



## Introduction: Additive manufacturing part II

**Workshop Mechatronics II MERO**  
**Joshua Voll, M.Eng.**  
**Schmalkalden, 27.04.2022**

# Agenda

1

- Live slicing

2

- Guidelines

3

- Workshop: Pen Plotter

# Live-slicing

Cura



# Agenda

1

- Live slicing

2

- Guidelines

3

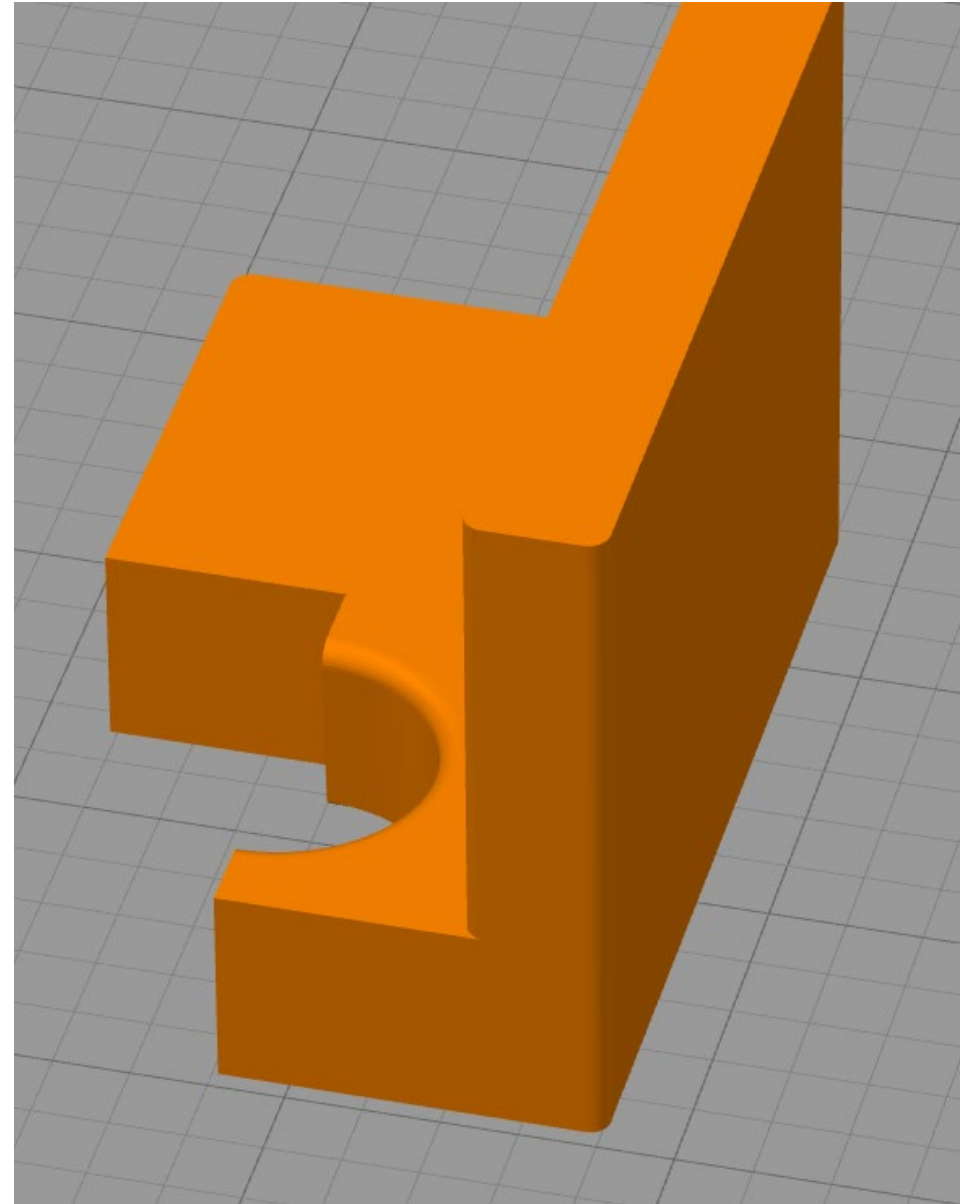
- Workshop: Pen Plotter

# Guidelines

What do I have to pay attention to when designing?

**Important:** No radii at the bottom!

Connection to build board!



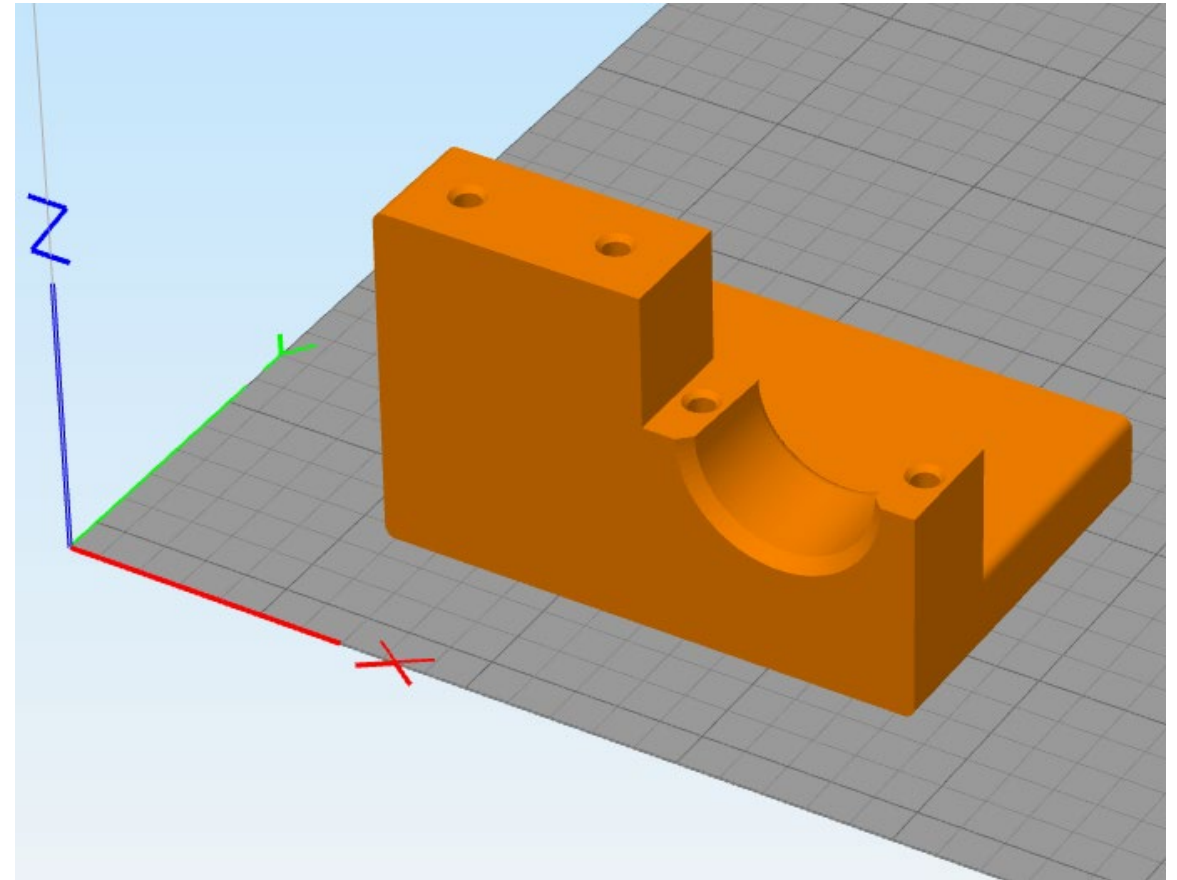
# Guidelines

What do I have to pay attention to when designing?

**Important:** If possible align your drill holes in Z direction!

Connection to build board!

Align your drill holes!



# Guidelines

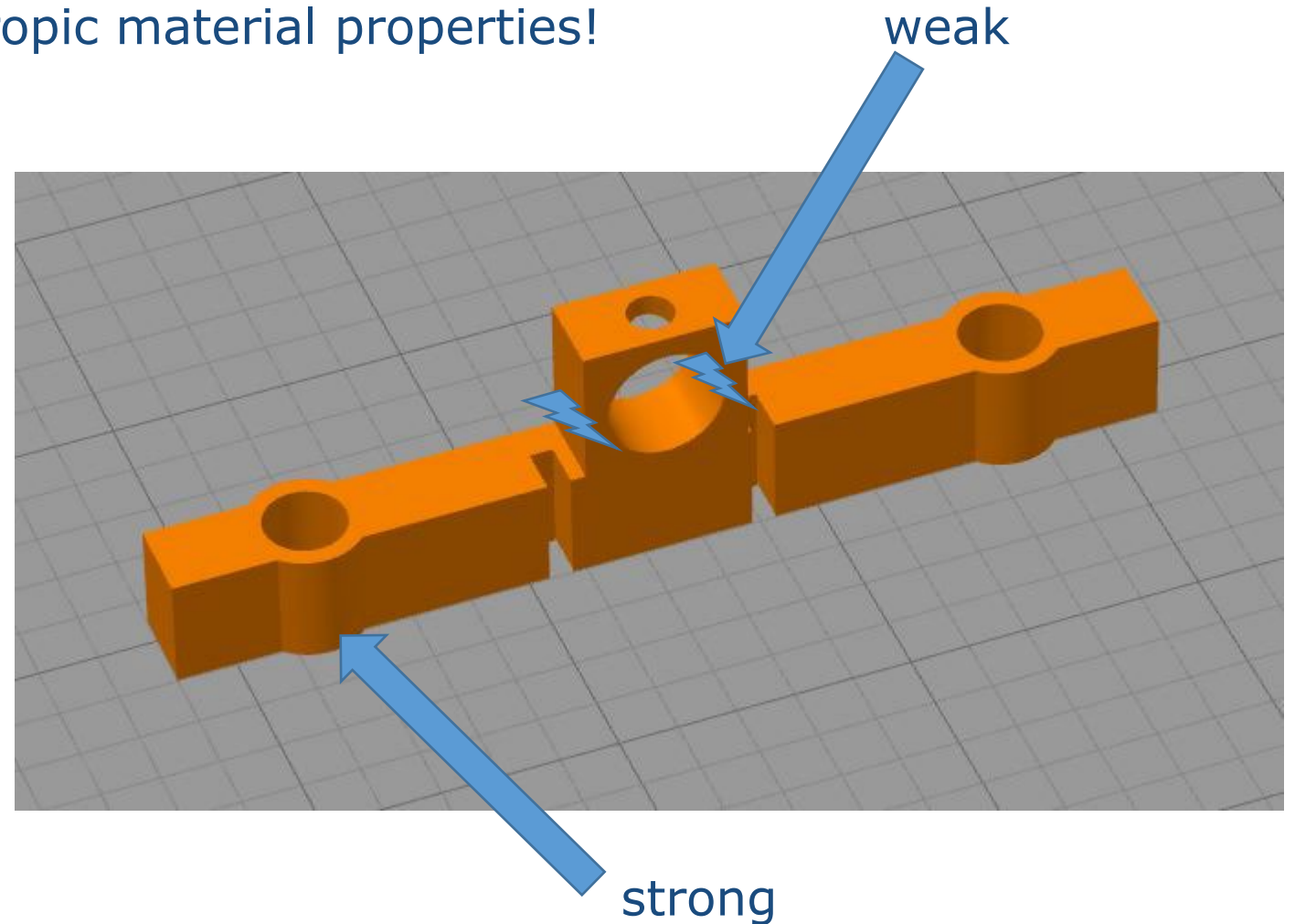
What do I have to pay attention to when designing?

**Important:** Be aware of the anisotropic material properties!

Connection to build board!

Align your drill holes!

Anisotropic material properties!





# Guidelines

What do I have to pay attention to when designing?

**Important:** Do not construct threads!

Connection to build board!

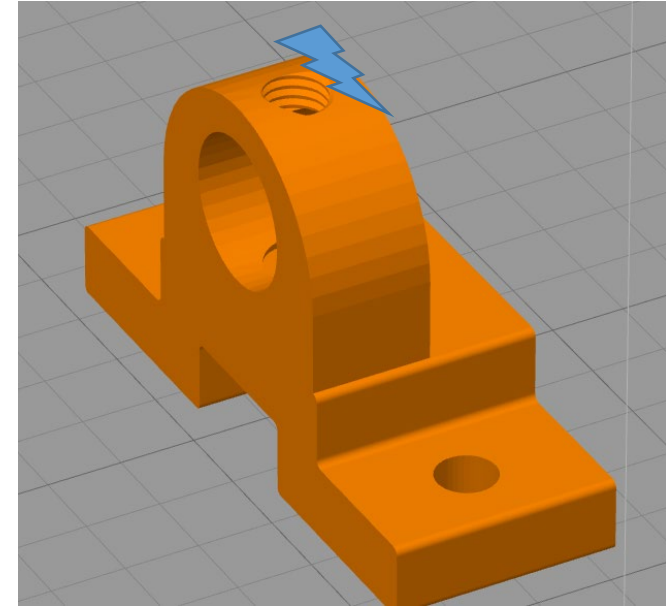
Align your drill holes!

Anisotropic material properties!

Cut threads after printing!

Gewinde	Kernlochbohrer
M 1	0,75
M 1,1	0,85
M 1,2	0,95
M 1,4	1,1
M 1,6	1,3
M 1,8	1,5
M 2	1,6
M 2,2	1,8
M 2,5	2,1
M 2,6	2,1
M 3	2,5
M 3,5	2,9
M 4	3,3
M 5	4,2
M 6	5
M 7	6
M 8	6,8

<http://www.moh-computer.de>



necessary hole diameter  
required thread



# Guidelines

What do I have to pay attention to when designing?

**Important:** Holes become smaller due to the manufacturing process!

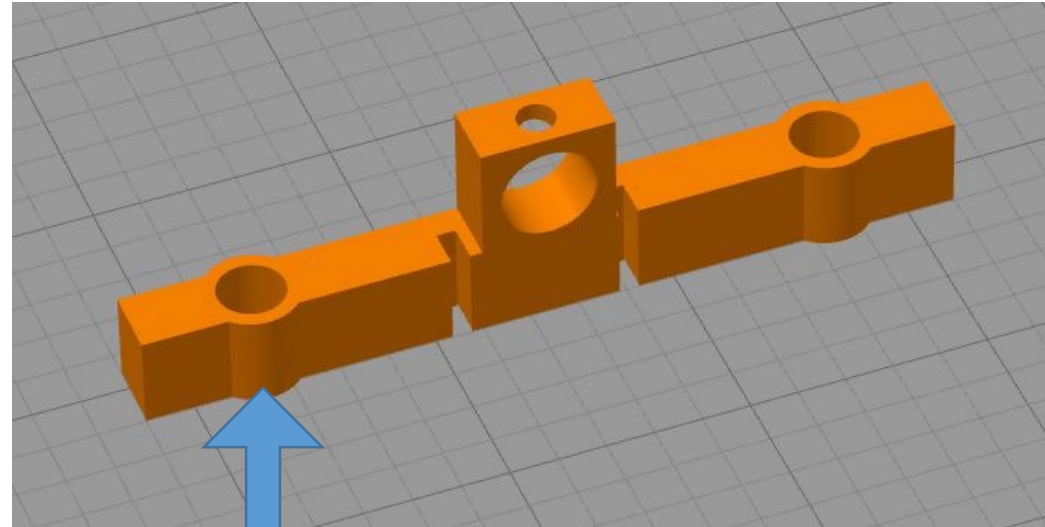
Connection to build board!

Align your drill holes!

Anisotropic material properties!

Cut threads after printing!

Design holes 0.2 mm larger!



in CAD: 6 mm

in real: 5,8 mm

# Guidelines

What do I have to pay attention to when designing?

**Important:** Do not print standard parts!

Connection to build board!

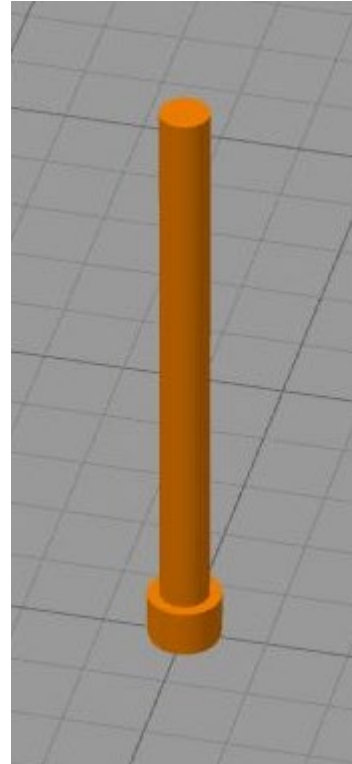
Align your drill holes!

Anisotropic material properties!

Cut threads after printing!

Design holes 0.2 mm larger!

Use standard parts!



Quelle: <https://www.voltus.de/>

# Guidelines

What do I have to pay attention to when designing?

**Important:** Do not design areas that are too thin!

Connection to build board!

Align your drill holes!

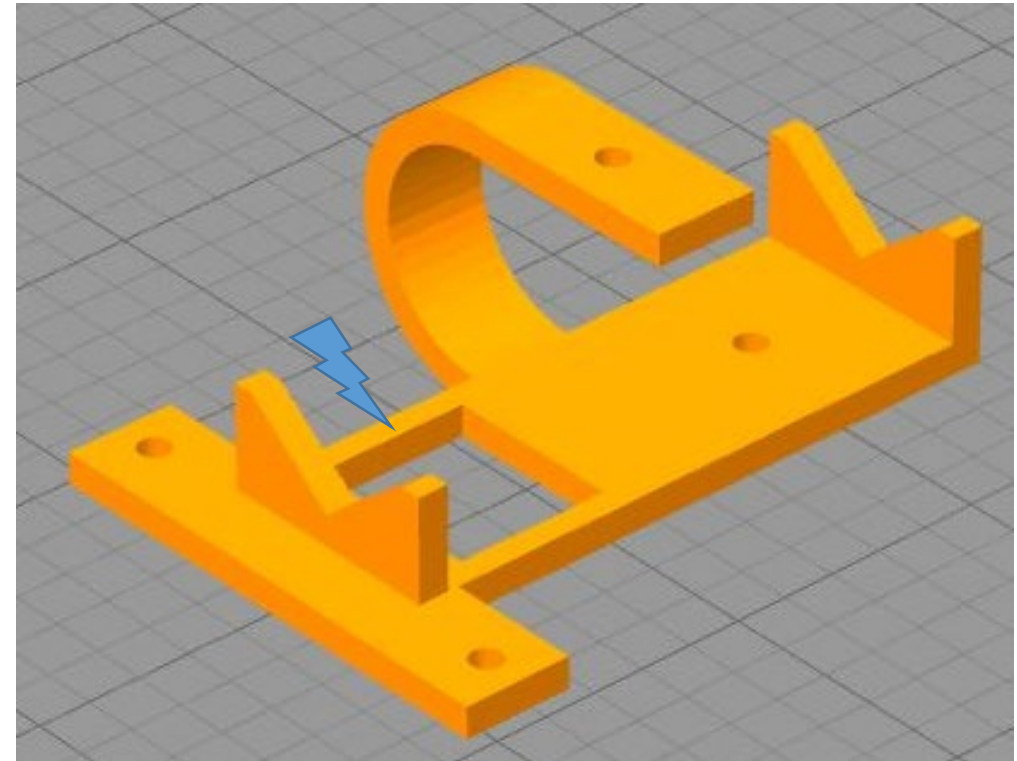
Anisotropic material properties!

Cut threads after printing!

Design holes 0.2 mm larger!

Use standard parts!

Attention to the wall thickness!



# Guidelines

What do I have to pay attention to when designing?

**Important:** Do not design sharp-edged transitions!

Connection to build board!

Align your drill holes!

Anisotropic material properties!

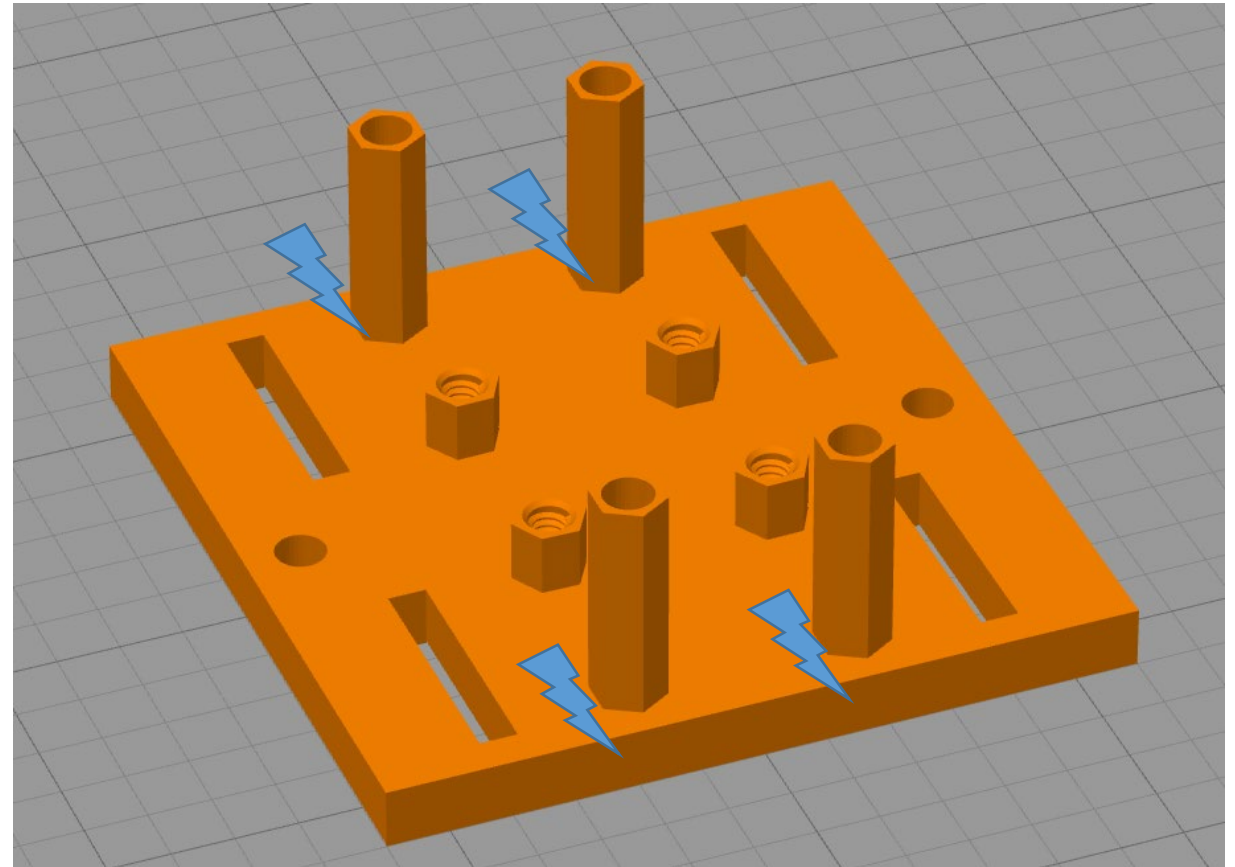
Cut threads after printing!

Design holes 0.2 mm larger!

Use standard parts!

Attention to the wall thickness!

Round off connections!



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# Building utensils

## pen plotter box

Designation	Specification	Quantity	Manufacturer	Image
Plug-in board	MB-102 Plug-in board 830 pins60320025	1	Eckstein Komponente	
Moto Driver	Qwiic Motor Driver	1	SparkFun	
7-Segment Serial Display Red	Thing Plus ESP32 WROOM WRL 17381	1	SparkFun	
Cable		65	Keyestudio	
lithium battery + cable		1	SparkFun	
Motors	DAGU - DG01D 48:1 - Mini DC GearBox	2	SparkFun	
Power supply unit	Breadboard Power Supply TS1171	1	QITA	
base plate	305x305x15 mm	1	Holzland	
Hall effect sensor	Module magnetic detector 49E LM393TS0145	1	Eckstein Komponente	

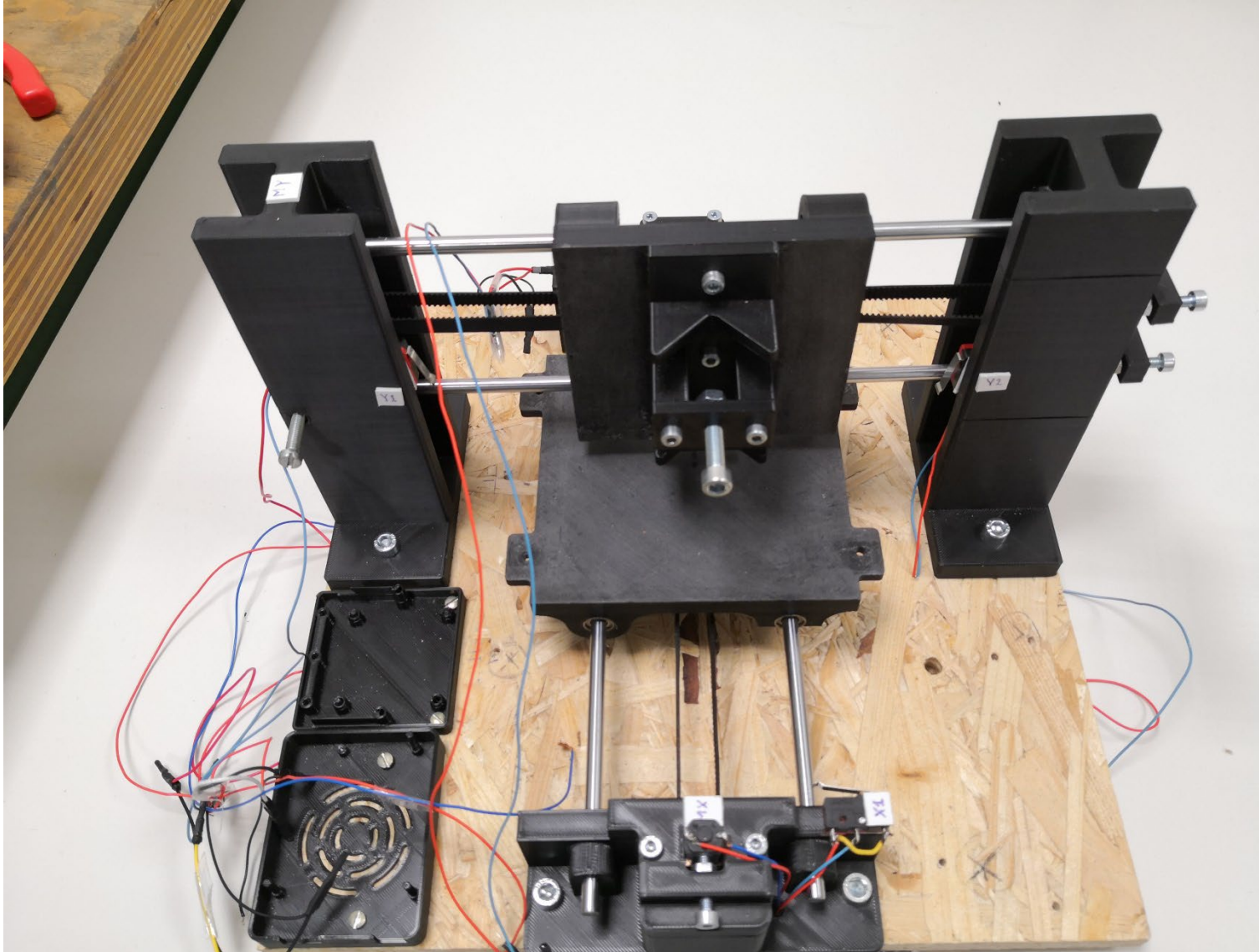
Microswitch red	XSS-5GL13	4	amazon	
Belt	T2 2mm pitch 6mm wide rubber timing belt	2m	amazon	
Linear ball bearing	LMU-N6	8	Misumi	
Push button	15 / length 24 [mm]	1	amazon	
Shafts	d6 x 300mm	4	Misumi	
Storage box		1		

- bolts and nuts:
- use standard machine screws (i.e socket head, hexagon,
  - M4 x (8, 10, 12, 16, 20, 25)
  - M5 x (10, 12, 16, 20, 25, 30)
  - M6 x (16, 20, 25, 30, 35)



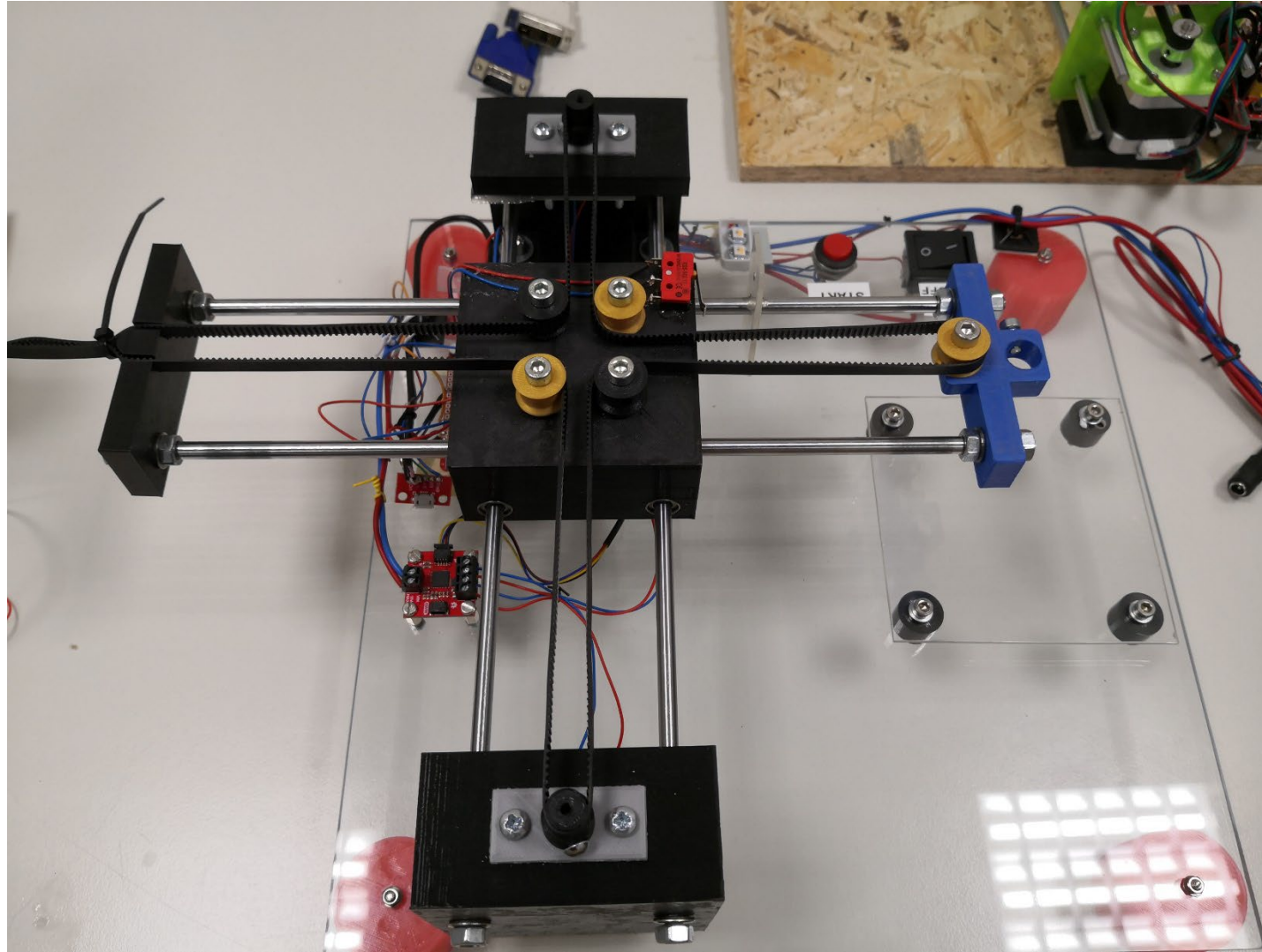


# Pen-Plotter

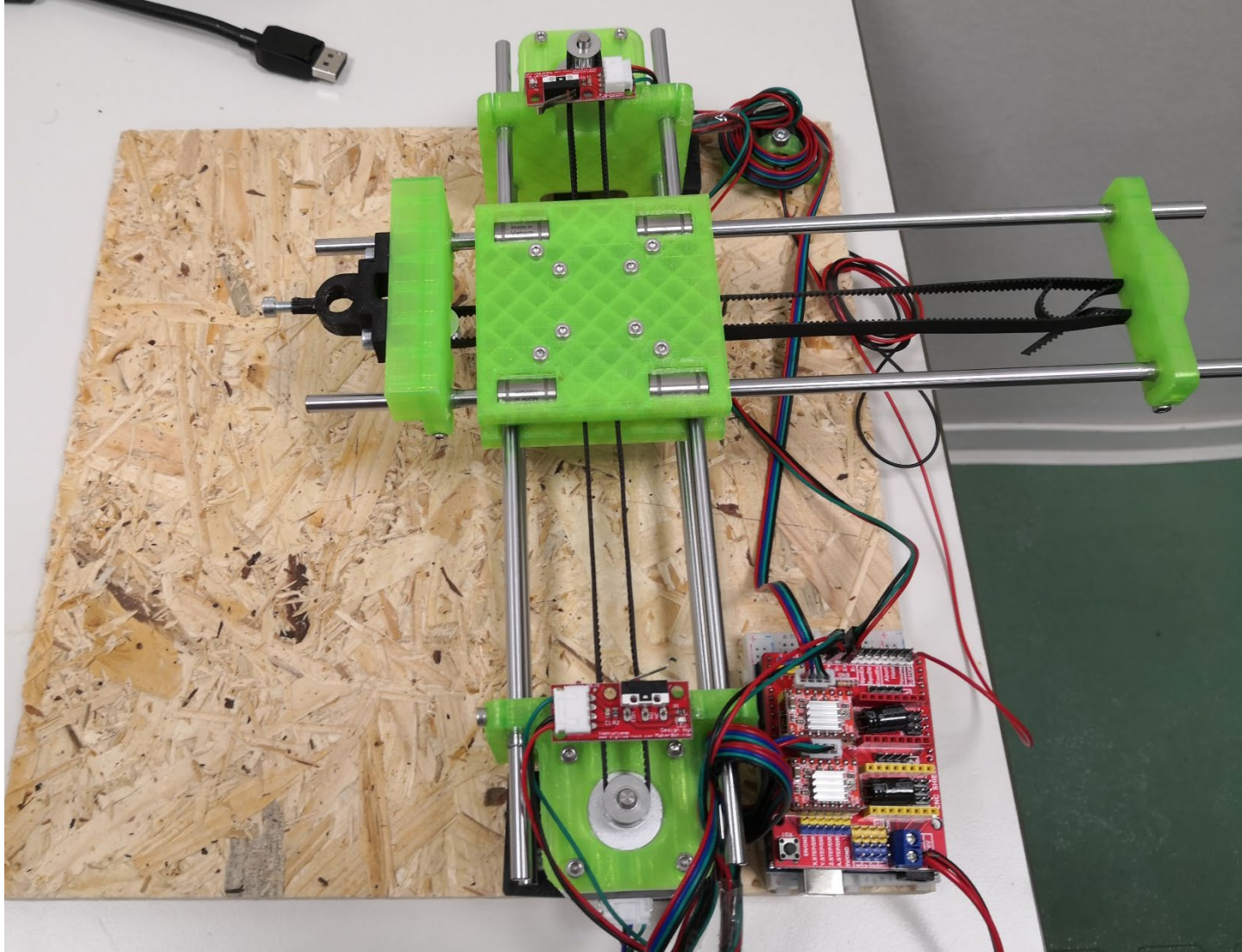




# Pen-Plotter



# Pen-Plotter



# Thank you for your attention