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Arduino Based Drinking Water Bill Calculator Using GSM Technology

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ABSTRACT:

The main aim of this paper is to distribute only required amount of water wanted, thus ensuring there is no wastage and block in supply of water. In order to apply the proposed system each home unit must be provided with water flow sensor and water flow switch ,which is controlled by arduino ATmega328 board. Flow sensor generates series of electric pulse during which water utilize by the user, flow rate and the quantity of water supplied can be calculated. Along with this arrangements a valve and relay is provided, which controls the supply of water from base station. Automated billing system and addition of GSM module for billing and maintaining the value. The optimization technique can be used for multifaceted pipeline system and overcrowded area.

KEYWORDS: Flow sensor, GSM, Arduino, LCD.

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I INTRODUCTION

Water is an important resource for all the living species on the earth. There are many issues uprising in day to day life like water scarcity, water inequality and many. In such a case when it comes to water distribution from government to public or consumers there are many issues faced, were the people are not able get sufficient amount of water because of unequal distribution.

The employee will go to that place and open the valve for a particular duration, then again the employee will go to the same place and close the valve, this result is wastage of time. In this research, we have implemented the design of GSM based water monitoring system that monitors the quantity of water in real time. This system consists of some sensors which measure the water quantity parameter.

II BLOCK DIAGRAM

The water flow through the tube is measured using the flow sensor and sensor is read by the Arduino. Based on the flow sensor calibration factor (CF), the amount of liters of water consumed is determined. This is a continuous process until the water flow stops through the tube. Based on the liters of water consumed, amount will be calculated using the Arduino microcontroller. The bill will be stored in the microcontroller.Using LCD display the bill is show, which is interfaced to Arduino. The GSM module is required to begin a communication link between the service provider and customer. Bill SMS is sent to user through SMS.

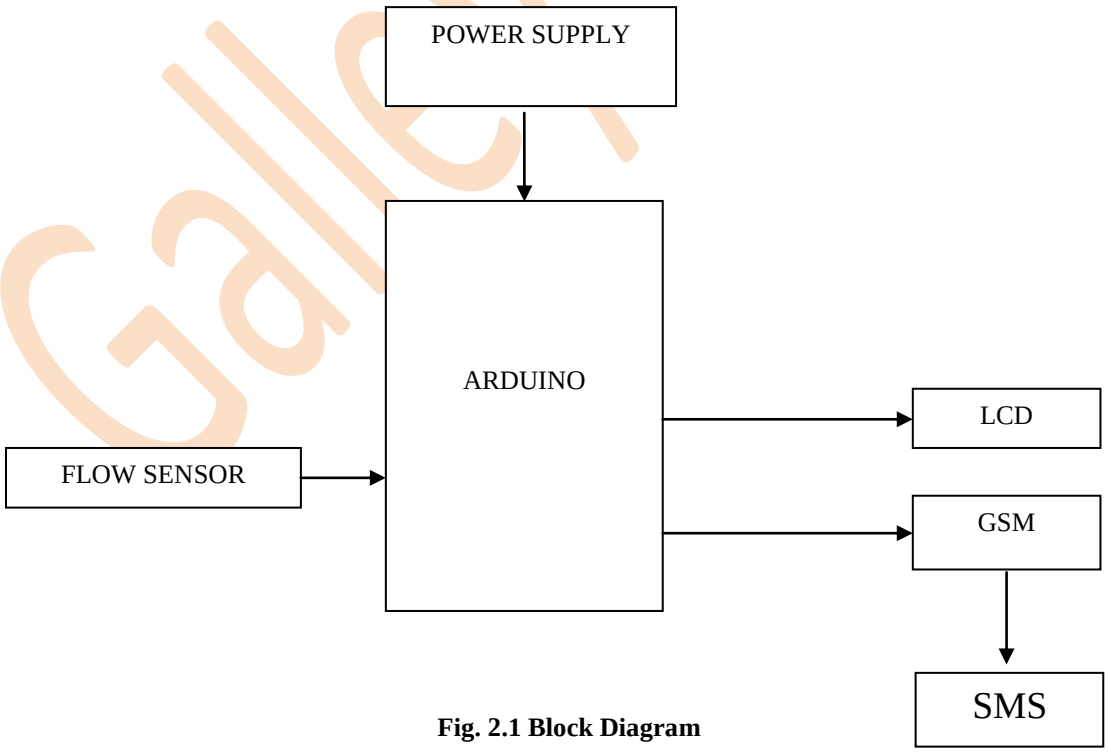

Fig. 2.1 Block Diagram

POWER SUPPLY

The power is a source of all device, here this supply contain step down transformer bridge wave rectifier, Voltage Regulator, capacitor. 12-0-12 transformer is used here, its output is AC but our device should work DC. So it converts AC into DC by means of bridge wave rectifier and its output has been regulator by voltage regulator. (IC 7805 and 7812) these are two regulator ICs should use for this processor. The input to the power supply is 230V AC, 50 Hz. The 7805 IC Regulator will convert the AC signal to 5V DC signal. Power is generated and sends to the distribution transformer.

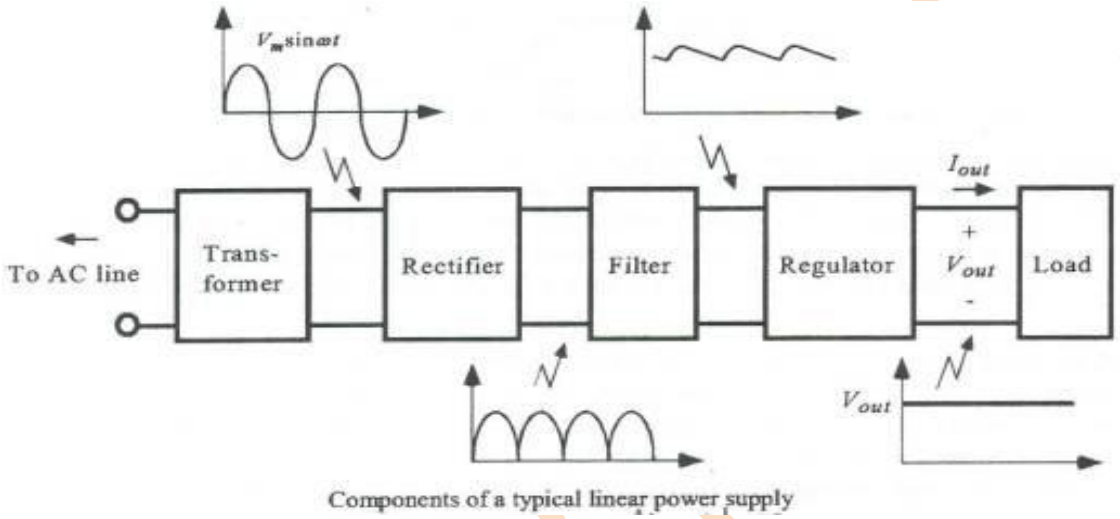

Fig. 2.2 Power Supply Block Diagram

FLOW SENSOR

Flow sensor plays a vital part next to arduino ATmega328 board in automated water system. The water rotor in the flow sensor rotates when the water flows through it and its rate changes with different rate of flow. Out of the three wires in the flow sensor, black -ground, yellow – LCD, red - arduino. Flow sensor generates a series of output pulse proportional to direct flow rate. Pulses generated from the output.

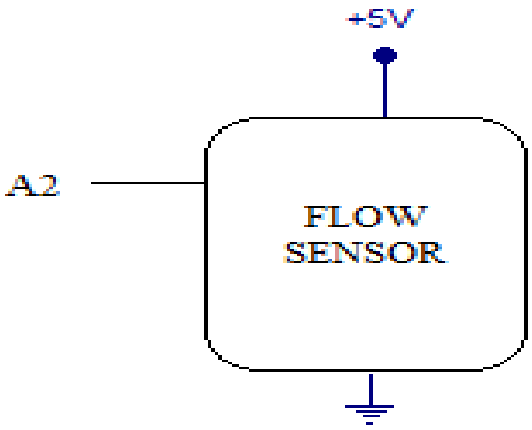

Fig. 2.3 Flow Sensor

LIQUID CRYSTAL DISPLAY (LCD)

A 16 Pins is utilized for displaying the values of the sensors and other discrepancies which, consist of 16 characters with 4 rows chip on board alphanumeric display. Out of these 16 pins the LED positive and LED negative pin are connected to power supply; three digital pins are used and is interfaced with Arduino mega digital pins. VCC is connected to power supply. Displays the amount of usage of water to each home unit separately. In this research the LCD is configured as an output device. The LCD is mainly used here to display the original data and encrypted data in transmission section of the project and the original data in the receiver section.

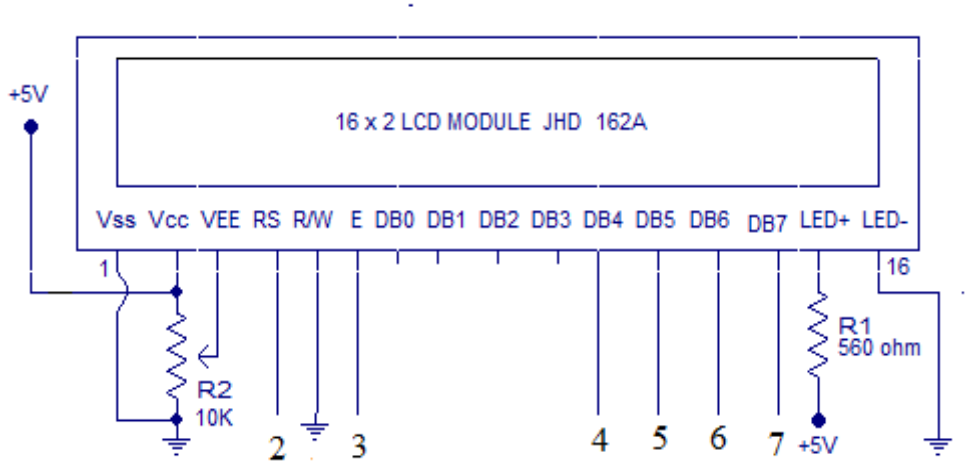

Fig. 2.4 LCD Display

ARDUINO (ATmega-328)

Arduino is the largest part micro-controller that is used while designing. Arduino is the largest part. The program is uploaded on the AVR microcontroller close on Arduino. Arduino is an 8- bit Microcontroller. It can hold the data sized of up to 8-bits. It is an AVR **(**ATmega328) based micro-controller.

- Internal memory -32KB.
- Operates ranging from- 3.3V to 5V.
- Electrical supply is removed from its biasing terminals.

Fig. 2.5 Arduino

GSM MODEM

A GSM modem is a particular type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just similar to a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to converse over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for making a call, sending and receiving SMS and MMS messages. A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, or it can be a mobile that provides GSM modem capabilities. GSM modems can be a fast and resourceful way to get started with SMS, because a special subscription to an SMS service provider is not required. In most parts of the world, GSM modems are a cost useful solution for receiving SMS messages, since the sender is paying for the message delivery.

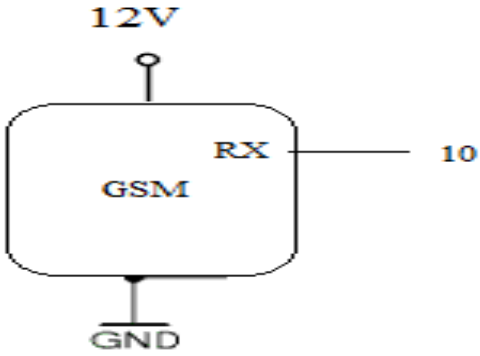

Fig. 2.6 GSM Modem

BASICS OF SERIAL COMMUNICATION

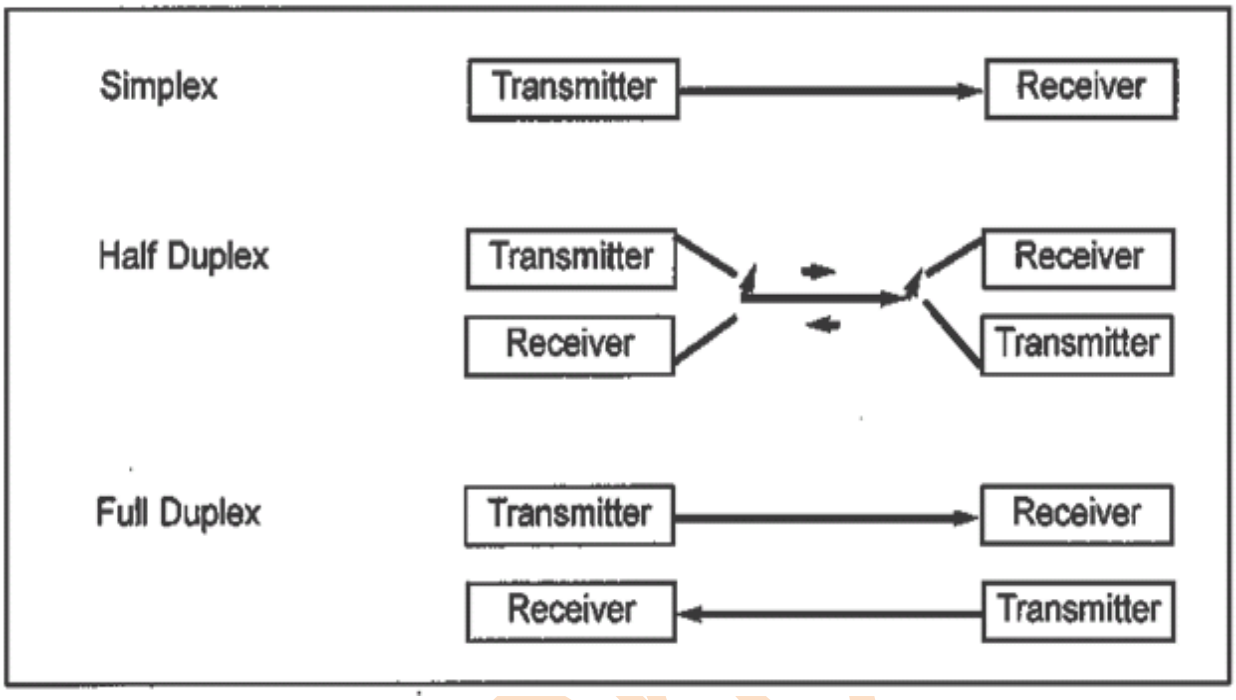

Fig. 2.7 Simplex, Half Duplex and Full Duplex Transfer

III CONCLUSION

Distribution system is used to water flow from its source to the point of usage which is entirely automated. The process of monitoring water flow rate, transmitting the usage, calculating the bill etc. is through preprogrammed by Arduino controller and hence no error as it avoids human intervention. Also, Billing information is sent through SMS which is a reliable and secured communication technique and also helpful for the user as the user get the bill on time.

IV REFERENCE

1. Al-Qatari S.A, Al-Ali A,R. ,"Microcontroller Based Automated Billing System", Published in Industrial Automation and Control: Emerging Technologies, 1995.
2. Bu- Islam NS, Wasi-ur-Rahman. "An Intelligent SMS based remote Water metering System", Published in Computer and information Technology, 2009.
3. Bhawarkar, N. B., et al. "Literature Review for Automated Water Supply with Monitoring the Performance System." 2014.
4. Vinothini, E., and N. Suganya. "Automated Water Distribution and Performance Monitoring System."International Journal of Engineering and Innovative Technology (IJEIT) Volume 3 2014.
5. Sharath, V. C., et al. "Smart aqua meter." Advances in Electronics, Computers and Communications (ICAECC), 2014 International Conference on. IEEE, 2014.

6. Rajeswari, V., L. Padma Suresh, and Y. Rajeshwari. "Water storage and distribution system for pharmaceuticals using PLC and SCADA." Circuits, Power and Computing Technologies (ICCPCT), 2013 International Conference on. IEEE, 2013.
7. Batista, N. C., et al. "Photovoltaic and wind energy systems monitoring and building/home energy management using ZigBee devices within a smart grid." Energy 2013; 49: 306315.
8. Karthikeyan Sundarsamy, Dr.P.Thirunavukkarasu, N.Nandakumar, Dr.R.Thangavel Voice Broadcasting Based Coal Mine Monitoring andControlling System with Zigbee and GSM Technology. ISSN(Online): 2319-8753, ISSN (Print) : 2347-6710. February 2016.
9. Karthikeyan Sundarsamy, IR Light Muscle and Nerve Pain Reliever with Stimulator. IJSTE - International Journal of Science Technology & Engineering | Volume 3 | Issue 10 April 2017 ISSN (online): 2349-784X.
10. Arun Prasad. M, Data Transfer System for Security Applications. IJSTE - International Journal of Science Technology & Engineering | Volume3 | Issue 10 | April 2017 ISSN (online): 2349-784X.
11. M. Arun Prasad, O. M. Saravanakumar Security and power saving system using embedded technology. IJRE-ISSN:2349-252X.
12. M. Senthil Kumar, Unobtrusive Sensing and Wearable Device for Soldiers using WNS. IJSTE - International Journal of Science Technology & Engineering | Volume 3 | Issue 10 | April 2017 ISSN (online): 2349-784X.