SRI VENKATESHWARA COLLEGE OF ENGINEERING

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"TO CONVERT EXISTING 3D PRINTING MACHINE INTO LASER ENGRAVER"

Bachelor of Engineering

in

Department of Electronics Communication and Engineering

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KEYWORDS

LASER Engraver, 3D Printer ,Laser Driver, PWM Signals ,Stepper motor.

INTRODUCTION

Combining a 3D printer and laser for engraving is very convenient, and it brings a number of benefits. Thus, the 3D printer becomes a complex machine, enabling easy prototyping not only functional printed but also design elements. With the help of a laser, it is possible to burn thin acrylic glass, which can serve as a building element of various structures and as part of the design. It is widely believed that 3D printing or additive manufacturing (AM) has the vast potential to become one of these technologies. 3D printing is an enabling technology that encourages and drives innovation with unprecedented design freedom while being a tool-less process that reduces prohibitive costs and lead times. Components can be designed specifically to avoid assembly requirements with intricate geometry and complex features created at no extra cost. 3D printing is also emerging as an energy efficient technology that can provide environmental efficiencies in terms of both the manufacturing process itself, utilizing up to 90% of standard materials, and throughout the product's operating life, through lighter and stronger design.

OBJECTIVES

- It is a technique that uses a laser beam to etch or mark a surface by removing material or altering its appearance.
- It is ideal for creating fine lines, small text, and intricate patterns with high accuracy.
- It produces a high-resolution engraving, resulting in clear and sharp markings. This is particularly useful when engraving small objects or items that require intricate designs.
- Laser engraving can be performed on various materials, including metals, plastics, wood, glass, leather, and more.
- It provides flexibility in terms of the type of objects that can be engraved, allowing for a wide range of applications.

METHODOLOGY

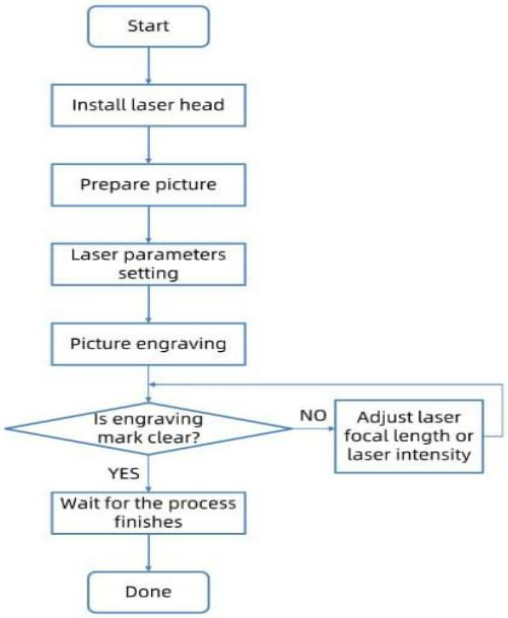

Fig.1: Algorithm of the proposed system

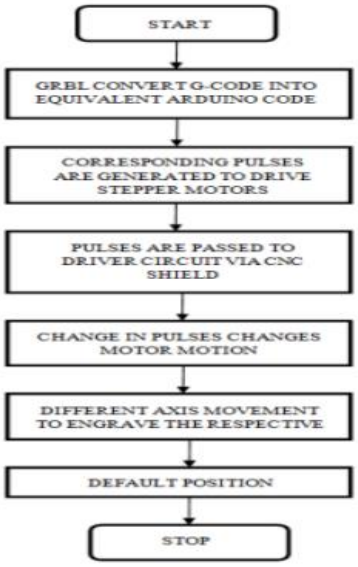

Fig.2: Block diagram of lase engraver

Laser engraving is used to engrave a specific image or trademark onto a chosen material. It's a subtractive technique of production. However, before the engraving process can begin, a file from a computer must be transferred to the machine's controller, which then sets the laser. When the Laser Engraving process begins, the beam generates a large amount of heat, which burns or evaporates the surface in accordance with the picture in the file. n. There are some 3D printers that also use multi extruders to combine completely different colors and to print a colorful object. Equally varied styles of lasers have also been developed that embrace carbonic acid gas optical laser, micro-jet optical laser and plasma optical laser, etc. optical laser frequency, range of passes, focal length and engraving speed impact on material removal rate by an optical laser diode.

HARDWARE REQUIREMENTS

- 0.5 LASER
- LASER DRIVER

- PWM SIGNALS
- 3D PRINTER
- WOOD

SOFTWARE REQUIREMENTS

- Creality Workshop

EXPERIMENTAL RESULTS AND OUTCOME

It is critical to consider appropriate space for the machine work head, both for the 3D printer dosing system and for the laser module, while constructing a printer and for future consideration of the interchangeable head. This is usually rather huge, depending on the machine's installed power. An aluminium cooler with forced cooling provided by a fan makes up a substantial portion of the module. However, in most circumstances, the dosage mechanism will be larger than the laser module. The design of 3D printers is solved such that the print nozzle's axis crosses through the z-axis, establishing the print head's centre. In each axis, the print area and print head feed size are adjusted to allow the print nozzle to travel around the whole workbench surface (heat bed). As a result, it's critical to align the laser module axis, through which the laser beam passes, with the print nozzle axis, or as close to each other as feasible, in order to maximise the workspace's potential. The clamping mechanism is also well-designed, allowing both the print mechanism as a whole and the laser module to be fastened. A viable option, for example, is to use the shaped contact to attach a unit to one section of the printing platform and a bolt to the other.

CONCLUSION

The laser diode's low power outputs are the key limiting factor in the laser's cutting capabilities. Although adding more lasers focused on the same place improves performance, there are certain drawbacks to this strategy. The mechanical structures investigated in this thesis provide a suitable starting point for creating a low-cost machine capable of precise placement, but further development is required before the machine can achieve its design objectives. The most

commercial Laser engravers can only deal with the cut objects laid on a flat surface. Since their cutting tracks are required to keep a specific distance from cut objects, the cuttings cannot be accomplished when the Laser loses its focal length.

NEW INNOVATION

We are the first batch to implement non working 3D printing machine to convert laser engraver.

SCOPE OF THE FUTURE WORK

1. In our project we are using 0.5 blue laser.It is working for only wood and enclave.
2. In future we are going to add 2.5 laser , it can work in any of the metals, like glass, metal sheet, and other thin materials.