

Temperature measurement system for electronic devices based on the PXI configuration for the Slow Control system at the TOF-MPD detector

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1. Motivation

MPD - (Multi-Purpose Detector) has been designed to record particles emitted during the heavy ions collisions. MPD is a component of the experimental NICA complex (Nuclotron-based Ion Collider fAcility) currently being under construction at the Joint Institute for Nuclear Research (JINR) in Dubna.

MPD is a multi-detector, which includes many subdetectors, including a TOF (Time Of Flight) detector. The purpose of these systems is to determine the trajectory of emitted after collision particles and their deposited energy in the active area of the detector.

Complex physical processes leading to the electrical signals formation make measurement systems to be maintained at a proper temperature, specific for each type of detector. Ensuring and maintaining the right temperature also applies to electronic circuits cooperating with detection systems.

2. Slow Control Systems

The Slow Control system is not a subject of physics studies, but it is an inalienable part of any physical experiment. The information from all the detectors has to be saved very quickly. But each detector needs to have special conditions, such as temperature, gas pressure, voltage. The Slow Control System allows one to measure, monitor, and control all these parameters. Thus, the Slow Control System (SCS) is an electronic system intended to support and enable operation of complex equipment for any physical experiment, for example, for detectors in high energy physics experiments. This kind of system should be modular, and each module should be able to adapt itself to other experiments, that is, it has to be scalable. Many different types of users will have access to this system. It is rather obvious that a shifter should have totally different access rights in comparison with those of management or maintenance personnel. The majority of program sources should be open, in case it is required to do additional coding. It is necessary to save all parameters and their maximal and minimal values. Due to this fact the EqDb database has been created.

3. Tasks

Students will work with the LabView on PXI device. The main tasks are:

- a. arrangement of the system in an assembly block and connection to the network of measurement systems,
- b. developing the software,
- c. developing the Data Acquisition System,
- d. performing test measurements and preparing documentation.

4. Requirements

- a. Computer with Windows operating system,
- b. Programming skills in LabView,
- c. Basic English skills.

5. Recommended literature

- a) www.jinr.ru – JINR's website,
- b) <http://nica.jinr.ru> – NICA's website,
- c) <http://labview.pl> – LabView website,
- d) <http://nica.fizyka.pw.edu.pl/> - Twiki of SCS group.

6. The maximum number of project participants: 2