

FOTOLAB - Dry Side

A computer in your traditional darkroom can be helpful, here is a small program aimed to simplify your work.

This software is freeware, free of use.

It's forbidden to sell or reuse it in any form, partially or totally, in a commercial product.

This program is given as is, without any warranty.

No responsibility is assumed for its use or consequences of its use.

For any comment, improvement or bug, you can contact me directly at: claudio@bonavolta.ch

Preliminary comment: the screen (and every other light source) of your PC must be inactive. For B/W, by example, with a red screen (plastic films like Rubylith could be used) or the screen can be shut down completely with panchromatic emulsions.

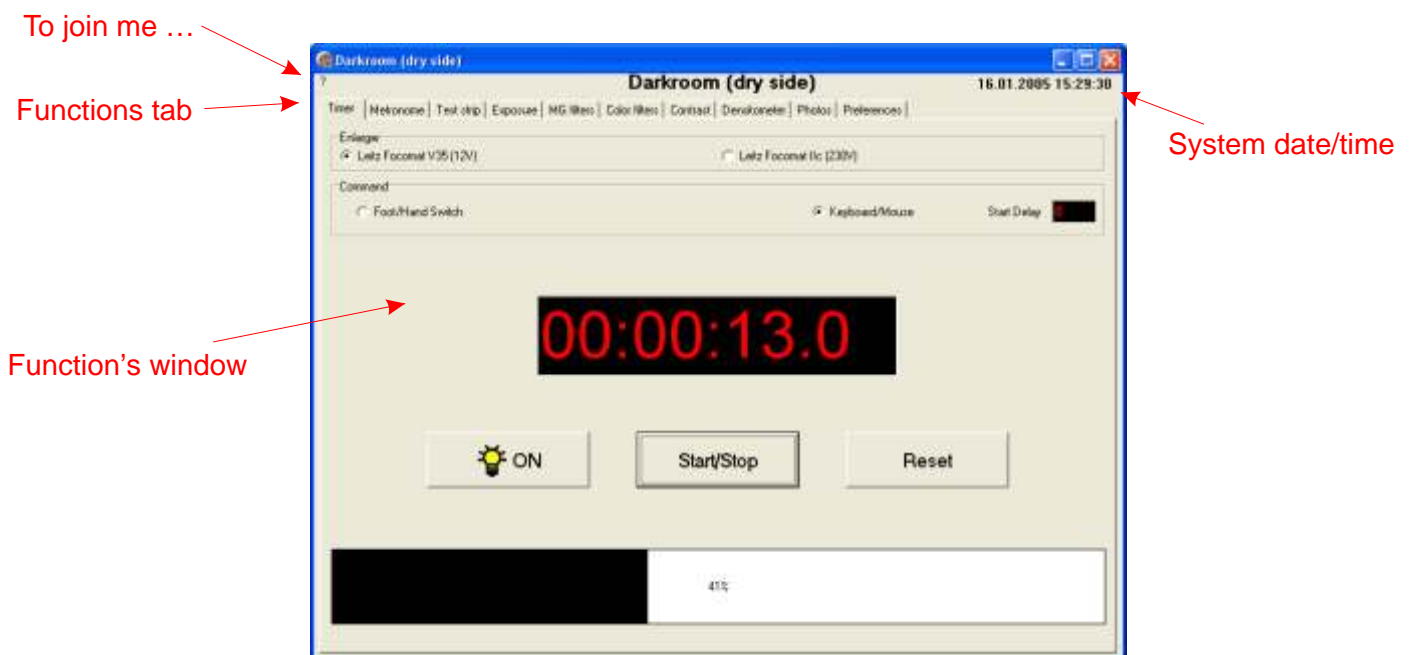
This program groups various functions:

Exposure

- Timer
- Metronome
- Test strips calculation. Based around a defined time and with a geometric progression by stop fractions.
- Calculates a new exposure if we modify the enlargement ratio, diaphragm, filter coefficient and/or by adding/removing a fraction of a stop value.
- Calculates the exposure factor for multigrade filters
- Color head filters addition with grey part removal and exposure factor calculation
- Evaluates the image contrast and paper grade necessary to accept it
- Densitometer function: evaluates densities and differences of densities
- Saves exposure parameters of images together with its masking sequence and layout

Options

- Defines the general parameters of the program.



Exposure - Timer

This timer counts down a programmed time with a precision of a 1/10th of second.
The interface switches the enlarger ON during that time.

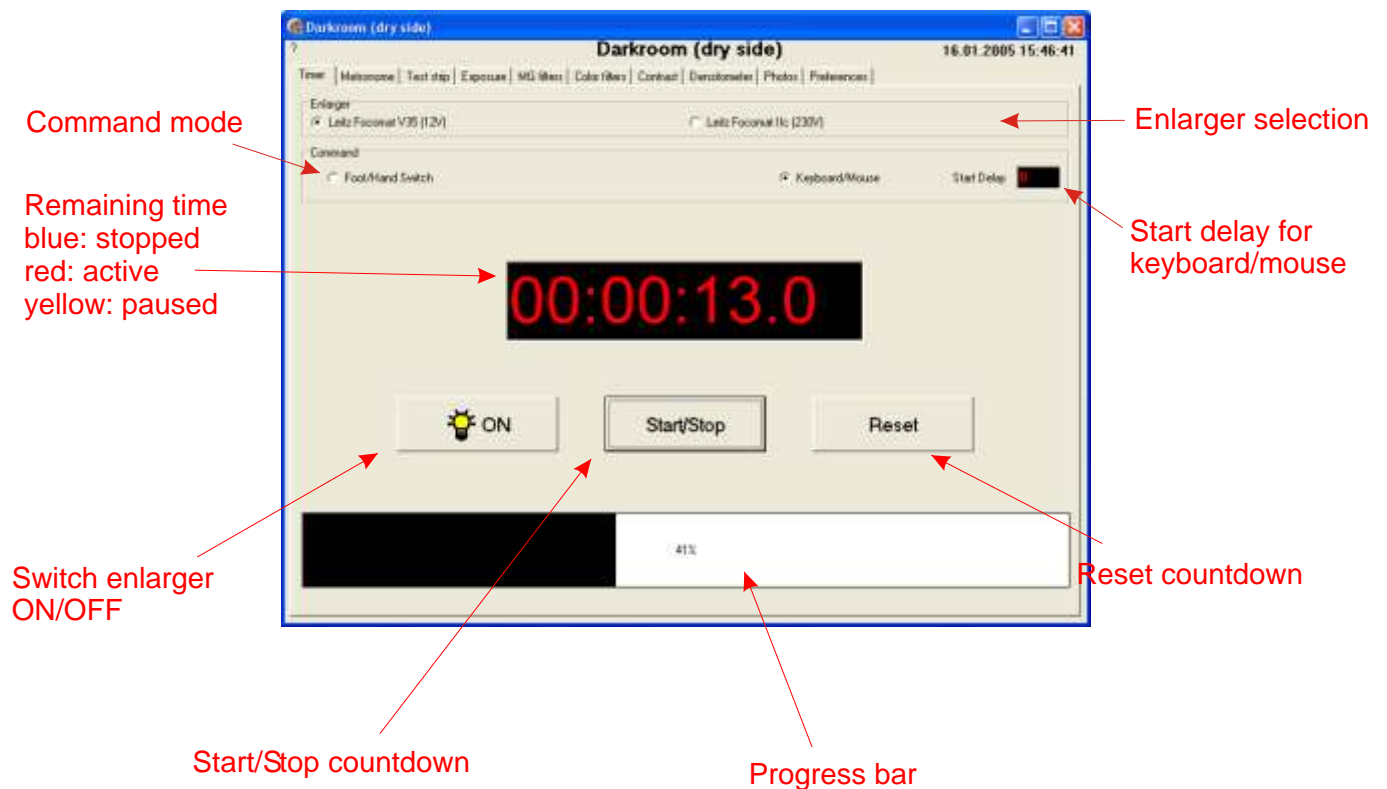
The initial time is entered with the keyboard and format hh:mm:ss.d.
Various tools of this program can send times to the timer (by double-clicking on a time) .

The enlarger can be selected so does the command mode (foot pedal/interface button or by keyboard/mouse).
The keyboard/mouse mode allows a delay before switching on the enlarger to ease dodging/burning.

Depending on the options selected on the "Options" tab:

- The display is in color or monochrome (various grey shades)
- Each second is indicated by a beep, a vocal countdown (under 20 seconds only) or no sound at all.

"Start/Stop" button starts/stops the countdown, "Reset" re-initializes the timer for a new countdown.



Exposure - Metronome

This function works like a metronome, counting time in an ascending way. It's often used for dodging/burning.

The interface switches the enlarger ON during the count time.

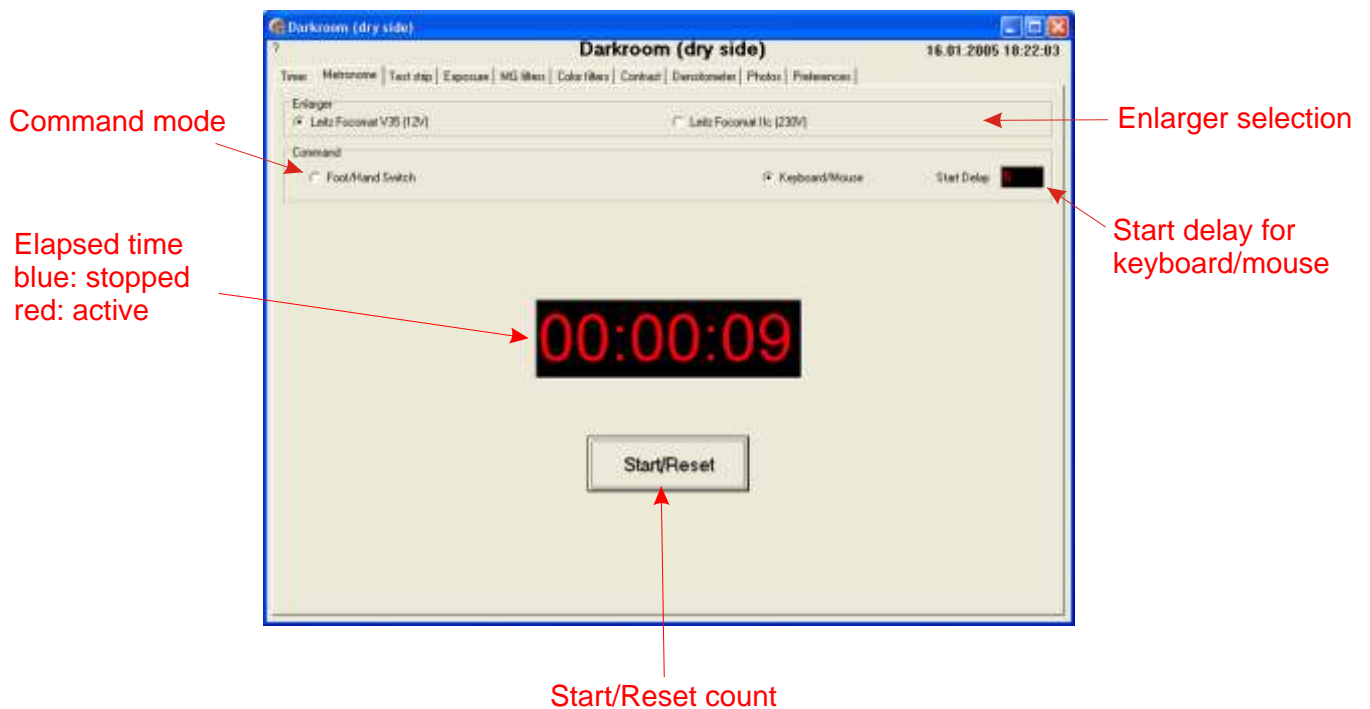
The enlarger can be selected so does the command mode (foot pedal/interface button or by keyboard/mouse).

The keyboard/mouse mode allows a delay before switching on the enlarger to ease dodging/burning.

Depending on the options selected on the "Options" tab:

- The display is in color or monochrome (various grey shades)
- Each second is indicated by a beep, a vocal countdown (under 20 seconds only) or no sound at all.

"Start/Reset" button starts/Resets the count.



Exposure - Test Strip

The classic test strip is done by adding constant times. The bands receive then an exposure, say, of 2, 4, 6, 8, 10 seconds. This progression, known as arithmetic, has the drawback of producing densities from a band to the other not being constant.

To obtain a constant spacing in terms of densities, we have to adopt a geometric progression, where the time increase between every bands is a constant fraction of stops.

This function calculates the various times, together with cumulated times, for each band of a test strip in a geometric progression.

You can tell the program how many bands you wished and the base time around which to distribute the bands.

The Compute button does the calculation, a double-click on a time sends the time to the timer.

The interface switches the enlarger ON automatically.

Two command modes are possible:

- automatic mode with the keyboard/mouse and a start delay allowing the printer to mask the paper and an interval between each band to move the mask for the next band.
- interface mode, where a band is exposed each time the printer presses the interface button or foot switch.

Command mode

Enlarger selection

Start delay for keyboard/mouse

Calculation button

Increment in stops value

Base time

Desired number of bands

Time per band

Cumulated time

Exposure button

| Time | Band 1 | Band 2 | Band 3 | Band 4 | Band 5 | Band 6 | Band 7 |
|-----------|--------|--------|--------|--------|--------|--------|--------|
| Per band | 1.3 | 1.2 | 0.9 | 0.8 | 0.7 | 0.6 | 0.5 |
| Cumulated | 0.4 | 1.1 | 2.0 | 3.0 | 4.2 | 5.7 | 7.5 |

Exposure - Modification

This function lets you calculate a new exposure time if you change the following parameters:

- Paper sensitivity
- Enlargement ratio
- Diaphragm
- Filter coefficient
- Add/removal of a stop fraction

Paper Sensivity

The manufacturer ISO(P) without filter is used.

Enlargement ratio

If your enlarger doesn't indicate you the current enlargement ratio, just type in one side length of the projected image. You must, of course, always use the same side (length or width) and measure completely the side of the projected image.

Diaphragm

The values indicated on the diaphragm ring are rounded (by example, f/11 is really f/11.3137 ...). To avoid that a translation between two common stop values (like f/8 -> f/11) gives a result that looks wrong, the rounded values are converted to their theoretical ones during the calculation.

If other values than those usually found on the diaphragm rings are entered, they are considered as theoretical and used as is by the program.

Filter coefficient

There are so many filtering system (color head, multigrade filters, ...) And because of the variable sensitivity of the papers to them and to the other components of the enlarger, I've preferred to use a simple "filter coefficient" value you should calibrate according to your system.

This field "Filter coefficient" is linear, that means if you you should double the exposure time to obtain the same result, then, the second coefficient is twice bigger than the first one.

Simple example with Ilford Multigrade filters: each filter should give the same exposure except grades 4 to 5 where you should double the exposure. You just have to enter "1" for the filters from "00" to "3.5" and "2" for the filters from "4" to "5".

More complex example with a color head: you should make several tests to find the coefficients that gives the same grey with every filter.

+/- stops

You can add or remove (negative number) a stop value to the exposure.

The Compute button calculates the new exposure and a double-click takes the time back to the main timer.

Two tables give also exposures around this new time by fraction of stops increments (1/4, 1/3, 1/2, 2/3 & 3/4).

Exposure - Modification

Old diaphragm

Old filter coefficient

Old format

Old sensitivity

Old time

New sensitivity

New format

Calculation button

Add/remove stop values

New time

New filter coefficient

New diaphragm

Variations around the new time

Reference print

| ISO(P) | Format | Diaphragm | Filter coef. | Time |
|--------|--------|-----------|--------------|------|
| 500 | 13 | 8 | 1 | 12 |

New print

| ISO(P) | Format | Diaphragm | Filter coef. | +/- stops | Time |
|--------|--------|-----------|--------------|-----------|------|
| 500 | 7.5 | 11 | 2.24 | -0.20 | 17.3 |

Compute

Exposure Variations

| | -2 | -1.5 | -1 | -0.5 | 0 | 0.5 | 1 | 1.5 | 2 |
|------|------|------|------|------|------|------|------|------|------|
| 0.25 | 1.25 | 1.67 | 1.9 | 1.93 | 1.78 | 1 | 0.75 | 0.67 | 0.5 |
| 0.5 | 5.1 | 5.4 | 5.1 | 4.5 | 3.7 | 2.6 | 18.1 | 18.5 | 17.2 |
| 1 | 20.8 | 21.8 | 20.8 | 17.5 | 14.6 | 11.1 | 7.8 | 6.9 | 5.9 |
| 2 | 83.2 | 87.6 | 83.2 | 67.5 | 54.6 | 41.1 | 28.8 | 25.9 | 21.8 |

Multigrade Filters Factors

This function gives the exposure factor of the selected multigrade filter and allows to transfer it to the exposure modification tab.

The factors are stored in a text file and various filtering systems can be stored in several files.

This option simplifies the use of a color head in single filtration (one color used at a time) and makes the double-filtration (two color filters used together to obtain constant exposure) obsolete.

The density reference point can be chosen according to your preferences and way of working.

With filter factors, a multigrade head or multigrade filter set can be used with other reference densities than the one meant by the manufacturer (usually 0.60 corresponding to the ISO norm).

The screenshot shows the 'Darkroom (dry side)' software interface. It features a menu bar with options: 'Toner', 'Histogram', 'Test strip', 'Exposure', 'MG filter', 'Color Mass', 'Contrast', 'Densitometer', 'Photos', and 'Preferences'. The main window displays a table of filter factors and a control panel.

| Grade | Filter | Factor |
|-------|--------|--------|
| 00 | r200 | 2.24 |
| 0 | r90 | 2.24 |
| 0.5 | r65 | 2 |
| 1 | r50 | 1.78 |
| 1.5 | Y25 | 1.41 |
| 2 | — | 1 |
| 2.5 | M20 | 1.41 |
| 3 | M40 | 1.78 |
| 3.5 | M65 | 2.24 |
| 4 | M100 | 2.82 |
| 4.5 | M140 | 3.16 |
| 5 | M200 | 3.16 |

Control panel elements:

- Grade: 2 (old), 3 (new)
- Filter: — (old), M40 (new)
- Factor: 1 (old), 1.78 (new)
- Buttons: Old, New, Send

Annotations:

- Grade: points to the 'Grade' column header in the table.
- Filter: points to the 'Filter' column header in the table.
- Exposure Factor: points to the 'Factor' column header in the table.
- Select old factor: points to the 'Old' button.
- Select new factor: points to the 'New' button.
- Send factors to exposure tab: points to the 'Send' button.

Exposure - Adding Filters

This function lets you add several filters of a color head and obtain the resulting filter without its grey part.

It calculates the exposure factor of the initial and resulting filters and can send it to exposure modification tab.

The filters values are stored in a text file. The program calculates the exposure factors including intermediate values.

The filter color is only an aesthetic gadget.

The screenshot shows the 'Darkroom (dry side)' software interface. The window title is 'Darkroom (dry side)' and the date/time is '16.01.2005 20:30:50'. The menu bar includes 'Timer', 'Metronome', 'Test strip', 'Exposure', 'MG filter', 'Color filter', 'Contact', 'Densitometer', 'Photo', and 'Preferences'. A red message box at the top states: 'No function computes a new filtering pack by suppressing the grey component (also also computes the exposure factor of the filter pack)'. The main interface features a table with columns for 'Cyan', 'Magenta', 'Yellow', and 'Factor'. Below the table are 'Compute' and 'Send' buttons. Red arrows point to various elements: 'Added filter' points to the 'Start filter' row; 'Resulting filter' points to the 'New filter' row; 'Calculation button' points to the 'Compute' button; 'Send factor to exposure tab' points to the 'Send' button; 'Filter color' points to the color swatches; and 'Filters factor' points to the 'Factor' column.

| | Cyan | Magenta | Yellow | Factor | Filter color |
|------------------|------|---------|--------|--------|--------------|
| Start filter | 30 | 15 | 0 | 1.44 | Light Blue |
| Modification +/- | 0 | 25 | 10 | | |
| Modification +/- | 0 | 0 | 0 | | |
| New filter | 20 | 30 | 0 | 1.68 | Light Purple |

Buttons: Compute, Send

Annotations:

- Added filter
- Resulting filter
- Calculation button
- Send factor to exposure tab
- Filter color
- Filters factor

Contrast - Evaluation & Paper Grade

This function lets you evaluate the contrast of an image and the corresponding paper grade.

To use it, you need either the RGB sensor of the interface (values retrieved does not correspond to a time) or a darkroom analyzer, not necessarily complex (the Ilford EM10 is sufficient), but indicating exposure times.

Contrast calculation is done in three modes:

- Luminosity ratio
- Ratio expressed in stops values
- According to ISO(R) norm

The ISO(R) norm represents the contrast in the straight part of the sensitometric curve and does not take into account the foot and shoulder.

Measure is done between a density of 0.04 above base+fog and the 90% of the maximum density the paper can reach.

This the reason you should indicate this maximum paper density (around 2.10 for a glossy paper and 1.80 for a matte paper).

A table with the most common papers lets you find the grade needed to match the luminances of the negative.

This table is stored in a text file and can, of course, be modified to display only the papers you use.

The given example uses the ISO(R) values supplied by the manufacturers, but you can switch for the mode you prefer.

I advise you perform tests with your paper and enlarger to setup your system.

Sensor measure **Calculates contrast**

Black point → Black point: 2.7

White point → White point: 35

Paper max density → Paper max density: 2.10

Measured contrast → Ratio: 12.96

Luminosity ratio → Ratio: 12.96

In stops values → Stops: 3.7

ISO(R) contrast → ISO(R): 90

Papers table and relative grades

| Grade | 100:10 | 110:11 | 90:12 | 75:13 | 60:14 | 50:15 |
|---------------------------------------|--------|--------|--------|--------|--------|-------|
| Agfa Multicontrast Process MCP 310 HC | 100:10 | 110:11 | 90:12 | 75:13 | 60:14 | 50:15 |
| Agfa Multicontrast Classic 9002 111 | 100:10 | 110:11 | 90:12 | 75:13 | 60:14 | 50:15 |
| Ilford Multigrade IV RC Glossy | 100:10 | 110:11 | 120:11 | 110:12 | 90:13 | 80:14 |
| Ilford Multigrade IV RC Glossy | 120:10 | 140:10 | 120:11 | 100:12 | 80:13 | 60:14 |
| Kodak Polyprint II RC2 | 100:11 | 140:10 | 120:11 | 120:12 | 100:13 | 70:14 |
| Kodak Polyprint II RC, B | 100:11 | 120:10 | 110:11 | 110:12 | 90:13 | 80:14 |
| Kodak Polyprint Focul II | 100:11 | 120:10 | 120:11 | 110:12 | 100:13 | 80:14 |
| Kodak Polyprint Focul II | 100:11 | 120:10 | 110:11 | 110:12 | 90:13 | 70:14 |

Densitometer - densities evaluation

This function lets evaluate density differences.

To use it, you need a lab analyzer, not necessarily complex (the Em10 from Ilford is sufficient), indicating exposure times.

Some examples

Base+fog

- Time 1: no negative
- Time 2: part of developed negative without any image

Absolute density of a zone

- Time 1: base+fog
- Time 2: zone to be measured

Density difference

- Time 1: zone 1
- Time 2: zone 2

The screenshot shows a software window titled "Darkroom (dry side)" with a menu bar and a main display area. The main display area contains the following elements:

- Reference time:** A digital display showing "1.3". A red arrow points to this display with the label "Time 1 reference".
- Measured zone time:** A digital display showing "5.3". A red arrow points to this display with the label "Time 2 zone to be measured".
- Compute:** A button with the text "Compute". A red arrow points to this button with the label "Calculates".
- Density gap:** A digital display showing "0.61". A red arrow points to this display with the label "Density difference between the two zones".

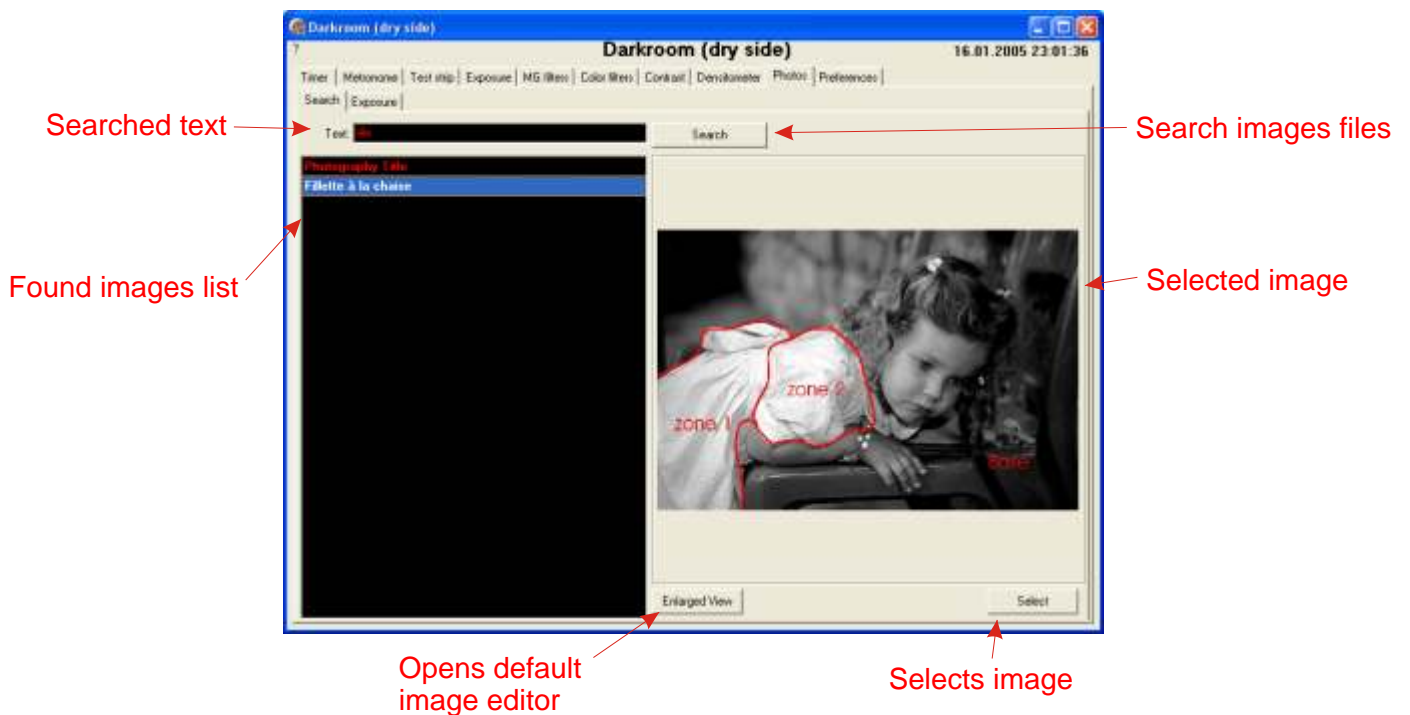
Additional red arrows point from the "Measured zone time" display to the "Compute" button and from the "Compute" button to the "Density gap" display, indicating the flow of data and calculation. A red arrow also points from the "Density gap" display to the label "Sensor measure".

Exposure Parameters - Selection

The exposure parameters, dodging/burning sequence included, are stored in text files, one file per image. It is completed by an image file containing the dodging/burning map.

This function finds images using keywords, in fact, it's an alpha text search in all text files.

Clic on button Selection or double-clic on the line to go to next screen to display all exposure parameters.



Exposure Parameters - Use

This function stores the exposure parameters of an image including the dodging/burning sequence.

An image with the dodging/burning map can be joined. It is advised to give it the same name as the text file, only the extension being different.

The search function uses the complete text file and not only the keywords.

The exposure sequence is indicated in times but also in stops, two buttons convert the values into the other scale.

A double-click sends the selected time to the main timer.

Two buttons allow to add or delete a line.

Three blocks of text contain the main informations about the image.

Three buttons clear the screen, save the text file or delete it (only the text file but not the image file).

To reduce typing, you can use templates (or any other file of this type).

The screenshot shows the 'Labo Photo (agrandissement)' software interface. The window title is 'Labo Photo (agrandissement)' and the date/time is '31.12.2004 18:03:27'. The interface is divided into several sections:

- Top Menu:** Menu, Métronome, Bande d'expos, Exposition, Filtré MG, Filtré couleur, Contraste, Développement, Photo, Préférences.
- Search/Exposure:** Recherche: Exposition, Fichier: exp001.tif, Titre: Bande d'expos, Mots-clés: orange, couleur, bande d'expos, Image: exp001.tif.
- Exposure Table:** A table with columns: Ligne, Temps, Diap, Commentaires. It contains three rows of data.
- Parameters:** Shooting parameters (Paramètres prise de vue), Storage parameters (Stockage), and Enlargement parameters (Paramètres agrandissement).
- Buttons:** Ajouter Ligne, Supprimer Ligne, Recalcule Temps, Recalcule Diap, Effacer Ecran, Enregistrer, Supprimer.

Red arrows point to the following features:

- Template selection (to Fichier)
- File selection (to Titre)
- Exposure File (to Mots-clés)
- Image title (to Image)
- Keywords (to Mots-clés)
- Image file (to Image)
- File selection (to Ajouter Ligne)
- Image editing (to Supprimer Ligne)
- Add line (to Recalcule Temps)
- Delete line (to Recalcule Diap)
- Recalculates times column (to Recalcule Temps)
- Recalculates stops column (to Recalcule Diap)
- Shooting parameters (to Paramètres prise de vue)
- Storage parameters (to Stockage)
- Enlargement parameters (to Paramètres agrandissement)
- Exposure sequence (to the table)
- Clear screen (to Effacer Ecran)
- Save text file (to Enregistrer)
- Delete text file (not the image) (to Supprimer)

General Settings

This tab lets you modify the general options:

- Sounds: "beeps", spoken countdown (.wav file, sound card necessary) or no sound
- Colour: color or monochrome display
- Language file: software language
- Papers contrast file: file containing the papers used and their ISO(R) contrast
- Multigrade filters factors file
- Color filters factors file
- Folder containing the images parameters files
- Enlargers list with connection port, an eventual associated fan and its action duration after lamp extinction

These options are saved in file "dsettings.txt".

The buttons "Save" and "Cancel" save or cancel the settings.

The screenshot shows the 'Darkroom (dry side)' settings window. The window title is 'Darkroom (dry side)' and the date/time is '17.01.2005 01:04:07'. The window has several tabs: 'Meter', 'Metronome', 'Test strip', 'Exposure', 'MG filters', 'Color filters', 'Contrast', 'Deratometer', 'Photos', and 'Preferences'. The 'Preferences' tab is active. The window is divided into several sections:

- Sound options:** Located on the left, it includes radio buttons for 'Beeps', 'Spoken', and 'No sound', and a 'Countdown till' field set to '10'.
- Color options:** Located on the left, it includes radio buttons for 'Color' and 'Monochrome'.
- Files:** A section with several text input fields for configuration files: 'Language File' (E:/language.txt), 'Papers Contrast File' (d:\papers\contrast.txt), 'Multigrade Filters Factors' (V:\351\ford\ColorFilters\Factors.txt), 'Color Filters Factors' (V:\351\ford\Filters\Factors.txt), and 'Photos Root Folder' (C:\Documents and Settings\Claudio\My documents\W3\dry\photos).
- Enlargers Ports:** A table with columns 'Enlarger', 'Port', 'Fan Port', and 'Fan Delay'. It contains two rows:

| Enlarger | Port | Fan Port | Fan Delay |
|---------------------------|------|----------|-----------|
| Leitz Focoflex V35 (12V) | 1 | 0 | |
| Leitz Focoflex IIc (230V) | 2 | 3 | 00:00:15 |
- Buttons:** 'Add row' and 'Del row' buttons are located below the table. 'Save' and 'Cancel' buttons are at the bottom of the window.

Red arrows point from the following labels to the corresponding elements in the screenshot:

- Sound options
- Color options
- Configuration files selection
- Fan duration
- Fan port
- Enlarger port
- Enlarger description
- Delete row
- Add row
- Save options
- Cancel modifications