

The replay option for the QuantaSmart software in Tri-Carb LSC's.

Author

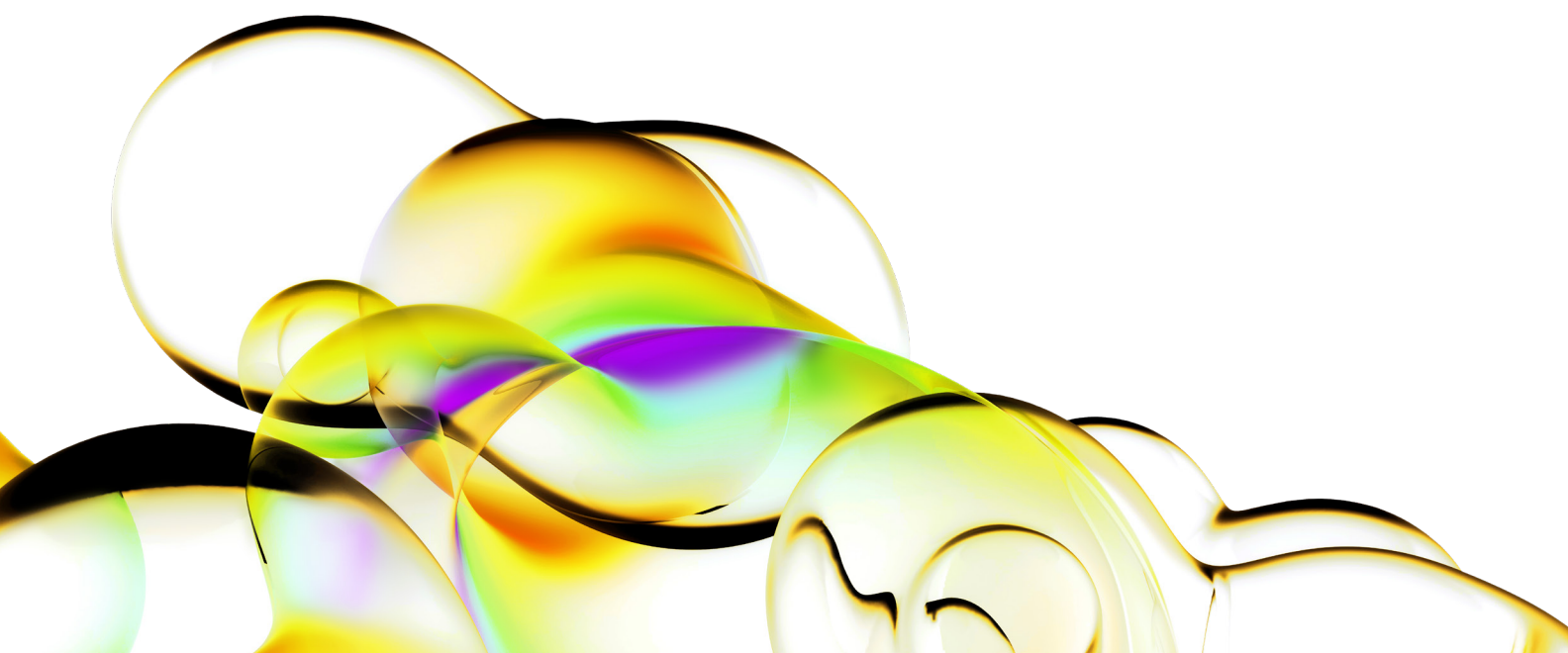
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Introduction

Usually results from a scintillation counter are saved as a file or printed out via a connected printer. In case the user made mistakes during protocol editing or the instrument had a hardware problem, sometimes it is necessary to repeat the measurement. Errors can result from the use of a wrong protocol or a wrong quench curve. The optimization of energy windows is also sometimes necessary to improve performance of the instrument. In these cases, the Replay option in the Software can be used to reprocess data without the necessity to count a sample again. This is especially helpful if mistakes have been done with samples which have been counted with very long counting times. This might be the case with low level samples or when large sample series have been counted. Therefore, the Replay Option comes standard with all counters of the series 3180TR/SL, 3110TR and 2910TR. But also, all other counters such as the instruments of the 2810TR series can be upgraded with this option.

On the following pages we will demonstrate the possibilities of the Replay option. For additional possibilities of the QuantaSmart software please also refer to LSC literature and other application notes.^{1, 2, 3, 4, 5, 6, 7, 8}



The Directory structure

In Figure 1 you can see the activated Replay tab. Using this file structure, you have access to all result files which have ever been created by the counter. These raw data files contain all data in the entire energy window (0 – 2000 KeV).

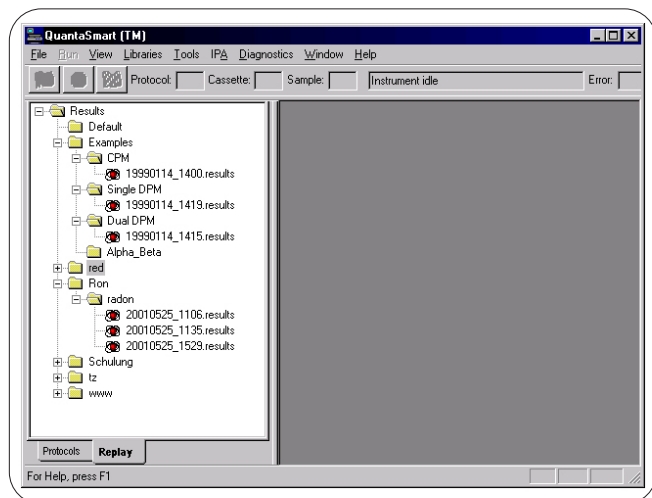


Figure 1: The Replay file structure

This allows calculations with Replay without measuring the sample again. Calculations with Replay are possible only based on raw data. A change of raw data in Replay is not possible. All parameters which would alter raw data are not allowed in Replay. Therefore, you cannot change the measurement time in Replay because this would change the statistical precision of the raw data.

When you double click on a result file the Replay Conditions tab will be opened. Besides this conditions tab there are three further tabs, namely the report definition tab, the report output tab and the special files tab

Replay conditions

This page contains all important parameters which can be changed after a measurement and is illustrated in figure 2. It is possible to change the assay type or the nuclide in case you accidentally chose the wrong nuclide which usually also means that you do not have the optimum energy window. If you click the "Nuclide" button (named "3H" in figure 2) you can open the sample library where you can change the nuclide. You can also change the quench indicating parameter. The available quench parameter can be accessed via a pull-down menu. In the "Quench Sets" area you can choose up to three new quench sets. By clicking the buttons in the "Quench Sets" area you get access to

the quench standards library where you can choose a new quench curve. In the "Regions" area you can choose up to three energy windows for the corresponding nuclides.

Also counting corrections are possible after the measurement. You can do a luminescence, background or half life correction after the measurement of a sample. When you have chosen the necessary changes, you can start the recalculation using the Replay button. Please be aware that a result file can contain a lot of samples which have to be recalculated now. Depending on the method you have chosen, the number of samples and the performance of the computer this can result in long calculation times. To avoid problems with the computer hard- and software Replay can only be started, if the counter is idle (not counting samples).

When the recalculation has finished the results will be displayed on the screen.

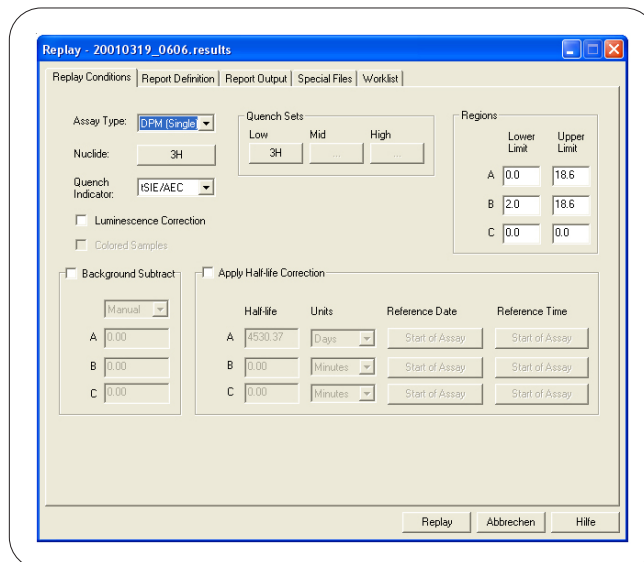


Figure 2: The Replay conditions tab

Report definition

On the Report Definition tab illustrated in figure 3 you can define what kind of information you want to have in your report. For each Replay calculation you can create several reports using the “Add...” button. You can save each report under a different name. You can individually set up each report with different contents. In the “Report Fields” section of this tab you can add items to the report by clicking into the “Use” column. If you click into the “Format” column of the “Report Fields” section you will automatically activate the “Format” button below the table. Clicking this button allows you to change the output format

of numbers. Here you can define the total number of digits and the numbers after the decimal point. In the same way you can activate the "Equation" button. In this column you can enter formulas for special calculations. Using the "Add" button you can create new rows which allow combination of formulas. By using these features, you are able to use more complex formulas which allow the calculation of the minimum detectable activity using DIN regulations. Besides the four basic calculation (+, -, /, *) modi you can also calculate the square root.

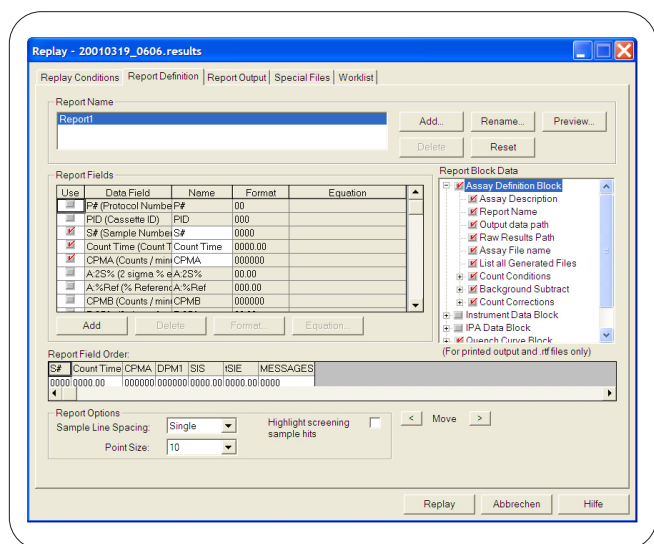


Figure 3: Report Definition tab

In the "Report Block Data" area you have access to bundled data which not only contain single data in a table but in most cases combinations of data and graphic such as quench curves. These data are always available in fixed format and design. Analogue to other data these block data can be added to the other data in the report. In the last section called "Report Field Order" you can see all the items included into the report in the order in which they will appear in the report printout.

With the help of the "Move" button you can change the order of items in the table. If some of the last these items are marked with a colour this indicates that the width of the table exceeds the DIN A4 format and that the report is not suitable anymore for a printout on DIN A4 paper. Delete one or more of the items to allow a printout on DIN A4 paper.

Report output

After you have defined a Report you can use the Report Output tab to define the output format and the destination of the output. All the reports you have defined on the previous Report Definition tab will appear in the Report Name list. For each report you can individually define several possible output devices. The printout or several printouts can be sent to the printer or some or all reports can be saved as a File. For each file you can choose the data format and a file name. You can also save the data as a rich text file. The possibility to export data via the RS-232 interface is a historical relic. In times of networks this interface is not used anymore. However, data can be exported using a network card if available to send data to any printer or to save data to any directories within the network.

In the "Run Application" area you can start an external application programme after you have finished the Replay calculation. This can be an Excel macro to make further calculations with a previously saved data file. It is possible to start this application after each sample, each cycle, or each batch. If you push the "Replay" button the calculation starts using all the parameters, you have defined.

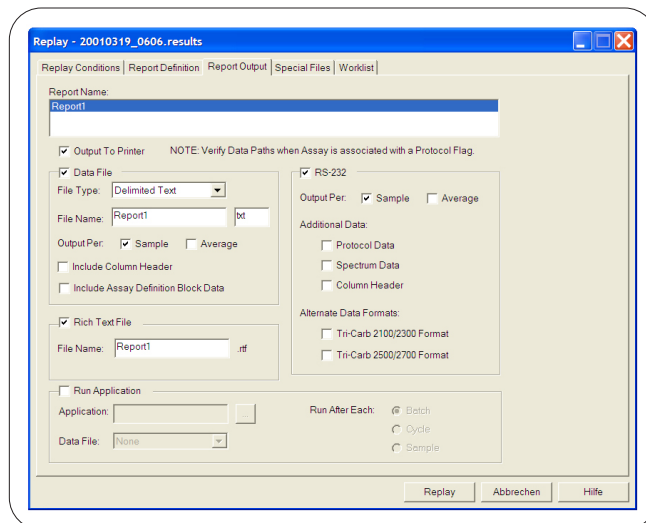


Figure 4: Report Output tab

Special files

The Special Files tab is the last tab in the Replay programme. Here you can define to save some special files. Figure 5 illustrates the 5 check boxes which can be used to activate the generation of special files. All data files generated on this page will be saved in the directory which has been established in the QuantaSmart Main Window in the File-Menu.

With "Spectra File (composite)" you can generate a file containing the spectra of all acquired samples. "Spectrum Files (individual)" allows saving of individual files for each sample. If you prefer individual files you have to make sure that you do not overwrite files in large sample series. Therefore, each sample name will be started with a flag number (two digits) followed by a sample number (three digits) and a number for repeat measurements (three digits). This way each sample will be given a unique sample name.

The IPA-File (Instrument Performance Assessment) is another file that you can generate here. In this file you can save the IPA data generated during the last IPA run. The IPA-option will be used to document the instrument performance in most cases. With the help of some standards parameters such as background, counting efficiency, sensitivity and counting statistics of the instrument will be documented. The Prot.dat-File contains data about the used protocol and can also be saved separately.

The ability to generate a 2000CA.Dat-file is available for historical reasons. The Tri-Carb™ 2000CA instrument series is an old DOS based instrument line. With the introduction of a newer still DOS based system the output format has been changed. To allow customers with old Tri-Carb instruments using old evaluation packages the connection of the QuantaSmart software to the old evaluation packages a special 2000CA.dat output file can be generated. For newer customers this output format is not interesting in most cases.

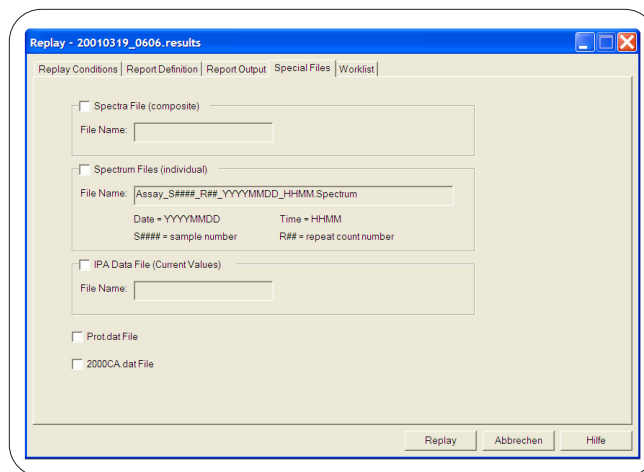


Figure 5: Special Files tab

In case you are interested in the Replay function and an upgrade of your instrument, please contact our service department. The Replay option has the part number 7001666.

Literature

1. R. H. W. Edler; An Introduction to the Scintillation Technology for the Measurement of Radionuclides, 1st Edition, Bremen 2020, ISBN 978-3-00-020422-7.
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5. Revvity 63110 Rodgau-Jügesheim, LSC Application Note, Basics of α/β -Discrimination for Liquid Scintillation Counting, January 2007.
6. Revvity 63110 Rodgau-Jügesheim, LSC Application Note, The Enhanced Security Option (21 CFR part 11) for QuantaSmart Software on Tri-Carb LSC's, January 2007.
7. Revvity 63110 Rodgau-Jügesheim, LSC Application Note, The IPA Option for the QuantaSmart Software in Tri-Carb LSC's, Documentation of the Instrument Performance, March 2007.
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