**Lab # 11**

Control of AC loads using embedded hardware

# Objectives

* Learn how to control AC load using embedded system
* Discover the new components to control AC Load

**Tools**

* Arduino
* Proteus ISIS

# Pre Lab

Please read the theoretical background of the control of AC loads.

## In-Lab Task 1:

Design and implement an embedded system to turn ON/OFF the 220V AC light from a button interfaced with controller.



V2

VSINE

DUINO1

R2

100

V1

12V

RL1

12V

L1

220V

D1

RESET

AREF

PB5/SCK 13 PB4/MISO 12

**~**PB3/MOSI/OC2A 11

**~** PB2/SS/OC1B 10

PB0/ICP1/CLKO 8

PD7/AIN1 7

**~** PB1/OC1A 9

R1

1k

Q1

2N2222A

A0

A1 PC0/ADC0

**~** PD6/AIN0 6

A2 PC1/ADC1

**~** PD5/T1 5

A3

PC2/ADC2 PC3/ADC3

PD4/T0/XCK 4

**~** PD3/INT1

A4

3

2

A5 PC4/ADC4/SDA

PD2/INT0

PC5/ADC5/SCL

**TX** PD1/TXD 1

**RX** PD0/RXD 0

ARDUINO UNO R3

DIODE

**microcontrolandos.blogspot.com**

*Figure 1: Circuit Diagram*

**DIGITAL (~PWM)**

**ANALOG IN**

**1121**

**ATMEGA328P-PU**

## In-Lab Task 2:

Using the circuit used in the previous task, please add the opto-coupler at the optimum place and do the same task again to make our controller more secure.

## Post-Lab Task 1:

Design and implement an embedded system to control the intensity of 220V AC light using variable resistor interfaced with controller using TRIAC and Zero Crossing Detector Circuit.

**Critical Analysis / Conclusion**

(By Student about Learning from the Lab)

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| **Lab Assessment** | | | | |
| **Pre Lab** | | | **/1** | **/10** |
| **In Lab** | | | **/5** |
| **Post Lab** | **Data Analysis** | **/4** | **/4** |
| **Data Presentation** | **/4** |
| **Writing Style** | **/4** |
| **Instructor Signature and Comments** | | | | |