



“DESIGN AND DEVELOPMENT OF E-WATCH SYSTEM ON WASTE COLLECTION VEHICLE”

(Using BASCOM Software)

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Abstract – One of the main concerns with our environment has been solid waste management which in addition to disturbing the balance of the environment also has adverse effects on the health of the society. The detection, monitoring and management of wastes is one of the primary problems of the present era. The traditional way of mutually monitoring the waste in wastebins is a complex, cumbersome process and utilizes more human effort, time and cost which is not compatible with the present day technologies in any way. This project proposes an advanced method in which waste management is automated. Micro-controller is one of the most promising and anticipated technologies in recent years. This project certainly provides a novel approach in handling and disposing off the day to day. Solid and metal wastes in efficient and easy way.

Keywords –Metal detector, IR sensor, RF sensor, Microcontroller, LCD

INTRODUCTION

In this system we started going to develop a unique electronic circuit to make a watch on waste collecting vehicles and waste collection bins. For which we are using R.F of 2.4 GHz frequency for communication. Controlling part is controlled using ATmega16 controller and for sensing purpose we are using IR sensor to indicate dustbin is full or not we are using. Different LEDs for each dustbin and it has also individual sensors.

We are going to attaches two sensors in every dustbin one is for empty and other is for full. Whenever both sensors are giving high signal it means dustbin is full. Waste management is the organization activity and actions required to manage waste from its inception to its final disposal. This includes among other things, collection, transport, treatment and disposal of waste together with monitoring and regulation. Now we will send a unique code assigned to that dustbin using controller and R.F transmitter.

Whenever this code is received to the R.F receiver it will decoded using controller and then LED will be switched on automatically. It also encompasses the legal and regulatory framework that relates to waste management encompassing guidance on recycling etc. Waste collection is a part of the process of wastemanagement. Now whenever collecting vehicle will collect garbage from that dustbin then automatically that LED will be switched off.

I. BLOCK DIAGRAM

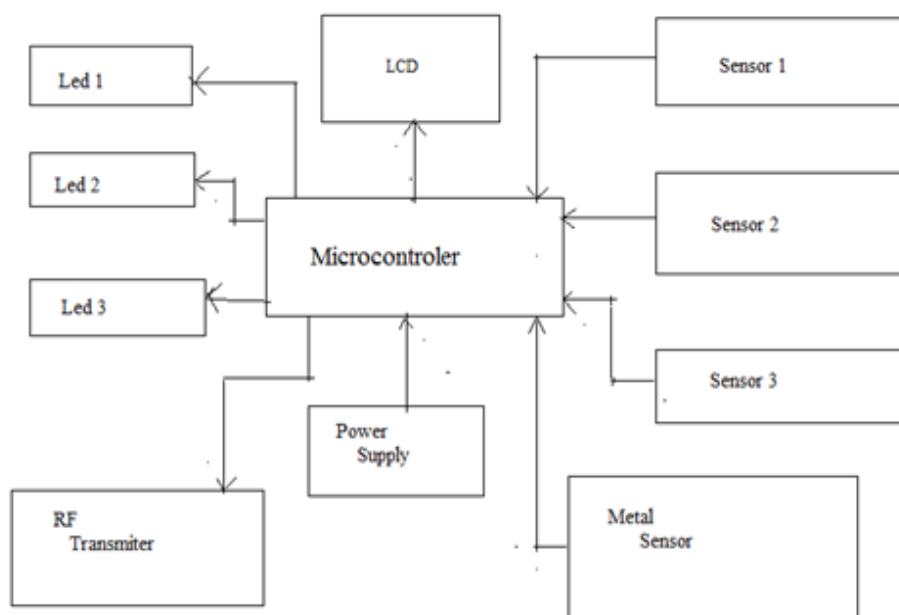


Fig: 1 Transmitter side

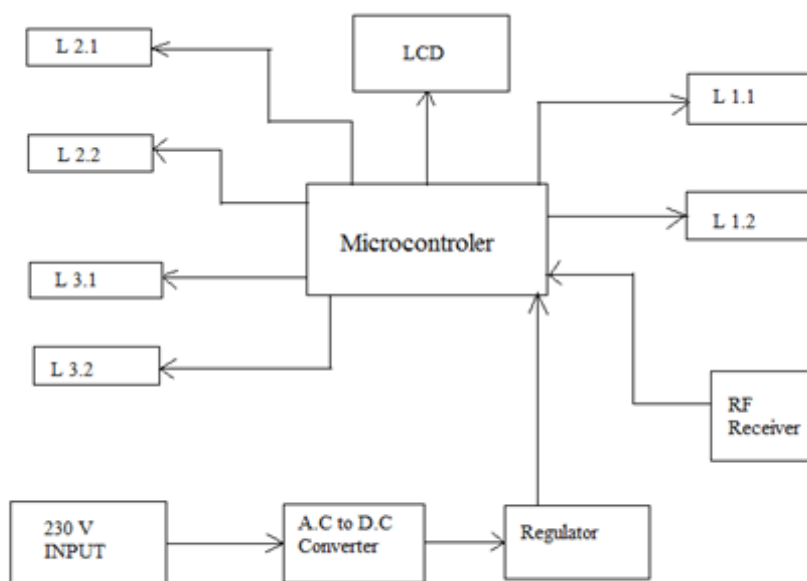


Fig: 2 Receiver side

II. HARDWARE DESCRIPTION

A. Power Supply:

A power supply is a device that obtaining electric power to an electrical load. The term is most commonly applied to electric power converters that convert one form of electrical energy to another, though it may also refer to devices that convert other form of energy to electrical energy. A regulated power supply is one that controls the output voltage or current to a specific value; the controlled value remains held approximately constant even with variations in either load current or the voltage supplied by the power supply's energy source. Each power supply must obtain the energy it purchases to its load, as well as any energy it ingests while performing that task, from an energy source.

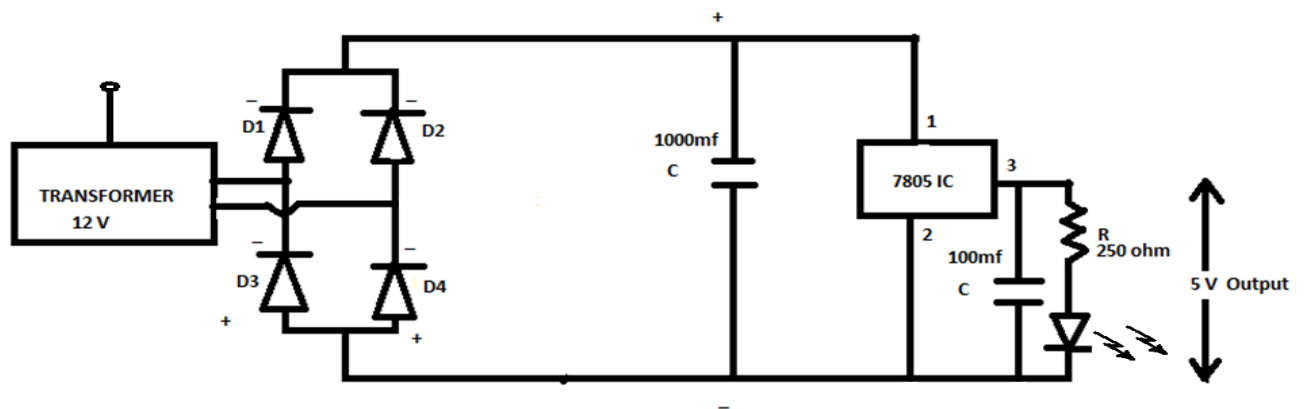


Fig: 3 Power Supply Circuit

As per its design, a power supply may obtain energy from:

1. Electrical energy transmission systems. Common examples of this include power supplies that convert AC line voltage to DC voltage.
2. Batteries and fuel cells are energy storage devices.
3. Electromechanical organizations such as generators and alternators.

B. 7805-IC:

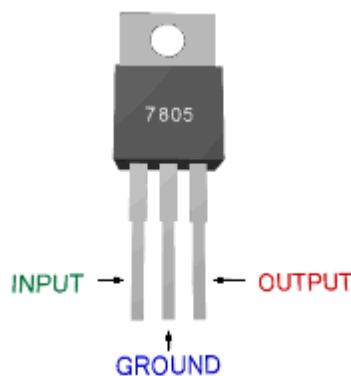


Fig: 4 IC 7805

This is the IC which is used to providing the 5V-dc supply to the ATmega16.

- This is joining to the ATmega16 for getting the 5V.
- This IC has total three pin and it is connect to the 12V dc.
- Power supply to getting the voltage of the 5V dc supply.

C. ATmega16 Microcontroller:

DEFINITION:

A microcontroller is a chip which has a computer processor with all its support function (clock & reset), memory (both program and data), and I/O (including bus interface) built into the device. These built in functions minimize the need for external circuits and devices to be designed in the last application.

The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega16 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed.

The AVR core syndicates a rich education set with 32 general purpose working register. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in one single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers.

The ATmega16 AVR is maintained with a full suite of program and system development tools including: C compilers, macro assemblers, program debugger/simulators, in-circuit emulators, and evaluation kits. The boot program can use any interface to download the application program in the Application Flash memory.

By combining an 8-bit RISC CPU with In-System Self-Programmable Flash on a monolithic chip, the Atmel ATmega16 is a powerful microcontroller that provides a highly-flexible and cost-effective solution to many embedded control applications.

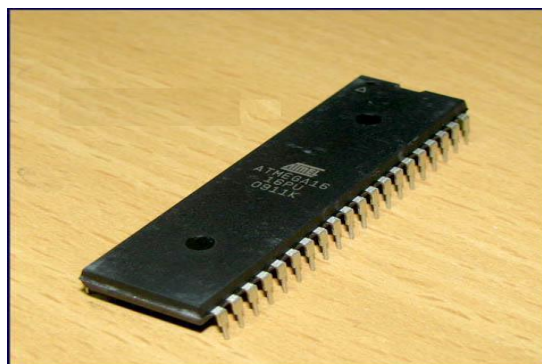


Fig: 4 ATmega16

D. IR Sensor

IR sensor is an electronic device. This is used to detect any object. In the infrared all the objects radiate some thermal radiation. This radiation is invisible to our eyes which can be detected by an infrared sensor. The emitter is IR LED and detector is photodiode.

In IR sensor we use LED, variable resistor, LM358 IC, photodiode, IR LED and resistors. A photodiode is used for generation of voltage while IR LED is used for the generation of IR rays. When the obstacle is coming and cuts the IR rays then rays are reflected from obstacle and photodiode will detects these rays and generate voltage accordingly.

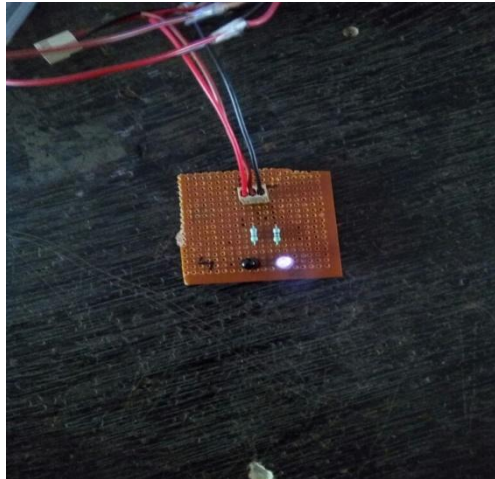


Fig: 5 IR Sensor

E. RF Sensor

The RF sensor operates by defining a sensitive volume and interrogating the values of these parameters for whatever materials invade this volume. Any or all of the parameters may be simultaneously measured by either a single sensor or a sensor pair and the sensor deduces the nature and behaviour of the invading items from the resulting signature. The sensitive volume is defined by a radio frequency antenna which is tuned to the sensor electronics.

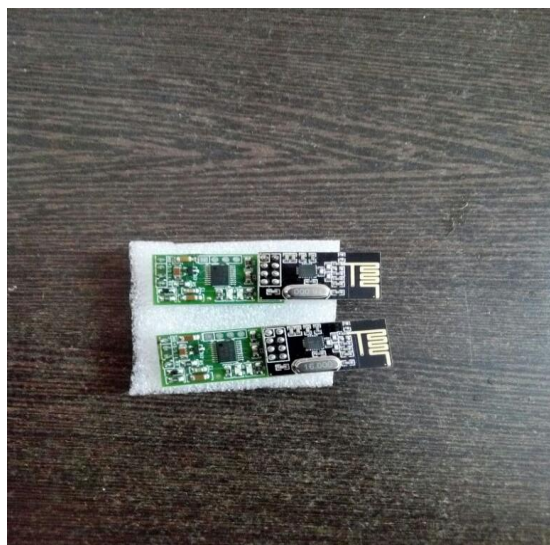


Fig:6 RF Sensor

III. Overview Of Project:

At Transmitter

In this system we are going to use 5 volt power supply to give supply voltage to controller. For which we are using step-down transformer with full wave bridge receiver circuit.to regulate supply we are using 7805IC, two IR sensor is attached to every dustbin. On is for full and other is for empty. IR sensors are attached to ADC port of ATmega16 controller. We have 10 bit inbuilt ADC in this controller.

Now when we get signals from the sensor then it will be given to the controller's ADC. Now our also will decode that signal and make unique code which will be transmitted using R.F for indication at dustbin side we are also using LED's.

At Receiver

In receiver section we will use same type of power supply using 7805IC. Now ever signal comes to RF receiver it will be given to controllers 14 & 15 number pin which is used pin which is used for communication and hence we will decode that signal.



Fig: 10 Hardware

IV. Conclusion:

From this project we are going to develop a unique electronic circuit to make a watch on waste collecting vehicles and waste collection bins. This project is mainly related to clean environment and the main purpose of this project is to reduce labour work and time consuming. The problem of overflow of dustbins will be solved quickly.

V. Acknowledgement:

I see that the project would not have possible without the support, faith and guidance of below mentioned people. A sincere heart full thanks to all of them for giving me the confidence and patience to go on.

I express my sincerest gratitude to Mr. Sachin Patel and Mr. Viral Patel for entrusting on this project. Without their guidance, support and encouragement this project wouldn't have been put together. We would also like to thank entire staff of E&C department especially to our teachers and our HOD Mr.JigneshJethwa who were always there support us and without that it would be impossible for us to complete our project.

Being last year student making of the project adds a final touch to our carrier. We would like to thanks to other members who have helped us directly and indirectly. We express our sincere thanks to all the staff members of the department of EC who have helped us when required.

VII. References:

[I]Journals Papers

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