Temperature Controllable Water Heater

Prof. Shekhar Mane[1], Sudarshan Gurav[2], Rutika Mhatre[3], Saurabh Mhatre[4], Akash Varma[5]
[1, 2, 3, 4, 5] Department of Electronics and Telecommunication
[1, 2, 3, 4, 5] Bharati Vidyapeeth College of Engineering, Belpada, Navi Mumbai, India

Abstract- *There are many water heating devices in the market which satisfies our requirement. However, these devices have two problems. Firstly, the price of these devices is high. Most of them cost more money. Second, the way to use these device is complicated. Hence the existing device must be easy to use and cost effective. By using a simple user manual, this device will be able to control the temperature of a heater by a remote.*

Keywords- ASK Module, LM 35 temperature sensor, Relay, ADC MCP3204, AT89S52

I. INTRODUCTION

This project is designed to build a controller to control the bath temperature of a heating element. A Temperature sensor is used as the temperature detection device and sent feedback to the microcontroller regarding to current bath temperature of the heating element. It also has wireless communication with help of which is controlled by the remote and according to the temperature microcontroller gives input to the relay there by heating system automatically turns on/off depending upon the temperature.

II. LITERATURE SURVEY

Earlier the heaters we used to heat up our water bath were not reliable. First of all, they consume more power and their cost is also high. According to the survey, most of the geysers have blasted due to overheating. We were unable to control the current bath temperature. While the most of the users don't know the proper operating conditions of heater and geyser. Unlike AC and Refrigerators which provides temperature control mechanism, heaters and geysers weren't so available with such mechanism. In order to eliminate the drawbacks, we are trying to implement the heater which will be totally temperature controlled heater. It will be cost effective as well as easy to implement.

III. PROPOSED WORKED

The objective of this project is to build the portable heater whose temperature can be controlled by the users. This is achieved using remote interface.

BLOCK DIAGRAM:

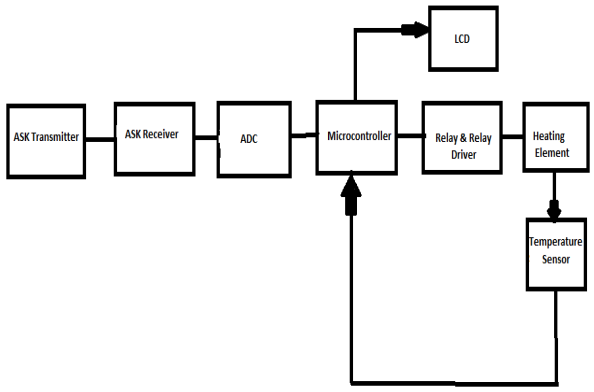


Figure 1.

A. Micro-Controller AT89s52

A micro-controller can be compared to a small standalone computer, it is a very powerful device, which is capable of executing a series of pre-programmed tasks and interacting with other hardware devices. Being packed in a tiny integrated circuit (IC) whose size and weight is usually negligible, it is becoming the perfect controller for robots or any machines requiring some kind of intelligent automation. A single microcontroller can be sufficient to control a small mobile robot, an automatic washer machine or a security system. Any microcontroller contains a memory to store the program to be executed, and a number of input/output lines that can be used to interact with other devices, like reading the state of a sensor or controlling a motor. Nowadays, microcontrollers are so cheap and easily available that it is common to use them instead of simple logic circuits like counters for the sole purpose of gaining some design flexibility and saving some space. Some machines and robots will even rely on a multitude of microcontrollers, each one dedicated to a certain task. Most recent microcontrollers are 'In System Programmable', meaning that you can modify the program being executed, without removing the microcontroller from its place. The 8051 micro-controller architecture is shown in figure 1.

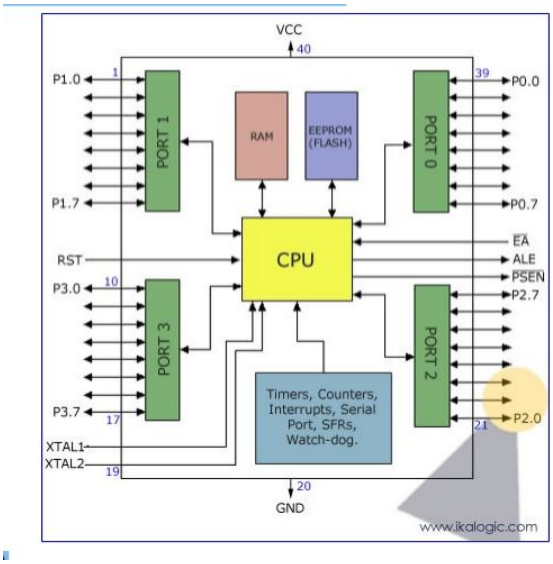


Figure 2. Micro-Controller Architecture

B. ADC MCP3204

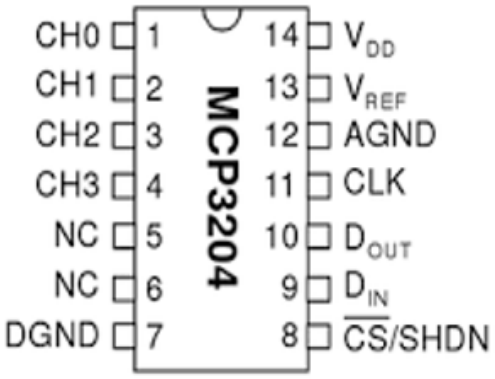


Figure 3. ADC MCP3204 IC

ADC is a device used for converting an analog signal to a digital code, usually the binary. Most of the signals are sensed and processed by humans are analog signal. Analog¬ to ¬Digital conversion is the primary means by which analog signal are converted into digital data that can be processed by computers for various purpose. The most inexpensive type of ADC is a Successive-Approximation ADC. The MCP3204 12-bit Analog ¬to ¬Digital Converter (ADC) combines high performance and low power consumption small package, making it ideal for embedded control applications.

C. ASK Module

A wireless radio frequency (RF) transmitter and receiver can be easily made using HT12E Encoder and ASK RF Module. Wireless transmission can be done by using 433Mhz or 315MHz ASK RF Transmitter and Receiver modules. In these modules digital data is represented by different amplitudes of the carrier wave, hence this modulation is known as Amplitude Shift Keying (ASK). Radio Frequency (RF) transmission is more strong and reliable than Infrared (IR) transmission. Radio Frequency signals can travel longer than Infrared. Only line of sight communication is possible through Infrared while radio frequency signals can be transmitted even when there are obstacles.

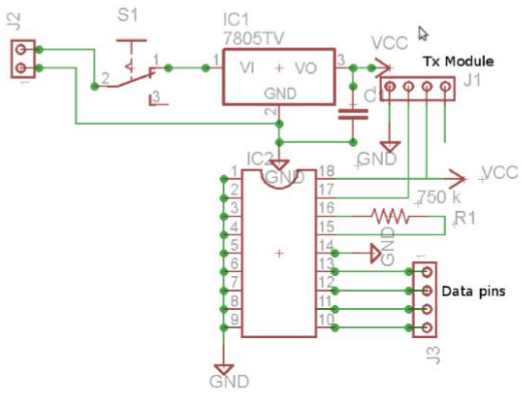


Figure 4a. ASK Transmitter Module

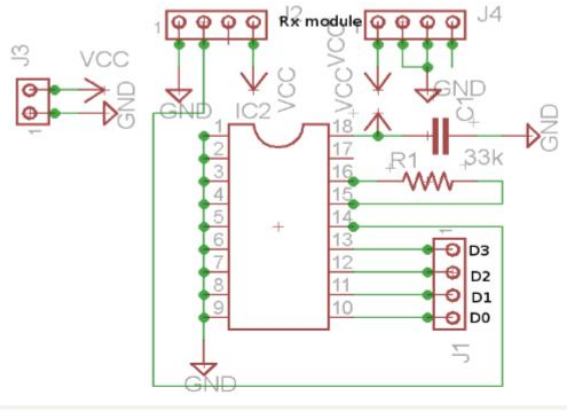
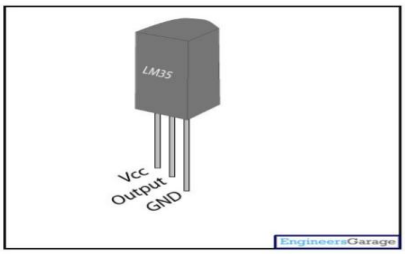


Figure 4b. ASK Receiver Module

D. Temperature Sensor LM35

LM35 is IC temperature sensor with its output proportional to the temperature. With LM35, temperature can be measured more accurately than with a thermistor. It also has low self-heating and does not cause more than 0.1 oC temperature rise in still air. The operating temperature range is from ¬55°C to 150°C. The output voltage varies by 10mV in response to every oC rise/fall in ambient temperature, i.e.its scale factor is 0.01V/ oC.



Pin No	Function	Name
1	Supply voltage; 5V (+35V to -2V)	Vcc
2	Output voltage (+6V to -1V)	Output
3	Ground (0V)	Ground

Figure 5. LM35 IC

E. Relay

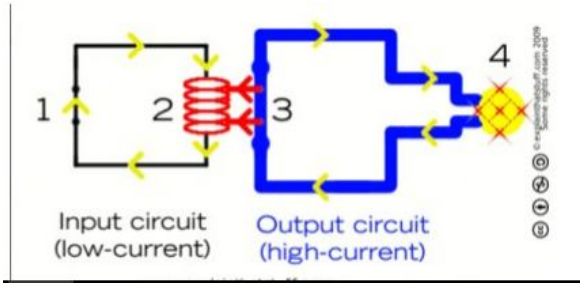


Figure 6. Relay

A relay is an electromagnetic switch operated by a very small electric current that can turn on or off a much larger electric current. The relay consists of an electro-magnetic coil of wire that becomes a temporary magnet when electricity flows through it. Relay is shown in figure 5.

COMPONENTS:

1. Heating Module
2. ASK Module
3. LM 35 temperature sensor
4. Relay Circuit
5. ADC MCP3204
6. AT89S52

IV. FUTURE SCOPE

1. Adding ZigBee module and all other module connected at transmitting and receiving side.
2. The Cable connected between project box and the heater can be upgraded both in length and robustness.
3. An LCD screen can be added on the project box so user can use the device without a computer.
4. Addition of heater cleaning service with CONCO systems.
5. An adding GTS technology.

V. CONCLUSION

This project provides safe heating. The project is small in size and can be made portable. The Cable connected to the project box can be upgraded both in length and robustness. An LCD screen can be added on the project box so user can use this device without a computer.

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