"Design And Implementation Of Basic SMPS and LED Driver Using Arduino"

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Abstract:

This Project aims to present an efficient approach to style a system for outdoor LED lighting during which user can control the sunshine intensity of the LEDs.

For the meantime the sunshine intensity of LEDs is directly proportional through the present passing through them, the deliberate system are often applied using constant current controllers to limit the flow of current through the LEDs. The LEDs Regulator by the led Drivers.

The circuit may be a constant current source, which indicates that the LED brightness would be constant regardless of the facility supply used. It's more dependable, flexible and efficient.

Main advantages are fast dealing out and straightforward interface. Nowadays, with cumulative number of persons using open source software and hardware devices day after day, technology is forming a extra measurement by making complex things look easier and interesting.

These open sources deliver free or virtually low costs, highly reliable and cheap technology. This project delivers a sight of sort of Arduino boards, working principles, software implementation and their applications.

Keywords- Basic SMPS, LED Driver, Arduino.

I. INTRODUCTION

The LED market is successful quickly around the globe. LEDs have taken over bright light sources and are used in environmental and task lighting. As a part of the innovative technology, LEDs are now used for high-power radiance maintaining efficiency and reliability. These are relatively useful for when exposed to frequent ON-OFF cycling conditions.

LEDs can very basically be reduced either by pulse-width modulation or lowering the forward current. Because of pulse-width modulation is why LED lights viewed on camera, headlights on cars, seem to be flashing or flickering.

This benefit of LEDs has led researchers mature various systems where the light intensity of LEDs can be controlled. In this project, a novel method is deployed to control their dimming with the help of a buck converter and a current sensing and intensity control unit.

An Involuntary LED Emergency Light circuit is future to turn ON when there is no travelable lighting or if the power supply is cut-off. Previous fluorescent lights were used to dimensions such circuits. But the use of LED's has established to provide adequate lighting for a longer period before draining the battery.

Next-generation solid-state lighting has the chance to meaningfully change the lighting marketplace, leading to improved quality of life, improved efficiency, and overall sustainability in the operation of our buildings.

There are five primary factors that make illumination one of the most important areas of emphasis for research and development (R&D) and policy development efforts to inspire this transformation process. These five factors include the following:

Lighting is one of the largest electrical loads:

Lighting signifies an important part of our general peak power demand. Electronic light sources offer the potential for 60 to 80% net discounts in electrical energy ingesting due to lighting.

Lighting contributes largest to greenhouse gas generation:

Near half of the electricity in the United States is produced through coal power generation plants. It has been projected that building operation donates to about half of our total greenhouse gas emissions because of coal burning for electricity production.

Lighting has significant consumer impact:

Lighting can have noteworthy implications for quality of life, productivity, and comfort. Our productivity and ease within workplaces and residences is highly reliant on upon the quantity and quality of light.

Rapid development of new technologies:

The lighting industry is sighted significant development of new developing technologies that have the opportunity for deep disruptive change in the way we provide light in our buildings. These new technologies offer the chance for spectral, temporal, and spatial control that is unmatched.

II. AIM AND OBJECTIVE

Aim of the project

This Project aims to present an effective approach to design a system for outdoor LED Lighting in which user can control the light intensity of the LEDs.

Objective of the project

Objective of our project is

1. User can control the light intensity of the LEDs.
2. To design a multicolor LED Driver which works in a way that the light intensity is controlled.
3. The goal is to reduce the amount of energy consumed and thereby reducing the cost incurred due to energy loss thus proving to be a cost-effective strategy.

III. LITERATURE REVIEW

As plotted in , current digital home applications mainly shelter six aspects, i.e., central control systems, security monitoring, heath care, residence monitoring, information appliances, energy saving. A dominant system are often applied to fridge monitoring, and isolated front room , the safety monitoring technique is applied to garage door control, car anti-theft devices, gas leakage monitoring, shower temperature monitoring, building access control, appearance call system, fire alarm, video surveillance systems, and many more. Conservatively, the presentation of a security monitoring system topographies a direct relationship with the quantity of security cameras installed, and there are inevitably some blind points when videotaping.

A long-term video monitoring brings a few multitude of audio and image data. As suggested in, a completely unique security monitoring system is operated in such how that a residence owner are often warned by a text alert automatically, and a motion activated security camera(s) is operated only there's something wrong therein for energy saving purposes. Fitness care technology is practical to smart beds, electric adjustable beds, smart toilets, smart sofas, smart care kits, etc. dwelling monitoring technology is practical to smart closets, smart lamps, electric curtain control, automated temperature monitoring, etc. information employment control is applied to smart kitchens, digital TVs, image phones, etc. and energy redeemable technology is practical to energy saving warm ovens, electric ovens, energy efficient wastewater treatment, energy saving heaters, thermal bathtubs, etc. As indicated in, facial feature removal is did before relations return home, and therefore the images of nameless visitors are often displayed on screens or smart phones for security concerns.

Besides, the region of interest within a picture can be skillfully laid out in an effort to scale back the incidences of false alarms. This technology are often further applied as an auxiliary tool for folks to stay an eye fixed on infants and youngsters . As stated in, glass fiber technology has been demonstrated as a really effective approach to the integration of smart TVs and many other services.

For example, at a tiniest transmission rate of 100 Mbps for home use, high speed network services, with high definition TV (HDTV), video on demand (VOD), and therefore the like, are often understood. Any sort of glass fiber wireless products isn't available yet in market thanks to a scarcity of transmission protocol stipulated. aside from the high spending, it requires an excellent effort to implement fiber to the house projects. Currently, there are a good sort of technologies, including LED, CCD and CMOS sensor technology, solar power technology, available for digital home services. There are an excellent number of problems waiting to be solved when integrating a good diversity of digital home services.

As optional in, an excellent test encountered is the daises and interoperability among various technologies, like Ethernet, phone lines, power lines, IEEE 1394, USB2.0, Bluetooth, infrared, 802.11a/b/g, and so into view. Additional big encounter is to provide the specified network suppleness such any extra sensors or devices are often effortlessly introduced into an existing smart home service network. As acknowledged in, another challenge is to seek out effective ways to form new technologies accessible for seniors. throughout this work, the calculation of extra IR remote home appliances into a digital home network merely needs more IR output networks within the aspect of hardware, while added control borders must be developed within the aspect of software as an alternative.
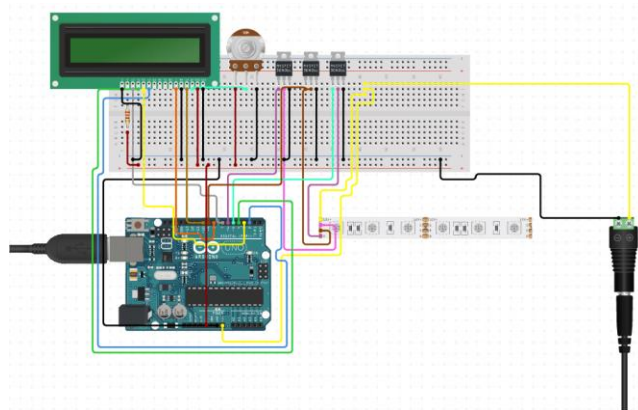
CIRCUIT DIAGRAM

Fig1.: Circuit Diagram

A compact and reliable high-power factor electrolytic less LED driver circuit that gives high frequency pulsating current is meant and developed as a hardware prototype.

Traditionally, AC to DC conversion is accomplished employing a transformer and rectifier circuit. Use of transformers in transformer-based supplies and incorporating inductor/MOSFET/controller in switched power supplies aren't feasible and affect the compactness of the general circuit by increasing the dimensions and weight especially for electrical appliances. A transformer less power supply using Zener diode provides 12V for the MOSFET driver circuit.

The figure shows the connection diagram of the lead strip controller using Arduino. Here we used the Arduino IDE to run the code.

V.COMPONENTS USED

In this project we are used the following components:

1. LED Driver
2. Arduino
3. SMPS Module
4. LCD Display
5. LED Strips

LED Driver : In predictable luminaires, for instance light bulbs, light is caused by a tungsten wire.

That way only a small part (less than 5 %) of the energy is converted into visible light. This appealing inefficient principle was unbeatable for many spans because of its simple structure and pleasant light.

Though LEDs have a much higher luminous efficacy than light bulbs, luminaires were not considered as a additional for light bulbs for a long time: In comparison to light bulbs LEDs impose special demands on the power source. If the LED's aren't sufficiently supplied with energy the light flickers or is perceived as choppy.

SMPS : A switching regulator does the regulation within the SMPS. A series switching element turns the present supply to a smoothing capacitor on and off. The voltage on the capacitor wheels the time the series element is straight. the continual switching of the capacitor maintains the voltage at the specified level
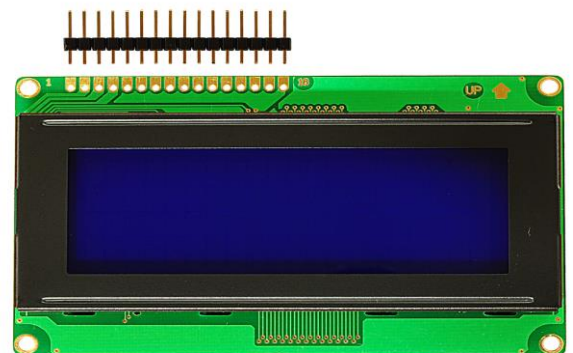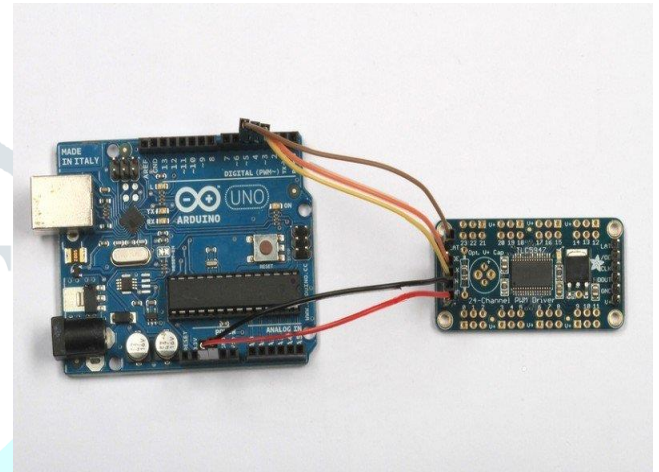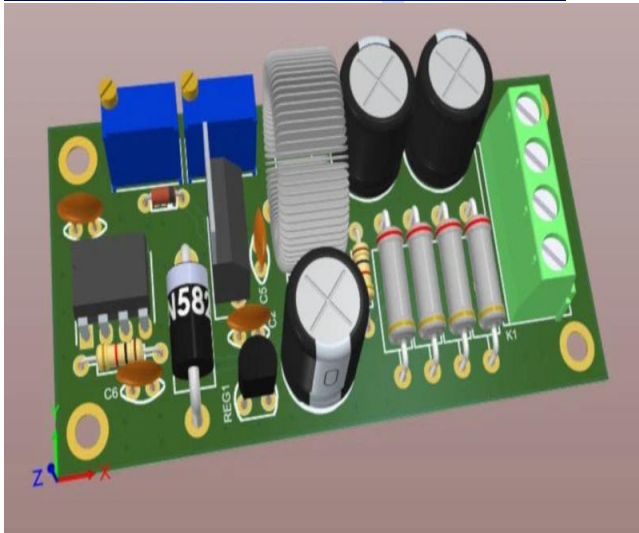
VI. CONCLUSION

This Project proposes a system in which the user can control the light intensity of the LEDs. The circuit is simulated to validate the feasibility of the proposed LED driver and the circuit shows good strength.

It provides all of the advantages of current mode control including line feed forward, cycle-by-cycle current limiting and simplified loop compensation. It is designed for current-mode control power converters, which require a single drive output, such as Fly back and Forward topologies.

VII. REFERENCES

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