ABSTRACT

Indonesia is a country whose energy needs are increasing every year, especially in the use of electrical energy. Nuclear energy as an electrical energy generator is a good choice in dealing with an energy crisis, in addition to the relatively low cost per power generation, nuclear energy is a very efficient type of energy. The essence of the process of producing energy lies in the reactions that occur in nuclear reactors.

Gamma spectrometer is a tool capable of analyzing radioactive substances that emit gamma radiation. The gamma spectrometer located at the Center for Applied Nuclear Science and Technology (PSTNT) BATAN which is connected to the SCA (Single Channel Analyzer) is able to calculate the amount of radiation generated. However, these tools need to be connected to a computer in order to work, so they are not effective when used in the field.

Therefore, the purpose of this research is to design an ESP32 and Arduino UNO software that can calculate the radiation energy spectrum by counting on a gamma spectrometer. The method used is a quantitative method, where the process of observation, data collection, and then analyzing the data is carried out. From the results of the research that has been done, it is found that the ESP32 and Arduino UNO microcontrollers can be used to calculate the number of pieces of the PWM input signal generated by the SCA. In addition, the results obtained can also be sent to the MySql Database and displayed on the android application. The benefit of the results of this research is to have a device for measuring radiation energy that is easy and effective for use in the field or laboratory.

Based on the test results of the device system, it is known that the device runs optimally for 24 hours and can send data to the MySql database per minute. The process of transmitting data from the Arduino board to the MySql database shows that the QoS on the system has a good average value with each parameter, namely delay of 165,023 ms, throughput of 2542,37 bps, and packet loss of 0 %.

Keywords : *Internet of Things, Gamma Spectrometer, energy spectrum, Single Channel Analyzer, mikrokontroler ESP32.*