

Mk 3S+ & MMU2S/MMU3 firmware update troubles

Printer 3.13.0, MMU 3.0.0 and up

H v Ooijen, 17-11-2023,
Glad to show you my results now.

Result:

I followed the mechanical route because there we can find, in my opinion, the root cause. See the result @ https://www.youtube.com/watch?v=82_PybeUpl

Problem:

Since the firmware update the homing of the MMU2S idler was not possible. Loud PRRRRTT noise and automatic repeated attempts were the result till the message "homing not possible". See the story @ <https://github.com/prusa3d/Prusa-Firmware/issues/4285>

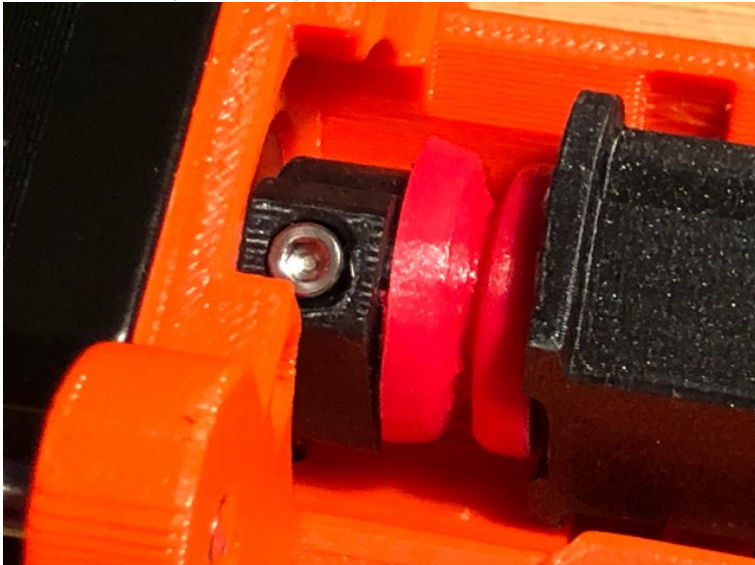
Some tried to solve the problem by changing sensitivity values in the (firm) software by adjusting the sensitivity values. Long discussions were the result. When a maker installed the latest firmware the problem was reported.

My attempts:

One moment Claudio (GlaGre or Claire) mentioned the "over defined" assembly design. And some others were also tweaking with the mounting screws between shaft and idler drum.

Attempt 1:

Some time ago I changed my MMU2S with a flexible coupling between shaft and idler drum.



This changed the sound, but not enough to avoid the repeated homing attempts. Only after the release of the motor-mount screws the homing cycle went successful. My conclusions: my flexible coupling was not soft enough.

See: <https://youtu.be/nvdJH7YKRpE>

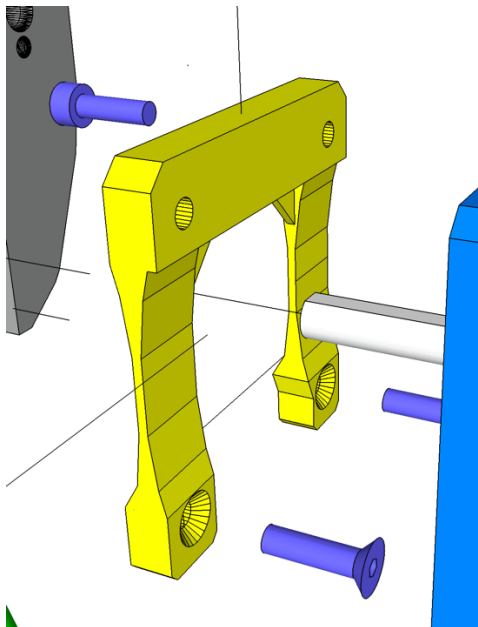
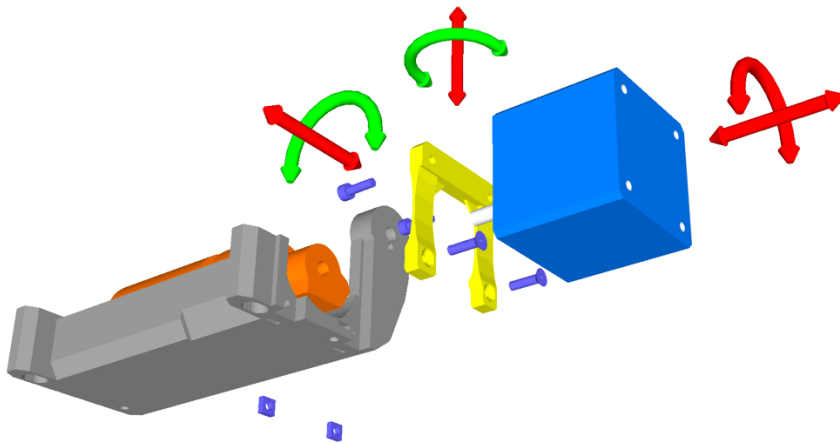
Attempt 2:

I then made the motor mount flexible and used the stiff connection between shaft and idler drum using the original MMU2 drum with the 2 screws.

I tried several flex motor mountings and I'm now using this one (the yellow one, printed black)

The red vectors are stiff, the green vectors are flexible and eliminate unpredictable internal stresses. You can see it clearly on https://www.youtube.com/watch?v=82_PybeUpl where the motor is wobbling when rotating. The wobble is caused by the inevitable misalignment of the motor shaft-idler drum.

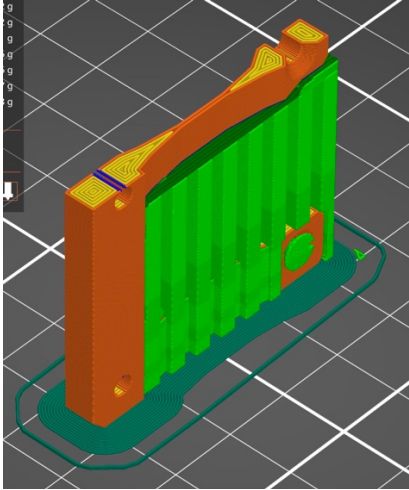
This misalignment is, in the original situation, causing a torque variation during the rotation which is bringing the troubles.



Also the idler housing is changed.

The motor-mount is printed separately to control the best strength/endurance. It is mounted by 2 m3x10 countersunk screws with help of 2 square nuts.

It is made from PETG (black) and printed on the side with multiple perimeters to make sure its massive and all the print lines are in the best direction to be loaded.



I added 2x STL's added. Feel free to test by yourself!

No sensitivity values are changed! The latest software is installed
It works fine from the start, and I've made several colored parts already.

Steps to go:

1. Testing for durability. Several multicolor parts made fine yet
2. Experimenting the flexible shaft-drum coupling because that's the easiest change for the MMU2S

In my career I have seen many failures of over defined assemblies. Its always hidden in the design. It's very neglected, but when solved, the improvements were dramatically.
Assembly made easy, parts needed less accuracy (€!), functionality of the assembly improved and the machine needed less maintenance.

Making things more stiff work often counterproductive. Robustness not always reliability!

Regards,
Henk van Ooijen

PS1: @ Claudio, feel free to contact me privately to talk about mechanic design.

PS2: I hope that Prusa engineers will respond to this analysis.