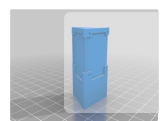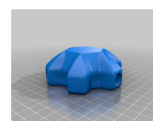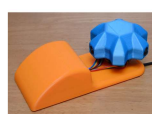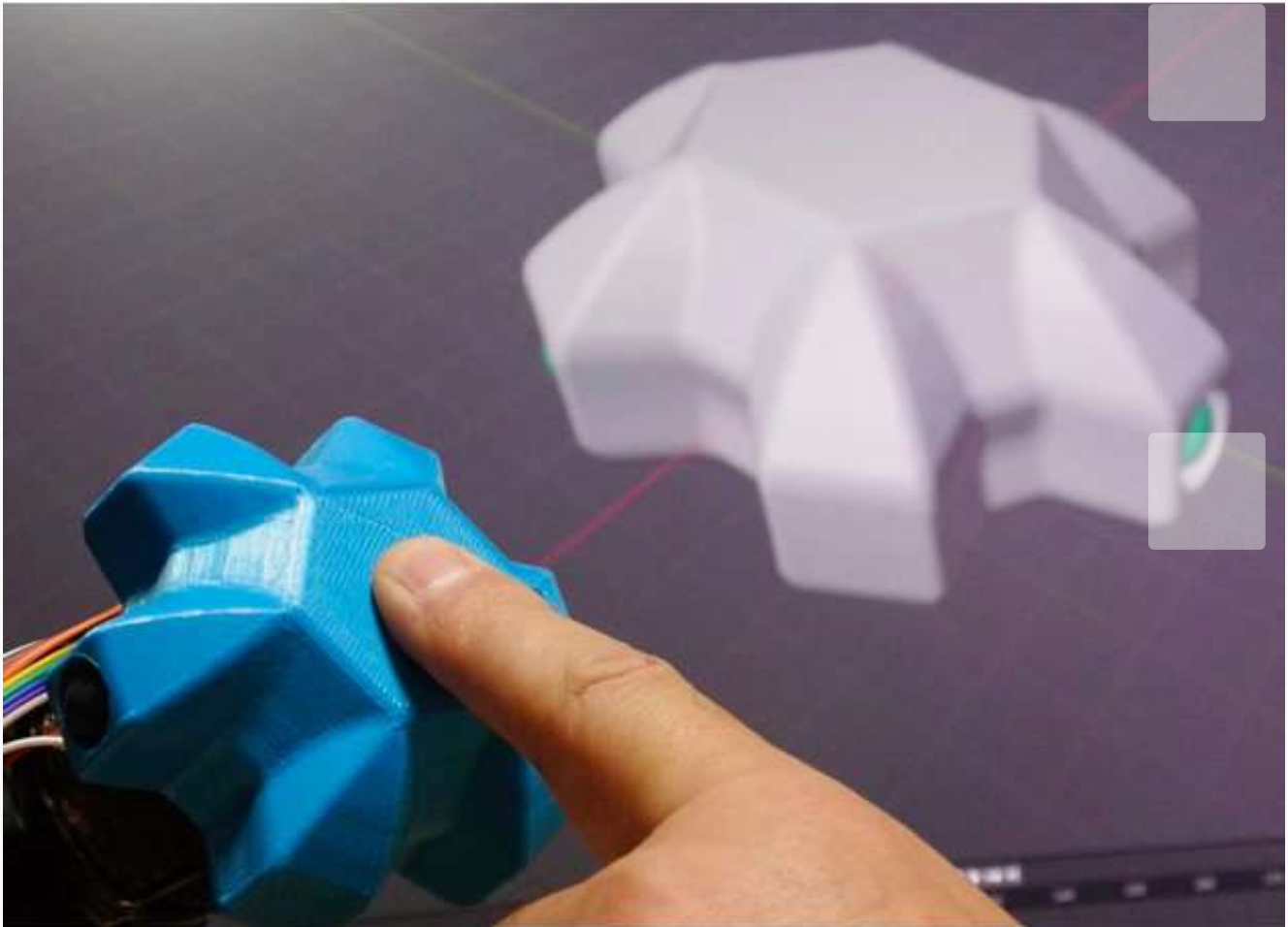# Space Mushroom : Full 6 DOFs Space Mouse

by shiura December 24, 2022

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Summary

Very simple and easy to assemble 3D space mouse. It can input full 6 degrees of freedom (rigid motion) simultaneously.

- Very easy to assemble.
- Tripod mount (thread hole) is on the bottom side of the triangle shaft.
- Two types of base (tilted and horizontal types) are provided (personally I prefer tilted type.)

Note : My first code (mouse.ino) is tuned for Blender on ARM based Mac. It handles very frequent change of keyboard / mouse button operation correctly. modifications or tunings (ex

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environment.

Note (Jan 1, 2023) : Code with conservative mouse operation (no frequent button press / release) is added. Please try "mouse-conservative.ino". You can configure this code for your app by modifying not "the code" but "table". Currently it has no function to switch between multiple apps, but it can be easily modified.

Video

3D Printed Full 6 DOFs Sp...

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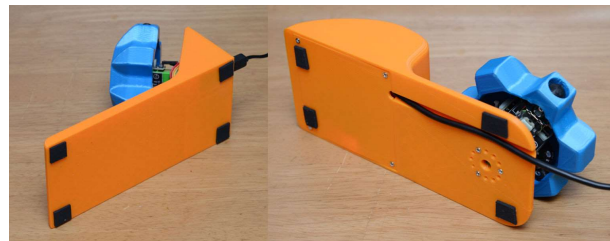
Custom Section

You need

- Three analog joystick sensors with board. I used
  https://www.amazon.co.jp/dp/B082M4V5S9
- "pro micro" (ATmega 32U4 based micro
  controller, Arduino Leonardo compatible)
- 2mm tapping screws with various lengths

It needs **various length of 2mm tapping screws**.
It is recommended to purchase an assortment of
2mm tapping screws.
Please search in amazon.com with words
"m2 tapping screw assortment".

Tips

- Print three copies of "ball-joint.stl".
- Support structure is necessary to print "knob.stl".
  If you set it upside down on the build plate,
  support structure might be not necessary.
- Select adequate length of screws. For "ball-
  joint.stl", shortest screws (M2 x 4mm) are
  recommended.
- Currently the code does not use the tactile
  switches of the joystick controller.
- The model is 120 degrees rotation symmetric.
  My code assumes [sensor 1 = at 2 o'clock],
  [sensor 2 = at 10 o'clock] and [sensor 3 = at 6
  o'clock].
- Connection of sensors and pro micro are as
  follos. [Sensor 1 to A0 and A1], [sensor 2 to A2
  and A3] and [sensor 3 to A6 and A7]. These are
  defined in the source code.

- For tilted version, pro micro board is fixed by the inner structure and the hole of the cover.
- For horizontal version, pro micro board is stored with the connector of microUSB in the housing space.

Stick rubber pieces to increase the friction.

Please edit the **RED TEXT** in the source code to use it with your applications.

```
if(abs(mv[RX]) > DEAD_THRES || abs(mv[RY]) > DEAD_THRES) {
    Mouse.press(MOUSE_MIDDLE);
    move(mv[RX], mv[RY], 0);
    Mouse.release(MOUSE_MIDDLE);
}

if(abs(mv[TX]) > DEAD_THRES || abs(mv[TY]) > DEAD_THRES) {
    Keyboard.press(KEY_LEFT_SHIFT);
    Mouse.press(MOUSE_MIDDLE);
    move(mv[TX], mv[TY], 0);
    Keyboard.releaseAll();
    Mouse.release(MOUSE_MIDDLE);
}

if(abs(mv[TZ]) > DEAD_THRES) {
    Keyboard.press(KEY_LEFT_CTRL);
    Mouse.press(MOUSE_MIDDLE);
    move(0, mv[TZ], 0);
    Keyboard.releaseAll();
    Mouse.release(MOUSE_MIDDLE);
}
```

```
Usable options:
Mouse buttons : MOUSE_LEFT, MOUSE_RIGHT, MOUSE_MIDDLE
Modifier Keys : KEY_LEFT_CTRL, KEY_RIGHT_CTRL,
                KEY_LEFT_SHIFT, KEY_RIGHT_SHIFT,
                KEY_LEFT_ALT, KEY_RIGHT_ALT, ("Option" of mac)
                KEY_LEFT_GUI, KEY_RIGHT_GUI ("Command" of mac)
```

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