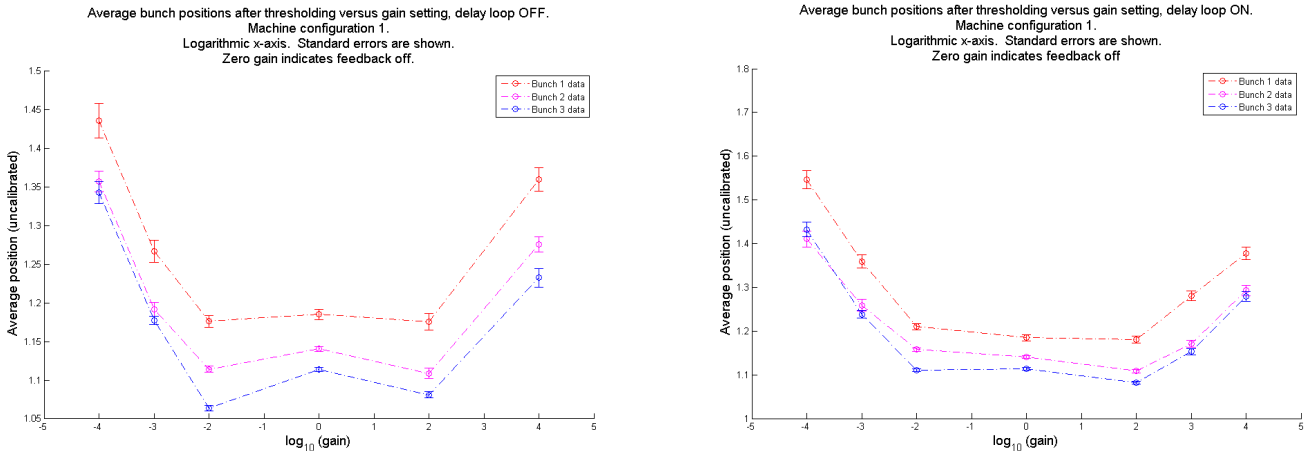


First pass analysis of March 2008 FONT4 feedback data

The following results are for the first machine configuration of 2 configurations used. The beam was quite large and the kicker strips quite far apart in configuration 1 to prevent radiation tripping. This was improved in configuration 2, though fewer data points were collected.



Both plots above show normalised position (digitised difference over digitised sum, no baseline subtraction or calibration), and the apparent disturbance of bunch 1 by the feedback is clear. The sense of the kick appears to be in the same direction for both positive and negative gains, and the possibility that this is due to an unintentional feature in the way the lookup table software handles negative numbers is being investigated. For reference, the magnitude of the sum and difference signals suggest the ADC should saturate at a gain of around 6400, or 3.8 on the log scale.

Each data point is determined from a sample of 1000 triggers (333 trains since 2/3 of triggers are empty). Thresholds are applied to the digitised sum and difference signals bunch by bunch to reject badly sampled trains. Fliers are removed from the resulting data set at the 2-sigma level. The various steps in the data cleaning process, along with some diagnostic plots and distributions, are presented for each data point in the following pages.

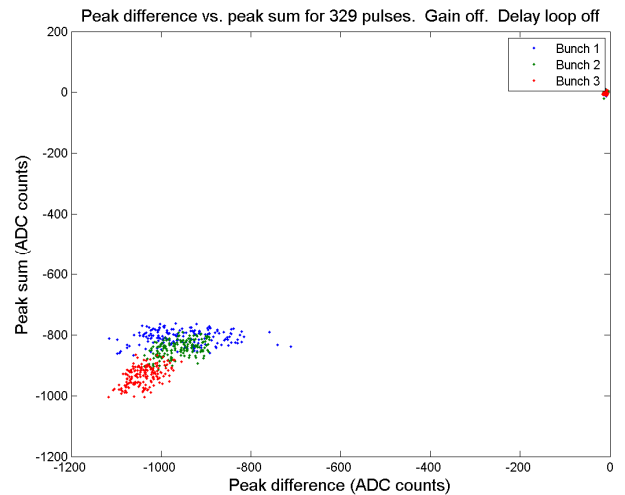
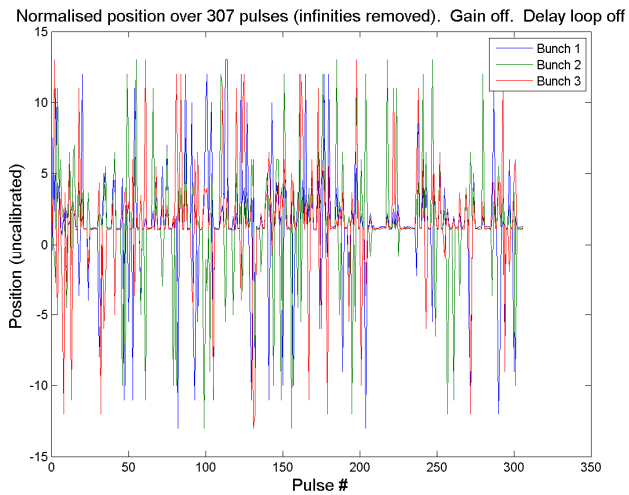
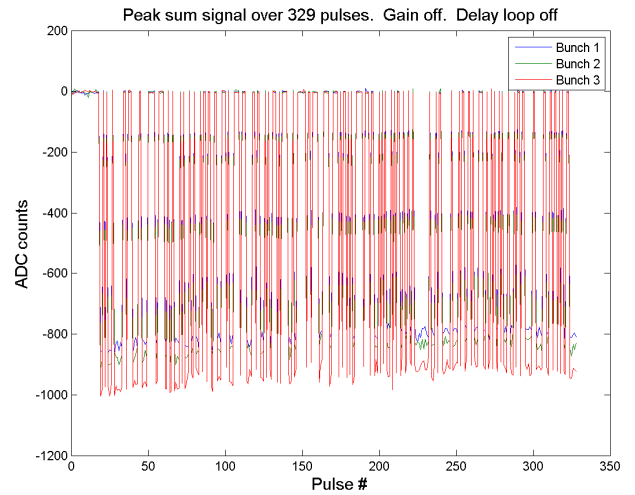
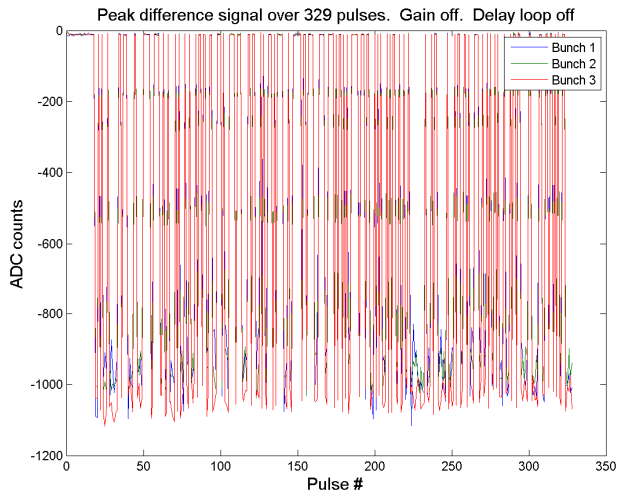
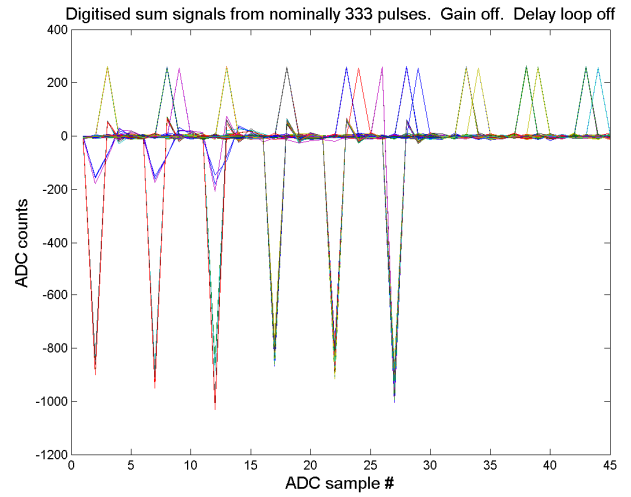
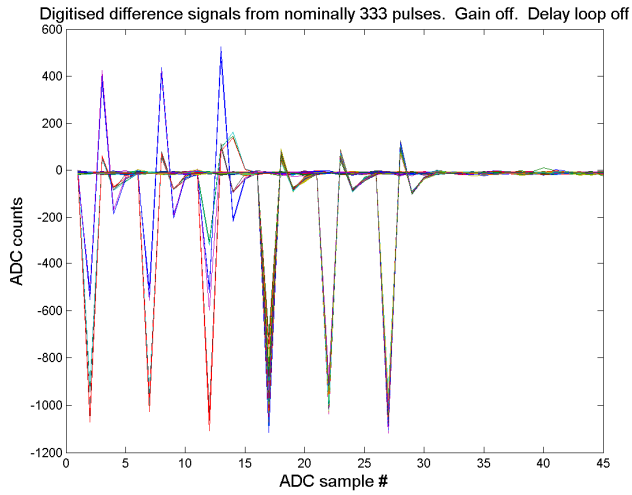
As the gain is increased, the number of trains surviving the thresholds falls significantly by as much as a factor of 5.

During some data runs, e.g. feedback off or gain 100 delay on, the position of the bunches in the data window is seen to jump once by 15 samples before remaining in this new location (15 samples is the number taken per trigger).

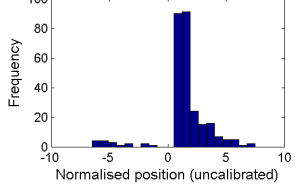
'Banding' is visible reminiscent of the single bunch sampling errors from December 2007. On some sets more than others, even those trains that are well sampled (that is, in which all bunches are visible) sometimes appear to be being sampled at two or more distinct t_s 's with respect to the bunch peaks.

Spurious pulses on the sum channel are also commonly visible.

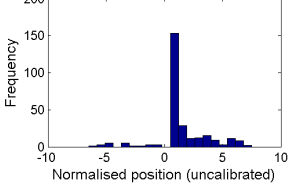
March 2008 – Position 1 – Feedback OFF



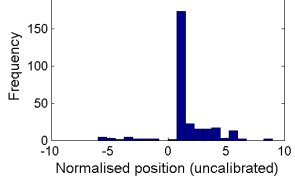
Bunch 1 normalised position over 273 pulses (34 fliers removed at 2 sigma). Gain off. Delay loop off



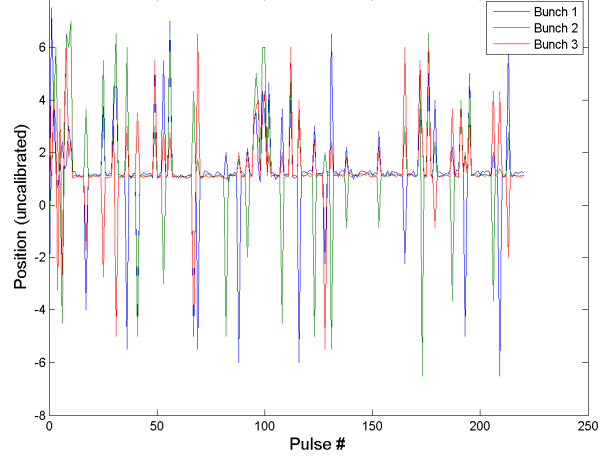
Bunch 2 normalised position over 275 pulses (32 fliers removed at 2 sigma). Gain off. Delay loop off



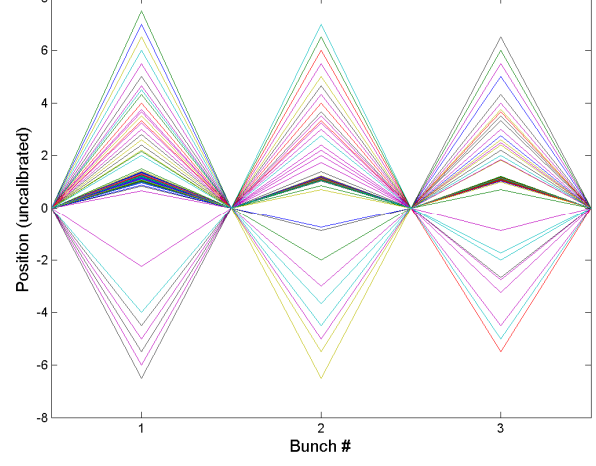
Bunch 3 normalised position over 282 pulses (25 fliers removed at 2 sigma). Gain off. Delay loop off



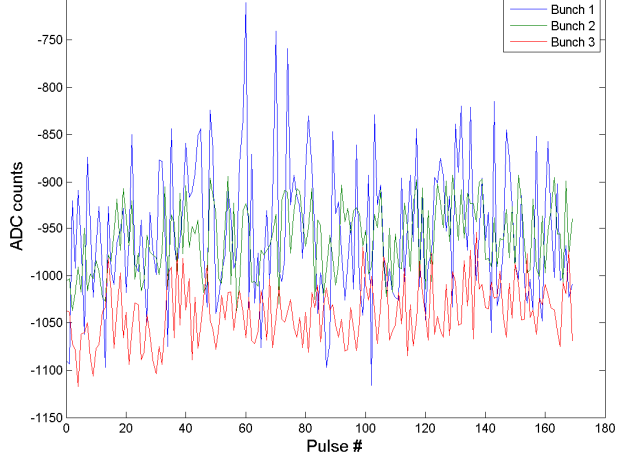
Normalised position over 221 pulses (flier trains removed at 2 sigma). Gain off. Delay loop off



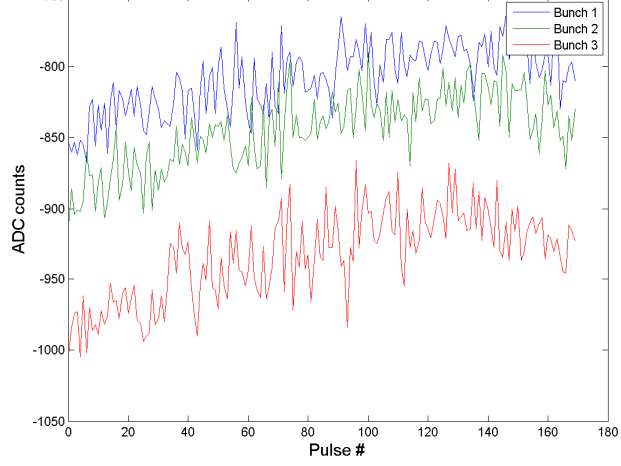
Normalised position for 221 pulses (flier trains removed at 2 sigma). Gain off. Delay loop off



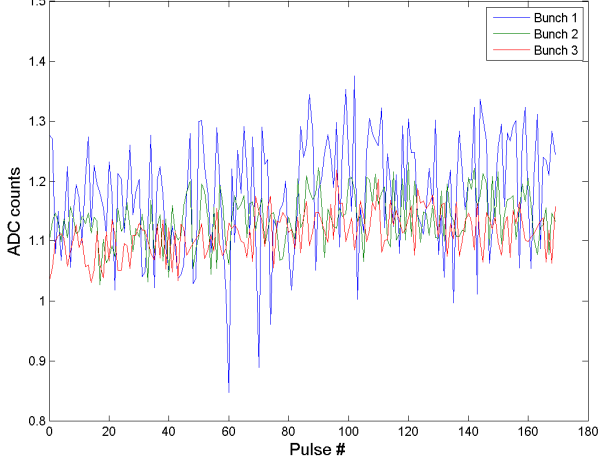
Peak difference signal over 170 pulses after thresholding. Gain off. Delay loop off



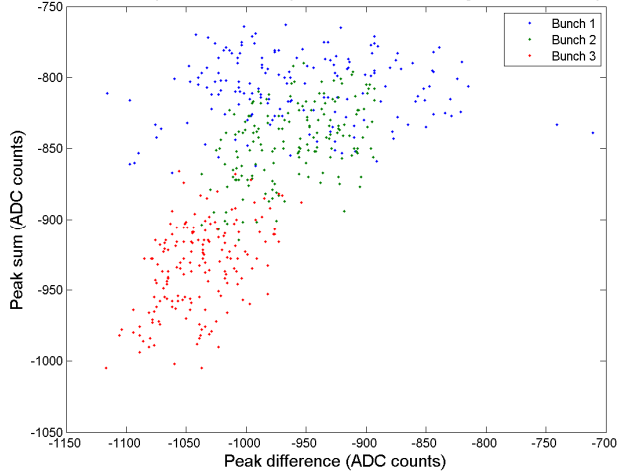
Peak sum signal over 170 pulses after thresholding. Gain off. Delay loop off



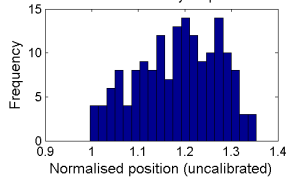
Normalised position over 170 pulses after thresholding (infinities removed). Gain off. Delay loop off



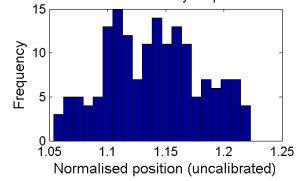
Peak difference vs. peak sum for 170 pulses after thresholding. Gain off. Delay loop off



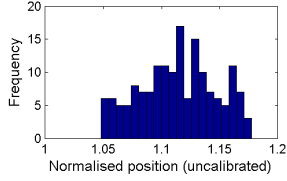
Bunch 1 normalised position over 166 pulses after thresholding (4 fliers removed at 2 sigma). Gain off. Delay loop off



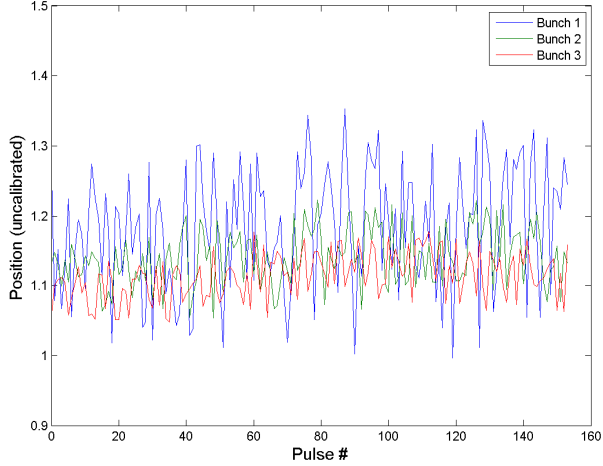
Bunch 2 normalised position over 165 pulses after thresholding (5 fliers removed at 2 sigma). Gain off. Delay loop off



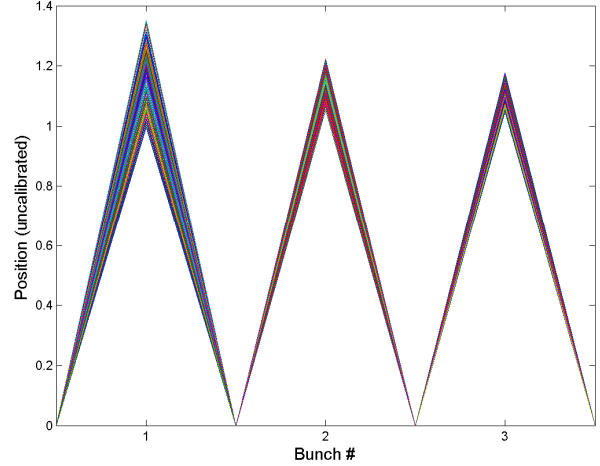
Bunch 3 normalised position over 163 pulses after thresholding (7 fliers removed at 2 sigma). Gain off. Delay loop off



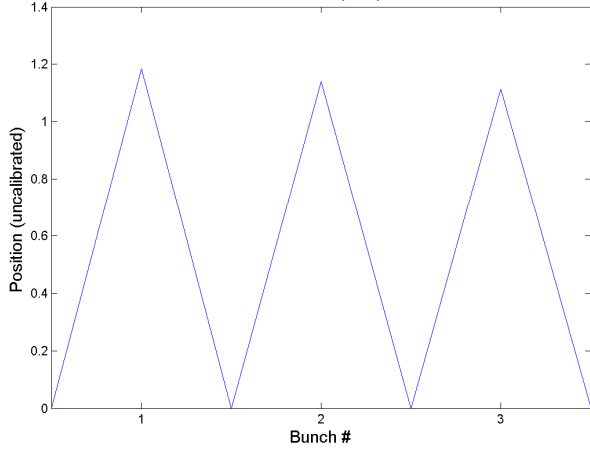
Normalised position over 154 pulses after thresholding (flier trains removed at 2 sigma). Gain off. Delay loop off



Normalised position for 154 pulses after thresholding (flier trains removed at 2 sigma). Gain off. Delay loop off



Normalised position averaged over 154 pulses after thresholding (flier trains removed at 2 sigma). Gain off. Delay loop off



Summary for Feedback OFF

Threshold information

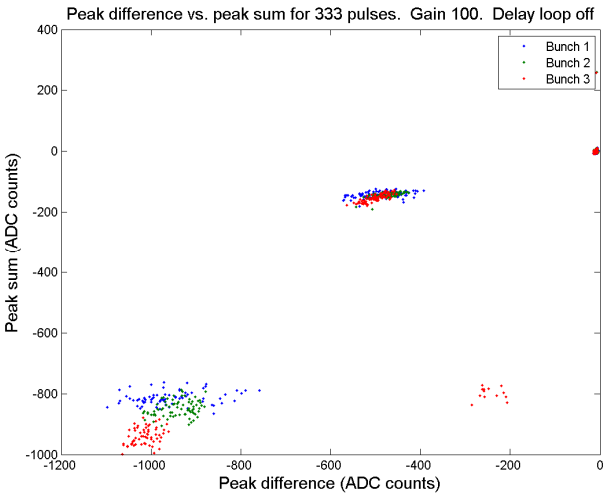
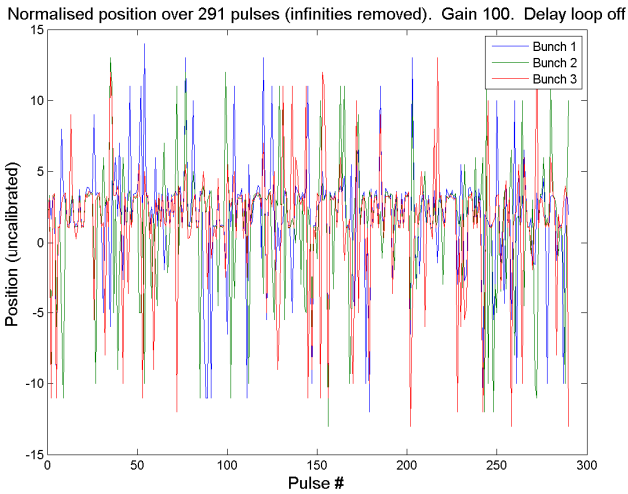
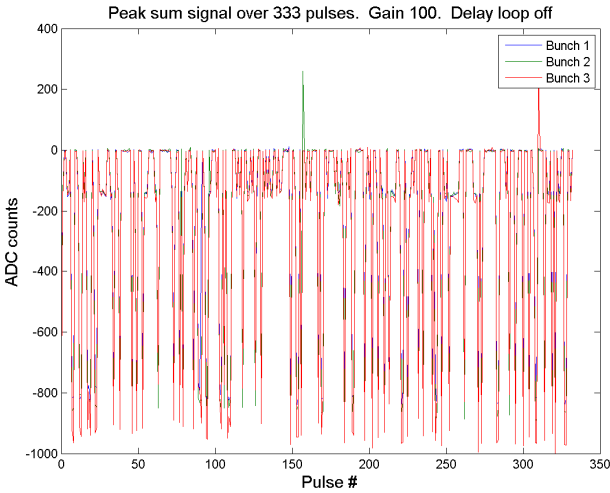
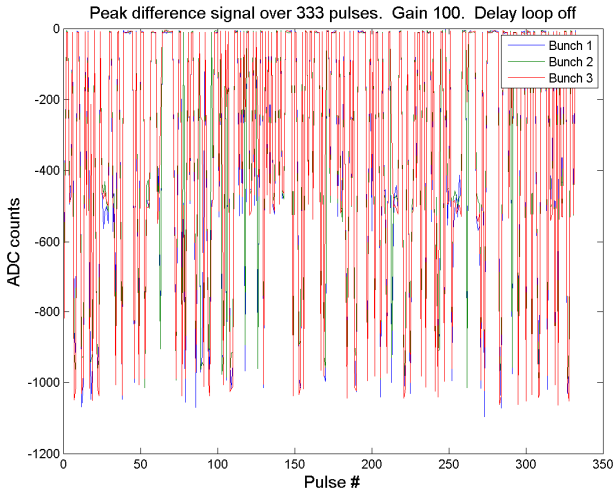
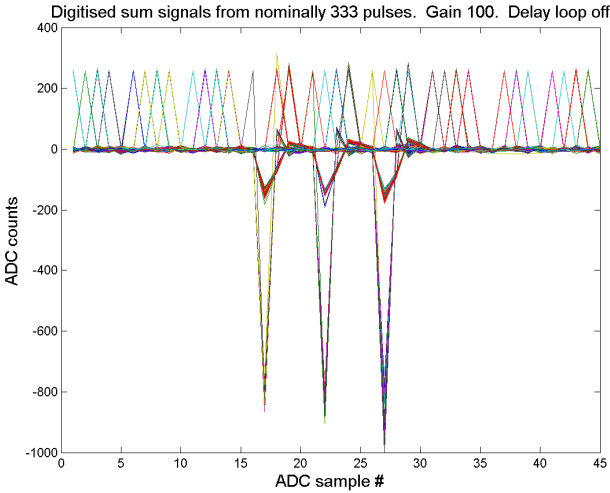
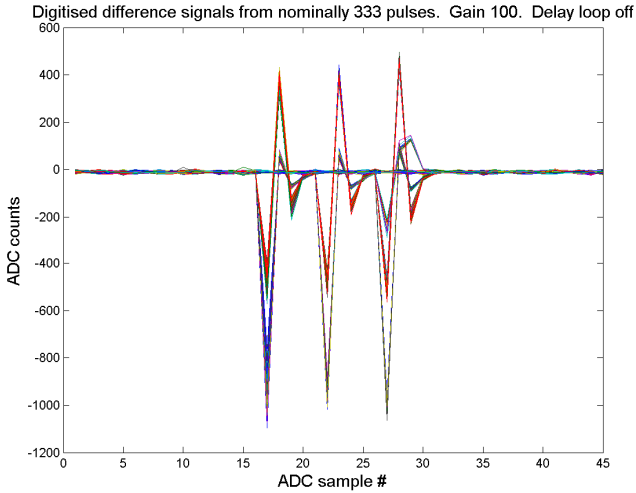
	Bunch 1	Bunch 2	Bunch 3
Difference	< -600	< -600	< -600
Sum	< -400	< -400	< -400

Final average information

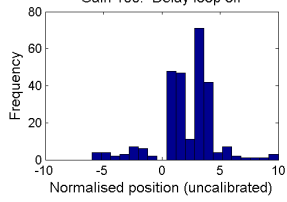
N = 154

	Bunch 1	Bunch 2	Bunch 3
Mean	1.1851	1.1404	1.1136
Sigma	0.0873	0.0415	0.0329

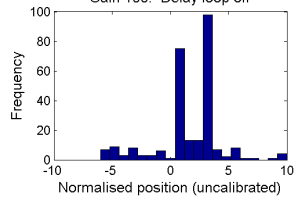
March 2008 – Position 1 – Gain 100 – Delay loop off



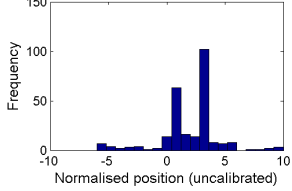
Bunch 1 normalised position over 266 pulses (25 fliers removed at 2 sigma). Gain 100. Delay loop off



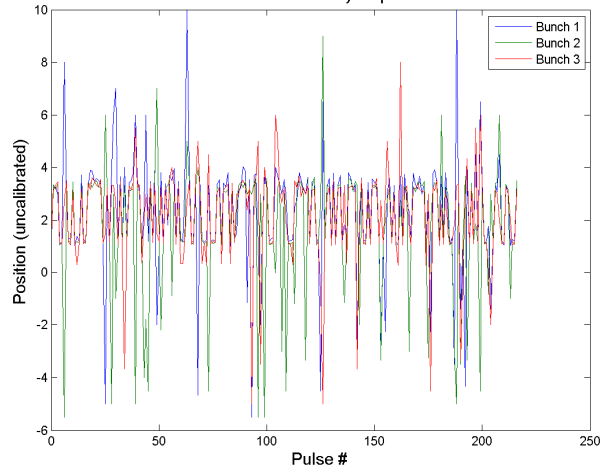
Bunch 2 normalised position over 263 pulses (28 fliers removed at 2 sigma). Gain 100. Delay loop off



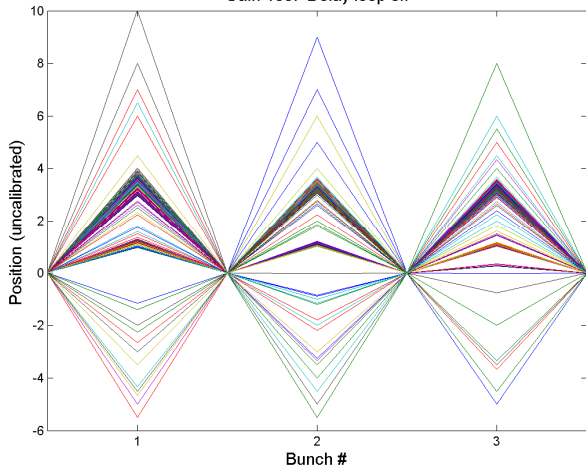
Bunch 3 normalised position over 262 pulses (29 fliers removed at 2 sigma). Gain 100. Delay loop off



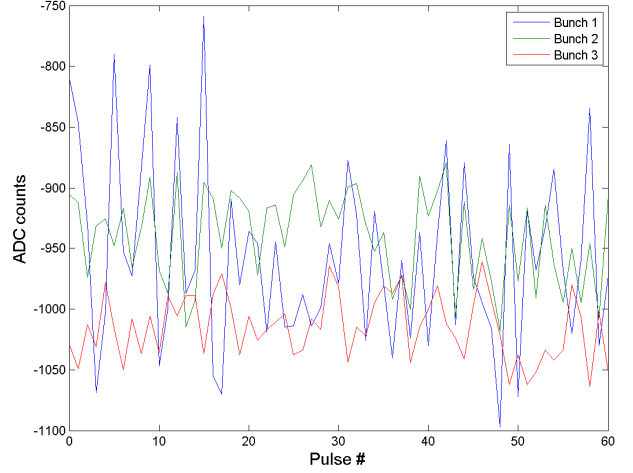
Normalised position over 217 pulses (flier trains removed at 2 sigma). Gain 100. Delay loop off



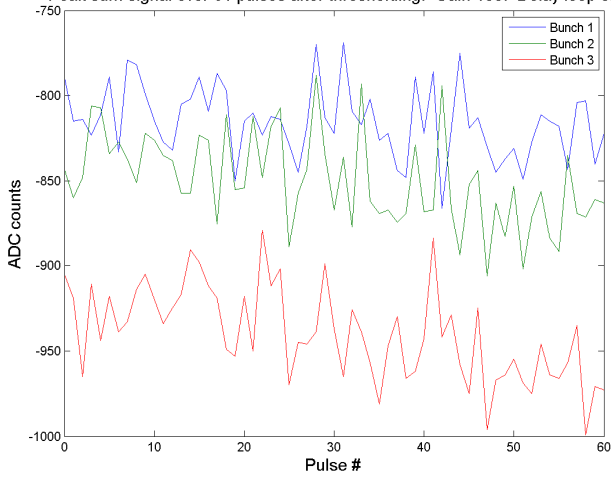
Normalised position for 217 pulses (flier trains removed at 2 sigma). Gain 100. Delay loop off



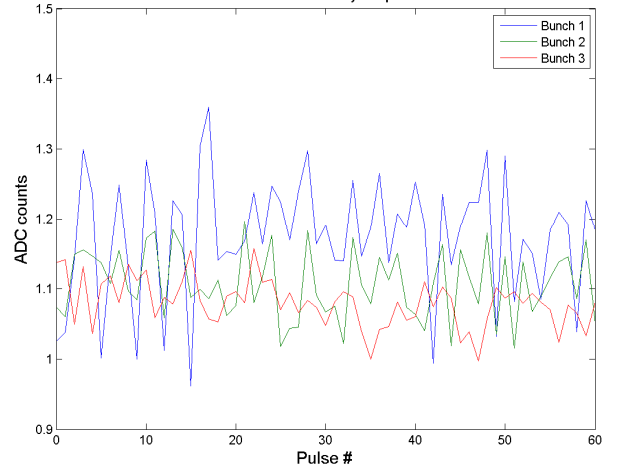
Peak difference signal over 61 pulses after thresholding. Gain 100. Delay loop off



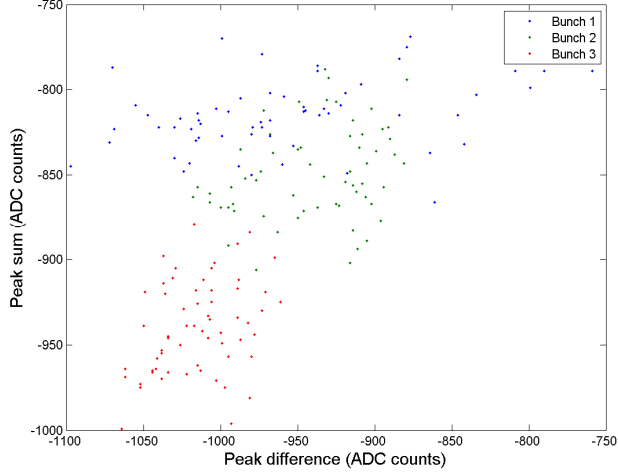
Peak sum signal over 61 pulses after thresholding. Gain 100. Delay loop off



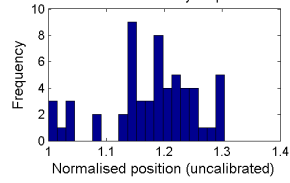
Normalised position over 61 pulses after thresholding (infinities removed). Gain 100. Delay loop off



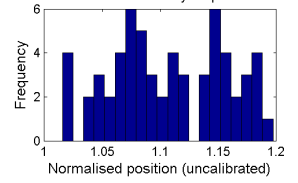
Peak difference vs. peak sum for 61 pulses after thresholding. Gain 100. Delay loop off



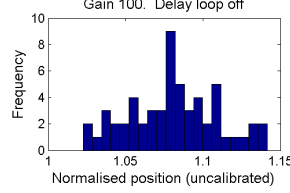
Bunch 1 normalised position over 58 pulses after thresholding (3 fliers removed at 2 sigma). Gain 100. Delay loop off



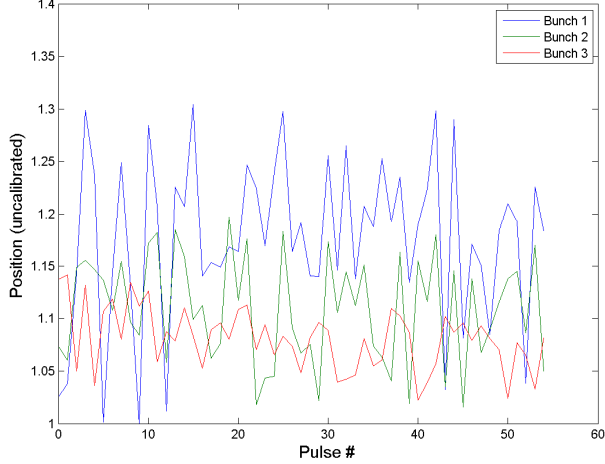
Bunch 2 normalised position over 61 pulses after thresholding (0 fliers removed at 2 sigma). Gain 100. Delay loop off



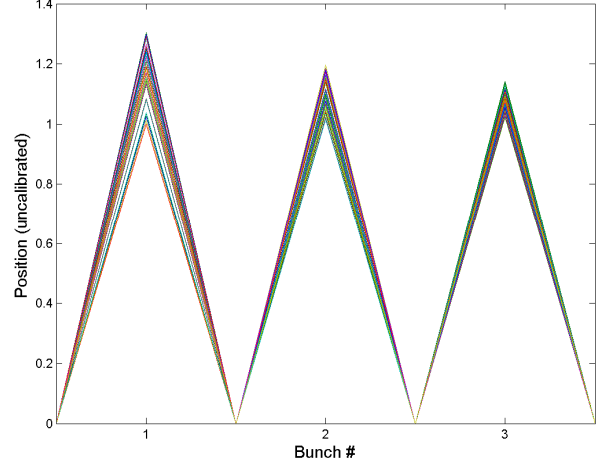
Bunch 3 normalised position over 57 pulses after thresholding (4 fliers removed at 2 sigma). Gain 100. Delay loop off



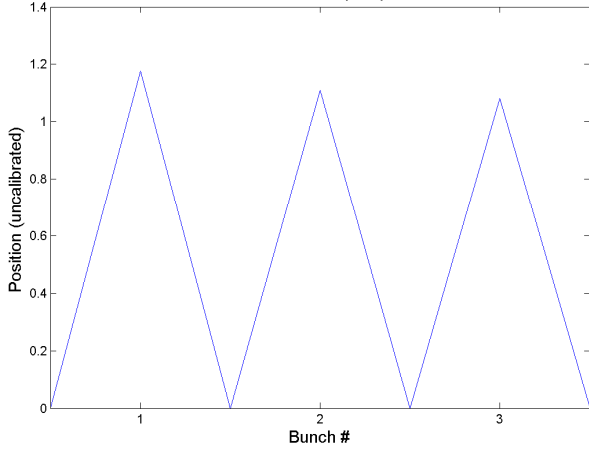
Normalised position over 55 pulses after thresholding (flier trains removed at 2 sigma). Gain 100. Delay loop off



Normalised position for 55 pulses after thresholding (flier trains removed at 2 sigma). Gain 100. Delay loop off



Normalised position averaged over 55 pulses after thresholding (flier trains removed at 2 sigma). Gain 100. Delay loop off



Summary for gain 100, delay loop off

Threshold information

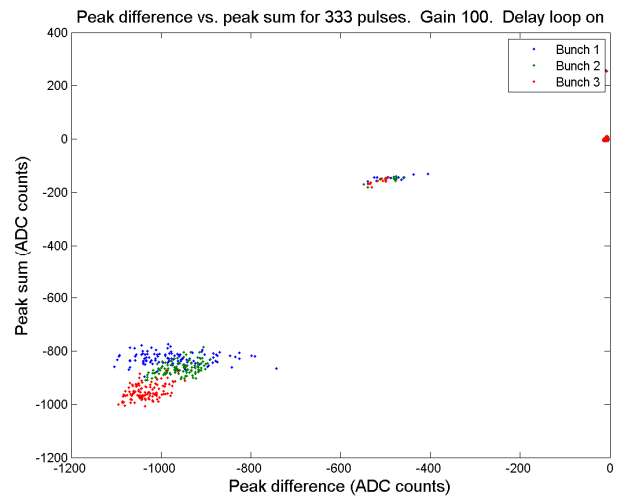
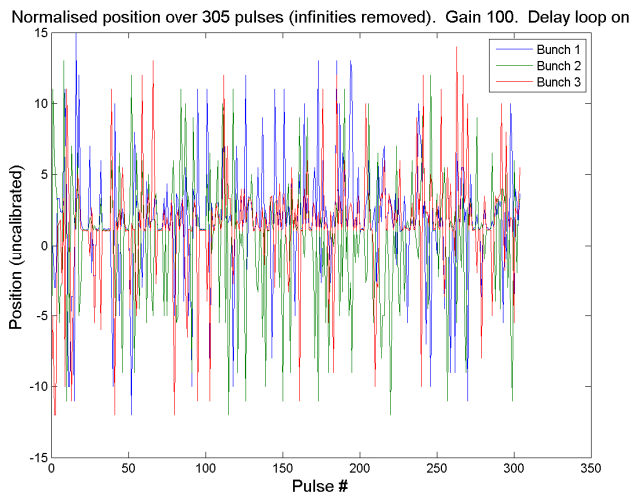
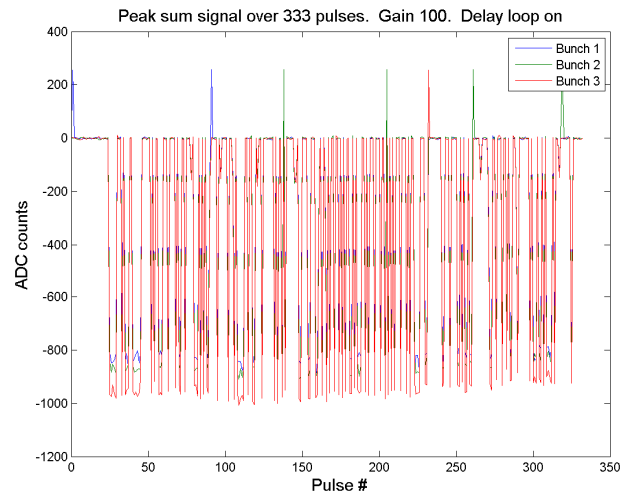
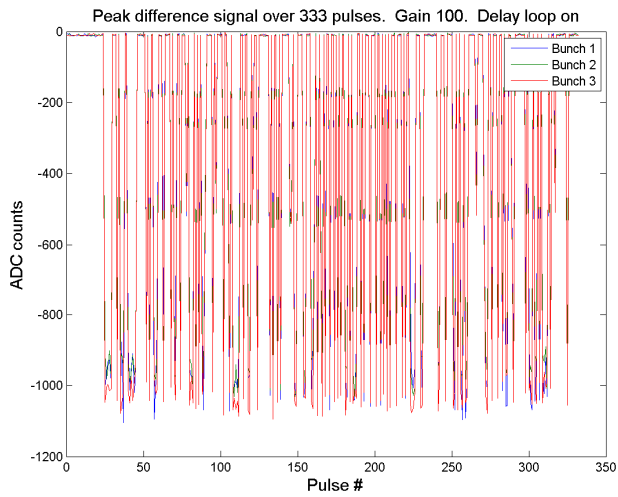
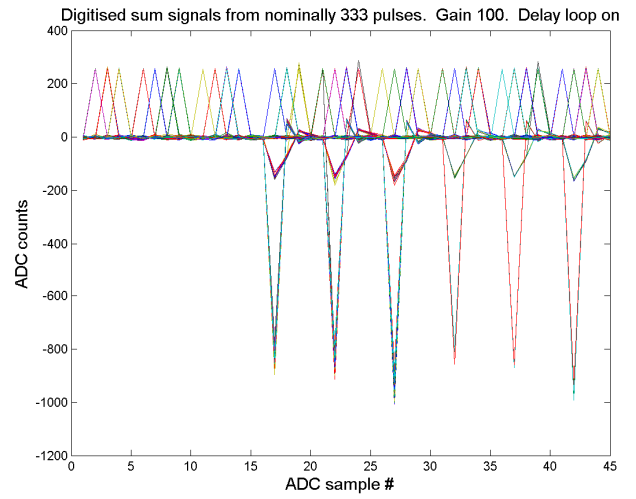
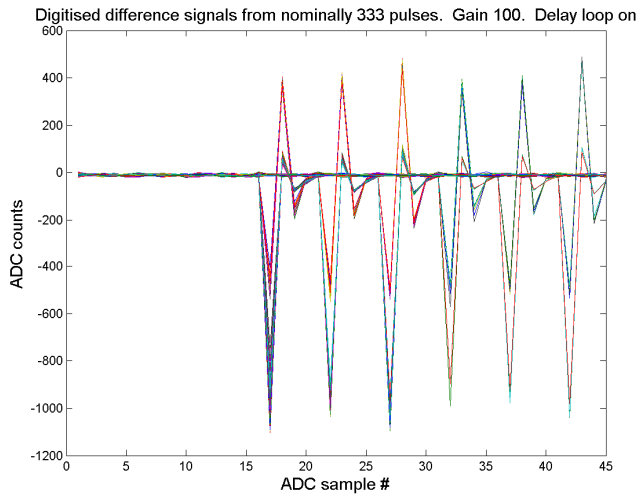
	Bunch 1	Bunch 2	Bunch 3
Difference	< -600	< -600	< -600
Sum	< -400	< -400	< -400

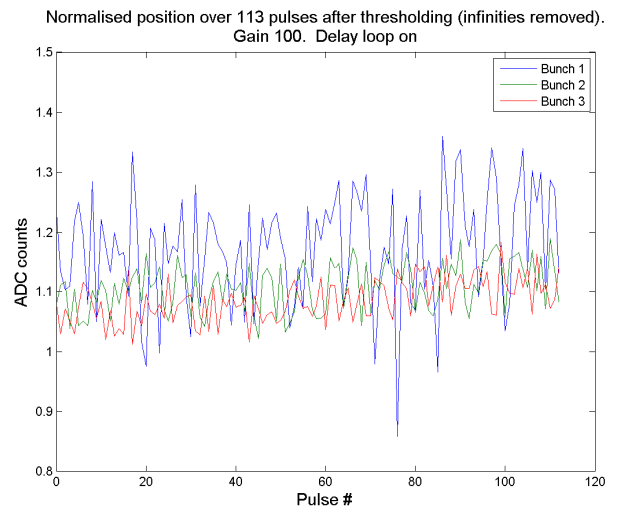
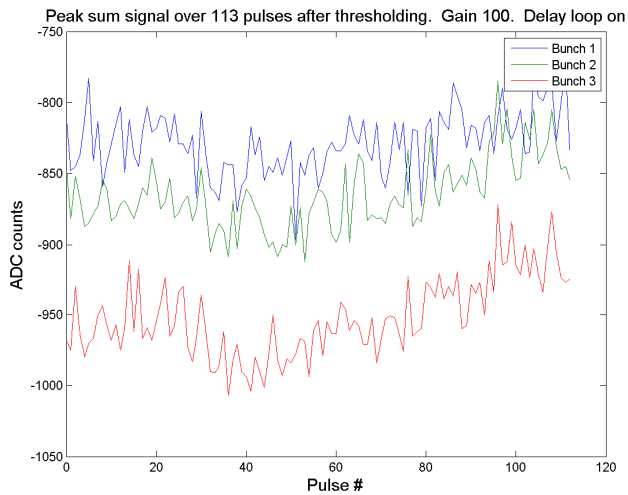
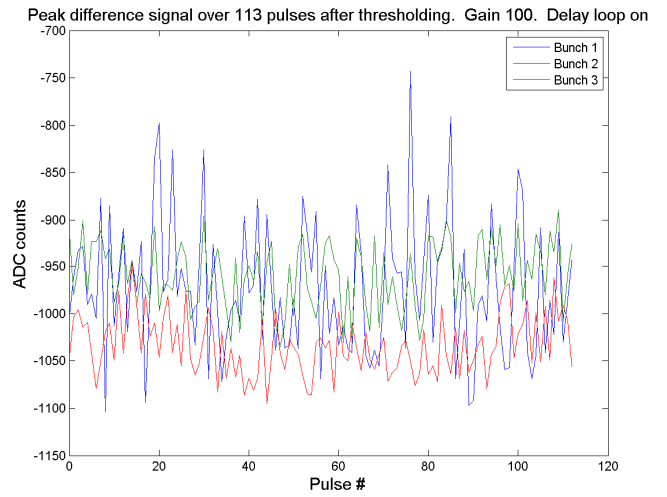
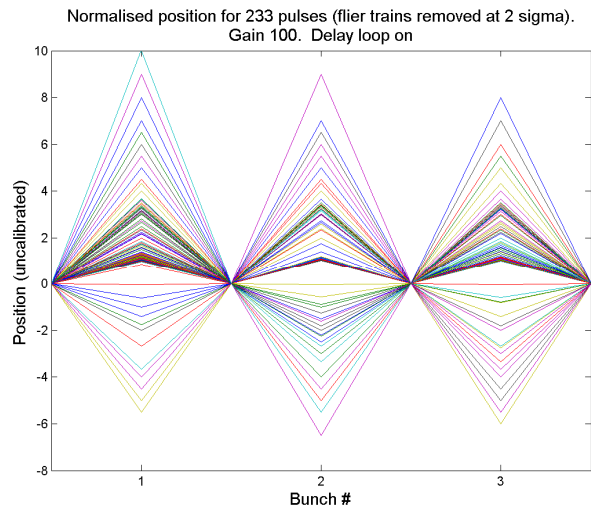
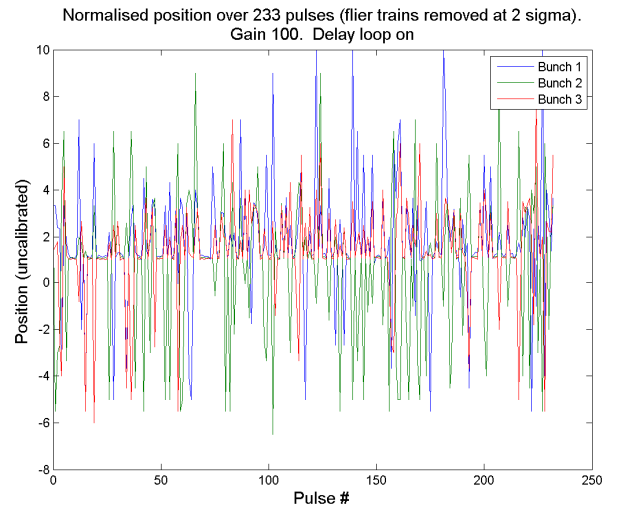
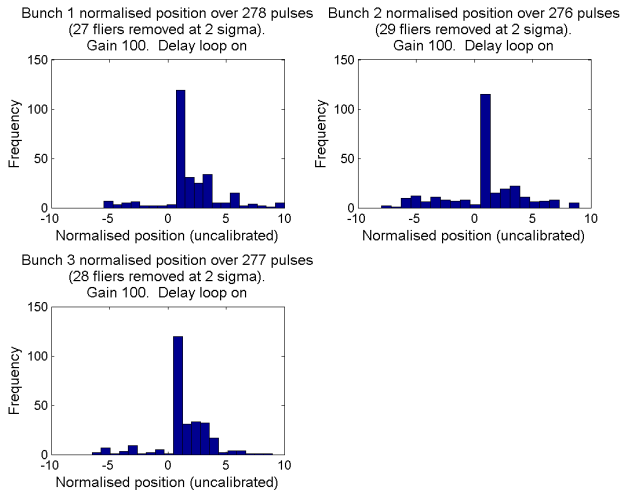
Final average information

N = 55

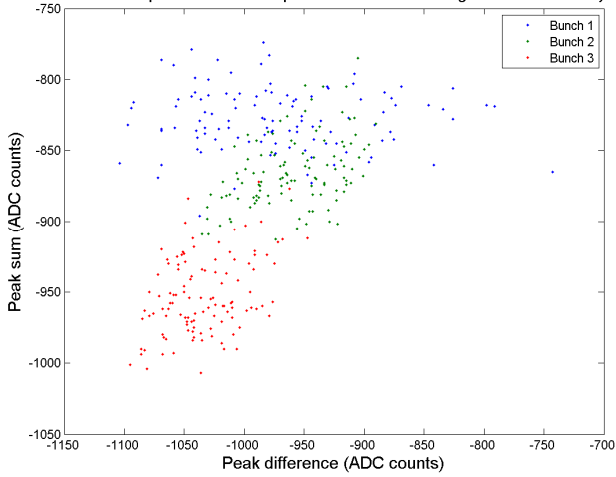
	Bunch 1	Bunch 2	Bunch 3
Mean	1.1757	1.1089	1.0811
Sigma	0.0799	0.0514	0.0291

March 2008 – Position 1 – Gain 100 – Delay loop on

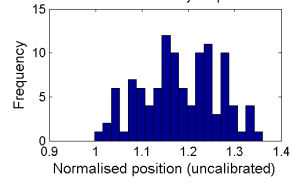




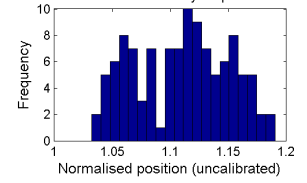
Peak difference vs. peak sum for 113 pulses after thresholding. Gain 100. Delay loop on



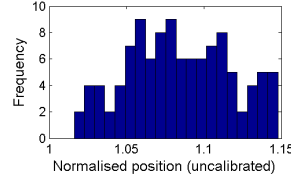
Bunch 1 normalised position over 109 pulses after thresholding (4 fliers removed at 2 sigma). Gain 100. Delay loop on



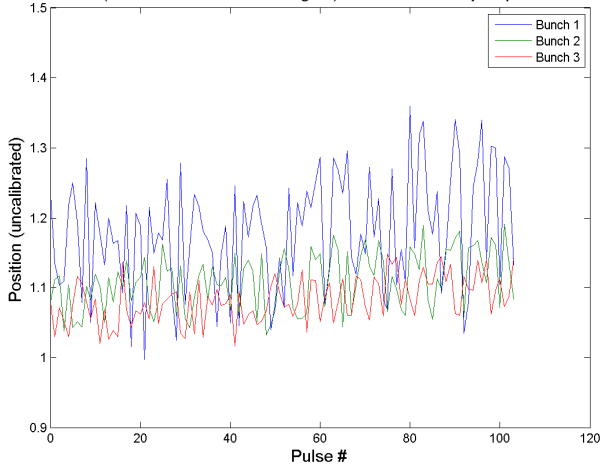
Bunch 2 normalised position over 112 pulses after thresholding (1 flier removed at 2 sigma). Gain 100. Delay loop on



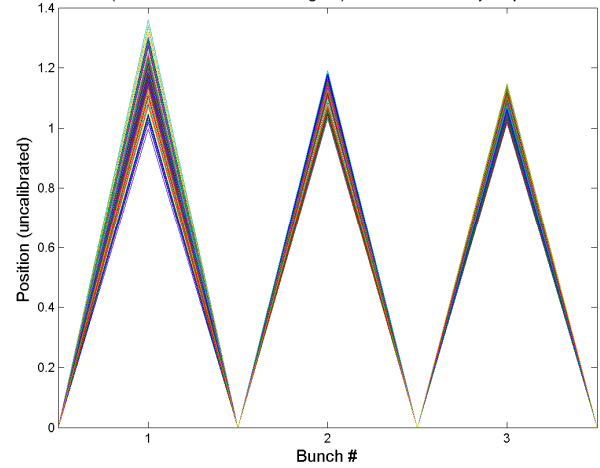
Bunch 3 normalised position over 109 pulses after thresholding (4 fliers removed at 2 sigma). Gain 100. Delay loop on



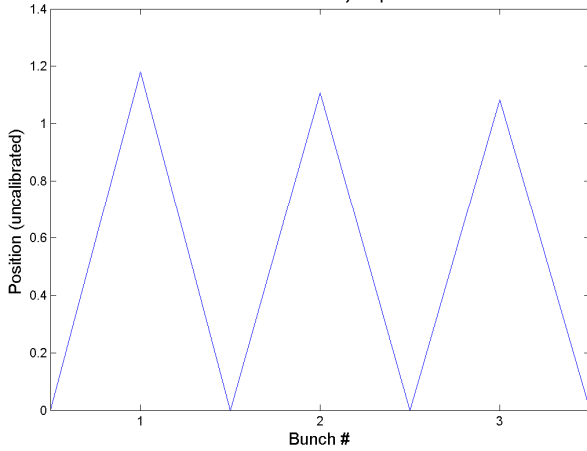
Normalised position over 104 pulses after thresholding (flier trains removed at 2 sigma). Gain 100. Delay loop on



Normalised position for 104 pulses after thresholding (flier trains removed at 2 sigma). Gain 100. Delay loop on



Normalised position averaged over 104 pulses after thresholding (flier trains removed at 2 sigma). Gain 100. Delay loop on



Summary for gain 100, delay loop on

Threshold information

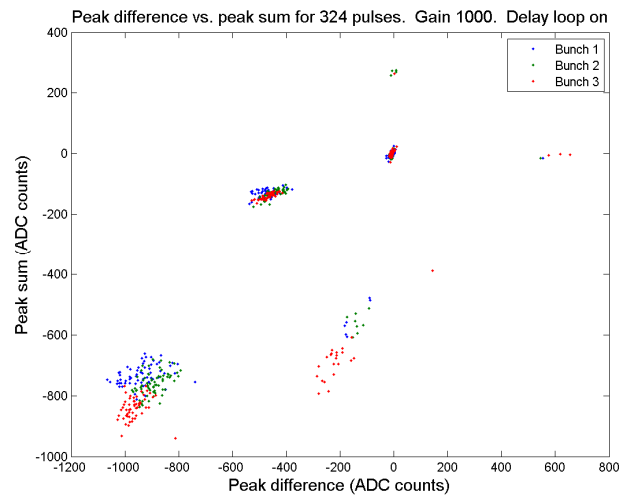
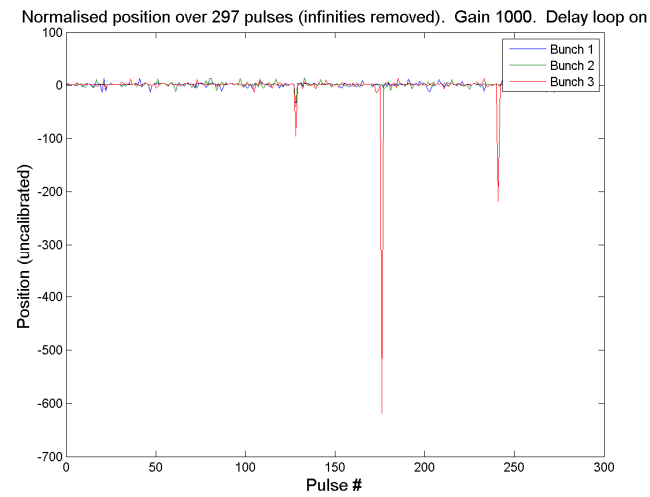
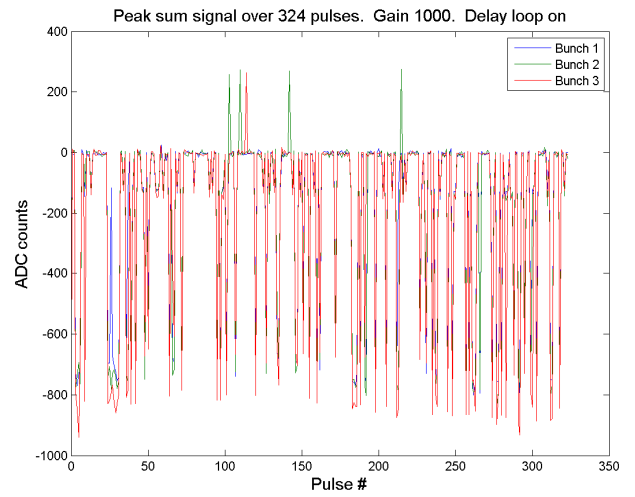
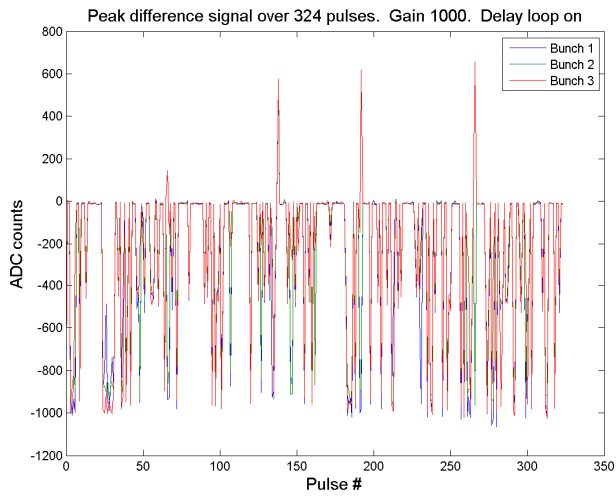
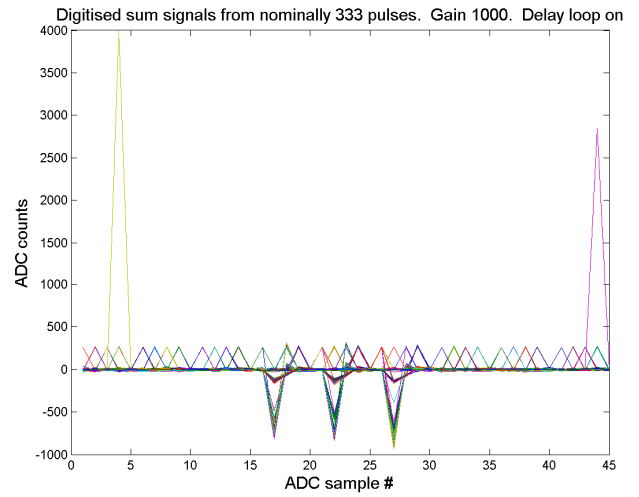
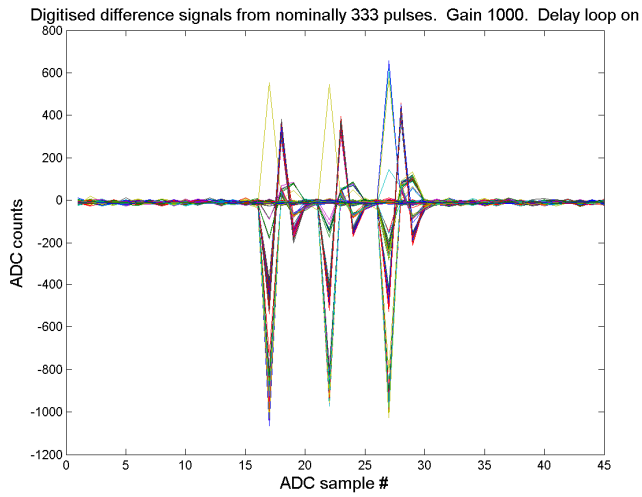
	Bunch 1	Bunch 2	Bunch 3
Difference	< -600	< -600	< -600
Sum	< -400	< -400	< -400

Final average information

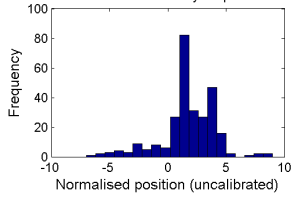
N = 104

	Bunch 1	Bunch 2	Bunch 3
Mean	1.1804	1.1086	1.0826
Sigma	0.0834	0.0412	0.0326

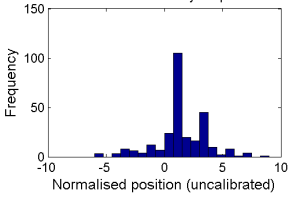
March 2008 – Position 1 – Gain 1000 – Delay loop on



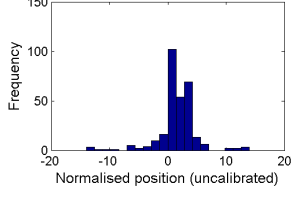
Bunch 1 normalised position over 278 pulses (19 fliers removed at 2 sigma). Gain 1000. Delay loop on



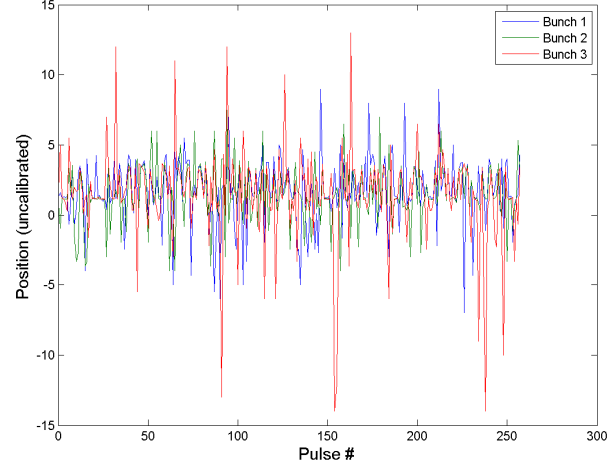
Bunch 2 normalised position over 279 pulses (18 fliers removed at 2 sigma). Gain 1000. Delay loop on



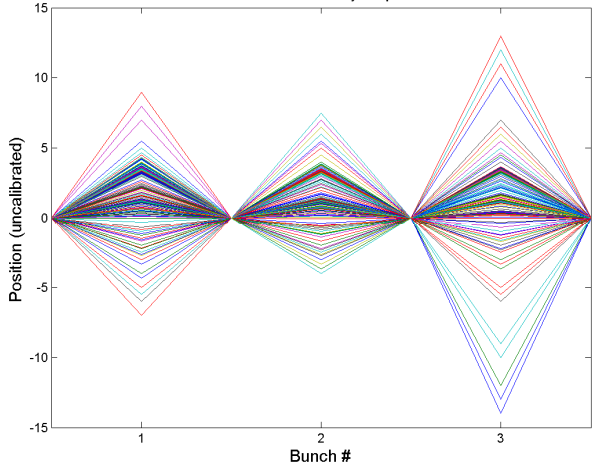
Bunch 3 normalised position over 294 pulses (3 fliers removed at 2 sigma). Gain 1000. Delay loop on



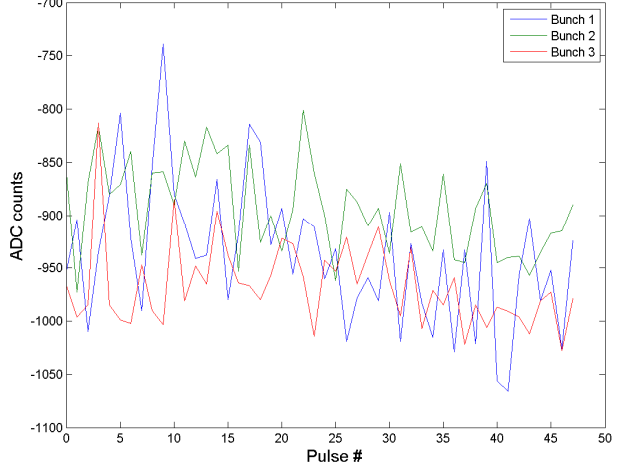
Normalised position over 258 pulses (flier trains removed at 2 sigma). Gain 1000. Delay loop on



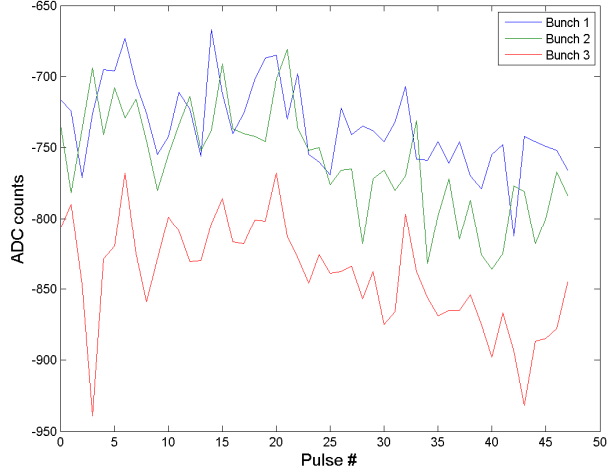
Normalised position for 258 pulses (flier trains removed at 2 sigma). Gain 1000. Delay loop on



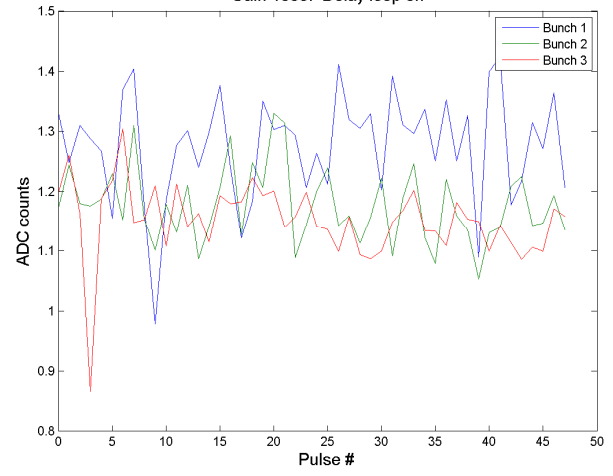
Peak difference signal over 48 pulses after thresholding. Gain 1000. Delay loop on



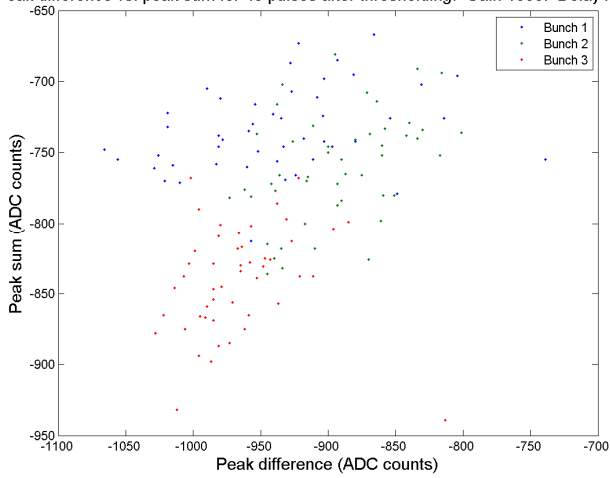
Peak sum signal over 48 pulses after thresholding. Gain 1000. Delay loop on



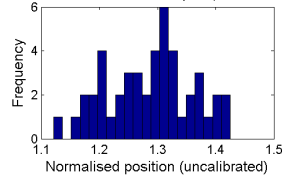
Normalised position over 48 pulses after thresholding (infinities removed). Gain 1000. Delay loop on



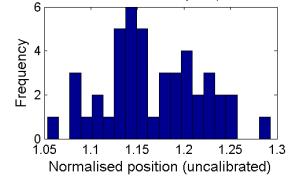
Peak difference vs. peak sum for 48 pulses after thresholding. Gain 1000. Delay loop on



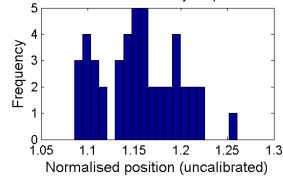
Bunch 1 normalised position over 46 pulses after thresholding (2 fliers removed at 2 sigma). Gain 1000. Delay loop on



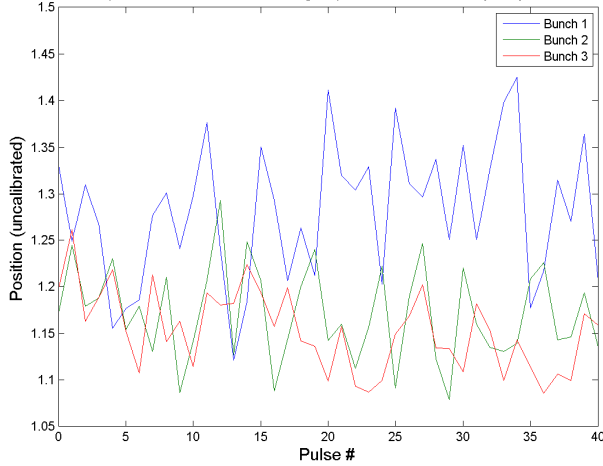
Bunch 2 normalised position over 45 pulses after thresholding (3 fliers removed at 2 sigma). Gain 1000. Delay loop on



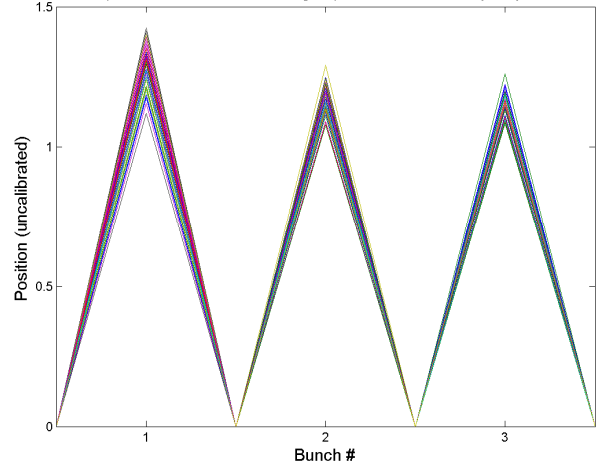
Bunch 3 normalised position over 46 pulses after thresholding (2 fliers removed at 2 sigma). Gain 1000. Delay loop on



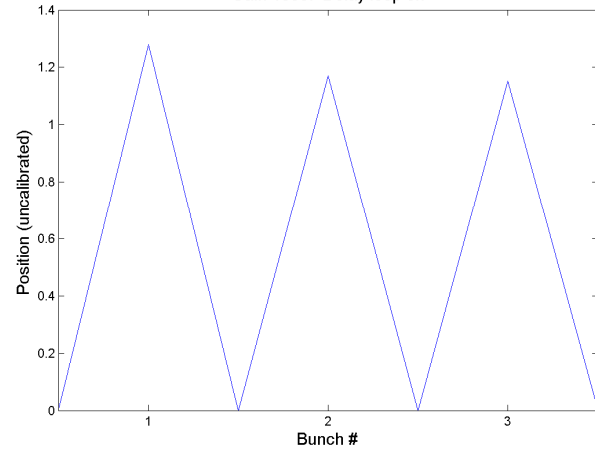
Normalised position over 41 pulses after thresholding (flier trains removed at 2 sigma). Gain 1000. Delay loop on



Normalised position for 41 pulses after thresholding (flier trains removed at 2 sigma). Gain 1000. Delay loop on



Normalised position averaged over 41 pulses after thresholding (flier trains removed at 2 sigma). Gain 1000. Delay loop on



Summary for gain 1000, delay loop on

Threshold information

	Bunch 1	Bunch 2	Bunch 3
Difference	< -600	< -600	< -600
Sum	< -400	< -400	< -400

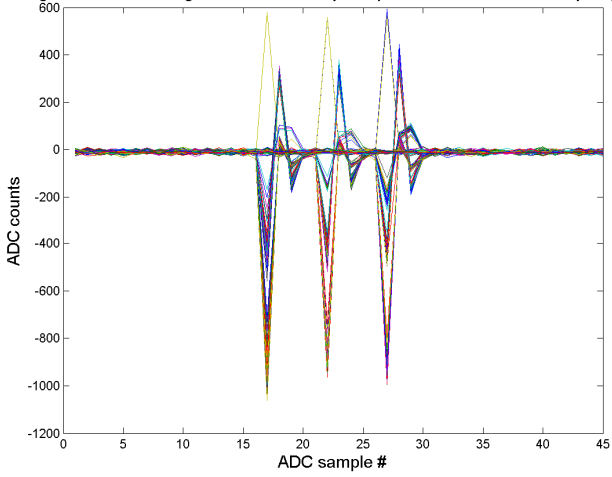
Final average information

N = 41

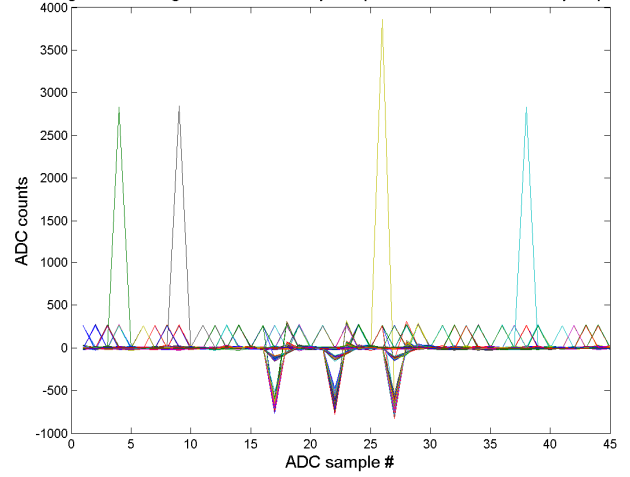
	Bunch 1	Bunch 2	Bunch 3
Mean	1.2805	1.1713	1.1528
Sigma	0.0743	0.0510	0.427

March 2008 – Position 1 – Gain 10000 – Delay loop off

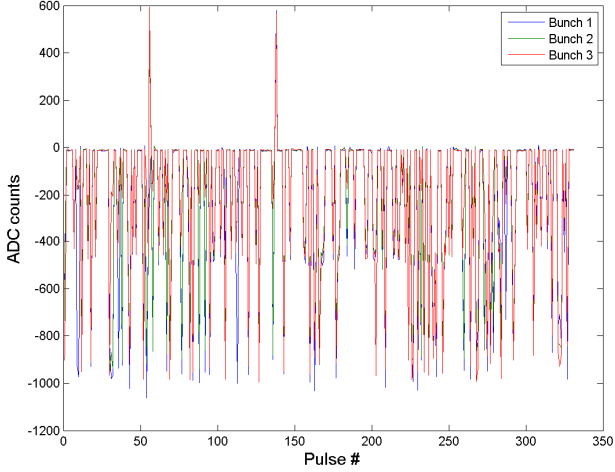
Digitised difference signals from nominally 333 pulses. Gain 10000. Delay loop off



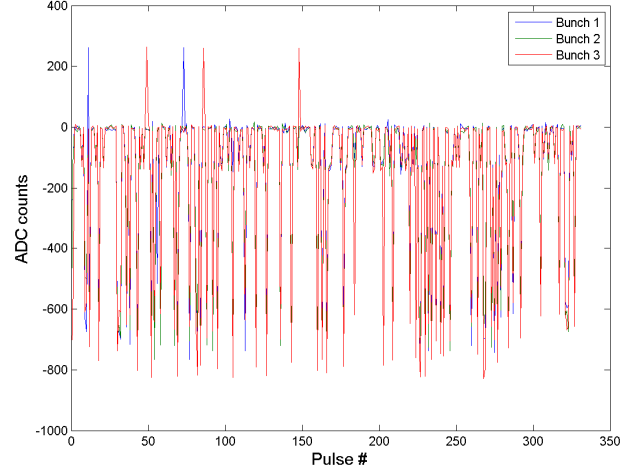
Digitised sum signals from nominally 333 pulses. Gain 10000. Delay loop off



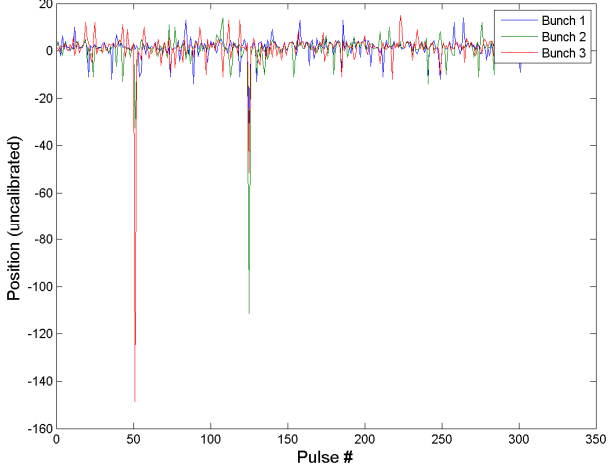
Peak difference signal over 332 pulses. Gain 10000. Delay loop off



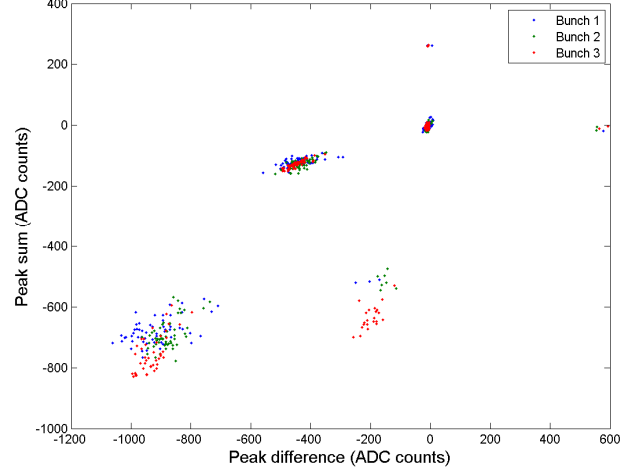
Peak sum signal over 332 pulses. Gain 10000. Delay loop off

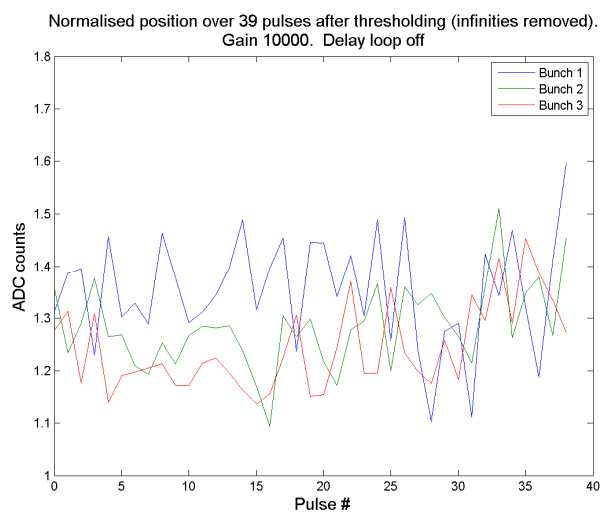
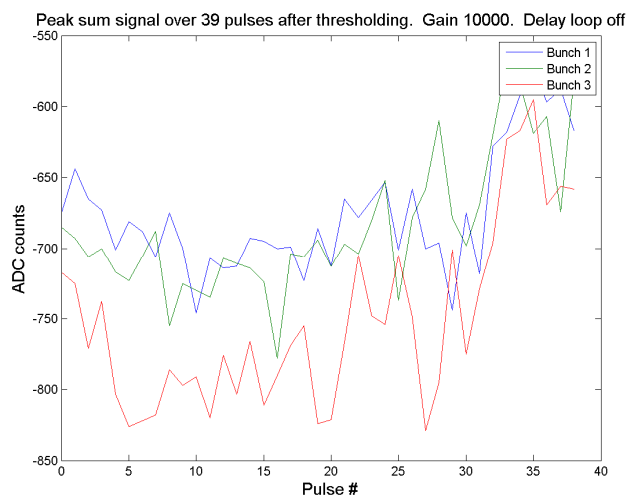
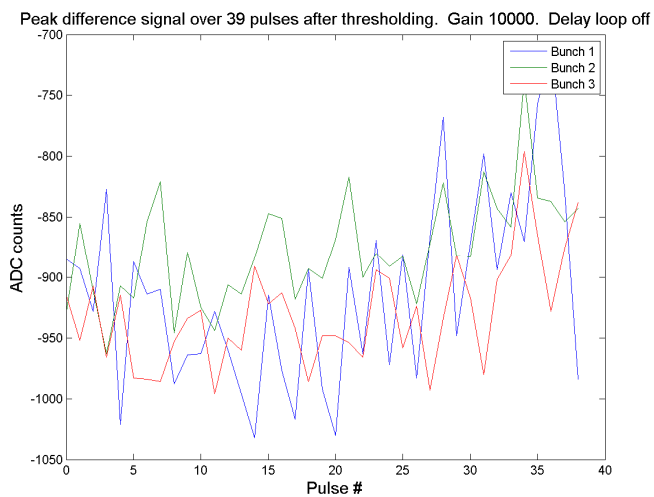
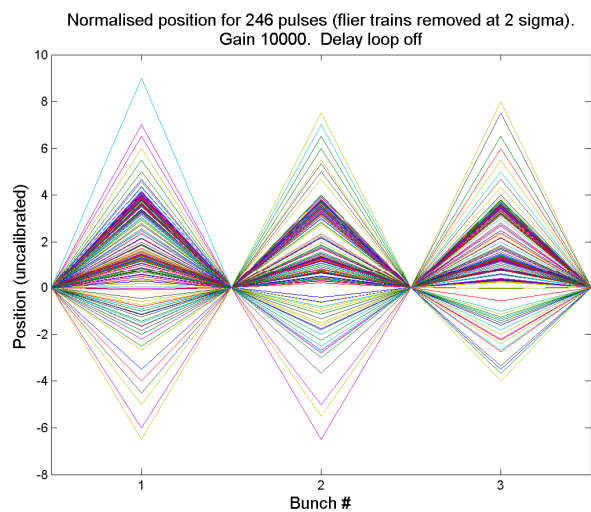
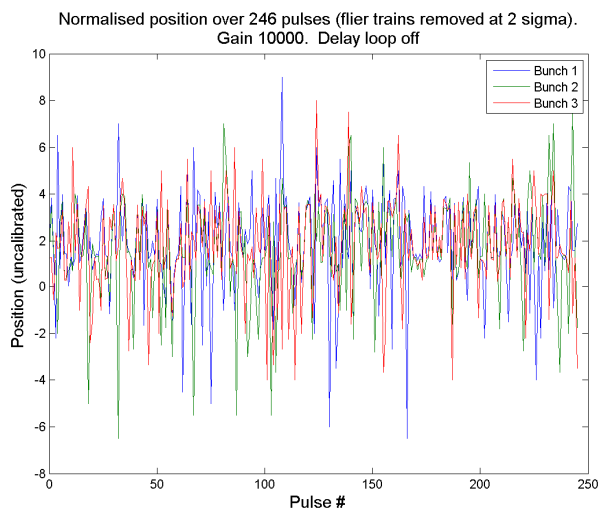
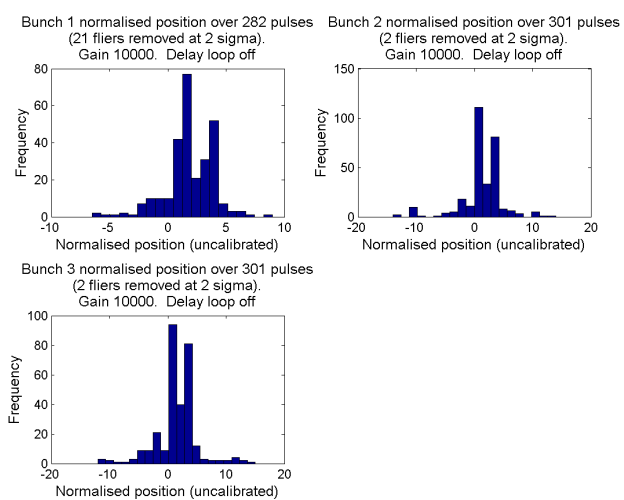


Normalised position over 303 pulses (infinities removed). Gain 10000. Delay loop off

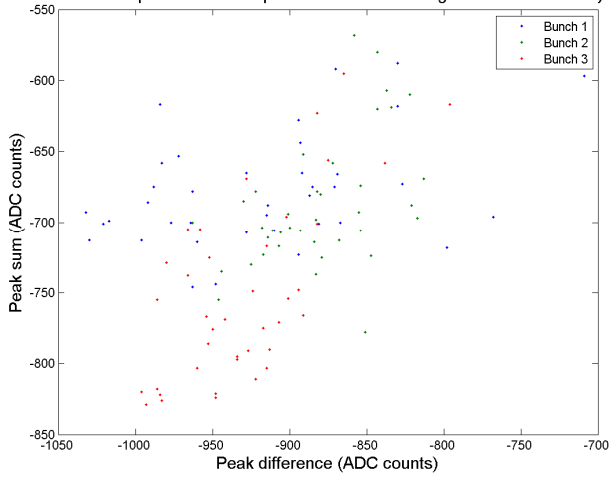


Peak difference vs. peak sum for 332 pulses. Gain 10000. Delay loop off

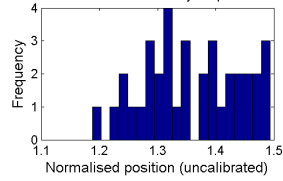




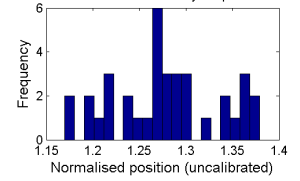
Peak difference vs. peak sum for 39 pulses after thresholding. Gain 10000. Delay loop off



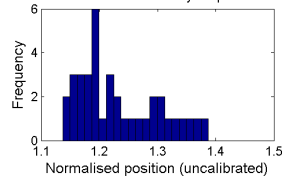
Bunch 1 normalised position over 36 pulses after thresholding (3 fliers removed at 2 sigma). Gain 10000. Delay loop off



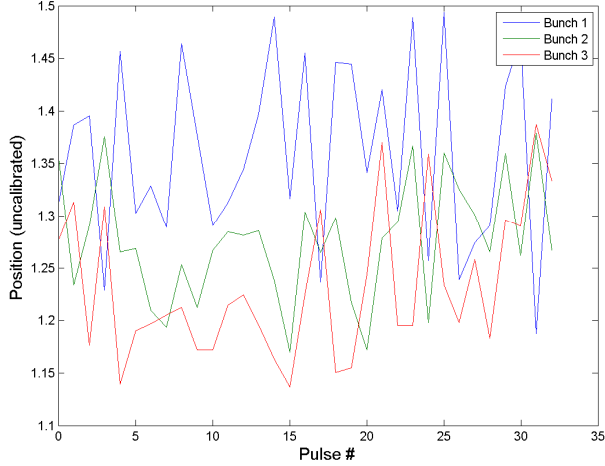
Bunch 2 normalised position over 36 pulses after thresholding (3 fliers removed at 2 sigma). Gain 10000. Delay loop off



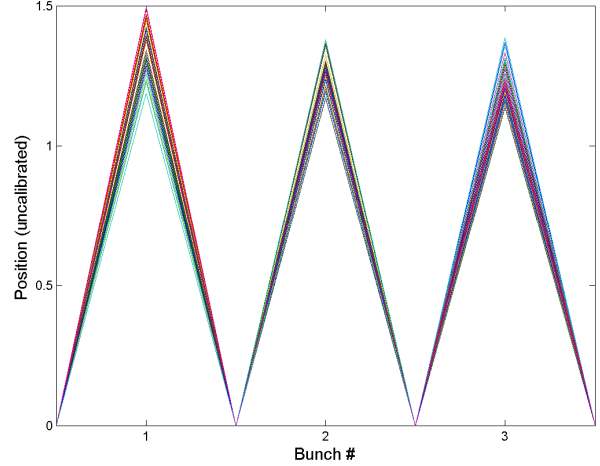
Bunch 3 normalised position over 37 pulses after thresholding (2 fliers removed at 2 sigma). Gain 10000. Delay loop off



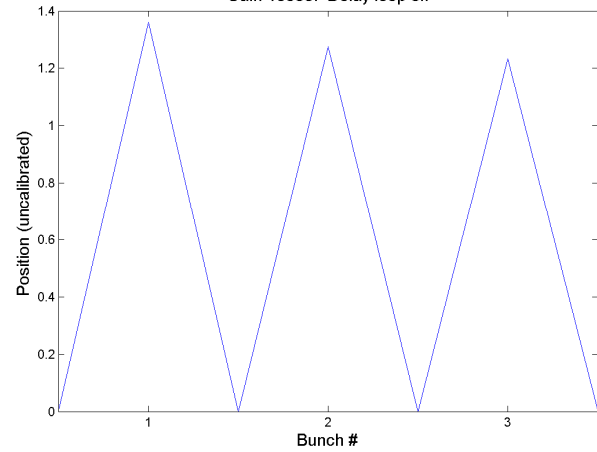
Normalised position over 33 pulses after thresholding (flier trains removed at 2 sigma). Gain 10000. Delay loop off



Normalised position for 33 pulses after thresholding (flier trains removed at 2 sigma). Gain 10000. Delay loop off



Normalised position averaged over 33 pulses after thresholding (flier trains removed at 2 sigma). Gain 10000. Delay loop off



Summary for gain 10000, delay loop off

Threshold information

	Bunch 1	Bunch 2	Bunch 3
Difference	< -600	< -600	< -600
Sum	< -400	< -400	< -400

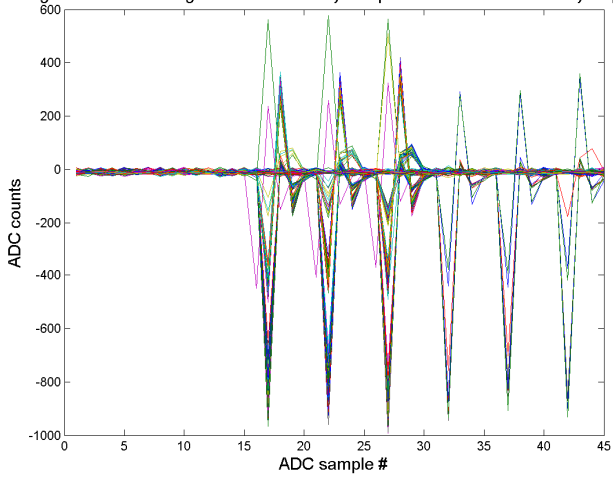
Final average information

N = 33

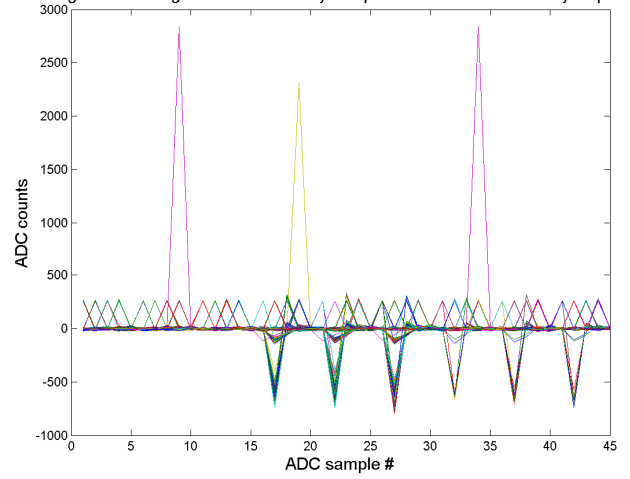
	Bunch 1	Bunch 2	Bunch 3
Mean	1.3598	1.2757	1.2326
Sigma	0.0857	0.0575	0.0696

March 2008 – Position 1 – Gain 10000 – Delay loop on

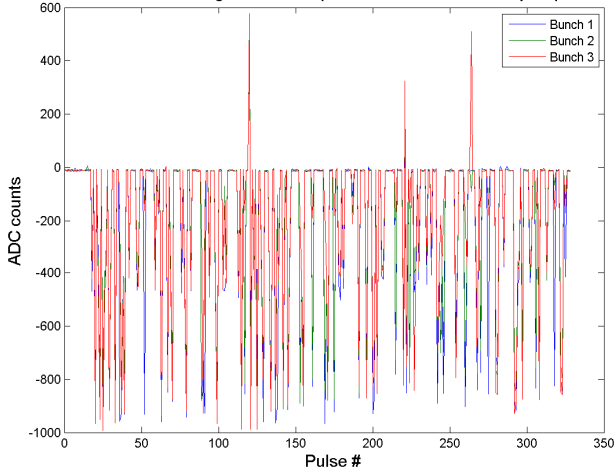
Digitised difference signals from nominally 333 pulses. Gain 10000. Delay loop on



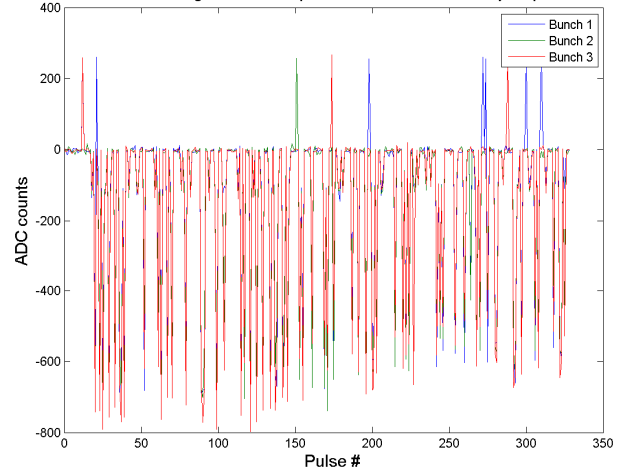
Digitised sum signals from nominally 333 pulses. Gain 10000. Delay loop on



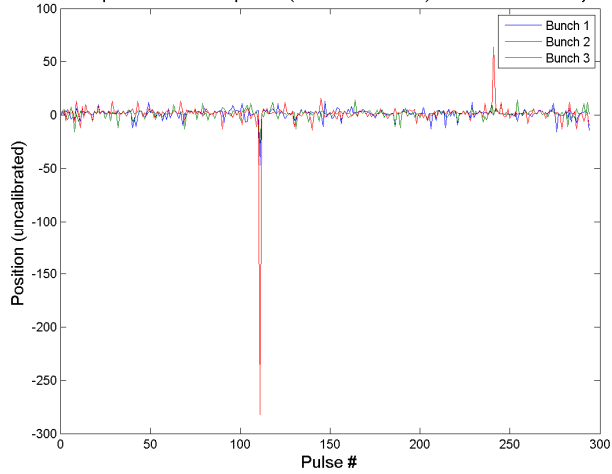
Peak difference signal over 329 pulses. Gain 10000. Delay loop on



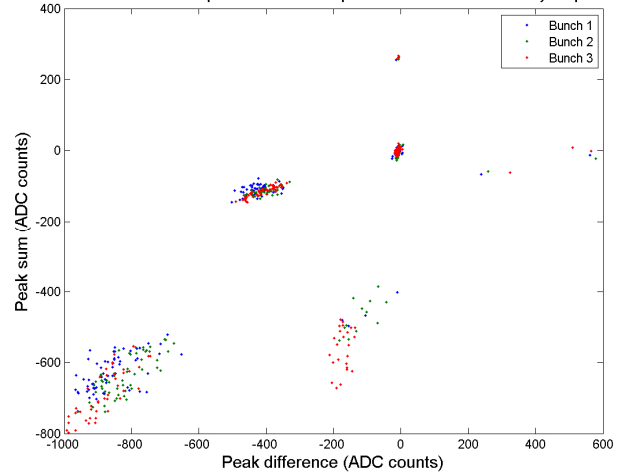
Peak sum signal over 329 pulses. Gain 10000. Delay loop on



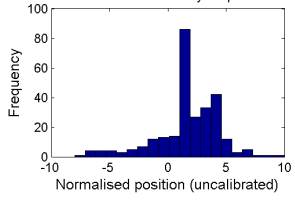
Normalised position over 295 pulses (infinities removed). Gain 10000. Delay loop on



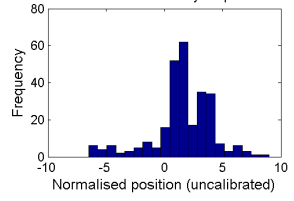
Peak difference vs. peak sum for 329 pulses. Gain 10000. Delay loop on



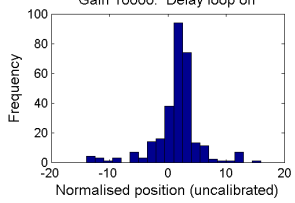
Bunch 1 normalised position over 278 pulses (17 fliers removed at 2 sigma). Gain 10000. Delay loop on



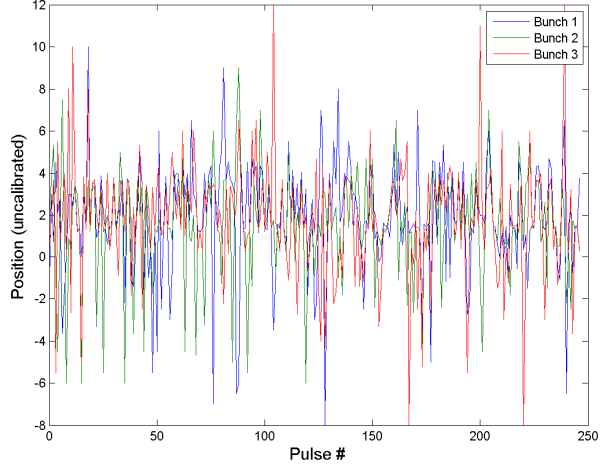
Bunch 2 normalised position over 276 pulses (19 fliers removed at 2 sigma). Gain 10000. Delay loop on



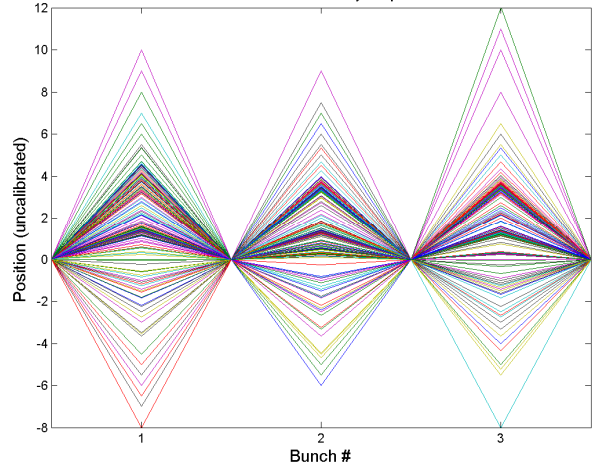
Bunch 3 normalised position over 293 pulses (2 fliers removed at 2 sigma). Gain 10000. Delay loop on



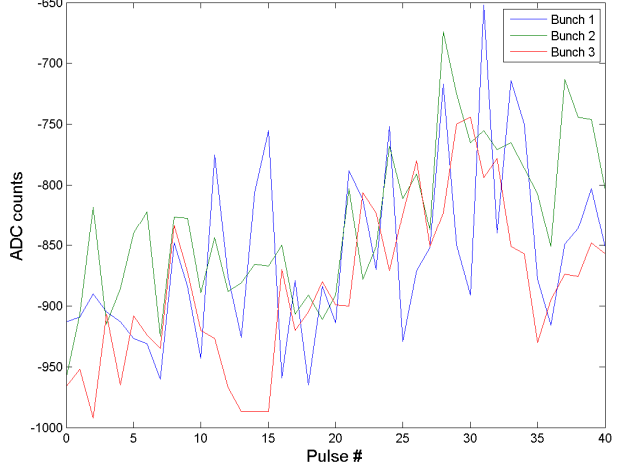
Normalised position over 247 pulses (flier trains removed at 2 sigma). Gain 10000. Delay loop on



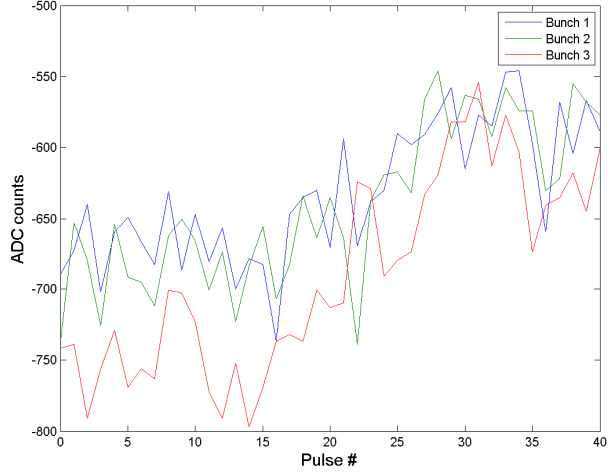
Normalised position for 247 pulses (flier trains removed at 2 sigma). Gain 10000. Delay loop on



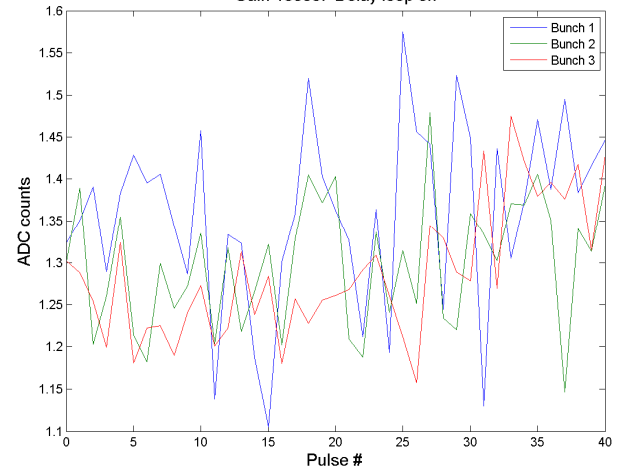
Peak difference signal over 41 pulses after thresholding. Gain 10000. Delay loop on



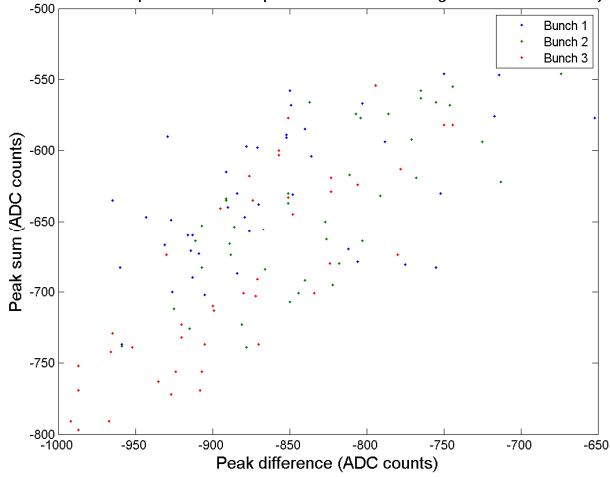
Peak sum signal over 41 pulses after thresholding. Gain 10000. Delay loop on



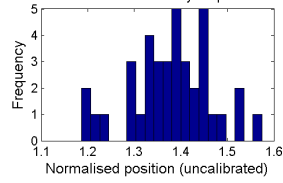
Normalised position over 41 pulses after thresholding (infinities removed). Gain 10000. Delay loop on



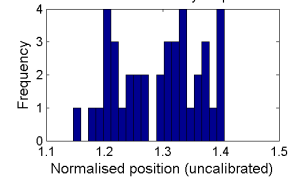
Peak difference vs. peak sum for 41 pulses after thresholding. Gain 10000. Delay loop on



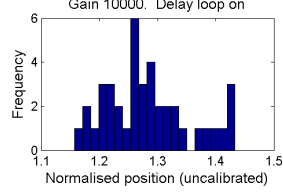
Bunch 1 normalised position over 38 pulses after thresholding (3 fliers removed at 2 sigma). Gain 10000. Delay loop on



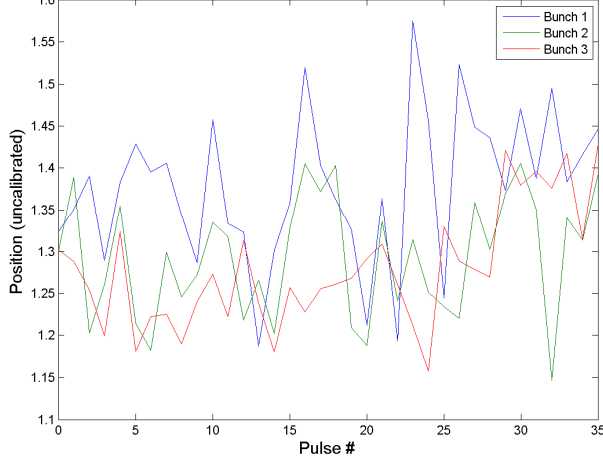
Bunch 2 normalised position over 40 pulses after thresholding (1 flier removed at 2 sigma). Gain 10000. Delay loop on



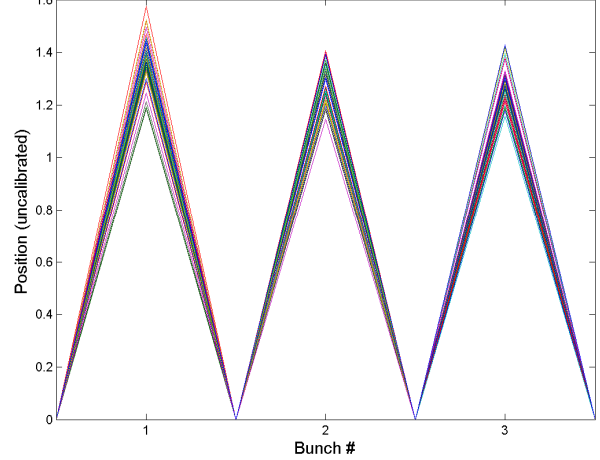
Bunch 3 normalised position over 40 pulses after thresholding (1 flier removed at 2 sigma). Gain 10000. Delay loop on



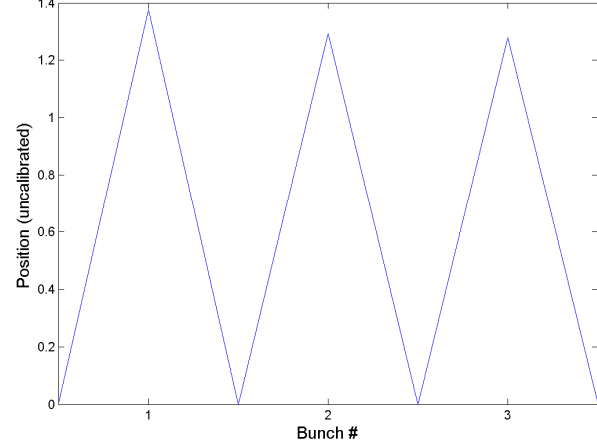
Normalised position over 36 pulses after thresholding (flier trains removed at 2 sigma). Gain 10000. Delay loop on



Normalised position for 36 pulses after thresholding (flier trains removed at 2 sigma). Gain 10000. Delay loop on



Normalised position averaged over 36 pulses after thresholding (flier trains removed at 2 sigma). Gain 10000. Delay loop on



Summary for gain 10000, delay loop on

Threshold information

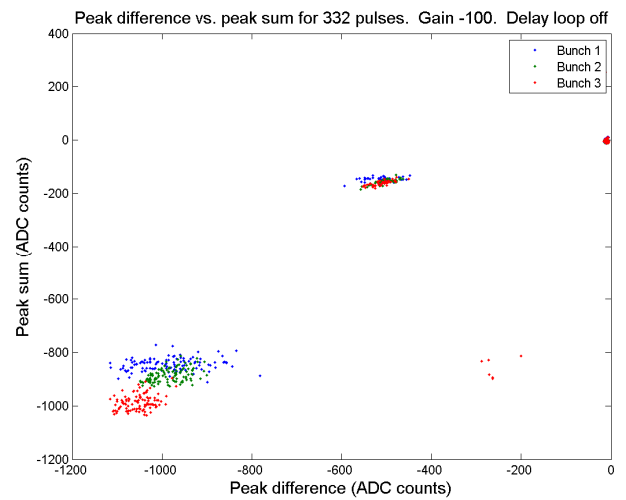
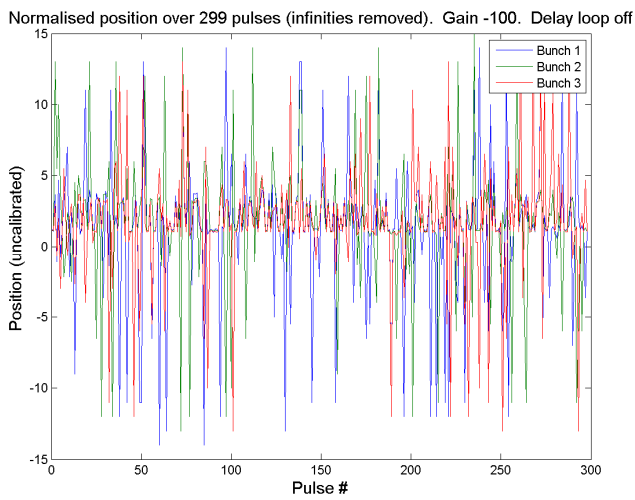
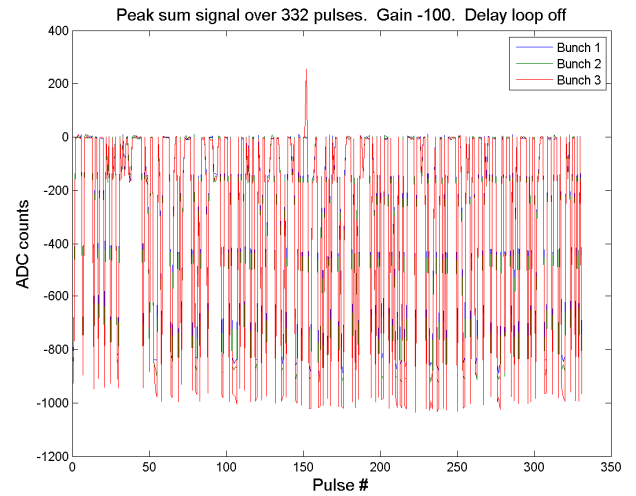
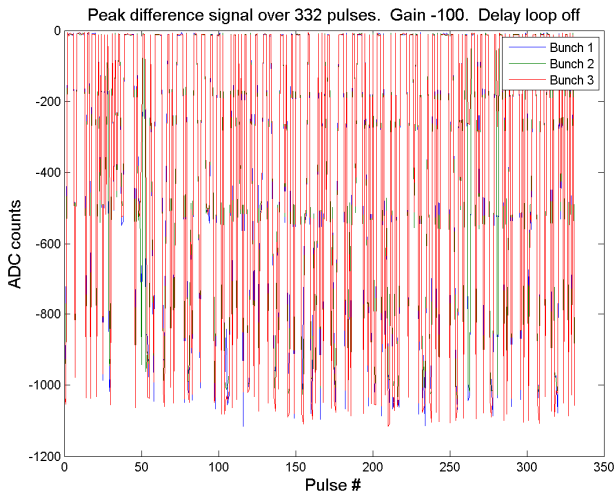
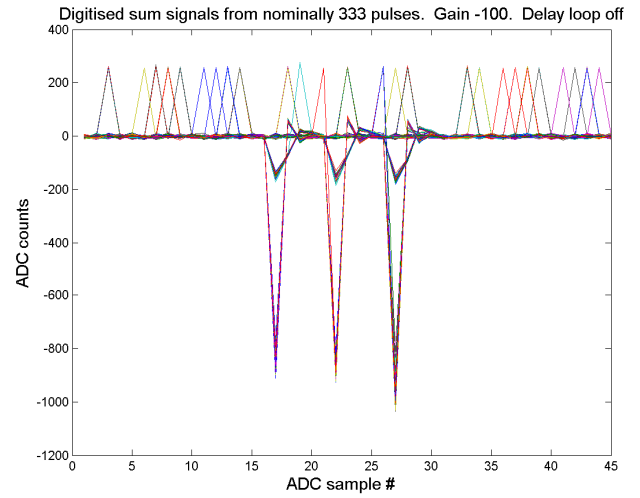
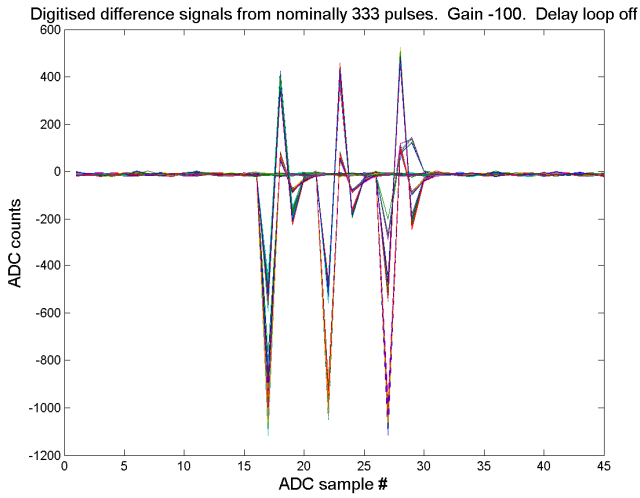
	Bunch 1	Bunch 2	Bunch 3
Difference	< -600	< -600	< -600
Sum	< -400	< -400	< -400

Final average information

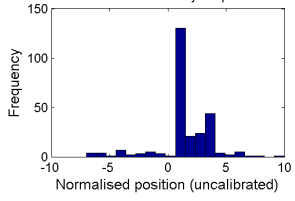
N = 36

	Bunch 1	Bunch 2	Bunch 3
Mean	1.3777	1.2929	1.2792
Sigma	0.0902	0.0730	0.0706

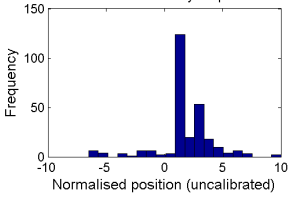
March 2008 – Position 1 – Gain -100 – Delay loop off



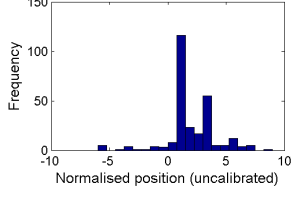
Bunch 1 normalised position over 263 pulses (36 fliers removed at 2 sigma). Gain -100. Delay loop off.



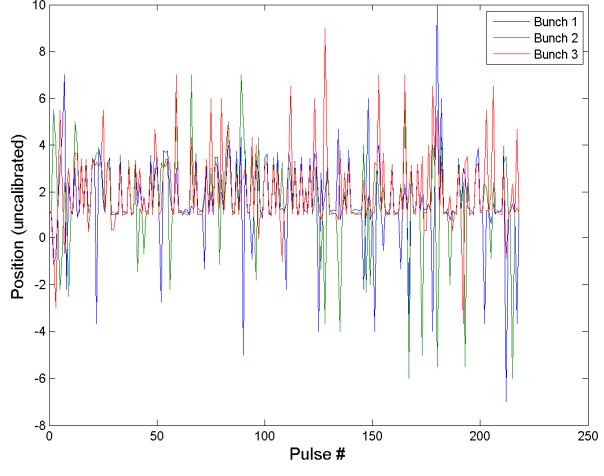
Bunch 2 normalised position over 271 pulses (28 fliers removed at 2 sigma). Gain -100. Delay loop off.



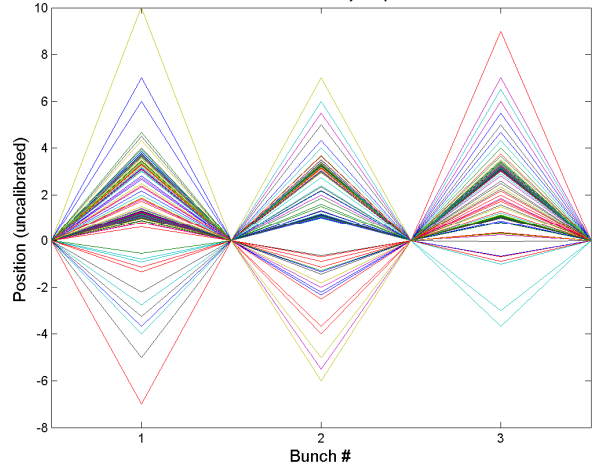
Bunch 3 normalised position over 270 pulses (29 fliers removed at 2 sigma). Gain -100. Delay loop off.



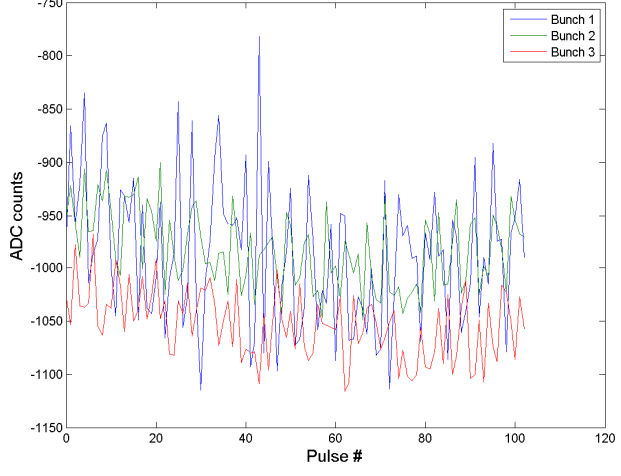
Normalised position over 219 pulses (flier trains removed at 2 sigma). Gain -100. Delay loop off.



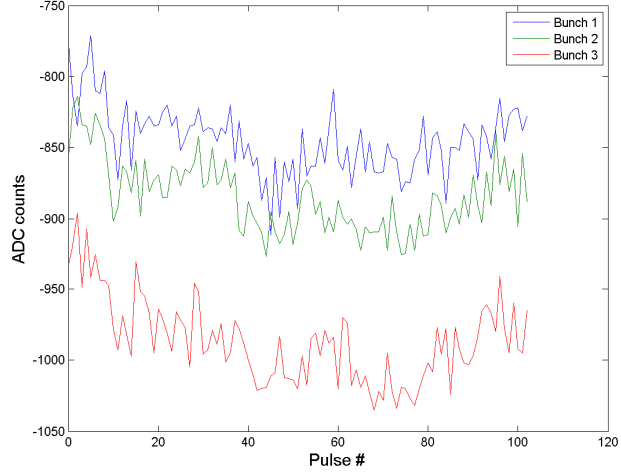
Normalised position for 219 pulses (flier trains removed at 2 sigma). Gain -100. Delay loop off.



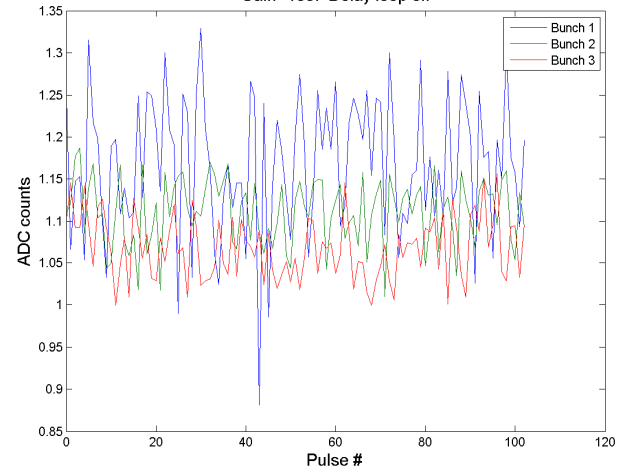
Peak difference signal over 103 pulses after thresholding. Gain -100. Delay loop off.



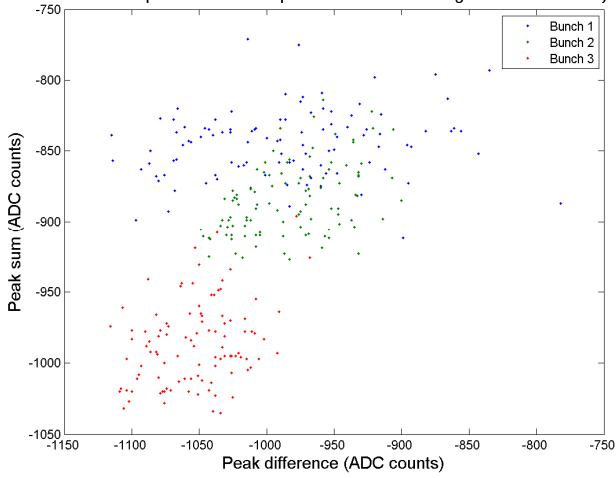
Peak sum signal over 103 pulses after thresholding. Gain -100. Delay loop off.



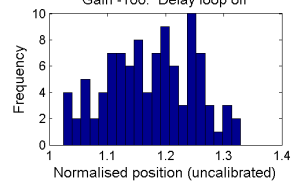
Normalised position over 103 pulses after thresholding (infinities removed). Gain -100. Delay loop off.



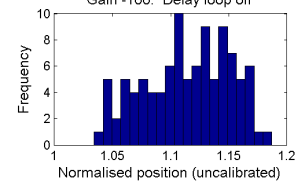
Peak difference vs. peak sum for 103 pulses after thresholding. Gain -100. Delay loop off



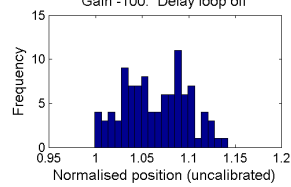
Bunch 1 normalised position over 100 pulses after thresholding (3 fliers removed at 2 sigma). Gain -100. Delay loop off



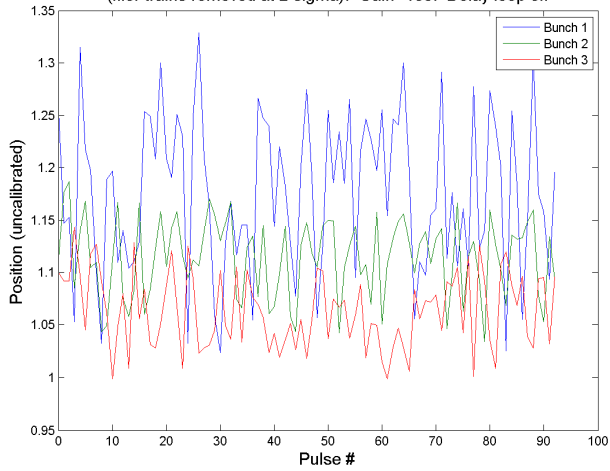
Bunch 2 normalised position over 100 pulses after thresholding (3 fliers removed at 2 sigma). Gain -100. Delay loop off



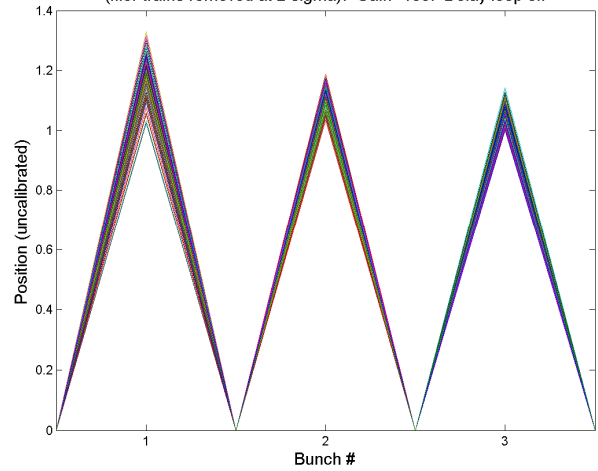
Bunch 3 normalised position over 99 pulses after thresholding (4 fliers removed at 2 sigma). Gain -100. Delay loop off



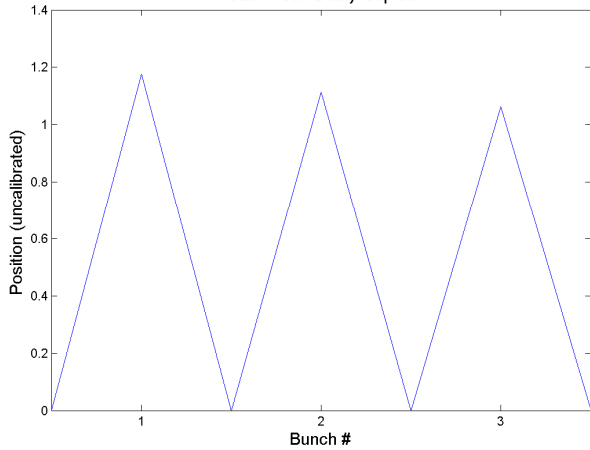
Normalised position over 93 pulses after thresholding (flier trains removed at 2 sigma). Gain -100. Delay loop off



Normalised position for 93 pulses after thresholding (flier trains removed at 2 sigma). Gain -100. Delay loop off



Normalised position averaged over 93 pulses after thresholding (flier trains removed at 2 sigma). Gain -100. Delay loop off



Summary for gain -100, delay loop off

Threshold information

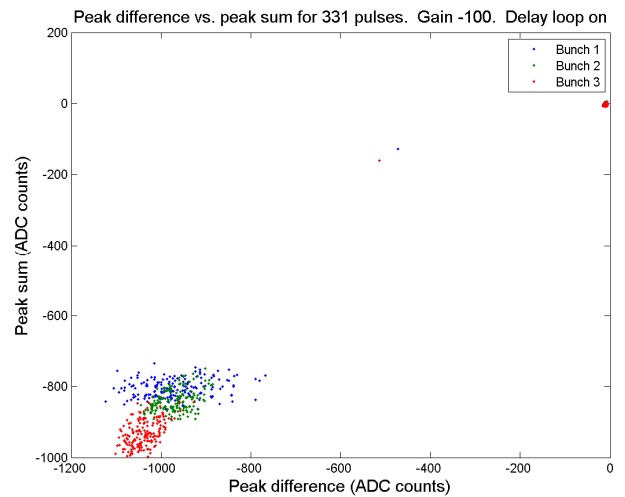
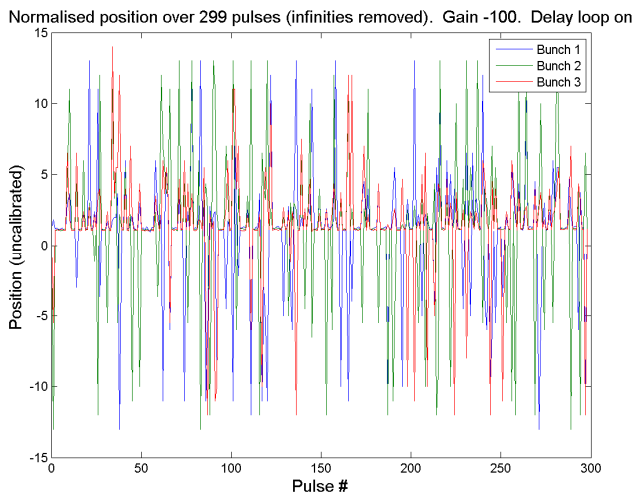
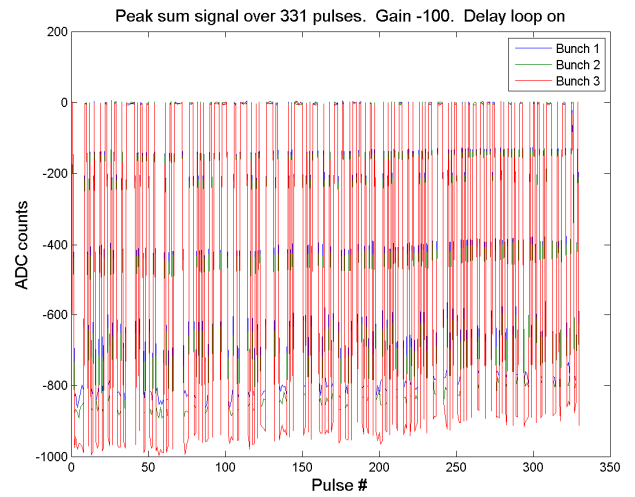
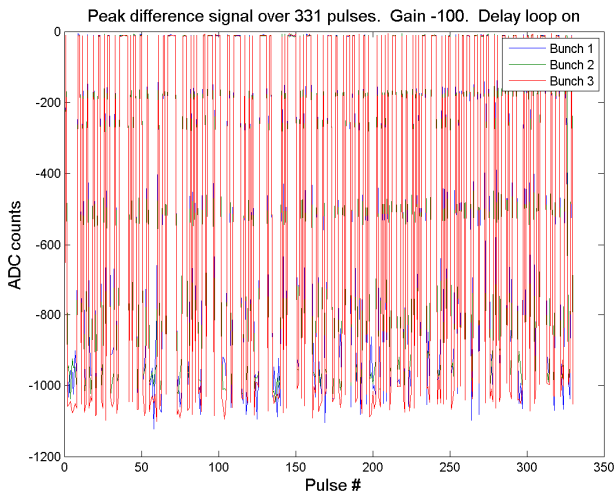
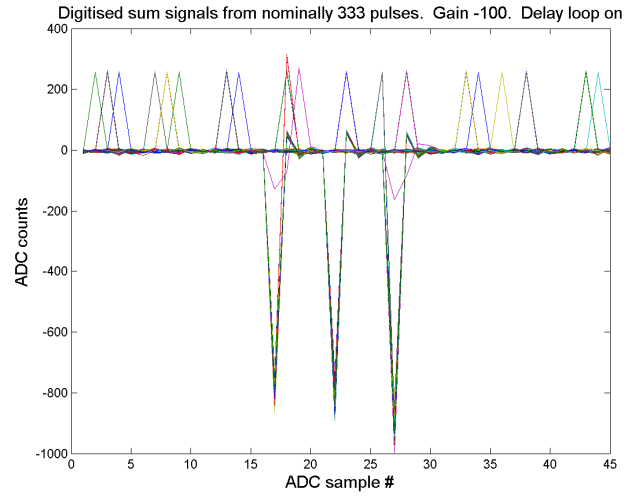
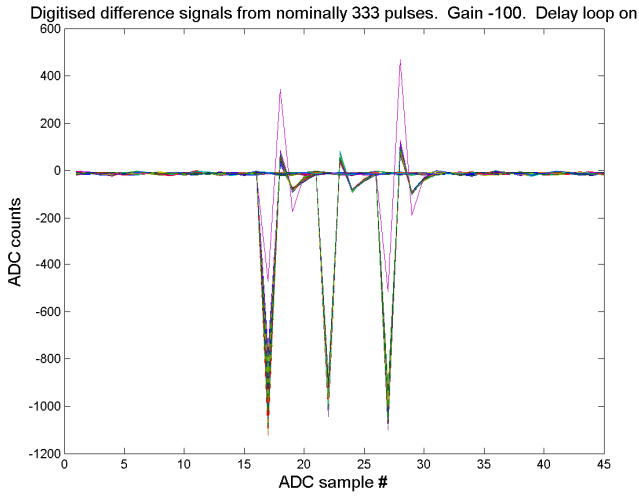
	Bunch 1	Bunch 2	Bunch 3
Difference	< -600	< -600	< -600
Sum	< -400	< -400	< -400

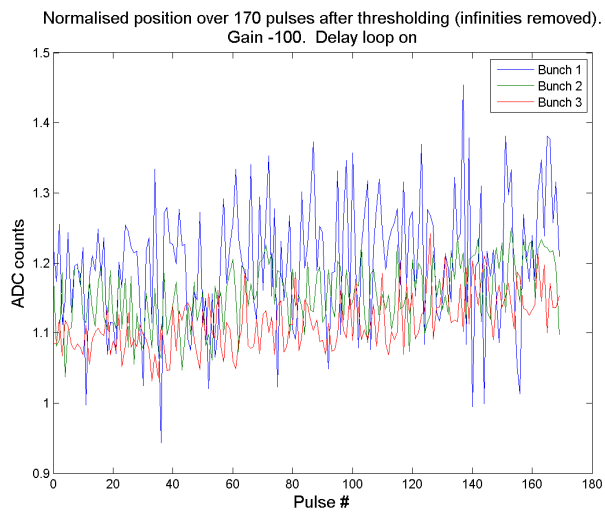
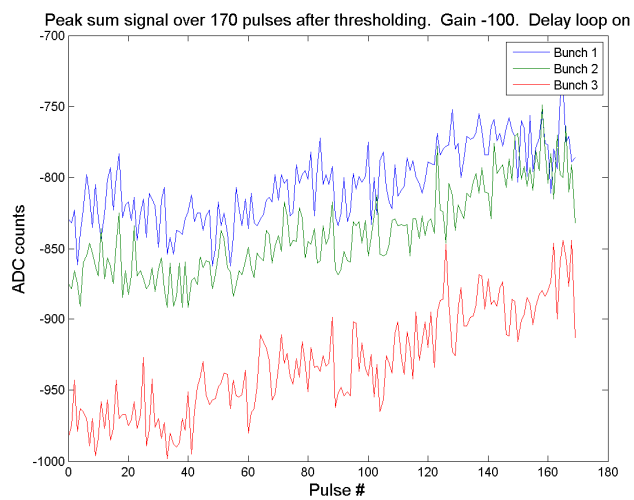
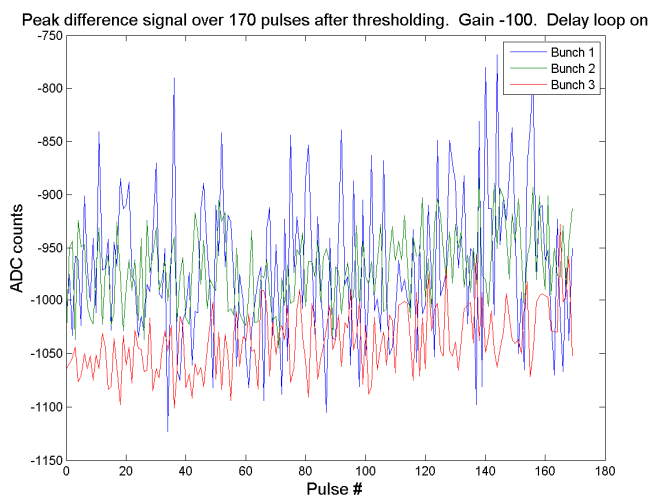
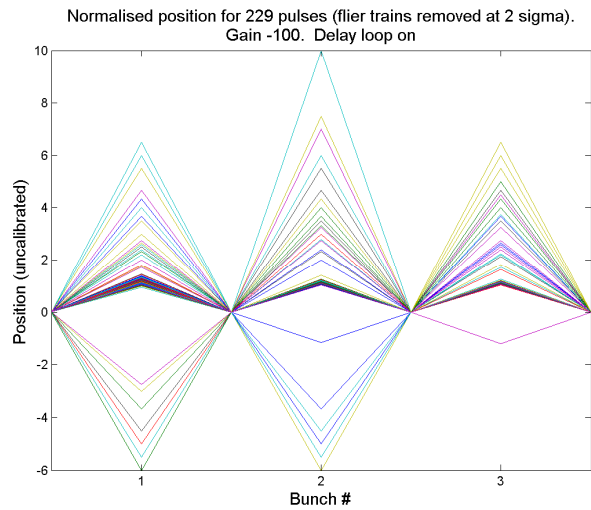
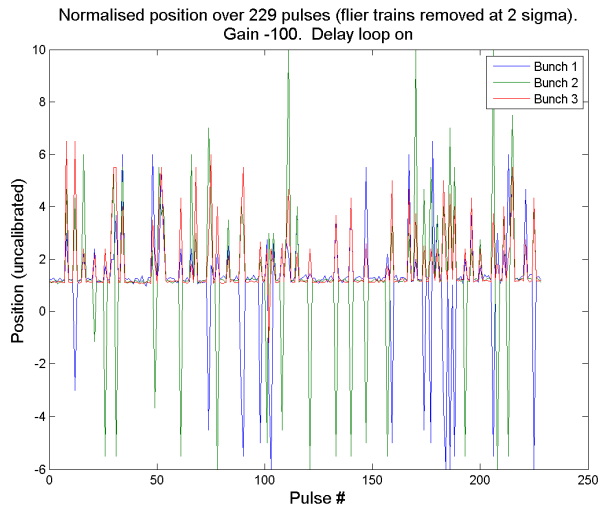
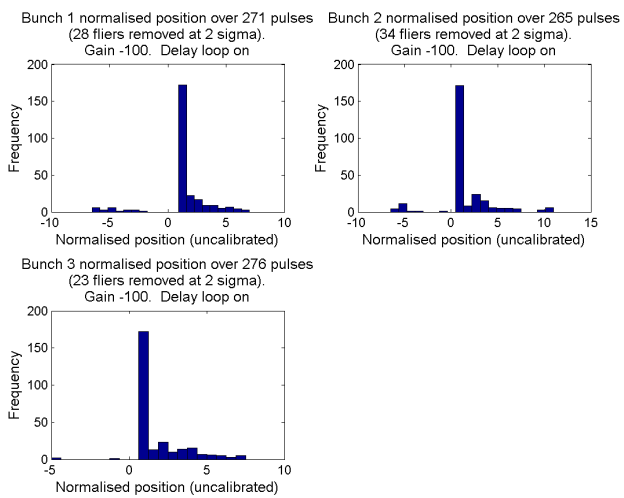
Final average information

N = 93

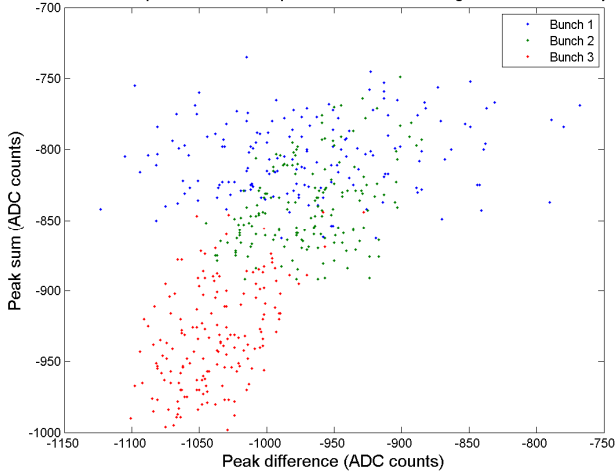
	Bunch 1	Bunch 2	Bunch 3
Mean	1.1764	1.1141	1.0636
Sigma	0.0747	0.0378	0.0355

March 2008 – Position 1 – Gain -100 – Delay loop on

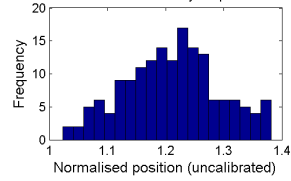




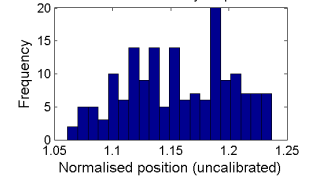
Peak difference vs. peak sum for 170 pulses after thresholding. Gain -100. Delay loop on



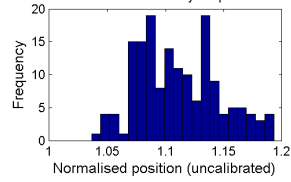
Bunch 1 normalised position over 163 pulses after thresholding (7 fliers removed at 2 sigma). Gain -100. Delay loop on



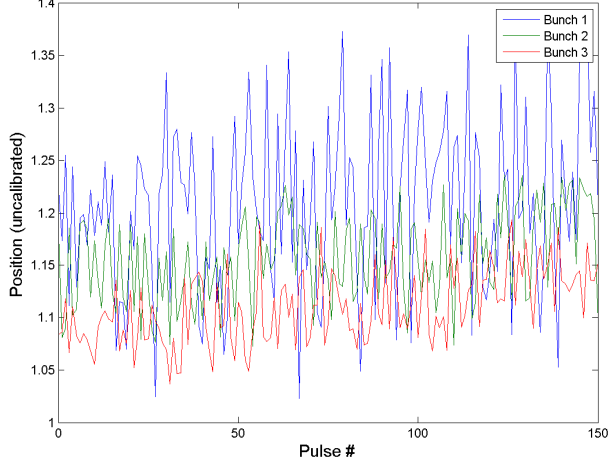
Bunch 2 normalised position over 166 pulses after thresholding (4 fliers removed at 2 sigma). Gain -100. Delay loop on



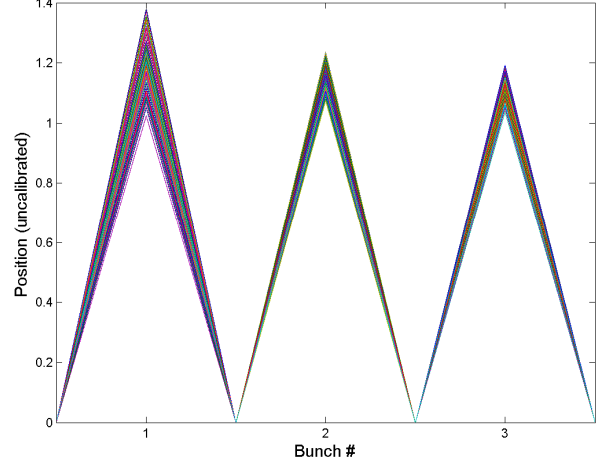
Bunch 3 normalised position over 161 pulses after thresholding (9 fliers removed at 2 sigma). Gain -100. Delay loop on



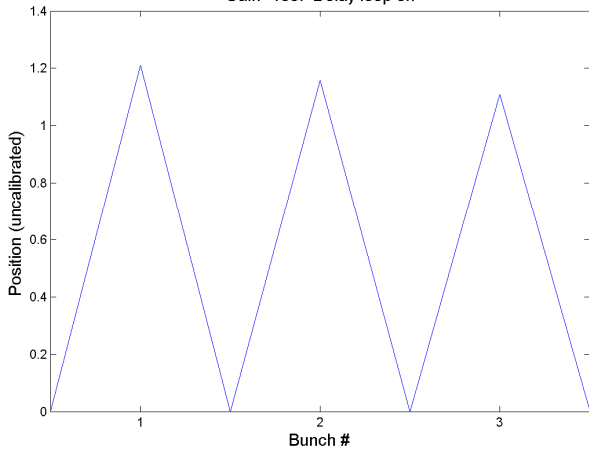
Normalised position over 151 pulses after thresholding (flier trains removed at 2 sigma). Gain -100. Delay loop on



Normalised position for 151 pulses after thresholding (flier trains removed at 2 sigma). Gain -100. Delay loop on



Normalised position averaged over 151 pulses after thresholding (flier trains removed at 2 sigma). Gain -100. Delay loop on



Summary for gain -100, delay loop on

Threshold information

	Bunch 1	Bunch 2	Bunch 3
Difference	< -600	< -600	< -600
Sum	< -400	< -400	< -400

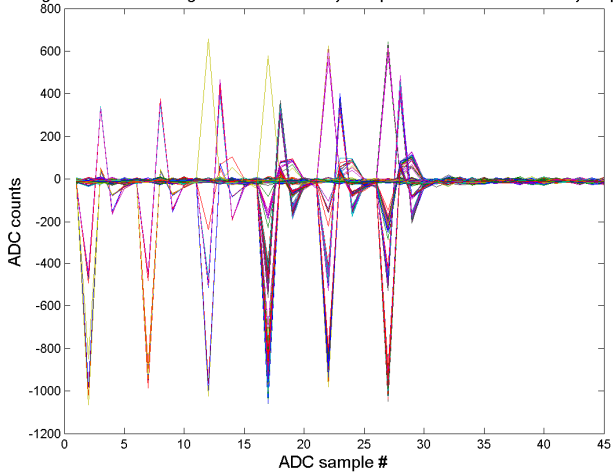
Final average information

N = 151

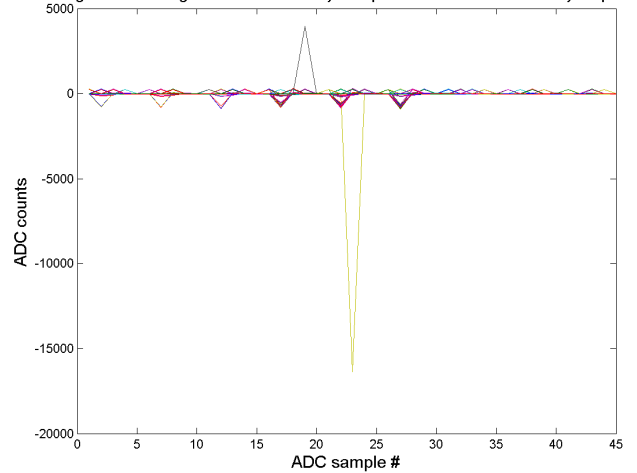
	Bunch 1	Bunch 2	Bunch 3
Mean	1.2101	1.1141	1.0636
Sigma	0.0822	0.0437	0.0352

March 2008 – Position 1 – Gain -1000 – Delay loop off

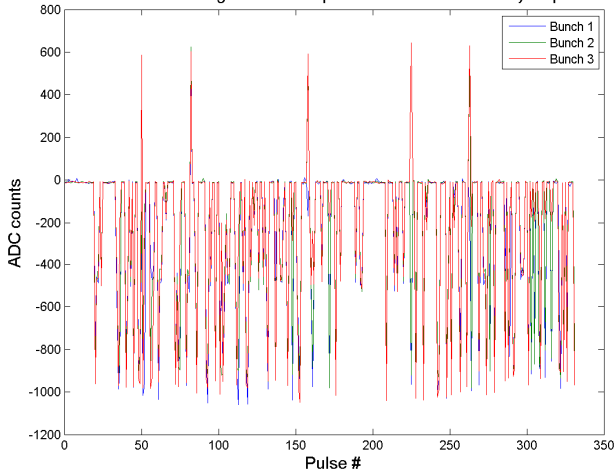
Digitised difference signals from nominally 333 pulses. Gain -1000. Delay loop off



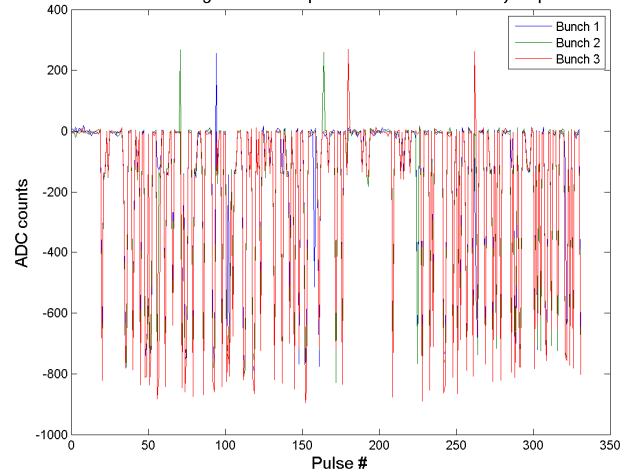
Digitised sum signals from nominally 333 pulses. Gain -1000. Delay loop off



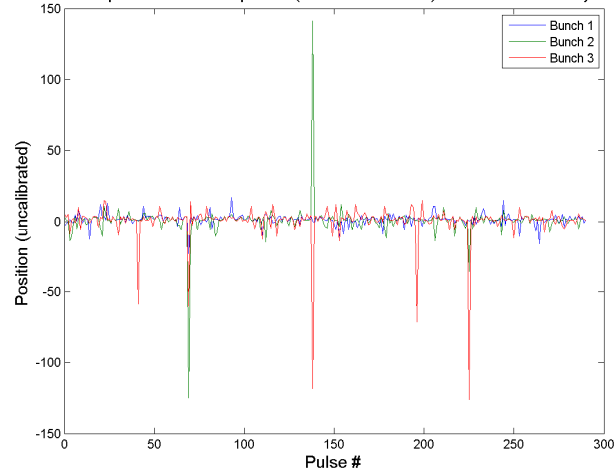
Peak difference signal over 332 pulses. Gain -1000. Delay loop off



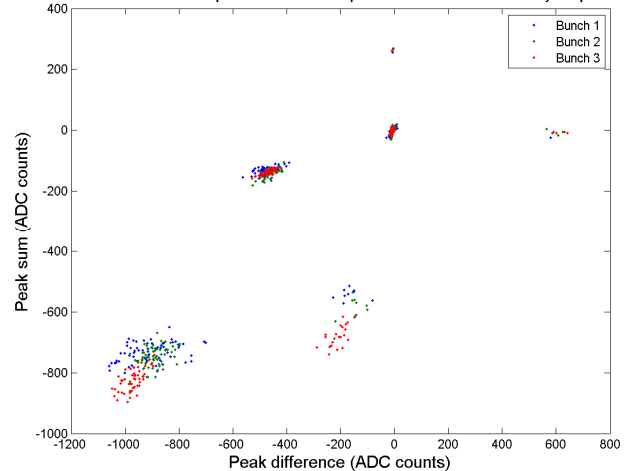
Peak sum signal over 332 pulses. Gain -1000. Delay loop off

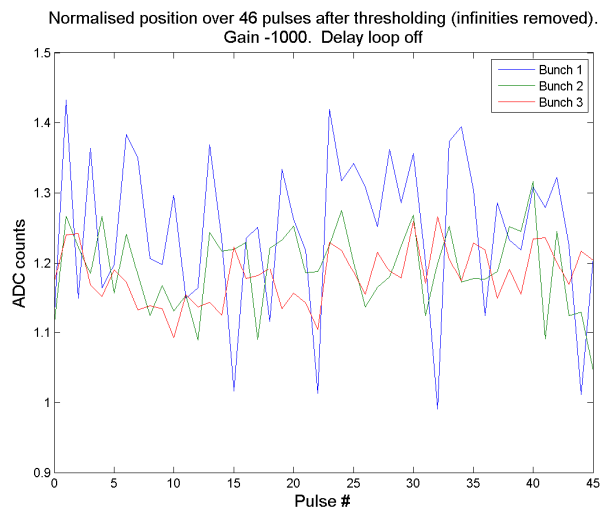
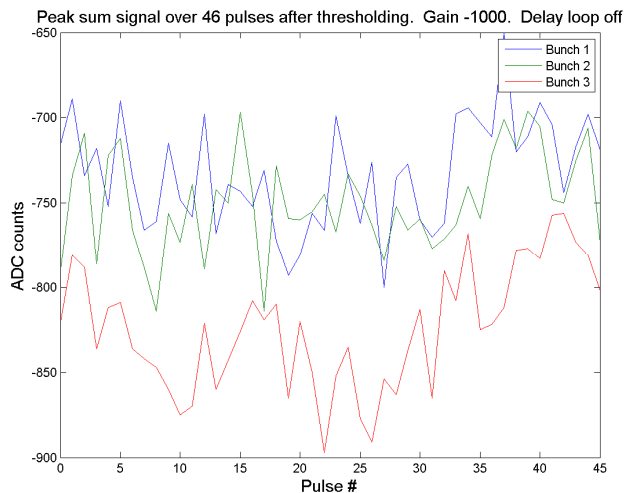
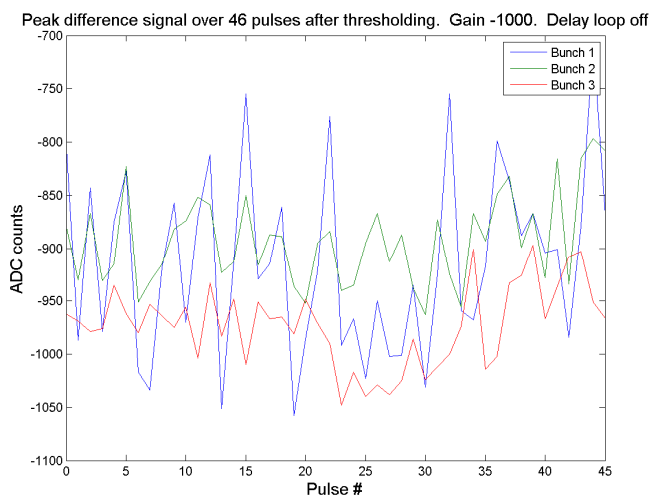
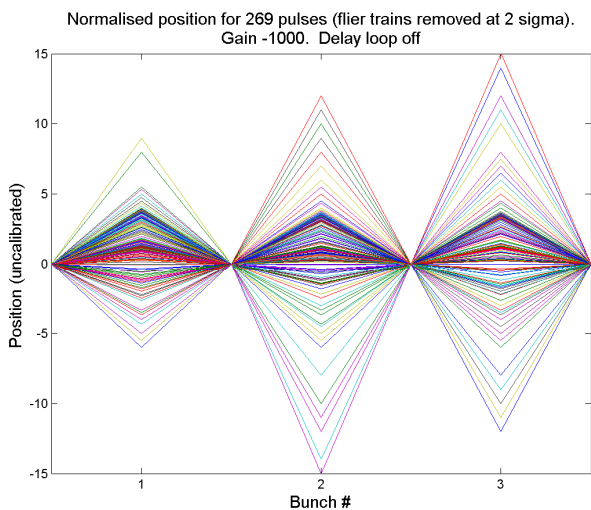
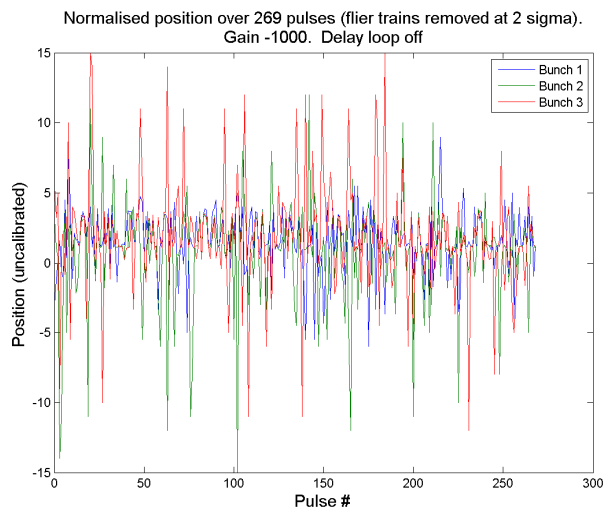
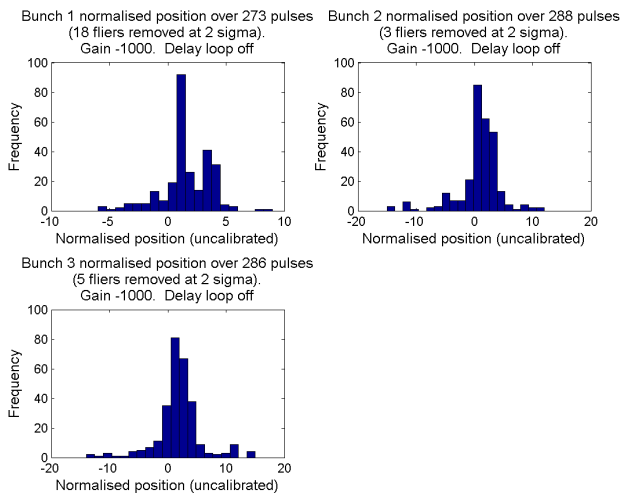


Normalised position over 291 pulses (infinities removed). Gain -1000. Delay loop off

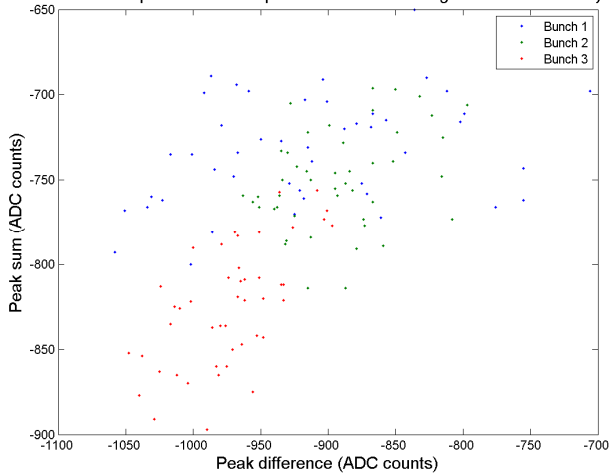


Peak difference vs. peak sum for 332 pulses. Gain -1000. Delay loop off

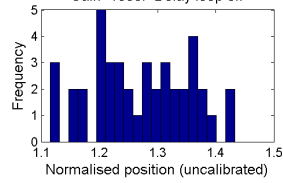




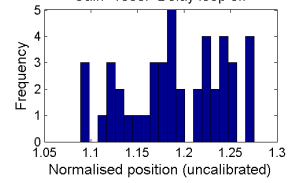
Peak difference vs. peak sum for 46 pulses after thresholding. Gain -1000. Delay loop off



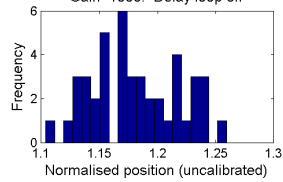
Bunch 1 normalised position over 42 pulses after thresholding (4 fliers removed at 2 sigma). Gain -1000. Delay loop off



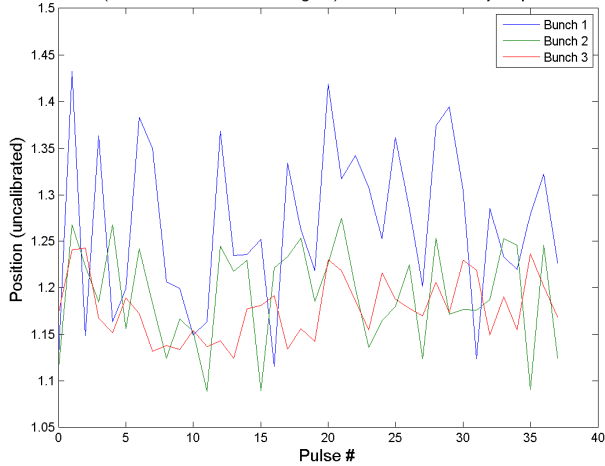
Bunch 2 normalised position over 44 pulses after thresholding (2 fliers removed at 2 sigma). Gain -1000. Delay loop off



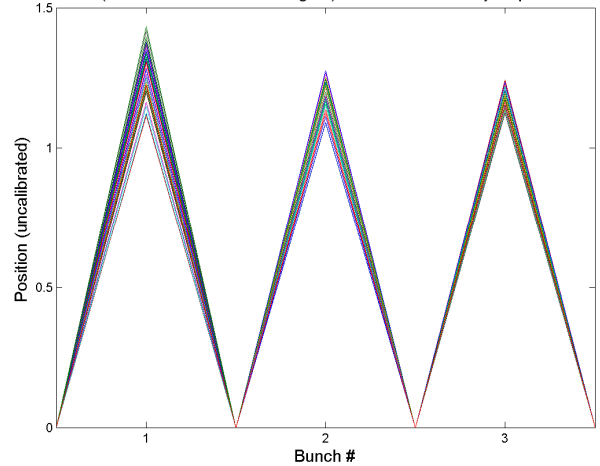
Bunch 3 normalised position over 44 pulses after thresholding (2 fliers removed at 2 sigma). Gain -1000. Delay loop off



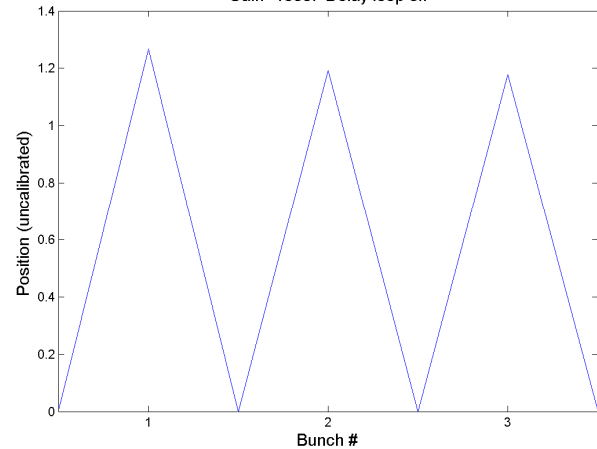
Normalised position over 38 pulses after thresholding (flier trains removed at 2 sigma). Gain -1000. Delay loop off



Normalised position for 38 pulses after thresholding (flier trains removed at 2 sigma). Gain -1000. Delay loop off



Normalised position averaged over 38 pulses after thresholding (flier trains removed at 2 sigma). Gain -1000. Delay loop off



Summary for gain -1000, delay loop off

Threshold information

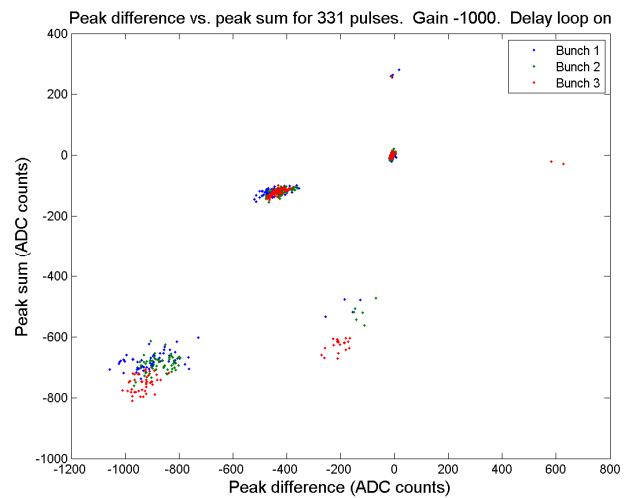
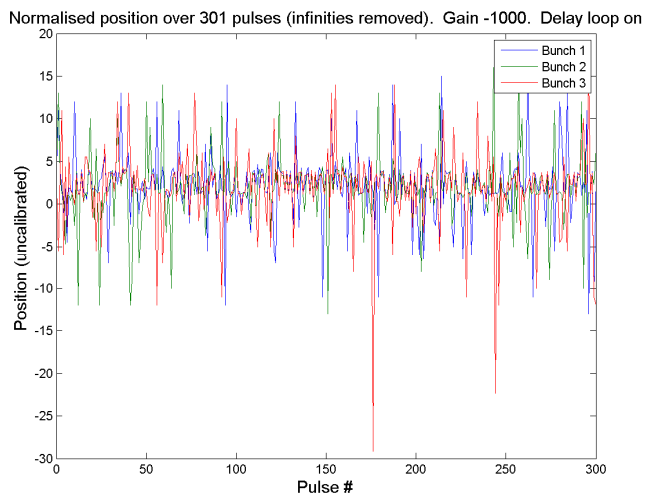
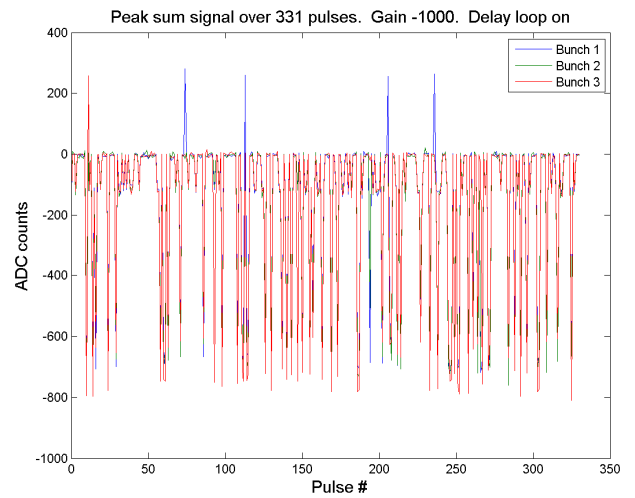
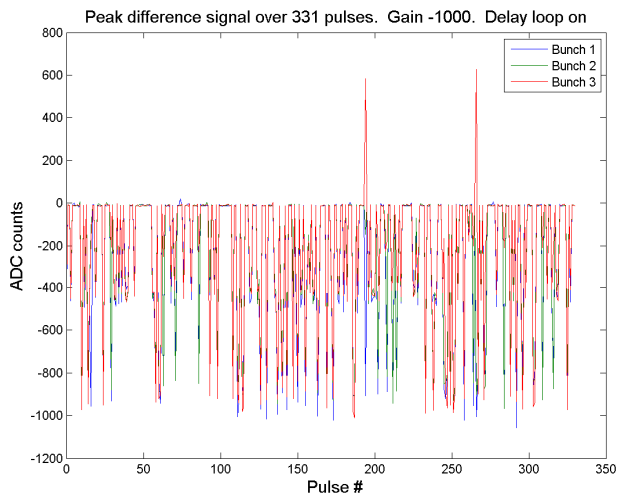
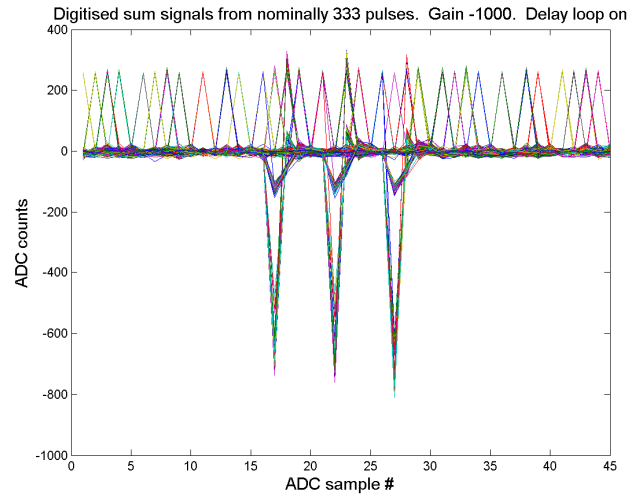
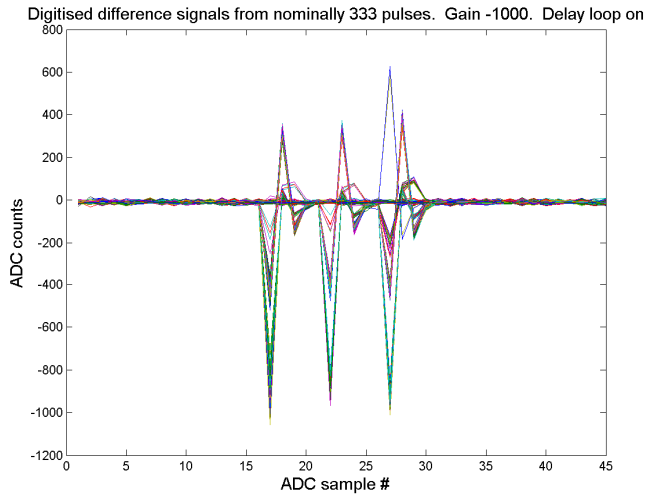
	Bunch 1	Bunch 2	Bunch 3
Difference	< -600	< -600	< -600
Sum	< -400	< -400	< -400

Final average information

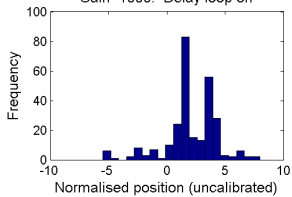
N = 38

	Bunch 1	Bunch 2	Bunch 3
Mean	1.2671	1.1918	1.1775
Sigma	0.0884	0.0541	0.0377

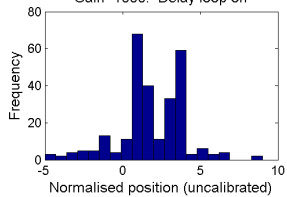
March 2008 – Position 1 – Gain -1000 – Delay loop on



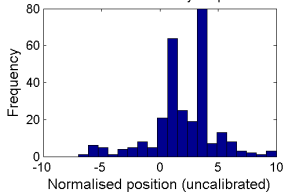
Bunch 1 normalised position over 272 pulses (29 fliers removed at 2 sigma). Gain -1000. Delay loop on



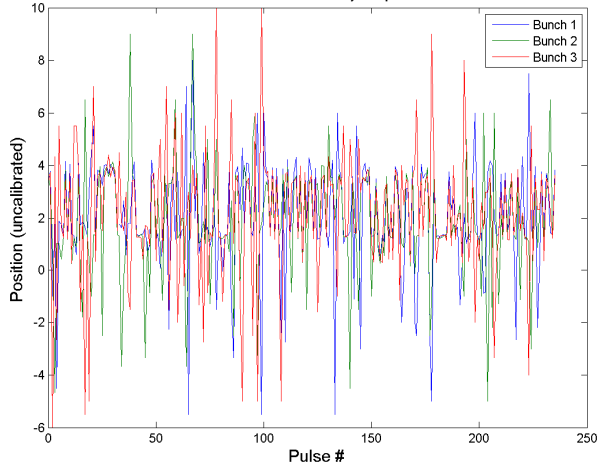
Bunch 2 normalised position over 276 pulses (25 fliers removed at 2 sigma). Gain -1000. Delay loop on



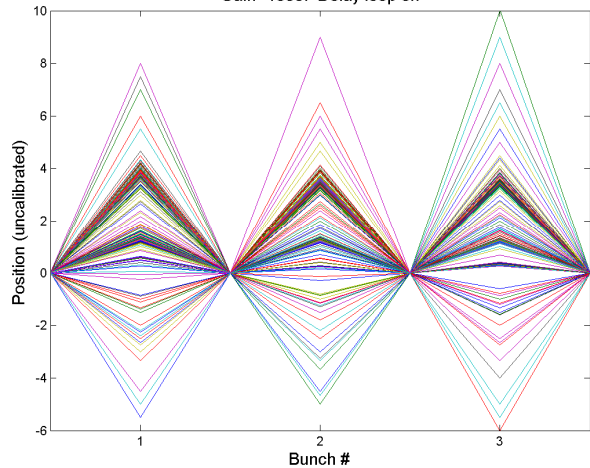
Bunch 3 normalised position over 281 pulses (20 fliers removed at 2 sigma). Gain -1000. Delay loop on



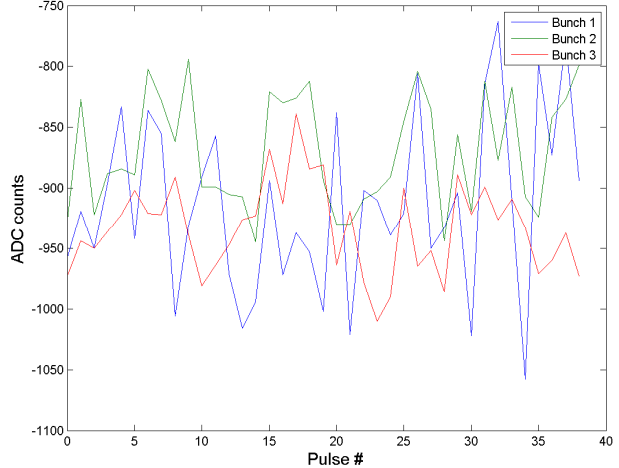
Normalised position over 236 pulses (flier trains removed at 2 sigma). Gain -1000. Delay loop on



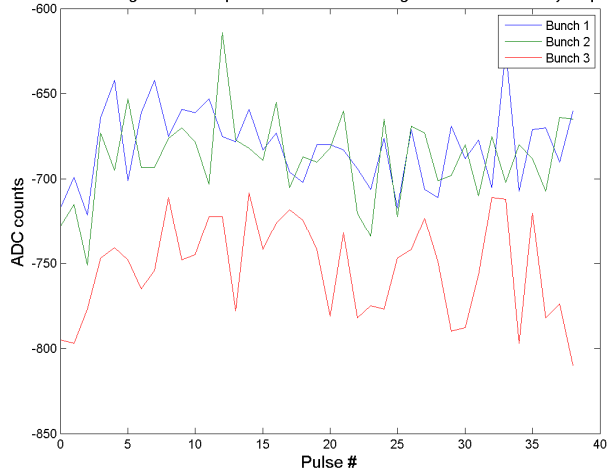
Normalised position for 236 pulses (flier trains removed at 2 sigma). Gain -1000. Delay loop on



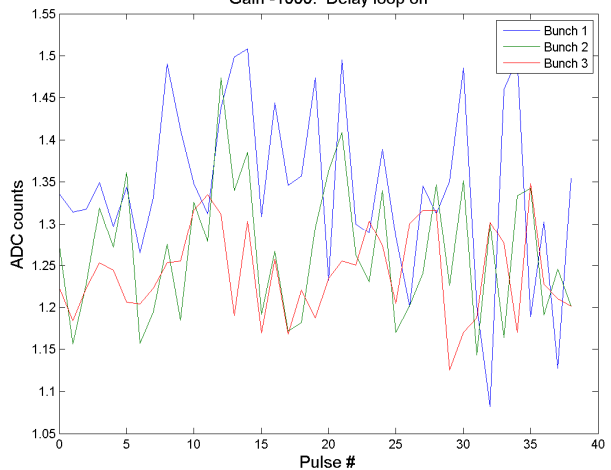
Peak difference signal over 39 pulses after thresholding. Gain -1000. Delay loop on



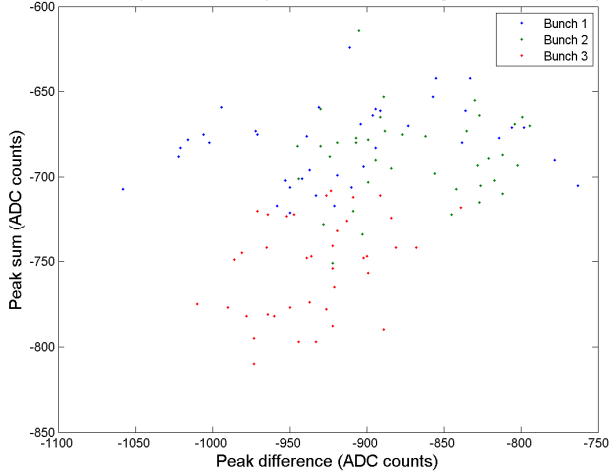
Peak sum signal over 39 pulses after thresholding. Gain -1000. Delay loop on



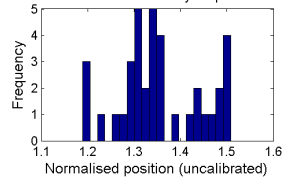
Normalised position over 39 pulses after thresholding (infinities removed). Gain -1000. Delay loop on



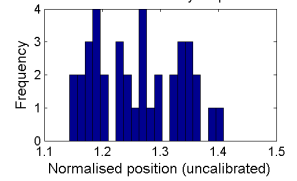
Peak difference vs. peak sum for 39 pulses after thresholding. Gain -1000. Delay loop on



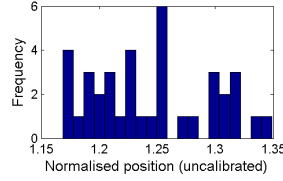
Bunch 1 normalised position over 37 pulses after thresholding (2 fliers removed at 2 sigma). Gain -1000. Delay loop on



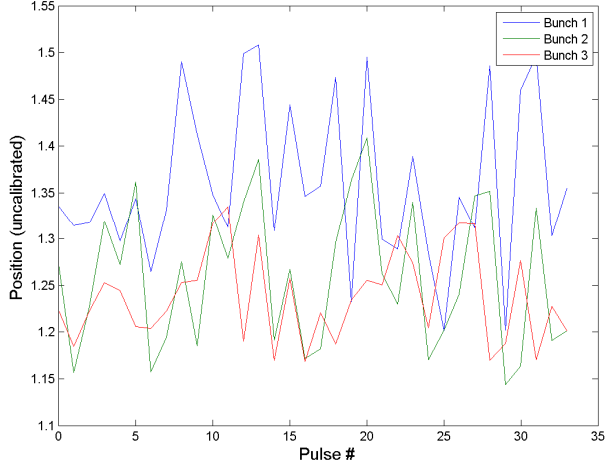
Bunch 2 normalised position over 38 pulses after thresholding (1 fliers removed at 2 sigma). Gain -1000. Delay loop on



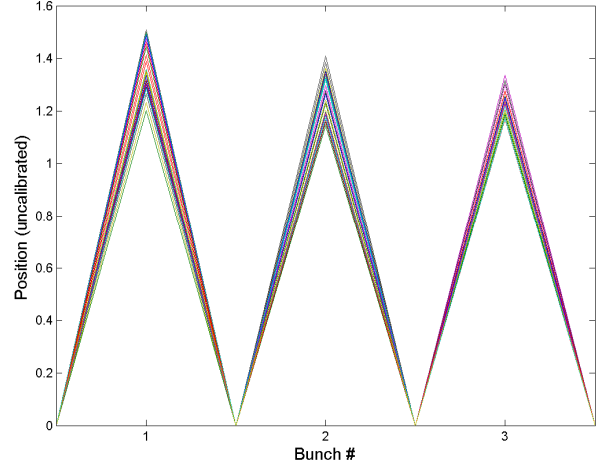
Bunch 3 normalised position over 38 pulses after thresholding (1 fliers removed at 2 sigma). Gain -1000. Delay loop on



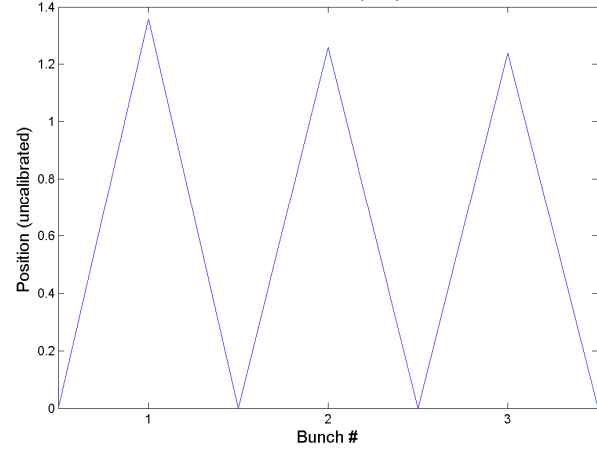
Normalised position over 34 pulses after thresholding (flier trains removed at 2 sigma). Gain -1000. Delay loop on



Normalised position for 34 pulses after thresholding (flier trains removed at 2 sigma). Gain -1000. Delay loop on



Normalised position averaged over 34 pulses after thresholding (flier trains removed at 2 sigma). Gain -1000. Delay loop on



Summary for gain -1000, delay loop on

Threshold information

	Bunch 1	Bunch 2	Bunch 3
Difference	< -600	< -600	< -600
Sum	< -400	< -400	< -400

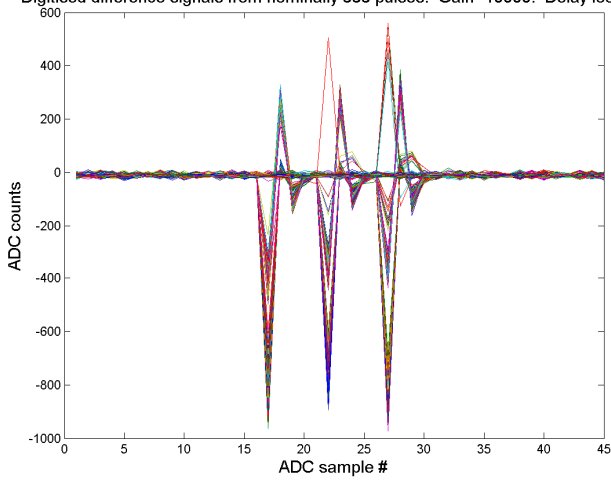
Final average information

N = 34

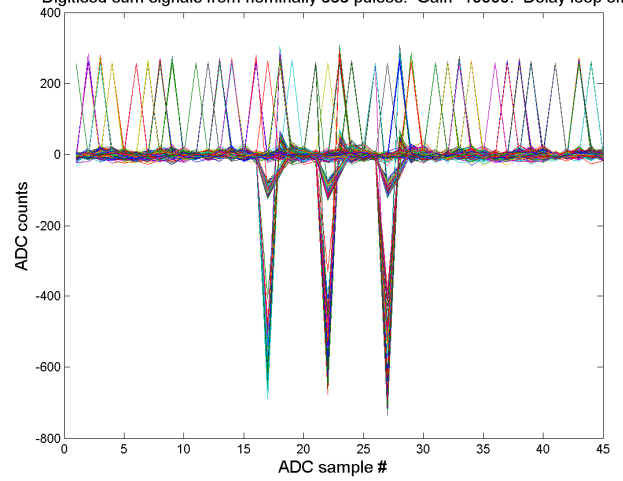
	Bunch 1	Bunch 2	Bunch 3
Mean	1.3590	1.2592	1.2385
Sigma	0.0878	0.0774	0.0491

March 2008 – Position 1 – Gain -10000 – Delay loop off

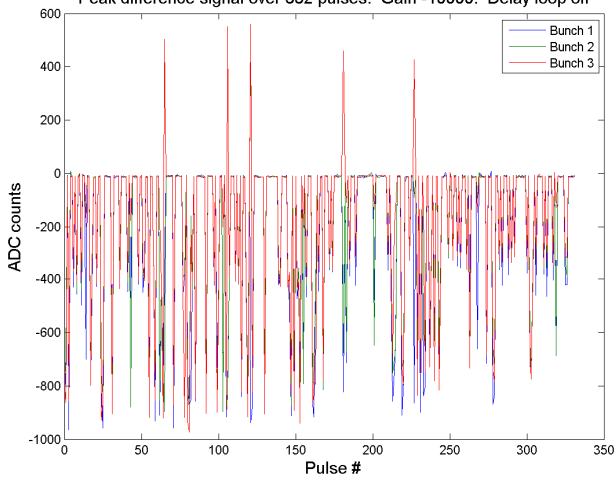
Digitised difference signals from nominally 333 pulses. Gain -10000. Delay loop off



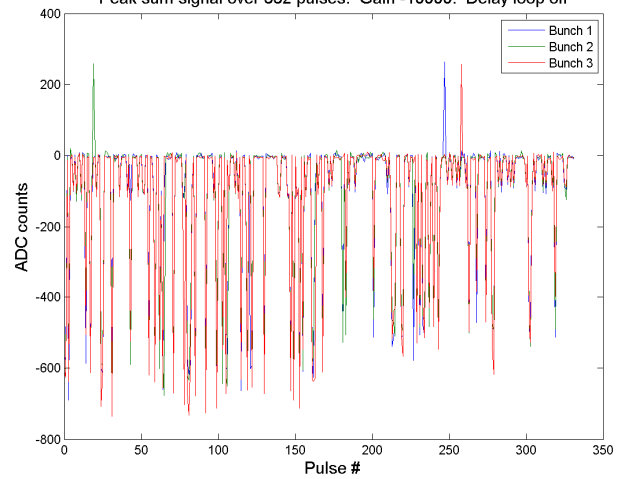
Digitised sum signals from nominally 333 pulses. Gain -10000. Delay loop off



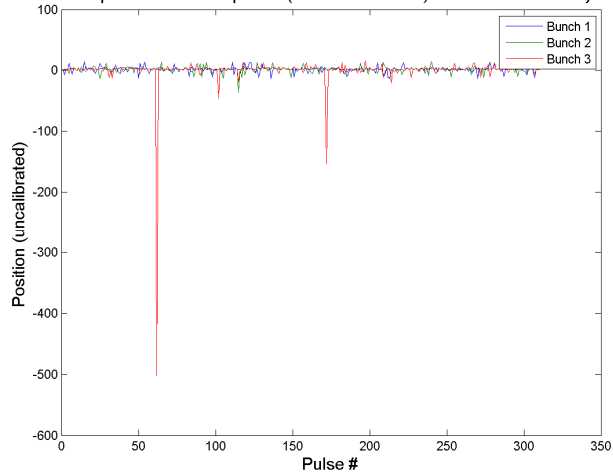
Peak difference signal over 332 pulses. Gain -10000. Delay loop off



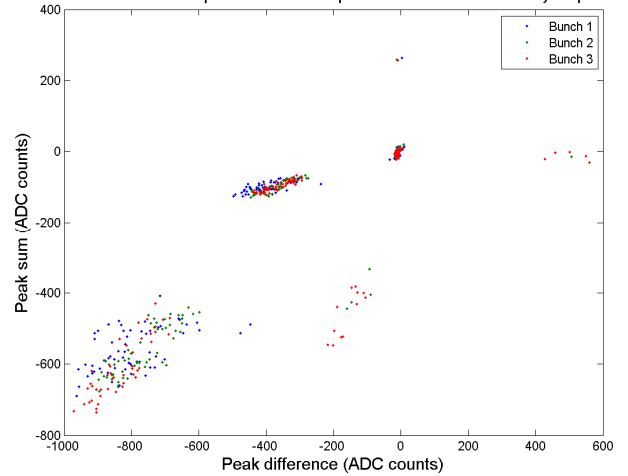
Peak sum signal over 332 pulses. Gain -10000. Delay loop off



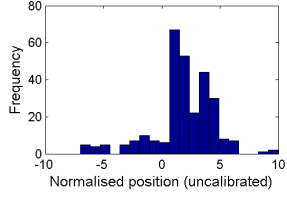
Normalised position over 311 pulses (infinities removed). Gain -10000. Delay loop off



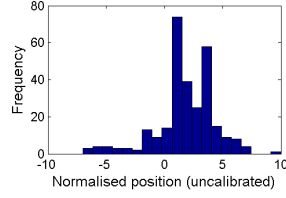
Peak difference vs. peak sum for 332 pulses. Gain -10000. Delay loop off



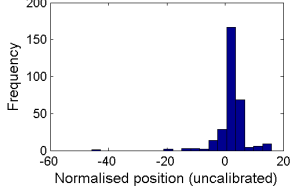
Bunch 1 normalised position over 283 pulses (28 fliers removed at 2 sigma). Gain -10000. Delay loop off



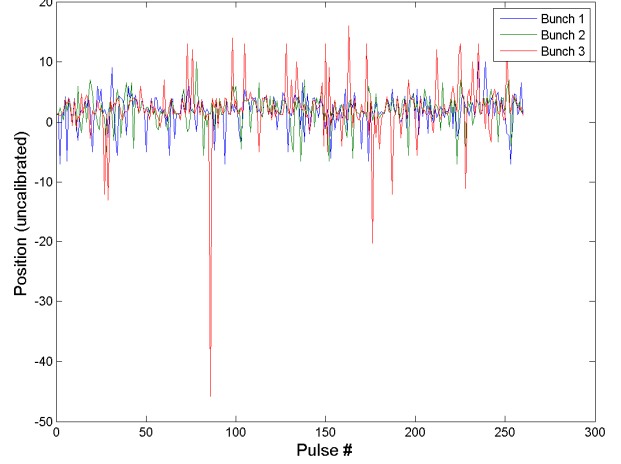
Bunch 2 normalised position over 288 pulses (23 fliers removed at 2 sigma). Gain -10000. Delay loop off



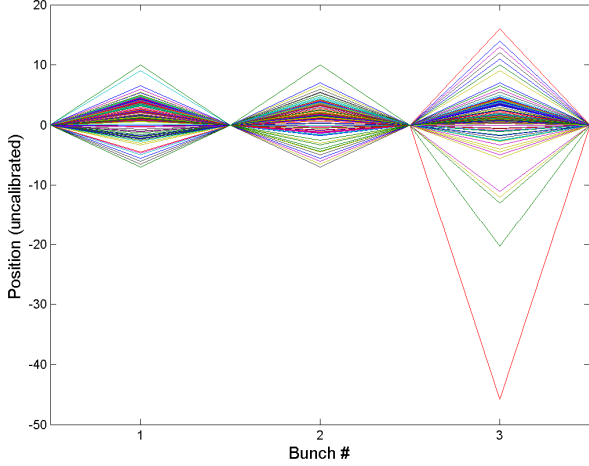
Bunch 3 normalised position over 309 pulses (2 fliers removed at 2 sigma). Gain -10000. Delay loop off



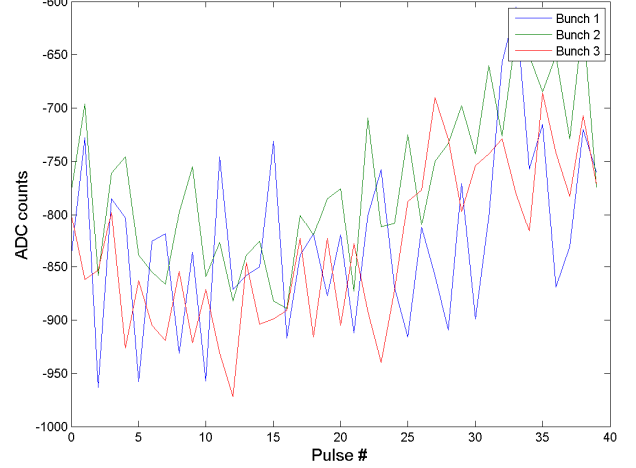
Normalised position over 261 pulses (flier trains removed at 2 sigma). Gain -10000. Delay loop off



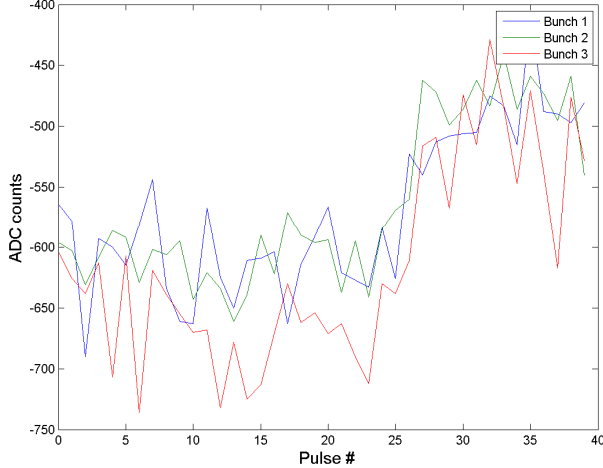
Normalised position for 261 pulses (flier trains removed at 2 sigma). Gain -10000. Delay loop off



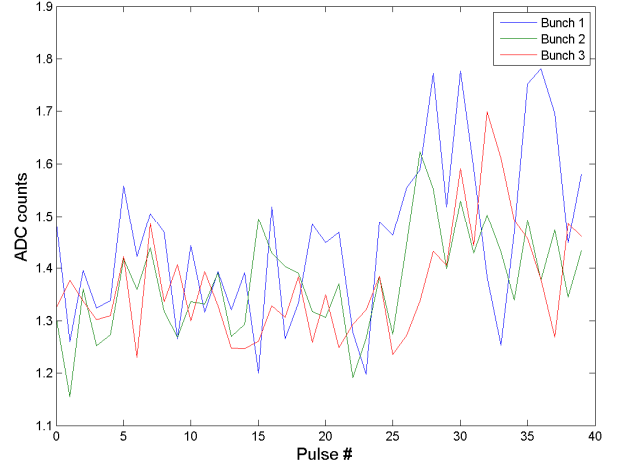
Peak difference signal over 40 pulses after thresholding. Gain -10000. Delay loop off



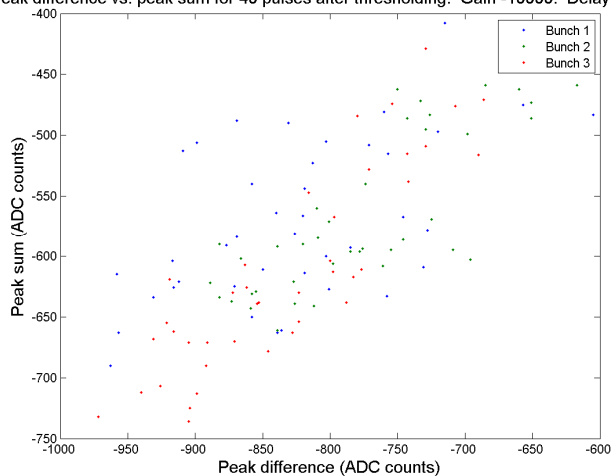
Peak sum signal over 40 pulses after thresholding. Gain -10000. Delay loop off



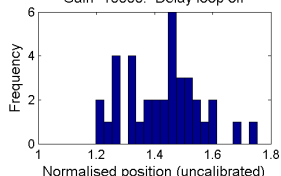
Normalised position over 40 pulses after thresholding (infinities removed). Gain -10000. Delay loop off



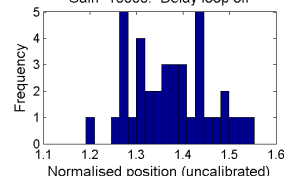
Peak difference vs. peak sum for 40 pulses after thresholding. Gain -10000. Delay loop of



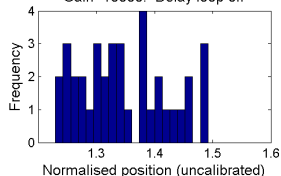
Bunch 1 normalised position over 37 pulses after thresholding (3 fliers removed at 2 sigma). Gain -10000. Delay loop off



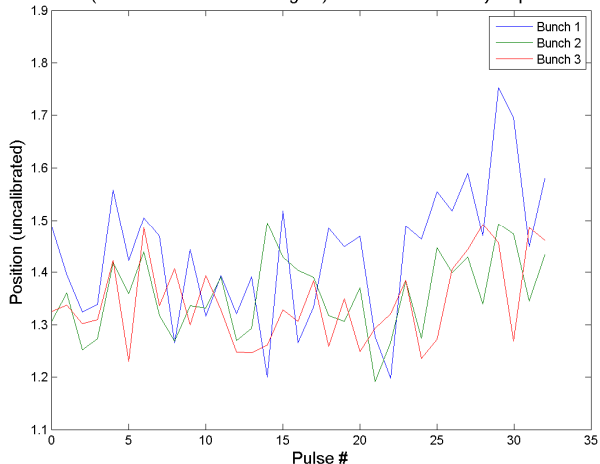
Bunch 2 normalised position over 38 pulses after thresholding (2 fliers removed at 2 sigma). Gain -10000. Delay loop off



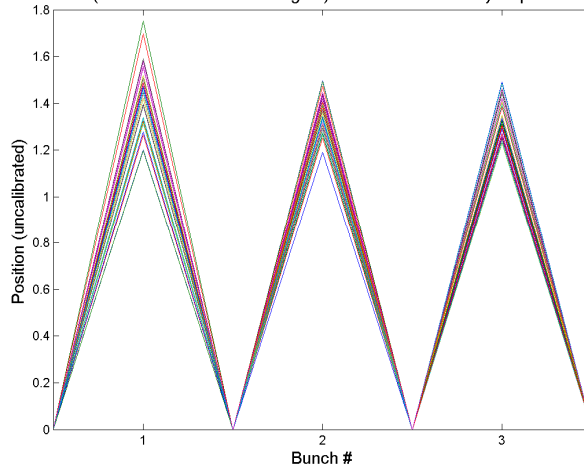
Bunch 3 normalised position over 37 pulses after thresholding (3 fliers removed at 2 sigma). Gain -10000. Delay loop off



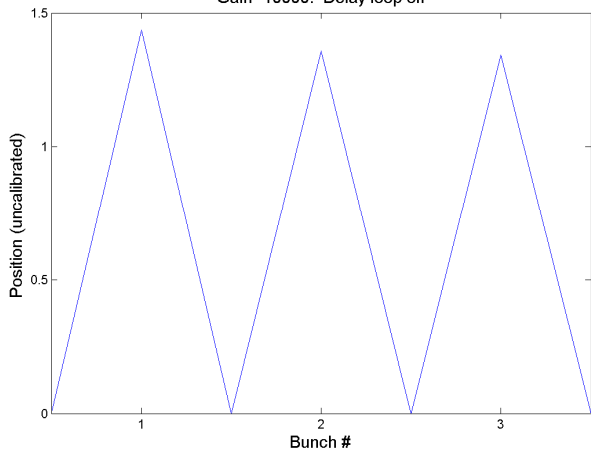
Normalised position over 33 pulses after thresholding (flier trains removed at 2 sigma). Gain -10000. Delay loop off



Normalised position for 33 pulses after thresholding (flier trains removed at 2 sigma). Gain -10000. Delay loop off



Normalised position averaged over 33 pulses after thresholding (flier trains removed at 2 sigma). Gain -10000. Delay loop off



Summary for gain -10000, delay loop off

Threshold information

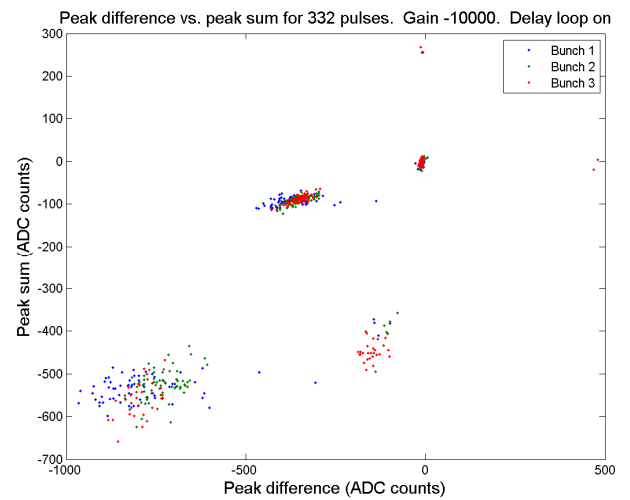
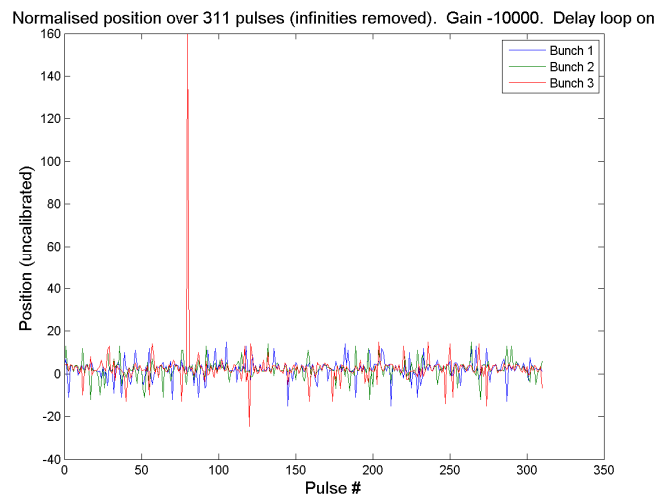
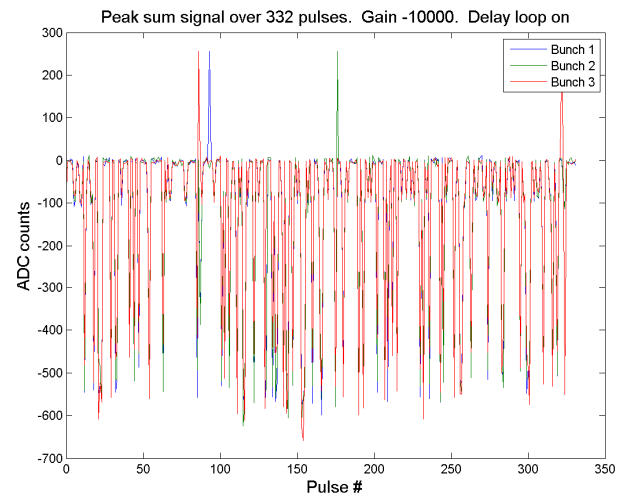
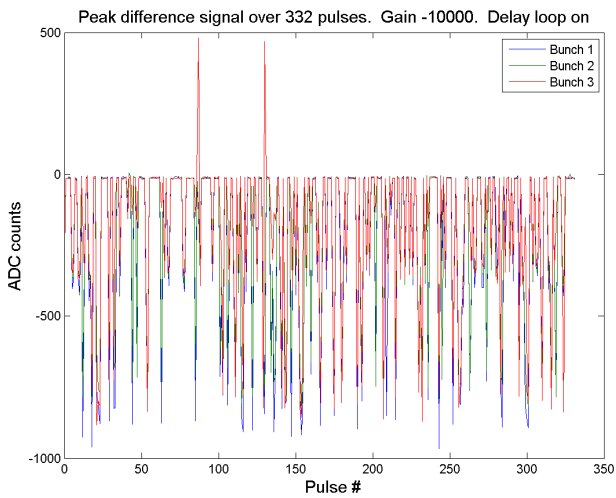
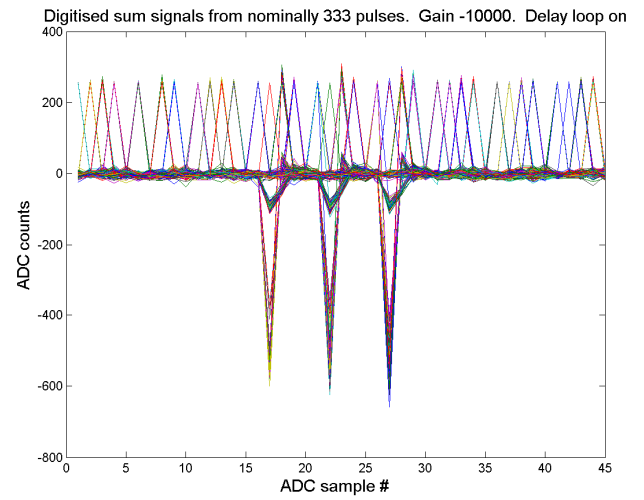
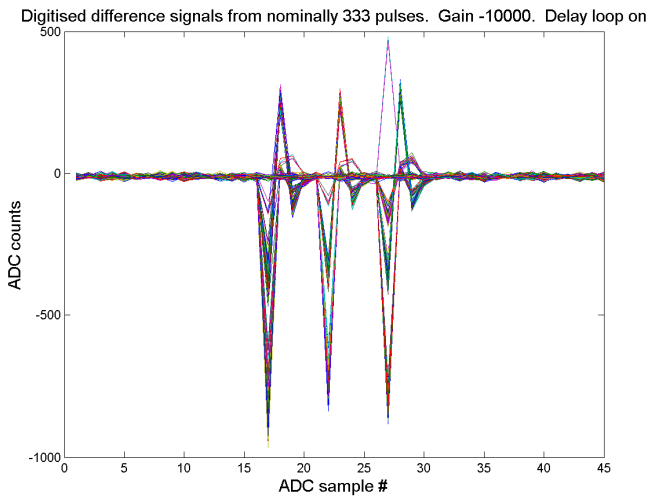
	Bunch 1	Bunch 2	Bunch 3
Difference	< -600	< -600	< -600
Sum	< -400	< -400	< -400

Final average information

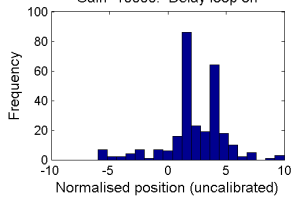
N = 33

	Bunch 1	Bunch 2	Bunch 3
Mean	1.4359	1.3574	1.3430
Sigma	0.1291	0.0755	0.0801

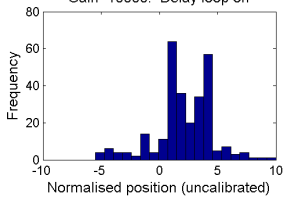
March 2008 – Position 1 – Gain -10000 – Delay loop on



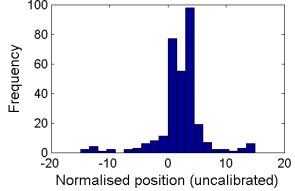
Bunch 1 normalised position over 283 pulses (28 fliers removed at 2 sigma). Gain -10000. Delay loop on



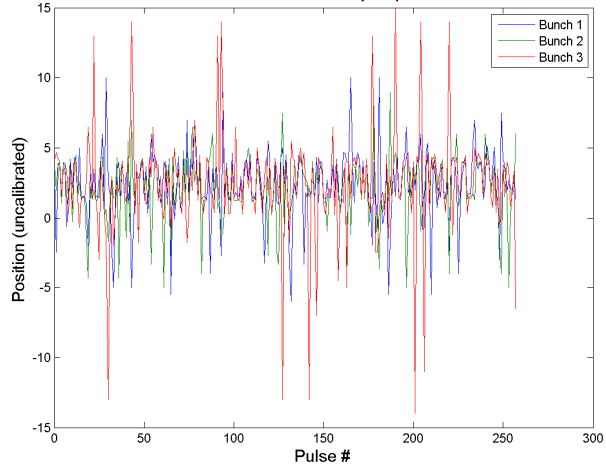
Bunch 2 normalised position over 282 pulses (29 fliers removed at 2 sigma). Gain -10000. Delay loop on



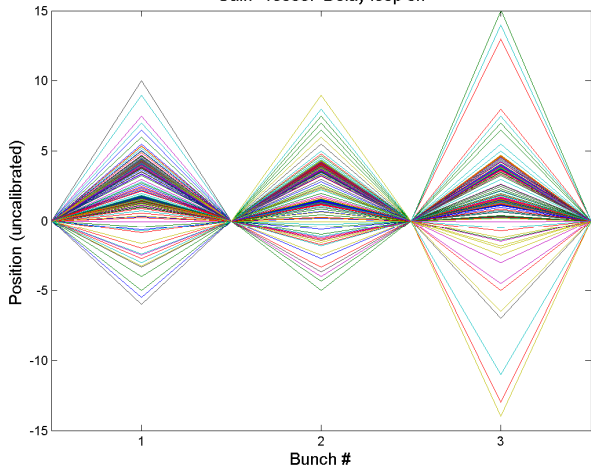
Bunch 3 normalised position over 309 pulses (2 fliers removed at 2 sigma). Gain -10000. Delay loop on



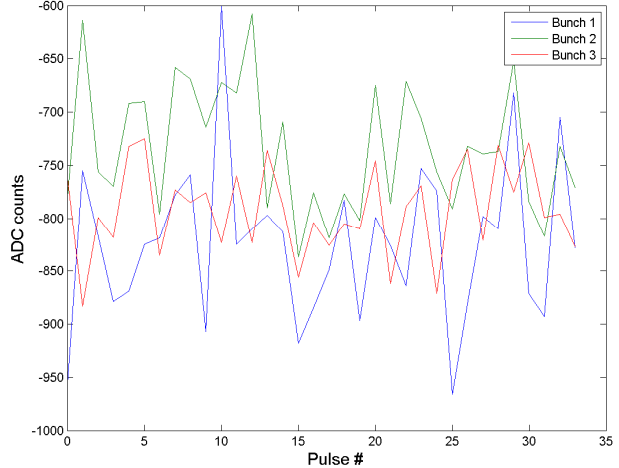
Normalised position over 258 pulses (flier trains removed at 2 sigma). Gain -10000. Delay loop on



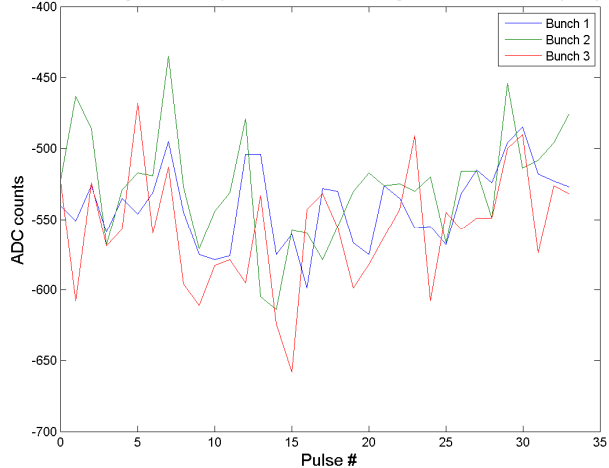
Normalised position for 258 pulses (flier trains removed at 2 sigma). Gain -10000. Delay loop on



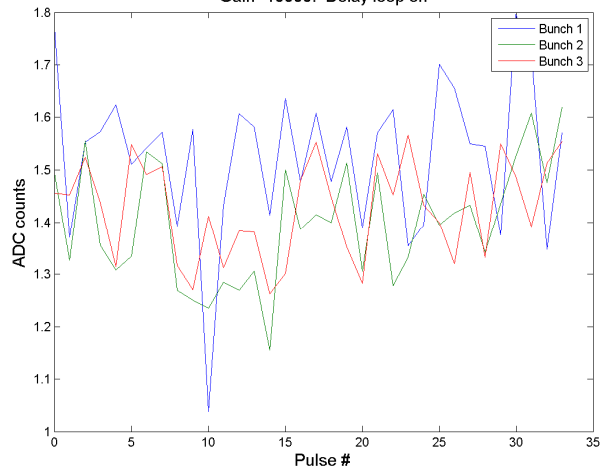
Peak difference signal over 34 pulses after thresholding. Gain -10000. Delay loop on



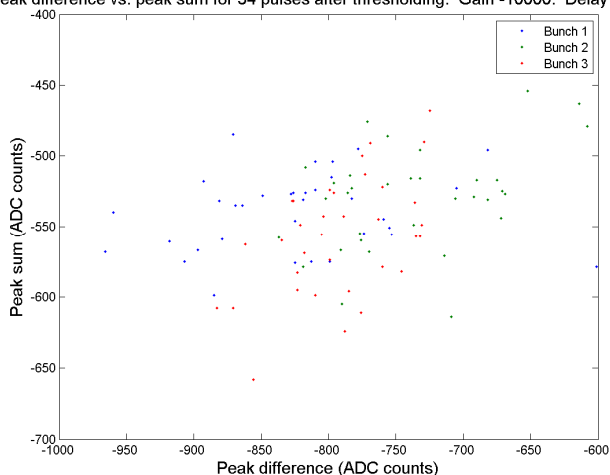
Peak sum signal over 34 pulses after thresholding. Gain -10000. Delay loop on



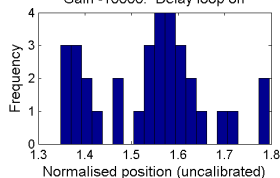
Normalised position over 34 pulses after thresholding (infinities removed). Gain -10000. Delay loop on



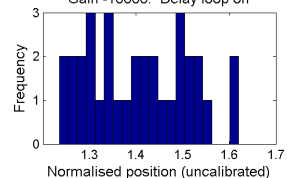
Peak difference vs. peak sum for 34 pulses after thresholding. Gain -10000. Delay loop on



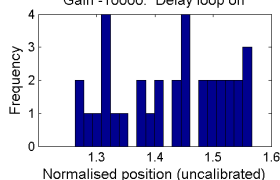
Bunch 1 normalised position over 33 pulses after thresholding (1 fliers removed at 2 sigma). Gain -10000. Delay loop on



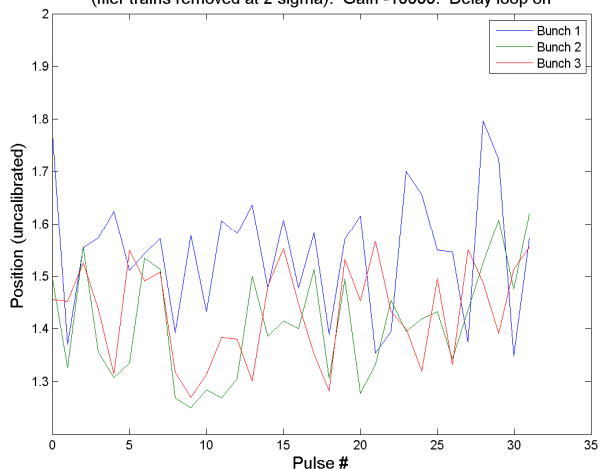
Bunch 2 normalised position over 33 pulses after thresholding (1 fliers removed at 2 sigma). Gain -10000. Delay loop on



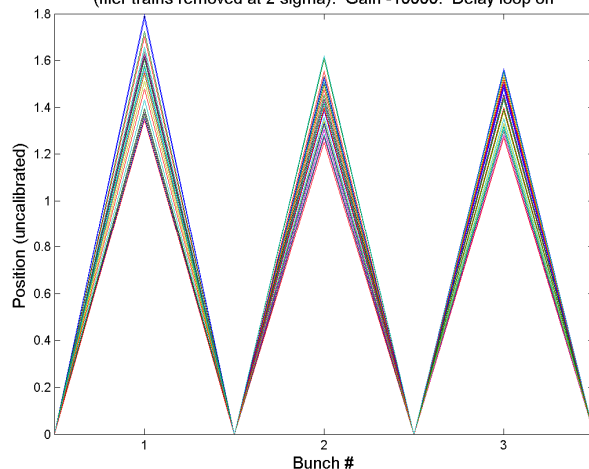
Bunch 3 normalised position over 34 pulses after thresholding (0 fliers removed at 2 sigma). Gain -10000. Delay loop on



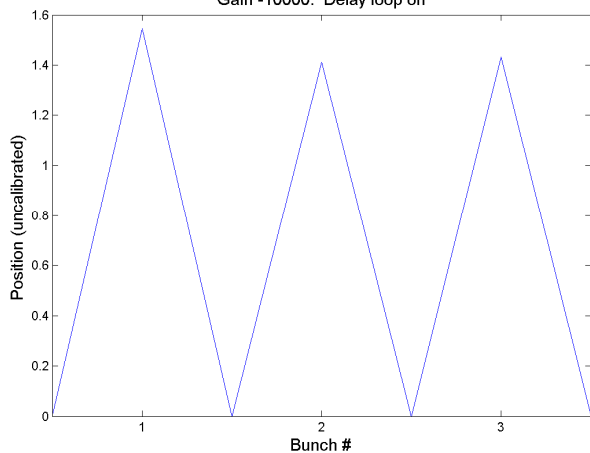
Normalised position over 32 pulses after thresholding (flier trains removed at 2 sigma). Gain -10000. Delay loop on



Normalised position for 32 pulses after thresholding (flier trains removed at 2 sigma). Gain -10000. Delay loop on



Normalised position averaged over 32 pulses after thresholding (flier trains removed at 2 sigma). Gain -10000. Delay loop on



Summary for gain -10000, delay loop on

Threshold information

	Bunch 1	Bunch 2	Bunch 3
Difference	< -600	< -600	< -600
Sum	< -400	< -400	< -400

Final average information

N = 32

	Bunch 1	Bunch 2	Bunch 3
Mean	1.5464	1.4104	1.4325
Sigma	0.1201	0.1051	0.0924