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TECHNOLOGIES

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DataLight II Software Manual

for ILT5000/ILT1000

FLASH

Rev. 2.4.3, FW 3-0-7-5 or higher

1/2016

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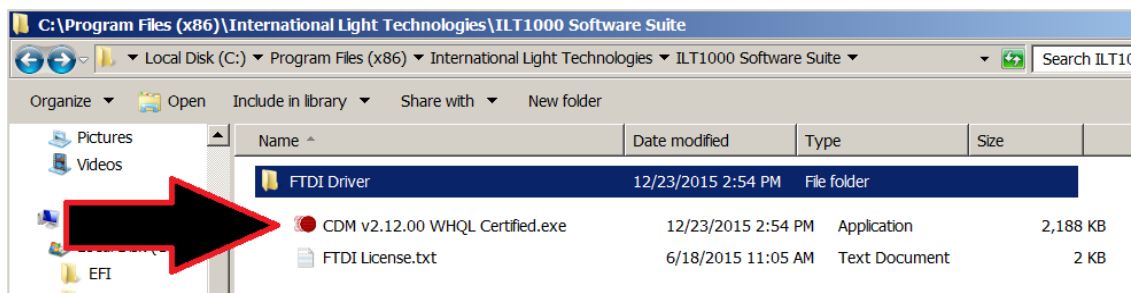
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The ILT “Flash” program is still under product development. It is currently being sampled by ILT customers and partners. This is a preliminary manual for the experimental Flash app and is intended for testing purposes only. Expected release date is 2/28/16

1. Prerequisites and Quick Start Guide:

1A.Prerequisites:

- A. Install the Datalight II software.
- B. Turn on ILT5000, Connect your device (ie, ILT5000 or ILT1000) to an available USB port.
- C. Allow the computer to assign a com port and install FTDI drivers, as needed. If the computer does not already contain the drivers, device drivers are located in C, Program Files, International Light Technologies, ILT*device* Software Suite, FTDI Driver folder. Double click drivers(see extension .exe)



D. If you have just updated the software, use “FW Update” in the DatalightII folder on the desktop to select the corresponding version of FW. Click browse, open the folder where the datalight download was saved. Select the newest firmware revision. (ie D:ILT*x000* 3-0-7-5 FW.hex) Note if using older software or firmware some features/functions may not apply.

E. If your sensors need to be biased IE vacuum photo tubes (SED240, SED220, SED185) or silicon sensors for faster response time (IE SED033, SED100) you will need to use the “Meter APP” to turn on the **bias**.

1B. Quick Start example:

For customers with sensors that measure the visible spectrum an easy way to familiarize oneself with Flash is to use a cell phone/camera flash. However, if the connected device is set up to measure only UV or IR (visibly blind) a UV or IR source will need to be used. Please use caution to prevent skin or eye damage. UV/IR protection such as glasses, sun block, gloves and protective clothing should be used when measuring UV & IR.

To begin, If you are using an ILT5000 turn on the device(s). Connect your ILT5000/1000 device(s) to a USB port. Wait a few seconds to allow the port(s) to connect.

Open the Datalight II folder on the desktop. Double click on **Flash**.

Name your device: Under “File” in the tree view box, right click on the device name. Click on set User Friendly Name. Type name IE lux sensor, top, bottom etc..

“**Select**” a device by clicking on the device name/user friendly name to highlight.

In the green Selected Device section;

Verify that you have the correct **calibration factor**, using “factor select”

Set Range selection to automatic: “(0) Auto-Range Next”

Click the Data Display button until it says **Light Level** above the **display**

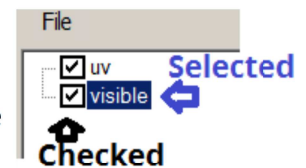
With the sensor covered press **Zero** to set a dark zero level.(or uncovered for low level ambient subtraction.)

Uncover Sensor

Read the value in your display. (Ie 6.306e+2 lux)

(Note If you are using more than one device, “**Select**” each device to set/verify the calibration factor in use. Calibration factors must be set by selecting 1 device at a time using the Green section “Selected Device” and “Factor Select”. You can perform the “Zero” and “Set Range” in the Yellow Checked Devices section for

“**All Checked Devices**” but calibration factors must be set individually. To **✓ Check** a device, simply click on the box to left of a device name and a check will appear. Click again to remove or un-check a device)



Your gray tab should open to **Flash Setup**. If it is not, click on the tab to select it.

Turn on the **Light Level** button by clicking in the white circle to the left. A black dot appears.

Set Prelay to 5 ms(this will capture data just before (5 ms before) the flash is recognized)

Note: You can set values by using the toggle up/down buttons or by deleting the existing value and typing in the new value.

Set light level to a value slightly larger than the value read in your display. (ie 9e+2 lux)

Set **trigger time out** to 5 seconds (this gives you 5 seconds to start your flash once you initiate measurement)

Note: For a flash with red eye removal, you will need more time to capture the full flash. Start with a few seconds and shorten the time until your graph ends just after the flash ends. Keep in mind the longer your measurement time, the fewer data point per msec. The meter takes 4096 data points over a user defined time period from 80msec to 40 seconds. It bases the time between displayed data on the total time programmed, including the prelay.)

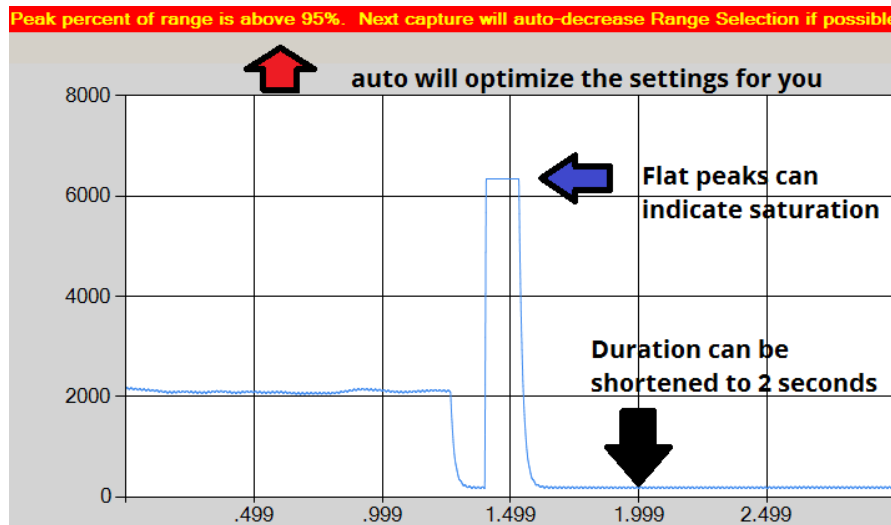
Change the Gray tab to **Flash Profile** by clicking on the Flash Profile tab to take a measurement

Click the **left Capture and Profile** button (with a green border).

You now have 5 seconds to initiate your flash

Aim your light source at the sensor and initiate a flash.

As your software is measuring, read any notes, warnings etc. that may flash across your screen. These will help you adjust your settings for future readings.



Scroll down

below the graph to see the all data points from the graph in the table. Use the scroll bar to the right to move up and down within the table.

To **save your results**, click on the Save Data to File button centered above the display.

Additional overview:

Getting more valuable data points: In the flash set up Tab, selecting On-Device Data Capture **-Only save above minimum light level**-During Profile ignores low level/zero readings based on the programmed value and plots all points for values above the threshold. Note: Use of this feature will impact the relative time scale as many readings are ignored.

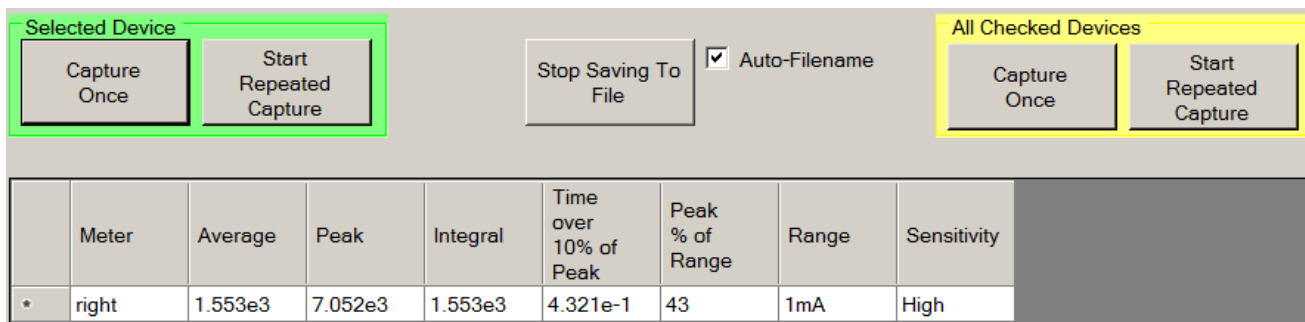
Optimizing Settings: In the flash set up Tab, selecting Range and Sensitivity Settings -Auto-Set Fixed Range Selection starts an automated, multi-flash measurement process which will determine the optimum Range and Sensitivity Settings. Before using this feature, a proper integration time (one that is larger than the expected flash duration) must be programmed (see 7E). This feature can be used in conjunction with "Range Selection, (0) Auto-Range Next" (see section 5C) to assure auto-ranging starts under optimal settings.

"Range and Sensitivity Settings -Auto-Set Fixed Range Selection", tests a series of flashes and optimizes the settings **Before** the Measurement flash occurs.

"Range Selection, (0) Auto-Range Next" Evaluates post flash data to see if any adjustments to the settings are needed **After each** a measured flash is complete.

Note: When using flash Profile, the measurement data is also populated and analyzed in Flash Capture. To review the results or to take a new measurement with analysis, click on the Flash Capture tab.

When the Flash Capture tab is selected data is captured and analyzed, but the data points and graph are not recorded (Flash Profile is not populated).



Flash Capture allows the user to measure single(once) or multiple(repeated) flashes from a single(green section) or multiple (yellow section) devices. Only one line of data will appear in the table for each device connected. As new measurements are taken, the previous analysis is **over written**.

Because the data in the table is overwritten during each new measurement, the best way to analyze repeated captures is by saving the data. Both saving data and repeat capture are toggle Start/Stop buttons. To begin Click on the **Saving to File** button to initiate.

Click on **Start Repeated Capture**.

Turn on the light source to be measured within the time set in the trigger time out.

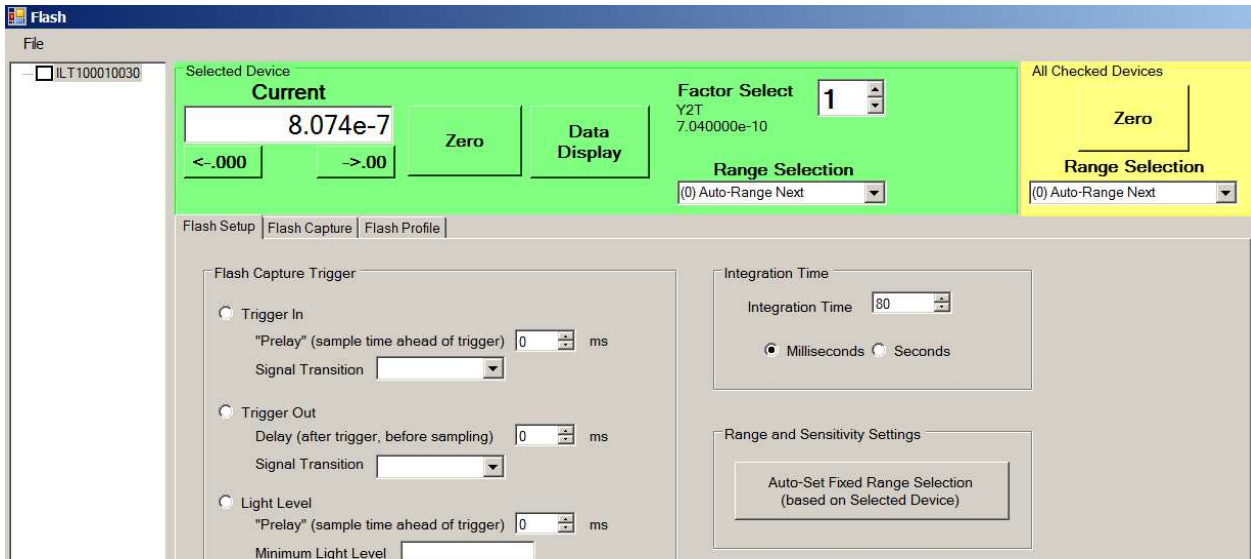
Watch for warnings to assure settings are optimized or to determine which adjustments are needed. Click on stop saving and stop capturing to end measurement session.

Files will be saved within My Documents\ILT\Reports, with a filename based on the time the control was selected.

2. About Flash: Flash allows fast measurement of a single pulse/brief flash of light and plots the rise and fall of the light output while recording 4096 data points over a user defined time period from 80msec to 40 seconds. To open the application, assure you have a device plugged in and available for use, then double click on the Flash Icon in the DatalightII folder on the desktop. The Application will scan through the computer and connect with the next available device. If no devices are available, an error message will appear and the application will need to be closed. Double check to assure no other applications are connected to the device and try again.

Note: For integration times shorter than 80 mSec, less data points are captured (Int time/20uS= captured data points ie. a 2 ms sample time will capture 100 data points). Also, when Only save above min light level is used, it is also possible less than 4096 datapoints will be captured.

3. Flash Opening Screen: Flash will open in “current” measurement mode and begin displaying live readings for the selected (first discovered device) in the Selected Device display window.



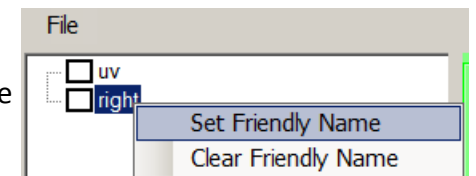
4.

Meter "Tree-View" (White):

The screen opens with a tree-view below "File" showing the model number, serial number and quantity of devices connected. The Tree-View is used to select and check devices. Most operations in the other tabs are performed on the "Selected Device" or "All Checked Devices" based on the tree-view settings. (I.e. Flash capture will capture flash light levels simultaneously for all devices checked in the tree section.)



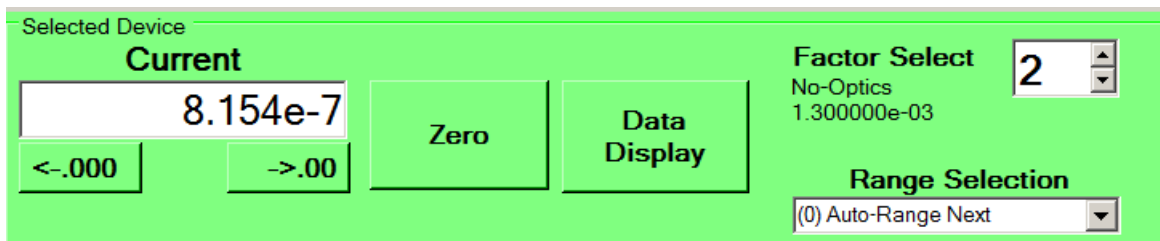
Note: If the device has not been programmed with a friendly name, "Right", "Left", or "-500" will appear in place of the model and or serial number. To program a name, right click on the existing name (ie right), click "Set Friendly Name" type name.



IMPORTANT: to **Select** a Device, Click on the device name so the device is highlighted (a blue box encloses the device name). To **Check** a device for use in all checked devices, click on the box to the left of the device ID and a check box will toggle between checked and un-checked.

5. Selected Device (Green):

To select a device, Click on the model/name/nick name of the device to be **selected** and a box will appear around the text in the tree view as shown above.

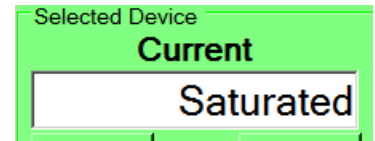


Descriptions:

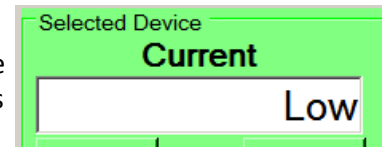
- Readout window shows "Current" or "Light Level" for the selected device.
- Resolution tabs increase or decrease the amount of digits displayed in the window.
- Zero subtracts the displayed value at time of use, from all future readings.
 - Zero Dark (sensor covered) is used to subtract low level noise from the environment.
 - Zero Ambient(uncovered) is used to subtract room lighting from the source under test lighting. With the source off and a stable room light condition measured, press zero.

- Data Display changes between “Current” or “Light Level”.
- Factor Select toggles between the available calibration factors.
- Range selection allows user to select the measurement range of current where the peak will occur.(see 5C to learn more about using range selection for testing flash.)

5A. “Saturated” Warning in Readout window: The Current or Light Level reading may read “Saturated”. Typically this indicates, that for the existing “Range Selection” the reading is too high to display. For flash detection this would indicate that the Range Selection (see 5C below) needs to be **lowered**. This, however, is a valid display value if the test is attempting to capture a momentary dip in current or light level.

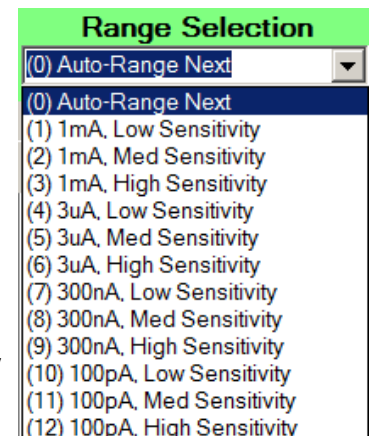


5B. “Low” Warning in Readout window: The Current or Light Level reading may be “Low”. This indicates that, for the existing “Range Selection” the reading is too low (all noise) to display. This is a perfectly valid, even expected, display value during “Pre-Flash” as the flash signal will raise the level significantly during capture.



5C. Range Selection:

There are 12 available ranges of sensitivity noted under range selection, with the default being set to (0) “Auto-Range Next”. The “Next” indicates that *after* each measurement/flash capture the software will automatically determine if the settings needs to be adjusted (based on the *last* reading), and will do so automatically before the *next* reading. As a result it may take a number of flash captures to arrive at the optimal range.



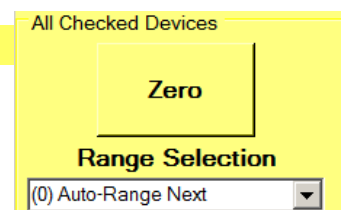
In manual, selections (1)-(12), the end user must select the sensitivity range that assures the current /amps generated by the sensor during the peak output of the flash can be captured during test.

The range should be set to assure the maximum current (amps) generated by the sensor during the peak of the flash can be captured. Like with Auto-Range, it may take a few flashes to determine the optimum setting. Setting the Data Display to current allows the user to monitor current levels. See also section 8 flash capture for help with analyzing flash, range and sensitivity settings.

Note: When monitoring multiple devices (Capture/All Checked Devices), the (0) Auto-Set feature will allow multiple devices to settle on different ranges. The need for different settings can be caused by changes in sensor type, sensitivity, and spectrum measured, or distance, angle, FOV, from the source, etc.

About Possible Ranges: The Range Selection will display ranges 0 through 12 (supported by ILT5000). Some attached devices may only support ranges 0 through 9 (ILT1000), or even just range 0 (OEM and small range devices) and is dependent on the functionality/ dynamic range of the device attached.

6. All Checked Devices (Yellow):

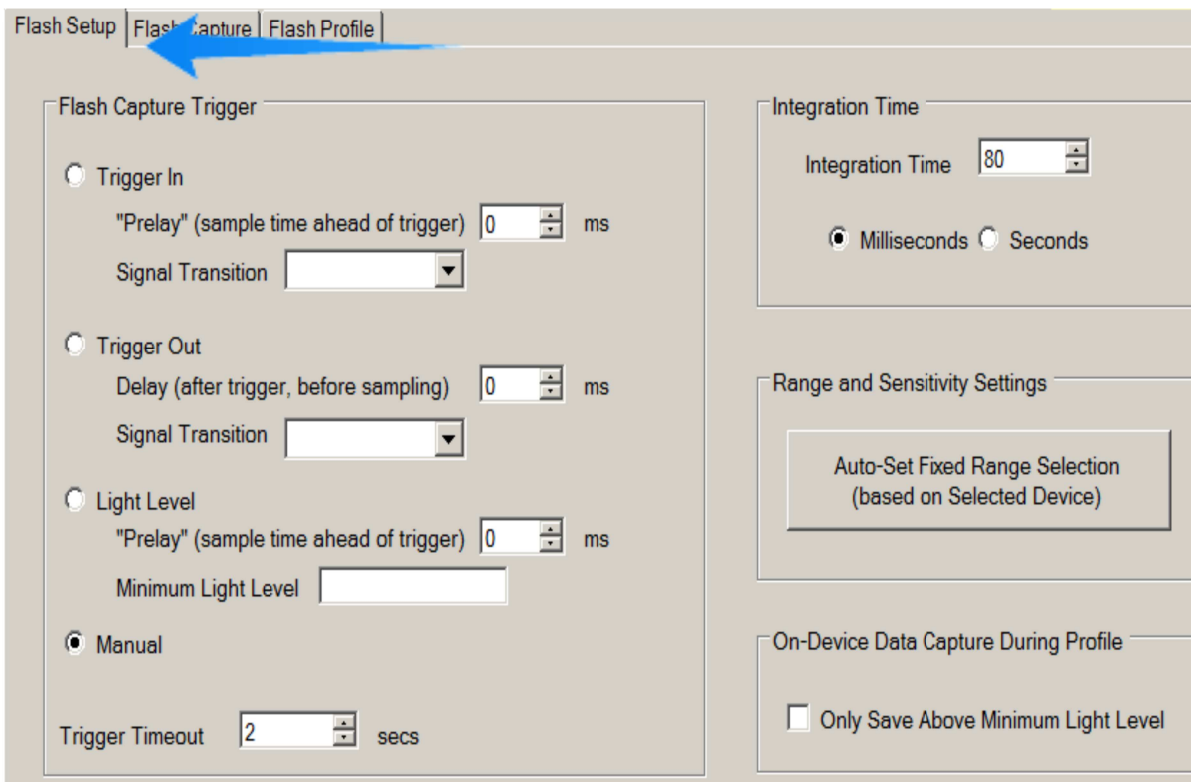


This area performs the same functions as described in “Selected Device” but applies the selections to all devices with a checked box in the “Tree Window”.

NOTE: The Factor can only be set individually using Selected Device.

7. Flash Setup (Gray, Main Tabbed Area):

The default tab is the Flash Set up Tab. This tab allows configuration of all the flash settings as follows:



7A. Trigger In **(UNDER DEVELOPMENT, Custom Cable Required)**

Select this trigger method if an external signal will be used to trigger the start of capture. This is only available on the ILT5000 which provides an optically isolated trigger input at its 15-pin connector input as follows:

Pin	Signal
12	Trigger signal INPUT Logic High must be between 0.2V and VDD (pin 15) Logic Low must be between 0.0V and 0.8V
13	Trigger signal OUTPUT (see Trigger Out below) Logic High is between 3.0V and 3.3V for VDD (pin 15) = 3.3V and between 4.7V and 5.0V for VDD (pin 15) = 5.0V Logic Low is between 0.0V-0.6V
14	External/Isolated Power Ground (GND)
15	External/Isolated Power (VDD) Can be either 3.3V or 5.0V

7A1. “Prelay” (sample time ahead of trigger) This value, in milliseconds, provides a mechanism whereby data can be captured ahead of the actual trigger.

7A2. Signal Transition The trigger can be sensed either as a logic “Low-to-High” or a logic “High-to-Low” transition.

7B. Trigger Out **(UNDER DEVELOPMENT, Custom Cable Required)**

Select this trigger method if the desire is for the meter to send a signal, followed by a small delay (for a shutter to open, the light-level to rise, etc) before capture begins. This is only available on the ILT5000 which provides an optically isolated trigger output at its 15-pin connector as shown in the “Trigger In” section above.

7B1. Delay (after trigger, before sampling) This value, in milliseconds, is the delay between when the trigger is sent and when the meter begins sampling.

7B2. Signal Transition The trigger can be sent either as a logic “Low-to-High” or a logic “High-to-Low” transition.

7C. Light Level This the most a convenient way to capture a flash without the use of an external trigger mechanisms. The software will automatically detect the rising edge of a flash and start sampling as soon as the light levels begin to increase above the pre-set (typically ambient) light level condition.

7C1. “Prelay” (sample time ahead of trigger)

Provides a mechanism whereby data can be captured just ahead of the actual light level trigger initiation in 7C2. This prelay time, in milliseconds, is the amount of time for which data will be captured. The prelay time can be set from 0 - 20 msec. When in use the software will capture, record and display readings that occurred just prior to the software registering the increase in light intensity.

7C2. Minimum Light Level

This is the light level where the trigger will initiate data capture. This is typically set to a value above the ambient level with the test source off. It can be a calculated value or a value slightly higher than in the readout window. (The units for the Light Level are defined by the sensitivity factor in use)

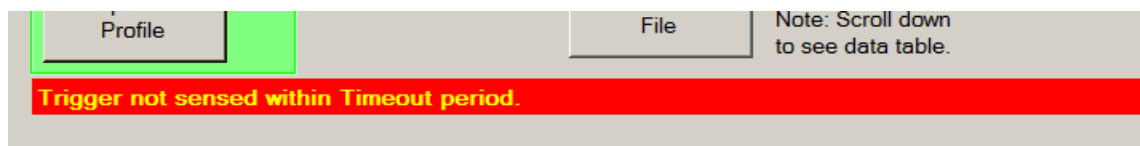
Example of Light Level capture. The light level (Pre-Flash/ambient) is 4.97e+2 lux, as shown in the readout window. The flash duration is estimated at 100 msec. Prelay is set to 2 msec to assure the full rise of the flash is recorded. The user needs 4 seconds to initiate the flash. Set Prelay to 2 msec, Set Min light level to 5.5e+2 (higher than ambient), set integration time to 110 msec (100 msec for flash 2 msec for prelay). Click on flash profile. Initiate the light source to generate a flash within 4 seconds.

7D. Manual

Manual mode means the software requires an additional action by the user to start. Using this trigger mechanism causes the system to start capturing upon sensing any of the “Capture” or “Capture + Profile” buttons being pressed (see below).

7D. Trigger Timeout

This is the time the software will wait for a trigger to occur. After this time period, the software will timeout while waiting to sense a trigger. See trigger time out message below:



If the error message appears, reset by pressing the applicable capture button again to restart the timer.

Note: Trigger time out does not apply the manual trigger.

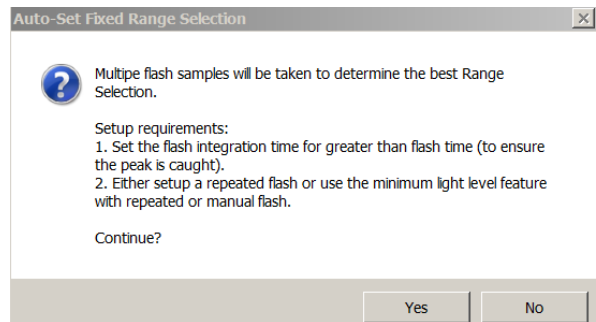
7E. Integration Time

This sets the actual integration/measurement duration. (How long the software will capture data in seconds or milliseconds) This can be set to allow capture of one or multiple flashes. Minimum recommended integration time is 80 msec and the maximum is 40 seconds in order to allow a full capture of 4096 data points. If an integration time is set for over 40 seconds, the software will indicate an error and automatically adjust to 40 seconds before taking a measurement. If the integration time is set to less than 80 msec less data points will be captured. The integration time should be set at a value slightly larger than the expected flash duration to assure the full flash is captured.

7F. Range and Sensitivity Settings

Auto-Set Fixed Range Selection (based on Selected Device)

Clicking the button starts an automated, multi-flash measurement process which will determine the optimum Range and Sensitivity Settings. Before using this feature, a proper integration time (one that is larger than the expected flash duration) must be programmed (see 7E). Once this value is



set, click Yes to continue. This feature is very helpful in detecting and configuring the correct settings for flash capture. It will adjust settings for a single Selected Device *as well as (multiple) Any Checked Devices*, to the best range(s) as determined from the Selected Device. This feature can be used in conjunction with “Range Selection, (0) Auto-Range Next” (see section 5C).

7G. On-Device Data Capture During Profile

Only Save Above Minimum Light Level

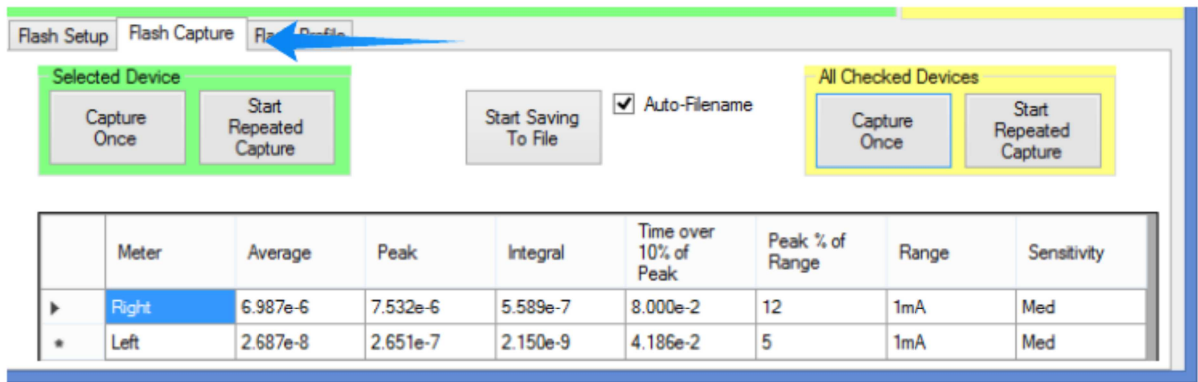
When using the Light Level trigger, selecting this option will cause the system to discard any data points that are below the user-defined minimum light level. This allows efficient capture of the more interesting flash data as all 4096 data points will be for values above the programmable value.

Note: Use of this feature will impact the relative time scale as the elimination of the data points eliminates their time from the x axis of the graph. See warning note below:

Warning: Data points below Minimum Light Level may have been omitted (see Flash Setup). Relative time scale may be skewed.

8. Flash Capture (Gray, Main Tabbed Area)

This tab control is used to capture a flash and display the calculated flash results, including; average, peak, integral, etc. It does not display the individual data points and chart (see Flash Profile for that functionality). Note that calculate flash results as a results of the Flash Profile activity (see below) will be populated within this tab control.



This tab allows simple and fast capture of flash light level data including:

Variable	Description
Average	The average light-level over the integration time.
Peak	The peak light-level over the integration time.
Integral	The integral of light over the integration time.
Time over 10% of Peak	The amount of time, in seconds, that the light-level was over 10% of the peak. This is an experimental variable attempting to approximate the “peak” time.
Peak % of Range	The percent of range (the Range Setting combined with the Sensitivity Selection)
Range	This is the current-sensing range that was active during capture. This value can vary among meters.
Sensitivity	Within each current-sensing range is a low, medium, and high sensitivity range. This value can vary among meters.

8A. Selected Device

These controls operate only on a single device selected within the Tree View.

8A1. Capture Once

This will cause a single capture and presentation of all the flash results.

8A2. Start Repeated Capture

This will cause the system to repeatedly capture the flash results.

8B. All Checked Devices

These controls operate all the devices checked within the Tree View.

8B1. Capture Once

This will cause a single capture and presentation of all the flash results.

8B2. Start Repeated Capture

This will cause the system to repeatedly capture the flash results.

8C. Start Saving to File

This function will start saving the variables for every capture, including the meter name and timestamp. This includes captures initiated with any Capture Once or Repeated Capture mechanisms. This control will transition to “Stop Saving to File” once saving has been started.

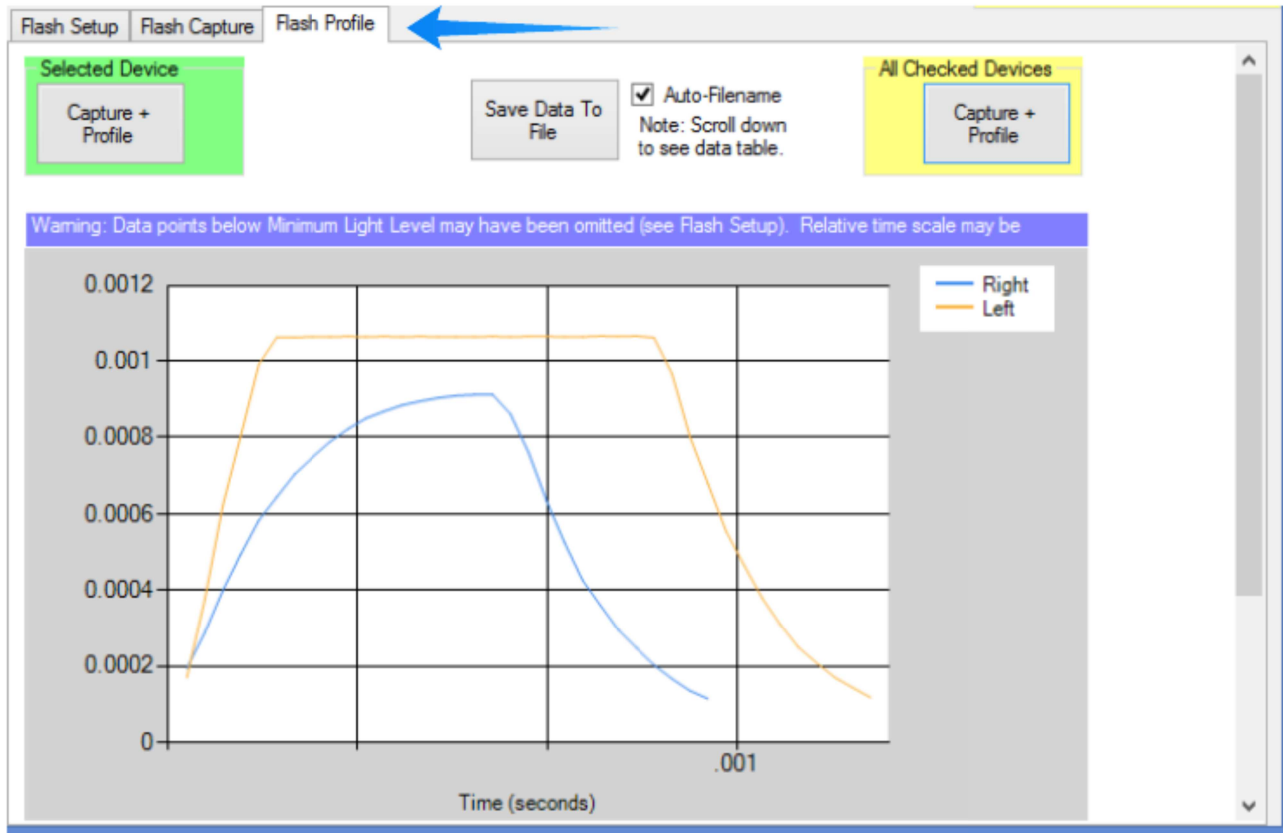
8C1. Auto-Filename

If this control is checked (the default) files will be saved within My Documents\ILT\Reports with a filename based on the time the control was selected.

9. Flash Profile (Gray, Main Tabbed area):

This tab control is used to capture and **profile** the flash results in both graphical format followed by tabulated formats. In the tabulated format is the time stamp, meter name, and the light level results.

Sample: In the example below two devices were placed on opposite sides of the room. A camera flash was measured. The device on the left, which was closer to the camera shows Saturation (the higher values are missing, indicated by the flat line)



All data points captured for each device (up to 4096) are compiled in a list just below the graph. In the example below, only one device was used. If numerous devices are used additional columns of data will be displayed.

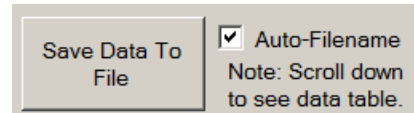
Due to the limitation of the display size, only a small portion of the readings can be displayed at one time.

The screenshot shows a data table with the following columns: 'Time (secs)' and 'right'. The table contains seven rows of data. A red arrow points to the right side of the table, indicating that there are more data points than can be displayed at once.

Time (secs)	right
0.000e0	8.206e3
4.880e-4	8.203e3
9.760e-4	8.225e3
1.464e-3	8.249e3
1.952e-3	8.239e3
2.440e-3	8.256e3

To see the full list of 4096 data points, use the scroll button to the right of the table to scroll down.

The data points from the profile(s), can be exported with the “Save Data to File” button in the center of the tab just above the display.



Note: It is also possible to use cut and past to transfer the data, however there are over 4000 points saved to the table which makes copying them a little tedious. To copy, left click in the top left cell and hold down as you scroll downward and the right, until all fields are highlighted. Then copy the data (control C) and paste (control V) into your file.

9A. Selected Device

These controls operate only a single device as selected within the Tree View.

9A1. Capture+ Profile

This will initiate a single capture and presentation of all the flash results (within the Flash Capture tab) and the flash profile (graph), as well as the specific data points (in a table below the graph).

9B. All Checked Devices

These controls operate all the devices checked within the Tree View.

9B1. Capture+ Profile

This will cause a single capture and presentation of all the flash results (within the Flash Capture tab) and the flash profile (graph), as well as the specific data points (in a table below the graph) for numerous devices simultaneously.

9C. Start Data to File

This function will save the profile data. This is an export of the data table that exists below the graph.

9C1. Auto-Filename

If this control is checked (the default) files will be saved within My Documents\ILT\Reports with a filename based on the time the control was selected.

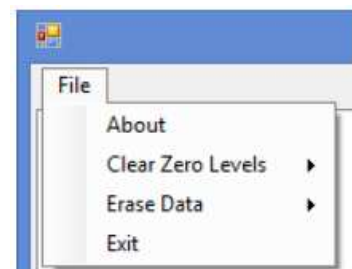
10. “File” Menu includes a small number of administrative functions as follows:

10A. About This function brings up a dialog box with detail about the application version as well as the device details for each meter.

10B. Clear Zero Levels The Flash application provides a “Zero” function to cancel out ambient light. At times it may be desirable to cancel this effect. This function removes any “Zero” data on Selected, Checked, or all devices shown in the Meter Tree-View.

10C. Erase When using the Profile feature (see below), data is stored within each meter’s internal memory. During normal operation, this data is automatically erased before the next profile is captured. If, for whatever reason, data is on the device when entering the Flash application, this function can be used to erase the data. This function is available for Selected, Checked, or all devices shown in the Meter Tree-View.

10D. Exit Selecting this option exits the Flash application.



11. Tips / Messages:

1. Low in Readout window. The Current or Light Level reading may read “Low”. This indicates that, for the existing “Range Selection” the reading is too low (all noise) to display. (This is often expected for pre-flash conditions)

- 2. Saturated** in Readout Window: Typically this indicates, that for the existing “Range Selection” the reading is too high to display
- 3. Peak Percent of range** notices: If the range warning occurs, the software will attempt to adjust the range selection to accommodate the light level of the peak. Re-take the measurement to allow the system to optimize. If the “below” warning persists, It may be necessary to decrease the distance between the source and the sensor. If the “above” warning persists, it may be necessary to increase the distance between the source and the sensor or to add attenuation filter(s) to the sensor.
- 4. Trigger not sensed** with in time out period. Increase the trigger time out in the flash set up tab as needed, then select capture flash again. (it may also be that the light level of the flash was not bright enough to start the trigger, In this case, lower the value in the light level trigger settings)
- 5. Rise of flash** (Left side) is missing in the data/cut off in the graph:Try increasing the prelay and /or lowering the light level variable.
- 6. Fall of flash** (right side) is missing in the data/cut off in the graph: Try increasing measurement time and /or lowering the light level variable.