

# Operations Manual

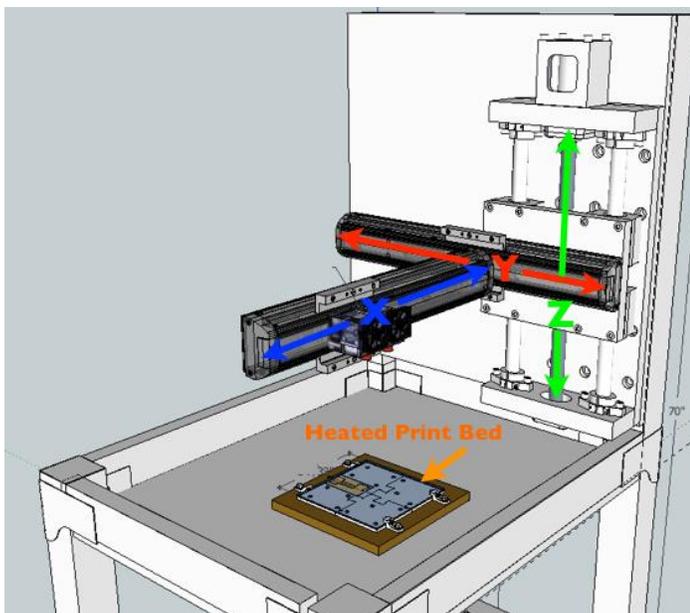
## INTRODUCTION

### USING THE MANUAL

This user guide was developed to give the user an Introduction, Overview, Operation, and Troubleshooting Tips for “The Beast” 3D printer. The Beast has many design features that are nearly identical to off the shelf 3D printers, but has even more features that are unique to itself. This guide will ensure that any user can produce successful prints without damaging The Beast or injuring themselves.

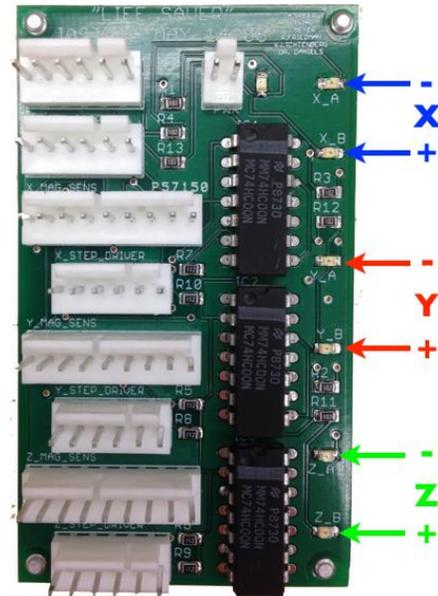
### SAFETY

The 3 axis system used in this 3D printer system is large and robust, especially when compared with today’s 3D printers. The strength of the stepper motors have enough power to damage themselves and injure an unexperienced user. Please familiarize yourself with all of the safety components implemented in our design before powering on The Beast.



*Figure 1: View of the print area*

The diagram above identifies the XYZ positioning system mounted to the wooden support bench. The X and Y axis are supported by the Z axis which is mounted vertically on the bench. The Z axis moves up for every printed layer of the printed item.



*Figure 2: Top view of the Safety Circuit*

The image above is the safety circuit used to protect the stepper drivers from overdriving past their physical limits. The logic implemented on this board sends a disable signal to the appropriate stepper driver when either a positive or negative limit has been triggered. The arrows indicate the location the LEDs indicating which magnetic sensor is tripped.

## COMPONENT BOARD

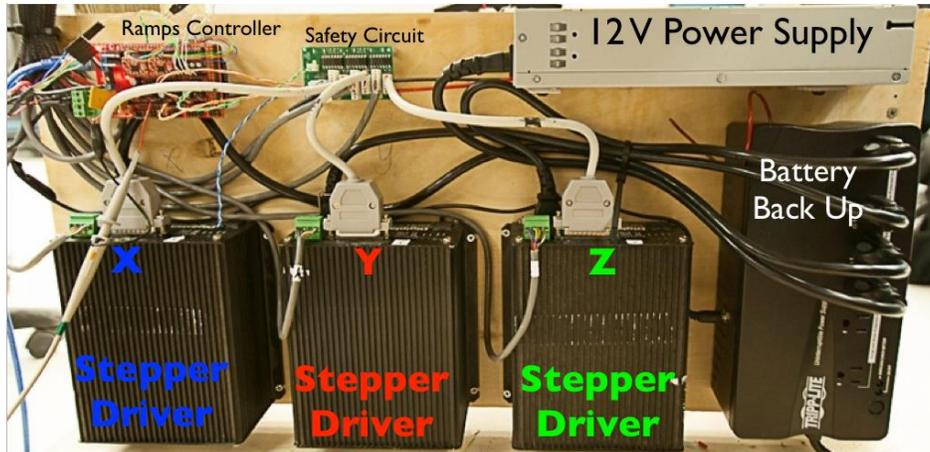


Figure 3: Component Board

The component board is located below the print area. This area houses the XYZ stepper drivers, the micro controller, and power supply systems.

## OPERATION

### POWER UP



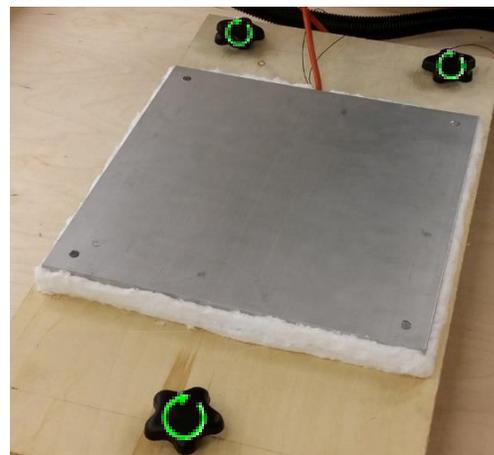
The Beast 3D printing system can be powered on by pressing and holding the power button for 1-2 seconds on the battery backup power strip found on the component board.



The 12V power supply used to heat the extruders and print bed has its own power switch that needs to be switched to the ON position.

### BED LEVELING

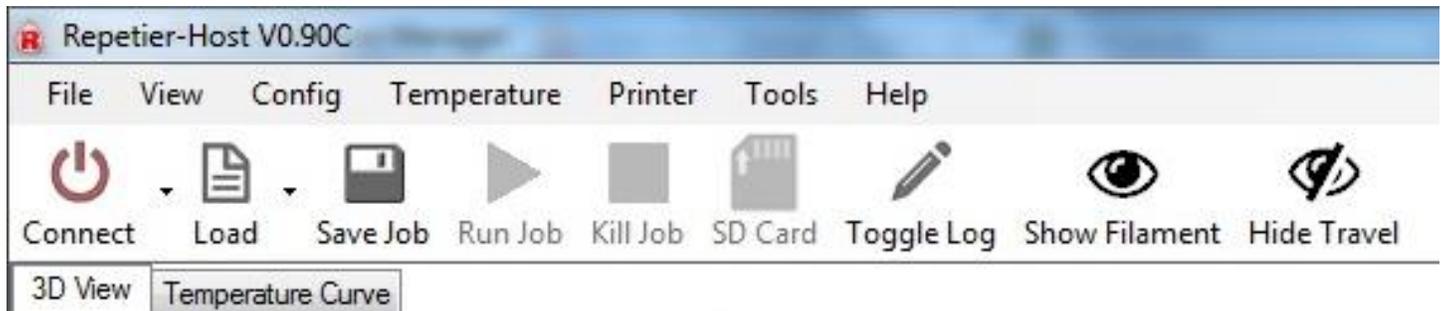
The heat bed will have to be leveled before you begin every print. To level the heat bed move the nozzle to every corner of the platform. Turn the knobs clockwise to lower the bed, and turn the knobs counter clockwise to raise the bed. You should be able to fit a piece of paper between the tip of the nozzle and the heat bed. You should be able to slide a piece of paper between the nozzle and the heat bed and a small amount of friction when doing so.



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## CONNECTING VIA COMPUTER

The Repetier software is used to send g-code to the ramps controller. To connect to The Beast, first ensure the USB is plugged into the micro controller and connected to the computer. open the Repetier software on the computer and simply click connect in the upper left corner of the screen.



Once connected, you will be able to heat extruders, bed, and used manual control to move the extruders to a location on the bed that you wish to print.