Automation of multiple data measurements for computer interface

S. Mohammed Aazir*, F.C. Ragel and M. Sriragavan

Department of Physics, Eastern University, Sri Lanka

Development of low cost instrumentation is a valuable exercise in a country like Sri Lanka where scientists strive to sustain in their research with limited funds. This student research project is motivated on such grounds and integrated with the existing experimental facility developed locally. In this work, a multiplexing electronic device was designed and constructed to automate multiple measurements of several samples during slow cooling-heating runs and isothermal measurements of an applied magnetic field sweep. The self-designed low-cost multiplexing device is constructed to automatically select one from several input signals and be measured either by an instrument or by microprocessor via analogue to digital converter. The device can be used with an amplification option if the resolution of the measuring instrument is insufficient. The design was with a multiplexer IC 4051 to automatically select inputs at specific time intervals that is controlled by 4017 Counter IC supported by 555 Timer IC, while the selected channel inputs are identified via a seven segment display. Op-amp CA 3140 was used for the amplification option. A specially designed regulated power supply unit provides the dc power requirements for the device. Microprocessor was connected using flash analog to digital converting method. Visual Studio 2007 software and the C++ programming were used to accept and analyze the digital data from the multiplexing electronic device. Several test experiments were performed to ascertain the multiplexing process and to validate the amplification reliability. The uncertainty that arises due to amplification is verified to be within 6%.

Key words: Automation, instrumentation, multiplexer

*aazir.infore@gmail.com