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Design of a Programmable Gain Waveform Digitization Instrument for Detector Calibration

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To test and calibrate various detectors in nuclear and high energy physics experiments, a general purposed calibration instrument has been developed. All information including timing, amplitude and charge of signals can be directly obtained to calibrate detector with this instrument by amplifying and digitizing the signal waveform. The system consists of two parts, a large dynamic range pre-amplifier module and a high speed and high-resolution digitization module. The pre-amplifier module based on programmable gain amplifier and attenuator achieves gain from -20 dB to 33 dB, making it suitable to adapt to different detectors. Taking advantage of a 3.6 GSPS and 12-bit resolution analog-to-digit converter (ADC), the waveform digitization module samples the signal after conditioning. To evaluate the feature of this instrument, a BaF2 detector calibration platform was installed and test results showed a bandwidth from DC to 500MHz and a timing precision about 280 ps, which indicated that it had broad application prospect in detector calibration.

Minioral

Yes

Description

Design gain control WFD

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