



Contribution ID: 269

Type: **Poster presentation**

Development of a high dynamic range and wide bandwidth amplifier electronics system

Friday, June 10, 2016 10:30 AM (1h 35m)

In modern physics experiment, data acquisition is required to readout high dynamic range and wide bandwidth detector signal, especially from direct current (DC) or ultra-low frequency (ULF). In this paper, a development of amplifier electronics system is presented to comply with the requirements of analog signal with DC or ULF to 250MHz signal bandwidth and 60dB dynamic range.

The core of the system is based on a programmable gain amplifier (PGA), whose gain is programmable and variable according to its application scenarios. The prototype amplifier electronics include programmable attenuator, programmable gain amplifier, differential amplifier and low-pass filter (LPF). This system also includes a specifically designed remote control board, which is composed by a microcontroller STM32 chip, control interface and necessary communication ports. In order to achieve a high performance, several boards of different schemes based on the structure are designed and compared.

Test results show that the amplifier electronics system has been proven to perform well. It can be of great analog signal processing performance in Ultra-fast ADC system and Switched Capacitor Arrays (SCA).

Primary author: Mr LI, Cheng (1 State Key Laboratory of Particle Detection and Electronics (IHEP-USTC), Hefei, 230026, China; 2 Department of Modern Physics, University of Science and Technology of China, Hefei, 230026, China)

Co-authors: Prof. FENG, Changqing (1 State Key Laboratory of Particle Detection and Electronics (IHEP-USTC), Hefei, 230026, China; 2 Department of Modern Physics, University of Science and Technology of China, Hefei, 230026, China); Mr HU, Jiadong (1 State Key Laboratory of Particle Detection and Electronics (IHEP-USTC), Hefei, 230026, China; 2 Department of Modern Physics, University of Science and Technology of China, Hefei, 230026, China); Prof. AN, Qi (1 State Key Laboratory of Particle Detection and Electronics (IHEP-USTC), Hefei, 230026, China; 2 Department of Modern Physics, University of Science and Technology of China, Hefei, 230026, China); Prof. LIU, Shubin (1 State Key Laboratory of Particle Detection and Electronics (IHEP-USTC), Hefei, 230026, China; 2 Department of Modern Physics, University of Science and Technology of China, Hefei, 230026, China); Dr CAO, Zhe (1 State Key Laboratory of Particle Detection and Electronics (IHEP-USTC), Hefei, 230026, China; 2 Department of Modern Physics, University of Science and Technology of China, Hefei, 230026, China)

Presenter: Mr LI, Cheng (1 State Key Laboratory of Particle Detection and Electronics (IHEP-USTC), Hefei, 230026, China; 2 Department of Modern Physics, University of Science and Technology of China, Hefei, 230026, China)

Session Classification: Poster Session 2

Track Classification: Front End Electronics and Fast Digitizers