

# AUTOMATIC POWER GRID CONTROLLER

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## Abstract

Now days, there is a lot of requirement to control the appliances in an industry or in a home connected to the power grid when we are working with our PC. In these situations we need to go to the place where the power grid has been situated which is a time consuming process. The main aim of the present project is to provide a facility by which we can control all the appliances connected to the power grid like bulbs, fans, TV, fridge, and air cooler etc. from your PC or from your laptop at a distance of 10meters around the control board. The only thing is we need to connect a RF remote transmitter to your PC and a control board to the power control section of home.

## Introduction

In order to develop the country's power sector, power generation and distribution[1] are important. Here, this has been done by automation.

Automation of systems has become the demand of the day. Newer technology has made everything automatic and self repairable. In fact most of the developed systems are impossible to be controlled by human beings. There are many advantages of automation, first and most common human errors are eliminated, speed of operation becomes very fast and most advantageous is that the cost gets reduced. The main objective of this work is to design and fabricate an automated control system[2] for automatic power grid control. In this project we are controlling a power grid and different units are controlled on the basis of time.

In this system the wireless communication link is made possible between the RF remote and the control board with the help of RF communication. RF is ideal for effective and long distance wireless communication.

The RF remote receives the commands from the PC through the serial communication link and is transmitted in to the air. Here the command denotes the on or off conditions of the home appliances. Each and every device connected to the power grid has its own separate command for the on and off conditions. The control board which is attached to the power grid control section in the home/industry consists of a RF receiver. This receives the commands transmitted by the transmitter and are given to the microcontroller. The microcontroller plays a major role in receiving the commands from the RF receiver module and to switch on or off the particular device according to the command. Here in this project a power grid is connected to control up to four devices.

## Description

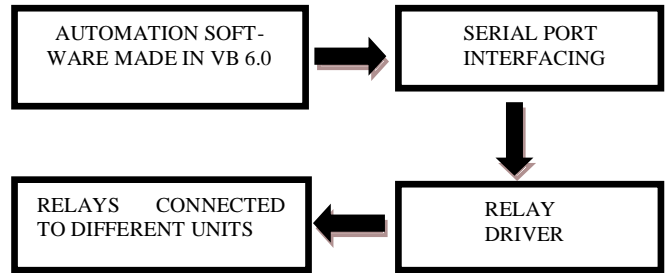


Figure 1. Functional diagram of automatic power grid controller

The working of the system can be described as below:

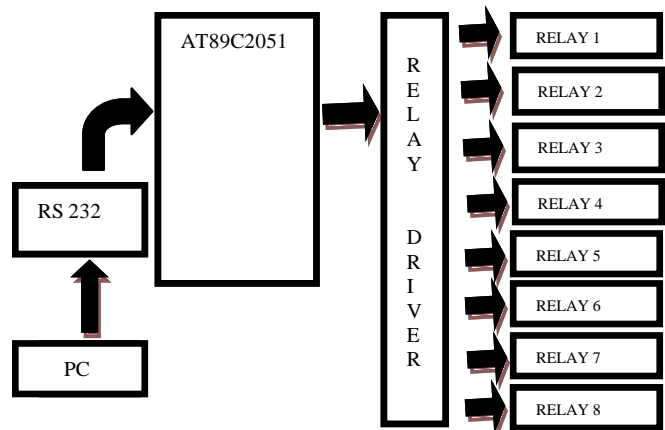


Figure 2. Block diagram of Automatic Power Grid Controller

Different relays will be controlled through the serial com of the PC. For the sake of simplicity, four relays will be controlled. The number can be extended according to the requirements. Controlling variable is time. In the duration of 24 hours, different time slots will be allotted to each unit. On proper time, relays will be activated automatically and the corresponding unit will get activated. To handle fast changing daily load, the power grid control system adopts the switching control method to design control subsystem [3].

## Software

In software we shall use VB interfacing to control the serial port. It provides easy method to implement a graphical user interface. MS comm. 6.0 will be used to control the

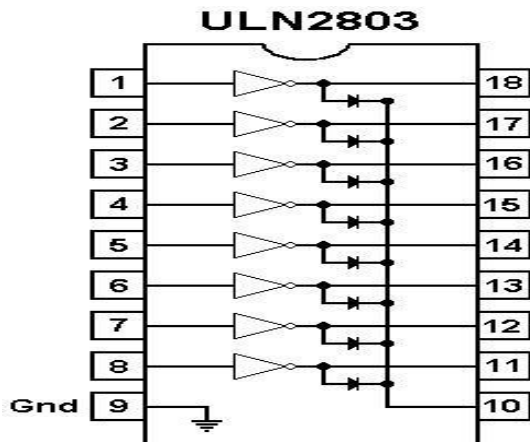
serial port. It has inbuilt control over serial port. Only parameters are reacquired to be configured.

## Hardware

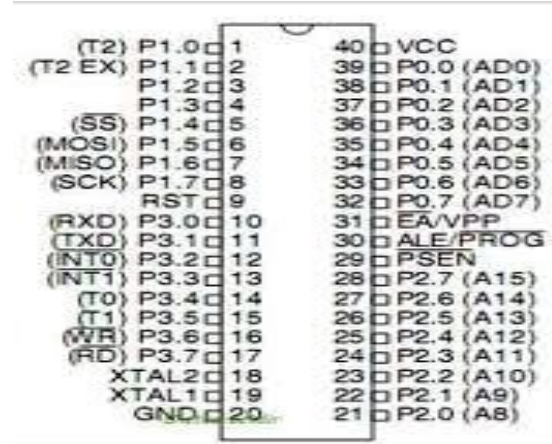
Microcontroller is the central part of the hardware. It serves two purposes, first it controls the serial communication and secondly it controls the relays. Other parts include opto couplers, relay driver and relays.

## Component Details

A. **ULN2803:** The eight NPN Darlington connected transistors in this family of arrays are ideally suited for interfacing between low logic level digital circuitry (such as TTL, CMOS or PMOS/NMOS) and the higher current/voltage requirements of lamps, relays, printer hammers or other similar loads for a broad range of computer, industrial, and consumer applications. All devices feature open-collector outputs and freewheeling clamp diodes for transient Suppression. The ULN2803 is designed to be compatible with standard TTL families while the ULN2804 is optimized for 6 to 15 volt high level CMOS or PMOS.



B. **AT89S8253:** The AT89S8253 is a low-power, high-performance CMOS 8-bit microcontroller with 12K bytes of In-System Programmable (ISP) Flash program memory and 2K bytes of EEPROM data memory. The device is manufactured using Atmel’s high-density non-volatile memory technology. The on-chip downloadable Flash allows the program memory to be programmed. By combining a versatile 8-bit CPU with downloadable Flash on a monolithic chip, the Atmel AT89S8253 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.



## Conclusion

The automatic control of power grid will enhance the operation of the grid. It will automatically detect the fault in the operational lines and configure the relays to work accordingly. Also, this is easy to operate and will not require any highly skilled person for controlling. The system provides a much easier access to achieve optimal automatic voltage control, thus highly feasible in practice [4]. The hardware components used and the supplementary components make it a cost effective project and also very efficient. The automated control system is working reliably so far, though it has few limitations. The limitations can be controlled by placing the system in an appropriate location [5]. Also, it is not capable of detecting fault in the supply.

## Acknowledgement

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