

2011-05-25 CSPad alignment parameters

- [Run for alignment](#)
- [Optical measurement](#)
- [Sensor center X and Y coordinates \(in pixel\) from optical measurement \(after run 3\)](#)
- [Additional manual offset \(in pixel\)](#)
- [Sensor nominal rotation angle \(dergee\)](#)
- [Sensor tilt angle \(dergee\) from optical measurement](#)
- [Quad nominal rotation angle \(dergee\)](#)
- [Quad corner X and Y coordinates \(in pixel\)](#)

Run for alignment

- [cxi80410-r0628](#)

Optical measurement

Original table from optical measurement:

[2011-03-11-CSPAD2-Alignment-PostRun3.xlsx](#)

[2011-03-11-CSPAD2-Alignment-PostRun3.txt](#)

We calculate

S1 - 1st short side of 2x1

S2 - 2nd short side of 2x1

L1 - 1st long side of 2x1

L2 - 2nd long side of 2x1

dS and dL are the deviations of the 1st and 2nd corner along the short and long sides, respectively. The sign of all dS are chosen in order to provide correct sign for the tilt angle (the same direction for all 2x1 sensors).

Everything, excluding <dS/L> and angle(deg), are in micrometers.

pair:	S1	S2	dS1	dS2	L1	L2	dL1	dL2	<dS/L>	angle(deg)
Quad 0										
pair: 0	20898	20907	-212	-203	43541	43540	105	104	-0.00477	-0.27305
pair: 1	20912	20911	27	26	43545	43529	0	-16	0.00030	0.01711
pair: 2	20914	20912	-265	-263	43546	43546	-125	-125	-0.00606	-0.34736
pair: 3	20904	20898	-65	-59	43544	43540	-26	-30	-0.00142	-0.08158
pair: 4	20902	20909	-121	-114	43536	43545	52	61	-0.00270	-0.15462
pair: 5	20904	20926	-105	-83	43540	43548	41	49	-0.00216	-0.12369
pair: 6	20912	20910	69	71	43538	43539	32	33	0.00161	0.09212
pair: 7	20908	20908	299	299	43543	43547	139	143	0.00687	0.39342
Quad 1										
pair: 0	20898	20896	109	107	43531	43529	-58	-60	0.00248	0.14215
pair: 1	20901	20883	12	-6	43549	43540	12	3	0.00007	0.00395
pair: 2	20904	20895	98	107	43543	43542	49	48	0.00235	0.13488
pair: 3	20916	20908	88	96	43546	43538	48	40	0.00211	0.12106
pair: 4	21379	21371	90	82	43919	43907	-30	-42	0.00196	0.11221
pair: 5	21372	21377	82	87	43911	43918	-46	-39	0.00192	0.11025
pair: 6	20900	20911	-3	-14	43541	43542	0	1	-0.00016	-0.00921
pair: 7	20906	20906	48	48	43540	43542	18	20	0.00110	0.06316
Quad 2										
pair: 0	21374	21376	-254	-252	43915	43916	121	122	-0.00576	-0.33008
pair: 1	21375	21336	21	-18	43906	43920	9	23	0.00003	0.00196
pair: 2	21386	21020	-310	56	43915	43374	-145	-686	-0.00288	-0.16524
pair: 3	21378	21376	-434	-432	43908	43908	-202	-202	-0.00986	-0.56502
pair: 4	20911	20906	-334	-339	43543	43536	170	163	-0.00773	-0.44282
pair: 5	20907	20906	-301	-302	43534	43543	140	149	-0.00692	-0.39677
pair: 6	21374	21359	-145	-130	42994	42871	60	-63	-0.00320	-0.18349
pair: 7	21370	21368	-170	-168	43222	43064	80	-78	-0.00392	-0.22444
Quad 3										
pair: 0	20910	20897	-260	-273	43539	43531	130	122	-0.00612	-0.35074
pair: 1	20902	20858	23	-21	43554	43539	21	6	0.00002	0.00131
pair: 2	20906	20907	-11	-12	43541	43538	-6	-9	-0.00026	-0.01513
pair: 3	20904	20909	32	27	43544	43538	19	13	0.00068	0.03882
pair: 4	0	0	0	0	0	0	0	0	0.00000	0.00000
pair: 5	20897	20909	257	269	43539	43540	-127	-126	0.00604	0.34609
pair: 6	0	0	0	0	0	0	0	0	0.00000	0.00000
pair: 7	20909	20917	71	63	43541	43544	35	38	0.00154	0.08816

Sensor center X and Y coordinates (in pixel) from optical measurement (after run 3)

```

self.pairXInQaud = [[ 198.59, 198.04, 310.42, 98.22, 629.25, 630.01, 712.11, 499.91],
                    [ 198.40, 198.13, 310.55, 97.68, 626.40, 626.59, 710.49, 498.15],
                    [ 200.58, 199.79, 314.91, 103.43, 631.36, 633.34, 714.25, 501.44],
                    [ 198.89, 198.18, 310.75, 98.13, 630.00, 629.41, 710.00, 499.99]] # 4,6
(630,710) were not measured

self.pairYInQaud = [[ 308.00, 95.24, 626.85, 627.63, 517.84, 730.54, 200.79, 200.22],
                    [ 308.35, 95.09, 626.15, 626.58, 513.07, 725.86, 200.67, 200.57],
                    [ 309.62, 97.24, 622.35, 625.76, 513.46, 725.96, 199.78, 199.76],
                    [ 307.80, 95.08, 628.38, 628.43, 515.00, 730.70, 200.00, 202.96]] # 4,6
(515,200) were not measured

self.pairZInQaud = [[ 0.37, 0.15, 0.52, 0.62, 0.39, 0.55, 0.24, 0.18],
                    [ 2.16, 1.08, 4.14, 3.51, 4.61, 5.68, 3.35, 2.63],
                    [ 0.28, 0.20, 0.50, 0.65, 0.39, 0.56, 0.30, 0.27],
                    [ 0.37, 0.30, 0.47, 0.25, 0.00, 1.06, 0.00, 0.85]]

```

Additional manual offset (in pixel)

```
self.dXInQaud = [
    # 0 1 2 3 4 5 6 7
    [ 0, 0, 0, 0, 0, 0, 0, 0],
    [ 0, 0, 0, 0, -1, 0, 0, 0],
    [ 0, 0, -1, -1, 0, 0, 0, 0],
    [ 0, 0, 0, 0, 0, 0, 0, 0]] # 4,6 (630,710) were not measured

self.dYInQaud = [
    [ 0, 0, 0, 0, 0, 0, -0.5, 0],
    [ 0, 0, 0, 0.5, -1, 0, 0, 1],
    [ 1, 0, 1, -2, 0, 0, -5, -4],
    [ 0, 0, 0, 0, 0, -1, 0, -2]] # 4,6 (515,200) were not measured
```

Sensor nominal rotation angle (dergee)

```
self.pairInQaudOrient = [ [ 270, 270, 180, 180, 90, 90, 180, 180],
                           [ 270, 270, 180, 180, 90, 90, 180, 180],
                           [ 270, 270, 180, 180, 90, 90, 180, 180],
                           [ 270, 270, 180, 180, 90, 90, 180, 180] ]
```

Sensor tilt angle (dergee) from optical measurement

```
self.dPhi = [ [-0.27305, 0.01711, -0.34736, -0.08158, -0.15462, -0.12369, 0.09212, 0.39342],
               [ 0.14215, 0.00395, 0.13488, 0.12106, 0.11221, 0.11025, -0.00921, 0.06316],
               [-0.33008, 0.00196, -0.16524, -0.56502, -0.44282, -0.39677, -0.18349, -0.22444],
               [-0.35074, 0.00131, -0.01513, 0.03882, 0.00000, 0.34609, 0.00000, 0.08816] ]
```

Quad nominal rotation angle (dergee)

self.quadInDetOrient = 180, 90, 0, 270

Quad corner X and Y coordinates (in pixel)

```
off = 30
gapX = 0
gapY = 0
shiftX = 18
shiftY = 18
```

```
quadXOffset = [ off+0-gapX+shiftX, off+ 0+1-gapX-shiftX, off+834+0+gapX-shiftX, off+834+0+gapX+shiftX]
quadYOffset = [ off+0-gapY-shiftY, off+834-3+gapY-shiftY, off+834-0+gapY+shiftY, off+ 0+2-gapY+shiftY]
```