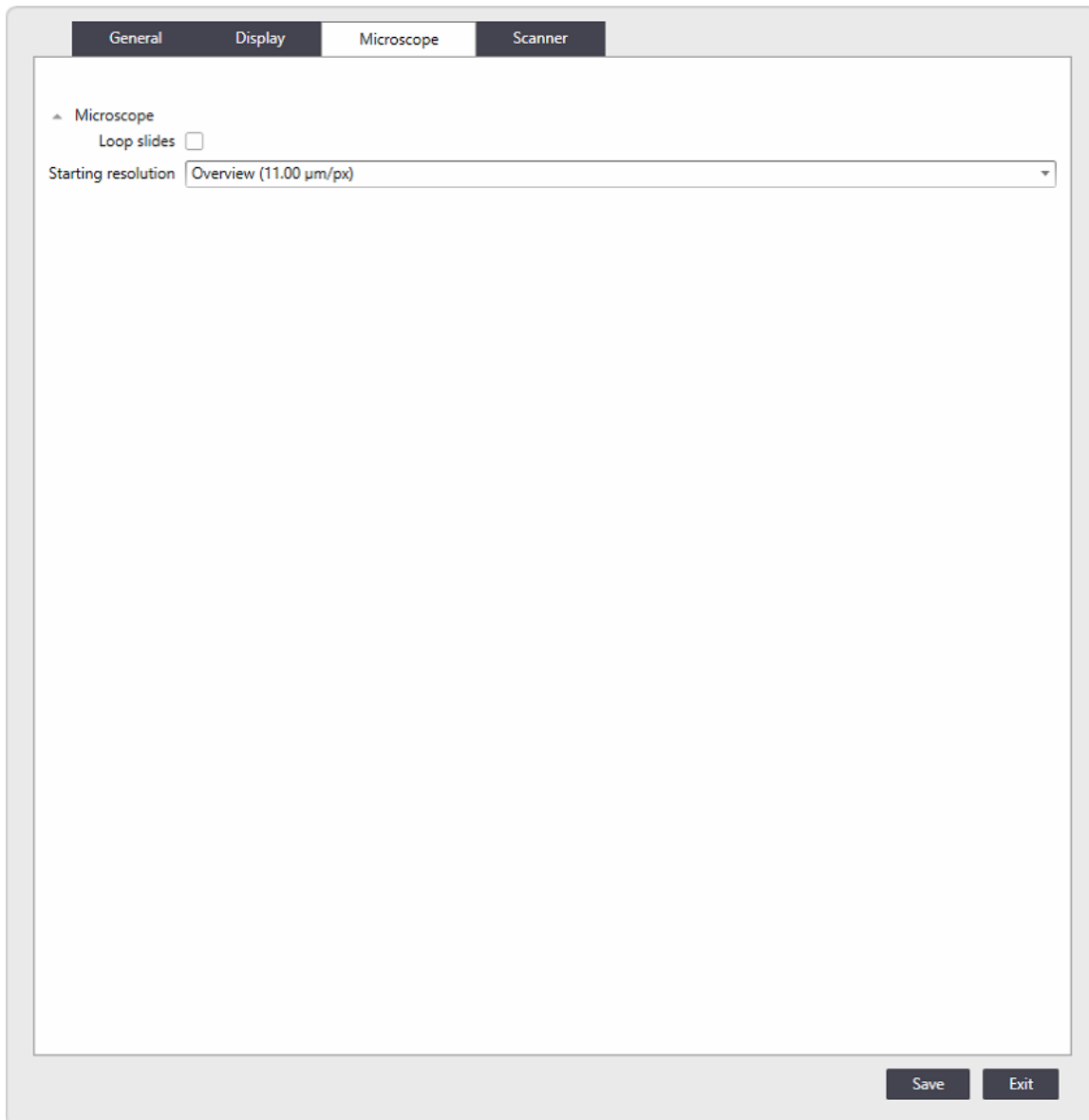
You define if the slide label and other elements in the main view are included in screenshots by default. See [Screenshot Tool](#).

Annotations

Here, default properties for annotations can be set

- ▶ Line width
- ▶ Font style
- ▶ Font size
- ▶ Font family

Microscope



Microscope – Loop Slides

Clicking the **Next** and **Previous** arrows allows examination of the slides present in the instrument one at a time. When loop slides is activated, clicking **Next** at the last slide takes you to the first slide.

Microscope – Starting Resolution

Definition of the initial resolution used in the main view when a new slide is opened.

Scanner

General Display Microscope **Scanner**

▲ Live Scan
 Default resolution
 Default live scan width (mm)
 Default live scan height (mm)

▲ Auto scan

▲ General
 Scan profile name
 Default scan name
 Default scan comment

▲ Scan area
 Automatic tissue detection

Working area
 Width: 16.3 mm
 Height: 12.7 mm

Minimum object size
 Width: mm
 Height: mm

Fixed scanning area
 Width: 12.4 mm
 Height: 8.2 mm

▲ Scan resolution and z-stacks
 Resolution
 Number of layers

Distance between layers (µm)

▲ Post processing
 Eject slide carrier?

Live Scan – Default Resolution

When using the interactive scan function you can choose the resolution/objective used for scanning. Here the default objective is defined in the dialog.

Live Scan – Default Live Scan Width/height (mm)

You can define the default scan area which can then be modified in the interactive scan dialog.

Auto Scan

In this section the profiles are defined which can be used in scanning mode. See [Scanning Mode](#).

The first line is for adding a new profile or selecting an existing profile to change or delete it.

Auto Scan – General

Edit the name of the scan profile.

Set a default name for a scan performed with this profile.

Add a standard comment to the scans performed with this profile.

Scan Area – Automatic Tissue Detection

Scanning mode profiles can define the scan of a fixed area or can perform tissue detection within a defined area. With tissue detection the instrument searches for tissue in the overview image and performs a scan in one or multiple areas with tissue. The area size and position in which tissue is to be detected can be changed by adjusting the colored frame in the slide representation. For tissue detection a minimum object size is defined.

Scan Area – Fixed Scanning Area

You can define the size and position of the fixed scan area by adjusting the colored frame in the microscopy slide representation. The entire area is scanned without tissue detection.

Scan Resolution and Z-planes

You can choose between the available resolutions (objectives) to be used for scanning.

Up to 5 z-planes can be acquired to ensure complete imaging of thicker specimens.

Using the +/- buttons, you can select the distance between z-planes. The Z-distances offered depend on the selected objective.

Post Scanning Options

When this option is checked, the slide tray is ejected automatically after scanning is complete.

Label Recognition

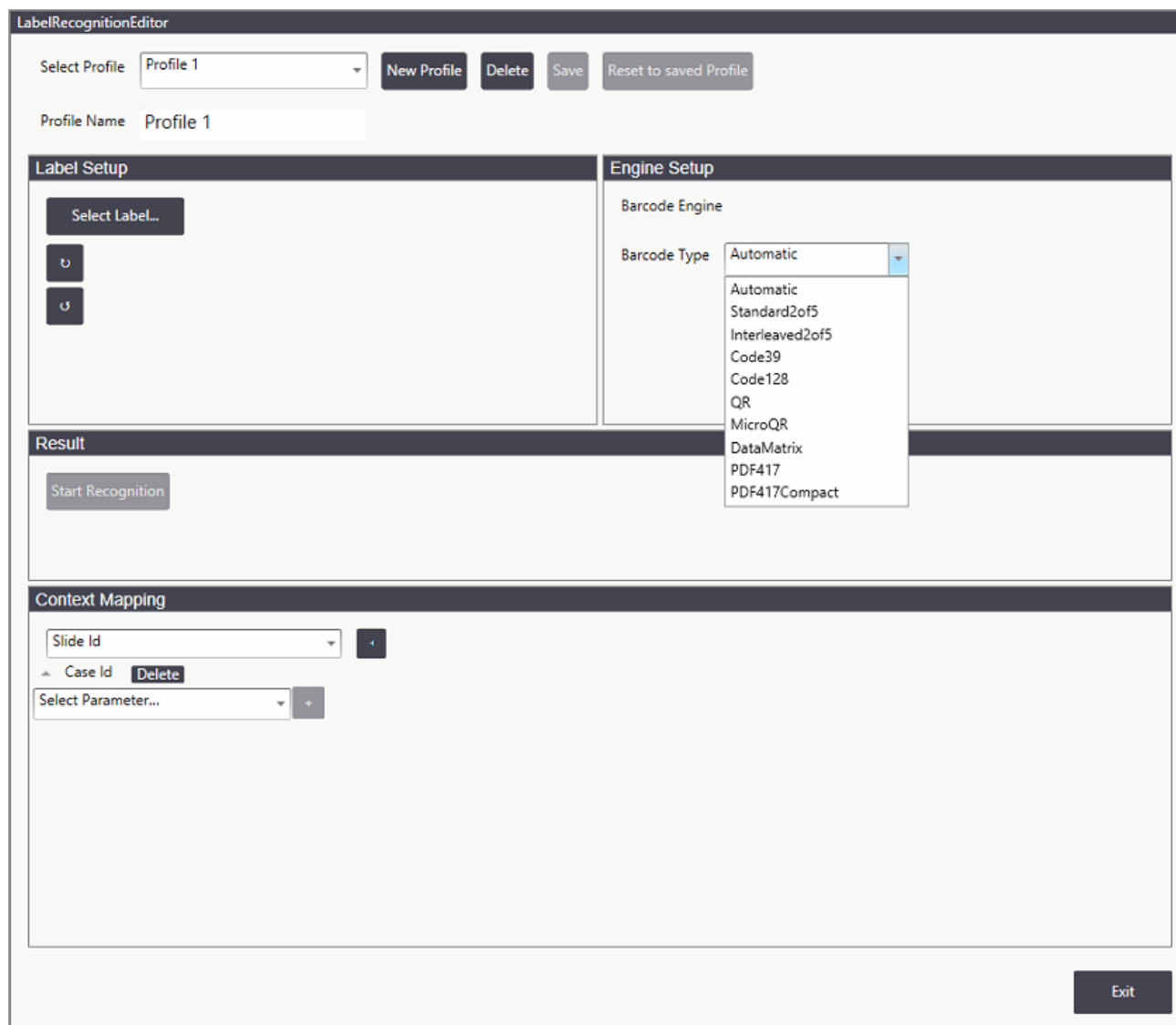
The slide labels are imaged and visible in the [Live View Main Window](#).

Barcodes in the label area can be interpreted. Using barcodes automates the workflow and makes it less error prone. Note that poor quality barcodes can be misinterpreted. Please refer to [Barcode Reading](#).

Barcode profiles can be defined to establish the information fields and content of the barcode.

Barcode Label Recognition Editor

There are a number of different barcode formats available. The Aperio LV1 IVD Live View and Desktop Scanner interprets them and flexibly uses parts of the barcode information. Profiles are used to define the barcode interpretation. Profiles are generated and selected in the settings section ([Label Recognition – Profile](#)) as the instrument's active profile.



To teach the instrument a new barcode, you must create a new profile by using the Settings Label Recognition Editor which is launched from the [Label Recognition](#) section of the Settings General tab.

1. Insert a slide with the new barcode into the instrument and have it read in by the Aperio LV1 IVD application.
2. On the General tab of the Settings window, go to the **Label Recognition** field and click **Editor** to launch the Label Recognition Editor (shown above).
3. Click **New Profile** and enter a descriptive name.
4. Click **Select Label** to review the last 10 labels read in by the Aperio LV1 IVD. Choose a label that contains a barcode by clicking on it.

5. Click the **Barcode Type** drop-down list and select the type of barcode that matches the label barcode.
6. Click **Start Recognition**. The recognized text is presented in the Results Area.

If encountering problems (for example, “Text not found”) you may adjust label orientation or reduce the label area to be interpreted by defining a subframe in the label image using the mouse.

Having interpreted the barcode successfully it is possible to extract parts of the barcode information. In the Context Mapping section

- ▶ Binary barcodes can be converted to a decimal number.
- ▶ Text of interest (TOI) can be extracted from the barcode string.
- ▶ Fixed text can be added to the information read from the barcode.
- ▶ Multiple parts of the barcode and fixed text can be combined using the “Combine Fields” feature.

A Troubleshooting

This appendix contains tips for troubleshooting the most common problems with your instrument.

Troubleshooting Steps

If the information below does not help you fix the problems you are having, for further technical support contact your Technical Services representative. See the front of this guide for contact information for your country.

Symptom	Solution
Slides are locked inside the instrument due to hardware or power failure	Turn off the instrument and unplug the power cord before using the side access door to access the slides. See the end of this appendix for information on removing broken slides.
Barcode information is not parsed successfully into slide information fields	<ul style="list-style-type: none">• Check that the barcode/label matches the profile setup.• Check for bad barcode print quality, mispositioning, dirt.• Check that the barcode recognition has been set up correctly.• Check, that the barcode type is supported.
Slide cannot be focused	<ul style="list-style-type: none">• Check that the slide is face up (label and coverglass up).• Check for dust, scratches, bubbles and residues on the slides. Clean the slides.• Make sure that the slides are prepared appropriately.
No instrument was detected. (no connection between PC and instrument)	<ul style="list-style-type: none">• Check for correct wiring of PC and instrument. Correct and restart the application.• After side door opening: Check that the side door is tightly shut. Restart instrument and application.
Scans and/or slides were skipped during automatic scan run	<ul style="list-style-type: none">• Prefocusing of slides might fail – see “slides cannot be focused”.• Check for correct orientation of slides. The instrument cannot focus on flipped slides.• Check for dust or other residues on the slides. Clean the slides.
Slides from the sample tray are not detected	<ul style="list-style-type: none">• Check for correct orientation of slides.• Check that there is a label on the left side of the slide; labels on the right side of the slide are not read.

Symptom	Solution
The instrument's eject button is not working	This is normal when the application is running: the instrument's eject button is not active to avoid sample removal by accident.
Slide storage hard drive is full.	Free up space on the local hard drive, by uploading slide data or via service maintenance (deleting data).

Opening the Access Door

In case of emergency, you may need to access the inside of the instrument by opening the access door. Please call Leica Technical Services first for assistance and instructions.

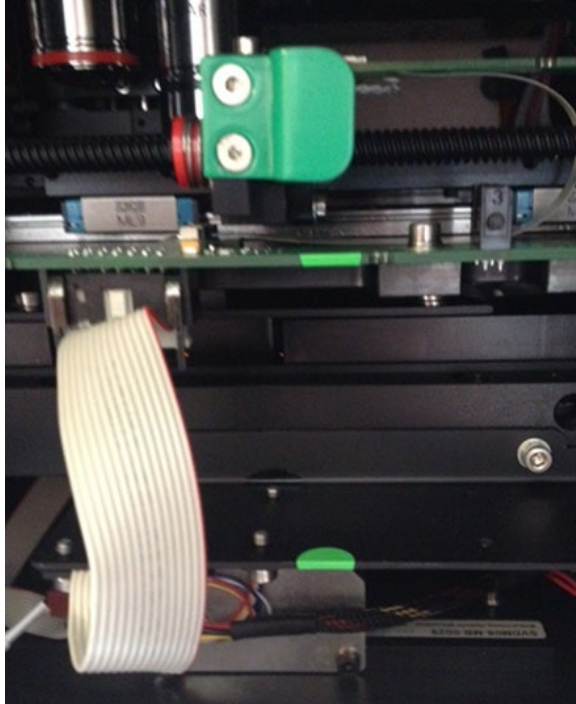
If instructed to open the access door, first turn off the instrument and unplug the power cord. To open the access door, use the hex key attached to the rear of the instrument to unlock the door, then pull the door off.



Do not operate the instrument while the side door is open. Use the hex key to fasten the door closed again when you are done.

Manually Ejecting the Slide Tray

Through the open access door you can see a green handle which you will use to manually push the sample tray into the eject position.



To avoid damage to the XY stage mechanics or housing, bring the stage to a central position first; the central position is reached when the two green stickers attached to the baseplate and upper plate of the stage are vertically aligned. Starting from this position, the stage can be pushed straight toward the instrument's front, until it reaches the eject position.

Cleaning the Scanner Interior

Before cleaning the LV1 IVD interior, call Leica Technical Services (see Customer Support) for assistance and instructions. If significant cleaning needs to be done, do not attempt it yourself, but call Leica Technical Services to arrange service.



Especially when infectious samples were used with the instrument, use the utmost care in removing glass shards and biological material, following your institution's biological safety policies and procedures regarding safely handling biological materials. Turn off power to the scanner and unplug the power cord before opening the side door and placing your hands inside the scanner.

Removal of Broken Slides

Using proper safety protection and procedures, pick up and wipe the visible pieces of any broken slides. Avoid getting fluid inside the instrument. Be careful not to scratch optical surfaces inside the instrument with tweezers or other tools. Use a dry, lint free cloth to take up small glass debris from the instrument XY stage and baseplate. Remove all major glass pieces from the XY stage.
















B Keyboard Shortcuts

This appendix contains the keyboard keys you can use as shortcuts in the Aperio LV1 IVD application.

Key	Action
Escape	<ul style="list-style-type: none">• Deactivate all annotations in current scan/slide• Leave full screen• Leave edit mode in slide name control
Delete	Delete activated annotations in current scan/slide
Page Up/Down	Change focus in current scene
Home/End	Zoom in/out in current scene
Left/Right/Up/Down	Move around in current scene
Shift+Left+Click	Activate an annotation or measurement
Shift+Right+Click	Annotation/measurement property menu
Ctrl+Left+Click	Toggle to full screen for current scene
Alt-F4	Exit the application

Symbols

The following symbols may appear on your product label or in this user's guide:

	ISO 15223-1 – 5.4.3	Consult instructions for use
	ISO 15223-1 – 5.1.1	Manufacturer
	ISO 15223-1 – 5.1.3	Date of manufacture
	ISO 15223-1 – 5.5.1	In vitro diagnostic device
	ISO 15223-1 – 5.1.7	Serial number
	ISO 15223-1 5.3.8	Humidity limitation
	ISO 15223-1 – 5.1.6	Catalog number
	ISO 15523-1 5.7.3	Temperature limit
	ISO 15223-1 – 5.4.1	Biological risks
	2012/19/EU	Device is regulated under 2012/19/EU (WEEE Directive) for Electrical and Electronic Equipment Waste and must be discarded under special conditions.
	ISO 15223-1 – 5.4.4	Caution
	ISO 7010 - W001	General warning
	ISO 7010-W012	Warning: Electricity
	ISO 7010-W017	Warning: Hot surface
	ISO 60417-6040	Ultraviolet radiation, instructional safeguard

www.LeicaBiosystems.com/Aperio

