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PROTOTYPE AUTOMATIC LIGHTS CONTROL SYSTEM IN THE MOSQUE AREA BASED ON ARDUINO NANO

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Abstract — To turn on and turn off lights in the mosque area in general still use a manual system that is to turn off and turn on the lights using a switch located on the wall. Therefore, currently a system that has been designed automatically is needed to control the light of life and the outages of lights based on a predetermined time and based on the detection of human presence, so that the lights will turn on and off automatically at the set time according to needs, namely using Real Time Clock (RTC) and Passive Infrared Receiver (PIR) sensors. The results obtained in the form of a light controller system in the area of the mosque using DS3231 RTC and Arduino Nano At mega 328P PIR Sensor. At 3:00 and 17:00 the condition of the lights is on and at 05:30 and 21:00 the lights are off. For the measurement of PIR sensor detection distance, the distance of 5 meters of the PIR sensor can still detect the presence of human movements, after 5 meters or even 6 meters of the PIR sensor cannot detect human movement. So that within a distance of 6 meters or more, the toilet lights cannot turn on automatically or turn off.

Keywords: lights, PIR, RTC

I. INTRODUCTION

In the industrial era 4.0, many manual systems have now turned into automatic systems. Because the existence of an automated system will facilitate humans. Not only as a human helper but this automated system can facilitate a work process in the industrial field. So that to meet this automatic need needed a control device that can work automatically [1].

The need for lighting is needed by humans to do their activities, especially in the room, this is due to the lack of light entering a room. When the room is dark, people will turn on the lights, and when going out of the room, the person does not necessarily remember to turn off the lights that are still on. For example, to turn on and turn off lights in the mosque area in general still use a manual system that is to turn off and turn on the lights using a switch located on the wall [2]. For this time it takes a system that has been designed automatically to control the lights on and outages based on the time that has been determined and based on the detection of human presence, so that the lights will turn on and turn off automatically at the time set according to need, namely using Real Time Clock (RTC) and Passive Infrared Receiver (PIR) sensors [3].

Previously, a device that controlled lights automatically using the RTC method had been made, one of which was a "Bedroom Light Control System Using RTC Microcontroller-Based Real Time Clock (RTC) made by Razu Putra Pratama in 2016 [4]. And there are also tools that have used PIR sensor methods have been made, one of which is "Home Burglar Detector Using Passive Infrared Sensor Based on Arduino" made by Wike Febriani Wijaya in 2017 [5].

From this basis, the author will conduct research 1) How to design and prototype automatic light control in the mosque area using RTC and Arduino Nano-based PIR sensors, 2) Will understand how the tool works, 3) And determine what the maximum distance of the PIR sensor is for detect human movements [6]. Which of these tools has the advantage of controlling the lights of the mosque to be more efficient because of the life and death of lamps based on a predetermined time that is using RTC, as well as the PIR sensor placed on the mosque toilet to detect human presence so that controlling lights is easier without having to push the switch first. So, there are 2 lighting

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1. The Interleaved Boost Converter series designed and made in this study can function as a Power Factor Correction well with the value of the generated power factor of 0.93.
2. The Interleaved Boost Converter circuit which is also used as a voltage regulator can maintain an output voltage of 48 volts with a fuzzy logic controller system.
3. The design of power factor correction using the Interleaved Boost Converter circuit can reduce the THD Current value from 39.0% (System Without Output Voltage Settings) to a value of 33.5% (System with Output Voltage Settings) and this value is far better than Power Supply Switching which are widely used with THD values of 58% to 60%.

In the preparation of this research, there are still many shortcomings that must be corrected. This can be seen from the results that are slightly incompatible with the initial planning of the author. In addition, the authors encountered several obstacles during the process of making this research. For this reason, here are some suggestions that the author can convey:

1. In designing the inductor so that it is carried out more carefully so that no errors occur in the manufacturing process In addition, in the inductor winding process to be done better so that it gets an inductor value that is close to the design value and has a better Q value (quality inductor.
2, In the selection of components must also be taken into account in order to choose components with a higher rating value compared to the design value. This is done so that the components used are not susceptible to damage due to high voltage or spike and other disturbances

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