

DLD - GUI 2 Software

Manual

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Surface Concept GmbH

Am Sägewerk 23a
55124 Mainz
Germany

Tel. ++49 6131 627160
Fax: ++49 6131 6271629

www.surface-concept.com,
support@surface-concept.de

User manual for the DLD-GUI 2 Software
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2 GUI 2 monitor software

2.1 General Information



This is a preliminary description of the Beta version the DLD-GUI 2 software.

Note

Not all functions of the software are described within this manual. Because of the Beta version status not all functions in all combinations have been tested. There is a high probability that different combinations of functions are still producing errors. Not all errors are recognised within the software. Crashes can occur and a stable long term operation cannot be guaranteed.

2.2 Start and Quitting of GUI-2 Software

Turn on the TDC before starting the GUI. To start the GUI software double-click the dldgui2.exe file in your "GUI-2 software" folder. The GUI software opens up with its main interface as shown in Figure 1. To end the program, press "X".

The GUI-2 main interface has different functionalities, which can be found on different slider positions. The slider positions are positions on the upper side of the main interface.

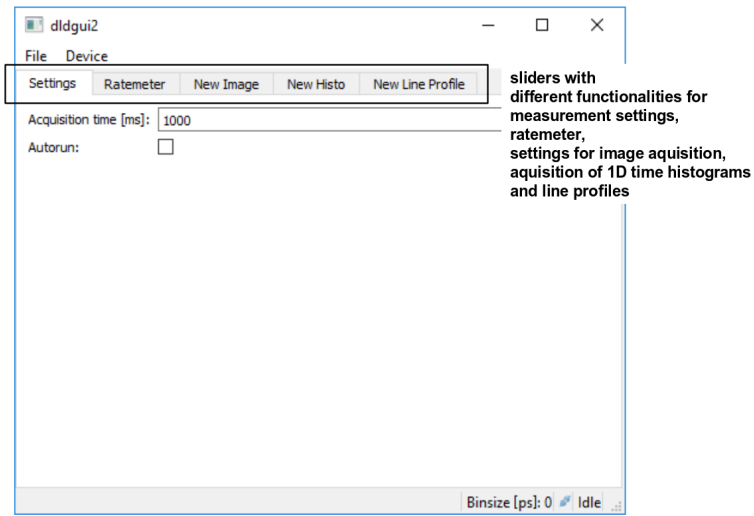
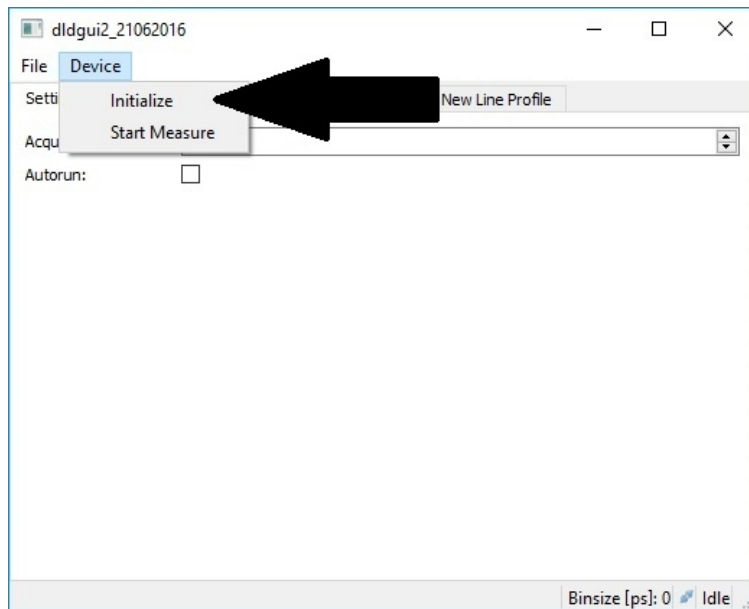


Figure 1: GUI-2 Main Interface

2.3 Device Initialization

To initialize the TDC press “Devices” → “Initialize”. As soon as a TDC has been initialized, the initialize-function changes to deinitialize. Press “Devices” → “Deinitialize” to deinitialize the TDC again.

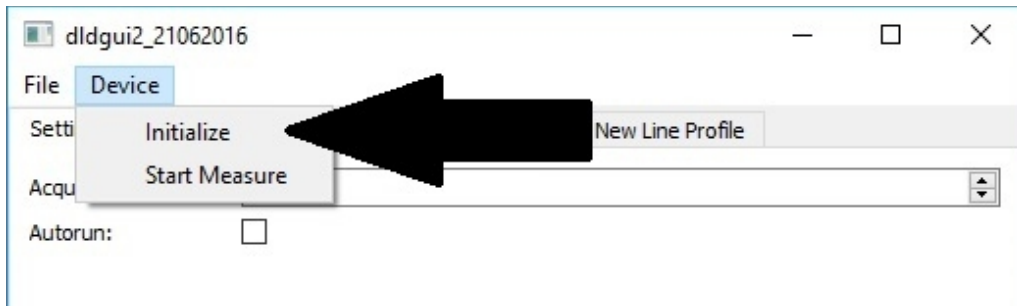


The USB-TDC must be turned on, before its initialization.

2.4 basic acquisition functions

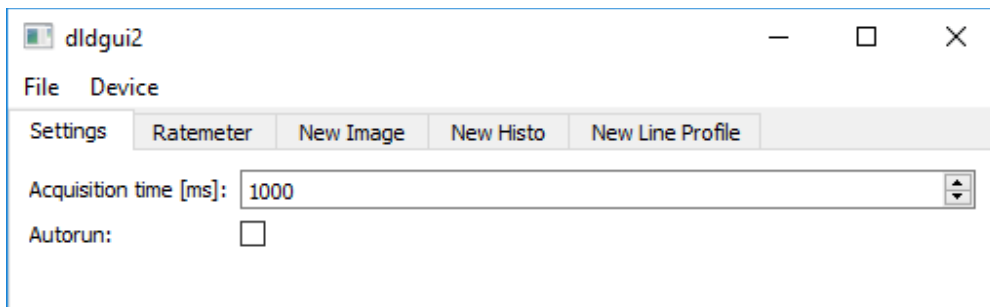
2.4.1 Measurement Start

To start a measurement press “Devices” → “Start Measure”.
 As soon as a measurement has been started, the Start-Measure-function changes to Stop-Measure. Press “Devices” → “Stop Measure” to stop a running measurement.



2.4.2 Acquisition Time

The software acts similar to a CCD camera monitor respective to image acquisition, real-time monitoring, exposure times, pixel binning, regions of interest etc.



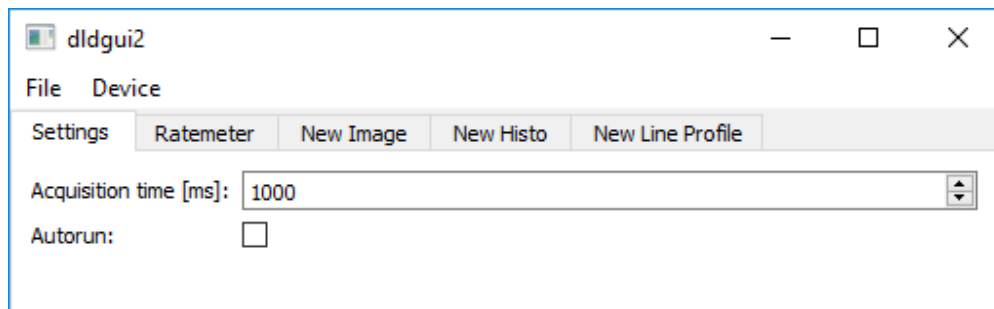
The acquisition time is set to 1000 ms by default. It can be changed in the field “Acquisition Time”, which can be found under “Settings” The exposure time is given in units of ms.



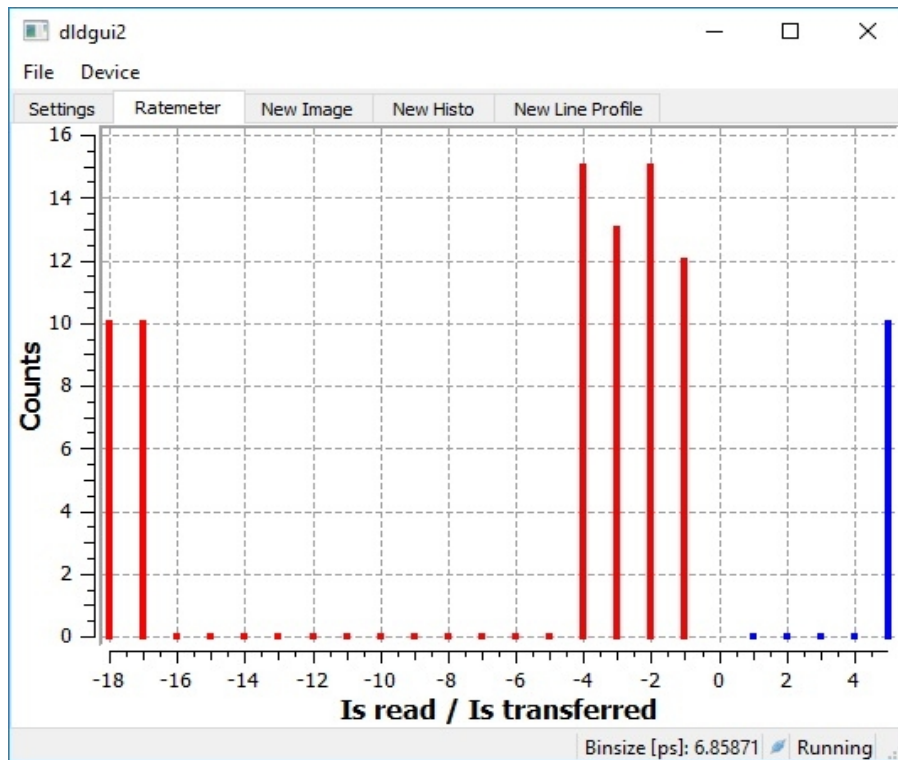
The defined acquisition time of the measurement is high precisely quartz-controlled by the measurement hardware.

2.4.3 Autorun Mode

In “AutoRun”-mode the acquisition process will restart automatically each time the acquisition time has ended. It is turned on/off by clicking the box named “Autorun”, which can be found under “Settings”



2.5 Count rate and count rate control



The GUI-2 software contains a rate meter, which can be found under “Ratemeter”.

Note The rate meter does not display a count rate directly. It displays the number of measured counts per set exposure time. Therefore the displayed number of counts must be divided by your exposure time to get the real count rate.

For example

The rate meter displays 3000 counts after a measurement with exposure time of 1000 ms. The corresponding count rate is than 3000 counts per sec. The corresponding count rate is 10.000 counts, if the exposure time was set to 300 ms.

Counts are updated after each acquisition, allowing an online observation of the count rates when “AutoRun” is activated.

Figure 2 shows a screenshots of the rate meter window for a TDC running in Pair Mode with a detailed description of the individual features.

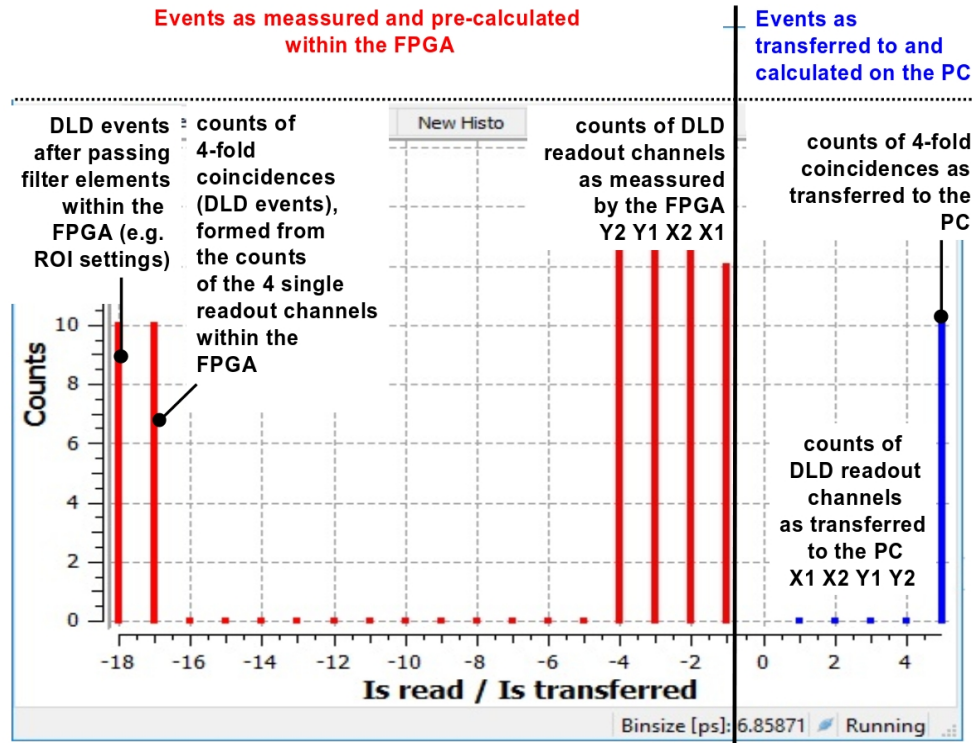


Figure 2: Rate meter window for a TDC operating in Pair Mode with detailed description of single features.

The Ratemeter holds 23 different channels. These channels are divided into two groups which are marked by different colors and by a different label in the numbering.

The red channels [labeled -1 to -18] display counts, which have been read and pre-calculated by the FPGA. The counts of the four DLD readout channels [x1, x2, y1, y2] are displayed in the red channels -1, -2, -3 and -4 (for x1, x2, y1, y2 – depending on the firmware file, this assignment can be different). The counts of matched 4-fold coincidences (DLD events) as calculated from the results of the 4 readout channels are given in channel -17. Channel -18 shows the DLD events after passing filter elements within the FPGA [e.g. ROI Settings]. The channels -17 and -18 display counts, which have been pre-calculated within the FPGA to reduce the transfer rate over the USB. Typically the amount of counts in channel -17 is around 80% - 90% of the amount of each of the four single DLD readout channels, but the counts in channel -18 are slightly less than in channel -17.

The blue channels [labeled 1 to 5] display counts, which were transferred to the PC. The blue channels 1 to 4 display the unprocessed counts of the four DLD readout channels [x1, x2, y1, y2] as they were transferred to the PC. The counts displayed in channel 5 correspond directly to the events displayed in the image. The interpretation of the counts in channel 5 depends on the readout mode of the TDC (RawData or Pair). In Pair Mode only the red channels, as described above and the blue channel no. 5 are displayed. Here the blue channel no. 5 displays DLD events as transferred to the PC after pre-calculation within the FPGA. Therefore the channels -18 and 5 should show the same number of counts. In RawData Mode counts from the single DLD readout channels are pre-calculated by the FPGA in RawData Mode, but the pre-calculated events are not transferred. In opposite to the Pair Mode only the pure raw (unprocessed) data from the four single DLD readout channels is transferred (blue channels 1 - 4 and the number of counts in the blue channel no. 5 corresponds to the 4-fold coincidences (DLD events) as calculated from the counts within the blue channels 1 - 4 by the software on the PC.



Note In Pair mode only the red channels as well as channel 5 are displayed. In RawData mode the red channels are still displayed together with the blue channels 1 – 5, because also in RawData mode the measurement data is always pre-calculated within the FPGA. But in RawData mode only the unprocessed data is transferred to the PC and not the pre-calculated one.

In RawData mode, number of counts displayed in the channels -1, -2, -3, -4, and 1, 2, 3 and 4 respectively should be equal and also the counts in channel -18 should be comparable to the counts in channel 5, as long as the transferred rate is smaller than the transfer limit of the USB. The increase of rates higher than the transfer limit of the USB will result in the effect, that the counts displayed in the channels 1, 2, 3, 4 and 5 will stay unchanged, while the counts displayed in channels -1, -2, -3, -4, -17 and -18 will further increase.



Note The count ratio between single channels and the 4-fold coincidence (counts in channel no. -17/-18 compared to counts in channel no. -1, -2, -3, -4 and counts in channel no. 5 compared to counts in channel no. 1, 2, 3, and 4 respectively) will decrease when going to high count rates (up to 10E6 and more) due to an increase in multi hit events and connected to this a loss of 4-fold coincidences.

The rate meter is a powerful tool mainly used for diagnostics, as e.g. input control of the four DLD readout channels. The ratio between the counts of the four readout channels and of the 4-fold coincidence is a measure for the detection efficiency of the detector. For a well-adjusted detector system the number of counts within the single readout channels should be of almost equal height and the counts of the 4-fold coincidence should be of 80 % or more of the number of counts of the single readout channels.

2.6 Definition of Image Buffer for Image Display

To parameters to create a new image buffer to display measured data image can be found under “New Image”.

You can define the Offset, the Size and the Binning for all three dimensions X, Y and t. Offset and Size for X and Y are given in number of pixel, for t are given in number of time channels.

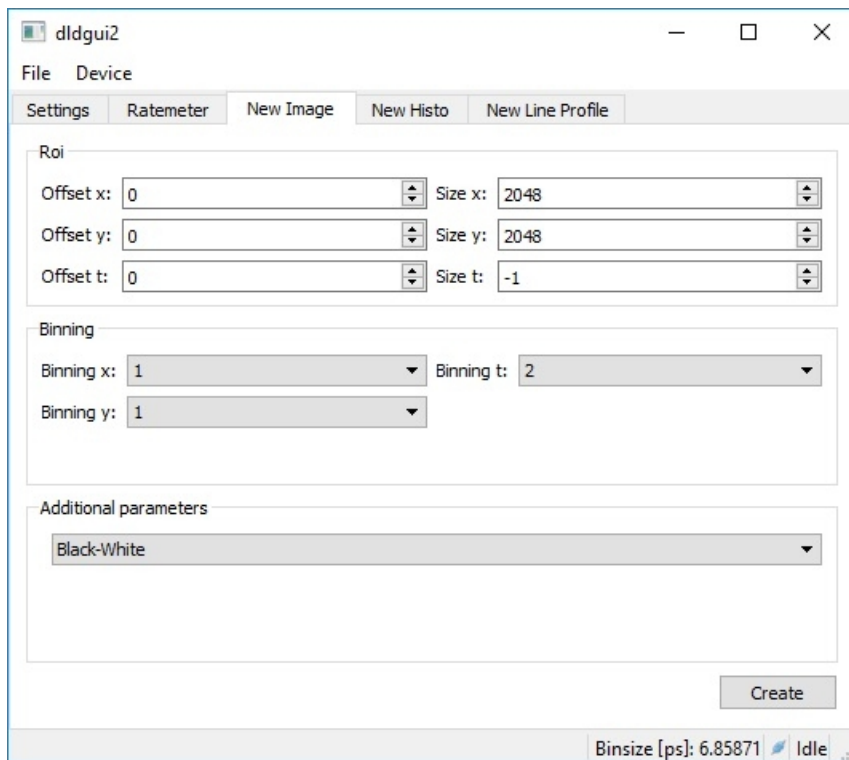


Note A size of -1 in t defines all available data in t without any time selection

After defining the parameters for Offset, Size and Binning press “Create” to create the new image buffer. Several image buffers with different parameter settings can be defined and can be active at once. Once a new image buffer has been created its parameters cannot be changed. You can only create a new image buffer with new defined parameters.



Note If you want to create any new image window to show results, you have to stop any running measurement first. As long as a measurement is running, the “Create” button is deactivated.



In the category “additional parameters” you can set beneath the standard display in black white a colored display for better optic analysis.

Each new image window has two taps, “File” and “Image”.


Under “File” → “Export” a measured image can be exported as a 16bit TIFF image.

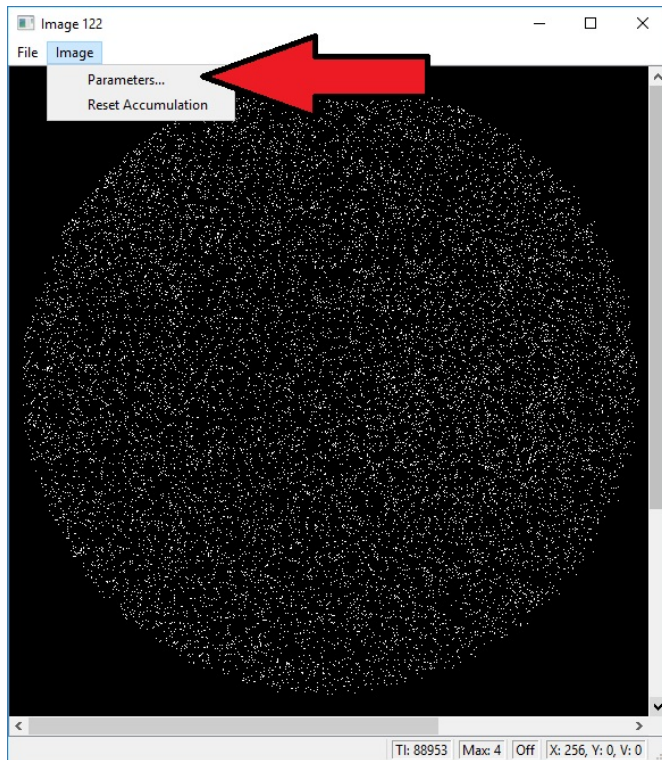
Under “Image” there are two additional entries: “Parameters” and “Reset Accumulation”.

Under “Parameters” you can set additional parameters concerning grey level and accumulation. The accumulation feature overlays a measure with the preceding one and this is done as often as set.

For example: If accumulation is set to 60 times with an acquisition time of 1000 [ms], the result will be an image overlay of the last 60 measurements taken and it will take about 60 x 1000 ms = 60 seconds.

Autorun must be activated for this!!

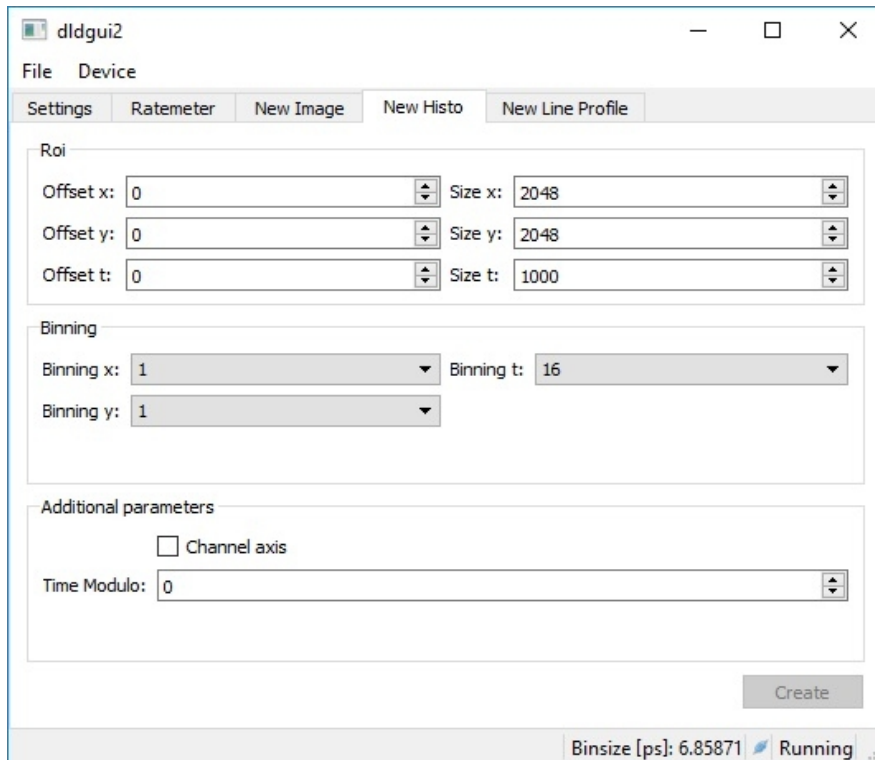
Note  An accumulated image stays unchanged after accumulation has been finished until parameter settings for accumulation are changed or until “Reset Accumulation” is pressed.



idence should be of 80 % or more of the number of counts of the single readout channels.

2.7 Definition of Time Histograms

At the tab “New Histo” you’re able to create a new window showing the time histogram providing basic setup. It is not possible to create a new time histogram while a current measurement is running.



2.8 Definition of a Line Profile

The new line profile is a feature that allows the user to show the measured intensity through a straight line in X or Y direction. It is not possible to create a line profile while a current measurement is running.

