Compensation of orbit distortion due to quadrupole vibration (a.k.a. “Ground Motion”)

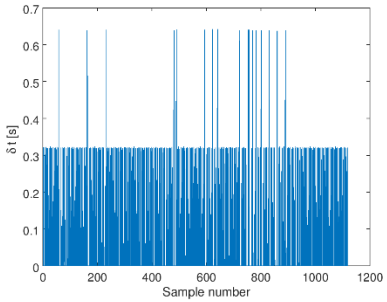
Douglas BETT

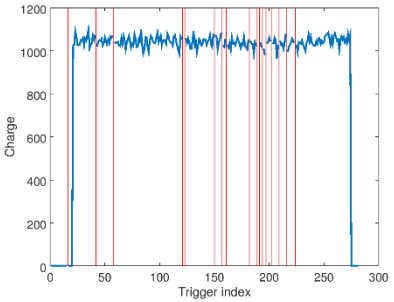
Outline

- System status
  - Synchronization
  - Feedforward hardware
  - Feedforward software
- Latest results

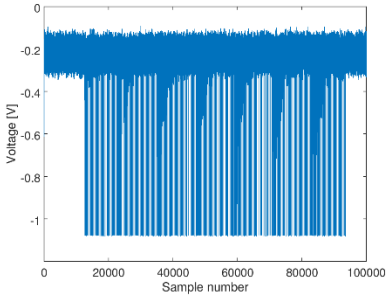
Synchronization

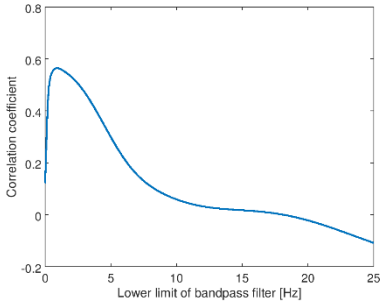
- ATF BPM data became unreliable around June 2015 (presently ~6% of triggers not recorded)
- A (relatively) robust procedure has been developed to synchronize the BPM and seismometer data





Change in timestamp identifies missed triggers in the charge data set





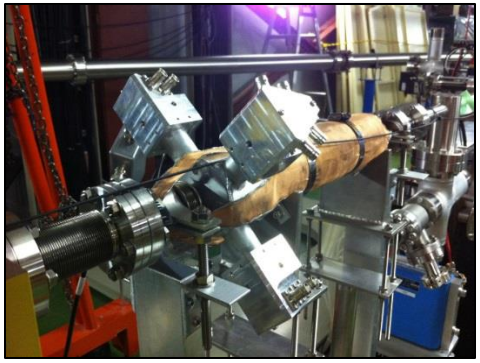
Synchronization confirmed if start/end of synch. signal matches the charge data, results in high correlations

Feed-forward hardware

FONT hardware

seismometers

stripline kicker



drive pulse

kicker amplifier

trigger

drive pulse

FONT5 board

velocity signal

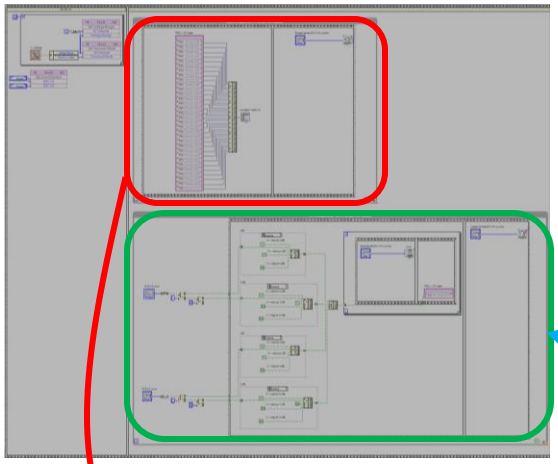
feed-forward correction value
(dedicated digital link)

CompactRIO
(local control room)

trigger

Feed-forward software

FPGA



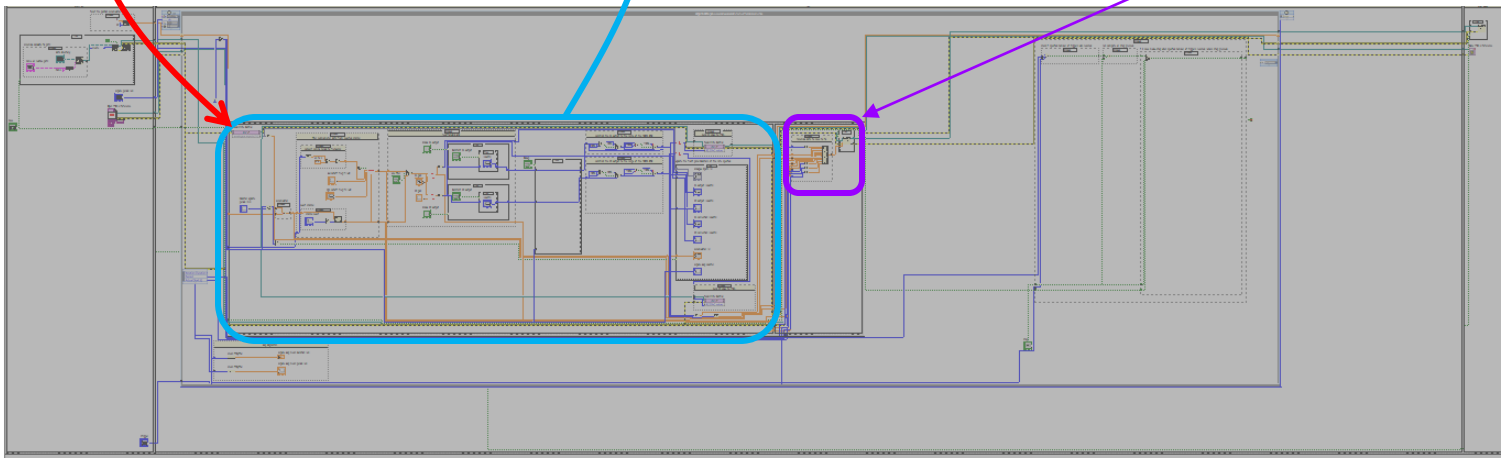
1. Sample analogue inputs every 1 ms

2. Integrate analogue input and filter result then calculate feed-forward correction (every 1 ms)

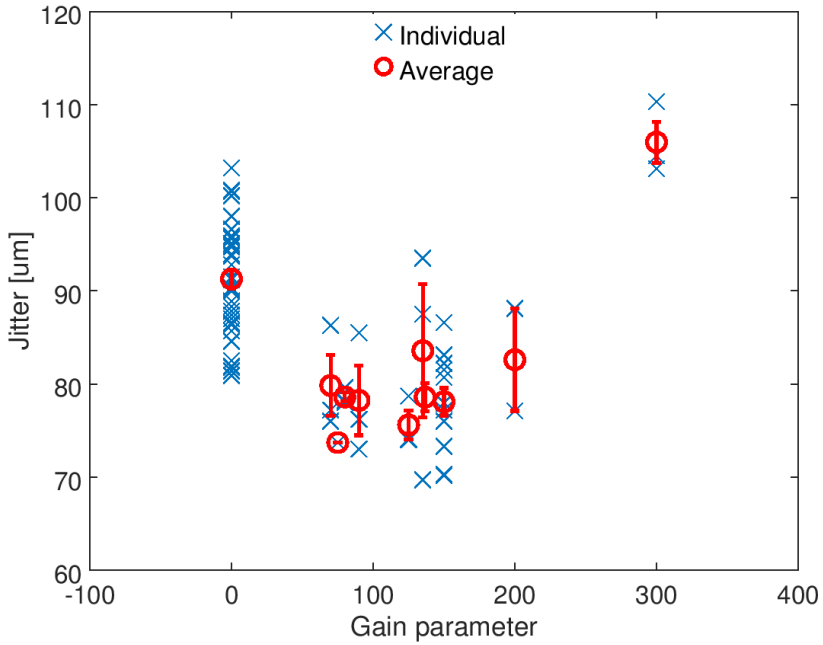
3. Generate digital output code every 5 ms

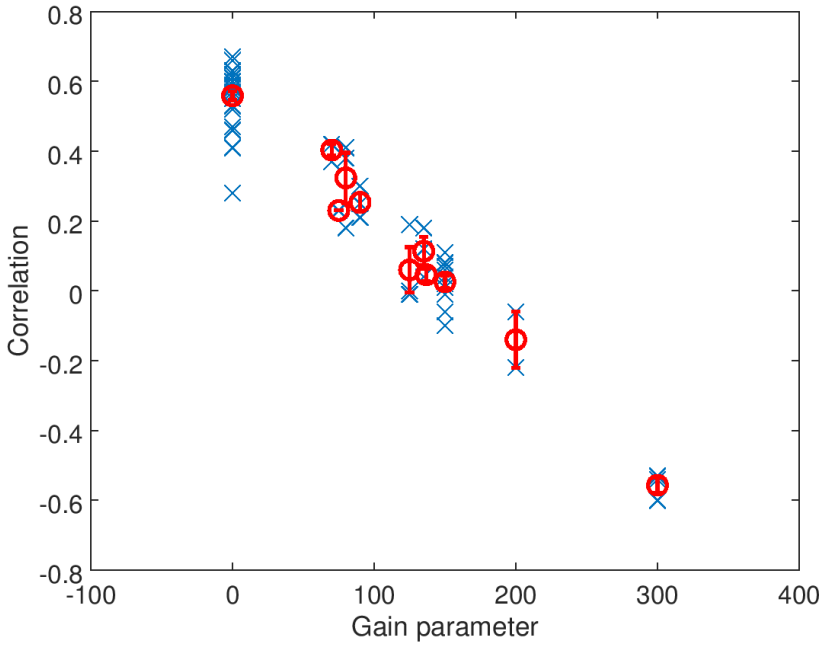
Stream to TDMS file

RT



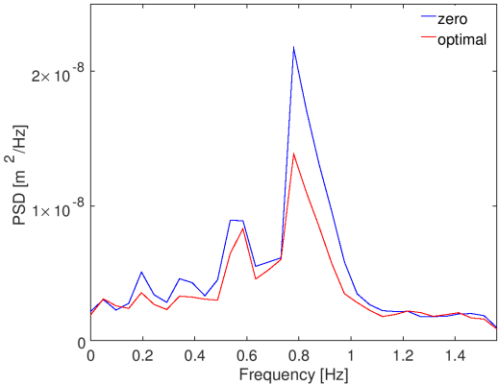
Latest results





~15% reduction in beam jitter achieved using the measured position of QD2X to drive a kick at K1

measured correlation between QD2X position and beam position reduced to zero but a significant amount of oscillation remains in the spectrum



Outlook

- See the talk of Jonas Breunlin!