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Design of a Stripline BPM System on MicroTCA.4

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SLAC National Accelerator Laboratory is a premier photon science laboratory. SLAC has a Free Electron Laser facility that will produce 0.5 to 77 Angstroms x-rays and a synchrotron light source facility. In order to achieve this high level of performance, the beam position measurement system needs to be accurate so the electron beam bunch can be stable. We have designed a general purpose stripline Beam Position Monitor (BPM) system that has a dynamic range of 10pC to 1nC bunch charge. The BPM system uses the MicroTCA (Micro Telecommunication Computing Architecture) for physics platform that consists of a 16-bit ADC module (SIS8300 from Struck) that uses the Zone 3 A1.x classification for the Rear Transition Module (RTM). This paper will discuss the RTM design, architecture, and performance measurements of this system using the SLAC LINAC. The RTM architecture includes a bandpass filter at 300MHz with 15 MHz bandwidth, and an automated BPM calibration process. The RTM communicates with the AMC FPGA using a QSPI interface over the zone 3 connection. The system is also going to be used at the Pohang Accelerator Laboratory with the newly designed xFEL facility.

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