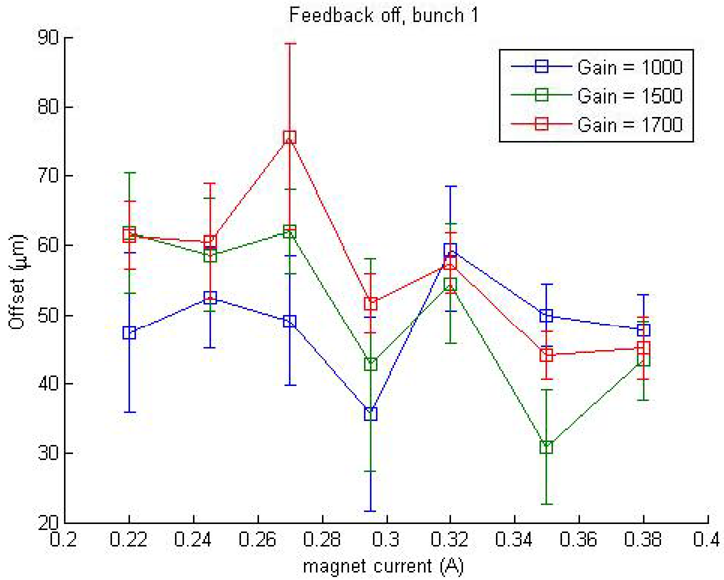
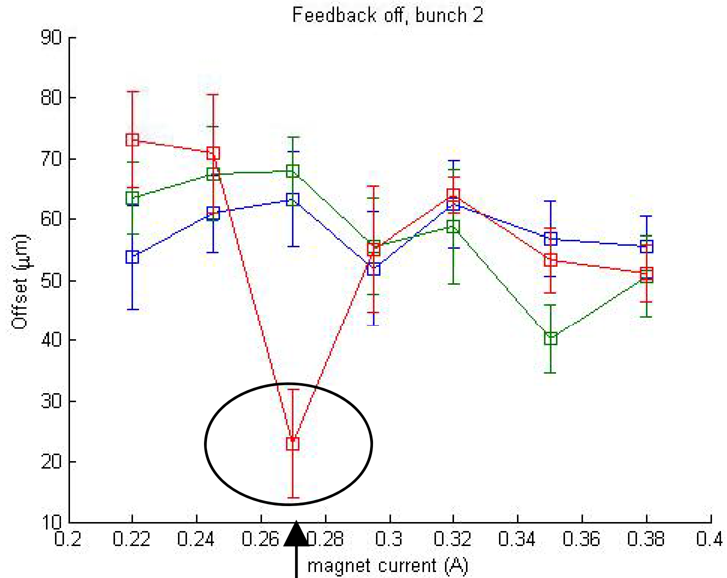
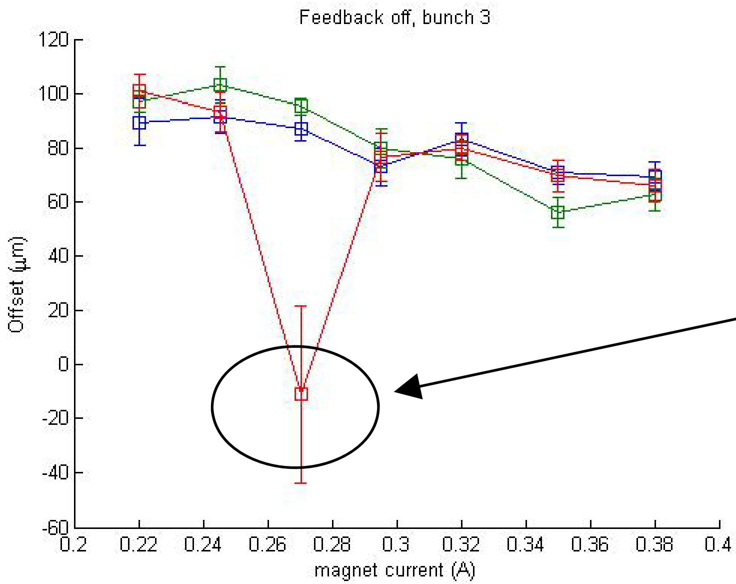
Offset analysis

Robert Apsimon

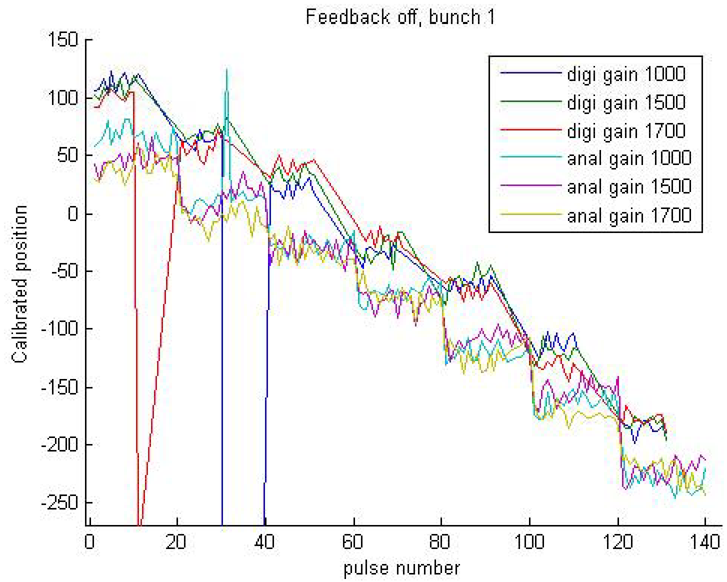


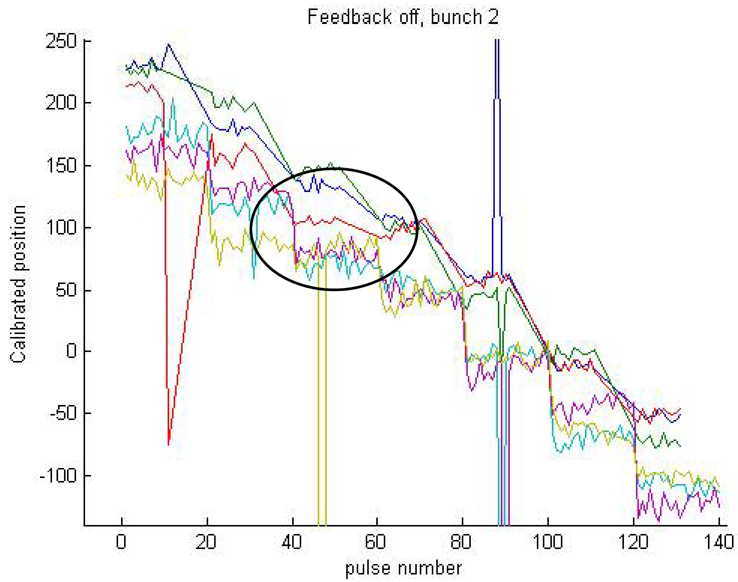


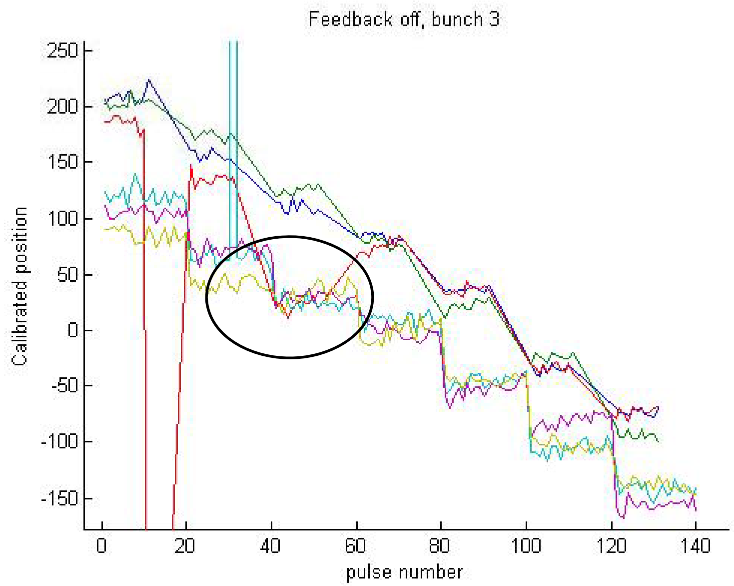


Next slide explains this weird offset…

Other than this, everything seems pretty good, though some error bars are a bit large, ~30 microns

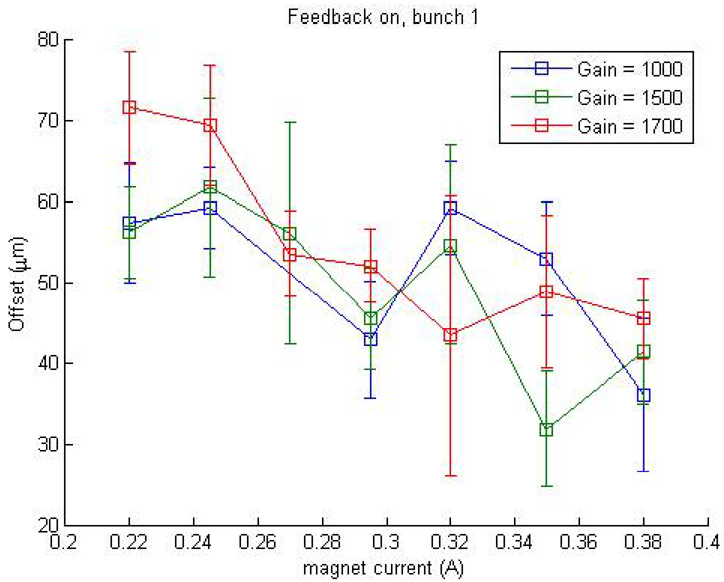


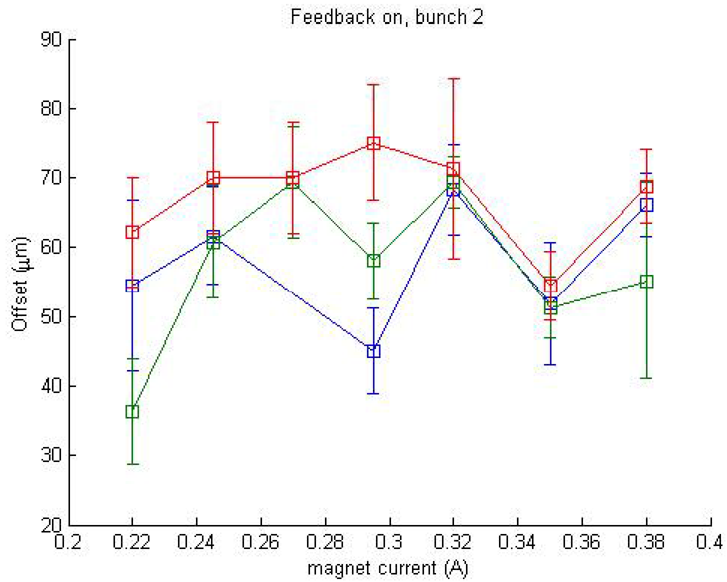


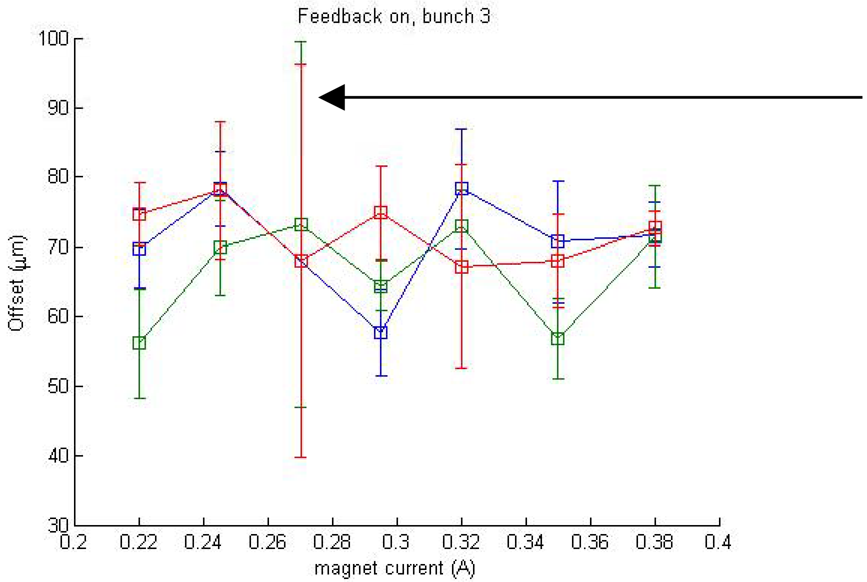


The red lines represent the digital data for feedback off with a gain of 1700 (though that obviously doesn't mean anything!)…

In both cases, measured position of the beam for the digital and analogue electronics is not consistent. Since the analogue data appears to be normal, it is probably an issue with the digital electronics.

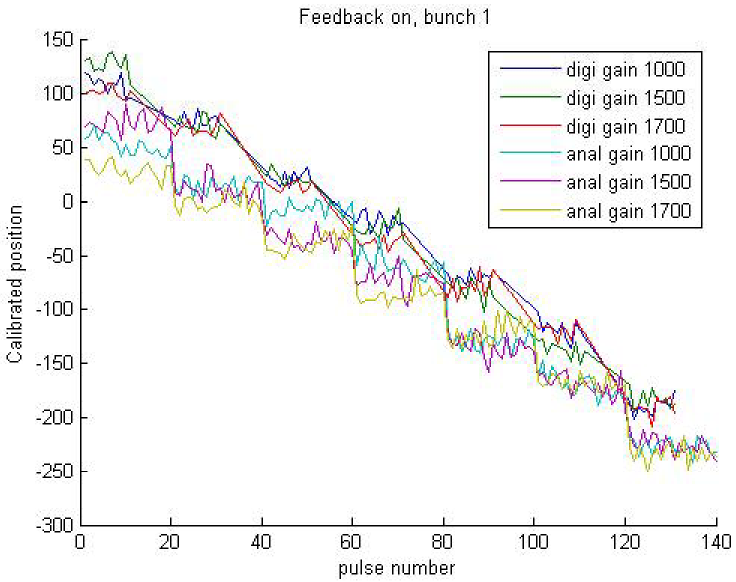


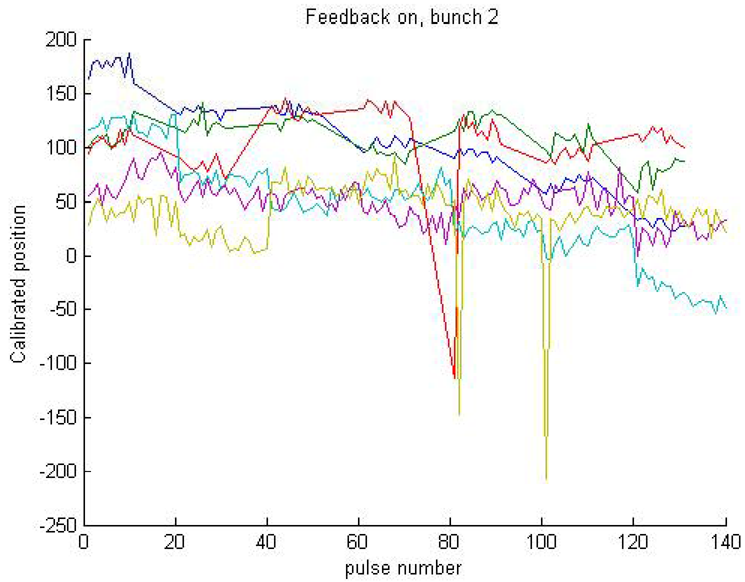


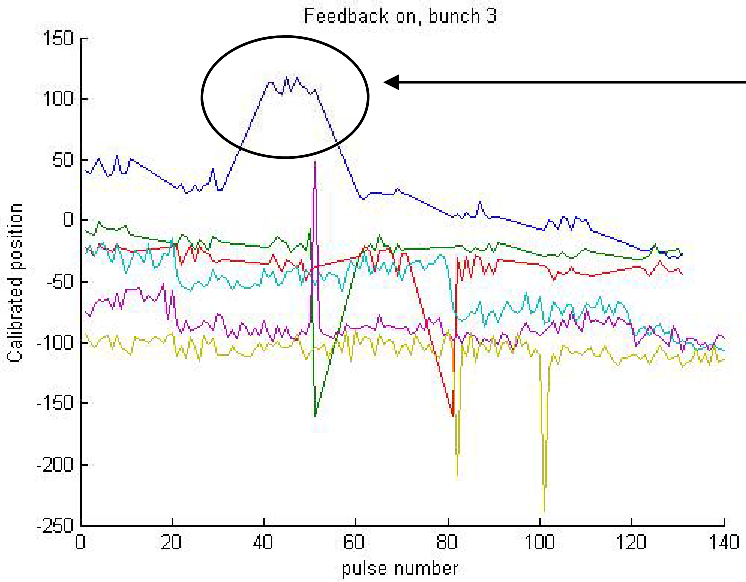


These error bars are about 30 microns. This is using a 2 sigma cut on flyers, with a 3 sigma cut the error bars are about 70 microns.

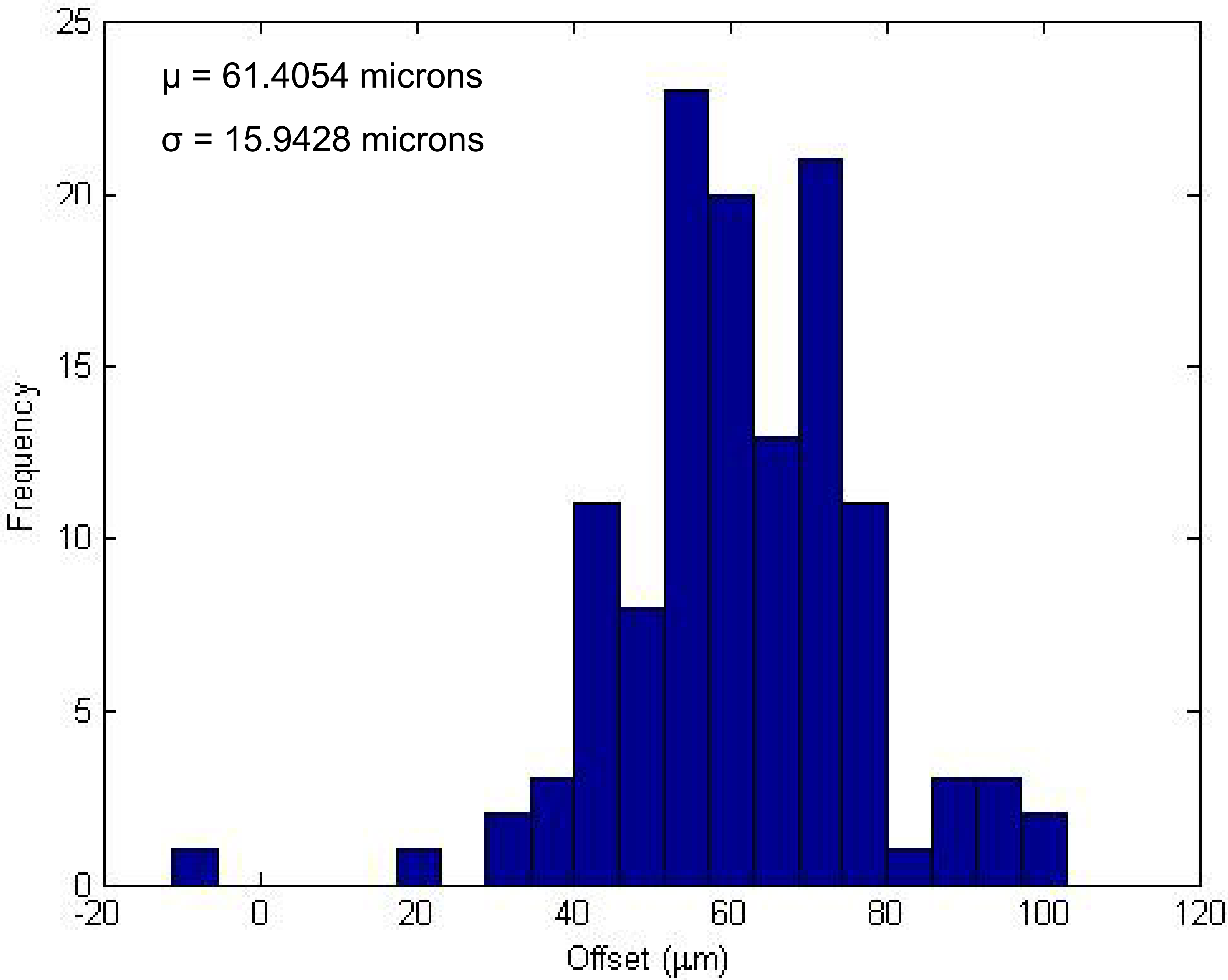
Also note that the third point on the blue line is absent, this was the data file Ben saved over.







Ignore, this is Ben's infamous saved over file… again!



μ = 61.4054 microns
σ = 15.9428 microns
Frequency
Offset (μm)
25
20
15
10
5
0
-20
0
20
40
60
80
100
120

Error Estimation

The errors were estimated by subtracting the first 11 pulses of the analogue data from the digital and taking the standard deviation. I have also taken the standard deviation of the two sets of data and added them in quadrature and get very similar errors, which is reassuring. I am aware I could/should be dividing by sqrt(n), but that's only a factor of 3.32.

Conclusion

The offsets are pretty similar in most cases, this agrees with our initial assumption that the offset is an intrinsic property of the processor. The standard deviation of all the offsets is approximately what we would expect for the processor resolution we have.