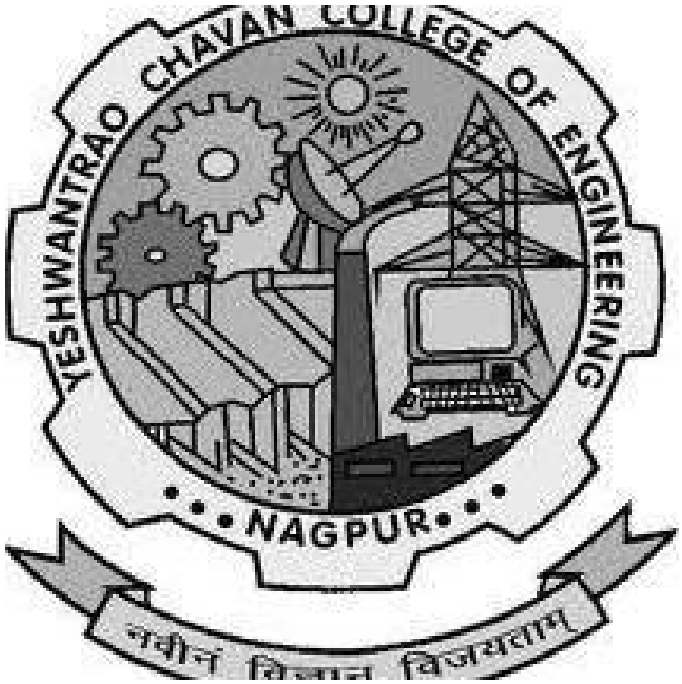
Home automation



Presented By

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contents

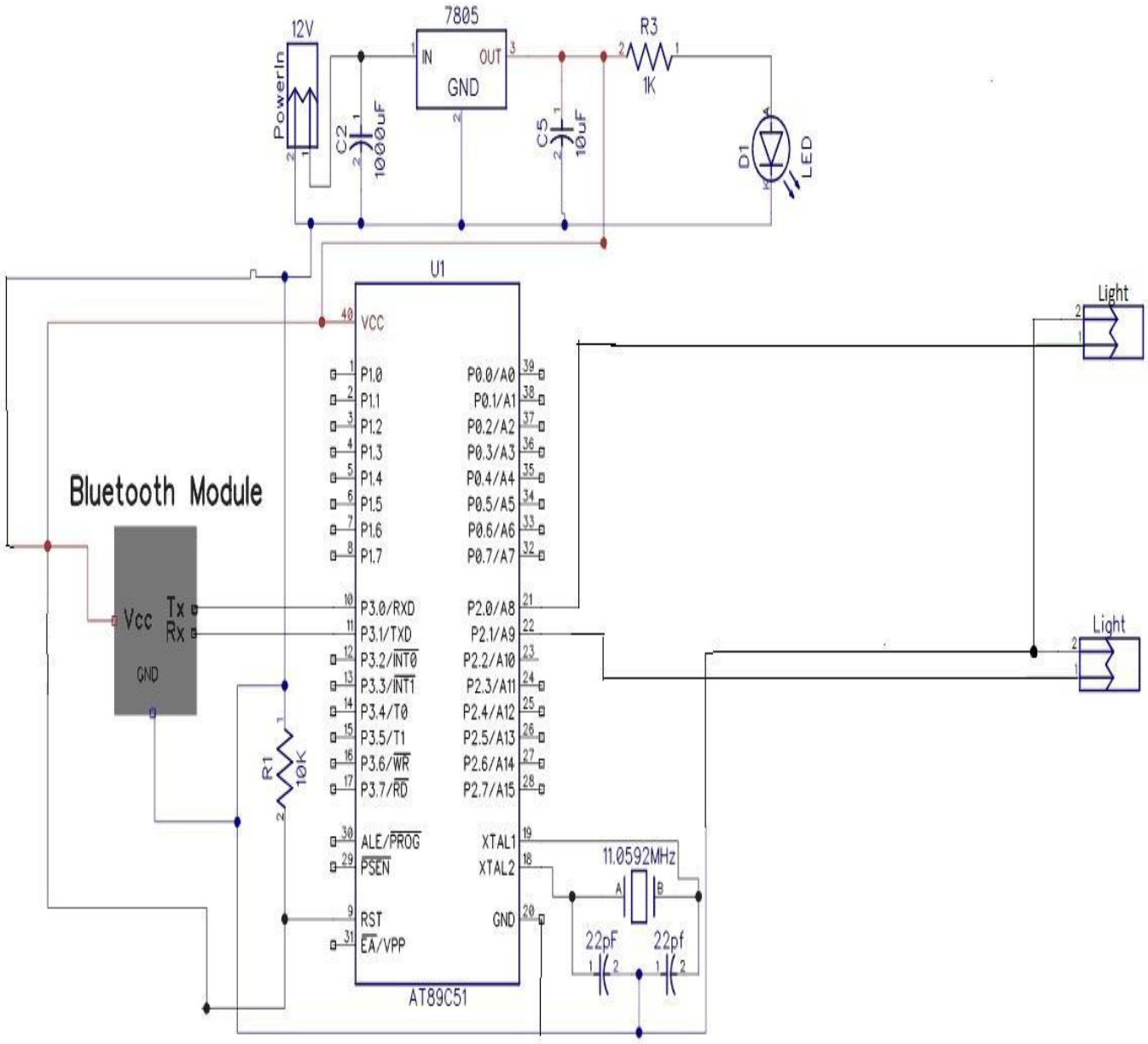
Introduction

Imagine that you can control the electronic appliances of your home from anywhere inside the house, just using your Smart phone. In this project, we will use wireless **Bluetooth technology to control the Home Electronic Appliances through a Android Phone**. Bluetooth has a range of 10-15 meters, so that you can switch ON and OFF any electronic appliance within the range.

Here we have used 328 microcontroller with a Bluetooth module, for wirelessly receive the data, sent from the Android Phone. So that microcontroller can Turn ON and OFF the home appliances accordingly.

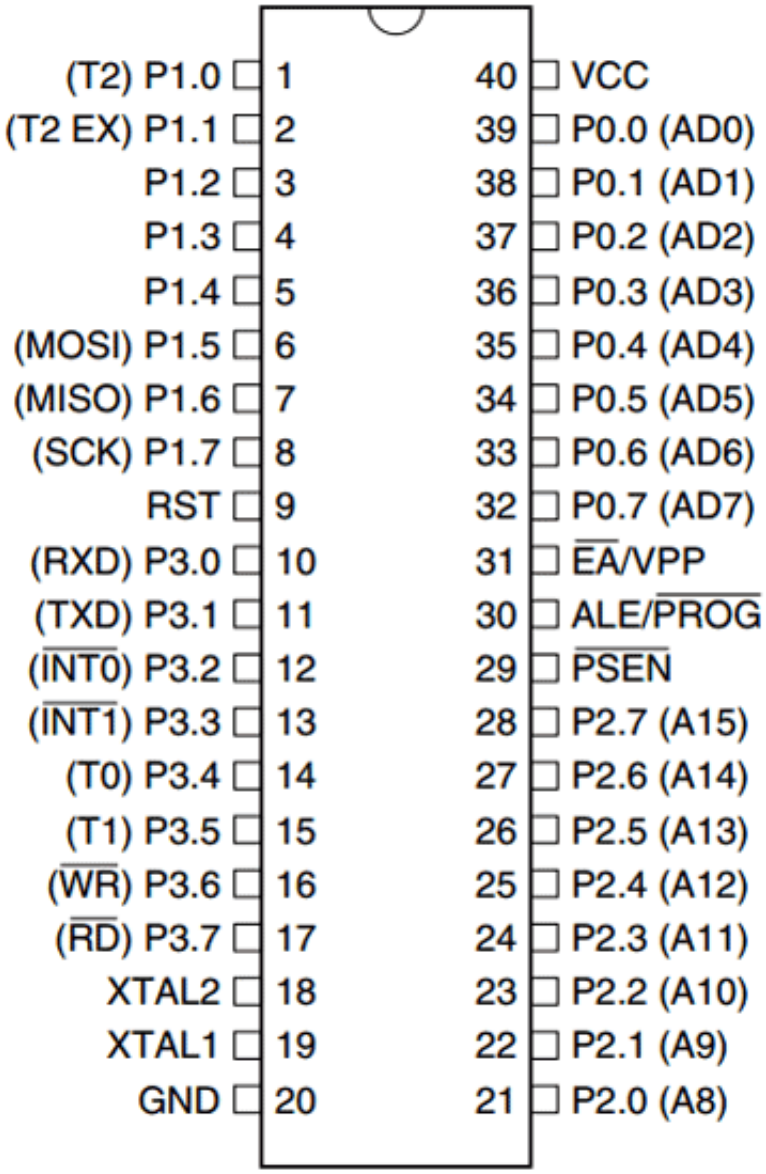
An application should be installed on his/her Android mobile handset to control various home appliances. User can send commands using that application. Wireless controlling technique used in this project is Bluetooth technology. This project consists of a Bluetooth receiver. This Bluetooth device is connected to the circuit which has a decoder. This decoder sends code for respective command sent by user. Then the respective device connected to the circuit will be turned on or off depending on the command given.

Circuit Diagram

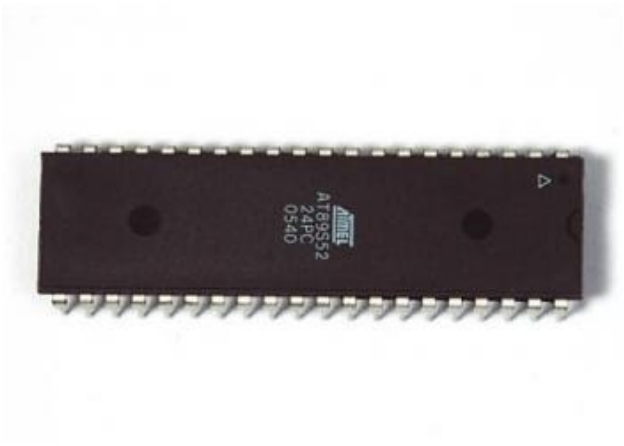


ATMEGA 328

Pin Diagram.



ATMEGA 89S52 PIN DESCRIPTION:-



The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the indus-try-standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory pro-grammer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit

timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT328 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes.

Pin Description

1 VCC:- Supply voltage. It is pin number 40.

2 GND:- Ground. It is pin number 20.

3 Port 0:- Port 0 is an 8-bit open drain bidirectional I/O port. Port 0 is from 32 to 39 pins of microcontroller. As an output port, each pin can sink eight TTL inputs. When 1s are written to port 0 pins, the pins can be used as high-impedance inputs. Port 0 can also be configured to be the multiplexed low-order address/data bus during accesses to external program and data memory. In this mode, P0 has internal pull-ups. Port 0 also receives the code bytes during Flash programming and outputs the code bytes during program verification. **External pull-ups are required during program verification**.

4 Port 1:- Port 1 is an 8-bit bidirectional I/O port with internal pull-ups. Port 1 is from 1 to 8 pins of microcontroller .The Port 1 output buffers can sink/source four TTL inputs. When 1s are written to Port 1 pins, they are pulled high by the inter-nal pull-ups and can be used as inputs. As inputs, Port 1 pins that are externally being pulled low will source current (IIL) because of the internal pull-ups. In addition, P1.0 and P1.1 can be configured to be the timer/counter 2 external count input (P1.0/T2) and the timer/counter 2 trigger input (P1.1/T2EX), respectively, as shown in the follow-ing table. Port 1 also receives the low-order address bytes during Flash programming and verification.

4.5 Port 2:- Port 2 is an 8-bit bidirectional I/O port with internal pull-ups. Port 2 is from 21 to 28 pins of microcontroller .The Port 2 output buffers can sink/source four TTL inputs. When 1s are written to Port 2 pins, they are pulled high by the inter-nal pull-ups and can be used as inputs. As inputs, Port 2 pins that are externally being pulled low will source current (IIL) because of the internal pull-ups. Port 2 emits the high-order address byte during fetches from external program memory and dur-ing accesses to external data memory that use 16-bit addresses (MOVX @ DPTR). In this application, Port 2 uses strong internal pull-ups when emitting 1s. During accesses to external data memory that use 8-bit addresses (MOVX @ RI), Port 2 emits the contents of the P2 Special Function Register. Port 2 also receives the high-order address bits and some control signals during Flash program-ming and verification.

Port 3:- Port 3 is an 8-bit bidirectional I/O port with internal pull-ups. Port 3 is from 10 to 17 pins of microcontroller .The Port 3 output buffers can sink/source four TTL inputs. When 1s are written to Port 3 pins, they are pulled high by the inter-nal pull-ups and can be used as inputs. As inputs, Port 3 pins that are externally being pulled low will source current (IIL) because of the pull-ups. Port 3 receives some control signals for Flash programming and verification.

RST :- Reset input. It is pin 9 of microcontroller. A high on this pin for two machine cycles while the oscillator is running resets the device. This pin drives high for 98 oscillator periods after the Watchdog times out. The DISRTO bit in SFR AUXR (address 8EH)

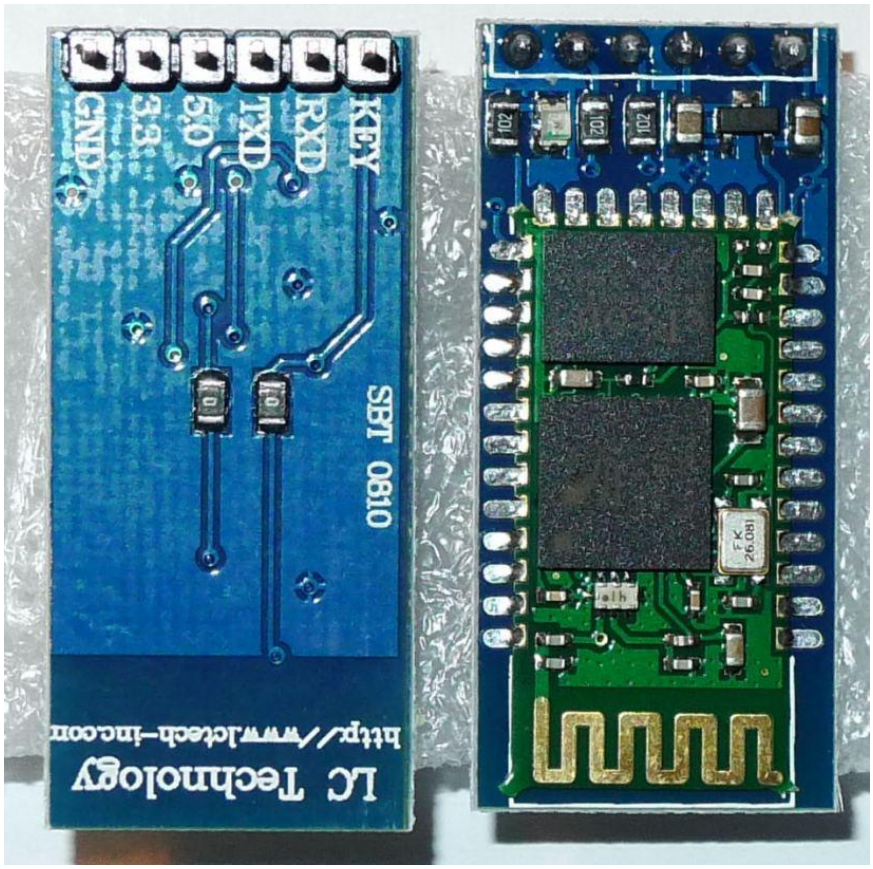
can be used to disable this feature. In the default state of bit DISRTO, the RESET HIGH out feature is enabled.

EA/VPP:- External Access Enable.It is pin 31 of microcontroller. EA must be strapped to GND in order to enable the device to fetch code from external program memory locations starting at 0000H up to FFFFH. Note, however, that if lock bit 1 is programmed, EA will be internally latched on reset. EA should be strapped to VCC for internal program executions. This pin also receives the 12-volt programming enable voltage (VPP) during Flash programming.

XTAL1:- Input to the inverting oscillator amplifier and input to the internal clock operating circuit.

XTAL2:- Output from the inverting oscillator amplifier. XTAL1 and XTAL2 are pin 18 and pin 19 of microcontroller respectievely.

Bluetooth Module



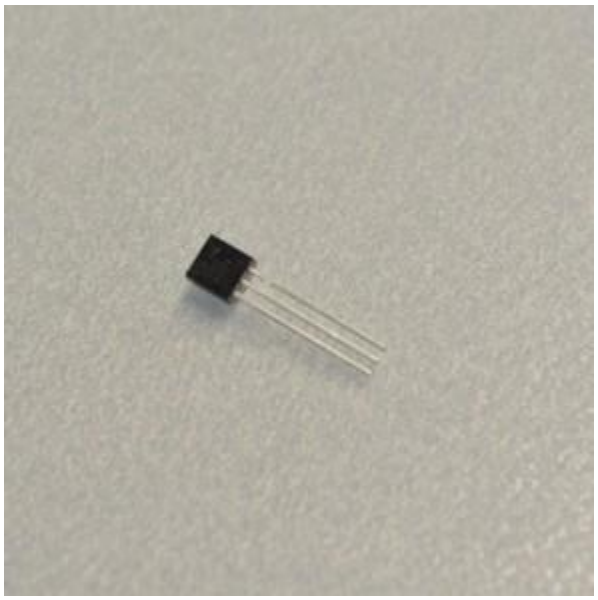
HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Bluecore 04-External single chip Bluetooth system with CMOS technology and with AFH(Adaptive Frequency Hopping Feature). It has the footprint as small as 12.7mmx27mm.

Hardware features

- Typical-80dbm sensitivity.
- Up to +4dbm RF transmit power.
- Low power 1.8 v operation, 1.8 to 3.6v I/O.
- UART linterface with programmable baud rate.
- With integrated antenna.
- With edge connector.

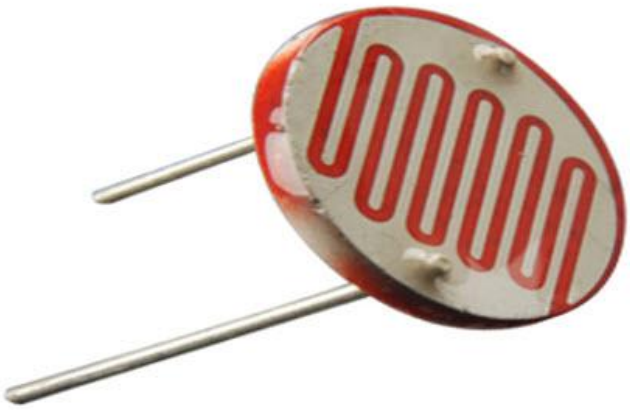
Temperature Sensor

The TMP36 temperature sensor is an easy way to measure temperature using any microcontroller. The sensor can measure a fairly wide range of temperature (-50°C to 125°C), is fairly precise (0.1°C resolution), and is very low cost, making it a popular choice. This sensor is very easy to read so all we have to do is read the output. Since the output voltage is an analog voltage proportional to the temperature we can convert the voltage and turn it into a number that makes more sense in the units of degree celsius.



Light Dependent Resistor

The sensor that can be used to detect light is an LDR. It's inexpensive and easy to use and integrate with a microcontroller. The LDR gives out an analog voltage when connected to VCC (5V), which varies in magnitude in direct proportion to the input light intensity on it. That is, the greater the intensity of light, the greater the corresponding voltage from the LDR will be. Since the LDR gives out an analog voltage, it is connected to the analog input pin on the microcontroller. The microcontroller, with its built-in ADC (analog-to-digital converter), then converts the analog voltage (from 0-5V) into a digital value in the range of (0-1023). When there is sufficient light in its environment or on its surface, the converted digital values read from the LDR through the microcontroller will be in the range of 800-1023.

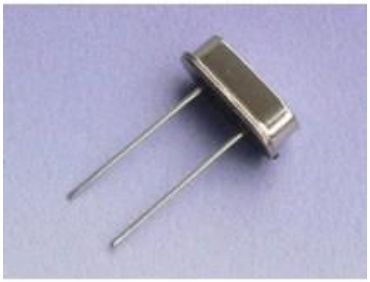


Other Components

Crystal Oscillator:

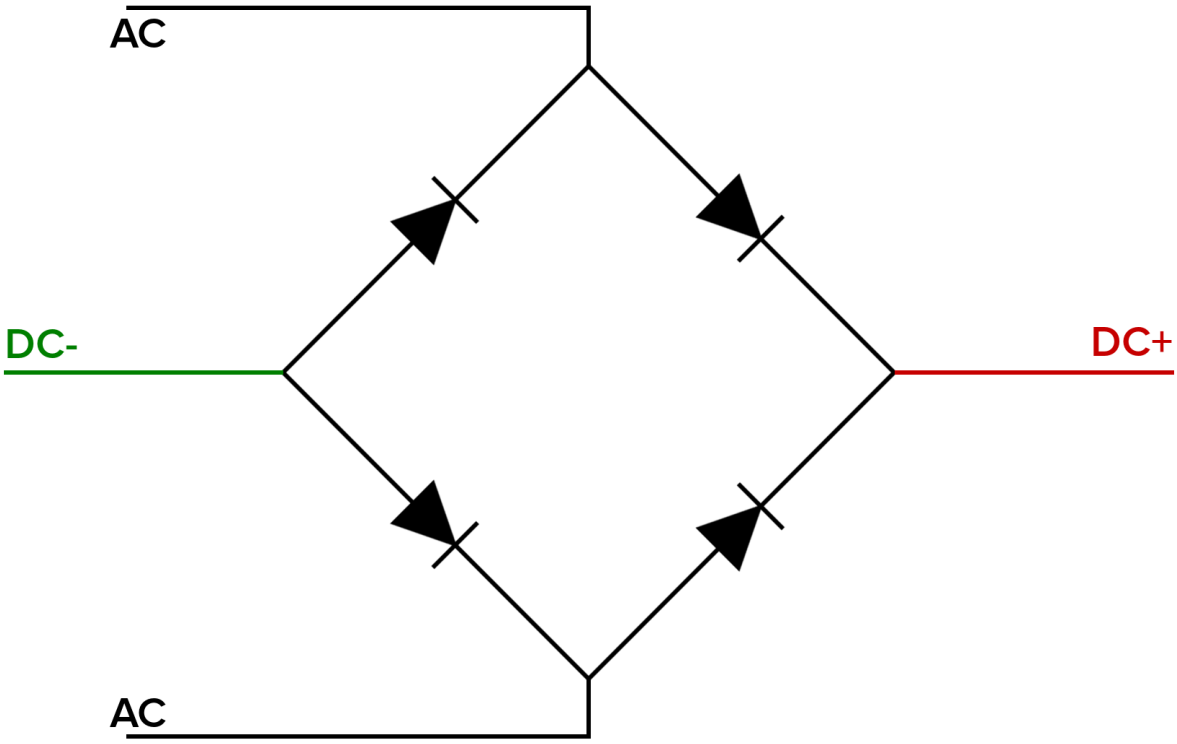
A **crystal oscillator** is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal ofpiezoelectric material to create an electrical signal with a precise frequency. This frequency is commonly used to keep track of time, as in quartz wristwatches, to provide a stable clock signal for digital integrated circuits, and to stabilize frequencies for radio transmitters and receivers. The most common type of piezoelectric resonator used is thequartz crystal, so oscillator circuits incorporating them became known as crystal oscillators,[1] but other piezoelectric materials including polycrystalline ceramics are used in similar circuits.

Quartz crystals are manufactured for frequencies from a few tens of kilohertz to hundreds of megahertz. More than two billion crystals are manufactured annually. Most are used for consumer devices such as wristwatches, clocks, radios,computers, and cellphones. Quartz crystals are also found inside test and measurement equipment, such as counters,signal generators, and oscilloscopes.



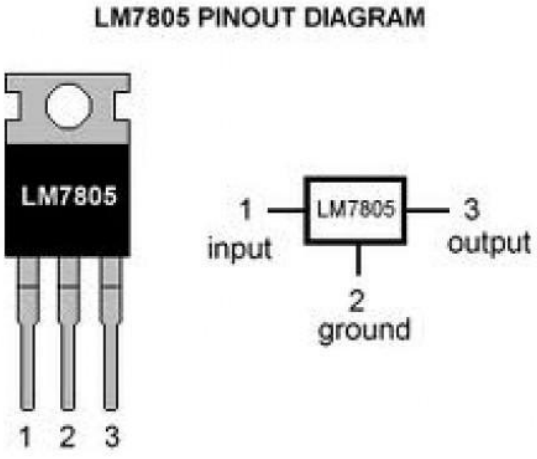
Diode

A rectifier diode is used as a one-way check valve. Since these diodes only allow electrical current to flow in one direction, they are used to convert AC power into DC power. When constructing a rectifier, it is important to choose the correct diode for the job; otherwise, the circuit may become damaged. Luckily, a 1N4007 diode is electrically compatible with other rectifier diodes, and can be used as a replacement for any diode in the 1N400x family.



Voltage regulator

This series of fixed-voltage integrated-circuit voltage regulators is designed for a wide range of applications. These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation. Each of these regulators can deliver up to 1.5 A of output current. The internal current-limiting and thermal-shutdown features of these regulators essentially make them immune to overload. In addition to use as fixed-voltage regulators, these devices can be used with external components to obtain adjustable output voltages and currents, and also can be used as the power-pass element in precision regulators.

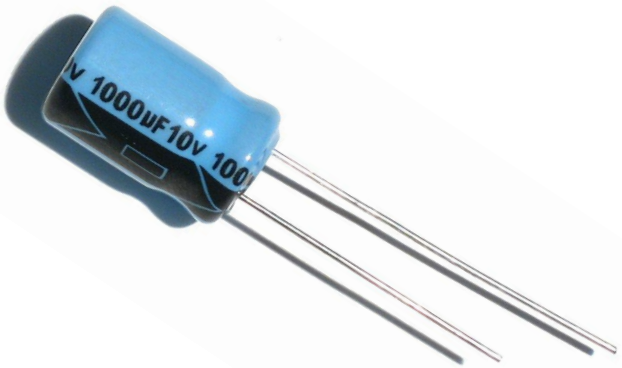


capacitor

A **capacitor** (originally known as a **condenser**) is a passive two-terminal electrical component used to temporarily store electrical energy in an electric field. The forms of practical capacitors vary widely, but most contain at least twoelectrical conductors (plates) separated by a dielectric (i.e. an insulator that can store energy by becoming polarized). The conductors can be thin films, foils or sintered beads of metal or conductive electrolyte, etc. The nonconducting dielectric acts to increase the capacitor's charge capacity. Materials commonly used as dielectrics include glass,ceramic, plastic film, paper, mica, and oxide layers. Capacitors are widely used as parts of electrical circuits in many common electrical devices. Unlike a resistor, an ideal capacitor does not dissipate energy. Instead, a capacitor storesenergy in the form of an electrostatic field between its plates.

When there is a potential difference across the conductors (e.g., when a capacitor is attached across a battery), anelectric field develops across the dielectric, causing positive charge $+Q$ to collect on one plate and negative charge $-Q$to collect on the other plate. If a battery has been attached to a capacitor for a sufficient amount of time, no current can flow through the capacitor. However, if a time-varying voltage is applied across the leads of the capacitor, adisplacement current can flow.

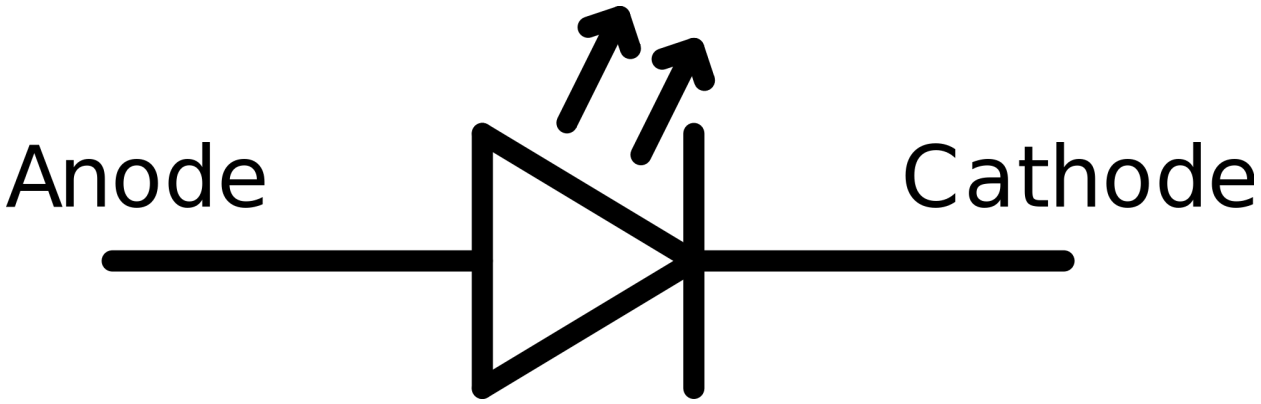
An ideal capacitor is characterized by a single constant value, its capacitance. Capacitance is defined as the ratio of the electric charge Q on each conductor to the potential difference V between them. The SI unit of capacitance is the farad(F), which is equal to one coulomb per volt (1 C/V). Typical capacitance values range from about 1 pF (10^{-12} F) to about 1 mF (10^{-3} F).



Here in this project we use capacitors to reduce ripples.

Led

A **light-emitting diode** (**LED**) is a two-lead semiconductor light source. It is a p–n junction diode, which emits light when activated. When a suitable voltage is applied to the leads, electrons are able to recombine with electron holeswithin the device, releasing energy in the form of photons. This effect is called electroluminescence, and the color of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor. Led is used for getting output.

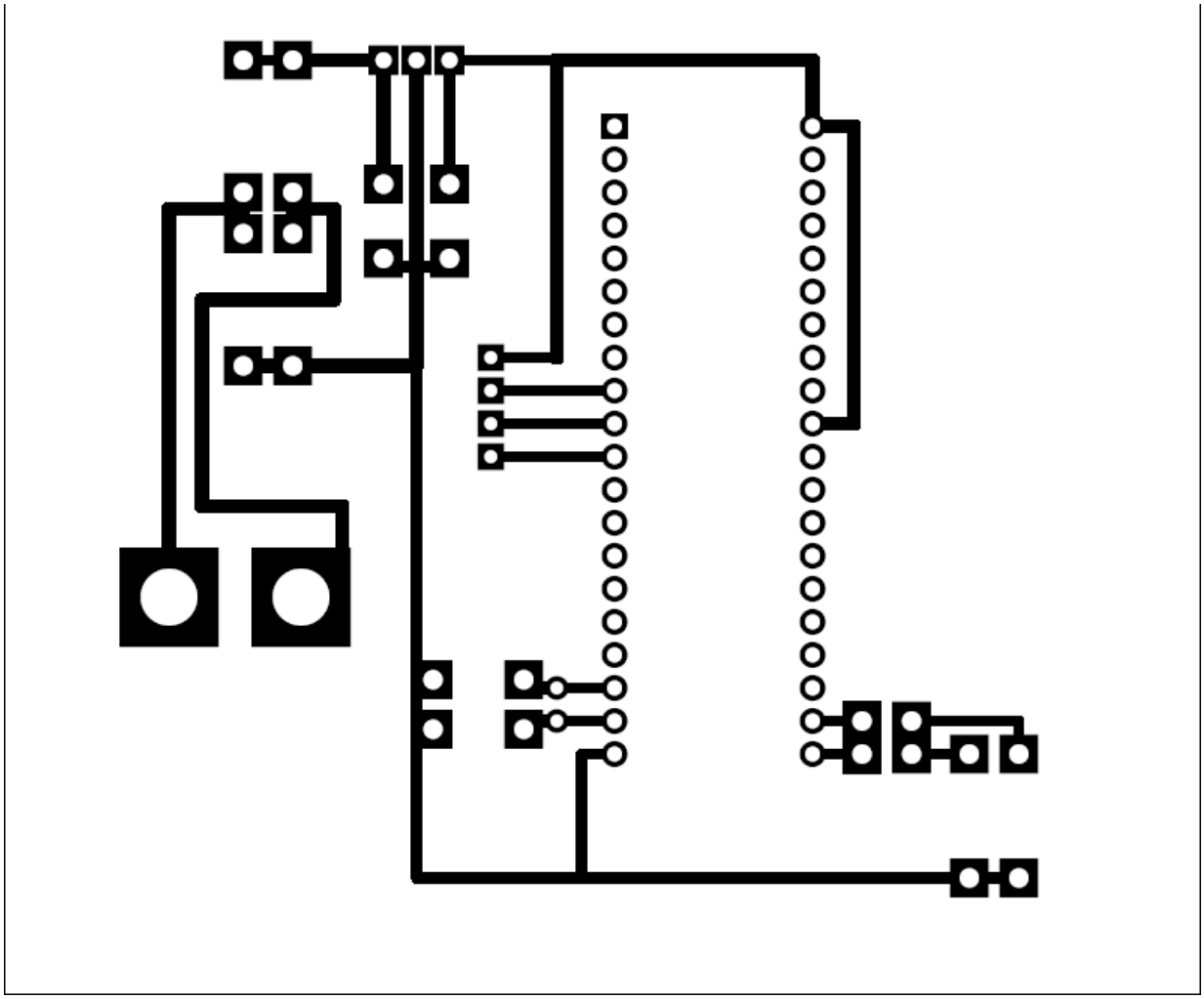


program:

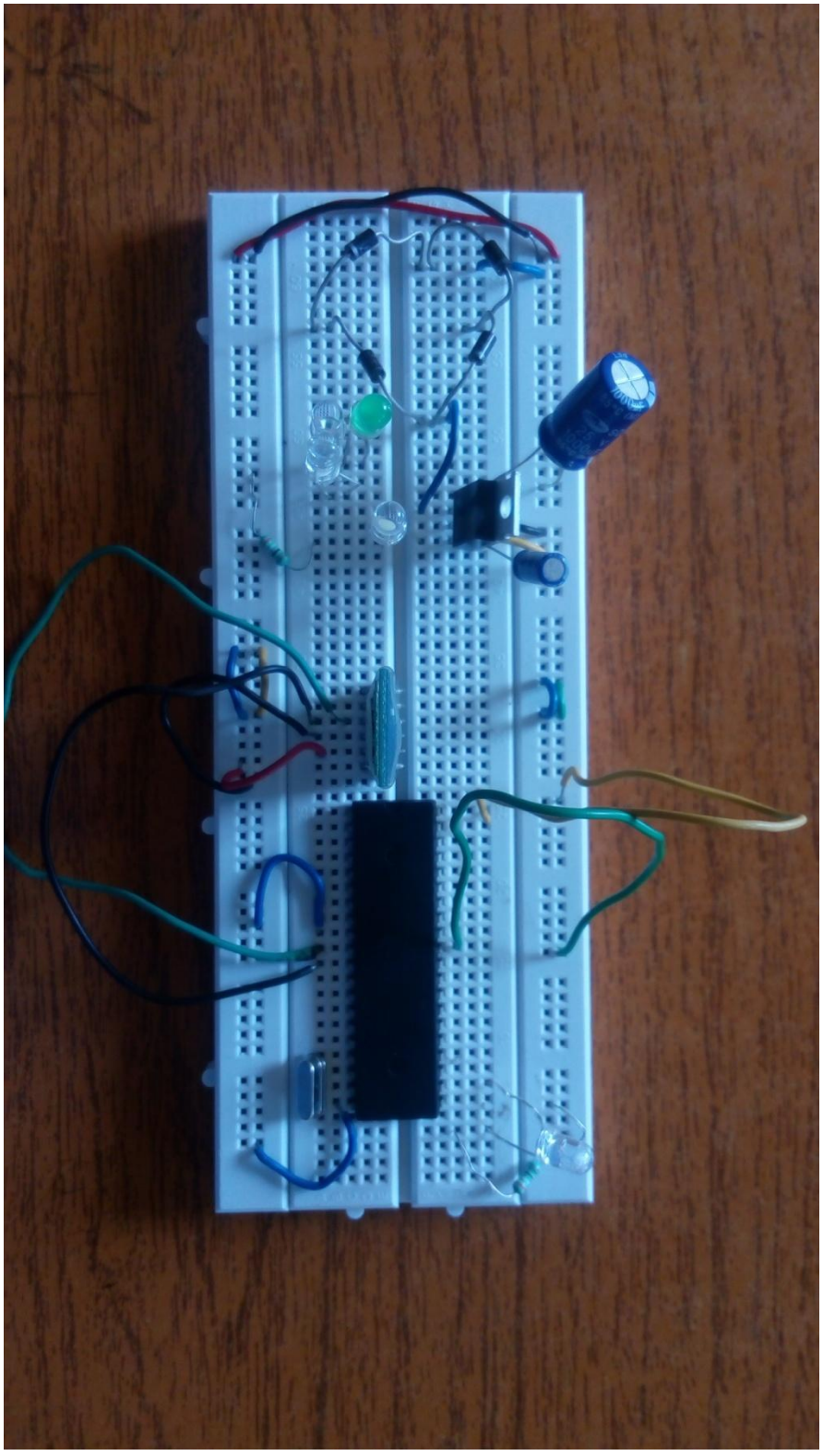
```
#include<reg51.h>
s bit led0=p2^0;
sbit led1=p2^1;
   Void main(void)
      {
          unsigned char my data;
          TMOD= 0x20;
          TH1= 0xFD;
          SCON= 0X50;
          TR1= 1;
         P2=0x00;
          Delay (200);
While(1)
   {
      While (RI==0);
       mydata= SBUF;
        RI=0;
  If(mydata==’1’)
   {
     Led0=1;
    Delay(200);
   }
 else if(mydata==’2’)
 {
```

```
    Led0=0;
   Delay(200);
 }
  Else if(my data==’3’)
 {
    Led1=1;
    Delay(200);
 }
else if(mydata==’4’)
{
  Led1=0;
  Delay(200);
 }
}
}
Void delay(int time)
{
  for(i=0; i<time; i++)
  for(j=0; j<1275; j++);
}
```

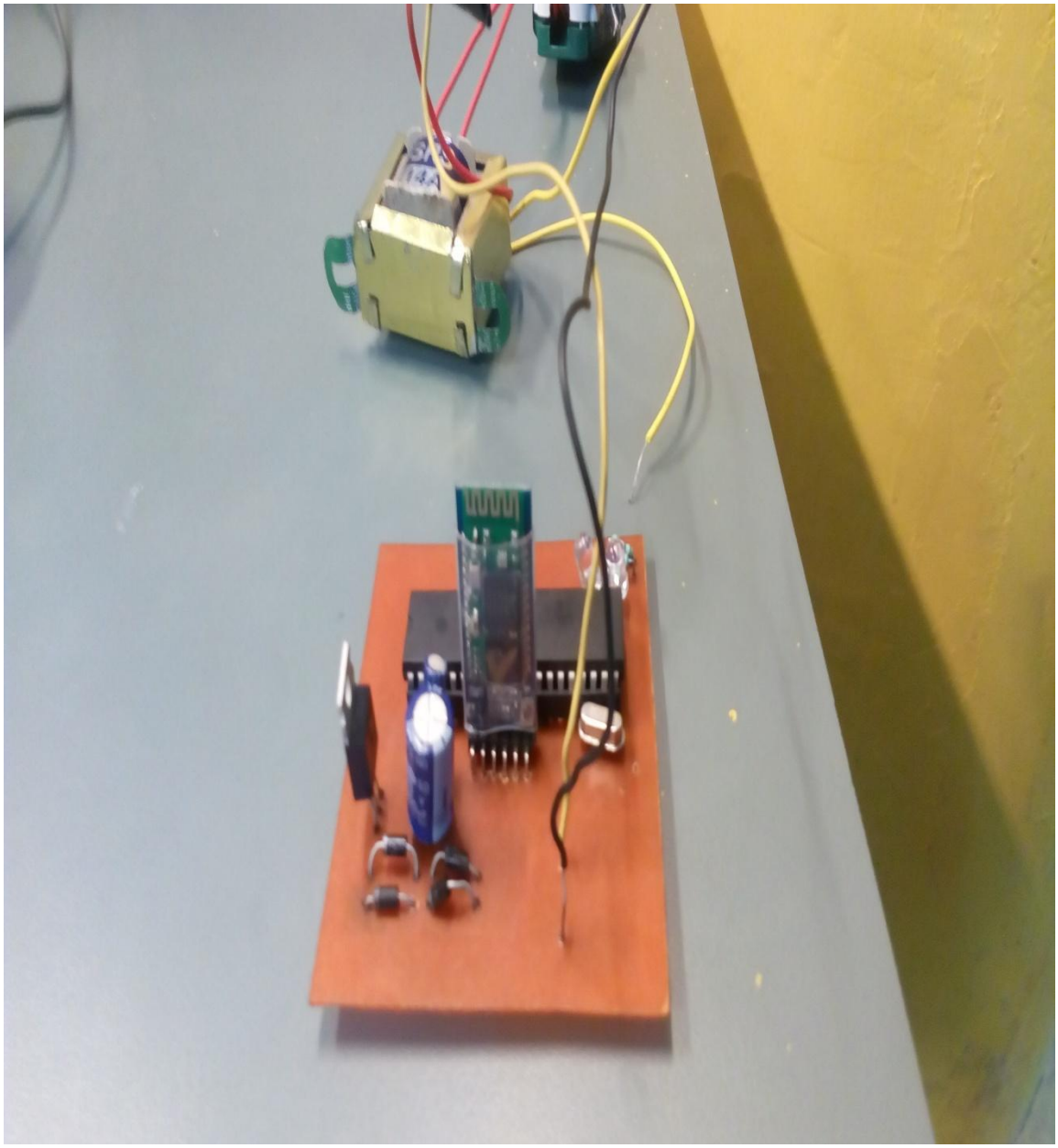
PCB LAYOUT



Connections on Breadboard



Printed circuit Board



TATA

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Certificate of Participation

This is to certify that Amey Waghmare

of YCCE, Nagpur

has participated in "pratikruti '16- The National Level Project Competition"
organized by Yeshwantrao Chavan College of Engineering, Nagpur and
TCSL (Technology and Knowledge Partner) on 11th March 2016.
He/She has presented his/her Model/Project on title
Home Automation

Chaudhari

Dr. S. S. Chaudhari
Project Co-ordinator

Dr. U. P. Waghe
Principal, YCCE