



“Automatic Lift for Construction with Electronics Safety”

Miss. Chorage Priyanka R.¹, Mrs. Gujar Mausami P.²

Student E&TC Department, Dr. Daulatrao Aher College of Engineering, Karad, India¹

Assistant Prof. E&TC Department, Dr. Daulatrao Aher College of Engineering, Karad, India²

Abstract: The Bucket elevator & Belt conveyor are the Part of transportation of material from one Place to another in a Particular space. Belt conveyor was huge load carrying capacity, large covering area simplified design, easy maintenance and high reliability of operation. Belt Conveyor system is also useful in material transport in foundry shop like supply and distribution of molding sand, molds and removal of waste. Hence Bucket elevator can be of great use during bulk material handling. This paper is mainly based on the combination of Bucket & Belt Conveyers to perform complex task within a short time and successfully in a cost effective way. On account of this, a machine and its physical description are covered here with some basic calculation. Lift is transport devices that are used to move either goods or material vertically.

Keywords: AVR@mega8A, L293D motor driver.

I. INTRODUCTION

Material handling involves “small-distance movement that usually takes place within the confines of a building such as construction or plant and between a building and a transportation office.” It can be used to make “time and place usefulness” through the handling, storage, and handling of material, as distinct from manufacturing, which creates “form utility” by changing the size, form, and makeup of material. It is often said that Material handling only adds to the cost of a product, it does not add to the value of a product. Although Material Handling does not provide a product with form utility, the time and place utility provided by MH can add real value to a product, i.e., the value of a product can increase after Material Handling takes place.

- The value get added by the extra delivery of a material is higher than or exact equal to the additional cost of the service as compared to regular mail service—otherwise regular mail would have been used.

- Robotics and Automation has been in all like the most challenging endeavour in the American construction engineering academic community over the past decade. Similar for this field has been shared by several government and private research institutions and laboratories. The industry, including design and construction firms, material suppliers, equipment manufacturers and owners, with a few notable exceptions, was somewhat slowly in relating self to this new field of research and development activity. Whereas the process of disseminating the early results from the research and development community to industry practice is now slowly beginning to take place. There are no universally accepted definitions for the terms 'construction automation'. For the sake of our discussion, we will assume that 'construction automation and robotics' refers

to the engineering or performance of any construction process, on-site or off-site, by means of teleported, numerically controlled, semiautonomous, or autonomous equipment.’ The primary “technology drivers” for introducing robotics to construction sites in the U.S. were health and safety hazards to workers from chemical or radioactive contamination. In extreme cases, where human access to the jobsite is impossible due to excessive levels of contamination, performance of the required work tasks can only be accomplished through the use of robots regardless of the assigned payable cost. On-site experience with robotics in these environments, as well as in underwater and outer space tasks, has provided the developers of robotic systems with valuable lessons with respect to the practicality of certain robot design and task implementation solutions. The underlying incentive for automating construction tasks is potential labor savings once the new technology proves successful. Although the U.S. has not experienced acute labor shortages in the construction industry similar to those in a few other developed nations, there appears to be significantly diminishing number of skilled construction workers at this time. There is also a potential for a shortage of labor in the future due to demographic reasons. Hopes for expanding the construction activity into difficult work environments, improving construction productivity and quality through the use of automation on jobsites are also frequently mentioned.

II. LITERATURE SURVEY

“Automation of Material Handling with Bucket Elevator and Belt Conveyor”

I. Ghazi Abu Taher



- II. Yousuf Howlader
- III. Md. Asheke Rabbi
- IV. Fahim Ahmed Touqir

Belt conveyor & Bucket elevator are the media of transportation of material from one location to another in a commercial space. Belt conveyor has large load(material) carrying capacity, huge covering area simplified design, easy maintenance and high reliability of operation. Belt Conveyor system is used in material transport in construction like supply and distribution of molding sand, molds and removal of waste. Whereas hand Bucket elevator can be of great use during heavy and bulk material handling. This paper is mainly for the combination of Belt and Bucket Conveyers to perform complex task within a short time and successfully in a cost effective way.

Paper 2:

“Modern Home Automation System Based On AVR Microcontroller”

Mohammad Arif Hossain,
Md. Nazmul Hasan

III BLOCK DIAGRAM OF PROPOSED SYSTEM

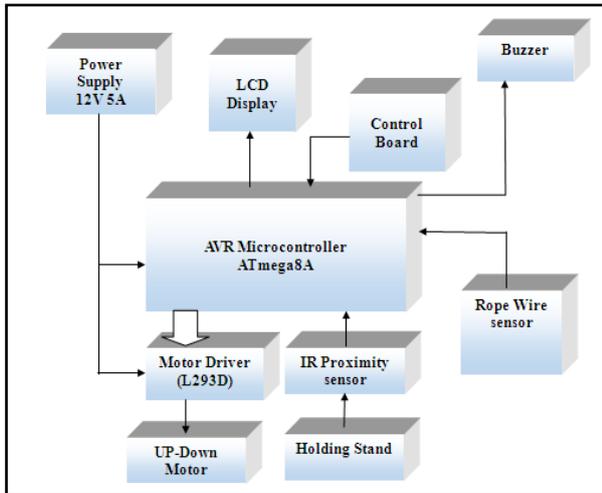


Fig. 1 Block Diagram of Project

Description:

The functions of various element (components) are given below:

A. control Board

The control board are used to enter floor number. On which floor we want to provide material this floor number is provided by the control board.

B) LCD Display

The LCD display is mainly used in our project to display at which floor our lift is present and also display which floor number we entered. Liquid Crystal Display screen is nothing but an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic

module and is very widely used in various devices and circuits. These module is used over seven segments and other multi segment LEDs. Because of LCDs are easily programmable economical and have no limitation to displaying special & even custom characters animations

(C) Motor driver (L293D) & UP DOWN Motor

To operate Pully motor is used. To drive motor, motor driver is used .By using Motor and Motor driver we can push either Up side or Down sides. “This motor driver is high voltage, high current, 4-channel monolithic integrated driver.” Basically this means using this chip you can use DC motors and power supplies of up to 36 Volts, that some pretty big motors and the chip can supply a maximum of 600mA (current) per channel, the L293D chip is also what’s known as a type of H-Bridge. The Hybrid-Bridge is nothing but an electrical circuit that enables a voltage to be applied across a load in either direction to an output, e.g. motor.

(D) Rope wire sensor & IR proximity sensor

When anything comes in the range of proximity sensor it emits infrared beam and monitors reflections, when sensor senses reflections it confirms that there is an object nearby. These two sensors are used for safety purpose .

(E) Power Supply

Power supply is the major concern for every electronic device .Since the controller and other devices used are low power devices there is a need to step down the voltage and as well as rectify the output to convert the output to a constant dc. Power supply unit is the basic requirement for electronic devices.

IV.CIRCUIT DIAGRAM

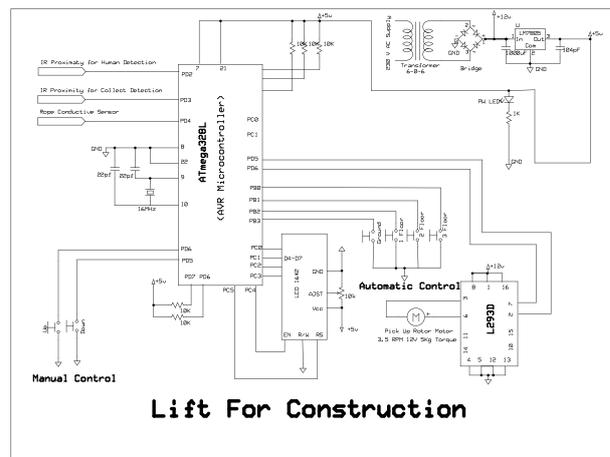


Fig. 2 Circuit Diagram

V. SOFTWARE DETAILS

a) USBASP AVR Programmer:

These AVR programmers are basically depend on Thomas Fischl's USBasp design and connect to your computer's



USB port. They are not quite compact (70x20mm), but also design is graceful. The USB interface is achieved by using an atmega8 processor and the rest is done in firmware. Being nothing but an Open source hardware (OSHW) project, released under the General Public License(GNU). Hence to load the USBASP firmware onto the atmega8 on the programmer, yes you guessed it, you need an AVR programmer. It is easier to buy fully built and programmed.

b) Express PCB:

PCB was first introduced by Thomas Nau for an Atari ST in 1990 and ported to UNIX and X11 in 1994. Initially PCB was not designed to be a professional layout system but as a tool for individuals to do small-scale development of hardware. The second type 1.2 introduced user menus. This made PCB easy to use and raised its popularity.

VI. HARDWARE DETAILS

A) Power supply design:

Power supply is the important part for every electronic device. Since the controller and other devices used are low power devices there is required to step down the voltage and also rectify the output to convert the output to a constant dc. Power supply is the basic need for electronic devices.

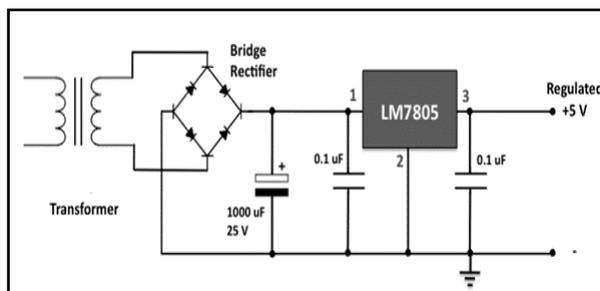


Fig.3 Power supply design

The major blocks of power supply are given below

i) Transformer

Transformer is a device used to step up or step down the input voltage given as per the requirement. The transformers are divided into two types depending upon their operation.

- Step up transformer
- Step down transformer

In our project we used step down transformer for stepping down the house hold ac power supply i.e. the 230V to 240V power supply. We use a 9-0-9V center tapped step down transformer.

ii) Rectifier

The output of the transformer is an ac and should be rectified to a constant dc for this it is necessary to feed the output of the transformer to a rectifier. The rectifier is employed to convert the alternating ac to a constant dc.

There are many rectifiers available in the market some of them are:-

- Half wave rectifier
- Full wave rectifier
- Bridge rectifier

The rectification is done by using one or more diodes connected in series or parallel. If only one diode is used then only first half cycle is rectified and it is termed as half wave rectification and the rectifier used is termed as half wave rectifier. If two diodes are employed in parallel then both positive and negative half cycles are rectified and this is full wave rectification and the rectifier is termed as Full wave rectifier. If the diodes are arranged in the form of bridge then it is termed as Bridge rectifier, it acts as a full wave rectifier. These rectifiers are available in the market in the form of integrated chips (I.Cs).

iii) Filter

Capacitor filter is used to remove ac ripple content is the rectified output in order to smoothen output waveform.

iv) 7805 voltage regulator

The voltage regulator is used for the voltage regulation purpose. We use IC 7805 voltage regulator. The IC number has a specific significance. The number 78 represents the series while 05 represent the output voltage generated by the IC

v) ATmega8 Uc:

AVR is a family of microcontrollers developed by Atmel beginning in 1996. These are modified Harvard architecture 8-bit RISC single-chip microcontrollers. AVR was one of the first microcontroller families to use on-chip flash memory for program storage, as opposed to one-time programmable ROM, EPROM, or EEPROM used by other microcontrollers at the time. AVR microcontrollers find many applications as embedded systems; they are also used in the popular Arduino line of open source board designs. The Atmel®AVR® ATmega8 is a low-power CMOS 8-bit microcontroller based on the AVR RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega8 achieves throughputs approaching 1MIPS per MHz, allowing the system designer to optimize power consumption versus processing speed.

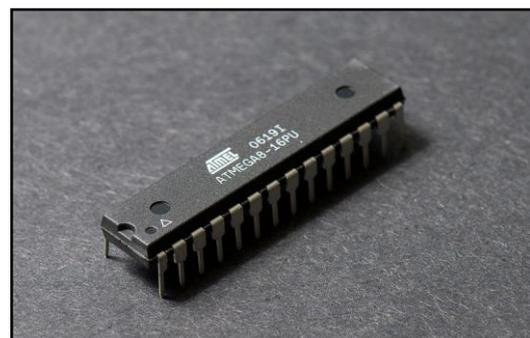


Fig. 4 ATmega8 Uc



B) LCD (Liquid Crystal Display):

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs.



Fig.5 LCD Display

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This display contains two internal byte wise resistors, One for the commands (RS=0) and second for character to be displayed (RS=1). It also contains a user programmed RAM area (the character RAM) that can be programmed to generate any desired character that can form using a dot matrix. To distinguish between these two data areas, the hex command byte 80H will be used to signify that display RAM address 00H is chosen. Port 1 is used to furnish the command or data byte, and ports 3.2 to 3.4 furnish register select and read/write levels. The display takes varying amounts of time to accomplish the functions. LCD bit 7 is monitored for logic high (Busy) to ensure the display is not overwritten

C) Light emitting diodes (LED's)

A light-emitting diode (LED) is a semiconductor light source. LEDs are used as Indicator lamps in many devices and are increasingly used for other lighting. Introduced as a practical electronic component in 1962, early LEDs emitted low-intensity red light, but modern Versions are available across the visible, ultraviolet and infrared wavelengths, with very high brightness.

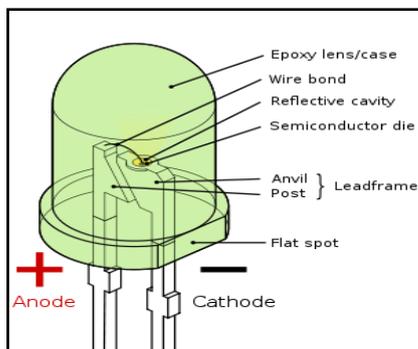


Fig.6 LCD Construction

When a light-emitting diode is forward biased (switched on), electrons are able to recombine with electron holes within the device, releasing energy in the form of photons.

This effect is called electroluminescence and the color of the light (corresponding to the energy of the photon) is determined by the energy gap of the semiconductor. LEDs are often small in area (less than 1 mm²), and integrated optical components may be used to shape its radiation pattern.

D) Voltage regulator IC 7805:

A three terminal voltage regulator is a regulator in which the output voltage is set at some predetermined value. Such regulators do not require an external feedback connection. Hence, only three terminals are required for device of such types, input (V_{in}) output (V_o) and a ground terminal as shown in figure. Since the regulator operates at a preset output voltage the current limiting resistor is also internal to the device. The main advantages of such regulators are the simplicity of connections to the external circuit and the minimum of external components. The capacitor, at the input side is required only when the voltage regulator is located more than 5 cm from the power supply because the lead inductance between the supply and the regulators may cause stability problems and high frequency oscillation. This capacitor should have very low effective resistance.

E) L239D DC Motor Driver & Pin Configuration

Although I've only used 1 motor, it is possible to use 2 motors on a single L293D chip of course you then have to compensate on the current accordingly to ensure enough juice for both motors under peak load. Remember that if you use 2 motors, the power source will be the same voltage but the current needed will be doubled – a good start is by altering how your batteries are connected in series or parallel. "The L293D is a monolithic integrated, high voltage, high current, 4-channel driver." Basically this means using this chip you can use DC motors and power supplies of up to 36 Volts, that's some pretty big motors and the chip can supply a maximum current of 600mA per channel, the L293D chip is also what's known as a type of H-Bridge. The H-Bridge is typically an electrical circuit that enables a voltage to be applied across a load in either direction to an output, e.g. motor.

VII. ADVANTAGES

- There is requirement of time is less
- Also required less Manpower
- Increase safety of workers

CONCLUSION

The main purpose for building this machine is to automate the handling of bulk material and its packaging. We are trying to design a prototype for fulfil our motive on this project. If we have some mistakes done by human error but we believe that we can clear our concept by our work. The total process is controlled by a control system automatically. We mainly focus on the electronic system.



The control system helps to transport the right amount of material on particular floor. There is requirement of well skilled manipulator is also reduced as compared to a manual system.

ACKNOWLEDGEMENT

We would like to thank sincerely to our guide **Mrs. Gujar M.P.** for her invaluable guidance, constant assistance, support, endurance and constructive suggestions for the betterment of this project work. We would like to express our deep sense of gratitude to our principal **Dr. J. R. Patil** for his continuous effort in creating a competitive environment in our college and encouraging throughout this course. We would like to convey our heartfelt thanks to our HOD **Mr. P. J. Chorage** for giving us the opportunity to embark upon this topic and for his continued encouragement throughout the completion of this project. We also wish to thank all the staff members of the department of E& TC engineering for helping us directly or indirectly in completing this work successfully. Finally we are thankful to our parents and friends for their continued moral and material support throughout the course.

REFERENCES

1. A. Spivakovshy and V.Dyachkov, "Conveyors and related Equipment", Chapter-IV, VII & XI, Peach Publishers, MOSCOW.
2. Wong, M. M., C. H. Tan, J. B. Zhang, L. Q. Zhuang, Y. Z. Zhao and M. Luo, 2006; On-line reconfiguration to enhance the routing flexibility of complex automated material handling operations, Robotics and Computer-Integrated Manufacturing, March 2006.
3. Babiceanu, R. F., Chen. F. F. and R.H. Sturges. 2005 "Real-time holonic scheduling of material handling operations in a dynamic manufacturing environment" Robotics and computer-Integrated Manufacturing, Volume 21, Issues 4-5, August-October 2005
4. Ghazi Abu Taher , Yousuf Howlader , Md. Asheke Rabbi, Fahim Ahmed Touqir "Automation of material handling with bucket elevator and belt conveyor"
5. Michael G.Kay Fitts Dept. Industrial and systems Engg " Material Handling equipment " January 12, 2012