

Short Gate Sampling Mode

- Definition: BPM system samples bunches of particles that are separated from oppositely charged bunches by more than 400ns.
- Analog filters specifications allow for this operational mode.
- Limitations: Only one trigger input / EchoTek card. Closed orbit data will be under-sampled.

Single Trigger Limitation

- Would like to run short gate sampling mode on pbar channels without disturbing proton closed orbit measurements.
- Might be able to configure pbar channel in turn-by-turn “gated” mode. Down-convert will only process data during gate period.
- Proton closed orbit measurement must handle over-clocked trigger, or must operate in short gate sample mode as well.

Undersampling Limitation

- Short gate sampling mode is most advantageous for pbar sampling.
- We do not have the backplane bandwidth for continuous turn-by-turn sampling operation.
- Closed orbit sampling will occur at the same rate as standard closed orbit sampling with a much wider digital filter bandwidth.
- Betatron and synchrotron oscillations will be aliased to produce systematic “noise” on the sampled signal.

Test Stand Study Plans

- Establish reliable, single species, closed orbit measurements. Verify resolution and systematic variation with beam intensity and bunch patterns.
- Study prospect of maintaining separate channels in Greychip running with different bandwidths. One for closed orbit and one for turn-by-turn.
- Study prospect of having Greychip operating in “gated” mode and derive algorithm for compressing turn-by-turn data in Greychip.
- Verify first turn and turn-by-turn acquisition with new Tev beam sync events.