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Team F: ADD\_IN

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ILR09

March 18<sup>th</sup>, 2016

## I - Individual progress

My goals these two weeks were to do tests on the printer and implement fixes whenever necessary.

### 1.1 Testing:

I pursued many tests in order to check for the reliability of our implementation, especially with respect to jamming, and so far there has been no new occurrence of jamming since the heat insulator was added, so it should not be an issue in the future. Some issues were identified though, in software, firmware and hardware, and we then worked on fixing them. The hardware issues was that the mount was not rigid enough, and that the wires in the hot end were colliding with the opto-sensor, causing the stepper to miss steps. The firmware and hardware had some bugs initially which slowed down testing, but fixes were implemented.

### 1.2 Updating the mount

After finding out the clearance issue of the wires with the slot sensor was still there, even though I cut the wires shorter, as shown in Figure 1. I made small changes to the mount so that the opto-sensor connector is facing upwards, which leaves more clearance.

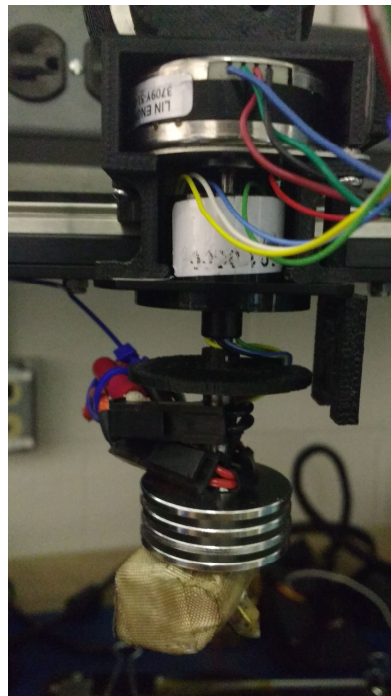


Figure 1: Current implementation(sensor not mounted in this picture)

The newer mount is shown in Figure 2, where the opto-slot will slide through the slot, connector facing upwards, and will then be glued to the mount. This means we need glue, but it should also make connecting the sensor easier.

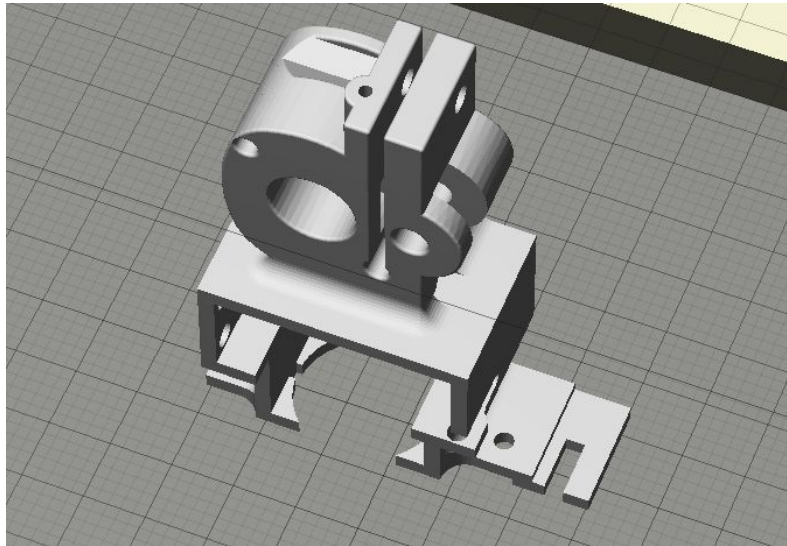


Figure 2: Updated mount design

### 1.3 Making the extruder sturdier:

I also identified one of the main reasons why the extruder was flexible was that a part of the extruder motor mount had to be removed in order to give clearance for the stepper, and since that part was printing with low infill setting (20%) it was not strong enough. So I made some changes to the part and tried printing it with 100% infill, which should make it stronger. The part is shown in Figure 3.

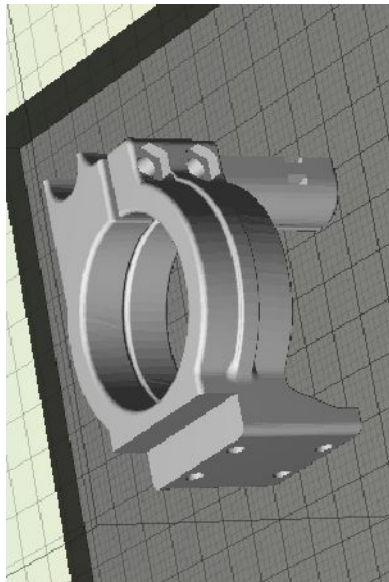


Figure 3: Extruder motor mount.

#### 1.4 Setting up the second printer:

In parallel of testing on the first printer, I started working on setting up the second one, where the extruder motor mount is metallic and the overall design is much better, which means it should give better results than the first one. The standard extruder for the new printer is shown in Figure 4, with the metallic mount highlighted by the arrow.

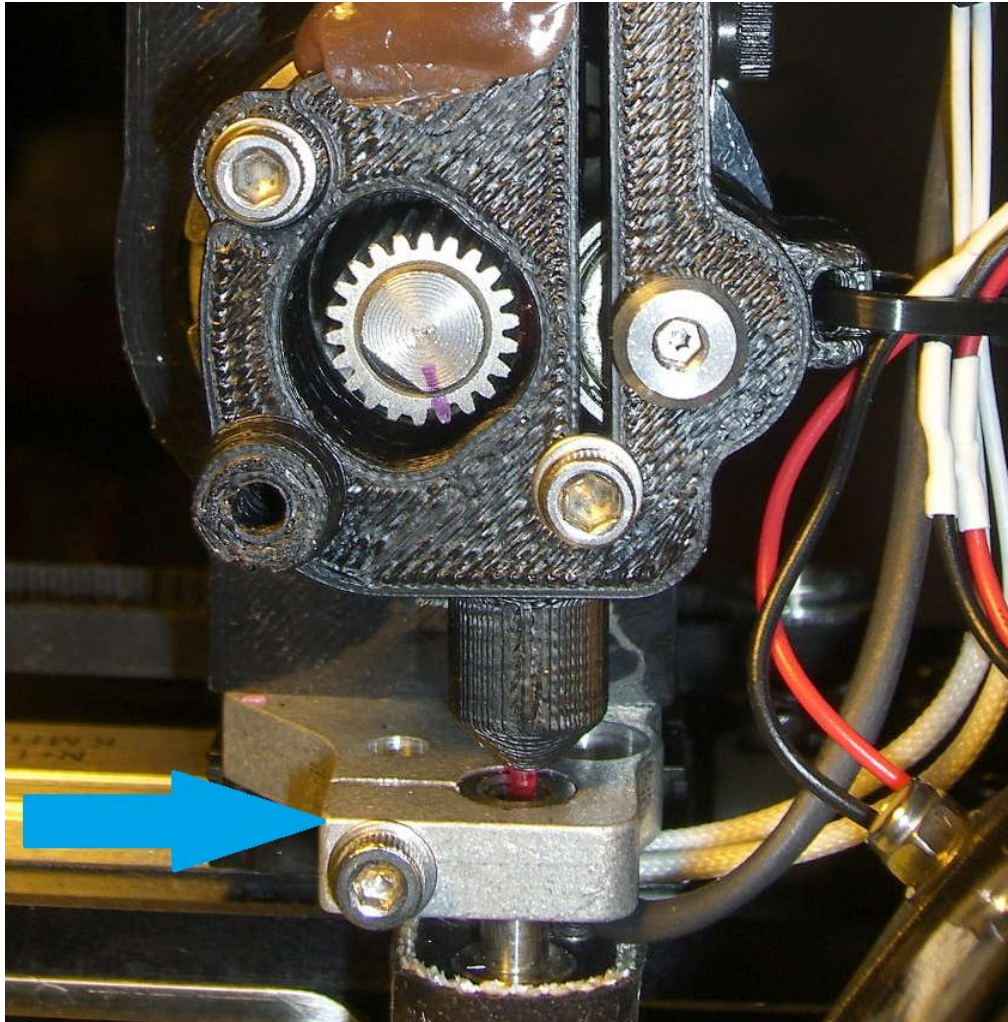


Figure 4: MakerGear M2 V4 extruder - Metallic mount highlighted

The plan is to machine a new part to replace the part shown by the arrow, offering mounting features for the stepper and the encoder. So I contacted MakerGear support to get the CAD model for that part and they replied quickly. Dan is now reviewing it and will machine that part at the shop.

#### II - Challenges

Apart from the small software/firmware bugs, the biggest challenge this week was getting the new parts printer on the Makerbots, as they were constantly jamming and failing prints, which took me a lot of time because the prints take many hours, so I was basically trying every day the last week to get a good print.

### III - Teamwork

These past two weeks, Nikhil worked endless hours implementing the Inverse kinematics on the firmware and fixing the resulting bugs. Dan and Astha were also helping with that, while making improvement to the software, and fixed some minor bugs as well. Also Dan is now doing the mount for the second printer and will make a mount for the other nozzle he made.

### IV - Future Plans

My future plans are first to print the new parts discussed above, and do more tests. I will work on the adhesion test by printing on various surfaces a part that has a flat base and a hook on top, then using a spring gauge measure the adhesion force. And I will also be testing printing around cots items now that the IK is implemented and most bugs are resolved.