



Handy Helper

Application Note 17

On Chip Integration versus Image Additions in Series Capture What Method is Best?

Series Capture is a function of GeneSnap Software that gives the user flexible options for image acquisition.



Series Capture allows users to automatically capture several different images at pre-programmed exposure times.

A correctly exposed (non-saturated) image is then selected from the image tabs at the bottom of the image window as they appear. Image addition allows users to add image data from all previously captured images to the current image being exposed.

What is "On Chip" Exposure?

On chip exposure involves accumulating photons in the CCD sensor pixel wells over a defined period time. As photons strike the pixels, a corresponding electron charge is collected in each pixel. This amount of electron charge is directly proportional to the amount of "light" that has been accumulated from the sample. Once the pre defined exposure time has ended this accumulated electron charge is converted from an analogue to a digital (a/d conversion) signal and appears as a digital image on the monitor. After this has occurred the pixels are empty and a new accumulate is required. Therefore "on chip" exposure assumes that only one A/D conversion is associated with each image. As only one process occurs, the noise associated with A/D conversions is minimised. As such, this is the best method for capturing very faint signals that require very long integration times (exposure times).

What is Image Addition?

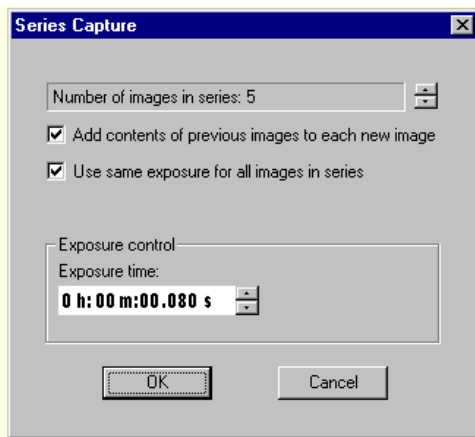
This automatically adds successive "on chip" exposure images together, so having many A/D conversions associated with each image. This allows the user to watch the image develop in "real time" over shorter exposure times. Due to the amount of A/D conversions that will be associated with each addition these images can be noisier and sometimes of lower quality than a non-additive single exposure. However, in cases when a quick flash chemiluminescent substrate is used such as ECL this method offers an excellent way of visualising an image quickly when you are unsure as to the development time required.

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A DIVISION OF THE SYNOPTICS GROUP

A Division of Synoptics Ltd
Beacon House, Nuffield Road,
Cambridge CB4 1TF UK
Telephone: +44 (0)1223 727123
Fax: +44 (0)1223 727101
Email: sales@syngene.com



The series capture function in GeneSnap also allows the user to choose to add the same time frame together eg: 10 images at 1s, this is only practical if you can see a good low noise image after 1s with minimal background. For better results each image should be given a different time in increasing increments. Once a user becomes familiar with the exposure times that suit their research, it is sensible to capture as few images as possible, this reduces the background signal and improves signal to noise ratio.