

The RF BPM Electronics Concept and Developments for the PETRA IV project at DESY

Thursday 9 December 2021 17:15 (15 minutes)

In the scope of the TDR phase for the future PETRA IV low-emittance ring upgrade project, special attention is being dedicated to the prototyping of the future BPM electronics. The large machine will use a large number of BPM pickups, around 800, and the requirements for each system will be stringent for what regards resolution, accuracy and long-term stability. To acquire and process all the signals from the Beam Position Monitors of each cell, a MTCA.4 system with 6 RF BPM modules is being prototyped by DESY and Instrumentation Technologies. Each BPM module consists of RTM and AMC cards and will sample the signals from 2 BPM pickups, with a total of 8 input channels per RTM card. The RF cables will vary in length from BPM to BPM and will be exposed to a non-controlled temperature environment. To fulfill the strict long-term stability requirements, a cross-bar switching matrix will be used. The matrix will be installed in the tunnel next to the BPM pickup and will be remotely controlled by the MTCA.4 platform's BPM modules. The real-time digital signal processing is then able to compensate the disturbances and drifts along the cables. This contribution presents the BPM prototype, focusing on the signal processing applied from the BPM pickups until their acquisition and digitization on the application-specific RTM modules, and further processing in the FPGA of the AMC module. Preliminary results will be presented as well.

Summary

Primary author: Mr LEBAN, P. (Instrumentation Technologies)

Co-authors: Mr REPIC, B. (Instrumentation Technologies); Mr BOGATAJ, L. (Instrumentation Technologies); Mr BARDORFER, A. (Instrumentation Technologies); Mr PAGLOVEC, P. (Instrumentation Technologies); Mr CARGNELUTTI, M. (Instrumentation Technologies); WITTENBURG, K. (DESY); KUBE, G. (DESY); SCHMIDT-FÖHRE, F. (DESY); FENNER, M. (DESY); SCHLARB, H. (DESY)

Presenter: Mr LEBAN, P. (Instrumentation Technologies)

Session Classification: Session 10