

3-AXIS CNC MACHINE

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ABSTRACT

Nowadays, industry is taking bigger and bigger leaps and accuracy in manufacturing became a must. CNC machines are used in almost all big factories and plants. However, their price is expensive and they are very big in sizes. This is a problem for designers and artists who come up with new creative designs, because in order to make there designs real, they need to send it to factories to be manufactured. This is of course is time consuming and very costly.

The objective of this project is to build a 3-axis portable CNC machine, which acts like a smaller version of the industrial CNC machines. The machine is controlled using a computer running the software Mach3.

The CNC machine is able to engrave different materials in 2D with high accuracy. Also the machine can fabricate PCB boards by removing the unwanted copper leaving only the traces needed to form the circuit. Furthermore, the machine is able to cut and engrave 3D objects such as gears with high accuracy.

The machine interface with the computer through the parallel port connected to the breakout board (BOB). The computer sends the signals to the stepper motors to move them according to the design loaded in Mach3. The BOB sends and receives the signals to and from the computer to control the other devices connected to the machine such as, touch probe, limit switches, and emergency stop button.

The CNC machine provides a working area of 15 x 32 x 3 Cm, in this area a spindle motor with a speed of 35,000 RPM will be moving to fabricate the materials.