

Calibration Store

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This page is about file system based repository for calibration files used in LCLS software.

Introduction

LCLS experiments use different type of detectors which produce raw data. Detectors are not perfect and in most cases these raw data can not directly be used in analysis. They need to be calibrated. Generic type of corrections for pixel geometry and intensity, such as dark rate (pedestals), common mode, mask, etc. need to be done in almost all experiments. These corrections use files with calibration parameters residing in calibration store.

Calibration store use regular file system to accumulate calibration files with a few simple rules about organization of the calibration store.

All calibration parameters are saved in text files. Full path to calibration file accounts for software version, detector location and name, calibration parameter type, parameters' validity run range.

Advantage of this approach: clean, simple structure of the calibration store structure and files' content with sufficient flexibility for analysis of data. Although, it is not recommended, regular OS tools can be used to browse, modify, re-locate files.

This note explains organization and content of the calibration store, tools for maintenance, application of corrections in psana, access in code to calibration parameters, and relevant references to other confluence documents.

Location

Directory containing calibration files is located at the same level as directories with data `xtc` or `hdf5` files:

```
<PATH>/<INSTRUMENT>/<experiment>/xtc
<PATH>/<INSTRUMENT>/<experiment>/hdf5
<PATH>/<INSTRUMENT>/<experiment>/calib
```

where `<PATH>` depends on computer farm:

Computer farm	PATH	Comments
pcds before s3df	/reg/d/psdm	deprecated
pcds with s3df	/cds/data/psdm	
s3df	/sdf/data/lcls/ds	

Full path to the calibration file consists of a few sub-directories under the `calib` directory, representing functional logical layers:

```
<PATH>/<INSTRUMENT>/<experiment>/calib/<calib-version>/<data-source>/<type>/<file>
```

where

- `<calib-version>` - is a directory reserved for different versions of calibration software. For each detector type it is defined through the dictionary.
- `<data-source>` - actual source of data. Each detector has an unique name in DAQ, which also includes its position. For example: `CxiDs1.0:Cspad.0`, `CxiDg1.0:Tm6740.0`, `CxiEndstation.0:Opal2000.1`, etc.
- `<type>`- type of calibration files:
 - `pedestals`,
 - `pixel_rms`,
 - `pixel_status`,
 - `pixel_mask`,

- pixel_gain,
- pixel_bkgd,
- common_mode,
- filter,
- geometry, etc.
- (center, tilt, marg_gap_shift, etc. are deprecated types).
- <file> - calibration file name consisting of the validity run range and extension .data. For example: 3-15.data, 1-end.data, 7-end.data, etc.

Example:

```
<PATH>/CXI/cxi12315/calib/CsPad::CalibV1/CxiDs1.0:Cspad.0/pedestals/1-end.data
<PATH>/CXI/cxi12315/calib/CsPad2x2::CalibV1/CxiSc2.0:Cspad2x2.0/geometry/5-end.data
<PATH>/AMO/amo12313/calib/PNCCD::CalibV1/Camp.0:pnCCD.1/pixel_status/8-22.data
```

Tools

General detector tools

- makepeds - tool supported by Silke and her team
- calibrun - dark processing script for regular detectors
- calibfile - constants deployment script
- det_ndarr_raw_proc - dark processing engine used in calibrun
- det_pixel_status - NEW - evaluates pixel status on light data files
- geometry_deploy_constants
- deploy_constants - used in calibfile

Tools for epix10ka and jungfrau detectors

- epix10ka_pedestals_calibration
- epix10ka_deploy_constants
- jungfrau_dark_proc
- jungfrau_deploy_constants
- jungfrau_gain_constants

Information scripts

- datinfo - retrieves major info about data in xtc file
- event_keys
- epix10ka_id
- jungfrau_id
- find_detector_names
- find_detector_runs
- find_runs_for_data_type
- dcs - DEPRECATED - script for population and deployment of hdf5 calibration files
- calibman - DEPRECATED - [Calibration Management Tool](#) - is a central tool for maintenance of calibration store. It allows to create, deploy, modify, and re-locate calibration files.

Geometry

- optical_metrology_check
- optical_metrology_* - optical metrology processing for specific detectors, cspad_v1_cxi, cspad_v1_xpp, cspad2x2, epix10ka2m

Direct access to calibration parameters in code

- [class PSCalib.GeometryAccess](#) - Python interface to geometry parameters.

References

- [Detector Geometry](#)
- [CSPAD Alignment](#)
- [CSPAD2x2 Alignment](#)
- [Calibration Management Tool](#) - DEPRECATED
- [Detector Calibration Store](#) - DEPRECATED

