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RESEARCH ARTICLE OPEN ACCESS

AUTOMATIC VEHICLE SPEED CONTROL USING RF MODULE

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Abstract:

This paper presents Autonomous speed control of over speeding vehicle using Radio Frequency. The main objective is to design a controller and a display, meant for vehicle's speed control and to monitor the zones, which can run on an embedded system. Display & Control can be custom designed to fit into a vehicle's dashboard, and display information on the vehicle. The proposed system is composed of two separate units: Zone status transmitter unit and receiver (speed display and control) unit. Whenever the vehicle is within the transmitter zone, the vehicle speed is controlled by receiving the signal, i.e.., every time the vehicle speed is decreased by some cut off and kept constant until the vehicle moves out of the transmitter zone, and then the vehicle can get accelerated by itself. The IR sensor detects the speed of the vehicle and sends the information to Micro controller. Micro controller interacts with motors through driver IC to take appropriate directions to prevent accidents

INTRODUCTION

Intelligent instruments are used in every part of our lives. It won't take much time to realize that most of our tasks are being done by electronics. They will perform one of the most complicated tasks that a person does in a day, that of driving a vehicle. As the days of man driving are getting extremely numbered, so are those of traffic jams, dangerous and rough drivers and more importantly, accidents. According to Mr. Willie D. Jones in the IEEE SPECTRUM magazine (September 2001), a person dies in a car crash every second. Automation of the driving control of Two-wheelers is one of the most vital needs of the hour. This technology can very well implement what was absent before, controlled lane driving. Considering the hazards of driving and their more pronounced effect on two-wheeler our VEHICLE CONTROL SYSTEM is exactly what is required. These systems have been implemented in France, Japan & U.S.A. by many companies, but only for cars and mass transport networks. In those systems, the acceleration and brake controls are left to the driver while the microprocessor simply handles the steering and the collision detection mechanism. This system is superior in the sense that Majority of the tasks related to driving are automated. The driver just has to sit back and enjoy the ride. Etc.

1. PROPOSED SYSTEM

The system is imposed in various zones. The three zones are hospital area, school and traffic section. The

Whenever the vehicle nears the particular zone, then the RF receiver receives a signal from the transmitter, and then slows down the vehicle in that zone. In both the school and wildlife section, the RF transmitter transmits a signal.

Based on that signal, the vehicle's speed is controlled the traffic section transmits an RF signal only when the signal is turned RED. Now whenever the vehicle in this zone

BLOCK DIAGRAM

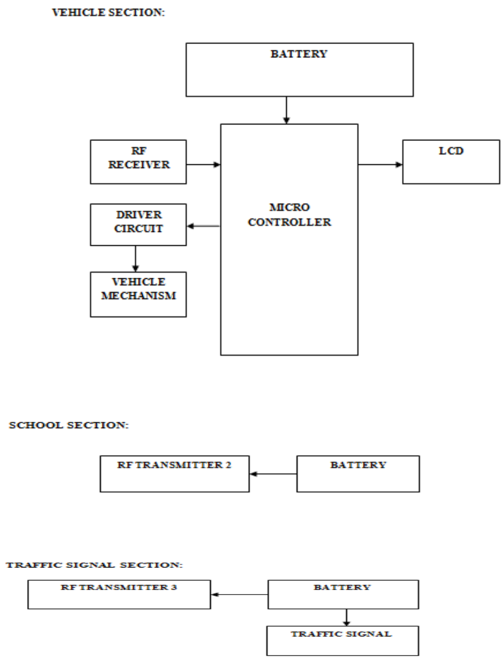

Fig. 2.1 Proposed system block diagram

1. **Instantaneous Power Compensation control:**

As the generalized instantaneous power theory is valid for unbalanced three-phase systems, it is chosen to calculate the reference compensating current icxref . The calculated icxref contains the harmonics, reactive power, unbalanced power, and the dc-link voltage regulating components. By controlling the compensating current icx to its reference icxref , the active inverter part can compensate the load harmonic currents, improve the reactive power compensation ability and dynamic performance of the TCLC part, and also regulate the dc-link voltage to its reference value.

2. **DC MOTOR :**

DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. Most types produce rotary motion; a linear motor directly produces force and motion in a straight line. DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal_motor can operate on• direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills.

3. **CIRCUIT DEVICES**

PERIPHERAL INTERFACE CONTROLLER:

5PIC16F877A microcontroller

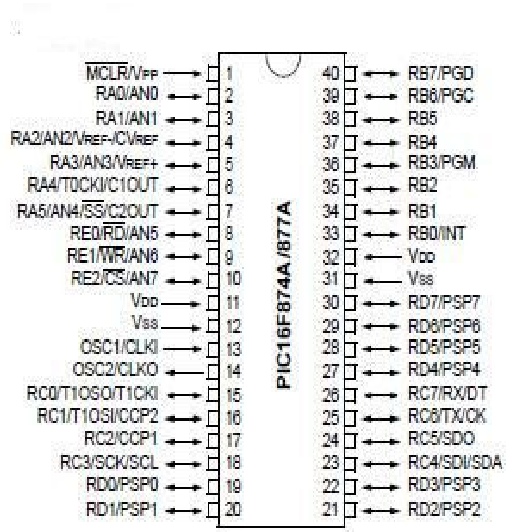

Fig.3.1 pin diagram

PIC16f877a finds its applications in a huge number of devices. It is used in remote sensors, security and safety devices, home automation and in many industrial instruments. An EEPROM is also featured in it which makes it possible to store some of the information permanently like transmitter codes and receiver frequencies and some other related data. The cost of this controller is low and its handling is also easy. It's flexible and can be used in areas where microcontrollers have never been used before as in coprocessor applications and timer functions etc. Program memory contains the programs that are written by the user. The program counter (PC) executes these stored commands one by one. Usually PIC16F877 devices have a 13 bit wide program counter that is capable of addressing 8K×14 bit program memory space. This memory is primarily used for storing the programs that are written (burned) to be used by the PIC. These devices also have 8K*14 bits of flash memory that can be electrically erasable /reprogrammed. Each time we write a new program to the controller, we must delete the old one at that time.

FEATURES OF PIC:

High-Performance RISC CPU:

Only 35 single-word instructions to learn

- All single-cycle instructions except for program branches, which are two-cycle
- Operating speed: DC – 20 MHz clock input DC – 200 ns instruction cycle
- Up to 8K x 14 words of Flash Program Memory, Up to 368 x 8 bytes of Data Memory (RAM), Up to 256 x 8 bytes of EEPROM Data Memory
- Pin out compatible to other 28-pin or 40/44-pin
- PIC16CXXX and PIC16FXXX microcontrollers

Fig.3.3 PIC microchip

DRIVER CIRCUIT

The ULN2003 is a monolithic high voltage and high current Darlington transistor arrays. It consists of seven NPN Darlington pairs that feature high-voltage outputs with common-cathode clamp diode for switching inductive loads. The collector-current rating of a single Darlington pair is 500mA. The Darlington pairs may be paralleled for higher current capability. Applications include relay drivers, hammer drivers, and have series input resistors for operation directly from 6 V to 15 VCMOS or PMOS logic outputs. The ULN 2003 is the standard Darlington arrays.

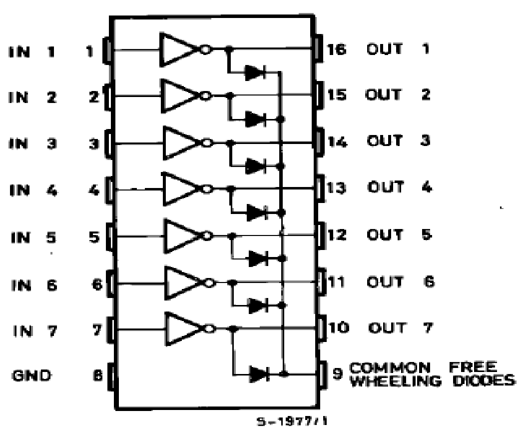

Fig.3.4 DRIVER CIRCUIT

There are three memory blocks in each of the PIC16F87XA devices. The program memory and data memory have separate buses so that concurrent access can occur and is detailed in this section. The EEPROM data memory block is detailed in **Section 3.0 "Data EEPROM and Flash Program Memory"**. Additional information on device memory may be found in the PIC micro® Mid-Range MCU Family Reference Manual (DS33023).

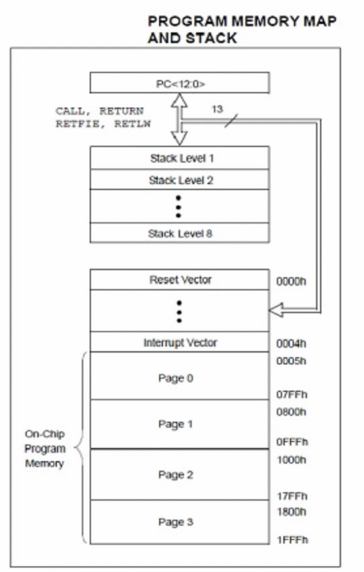

Fig.3.5 PROGRAM MEMORY MAP AND STACK

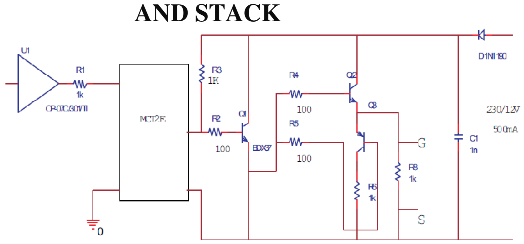

Fig.3.5 driver circuit

In electronics, driver is an electrical circuit or other electronic component used to control another circuit or other component, such as a power MOSFET or high-power transistor. The term is used, for example, for a specialized computer chip that controls the high-power transistors in DC-to-DC voltage converters. The Driver circuit diagram is as shown in the

4. EXPERIMENTAL RESUTS

The RF transmitting circuit consist of a RF transmitter module TWS434 TX interfaced with HT12E encoder and the user can select the ID using binary logic .The voltage regulator circuit is obtains power from a 8 volt (1 A) battery Which provides the motor with unregulated 8 volt supply and whereas micro controller, motor driver, LCD and the receiver module receives a 5 volt regulated supply. The IR sensor is used to determine the speed of the DC motor, which sends the speed of the wheel to the microcontroller and displays it on the LCD display which is compared The controlling device of the whole system is a Microcontroller to which RF receiver module is RWS 434 RX interfaced With HT12D is connected; DC motors are interfaced through a motor driver. The IR sensor is used to determine the Speed of the DC motor. When the RF transmitter is turned on, the data set by the user is encoded and sent to the Receiver module. The receiver module decodes the data and sends it to the AT89S52 micro controller to compare the data embedded in the controller. If the speed of the DC motor is less than the limit zone, the Microcontroller compares the data received from the IR sensor and data received from the RF transmitter. Then commands the motor driver to take no actions and the speed of the DC motor remains same. If the speed exceeds the set speed limit, the microcontroller instructs the motor driver to limit speed according to the zone thus preventing accidents. The representation below shows how the proposed system can be implemented

5. CONCLUSION

This paper explains the smart vehicle control based on the RFID technology. It has explained how transponders and readers can be used to communicate with the vehicle thereby providing autonomous vehicle control with the ECU. The Simulation technique for speed control has been given which is installed in almost all the upcoming vehicles. Thus we hope this can revolutionize the traffic management and avoid accidents caused due to over speeding in the near future. The above prototype can be installed in vehicles which will reduce the speed automatically when the vehicle is about to collide or is nearby another vehicle by implementing the transmitter and the receiver module in individual vehicle.

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