Prior knowledge of this manual is required for proper Viewer operation. You are therefore advised to familiarize yourself with its contents and, equally importantly, to follow special notes and instructions it contains regarding the safe product handling.

We reserve the right to make changes as may be deemed appropriate in the interest of ongoing technical improvement. This manual is not subject to updating or revision services of any kind.

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1  INSTALLATION

1.1  Installation Requirements

The MIRAX Viewer program has been certified for operation under Windows XP Professional SP2. Selected hardware resources should meet the following minimum requirements:

− CPU: 1.8 GHz or better
− RAM: 512 MB or better
− Graphics: minimum required capability: SXGA (1280 x 1024, True Colour), recommended: UXGA (1600 x 1200, True Colour) or better
− Monitor resolution: 96 ppi or better (120 ppi are recommended)

For access to digital LAN or WAN slides:

− LAN: 10 Mbit/s or better networking interface
− Minimum required bandwidth for telecommunication with remote servers: 1,000 kbit/s (DSL).

1.2  Program Installation

MIRAX Viewer requires Microsoft .NET Framework 2.0.

This software component should have been installed on most computers. The availability of this component is checked during the installation process of the MIRAX Viewer program. If a corresponding error message appears, please install Microsoft .NET Framework 2.0. This software can be downloaded free of charge from the Microsoft website.

MIRAX Viewer is available as an installation CD or as an executable file.

Installation CD:

− The starting screen (Fig. 1-1) should automatically appear, when an installation CD is inserted. If it fails to appear, the setup.exe program must be triggered in the CD’s root directory.
− Once the starting screen has appeared, you need to select Install Mirax View.

Installation file:

− If the program is available as a compressed file (ZIP format), it needs to be unpacked at first.
− Trigger program installation with a double-click onto file setup.exe: ...

The sequence of next working steps has to be carried out regardless of whether the installation was initiated from an installation CD or a compressed file.
• Now, Windows XP security warnings might appear (Fig. 1-2). They need to be acknowledged.

Fig. 1-2 Security Warning

• Another window (Fig. 1-3) will show. Click Next in this window.

If the screen displays a window with the two options Repair and Remove Mirax Viewer, a previous program version is already contained on your computer. To install the new version, the previous version needs to be de-installed (refer to 1.3).
Fig. 1-3  Welcome screen

• In the next window (Fig. 1-4) the License Agreement has to be accepted.

Fig. 1-4  Accepting License Agreement

• In the next window the desired installation path has to be selected. (Fig. 1-5). Use the Browse... button or make a direct entry at the Folder input line to select another path. It is recommended to work with the pre-set path.
Fig. 1-5  Installation path

- Click **Next** to continue preparation for the installation procedure.

Fig. 1-6  Selecting start-up folder and starting installation

- In the next window (Fig. 1-6) you can select the Start Menu folder, in which a MIRAX Viewer shortcut will be created. In the upper line you can enter manually a new folder. If you activate the check box *Do not create shortcuts*, no shortcut will be created.
- Begin installation by clicking onto **Install**.
Fig. 1-7  Installation complete

- On completion of the installation routine click **Next** for confirmation.

Fig. 1-8  Completing the installation

- With the message **Completing the MIRAX Viewer 1.12.xx.xx Setup Wizard** the installation procedure is finished (Fig. 1-8). Click **Finish** to close this window.
1.3 Program Updating

Before a MIRAX Viewer update can be performed, the previous version must be de-installed. To do this, proceed as follows:

1. The first steps depend on whether an installation CD or a compressed file is available.

2. Click the Start button to call the System Control window.
3. In the System Control window, double-click the entry Software.
4. Select the entry MIRAX Viewer.
5. Click the Remove button.
6. Confirm the following message (Fig. 1-9) with Yes.

![Fig. 1-9 De-installation of MIRAX Viewer](image)

7. During the de-installation procedure you will be asked whether you want to keep the cache (Fig. 1-10). You should select No.

![Fig. 1-10 De-installation cache of MIRAX Viewer](image)

8. To trigger an installation process for the latest version, proceed as described in section 1.2.
2 OPERATION

2.1 Description

Manufacturer’s designation: MIRAX Viewer

The MIRAX Viewer is used to view Digital Slides previously digitized by means of the following Zeiss products: MIRAX SCAN, MIRAX MIDI, and MIRAX DESK. The MIRAX Viewer allows to navigate through these Digital Slides and to add annotations. The Digital Slide will not be affected by using it this way.

2.2 Program Start

Use a double-click onto the Mirax Viewer icon (Fig. 2-1) to launch this program.

Alternative program launch option:
Start ► Programs ► Carl Zeiss ► Mirax Viewer

If the program is triggered for the first time, one should begin by making program start settings (refer to section 2.4).
2.3 Terminology

The main MIRAX Viewer screen consists of five sub-areas (Fig. 2-2):

- Menu bar (2-2/1)
- Main toolbar (2-2/2)
- Thumbnail area (gallery) (2-2/3)
- Tab area (2-2/4)
- Window with Digital Slides (Fig. 2-3)

![Main MIRAX Viewer screen](image)

The tab area (2-2/4) typically displays two tabs:

**Local:**
This tab shows all Digital Slides that have been selected for viewing (refer to 2.5.2). As a necessary prerequisite, such Digital Slides must be maintained on the local computer or on other computers’ drives which are enabled.

The **Teleconsultation Server** tab will turn up if there is a connection to a teleconsultation server. All Digital Slides enabled for the user or public will be shown. For Digital Slides to be displayed, a connection to the teleconsultation server is imperative.

Another tab (**Teleconsultation**) will turn up if an online teleconsultation session was established. On closing the session, this tab will disappear again.
The entire tab area can be turned on and off by clicking the button. The main toolbar lists all functions of general significance, i.e. such functions which do not concern only one particular slide (e.g. arrangement of individual windows of Digital Slides). The thumbnail area (gallery, Fig. 2-2/3) shows all Digital Slides of a selected directory (via Teleconsultation Server or Local tab) as thumbnail images if the viewing icon was activated.

Fig. 2-3 Window of a Digital Slide

A Digital Slide window is, in turn, composed of six functional sub-windows (Fig. 2-3):

Toolbar (2-3/1):
This toolbar unites all functions that concern only this Digital Slide. In the case of a fluorescence specimen, an additional toolbar will be displayed in the lower part of the window (Fig. 2-28).
Magnifier (2-3/2):
Displays a 4x-magnified image of a given area of a Digital Slide, on which the mouse pointer currently rests (2-3/3). Its position and magnification factor cannot be changed.

Digital slide (2-3/3):
This main screen area displays the Digital Slide. Here it is possible to move within the Digital Slide, to zoom in and out, generate annotations, etc.

Position tracing field (2-3/4):
The MIRAX Viewer includes a function to trace and display those regions of a Digital Slide which have already been visited. A region already visited will always be saved. The user may decide to turn on or off this function for display.

Variable preview screen (2-3/5):
Provides a preview screen in magnified scale. A selection field below this sub-area allows the image size to be defined in discrete steps (Fit, 100%, 200%, 400%). If the position tracing indicator was activated, the area that was already inspected by the user will be depicted.

General preview screen (2-3/6):
This preview screen always shows the entire specimen on a Digital Slide. If option *Fit scanned area* was turned on, only the specimen area will be on display. If this option is off, the entire slide can be seen. Since this setting state does not provide any additional information, you are advised to keep this option active.
2.4 Program Settings

2.4.1 Calibration of Micrometer Scale

A calibrated scale can be superimposed onto the Digital Slide window (2-3/3). Because the calibrated scale integrates the current values for display screen resolution and pixel geometry, the display screen must be properly calibrated. This input is required only once, unless your monitor is replaced with a new one:

- To calibrate your micrometer scale, select the Settings menu, then select Slide Display Scale Setup. An input window opens.

- This input window (Fig. 2-4) allows you to determine the length of a superimposed red line. The various line length options (available at Displayed line length) are intended for matching the size of the red line and that of the user’s ruler. The red line’s length value measured with a ruler must be entered in millimeters at Measured line length. An extra magnification is possible by entering the Extra slide display zoom factor desired.

- To complete calibration, click onto Apply.

Fig. 2-4 Calibration of micrometer scale
2.4.2 **MIRAX Viewer Starting Options**

Various parameters are available for a desired user-defined graphical appearance of the MIRAX Viewer, once the program has started.

- These properties can be called up via **Settings ▶️ Options**. An **Options** dialog window for MIRAX Viewer (Fig. 2-5) opens.

![MIRAX Viewer Options](image)

**Fig. 2-5** MIRAX Viewer Options
All setting options are described below:

**Thumbnail** (changes will take effect immediately)

**Size**  
With the preview function *(Show thumbnails)* in on state, this option allows you to determine the size of the various preview images *(Small, Normal or Large)*. The larger the preview images are, the more space is available for the name of the Digital Slide.

**Type**  
This option defines the representation mode in the thumbnail view.

- **Barcode area:** Displays only the barcode area as a thumbnail image in the gallery if the barcode area was recorded as an image by the digitizer. Otherwise, only the Digital Slide’s thumbnail view will be on display.

- **Preview camera image:** Displays the barcode area and the Digital Slide as a thumbnail image in the gallery (as taken by the preview camera) if the barcode area was recorded by the digitizer. Otherwise, only the Digital Slide’s thumbnail view will be on display.

- **Low resolution scanned image:** Displays the Digital Slide as a thumbnail image (taken by the scan camera) in the gallery.

**Viewer** (changes will take effect at next MIRAX Viewer start)

**Show thumbnails**  
This option defines if the thumbnail view screen of Digital Slides is to be in on or off state when a MIRAX Viewer session starts (refer to 2.5.3). This option can be turned on and off again at any time. If the preview image takes much time to build up, e.g. accessing a remote server, this option should be turned off. It can be turned on again at any time during the program session.

**Show slide tree**  
This option defines if the tab view (tree view of the Digital Slides 2-2/4) is to be displayed or not when starting the MIRAX Viewer session.

**Resolution Options** (changes will take effect at next MIRAX Viewer start)

**Screen resolution**  
For setting the currently connected monitor’s display screen resolution in units of ppi (pixels per inch) (refer to notes in section 1.1).
Slide Window Defaults (changes will take effect at next Digital Slide open)

Show slide preview
This option displays a preview of Digital Slides (2-3/5 and 6) if active.

Show preview in full screen mode
On selection of full screen mode, the user will be shown preview images (2-3/5 and 6). Preview images can be turned off again via the CTRL+P hotkey.

Top preview ‘Fit scanned area’
If this option is active, the preview image (2-3/6) will only zoom onto that slide area which is actually covered by a specimen for display.

Show magnifier
Allows a magnifier to be superimposed in the top right corner of a Digital Slide’s window (2-3/3). If this option is turned off, this window will not come on display in standard mode. Regardless of that, the magnifier can always be displayed, for example, via the CTRL+Z hotkey.

Step size
If the user is panning inside the Digital Slide with the cursor keys the Step size defines the moved field of view (e.g. 100 % moves the complete actual field of view).

Progressive Rendering
This option defines the mode of how the screen is built up and updated. With Progressive Rendering the Digital Slide is first loaded with a low resolution and afterwards updated with a higher resolution. If Progressive Rendering is disabled, the complete viewing area of the Digital Slide is shown with the selected resolution, without any intermediate views:

Always: Progressive Rendering will always be carried out.
LAN and Internet: Progressive Rendering will only be carried out if the Digital Slide is displayed via LAN or an Internet source.
Internet: Progressive Rendering will only be carried out if the Digital Slide is displayed via an Internet source (recommended setting).

Never: Progressive Rendering will never be carried out.

Prefetch (recommended)
If this option is active, already areas outside the visible zone will be loaded. This way, a faster view build-up process is reached.

Bottom Preview Mode
This is to define if the variable preview of a related specimen (Preview), the tracing mask (Slide viewing history) or both features (Preview and slide viewing history) are to be displayed when a new Digital Slide is opened (refer to 2.7.2).

Bottom Preview Zoom
Allows you to define a default size for displaying the variable preview image. This value, however, can be specifically matched to each Digital Slide later on (refer to 2.7.1).

Slide Viewing History Color
This property defines the color of the tracing mask (Slide viewing history).
**Show scale bar**

The *Brightfield colors* and *Fluorescent colors* buttons allow different scale bar settings for Digital Slides captured in brightfield or with fluorescence. The select box *Show scale bar* is used to decide whether or not a scale bar shall be shown in the Digital Slide.

Upon clicking one of the two buttons, the following color setting window will appear:

![Scale Bar Colors Window](image)

The following settings are possible in this window:

- The color of the scale bar is set in the field below *Scale bar color*.
- The color of the text for the scale bar is set in the field below *Text color*.
- The color of the background is set in the field below *Background color*.

The colors can be changed by clicking the *button.

For scale bar and text colors, the emerging palette offers two options - the selection of a predefined color and the determination of a color by the user himself.

After clicking the *button for the background color, a slider will appear. Moving the slider upwards will brighten the background, moving the slider downwards will darken the background. Different gray levels appear in between. When pushing the slider right to the bottom position, the background color will be set to *None*, i.e. there will be no background color.
**External Application Call for Image Capture** (changes will take effect immediately)

The snapshot function allows you to export the displayed image to another image editing program (refer to 2.11.1). The related settings can be made in this area.

*Application*  
This option defines the program, to which the image information is to be imported.

*Start in*  
This field is used to define the work path for the exporting process. It is recommended to define the path in which the program to be called is located.

*Parameters*  
When the image data are exported, the file name of the Digital Slide can also be transferred:

"<IMAGE>"  
The file name of the Digital Slide is transferred.

*Run*  
Here you can select the size in which the window to be called for the export procedure is to be presented:

- **Normal window:** The program will be displayed in the standard window.
- **Minimized:** The program window will appear minimized.
- **Maximized:** The program window will appear maximized.

*Image format*  
The image format to be exported is defined here. The following formats can be selected:

- JPEG, TIFF, BMP, and PNG

*Quality factor*  
If the JPEG image format is selected, the quality factor can be chosen here (1 % … 100 %). This setting is not possible for other image formats.
**External Application Call for Annotation Export** (changes will take effect immediately)

When administrating the annotations, the Digital Slide currently displayed and a selected annotation can be opened in another program (refer to 2.8.2). In this field you can make the corresponding settings.

*Application*
This option defines the program, to which the image information shall be imported.

*Start in*
This field is used to define the work path for the exporting process. It is recommended to define the path in which the program to be called is located.

*Parameters*
When the image data are exported, other parameters can also be transferred:
- `<SLIDE>` The file name and the path of the Digital Slide currently displayed are transferred.
- `<X1>` The value for the top left corner of the annotation is transferred.
- `<Y1>` The value for the top left corner of the annotation is transferred.
- `<X2>` The value for the bottom right corner of the annotation is transferred.
- `<Y2>` The value for the bottom right corner of the annotation is transferred.

*Run*
Here you can select the size in which the window to be called for the export procedure is to be presented:
- **Normal window:** The program will be displayed in the standard window.
- **Minimized:** The program window will appear minimized.
- **Maximized:** The program window will appear maximized.
2.5 Opening Digital Slides

The user may open individual Digital Slides or have the directory displayed completely with all sub-directories as an overview.

2.5.1 Opening Individual Digital Slides

- Select Open Slide dialog via the (File ▶ Open) menu or by clicking the button. The Open Slide window (Fig. 2-7) is displayed.

- Activate the desired slide tree at the Local tab. The right half-area of the window always shows all Digital Slides contained in a selected directory.

  The window’s right half-area can be used to decide if Digital Slides are to be displayed in a list with names and file sizes (List tab) or as thumbnail images (Preview tab).

- Select desired directory in slide tree.

- Mark Digital Slide to be opened in the right half-area of the window.

  Alternatively, a Digital Slide can also be opened with a double-click onto that slide. This process can be repeated as many times as required. The Open Slide window must then be closed by clicking onto the Close button.

- Complete opening procedure with Open. The selected Digital Slide will be opened.

2.5.2 Adding Folder to and Removing Folder from Local View Screen

Where a folder (including its sub-folders) contains several Digital Slides, it is advisable to add this folder to the Viewer directory. It is irrelevant if this folder is contained on the local PC or on an assigned network drive.

- Activate the Slide Tree with a click onto button (2-6/1).

- Activate the Local (2-6/3) tab.

  Fig. 2-6 Opening Digital Slides
• Select Open Slide dialog (Fig. 2-7) via the (File ► Open) menu or by clicking the button.
• Select desired directory in the now opened window.
• The right half-window can be used to decide if Digital Slides are to be displayed in a list with names and file sizes (List tab) or as thumbnail images (Preview tab).
• Click onto button Add Folder to add a directory to the Local tab.
• Directories can be added as many times as necessary.
• Press Close to close this dialog. Your selected directories will be shown in the Local tab.

Fig. 2-7  Open Slide Dialog
By clicking Set Home Folder, you may define a currently selected path as the root directory. Pressing Update Tree will update the contents of the window.

To remove a directory from the Local tab view screen, the corresponding folder needs to be marked with the right mouse-key. A dialog field appears. Select Remove Project from Tree in this field.

This will only terminate the link between the MIRAX Viewer and the directory. The actual data remain undeleted in their original directory.

Where a project (directory) appears with a strikeout symbol (see Fig. 2-8), the MIRAX Viewer will be unable to access the data in this directory, because, for example, it does not exist any longer. This may occur if a directory was deleted, connection with a network drive has ceased, an external hard-drive is not connected any longer, etc.
2.5.3 Opening Digital Slides from Thumbnail View Screen

Provided that directories containing Digital Slides have been linked up with the MIRAX Viewer (refer to 2.5.2), any of these directories can be selected by the user who will see all its Digital Slides in thumbnail view format (Fig. 2-9). As a compulsory prerequisite therefore, the thumbnail preview icon (in main toolbar; 2-6/2) must be active.

The directory’s Digital Slides can now be opened by double-clicking onto the corresponding thumbnail area.

where a path contains many Digital Slides, the actual screen may not provide enough space for all thumbnails. You should use the Up and Down buttons in this case to page through in the required direction.
2.5.4 Opening Digital Slides in Slide Tree

Any directory of Digital Slides which has been linked up with the MIRAX Viewer (refer to 2.5.2) can be individually selected. The user will see all Digital Slides contained in that directory.

A directory's Digital Slides can be opened as described hereafter:

- Use a click onto the symbol to have a particular folder indicated in extended view mode.
- Use a double-click onto the desired slide name to open that Digital Slide in a new window.

2.5.5 Opening Digital Slides from a MIRAX Teleconsultation Server

In addition to local storage media or connected drives, data can also be provided on a MIRAX teleconsultation server:

- The Connect to teleconsultation server button will open a login window (Connect to Teleconsultation Server; Fig. 2-11) when clicked.
- Type in the URL or the IP address of a desired teleconsultation server at Address. The software memorizes all names that were entered. They can be selected later via the pull down menu.

If the teleconsultation server needs to be addressed from within the network (LAN) in a way that is different from the way it should be addressed from an external location (WAN), you should note the following:

- For access from within the network, the corresponding user name must be entered at Address.
- For access from an external location, that name must be entered at Address (from Internet).

An entry at Address should prove sufficient in the majority of cases!
• Enter your login data at **User Name** and **Password**. Login data are assigned by the teleconsultation server administrator.

• Use a click onto **OK** to initiate the login procedure.

On successful completion of a login procedure, the **Teleconsultation Server** tab will show all Digital Slides that are enabled for the **particular** user name together with the slides that are enabled for **all** user names (Fig. 2-12). The data are combined into user-related groups.

Essentially, the sequence of further actions (e.g. thumbnail view screen, opening of files) is not different from the one for Digital Slides which are available on a local source. Depending on the type and speed of connection, some view screens, however, may take longer to load.

---

**Fig. 2-12**  **Teleconsultation Server tab**
2.6 Organization of Various Digital Slide Windows

The main toolbar provides various buttons for windows arrangement options if several Digital Slides are open.

2.6.1 Positioning of Digital Slide Windows and Full Screen Mode

- Button \( \text{Tile vertically} \) (alternatively use Window \( \text{Tile vertically} \)) in the main toolbar arranges all windows in vertical tile fashion. To achieve horizontal windows tiling, you need to activate button \( \text{Tile horizontally} \) (alternatively use Window \( \text{Tile horizontally} \)). Windows can be stacked by clicking the \( \text{Cascade} \) button (alternatively use Window \( \text{Cascade} \)).
- Button \( \text{Full Image} \) can be used to turn on full image mode for a currently selected window.
- \( \text{Minimize All} \) (Window \( \text{Minimize All} \)) will minimize all currently open windows.
- It is also possible to selectively call up single Digital Slide windows of those currently open by selecting Window \( <\text{window name}> \).

2.6.2 Synchronized Navigation

One benefit of digital microscopy is that it allows identical specimen to be simultaneously inspected with different stainings. The MIRAX Viewer provides a function for synchronized navigation. This function combines two or more Digital Slides in such a way that the user has to navigate in only one slide while the other slides move along automatically.

Synchronization only refers to horizontal and vertical motion of a Digital Slide, as opposed to e.g. magnification or demagnification which is not automated. However, the different magnifications are taken into consideration for motion speed.

A sample procedure could be as follows:

- You open Digital Slides that need to be synchronized.
- Windows can be arranged as necessary with the help of \( \text{Tile horizontally} \) or \( \text{Tile vertically} \).
- An identical magnification should be selected for all windows.
- Select a clearly distinct detail which is contained in every window of a sectional series. You move this spot into the middle or in one of the corners of each individual window.
- Click onto button \( \text{Synchronize all slide windows} \) to activate synchronization.
- Now, synchronized navigation in all open windows is possible.

Individual windows (Digital Slides) can be excluded from synchronized navigation by clicking onto the \( \text{Synchronize Option} \) button in the toolbar of the Digital Slide. The same button needs to be clicked to integrate the slide again in the synchronized navigation. Attention has to be paid to the fact that, meanwhile, the position of the Digital Slides may have changed and, in such a case, another spot is being navigated.
Digital slides opened after the synchronized navigation mode has been activated are not automatically included in the synchronized navigation process. Synchronized navigation has to be activated first by clicking on the button in the toolbar of the Digital Slide.

- Another click onto in the main toolbar will reset the synchronization mode for all Digital Slides.

Fig. 2-13 Synchronized navigation in two Digital Slides
2.7 Navigation in Digital Slide Windows

2.7.1 Navigation and Preview Screens

Navigation in Digital Slides is very easy indeed. It can be performed using the mouse or hotkeys on the keyboard.

The general preview screen is located in the top left corner of a slide window (if this view mode is turned off, it can be turned on again with the help of button in the toolbar; conversely, the preview screen can be turned off if active and not required).

With a click onto this area, a view screen of the main screen can be updated for this area for a given magnification. Identical in functionality, the variable preview image below can be enlarged in discrete steps (Fit, 100 %, 200 %, 400 %) to keep navigation procedures as simple as possible.

In the variable preview screen area, the mark indicating the image segment currently displayed always remains in the center. You may move the preview image by keeping the left mouse-key depressed and shifting the mouse as desired.

2.7.2 Position Tracing

As the user moves through a Digital Slide, the visited areas of that slide will be recorded, thus allowing the user to keep track over those image parts already examined. This information can be superimposed onto the variable preview screen as a mask (Viewing history). Setting options for this representation mode are provided in the bottom left corner of a slide window (position tracing control button). If Preview is on, only the variable preview of the Digital Slide will be displayed without a tracing mask. If the Viewing history option was selected; only the tracing mask will be on display, while the variable preview screen is off.

To display both the variable preview screen and the position mask, you need to select option Preview and viewing history.

The tracing mask appears as a color mask (color change setting options are available, see Fig. 2-5). The intensity of a color indicates the magnification at which a particular sub-area was examined. Brighter color shadings suggest greater magnification factors. A position will not be saved, unless a certain magnification level was exceeded. This tracing mask is saved as a superimposed layer rather than as an integral part of the image. A tracing mask is even preserved on closing and reopening of the Digital Slide. This mask can be deleted with a click onto the Delete Viewing History button.

Fig. 2-14 Position tracing
2.7.3 Main Screen Navigation

Besides navigating with the help of preview screens, the user may also directly navigate in the main view screen. An adequate magnification factor must be selected at first:

Available magnification settings range from Fit (specimen is fully depicted in main view screen) to discrete magnification factors which can be set with a mouse-click (1X, 2X, 5X, 10X, 20X and 40X) to the largest sensible magnification 1:1 (with one camera pixel corresponding to one pixel on the monitor). Any other magnification can be typed in at the Magnification input box.

Another option to work with magnifications is provided by the button. If this button is on, a desired area can be marked with the mouse in the main view screen for display in a magnified scale.

Actual navigation within a Digital Slide can be performed with the mouse or triggering keyboard commands:

Mouse-driven control:
For mouse-control mode, button must be turned on. Once this has happened, the user may click any desired point in the main view screen with the mouse (left mouse-key) and shift the image content while keeping the mouse-key depressed.

Keyboard-driven control:
The cursor keys may be used to shift the image content. The desired amount of shift in visible image content can be defined via the options (see 2.4.2). The user can zoom in and out in the Digital Slide by means of the + and - keys.

To find the assigned directory of a currently open Digital Slide on the Teleconsultation Server or the Local tab, the user must click onto the button.

2.7.4 Information Fields in Toolbar of Digital Slide

In every window of a Digital Slide the loading progress of the current view is shown:

![Progress:](image)

With Digital Slides available on local sources, the loading process is very fast so the progress bar is of secondary signification in this case. However, where Digital Slides on remote servers are accessed, this bar will show the latest progress state of downloading the actual field of view.
2.8 Annotations

2.8.1 Defining Annotations

Annotations can be superimposed on a Digital Slide. To show these annotations, the Display Annotations function has to be activated after clicking onto the Info button.

There are four different types of annotations:

Rectangular-shaped annotation (Fig. 2-15/Example 1):

If button is on, a rectangle can be marked by clicking into the Digital Slide with the left mouse-key and keeping that key depressed. As soon as the key is released, the user will be prompted (Fig. 2-16) to enter the name of the annotation (Title) and a comment (Comment). While the name is a compulsory entry item which is indicated in that Digital Slide, the comment is an optional entry. In addition, the user may define a frame line color (Outline color) and a background color (Title background color) for the caption area.
Freehand annotation (Fig. 2-15/Example 2):

If button 🔄 is on, a click into the Digital Slide with the left mouse-key will set the starting point for freehand drawing. Further clicks with the left mouse-key allow you to mark any desired image area. The end point of a given freehand drawing line must be located near the starting point for the marked area to be actually enclosed. Annotation features can be specified in much the same way as for rectangular-shaped annotations.

Point annotation (Fig. 2-15/Example 3):

To mark just a specific point rather than a whole area, the 🔄 button must be turned on. To define an annotation, click a desired spot with the left mouse-key. A special input window (Fig. 2-17) for definition of properties will appear. An annotation name must be typed into the Title entry field. This name will also appear in the Digital Slide view. A comment to this annotation is an optional entry item (Comment). A desired frame line color for that annotation can be selected in the Outline color input box. A background color for the annotation area can be defined via Title background color. Direction allows you to determine how a mark is to point to the given point.

Measurement annotations (Fig. 2-15/536.43 µm):

A measurement annotation is provided for displaying a required distance or spacing. Following a click onto button 🔄, the Create Distance Measurement Annotation entry item must be selected. By clicking with the left mouse-key the marked spot may be chosen as starting point now. By keeping that key depressed, dragging it accordingly and releasing it, the end point of measurement will be defined.
2.8.2 Organizing Annotations

Once defined, annotations can be organized with the help of button 🎨. Another window appears (Fig. 2-18). It shows all rectangular-shaped, freehand-drawn and point annotations in its upper part. For rectangular-shaped and freehand-drawn annotations, the related perimeters (in µm) and surface areas (in µm²) are displayed in addition.

The lower window half-area lists defined measurement annotations (Measurement annotations).

To find a desired annotation in a Digital Slide, this annotation must be marked and the user must click onto the Locate button. The main view screen will show the selected annotation.

![Fig. 2-18 Window for annotation organization](image)

With the help of Edit the content and format of an annotation can be changed. For such change, the software will call up the same windows that had been on display as the annotations were generated.

An annotation can be deleted by selecting it and clicking onto the Delete button.

The content of a window which is listed under Annotations or Measurement annotations can be exported by clicking onto button Save to CSV.... Values are separated by comma in the resulting file (csv; comma separated values).

Send Link to Clipboard is the button for copying a link to this annotation to the clipboard. This button is only active if a separate software module was acquired. This type of link might be copied to a web browser as an example. On activation of this link, the system will call the MIRAX Viewer and open the linked Digital Slide and the related annotation. This procedure should only be employed if the Digital Slide is located on a server access to which is shared by all users (i.e. the user who generates a given link and the one who calls this link up).
By clicking onto the Export button, the current slide is opened in a defined program and the coordinates of the annotation are transferred. For settings, the options referred to in 2.4.2 are available.

The Scanmap button allows the user to store the selected annotation(s) as a scan mask. When clicking upon this button, a window will open, in which the location and the name of the scan mask are set. This scan mask can be read in again through the MIRAX DESK, MIDI or SCAN control software, defining a scan area. Proceeding according to this workflow provides a good solution, for example, for digitizing once more a given area of a Digital Slide. This function is particularly suitable for fluorescence applications. It allows the user to digitize a smaller section once more, if the previous digitization does not satisfy the requirements, but the available time does not allow digitization of the whole specimen. By pressing the control key, several annotations can be selected.

The user may decide the annotations should be displayed or not. By clicking onto Info in the toolbar of a Digital Slide, the user may turn the Display Annotations entry function on, in order to have the annotations displayed. No annotations will be shown if this entry item is off.
2.9 Measuring in a Digital Slide

2.9.1 Length Measurement

Users may perform length measurement jobs via related annotations. Although such annotations are saved and maintained as part of a Digital Slide, they can be deleted again. Refer to section 2.8.1 for a detailed description of the procedure to generate so-called measurement annotations.

Apart from this working approach, it is also possible to perform temporary length measurements. In this case, you need to press button and select the Measure Distance entry item. A starting point must then be defined with the left mouse-key, keeping that mouse-key depressed. The distance reading from the starting point to the current position will be indicated in µm. As soon as the mouse-key is released, a new starting point can be set.

2.9.2 Determination of Perimeter and Surface Area

Neither a perimeter nor a surface area value can be determined directly.

To define any of these two parameters, an area must be defined at first, using annotations (rectangular-shaped or freehand-drawn) (2.8.1).

Having completed this, the user may click button to turn the annotations organization window on. This window (Fig. 2-18) lists the related perimeter and surface area values behind a given annotation. To save these data, click Save to CSV...
2.10  **Displaying Information Relating to a Digital Slide**

After a click onto the *Info* button and selecting *Slide Information* in the Digital Slide window, a special window with information items relating to the Digital Slide (*Slide Information*) will come on display. These information items depend on the hardware used, the hardware control software version, and the mode of digitization.

![Slide Information Window](image)

**Fig. 2-19  Slide Information**

Explanations to digital-slide-related information using the above example on the left:

**Optical parameters**

- **Objective name**: The type name of the objective used is indicated here (e.g.: PlanApo).
- **Objective magnification**: The given specimen was digitized with an objective with a physical magnification of 40x.
- **Camera adapter magnification**: Shows the magnification of the TV adapter (this information will only appear if digitization was carried out with version 1.9 or higher).
- **Optovar magnification**: Shows the magnification of the Optovar used (this information will only appear if digitization was carried out with version 1.9 or higher). This information is displayed only for specimens digitized in the brightfield mode.

- **Camera type**: Hitachi HV F22 CL was used to digitize the specimen.

- **Micrometer / pixel X**: Pixel resolution is 0.116250 µm in X direction for this Digital Slide. This value depends on MIRAX control software settings and your hardware configuration.

- **Micrometer / pixel Y**: Pixel resolution is 0.116250 µm in Y direction for this Digital Slide. This value depends on MIRAX control software settings and your hardware configuration.

**Scan information**

- **Scan start**: This Digital Slide was digitized on January 08, 2009 at 16:39:19.

- **Scanning duration**: Digitization time was 23 minutes and 34 seconds.

- **File size**: This Digital Slide occupies about 504 Mbytes of hard-drive space.

If a Digital Slide is opened via a teleconsultation server, no respective value will be indicated.

- **Slide dimensions in pixels (width x height)**: The size of this slide is 150,528 x 151,296 pixels (each single image has a size of approx. 1,400 x 1,000 pixels in standard configuration).

The slide size is referred to the total theoretically digitized area of a specimen, not to the actually digitized specimen.

- **Scanned field of view count**: To create the Digital Slide, a total of 2933 single photos were taken.

- **Profile name**: This item indicates the name of the profile, which was used for digitization. If no profile was selected, **No Profile** is indicated. Please note that a profile may be modified after the digitization process, so that an existing profile provided with the name indicated needs not necessarily contain the parameters used for digitization.

- **Number of focus levels**: If a specimen was digitized using extended depth of focus, this field indicates the number of image planes.

- **Number of step size**: If a specimen was digitized using extended depth of focus, this field indicates the distance between two image planes (1 equals 0.2 µm), i.e. in the example three image planes were captured with a distance of 0.6 µm between each other.

If a slide was digitized in fluorescence mode, the individual channels are displayed with the respective parameters.
Fluorescence parameters

- **Filter 1 (B)** – The name of the filter is indicated in brackets. It is indicated as defined by the user.  
  **Exposure time (ms):** This entry item informs on the exposure time for the individual image fields for this channel.

- **Filter <n>** – The name of the filter is indicated in brackets. It is indicated as defined by the user.  
  **Exposure time (ms):** This entry item informs on the exposure time for the individual image fields for this channel.

Image parameters

- **Image compression:** This entry item shows, whether a compression of the image data was carried out (Yes) or not (No).
- **Image file format:** This parameter indicates the image file format.
- **Quality factor:** In the case of a JPEG compression the quality factor is indicated here.

Preview image

- Depending on the equipment of the digitizer, an additional image of the barcode area is displayed or not.
2.11 (Partial) Export of Digital Slides

2.11.1 Creating Snapshots

For documentation needs, a screen snapshot of a currently displayed Digital Slide can be made:

- Set a suitable magnification factor and shift the image as necessary to select a desired screen segment.
- A click onto the Capture Image button in the toolbar opens a selection window (Fig. 2-20).

![Fig. 2-20 Creating snapshots](image)

- The image editing functions, offered in the bottom area, allow changes to colors, brightness, contrast, and gamma value still to be carried out. However, this is not recommendable due to the precise white-level balancing carried out by the MIRAX control software.
- The two options Show annotations and Show scale bar can be used to define if an exported snapshot is to contain annotations and/or scale bars.
- Fit is the button for adapting the screen contents of a Digital Slide to the size of the Image Capture window.
• **Copy To Clipboard** allows you to export a given bitmap directly to the Windows clipboard for direct reuse by other programs.

• By clicking onto the **Export** button, an external program is called and the image content and parameters are exported. The program is defined via the options referred to in 2.4.2.

• **Save** will open the known dialog screen for saving the bitmap as an image file. The software will generate a folder with the following name (based on the file name and the file format): `<name>_<file format>_files` (e.g.: TMA.BMP_files). This folder includes the image with the designation `<name>_p0.<file format>` (e.g.: TMA_p0.bmp) and a file `_meta.xml` containing the metadata of this image (e.g.: pixel resolution). Selectable formats are: BMP (uncompressed bitmap, RGB 24 bits), JPG (compressed JPEG file, 24 bits, 90 % quality), or TIFF (uncompressed bitmap, RGB 24 bits).

### 2.11.2 Saving a Digital Slide

Where Digital Slides are not contained on a local hard-drive so the user has to access them via a teleconsultation server, an accessed slide can be saved on the local hard-drive. To accomplish this, select function **File ➤ Save slide as...** (alternatively: CTRL+S). It will display a dialog screen (Fig. 2-21).

The same function can be used to save Digital Slides which are maintained on a local source or a network-linked drive.

Begin by selecting the desired format.

<table>
<thead>
<tr>
<th>Mirax Digital Slide format:</th>
<th>The selected Digital Slide is saved in the specific MIRAX format. This format allows you to open the Digital Slide again by the MIRAX Viewer.</th>
</tr>
</thead>
</table>
| MetaXML image format:      | The selected Digital Slide is saved in the form of individual image files. For this purpose, a folder is created (in the given example: C:\TMA.jpg_Files) to save the individual images (for our example: TMA1_p0 to TMA1_pn, representing n the number of images reduced by one). Together with these images, an XML file `_meta.xml` is created where, for example, the position information for the individual images in relation to the complete image is contained. In addition to that, another file is created containing a link (for the given example: C:\TMA.jpg) to open the complete image (e.g. in AxioVision).

Different parameters can be set for this format:

- **Magnification**: 1:1 to 1:128
- **Tile size**: 256 x 256 pixel², 512 x 512 pixel² or 1024 x 1024 pixel²
- **Add overlap**: In some programs, voids between the individual image fields may be noted. These voids can be compensated with **Add overlap**. The % value refers to the image field size (**Tile size**) selected. With 10 % and a selected size of 256 x 256 pixel², the overlap would be 26 pixels.
- **Image format**: JPEG, BNP, PNG, or TIFF
- **Quality factor**: 1 to 100 % (settable for JPEG only)

On the right side, the resulting data are indicated (e.g. the number of the (part) images to be generated).
Furthermore, the destination folder and the name, to which the Digital Slide is to be stored, needs to be selected.

Click onto Save to trigger the saving procedure.

Depending on the original location of the particular Digital Slide (data rate) and the size of files to be handled, saving may take very long to finish (hours in some cases).

A Digital Slide on a teleconsultation server must carry an Allow saving attribute to be locally saved.

An information box will acknowledge the successful export (Fig. 2-22).
2.11.3 Exporting Digital Slides

The previous chapter dealt with the storage of a complete Digital Slide, based on the creation of tiles that have to be re-assembled (by using another program, e.g. Axio Vision) to form again a complete image. The export option allows you:

a) to export the complete Digital Slide or individual annotations as an image in the TIFF format (_TIFF Image_). Furthermore, specific channels can be exported (e.g. for fluorescence specimens). Most programs allow further processing of these images.

b) to export the complete Digital Slide or individual annotations in the MIRAX format (_MIRAX Slide_). Furthermore, specific channels can be exported (e.g. for fluorescence specimens). This format can be opened again in the MIRAX Viewer.

Via the **File ▶ Slide Export...** menu, a dialog window will open (Fig. 2-23), in the upper part of which (_Original Settings_) the relevant data (digitization settings used for the specimen) of the Digital Slide are displayed:

- **Slide type:** Indicates whether the Digital Slide was digitized in brightfield or in fluorescence mode.
- **Image file format:** Indicates the image format of the Digital Slide.
- **Quality factor:** If the Digital Slide was digitized as a JPEG image, the quality factor used in digitization is shown here.
The Output Settings panel of this window allows the user to enter the desired data for the slide export:

**File format:** The user can save the Digital Slide in two formats:
- a) **TIFF Image**
- b) **MIRAX Slide**

**Magnification:** This is to define the export resolution.
1:1 exports the Digital Slide with the highest resolution.

**Tile size:** The exported image is divided internally into smaller units. The size of these units is defined here.

**Overlap:** If **MIRAX Slide** is selected as the output format, an overlap of the individual parts can be defined here. This overlap should not be changed (0 %) in the normal case.

**Image codec:** The output format must be defined at **File format**.

Specifies the codification of the image. The available selection depends on the data format chosen.

If **MIRAX slide** has been chosen, JPEG, BMP or PNG can be selected. If **TIFF format** has been chosen, either not compressed (= TIFF) or JPEG can be selected.

**Quality:** If JPEG has been selected at **Image codec**, the quality of the JPEG compression can be set here.

**Burn in slide annotations:** If annotations have been created, this option is used to decide whether these annotations shall be burnt in or not displayed in the exported image.

**Output channels:** This field allows you to specify the channels to be exported. The selection possibilities depend on the **File format** chosen.

If **MIRAX Slide** is selected at **File format**, only **Multi channel** will be available. The underlying fields are used to select the channels to be exported. For Digital Slides captured in the brightfield mode the export of all three channels is recommendable. The export with fewer channels is only interesting for fluorescence images.

If the **TIFF Image** option is selected at **File format**, there will be a choice of three modes at **Output channels**:

- **Multi channel:** The features of this option are equal to those of **MIRAX Slide** at **File format**.

- **Single channel:** This option is selected to export one channel as gray-value image. The channel to be exported can be specified in the underlying selection field. This choice is recommended for fluorescence images if only one channel shall be exported.

- **Current view:** This option allows the Digital Slide to be exported as displayed in the **Selected Region of Interest** area.
ROI Selection: In the area under Available regions all rectangular and freehand-drawn annotations are indicated. The entry Whole Slide always appears for the export of the complete Digital Slide. The arrow buttons are used to move the desired regions to the Regions to be exported area (and back). All regions listed in this area will be exported.

Selected Region of Interest: Displays the region that has just been selected.

Destination Path: Indicates the path for saving the exported image. A click on the Browse... button will open a window, in which the path can be defined.

Output Image Information:
- Selected image information indicates the export information for the just selected region.
- Aggregated Export Information indicates the export information for all regions listed under Regions to be exported.

⚠️ Depending on the performance of the computer, exporting, especially high-resolution exporting processes, may take a longer time.
2.11.4 Exporting Annotations

Where annotations have been created in a Digital Slide enclosing certain sub-areas of that Digital Slide (rectangle-shaped or freehand-drawn annotation), these sub-areas can be exported (Slide report).

Since only the image contents and title line of an annotation are copied to the report, it is not possible to export point-type and measurement annotations.

The button to initiate an exporting process is located in the toolbar of the Digital Slide's window. Click onto button to open the export window (Fig. 2-24).

This window defines to which file one or more exported annotations are to be stored (after File name). If a file name or directory name other than the default file name or the default directory name are desired, Change can be pressed for selection of a different file name or a different path.

Working in this window, the user can mark all desired annotations in the Available annotations sub-area and prepare these for transfer to the report by clicking onto , i.e. for shifting these annotations to the Annotations to export sub-area. It is possible to select several annotations at one time by pressing the Control (CTRL) key and clicking with the mouse as well as pressing the upper-case key (Shift) and clicking with the mouse.

Similarly, individual annotations can be moved from the Available annotations sub-area to the Annotations to export sub-area and vice versa by double-clicking them. To remove annotations which were shifted to the Annotations to export sub-area by mistake, you must select the button.

Once all desired annotations are ready for transfer (i.e. were copied to Annotations to export), the pre-selected contents can be transferred to the defined file by clicking OK.
The file will be saved in HTML-format. Its title line corresponds to the name of the Digital Slide. All exported annotations will be listed thereafter, each with a pertaining name, image and (if added) comment text (Fig. 2-25).

Exported JPEG images are saved in a directory named `<file name>_files` (in the given example: `C:\Program Files\Mirax Viewer\mouse_embryo_files`).

Fig. 2-25   Example of file with exported annotations
2.12 Changing Image Properties

For each single Digital Slide the user may enter modifications in property settings regarding brightness, contrast, gamma value, and color matching. If the button is activated, the software will superimpose a dialog window (Fig. 2-26) where these properties may be modified. This dialog window can be moved.

- If the Current Area button has been activated, the histogram of the currently displayed image segment is shown. If 1:1 has been activated, the histogram for the complete Digital Slide is shown. The option 1:1 is only available if the specimens were digitized by means of a MIRAX control software version 1.11 (or higher).

- In the upper part of the window there is a graphic image of the color values of the currently displayed Digital Slide or image segment. The black line with squares represents the characteristic curve. The curve can be shifted to the left/right or upward/downward by clicking on the squares. If brightness, contrast and gamma values are changed, the sliders below will be set automatically to the corresponding positions.

- Representation between gray-scale value (0 ... 255) and number of gray-scale values is linear. For logarithmic representation the log button has to be activated.

- The Best fit button is used for optimal setting on the basis of the threshold value defined in per thousand. In brightfield mode all three channels (RGB) are optimized; for fluorescence, this function can be executed for each single channel.

- The Min/Max button is used for optimal setting by extending the histogram between the minimum and maximum values. In brightfield mode all three channels (RGB) are optimized; for fluorescence this function can be executed for each single channel.

- The three sliders have a direct influence on brightness, contrast and gamma value. By clicking on the Default button, the sliders for brightness and contrast are reset to the default value 0, the gamma value is set to 1.20 (brightfield) or 1.00 (fluorescence).

- Settings will be saved by clicking on the Save button. Restore is used to call the settings again. This function refers only to the current Digital Slide. If another Digital Slide is called, the saved values will not be available.

If you use a high-quality screen, the default settings for color reproduction, gamma, brightness and contrast are adequate. These functions are mainly intended for highlighting specific image contents for training and documentation purposes or to match monitor screen features.

User-modified settings will be saved specifically for this Digital Slide.
2.13 Changing Image Properties (Fluorescence)

If specimens were digitized in the fluorescence mode, all channels are displayed in the bottom part of the image (Fig. 2-27). The software supports up to 9 channels. In the example below three channels were digitized (DAPI, Alexa 488 and Cy3). The pseudo-colors are taken over as specified in the MIRAX control software before digitization. But they can still be changed in the MIRAX Viewer.

![Digital slide (fluorescence)](image)

**Fig. 2-27** Digital slide (fluorescence)

![Settings for fluorescence](image)

**Fig. 2-28** Settings for fluorescence
There are various options for changing the representation of Digital Slides:

- Individual channels can be shown or hidden by clicking on the respective channel (e.g., DAPI, Alexa 488, Cy3).
- By clicking with the right mouse key on the respective channel, another pseudo-color can be selected for this channel.
- The channels are displayed in their pseudo-colors when the button is **On**. To display the Digital Slide in gray levels, this button must be in the **Off** position. For gray-level images, only one channel can be displayed. By clicking on this button you can pass from **On** to **Off** and vice versa.
- The button serves to optimize the Digital Slide for all channels through the Best fit function (for optimizing single channels see section 2.12).
- The button is used to optimize the Digital Slide for all channels by extending the histogram (Min/Max) (for optimizing single channels see section 2.12).
- By clicking on the button, the default settings are restored.
- The button opens a dialog window, which allows contrast, brightness, gamma and other values to be set for the individual channels (Fig. 2-29). For details on the settings please see section 2.12.
- The non-digitized region of a Digital Slide is displayed with a gray-scale value that has been defined by means of the slider **Background color**. A relatively dark background is recommended (slider shifted to the left).

### 2.14 Scale Bar

A scale bar dynamically adapting to a selected magnification can be superimposed onto the Digital Slide window. A desired color can be selected for this scale bar. Its position is fixed onto the top left corner. This position assignment cannot be changed.

To change the color, the options explained in 2.4.2 are available.
# 3 MIRAX VIEWER REFERENCE

## 3.1 Main Menu

### File

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>Icon/Hotkey</th>
</tr>
</thead>
<tbody>
<tr>
<td>New 3D project</td>
<td>Opens the dialog window for adding a folder or opening a single Digital Slide.</td>
<td></td>
</tr>
<tr>
<td>Open...</td>
<td>Opens the dialog window for saving the Digital Slide (single images).</td>
<td>Identical with icon: or CTRL+O</td>
</tr>
<tr>
<td>Save Slide as...</td>
<td>Opens the dialog window for saving the Digital Slide (complete image).</td>
<td>Identical with hotkey: CTRL+S</td>
</tr>
<tr>
<td>Slide Export...</td>
<td>Opens the dialog window for saving the Digital Slide (single images).</td>
<td></td>
</tr>
<tr>
<td>Close</td>
<td>Closes currently open Digital Slide window.</td>
<td>Identical with hotkey: CTRL+F4</td>
</tr>
<tr>
<td>Exit</td>
<td>Terminates program session.</td>
<td>Identical with hotkey: ALT+F4</td>
</tr>
</tbody>
</table>

### Settings

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>Icon/Hotkey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Options</td>
<td>Opens dialog window with MIRAX Viewer setting options.</td>
<td></td>
</tr>
<tr>
<td>Slide Display Scale Setup</td>
<td>Opens dialog window for calibration of monitor.</td>
<td></td>
</tr>
</tbody>
</table>

### Window

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>Icon/Hotkey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cascade</td>
<td>Arranges several windows currently open in cascade pattern.</td>
<td></td>
</tr>
<tr>
<td>Tile Horizontally</td>
<td>Arranges several windows currently open one below the other.</td>
<td></td>
</tr>
<tr>
<td>Tile Vertically</td>
<td>Arranges several windows currently open in a horizontal row one beside the other.</td>
<td></td>
</tr>
<tr>
<td>Minimize All</td>
<td>Minimizes all windows.</td>
<td></td>
</tr>
<tr>
<td>Arrange All</td>
<td>This function is currently not used.</td>
<td></td>
</tr>
</tbody>
</table>

### Help

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>Icon/Hotkey</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIRAX Viewer Help</td>
<td>Opens a window with hotkey explanations.</td>
<td>Identical with hotkey: F1</td>
</tr>
<tr>
<td>About...</td>
<td>Displays information about program version and authorized modules.</td>
<td></td>
</tr>
</tbody>
</table>
3.2 Toolbar in Program Screen

Fig. 3-2 Program screen toolbar

- **Slide tree**: Turns slide tree for Digital Slides on or off.
- **Thumbnails**: Turns thumbnail view screen (gallery) on or off.
- **Open Slide**: Opens a dialog window for adding a folder or opening a single Digital Slide.
- **New 3D project**: This function is currently not used.
- **Connect to teleconsultation server**: Logging in to a teleconsultation server to view the Digital Slides on the same (e.g.: offline teleconsultation)
- **Host teleconsultation**: If this icon is selected, the host will create a group (online teleconsultation)
- **Join teleconsultation**: If this icon is selected, a client may join a group (online teleconsultation)
- **Disconnect from web server**: Separates the user from teleconsultation server.
- **Tile vertically**: Arranges several windows currently open horizontally one beside the other.
- **Tile horizontally**: Arranges several windows currently open one below the other.
- **Cascade**: Arranges several windows currently open in a cascade.
- **Multi View**: Links open windows for simultaneous navigation.
- **Full Screen**: Maximizes currently selected window to cover the entire screen area.
3.3 Toolbar of Digital Slide Window

Fig. 3-3 Toolbar of Digital Slide window

- Turns preview image in left window half-area on or off. Identical with hotkey: CTRL+P
- Turns magnifier in top right position on or off. Identical with hotkey: CTRL+M
- Shows or hides an operator panel for color matching (for brightfield only).
- Allows you to shift the window contents using the mouse or keyboard commands if active.
- This function may be used to create a rectangular-shaped annotation.
- This function may be used to create a freehand-drawn annotation.
- This function creates an annotation that points to a specific spot.
- Allows you to measure a distance in a Digital Slide and/or create a measurement annotation. In addition, you can turn the scale bar on or off and determine a color for the bar.
- Opens a window for organizing of the various annotations (e.g. editing comments, deleting annotations).
- Selects annotations for consolidation in a report (slide report).
- Creates a bitmap snapshot of the Digital Slide contained in a currently open window (same window size as actually displayed) and opens a dialog window for editing and saving.
- With this button turned on and general simultaneous navigation activated, also this Digital Slide will be moved. If this button is turned off, the Digital Slide will not be moved simultaneously.
- By clicking onto this button, you can mark the entry that relates to a currently open Digital Slide, if the slide tree is open at this moment.

Info function:
- Turns view screen for annotations / measurement annotations on and off.
- Opens Digital Slide information window.

- Selects sample areas to be enlarged via rectangle selection.
Express selection of defined magnification factors (refer to hotkeys F2 to F8)
20X corresponds, for example, to the visual impression when observing
the specimen using a 20x objective and a 10x eyepiece. However, for
monitors with a high pixel density, 40X is still more than adequate for
medical fact-finding purposes.

Indicates the currently set magnification of the Digital Slide on display.
You may also enter a desired magnification here.

Provides a progress display of the loading process to the current view
screen.

Changes between gray-level and color view.

Shows all available channels; they can be turned on or off.

Optimizes the view according to the Best Fit method for all channels.

Optimizes the view according to the Min/Max method for all channels.

Resets the settings to the default values.

Shows or hides an operator panel, which can be used to match the colors for
the individual channels.

This slider is used for background setting (the non-digitized region).
3.4 Manage Annotations Window

Fig. 3-5 Manage Annotations Window

Changes the main screen view resulting in that the selected annotation is shown.

Opens another window with options for editing the properties of a previously marked annotation.

Deletes a selected annotation.

Saves the information contained in Annotations and Measurement annotations as a file. Values are separated by comma.

Copies a link to the selected annotations to the clipboard (only active if a special license has been acquired).

The Digital Slide currently displayed is opened in a defined program and the marked annotation is transferred with its position data.

A scan mask can be created from the marked annotations. It can be opened in the control software (for MIRAX DESK, MIRAX MIDI, and MIRAX SCAN). Now, the defined areas can be digitized once more.

Terminates this dialog.
3.5 Image Capture Window

Fig. 3-6 Image Capture window

Matches a given sample segment to the size of the window (Image Capture) if in active state. If this function is deactivated, the resolution of the main screen view is used. Consequently, the resulting resolution of the saved image depends on the resolution of the monitor.

In this panel, image properties such as brightness, contrast and gamma can be changed and colors can be balanced.

This function defines if annotations / measurement annotations are to be displayed on the capture screen and saved later on.
This function defines if the scale bar is to be displayed on the capture screen and saved later on.

This function saves the images.

Copies the screen capture to the clipboard.

Copies the image content to an external program.

Terminates this dialog.

### 3.6 Hotkeys

Navigation within a given sample is made easier by the use of hotkeys (functions assigned to individual keyboard keys).

#### Arrow keys

- **Up**: Moves slide up.
- **Down**: Moves slide down.
- **Left**: Moves slide to the left.
- **Right**: Moves slide to the right.
- **+ key**: Increases magnification of slide.
- **- key**: Decreases magnification of slide.

#### Function keys

- **F1**: Calls help window with display of hotkey functions.
- **F2**: Matches magnification of slide to currently selected window.
- **F3**: 1X magnification
- **F4**: 2X magnification
<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
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<tbody>
<tr>
<td>F5</td>
<td>5X magnification</td>
</tr>
<tr>
<td>F6</td>
<td>10X magnification</td>
</tr>
<tr>
<td>F7</td>
<td>20X magnification</td>
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<td>40X magnification</td>
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<tr>
<td>F9</td>
<td>1:1 magnification</td>
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<tr>
<td>F10</td>
<td>Activates the menu bar.</td>
</tr>
<tr>
<td>F11</td>
<td>Turns full screen view (Fullscreen) on or off (maximizes currently selected window until screen area is fully covered).</td>
</tr>
<tr>
<td>F12</td>
<td>Changes to the mode, in which you can navigate within the Digital Slide using the mouse.</td>
</tr>
<tr>
<td>CTRL+T</td>
<td>Turns slide tree on or off.</td>
</tr>
<tr>
<td>ESC</td>
<td>Returns from full screen mode to normal mode (alternatively to re-pressing of key F11).</td>
</tr>
<tr>
<td>CTRL+M</td>
<td>Unhides or hides magnifier in top right position.</td>
</tr>
<tr>
<td>CTRL+P</td>
<td>Unhides or hides previews on the left.</td>
</tr>
<tr>
<td>CTRL+V</td>
<td>Switches the upper preview screen to Fit mode or Full View mode. In Fit mode, the digitized area will be matched to the preview screen to a maximum degree. In Full View mode, the entire slide will be on display.</td>
</tr>
<tr>
<td>CTRL+C</td>
<td>Changes color of the tracing mask (Red, Green, Blue).</td>
</tr>
<tr>
<td>CTRL+Z</td>
<td>Changes view mode of variable preview screen (Preview → Position Tracing → Preview + Position Tracing).</td>
</tr>
<tr>
<td>CTRL+F4</td>
<td>Closes currently displayed Digital Slide.</td>
</tr>
</tbody>
</table>