**CK\_Light software architecture**

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1. measurement mode
2. layers
3. data structure, very detailed one
4. synchronization
5. hardware: initialization, each hardware got its own interface for setting up
6. additional functionalities
7. how to send feedback to company server and listed in a database for response
8. scanning:

Complicated concepts need examples, maybe in Chinese.

1. Measurement mode:

File is there in the github.

1. layers:  
   4 layers: hardware interface, low level interface (good documents), high level interface(good documents), graphic interface level (extendable): idea, when the adaptor from hardware interface to low level interface is written. The layers above work directly, no need to change anything.
2. Data output and input are in different process,
   1. data output has two modes:
      1. hardware synchronization mode: different channels got there scanning wave beforehand. the hardware action need either a trigger to start or start by software. different hardware channels are synchronized by the hardware connections. Typical example is the NI cards.
      2. software synchronized mode: software sends the stream constantly. while hardware got their paces due to their own resources. therefore, a cache is need for them.
   2. data input or acquisition:
      1. DMA (direct memory access) option should be available. some hardware supports it.
3. data structure, check the one from picoquant and abberior,

hardware vector, parameter vector, data.   
**hardware vector** is responsible for hardware initialization (at the beginning and running initialization), status checking (oneline, initialized, last operation time, …), unique for each hardware and exclusive to each other. hardware initialization, some of them are slow, therefore, multi-threaded (to speed up) and error (wait) return, in software initialization.  
**parameter vector**, check my matlab code.   
**data**, compressed

save files  
two temporary files: one for parameter and one for data. Then save to one file, default file name, username+ timestamp.ext. Md5 check is needed for data integrity.

some setting lock while measurement.

special for the software

hardware: laser, shutter (eom aotf), power tuning, scanner, slm, focus lock, spectrometer, TCSPC, scanner, detector gating, fast gating,

Hareware tend to stop working or be occupied, therefore, there should be a mechanism to handle it. hardware response handling class is needed.

potential functionalities: calibration, camera (same as the others)

hardware is associated with the properties of parameters. parameters are element of the parameter list. each element shares standard properties, which is extendable (property numbers). find a way to extend property. (Check my Matlab parameter list, + hardware typical response time, last response time (time or -1 means failed). + axis can across multiple scanning axis. one function to check the integrity of the scanning. display should be able to handle it as well. scans can be also axis, but is a node, and cannot extended to a normal scan but only a loop like scanning. scanning level, low or high.

low level scanning axis, high level scanning axis: low level need additional hardware to sync better. high level scanning axis will be synced in different thread in software.

A hardware list and then be linked by the parameter list. incase multiple scanscheme need to access the same hardware and get messed up. Hardware status, can be set by different scanscheme and set to different state?

synchronization ?????

exception handling? I have no experiences.