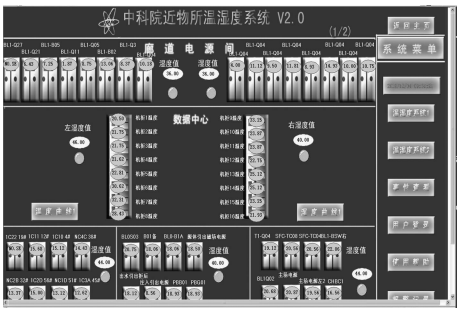

Fig. 3 The software interface for real time data and location.

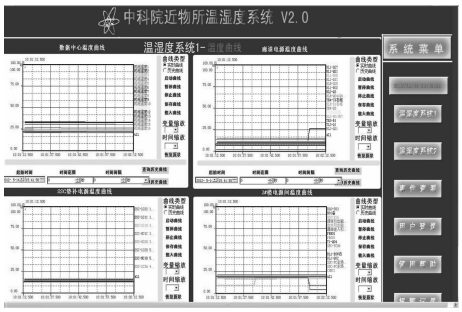

Fig. 4 The software interface for history data curve.

This environment T/H monitoring system has been working stable since Oct. 2012. It not only gave an accurate monitoring of the temperature and humidity for the HIRFL-CSR, but also provided a new way for the diagnosis of malfunction of the accelerator. Next year, the T/H monitoring system will be extended to CSRe.

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5 - 7 Design of a Small Size Nuclear Physics Data Acquisition System

Zhou Wenxiong, Wang Yanyu, Nan Gangyang and Zhang Jianchuan

In order to meet the need of small physics experiment, a small size data acquisition system based on FPGA and ARM11 is designed and realized in November 2012.

The whole data acquisition system consists of both hardware and software, and the heart of the hardware part is composed of FPGA and ARM11. There are two key points in its operating mechanism: firstly, FPGA is designed to control front-end circuit ADC/TDC[1,2], and transmit the data to ARM11. Secondly, ARM11 is expected to send the data to the back-end computers through the TCP/IP protocol. While in the software part, the distinctive feature is the implementation of high-speed data transmission method which helps FPGA to transfer data to ARM11. There are also two points in this part: the first and foremost one is the driver program and the application program of ARM11[3]. The driver program is applied to respond to the hardware interrupt and notify the application program to send those data to back-end computers. And then, the data processing software we developed in back-end computers can convert the date to real-time energy spectrum and save it to hard-disk in high-speed. As we can see, the Fig. 1 shows the circuit board of the data acquisition system.

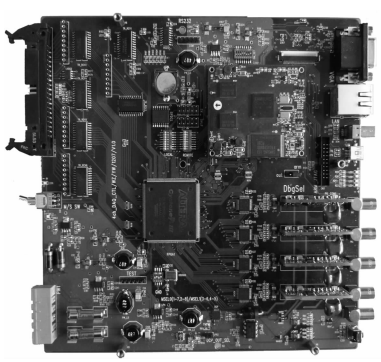

Fig. 1 The circuit board.

To sum up, the small size nuclear physics data acquisition system can be used in small nuclear physics experiment. It has been tested in laboratory with the radioactive source of Na_{22}, and the energy spectrum obtained in experiment is the same with that obtained through CAMAC PHILLIPS7164. Fig. 2 is the compare of the two energy spectrums obtained by the system and PHILLIPS7164. And the other realistic experimental results illustrate that the maximum data transmission rate can reach the point of circa 2.2 MB/s, while event trigger rate is about 250 kHz. It can meet the need of most lab detector test.

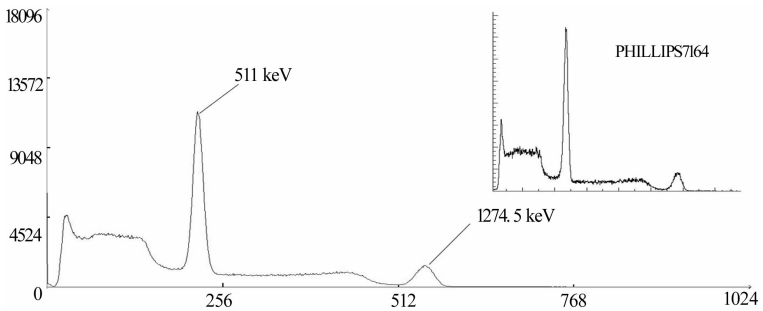

Fig. 2 The appearance design.

References

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[3] J. Corbet, et al., Linux Device Drivers (2006), China Electric Power Press.

5 - 8 Electro-static Septum Control System for CSRm Beam Injection

Lin Fuyuan, Wang Yanyu, Zhou Detai, Yin Jia, Yu Yanjuan and Zhou Wenxiong

The CSRm injection Electro-Static Septum (ES) is an important equipment to connect the CSRm and beam injection line. According to the difference of the ion mass and energy, the CSRm has two injection modes[1]: multiple multi-turn injection (MMI) and stripping injection (SI) mode. These two modes used two different ES equipment respectively in the past, so it takes lots of time to change corresponding ES equipment to achieve mode changing. Now, in order to improve the switching efficiency of the injection modes, the MMI and SI ES are combined together into single integrated ES equipment. The integrated ES consists of a high voltage electrode (HVE) and an anode frame (AF). Adjusting their position can switch the different injection modes. Step motor was mounted to adjust the position of the HVE and the AF.

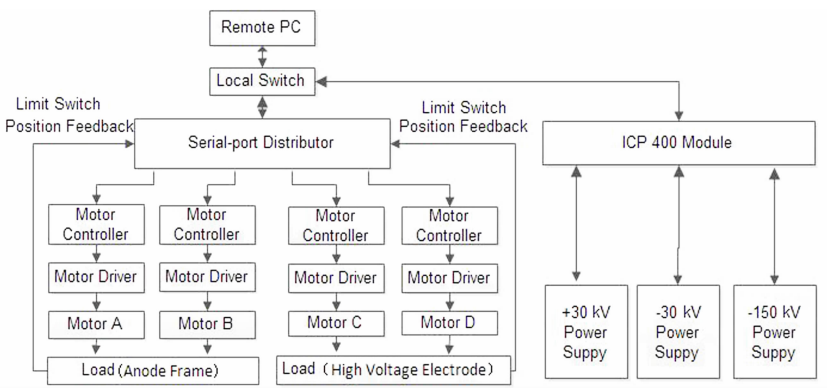

Fig. 1 System framework.

The integrated ES equipment is controlled by four motors. The HVE or AF is driven by two motors respectively in order to improve the control accuracy and stability. The system provides different control strategies: single-movement and unite-movement. Single-movement is a micro-adjustment to meet the precise move of the HVE and the AF. Unite-movement is that motor AB or CD linkage to prevent the HVE and the AF distorted or tilted. Besides, the system interlock can prevent the clash of HVE and the AF,