QUICK REFERENCE · TK62

Tilt Sensor

Left edge down reads HIGH, right edge down reads LOW. Near level it keeps its last answer.

VCC is your board's logic voltage

A closed switch joins SIGNAL straight to VCC, with no resistor between. **On an ESP32, ESP32-S3 or Pico wire VCC to 3V3**: 5 V there puts 5 V on a 3.3 V pin each time the left edge goes down. Only an Uno takes 5V.

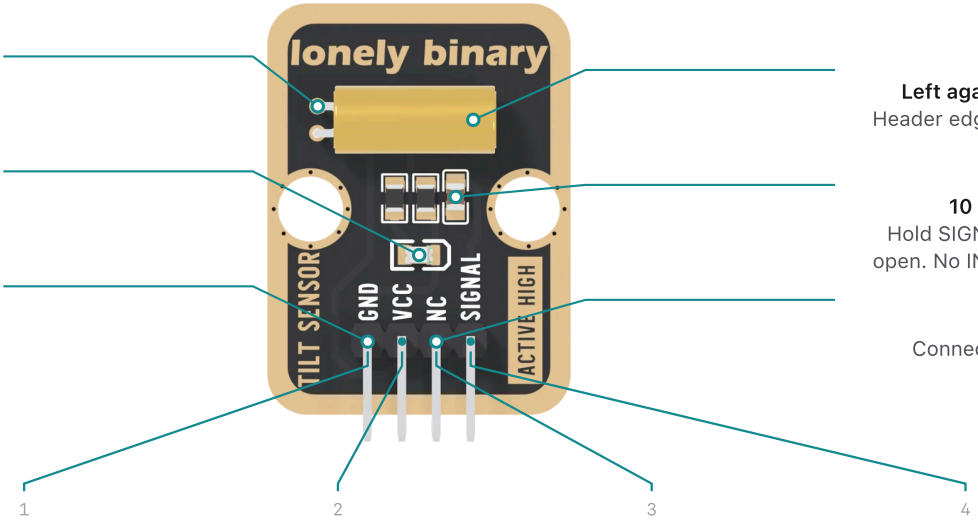
Pins, and which to wire

Parts up, header at the bottom. Wire GND, VCC and SIGNAL; NC is connected to nothing on the board. Read SIGNAL with INPUT.

SW-520D tilt switch
Its leads are at the left: left edge down, HIGH.

Red LED, 1 kΩ
Lit while closed, from VCC. Needs no sketch.

GND is the square pad
Count from it. The back prints no pin names.



Left against right only
Header edge down leaves the can level.

10 kΩ and 100 nF
Hold SIGNAL LOW when open. No INPUT_PULLUP.

NC
Connected to nothing on the board.

Front	GND	VCC	NC	SIGNAL
Read it	GND	VCC	●	SIGNAL

Level is not a reading

Two balls roll to the lower end of the can. One maker puts the change about 10° either side of level; in between, the balls stay where they last stopped. Flat on a desk, or standing on its header, it reads whatever it read before.

What it draws, and when

Open, right edge down

0 mA

VCC reaches only the switch. Nothing on the block runs while it waits.

Closed, VCC on 3V3

1.6 mA, worked out

0.33 mA in the pull-down, about 1.3 mA in the LED.

Closed, VCC on 5V

3.5 mA, worked out

Uno only. 0.5 mA in the pull-down, about 3 mA in the LED.

None of it comes from your pin, which only reads the voltage, and all of it is well inside the switch's 10 mA. On a battery, mount it so the position that lasts longest is the open one.

Arithmetic on the net list and a red LED's usual 2 V drop, not measured. Switch figures from Shouhan's SW-520D specification (12 V, 10 mA, can 12 × Ø5 mm) and, for the 10° angle, Bailin's sheet for the same part. The sketch compiles for an ESP32-S3 and an Uno; the block has not been bench-tested for this sheet.

The first read, on an ESP32-S3

Arduino IDE · Board: ESP32S3 Dev Module · USB CDC On Boot: Enabled · No library

```
// The pin SIGNAL is wired to.
// Uno: 2. ESP32: 25. ESP32-S3: 4. Pico: 15.
const int TILT_PIN = 4;

int last = -1;   // nothing read yet

void setup() {
  Serial.begin(115200);

  // INPUT, not INPUT_PULLUP: the board has its own 10k pull-down.
  pinMode(TILT_PIN, INPUT);
}

void loop() {
  int level = digitalRead(TILT_PIN);

  if (level != last) {
    if (level == HIGH) {
      Serial.println("left edge down: switch closed");
    } else {
      Serial.println("right edge down: switch open");
    }
    last = level;
  }

  delay(10);
}
```

```
left edge down: switch closed
right edge down: switch open
```

Serial Monitor at 115200, one line each time the block changes sides, with the red LED lit while the left edge is down.

Wiring

	FRONT	S3	UNO	ESP32	PICO
1	GND	GND	GND	GND	GND
2	VCC	3V3	5V	3V3	3V3
3	NC				
4	SIGNAL	GPIO 4	D2	GPIO 25	GP15

Hole 1 is the square pad. VCC is each board's own logic voltage: 3V3 on the ESP32 boards and the Pico, 5V on the Uno. The pins are the Push Button and Reed Switch blocks' pins.

The rattle, and the pin to avoid

The balls bounce when the block moves. The 100 nF hides gaps under about 1.1 ms on a 3.3 V board (0.55 ms on an Uno); believe any change only once it has held for 50 ms. On an ESP32-S3 avoid GPIO 0: with the right edge down the pull-down holds it at about 1.65 V against the BOOT pull-up, and the chip may start in its download mode.

When it does not work

LED dark with the block tipped

Only the left edge down closes it, well past level. Then check VCC and GND.

LED lit, but reads LOW

SIGNAL is on another pin, or on NC. Check TILT_PIN.

HIGH whichever way it is tipped

INPUT_PULLUP fights the pull-down, or GND is off. Use INPUT.

Tipped forwards, nothing changes

The can lies across the board. Turn the block a quarter.

Flat, reads HIGH or LOW at random

Level keeps its last state. Mount it with one edge down.

Counts two or three for one tip

The rattle. Believe a change only after 50 ms.

Specifications

Switch	SW-520D, 2 balls in a brass can	**Reads HIGH**	Left edge down, where the leads are
Changes at	About 10° past level, one maker	**Near level**	Keeps its last state
Rating	12 V, 10 mA	**SIGNAL**	Switch to VCC, 10 kΩ and 100 nF down
Current	0 open; 1.6 mA closed at 3.3 V	**Supply**	Your board's logic voltage