

Automatic PCB Drilling Machine

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Abstract: This paper presents the design of a PCB drilling machine, where the drill holes are automatically find out from an image of the circuit then it reduces the use to manually enter the drill hole coordinates. The Aim of this project is to design and implement automatic PCB drilling machine. Further the drilling machine uses path planning through co-ordinate measurement machine method which is used to make the system more stable and accurate.

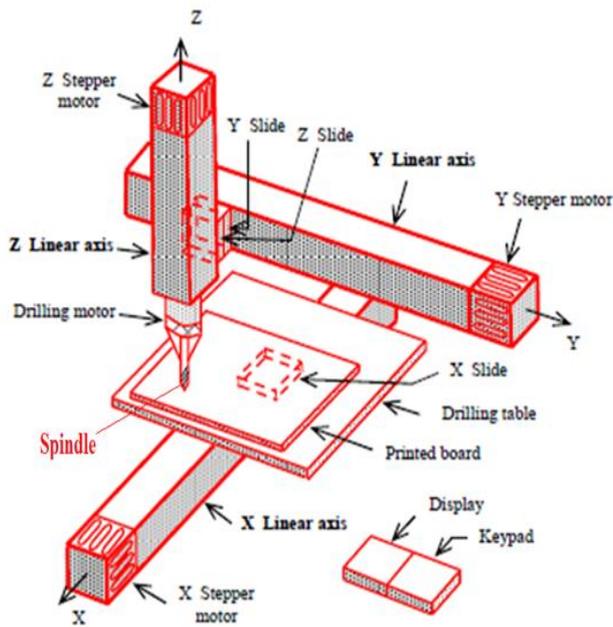
Keywords: Computerized numerical control, Printed circuit board, drilling machine co-ordinate measurement machine

1 INTRODUCTION

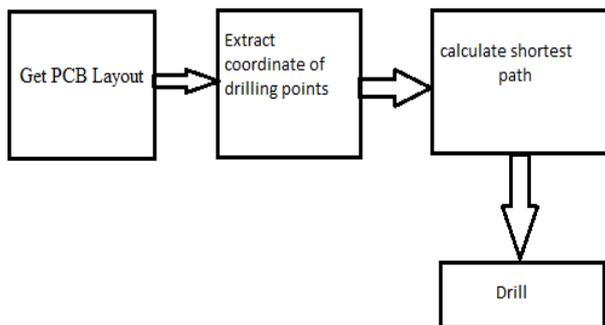
In this system we are involved in electronic circuit manufacture have to go through. For drilling the PCB holes which needs both precision and patience. Because of the repetitiveness of the task laborers and particularly the beginners can be lead to countless foil. Further, the time taken to drill a PCB can have a luminous on the production capability in mass scale production. Therefore the main goal of this project was to enable beginners in the field to use an automated PCB drilling machine with path planning capability to complete the job efficiently. The aim of this project is to develop a low cost PCB drilling machine can be used in many applications like the small scale industries and can be helpful to avoid the Workload of human. So such kind of project induce us to develop low cost drilling machine such that it would provide advantage to the laborers as well as the industries.

2 PROBLEM DEFINATION

The PCB is placed to this system then it is drilled automatically through path planning. The PC provides X, Y, Z co-ordinates. and by using the pc software read the file which is generated by the PCB design software. Another system uses the basic 8051 microcontroller and drilling driver are designed by relays makes system bulky and does not provide high amount of current in order to drive the motor exactly. The another method uses microcontroller the c programming. The system consist of three 3 stepper motor and one AC motor to control drill. Thus due this the system is complicated and system become instable. The proposed project does not use the path planning method. Further the automatic PCB drilling machine uses a path planning algorithm, which is capable of estimating an exact traversing path for the drill bit. The path planning algorithm optimizes the use of the motors and other mechanical paths involved in the process while reducing total time taken to cross all the drill holes. In this project, the developed software takes the position of the drill hole. Than it calculates the previous and current co-ordinate and sends the coordinate information Microcontroller unit over USB cable. Stepper motors move on the basis of co-ordinate information to accomplish the drilling of the PCB.



3 Design & Implementation



The first step is getting the PCB layout. This is simply done by the PCB design software. A simple enough task for beginner in a PCB designing as is our goal. Figure sample schematic of image file Once the image is obtained it is loaded into the MATLAB program which will extract the coordinates for plotting.

3.2 Hardware Design:

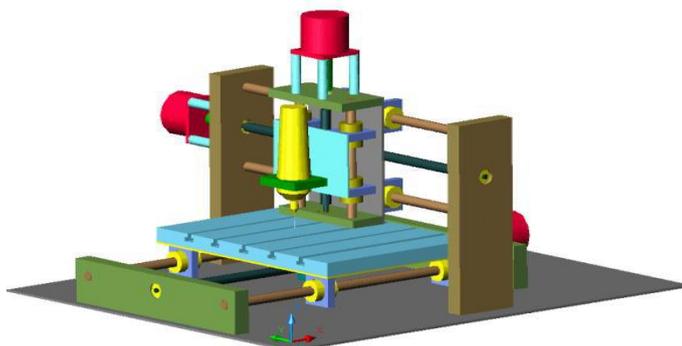


Figure: Proposed Model

3.1 Working

The machine designed based on co-ordinate measurement machine, therefore the machines have designed with three coordinate, X, Y and Z as shows in Fig. The PCB is moved along the X and Y axis and Z coordinate is used to move the drill machines up and down. Then withdrawn and translated to another place. Drill co-ordinates are extracted using MATLAB. The microcontroller simply connect it to a computer with a USB cable.

