ZONE BASED VEHICLE SPEED CONTROLLER

A PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report **"ZONE BASED VEHICLE SPEED CONTROLLER" is the bonafide work of Mr.K.M.VENKATESH PRASAD (13BEC162), Mr.Y.VIJAYA RAGAVAN (13BEC168), Mr.Y.VIJAYA PRASANNA(13BEC167), Mr.S.NANDA KUMAR (13BEC301),** who carried out the project work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other project or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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INTERNAL EXAMINAR **EXTERNAL EXAMINAR**

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ABSTRACT

To control the speed of the vehicle in speed limit zones .The drivers are alerted that they are in a speed limit zone by sign boards nearby roads. In case of not controlling the speed manually the speed will be controlled automatically by the zone based vehicle speed controller and also the ahead of speed limit zones will be indicated before 5meters in the vehicles display.

The main objective is to design a small display controller meant for vehicles speed control and monitors the zones, which can run on an embedded system. Smart display and control can be custom designed to fit into a vehicles dashboard, and display information on the vehicle. The project is composed of two separate units, zone status transmitter unit and receiver unit. Once the information is received from the zones, the vehicles embedded unit automatically give the signal to the engine control unit for the limiting the vehicle speed. In this project mainly there will be a RF transmitter and receiver. Here we place the transmitter in a school or a hospital zone or a Highway or a U turn, where there will be more traffic.

The transmitter can transmit signal up to 10 mts. The receiver will be placed in the vehicle that is connected to a micro Controller. 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 to Some Cutoff and kept constant Until the vehicle moves out of the transmitter zone, and then the vehicle can get accelerated by itself.

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1.INTRODUCTION

Today the world is undergoing a revolution. Its taking place in various forms such as Economical revolution, technological revolution, and medical revolution and in many ways and types, which is very difficult to put onto the papers. As far as technological revolution is concerned, the technology is changing at a drastic pace just because of Embedded system and Wireless communication. Wireless communication is an upgrading technology due to its immense wide scale applications. It includes increase accuracy, reduced time consumption, cost efficient and many more.

Roads are a major concern in the developed world. Recent studies show that one third of the number of fatal or serious accidents are associated with excessive or inappropriate speed as well as changes in the roadway. One important line of action consists in the use of advanced accidents, etc. which would need the use of dynamically-driver assistance systems (ADAS), which are acoustic, generated digital maps. The key idea offered by this paper is hectic or visual signals produced by the vehicle itself to use Radio Frequency Identification (RFID) technology to communicate to the driver the possibility of a collision. Tag the warning signals placed in the dangerous portions of these systems are somewhat available in commercial the road. While artificial vision-based recognition of traffic vehicles today, and future trends indicate that higher safety signals might fail if visibility is poor (insufficient light, will be achieved by automatic driving controls and a difficult weather conditions or blocking of the line of sight growing number of sensors both on the road infrastructure by preceding vehicles), RF signals might still be transmitted and the vehicle itself is a prime example of driver assistance.

In the era of embedded systems time and efficiency are a matter of priority . RFID (Radio Frequency Identification) emerges as one of the converging technologies and transportation plays an important role in urbanization. RFID is one of the key catalyst playing a significant role in it. RFID plays major role in auto ID applications. Our project aims to understand the benefits of RFID technology possibilities to reduce the accidents on Indian roads.

In the last years, RFID technology has been systems is cruise control (CC), which has the capability of gradually incorporated to commercial transportation maintaining a constant user preset speed and its evolution, systems. A well-known example is the RFID-based highway the adaptive cruise control (ACC), which adds to CC the toll collection systems which are now routinely employed in capability of keeping a safe distance from the preceding many countries, like the Telepass system in Italy or the Auto vehicle .A drawback of these systems is that they are not pass system in Norway. Other uses include monitoring independently capable of distinguishing between straight systems to avoid vehicle theft, access control to car parking and curved parts of the road, where the speed has to be or private areas and embedding of RFID tags in license lowered to avoid accidents. However, curve Warning plates with specially codedIDs for automatic vehicle systems (CWS) have been recently developed that use a detection and identification. Placement of RFID tags on the road lanes has been proposed in order to provide accurate vehicle localization in tunnels or downtown areas where GPS positioning might be unreliable. In the work by RFID tagging of cars is offered as an alternative to traffic data collection by inductive loops placed under the road surface. The information about the traffic collected by a network of RF readers is then used to regulate traffic at intersection or critical points in the city. The work by Sato describes an ADAS, where passive RFID tags are arranged in the road close to the position of real traffic signals. An antenna placed in the rear part of the car and close to the floor (since the maximum transmitting range of the tags is about 40 cm) permits reading of the information stored in the tag memo and conveys a visual message to the driver. Initial tests at low driving speeds (20 km/h) show good results The work described in this paper is collaboration between AUTOPIA (Autonomous Vehicles Group) and LOPSI (Localization and Exploration for Intelligent Systems), both belonging to the Centre for Automation and Robotics (CAR, UPM-CISC).

1.1 AIM OF THE PROJECT

The aim of our project is to build a sensor system for infrastructure to vehicle (l2V) communt10n, which can transmit the information provided by active signals placed on the road to adapt the vehicles speed and prevent collisions. By active signals we mean ordinary traffic signals that incorporate long-range active RFID tags with information stored into them. This information is collected in real time by RFID sensors placed on board of the vehicle , which we have modified to automatically change its speed to adapt to the circumstances of the road. In particular, we have implemented a fuzzy logic control algorithm acting on the longitudinal speed of the vehicle with actuators which control the vehicles throttle and brake to reach and maintain the target speed to be achieved.Thus the control of the car shifted to manually

2.LITERATURE SURVEY

2.1 DESIGN AND PROTOTYPE OF IN VEHICLE ROAD SIGN DELIVERY SYSTEM USING RFID

2.1.1 BEACON RATE ESTIMATION

The tag antenna is omni-directional, with a range of 10m. Therefore, it is assumed that when kept on a road, its beacon can be picked up anywhere within a hemisphere of radius 10m, and that its signal dies out exponentially thereafter. Each RFID tag will cater to a single direction of oncoming traffic. For a vehicle moving at the center of the road, it stays within the read hemisphere during the time duration it takes to travel 20m, as shown in Figure 2.1 Since this model is applicable mainly for city traffic, particularly in crowded metropolitan cities, 100 km/hr. is a safe upper speed limit to assume. A vehicle travelling at 100 km/hr. traverses the shown 20m distance in 0.72 sec. Therefore, the tag has to flash a beacon at least once in this time for it to be picked up by the RFID reader of the vehicle. Accuracy of read decreases above this speed.

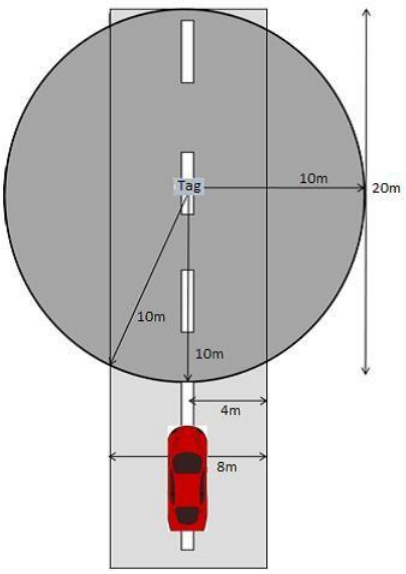


FIGURE 2.1: BEACON RATE ESTIMATION

2.2 INSTALLATION AND EVALUATION OF RFID READERS ON MOVING VEHICLES

2.2.1 RFID TAG

Minsoo Kim (Electronics & Telecomm. Research institute, Daejeon, Korea) investigated a posture of an RFID tag in terms of its yaw angle and pitch angle. Figure 3.2 describes their definition. A yaw angle is an internal angle of the tag and the straight line drawn from the antenna to the tag. The average read latency when varying the yaw angle by every 30 is summarized in Table 3.1. At 60, 90, and 120 of yaw angles, there is no communication..

Table 2.1: Average read latency [ms] with varying yaw angle (a single RFID tag , a single RFID reader antenna and pitch angle = 0)

Yaw angle(degrees)	0	30	60	90	120	150	180
Read latency	44.3	44.2	X	X	x	45.1	46.9

Average read latency with varying pitch angles of RFID tag (yaw angle = 0 and pitch angle of the reader antenna=30).For each pitch angle, we measure the average read latency and the length of the read area, which is shown in Figure 3.3. Results in the case of 10 and 20 are almost same. When comparing them to the result of 0, the only distinction is the starting and ending point of the read area. Therefore, we can conclude that the pitch angle of a tag does not affect performance of the RFID read rate. For deployment of the RFID system, we use 0 of pitch angle.

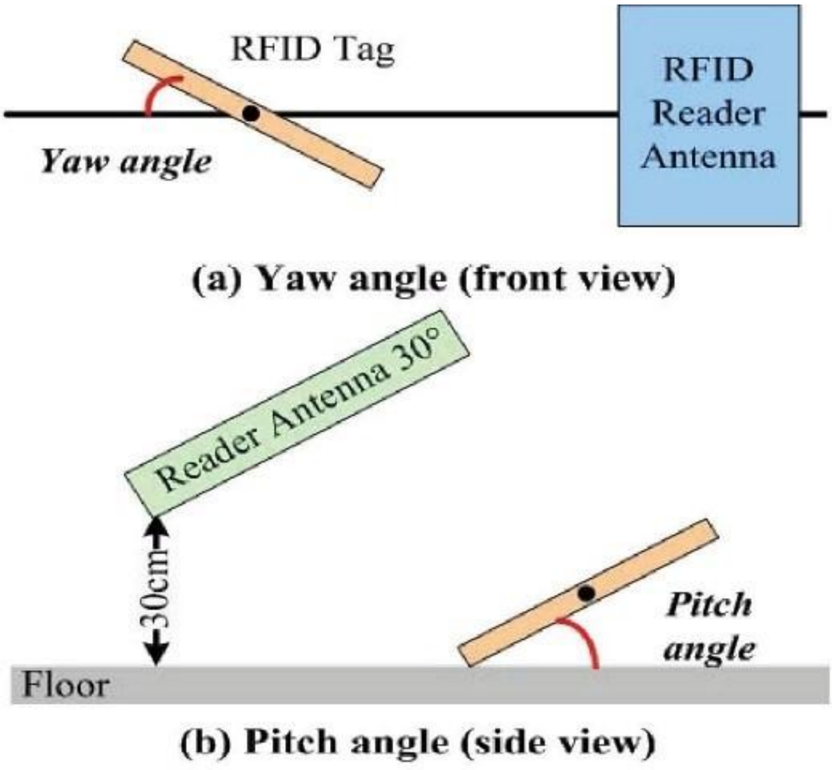


FIGURE 2.2: YAW ANGLE AND PITCH ANGLE OF RFID TAG

2.2.2 RFID READ RATE

Mario Gerla stated that in order to utilize the RFID system on roads, it must demonstrate reliable perfor- mance at a high speed. In order to appreciate reliability of the RFID system, she defined RFID read rate as a fraction of RFID tags successfully read over the total number of tags deployed over a designated test.

3.PROPOSED WORK

3.1 PROBLEM DEFINITION AND OBJECTIVES

The hassles of vehicular commuting in crowded metropolitans in developing countries are many having to wait hours together in traffic jams, taking tortuous detours due to on-road constructions, trying to spot speed breakers, navigating blind turns, one-ways and so on. Forked roads, railway crossings, sudden reverse bends and steep ascents and descents are just few of the road oddities that one may encounter on the average drive. At times, such road oddities are accompanied by road-signs. Mandatory road-signs enforce law, while Cautionary road-signs are installed in hazardous areas to avert accidents. Informative road-signs provide directions, locations and other information that is potentially useful to drivers in that locality. However, most vehicle drivers miss road signs more often than not. It is understandably difficult to keep an eye out for road signs when one should be focused on driving. The inconvenience is augmented by inadequate placement and poor noticeable signs. They are non-intelligent displays, and preventing traffic jams and providing personalized alerts are beyond their capacity.

The problems pervade much deeper than our daily hassles. Over 130,000 fatalities due to road accidents are reported annually in India alone (National Crime Records Bureau). With rapid increase in road transport throughout the world, there emerges a need for novel concepts and intelligent systems that enhance driving safety and convenience.

The purpose of our project is to meet the requirements of the present industrial and commercial scenario. The prime objective was to implement the project with the use of latest available and the developed techniques and components such as Embedded Systems which can perform well even with a compact hardware and also increases its accuracy. It provides high accuracy, speed, reliability and ruggedness.

The objective was to replace road signs with RFID tags, and use in-vehicle RFID Reader-enabled modules to sense them, and provide tangible information to the driver. The project being made is such that along with its efficiency other factors like future expansion possibility, cost and availability of components is taken into considerations.

4.PROJECT DESIGN

4.1 BLOCK DIAGRAM

4.1.1 TRANSMITTER SECTION

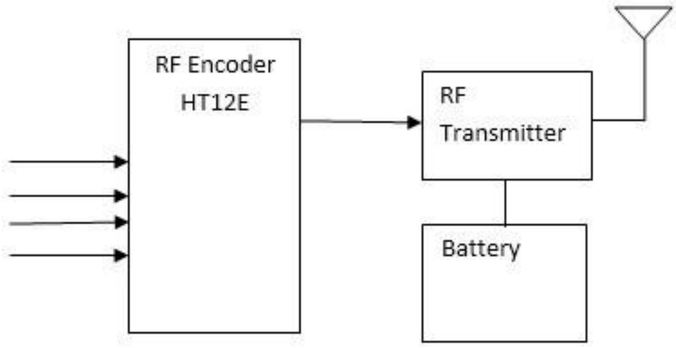


FIGURE 4.1: BLOCK DIAGRAM OF TRANSMITTER SECTION

A four-digit tag code that is to be transmitted is entered into the microcontroller with the help of keypad. Keypad is nothing but 44 matrix (i.e.4 Rows & 4 Columns). Each key is assigned a unique code. There is a unique four-digit code for each tag, which we have to enter by a keypad.

In the microcontroller this code will be stored in a microcontroller identifier. Now microcontroller will convert this analog code in digital form. Microcontroller will attach start bit and synchronization bits to each code and now this encoded data will be applied to ASK modulator (TWS-434). This module will perform Amplitude shift modulation on this data. The ASK modulator uses the carrier frequency of 434MHz (ISM band frequency). The modulator output will be applied to transmitter. The trans- mitter will now continuously transmit this code through telescopic antenna connected to it at a data rate of 1200 bps (max. speed supported by the microcontroller for wireless communication. For wired communication, it is 9600 bps).

4.1.2 RECEIVER SECTION

At the receiver, the receiving antenna will receive the signal and fed it to the receiver unit. In the receiver unit the data will be amplified and then fed to the demodulator unit. Demodulation is necessary in order to compensate for the modulation at the transmitter section. Demodulation will be carried out by the ASK demodulator

(RWS-434) which will produce the original digital data at its output and will transfer it to microcontoller. Between microcontoller and demodulator there is MAX232 section. When signal travels through the wireless medium it is immune to noise and hence at the receiver the RF voltage

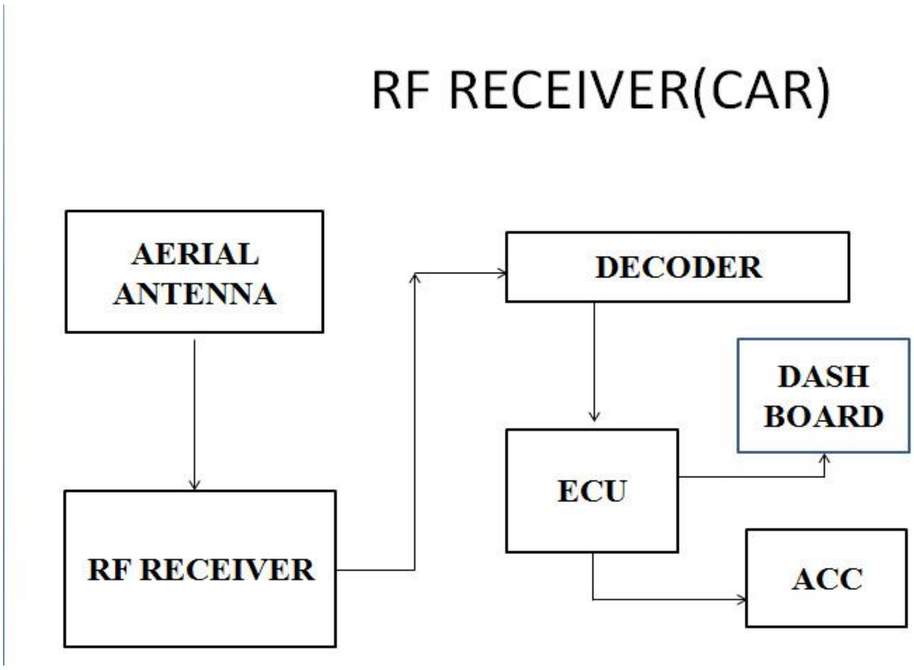
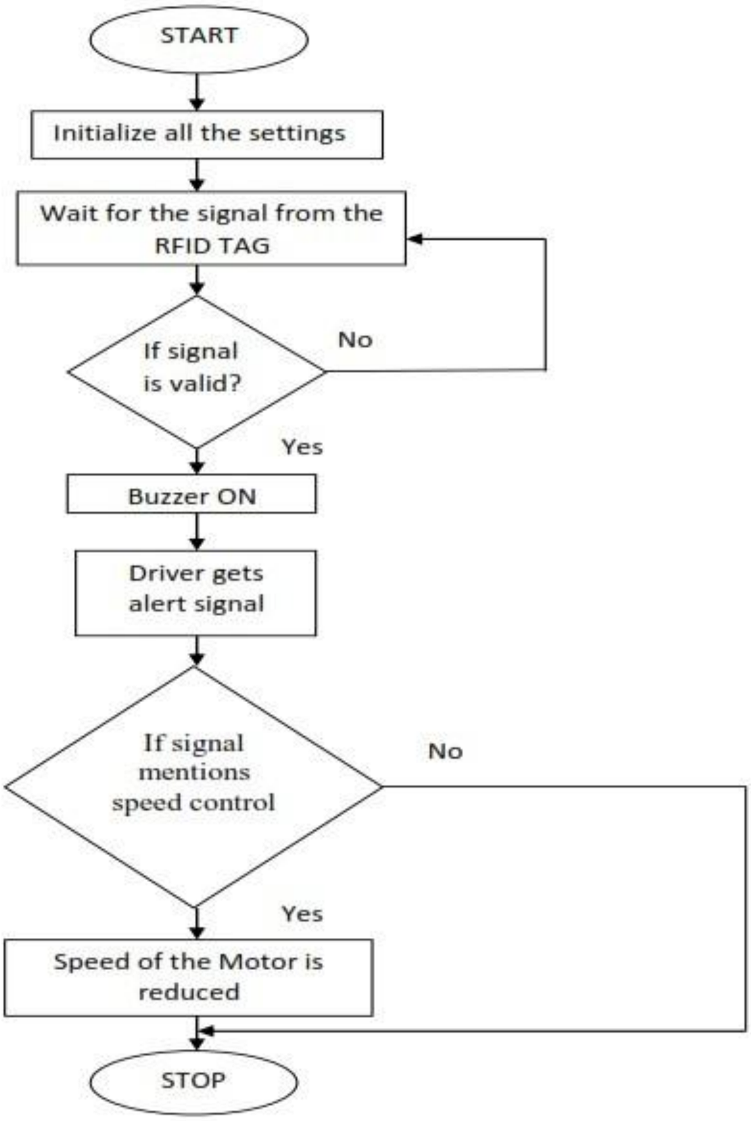


FIGURE 4.2: BLOCK DIAGRAM OF RECEIVER SECTION

amplitude received will be in mV range. The microcontoller ATMEGA 16 we have use requires TTL Logic level. The MAX232 sections output is then applied to the microcontoller.

Now the microcontroller will first discard the start bit and synchronization bit from the code and will recover the original code. Now it will start comparing this input four digit code with various tag codes stored in its internal memory. When a match is found with one of the code,microcontroller will transfer the name of the tag assigned to it, which is stored in its memory to the LCD. LCD will display the name of the station. When name of the tag is displayed, the buzzer alarms.

4.2FLOWCHART



5. IMPLEMENTATION & TECHNOLOGIES USED

5.1 COMPONENTS USED FOR IMPLEMENTATION

5.1.1 RF ENCODER

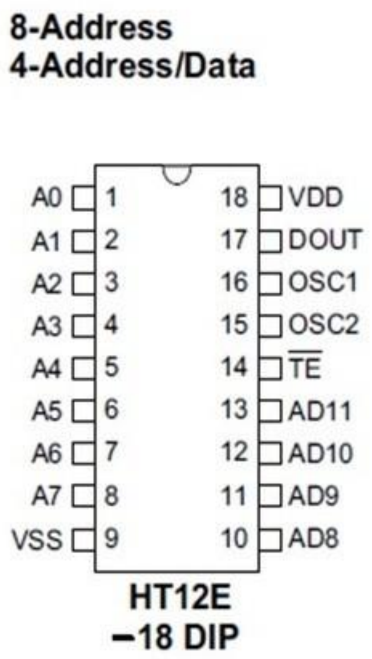


FIGURE 5.1: PIN DIAGRAM OF RF ENCODER

5.1.2 RF DECODER

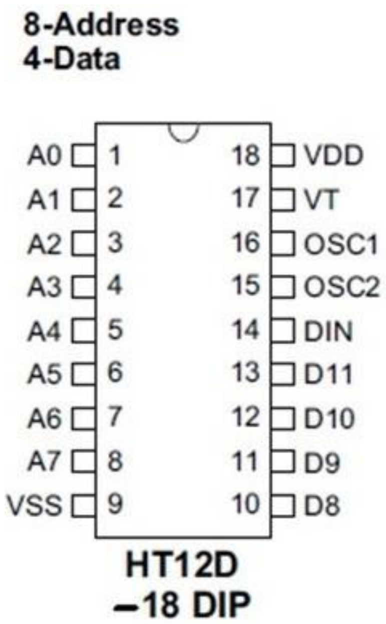


FIGURE 5.2: PIN DIAGRAM OF RF DECODER

TABLE 5.1: PIN DESCRIPTION OF RF ENCODER

Pin Name	I/O	Internal Connection	Description
A0-A11	I	NMOS TRANSMISSION GATE	Input pins and can be externally set VDD or VSS
D8-D11	O	CMOS OUT	Output dat pins
DIN	I	CMOS IN	Serial data input pin
VT	O	CMOS OUT	Valid transmission,active high
OSC1	I	OSCILLATOR	Oscillato rinput pin
OSC2	O	OSCILLATOR	Oscillator output pin
VSS	I	-	Negative power supply,grounds
VDD	I	-	Positive power supply

5.1.3 TWS-434 and RWS-434 Modules

The TWS-434 and RWS-434 modules are extremely small and are excellent for applications requiring short-range RF remote controls. The transmitter module is only 1/3 the size of the standard postage stamp, and can easily be placed inside a small plastic enclosure.

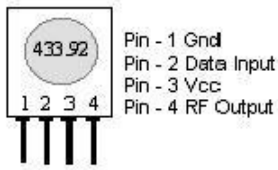


FIGURE 5.3: PIN DIAGRAM OF TX434

5.1.4 433.92 MHz TRANSMITTER MODULE (TX434)

The transmitter output is up to 8 mW at 433.92 MHz with a range of approximately 400-foot (open area) outdoors. Indoor the range is approximately 200 foot, and will go through most walls.

The TWS-434 module accepts both linear and digital inputs can operate from 1.5 to 12 volt DC, and makes building a miniature hand held RF transmitter very easy.

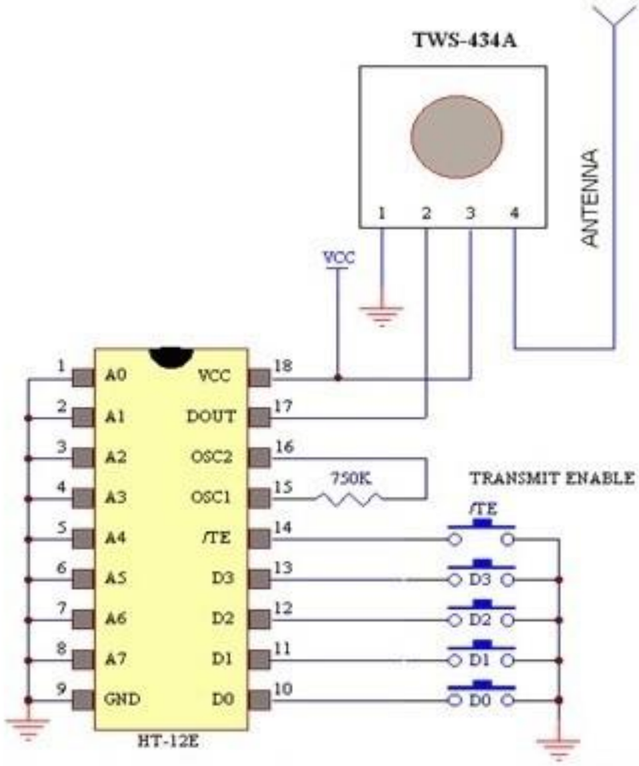


FIGURE 5.4: TRANSCEIVER AT TRANSMITTER MODULE

5.1.5 TWS-434 and RWS-434 Modules

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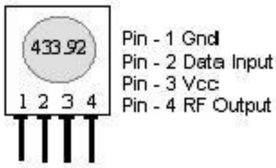

FIGURE 5.5: PIN DIAGRAM OF TX434

5.1.6 433.92 MHz TRANSMITTER MODULE (TX434)

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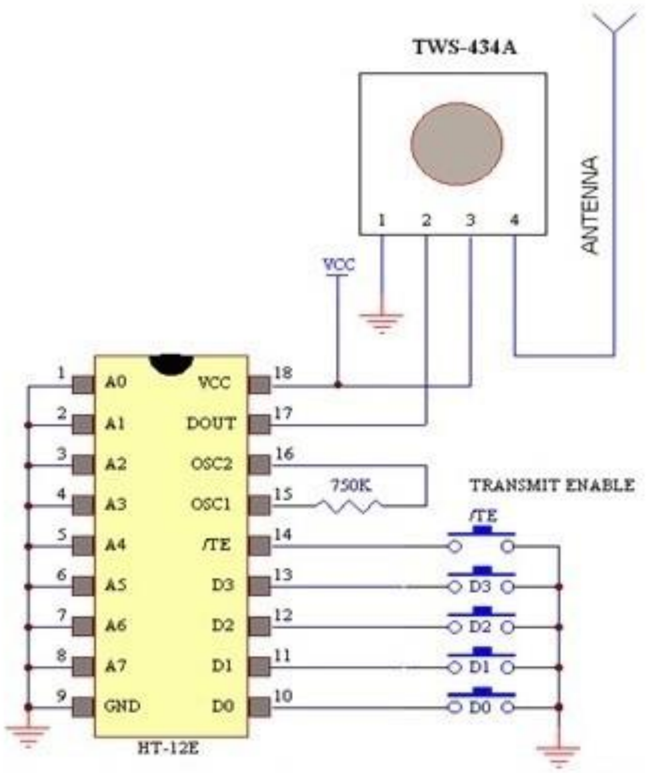
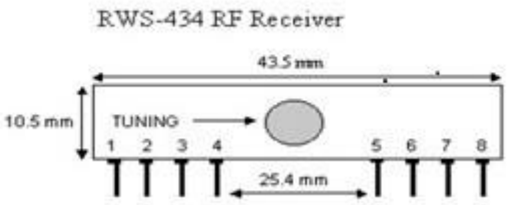


FIGURE 5.6: TRANSCEIVER AT TRANSMITTER MODULE

5.1.7 433.92 MHz RECEIVER MODULE (RX434)

The receiver also operates at 433.92MHz, and has a sensitivity of 3uV. The RWS-434 module operates at 1.5 to 5.5 volts-DC and has both linear and digital outputs.



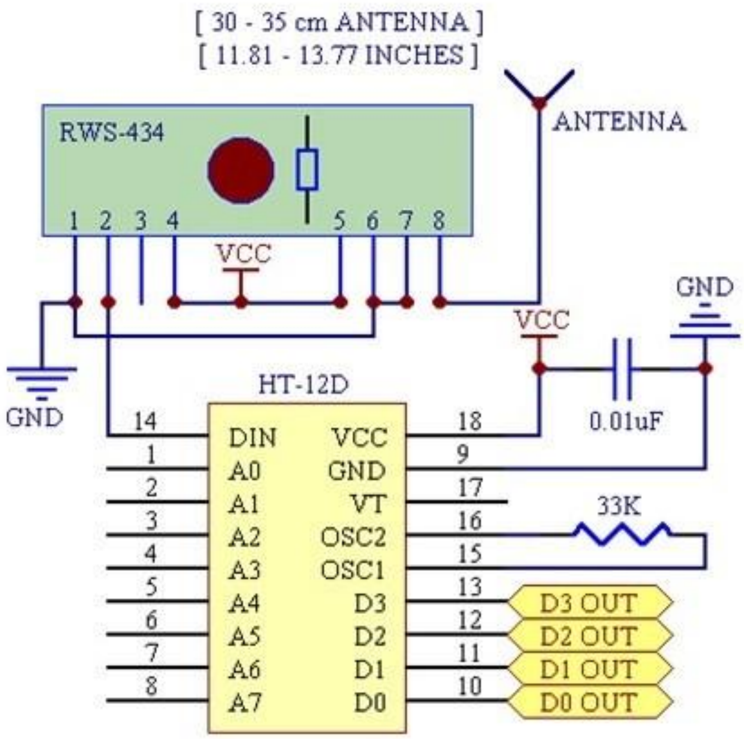


FIGURE 5.7: TRANSCEIVER AT RECEIVER MODULE

5.1.8 Power Supply Unit

Explanation: This power supply circuit is divided into the following different part: The transformer, The rectifier, The filter and The regulator.

Transformer

This is used to step down the voltage level of the A.C. input from 230 V to 12 V A.C.The current rating of the transformer is 500mA. This is more than enough to supply the current to the relay unit & to all the other circuits.

Rectifier

The rectifier used here is bridge rectifier. This is more efficient than the center tap. Here the A.C. signal coming from the transformer is rectified & converted into the pulsating D.C. this is further fed to the filter circuit.

Filter

This unit is nothing but a capacitor of high value, which can charge & supply its charge to the circuitry in the falling edge of the input signal. This way it continuously maintains the direct cycle voltage across the circuit.

Regulator

The regulator is used to give constant output whatever is its input voltage. The input to this unit is nearly 15 V D.C. & its output voltage is constant to 5 V. & 12 V. since we are using two different types of regulators 7805 & 7812.Here we are using IC78XX Voltage Regulator.

FIGURE 5.8: IC 78XX VOLTAGE REGULATOR

The 78XX series of three terminal regulators is available with fixed output voltage making them useful in wide area of application. One of this is local regulation, eliminating the distortion problem associated with single point regulation. The voltage available allows these regulators to be used in logic systems instrumentation, Hi-Fi and other solid-state equipment. The LM 7805 is available in aluminum (3 terminals) package, which will allow over 1.0 Ampere load current I adequate heat sinking is provided. Current limiting is included to limit the peak output current to a safe value. Protection for the output transistors is provided to limit internal power dissipation. If internal power dissipation becomes too high for the heat sinking provided, the thermal shut circuit takes place over preventing the IC from over heating.

Considerable efforts were expended to make the LM 7805 regulators easy to use and minimize the number of external components. It is not necessary to bypass the output although this does improve transient response.

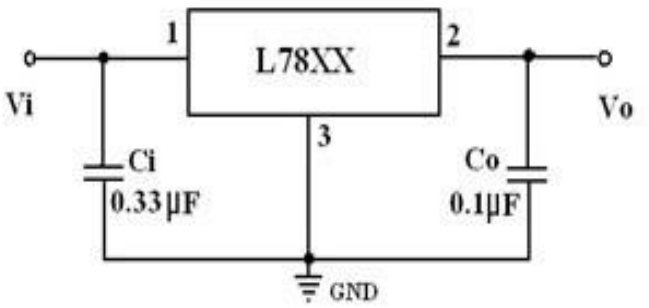


FIG 5.9:APPLICATION OF CIRCUITS

FEATURES

Output current is excess of 1A, Internal thermal overload protection, No external components required, Internal short-circuit current limit, Available in the aluminum T0-3 package, Output voltages of 5; 5.2; 6; 8; 8.5; 9; 12; 15; 18; 24V, Output voltage tolerance of 5% (LM78LXXAC) over the temperature range and Output transistor safe area protection.

5.1.9 ATMEGA 16(MICROCONTROLLER)

The ATMEGA16 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmels high-density nonvolatile mem- ory technology and is compatible with the industry- standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non- volatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmega 16 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The ATMEGA16 provides the follow-ing standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the ATMEGA 16 is designed with static logic for operation down to zero frequency and supports two software selectable power

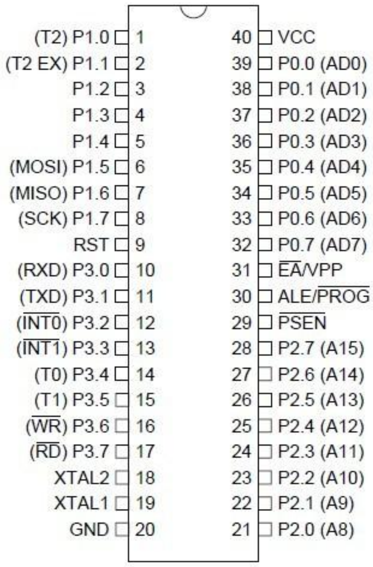


FIGURE 5.10: PIN DIAGRAM OF 89S52

saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to con- tinue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

PIN DESCRIPTION:

1.VCC: Voltage supply

2.GND: Ground.

3. Port 0: Port 0 is an 8-bit open drain bidirectional I/O port. As an output port, each pin can sink eight TTL inputs. When 1s are written to port 0 pins, the pins can be used as highimpedance inputs. Port 0 can also be configured to be the multiplexed low-order address/data bus during accesses to external program and data memory. In this mode, P0 has internal pull-ups. Port 0 also receives the code bytes during Flash programming and outputs the code bytes during program verification. External pull-ups are required during program verification.

4. Port 1: Port 1 is an 8-bit bidirectional I/O port with internal pull-ups. The Port 1 output buffers can sink/source four TTL inputs. When 1s are written to Port 1 pins, they are pulled high by the internal pull-ups and can be used as inputs. As inputs, Port 1 pins that are externally being pulled low will source current (IIL) because of the internal pull-ups. In addition, P1.0 and P1.1 can be configured to be the timer/counter 2 external count input (P1.0/T2) and the timer/counter 2 trigger input (P1.1/T2EX), respectively, as shown in the following table. Port 1 also receives the low-order address bytes during Flash programming and verification.

5. Port 2: Port 2 is an 8-bit bidirectional I/O port with internal pull-ups. The Port 2 output buffers can sink/source four TTL inputs. When 1s are written to Port 2 pins, they are pulled high by the internal pull-ups and can be used as inputs. As inputs, Port 2 pins that are externally being pulled low will source current (IIL) because of the internal pull-ups. Port 2 emits the high-order address byte during fetches from external program

memory and during accesses to external data memory that use 16-bit addresses (MOVX @ DPTR). In this application, Port 2 uses strong internal pull-ups when emitting 1s. During accesses to external data memory that use 8-bit addresses (MOVX @ RI), Port 2 emits the contents of the P2 Special Function Register. Port 2 also receives the high-order address bits and some control signals during Flash programming and verification.

6. Port 3: Port 3 is an 8-bit bidirectional I/O port with internal pull-ups. The Port 3 output buffers can sink/source four TTL inputs. When 1s are written to Port 3 pins, they are pulled high by the internal pull-ups and can be used as inputs. As inputs, Port 3 pins that are externally being pulled low will source current (IIL) because of the pull-ups.

7. RST :Reset input. A high on this pin for two machine cycles while the oscillator is running resets the device. This pin drives high for 98 oscillator periods after the Watchdog times out. The DISRTO bit in SFR AUXR (address 8EH) can be used to disable this feature. In the default state of bit DISRTO, the RESET HIGH out feature is enabled.

8. ALE/PROG: Address Latch Enable (ALE) is an output pulse for latching the low byte of the address during accesses to external memory. This pin is also the program pulse input (PROG) during Flash programming. In normal operation, ALE is emitted at a constant rate of 1/6 the oscillator frequency and may be used for external timing or clocking purposes. Note, however, that one ALE pulse is skipped during each access to external data memory. If desired, ALE operation can be disabled by setting bit 0 of SFR location 8EH. With the bit set, ALE is active only during a MOVX or MOVC instruction. Otherwise, the pin is weakly pulled high. Setting the ALE-disable bit has no effect if the microcontroller is in external execution mode.

9. PSEN: Program Store Enable (PSEN) is the read strobe to external program memory. When the AT89S52 is executing code from external program memory, PSEN is activated twice each machine cycle, except that two PSEN activations are skipped during each access to external data memory.

10. EA/VPP: External Access Enable. EA must be strapped to GND in order to enable the device to fetch code from external program memory locations starting at 0000H up to FFFFH. Note, however, that if lock bit 1 is programmed, EA will be internally latched on reset. EA should be strapped to VCC for internal program executions. This pin also receives the 12-volt programming enable voltage (VPP) during Flash programming.

11. XTAL1: Input to the inverting oscillator amplifier and input to the internal clock operating circuit.

12. XTAL2 :Output from the inverting oscillator amplifier.

SPECIAL FUNCTION REGISTERS:

Timer 2 Registers: Control and status bits are contained in registers T2CON (shown in Table 2) and T2MOD (shown in Table 6) for Timer 2. The register pair (RCAP2H, RCAP2L) are the Capture/Reload cycle, except that two PSEN activations are skipped during each access to external data memory.

EA/VPP: External Access Enable. EA must be strapped to GND in order to enable the device to fetch code from external program memory locations starting at 0000H up to FFFFH. Note, however, that if lock bit 1 is programmed, EA will be internally latched on reset. EA should be strapped to VCC for internal program executions. This pin also receives the 12-volt programming enable voltage (VPP) during Flash programming.

Timer 2 Registers: Control and status bits are contained in registers T2CON (shown in Table 2) and T2MOD (shown in Table 6) for Timer 2. The register pair (RCAP2H, RCAP2L) are the registers for Timer 2 in 16-bit capture mode or 16-bit auto-reload mode.

Interrupt Registers: The individual interrupt enable bits are in the IE register. Two priorities can be set for each of the six interrupt sources in the IP register.

CHARACTERISTICS:

1. Oscillator Characteristics: XTAL1 and XTAL2 are the input and output, respectively, of an inverting amplifier that can be configured for use as an on-chip oscillator, as shown in Figure 3.5 Either a quartz crystal or ceramic resonator may be used. To drive the device from an external clock source, XTAL2 should be left unconnected while XTAL1 is driven, as shown in Figure 8. There are no requirements on the duty cycle of the external clock signal, since the input to the internal clocking circuitry is through a divide-by-two flip-flop, but minimum and maximum voltage high and low time specifications must be observed.

2. Idle Mode: In idle mode, the CPU puts itself to sleep while all the on-chip peripherals remain active. The mode is invoked by software. The content of the on-chip RAM and all the special functions registers remain unchanged during this mode. The idle mode can be terminated by any enabled interrupt or by a hardware reset. Note that when idle mode is terminated by a hardware reset, the device normally resumes program execution from where it left off, up to two machine cycles before the internal reset algorithm takes control. On-chip hardware inhibits access to internal RA Min this event, but access to the port pins is not inhibited. To eliminate the possibility of an unexpected write to a port pin when idle mode is terminated by a reset, the instruction following the one that invokes idle mode should not write to a port pin or to external memory.

3. Power-down Mode : In the Power-down mode, the oscillator is stopped, and the instruction that invokes Power-down is the last instruction executed. The on-chip RAM and Special Function Registers retain their values until the Power-down mode is terminated. Exit from Powerdown mode can be initi- ated either by a hardware reset or by an enabled external interrupt. Reset redefines the SFRs but does not change the on-chip RAM. The reset should not be activated before VCC is restored to its normal operating level and must be held active long enough to allow the oscillator to restart and stabilize. 4.Pro- gram Memory: If the EA pin is connected to GND, all program fetches are directed to external memory. On the AT89S52, if EA is connected to VCC, program fetches to

addresses 0000H through 1FFFH are directed to internal memory and fetches to addresses 2000H through FFFFH are to external memory.

4. Data Memory: The AT89S52 implements 256 bytes of on-chip RAM. The upper 128 bytes occupy a parallel address space to the Special Function Registers. This means that the upper 128 bytes have the same addresses as the SFR space but are physically separate from SFR space. When an instruction accesses an internal location above address 7FH, the address mode used in the instruction

specifies whether the CPU accesses the upper 128 bytes of RAM or the SFR space. Instructions which use direct addressing access the SFR space. For example, the following direct addressing instruction accesses the SFR at location 0A0H (which is P2). MOV 0A0H, #data Instructions that use indirect addressing access the upper 128 bytes of RAM. For example, the following indirect addressing instruction, where R0 contains 0A0H, accesses the data byte at address 0A0H, rather than P2 (whose address is 0A0H). MOV @R0, #data Note that stack operations are examples of indirect addressing, so the upper 128 bytes of data RAM are available as stack space.

5. Interrupts: The AT89S52 has a total of six interrupt vectors: two external interrupts (INT0 and INT1), three timer interrupts (Timers 0, 1, and 2), and the serial port interrupt. Each of these interrupt sources can be individually enabled or disabled by setting or clearing a bit in Special Function Register IE. IE also contains a global disable bit, EA, which disables all interrupts at once. It is that bit position IE.6 is unimplemented. User software should not write a 1 to this bit position, since it may be used in future AT89 products. Timer 2 interrupt is generated by the logical OR of bits TF2 and EXF2 in register T2CON. Neither of these flags is cleared by hardware when the service routine is vectored to. In fact,the service routine may have to determine whether it was TF2 or EXF2 that generated the interrupt, and that bit will have to be cleared in software. The Timer 0 and Timer 1 flags, TF0 and TF1, are set at S5P2 of the cycle in which the timers overflow. The values are then polled by the circuitry in the next cycle. However, the Timer 2 flag, TF2, is set at S2P2 and is polled in the same cycle in which the timer overflows.

5.1.10 L293D MOTOR DRIVER

The L293D motor driver is available for providing User with ease and user friendly in- terfacing for embedded application. L293D motor driver is mounted on a good quality, single sided non-PTH PCB. The pins of L293D motor driver IC are connected to connectors for easy access to the driver ICs pin functions. The L293D is a Dual Full Bridge driver that can drive up to 1Amp per bridge with supply voltage up to 24V. It can drive two DC motors, relays, solenoids, etc. The device is TTL compatible. Two H bridges of L293D can be connected in parallel to increase its current capacity to 2 Amp.

Features: Easily compatible with any of the system Easy interfacing through FRC

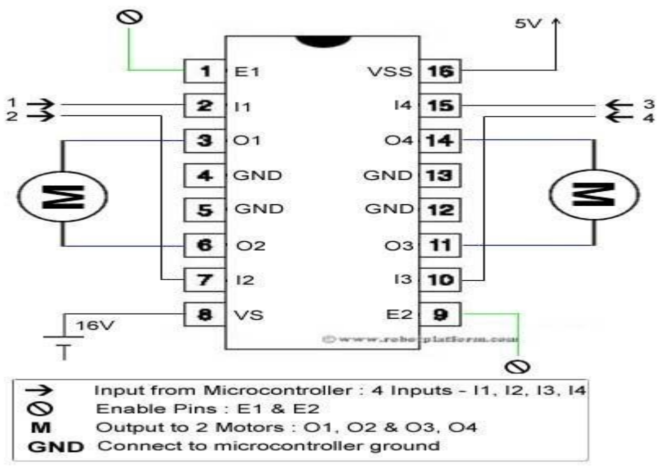


FIGURE 5.11: PIN DIAGRAM OF L293D MOTOR DRIVER

Cable External Power supply pin for Motors supported Onboard PWM (Pulse Width Modulation) selection switch 2pin Terminal Block (Phoenix Connectors) for easy Motors Connection Onboard H-Bridge base Motor Driver IC (L293D)

Technical Specification: Power Supply : Over FRC connector 5V DC External Power 9V to 24V DC Dimensional Size : 44mm x 37mm x 14mm (l x b x h) Temperature Range : 0C to +70 C

5.1.11 LCD (LIQUID CRYSTAL DISPLAY)

FIGURE 5.12: LCD DISPLAY

LCD(liquid crystal display) is one of the most used device for user interface that is used in embedded system. LCD that we use generally is of 16x2 character that is it has rows and 16 columns as follows

Each character in LCD is displayed by 5x7 dot pixels. The liquid crystal is filled within the cavity of the pixels .One can draw any character font by using the look up table provided by the datasheet. We have to just send ASCII codes for desired character and pattern drawing will be done by inbuilt IC that is "Graphic Controller IC" - HD44780. Since graphic controller IC is slower (because all display devices are slower) device and microcontroller is a faster one; we have to syncronize the communication between them for this we use some handshaking or control lines along with data lines as follows.

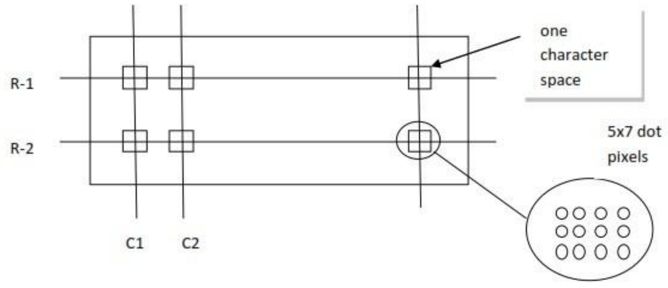


FIGURE 5.13: ROWS AND COLUMNS OF LCD

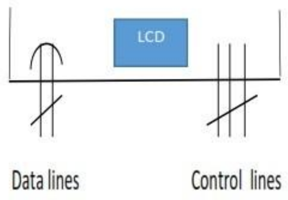


FIGURE 5.14: DATALINES AND CONTROLLINES OF LCD

LCD displays are available with its control circuitry. LCD displays are available with as per its number of characters in a line and number of lines. Dot matrix LCD and colour displays are also available. We are using 16 characters by two-line display (16 by 2). For long visibility we can use LCD or large display.

Features of NetMedia 216 Serial Display Module v1.2 1. RS232 compatible serial interface (2400 and 9600 baud selectable) 2. Externally selectable polarities (Inverted and Non-inverted) 3. Serially controllable backlight and contrast levels 4. 8 user programmable custom characters 16 byte serial receiver Buffer5.

5.1.12 BUZZER

These devices are output transducers converting electrical energy to sound. They contain an internal oscillator to produce the sound, which is set at about 400MHz for buzzers. Buzzers have voltage rating but it is only approximate, for example 6V and 12V. Buzzers can be used with a 9V supply. Their typical current is about 25mA. Buzzers must be connected the right way around, their red lead is positive (+).

FIGURE 5.15: BUZZER

5.2 INTERFACING OF MICROCONTROLLER WITH LCD MODULE

This circuit is the heart of the complete project. This is the actual unit, which controls all the external peripherals.

The Port0 is connected to the Relay unit to control the devices connected on the relay pins. We can control up to 8-devices. As port0 is used for controlling the relay section, it is pulled up with the help of 10K resistor network. The Port1 & some pins of Port3 are used for LCD display interfacing. Port1 is used for 8-bit data line. The controller sends various messages on the LCD indicating the current status of the system. The Pin Rx & Tx are used for serial communication with the mobile. The baud rate is 1200 bps. The crystal 11.0592 MHz is the standard for serial communication.

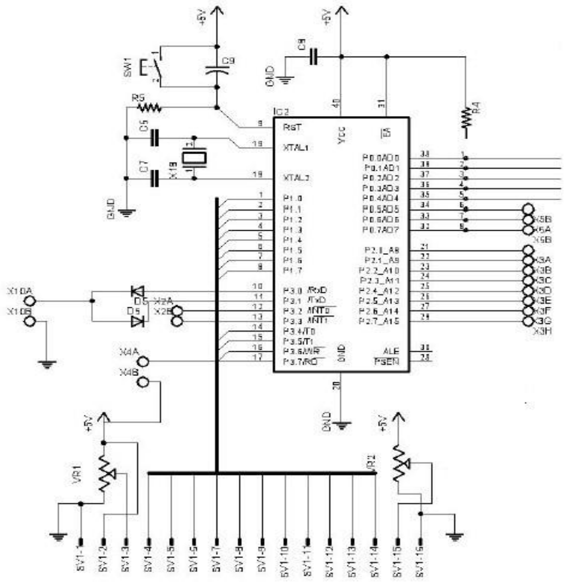


FIGURE 5.16: INTERFACING OF MICROCONTROLLER WITH LCD MODULE

The external circuit connected to the Reset Pin of microcontroller is the R-C Network.

5.3 INTERFACING OF RF READER WITH LCD MODULE

The RFID reader is interfaced via UART to an Atmega16 microcontroller mounted on an Arduino development board. The Arduino platform was selected due to its simple code development features. The Atmega16 allows space for further code expansion to incorporate other elements in future. The digital pins on the Arduino board are used to control the LCD display. The Atmega16 was coded to recognize the respective tag ID as sensed by the reader, and correlate it to a suitable warning message which is displayed on the LCD. It currently occupies close to 4Kb of space (which includes the 2Kb required for the Arduino bootloader). The code was also tuned to incorporate simultaneous detection of more than 1.

By interfacing the LCD with the microcontroller we can display a character or a message on LCD display. We can use any standard LCD available in market. In our project we have use 162 LCD display. It means LCD has 2 lines of 16 characters each. Many other LCDs like 20by2, 24by2, 32by2, 20by4 etc are available. Functionally all these LCDs are same. To develop a protocol to interface LCD with 89C51 first we have to understand how they functions.

These displays contain two internal byte-wide registers, one for command and second for characters to be displayed. There are three control signals called R/W, DI/RS and En. The table given below will tell us the uses of the above said three signals.

TABLE 5.2: USES OF THE SIGNALS

Control	It's function
R/W	= 0 Writes character in display
R/W	= 1 Reads from display
RS/DI	= 0 Selects command register
RS/DI	= 1 Selects Data register to
En	= 0 Disables the display
En	= 1 Enables the display

5.4 POWER SUPPLY AND CONSUMPTION

The objective of in-vehicle implementation brings in the need for a robust power supply which should deliver 900mW of power. The break-up of power required by each device is as follows:

TABLE 5.3:POWERCONSUMPTION

Sr.	Component	Power(m
1	RFID Reader	180
2	Development board +	410
3	Voice playback module	300
4	TOTAL	890

The required power is delivered by a car adapter a 12V point provided in all cars today.

5.5 GENERATION OF MESSAGES

Along with the primary objective of road safety, a plethora of other information can be provided to the commuter. Tags could disseminate additional information such as locations of nearby hospitals, petrol stations and eateries, by serving as data pellets. If there is on-road work/construction in progress in a locality, a tag installment a few km before the affected area can be used to suggest suitable detours, thereby averting potential traffic jams and blockades. The possibilities are numerous. Care has been taken to provide the alerts on a priority basis.

5.6 CODING

```
#include<avr/io.h>

define ctrl PORTB

#define en PB2 // enable signal

#define rw PB1 // read/write signal

#define rs PB0 // register select signal

void LCD_cmd(unsigned char cmd);

void init_LCD(void);

void LCD_write(unsigned char data);

int main()

{

DDRA=0xff; // making LCD_DATA port as output port

DDRB=0x07; // making signal as out put

DDRD=0x01;

DDRC=0x00;

init_LCD(); // initialization of LCD


_delay_ms(1);

while(1)

{
```

```
PORTC=0x00;


 if(PINC & 0b00000001)
 {
 PORTD=0x01;
LCD_cmd(0x82);
  LCD_write('S');
 _delay_ms(10);
  LCD_write('C');
   _delay_ms(1);
  LCD_write('H');
   _delay_ms(1);
  LCD_write(' O');
   _delay_ms(1);
LCD_write('O');
_delay_ms(1);
  LCD_write('L');
  _delay_ms(1);
  LCD_write(' ');
  _delay_ms(1);
  LCD_cmd(0x07);
  _delay_ms(1);
```

```
LCD_write('Z');
_delay_ms(1);
LCD_write('O');
_delay_ms(1);
LCD_write('N');
_delay_ms(1);
LCD_write('E');
_delay_ms(1);
LCD_write(' ');
_delay_ms(1);
LCD_write('A');
_delay_ms(1);
LCD_write('H');
_delay_ms(1);
LCD_write('E');
_delay_ms(1);
LCD_write('A');
_delay_ms(1);
LCD_write('D');
```

```
_delay_ms(1);

LCD_cmd(0xC2);

LCD_write('S');

_delay_ms(1);

LCD_write('P');

_delay_ms(1);

LCD_write('E');

_delay_ms(1);

LCD_write('E');

_delay_ms(1);

LCD_write('D');

_delay_ms(1);

LCD_write(' ');

_delay_ms(1);

LCD_write('4');

_delay_ms(1);

LCD_write('0');

_delay_ms(1);
```

```
LCD_write('K');

_delay_ms(1);

LCD_write('M');

_delay_ms(1);

}

else

{

PORTD=0x00;

}

}

}

 void init_LCD(void)

{

LCD_cmd(0x38); // initialization of 16X2 LCD in 8bit mode

_delay_ms(1);



LCD_cmd(0x01); // clear LCD

_delay_ms(1);
```

```
LCD_cmd(0x0C); // cursor ON

_delay_ms(1);

return;

}



void LCD_cmd(unsigned char cmd)

{

LCD_DATA=cmd;

ctrl =(0<<rs)|(0<<rw)|(1<<en); // RS and RW as LOW and EN as HIGH

_delay_ms(1);

ctrl =(0<<rs)|(0<<rw)|(0<<en); // RS, RW , LOW and EN as LOW

_delay_ms(1);

return;

}



void LCD_write(unsigned char data)

{
```

```
LCD_DATA= data;

ctrl = (1<<rs)|(0<<rw)|(1<<en); // RW as LOW and RS, EN as HIGH

_delay_ms(1);

ctrl = (1<<rs)|(0<<rw)|(0<<en); // EN and RW as LOW and RS HIGH

_delay_ms(1); // delay to get things executed

return;

}

#include<util/delay.h>

#define LCD_DATA PORTA // LCD data port

#
```

6.RESULTS

This model shows the experimental view of this project covering the theoretical as well as practical areas related to this project. This model shows the practical implementation of the device which could be fitted in to the automobiles for safety purposes. We have worked with all the possibilities related to this project and we have come with a model which shows the experimental view of Smart Display and control device through which the Idea of automated speed control concept to prevent the accident and control traffic is more clearly understood. Basically it consists of two sections: zone status transmitter according to the zone, it waits for few seconds, otherwise unit and receiver (speed display and control) unit. Once the information is received from the zones, the vehicles embedded unit automatically alerts the driver, to reduce the speed vehicles SDC unit to automatically reduce the speed.

7.CONCLUSION AND FUTURE SCOPE

7.1 CONCLUSION

We conclude that this project is very easy to implement on current system, low cost and durable, en- sures maximum safety to passengers and public, the driver gets all information about the road without distracting him from driving, driver gets all information even in bad weather conditions, low power con- sumption. This project is further enhanced by automatic speed control when the vehicles get any hazard signal from outside environment.

Our project thus demonstrated the full-scale prototype design of a system that can deliver road signs and other road-related mandates inside commuters vehicles. Rather than erecting more road signs con- tinually, which only adds to driver distraction, we introduce a possible shift in the way cautions and other information is provided to vehicle drivers. There is a plethora of prospective benefits it has for vehicle owners and public transport users alike, which have been documented in In Vehicle Road sign Delivery System with Speed Control Mechanism. Drivers can receive route suggestions and directions at regular intervals even if their vehicle is not equipped with a GPS module. Dependency on road signs will lessen.

This project is designed as a system to give complete solution for transport related problems such as accident alert, Vehicle surveillance, etc.

7.2 FUTURE SCOPE

Drivers can receive route suggestions and directions at regular intervals even if their vehicle is not equipped with a gps module. Dependency on road signs will lessen. A 1000 inr cost differential per road sign (in india), multiplied by the volume of road signs installed every year offers a significant positive cost differential to the government. Driving safety will be enhanced significantly.

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