Pds FCCD

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Fast CCD

The fast CCD camera produces a 480x480 pixel image, arranged as 500x576 with empty rows and columns (info pixels)

- To get the trimmed 480x480 image:

```
Height:
500 rows   = 6 + 240 + 7 + 240 + 7
       Dark A: 6   Rows 0-5
     Data Top: 240 Rows 6-245
       Dark B: 7   Rows 246-252
  Data Bottom: 240 Rows 253-492
       Dark C: 7   Rows 493-249

Width (in 16-bit pixels):
576 pixels = 12 * 48 outputs
           Top: (10 image pixels followed by 2 info pixels) * 48 outputs
        Bottom: (2 info pixels followed by 10 image pixels) * 48 outputs
```

- Also be aware that the 16-bit pixels are read out via two cables, 8-bits each. To get the right format, read out as 16-bit integers instead of 8-bits. Straight-forward for myana, but with pyana you need to be aware of this and convert the output:

myana/C++

```
int status;
status = getFrameValue(fccdDet, fccdWidth, fccdHeight, fccdImage);
```

pyana/python

```
data = evt.getFrameValue("SxrBeamline-0|Fccd-0").data()
data.dtype = np.uint16
```

Class FccdConfigV1

Public Types

```
         Version = 1
         Sixteen_bit = 16
         Output_FIFO = 0
         Output_Pattern4 = 4
         Row_Pixels = 500
         Column_Pixels = 576
         Trimmed_Row_Pixels = 480
         Trimmed_Column_Pixels = 480
enum          { Version = 1 }
enum          Depth { Sixteen_bit = 16 }
enum          Output_Source { Output_FIFO = 0, Output_Pattern4 = 4 }
enum          { Row_Pixels = 500 }
enum          { Column_Pixels = 576 }
enum          { Trimmed_Row_Pixels = 480 }
enum          { Trimmed_Column_Pixels = 480 }
```

Public Member Functions

```
        // Constructors
         FccdConfigV1 ()
         FccdConfigV1 (uint16_t u16OutputMode)

 uint32_t         width () const         // returns Column_Pixels
 uint32_t         height () const        // returns Row_Pixels
 uint32_t         trimmedWidth () const  // returns Trimmed_Column_Pixels
 uint32_t         trimmedHeight () const // returns Trimmed_Row_Pixels
 uint16_t         outputMode () const    // returns output mode
 unsigned         size () const          // returns size of image (bytes)
```

Class FccdConfigV2

Public Types

```
         Version = 2
         Eight_bit = 8
         Sixteen_bit = 16
         Output_FIFO = 0
         Test_Pattern1 = 1
         Test_Pattern2 = 2
         Test_Pattern3 = 3
         Test_Pattern4 = 4
         Row_Pixels = 500
         Column_Pixels = 576 * 2
         Trimmed_Row_Pixels = 480
         Trimmed_Column_Pixels = 480
enum          { Version = 2 }
enum          Depth { Eight_bit = 8, Sixteen_bit = 16 }
enum          Output_Source {
  Output_FIFO = 0, Test_Pattern1 = 1, Test_Pattern2 = 2, Test_Pattern3 = 3,
  Test_Pattern4 = 4
}
enum          { Row_Pixels = 500 }
enum          { Column_Pixels = 576 * 2 }
enum          { Trimmed_Row_Pixels = 480 }
enum          { Trimmed_Column_Pixels = 480 }
```

Public Member Functions

```
        // Constructors
         FccdConfigV2 ()
         FccdConfigV2 (uint16_t outputMode, bool ccdEnable, bool focusMode, uint32_t exposureTime,
                       float dacVoltage1, float dacVoltage2, float dacVoltage3, float dacVoltage4,
                       float dacVoltage5, float dacVoltage6, float dacVoltage7, float dacVoltage8,
                       float dacVoltage9, float dacVoltage10, float dacVoltage11, float dacVoltage12,
                       float dacVoltage13, float dacVoltage14, float dacVoltage15, float dacVoltage16,
                       float dacVoltage17,
                       uint16_t waveform0, uint16_t waveform1, uint16_t waveform2, uint16_t waveform3,
                       uint16_t waveform4, uint16_t waveform5, uint16_t waveform6, uint16_t waveform7,
                       uint16_t waveform8, uint16_t waveform9, uint16_t waveform10,
                       uint16_t waveform11, uint16_t waveform12, uint16_t waveform13,
                       uint16_t waveform14)
uint32_t         width () const
uint32_t         height () const
uint32_t         trimmedWidth () const
uint32_t         trimmedHeight () const
unsigned         size () const
uint16_t         outputMode () const
bool         ccdEnable () const
bool         focusMode () const
uint32_t         exposureTime () const
float         dacVoltage1 () const
float         dacVoltage2 () const
float         dacVoltage3 () const
float         dacVoltage4 () const
float         dacVoltage5 () const
float         dacVoltage6 () const
float         dacVoltage7 () const
float         dacVoltage8 () const
float         dacVoltage9 () const
float         dacVoltage10 () const
float         dacVoltage11 () const
float         dacVoltage12 () const
float         dacVoltage13 () const
float         dacVoltage14 () const
float         dacVoltage15 () const
float         dacVoltage16 () const
float         dacVoltage17 () const
uint16_t         waveform0 () const
uint16_t         waveform1 () const
uint16_t         waveform2 () const
uint16_t         waveform3 () const
uint16_t         waveform4 () const
uint16_t         waveform5 () const
uint16_t         waveform6 () const
uint16_t         waveform7 () const
uint16_t         waveform8 () const
uint16_t         waveform9 () const
uint16_t         waveform10 () const
uint16_t         waveform11 () const
uint16_t         waveform12 () const
uint16_t         waveform13 () const
uint16_t         waveform14 () const
```