

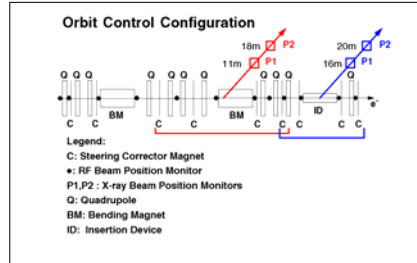
APS STORAGE RING ORBIT CORRECTION AT 10 HZ

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Purpose

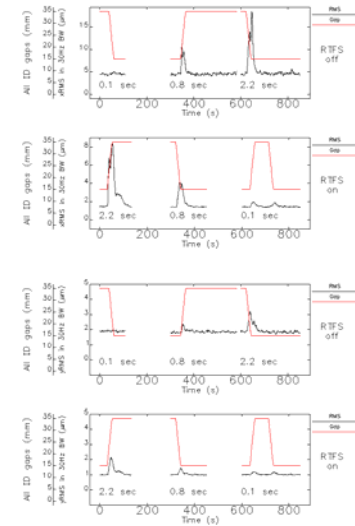
To reduce the orbit perturbation from insertion device (ID) gap motion occurring in the overlap frequency band between Real-Time Fast Feedback System (RTFS) and DC Orbit Correction (OC).
 RTFS bandwidth: 0.025 Hz – 50 Hz
 Previous OC bandwidth: DC – 0.03 Hz / 0.1 Hz
 New OC Bandwidth: DC – 0.6 Hz / 1.3 Hz

All BPM and Correctors available for both ioc- and workstation-based OC
 RTFS has access to all BPMs but only 1 corrector per sector



Result of 10 Hz Rate

Orbit perturbation reduced as expected



Towards Higher Correction Rate

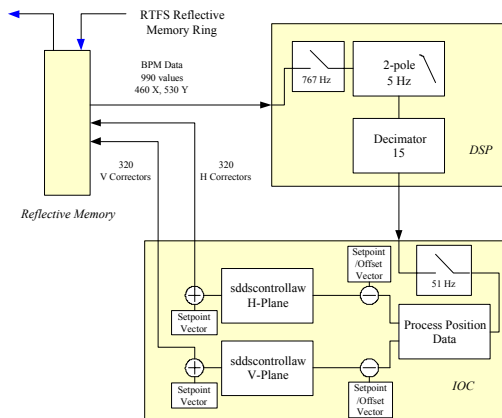
Port Toolkit Software (sddscontrollaw) to IOC

EPICS database access instead of CA
 New IOC is called datapool IOC

Other IOC Software

Use reflective memory network from RTFS
 Vectorized computations of beam position monitor (BPM) readback
 IOC processor permits up to 30 Hz iteration

Data Flow in Datapool IOC



sddscontrollaw Software Improvement

Added waveform PV capability
 Loop parameters modifiable through EPICS while loop is closed

Integration with RTFS

Frequency band overlap compensation:
 Calculate new BPM setpoint deltas to RTFS

External Processes

Test out-of-range PVs.
 Transfer "scalar" BPM offsets and setpoints to waveform PVs.

Typical Configuration

H-plane: 80 correctors, all rf bpm + Xray bpm
 V-plane: 80 correctors, 80 rf bpm + Xray bpm
 Iteration Interval: 0.1sec / 0.05 sec
 Gain: 0.4
 Bandwidth: DC – 0.6 Hz / 1.3 Hz

High-Level Software

Split work in smaller GUIs:
 1) Good and Bad device configuration
 2) Configuration creation
 3) Correction control
 GUIs configurable for different mdes
 Same GUIs for workstation and datapool IOC OC (and RTFS).

