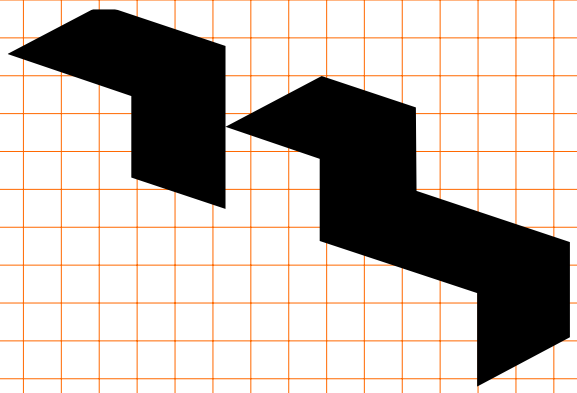

FILMFABRIEK
PICTOR FILM SCANNER
USER MANUAL

ENJOY YOUR FILMFABRIEK SCANNER

Revision: 1.0.4 – 2024/12/17
Applicable models: PIC2100/1, PIC2200/1
Contact: support@filmfabriek.nl

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USING THE PICTOR

MAINTENANCE & CALIBRATION

Congratulations on acquiring a Filmfabriek Pictor scanner!

There are two versions of the Pictor (Pictor and Pictor Pro). The Pictor Pro has a higher resolution camera and a sound module.

In this user manual, you will learn how to use your scanner and the included control software. Difference in usage between the Pictor and the Pro version will be specified when necessary.

After reading this document, you will be able to choose the best settings for each film and start digitizing your material.

We are proud of our products, and we sincerely hope that you will enjoy your Filmfabriek scanner.

Updated versions of this document may be available on our support website,
Please always make sure you are referring to the latest version
(the revision number can be found on the first page).

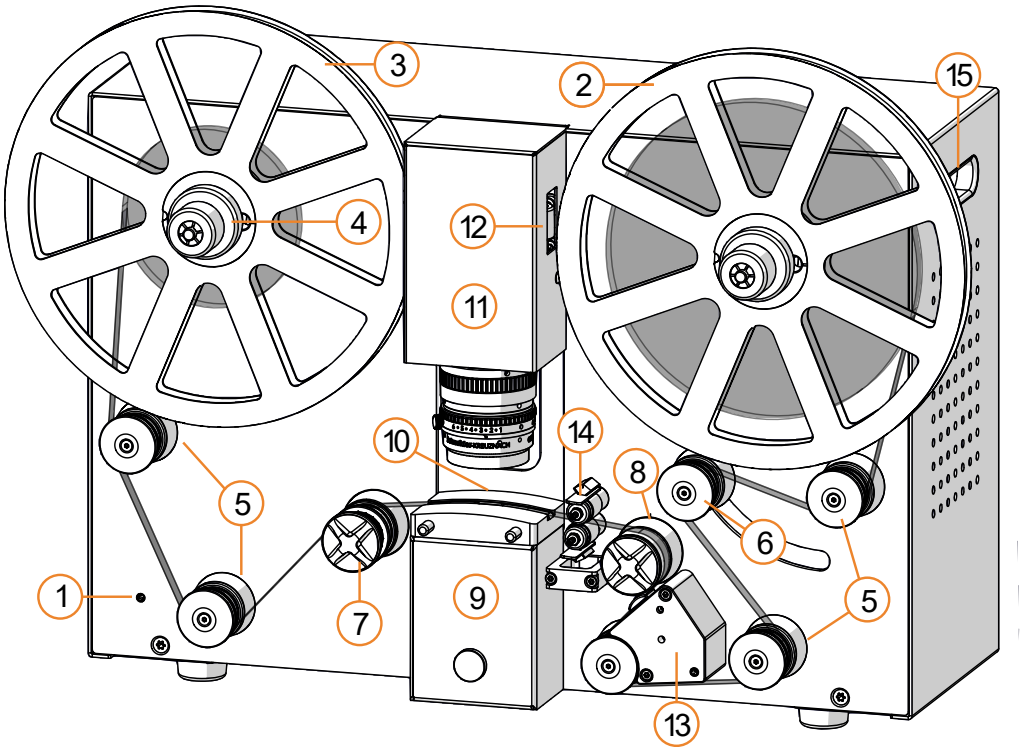
Note that while there may be slight variations on your scanner compared to the pictures or descriptions in this document, it is functionally the same.

GETTING STARTED

DESCRIPTION OF THE PICTOR FILM SCANNER

The Pictor is a frame-by-frame 8mm film scanner with audio recording capabilities and an optional wet gate.
It can be used to play and scan **regular 8** (also simply called 8mm, normal 8 or standard 8) and **super 8** (and its variants such as **single 8**), both with and without magnetic soundtrack (Pictor Pro only).

The Pictor is mechanically driven by the rotating reels and the transport is constantly tension-adjusted in order to prevent excessive strain on the film and to keep it well positioned in front of the camera.
While it uses a roller with sprockets to follow the movement of the film frames (“frame registration roller”), this roller freely rotates without offering any resistance and is not used to drive the film in any way, making the Pictor a virtually sprocket-less scanner.



1. Power indicator | **2.** Supply reel | **3.** Take-up reel | **4.** Locknut on the reel axles
5. Film guide rollers | **6.** Tension arm roller | **7.** Frame registration roller
8. Follower roller | **9.** LED light source casing | **10.** Film gate
11. Camera and lens assembly | **12.** Focus adjustment knob
13. Sound head module (Pictor Pro only) | **14.** Wet gate module | **15.** Carrying handles

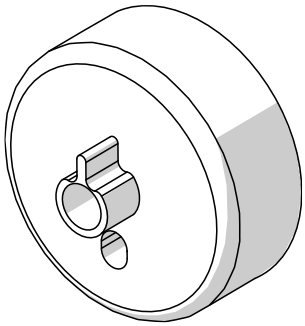
POWER INDICATOR

When the scanner is powered, the LED will be red. When the control software is running and connected with the scanner, the LED will be green.

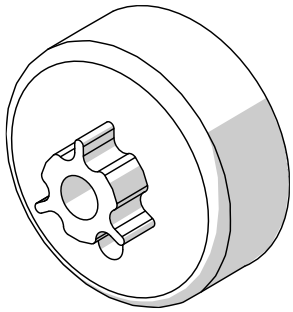
FILM REEL AXLE ADAPTERS

The scanner can be used with two different reel formats: regular 8 reels and super 8 reels. Reels of up to 180m (600ft) of film are supported. Note that the format of the take-up reel does not need to match the format of the film (a regular 8 film can be wound on a super 8 reel, for instance).

Adapters must be fitted on the scanner's axles for both formats.

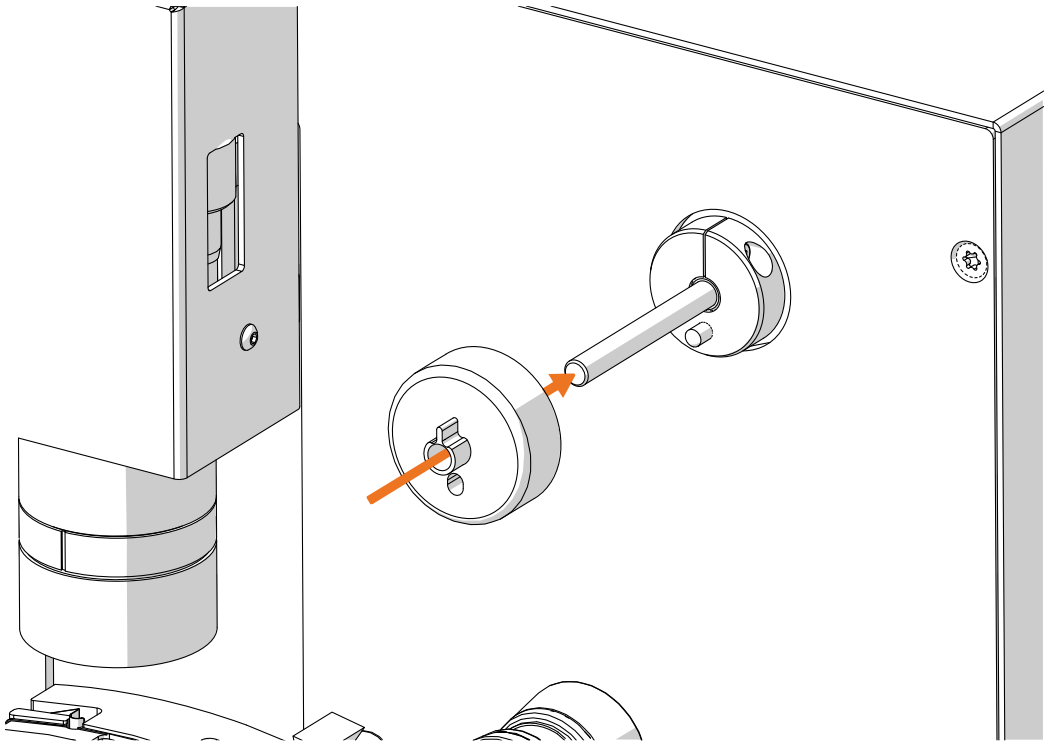


Regular 8 axle adapter



Super 8 axle adapter

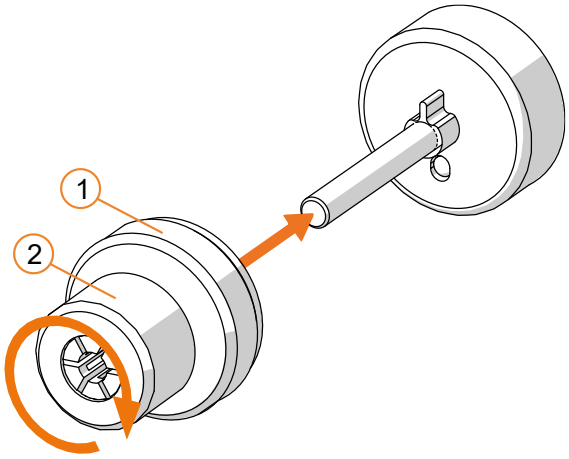
Only use one adapter at a time on each axle and always make sure the piece is in the right position and pushed fully, with the pin on the scanner aligned with the axle adapter's hole.



Fitting the regular 8 adapter on the supply axle

LOCKNUT

The locknut holds the reels in place on the axle. To place the nut: hold the larger part (**1**) and loosen by slightly unscrewing the smaller part (**2**). Slide the nut on the axle and whilst pressing the nut firmly against the reel, hand tighten (**2**) while holding (**1**) stationary.



Tightening the locknut on the axle

FILM GUIDE ROLLERS

These free-wheeling rollers are simply guiding the film on the scanner.

TENSION ARM ROLLER

This film guide roller is fitted on a tension-regulating arm that will move to apply an ideal resistance for film transport, while guaranteeing no extra strain is put on the film.
If the film breaks or reaches the end, the tension-regulating arm will also command the motors to stop.

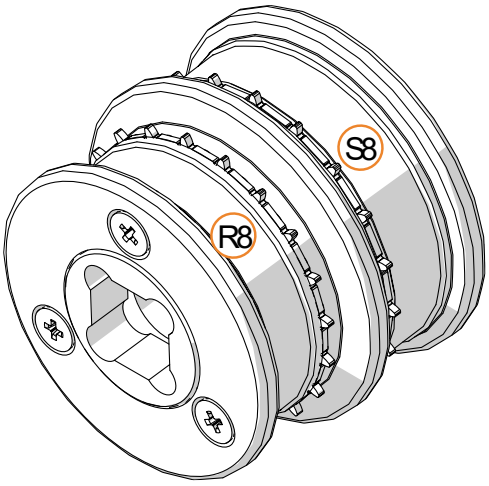
FOLLOWER ROLLER

This special roller is used to measure the movement of the film during the scan.

FRAME REGISTRATION ROLLER

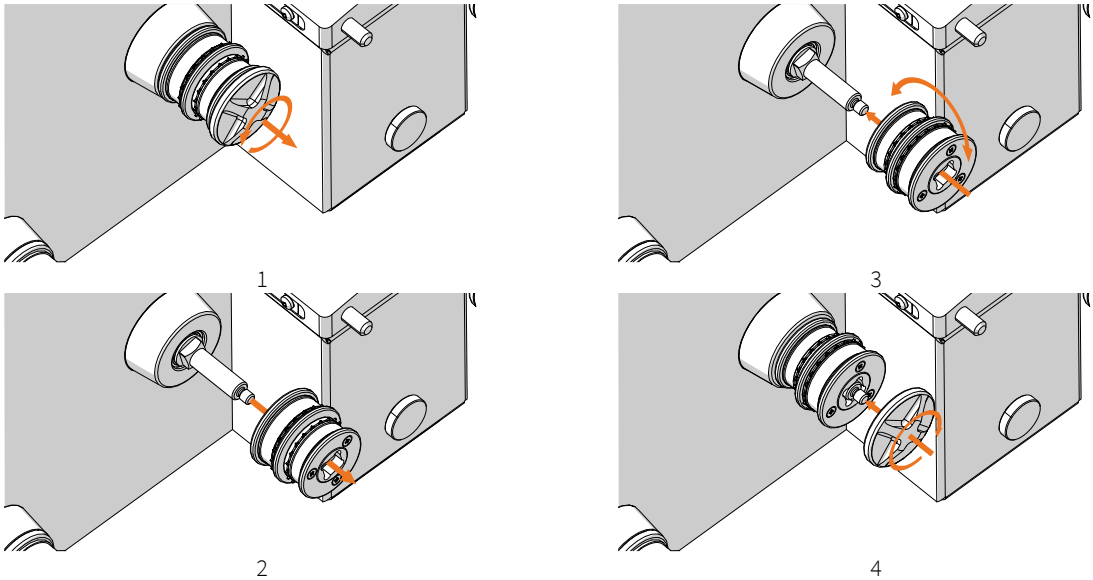
This roller with sprockets freely rotates while the film passes onto it and keeps track of the number of perforations that go by in order to control the speed of capture and to trigger the camera at the right moment. It does not offer any resistance to the film and does not risk damaging it.

Along with the axle adapters, this is the only part of the scanner transport that needs to be adapted to the film format.
The roller has two sides: the smaller side is for regular 8 (**R8**), the larger for super 8 (**S8**).



If the roller is in the wrong position, it will not damage the film but may not register each film frame properly.
Be sure to put the film the right way around, however. If it is flipped (that is if the perforations are on the wrong side) the film will run over the sprockets and could be scratched.

To change the format, simply unscrew the cap of the frame registration roller (**1**), pull the roller (**2**) and return it (**3**) before securing it in place with the tip (**4**). Be sure to push the roller fully before screwing the tip back in place.
The side matching the desired film format must be towards the scanner.



Changing from super 8 to regular 8

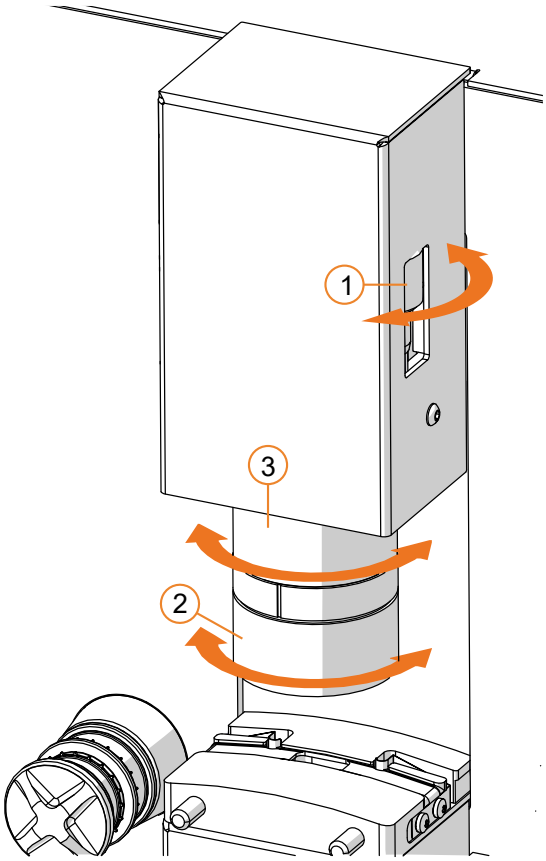
OPTICAL ASSEMBLY

The optical assembly is composed of the camera (hidden inside the case) and zoom lens. The zoom can be adjusted by turning the zoom ring (**3**) and the focus can be fine-tuned with the focus adjustment knob (**1**).

The aperture of the lens can be adjusted by turning the ring (**2**).

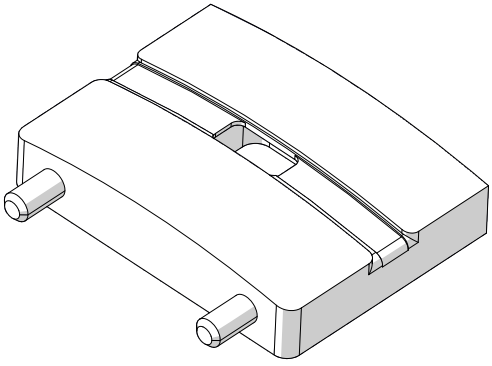
Do not forget to remove the lens cap when using the scanner for the first time.

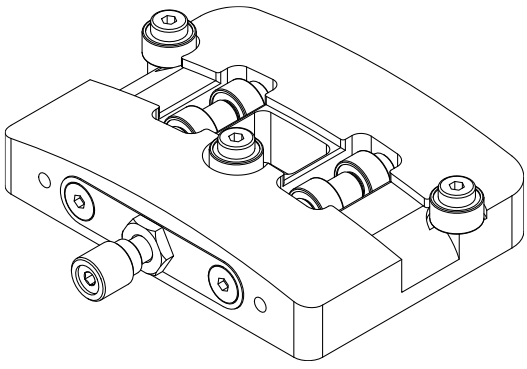
We also advise covering the lens when the scanner is not in use to avoid dust or contact.



FILM GATE

The gate is where the film passes onto a light source and in front of the camera. It is 8mm wide and accommodates for all types of 8mm wide films. Newer models are equipped with a special adjustable width film gate (shown right) to accommodate for unevenly manufactured film stock: simply adjust with the front knob.

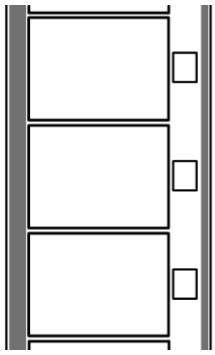




SOUND HEAD MODULE (PICTOR PRO ONLY)

The Pro version of the scanner comes equipped with a two-track magnetic sound head.

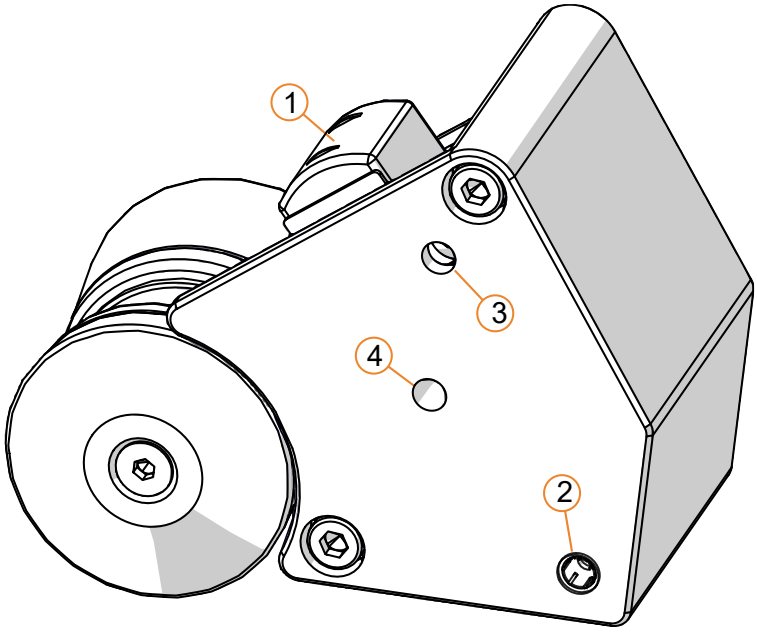
8mm sound films were striped with a magnetic track for sound recording on the side opposite the perforations. A thinner “balancing” track was often striped on the other side, next to the perforations to ensure the film would lay flat in the gate.
While it was not originally made to be recorded, the possibility of having a secondary soundtrack was sometimes used.



Super 8 film with two magnetic tracks, the main on the left and the balancing track on the right, next to the perforations

The Pictor scanner can read both tracks and mix them as desired.

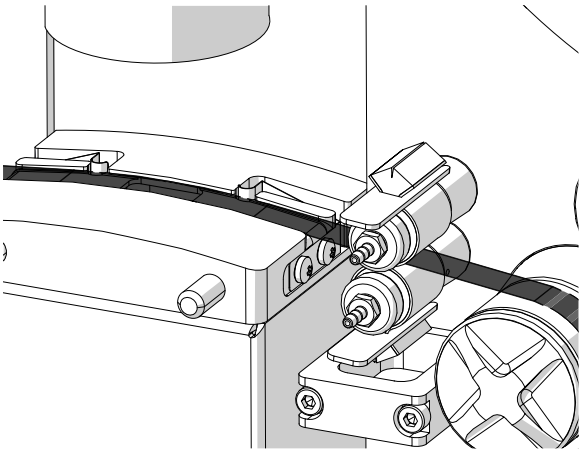
Sound playback and recording is activated through the control software.
See “Capturing with audio” and “Calibration” for more details and instructions.



1. Magnetic head | **2.** Light status indicator
3. Adjustment screw for azimuth | **4.** Adjustment screw for lateral position

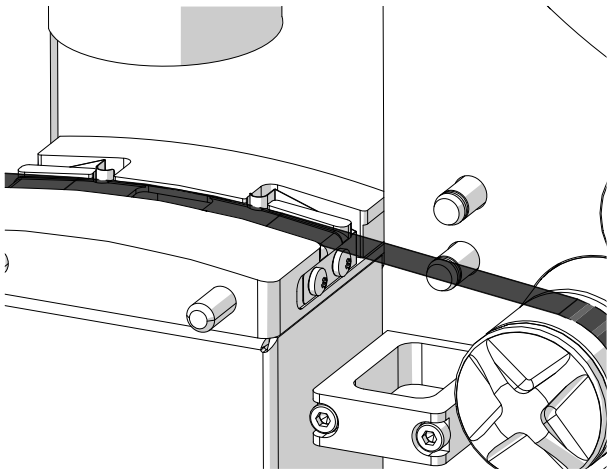
WETGATE MODULE

The wetgate module helps remove dirt and attenuate visible scratches on the film by temporarily filling them with a liquid so that light will be refracted as if they were not there. The Pictor's wetgate consists of two small microfiber sponges fitted on protruding rods (drip feed) and a safety recipient to avoid dripping fluid.



Film threaded for scanning with wetgate module

When scanning without using the wetgate, remove both sponge holders by simply pulling them towards you.



Film threaded for scanning without wetgate module

See "Capturing with wetgate" for more instructions.

UNPACKING & SETTING UP

The Pictor scanner comes ready-to-use out of the box.

CONTENT OF THE BOX

- Pictor film scanner
- Two regular 8 and two super 8 reel adapters
- Two sponge holders for the wetgate module
- Power cable
- USB 3.0 cable for camera
- Squeeze bottle for wet gate fluid
- This manual

UNPACKING

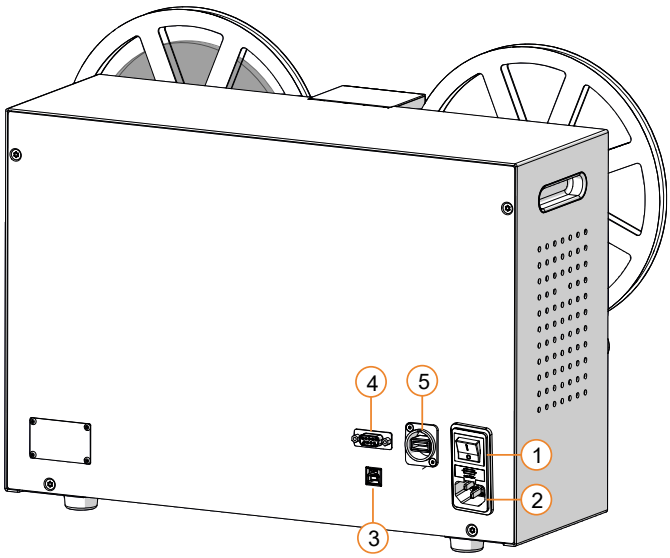
Carefully lift the scanner out of its package and place it on your work table.

The two film reels adapters are placed on each axle for shipment, make sure you only use one at a time when you load a film on the scanner.

The sponge holders for the wetgate are already in place, remove them to scan without wetgate.

CONNECTING

The Pictor must simply be connected to power and to a computer, through which the scanner is controlled and where digitized images and sounds are saved.



1. Power switch | 2. Power socket | 3. Camera USB 3.0 to computer
4. External module connector (optional) | 5. Audio USB 2.0 to computer (some Pictor Pro models only)

Connect the power cable to the scanner and plug it into a power socket (only use a grounded power socket).

Plug the USB 3.0 cable in the scanner and in the computer on the other end. On the computer, it is advised to use a USB 3.0 port that is not shared with another used port to allow for the full transfer rate from the scanner to the computer.

For first generation Pictor Pro, an extra connection was needed: connect the USB 2.0 cable to the audio port on the back of the scanner and to the computer, to any USB port.

For the camera, please use the provided USB 3.0 cable, other cables may not be satisfactory for optimal communication with the Pictor.
Certified cables of different length can be acquired from Filmfabriek as accessory if needed.

SYSTEM REQUIREMENTS

Scanning a film and handling heavy image files is quite an intensive task so we advise using a reasonably recent and powerful computer.
Check our support webpage for up-to-date specifications.

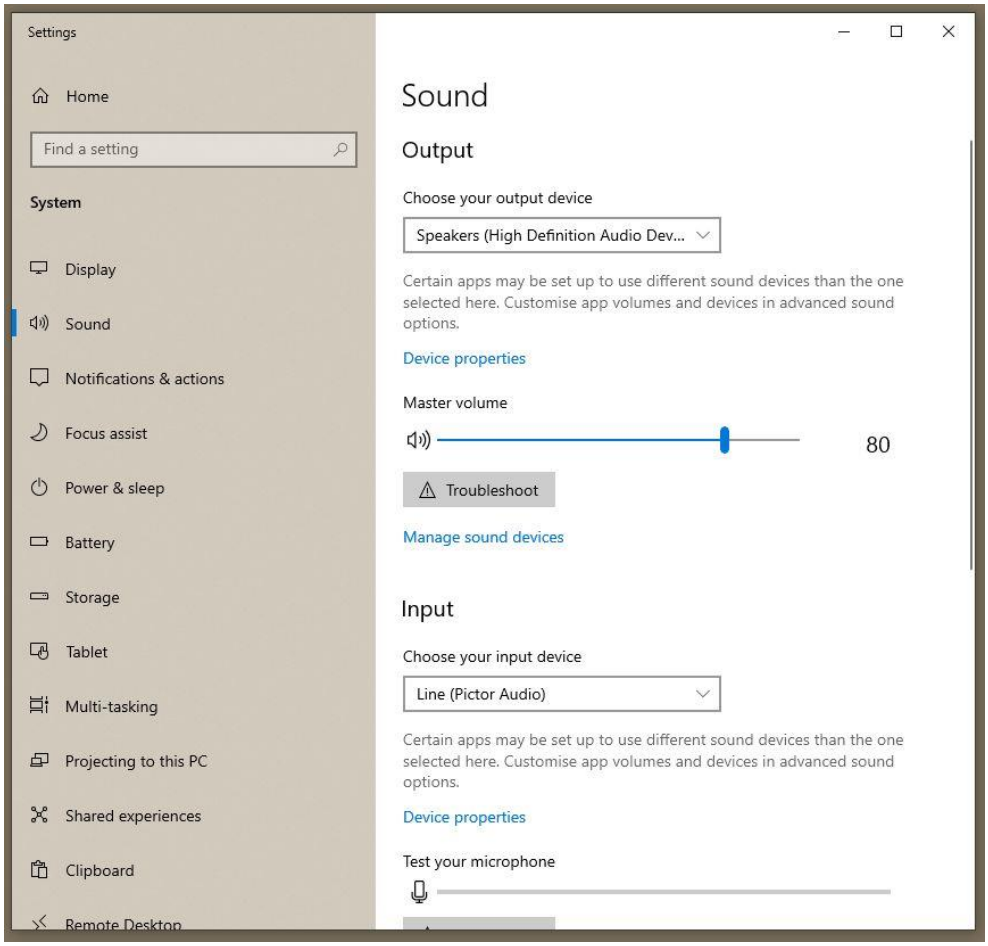
INSTALLING THE CONTROL SOFTWARE

Up-to-date installation instructions can always be found on the support page of Filmfabriek's website: http://support.filmfabriek.nl

SETTING UP WINDOWS SOUND INPUT (PICTOR PRO ONLY)

With the scanner plugged in, go to the sound settings of Windows, and make sure the selected **Input** device is "Line (Pictor Audio)". In the "Device properties" of the Input, make sure volume is set to 100.

Also make sure your desired speakers are selected as **Output**, and not the Pictor (Windows will sometimes select it by default and this will cause issues as it will try to use it as a speaker).



You should now be all set and ready to use your Pictor!

USING THE PICTOR

FILM PREPARATION

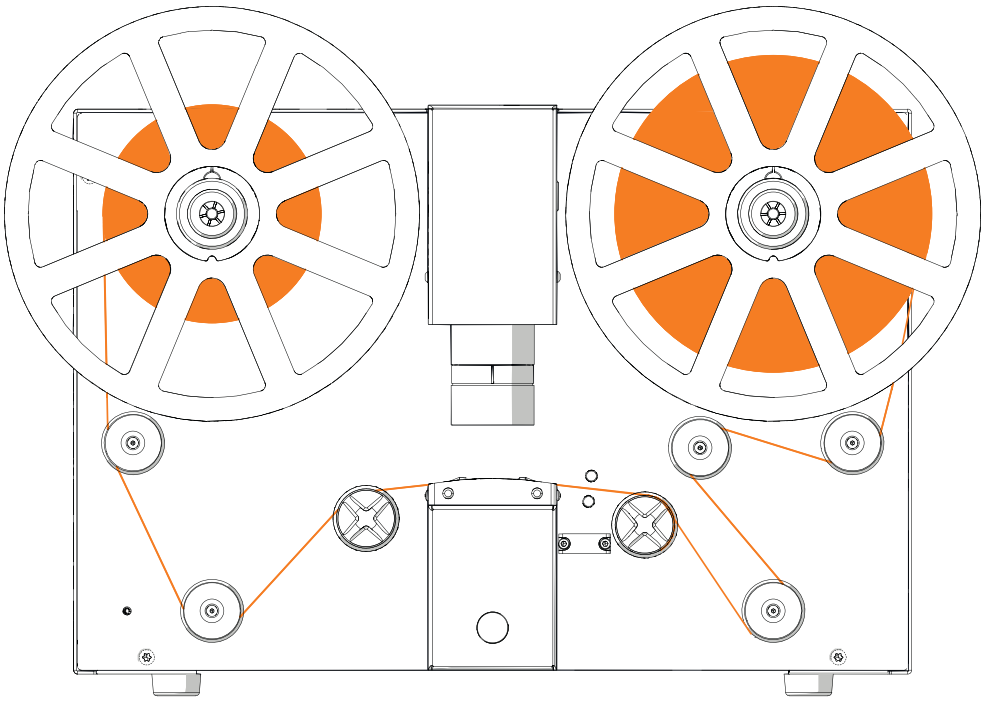
While it is very easy and quick to load a film on the Pictor and start scanning, the scan result will only be as good as the source material allows and it is therefore advised to properly inspect, clean, and – if needed – repair the film before scanning it.

Here are a few tips to ensure a good scan:

- The film should be clean in order to offer the best image and sound possible, but also to avoid leaving dust or oil on parts of the scanner. Dust can cause scratches on the film and could be scattered on other parts of the scanner. Oil will make dust stick to the film and the scanner and is not good for long-time conservation of the celluloid and emulsion.
  Cleaning the film beforehand is particularly indicated when using the wetgate, as dust and dirt will get caught in the sponges and the whole film will be run onto them.
- Proper leader should be placed at the head and tail of the film so that it can run smoothly from the first frame to the last and to avoid manipulating the film directly. A head leader of about 1.2m is enough, the tail can be about half of that length.
- The Pictor is very gentle on the film, but old splices could come apart if the film had not been run into a projector for a long time. We advise checking their robustness before threading the film on the scanner.
- Bad splices could also cause the film to run unevenly on the frame registration roller, causing the detection of one or two frames to be inaccurate. Bad splices could also lead to film jumping outside the film path. To prevent this, bad splices should be replaced.
- Moderate perforation damage should not be a problem as they are not used to drive the film, but extra care should be taken if using the wetgate, as torn perforations risk getting caught in the sponge holders.

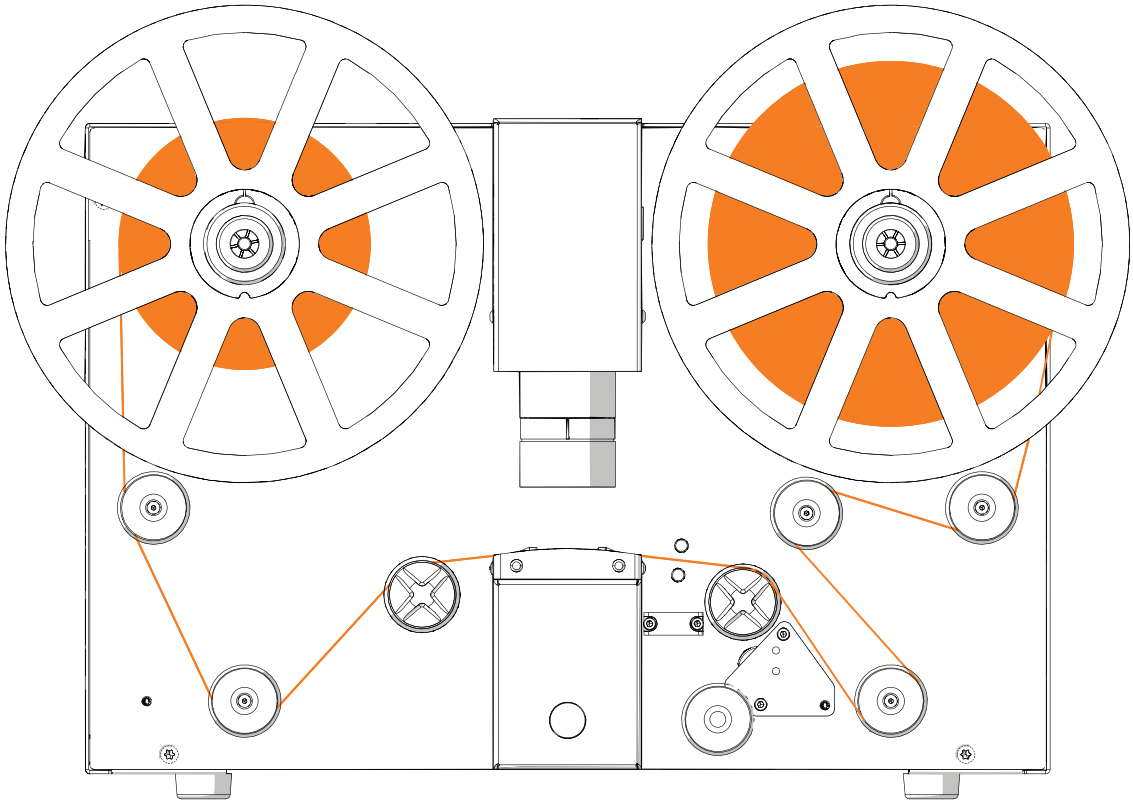
THREADING A FILM

The scanner has the supply reel on the right side and the take-up reel on the left side. After having put the correct axle adapters for your reels and securely tightened the film reel and the take-up reel in place with the locknut, thread the film following the pictures below, with the perforations outwards, away from the scanner.

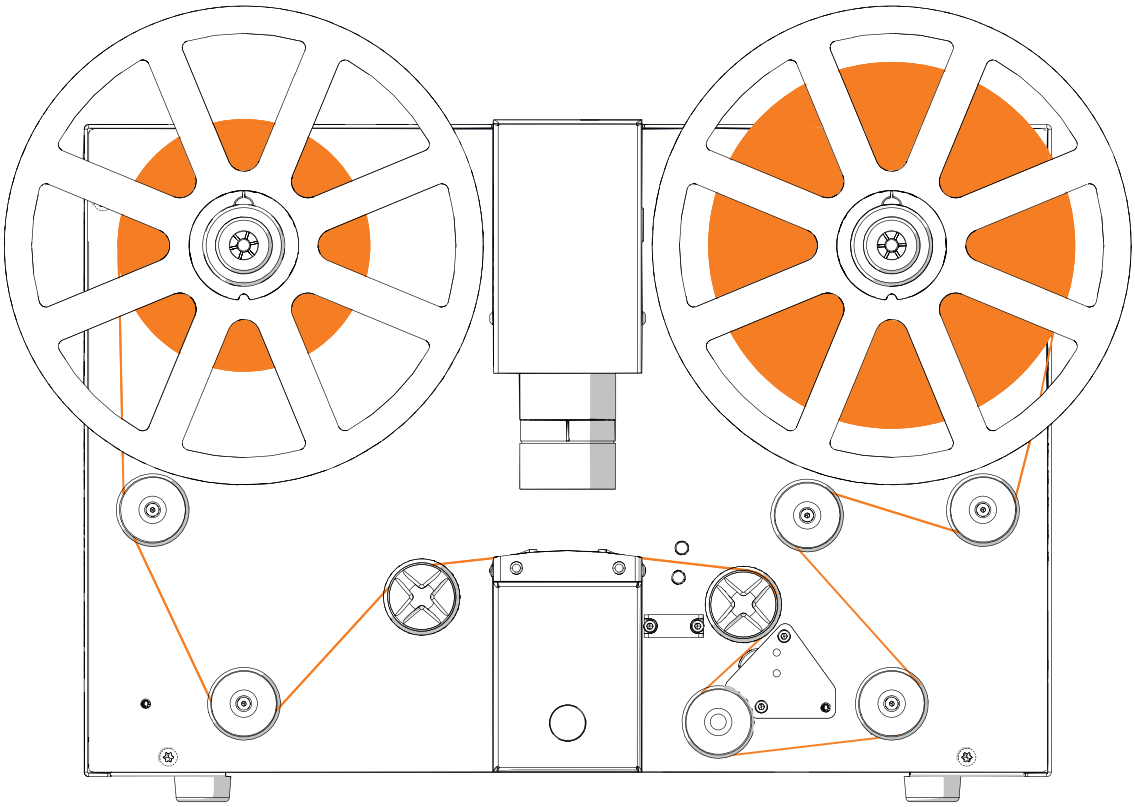


A-A wind threading on the Pictor

On the Pictor Pro, the threading will depend on the need to capture sound. For a silent scan, the film should not be threaded around the sound module.



A-A wind threading on the Pictor Pro for a silent scan

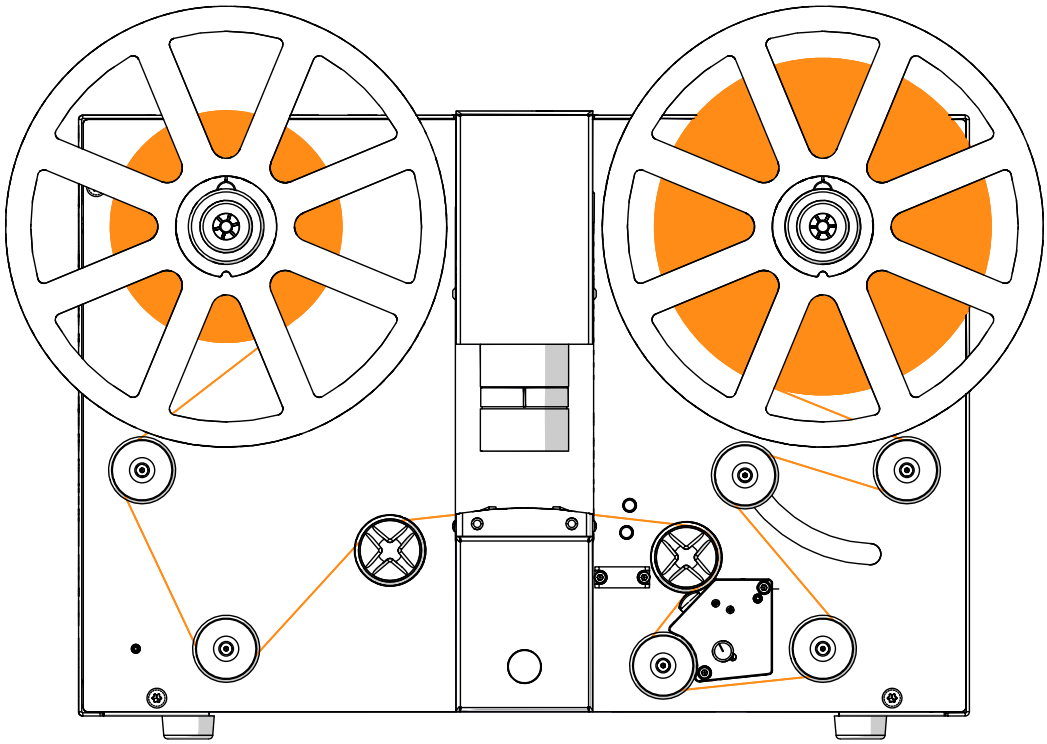


A-A wind threading on the Pictor Pro for a scan with audio

A and B wind

A clockwise movement of the reels is called “A wind” and a counterclockwise movement “B wind”. The above pictures show A wind configurations for both supply and take-up reels. If the supply reel has the film spooled with the emulsion facing outwards, the supply motor will rotate in A wind mode.

If the emulsion is inwards, do not twist the film! Return the supply reel so that the perforations are away from the scanner and lace the film in the same way.
You will just have to make sure that B wind mode is chosen for the supply motor in the control software so that it will rotate counterclockwise.
The same goes for the take-up reel, simply choose B wind for the take-up motor in the control software if you want to spool the film the other way around.



B-B wind threading

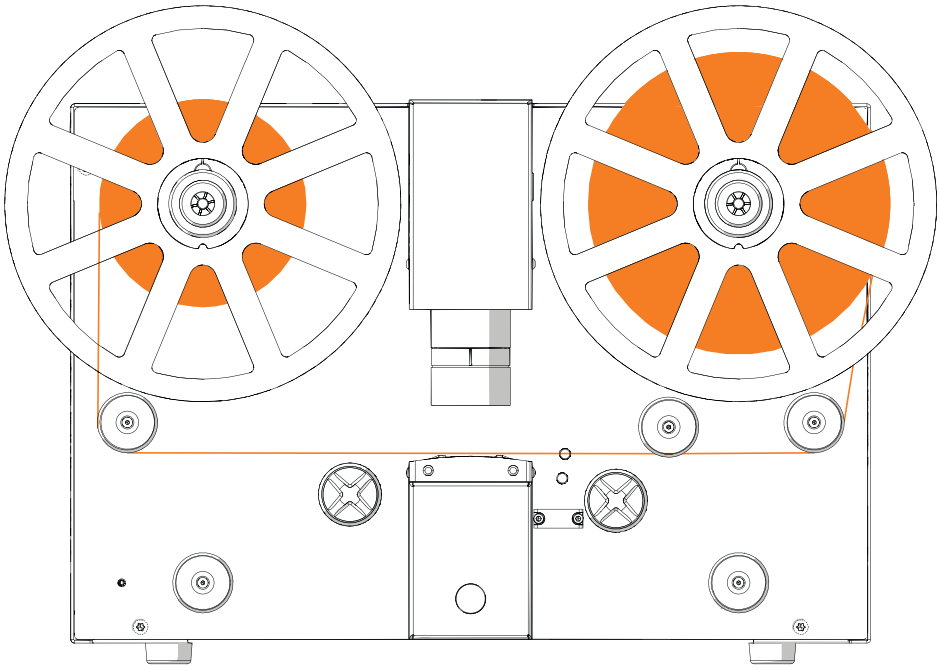
Any combination of A and B wind is possible.

Threading with wetgate

When using the wetgate, the film must be threaded as described above. The only difference being that the two sponge holders must be inserted, and the film passed in between them.

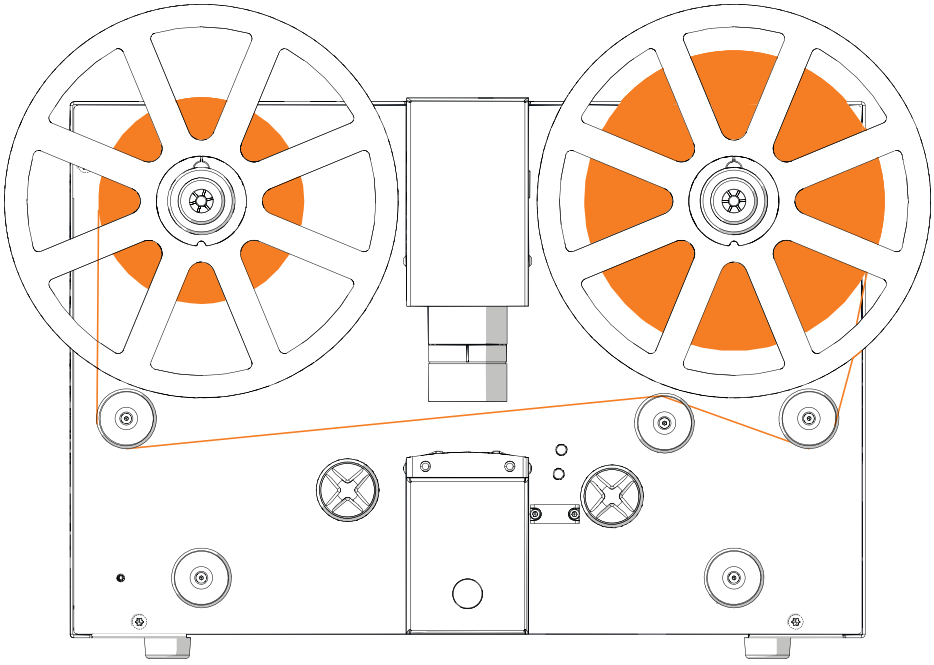
Fast wind lacing

For a fast rewind with minimal contact on rollers, you can lace the film in the following way. You can also use this lacing to spool the film forward quickly.
All configurations of A wind and B wind are possible for fast wind.
For the safety of the film, the fast winding mode will not work if the film is fully threaded on the scanner.



Straight fast wind lacing, in A-A mode

If the upper sponge of the wetgate module is in place, you will need to put the film above the tension arm roller, as shown below. It may require zooming out on the lens so that the film does not risk touching the lens.



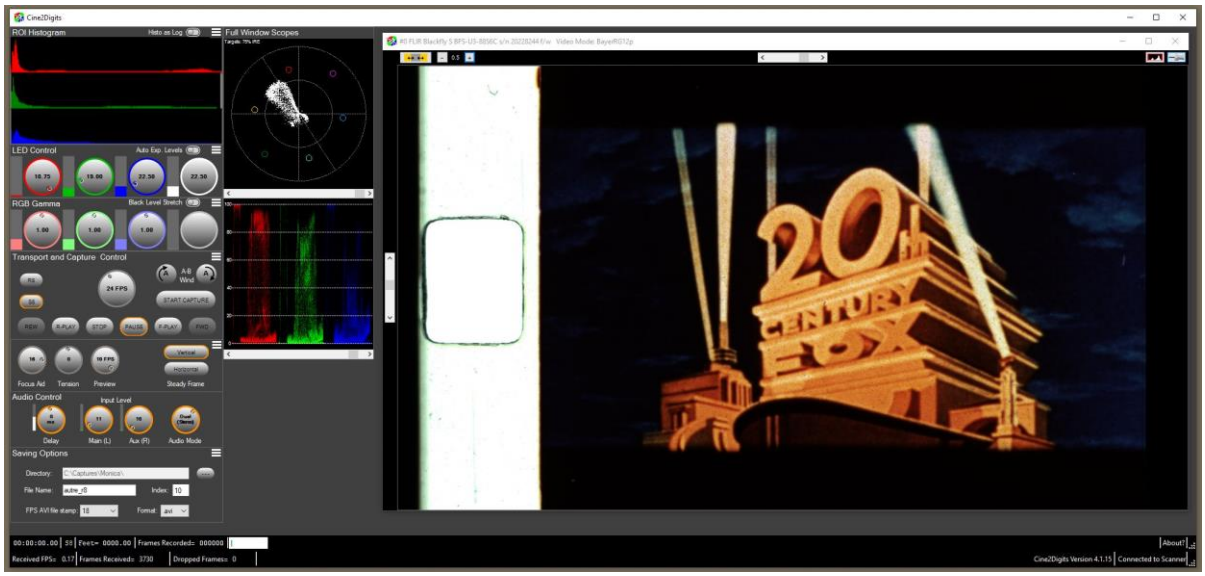
Fast wind lacing above tension arm, in A-A mode

CAPTURING FILM WITH CINE2DIGITS

The scanner is controlled with the Cine2Digits software (C2D). This application controls the film transport mechanism as well as the light source and the image and sound capture. Make sure the scanner is plugged and powered on before starting C2D.

OVERVIEW OF CINE2DIGITS

When launching Cine2Digits, you will be presented with two windows: the panel offering the controls and the camera preview window (the title of the window shows some camera information).



Overview of C2D

The different control elements are described below, and some more information and frequently asked questions can be found on the support page of our website. See "Support".

FILM TRANSPORT AND CAPTURE CONTROL

The "Transport and capture control" widget holds the main controls for the scanner. These buttons command the transport of the film, the capture of the content on the computer, and some images settings.

Camera preview

Images are presented in the camera preview window and refreshed only when the camera is "triggered", that is when the film is running and a frame is detected or when "Preview" mode is activated.
If you need to make adjustments when the film is not running and wish to refresh the view with the image that is currently in the gate, just enable the preview mode by clicking the Preview button. It will turn orange, and you will see the light source flashing and the display being refreshed. The speed at which this happens is indicated in the button itself (10 FPS by default) and can be adjusted by scrolling with your mouse wheel with the pointer over the button.

When you run the film normally for a capture, preview mode is not necessary and will even conflict with the automatic triggers, so be sure to disable it (the button should be grey).

The camera preview window can be kept on top of other windows by clicking on the "pin" icon in the top right:

Transport controls

Clicking on F-Play will start playing the film in forward mode (from supply reel to take-up) while clicking on R-Play will run it in rewind mode (from take-up to supply reel). The film will run at the speed given (in FPS, frames per second) by the speed dial in the middle of the widget. To increase or decrease the speed, rotate the dial with a scroll of the mouse-wheel. The speed can be changed when the transport is stopped, paused, or during capture if audio recording is disabled on the Pictor Pro.
The selected speed for transport and capture does not have to match the speed at which the film is supposed to be played at but should instead be set according to the speed at which you feel comfortable scanning and depending on the ability of the computer to handle the data sent by the scanner.
When the transport starts, it will first slowly adjust the tension, then increase the speed to reach the desired framerate.
Do not switch too fast between play directions, this would cause the transport to stop.

Pause stops the transport but keeps the film tensioned, while Stop stops the film and releases tension. Never manipulate a film on the scanner while it is tensioned (or running!), always release the tension beforehand.
Note that when the transport is stopped, if the Pause button is clicked, the film will be tensioned and stay in place, ready to run.

FWD and REW allow to run the film at higher speed for a fast wind. For the film's safety, this is not allowed when the film is normally threaded as running it at high speed in the path would represent a higher risk of damage.
See "Fast wind lacing" for more details.

Both FWD and REW buttons activate the fast wind mode but only slowly start winding the film. When they are clicked, a speed percentage is shown in the speed dial button (it starts at 6%). Speed can be increased progressively with a scroll of the mouse-wheel on top over the dial.
When winding at a high speed, do not stop the transport abruptly, first progressively decrease the speed.

Fast rewind mode at standstill (0%) then increased to 63%

The A-B wind buttons show the direction in which the supply (right) and take-up (left) reels will rotate. Click on a button the change the direction.

Supply reel in B-wind mode

The R8 and S8 buttons allow to choose the format of the film: regular 8 or super 8.
It is necessary to indicate the correct format so that the scanner can react accordingly in terms of speed and image calibration.
It is not permitted to change format while playing a film with audio (it is possible in silent mode).
By default, according to the standard practice, the speed is set to 16 FPS for regular 8 and 18 FPS for super 8. But keep in mind that some films were made to be played at other speeds.

The Start capture button simply starts the recording of the images and sound on the computer when the film is running properly (see below for more details) and the Focus aid and Steady frame controls are for image settings that will be covered in a following section.

Notes on film tension

Tension is regulated through the tension-arm when the scanner is running. The film is kept tight in the transport and flat in the gate while excessive strain is avoided.

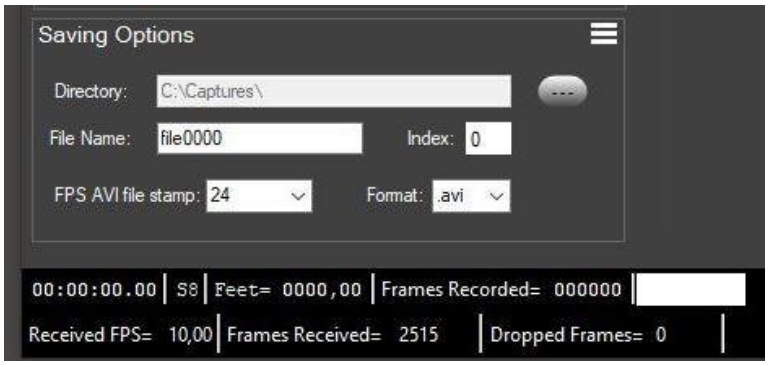
The scanner will only start if a certain tension is reached. It may sometimes take a few clicks on the play buttons to tension the film enough. To ensure the scanner reacts as desired, it is advised to tension the film by hand when threading.
If the film is too loosely wound on the reel, the tension safety mechanism may stop the transport after failing to detect enough resistance. If this is the case, instead of pulling the film and risking cinching[1], it is advised to fast-wind it a bit to the take-up reel then rewind it and start again. The film will then be tight enough.

For fragile films, you may wish to reduce the applied tension. For warped film, on the contrary, increasing the tension may help flatten them in the gate.
Tension can be adjusted by clicking the Tension dial and increasing or reducing the value with the mouse-wheel.

[1] When the film rubs on itself, causing scratches.

SAVING AND CAPTURING FILM

In the **Saving options** widget, you can set the name and directory of the file that will be created for your capture, as well as its format.



The **index** is a number that will be added to the file name. This number is incremented each time a capture is started, preventing an overwrite to happen. The counter is reset to 0 by double clicking on it but will still skip over any existing saved files with the same index[2].

The Pictor can capture film in the following file formats:

Extension	*Colour bit-depth*
.avi	8-bit
.tiff	12-bit (in 16-bit container)
.dpx	10-bit log

For AVI files, you need to select the correct **FPS AVI stamp** to indicate to video players at what speed they should play the file. It should therefore be the rate at which the film is supposed to be played, not the speed at which it was scanned (if it is a different value).

Capture

To start the capture, use the **Start capture** button in the transport and capture control widget. The capture will actually start only when the film is properly running on the scanner, that is when it has reached its desired speed. If the transport was stopped, it may take a few frames before the speed is reached so be sure to thread the film with a leader and position the film accordingly. It is advised to put the transport on “pause mode” before starting the capture so the film is kept in place as you prepared it.
When the capture is running, click the button again to stop it, or use the Stop button to stop transport and capture at the same time.

For captures with audio, refer to the dedicated section.

Capture information

In the status bar at the bottom of the control panel, you can find some information about the capture. The first line shows the duration of the capture in time, length (meters or feet – click on it to switch unit), and frames.

The white bar on the right shows the processing time for the capture of one frame. It fills with green bars when an image is saved, showing how long it takes relative to the time available between two frames (which depends on the scanning speed: at 24fps, there is 1/24 second available between two frames). If the bar is almost full, it will show red bars, and this means that the scanner is probably running too fast for the computer. If the PC needs too much time to process an image, longer than for the next frame to be sent by the capture

[2] If the system detects a file with the same name and index, it will skip this number and use the next one to avoid overwriting existing files.

software, a frame will be skipped and not recorded. The Dropped frames counter shows how many frames the computer was not able to save (it can be reset between captures by clicking on it).
If you see the bar filling up and dropped frames being added, you should reduce the scanning speed, or even start again at a lower speed if the missed frames are important to you.

During capture, the Received frames are also counted. The rate at which the pictures are taken by the camera is shown as Received FPS. This is a number you should carefully look at. If everything goes well, it should match the desired FPS set on the speed dial (with a bit of fluctuation). If you notice that this number is significantly below the desired speed, it probably means that the camera or computer cannot follow, and you should set a lower framerate with the speed dial.

FOCUSING AND FRAMING THE IMAGE

The Pictor frames a HD picture with a 16:9 aspect ratio (1920x1080 pixels).
The Pictor Pro frames a 2K+ picture with a 16:9 aspect ratio (2728x1536 pixels).

You will be able to frame the picture with the zoom lens and software and cut undesired side borders. You may also need to adjust the image stabilisation settings to make sure the framing is stable during the whole scan.

Framing is done in several steps described below. Focusing should only be done after the basic framing has been done with the camera zoom, otherwise it will be lost in later steps.

Adjusting the zoom and focus

To focus the image and do the basic framing, it is important that the film is tensioned on the scanner. Use the Pause button to keep the film tensioned and in position. Activate the Preview mode to be able to view your changes in the camera preview window. If the frame is not vertically centred, press Stop and try to move it manually. The centring is not important for this step, it will be corrected later, but it will help with the zoom.

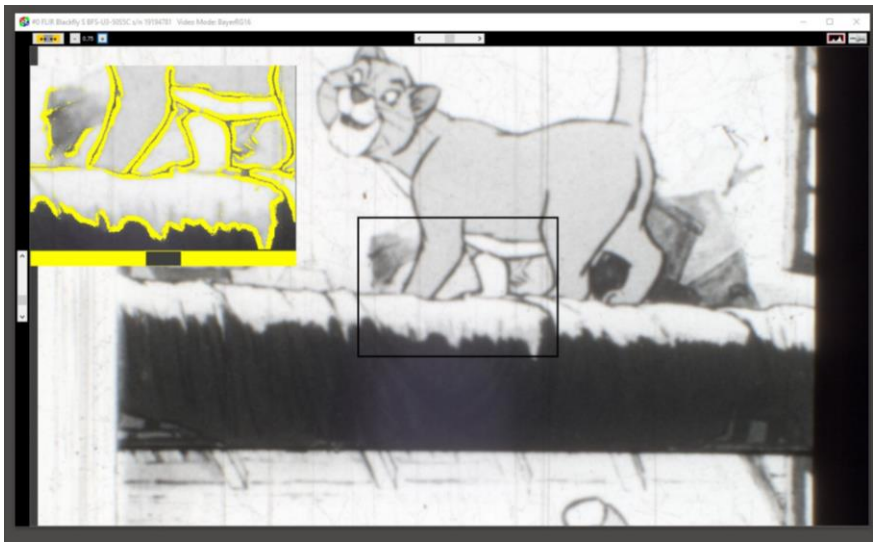
The saved images will always have the full height of the scanner's frame (1080 pixels for the Pictor and 1536 pixels for the Pictor Pro). You therefore need to first frame vertically with the zoom lens, choosing if you want to leave the interframes and frame borders in the picture or crop to get a full frame image.

Framing for regular 8 and super 8 will require different zoom levels as frames are smaller on regular 8 film. Zooming in for regular 8 will allow you to capture the actual image at a higher resolution but is also required for the image stabilisation to work properly as it expects the frame to be a certain size.
See "Steady frame settings" for zoom range considerations.

Framing regular 8 film at super 8 zoom level on the Pictor: zooming in is required

Once you have set the zoom, use the focus adjustment knob on the camera assembly to focus the picture (focus on the emulsion). The Focus aid mode can be helpful as it emphasizes points to focus on and shows an indicator of sharpness: the grey horizontal bar should be as thin as possible.

Scrolling over the Focus aid dial while it is activated will adjust the sensitivity (this should only be helpful for particularly light or dark images). Changing the sensitivity to a lower number will increase the sensitivity. This helps to be able to focus on the emulsion of the film. Changing the sensitivity does not change the actual focus of the camera. This can only be done with the orange focus adjustment knob at the scanner.



Focus aid mode activated by the Focus aid button

Steady frame settings

Cine2Digits offers automatic image stabilisation to keep the frame steady and compensate for vertical or horizontal movements that could occur during scanning.
The stabilisation is based on the detection of the perforations.
The stabilisation can be disabled in one or both directions by clicking the Vertical and Horizontal buttons in the Transport and Capture control widget. An orange button means the automatic stabilisation is active in that direction:

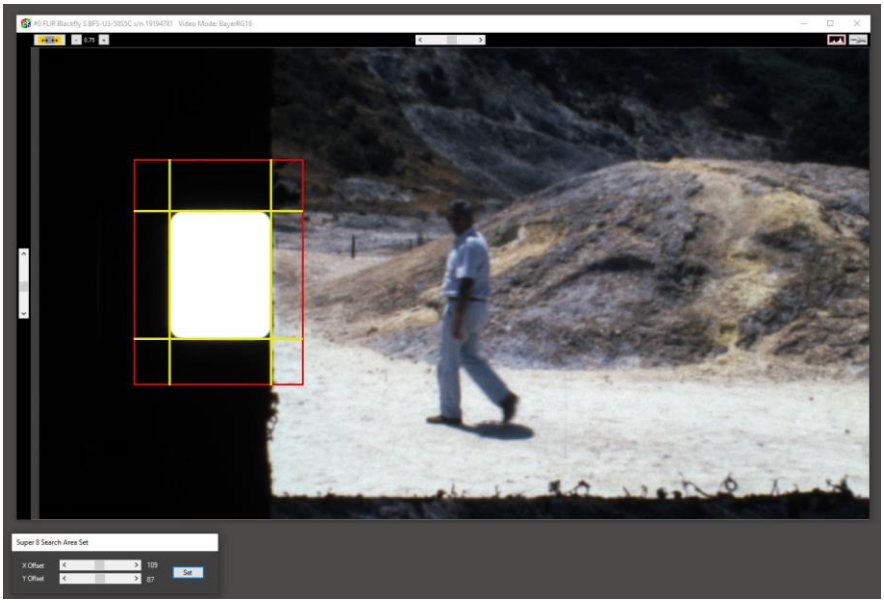
Note that you will probably always want to leave vertical stabilisation on but may prefer to disable horizontal stabilisation as it can introduce jitter: on many films, the perforations were not perfectly aligned horizontally, and many cameras were made with a focus on the regular vertical movement rather than on a gate that would not allow for horizontal movement.

When you choose the film format with the R8 or S8 button, a search area will automatically be set in a position corresponding to the placement of the perforation on this type of films. It should work automatically independently of the zoom you previously set but may be a bit off and require repositioning to ensure maximum efficiency of the detection and stabilisation.
As explained above, the detection will work best if the zoom level is so that the image fills the frame vertically. This will ensure perforations are of the expected size and in the expected position.

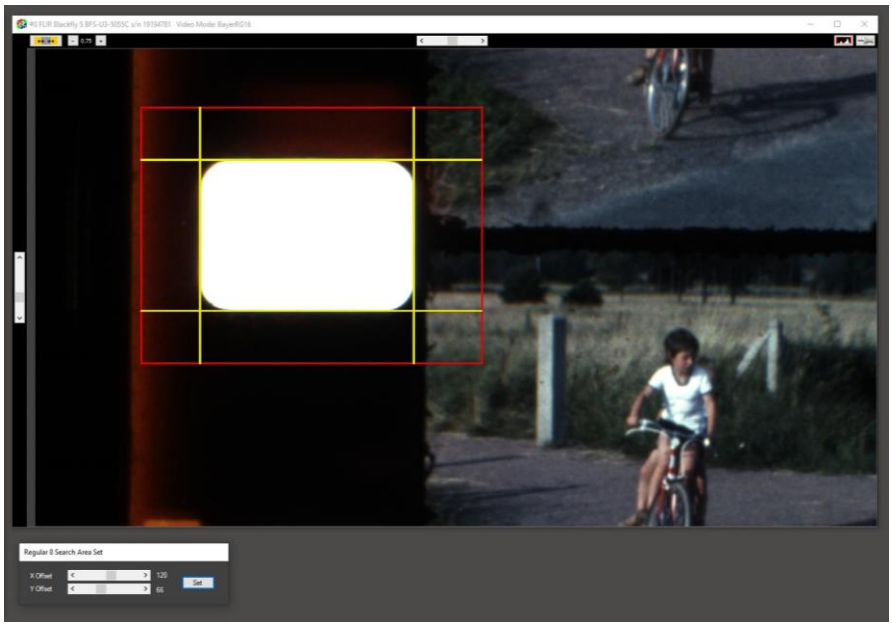
To reposition the search area, click on the “three bars” menu button next to the Steady frame buttons, while the film is running:

A pop-up window will appear, and the camera preview will temporarily move to the perforation zone to allow for adjustments even if the perforation is partially out of frame. Your framing will be restored when the adjustments have been made.

The following two pictures show the adjustment pop-up for the positioning of the perforation search area for super 8 and regular 8. Simply adjust the X and Y offset values to position the red box centred around the perforation and then click Set to close the pop-up and restore your framing.



Adjusting the perforation search area for super 8 on the Pictor



Adjusting the perforation search area for regular 8 on the Pictor

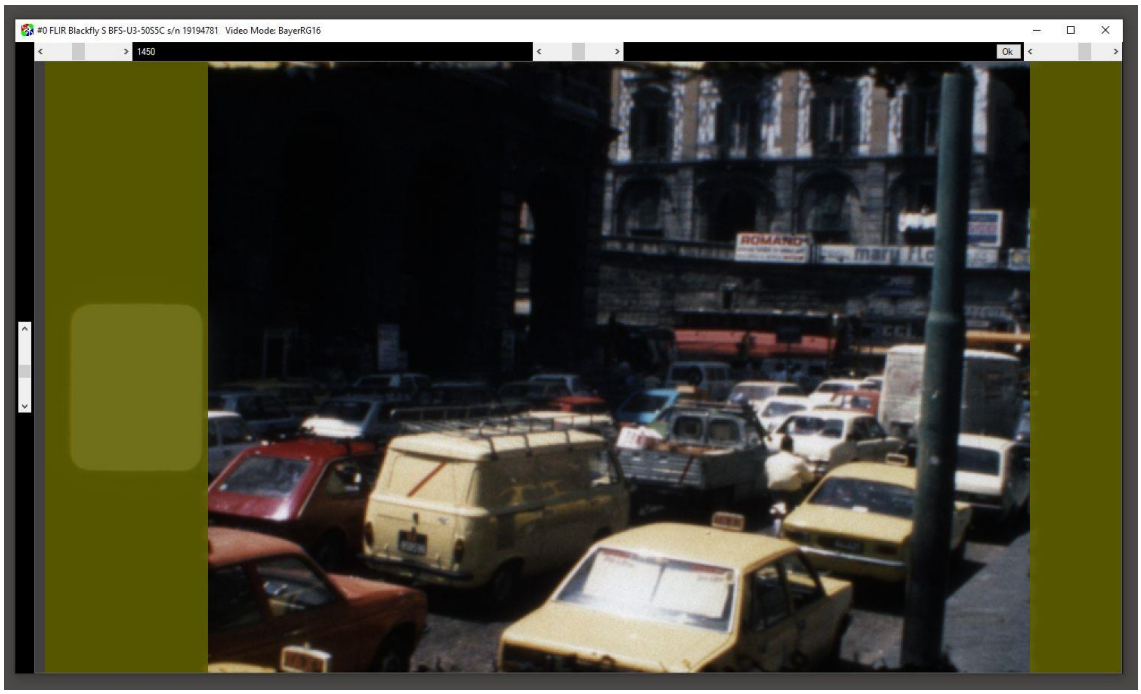
The lines inside the red box show the detected edges of the perforation. They will be yellow if the detection is a success and red if the corresponding edge could not be identified in the search area.

Centring and cropping horizontally

This (optional) step of the framing consists in cropping the left and right sides of the image to hide the perforation, frame border, and the side of the film.
This may also be needed to centre the image if it is shifted to one side or the other.

Click the top left button in the camera preview window: 
Three sliders are now accessible in the top bar of the preview. A number on the left show the horizontal resolution (remember that the vertical resolution is fixed and depends on the model). On the right, the OK button will validate your settings when you are satisfied with the framing.

First make sure the frame is centred. If not, use the slider in the middle to move it.
You can now define crop zones for the left and right sides using sliders at the top left and right. The resulting horizontal resolution is indicated.
When you are done, click on OK to set the crop.



Adjusting the left and right crop

The horizontally cropped image, grey zones on the sides will not be captured

Final precision framing

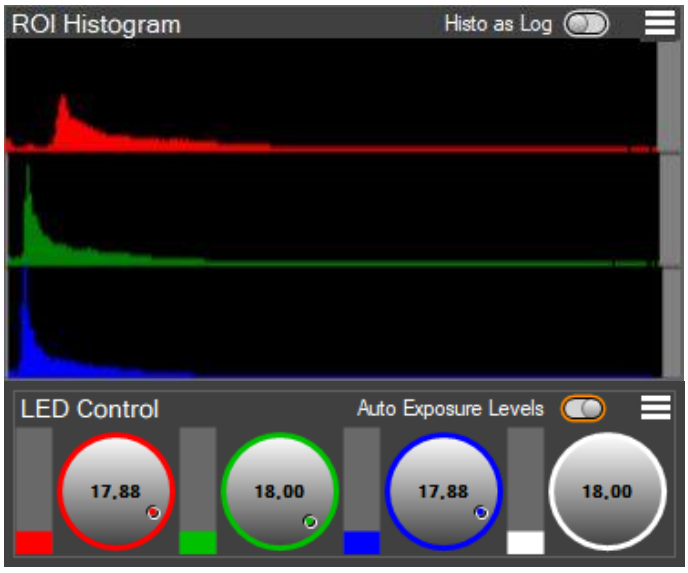
Using the vertical and horizontal sliders of the preview window, you can move your frame "in the picture" to adjust it more precisely, if the side of the perforation is showing for instance, or to cut on the interframe.
If you do not have enough leeway to position the frame where you want, you probably need to centre the image as described above, in the previous step.

Note that this adjustment can also be done during a capture, but the crop adjustments cannot (it would change the resolution of the saved images).

The sliders allow to move the image left to hide the perforation (slider located top/middle) and down to frame on the interframe (slider located left/middle)

LED CONTROL

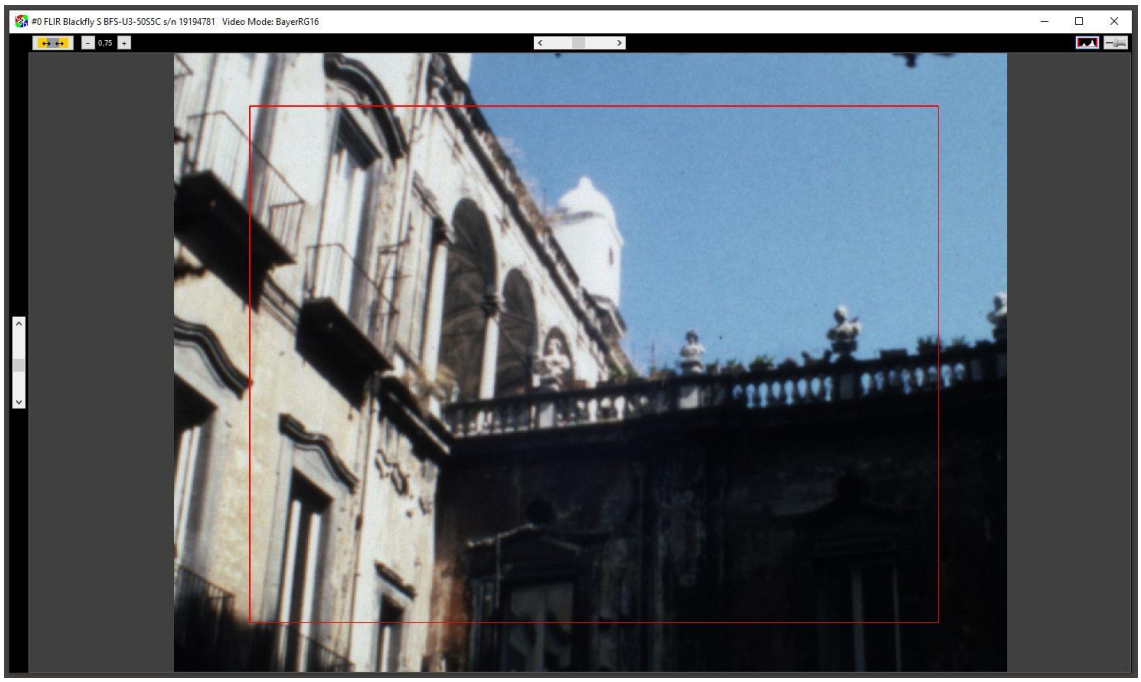
Cine2Digits is designed to make optimal use of the dynamic range of the digital sensor. This is done by controlling the LED light source to maximize the individual RGB channel exposures on the sensor whilst preventing under and over-exposure.
The Histogram displays the exposures of the RGB channels of the camera.



Region of interest

The area in which the exposures are monitored is indicated by the Region of interest (ROI). This area can be shown by clicking the ROI button in the camera preview window:

The ROI can be moved or resized as required. It is always active, regardless of whether it is displayed as an overlay or not, and the red box showing its position will never be saved during capture.



Exposure levels and lens aperture

The capturing method described above, where the exposures are controlled automatically is called "Auto exposure levels" (auto-levels) and activated by toggling the switch in the LED control widget. It can be turned off if you want to have constant exposures during capture or if you want to manually adjust it. Scrolling with the cursor above the bar left of the dial will move the value in larger steps while scrolling the cursor on the dial itself will allow for more precise control.

Manual adjustments can be done per colour channel or using the white dial, to control all colours together. The LED exposure values range from 10 to 300.
The auto-levels function will increase exposure for dark scenes or decrease the exposure when the scene is lighter. If you always find yourself adjusting values around the minimum or maximum, it probably means that the lens aperture should be adjusted (by rotating the aperture ring on the lens).
When the dials reach values of 300, the aperture can be opened to allow for more light to reach the sensor. The lower the number on the lens, the wider open the aperture.
Inversely the same can be done for very light scenes in the film, closing the aperture if values are always around minimum on the dials.
You should try to find settings that offer optimal lighting while leaving enough room for exposure variations from scene to scene.

If you want to capture images that are faithful to the variations of brightness and colours on the film, you should disable auto-levels and adjust the channels exposure with values that are the best compromise overall for the film.

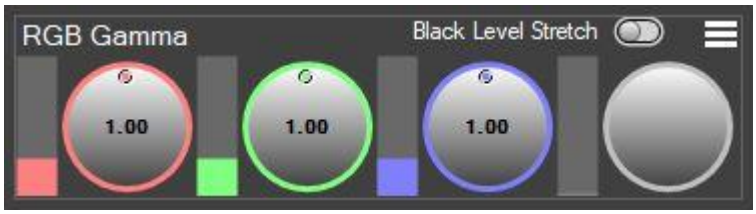
When scanning clear film (film that has a transparent background, as opposed to black borders around the images), high exposure values can lead to very bright light on the left side, where the perforations are. This can make perforation detection difficult and therefore lead to improper stabilisation.

Dark film (left) and clear film (right)

If you find yourself scanning a clear film that has dark images and needs high exposures values, if stabilisation does not give satisfying result, we advise decreasing the exposure until a clear distinction is visible between the side of the film and the perforations.
That way you will be able to scan your film with a stable image and correct the brightness in post-processing if needed.

Gamma control

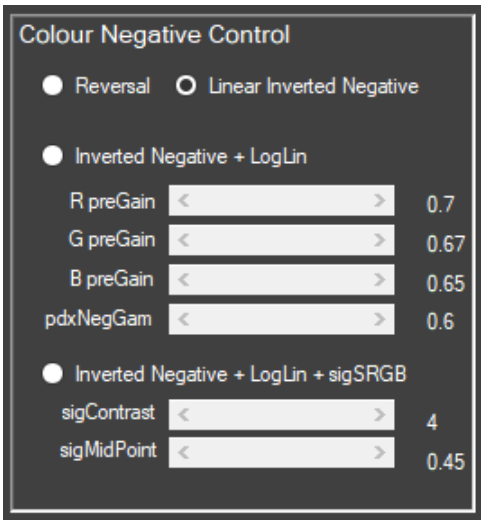
During capturing, a gamma correction can be applied to the image. Gamma corrections can also be applied during post-processing but applying them in C2D will ensure that the correction is done at the highest bit-level possible. For example, if a capture is done in .avi file format, the camera on the scanner having a 12-bit sensor, the gamma is applied in the 12-bit colour space before the data is down-sampled to 8-bit and stored in the avi file. If the gamma correction were done later, the correction would be done in the 8-bit colour space, increasing the risk of colour banding.



Next to the RGB gamma correction, C2D offers a Black level stretch option. This option stretches the pixel values towards 0 (left of the histogram) to produce darker blacks with high setting of gamma levels.
The default gamma setting is 1 with Black level stretch set to off. If you would like to use the auto-levels, a good reference point to start with would be a gamma of 2.20 and black level stretch set to on.

Scanning negative film

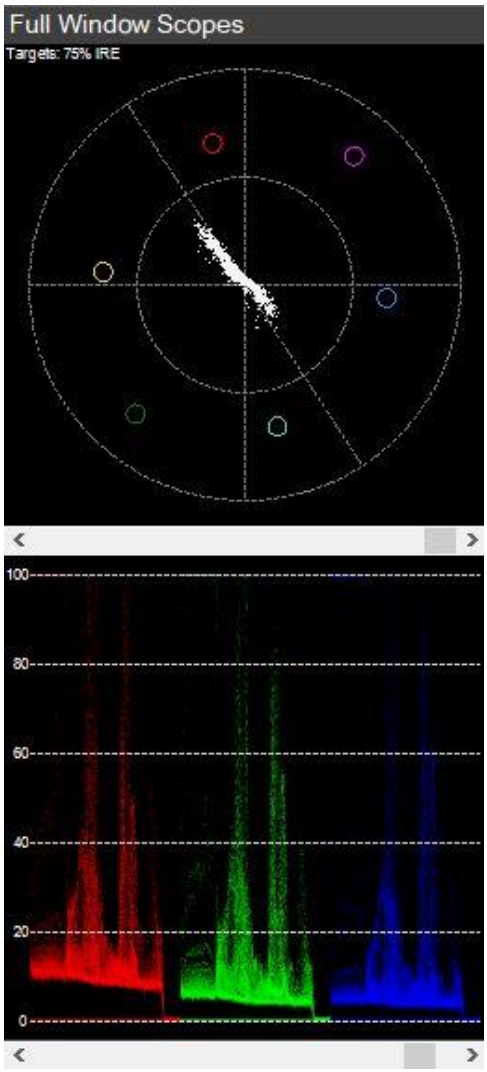
The Pictor can scan negative films. This option can be selected in the Transport and Capture control options. When the negative button is toggled, the colours are inverted and additional colour controls pop-up. The LED auto-levels are disabled when scanning negative film, manual setting of the correct exposure is required.



The **Colour Negative Control** widget allows the operator to dial in a more accurate LUT for negative scanning. The LUT is used for gamma processing, meaning that these settings will not affect the LED's. As for setting the gamma in C2D, the LUT is applied at the highest bit-depth the camera will allow.

SCOPES

Additional visualisation of colour and luminosity values (scopes) are available.
You can toggle them on or off by clicking on the menu button in the Histogram widget.
Showing the scopes will impact the performance of the capturing software so if you find your workstation to have difficulties, it may be recommended to turn them off.



Contrary to the histogram, the scopes are not presenting data from the Region of Interest (ROI) but show information about the whole captured frame (so exactly what you see in the preview window).

Vectorscope

The vectorscopes use a polar coordinate system to display hue and saturation measurements. Hue, the colour value, is mapped in radially around the centre of the vectorscope. Saturation, the intensity of the colour, is measured in distance from the centre of the vectorscope. The greater the saturation, the further away it is from the centre.
The polar display uses a graticule with specific colour targets marked on it. Each of the targets marked on the graticule are representative of the colours found in standard video signal colour bars. This includes red, magenta, blue, cyan, green, and yellow.

RGB Parade

The RGB parade plots the luminance values of the pixels of the image in columns from left to right, for each colour channel. It helps visualise the brightness distribution in the image and have an overall look at shifts in colour.

The colour pixels in the RGB parade have a brightness proportional to the count of pixels with the same value in the same image column. This means values with low count will not always be very visible.
The slider under the RGB parade allows to increase the brightness of the display, for better reading. It only affects the brightness of the graph, not the captured image.
If the display is too distracting, its brightness can be toned down (or the RGB parade can be switched off).

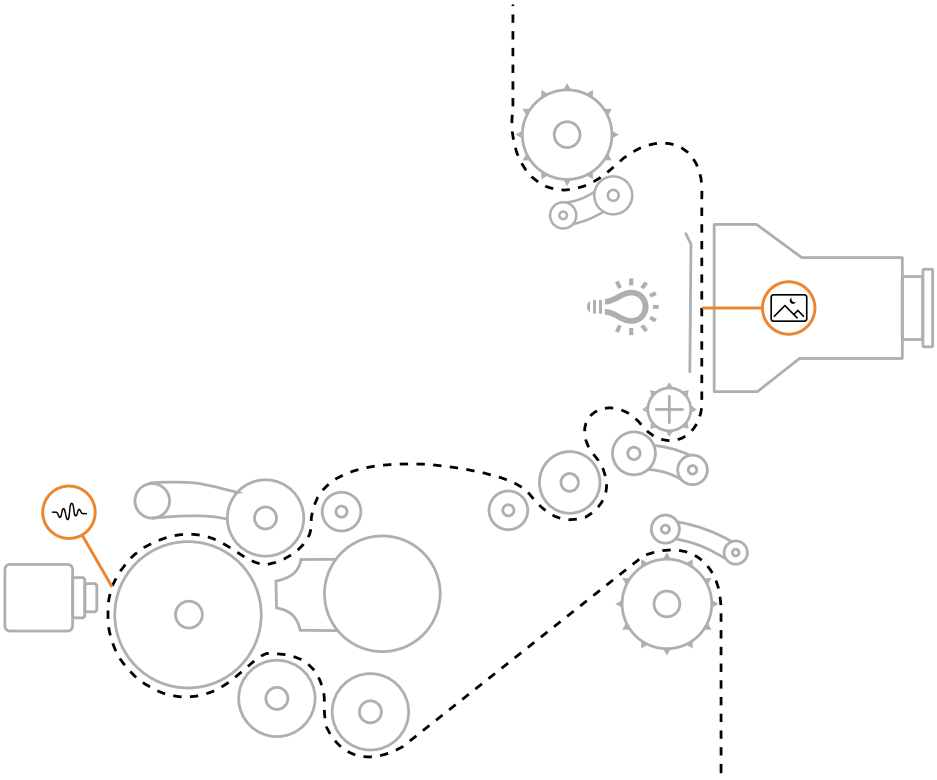
CAPTURING WITH AUDIO (PICTOR PRO ONLY)

The Pictor Pro can play and capture the magnetic track(s) of an 8mm film. It uses dynamic audio correction to ensure the playback is stable and always in sync with the images.
A super 8 film can be striped with a magnetic track on the side opposite the perforations. Many films also have a smaller balancing track on the other side to ensure the film lays flat in the gate. This secondary track was rarely used but some equipment allowed for recording on it and some commercial films used it as a separate channel for a stereo soundtrack.
Further in this manual, we will refer to them as the main track and the auxiliary track.
The Pictor Pro can read and capture both tracks in a stereo audio file. The main track will be recorded on the left channel and the auxiliary track on the right channel but note that they are not always meant as stereo sound. As explained above, they can be two mono channels meant to be played "on top of each other" (the auxiliary track was sometimes used for voice-over, for instance).
Keep in mind that most of the time, there will be no audio signal coming from the auxiliary track and if you play/record it, it will only add noise.

Regular 8 films were very rarely striped with one or two magnetic track(s).

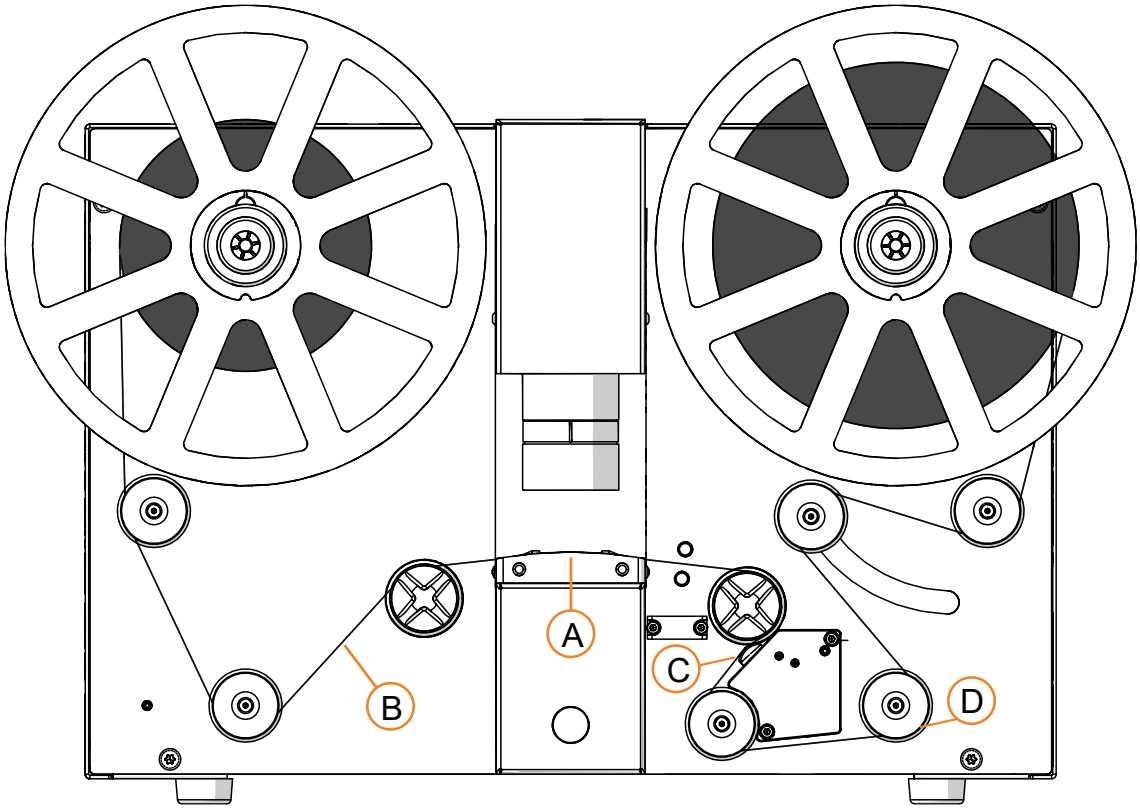
On the film itself, sound is a certain number of frames "in advance". This is due to the construction of film projectors[3] that need to play sound precisely when the corresponding image is in front of the light. The sound is read after the gate, so it must be "before" the image on the film.
This offset is standard: on super 8 films, sound is 18 frames in advance while it is 56 frames in advance on regular 8 films.

[3] And late super 8 sound cameras.



Schematic of the film path on a film projector, with matching image and sound highlighted

On the Pictor Pro, sound is read before the corresponding frame passes in the film gate. This allows for processing time and recording. The sound data is put in a buffer and played back when the corresponding frame is scanned.



Naturally, the film must be threaded around the sound module so that the soundtracks pass over the magnetic head. See Threading a film.

When threading the film on the scanner for audio capture, remember that the sound corresponding to the first frame that will pass in front of the light (A) is “already gone by” (B). The first sound information that will be read is on the magnetic head (at position C) and corresponds to an image that is even further (at position D)!
Make sure you leave a working margin before the first piece of audio you want to capture, by using a long enough leader for instance.

The Pictor reaches the desired speed quickly, but it may take a few frames before speed is stable and only then will the audio playback and capture be possible.
When scanning with audio, the actual image capture will begin with the frame A, meaning the audio corresponding to the frames between B and C will be missing.
This offset is corrected in the audio synchronisation done post-scanning and allows for a bit of play if you want to manually adjust the synchronisation.
Again, make sure you thread the film with enough margin before the first elements you want to capture to be sure not to miss any image or sound bit.

Naturally, speed cannot be changed during the scan when capturing with audio. The sound must be recorded at a constant speed. The best results will be obtained if the film is scanned at the speed it was made to be played at but scanning at lower or higher speed is also possible. The sound speed can then be adjusted post-scanning but note that you may experience frequency distortion.
Although it is technically possible, scanning with audio slower than 10 FPS is not recommended for sound quality concerns.

CAPTURING AUDIO IN CINE2DIGITS

Turning audio capture on or off and adjusting it is done in the control software using the Audio Control widget.

Audio widget in C2D

Audio is captured separately from the images, even if images are recorded in a video file (in a *.avi* container). A raw stereo WAV file is created in the destination folder of the scan, it has the same name has the video or image sequence files, with the *.ffraw* extension.
This file holds information about the scan and needs to be treated by our post-processing tool to produce a usable WAV file. Refer to the instructions of the tools provided.

Audio Mode

The audio can be either Off (no sound will be captured even if it is a sound film and if the film is threaded so that it passes over the magnetic head) or in one of four playback and capture mode:

- Mute
- Dual (Stereo)
- Main mono
- Aux mono

Audio can be turned On or Off only when the scanner is not running.
Switching between the other mode is possible while the scanner is running and even during capture.

Mute is explicit: no sound will be captured or played back. This mode is not useful in itself but may be used to mute sound at a specific moment during a capture, for instance.
Dual (Stereo) will play back and record both tracks. The main track will be on the left channel of the recorded audio file and the aux track will be on the right channel. This creates a stereo file but as mentioned above it does not mean it is actual stereophonic sound. It will more likely be two separate tracks meant to be played on top of each other.
If there is no sound recorded on the film on one or the other channel (most likely the aux channel), it will still be "played back" (this will just create noise) and create an empty track in the audio file.
Main mono will mute the aux track and only play back the main track on your left and right speakers. It records the main track on both channels in the recorded sound file.
Aux mono is the same as "Main mono" only with the tracks inverted, playing and recording only the aux track.

Other controls

If the audio mode is 'Off' or 'Mute', the controls are disabled.

The input level is a level from 1 to 16 that allows to adjust how the magnetic head reacts to the magnetic soundtrack on the film.
The default value is 5 but the best setting can vary from film to film. The best way to get optimal sound quality is to run the film and adjust the levels progressively to get the maximum range in the VU meter left of the control for each channel, without ever reaching too high values (that could cause clipping).
Levels should not be used to adjust the sound volume, it should always be set to maximize the input signal, then the desired volume can be set on your speakers or in the Windows volume mixer.
Input level changes will only be heard after one or two seconds so do proceed slowly when adjusting.

The Delay control allows to adjust the audio delay relative to the image. It is measured in milliseconds. A positive value adds delay, meaning sound will come later, while a negative value will make the sound come sooner.
The value shown is the total delay. Due to the offset between sound and image on the film, the delay will be applied after a second or two, so do proceed slowly when adjusting.

The delay between sound and image depends on various factors, one of which is film shrinkage. It is difficult to estimate the delay for each particular film so manual corrections may be required for optimal synchronisation.

Summary: capture a film with audio

- Do a test run to adjust input levels for a maximal range.
- Mute unwanted channels by selecting the appropriate audio mode.
- Rewind the film and lace it with enough leader to allow for the sound to be buffered and the desired speed to be reached before the first frame passes in the gate.
- Add enough leader (ender in this case) at the end of the film, to be able to capture the audio at the end of the film.
- Press Pause to tension the film and ensure everything is correctly in place.
- Make sure the desired speed is set; it will not be possible to change it during the scan.
- Start the transport by pressing Play.
- Start the capture when the desired speed is reached (if the button is clicked before, the capture will begin only when that speed is reached).
- Before the end of the film, press Stop; or Stop capture to leave the transport running but stop the recording.

LED indicator

The colour of the LED of the sound module gives indication on the state of the Pictor Pro audio functionalities (for more detailed troubleshooting in case of problems, refer to the support section).

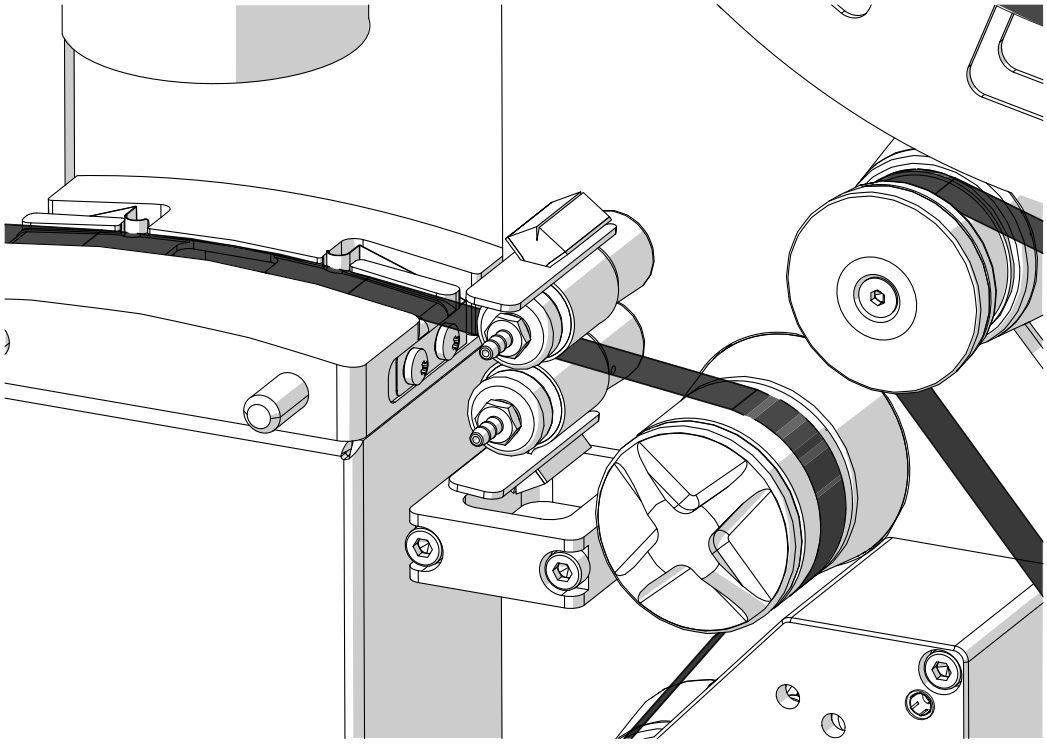
When the scanner power is turned on, the sound module hardware initialises, and the LED will be purple for a few seconds. It will then turn off until the control software is started.

LED Colour codes when using Cine2Digits:
Off: The sound module is not active. Either the sound mode is set to Off or there is a communication problem between the scanner and the PC.
Purple: The sound module is initialising.
White: The sound module is idle, ready to start playing and recording.
Yellow: The sound module is syncing the incoming audio data. This should be very brief; the LED will quickly turn into another colour.
Blue: The sound module is playing back audio from the film.
Green: The sound module is recording the audio from the film (and playing it back).
Orange: The sound module has encountered a playback error. This does not impact recording: even if no sound is heard, recording goes on normally. A playback error may be temporary, playback may recover quickly. The LED will stay orange to indicate there was an issue. It will return to normal when the scan is stopped.
Red: The sound module has encountered an error that could impact recording. It may be a temporary error; recording may have recovered quickly, and the error could be hardly noticeable, but the LED will stay red to indicate there was an issue. It will return to normal when the scan is stopped.

CAPTURING WITH WETGATE

Our wetgate technology makes it possible to attenuate scratches and remove dirt from the film. Scratches on the film base divert the light away from the camera, resulting in dark lines in the image. By temporarily filling the scratches with a transparent fluid, the light is not diverted as much, and the scratches disappear or appear a lot less noticeably. This greatly enhances the quality of the scan.

The wetgate module consists of two sponge holders in between which the film passes. When the sponges are slightly imbibed, the film running between them will be covered in a thin layer of liquid just before it is scanned.
A safety recipient ensures fluid will not drip.



The fluid we advise to use for wetgate scanning is isopropyl alcohol (>99,8%). This can be bought in most electronics and hardware stores. Use proper ventilation when scanning with wetgate. Make sure you comply with all applicable local health and safety regulations when working with isopropyl alcohol.

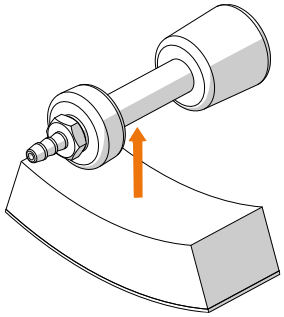
The liquid used is highly volatile and will evaporate before the film is rolled on the take-up reel. To ensure this is the case, it is advised not to run the film at more than 6 fps.
Depending on room temperature and humidity, you will have to rehumidify the sponges after 5 to 10 minutes using a squeeze bottle.
The sponges need to be wet but not dripping with fluid, only a very thin layer of liquid must cover the film. Start by putting a little liquid on the sponges and check if this is enough, then increase the dosage slowly if needed.

The sponges must be removed when not using the wetgate: simply pull the protruding rod away from the scanner.

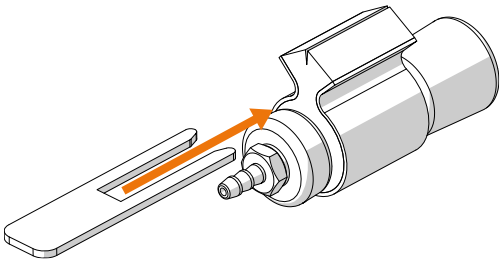
Scanning speed should be reduced between 5 and 10 fps to allow the film to dry completely before being wound at the take-up reel.

SPONGE HOLDERS MAINTENANCE

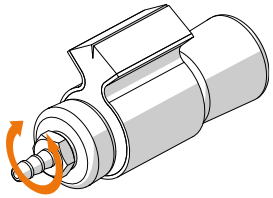
The sponge holders consist of a piece of sponge folded onto a small rod and held in place by a clamp. The sponge holders can be easily disassembled and reassembled for cleaning or replacement:



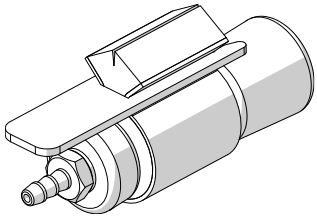
1. Place the sponge on the rod



3. Clamp the sponge in place



2. Fold the sponge around the rod



4. The sponge holder is assembled

Cleaning: Use warm water with a mild detergent, preferably dish soap. Clean sponges by hand and rinse off the detergent. Let the sponges dry before using on the scanner.

MAINTENANCE & CALIBRATION

MAINTENANCE

The Pictor is constructed in such a way that it requires only a minimum of maintenance. To keep the scanner in optimum condition, keep the scanner clean and free of dust.

REGULAR CLEANING OF THE SCANNER

After each scan, when removing the film, remove the dust on the scanner and clean the parts that are in contact with the film. Removing dust works best by using compressed air, either from a compressor or an air-duster.
Regularly remove the film gate to remove dust on the lens (see below).
For cleaning the remainder of the scanner use a lint-free cloth and standard cleaning agent. The film residue from the gate and guide rollers can be cleaned off using a cloth with some isopropyl alcohol.

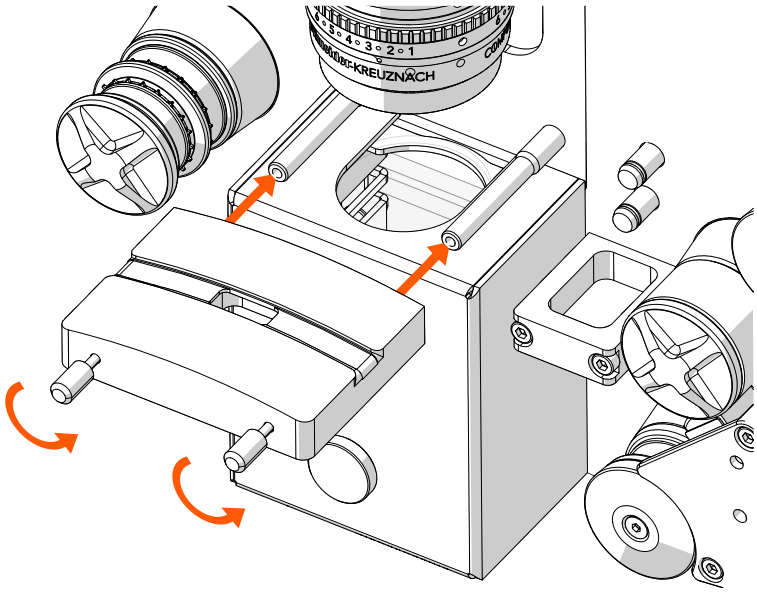
Cleaning the follower roller

The follower roller should be cleared of dust between each scanning job. This can be done by removing it (unscrew the cap and gently pull the roller) and rolling it over a piece of tape with the sticky side up. Clear packing tape works well for this. It is advised to do a more thorough cleaning of the rollers once a week. For this type of cleaning use warm water with a mild detergent, preferably dish soap. Clean the rollers by hand and rinse off the detergent. Let the rollers dry before using them on the scanner.

Removing dust from light source

If dust particles remain visible on the light source when no film is on the film gate, the light source can be partially dis-assembled for a more thorough cleaning:

1. Unscrew both front screws of the film gate
2. Pull the gate away from the scanner
3. Clean the top of the lens with a lint-free cloth

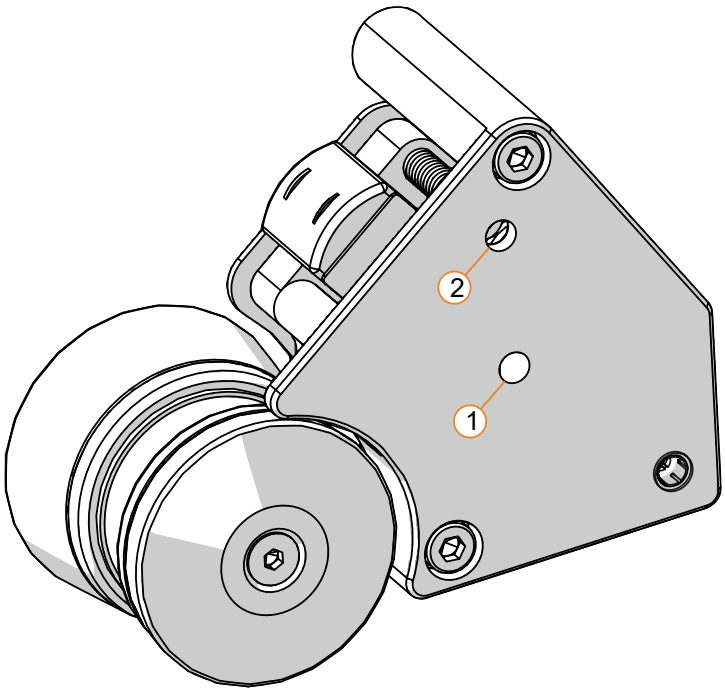


To completely clean the lens and optical assembly, its cover can be removed by unscrewing its front plate and pulling it. This will reveal the lens holder as well as diffuser glass plates. The lens can be carefully lifted and cleaned with a lens cleaning-agent then carefully put back in place. The diffuser glass plates can be cleaned with a lint-free cloth.
With the scanner turned off, use compressed air to blow dust from the LED panel at the bottom of the assembly.
This cleaning should however only be necessary if a significant amount of dust has fallen inside the gate. Usually, dust will only fall on the top of the lens and can be cleaned without removing the optical assembly cover and the lens itself, only by removing the film gate.

CALIBRATION PROCEDURES

Magnetic sound head calibration

The sound head comes factory aligned and tested. No further adjustment should be needed. However, if it has moved for a reason or another, advanced users can optimise its alignment with the two (PH2) screws on the front of the sound head module (**1** & **2**).



The screw on the bottom (**1**) moves the magnetic head toward and away from the front plate, making it possible to precisely align its two sensitive areas with the two magnetic tracks on a film. Sound will not be read correctly or at all if this alignment is not correct. The screw on the top (**2**) tilts the head so that it is in the axis of the film (azimuth adjustment). If the head if not in the axis of the film, higher frequencies can be lost.

LED calibration

In the Transport and Capture widget menu, you will find an option to calibrate the LEDs. Remove any film, clear the gate, and click on the “Auto adjust” button. Calibration will start, requiring you to slowly adjust the aperture ring at some point.

LED calibration is needed after having changed settings impacting colour in the camera or just due to normal wear of the LED after some time.

Restoring default camera settings

In the Transport and Capture widget menu, you will find an option to reset the camera settings to a preset made for the scanner. If you had previously changed colour gain and white balance settings in the camera settings, it will be necessary to calibrate the LED after the settings have been changed.

SUPPORT

In case of problem or if you have any question, we are available for support.

Please first check that your question is not already answered in the guides and Frequently Asked Questions that can be found on our website.
Newer versions of this document may also be available online.

When you contact us, please provide as much information as possible so we can best assist you. You can provide us with the version numbers of your software and some information on your Windows system and PC.

http://support.filmfabriek.nl

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