

## **DESIGN OF A DIGITAL FRONT END FOR THE APS BEAM POSITION MONITOR SYSTEM\***

R. Merl, ANL; J. Carwardine, ANL; G. Decker, ANL; F. Lenkszus, ANL

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The storage ring of the Advanced Photon Source has 360 broadband rf beam position monitors (BPMs) distributed around its 1104-meter circumference. These BPMs are grouped into 40 VXI crates, each containing the analog signal conditioning and digitization electronics for nine BPMs. The "Processor/Scanner" is a separate VXI module that provides digital signal processing for the BPMs in each VXI crate. Beam position data that is sampled at up to 270 kHz is low-pass filtered in several decimation stages. Output taps are available with corner frequencies at 300 Hz for use with the real-time orbit feedback system and at 1 Hz for compatibility with the slow orbit correction system. The Processor/Scanner employs a cluster of six ADSP-21061 digital signal processors that have enough additional processing bandwidth to provide real time spectral analysis, statistical parameterization and other high level real-time tasks in addition to low-pass filtering.

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