Recycler BPM Project
Software Requirements

4.0
Background Flash, Flash, Closed Orbit and Turn-by-turn in separate buffers

4.1 Flash
First Turn and Last Turn Flash
Armed by application request
Triggered by Bsync event
Acquisition delay determined by Mdat
Over-written on next flash
Restores previous Background Flash
Trigger timeout in 5 minutes
May be first turn of TbT

4.2 Closed Orbit
Shall average of 1..1024 Flash measurements
may be average of TbT measurements
Armed by application request
Triggered by Bsync event
Acquisition delay determined by Mdat
Over-written on next closed orbit
Restores previous Background Flash
Trigger timeout in 5 minutes

4.3 Turn-by-turn
1..1024 successive turn measurements
Armed by application request
Triggered by Bsync event
Acquisition delay determined by Mdat
Over-written on next turn-by-turn
Restores previous Background Flash
Trigger timeout in 5 minutes

4.4 Background Flash
Periodic Flash data at programmable rate >= 200 Hz
Circular Buffer 16384 consecutive measurements
Plot most recent position Background Flash values

Plot even when buffer stopped
Made when otherwise Idle ceasing when other requested
Acquisition delay determined by Mdat
External pulse may stop the buffer
Restart buffer on application request

5.1 2.5 MHz Beam
Average Batch – BCFT
Bunch – BCFT one at a time

5.3 Un-bunched Beam
Ensemble center-of-mass – BC
Head – BCFT
Tail – BCFT

5.5 Intensity
Common Mode (sum proportional) scaled for relative intensity +/- 5% - BCFT

7.0 Number of channels
ring 104 horizontal & 104 vertical
lines 26 total (13+13?)

7.1 transfer line BPM
2.5 Mhz Bunched only
all Flash mode specifications apply

8.0 Calibration
check & calibrate HW from preamp to front-end
test software
store data user friendly manner

9.0 Front-end Functionality
Similar to existing front-end

9.1 Input Parameters
proton/pbar
B/C/F/T
Bunched/unbunched
CO #turns averaged

TBT #turns sampled
BF sample frequency
Bsync trigger and delay
Collection parameters: Mdat address, global delay, interval segment size

9.2 Measurements
Measurement commands abort any previous unsatisfied trigger loosing data
If triggered measurement will complete and new request queued for execution

BF is default whenever otherwise idle
BF entered when CB reset (if aborted)
Delay specified by Mdat

Separate buffers for BCF&T returning latest data
Readout of BF-CB undefined if spinning

9.3 Readback
read all settable parameters
detailed status

data position + intensity
BF-CB buffer has multiple measurements
Tbt buffer has multiple measurements
Buffers contain associated parameters & timestamp to identify measurement

Indepentent readback of
Position
Intensity
Specified range of turns on tbt
Parameters only

9.4 Future Improvements
“We … expect that the front-end in the beginning will be similar to the existing front-end system…”
Clock event driven front-end system as it exists in MI & Tevatron
Desirable event driven measurements at time gap approximately 1 mS

10.0 Application SW
tbt on every bpm pickup

calibration/test
Intensity