Published by :
http://www.ijert.org

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 8 Issue 04, April-2019

Automatic Speed Breaker on Time Demand using Embedded Systems

Ajay S, Govind G, Dharmendhar S, Parthasarathy J
Department of Electronics and Communication
Panimalar Engineering College

***Abstract*—The concept of this research work is to have anautomatic speed breaker on time demand according to the requirements. Means when there is no need of the speed breaker on the road, it disappears from the road and the road becomes flat and when there is a need then the breaker comes on the road from ground and it starts its working of slowing speed of the vehicles. In implementation of this concept, we use an iron made hemi-cylindrical speed breaker which is capable of rotating itself using control circuitry of embedded systems. So when needed, it comes on the road by rotating itself from flat position and when not needed, it rotates itself again and gets flat and combines with flat road. In the system, real time clock is used to mention the required time for having the speed breaker on road. When time gets started, breaker comes on the road and remains until the countdown gets zero. In the Embedded system's clock any time and date can be stored on which the speed breaker is required on the road. So this type of speed breaker is useful before any building for which the time is specified for coming in the building and going out from it e.g. schools, any organization etc.Additionally we used a Wireless sensor network which provides a interface to monitor and controlmultiple humps at the same time. Further we used a internet of things (IOT) for better capability of handling from remote areas. For the exceptional cases like emergency or for the Ambulance the RF is used. So that the RF will automatically disable the Speed braking system. When the RF receiver , receives high signal strength then the microcontroller will command the system to disable at that time.**

I. INTRODUCTION

The concept of this research work is to have an automatic speed breaker on time demand according to the requirements

Means when there is no need of the speed breaker on the road, it disappears from the road and the road becomes flat and when there is a need then the breaker comes on the road by rotating itself from its flat position and it starts its working of slowing speed of the vehicles. In implementation of this concept, we use an iron made hemi-cylindrical speed breaker which is capable of rotating itself using control circuitry of Embedded Systems. So when needed, it comes on the road and when not needed, it rotates itself again and gets flat and combines with flat road. In the system, real time clock is used to mention the required time for having the speed breaker on road. When time gets started, breaker comes on the road and remains until the countdown gets zero. This is because for best results when applying high speed auto-reclose to improve a system stability limit, it is important that the fault should be cleared as quickly as possible from both line ends. In the Embedded system's clock any time and date can be stored on which the speed breaker is required on the road. So this type of speed breaker is useful before any building for which the time is specified for coming in the building and going out from it e.g. schools, any organization etc. By using this idea, it is possible to adjust the time of speed breaker on road. We can use this innovative idea in front of any organization, which is on main road and the entry and exit times for that place are almost fix. When the entry time gets started then clock connected to the speed breaker automatically transfer the speed breaker on the road for a time period. After the specified time period, speed breaker gets automatically reverse to the flat position. Semi circle portion of speed breaker is turn automatically as per the time set.

Time set option is changeable. We can set the time of open and close the speed breaker as per our choice. Changeable time is to be stored in the external memory up to next change. This memory is non-volatile and retain its data for a long time. Time is automatically adjusted by the RTC IC with a small battery backup to save the clock setting. Speed breaker is designed by a half semi circle shaped long metallic pipe. Two magnetic sensors are connected across the speed breaker to adjust the close and open point of the speed breaker. So this type of speed breaker is so much useful, important as well as required as of today's time period when everyone is chasing the life very fast and wants to have a speedy life to get goals as soon as possible.

II. REVIEW OF THE RESEARCH WORK

In the rapidly changing world, the speed has become an important factor in human's life. Everyone wants to get fast as much as possible. In the fast speed world, there are two perspectives, one is keeping speed and another is to maintain safety mediums as well. So keeping speed is quite easy for a person and in case of safety mediums, there must be a lot of attention. For safety purpose, preventing accidents on road, there is a conventional method of having concrete speed breakers on road. In case of conventional concrete speed breakers, they are found firm all the time on the road.

These types of speed breakers are very useful on road but at the same time, these cause a great change in performance of the vehicles as well. The example diagram of such conventional concrete speed breaker is (Fig. 1). So why don't we have such speed breaker which can reduce the speed and maintain the performance of the vehicle. That's why there is a need of an automatic breaker on time demand according to the requirements.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 8 Issue 04, April-2019

Means when there is no need of the speed breaker on the road, it disappears from the road and the road becomes flat and when there is a need then the breaker comes on the road from ground and it starts its working of slowing speed of vehicles. The example diagram of such is as follows (Fig.2).

Figure 1. Conventional concrete speed breaker

With the help of switches we adjust the time period on/off for each channel separately.

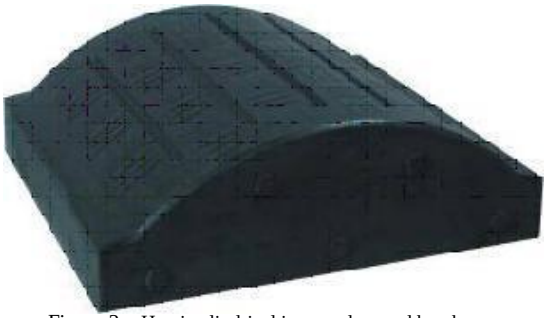


Figure 2. Hemi cylindrical iron made speed breaker

III. OBJECTIVES

The presented study purpose is to achieve the following objectives-

- To have the speed of vehicle reduced before the place specified; for some time interval.
- Here the main purpose of the breaker is to make the speed of the vehicle reduced before any place or organisation specified for which it has been installed.
- To keep the speed of vehicle unchanged when reduction in speed is not required.
- When there is no need to reduce the speed of the vehicle, the speed of the vehicle should be kept unchanged by making the speed breaker disappeared from the road.
- To have a greater mileage of vehicles in this time of increasing fuel rates speedily.

When the speed of the vehicle is reduced, the performance of the vehicle gets affected. So to keep the performance and mileage of vehicle positive, the speed should not be reduced or changed in this time when the fuel rates are increased at any time.

- To make sure that one should pay attention before entering and exiting the organization or place specified by such types of speed breaker.

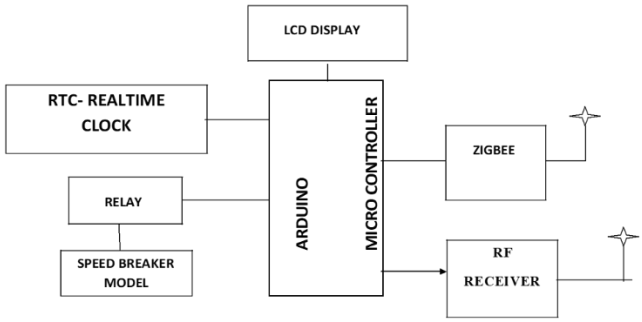
This last; but not the least; objective is to make someone insured that he/she must pay attention before entering and exiting the place specified when the fixed time duration of the speed breaker is not in action by indicating some means as display.

IV. DEVICES& CIRCUITS

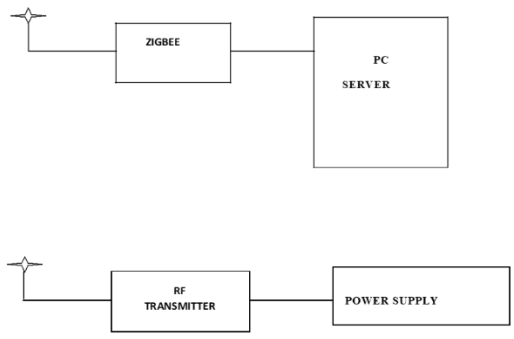
Speed breaker is designed by a half flat and half semi circle shaped long metallic pipe. Two magnetic sensors are connected across the speed breaker to adjust the close and open point of the speed breaker. The main block diagram of the research work is as follows (Fig. 3). In the diagram, all the devices and circuits required are shown. Main device of this research work is Arduino UNO. RTC PCF8563 is connected with the controller. We use 2x16 L.C.D to provide a visual time delay and show the menu also. With the help of switches we adjust the time period of speed breaker. In this research work we provide a 4 channel output for speed breaker. We adjust the time of speed breaker for UP four channels. With the help of switches we adjust the time period on/off for each channel. Change data is store in the external memory.

BLOCK DIAGRAM:

ROAD SIDE:

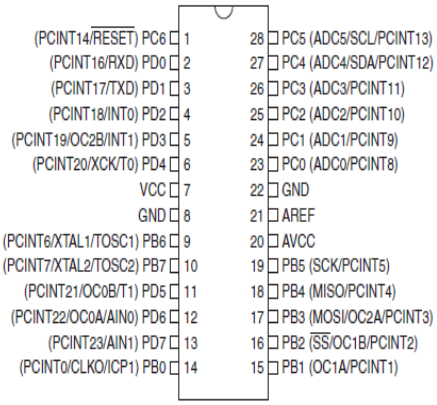


SERVER SIDE:

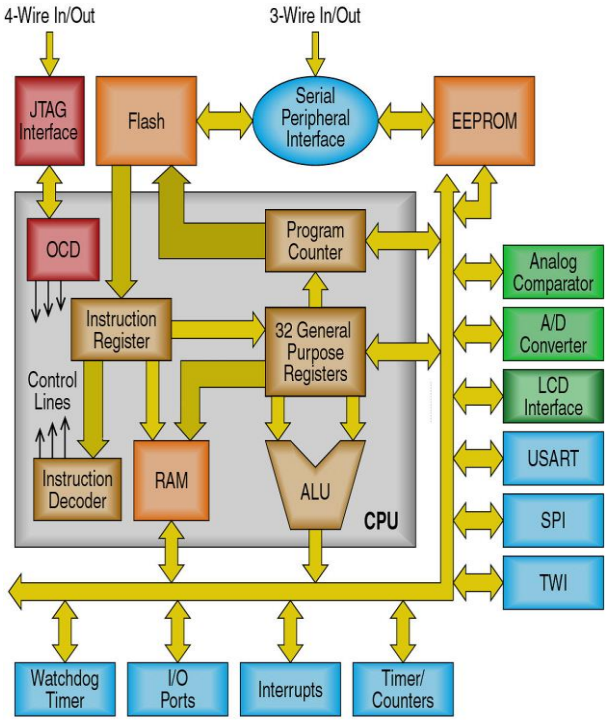


International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 8 Issue 04, April-2019

PIN DIAGRAM:



ARCHITECTURE DIAGRAM



ATMEGA 328P IC

The ATmega328 is a single-chip microcontroller created by Atmel in the mega AVR family. The Atmel 8-bit AVR RISC-based microcontroller combines 32 kB ISP flash memory with read-while-write capabilities, 1 kB EEPROM, 2 kB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughput approaching 1 MIPS per MHz Slow speed motor base speed breaker is connected to the microcontroller via relay circuit (Fig. 6). The SCL is clockinput and is used to synchronize EEPROM with microcontroller for various operations. When data is to be read or write, first a start condition is created followed by device address, byte address and the data itself. Finally a stop condition is provided [5]. The start condition occurs when SDA and SCL get high to low simultaneously. The stop condition is when SDA remains low while SCL goes from high to low. The data is read or written between the start and stop conditions on every transition of SCL from high to low. For more details on different operations and addressing, refer interfacing 24c02 with 8051. A total of eight EEPROMs can be connectedthrough a bus.

Figure 6. Relay

A real time clock is used in the concept for completing real time requirement. The PCF8563 is a CMOS real time clock or calendar designed for low power consumption in the operation (Fig. 7). A programmable clock output, interrupt output and voltage-low detector are also provided in the PCF8563 [6]. All addresses and data are transferred serially through a two line bidirectional I_2C-bus. Maximum bus speed for PCF8563 is 400 kbps.

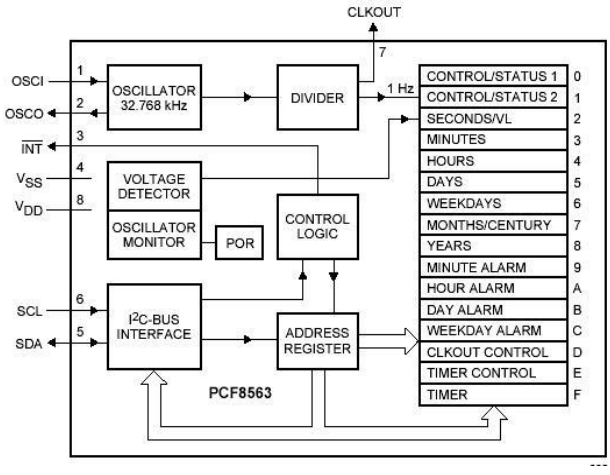


Figure 7. Block diagram of RTC

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 8 Issue 04, April-2019

For displaying the time, a 2x16 LCD display is used in the hardware construction of the concept. (Fig. 8).

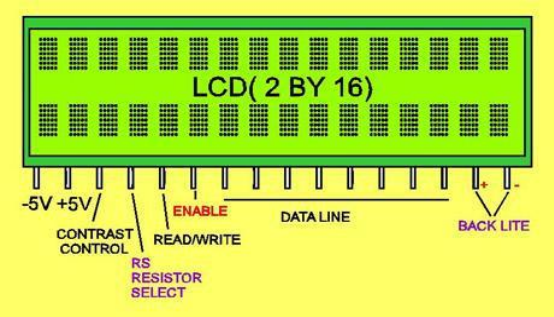


Figure 8. 2x16 LCD

ZIGBEE MODULE

ZigBee is a wireless technology developed as an open global standard to address the unique needs of low-cost, low-power wireless M2M networks. The ZigBee standard operates on the IEEE 802.15.4 physical radio specification and operates in unlicensed bands including 2.4 GHz, 900 MHz and 868 MHz.

ZigBee is an IEEE 802.15.4-based specification for a suite of high-level communication protocols used for wireless networking. It is a wireless technology developed as an open global standard to address the unique needs of low-cost, low-power wireless M2M networks. ZigBee (CC2500) is a low cost true single chip 2.4 GHz transceiver designed for very low power wireless applications. The RF transceiver is integrated with a highly configurable baseband modem.

V. RESULT OF THE RESEARCH WORK

On completion the concept of having an automatic speed breaker on time demand using Embedded Systems tool; it can be seen that the idea is very innovative and useful for the requirements of today's speedy life. The concept of the mentioned idea is to give the performance to vehicles as well as to make them slow. The microcontroller is a very important and useful in today's electronic environment. This can be used in a very wide range of applications or it can be said that the electronics world is not possible without microcontrollers. Where; this demo of the idea to have such a speed breaker in practical life, shows us how to reduce the speed of vehicles; maintaining the performance as far as possible. So it becomes a very descriptive research work for the details of the practical one. Using microcontroller, iron made speed breaker, RTC, memory etc; the breaker can be driven to the reality of humans'life. The coding used in the completion of the research work is shown in the thesis. The real working demo of the research work is very realistic and charming. This can be a very useful in real life.

VI. CONCLUSION AND FUTURE ADVANCEMENTS

Conclusion to the research work shows that a realistic and practical life like research work has been made which can be a milestone in electronics world. The future advancements in the concept is as told before that more channels can be given to the RTC to have more time slots to be worked for. Thrones can be used to make any specified vehicle punctured. The future cops will be more powerful and smart with the help of such ideas and concepts. The more complicated and more useful speed breaker on time demand can be made in future easily. More will be the useful in respect of the applications, more will be the complications. As the concept is so smart, the complexity can be considered easy in reference of the smartness of the idea.

REFERENCES

[1] AIRES. http://kabru.eecs.umich.edu/bin/view/main/aires.
[2] M. Briday, J.-L. Bechennec, and Y. Trinquet. Task scheduling observation and stack safety analysis in real time distributed systems using a simulation tool. In Proc. of the IEEE Conference on Emerging Technologies and Factory Automation, pages 299–306, 2005.
[3] K. bun Yue, S. Davari, and T. Leibfried. Priority ceiling protocol in Ada. In TRI-Ada '96: Proceedings of the conference on TRI-Ada '96, pages 3–9. ACM Press, 1996.
[4] A. Cervin, D. Henriksson, B. Lincoln, J. Eker, and K. E. Arzen. How does control timing affect performance? Analysis and simulation of timing using Jitterbug and TrueTime. IEEE Control Systems Magazine, 23(3):16–30, 2003.
[5] A. Crespo, I. Ripoll, and M. Masmano. Dynamic memory management for embedded real-time systems. In Proc. of the IFIP Working Conference on Distributed and Parallel Embedded Systems, pages 195–204, 2006.
[6] J. A. Darringer, R. Bergamaschi, S. Bhattacharya, D. Brand, A. Herkersdorf, J. Morell, I. I. Nair, P. Sagmeister, and Y. Shin. Early analysis tools for system-on-a-chip design. IBM Journal of Research and Development, 46(6):20–38, 2002.
[7] A. Gerstlauer, H. Yu, and D. D. Gajski. RTOS modeling for system level design. In Proc. of the Conference on Design, Automation and Test in Europe, pages 130–135, 2003.
[8] Z. He, A. Mok, and C. Peng. Timed RTOS modeling for embedded system design. In Proc. of the IEEE Real Time and Embedded Technology and Applications Symposium, pages 448–457, 2005.
[9] F. Hessel, V. M. Rosa, C. E. Reif, C. Marcon, and T. G. Santos. Scheduling refinement in abstract RTOS models. ACM Trans. on Embedded Computing Systems, 5(2):342– 354, 2006.
[10] C. Krishna and K. G. Shin. Real-Time Systems. McGraw Hill, 1997.