

GSM BASED DC MOTOR CONTROL

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Abstract-This project represents the design aspect of a device which can control DC motor by sending a specific SMS from a mobile phone. This controller is extremely proficient at places where we have to control of ON & OFF switching of the devices without the presence of a person. GSM controlled DC motor automatic control system which is capable of receiving a set of command instructions in the forms of SMS & perform necessary actions like start, stop, speed control. We use a dedicated modem (SIM 900) at the receiver module and send a AT commands using SMS service as per the required actions. The mobile unit is interfaced with ARDUINO MEGA 2560 so that it takes the responsibilities of receiving commands in the form of SMS and performs the predefined tasks.

Keywords: ARDUINO MEGA 2560, GSM module (SIM900), GSM.

1. INTRODUCTION

Some wise scientist once said that control system is a system where we can shut down the machine whenever we want. That's the difference between controlled and uncontrolled system. Our project is about to make this control system efficient and dynamic. Today in Bangladesh for industrial sectors motors are too much important. But high rating motors require safe operation. Equipment necessary for automatic motor control and safety operation requires more foreign currency to import. Although maximum systems are consists of wire which increase the complexity of the system. That's why we are willing to make a device which is dynamic, cheap and wireless in the field of motor controlling. Again safety of a motor is also a major concern because malfunctioning of a huge motor can cause a huge loss in production also increase maintenance cost of the motor [1].

2. OBJECTIVE

This project represents a GSM based motor control system which is having capabilities like remote monitoring and controlling of a motor.

Start and terminate the operation of a motor.

Speed control and measurement of a motor.

Change of direction of a motor.

3. OPERATION

DC supply is needed to start ARDUINO MEGA 2560[2]. Arduino is connected to Arduino shield (SIM 900) and it is used for transferring and receiving messages. Here we use H-Bridge circuit [3] configuration to ON & OFF and direction control of the DC motor. Direction is controlled with the help of two diagonal combination and

the voltage will be +V and -V. Here the voltage regulator [4] is used to regulate the voltage to 5 V which goes to voltage follower. The function of voltage follower is to get same voltage at the output which is given at input. The voltage follower have infinite input impedance that is small amount of current pass through it. DC motor speed is changed by using the PWM signal [5]. By changing the duty cycle of the PWM signal the voltage changes and the number of rotation is also changes. If the voltage exceeds 12 V or goes down 6V this particular phenomenon is regulated by variable resistors. If this case a message comes to the user.

3.1 Block diagram of the hardware section

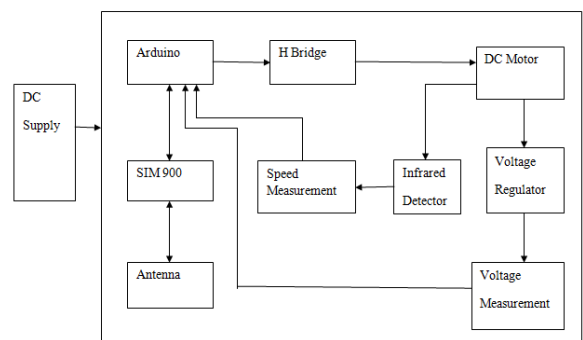


Fig.1: Block diagram of the hardware section.

3.2 Flow chart of the software section

To initiate the system at first we load the program in the Arduino board. Then the system will be check

whether any new message is received or not. If the answer is NO then system is waiting for a message. If the answer is YES the system will recognize the command by reading the message. For an example, if the message content is # SC *** then the motor start in clockwise direction with the given duty cycle [6]. For #SA*** the direction is anti-clockwise. Then the system checks the #M message. If no messages containing this information received system will wait for it. #M gives the command to the SIM900 to leave a reply to the user number about the condition of the motor. If we send #F then the motor shut down otherwise it continues its operation.

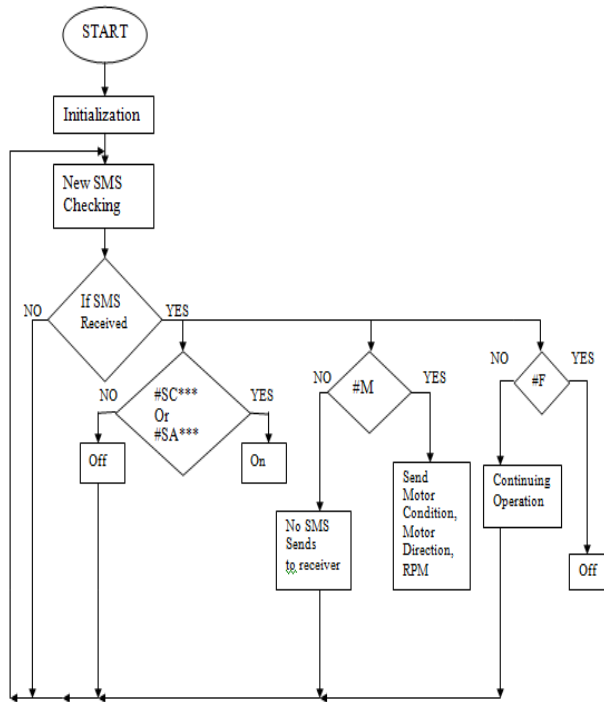


Fig.2: Flow chart of software section.

4. TEST & RESULT

GSM controlled DC motor is automatic control system of receiving a set of command instructions in the form of short message service and performs the necessary actions like to start, stop, speed control.

Loading the program: For loading the program we go to file and then load.

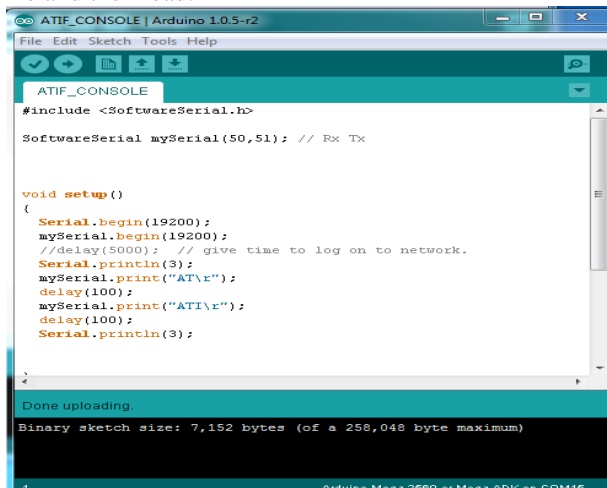


Fig.3: System configuration procedure.

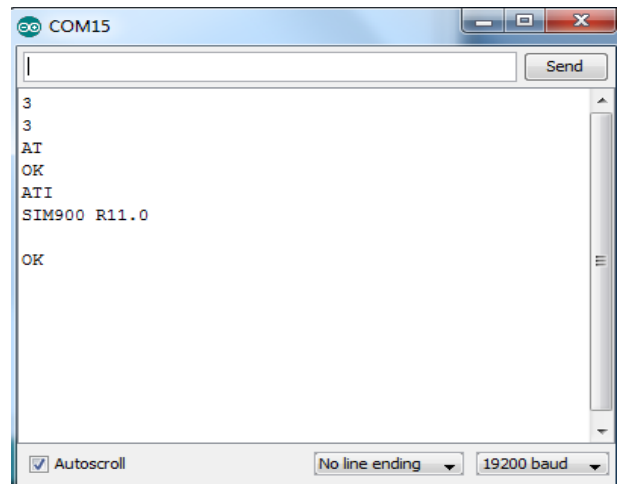


Fig.4: System check procedure.

Program in ARDUINO:

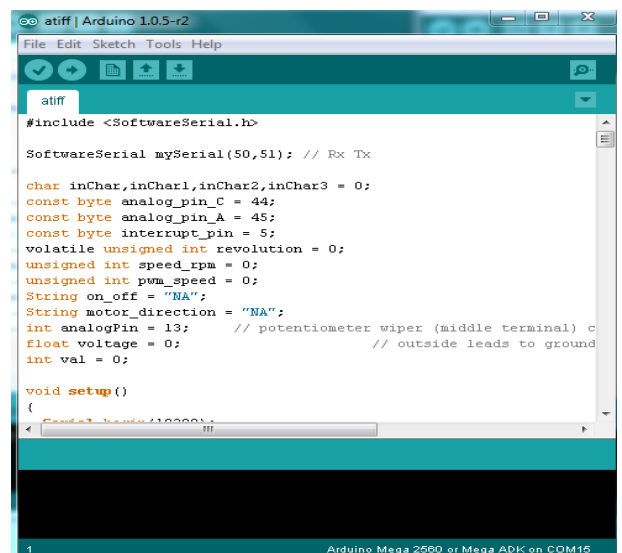


Fig.5: Program loading procedure.

Checking the system:

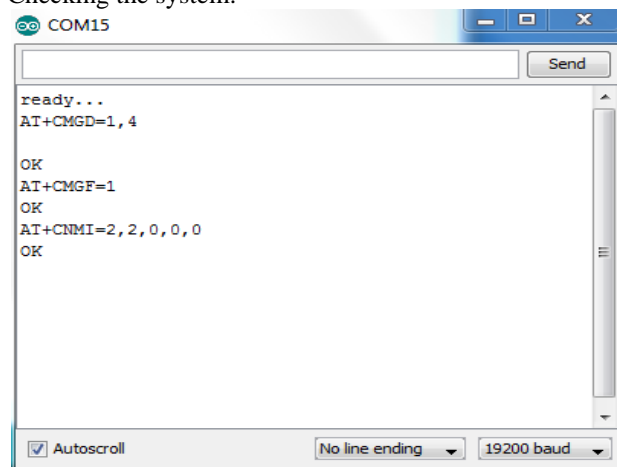


Fig.6: Checking loaded program.

5. TABLES AND FIGURES

The reading of RPM measured by tachometer and ARDUINO board is given below in the table.

Table 1: Tachometer reading & message reading.

PWM	Tachometer Reading	Message Reading	Percentage Deviation of RPM in terms of Tachometer Reading
050	1024	1112	-8.59%
080	1613	1562	3.16%
100	2200	2404	-9.27%
120	2532	2690	-6.90%
130	2932	3100	-5.72%
150	3245	3305	-1.84%
170	3465	3552	-2.51%
185	3563	3696	-3.73%
200	3663	3800	-3.74%
220	4338	4491	-3.52%
230	4900	5134	-4.74%
240	5300	5534	-4.41%
255	6395	6712	-4.95%



Fig.7: Motor in action.

6. FUTURE IMPLEMENTATION

The project we have undertaken can be a reference for realizing a scheme to be implemented in other projects such as weather forecasting, temperature updates, device synchronization. Mobile in the control panel need to charge.

7. CONCLUSION

The project helps us to gain a better perspective on various aspects related to course as well as practical knowledge of electronic equipment and communication.

GSM technology capable solution has proved to be controlled remotely, provide industrial security has achieved the target to control different industrial appliances remotely using the SMS based system.

8. REFERENCES

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