Introducing EzTime software for DeltaFlex & DeltaPro TCSPC Systems

Quick Start Guide [V3]
Introduction

EzTime is intended for use with the HORIBA Scientific DeltaFlex™ and DeltaPro™ Fluorescence Lifetime Systems.

It is a complete application that handles the following:

- Instrument control
- Data collection
- Data analysis

EzTime has been optimised for use with touch screen computers and can autofit data requiring minimal operator interaction. It also enables the operator to define their specific data collection task using a simple built-in scripting language.

This guide is just intended to help give a brief overview of the software, measure and analyse a fluorescence decay. You are encouraged to familiarise yourself with the system user guide and guides relating to the component parts.
Installation

EzTime can be installed on Windows 7, 8 or 10 (English language version only at this time). The files may be supplied on DVD or USB Stick and during installation your equipment does not need to be connected.

Simply:

• Locate the folder containing your new software
• Click on the set up icon
• Follow instructions

If you have purchased a computer with your HORIBA system then the software will have been preinstalled.

**Note** that EzTime requires a specific version of the Microsoft .Net framework to operate. If your PC does not already have this framework installed then you will be prompted to install this during the installation process.

The timing electronics also need the correct firmware version. EzTime will update this if required. Follow instructions (see firmware update section) and this process should not be interrupted.
Launching EzTime

The first time EzTime is launched you will be prompted to enter a registration key. The key is obtained from HORIBA Scientific by providing the system ID. Note the key is specific to the computer. EzTime may be run in “Trial mode” for 30 days without the key, so you can proceed immediately but please be sure to note the system ID and request the key to avoid any later interruption to your work.

When launching, EzTime will attempt to connect to the (DeltaFlex instrument. If the instrument is not connected (via USB) or it is powered off, then EzTime will start in the Offline mode. In Offline mode the software may be used to analyse data files that have already been measured, and the Instrument page (shown overleaf) will not be available.
Unless you only wish to perform data analysis in Offline mode, please ensure the instrument is switched on and ready to communicate (is turned on). If the instrument is not detected, you will be reminded to do so.
Data storage concept

Data is stored in “containers”
- The primary “LiveData” container is the only container that can be used to collect new data. Any other visible containers are “locked” - no new data can be collected into them.
- Analysis is allowed in both “live” & “locked” containers.
- Each container can have many nodes; i.e. decays / IRFs / spectral data. Additional nodes can be added by tap / right click on “Measurement”
- New containers can be made from the file menu and existing containers can be opened and closed (or saved) using this menu.
Instrument page – measurement set up

The experimental parameters; time range, wavelengths, bandpass, sample focus, count rates etc are all optimised using this page.
Sample control: position, temperature, stirring

The options available on this dropdown control depend on the sample accessory installed. For example, when a 4-position sample turret is installed, then four cell positions will be available, whereas if the regular cuvette holder is installed then controls for only one cell position will be displayed. Similarly, the temperature reading is for information only unless the cell holder is an optional TEC model.
Instrument control – measurement set up

Time Range control
This dropdown control selects the time window to be measured. Changing the Time Range also selects the allocated excitation source and sets the optimal operating parameters for that source to suit the newly selected Time Range e.g. Laser diode repetition rate.

Advanced settings can be used to change sources for TCSPC and Phos plus Stop channel inputs etc.

Note: For changes to be registered the “Apply” button must be clicked.
As well as using the ratemeters, the oscilloscope mode enables optimisation of conditions. Running the oscilloscope mode (view continually refreshes) enables the prompt / decay shape to be seen and temporal position to be altered. Rates etc can also be displayed – this is intended to help set up (more complicated) systems. In MCS ranges this acts as a measurement preview (rather than oscilloscope refresh) to set the conditions for the measurement. Remember, the start to stop ratio (alpha) should be less than 2%. If using a MCP the detection rate should be below 20,000 cps.
Data collection

Once experimental conditions are set go to the Data page to collect and analyse your decays.

- Data Tree in data container
- Automated scripts / script editor
- Options
- File menu
- Data view
- Status bar
- Toolbar
- Data / Instrument page selection
- Time expander range lines (visibility depending on hardware and settings) - Ultima
Data collection

Toolbar functions

- start / stop MEASUREMENT
- ANALYSIS (auto range)
- Configure measurement presets
- Configure analysis ranges
- pointer
- set cursor
- zoom
- full chart range
- log – lin y axis
- normalise data
- copy
- print
- tabulate data on chart
- sum decay data on chart
- step back through data
- step forward through data
Data collection

Configuring peak or run time presets

Selecting to the right of the start/stop measurement button opens the Measurement Settings form. Here the presets for new lifetime and steady measurements may be entered.

If Autofit is checked then the decay data will automatically be fitted to 1, 2 & 3 exp models after the decay measurement stops. Suitable data fitting ranges will be automatically chosen. (Tip: if reconvolution with the IRF is required then the IRF needs to be measured before the decay, otherwise a “tail fit” will be performed.)

Note if both Presets are non-zero then the measurement will terminate when the first preset is reached. (Tip: 0=preset disabled)
Data collection

Select IRF or Decay in the tree to measure an IRF / decay and select \( \text{Play} \) to collect data.

IRF - blue
Highlighted decay – red
Other data - grey

Save buttons

If Autofit was selected, fit results will appear after completion of the decay measurement. These can be saved as required and will then appear under the decay in the Data Tree.
Data collection 4

Saving data and making new measurements

New measurement nodes can be created by:

(a) Adding individual nodes (IRF or decay) - right click or tap measurement to open radial menu...

(b) Adding measurement pairs i.e. a measurement node with IRF and decay sub-nodes

(c) Selecting New from File menu (left) will open a new measurement container with its own tree view. This will lock the previously created container.

Several save / open options are available in the File menu.
Data analysis (with measurement)  

Using Autofit (must be selected prior to measurement)  

With Autofit the decay data will automatically be analysed using 1, 2 and 3 exponential models. Fits that are saved by user appear under the appropriate decay node in the Data tree. Select the fit, which will display it on the Data view screen, then Tap or right click the fit in the data tree to bring up a radial menu to view the results or see them in tabulated form.
Data analysis (post measurement) 2

Using selected data from the Data Tree – auto limits

Select the decay data (and IRF) to be analysed. If multiple decays are present in the data chart they will all be analysed (global or batch) so select what you want to analyse in the Data view. Note the analysis button will be greyed out if spectral data is present.

You can let the program select the fit range or put in the limits yourself. With auto limits just select the analyse button and select the fit model.

View results as before (Data Analysis -1)
Data analysis (post measurement)  3

Using selected data from the Data Tree – manual fit limits

As before select the data that you wish to analyse so that it is present in the Data View. Select the configure icon to the right of the Analyse button and put in the ranges for decay and prompt (if different). The form below will appear “docked” but can be made to float as shown. Cursors will appear on the screen (red = decay, blue = IRF) which can be adjusted.

Data can then be analysed and viewed as before (see Data analysis -2 and -1) Highlighted data containers can then be saved using the file menu. On exiting the program you will be reminded to save any unsaved data.
An easy to use script language is included with EzTime allowing measurements to be made in a predetermined manner.

For routine measurements an automated script feature, which gives a “wizard-like” interface to produce the scripts is provided. This can be used for:

- Time-resolved emission spectra (TRES)
  - monochromator based systems
- Anisotropy
  - requires polarisers
- Turret scan
  - requires 4 position sample turret

The autoscript feature can be used to run the above measurement methods without knowledge of the simple scripting language. However it can also generate the script. This can provide a basis, and by editing, to tailor a method to your specific measurement requirement.
Scripting

An example of a TRES script using a sample turret is shown below with some annotation.
The DeltaHub™ firmware needs to be V2.6 or above for the program to function. If this is not present then the program will not run and you will be advised to update the DeltaHub™ firmware. This is included in the EzTime installation package.

The following dialogues will appear and it is vital that the update process can be performed without interruption to avoid firmware corruption.

If unsuitable firmware in on the DeltaHub a message appears

Follow instructions, wait for update, click on finish, turn DeltaHub off, then power on.
Thank you for choosing this HORBA Scientific product
Thank you

Danke

Merci

Grazie

Obrigado

Dziękuję

Cảm ơn

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Большое

спасибо

Thank you