

ACQUISITION OF ANALOG SIGNALS IN ATCA BASED LLRF CONTROL SYSTEM FOR X-FEL

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Abstract

The Low Level Radio Frequency System (LLRF) for the European X-FEL must provide exceptional stability of the accelerating RF field in the accelerating cavities. The regulation requirements of 0.01% and 0.01 degrees in amplitude and phase respectively must be achieved at a frequency of 1.3 GHz while keeping low drifts (during RF pulse). The quality of analog signal processing and distribution plays a crucial role in achieving these goals. The RF signals are connected to the Rear Transition Module (RTM), downconverted there into intermediate frequency (IF) signals and finally sampled at AMC-ADC module. The high quality of the signals (SNR, low crosstalk) must be assured across all the way. The paper presents the results of development of ATCA based LLRF system for XFEL. The special attention is paid to RTM module with downconverters and carrier board conducting analog signals to the AMC-ADC module in the presence of digital processing components (FPGA, DSP).

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