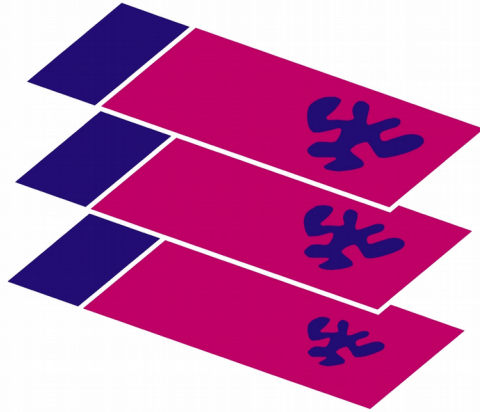




3DHISTECH

**Pannoramic MIDI II**  
**1.23**  
**User's Guide**

June 4, 2018  
Rev. 2

PMII123-UG-Rev2

For research and education uses only, not for use in diagnostic procedures.

# Contents

|                                                                     |           |
|---------------------------------------------------------------------|-----------|
| <b>Disclaimer.....</b>                                              | <b>5</b>  |
| <b>Declaration Of Conformity.....</b>                               | <b>7</b>  |
| <b>Character Formats and Symbols.....</b>                           | <b>8</b>  |
| <b>Notes Regarding Operational Safety.....</b>                      | <b>9</b>  |
| <b>Notes on Warranty.....</b>                                       | <b>11</b> |
| <b>Terms and Abbreviations.....</b>                                 | <b>12</b> |
| <b>1 Product Description.....</b>                                   | <b>13</b> |
| 1.1 Product Overview.....                                           | 13        |
| 1.1.1 Intended Use.....                                             | 13        |
| 1.1.2 Features and Benefits.....                                    | 13        |
| 1.1.3 Warning and Information Labels.....                           | 15        |
| 1.1.4 Base Unit.....                                                | 16        |
| 1.2 System Overview.....                                            | 17        |
| 1.2.1 Pannoramic MIDI II system.....                                | 17        |
| 1.2.2 Hardware Options.....                                         | 18        |
| 1.2.3 Control Software.....                                         | 20        |
| <b>2 Installation.....</b>                                          | <b>22</b> |
| 2.1 Control computer ports.....                                     | 22        |
| 2.2 Connectors and cables.....                                      | 23        |
| 2.3 Coupling the Lumencor SOLA SM II unit with the scanner.....     | 24        |
| 2.4 Coupling the Lumencor Spectra 6 unit with the scanner.....      | 24        |
| <b>3 Operating Slides and Trays.....</b>                            | <b>25</b> |
| 3.1 Preparing Slides and Trays.....                                 | 25        |
| 3.2 Affixing Barcode Stickers to Slides.....                        | 27        |
| 3.3 Inserting and Removing Slides.....                              | 28        |
| <b>4 Software Description.....</b>                                  | <b>30</b> |
| 4.1 Starting / Exiting Pannoramic MIDI II Software Application..... | 30        |
| 4.1.1 Starting the software.....                                    | 30        |
| 4.1.2 Exiting the software.....                                     | 31        |
| 4.2 Options.....                                                    | 31        |
| 4.2.1 Barcode Settings.....                                         | 31        |
| 4.2.2 Image Compensation.....                                       | 35        |

|                                                                           |            |
|---------------------------------------------------------------------------|------------|
| 4.2.3 Microscope Settings.....                                            | 37         |
| 4.2.4 Event Call Settings.....                                            | 42         |
| <b>4.3 Using Brightfield Manual Mode.....</b>                             | <b>46</b>  |
| 4.3.1 Routine work panel.....                                             | 47         |
| 4.3.2 Scan Options window.....                                            | 49         |
| 4.3.3 Preview panel.....                                                  | 51         |
| 4.3.4 Preview area scanned by preview camera.....                         | 54         |
| 4.3.5 Focus panel.....                                                    | 61         |
| 4.3.6 Service panel.....                                                  | 63         |
| 4.3.7 Display field and toolbar for live images.....                      | 64         |
| 4.3.8 Start scan.....                                                     | 66         |
| <b>4.4 Using Brightfield Automatic Mode.....</b>                          | <b>66</b>  |
| 4.4.1 Routine work panel.....                                             | 66         |
| 4.4.2 Barcodes panel.....                                                 | 68         |
| 4.4.3 Preview panel.....                                                  | 72         |
| 4.4.4 Focus panel.....                                                    | 73         |
| 4.4.5 Service panel.....                                                  | 74         |
| 4.4.6 Start scan.....                                                     | 75         |
| <b>4.5 Using Fluorescent Manual Mode.....</b>                             | <b>76</b>  |
| 4.5.1 Routine work panel.....                                             | 76         |
| 4.5.2 Scan Options.....                                                   | 82         |
| 4.5.3 Preview panel.....                                                  | 86         |
| 4.5.4 Hardware panel.....                                                 | 90         |
| 4.5.5 Service panel.....                                                  | 94         |
| <b>4.6 Using Fluorescent Automatic Mode.....</b>                          | <b>94</b>  |
| 4.6.1 Routine work panel.....                                             | 95         |
| 4.6.2 Barcodes panel.....                                                 | 100        |
| 4.6.3 Preview panel.....                                                  | 103        |
| 4.6.4 Focus panel.....                                                    | 105        |
| 4.6.5 Service panel.....                                                  | 105        |
| <b>4.7 Scan To CaseCenter.....</b>                                        | <b>107</b> |
| <b>4.8 Using Profiles.....</b>                                            | <b>112</b> |
| <b>5 Troubleshooting and Maintenance.....</b>                             | <b>114</b> |
| 5.1 Safety Information.....                                               | 114        |
| 5.1.1 Cleaning the device.....                                            | 115        |
| 5.1.2 Cleaning the trays.....                                             | 115        |
| 5.1.3 Preventive maintenance.....                                         | 115        |
| 5.2 Troubleshooting.....                                                  | 116        |
| 5.2.1 Fluorescent Applications (optional).....                            | 118        |
| 5.3 Maintenance.....                                                      | 119        |
| 5.3.1 Opening the protective covers.....                                  | 119        |
| 5.3.2 Removing a slide.....                                               | 120        |
| 5.3.3 Installing and Removing the Filter Module (Fluorescent Option)..... | 122        |
| 5.3.4 Transporting Pannoramic MIDI II.....                                | 123        |

|                                               |            |
|-----------------------------------------------|------------|
| <b>6 Technical Data.....</b>                  | <b>125</b> |
| <b>Appendix – Packaging instructions.....</b> | <b>129</b> |
| Preparations.....                             | 129        |
| Main parts and their accessories.....         | 129        |
| Packaging.....                                | 131        |
| Packing the MIDI II scanner.....              | 133        |
| Packing the accessories.....                  | 133        |
| Closing the package.....                      | 133        |
| Handling of the package.....                  | 134        |
| <b>Index.....</b>                             | <b>135</b> |

## Disclaimer

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Intellectual property related to the 3DHISTECH products are as follows:

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### CAUTION

For research and education uses only, not for use in diagnostic procedures. This product has not been approved or cleared as a medical device by the U.S. Food and Drug Administration or the European Union.

Do not use this device in close proximity to sources of strong electromagnetic radiation (e.g. unshielded intentional RF sources), as these may interfere with the proper operation.

### **Further Information**

For the latest information on 3DHISTECH products and services, please visit our website at the following URL: <http://www.3dhistech.com>.

Or contact the distributor:

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## Declaration Of Conformity

3DHISTECH Ltd. declares that the product Pannoramic MIDI II slide scanner is designed and produced with consideration of specified requirements according to the IEC 61326-2-6:2005 standard, and conforms to the directives and other standards listed below:

IEC 61010-1:2001, "Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements"

IEC 61010-2-101:2002, " Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use

UL 61010-1:2004 R10.08, "Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements"

There is no further operator (user) action required in case of residual risks.

Further information may be obtained from the distributor:

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Runcorn, WA7 1TA

United Kingdom

+44 (0) 800 018 9396

+44 (0) 1928 534 000

## Character Formats and Symbols

|                 |                                                                                                                                                                                                                                                                        |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Example</b>  | Words or characters that appear on the screen. These include field names, screen and window titles, push-buttons and menu names, paths or options.<br><br>Keys on the keyboard. For example, function keys (such as <b>F11</b> ) or the <b>Ctrl+M</b> key combination. |
| <b>Example</b>  | Cross-references within this document or to other documents.                                                                                                                                                                                                           |
| <b>Warning!</b> | It might cause irreversible damage or harm to the user of the product or the product itself if this instruction is not followed.                                                                                                                                       |
| <b>Caution!</b> | It might cause the product to not work properly if this instruction is not followed and alerts to a potential danger situation.                                                                                                                                        |
| <b>Note:</b>    | Calls attention to some important features.                                                                                                                                                                                                                            |

## Notes Regarding Operational Safety

The below section of this User's Guide contains information and warnings of a kind that must be followed by owner/operator personnel.

Warning and advisory symbols which are used on the base unit of the Pannoramic MIDI II and in the section **1.1.3 Warning and Information Labels** have the following meanings:

|                                                                                   |                                                                                          |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
|  | <b>CAUTION</b><br>Disconnect mains plug before any kind of intervention into the device! |
|  | <b>CAUTION</b><br>Crush hazard!                                                          |

The Pannoramic MIDI II, including any of its original accessory components, should not be operated in any other way than described in section **1.1.1 Intended Use**.

Any of the following notes should be strictly observed:

|                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Warning!</b>                                                                                     | If operating the device other than specified by the manufacturer, the level of safety will decrease.                                                                                                                                                                                                                                                                            |
|  <b>Caution!</b> | In the event of any non-conforming type of use, including non-conforming use of assemblies or single parts, no liability will be assumed by the Manufacturer. This shall also apply to service or repair work of any kind, which is performed by other than authorized service personnel. All claims for warranty and warranty services will be null and void in any such case. |
| <b>Note:</b>                                                                                        | The safety level of the equipment after servicing will be identical with level of the original equipment.                                                                                                                                                                                                                                                                       |
|  <b>Warning!</b> | Insert the power cord plugs only into a grounding outlet. The protective action must not be rendered ineffective by extension cables without protective conductor. The Pannoramic MIDI II has a built-in protection which must not be rendered ineffective by extension cables without protective (earth-ground) conductor.                                                     |
| <b>Warning!</b>                                                                                     | The operation of the instrument in explosion-risk environments is not allowed.                                                                                                                                                                                                                                                                                                  |
|  <b>Warning!</b> | If protective devices are found to be ineffective, the Pannoramic MIDI II must be shut down and precautions must be taken to prevent unintended usage. For necessary repair work or work to restore proper operating condition, you should contact the Thermo Fisher Scientific Customer Service.                                                                               |

|                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Note:</b>            | Electric power to the Pannoramic MIDI II is supplied via an external mains power supply unit. It allows for operation at line voltages in the range of 100 V to 240 V $\pm 10\%$ , 50/60 Hz, without any extra facilities required for voltage transformation.                                                                                                                                                         |
|  <b>Warning!</b>         | Check that your local line voltage is compatible with Pannoramic MIDI II specifications before you turn power on.                                                                                                                                                                                                                                                                                                      |
|  <b>Disconnect plug!</b> | Remember to unplug the power cord before you open the Pannoramic MIDI II base unit for maintenance!                                                                                                                                                                                                                                                                                                                    |
|  <b>Warning!</b>         | Only connect external devices to the instrument which are approved to avoid the risk of electrical shock.                                                                                                                                                                                                                                                                                                              |
|  <b>Warning!</b>         | The Pannoramic MIDI II does not include any special facilities to protect from samples with an etching, potentially infectious, toxic, radioactive or other health-damaging effect. You are under obligation to comply with all currently binding legislation, notably, national accident prevention rules when handling samples of this kind.                                                                         |
|  <b>Caution!</b>        | Dirt or dust may adversely impact the operating capability of the Pannoramic MIDI II. For this reason, measures must be taken to eliminate such influences to a maximum possible degree. During periods of non-use, the Pannoramic MIDI II must be protected with a dust cover. Check that power is turned off before you put the cover on.                                                                            |
|  <b>Caution!</b>       | Do not position the equipment so that it is difficult to operate and to disconnect the device if necessary.                                                                                                                                                                                                                                                                                                            |
|  <b>Crush hazard!</b>  | There is crush hazard in the movement area of the slide insert during operation. Please note that the digitizing process has to be interrupted and the insert moved via software to the output position before removing the insert.                                                                                                                                                                                    |
|  <b>Warning!</b>       | A defective Pannoramic MIDI II is not classified as domestic waste. It must be properly disposed in accordance with currently valid legal requirements.                                                                                                                                                                                                                                                                |
|  <b>Warning!</b>       | The Pannoramic MIDI II may not be operated by other than properly instructed persons. Operating personnel must be fully aware of the potential dangers which a particular field of application involves. The Pannoramic MIDI II is a precision instrument which may suffer a significant reduction in operational functions or even physical destruction following intervention performed in any nonconforming manner. |
|  <b>Warning!</b>       | If a Lumencor SOLA SM II fluorescent illumination unit is used, the corresponding warnings included in the manufacturer's operating manual have to be observed.                                                                                                                                                                                                                                                        |

## Notes on Warranty

We at Thermo Fisher Scientific are proud of our quality, reliability and of our after-sales service. We continuously strive to improve our service to our customers.

Please ask a Thermo Fisher Scientific representative about Service Contracts which can keep your purchase in peak condition for many years to come.

Warranty provisions necessarily vary to comply with differences in national and regional legislation. Specific details can be found in the delivery documentation or from your dealer or representative.

Please note that your warranty may be invalidated if:

- This instrument is modified in any way.
- Accessories and reagents which have not been approved by Thermo Fisher Scientific are used.
- The instrument is not operated or maintained in accordance with the instructions in the Operator Guide.

## Terms and Abbreviations

|                              |                                                                                                                                                                                                                                                                                                     |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CSV</b>                   | Comma Separated Value                                                                                                                                                                                                                                                                               |
| <b>FOV</b>                   | Field of View                                                                                                                                                                                                                                                                                       |
| <b>NA</b>                    | Numerical Aperture                                                                                                                                                                                                                                                                                  |
| <b>Virtual Slide / Slide</b> | <p>A digital image of a thin glass plate on which specimens are mounted for microscopic study:</p> <p>a dynamic, interactive image that you can manage, save, magnify, zoom, name, evaluate, annotate, mark, comment, send to a colleague electronically for co-operation or advice, and so on.</p> |

# 1 Product Description

## 1.1 Product Overview

### 1.1.1 Intended Use

The Pannoramic MIDI II is designed to use transmitted light and reflected light fluorescence to digitize biological samples and specimens (histological sections, typically).

**Warning!**

After each scanning make sure to inspect the digital slide for over-exposed areas. In case the slide is scanned based on improperly set parameters, it can highly affect the results because of information loss.

**Warning!**

Any modification to a hardware or software component of the PC will highly affect the functionality of the scanner program.

### 1.1.2 Features and Benefits

The Pannoramic MIDI II offers world class brightfield and fluorescent whole slide scanning on up to 9 channels. An outstanding 0.12  $\mu\text{m}/\text{pixel}$  (in Brightfield) and 0.16  $\mu\text{m}/\text{pixel}$  (in Fluorescent) resolution is achieved with the 40 $\times$ /0.95 NA (equivalent to 80 $\times$  magnification) Plan-Apochromat objective.

Key features of the Pannoramic MIDI II scanner:

- A single monochrome camera is used both for Brightfield and Fluorescent scanning
- LED-based RGB illumination unit
- Up to 9 freely selectable color filters for fluorescence
- High-end fluorescent illumination device – Lumencor SPECTRA 6 Light Engine
- Multiband filter support

- FL scanning with a low noise, 16-bit scientific CMOS pco.edge 4.2 camera
- New software-aimed flat-field correction compensation method to create homogenous slide image
- 12 slide automatic loading and scanning
- Improved permanent autofocus
- Compact and robust device
- Good quality and stable manufacturing
- 3MP camera for barcode reading and preview image
- Image sharpening (for both Fluorescence and Brightfield) feature to improve the visual appearance of digital slides
- Focus algorithm finds the focus which is most appealing to the human eye

Pannoramic MIDI II is an optimal choice for customers who want to scan in brightfield and in fluorescent mode where the quantity of scanned slides will be regularly over 10 slides per day. It has the best price/performance ratio with a reliable loading/scanning mechanism.

### 1.1.3 Warning and Information Labels

The following figure contains the labels used on the Pannoramic MIDI II main unit, the external mains power supply unit, and the Lumencor SOLA SM II illumination unit.

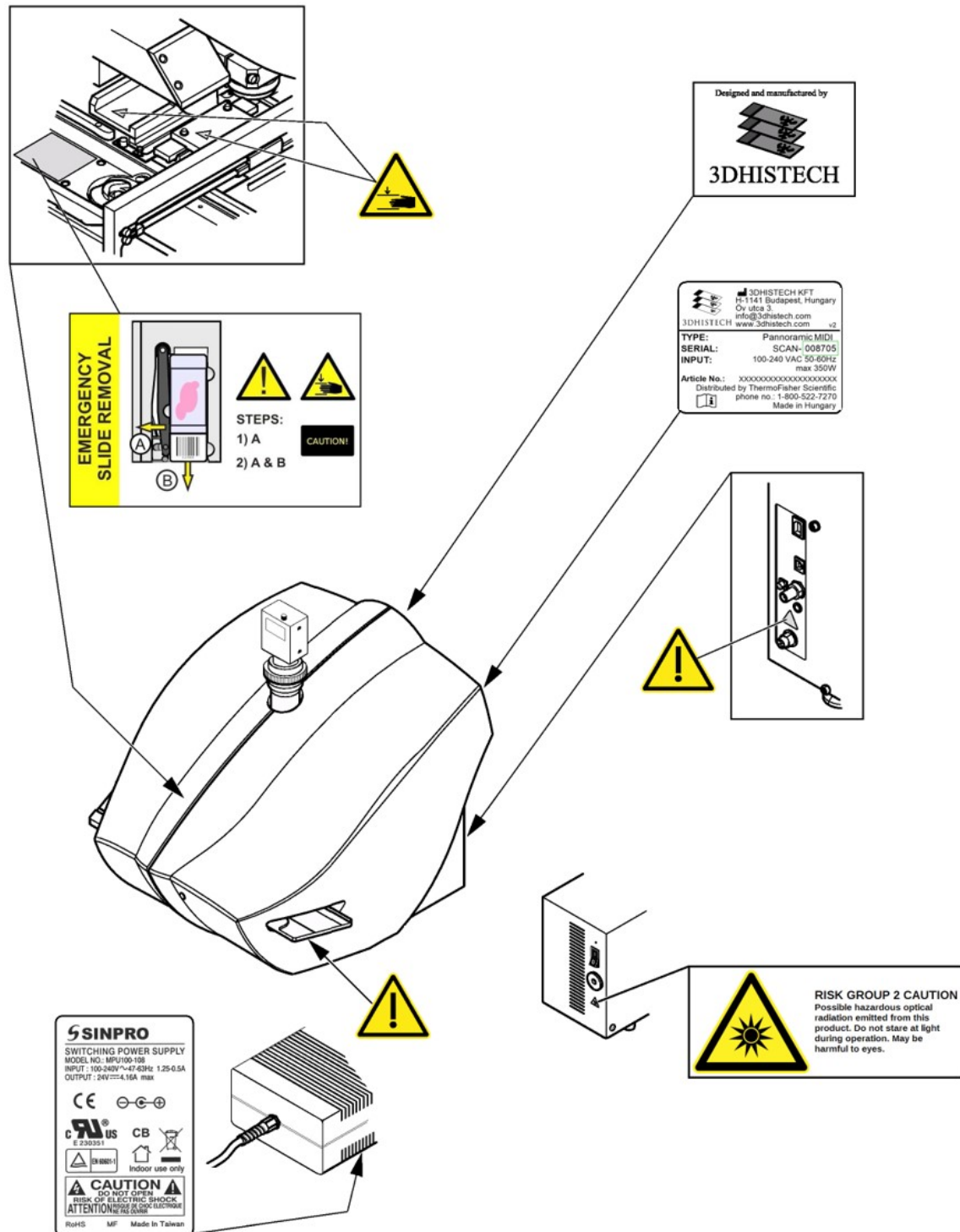


Figure 1 – Warning and information labels

### 1.1.4 Base Unit

The following figure shows the main parts of the base unit.

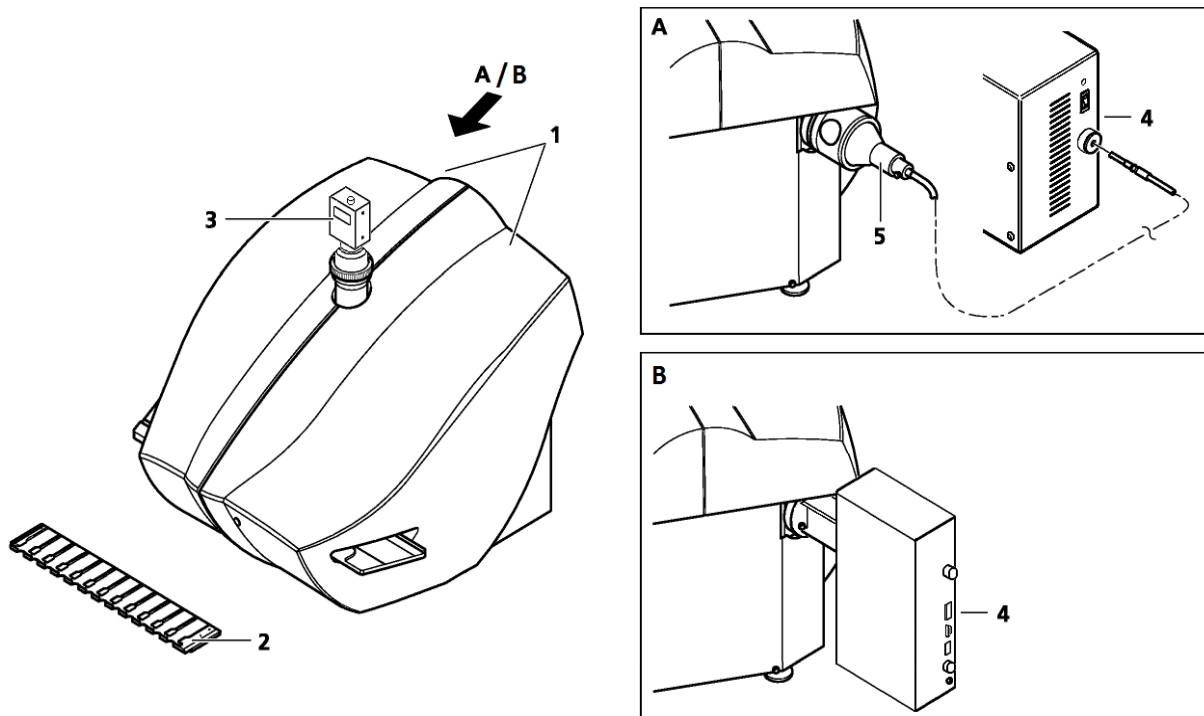


Figure 2 – Main parts of base unit

1. Protective covers
2. Slide tray
3. Point Grey Grasshopper 3 or pco.edge 4.2 camera

#### Fluorescent option A

4. Lumencor SOLA SM II fiber-coupled illumination unit (can be used with Point Grey Grasshopper 3 camera only)
5. Lumencor illumination adapter and cable

#### Fluorescent option B

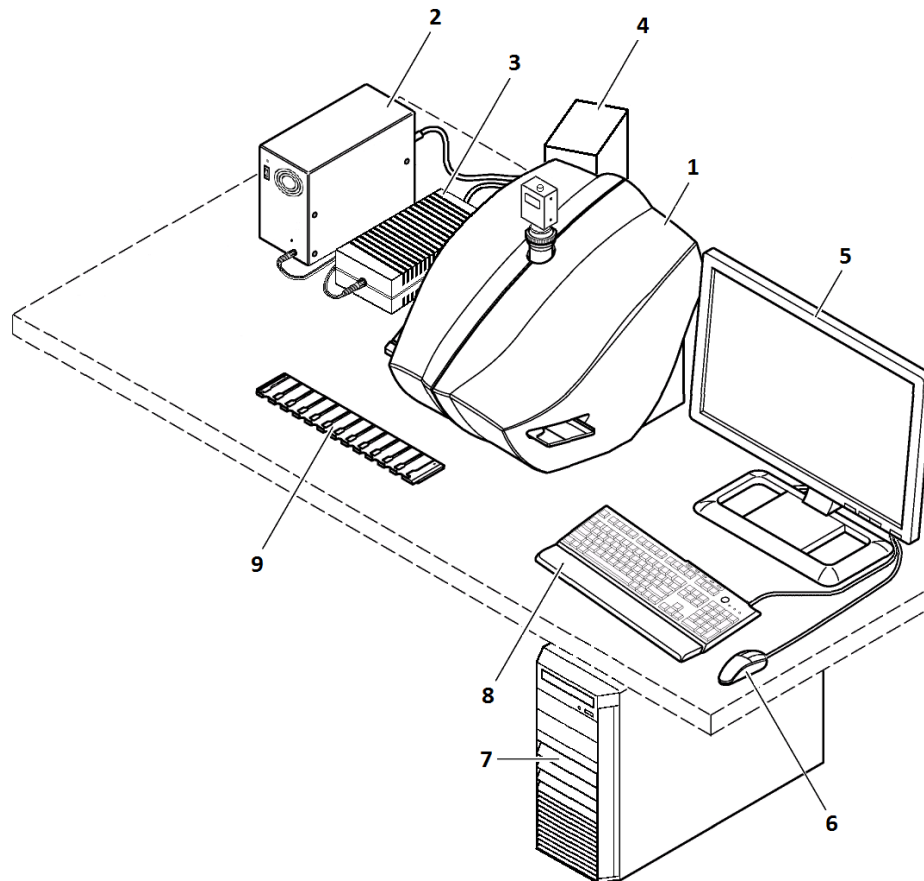
4. Lumencor SPECTRA 6 Light Engine fiber-coupled illumination unit

## 1.2 System Overview

The standard scope of delivery of the product includes the following hardware and software components.

### 1.2.1 Pannoramic MIDI II system

The following figure shows the main parts of the Pannoramic MIDI II system.



**Figure 3 – Pannoramic MIDI II system overview**

1. Pannoramic MIDI II base unit
2. SOLA SM II fiber-coupled illumination unit (option)
3. 24 V power supply
4. Lumencor SPECTRA 6 Light Engine illumination unit (option)
5. Monitor
6. Mouse
7. Control computer
8. Keyboard
9. Slide tray

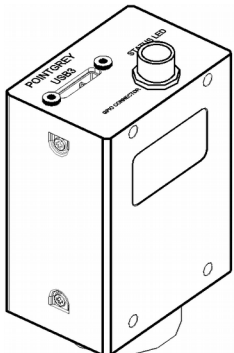
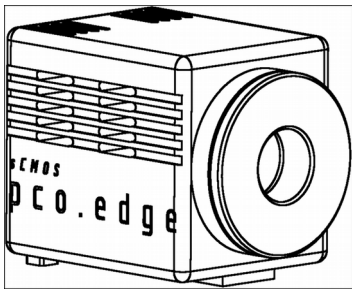
## 1.2.2 Hardware Options



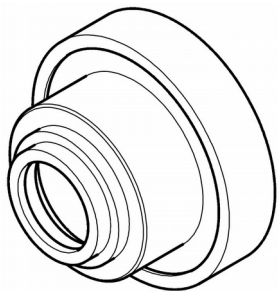
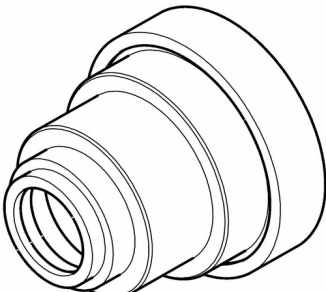
### Note:

The configuration of the control computer and monitor can vary depending on the product order.

### Cameras

|                                                                                     |                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | <p><b>Point Grey Grasshopper 3</b></p> <p>1 CCD monochrome camera for high-quality sensitive fluorescent applications.</p>                                                                                                         |
|  | <p><b>pco.edge 4.2</b></p> <p>Equipped with a high-quality sCMOS image sensor for fluorescent applications allowing fast scanning and an outstanding low read out noise. High quantum efficiency, cooled with Peltier element.</p> |

### Camera adapters

|                                                                                     |                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |
| <p>0.63× adapter (for Point Grey Grasshopper 3 only)</p>                            | <p>1× adapter</p>                                                                    |

**Warning!**

The installation of the cameras in Pannoramic MIDI II must be carried out by trained professionals!

In any other case the warranty will be automatically voided. The supplier or distributor is not liable for any damages caused by an installation carried out by an unauthorized person.

**Base Unit options**

- Pannoramic MIDI II Basic Scan Option / Fast Option – base unit equipped with Point Grey Grasshopper 3 camera for Brightfield scanning (no fluorescent accessories included)
- Pannoramic MIDI II Basic Brightfield and Fluorescence Option – base unit completely equipped with Point Grey Grasshopper 3 camera and Lumencor SOLA SM II (non-triggered) or Lumencor SPECTRA 6 fluorescent illumination unit, with filters for fluorescence scanning
- Pannoramic MIDI II Advanced Brightfield and Fluorescence Option – base unit completely equipped with pco.edge 4.2 camera and Lumencor SPECTRA 6 fluorescence illumination unit, trigger cable and filters for fluorescence scanning

**NOTE:** If Lumencor SPECTRA 6 unit is ordered, the custom light source and filter modules can be variable. For more information, contact Thermo Fisher Scientific customer service.

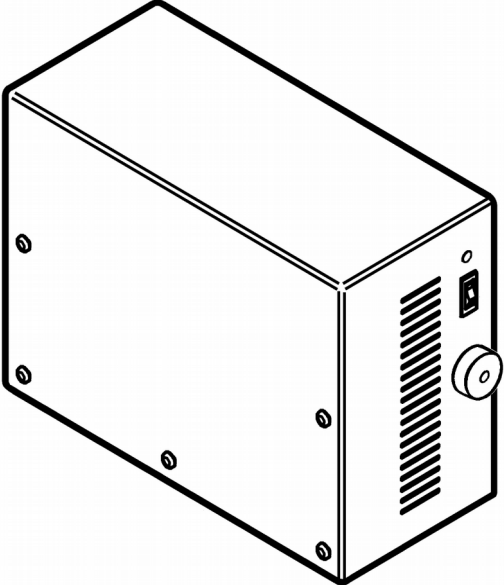
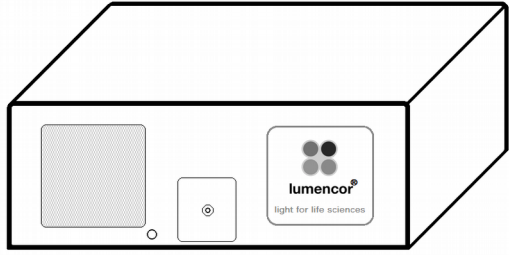
**Objectives**

- Plan-Apochromat 20×/NA 0.8
- Plan-Apochromat 40× Corr/NA 0.95

**Warning!**

Do not change correction collar settings on 40×/NA objective, if you need it to be set, contact customer service.

**Fluorescent Option for Pannoramic MIDI II**

| Fluorescent illumination unit                                                      | Description                                                                                                      |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|   | <p>Lumencor SOLA SM II Fluorescent illumination unit (can be used with Point Grey Grasshopper 3 camera only)</p> |
|  | <p>Lumencor SPECTRA 6 Light Engine illumination unit</p>                                                         |

**1.2.3 Control Software**

- **Pannoramic Scanner control software**

Optional:

- Fluorescence
- Extended focus
- Z-stack
- Barcode reader (licensed feature)

- **Pannoramic Viewer software (fully functional)**

Optional:

- CaseCenter
- TMA module
- 3D Reconstruction module
- QuantCenter, HistoQuant, NuclearQuant, MembraneQuant, CISHQuant, FISHQuant, and DensitoQuant modules
- TumorBoard module
- E-School Encoder

## 2 Installation



### Warning!

The installation of Pannoramic MIDI II must be carried out by a trained professional! In any other case the warranty will be automatically voided. The supplier or distributor is not liable for any damages caused by an installation carried out by an unauthorized person.

Only qualified service assistants are allowed to install the hardware and software. The product is ready for use after installation.



### Caution!

Make sure that the device is placed so that there is enough space for ventilation and for safe and efficient operator maintenance.

### 2.1 Control computer ports

The following figure shows the location of the connectors in order to enable easier transportation of the product for a short distance, by disconnecting cables and detaching hardware components from each other.

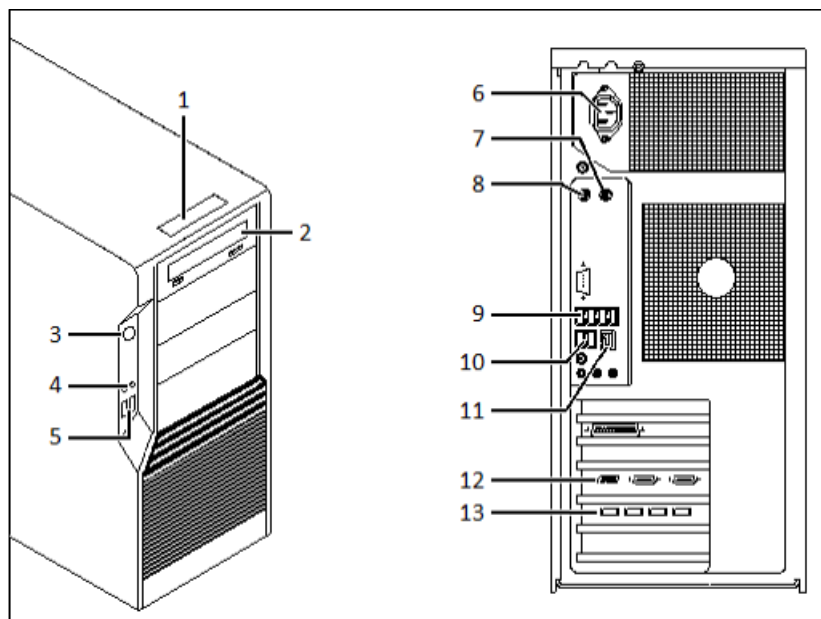


Figure 4 – Ports on control computer

1. Status display
2. DVD drive (RW)
3. Power on/off button
4. Earphone and microphone 3.5mm Jack ports
5. 2x USB port
6. Power supply connector
7. PS/2 mouse port
8. PS/2 keyboard port
9. 4x USB port
10. 2x USB port
11. Network port
12. Matrox Radiant eCL CameraLink ports (for pco.edge 4.2 camera)
13. 4x USB 3.0 ports for Point Grey Grasshopper 3 camera

## 2.2 Connectors and cables

- Control – USB (between scanner and control computer)
- Preview camera – USB cable (between scanner and control computer)
- Point Grey Grasshopper 3 – USB 3.0 cable (between Point Grey Grasshopper 3 camera and control computer)
- pco.edge 4.2 – a pair of CameraLink cables (between pco.edge 4.2 camera and control computer)
- Video cable (between monitor and control computer)
- Power supply cable (between 230V/110V and monitor)
- Power supply cable (between 230V/110V and Lumencor SPECTRA 6 unit)
- Power supply cable (between 230V/110V and control computer)
- Power supply cable (between 230V/110V and external power supply unit)
- Power supply cable (between 230V/110V and Lumencor SOLA SM II fluorescent illumination unit)
- Power supply cable (between 230V/110V and pco.edge 4.2 camera)
- Optical cable (between Lumencor SOLA SM II fluorescent illumination unit and scanner)
- Trigger cable (between pco.edge 4.2 or Point Grey Grasshopper 3 camera and Lumencor SPECTRA 6 fluorescent illumination unit)
- USB-to-RS232 serial communication cable (between Lumencor SPECTRA 6 fluorescent illumination unit and control computer)

**Warning!**

Only connect external devices that are safety extra low voltage rated to the instrument to avoid the risk of electrical shock.

## 2.3 Coupling the Lumencor SOLA SM II unit with the scanner

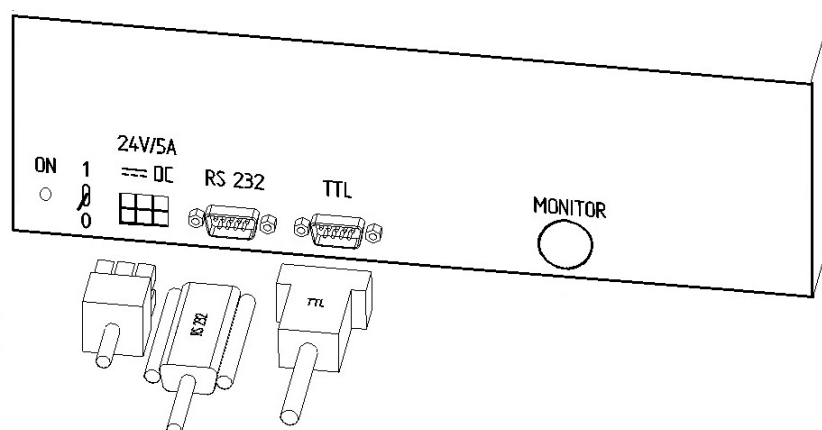
To operate the Lumencor SOLA SM II fluorescent illumination unit, it has to be connected to the Pannoramic MIDI II base unit.

1. Turn the control computer and the Pannoramic MIDI II unit off.
2. Connect both ends of the fiber optic cable to the coupling ports of the scanner and the illumination unit (see **Figure 2 – option A**).
3. Connect power supply cables both of the scanner and the illumination unit.

## 2.4 Coupling the Lumencor Spectra 6 unit with the scanner

To operate the Lumencor Spectra 6 Light Engine fluorescent illumination unit, it has to be attached to the Pannoramic MIDI II base unit, and connected to the camera, and the control computer with cables.

1. Turn the control computer and the pco.edge 4.2 camera off.
2. Attach Lumencor SPECTRA 6 fluorescent illumination unit to the coupling adapter of the Pannoramic MIDI II scanner (see **Figure 2 – option B**).
3. Connect power supply cables both of the scanner and the illumination unit.
4. Connect TTL trigger cable between pco.edge 4.2 camera (out 4) or Point Grey Grasshopper 3 camera and the Lumencor SPECTRA 6 unit (TTL port), and USB-to-RS232 communication cable between the Lumencor SPECTRA 6 unit and the computer.



**Figure 5 – Lumencor SPECTRA 6 Light Engine connecting ports**

## 3 Operating Slides and Trays

### 3.1 Preparing Slides and Trays

This section demonstrates how to prepare slides and trays. You may use slides and coverslips that meet the following specifications:

|                  | Slides              | Coverslips                                              |
|------------------|---------------------|---------------------------------------------------------|
| <b>Length</b>    | 75.0 to 76.0 mm     | max. 50 mm                                              |
| <b>Width</b>     | 25.0 to 26.0 mm     | max. 24 mm (recommended: 22 mm)                         |
| <b>Thickness</b> | 0.9 to 1.2 mm       | No. 1 and No. 1.5 (0.13 to 0.16 mm and 0.16 to 0.19 mm) |
| <b>Corners</b>   | 45° beveled corners |                                                         |
| <b>Edges</b>     | Polished or cut     |                                                         |

**Warning!**

Always wear personal protective equipment (safety goggles, gloves and coat) when working with biohazardous material or slides.

**Warning!**

Do not use a slide when it is broken or its edges are not properly cut or grounded. Using such slides can lead to injury.

**Warning!**

Ensure that no part of the mounted coverslip protrudes from the edges of the slide.

Use slides with completely dried embedding medium only. Otherwise, the coverslip can be shifted that makes slide loading less reliable. Not completely dried embedding might also influence the operation of objectives and other device parts.

**Caution!**

Do **NOT** scratch any circular marker onto the glass surface of a slide, use a soft tip pen instead for marking area of interest.

**Note:**

The distance between slide edges and the edges of the mounted coverslip should be 1-2 mm, and they should be parallel with each other.

**Note:**

Fluorescent signals become more easily detectable for the scanner, therefore resulting in a brighter and better image, by treating the slide with a formula that prevents rapid photobleaching of fluorescent reagents (e.g. VECTASHIELD® Fluorescent Mounting Medium by **Vector Laboratories** and ProLong® Gold and *SlowFade*® Gold antifade reagents by **Invitrogen**) during the FISH protocol.

For further information, see the homepages of the manufacturers:  
<http://www.vectorlabs.com/> and <http://www.invitrogen.com>.

## 3.2 Affixing Barcode Stickers to Slides

This section describes how to affix barcode stickers to slides. Barcodes enable virtual slide identification.

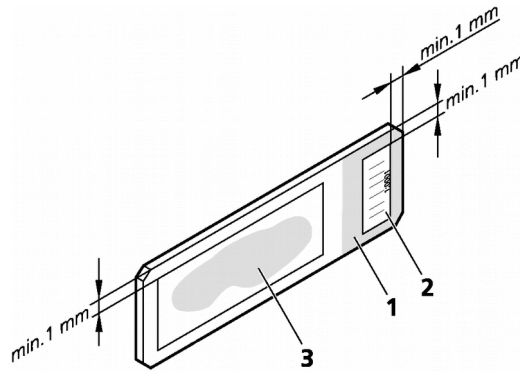


Figure 6 – Slide with a barcode sticker

The label area is recorded by the preview camera, and can be displayed by the control and viewer software.

To affix barcode stickers to slides, do the following:

1. Peel off the barcode sticker **(2)** from the roll.
2. Stick it on the colored label area **(1)** of the slide, on the specimen side.



### Caution!

Ensure that a marginal space of 1-2 mm remains on all sides between the sticker and the label area outer limits. It is vital for barcode identification. Do not let barcode sticker protrude from slide edges, or stick on the coverslip surface **(3)**.

**The thickness of the barcode sticker on the slide must not exceed 0.4 mm!**

Do not stick more than **four** barcode stickers over each other and the overall thickness must be kept below 1.65 mm (including the barcodes and the slide).

### 3.3 Inserting and Removing Slides

To insert slides into a tray

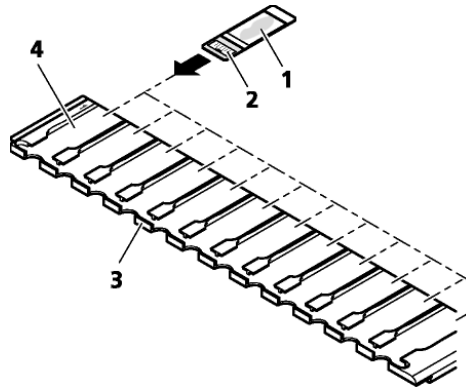


Figure 7 – Inserting slides into a tray

A tray can contain a maximum of 12 slides.

- Push a slide (1) into the desired slot (4) of the tray (3) with its barcode end (2) first.



**Caution!**

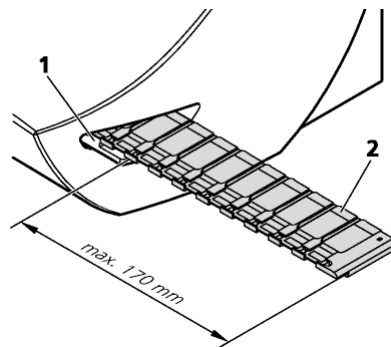
Incorrect slide insertion may break the glass. Always make sure that slides are correctly inserted in the tray. The edge of the broken area of the slide is sharp and its removal can lead to injury and contagion! Broken slide can be removed only by a well-trained person!

Only original 3DHISTECH trays are allowed for use with Pannoramic MIDI II!



**Note:**

The coverslip and the label area should be on the top.

**To insert and remove trays****Figure 8 – Inserting the tray**

1. Insert the tray (2) that contains at least one slide into the opening (1) on the right side of the device. Push it until it cannot be pushed further.
2. After digitizing slides, the tray is moved to the output position where it can be removed.

**Caution!**

To insert or remove a filled tray from the device, or when transporting it, slightly tilt it to its closed side to prevent the slides from accidentally falling out.

Inserts should always be kept clean from dust, broken glass and other mounting media residues. Slides will only operate safely and properly, if trays are clean.

**Caution!**

Do not place objects near the device, or in the movement area of the slide tray.

**Warning!**

Do not reach into the movement area of the tray while slides are digitized. It can move partly out of the device during the digitization process both to the right or the left sides (around 25-30 cm).

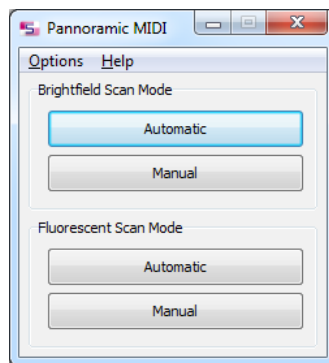
## 4 Software Description

### 4.1 Starting / Exiting Pannoramic MIDI II Software Application

#### 4.1.1 Starting the software

For the scanning software you can choose from different scanning modes at the startup of the program.

1. To start the program, double-click on the program icon on the desktop or start it from **Start \ Program Files \ 3DHISTECH \ Pannoramic Scanner**
2. During start-up, all motors, the preview camera and the scan camera are initialized.
3. The Mode selection window is displayed.



**Figure 9 – Mode selection window**

The selection window displays two **Brightfield** and **Fluorescent** scan modes:

- **Automatic**
  - for digitizing multiple slides
- **Manual**
  - for digitizing individual slides
  - where contrast ratio is critical due to specimen staining and where ideal parameters need to be determined for subsequent use in **Automatic** mode
  - if profiles need to be defined for the **Automatic** mode

**Note:**

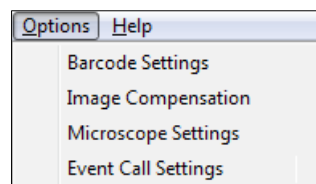
It is recommended to use specimens with identical staining for a given tray in Automatic mode.

### 4.1.2 Exiting the software

If you close a mode or one of the options window the Mode selection window turns active again. To exit the software, click **X** in the title bar of the Mode selection window.

## 4.2 Options

The **Options** menu can be activated from the main menu of the Mode selection window.



**Figure 10 – Options menu**

### 4.2.1 Barcode Settings

Barcode settings can be modified in the Barcode Settings window. By predefining barcode type, foreground color (black or white – the color of the barcode), and other settings, you enable the **Read Barcode** option when using the control software.

**Note:**

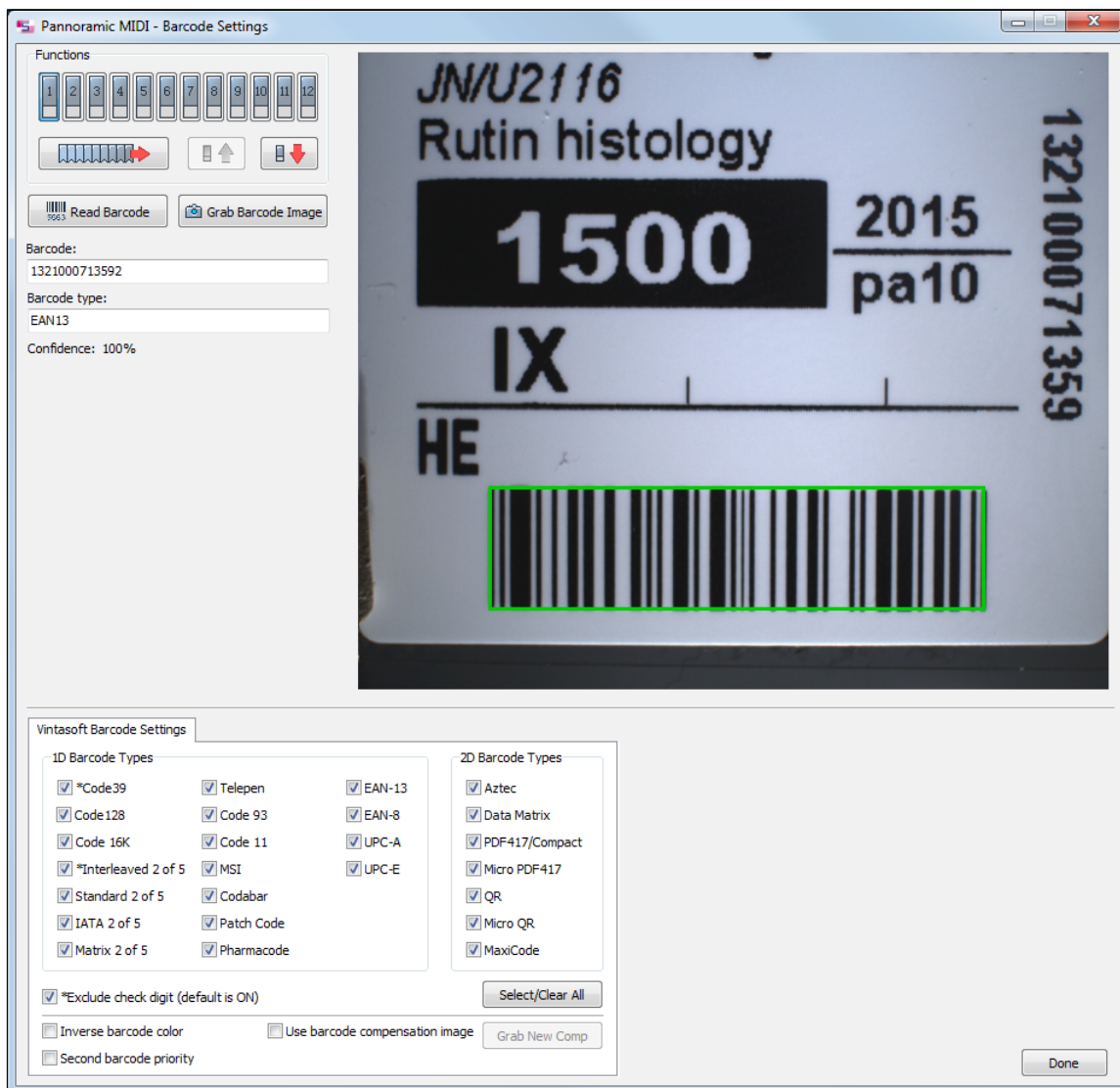
You can only scan the barcode type that you have previously set. If you want to read several barcode types, you always have to set the current barcode type before reading it.

#### Functions

- To move a slide to the loading position, click the number of the slide that you want to load



- To load a slide from the tray to the specimen holder, click  . A preview image is automatically generated.
- To unload the slide, click  .
- To remove the tray, click  . It will then be moved to the position where you can remove it manually.



**Figure 11 – Barcode settings**

To display an image of the barcode area, click  . You can redefine the barcode reading area by dragging the edges of the green square.

To check whether the barcode reading settings are correct, display the barcode digits in the **Barcode** field by clicking  .

**Note:**

If you did not set the barcode type correctly, or there is no barcode in the barcode area, the software will display the following error message: *"Barcode detection unsuccessful! There might be no barcode present."*

### 1D Barcode Types

You can select the following 1D barcode types:

- \*Code 39
- Code 128
- Code 16K
- \*Interleaved 2 of 5
- Standard 2 of 5
- IATA 2 of 5
- Matrix 2 of 5
- Telepen
- Code 93
- Code 11
- MSI
- Codabar
- Patch Code
- Pharmacode
- EAN-13
- EAN-8
- UPC-A
- UPC-E

## 2D Barcode Types

You can select the following 2D barcode types:

- Aztec
- Data Matrix
- PDF417/Compact
- Micro PDF417
- QR
- Micro QR
- MaxiCode

### Exclude check digit (default is ON)

If activated, the check digit value (last digit of the barcode), an additional checking number of the barcode will also be analyzed as a barcode number.

### Inverse barcode color

Activate to invert foreground and background colors of the barcode.

### Second barcode priority

The software is capable to read two barcodes at the same time. If activated, the second barcode will be the barcode used for slide identification.



#### Note:

When having two barcodes on the slide, barcode layout must be consequential.

## Barcode Image Compensation

Activate **Use barcode compensation image** to use the previously created compensation image for scanning the label area. The compensation image improves the effectiveness of barcode reading.

1. Prepare a slide with a label area covered fully by a white sticker.
2. Take a new compensation image of the blank barcode sticker by clicking .

## 4.2.2 Image Compensation

You can use a saved compensation image whenever compensation-related issues occur (deriving from the slide, illumination, staining or embedding medium irregularities). To set compensation parameters properly, follow the instructions below.

By moving the mouse cursor over the  buttons, the software displays information about the setting you are interested in.

### Brightfield Compensation

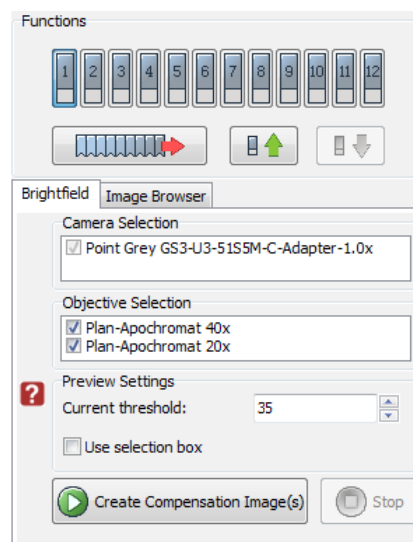


Figure 12 – Brightfield Compensation

#### Camera Selection

This field displays the active camera. Currently, there is only one active camera for Brightfield mode.

#### Objective Selection

This field displays the objective used for scanning.

## Preview Settings

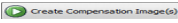
There might be specks or minor etches on the surface of the compensation slide that require modifying the threshold settings. Therefore, the scanner will not use those areas for the creation of the compensation images.

- **Current threshold**

To modify the threshold settings, set the desired threshold level in the box.

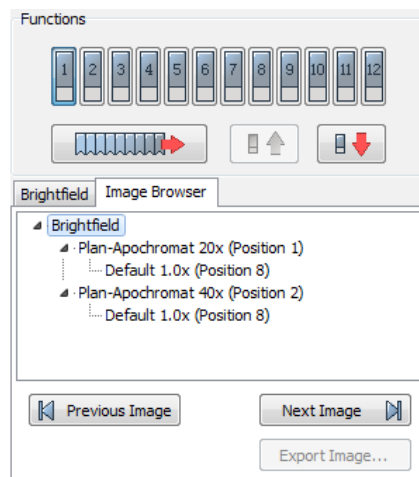
- **Use Selection Box**

Select this if you have a compensation slide that has only certain predefined areas for creating compensation images.

To create the compensation image(s), click . Click the **Stop** button to interrupt the process. The **Progress** bar at the bottom of the window displays the progress of the compensation image creation.

## Image Browser

This function displays the created compensation image.

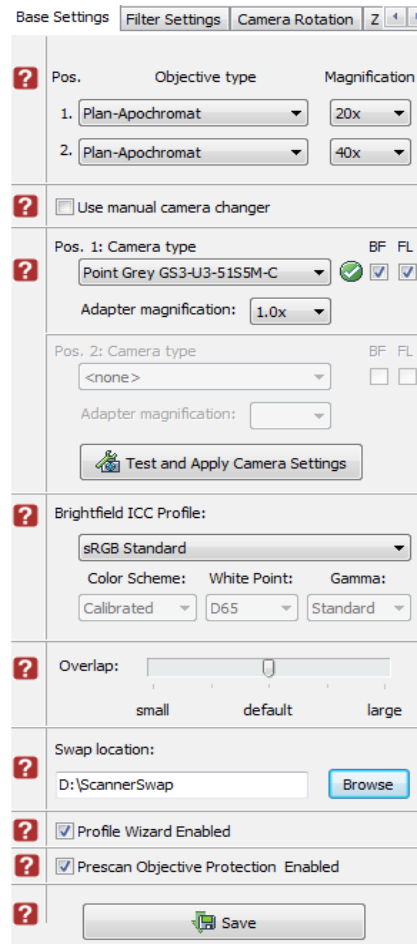


**Figure 13 – Image Browser**

### 4.2.3 Microscope Settings

By moving the mouse cursor over the  buttons, the software displays information about the setting you are interested in.

#### Base Settings



Base Settings | Filter Settings | Camera Rotation | Z  

 Pos. Objective type Magnification

1. Plan-Apochromat 20x

2. Plan-Apochromat 40x

 ☐ Use manual camera changer

 Pos. 1: Camera type BF FL

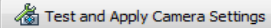
Point Grey GS3-U3-51S5M-C ☒ ☒

Adapter magnification: 1.0x

Pos. 2: Camera type BF FL

<none> ☐ ☐

Adapter magnification:



 Brightfield ICC Profile:

sRGB Standard

Color Scheme: White Point: Gamma:

Calibrated D65 Standard

 Overlap: 

small default large

 Swap location:

D:\ScannerSwap 

 ☒ Profile Wizard Enabled

 ☒ Prescan Objective Protection Enabled

Figure 14 – Base settings panel

#### Objective type

You can select the type and the magnification level of the objective.

#### Camera type

Activate **BF** and/or **FL** mode for the camera. The software automatically loads the camera settings upon clicking the  button.

### Brightfield ICC Profile

Select an applicable preset color profile to be used for Brightfield scanning from the drop-down menu. Settings according to the profile has effect on the color set, color temperature, and gamma value of the scanned image.

**Preset profiles** are the following:

- **Calibrated Linear:** Color scheme is defined by calibration (Gamma value is not included)
- **sRGB standard:** Color scheme is defined by calibration (standard Gamma value -2.2- is applied)
- **sRGB standard Microscope Like:** Color scheme is defined by calibration (standard Gamma value / White Point: D50)
- **Legacy:** a Color scheme calibrated for the previous software version is applied
- **Custom:** parameters are freely customizable as follows:

### Color Scheme

- **Calibrated:** Scheme is defined by the color calibration slide
- **Legacy:** a Color scheme calibrated for the previous software version is applied
- **Raw:** the color information of the recorded raw image is applied

### White Point

- **D65:** color temperature according to a standard illuminant D65 white point value is applied (6500K / daylight)
- **D50:** color temperature according to a standard illuminant D50 white point value is applied (5000K / horizontal daylight)

### Gamma

- **Standard:** a value of 2.2 is used
- **Medium:** a value of 1.8 is used
- **Off:** a value of 1.0 is used



#### Note:

If Lumencor SPECTRA 6 is configured as illumination unit, the corresponding **Enable Lumencor hardware trigger** option is displayed on the form.

**Profile Wizard Enabled** – If activated, the Profile Wizard function on the Routine Work panel will be enabled.

**Prescan Objective Protection Enabled** – If activated, slide area near the edges will not be scanned to record fast preview image. If inactive, Fast Preview processing becomes slower.

Save settings by clicking  .

## Filter Settings

On this panel you can define which filters occupy which turret positions.

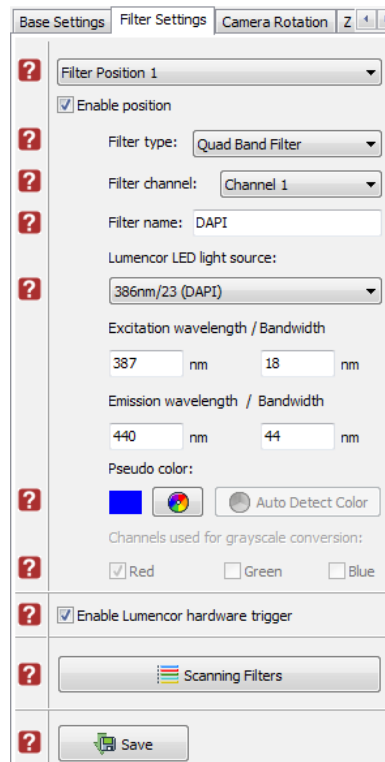


Figure 15 – Filter Settings panel

## Camera Rotation

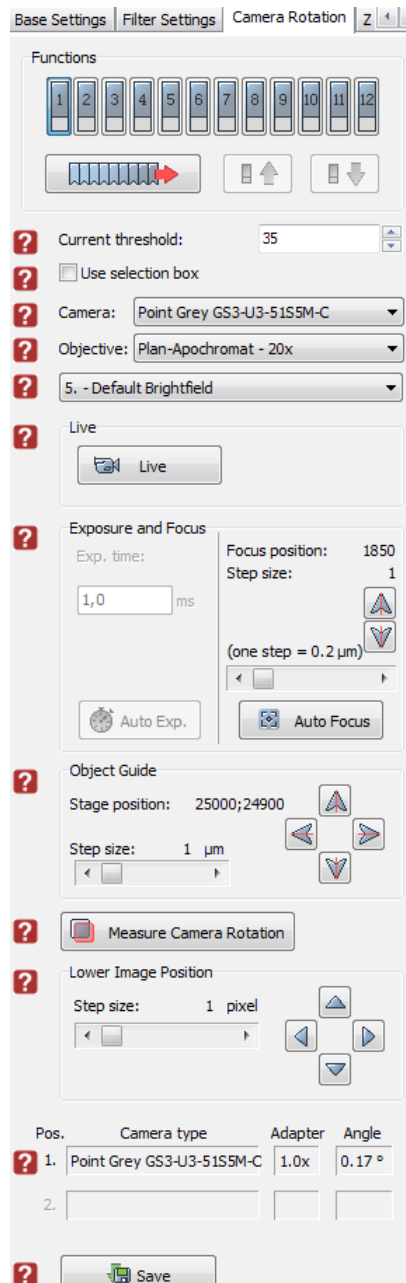


Figure 16 – Camera rotation



### Caution!

If you have transported the product, or changed the camera, there is a possibility, that the camera does not display the images properly. If you experience such problems, contact service support. Do not modify these settings!

## Z Difference

This function is available only for fluorescence settings; it enables you to set the basic focus differences between the filters. This facilitates more precise focusing during scanning.

Camera Rotation Z Difference Service

Functions

1 2 3 4 5 6 7 8 9 10 11 12

Objective: Plan-Apochromat - 20x

**Z difference**

Primary filter: DAPI Secondary filter: FITC

Activate Activate

Focus pos.: 1600 Focus pos.: 1601

Z difference [µm]: 0.26 Store difference

**Live**

Live Camera Control

**Exposure and Focus**

Exp. time: 20.00 ms Focus position: 1601

Step size: 1

Auto Exp. Auto Focus

| Pos. | Name        | Diff. [µm] |
|------|-------------|------------|
| 1.   | DAPI        | 1.34       |
| 2.   | FITC        | 0.27       |
| 3.   | TRITC       | 0.00       |
| 4.   | Cy5         | 0.27       |
| 5.   | Brightfield | --         |
| 6.   | <none>      |            |
| 7.   | <none>      |            |
| 8.   | <none>      |            |
| 9.   | <none>      |            |
| 10.  | <none>      |            |

Clear

Save

Figure 17 – Z Difference panel

## Service

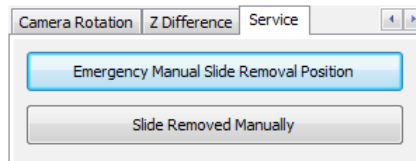


Figure 18 – Service panel

This panel contains control and maintenance functions.

### Emergency Manual Slide Removal Position

The slide holder will be moved to a position where the slide can be removed manually after opening the cover (see section [5.3.1 Opening the protective covers](#)).

### Slide Removed Manually

Click this button to notify the software that you have removed the slide manually.

## 4.2.4 Event Call Settings

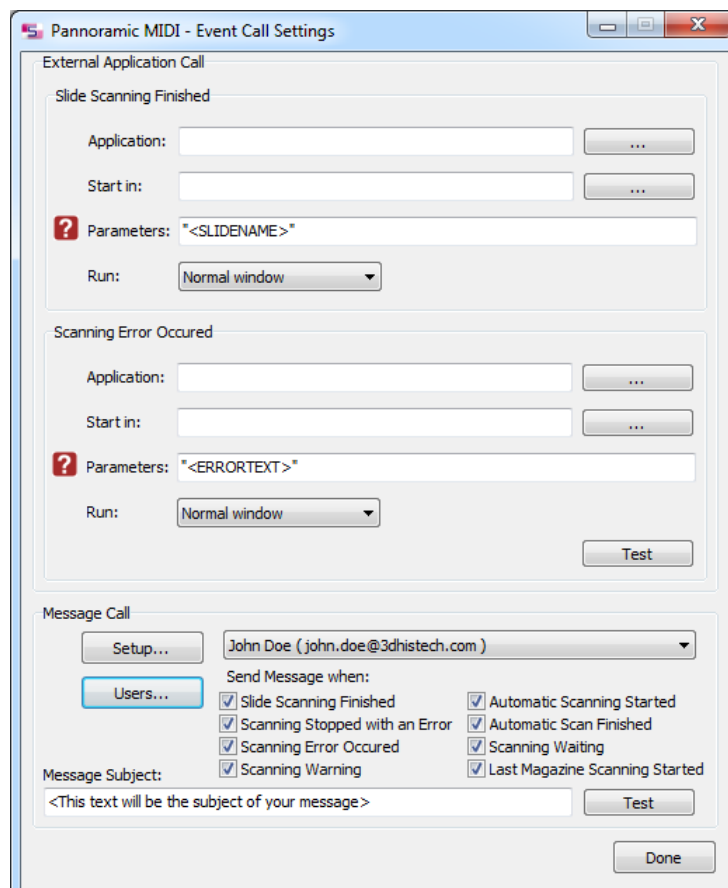


Figure 19 – Event Call Settings

Two of the three settings are responsible for opening external applications (.exe or .bat) as defined (for example, Pannoramic Viewer software can be opened after scanning is finished).

You can define external application call settings for the following cases:

- Slide Scanning Finished
- Scanning Error Occurred

For **Slide Scanning Finished** and **Scanning Error Occurred** you can define the external software by entering the file path in the **Application** box, or by browsing for it by clicking  .

If you define parameters in the **Parameters** box, it will pass them to the software that it starts. If no parameter is defined, then the parameter will not be passed. The default parameters are the following:

- For **Slide Scanning Finished**: "<SLIDENAME>" – transfers the slide name
- For **Scanning Error Occurred**: "<ERRORTEXT>" – transfers the error message

**Run** defines the window mode that the external application will start in. The following window modes can be set:

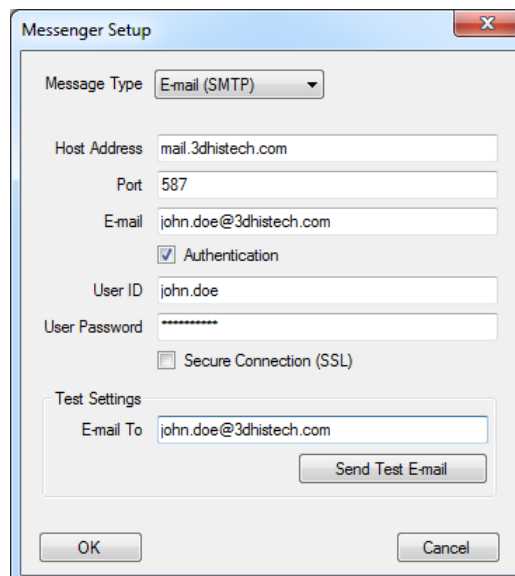
- Normal window
- Minimized
- Maximized

You can test whether the **Scanning Error Occurred** settings work by clicking  . By moving the mouse cursor over the  buttons, the software displays information about the setting you are interested in.

In the **Message Call** section of the window complex messaging functions can be defined. Here you can setup parameters of the mail server, add or remove users, and also set the message body in the **Message subject** field by entering a text for example, to inform recipients on the location of the scanner, or the slide set you are working with.

Click **Test** to test settings (by sending an e-mail to the address defined in the **E-mail To** field) after you have finished to check their relevancy before applying them.

First click **Setup** to display the Messenger Setup window, in which you can dedicate an e-mail server through which the software sends e-mails to the selected recipients.



**Figure 20 – Messenger Setup window**

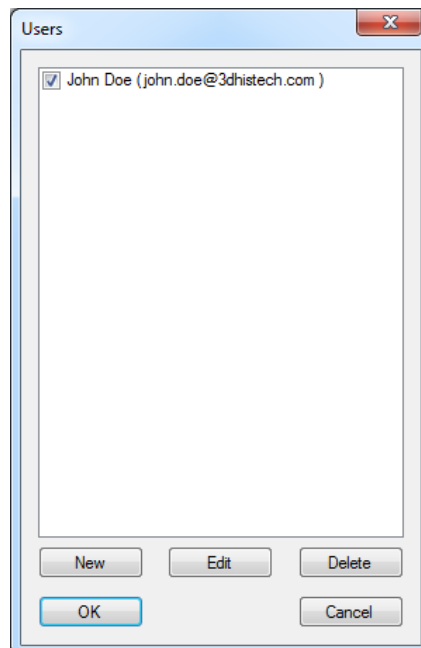
In the Messenger Setup window the following parameters can be set:

- **Message Type** – E-mail (SMTP)
- **Host Address**
- **Authentication** – **User ID** and **User Password** are required.
- **Secure connection (SSL)** – If activated, the messages will be sent through secured connection.
- **Send Test e-mail** – Click this button to send test e-mail to the specified address.

There are 2 feedback messages that come up after sending the e-mail:

- *"An e-mail has been sent to the recipient."*
- *"An error has been occurred. The e-mail could not be sent."* - Check parameters then retry.

- If you have properly set messenger settings, click **OK**, then click **Users** in the Message Call section of the Event Call Settings window to address functions to the recipients (that can be selected under the **Send Message when:** field).

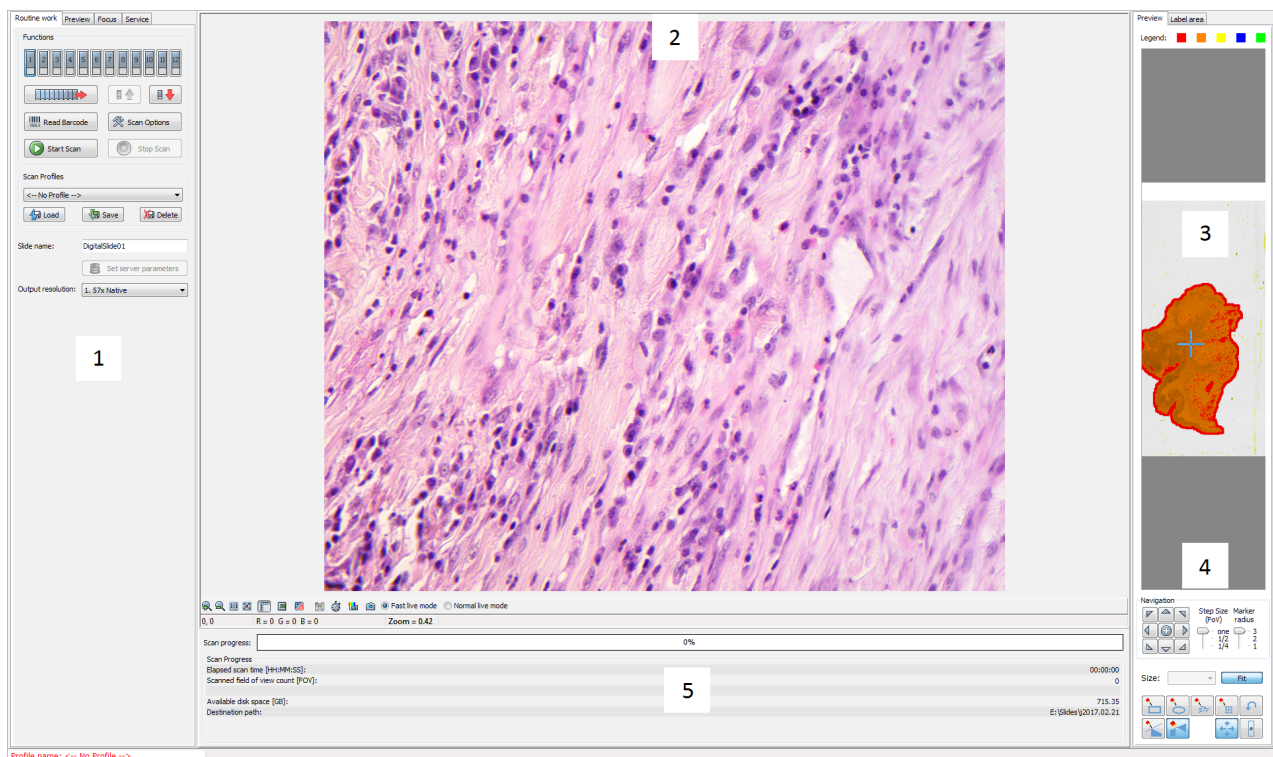


**Figure 21 – Users window**

## 4.3 Using Brightfield Manual Mode

You can use Brightfield Manual mode to set the scanning, preview, and image quality settings. You can also set profile settings here, and start scanning in Brightfield Manual mode. Manual mode is perfect for digitizing slides that require unique settings, or single slides. You can also define profiles here, which can be used in the Automatic mode.

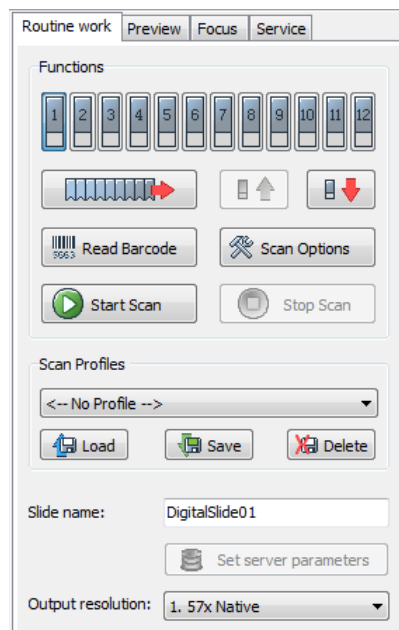
For more information on profiles, see section [4.8 Using Profiles](#). For more information on Automatic mode, see section [4.4 Using Brightfield Automatic Mode](#).



**Figure 22 – Main window of control software**

1. Panel with scanner functions and settings
2. Scan camera live image display area
3. Preview image recorded by the preview camera
4. Navigation and Preview image editor toolbar
5. Information area about the digitization progress

### 4.3.1 Routine work panel



**Figure 23 – Routine work panel**

The Routine work panel provides basic digitization functions. Features are described in the forthcoming section.

#### To insert and remove slides

- To move a slide to the loading position, click the number of the slide that you want to load  .
- To load a slide from the tray to the specimen holder, click  . A preview image is automatically generated.
- To unload the slide, click  .
- To remove the tray, click  . It will then be moved to the position where you can remove it manually.

#### To enter the slide name

- To enter the slide name manually, type it into the **Slide Name** field.

- You can also use the barcode as a slide name if a compatible barcode sticker is affixed on the slide. To do this, click . It will automatically detect the barcode on the slide, and the number or string will appear in the **Slide Name** field.

### Output resolution

The resolution of the output digital slide can be modified to result a smaller file size. You can select the output resolution from the drop-down list, where **Native** is the raw resolution of the slide, and other values are listed (40x, 20x, etc.) depending on the size native resolution.

You can also find the  button on this panel that you can start scanning with, but it is recommended to go through all the settings before clicking it.

To administer profiles, use the **Scan Profiles** field.

- The current profile name is displayed at the bottom left corner of the screen.
- To save the current profile, click **Save**.
- To select an existing profile from the selection menu, click **Load**.
- To delete the current profile click **Delete**.

The **Objective position** field sets the objective changer to the appropriate position.

To access the Scan Options window, click .



#### Note:

These settings are only applicable if you do not use profiles. If you use profiles, the settings stored in them are used.

### 4.3.2 Scan Options window

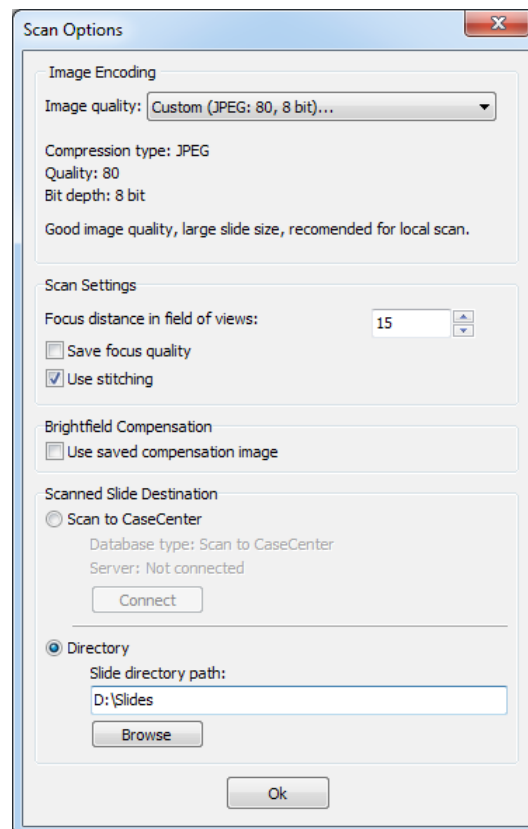


Figure 24 – Scan Options window

These settings will determine the resulting quality and storage location of the virtual slide.

You can choose the following predefined image formats (and a subsequent custom option) from the **Image Quality** drop-down list in the **Image Encoding** section of the window:

- **Excellent (JPEG: 90)**
- **Good (JPEG: 80)**
- **Medium (JPEG: 60)**
- **Low (JPEG: 30)**
- **Custom...**

If choosing this option, the Image encoding window is displayed on which you can select from different image formats.

Accordingly, further adjustments can be made, except if PNG or BMP image format is selected.

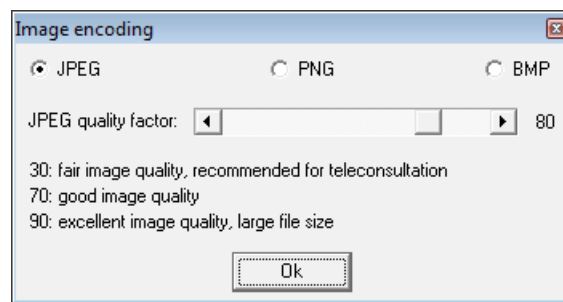


Figure 25 – Image encoding window

- **JPEG** – The quality can be adjusted with the **JPEG quality factor** slider. Greater values result in better quality, but larger files. The default setting is 80%.
- **PNG** – Lossless compressed image format.
- **BMP** – Lossless uncompressed image format, but larger files due to less effective compression. It is a raw data file.

### Scan Settings

- **Focus distance in field-of-views** – the distance of focal points can be set to create a focus map, based on which the software calculates interpolated focus values (one step in distance means one FOV).
- **Save focus quality** – the measurement of focus quality (correctness of average focus on layers) is saved. This option is inactive when **Extended focus** option is activated.
- **Use Stitching** function enables the seamless stitching of digital tiles.
- **Save image in original Bayer size** function is only available if pco.edge 4.2 camera is installed on the scanner. It is not accessible for configurations installed with Point Grey Grasshopper 3 camera. Image fields will be saved with native pixel resolution. If this function is disabled, you will work with reduced pixel resolution. These resolution differences are not really visible with the human eye, what is important in this feature is the resulting smaller file size.

### Brightfield Compensation

The **Use saved compensation image** function enables the use of previously recorded reference images for all slides. Use this function when the slide is completely covered by the specimen (for example, blood smear) thereby making compensation image capture impossible. For such slides, use an empty slide with coverslip to grab a compensation image (for more information, see section [4.2.2 Image Compensation](#)). If you select this, the software will not create new compensation images for each slide. Compensation images are reference images used for white balancing and shading.

The **Scanned slide destination** field determines the location digitized slides will be stored.

- Select the **Scan to CaseCenter** function to scan directly to a dedicated CaseCenter server.

For information on how to use the **Scan to CaseCenter** application, see section [4.7 Scan To CaseCenter](#).

If you enable the **Directory** function, the virtual slides will be digitized in the specified folder. You can browse for the folder with the **Browse** button. If you specify a folder that does not exist, the software will create it.

All parameter inputs are saved for the next software session.

### 4.3.3 Preview panel

The Preview panel offers options for threshold setting and selection of the area to be scanned.

Figure 26 – Preview panel

### Preview Type

- **Brightfield preview** – a normal type of illumination in the microscope for scanning the slide. This option is recommended when scanning in Brightfield mode.
- **Darkfield preview** – the preview image is created with transmitted Darkfield illumination.

### Use threshold

- **Scan specimen with auto threshold** – This automatically detects the specimen in the preview image.



#### Caution!

Make sure that the detection result is acceptable for you. Otherwise set the threshold value manually or append missing areas with the help of **Scanned** function located at the preview toolbar. For more information see section [4.3.4 Preview area scanned by preview camera – Preview Toolbar](#).

- **Scan specimen with user set threshold** – This sets the sensitivity of the specimen detection. To set the desired threshold value manually, change the setting in the **Specimen threshold level** selection box in the range of 0-255. The default value is 35. Smaller values result in a more sensitive scanning, meaning that more areas will be digitized, however, this may also include specks or other imperfections of the slide. Greater values result in a less sensitive scanning, but it is possible that some of the smaller specimen areas will not be digitized.
- **Scan area inside the marker** – If the specimen cannot be identified as required for digitization, (for example, weak contrast), it can help to encircle completely the specimen with a black marker pen. You have to draw a full circle with the pen to enable the detection. Marker pen detection will make specimen detection easier by limiting the scanned area.

If this option is selected, only the area encircled with a marker pen will be scanned. You can define the threshold level by changing the threshold value in the **Marker threshold level** selection box in the range of 0-255. This sets the sensitivity of the specimen detection inside the marker area. To set the desired threshold value manually, change the setting in the **Specimen threshold level** selection box in the range of 0-255. The default value is 35.

- To scan everything within the marked area, check the **Scan everything within the marked area** selection box.

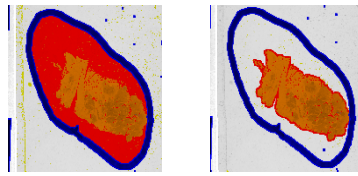


Figure 27 – Scan everything within the marked are selected / not selected

### General threshold options

- **Remove coverslip** – If selected, the edges of the coverslip are not detected as specimen to be scanned. Depending on the threshold level, it is possible that the edges of the coverslip are detected as areas to be digitized.

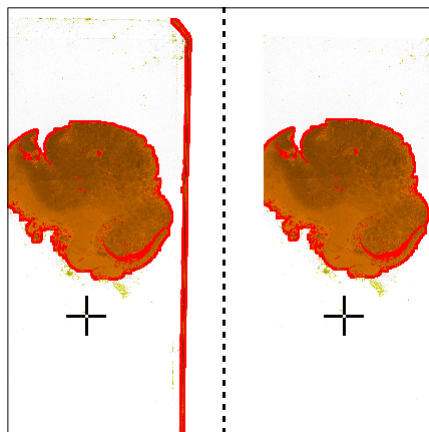


Figure 28 – Preview image with and without coverslip edge



#### Caution!

It requires lots of time (since it cannot find focus neither on the edges, nor on specks) to digitize coverslip edges. Select **Remove coverslip** function to eliminate those areas.



#### Warning!

Do **not** use **Remove coverslip** function on TMA slides! The layout of TMA slides may mislead the detecting algorithm.

- **Fill holes in scan area** – If selected, the holes inside the specimen will also be scanned. Often these holes contain small sample objects that otherwise would not be scanned.

- **Remove specks** – If selected, the scanner does not digitize objects smaller than the predetermined size. This helps filtering specks and other uninteresting objects out. Set the maximum size of specks not to be digitized by adjusting the **Speck size** slider.
- **Scan area dilation** – Adjust the slider to enlarge or decrease the scanned area. The edge is extended discretely by 100  $\mu\text{m}$  each time.

#### Use saved scan area

This function is useful if the slides contain areas of interest that cannot be detected by the preview camera. This function along with saving profiles helps to scan all slides with the most adequate settings.

To save a new mask, click **Save**. It will display a drop-down menu. Select whether to save preview mask or TMA grid.

To load a mask, click **Load**. It will display a drop-down menu. Select whether to load preview mask or TMA grid.

#### Use selection box

If selected, only the area inside the box is scanned. It is useful if you only want to scan the area that is equivalent with the size of the coverslip, so external specks will not be scanned.

### 4.3.4 Preview area scanned by preview camera

The preview image shows the area that will be digitized with a red and/or an orange mask. If the **Use selection box** is enabled, there is a black frame displayed in the image.

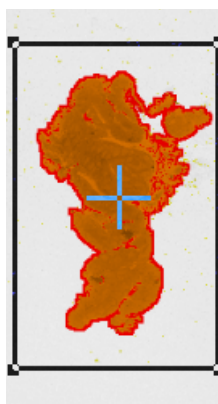


Figure 29 – Preview image

#### Colors used in preview image

The following four colors are used in the preview image to demonstrate digitization and selection settings:

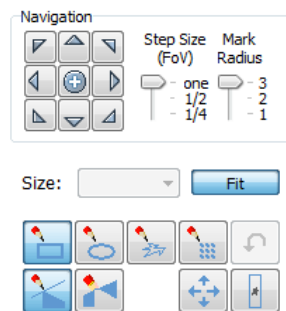


**Figure 30 – Colors in preview image**

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Areas that will be scanned</b></p> <p>These areas are digitized on the basis of user settings (for example, <b>Fill holes in scan area</b>) and not detected by the selected threshold value.</p> <p><b>Detected sample areas that will be scanned</b></p> <p>These areas are digitized. They are detected on the basis of the selected threshold value.</p> <p><b>Detected sample areas that will not be scanned</b></p> <p>These areas are not digitized on the basis of their position (for example, they are outside the selection box). They are detected by the selected threshold value.</p> <p><b>Marker</b></p> <p>If <b>Scan area inside the marker</b> is selected in the Preview panel, the preview camera detects the marker pen. The inside areas appear in red color and will be digitized.</p> <p><b>Areas scanned in</b></p> <p>This color is only displayed during scanning.</p> |
|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

### Navigation tool and Preview toolbar

This section is located at the bottom of the preview image.



**Figure 31 – Navigation tool and Preview toolbar**

### Navigation Tool:

This tool offers easy and punctual slide navigation in distinctive steps. Set **Step Size (FoV)** – 1, ½, or ¼ to determine the size of movement in proportion of one FOV. Click an arrow to move to the required direction with the set step size.

**Marker Radius** – Set 3, 2, or 1 as the radius of the marker, then mark area to be scanned by clicking the + button.

You can select the area to be scanned with the different tools on the **Preview toolbar**:

- **Square tool**
- **Ellipse tool**
- **Polygon tool**: you can finish the selection process with the polygon tool by double-clicking with the mouse.
- **TMA tool**

To undo your last action, click (maximum of 40 changes).

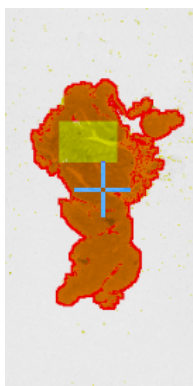
To position the specimen holder that holds the current slide, click **Position sample** and then click on the area of interest on the preview image. This will define the Live image that you can access from the Focus panel.

To display the original image created by the preview camera, click .

To shrink or enlarge the preview image, set the zoom level at the left **Size** selection box (100%-600%). To fit the preview image to the preview area, click **Fit**.

Choose from the **Scanned** or the **Not scanned** option from the right selection box.

- To add the selected areas to the preview, select the **Scanned** option.
- To delete the selected areas from the preview, select the **Not scanned** option.

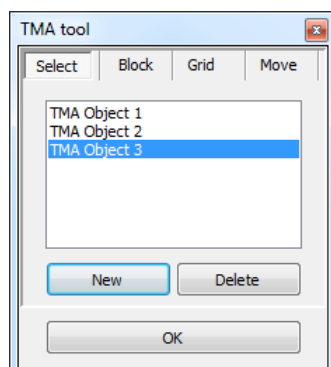


**Figure 32 – Not scanned selection**

### TMA tool

TMA tool is used for selecting TMA spots on TMA slides. You can set the selection settings on the following four tabs:

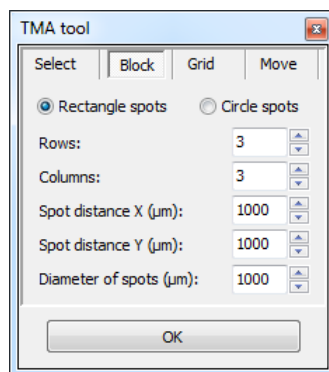
#### Select panel



**Figure 33 – TMA tool: Select**

- To create a new TMA object, click **New**.
- To select an existing TMA object, click on the object name. The selected object name will highlight.
- To delete an existing TMA object, click **Delete**.

#### Block panel



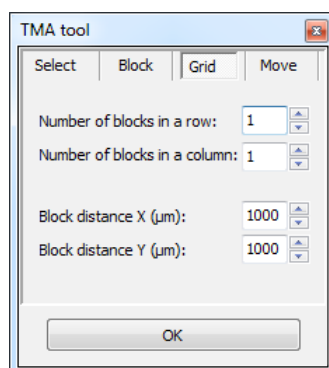
**Figure 34 – TMA tool: Block**

Set the type of TMA block on this panel.

1. Select the shape of the TMA spots (**Rectangle spots** or **Circle spots**).
2. Enter the number of rows and columns in the **Rows** and **Columns** fields or select the appropriate values with the arrows.
3. Enter the distance between two spots on the X and the Y axis in  $\mu\text{m}$  (in the **Spot distance X ( $\mu\text{m}$ )** and **Spot distance Y ( $\mu\text{m}$ )** fields or select the appropriate values with the arrows.
4. Enter the average diameter of the spots in the **Diameter of spots ( $\mu\text{m}$ )** field or select the appropriate value with the arrows.

### Grid panel

The Grid panel displays the previously set grid settings



**Figure 35 – TMA tool: Grid**

### Move panel

The Move panel allows the rotation and moving of the TMA selection spots that are displayed on the preview image.

- To move the spots enter the pixel value in the **Move** field or use the arrows.
- To rotate the spots, enter the degree value in the **Rotate** field or use the rotation arrows.

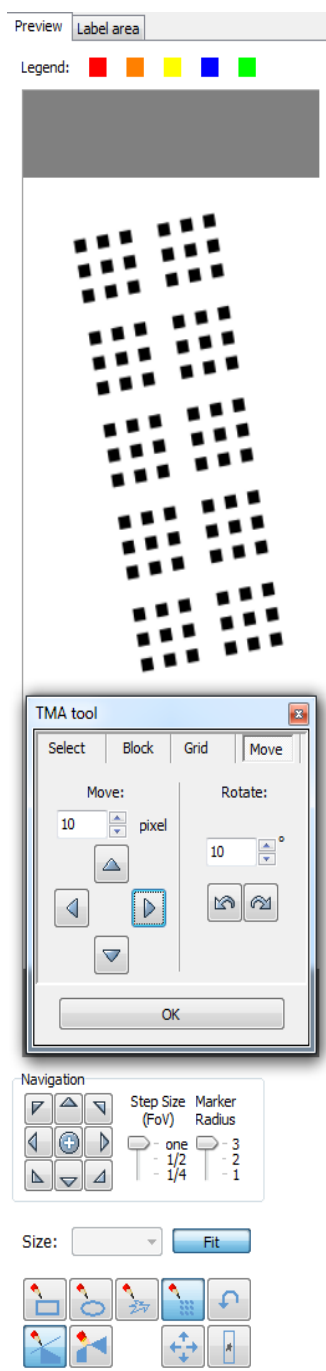


Figure 36 – TMA tool Move panel with preview

## Label area

To rotate the label area by 180°, select the **Rotate image by 180 degrees** checkbox.



Figure 37 – Label area

## 4.3.5 Focus panel

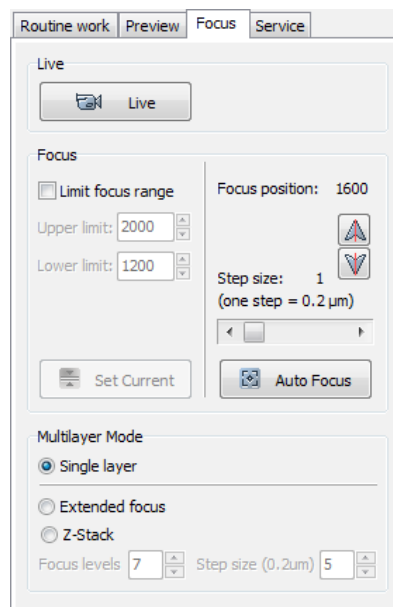


Figure 38 – Focus panel

## Live

To display a live image of the current specimen, click  .

This function works only if you select an area in the preview image with the **Position sample**. This option has no effect on a running digitization process. To display a live image during scanning, select **Show images during scanning** in the Service panel.

## Focus

To define focus limits, select **Limit focus range**. Set the upper and lower limits by selecting the desired value in the selection boxes. This is useful if **Auto Focus** does not find the focus on the specimen, but on the coverslip. Also, this makes the focusing sequence faster.

By using **Set Current**, the **Lower limit** value is set to -32 of the current focus value and the **Upper limit** value is set to +32 of the current focus value.

Use the two arrow buttons to focus manually. This is useful when you are interested in an area that remained blurry with **Auto Focus** (for example, the specimen is thicker in that area). This does not influence the way slides are digitized in Automatic mode. The manual focus is mainly for setup purposes, not for using the product as a traditional microscope.

Define the manual focus step size by adjusting the **Step size** slider.

Search for the sharpest focus on the current field of view automatically by clicking



## Multilayer mode

- Select **Single layer** option if you want to scan a single layer of the slide.
- By choosing the **Extended focus** option, the software selects the sharpest image from each focus level for each image field, and combines them into one single image. Therefore those parts that were blurry in auto/manual focus will also be sharp. This method guarantees the maximum depth of sharpness, however, it reduces digitization speed.
- With the **Z-stack** method separate layers are created and stored, and can be opened with Pannoramic Viewer. The Z-stack slide contains the extended focus layer. Both for **Extended focus** and **Z-Stack** scanning methods, you can determine the desired number of focus levels with the **Focus levels** selection box. The current focus value is the starting point. If you set 5 for example, one current, two focus levels above and below FOVs are captured. Therefore, it is advised to choose an odd number for the focus levels.

**Focus step size** determines the spacing between focus levels. One step is around 0.2  $\mu\text{m}$ . Default settings are: **Number of focus levels: 7; Focus step size: 5.**

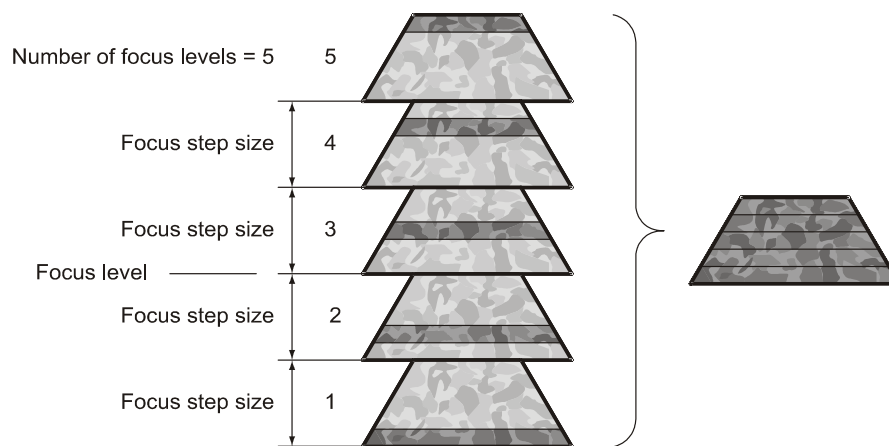


Figure 39 – Focus level and step size

### 4.3.6 Service panel

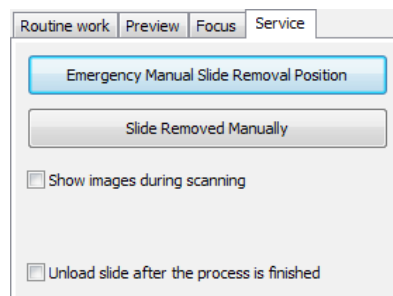


Figure 40 – Service panel

This panel contains control and maintenance functions.

#### Emergency Manual Slide Removal Position

The specimen holder will be moved to a position where the slide can be removed manually after opening the cover (see section [5.3.1 Opening the protective covers](#)).

#### Slide Removed Manually

Click this button to notify the software that you have removed the slide manually.

#### Show images during scanning

If you select this option, you will be able to see the currently scanned image field during scanning in the live image display field. This slows down digitization process and should be activated only with purpose.

#### Unload slide after the process is finished

Slide is ejected after the scanning procedure is finished.

### 4.3.7 Display field and toolbar for live images

The display field for live images displays images of the scan camera. The live image is displayed if no current digitization process is running or **Show images during scanning** option is enabled.

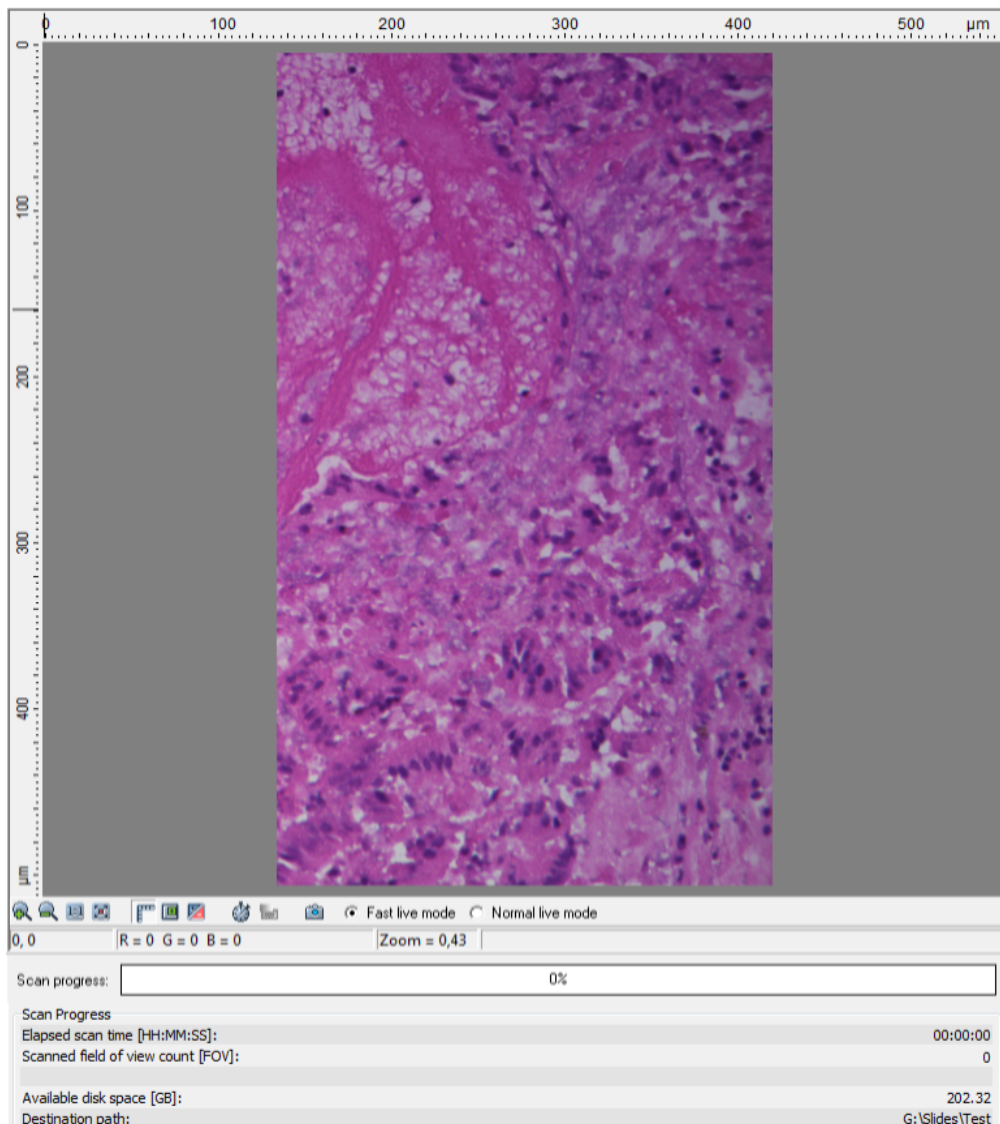


Figure 41 – Display field and toolbar for live images

#### Navigation on the Live image

With the **Point & Click** feature the slide can be moved on the Live image field by left-clicking the desired area that will be displayed in the center of the image field (an animated crosshair represents the location on the slide). By right-clicking the desired area, the actual objective position (one pixel) is marked on the scanmap.

**NOTE:** This feature is active on each of **Brightfield** and **Fluorescent** forms, but is inactive on **Microscope Settings** and **Auto** forms.

**Status bar**

- Current position of the cursor related to the live image
- RGB value of current pixel
- Zoom level of the current live image

**Toolbar for live images**

The toolbar is only available for the displayed live image, but not available for camera images during digitization.

-  – Zoom in
-  – Zoom out
-  – One pixel on the monitor corresponds to one pixel on the camera
-  – The live image completely fills the display area
-  – Displays or hides the vertical and horizontal scale bars
-  – Displays the magnifier window
-  – Activates red marking on overexposed pixels
-  – Turns pseudo-color ON/OFF on the Live image (can be activated in FL mode only)
-  – Recalculates exposure time (useful if too many overexposed pixels were detected)
-  – Calculates white balance
-  – Saves the current image as BMP or JPEG file
- **Fast live mode** – live images are displayed with a frequency of at least 10 images per second. If an exposure time is set to more than 100 ms, the pixel values are multiplied accordingly (for example, if an exposure time of 200 ms is set, the pixel values are multiplied by 2, and the exposure time is reset to 100 ms). Therefore the resulting images will have a higher noise level.  
  
This function is useful for fluorescent live view where in spite of the higher noise level, the resulting image will be refreshed as in normal mode.
- **Normal live mode** – images are taken with the user-specified exposure time.

**Scan Progress**

Scan-related data are displayed in this section. Illumination time represents the cumulated excitation time during scanning (available only if **User controlled** scanning mode is activated and exposure time values have been defined).

### 4.3.8 Start scan

To start digitization process, click  .



#### Caution!

Before starting digitization process ensure that you have enough free space on the destination drive. You can check the available free disk space in the last line (**Available disk space**) of the **Scan Progress** information area.

You can interrupt a running digitization process by clicking  . This button is only enabled if a digitization process is in progress.

## 4.4 Using Brightfield Automatic Mode

Compared to Manual mode, it has less options in some dialogs, but it has an additional Barcodes panel.

### 4.4.1 Routine work panel

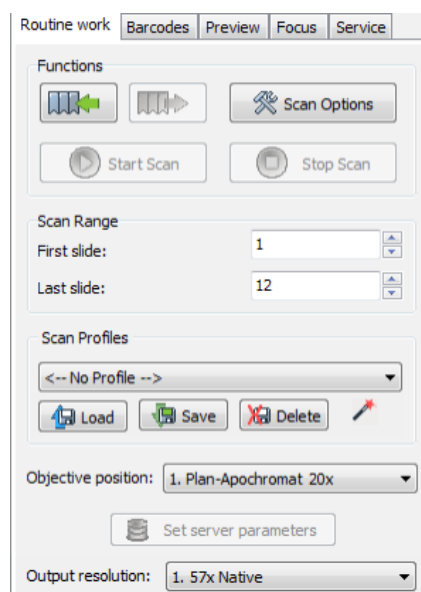


Figure 42 – Routine work panel

The Routine work panel provides basic digitization functions.

#### To insert and remove slides

- To load the tray, click . The system checks the positions for slides during the loading process.
- If you do not want to load all slides, you can specify the first and last slide to be loaded in the **Scan Range** by entering the appropriate slide numbers in the selection boxes of **First slide** and **Last slide**.
- To remove the tray, click . It will then be moved to a position where you can remove it manually. Slide in the specimen holder is unloaded to the tray before the process.

You also find the  button on this panel, that you can start scanning with, but it is recommended to go through all the settings before clicking it.

To administer profiles, use the **Scan Profiles** field.

- The current profile name is displayed at the bottom left corner of the screen.
- To save the current profile, click **Save**.
- To select an existing profile from the selection menu, click **Load**.
- You can delete the current profile by clicking **Delete**.

To access the Scan Options window, click .



#### Note:

These settings are only applicable if you do not use profiles. If you use profiles, the settings stored in them are used. The used profile name is indicated at the bottom left of the main window.

#### Output resolution

The resolution of the output digital slide can be modified to result a smaller file size. You can select the output resolution from the drop-down list, where **Native** is the raw resolution of the slide, and other values are listed (40x, 20x, etc.) depending on the size native resolution.

For more information, see section [4.3.2 Scan Options](#).

## 4.4.2 Barcodes panel

1: ☐ Apply one profile to all slides  
 Current Profile

2: ☒ Read barcode if no name is defined on the list

3: ☐ Enable parsing of barcodes or defined names  
 Folder mask 1:   
 Folder mask 2:   
 Folder mask 3:   
 Folder mask 4:   
 Folder mask 5:   
 Name mask:   
 Profile mask:   
☐ Match only the beginning of the profile name

4: ☒ Generate name if no name was defined

Load Names and Profiles from File

Save Names and Profiles to File

Delete Names and Profiles

Tray

| Sl | Names / Barcodes | Profiles        |
|----|------------------|-----------------|
| 1  | SS-1234-001A     | HE_stain_std    |
| 2  | SS-1234-002B     | HE_stain_std    |
| 3  | SS-1234-003C     | HE_stain_std    |
| 4  | SS-1234-004D     | HE_stain_std    |
| 5  |                  | Current Profile |
| 6  |                  | Current Profile |
| 7  |                  | Current Profile |
| 8  |                  | Current Profile |
| 9  |                  | Current Profile |
| 10 |                  | Current Profile |
| 11 |                  | Current Profile |
| 12 |                  | Current Profile |

Current profile: HE\_stain\_std

**Figure 43 – Barcodes panel**

Identification features and profiles for slides can be set on this panel.

## Features on the panel

### 1. Apply one profile to all slides

- One profile is used for all slides in a batch.
- **Current Profile** is the profile that was loaded in **Routine work / Scan Profiles**.
- You can also select any other profile in the selection box.

### 2. Read barcode if no name is defined on the list

- The barcode will be used as name for the virtual slide. This option will work only if no name has been entered in the **Names / Barcodes** cell of the table.

### 3. Enable parsing of barcodes or defined names

- You can define the output directory, the name and the profile to be used by barcodes.
- The positions of the characters in the barcode are defined in the mask fields. It is possible to define areas using the character '-'. Characters located at different places of the barcode may be combined by using a comma.
- Mainly 2D barcodes are used for this purpose. It is possible to use 1D barcodes, however, it can contain less information.
- You can create up to five subdirectories by the barcode.
- If you use long strings for defining the profile name, select **Match only the beginning of the profile name**. This makes profile coding faster.



#### Note:

Make sure that only one profile name begins with those characters.

## Example for character string analysis

- Character string: PANNORAMIC\_MIDI\_123
  - Mask: 1-10 = PANNORAMIC
  - Mask: 12-15 = MIDI
  - Mask: 1-10, 17-19 = PANNORAMIC123

**Note:**

You can separate the character groups with any character you choose, it will not be read by the software.

**Example for barcode usage**

- **Barcode:** Folder\_Vir\_123\_prof\_n
- **Folder** is the folder for saving
- **Vir** is the name of the virtual slide
- **123\_prof\_n** is the profile name
- The barcode control will then look like the following:
  - Folder mask 1: 1-6
  - Folder mask 2: <empty>
  - Folder mask 3: <empty>
  - Folder mask 4: <empty>
  - Folder mask 5: <empty>
  - Name mask: 8-10
  - Profile mask: 12-21

**Note:**

The **Profile mask** row is inactive if the option **Apply one profile to all slides** is active.

**4. Generate name if no name was defined**

By choosing this option, a name is generated automatically in the following format if no name was defined and there is no barcode:

<tray number>M<slide position> (for example, 1M10)

1M does not change, the number after 1M represents the slide position. In this example, the name indicates a slide in position 10.

You can also define names for the slides in the table below, by entering names into the column **Names / Barcodes**. You can also define profiles in the selection boxes in column **Profiles** if you intend to use different profiles for slides.

- Only those positions are active that have slides in it.
- **Current Profile** is the profile loaded in **Routine Work / Scan Profiles**.

You can save the entered names and assigned profiles by clicking . You can define a name before saving. The information will be saved in a CSV format:

```
1;<slide position>,<slide name>,<profile name>
```

You can export this information into Excel where you can change the data and save it again in CSV format.

You can import previously saved names and assigned profiles by clicking .

You can delete all entries from the table by clicking .

### 4.4.3 Preview panel

The screenshot shows the 'Preview' tab of a software interface. It contains several sections: 'Scan area selection' with a 'Preview Type' dropdown set to 'Brightfield Preview', radio buttons for 'Use threshold' (selected), 'Scan specimen with auto threshold', and 'Scan specimen with user set threshold' (selected), and input fields for 'Specimen threshold level' (35) and 'Marker threshold level' (150). Below this is a 'General threshold options' section with checkboxes for 'Remove coverslip' (checked), 'Fill holes in scan area' (unchecked), and 'Remove specks' (checked). There are also sliders for 'Speck size' (0.503 mm<sup>2</sup>) and 'Scan area dilation' (200 μm). At the bottom, there is a 'Use saved scan area' section with a 'Path' input field, 'Load' and 'Save' buttons, and a 'Use selection box' checkbox.

Figure 44 – Preview panel

The Preview panel offers options for threshold setting and selection of the area to be scanned. The options in Automatic mode are the same as described in Manual mode.

In Automatic mode you cannot change the threshold values. It will use the threshold values that were set previously in the Manual mode.

For more information, see section [4.3.3. Preview panel](#).



**Note:**

It is recommended to use profiles, because settings cannot be modified in Automatic mode.

#### 4.4.4 Focus panel

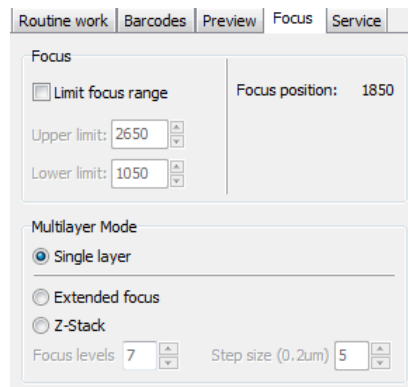


Figure 45 – Focus panel

##### Focus

You can define focus limits by selecting **Limit focus range**. You can set the upper and lower limits by selecting the desired value in the selection boxes. This is useful if focusing was not targeted on the specimen, but on a spot on the coverslip.

##### Multilayer mode

- Select **Single layer** option if you want to scan a single layer of the slide.
- By choosing the **Extended focus** option, the software selects the sharpest image from each focus level for each image field, and combines them into one single image. Therefore those parts that were blurry in auto/manual focus will also be sharp. This method guarantees the maximum depth of sharpness, however, it reduces digitization speed.

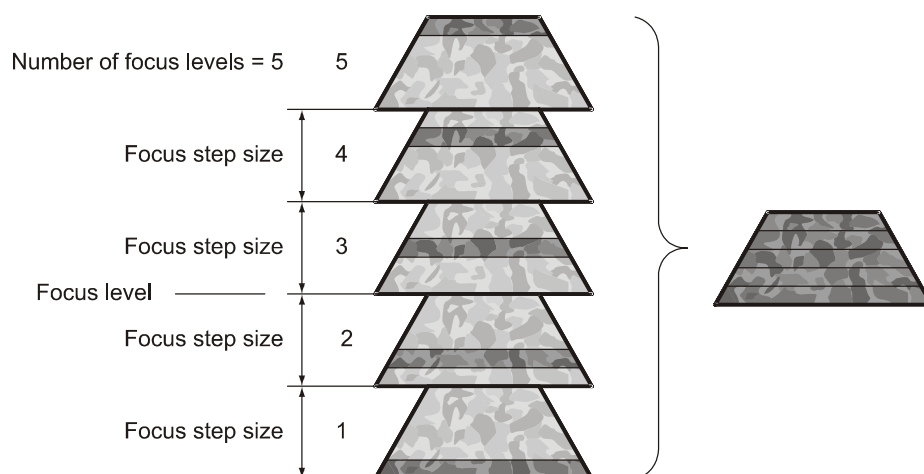


Figure 46 – Focus level and step size

- Both for Extended focus and **Z-Stack** scanning methods, you can determine the desired number of focus levels with the **Focus levels** selection box. The current focus value is the starting point. If you set 5 for example, one current, two focus levels above and below FOVs are captured. Therefore, it is advised to choose an odd number for the focus levels. Separate layers are created and stored this way, and can be opened with Pannoramic Viewer. The Z-stack slide contains the extended focus layer.

**Focus step size** determines the spacing between focus levels. One step is around 0.2  $\mu\text{m}$ .

The default settings are: **Number of focus levels: 7; Focus step size: 5.**

### 4.4.5 Service panel

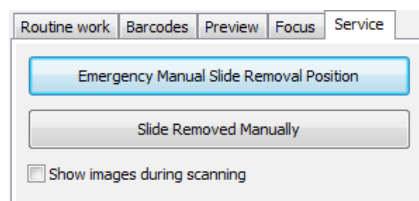


Figure 47 – Service panel

This panel contains control and maintenance functions.

#### Emergency Manual Slide Removal Position

The specimen holder will be moved to a position where the slide can be removed manually after opening the cover (see section [5.3.1 Opening the protective covers](#)).

#### Slide Removed Manually

Click this button to notify the software that you have removed the slide manually.

#### Show images during scanning

If you select this option, you will be able to see the currently scanned image field during scanning in the live image display field. This slows down digitization process and should be activated only with purpose.

### 4.4.6 Start scan

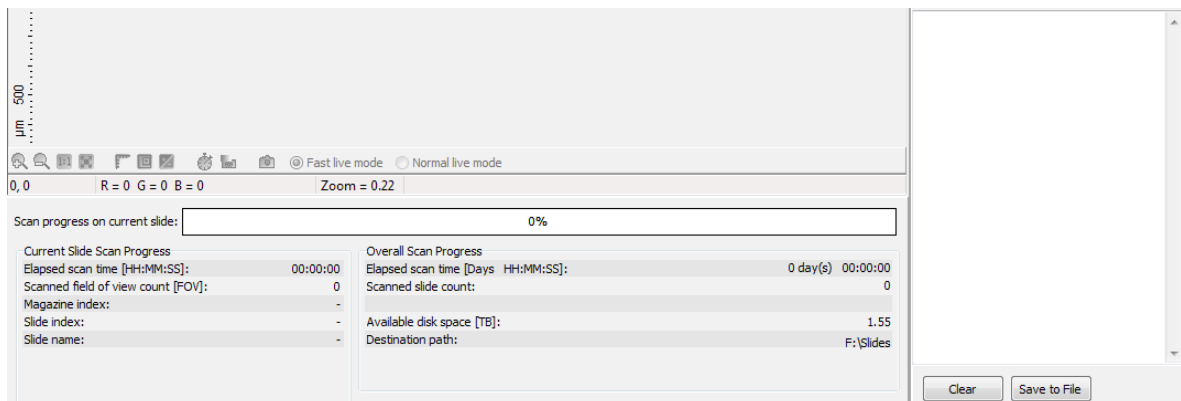
To start digitization process, click  after checking settings on the Barcodes panel.



#### Caution!

Before starting digitization process ensure that you have enough free space on the destination drive. You can check the available free disk space in the last line (**Available disk space**) of the information area of **Current Slide Scan Progress** (see **Figure 48**).

In the scanning process log window (in the right bottom of the application window) a timestamp is added to each step of the scanning process. The logs can be erased by clicking the **Clear** button or saved as a text file by selecting **Save to file**.



**Figure 48 – Information on scan progress**

You can interrupt a running digitization process by clicking . This button is only enabled if a digitization process is in progress.

If you have interrupted a digitization process, the slide currently being digitized is placed back into its tray.

The first selected slide is loaded into the specimen holder. The preview camera creates a preview image. It also creates an image of the barcode area.

If a running digitization process is interrupted, and you want to continue scanning, click .

## 4.5 Using Fluorescent Manual Mode

### 4.5.1 Routine work panel

Routine work | Preview | Hardware | Service

**Functions**

1 2 3 4 5 6 7 8 9 10 11 12

Read Barcode | Scan Options

Start Scan | Stop Scan

**Scanning Mode**

☒ Full automatic  
☐ User controlled

**Scan Profiles**

<-- No Profile -->

Load | Save | Delete

Slide name: DigitalSlide01

**Filter Settings**

Focus channel: DAPI  
Stitching channel: <Focus Channel>

Objective: Plan-Apochromat 20x

**Channel Settings**

|                                        | FILTER | EXC | TW  | DG | EF |
|----------------------------------------|--------|-----|-----|----|----|
| 1: <input checked="" type="checkbox"/> | DAPI   | 100 | 100 | 2  | X  |
| 2: <input checked="" type="checkbox"/> | FITC   | 100 | 100 | 0  |    |
| 3: <input checked="" type="checkbox"/> | TRITC  | 100 | 100 | 1  | X  |
| 4: <input checked="" type="checkbox"/> | Cy5    | 100 | 100 | 0  |    |
| 5: <input type="checkbox"/>            | <none> | --  | --  | -- |    |
| 5: <input type="checkbox"/>            | <none> | --  | --  | -- |    |
| 7: <input type="checkbox"/>            | <none> | --  | --  | -- |    |
| 3: <input type="checkbox"/>            | <none> | --  | --  | -- |    |
| 3: <input type="checkbox"/>            | <none> | --  | --  | -- |    |

Multilayer Settings | Set server parameters

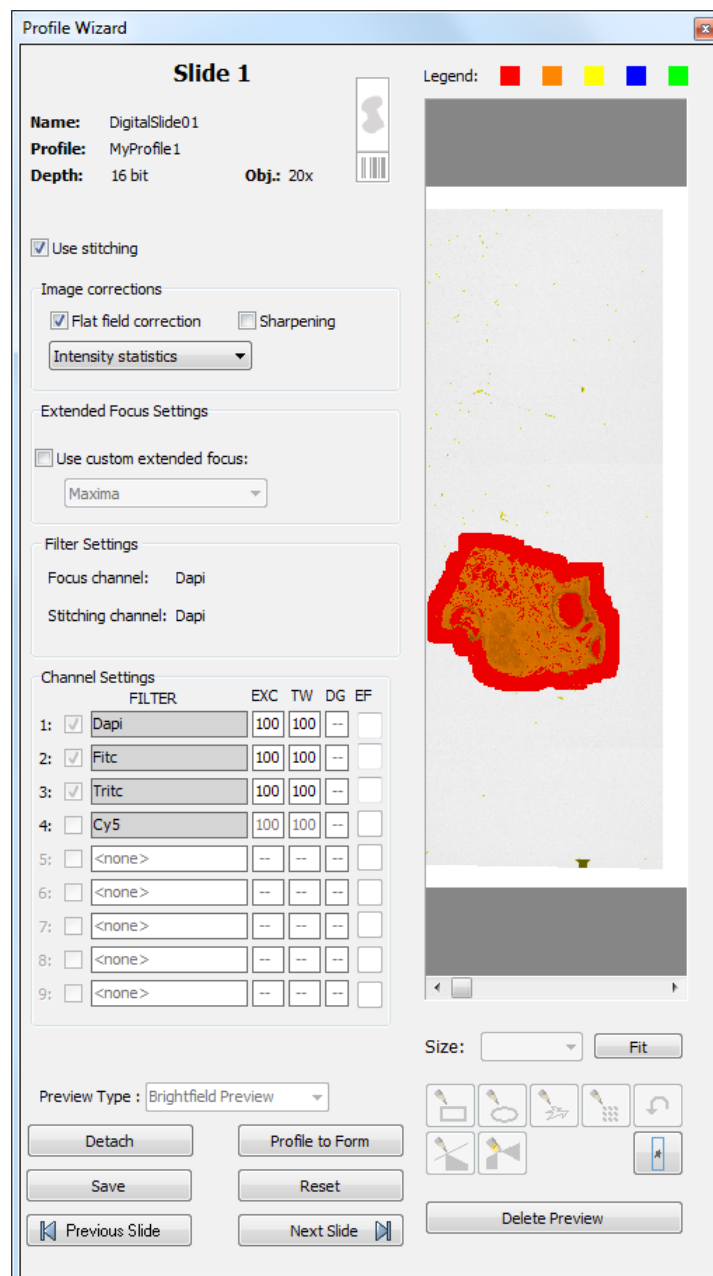
**Figure 49 – Routine work panel**

The Routine work panel provides basic digitization functions.

### To insert and remove slides

- To move a slide to the loading position, click the number of the slide that you want to load  

- Right-click on a slot to display the **Profile Wizard** window in which the actual profile (settings and parameters) for the slide in the selected position is displayed. Editing of scannable areas on the preview image is available by using FastPreview. Profile settings can be modified except for channel settings. Remove profile from the slide by clicking **Detach**, or click **Reset** to restore default settings of the profile. Click **Delete Preview** to delete preview image displayed in the preview area of the window.



- To load a slide from the tray to the specimen holder, click  . A preview image is automatically generated.
- To unload the slide, click  .
- To remove the tray, click  . It will then be moved to the position where you can remove it manually.
- To access the **Scan Options** window, click  .

**Note:**

These settings are only applicable if you do not use profiles. If you use profiles, the profile settings are used.

### Scanning Mode

- **Full automatic:** focus and exposure time are automatically determined by the software
- **User controlled:** you can define focus and exposure time manually.

The selection of scanning mode influences the number of options on the Focus panel.

To administer profiles, use the **Scan Profiles** field.

- The current profile name is displayed at the bottom left corner of the screen.
- To save the current profile, click **Save**.
- To select an existing profile from the selection menu, click **Load**.
- You can delete the current profile by clicking **Delete**.

### To enter the slide name

- You can enter the slide name manually by typing it into the **Slide Name** field.
- You can also use the barcode as a slide name if a compatible barcode sticker is affixed on the slide. To do this, click . It will automatically detect the barcode on the slide, and the number or string will appear in the **Slide Name** field.

You also find the  button on this panel, that you can start scanning with, but it is recommended to go through all the settings before clicking it.

### Filter Settings

- **Focus channel**

Choose a filter that you want to focus with. It is recommended to choose a filter that is related to the staining that stained the most of the specimen, or where the exposition time is low. You can choose from filters that you have previously selected in the **Channel Settings** field.

- **Stitching channel**

This is done on one channel. You can choose whether you want to do stitching on the focus channel, or on another channel. It is recommended to choose another channel if the focus channel was determined on the basis of exposition time, and it would display less information. It is recommended to choose a filter that is related to the staining that stained the most of the specimen.

The default selection is **Focus channel**.

The **Objective position** field sets the objective changer to the appropriate position.

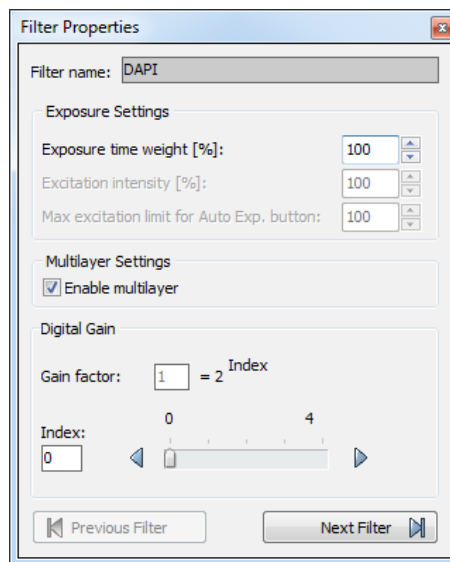
### Channel Settings

Select the types of filters you want to use during scanning. You can select the filter types and the number of channels to be used. The values in the **EXC** column define the excitation of the Lumencor illumination, in **TW** define exposure time weight, and in the **DG** the amount of digital gain is displayed. It is also available for you to enable Extended Focus (**EF**) and/or Z-stack (**ZS**) functions in this field.

Those filters are displayed automatically that you have previously defined in the **Options / Microscope Settings** at the Filter Settings panel.

For more information on predefining filters, see section [\*\*4.2.3 Microscope Settings / Filter Settings\*\*](#).

To set filter properties, select a filter and click on any of the white boxes of the **TW** and **DG** columns next to the filter name. This displays the Filter Properties window.



**Figure 50 – Filter properties window**

#### Filter name

The name of the filter is displayed here.

#### Exposure Settings

You can set the **Exposure time weight (%)** here (displayed under **TW** in the **Channel Settings** frame).

In full automatic mode, the system automatically calculates the exposition time to the given channel. You can increase or decrease this amount here in a range of 50%-200%.

Set Lumencor excitation intensity at the **Excitation intensity (%)** field. The defined value will be used as maximum when applying Auto Exposition time if you activate the **Max. excitation limit for Auto Exp. button** option.



#### Caution!

To omit over-exposure, the **Excitation intensity (%)** value can be modified by the software when calculating Auto Exposition time.

### Multilayer Settings

**Enable Multilayer** function and the concerning settings can be activated in this field, accordingly, you can set the **Extended focus** and **Z-stack** values for each channel separately.

### Digital Gain



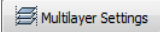
#### Note:

This is camera-dependent, with Point Grey Grasshopper 3 the index value ranges from 0 to 4, and with pco.edge 4.2 from 0 to 6.

Enter the **Index** value by entering it in the box or by selecting the value with the arrow buttons. If you raise the **Index** value, the exposition time is halved by every step, and the image becomes noisier.

To move between the filters, click **Previous Filter** or **Next Filter**.

### Multilayer Settings

By clicking the  button the Multilayer Settings window is displayed. The containing settings are the same as in Brightfield mode, but you can select **Extended focus** or **Z-stack** value for the specific channel.

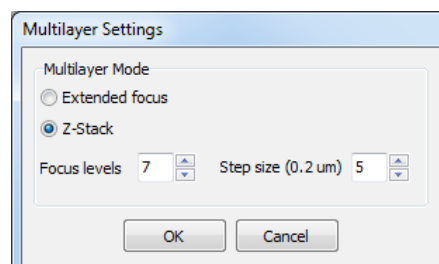


Figure 51 – Multilayer Settings window

Set the focus level value under the **Number of focus levels** box, and the **Focus step size (one step = 0.2  $\mu\text{m}$ )**. Once you have set the correct values and clicked **OK**, tick the multilayer checkbox (**EF** or **ZS** column) of the channel for which you want to apply these settings, or activate **Enable Multilayer** function in the Filter Properties window.

## 4.5.2 Scan Options

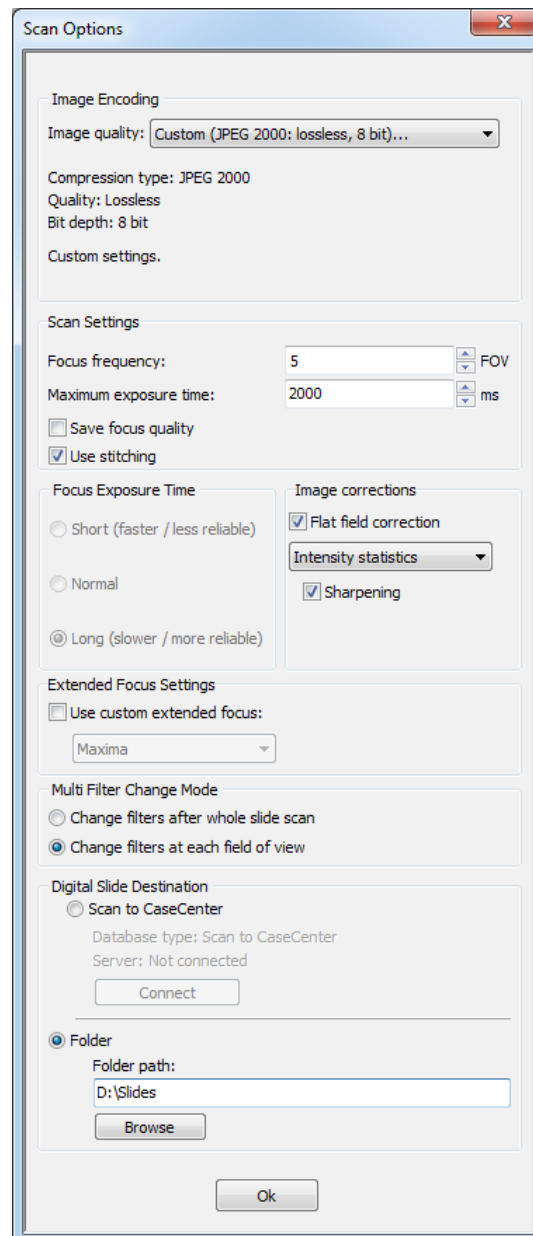


Figure 52 – Scan options panel

These settings determine the resulting quality and storage location of the virtual slide.

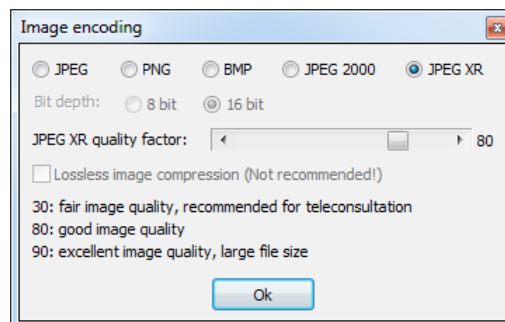
## Image Encoding

You can set the image format parameters within this group.

Select an item from the **Image quality** drop-down list. There are four predefined quality types, and a custom settings option on the list:

- **Excellent (JPEG XR: 90)**
- **Good (JPEG XR: 80)**
- **Medium (JPEG XR: 60)**
- **Low (JPEG XR: 30)**
- **Custom...**

If choosing this option, the Image encoding window is displayed on which you can select from different image formats. Accordingly, further adjustments can be made, except in case PNG or BMP is selected.



**Figure 53 – Image encoding window**

- **JPEG** – The quality can be adjusted with the *JPEG quality factor* slider. Greater values result in better quality, but larger files. The default setting is 80%.
- **PNG** – Lossless compressed image format.
- **BMP** – Lossless uncompressed image format, but larger files due to less effective compression. It is a raw data file.
- **JPEG 2000** – It supports both the 8 bit and 16 bit image formats. The quality can be adjusted with the **JPEG 2000 quality factor** slider. Greater values result in better quality, but larger files. The default setting is 80%. You can create lossless image by selecting the *Lossless image compression (Not recommended)* checkbox. You can select the desired **Image Bit Depth** for the applied camera (8 bit only when using Point Grey Grasshopper 3, 8 or 16 bit when using pco.edge 4.2 camera).
- **JPEG XR** – Available in 16 bit mode (for pco.edge 4.2). The quality can be adjusted with the **JPEG XR quality factor** slider. Greater values result in better quality, but larger files. The default setting is 80% (Good). The JPEG XR compression process is much faster than of the JPEG 2000.

### Scan Settings

- **Focus frequency** – This value determines how many field of views will pass before the sample is refocused. This value should be selected depending on the unevenness and size of the specimen.
- **Maximum exposure time** – A limit value can be set to determine that the exposure time cannot be longer than the time of focusing and calculation of exposure. This is necessary because the exposure time would be too long when taking image of an empty field of view. Default value is 2000 ms.
- **Skip empty field-of-views** – By selecting this function the software decides on the base of the focus channel whether there is a specimen in the given FOV, or not. If the FOV is empty, it will not be scanned at all, but an empty field is created instead. Note, that when selecting this option, the speed of scanning process is increased.



#### Caution!

If the specimen area is barely visible, it is possible that the software will analyze that area as an empty one.

- **Do not use multilayer mode on empty field-of-views** – If selected, the extended focus or Z-stack function will not run on empty (not containing specimen) field of views.
- **Save focus quality** – the measurement of focus quality (correctness of average focus on layers) is saved. This option is inactive when Extended focus options is activated.
- **Use stitching** – By selecting, this function enables seamless stitching of digitized tiles.

### Focus Exposure Time

This function is used for defining time length used for determination of focus but is inactive when using Point Grey Grasshopper 3 and pco.edge 4.2 cameras.

## Image corrections

### Flat field correction

If this function is active the scanned slide compensates itself with a special method (light intensity statistical data, not to modify the average intensity of the slide. Quantitative measurements can be made on the slide. The following three options can be selected from the drop-down list:

- **Intensity statistics** – legacy compensation algorithm
- **Intensity reducing** – pixel-level analyzation of the acquired image during which the background of the image is reduced based on the comparison of the image recorded by the camera and the compensation image.
- **Intensity equalization** – pixel-level analyzation of the acquired image, a one-by-one type image compensation method is applied.
  - **Sharpening** – image contrast is increased (the image may become noisier)



#### Note:

Do not use this option if you want to take quantitative measurements, since it may minimally affect the results.

## Extended Focus Settings

- **Use custom extended focus** – select the type of the extended focus algorithm used during scanning:
  - **Maxima** – the final image is made up from all of the layers created, areas (pixel groups) with the highest intensity are combined together.
  - **AVG** – an average of the layers is used for the final image.
  - **Max-AVG** – the final image is made up from all of the layers created, areas (pixel groups) with higher intensity than the average are combined together.

## Multi Filter Change Mode

This is for a multi-channel digitization. To optimize speed, filter change should take place after the digitization of the slide with one channel.

Filters should be changed for each field of view if very precise colocalization is required, but consider that this option is more time consuming.

- **Change filters after whole slide scan**
- **Change filters at each field of view**



**Note:**

Make sure to select the **Change filters at each field of view** option if using multi band filter for multi-channel digitization.

### Digital Slide destination

This field determines where to digitize the virtual slides.

- Select the **Scan to CaseCenter** function to scan slides directly to a dedicated CaseCenter server.

For information on how to use the **Scan to CaseCenter** application, see section [4.7 Scan To CaseCenter](#).

- If you enable the **Directory** function, the virtual slides will be digitized in the specified folder. You can browse for the folder with the **Browse** button. If you specify a folder that does not exist, the software creates it.

All parameter inputs are saved for the next software session.

### 4.5.3 Preview panel

The Preview panel offers options for threshold setting and selection of the area to be scanned.

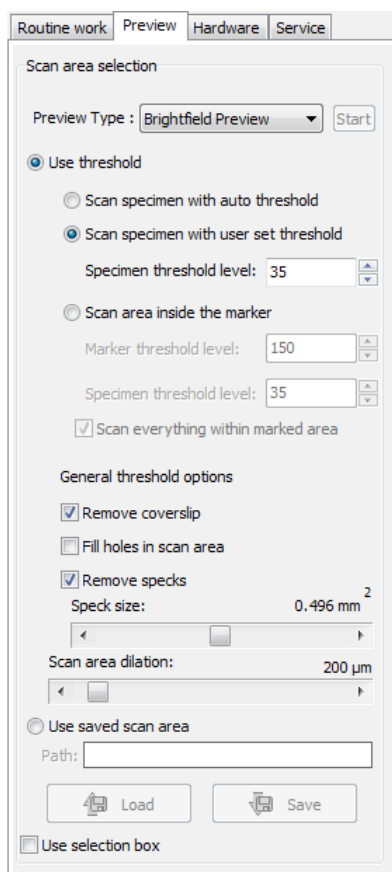


Figure 54 – Preview panel

### Preview Type

- **Brightfield Preview** – a normal type of illumination in the microscope for scanning the slide. This option is not recommended in Fluorescent manual mode.
- **Fluorescent PreScan** – creates a fast FL preview image that is displayed in the Profile Wizard window. Scanning process takes a couple of minutes only, and it cannot be interrupted.
- **Fluorescent PreScan (HR)** – creates a High-Resolution fast FL preview image of every FOV within the selected area (in single layer DAPI, with an illumination time of 20ms) that is displayed in the Profile Wizard window. Scanning process takes a couple of minutes only, and cannot be interrupted.
- **Fluorescent PreScan (+HR)** – creates a High-Resolution fast FL preview image of every FOV within the selected area (in single layer DAPI, with an illumination time of 20ms) that is displayed in the Profile Wizard window. Scanning process is initiated with a simple PreScan, the located sample with auto threshold is selected, and finally, an HR PreScan is launched.

Click **Start** to launch prescanning process.

### Use threshold

- **Scan specimen with auto threshold** – This automatically detects the specimen in the preview image.

**Caution!**

Make sure that the detection result is acceptable for you. Otherwise set the threshold value manually or append missing areas with the help of **Scanned** function located at the preview toolbar. For more information see section [4.3.4 Preview area scanned by preview camera – Preview Toolbar](#).

- **Scan specimen with user set threshold** – This sets the sensitivity of the specimen detection. To set the desired threshold value manually, change the setting in the **Specimen threshold level** selection box in the range of 0-255. The default value is 35. Setting smaller values result in a more sensitive scanning, meaning that more areas will be digitized, however, this may also include specks or other imperfections of the slide. Greater values result in a less sensitive scanning, but it is possible that some of the smaller specimen areas will not be digitized.
- **Scan area inside the marker** – If the specimen cannot be identified as required for digitization, (for example, weak contrast), it can help to encircle completely the specimen with a black marker pen. Draw a full circle with the pen to enable the detection. Marker pen detection will make specimen detection easier by limiting the scanned area.

If this option is selected, only the area encircled with a marker pen will be scanned. You can define the threshold level by changing the threshold value in the **Marker threshold level** selection box in the range of 0-255. This sets the sensitivity of the specimen detection inside the marker area. To set the desired threshold value manually, change the setting in the **Specimen threshold level** selection box in the range of 0-255. The default value is 35. To scan everything within the marked area, check the **Scan everything within marked area** selection box.

**Note:**

It is recommended to choose **Scan everything within marked area** option if using FL mode, as the application is less capable of finding the specimen based on the **Specimen threshold level** value.

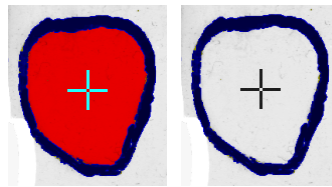


Figure 55 – Scan everything within marked area option is selected / not selected

### General threshold options

- **Remove coverslip** – If selected, the edges of the coverslip are not detected as specimen to be scanned.



#### Warning!

Do **not** use **Remove coverslip** function on TMA slides! The layout of TMA slides may mislead the detecting algorithm.

- **Fill holes in scan area** – If selected, the holes inside the specimen will also be scanned. Often these holes contain small sample objects that otherwise would not be scanned.
- **Remove specks** – If selected, the scanner does not digitize objects smaller than the predetermined size. This helps filtering specks and other uninteresting objects out. Set the maximum size of specks not to be digitized by adjusting the **Speck size** slider.

### Scan area dilation

Adjust the slider to the desired value to enlarge or decrease the scanned area. The edge is extended discretely by 100 µm each time.

### Use saved scan area

This function is useful if the slides contain areas of interest that cannot be detected by the preview camera. This function along with saving profiles helps to scan all slides with the most adequate settings.

To save a new mask, click **Save**. It will display a drop-down menu. Select whether to save preview mask or TMA grid.

To load a mask, click **Load**. It will display a drop-down menu. Select whether to load preview mask or TMA grid.

### Use selection box

If selected, only the area inside the box is scanned. It is useful if you only want to scan the area that is equivalent with the size of the coverslip, so external specks will not be scanned.

## 4.5.4 Hardware panel



### Note:

If you have selected **Full automatic** mode on the Routine work panel, the **Manual Focus** and **Manual Filter Settings** frames are not displayed here.

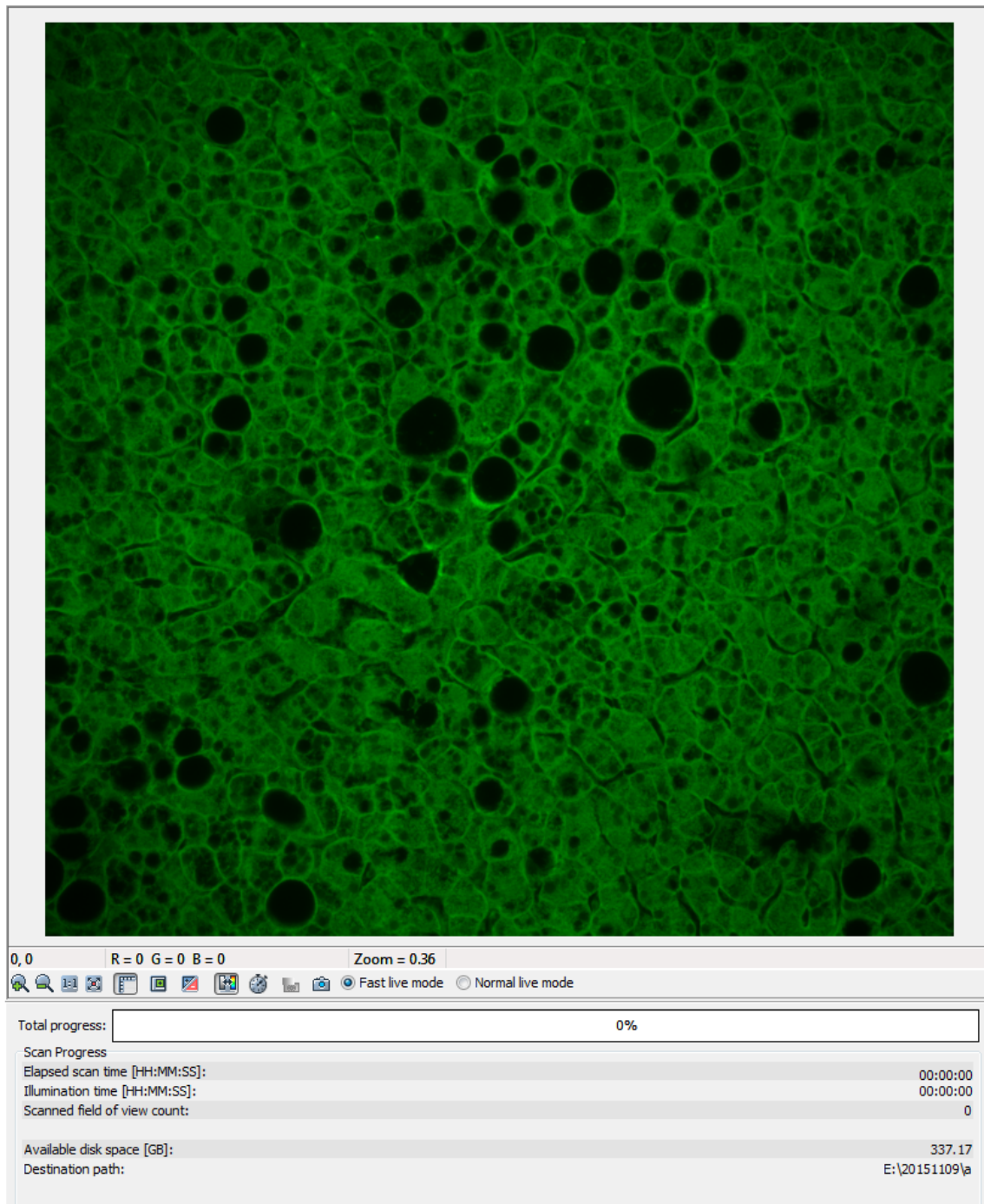
| Filter name: | DG: | Exp. [ms]: |      |
|--------------|-----|------------|------|
| DAPI         | 0   | 75.00      | Auto |
| FITC         | 0   | Auto       | Auto |
| TRITC        | 0   | 25.00      | Auto |
| Cy5          | 0   | Auto       | Auto |

Figure 56 – Hardware panel (selected mode: User controlled)

## Live

You can display a live image of the current specimen in the Live image display field by clicking  .

**NOTE:** Pseudo-color function can be activated on the Live image.



This option has no effect on a running digitization process where no live image is displayed. To display a live image during scanning, select **Show images during scanning** on the Service panel.

## Filters

Select the filter you want to display the live image with from the **Filters** selection box. The selected filter will be rotated into position only after displaying the Live image by clicking



You can display the Filter properties window by clicking . For more information, see section [4.5.1 Routine work panel](#).



### Note:

After 10 seconds, an empty position is rotated into position instead of the filter. However, the last snapshot is still displayed. In case Lumencor illumination unit is used, it is triggered by the pco.edge 4.2 camera so it will not emit light.

## Exposure

You can automatically detect the appropriate exposure time by clicking . You can also enter the exposure time manually by entering it into the **Exp. Time** field. If **Auto focus** is applied, the displayed raw image can be refined with **Auto Exp**. Click  to mark overexposed pixels on the live image.

The displayed **Excitation intensity** value is determined by the set amount of excitation based on the **EXC** column in the Channel settings section of **Routine Work** panel.

## Digital Gain



### Note:

This is camera-dependent, when working with Point Grey Grasshopper 3 camera the **Index** value ranges from 0 to 4, and when using pco.edge 4.2 the value ranges from 0 to 6.

You can enter the **Index** value by entering it in the box or by selecting the value with the arrow buttons. If you raise the **Index** value, the exposition time is halved by every step, and the image becomes noisier.

## Focus

To define focus limits, select **Limiting the range** checkbox. Set the upper and lower limits by selecting the desired value in the selection boxes. This is useful if **Auto Focus** does not find the focus on the specimen, but on the coverslip. Also, this makes the focusing sequence faster. By using **Set Current**, the **Lower limit** value is set to -32 of the current focus value and the **Upper limit** value is set to +32 of the current focus value. Use the two arrow buttons to focus manually. This is useful when you are interested in an area that remained blurry with **Auto Focus** (for example, the specimen is thicker in that area). This does not influence the way slides are digitized in Automatic mode. The manual focus is mainly for setup purposes, not for using the product as a traditional microscope.

Define the manual focus step size by adjusting the **Step size** slider. Search for the sharpest focus on the current field of view automatically by clicking  .

### Manual Focus

By selecting the **Use manual focus** box, you can preset the coarse focus value. By activating the **Coarse focus** function, the lower limit value is set to -64, and the upper limit value is set to +64 of the current focus value.



#### Note:

Before entering coarse focus value, turn live image on and set a suitable focus position.

You can accept the current z-value by clicking **Set Value**.

If you select the **Interpolated focus** option, the coarse focus level is calculated from three different focus points of the specimen. Carry out a manual focusing sequence in the preview image on those three points. Set the correct focus value of the desired preview position by clicking **Set**. If you want to go back to any of the previously set focus points, click the appropriate **Goto** button. To delete the stored values, click **Clear Values**. The software calculates a coarse focus level from the three values determined this way as a basis for the fine focusing routine. You can only define the start parameter here. This will, however, speed up the focusing process. If you deselect the **Use fine focus** checkbox, the software immediately starts scanning on the basis of the interpolated values, without pre-fine-focusing.

### Manual Filter Settings

By selecting the **Enable Settings** option, you can determine the exposure times (and if in confocal mode, the confocal gain values too). The values are typically set on **Auto**, meaning that the exposure times (and if in confocal mode, the confocal gain values too) are determined automatically.

After selecting the corresponding filter and activating the live image, you can preset an exposure time in the **Exposure value** field.

It is recommended to go to various positions in order to determine the intensity distribution throughout the specimen and define a representative value. You can accept the value for presetting by clicking **Set Value**. Repeat the procedure for all other filters.

### 4.5.5 Service panel

This panel contains control and maintenance functions.

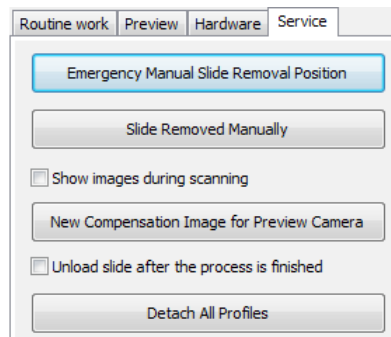


Figure 57 – Service panel

#### Emergency Manual Slide Removal Position

The specimen holder will be moved to a position where the slide can be removed manually after opening the cover (see section [5.3.1 Opening the protective covers](#)).

#### Slide Removed Manually

Click this button to notify the software that you have removed the slide manually.

#### Show images during scanning

If you select this option, you will be able to see the currently scanned image field during scanning in the live image display field. This slows down digitization process and should be activated only with purpose.

#### Unload slide after the process is finished

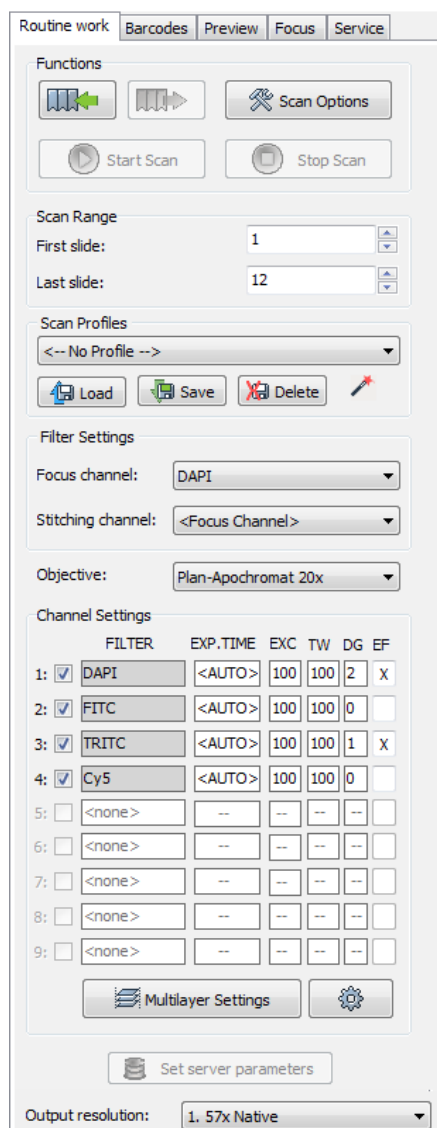
Slide is ejected after the scanning procedure is finished.

#### Detach All Profiles

Each of the profiles will be removed from the designated slide slots.

## 4.6 Using Fluorescent Automatic Mode

### 4.6.1 Routine work panel



Routine work | Barcodes | Preview | Focus | Service

**Functions**

Start Scan | Stop Scan | Scan Options

**Scan Range**

First slide: 1  
Last slide: 12

**Scan Profiles**

<-- No Profile -->

Load | Save | Delete

**Filter Settings**

Focus channel: DAPI  
Stitching channel: <Focus Channel>  
Objective: Plan-Apochromat 20x

**Channel Settings**

|    | FILTER                                    | EXP.TIME | EXC | TW  | DG | EF |
|----|-------------------------------------------|----------|-----|-----|----|----|
| 1: | <input checked="" type="checkbox"/> DAPI  | <AUTO>   | 100 | 100 | 2  | X  |
| 2: | <input checked="" type="checkbox"/> FITC  | <AUTO>   | 100 | 100 | 0  |    |
| 3: | <input checked="" type="checkbox"/> TRITC | <AUTO>   | 100 | 100 | 1  | X  |
| 4: | <input checked="" type="checkbox"/> Cy5   | <AUTO>   | 100 | 100 | 0  |    |
| 5: | <input type="checkbox"/> <none>           | --       | --  | --  | -- |    |
| 6: | <input type="checkbox"/> <none>           | --       | --  | --  | -- |    |
| 7: | <input type="checkbox"/> <none>           | --       | --  | --  | -- |    |
| 8: | <input type="checkbox"/> <none>           | --       | --  | --  | -- |    |
| 9: | <input type="checkbox"/> <none>           | --       | --  | --  | -- |    |

Multilayer Settings | Set server parameters

Output resolution: 1. 57x Native

**Figure 58 – Routine work panel**

The Routine work panel provides some basic digitization functions.

### To insert and remove slides

- To load the tray, click  . The system checks the positions for slides during the loading process.
- If you do not want to load all slides, you can specify the first and last slide to be loaded in the **Scan Range** by entering the appropriate slide numbers in the selection boxes of **First slide** and **Last slide**.
- To remove the tray, click  . It will then be moved to a position where you can remove it manually. Slide in the specimen holder is unloaded to the tray before the process.

You also find the  button on this panel, that you can start scanning with, but it is recommended to go through all the settings before clicking it.

### Scan Range

You can select a range of slides to be scanned here by entering the first and last slides in the selection boxes.

To administer profiles, use the **Scan Profiles** field.

- The current profile name is displayed at the bottom left corner of the screen.
- To save the current profile, click **Save**.
- To select an existing profile from the selection menu, click **Load**.
- You can delete the current profile by clicking **Delete**.

To access the Scan Options window, click  .



#### Note:

These settings are only applicable if you do not use profiles. If you use profiles, the settings stored in them are used. The used profile name is indicated at the bottom left of the main window.

For more information, see section [4.5.2 Scan Options](#).

### Filter Settings

- **Focus channel** – Choose a filter that you want to focus with. It is recommended to choose a filter that is related to the staining that stained the most of the specimen, or where the exposition time is low. You can choose from filters that you have previously selected in the **Channel Settings** field.
- **Stitching channel** – This is done on one channel. You can choose whether you want to do stitching on the focus channel, or on another channel. It is recommended to choose another channel if the focus channel was determined on the basis of exposition time, and it would display less information. It is recommended to choose a filter that is related to the staining that stained the most of the specimen.

The default selection is **<Focus Channel>**.

### Channel Settings

Select what types of filters you want to use during scanning. You can select the filter types and the number of channels to be used. Those filters are displayed automatically that you have previously defined in the **Options / Microscope Settings** at the mode selection screen.

For more information on predefining filters, see section [4.2.3 Microscope Settings / Filter Settings](#).

To set filter properties, select a filter and click on any of the white boxes of the **EXC**, **ET**, **TW** or **DG** columns next to the filter name, or click . This displays the Filter Properties window.

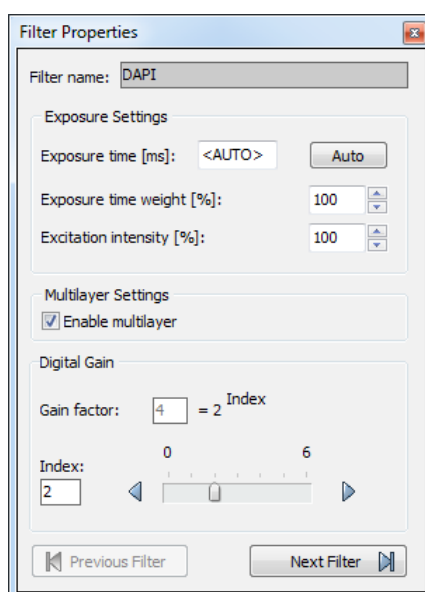


Figure 59 – Filter properties window

- **Filter name**

The name of the filter is displayed here.

- **Exposure Settings**

**Exposure time** – You can set the fix exposition time here. By selecting the **Auto** button, the exposition time is set to <AUTO> (the exposition time is calculated by the software). If the fix position is set, the **Exposure time weight** value is not valid.

You can set the **Exposure time weight (%)** here (displayed under **TW** in the **Filter Selection** frame).

In full automatic mode, the system automatically calculates the exposition time to the given channel. You can increase / decrease this amount here in a range of 50%-200%.

- **Multilayer Settings**

**Enable Multilayer** function and the concerning settings can be activated in this field, accordingly, you can set the **Extended focus** and/or **Z-stack** values for each channel separately.

- **Digital Gain**



**Note:**

This function is camera-dependent, works only with Point Grey Grasshopper 3 (**Index** value ranges from 0 to 4) and pco.edge 4.2 (**Index** values: 0-6).

You can enter the **Index** value by entering it in the box or by selecting the value with the arrow buttons.

If you raise the **Index** value, the exposition time is halved by every step, and the image becomes noisier.

You can move between the filters by clicking **Previous Filter** or **Next Filter**.

## Multilayer Settings

By clicking the  the Multilayer Settings window is displayed. The containing settings are the same as in Brightfield mode, but you can set an **Extended focus** or a **Z-stack** value for the specific channel.

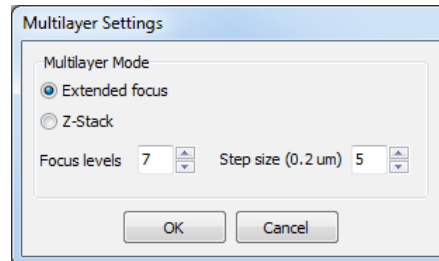


Figure 60 – Filter properties window

Set the focus level value under the **Number of focus levels** box, and the **Focus step size (one step = 0.2  $\mu$ m)**.

Once you have set the correct values, tick the multilayer checkbox (**EF** or **ZS** column) of the channel for which you want to apply these settings, or activate **Enable Multilayer** function in the Filter Properties window.

For more information about **Extended Focus**, see section [4.3.5 Focus panel](#).

## Output resolution

The resolution of the output digital slide can be modified to result a smaller file size. You can select the output resolution from the drop-down list, where **Native** is the raw resolution of the slide, and other values are listed (40x, 20x, etc.) depending on the size native resolution.

## 4.6.2 Barcodes panel

Routine work | **Barcodes** | Preview | Focus | Service

1: ☐ Apply one profile to all slides  
 Current Profile: Current Profile

2: ☒ Read barcode if no name is defined on the list

3: ☐ Enable parsing of barcodes or defined names  
 Folder mask 1:   
 Folder mask 2:   
 Folder mask 3:   
 Folder mask 4:   
 Folder mask 5:   
 Name mask:   
 Profile mask:   
☐ Match only the beginning of the profile name

4: ☒ Generate name if no name was defined

 Load Names and Profiles from File

 Save Names and Profiles to File

 Delete Names and Profiles

Tray

| Sl | Names / Barcodes | Profiles        |
|----|------------------|-----------------|
| 1  | FLSS-1234-001A   | <b>FL_stain</b> |
| 2  | FLSS-1234-002B   | <b>FL_huh7</b>  |
| 3  | FLSS-1234-003C   | <b>FL_huh7</b>  |
| 4  | FLSS-1234-004D   | <b>FL_stain</b> |
| 5  |                  | Current Profile |
| 6  |                  | Current Profile |
| 7  |                  | Current Profile |
| 8  |                  | Current Profile |
| 9  |                  | Current Profile |
| 10 |                  | Current Profile |
| 11 |                  | Current Profile |
| 12 |                  | Current Profile |

Current profile: FL huh7

**Figure 61 – Barcodes panel**

On this panel, you can set identification features to the various slides and for assigning profiles.

### Modes on the panel

- **Apply one profile to all slides**
  - One profile is used for all slides in a batch.
  - **Current Profile** is the profile that was loaded in **Routine work / Scan Profiles**.
  - You can also select any other profile in the selection box.
- **Read barcode if no name is defined on the list**
  - The barcode will be used as name for the virtual slide. This option will work only if no name has been entered in the **Names / Barcodes** cell of the table.
- **Enable parsing of barcodes or defined names**
  - You can define the output directory, the name and the profile to be used by barcodes.
  - The positions of the characters in the barcode are defined in the mask fields. It is possible to define areas using the character '-'. Characters located at different places of the barcode may be combined by using a comma.
  - Mainly 2D barcodes are used for this purpose. It is possible to use 1D barcodes, however, it can contain less information.
  - You can create up to five sub-directories by the barcode.
  - If you use long strings for defining the profile name, select **Match only the beginning of the profile name**. This makes profile coding faster.

**Note:**

Make sure that only one profile name begins with those characters.

### Example for character string analysis

- Character string: PANNORAMIC\_MIDI\_123
  - Mask: 1-10 = PANNORAMIC
  - Mask: 12-15 = MIDI
  - Mask: 1-10, 17-19 = PANNORAMIC123

**Note:**

You can separate the character groups with any character you choose, it will not be read by the software.

**Example for barcode usage**

- Barcode: Folder\_Vir\_123\_prof\_n
- **Folder** is the folder for saving
- **Vir** is the name of the virtual slide
- **123\_prof\_n** is the profile name
- The barcode control will then look like the following:
  - Folder mask 1: 1-6
  - Folder mask 2: <empty>
  - Folder mask 3: <empty>
  - Folder mask 4: <empty>
  - Folder mask 5: <empty>
  - Name mask: 8-10
  - Profile mask: 12-21

**Note:**

The **Profile mask** row is inactive if the option **Apply one profile to all slides** is active.

- **Generate name if no name was defined**

By choosing this option, a name is generated automatically in the following format if no name was defined and there is no barcode:

`<tray number>M<slide position>` (for example, 1M10)

1M does not change, the number after 1M represents the slide position. In this example, the name indicates a slide in position 10.

You can also define names for the slides in the table, by entering names into the column **Names / Barcodes**. You can also define profiles in the selection boxes in column **Profiles** if you intend to use different profiles for slides.

- Only those positions are active that have slides in it.
- Current Profile is the profile loaded in **Routine Work / Scan Profiles**.
- **Load Names and Profiles from File**

You can import previously saved names and assigned profiles by clicking

 Load Names and Profiles from File

- **Save Names and Profiles to File**

By clicking the  button, you can save the entered names and assigned profiles. You can define a name before saving. The information will be saved in a CSV format:

`1;<slide position>,<slide name>,<profile name>`

You can export this information into Excel where you can change the data and save it again in CSV format.

- **Delete Names and Profiles**

You can delete all entries from the table by clicking

 Delete Names and Profiles

### 4.6.3 Preview panel

The screenshot shows the 'Preview' tab of a software interface. It contains several sections: 'Scan area selection' with a 'Preview Type' dropdown set to 'Brightfield Preview', radio buttons for 'Use threshold' (selected), 'Scan specimen with auto threshold', and 'Scan specimen with user set threshold' (selected). Below these are input fields for 'Specimen threshold level' (35) and 'Marker threshold level' (150). There are also checkboxes for 'Scan area inside the marker' and 'Scan everything within marked area'. The 'General threshold options' section includes checkboxes for 'Remove coverslip', 'Fill holes in scan area', and 'Remove specks', along with a 'Speck size' input field (0.496 mm<sup>2</sup>) and a 'Scan area dilation' input field (200 μm). At the bottom, there is a radio button for 'Use saved scan area' with a 'Path' input field, 'Load' and 'Save' buttons, and a checkbox for 'Use selection box'.

**Figure 62 – Preview panel**

The Preview panel offers options for threshold setting and selection of the area to be scanned. The options in Automatic mode are the same as described in Manual mode.

In Automatic mode you cannot change the threshold values (it will use the threshold values that were set previously in the Manual mode), and when activating the **Use selection box** option, the area cannot be set.

For more information, see section [4.5.3. Preview panel](#).



**Note:**

It is recommended to use profiles, because settings cannot be modified in Automatic mode.

#### 4.6.4 Focus panel

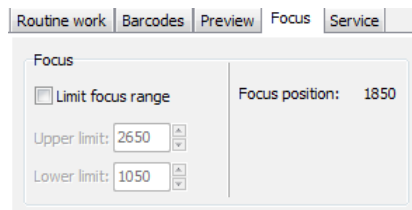


Figure 63 – Focus panel

##### Focus

You can define focus limits by selecting **Limit focus range** checkbox. You can set the upper and lower limits by selecting the desired value in the selection boxes.

This is useful if focusing was not targeted on the specimen, but on a spot on the coverslip.

#### 4.6.5 Service panel

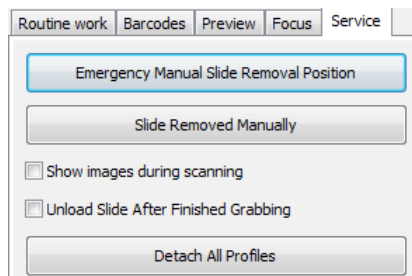


Figure 64 – Service panel

This panel contains the following control and maintenance functions:

##### Emergency Manual Slide Removal Position

The specimen holder will be moved to a position where the slide can be removed manually after opening the cover (see section [5.3.1 Opening the protective covers](#)).

##### Slide Removed Manually

Click this button to notify the software that you have removed the slide manually.

##### Show images during scanning

If you select this option, you will be able to see the currently scanned image field during scanning in the live image display field. This slows down digitization process and should be activated only with purpose.

**Unload slide after finished grabbing**

Slide is ejected after the grabbing procedure is finished.

**Detach All Profiles**

Each of the profiles will be removed from the designated slide slots.

## 4.7 Scan To CaseCenter

The **Scan to CaseCenter** function is available for you to scan directly to a dedicated CaseCenter server.

To setup a connection with a designated server, follow the steps below:

1. Click **Scan Options** on the Routine Work panel.

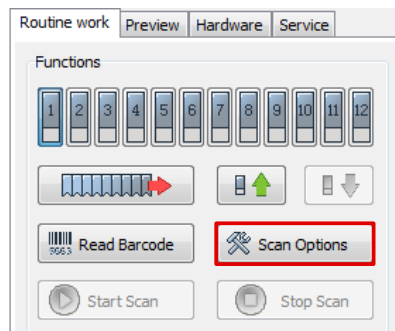


Figure 65 – Scan Options button

2. Select the **Scan to CaseCenter** option in the Scan Option window, then click **Connect**.

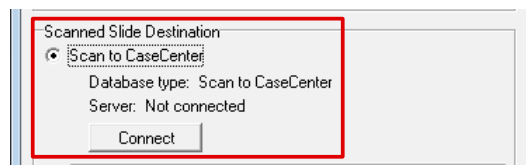


Figure 66 – Scan to CaseCenter option

3. Type in or select the server address from the **Connect to:** drop-down list, then give the user name and password. Activate the **Secure connection** option to enable HTTPS connection. Click **Connect** when finished.

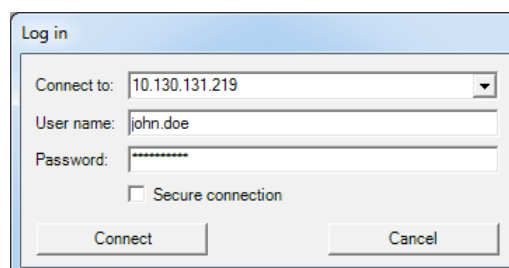
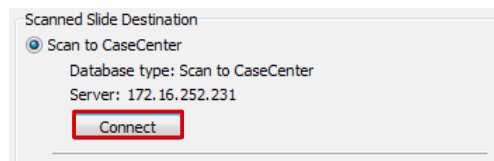


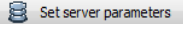
Figure 67 – Server Log in window

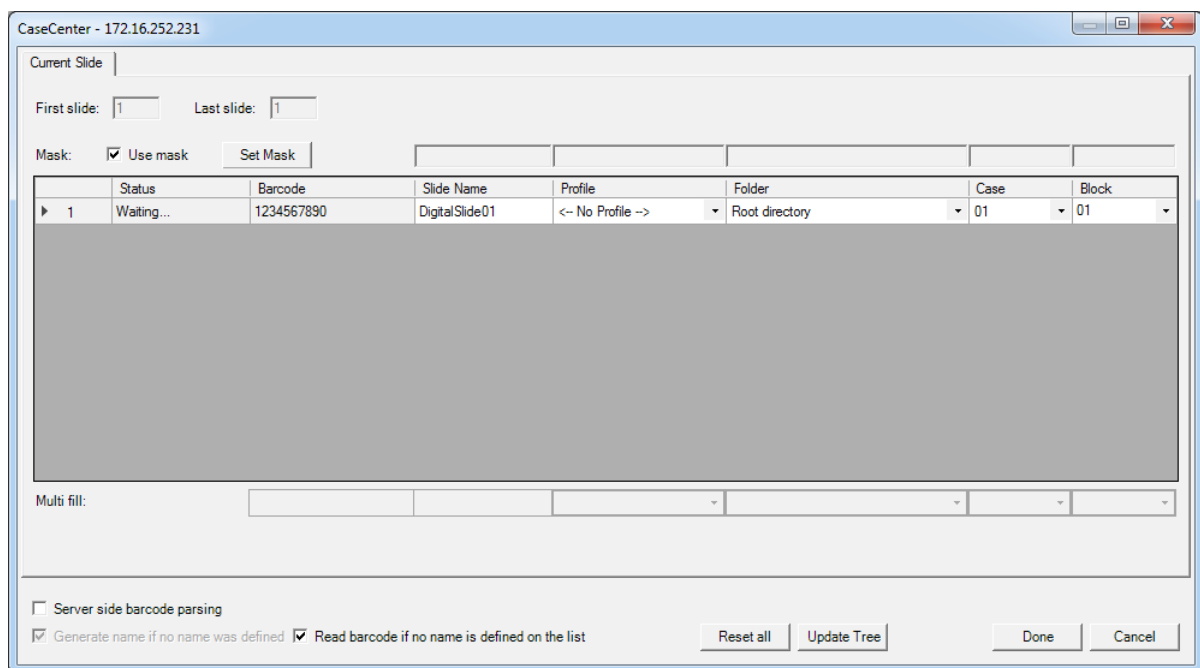
- Click the **Connect** button in the Scan Options window to connect to the server. If the connection is established the server status will be modified from *Not connected* to *Connected*. Click **OK** to close the Scan Options window.



**Figure 68 – Connected to server**

### Slide settings in the CaseCenter window

- In the Routine work panel, click the  button.
- The CaseCenter window opens.
  - Slide data is displayed in a form for the slides loaded in the tray. If in Manual Mode, only the data of the actually loaded slide can be set (see **Figure 69**), and when in Automatic Mode, the form contains 12 rows for all the slots on the tray (**Figure 70**).



**Figure 69 – CaseCenter window in Manual Mode**

CaseCenter - 172.16.252.231

Tray

First slide: 1 Last slide: 12

Mask: ☒ Use mask Set Mask

|    | Status     | Barcode | Slide Name | Profile         | Folder         | Case | Block |
|----|------------|---------|------------|-----------------|----------------|------|-------|
| 1  | Waiting... |         |            | Current Profile | Root directory |      |       |
| 2  | Waiting... |         |            | Current Profile | Root directory |      |       |
| 3  | Waiting... |         |            | Current Profile | Root directory |      |       |
| 4  | Waiting... |         |            | Current Profile | Root directory |      |       |
| 5  | Waiting... |         |            | Current Profile | Root directory |      |       |
| 6  | Waiting... |         |            | Current Profile | Root directory |      |       |
| 7  | Waiting... |         |            | Current Profile | Root directory |      |       |
| 8  | Waiting... |         |            | Current Profile | Root directory |      |       |
| 9  | Waiting... |         |            | Current Profile | Root directory |      |       |
| 10 | Waiting... |         |            | Current Profile | Root directory |      |       |
| 11 | Waiting... |         |            | Current Profile | Root directory |      |       |
| 12 | Waiting... |         |            | Current Profile | Root directory |      |       |

Multi fill:

☐ Server side barcode parsing

☒ Generate name if no name was defined ☒ Read barcode if no name is defined on the list

Import CSV Export CSV

Reset all Update Tree

Done Cancel

Figure 70 – CaseCenter window in Automatic Mode

- Give the number of the starting (**First slide**) and the final slide (**Last slide**) to be scanned in the appropriate field. For example, if you want to scan slides to server from 1-12, type: First slide: **1**; Last slide: **12**.
- There are three options at the bottom of the window:
  1. **Server side barcode parsing** option can be selected if CaseCenter is connected with the supported HIS/LIS. This way the barcode read by the software is being identified, and the predefined location of that specific case in CaseCenter is automatically selected as scanning destination based on the CaseID (containing slide and patient data stored on HIS/LIS). Therefore, **Slide name**, **Folder**, **Case**, and **Block** field data cannot be modified, only a profile can be selected.
  2. The **Generate slide name if no name was defined** option can be activated when you do not want to type in a unique name for each slide.
  3. Upon activating the **Read barcode if no name is defined on the list** option, the slide barcode will be read and set in the Barcode field.
- Use masks for automatic fills. Activate the **Use mask** option and the mask fields turn fillable. To save masks, click the **Save Mask** button. To modify masks click **Set Mask**. For example, by creating a string for the slide name fields based on the characters of the barcode, a unique name will be generated. The barcode '0123456789', and a mask '1-3' result that the first four characters of the barcode will be displayed and set as slide name (012). **Case** and **Block** fields can be set this way as well, if necessary (see **Figure 71**).

**NOTE:** When filling slide data fields, press **TAB** to move to the next cell.

|     | Status     | Barcode    | Slide Name | Profile         | Folder         | Case | Block |
|-----|------------|------------|------------|-----------------|----------------|------|-------|
| ✓ 1 | Waiting... | 1234567890 | 123        | Current Profile | Root directory | 456  | 789   |
| 2   | Waiting... | 2345678901 | 234        | Current Profile | Root directory | 567  | 890   |
| 3   | Waiting... | 3456789012 | 345        | MyProfile1      | Root directory | 678  | 901   |
| 4   | Waiting... |            |            | MyProfile2      | Root directory |      |       |
| 5   | Waiting... |            |            | MyProfile3      | Root directory |      |       |
| 6   | Waiting... |            |            | MyProfile4      | Root directory |      |       |
| 7   | Waiting... |            |            | Current Profile | Root directory |      |       |
| 8   | Waiting... |            |            | Current Profile | Root directory |      |       |
| 9   | Waiting... |            |            | Current Profile | Root directory |      |       |
| 10  | Waiting... |            |            | Current Profile | Root directory |      |       |
| 11  | Waiting... |            |            | Current Profile | Root directory |      |       |
| 12  | Waiting... |            |            | Current Profile | Root directory |      |       |

Figure 71 – CaseCenter window in Automatic Mode

- Profiles can be added by selecting a list entry from the **Profile** drop-down list.
- Select a folder where the slide will be scanned to. After clicking the **Folder** drop-down list, a path will be displayed in which the destination folder can be selected.

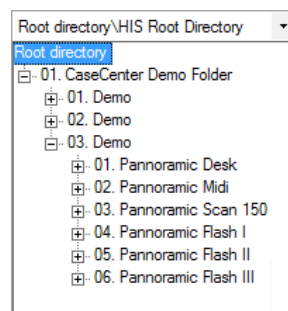


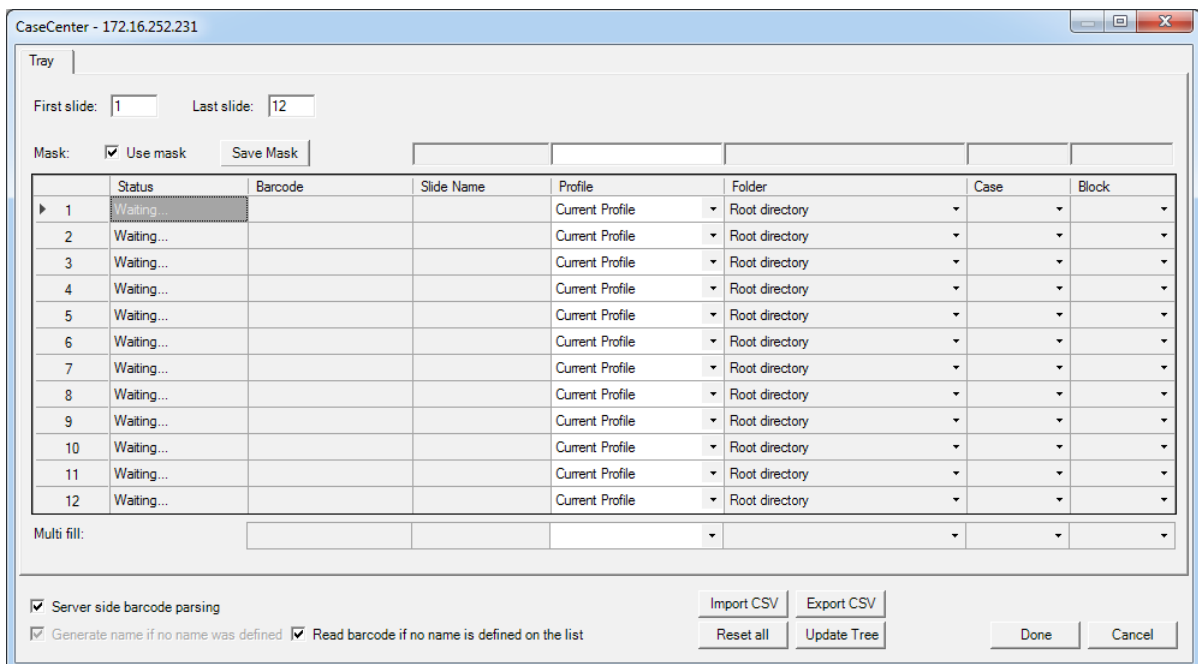
Figure 72 – Folder selection

- Fill in the **Case** and **Block** fields in case you do not use masks, or select an item from the drop-down list.
- With the **Multi fill** option the selected slides will be given the same input data to their specific fields. **Profile**, **Folder**, **Case**, and **Block** fields can be auto-filled this way by clicking the drop-down lists at the **Multi fill** section at the bottom of the window.

Rows can be selected one by one clicking the row headings while the **Ctrl** button on your keyboard is pressed down, or select the entire form by clicking the gray field at the top left corner.

- To erase/reset fields to default, click the **Reset all** button.

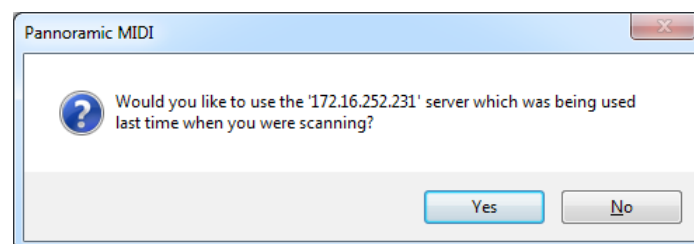
- If modification is done to the folder tree of the CaseCenter server while the CaseCenter window is open, click **Update Tree** to refresh the tree view.



**Figure 73 – CaseCenter window during the barcode parsing process**

- **Import CSV** – Import entered names and assigned profiles stored in a CSV file.
- **Export CSV** – Export entered names and assigned profiles. You can define a name before saving. The information will be saved in a CSV format:  

```
1;<slide position>,<slide name>,<profile name>
```
- Click **Done** when finished or **Cancel** to quit the CaseCenter window. If you save the form, slides will be scanned to server according to the data recorded in the form after you start scanning.
- After restarting the scanner software a dialog window appears when scanning to server is performed previously. Click **Yes** to use the last used server, or **No** to get back to local scan mode.



**Figure 74 – Reconnecting to the previously used server**

## 4.8 Using Profiles

**Note:**

Saved profile settings cannot be applied if using a different type of Pannoramic scanner.

If you want to scan a group of slides, it is advised to save your settings previously in a profile and continue scanning in Automatic mode. You can save the following settings in a profile:

**Scan Mode**

- Brightfield
- Fluorescent

**Scan Options**

- Focus frequency (in Fluorescent mode)
- Focus frequency (in Brightfield mode)
- Compression procedure
- Use of a fixed compensation image (in Brightfield mode – ON/OFF)
- Use of Save focus quality (ON/OFF)
- Use of stitching (ON/OFF)

**Determination of the area to be scanned**

- Use of automatic threshold specimen
- Use of specimen threshold value
- Use of marker pen threshold and specimen threshold values
- Use of scan everything within marked area (ON/OFF)
- Remove coverslip function (ON/OFF)
- Filling of holes (ON/OFF)
- Use of removing specks according to the set value (ON/OFF)
- Use saved scan area
- Use selection box (ON/OFF)

**Fluorescent settings**

- Filter position(s)
- Selected focus channel
- Selected stitching channel
- Flat field correction (ON/OFF)
  - Intensity statistics
  - Intensity reducing
  - Intensity equalization
- Sharpening (ON/OFF)
- Use of skip empty field-of-views (ON/OFF)
- Do not use extended focus on empty field-of-views (ON/OFF)
  - Custom extended focus

**Other settings**

- Limitation of focus range (ON/OFF)
- Focus quality (ON/OFF)
- Enable/disable Multilayer options
- Use of extended focus or Z-stack step size and focus level
- Output resolution

## 5 Troubleshooting and Maintenance

### 5.1 Safety Information

Check cables, plugs and connections before operation, and if defective or cannot be replaced, contact Thermo Fisher Scientific Service for support.

Check whether the device is compatible with your local line voltage. It can operate at line voltages 100V to 240V and 50/60 Hz.

Only plug the device in a socket with protective grounding (earth) contact.

Do not operate the device in explosive environment.

Disconnect the device from the power outlet before opening it or replacing a part.

The product is not equipped with protection against hazardous materials (infectious, toxic, radioactive, corrosive substances or other effects damaging to health). Decontaminate infectious materials after use.

Slides that are not used any longer do not classify as domestic waste and must be treated as hazardous materials and disposed in compliance with the currently valid legal requirements.

Dust, specks and humidity may decrease or harm the operating capability of the device. Protect it with dust cover when not in use. Switch the power off before covering it.

There is crush hazard during operation in the area of input or output. Trays should be moved through software. Never open the device unless prompted accordingly by the software.

Defective devices do not classify as domestic waste. Dispose of the device in compliance with the currently valid legal requirements.

#### **Lumencor SPECTRA 6 illumination unit**

- **NEVER** switch on the Lumencor SPECTRA 6 Light Engine illumination units when they are not connected to the microscope.
- Ensure that the light source is properly connected.
- Do not cover the unit, as it would cause abnormal temperature rising.

**Lumencor SOLA SM II illumination unit**

- Keep inflammable and combustible materials outside the range of **SOLA SM II** illumination unit.
- Do not expose yourself to the UV radiation of the **SOLA SM II** illumination unit.
- When the **SOLA SM II** illumination unit is switched on:
  - **NEVER** look directly into the fiber-optic cable.
  - **NEVER** remove the fiber-optic cable from the device.
  - **NEVER** connect the fiber-optic cable to the device.
  - **NEVER** remove the housing from the device.

**5.1.1 Cleaning the device**

- Before cleaning, switch off the device and pull the plug out.
- Do not let liquid penetrate into the system.
- To clean liquid from the device, use a lint-free cotton cloth. You can moisten the cloth with water.
- To clean greasy surfaces, it is recommended to apply **soapy water** on a piece of lint-free cotton cloth and gently rub the surface.

**5.1.2 Cleaning the trays**

**NEVER** clean the trays with **Xylene**, because it might harm the plastic. We recommend to apply **Isopropanol** on a piece of lint-free cotton cloth and gently rub the surface instead. In case the tray is damaged, use either order a new one, as inserting a deteriorated tray could lead into unsafe loading of slides.

**5.1.3 Preventive maintenance****To prevent fungus growth**

- Do not leave the equipment in an unconditioned environment with a storage temperature above 60°C (140°F) or below 0°C (32°F), which may damage the equipment.
- Maximum operating temperature is 35°C (95°F) with a relative humidity of less than 75%.
- Install it in a room with proper air ventilation.
- Do not let dust or fingerprints remain on optical surfaces.

## 5.2 Troubleshooting

This section describes the most common troubleshooting solutions for the Pannoramic MIDI II product.

If any problem arises that does not have solution in this manual, contact the service personnel.

### The product does not start

- **Power supply is interrupted**

1. Make sure that the 24V external power supply is on.
2. Check cable connections.

### Control software has stopped

- **Slide jammed**

1. Exit control software.
2. Switch off control computer and 24V power supply, disconnect power cable.
3. Remove protective covers. Follow the steps in section [5.3.1 Opening the protective covers](#).
4. Remove slide manually (see section [5.3.4 Removing a slide](#)).
5. Reattach protective covers.
6. Reconnect 24V power supply and control computer to line power supply.
7. Switch on the 24 V power supply.
8. Switch on the control computer.
9. Launch control software.

- **Tray jammed**

1. Exit control software.
2. Switch off control computer and 24V power supply, disconnect power cable.
3. Remove protective covers (see section [5.3.1 Opening the protective cover](#)).
4. Remove tray manually. If a jammed tray cannot be removed, contact service personnel.
5. Reattach protective covers.
6. Reconnect 24V power supply and control computer to line power supply.

7. Switch on the 24 V power supply.
8. Switch on the control computer.
9. Launch control software.

**Virtual slide is improperly focused almost across its entire surface**

- **Focus range enabled**
  - Disable **Limiting focus range** function

**Poor image quality**

- **Imaging error (for example, chromatic aberrations)**
  - Contact Thermo Fisher ScientificService for support.

**Warning!**

Do not modify the camera driver settings, as the default factory settings give the most accurate images.

**Virtual slides show poor stitching in Pannoramic Viewer**

- **Scan camera is not properly adjusted (for example, due to loose fixture)**
  - Contact Thermo Fisher Scientific Service for support.

**Slide is often positioned incorrectly**

- **Guiding fault in transport system**
  - Contact Thermo Fisher Scientific Service for support.

**Digitization process is extremely slow**

- ***Extended focusing* option is activated**
  - Deactivate the **Extended focusing** option if not required.
- ***Z-stack* option is activated**
  - Deactivate the **Z-stack** option if not required.

**Image is out of focus (in Manual mode)**

- **Focus range limit is activated**
  - Deactivate the **Limiting focus range** option.
- **Focus range setting is incorrect**
  - Change focus range setting.

**All individual images show a shading effect**

- **Algorithm failed to find empty image fields**
  - Capture a reference image with a blank slide (see section [4.2.2 Image Compensation](#)).

## 5.2.1 Fluorescent Applications (optional)

**The switching of the Lumencor SPECTRA 6 cannot be triggered, in spite of trigger connection through the camera.**

- Contact Thermo Fisher Scientific Service for support.

**No suitable exposure time can be found. Signal is too weak.**

- **Lumencor SOLA SM II is switched off**
  - Switch light source on.

## 5.3 Maintenance

This section describes the most common maintenance solutions that can be performed by the user of the product. For maintenance solutions not described in this manual, contact the service personnel.

### 5.3.1 Opening the protective covers

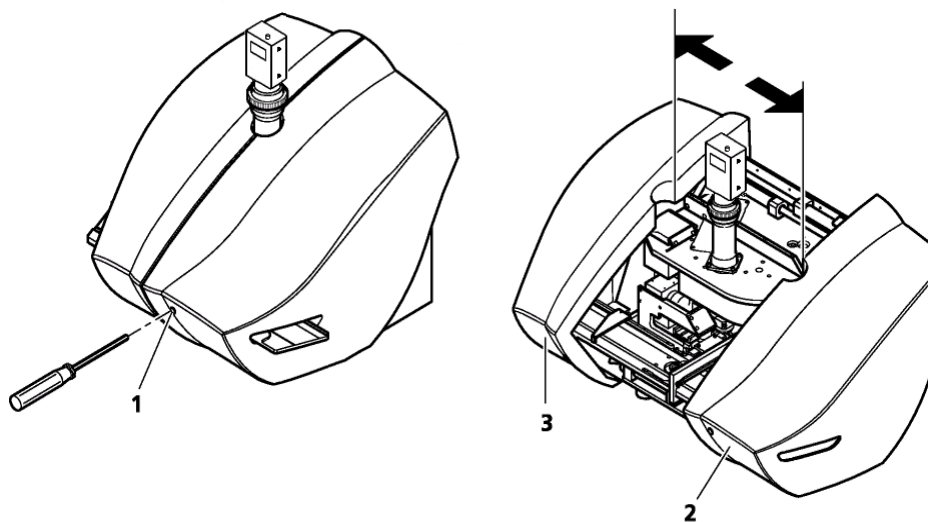
To perform any maintenance work and to interrupt a running digitization procedure because of slide or tray jamming, the protective covers of the Pannoramic MIDI II need to be opened in order to eliminate the problem.

Before removing the cover, exit the control software, switch off the 24 V power supply and disconnect the power cables (exception: filter change).



**Note:**

To improve access to special points you can remove the covers completely.



**Figure 75 – Removal of covers**

The protective cover is composed of two halves locked to each other. Locate the hole **(1)** at the front of the right half of the cover **(2)**:

1. Push with a blunt or long object (for example, with a 3 mm Allan key) against the opener lever behind the hole to open the lock. You will hear a “clack”.
2. The two halves can be pushed apart.

**Note:**

If necessary, one or both halves can be removed completely. For this purpose, push them to the right or to the left until they can be detached.

3. On completion of the maintenance or repair work, the cover halves must be pushed together again and locked. A “clack” sound can be clearly heard.

**Caution!**

Make sure that no cables are squeezed as you replace the cover(s). This refers in particular to the cable(s) of the scan camera.

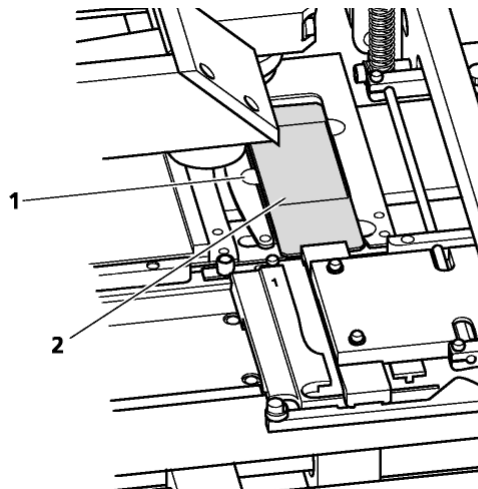
### 5.3.2 Removing a slide

If a slide got jammed or has suffered breakage during the process of digitization, stop the process and, if possible, move the slide holder to a position where the slide can be easily removed by clicking the **Emergency Manual Slide Removal Position** button (see section [4.3.6 Service panel](#)).

**Warning!**

Crush hazard! Before you remove a jammed slide, cancel the running digitization process, terminate the software session and turn the power off.

Any manipulation performed on a mechanical component must be followed by a complete device initialization routine (software restart).



**Figure 76 – Removing a slide**

1. Push protective covers apart (see section [5.3.1 Opening the protective covers](#)).
2. Move clamp **(1)** to the left, so the slide could be easily removed.
3. Remove the slide **(2)** carefully.



**Caution!**

If the slide is broken, make sure to remove all pieces completely from the device. The edge of the broken area of the slide is sharp and it can lead to injury and contagion! Broken slide can be removed only by a well-trained person!

4. Push protective covers together again (see section [5.3.1 Opening the protective covers](#)).
5. Launch control software.

### 5.3.3 Installing and Removing the Filter Module (Fluorescent Option)

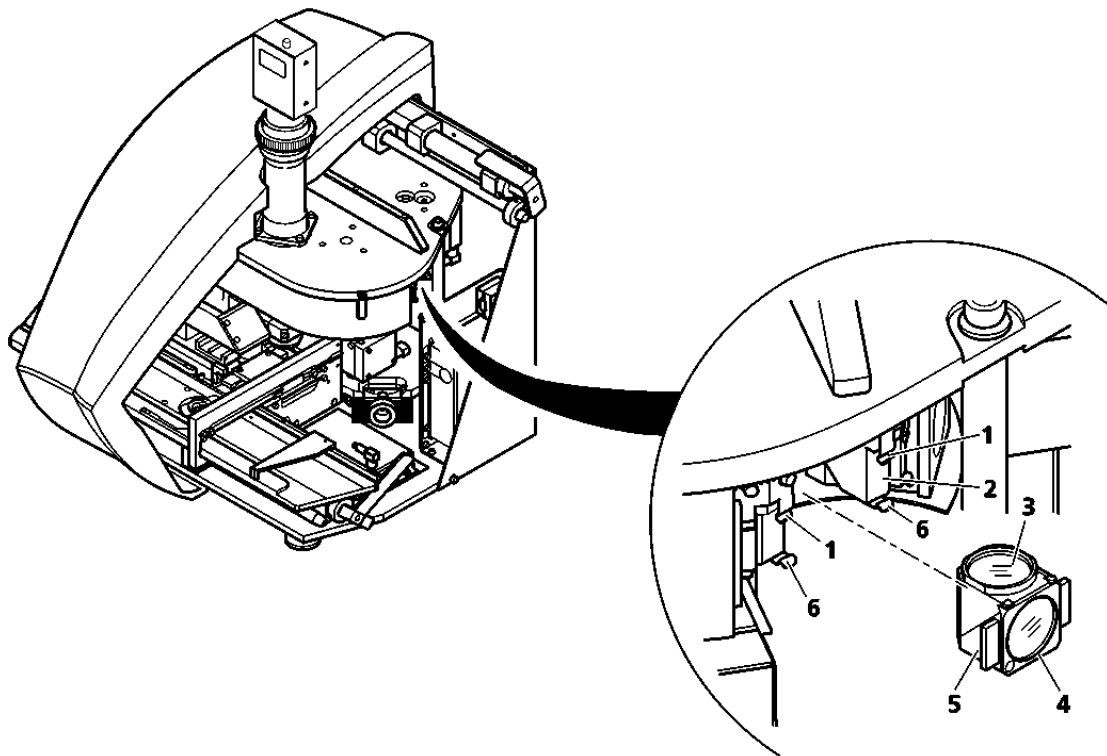


Figure 77 – Installing and removing the filter module

1. If using an Lumencor SOLA SM II illumination unit, turn it off.



**Warning!**

Crush hazard! Stop the running digitization process before you proceed with filter module installation or removal.

2. Pull the pair of the protective cover halves apart or remove the right part completely (see section [5.3.1 Opening the protective covers](#)), but do not switch the main unit off.
3. Select the desired filter in the corresponding software window (see section [4.2.3 Microscope Settings / Filter Settings](#)). The filter will be positioned in such a way that the user can access it without having to turn the filter wheel manually.
4. Enter the respective parameters in the input fields.

**Warning!**

Crush hazard! Rotating the filter turret motorically during installation or removal may lead to injury.

5. Hold the filter module by its handling pads **(5)** (one on the right, one on the left side of the module) and insert its upper part in forward tilted position under the upper spring-loaded clamps **(1)**.
6. Press the filter module by its handling pads, until it safely connects to the bottom spring-loaded clamps **(6)**.

Mounting position of the filters: Excitation filter **(4)**; Emission filter **(3)**.

7. To remove the filter module, first slightly tilt it out of its bottom spring-loaded fixtures **(6)**, then pull it out of the upper spring-loaded components **(1)** and take it off.
8. Place the protective covers back again (see [5.3.1 Opening the protective covers](#)).
9. If a Lumencor SOLA SM II illumination unit is used, turn it on again (consider the cooling time possibly required).

### 5.3.4 Transporting Pannoramic MIDI II

The following procedure shows how to transport Pannoramic MIDI II in-house. For transporting the whole system to other location, see **Appendix**.

**Note:**

The base unit does not have carrying handles for transporting. Two people can carry the base unit by holding it by its base plate. You can find the weight data of the base unit in section **6. Technical Data**.

**Caution!**

Be sure that the scan camera is not moved during transportation.

To transport Pannoramic MIDI II do the following:

1. Turn power supply off and detach all cables.
2. Remove the slide tray if necessary.
3. Transport Pannoramic MIDI II with the help of another person.
4. After finishing transportation, reestablish cable connections.

**Caution!**

Do not lift or transport Pannoramic MIDI II by holding its protective covers!

**Caution!**

Readjust camera angle if necessary after transporting and reinstalling the Pannoramic MIDI II!

## 6 Technical Data

### Dimensions (width x depth x height)

|                                    |                                              |
|------------------------------------|----------------------------------------------|
| Base unit                          | approx. 700 mm (W) x 500 mm (D) x 500 mm (H) |
| Base unit with fluorescence option | approx. 700 mm (W) x 500 mm (D) x 500 mm (H) |
| 24V 100W power supply              | approx. 189 mm x 90 mm x 44 mm               |

### Weight

|                                   |               |
|-----------------------------------|---------------|
| Base unit                         | approx. 23 kg |
| Base unit with fluorescent option | approx. 26 kg |
| 24V 100W power supply             | approx. 550 g |

## Ambient conditions

### Transportation / shipment (packed)

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

### Storage

|                                                    |               |
|----------------------------------------------------|---------------|
| Permissible ambient temperature                    | +0°C to +60°C |
| Permissible relative air humidity (non-condensing) | 75%           |

### Operation

|                                   |                     |
|-----------------------------------|---------------------|
| Permissible ambient temperature   | +10°C to +35°C      |
| Permissible relative air humidity | 75%                 |
| Altitude at installation site     | max. 2000 m         |
| Atmospheric pressure              | 500 hPa to 1060 hPa |
| Degree of pollution               | 2                   |

**Operating data**

|                                                 |                                                                                                          |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Intended site</b>                            | closed room facilities                                                                                   |
| <b>Electrical protection class</b>              | I                                                                                                        |
| <b>Internal protection degree</b>               | IP 20                                                                                                    |
| <b>Electrical safety</b>                        | in compliance with DIN EN 61010-1:2001, DIN EN 61010-2-101:2002 (IEC 61010-1:2001, IEC 61010-2-101:2002) |
| <b>Over-voltage category</b>                    | II                                                                                                       |
| <b>Radio interference suppression</b>           | in accordance with EN 55011 class B                                                                      |
| <b>Noise immunity</b>                           | in accordance with EN 61326-2-6:2005                                                                     |
| <b>Base unit input voltage</b>                  | 24V DC $\pm$ 1V                                                                                          |
| <b>Power consumption of the complete device</b> | 60 VA                                                                                                    |

**SINPRO MPU101-108 – 24V external mains power supply unit**

|                                       |                                                                 |
|---------------------------------------|-----------------------------------------------------------------|
| <b>Intended site</b>                  | closed room facilities                                          |
| <b>Electrical protection class</b>    | I                                                               |
| <b>Internal protection degree</b>     | IP 20                                                           |
| <b>Electrical safety</b>              | in compliance with UL 2601-1, TÜV EN 60601, CE EN60601-1-2:2001 |
| <b>Over-voltage category</b>          | II                                                              |
| <b>Radio interference suppression</b> | in accordance with CISPR-11 EN 55011 class B                    |
| <b>Line input voltage</b>             | 100 V AC to 240 V AC                                            |
| <b>Line input frequency</b>           | 50 / 60 Hz                                                      |
| <b>Power consumption</b>              | max. 100 VA                                                     |
| <b>Secondary voltage</b>              | 24V DC                                                          |
| <b>Secondary current</b>              | max. 4.8 A                                                      |

**Light sources**

|                                                           |                                                            |
|-----------------------------------------------------------|------------------------------------------------------------|
| <b>Transmitted light source</b>                           | Multichannel LED-based with wide Red, Green, Blue emission |
| <b>Average service life of transmitted light source</b>   | ~ 30000 hrs                                                |
| <b>Fluorescent light source</b>                           | Lumencor SPECTRA 6 or SOLA SM II Light Engine              |
| <b>Estimated service life of Fluorescent light source</b> | ~ 20 000 h                                                 |

This User's Guide describes Lumencor SPECTRA 6 and Lumencor SOLA SM II fluorescent illumination units as light sources.

**Objectives**

|                        |                                |
|------------------------|--------------------------------|
| <b>Plan-Apochromat</b> | 20×/NA 0.8 or 40× Corr/NA 0.95 |
|------------------------|--------------------------------|

**Scan cameras**

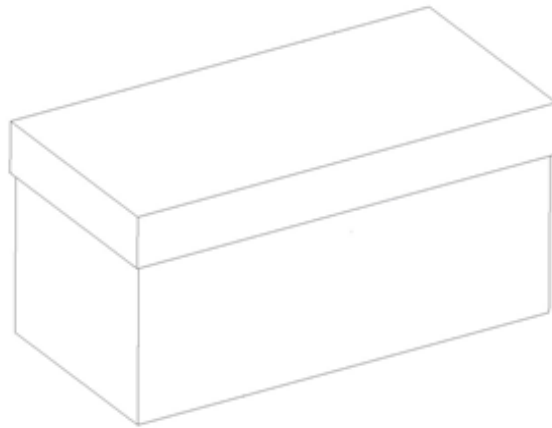
| <b>Point Grey Grasshopper 3 (GS3-U3-51S5M-C)</b><br><b>Global Shutter Type CMOS (Sony IMX250)</b> |                                                |
|---------------------------------------------------------------------------------------------------|------------------------------------------------|
| <b>Pixel size</b>                                                                                 | 3.45µm × 3.45µm                                |
| <b>Camera resolution</b>                                                                          | 2448 (H) × 2048 (W) pixel                      |
| <b>Frames rates</b>                                                                               | 75 fps                                         |
| <b>Bit-depth</b>                                                                                  | 10-bit / 12-bit                                |
| <b>Pixel resolution with 20x objective and 0.63x C-mount adapter</b>                              | 0.27µm                                         |
| <b>Pixel resolution with 20x objective and 1x C-mount adapter</b>                                 | 0.17µm                                         |
| <b>Pixel resolution with 40x objective and 0.63x C-mount adapter</b>                              | 0.14µm                                         |
| <b>Pixel resolution with 40x objective and 1x C-mount adapter</b>                                 | 0.09µm                                         |
| <b>Connection type</b>                                                                            | USB 3.0                                        |
| <b>pco.edge 4.2</b><br><b>13.3 mm × 13.3 mm sCMOS (CIS2020)</b>                                   |                                                |
| <b>Pixel size</b>                                                                                 | 6.5 µm x 6.5 µm                                |
| <b>Camera resolution</b>                                                                          | 2048 x2048 active pixel                        |
| <b>Camera max. speed</b>                                                                          | 100 fps at full resolution (2048 × 2048 pixel) |

|                                                                     |                                        |
|---------------------------------------------------------------------|----------------------------------------|
| <b>Bit-depth</b>                                                    | 16 bit                                 |
| <b>Pixel resolution with 20x objective and 1x C-mount adapter</b>   | 0.33µm                                 |
| <b>Pixel resolution with 20x objective and 1.6x C-mount adapter</b> | 0.20µm                                 |
| <b>Pixel resolution with 40x objective and 1x C-mount adapter</b>   | 0.16µm                                 |
| <b>Pixel resolution with 40x objective and 1.6x C-mount adapter</b> | 0.10µm                                 |
| <b>Cooling</b>                                                      | Peltier with forced air (fan)          |
| <b>Connection type</b>                                              | Dual Camera Link Full (10 taps, 85MHz) |

### Control computer, minimum system requirements

|                         |                                                                         |
|-------------------------|-------------------------------------------------------------------------|
| <b>Operating System</b> | Microsoft Windows 7 Professional SP1 64-bit EN                          |
| <b>CPU</b>              | Xeon E5-2609v3 1.90GHz 15MB cache                                       |
| <b>RAM</b>              | 32GB DDR4                                                               |
| <b>Hard disk</b>        | 1.5 TB                                                                  |
| <b>Optical drive</b>    | DVD-RW                                                                  |
| <b>Display</b>          | 96 dpi                                                                  |
| <b>Graphics</b>         | SXGA (1280×1024, True color)                                            |
| <b>Input devices</b>    | Keyboard, mouse                                                         |
| <b>Ports</b>            | 2xDouble CameraLink port; 1 FireWire (1394 A); 4 × USB 2.0; GB Ethernet |

## Appendix – Packaging instructions



**Figure 1.**

### Preparations

1. Unload the slide from the device by using the scanner software. Remove your slide.
2. Close the scanner software normally.
3. Turn off the scanner with the main switch located on the backside of the device. Disconnect all the cables of the scanner.
4. Remove the main camera and camera adapter.
5. Turn off and disconnect all the cables of the workstation and display.

### Main parts and their accessories

1. BOX 1 – Big carton box
  - a) fixing foams for the angles of the scanner box
2. BOX 2 – MIDI II scanner – large carton box
  - a) Scanner unit
  - b) objective(s)
  - c) BF tube

3. BOX 3 – carton box dedicated for the PC
  - a) PC (placed inside the dedicated foam)
  - b) power cable for PC
  - c) power cable for scanner
  - d) USB cable of the scanner
  - e) keyboard and mouse (has a separated small carton box)
  - f) 3DH mouse pad
4. BOX 4 – Accessories (3 pcs)
  - a) main camera
  - b) main camera trigger cable
  - c) power supply + connector
  - d) power supply cable
  - e) dongles, software and driver CDs in 3DH SW box
  - f) trays
  - g) slide checker
5. BOX 5 – Cables
  - a) 3 m USB cable
  - b) USB cable of the scanner
6. BOX 6 – FL lamp (if any)
  - a) FL lamp
  - b) lamp power supply
  - c) power supply cable
  - d) adapter
  - e) light guide

## Packaging

The whole system is packed in a big carton box. This is divided into two areas with a vertical carton slab:

“Space 1” for accessories (PC, cables, etc.)

“Space 2” for BOX 2 (scanner)

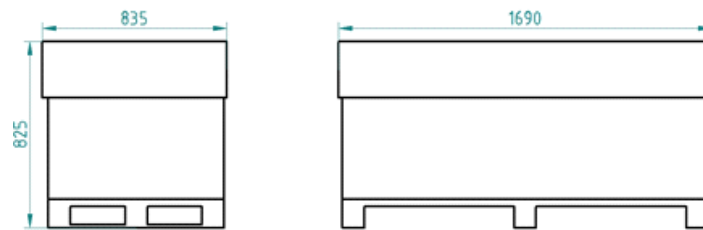
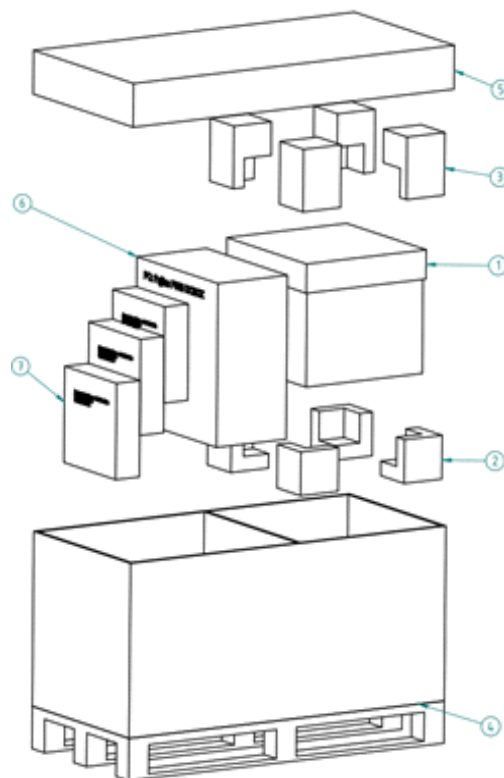


Figure 2.

1. BOX 2 – scanner box
2. Fixing foams for underneath BOX 2
3. Fixing foams for above BOX 2
4. Bottom part of BOX 1
5. Top of BOX 1
6. BOX 3
7. BOX 4, 5, 6



*Figure 3.*

## Packing the MIDI II scanner

The most sensitive and most heavy unit is the MIDI II scanner. Please handle it with care, the weight of the device is more than 22 kg.

Place the scanner to the nylon bag.

The structure of the BOX 2 including the rubber foams is shown on Figure 4. The shape of the foam in the box defines the orientation how the scanner should be placed inside, so first please examine it!

The scanner should be lifted up by holding the scanner at its motherboard between its feet and taken inside the BOX 2's lower part onto the foams inside it.

The shape of the rubber foam defines the orientation, how they should put on. After the scanner and foams are taken in, you can place the upper part of the box of the scanner. Now place the BOX 2 into BOX 1 and place the fixing foams around.

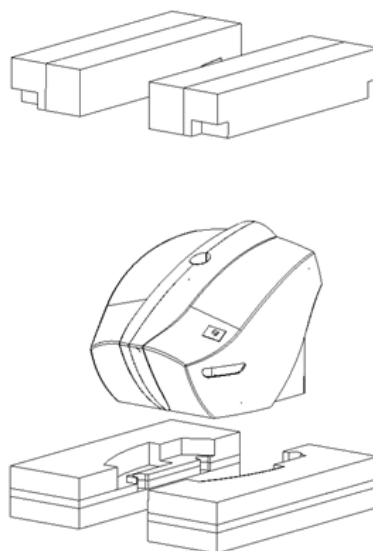


Figure 4.

## Packing the accessories

Place inside BOX 1 all the accessories of the scanner. BOX 3, 4, 5 and BOX 6 should be next to each other. Fill the gaps with pellets.

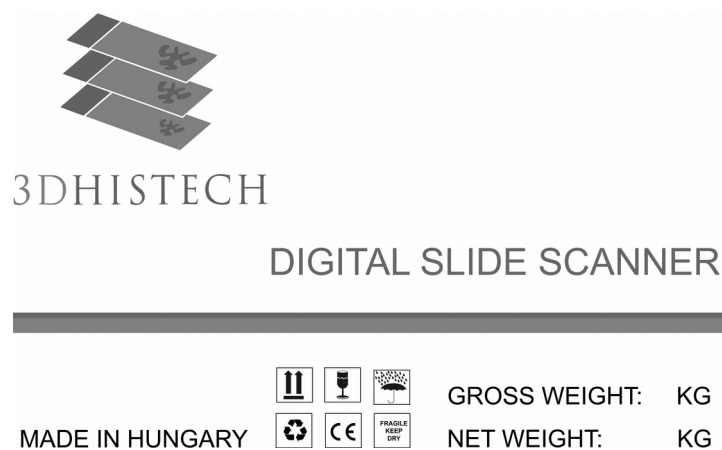
## Closing the package

Place the top to BOX 1. Secure it with strap.

## Handling of the package

Please be aware to observe the following instructions on **Figure 5.**:

| Designation               | Symbol                                                                              | Explanation                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Top                       |    | The package must always be transported, handled and stored in such a way that the arrows always point upwards. Rolling, swinging, severe tipping or tumbling or other such handling must be avoided. The cargo need not, however, be stored "on top".                                                                                                                                                              |
| Fragile, Handle with care |    | The symbol should be applied to easily broken cargoes. Cargoes marked with this symbol should be handled carefully and should never be tipped over or slung.                                                                                                                                                                                                                                                       |
| Keep dry                  |    | Cargoes bearing this symbol must be protected from excessive humidity and must accordingly be stored under cover. If particularly large or bulky packages cannot be stored in warehouses or sheds, they must be carefully covered with tarpaulins.                                                                                                                                                                 |
| Recycling                 |   | This indicates that an object is capable of being recycled.                                                                                                                                                                                                                                                                                                                                                        |
| CE                        |  | The symbol shows that the device complies with the essential requirements of the relevant European health, safety and environmental protection legislation, in practice by many of the so-called Product Directives..                                                                                                                                                                                              |
| Fragile, keep dry         | FRAGILE<br>KEEP<br>DRY                                                              | The symbol should be applied to easily broken cargoes. Cargoes marked with this symbol should be handled carefully and should never be tipped over or slung.<br>Cargoes bearing this symbol must be protected from excessive humidity and must accordingly be stored under cover. If particularly large or bulky packages cannot be stored in warehouses or sheds, they must be carefully covered with tarpaulins. |



**Figure 5.**

# Index

## B

Barcode.....20, 27, 28, 31, 32, 33, 34, 48, 66, 68, 69, 70, 71, 75, 79, 100, 101, 102, 103, 109  
 Brightfield.....13, 14, 19, 30, 35, 46, 50, 66, 81, 99, 112

## C

CaseCenter.....21, 51, 86, 107, 111  
 Compensation image.....34, 35, 36, 50, 112  
 Control software.....20, 31, 46, 116, 117, 119, 121

## F

Fluorescent.....13, 14, 18, 19, 20, 23, 26, 30, 65, 76, 95, 112, 113, 118, 122, 125  
 Focus.....14, 20, 41, 50, 53, 56, 61, 62, 63, 73, 74, 78, 79, 81, 84, 90, 93, 97, 98, 99, 105, 112, 113, 117, 118

## L

Lumencor.....13, 19, 23, 24, 92, 114, 118  
 Lumencor SPECTRA 6.....20, 127

## M

Marker.....52, 55, 88, 112

## P

Pannoramic.....7, 24  
 Pannoramic MIDI II.....7, 9, 10, 11, 13, 14, 15, 17, 19, 20, 22, 24, 28, 30, 116, 119, 123, 124  
 Pannoramic Viewer.....21, 62, 74, 117  
 Pco.edge 4.2.....14, 83, 127  
 Preview. .23, 27, 30, 32, 36, 46, 47, 51, 52, 53, 54, 55, 56, 57, 59, 60, 62, 72, 75, 78, 87, 88, 89, 93, 104

## R

RGB.....65

## S

Scan.....36, 52, 53, 54, 88, 89, 112  
 Scan to CaseCenter.....51  
 Scanner.....7, 36, 54, 89

\*