

ELECTRONIC PEN AND CNC MACHINE SURVEY

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Abstract - The main objective of this paper is to study “ Electronic Pen used in Computer Numerical Control (CNC) Machine”. This also includes design of automatic mini CNC machine for drawing. Here is an general review to the three aspects of the pen computing are represented: pen computer application pen input hardware and hardware recognition. There are different methods and tools which helps to the process planar. This paper examine industrial use and outlines potential to emphasize reasons for available condition.

1. Introduction:

A digital pen is a electronic pen which is a battery operated writing instrument. An electronic pen comes with a Universal Serial Bus(USB) support gently to let the user to transfer the handwritten data to the computer. This pen arrives as a regular ball-point pen and can be used as such but there is a need of special digital paper if the consumer wishes to digitally arrest what they has written. They can be used on such normal papers also but there is a need of special digital paper to seize what has been written on the paper.

Here we are introducing a notion of CNC pen plotter using custom built PLC. PLC is used over a large area in CNC Machine and other industrial aspects, exercising authority over spindle positive inversion, tool changer and other auxiliary moves. When any consumer wants to upload their data or drawing the pens, is loading or unloading in its USB cradle. The cradle automatically judge the pen’s presence, open the required software application on computer. Most of the pens save the handwritten notes as an image file even though some pens use a proprietary file format.

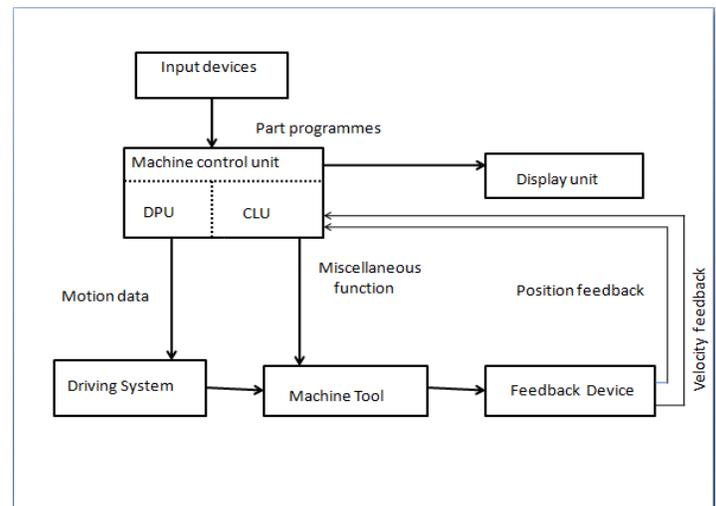
2. Objective:

- To understand working principle of CNC machine
- To understand electronic pen
- To study about machine tool survey
- To understand application of CNC machine and Electronic pen

3. Methodology

The G code is interfused with ATMEGA 328 CNC based controller by FTDI module which is used to convert the code. It is also referred as serial to USB converter. Hence it interact between Computer to Controller. There are three axis X,Y,Z which functions as under X stepper motor move left and right Y stepper motor moves front and back and Z stepper motor up and down as per required dimensions.

4. Block Diagram



4.1 Elements Of a CNC System

- Input Devices
- Machine Control Unit
- Driving System
- Machine tool
- Feedback Devices
- Display Unit

4.1.1 Input Devices

Input devices includes Floppy Disk, Serial Communication and USB Flash Drive. Floppy Disk is a small magnetic storage device for CNC data input. The data in a Floppy Disk Drive could be easily characterized at any point. A USB Flash Drive is a removable and rewritable portable hard drive with bigger storage size than a floppy disk. The

data transfer between a computer and a CNC system is successfully carry out with a serial communication port.

4.1.2 Machine Control Unit

The Machine Control Unit is the core of the CNC Machine. These are categorized into two viz. Data Processing Unit(DPU) and Control Processing Unit(CLU). On receiving a program , the DPU explain and convert the part of a program into internal machine codes. In Control Loop Unit, the data from the DPU are encoded into electrical signals to authorized the driving system to perform the given motions.

4.1.3 Driving System

The Driving System consist of DC Servo Motor, AC Servo Motor and Stepping Motor. DC Servo Motors are the feed motors used in CNC Machines. The working principle is based on the rotation of an armature winding in a permanent magnetic field. AC motors are gradually replacing Dc Servo motors as they have a smaller power to weight ratio and faster response. A device which is called as Stepping Motor that converts the electrical pulses into discrete mechanical rotational motions of the motor shaft.

4.1.4 Machine Tool

Machine Tool is an equipment which is required to have accuracy and repeatability. The slides are usually adjusted to high precision and covered with anti-friction material such as PTFE and Turcite to reduce the stick and slip phenomenon.

4.1.5 Feedback Devices

There are two types of feedback used in CNC Machine viz. Position Feedback and Velocity Feedback. These feedbacks are used to have a CNC machine operating at high precision and speed of the axes required to be constantly updated.

4.1.6 Display Unit

In CNC Machine, Display unit is a device that can shows the graphics presentation of tool path so that programmer can established before the actually machining. This is the interactive device between machine and operator.

5. Machine Tool Survey

After growing in 2010 and 2011, world machine tool consumption has shirked for two consecutive years. The succession of annual reports of world machine tool

production, consumption, and trade was started in 1965 at American Machinist magazine. Most of the data comes from the official sources carried directly to Gardner's research department. Machine tools are power-driven machine, unable to carry by hand, energized by an external source of energy. Co-ordination of data collection is handled by Nancy-Eigel -Miller, research manager at Gardner. Machine tools are differentiate into two phases: metal cutting and metal forming. Metal cutting machine includes drilling machines, electrical-discharge machine, lasers, gear cutting machines, machining centers, milling machines. Metal forming machine contract the metal into shape and includes stamping machines, bending machines, presses.

6. Application

1. Many industries use form for collecting information. Many forms are completed on the field where the mobility is difficult. Devices like Cross Pad, Palm Pilot are extremely in these cases for data entry and data collection.
2. CNC machines and instruments can be used in industries such as Drilling Machines, Turning centre, Machining centre, Turret Press and Punching Machine, Wire cut Electro Discharge Machine(EDM) Grinding Machine, Laser Cutting Machine, Wetter Jet Cutting Machine, Electro Discharge Machine, Coordinate Measuring Machine and Industrial Robot.
3. CNC machines are widely used in metal cutting area from which parts with complicated contours, parts requiring expensive jigs and fixtures.
4. Electronic Pen write like a ball pen and save the same data what we have written. An exact image of the form and other data will be stored into the inbuilt memory of the electronic pen.
5. Electronic pen has the storage capacity of 50 pages of A4 text. Every pen stroke is time stamped.

7. Conclusion

This describes the electronic pen that converts the writing data into digital media . The important aspect of this project is that hand written digital files can be converted into text format. This project will allow everyone to interact with each other like never before. Any one can get information about anything from anywhere within a few moments. CNC machines consumes a low power and works with high precision due to accuracy controlling of stepper motor.

8. References

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