Paper on wire cutting machine for wire harnessing imdustry

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Abstract —*Today's insulation material is toughest possible demand on cutting of wires. An automatic wire cutting machine is a special idea which makes wire cutting safer than before. This is implemented using various components. The working of this machine is very simple; once you install program in microcontroller IC, IC start works on that installed program. According to the program there is a permanent display of Length and Count. According to the program stepper motor takes one rotation in 20 steps which of 1.8 degree per rotation. In our program, delay of few seconds is given for the cutting of wire using mechanical hand hold cutter which works on DC motor as DC motor rotate in clockwise and anticlockwise direction , cutter simultaneously moves upward and downward direction. According to the delay stepper motor itself and mechanical cutter cuts the wire. This machine has usage in different industries as per the requirement. In future we can detect the faulty wire using sensor and GSM is used to convey the message that how much work has done. This is one of the advantageous machine that we had ever seen. Manual cutting comprises of errors such as unequal length, wasting of wires and Time consumption is more. So to overcome these problems we have designed the product which reduces human efforts and it cuts the wire in equal length, it also saves the time.*

Keywords-*components, IC(integrated circuit).*

I.   INTRODUCTION

Wire-cut machining is a non-conventional machining method used to cut hard to machine material, which are difficult to process by conventional processes. The applications of Wire cutting machine are in automobiles, aero-space, medical instruments, tool and die industries, electronics devices manufacturing industries. Productivity and quality are two important aspects have become great concerns in today's competitive global market. Every production/manufacturing unit mainly focuses on these areas in relation to the process as well as product developed. Since wire-cut has experienced explosive growth in application users demand and need maximum productivity and through-put, increased accuracy, and predictable performance.

Manual method means we can cut the wire by using hand hold cutter. So, this method is not applicable in industries due to some drawbacks.
- Manual method required more labor work, since more bunches of wires are required in industry with accurate length and perfect cut.
- There is wastage of materials because we require wire with accurate length. But there is possibilities that man is not able to cut the wire with accuracy as per the requirement, hence there will be the wastage of wire.
- This method is time consuming as we require wire with accurate length and perfect cut. For this purpose firstly we have to measure wire with scale as per the requirement then wire will cut by hand hold cutter. As numbers of wires are required then we have to compare one wire with another so it will take more time compared with automatic wire cutting machine.

II.   FORMATTING YOUR PAPER

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4.	1.2	ULN2003 IC
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6.	4	Top view

I. INTRODUCTION

This report describes the manufacture and assembly process for an automotive wire harness. The main function of a harness is to transmit power to the different components and modules in the automotive. The range of complexity for a wiring harness depends by the quantity of wires and components required for complete its assembly. This report will

follow the sequence that the operations occur in the actual manufacturing process. This sequence is not strictly followed in all the cases, in fact there are many operations that can be perform at the same time and the particular sequence willdepend in the specific wiring harness design.

Large number ofwiresare required for different connections in industry. Manual cutting comprises of many errors such as unequal length, also it is very tedious job in different industries where we have to cut large number of wires. The wire cutting machine which is available is not economical. To overcome all these problems we are come up with this project.

1.1. Overview

Today's insulation materials is toughest possible demands on the cutting of wire.
- Automatic wire cutting machine is machine which cuts wire automatically. It cut wire using hand hold cutter.
- This machine has usage in harnessing industry for wire and cable cutting.
- It has also demand in electronics, mechanical and electrical industry as different length of wire required.
- It can cuts different length of wire at a time without defect.
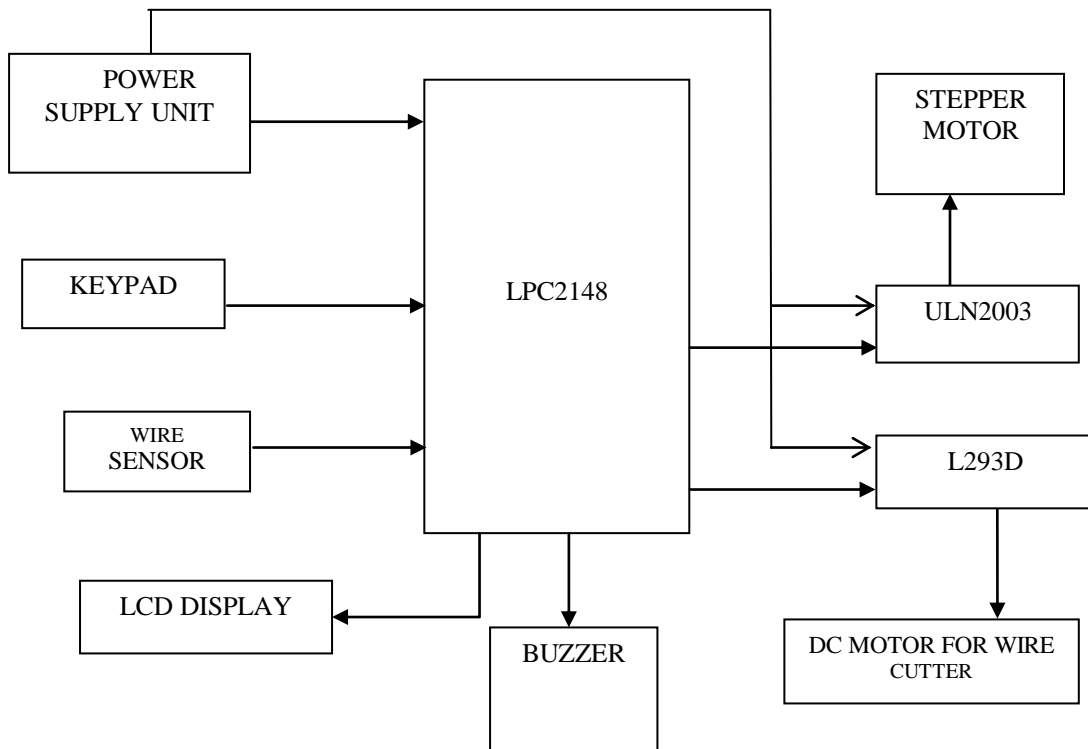- This is one of the advantageous that we had ever seen.

Fig 1

The main components used in this mechanism are ARM 7 IC, LCD, Stepper motor, D.C motor, Wire sensor etc. The input entered through the keyboard will be displayed on the LCD screen.

1.1.1LPC2148

LPC2148 (ARM IC) is widely used IC from ARM family.It is manufactured by Philips and it is pre-loaded with many inbuilt peripherals making it more efficient and a reliable option for the beginners as well as high end application developer.

Fig 2

1.1.2. L293D DC MOTOR DRIVER

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC.

Fig 1.1

1.1.3. ULN2003

ULN2003 belongs to the family of ULN200X series of ICs. Different versions of this family interface to different logic families. ULN2003 is for 5V TTL, CMOS logic devices. These ICs are used when driving a wide range of loads and are used as relay drivers, display drivers, line drivers etc. ULN2003 is also commonly used while driving Stepper Motors.

Fig 1.2

1.1.4.Wire Sensor
The wire sensor used in this mechanism is NOTCH sensor. The wire sensor detects the presence of the wire. If in case the wire is not present the same will be displayed on the LCD screen.

1.1.5.Stepper Motor Driver
The stepper motor will drive the roller according to the step angle (1.8 degree per step) i.e it will take 200 steps to complete one rotation of 360 degree of the roller.

1.1.6.DC Motor Driver
The dc motor driver is used for cutting mechanism. The cutter is attached to the dc motor driver which will cut the wire accurately. The dc motor which is used here has a high torque.

1.2. Working

The objective of this project is to increase the speed of operation of the machine. In our project we fed the wire continuously rather than inserting it time to time. The above result are obtained by employing a movable wire guide due to which the wire moves in forward direction at uniform intervals into the path of the cutterso that the delay was not introduce so that each cut will sever a section of uniform length depending upon the coordinated adjustment of the various portions of the machine. The machine as a whole is mounted upon a rectangular base consisting front wall, a rear wall, and end wall. The base of the entering end of the wire is supported with the help of a grooved guide roller, which the wire is fed and then passes between a group of wire straightening rolls, which is driven at the desired feeding speed by means presently to be described.

Fig 3

Fig 4

1.3. Software used
1. KeilMicrovision:

  The KeilMicrovisionDebbuger accurately simulates on-chip peripherals (I2C, CAN, UART, SPI, Interrupts, I/O Ports, A/D Converter, D/A Converter, and PWM Modules) of ARM7 device. Simulation helps you understand hardware configuration and avoids time wasted on setup problems. Additionally, with simulation, you can write and test applications before target hardware is available.

2. Flash Magic:

Flash Magic is a PC tool for programming flash based microcontrollers from **<u>NXP</u>** using a serial or Ethernet protocol while in the target hardware.

<u>Features of Flash Magic:</u>

1. Straightforward and intuitive user interface   .
2. Five simple steps to erasing and programming a device and setting key options   .
3. Programs Intel Hex Files   .
4. Automatic verifying after programming   .
5. Automatically program checksums. Using the supplied checksum calculation routine your firmware can easily verify the integrity of a Flash block, ensuring no unauthorized or corrupted code can ever be executed.
6. Program security bits   .
7. Reprogram the Boot Vector and Status Byte with the help of confirmation features that prevent accidentally programming incorrect values   .
8. Display the contents of Flash in ASCII and Hexadecimal formats.
9. Use high-speed serial communications on devices that support it.
10. Command Line interface allowing use in IDEs and Batch Files   .
11. Supports half-duplex communications for many devices   .
12. Control the DTR and RTS RS232 signals to place the device into Boot ROM and Execute modes automatically (requires hardware support)   .
13. Send commands to place the device in Boot loader mode   .

3. Proteus:
 It is a software suite containing schematic, simulation as well as PCB designing.It can be purchased in many

configurations, depending on the size of designs being produced and the requirements for microcontroller simulation. All PCB Design products include an auto router and basic mixed mode SPICE simulation capabilities. Schematic capture in the Proteus Design Suite is used for both the simulation of designs and as the design phase of a PCB layout project. It is therefore a core component and is included with all product Configurations.

FUTURE SCOPE

GSM MODULE: The GSM model can also attach to the motor to convey the message related to how much work has done. If any problem is detected in the process of wire cutting message will automatically send to the user so that work will not stop for long time. These are all future scopes which can make this machine smarter.
FAULTY WIRE DETECTION: In the process of cutting wires of different length if in between faulty wire is comes then it is automatically detected by sensor and this sensor is placed on the mechanical cutter so that faulty wire got detected by the machine to thrown it out.
CREMPING: Most of the wire uses user wants wire to be crimped on both side as it is time efficient so that creaming is also possible on both side by doing more attached mechanical arrangement.

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