Department of Electrical and Electronic Engineering

Project Report

Project Name- AC Load control through Web.

Submitted By-

Arif Rubayet	13.02.05.091
Naim Reza Munna	13.02.05.071
Fatematuz zohra	12.02.05.107

Introduction :

For large industries or even for home sometimes it would be better to control appliance just by a click for that purpose these project stands. We can control any load for our home or industry just by a single web page. Even we can see the live status of connected load which will tell us whether the connected load is oN or oFF.It seems that this is too infinitesimal. But Actual applications of this is borderless.What we actually use here is relay with Ethernet communication with arduino. A relay is a simple electromechanical switch made up of an electromagnet and a set of contacts. Relays are found hidden in all sorts of devices. In fact, some of the first computers ever built used relays to implement Boolean gates.Our project provides remote ac aplience control through its three large 10-Amp relays. The relays can be individually controlled using a standard web browser.It is self-contained with a built-in web server, and requires no external software, additional network modules, or computers.For the safety purpose this is altogether boxed with plastic which ensure insulation from 220v.

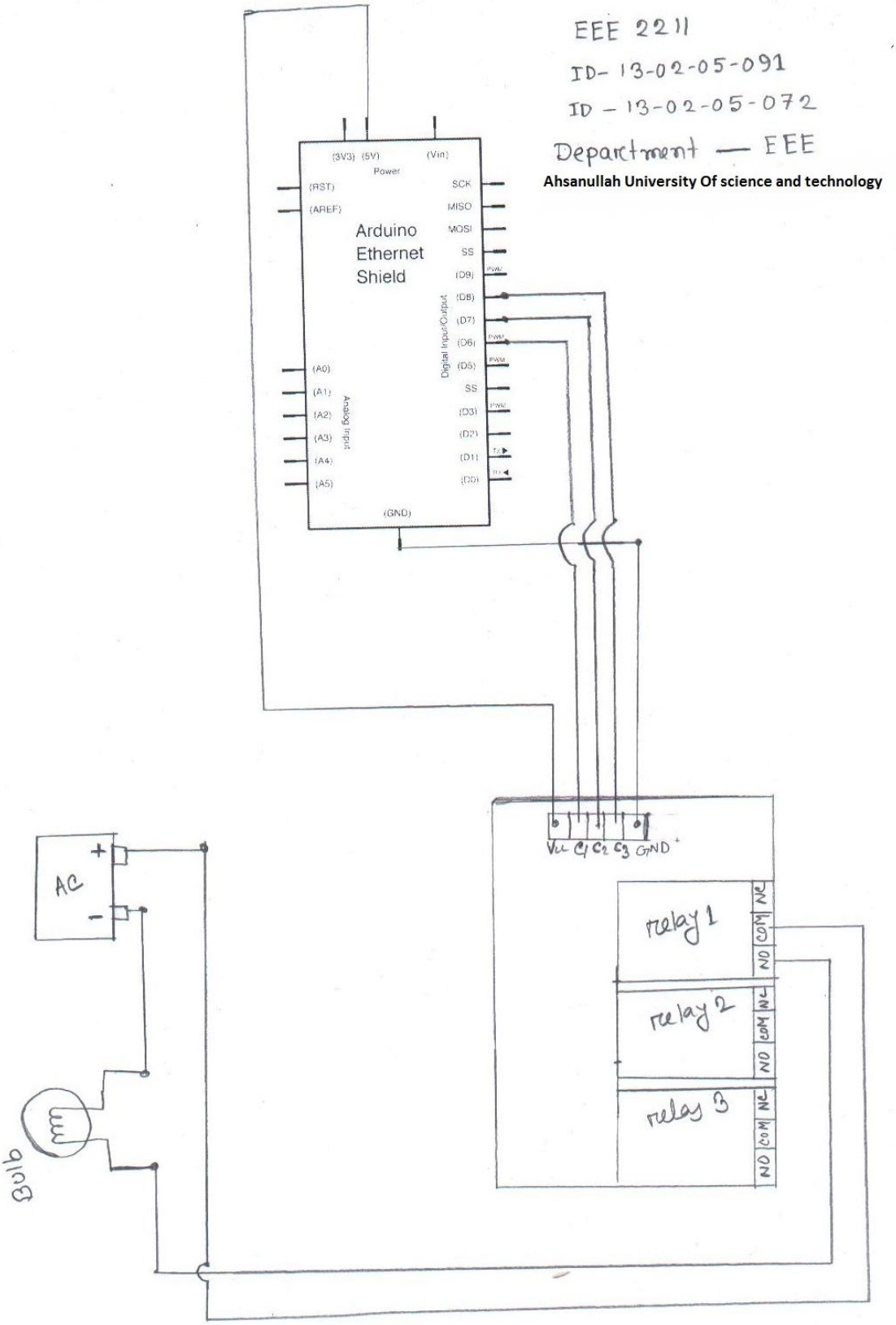
Equipments :

1. Arduino Uno R3 x1
2. Ethernet shield x1
3. Ethernet cable x1
4. Tp-Link TL-WR7-40N Router x1
5. 3 channel relay modeul x1
6. Bulb holder x3
7. 25 watt bulb x3
8. 220v plug x3

Working Principle:

1. Ethernet shield's built in server takes command from a webpage . This webpage can be accessed by any webbrowser.
2. Server webpage has some buttons. This buttons are for submitting user requests to main server.On this project left three buttons for requesting to turn on and right three for turning off.
3. Web page also has a feature for live status of Load. Which ensure that whether the load is actually triggered or not.
4. When users hit these buttons webpage submit signals to router. Router process this signal to ethernet shield as ethernet shield is connected to the router via a ethernet cable.
5. Then arduino analyze the the signal according to our code. If our submitted request match with any output condition with the code then arduino also permit devices to trigger or shut down.

Circuit diagram



Programming :

```
#include <SPI.h>
#include <Ethernet.h> //Declear of MAC and IP
byte mac[]={0xDE,0xAD,0xBE,0xEF,0xFE,0xED};
IPAddress ip(192, 168, 0, 102); //IP
EthernetServer server(80);

const int pin8=8;
const int pin7=7;
const int pin6=6;

String readString=String(30);
String state1=String(15);
String state2=String(15);
String state3=String(15);

void setup()
{
Ethernet.begin(mac, ip); //initialization
server.begin();

pinMode(pin8,OUTPUT);
digitalWrite(pin8,LOW);
state1="OFF|";

pinMode(pin7,OUTPUT);
digitalWrite(pin7,LOW);
state2="OFF|";

pinMode(pin6,OUTPUT);
```

```
digitalWrite(pin6,LOW);
state3="OFF|";
}



void loop()
{
       EthernetClient client= server.available();
   if(client)

 {
     boolean blankline=true;

     while(client.connected())
   {
          if(client.available())
           {
              char c=client.read();

                  if(readString.length()<30)

                {
                     readString.concat(c);
                }

     if(c=='\n' && blankline)

          {
                int LED = readString.indexOf("LED=");
```

```
if(readString.substring(LED,LED+5)=="LED=T")

{
    digitalWrite(pin8,HIGH);
     state1="ON|";
}

          else if (readString.substring(LED,LED+5)=="LED=F")
                    {
                       digitalWrite(pin8,LOW);
                       state1="OFF|";
                     }


                     int LED2 = readString.indexOf("LED2=");

if(readString.substring(LED2,LED2+6)=="LED2=T")

{
    digitalWrite(pin7,HIGH);
     state2="ON|";
}

          else if (readString.substring(LED2,LED2+6)=="LED2=F")
                    {
                       digitalWrite(pin7,LOW);
                       state2="OFF|";
                     }
```

```
            int LED3 = readString.indexOf("LED3=");


        if(readString.substring(LED3,LED3+6)=="LED3=T")


            {
                digitalWrite(pin6,HIGH);
                 state3="ON|";
            }


                    else if (readString.substring(LED3,LED3+6)=="LED3=F")
                            {
                                digitalWrite(pin6,LOW);
                                state3="OFF|";
                             }


client.println("HTTP/1.1 200 OK");
client.println("Content-Type: text/html");
client.println();
client.println("<html>");
client.println("<body bgcolor=#8A0829>");
client.println("<head>");
client.println("<title>Project FOr EEE2211</title>");
client.println("</head>");
client.println("<body width=100% height=100%>");
client.println("<center>");
client.println("<h1><span style=color:#00FF00;><span style=font-size:72px;><span
style=background-color:#000000;>EEE 2211 Project</span></span></span></h1>");
client.print("<br><br>");
client.print("<span style=color:#FFFFFF;> LOAD 1 = ");
```

```
client.print(state1);

client.print("  LOAD 2 = ");

client.print(state2);

client.print("  LOAD 3 =  ");

client.print(state3);

client.print("<br><br>");

client.println("<input type=submit value=ON style=width:200px;height:75px
onClick=location.href='./?LED=T\'>");

client.println("<input type=submit value=OFF style=width:200px;height:75px
onClick=location.href='./?LED=F\'>");

client.println("</center>");

client.println("<center><input type=submit value=ON2 style=width:200px;height:75px
onClick=location.href='./?LED2=T\'>");

client.println("<input type=submit value=OFF2 style=width:200px;height:75px
onClick=location.href='./?LED2=F\'>");

client.println("</center>");

client.println("<center><input type=submit value=ON3 style=width:200px;height:75px
onClick=location.href='./?LED3=T\'>");

client.println("<input type=submit value=OFF3 style=width:200px;height:75px
onClick=location.href='./?LED3=F\'>");

client.println("</center>");

client.println("<center> </center>");

client.println("<center> </center>");

client.println("<center> </center>");


client.println("<center><span style=color:#FFFF00;><span style=background-
color:#000000;>Department of Electrical And Electronic Engineering</center>");

client.println("<center><span style=font-size:20px;><u><strong><span style=text-align: -webkit-
center;><span style=background-color:#00FF00;>Ahsanullah University Of Science And
Technology</span></span></strong></u></span></center>");

client.println("</body>");

client.println("</html>");

client.stop();
```

```
//Cierro conexión con el client
readString="";
}


}
}
}
}
```

Trouble Shooting and solutions:

1. The IP address confliction may occur. For this issue we have to modify our code according to the New Ip address provided by ISP.
2. In order to use a huge loaded and well designed server page we need much memory. In that case we have to use miCro sD card which is insertable to our ethernet shield.
3. Router ragne does matter. So we should be careful about the range of this one.

Opportunity and challenges

1. By a webserver we are controlling a physical output of a device. So for installing a new interactive system we can use this.
2. We can reduce the cost of handing a machine and using this we can monitor all the machine or every single load.
3. As we are remotely operating a device so we can use this (method) for the purpose of spy investigations.
4. This project costs so low so we can swimmingly install this for any industry where operating and monitoring cost does matter,
5. For the safety purpose of a load it may work like a charm. So in this price we are getting Safety , remotely useable and a clean smart system. There should be nothing else to want .

Further Advancement

1. We can use external memory for the purpose of huge server where many more command can be placed.
2. We can add a feature like live monitoring by vedio streaming .
3. We can use energy meter along with this project to monitor how much power is consuming by the load connected to our system. We can add to our server page a feature like plotting a graph by the data which is achieved by our system. So thats how we can see every single information about Power consumption.
4. We can use a windows based application along with this server webpage .
5. We can Make apps which should be compatible to Windows OS, iOS, android by this we can enhance the security of our server.
6. In order to avoid wrong command submission we can add a feature like verify command.
7. We can make our system password protected to avoid abuses.

Reference –

1. http://kellykeeton.com/2013/08/06/webpower/

2. http://www.editronikx.com/search/label/Conecta%20tus%20proyectos%20electronico%20a%20internet%20con%20ethernet%20shield%20de%20arduino