USB-C Potentiometer

10 kΩ linear, absolute-position rotary input

1.1 Description

The board converts a knob position into a digital value from 0 to 255 and reports it to a host over USB. Use it to set a level, such as volume or display brightness. The shaft retains its position when power is removed.

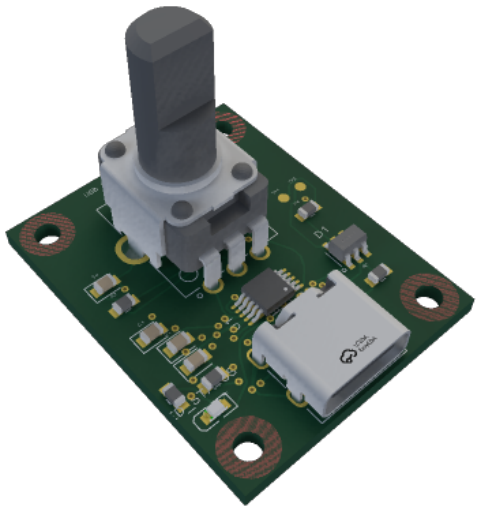


Figure 1. Populated board, knob removed.

1.2 Features

- 300° nominal travel with mechanical end stops
- Ø6 mm knurled shaft for a press-fit knob
- USB-C data and power through one connector
- Four M2 mounting holes for enclosure installation

1.3 Device specifications

Parameter	Specification
Sensing element	Alps Alpine RK09K1130D62, 10 kΩ, linear taper
Mechanical travel	300° ±5°
Digital output	8-bit absolute position, 0 to 255 counts
USB interface	USB serial at 115200 baud; DTR asserted
PCB outline	24 × 30 × 1.6 mm
Design identification	basic-usbc-devices v0.0.8, PCB source commit 92ca17f

1.4 Using the board

Connect a USB-C data cable. In the device console, choose Add device › Potentiometer. Turn the shaft to see the raw count and percentage. For a custom host, see page 2.

Device console **Board guide** **Versioned PCB source**

2 USB serial protocol

2.1 Connection

Open the USB serial port at 115200 baud and assert DTR. Send each ASCII command on its own line, ending in LF. Position reports can arrive between command replies.

2.2 Command reference

Command	Operation	Reply
`id`	Identify the board and firmware.	DEVICE tscircuit potentiometer 1.0.0
`help`	List the supported commands.	One line of command syntax
`status`	Request the current reading.	One JSON position report
`led on`	Turn the status LED on.	OK led=on
`led off`	Turn the status LED off.	OK led=off

Unknown commands return ERR unknown command. Malformed lines return ERR invalid command.

2.3 Streamed position report

The firmware averages eight samples and sends a report when the averaged count changes. If the reading is steady, it repeats the report about every 250 ms.

```
{"module":"position","raw":128,"max":255,"uptime_ms":1000,"led":0}
```

Field	Meaning
`module`	Always "position" for this report.
`raw / max`	Absolute reading and full-scale count. Firmware v1.0.0 reports max = 255.
`uptime_ms`	Milliseconds since the board powered up.
`led`	1 when the indicator is on; 0 when it is off.

Convert a reading to percent using 100 × raw / max. For example, 128 / 255 is about 50.2%.

3 Mechanical information

3.1 Assembly and mounting drawing

Dimensions in millimeters. Use the stated dimensions to lay out the enclosure.

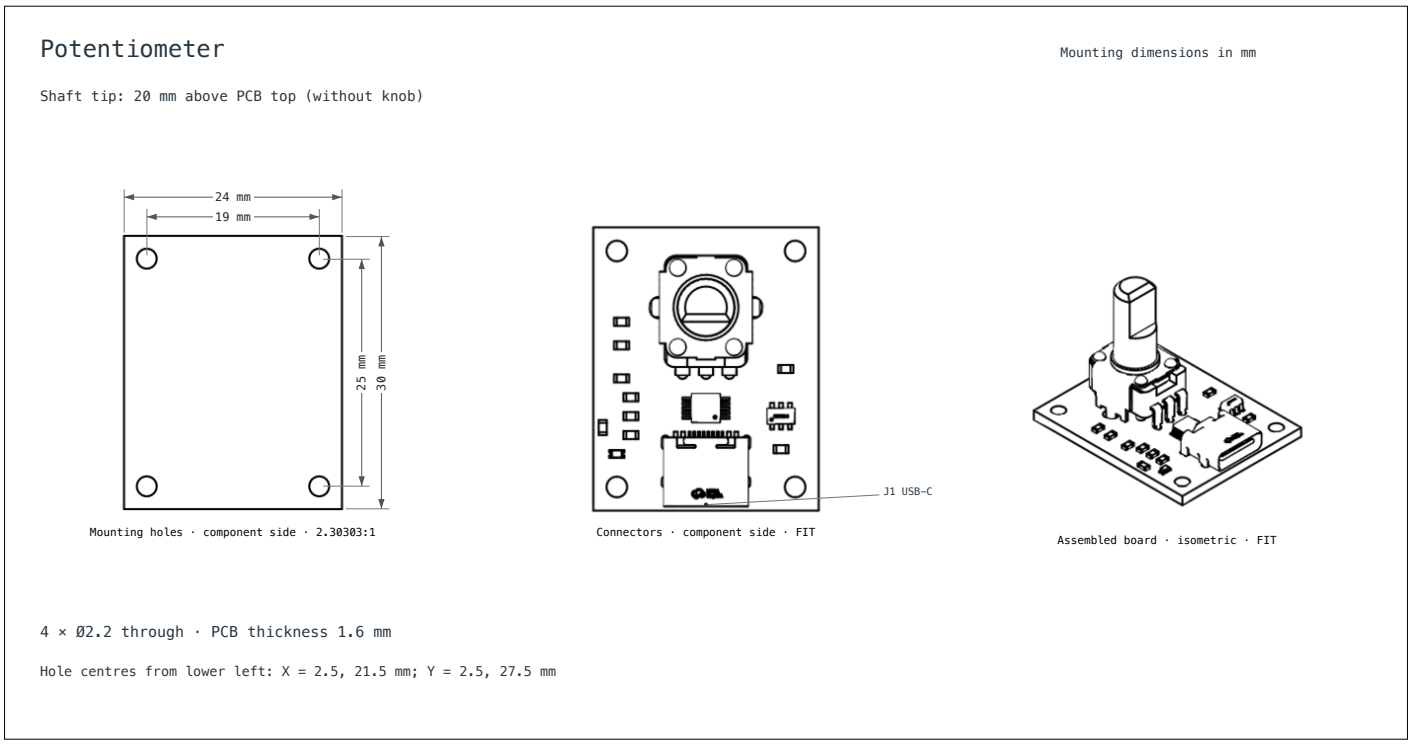


Figure 2. Component-side hole pattern, USB-C connector location and isometric assembly.

3.2 Enclosure dimensions

Feature	Dimension or location
Mounting holes	Four Ø2.2 mm through holes for M2 screws; 19 × 25 mm center spacing.
Hole centers	With J1 at the bottom, measure from the lower-left PCB corner. X = 2.5 and 21.5 mm; Y = 2.5 and 27.5 mm.
Shaft and lid	Ø6 mm shaft with 7 mm knurled length. Tip is 20 mm above the PCB top. A lid outer face 15 mm above the PCB leaves 5 mm of shaft exposed.

3.3 Design resources

STEP model **GLB model** **Full-size drawing** **Native drawing source**