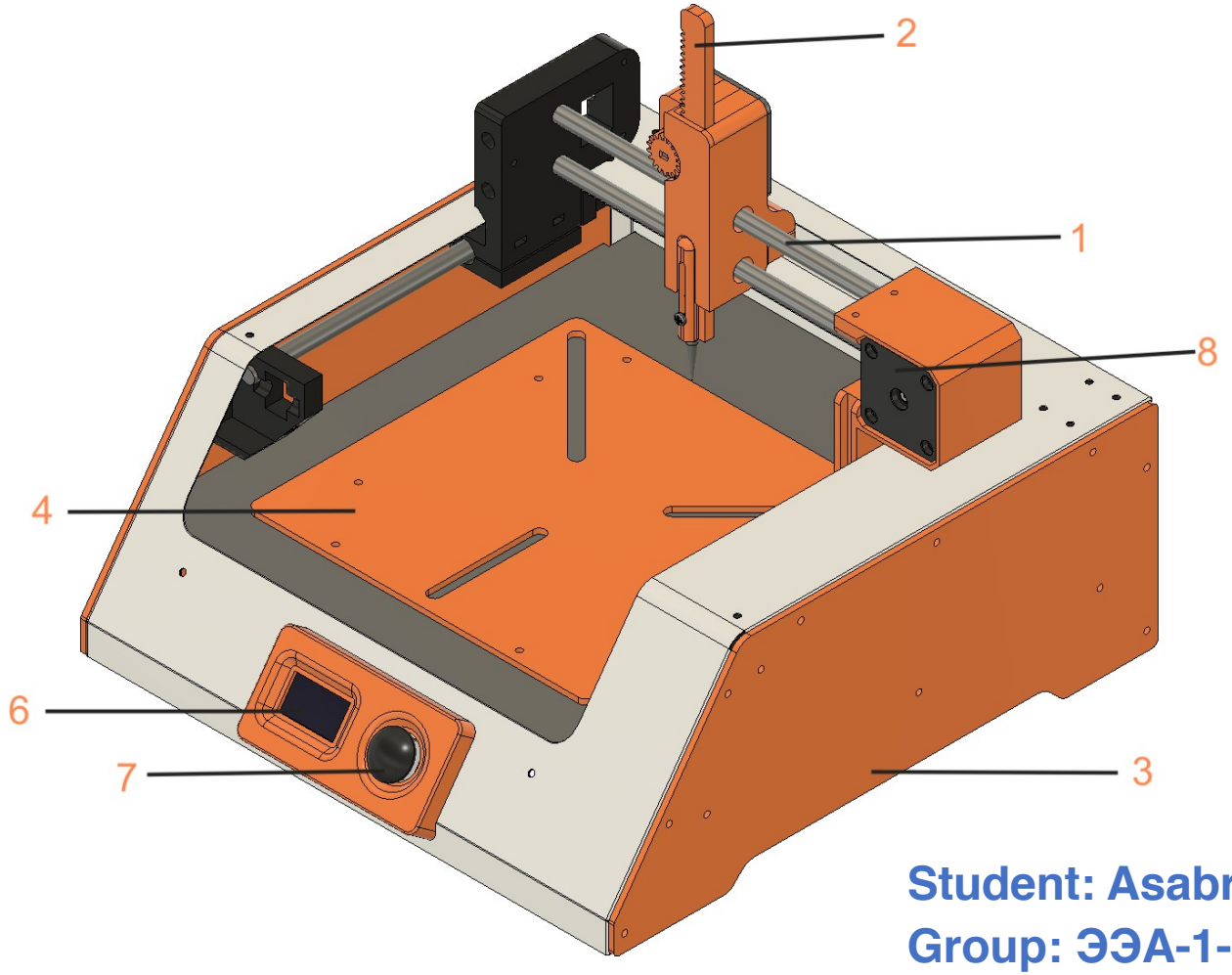
DEVELOPMENT OF THE MEASURING PART OF THE DEVICE FOR AUTOMATIC CONTROL OF ELECTRICAL MODES OF PRINTED CIRCUIT BOARDS



Student: Asabre Ebenezer
Group: ЭЭА-1-15
Supervisor: Kaminskii Stanislav S.

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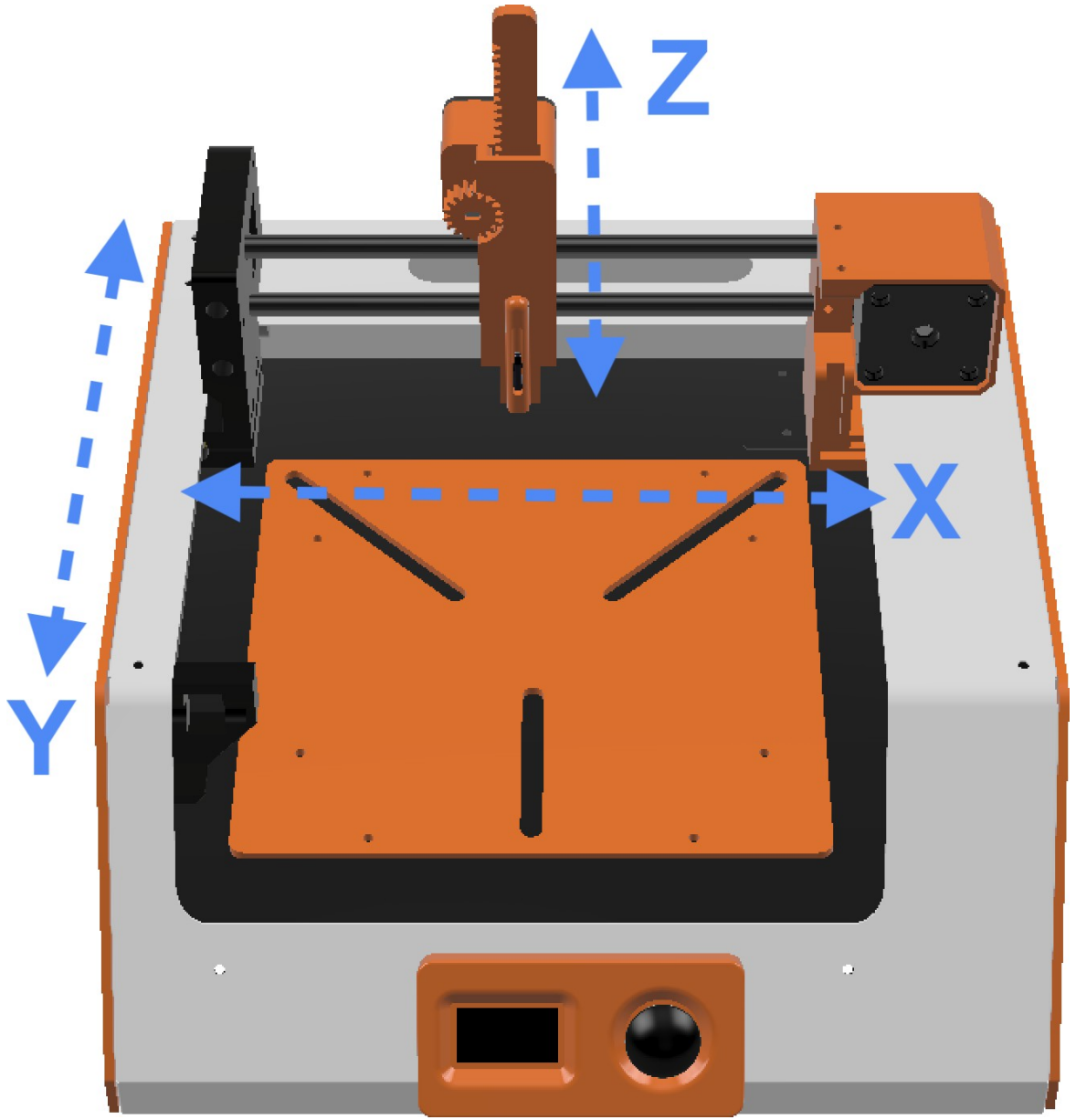
CONTROL DEVICE



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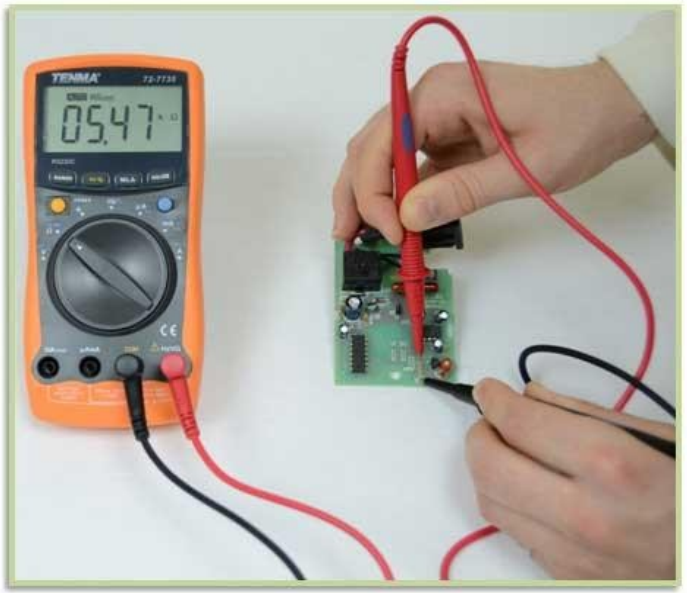
Device Purpose

This device allows testing of printed circuit boards in medium and small production volumes without the need to invest in expensive equipment.

A large and expensive device for testing printed circuits



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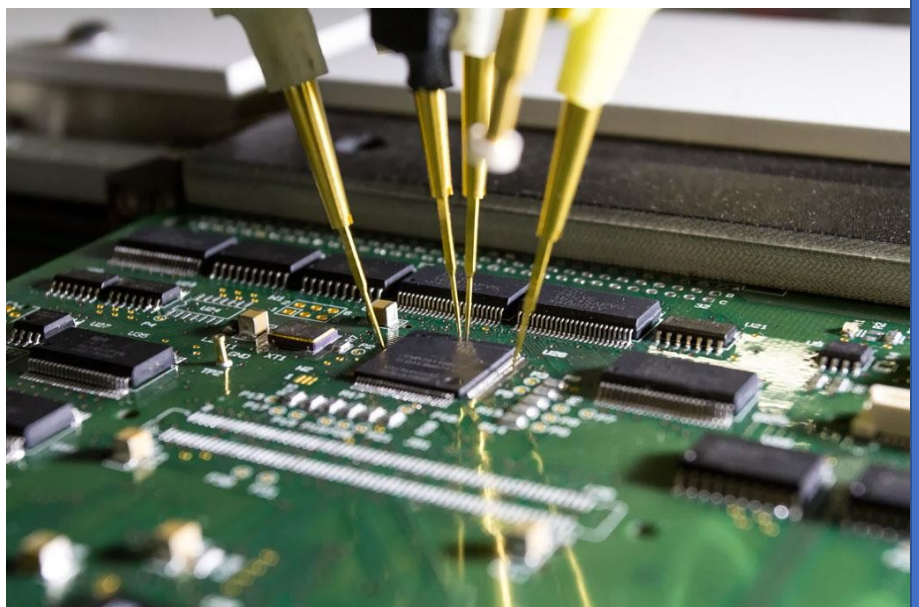

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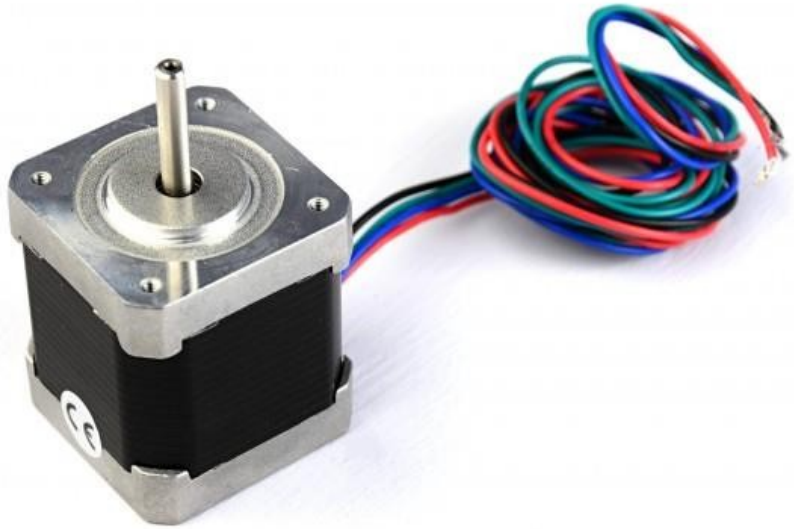
Selecting the motor for the control device

Or



DC motor with encoder

Stepper motor

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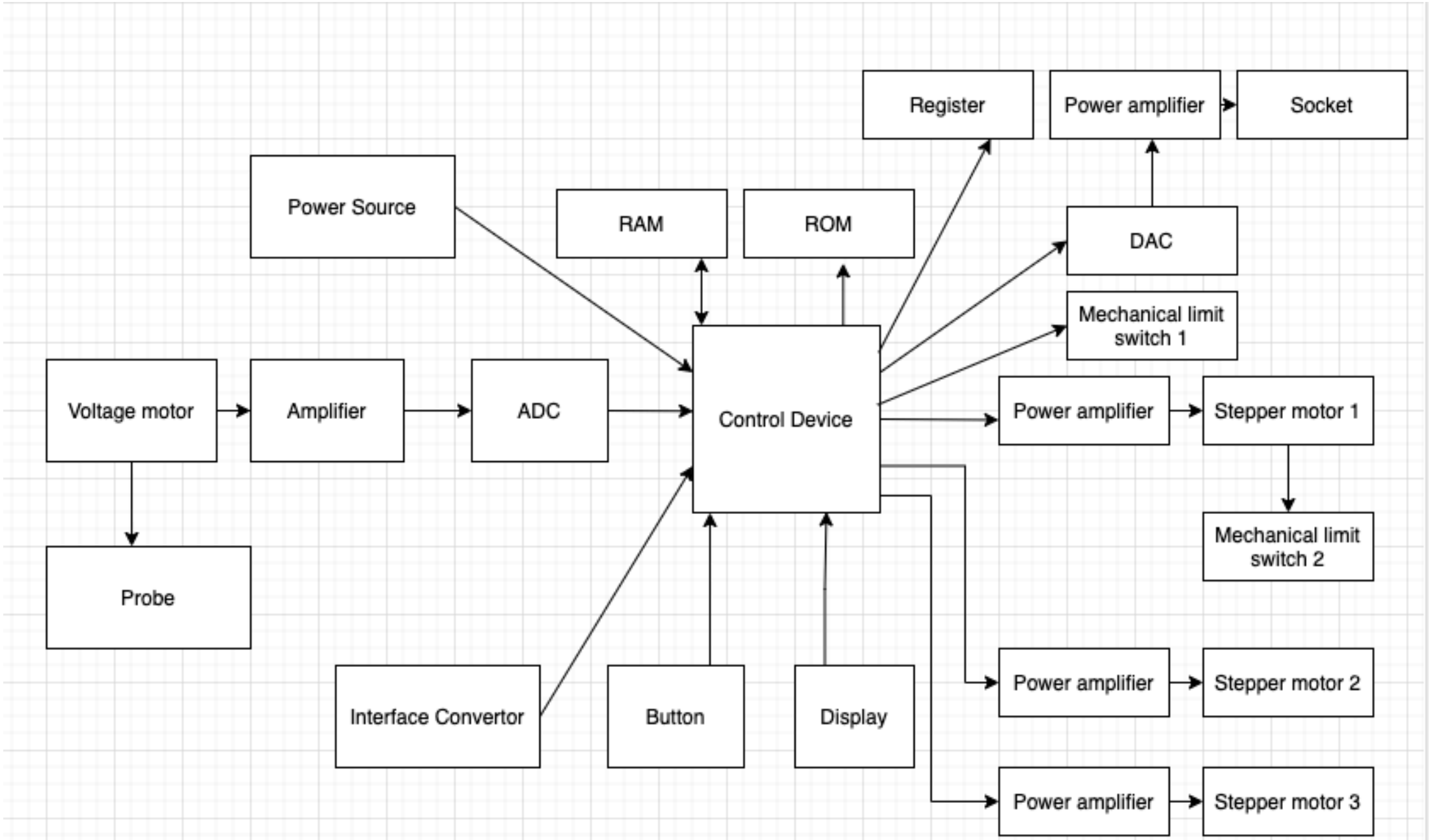
FLOW DIAGRAM OF DEVICE



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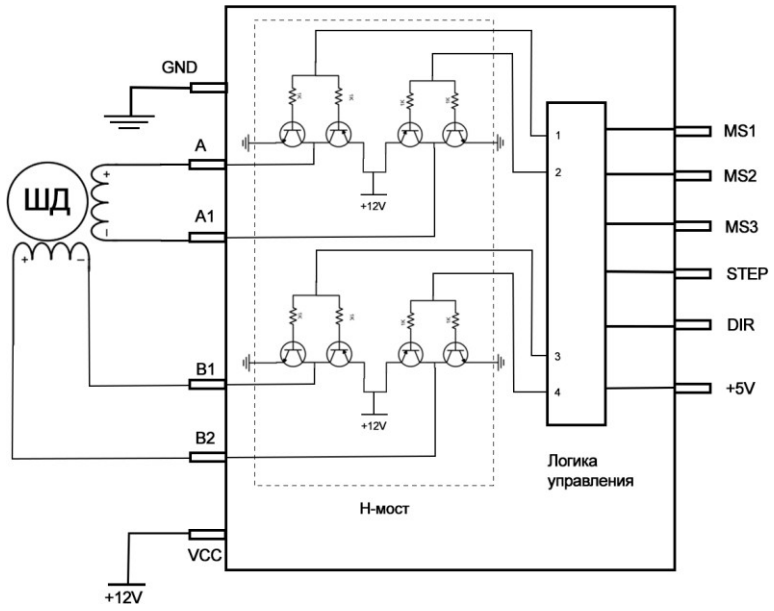
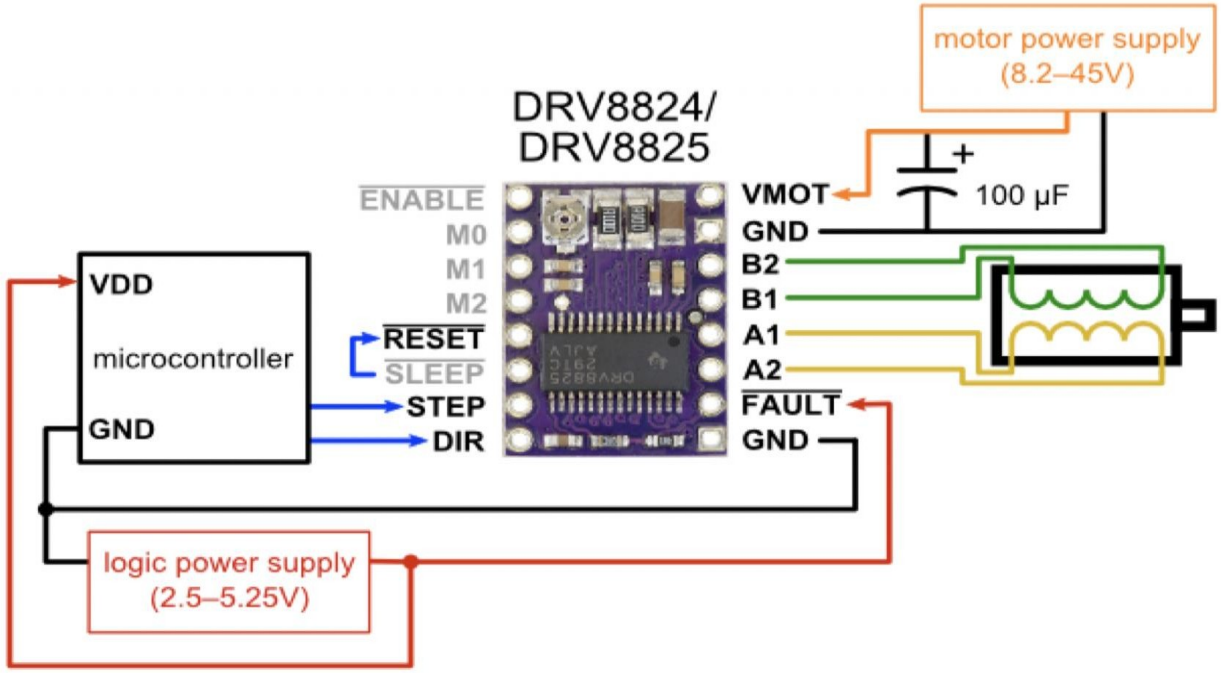
Schematic diagram for motor control

DRV8824





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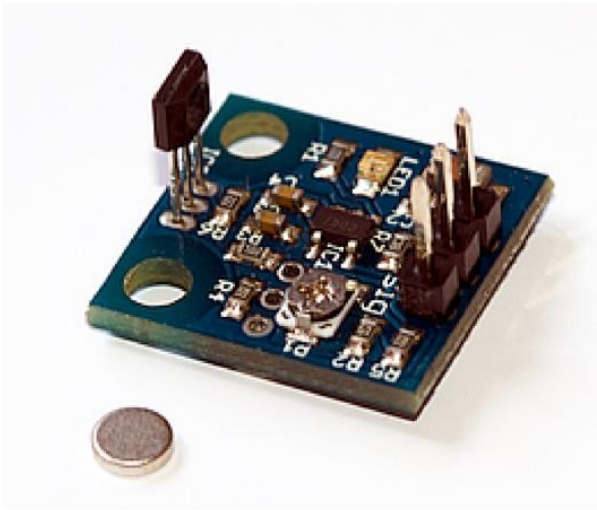
Device development

Optical limit switch

Mechanical limit switch



Magnetic limit switch

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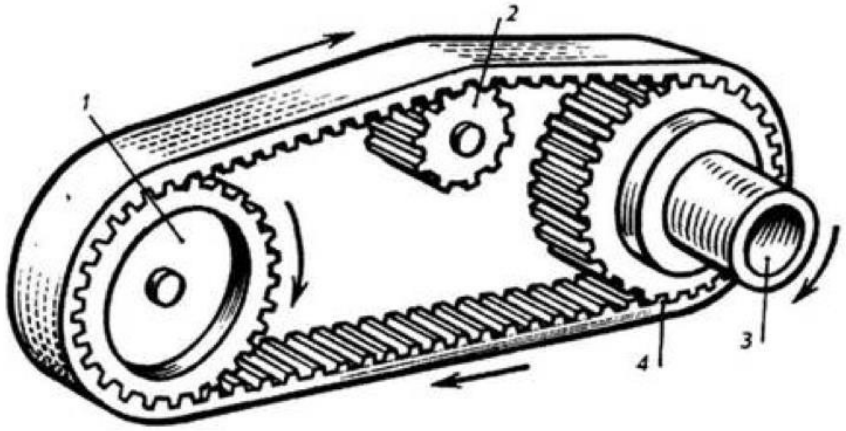
Suitable mechanical transmissions

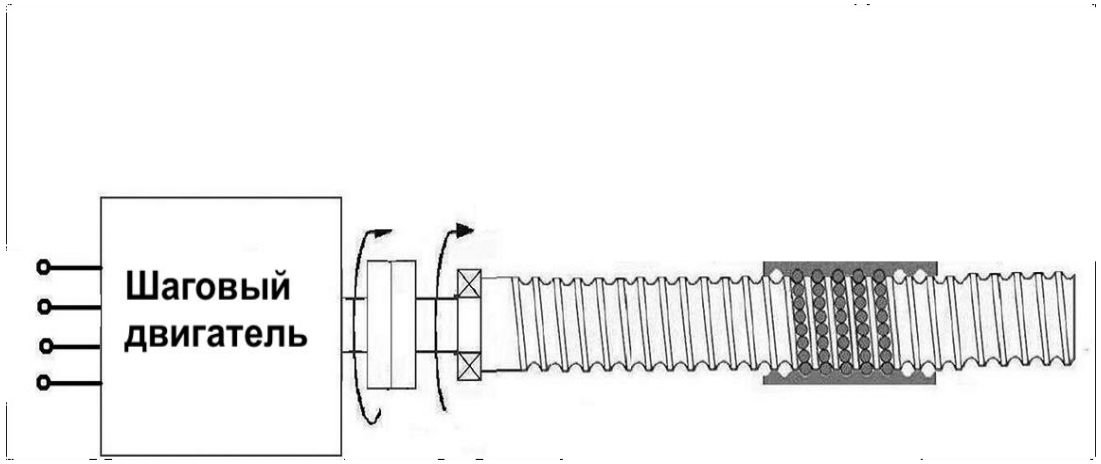
Belt Transmission



1)Faster

2)Low torque

Spiral transmission



1) Slower

2) High torque

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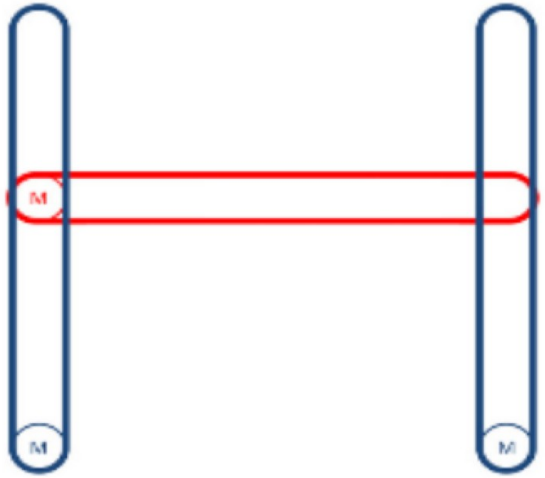
Developing a scheme of a two-axis motion system

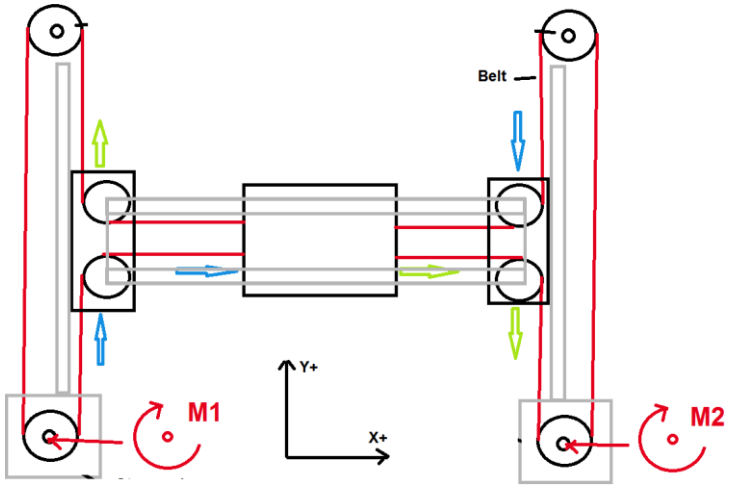
1. Linear guide rails

2. Steel rod with bearings

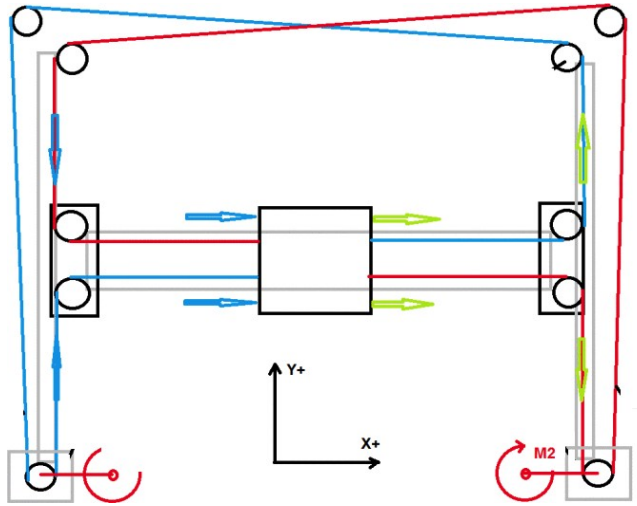
3. Aluminium profile with bearings



Cartesian base system



«H-bot»



«CoreXY»

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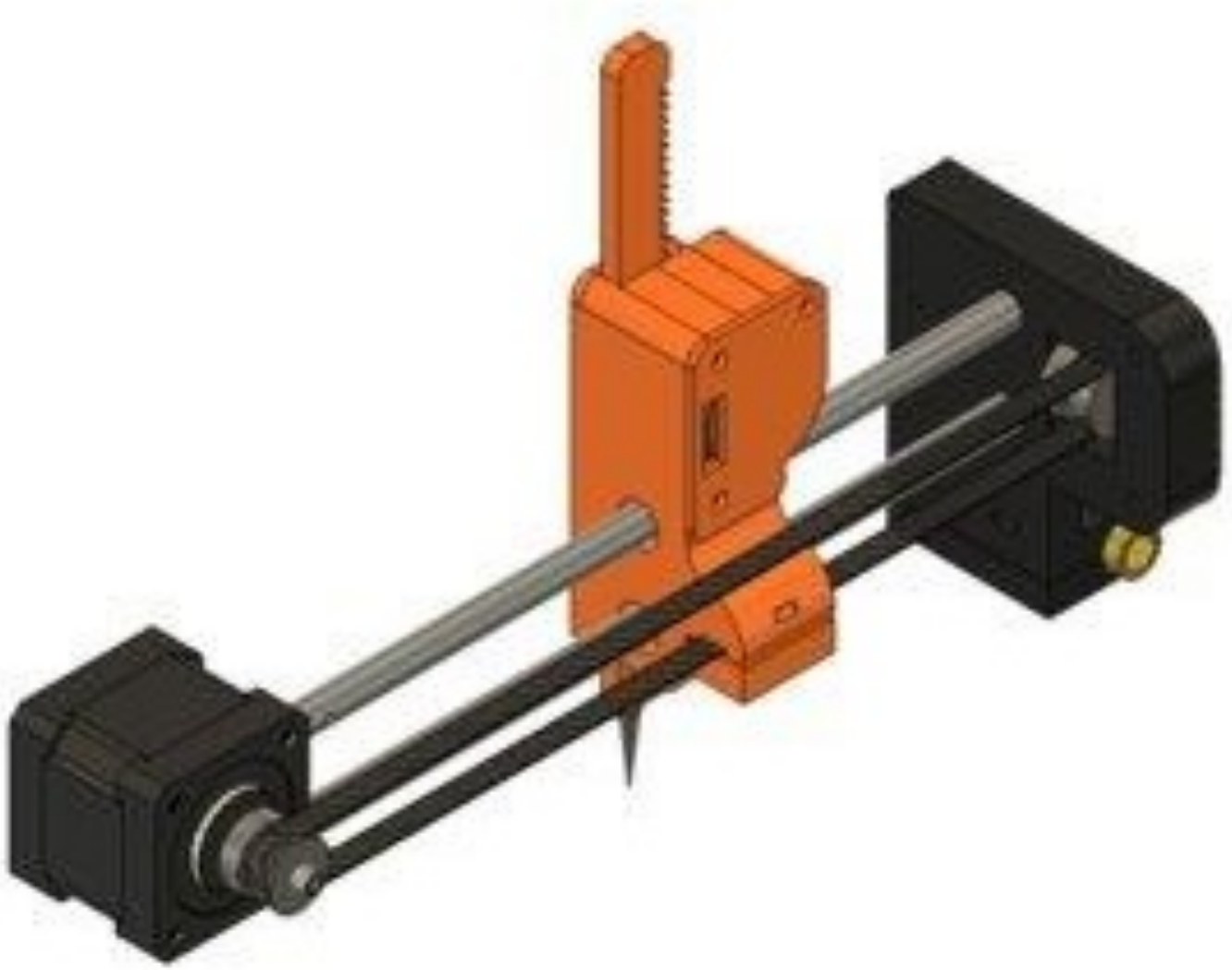
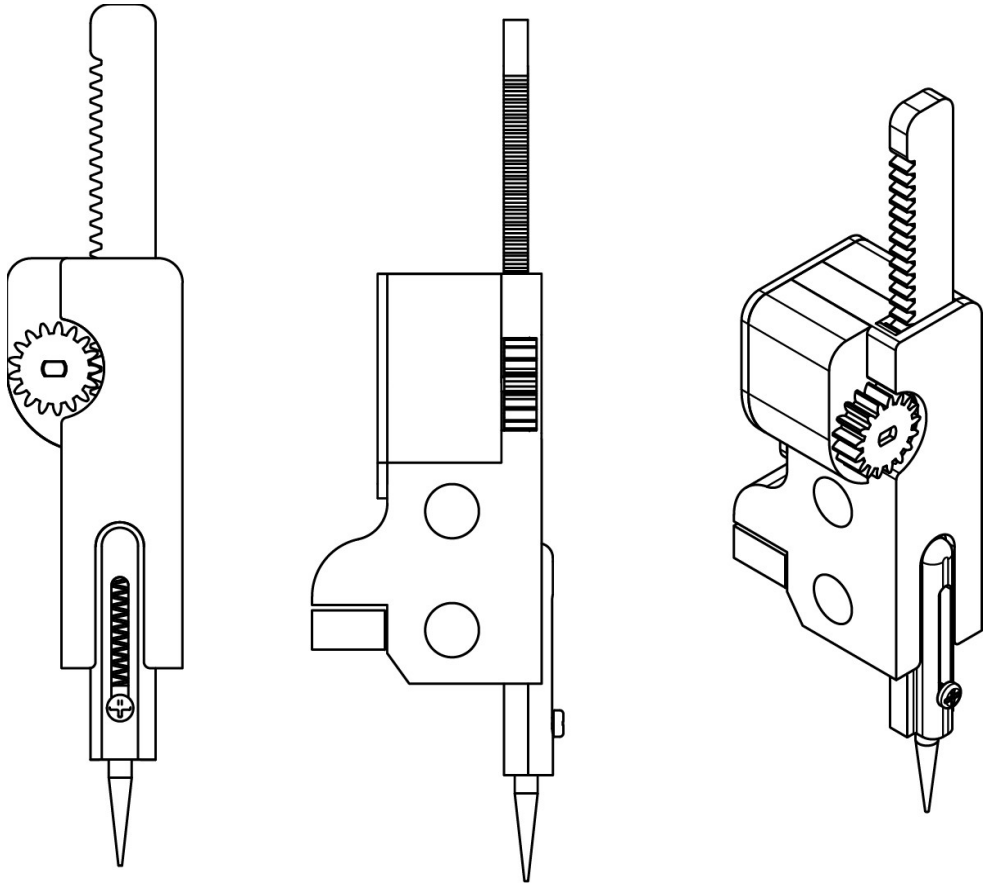
Motor control diagram

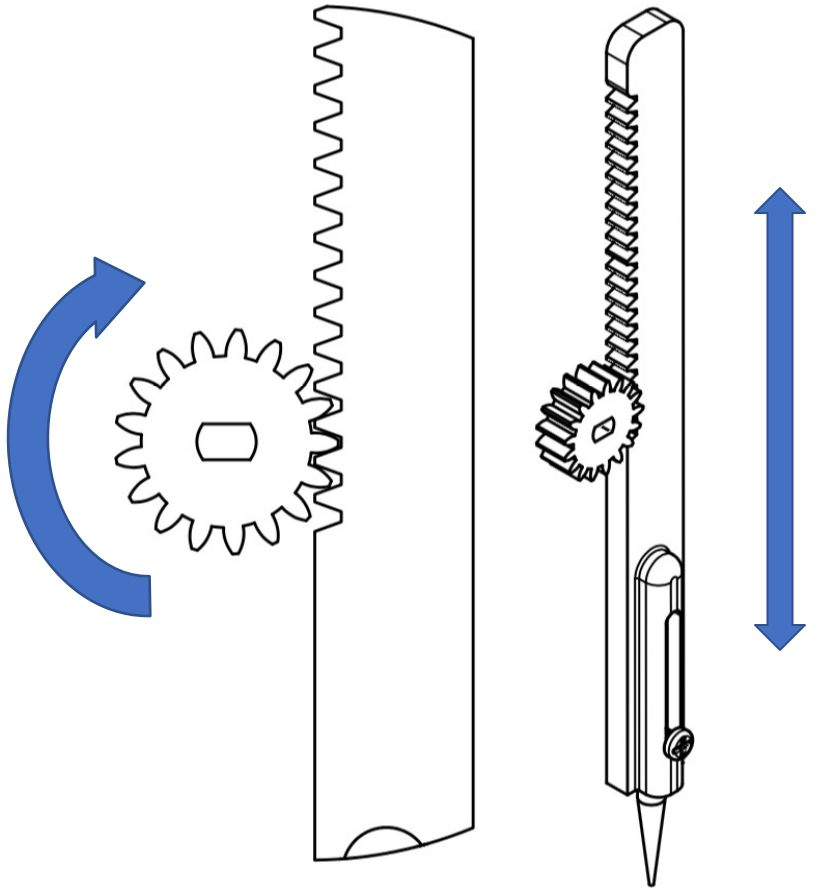


ось «X» control device

Probe mechanism



Principle of operation



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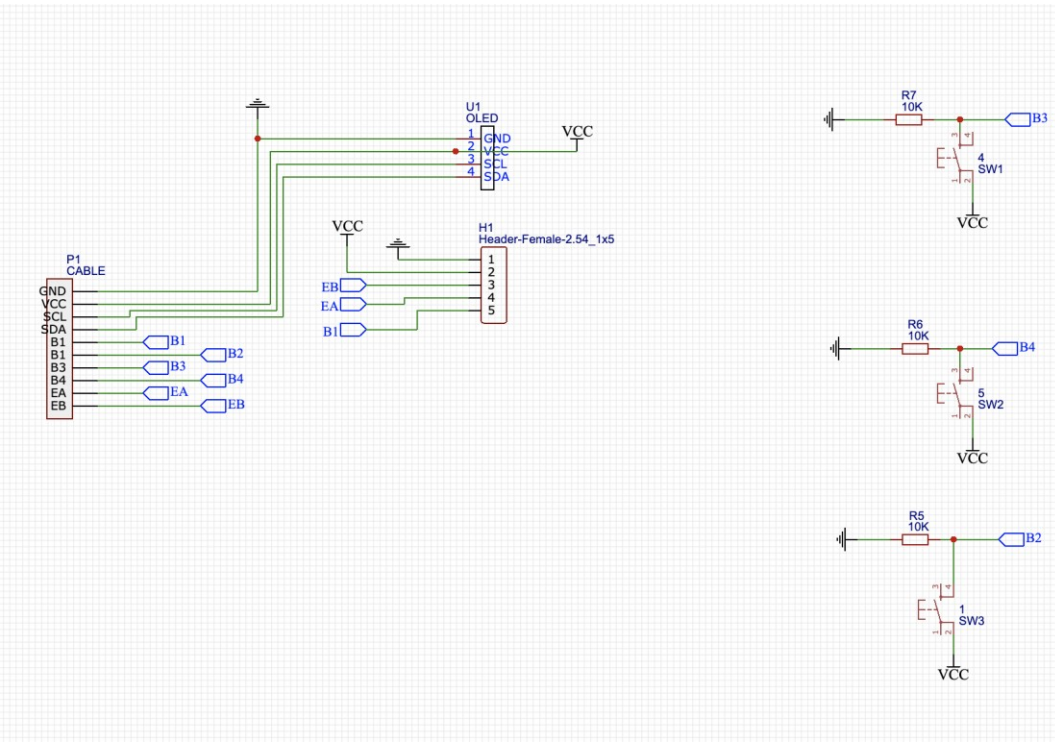
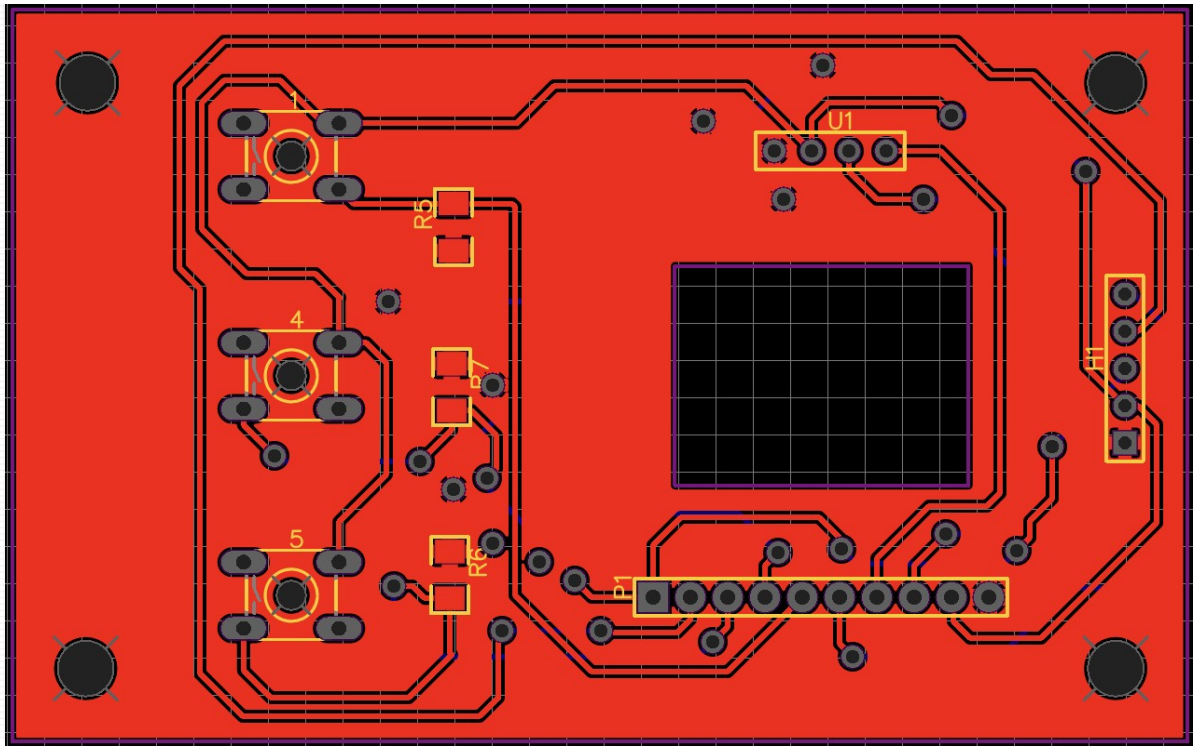
Circuit design for "OLED" display, joystick and buttons





Printed Circuit Board

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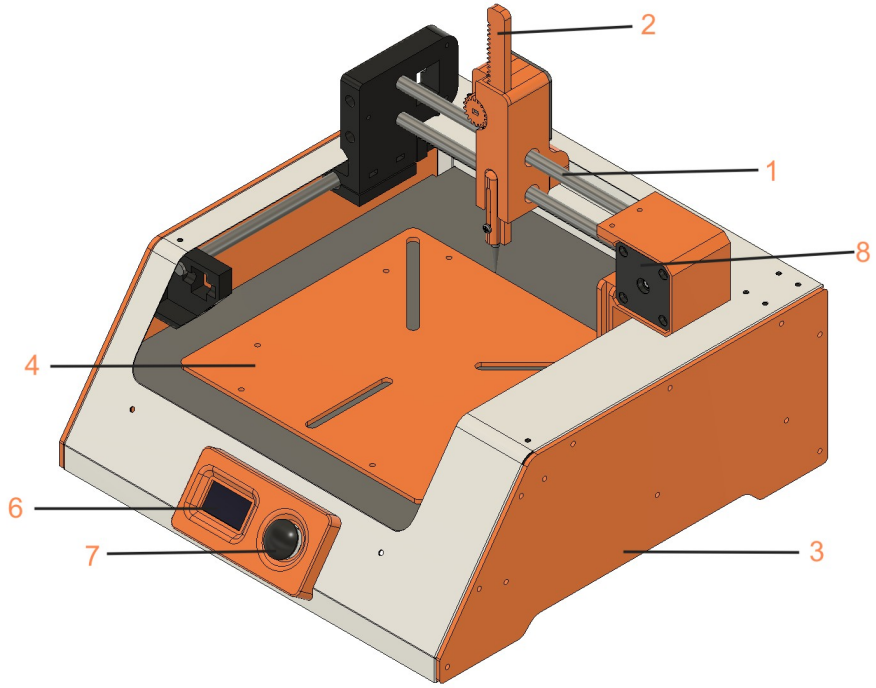

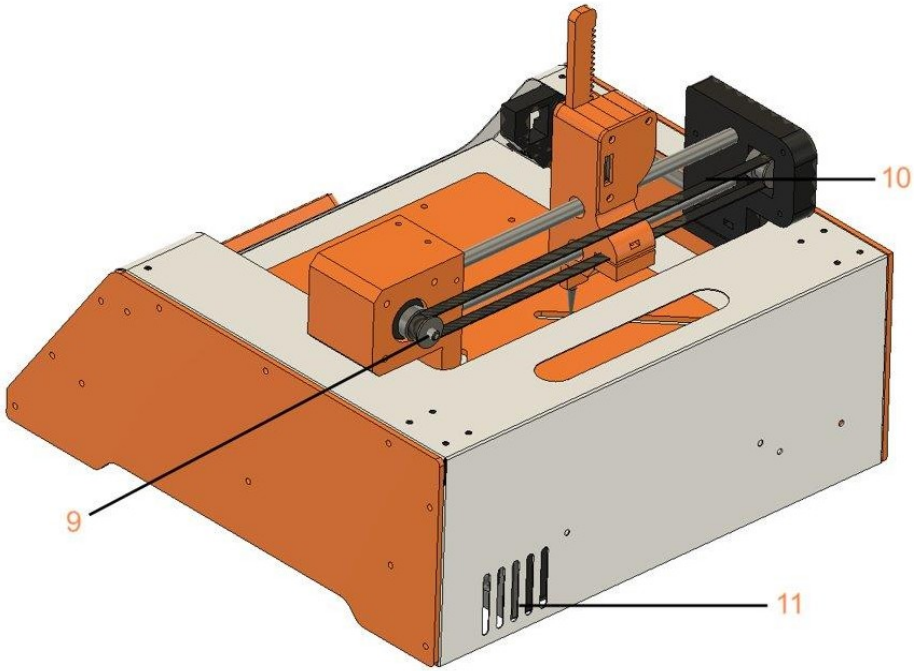

Developed device

1. Steel rod for moving axle
2. Working body probe
3. Tool body
4. Guard for printed circuit boards
5. Switch
6. LCD screen
7. Buttons for axis control
8. Stepper motor for moving axis
9. Toothed pulley for belt transmission
10. Belt
11. Fan
12. Optical end sensor

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The results of the work

1) Developed schematic diagram of the printed circuit board control device;
2) Described the usage of the device to test multiple printed circuit boards;
3) Reviewed the principle of operation and basic properties of stepper motors;
4) Thee choice of motor was made based on the result of the comparison of stepper motors with conventional DC motor;
5) Solved the issue of stepper motor control;
6) Reviewed the schematics of two-axis motion system;
7) Reviewed types of mechanical gears that convert rotary motion into linear motion;
8) Designed and manufactured the printed circuit board for the OLED display;
9) Designed and constructed the entire device, including, housing, two-axis mechanism for vertical and horizontal motion of the probe.

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Thank you for listening

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