QUICK REFERENCE · TK96

Mechanical Key and LED

A keyboard key that reads HIGH when pressed, and a WS2812 under it on its own pin.

VCC is your board's logic voltage

The key joins VCC straight to BUTTON, so a press puts VCC on your pin. **On an ESP32, ESP32-S3 or Pico wire VCC to 3V3**, never 5V. Only an Uno takes 5V. On 3V3 the LED runs under its 3.5 V rating: red holds up, green and blue fade.

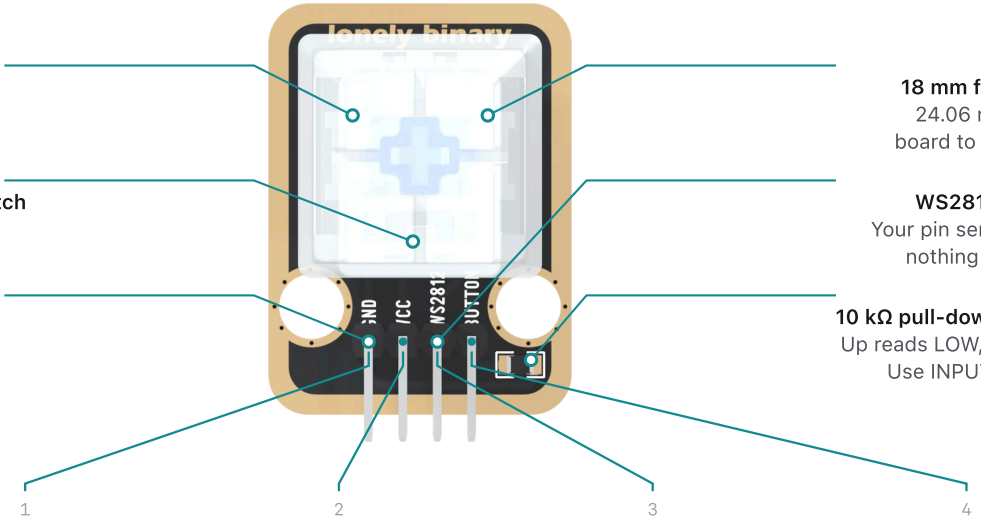
Pins, and which to wire

Key up, header at the bottom. Wire all four: GND, VCC, WS2812 to an output pin, BUTTON to an input pin. Pressing the key does not light the LED; the sketch does.

MX-style key switch
VCC to BUTTON when down. Takes any MX keycap.

WS2812 LED, under the switch
Not wired to the key. It shows what you send.

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



18 mm frosted keycap
24.06 mm tall overall, board to top of the cap.

WS2812 is an output
Your pin sends the colour; nothing chains after it.

10 kΩ pull-down on BUTTON
Up reads LOW, a press HIGH. Use INPUT, not PULLUP.

Front	GND	VCC	WS2812	BUTTON
Key and light	GND	VCC	WS2812	BUTTON

A press reads HIGH, and the light is yours

BUTTON is LOW while the key is up and HIGH while it is down: the board has a pull-down, not a pull-up. The LED is a separate circuit. It keeps the last colour sent until the sketch sends another.

What each wiring gives, on a 3.3 V board

VCC on 3V3

3.3 V on the pin when pressed

Right for the pin. The LED is under its 3.5 V minimum: red best.

VCC on 5V

5 V on a 3.3 V pin: no

Full colour, and a pin past its rating on every press.

5V + divider

3.33 V on the pin from 5.0 V

10 kΩ in series, 20 kΩ to GND. Worked out, not tried.

On an Uno, VCC on 5V does both jobs. On a 3.3 V board the pin wins: VCC on 3V3. For full colour there, feed VCC from 5V and bring BUTTON to the pin through the divider. The data line needs nothing: the LED reads a HIGH from half its supply.

Figures from XINGLIGHT's XL-2020RGBC-WS2812B data sheet: 3.5 to 5.5 V, fully working from 4.5 V, 5 mA per colour, 0.5 mA dark, 24 bits sent green first. The pull-down takes 0.5 mA at 5 V while the key is held. The switch's maker is not recorded. The sketch compiles for an ESP32-S3 and an Uno; the block has not been bench-tested for this sheet.

The first press, on an ESP32-S3

Arduino IDE · Board: ESP32S3 Dev Module · USB CDC On Boot: Enabled · Library: Adafruit NeoPixel

```
#include <Adafruit_NeoPixel.h>

// Uno: 2. ESP32: 25. ESP32-S3: 4. Pico: 15.
const int BUTTON_PIN = 4;
// Uno: 6. ESP32: 4. ESP32-S3: 5. Pico: 14.
const int LED_PIN = 5;

Adafruit_NeoPixel key(1, LED_PIN, NEO_GRB + NEO_KHZ800);
int last = LOW;

void setup() {
  Serial.begin(115200);
  pinMode(BUTTON_PIN, INPUT);   // the block has its own pull-down
  key.begin();
  key.show();                   // a dark frame to start
}

void loop() {
  int level = digitalRead(BUTTON_PIN);
  if (level != last) {
    last = level;
    if (level == HIGH) {
      key.setPixelColor(0, key.Color(255, 0, 0));   // red
      Serial.println("HIGH  pressed");
    } else {
      key.setPixelColor(0, 0);                      // off
      Serial.println("LOW   released");
    }
    key.show();                 // nothing changes until show()
  }
  delay(5);
}
```

```
HIGH pressed
LOW released
```

Serial Monitor at 115200, one line per change. The key glows red while held. A bounce can add an extra pair of lines.

Wiring

	FRONT	S3	UNO	ESP32	PICO
1	GND	GND	GND	GND	GND
2	VCC	3V3	5V	3V3	3V3
3	WS2812	GPIO 5	D6	GPIO 4	GP14
4	BUTTON	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. None of the ESP32 pins is a strapping or flash pin.

One press, one step

The contacts bounce for a few milliseconds as they close, so a sketch that acts on every rising edge can act several times per press. Accept a change only after the reading has held for 20 ms, as the handbook's modes sketch does: off, red, green, blue, one step per press.

When it does not work

LED never lights

WS2812 wire on LED_PIN? show() after setting? Try red first.

Reads pressed when up

The sketch tests for LOW. A press is HIGH on this board.

Red shows as green

Colour order: use NEO_GRB. The LED reads green first.

Key never reads HIGH

VCC not connected, or BUTTON on another pin.

One press, several steps

Contact bounce. Wait 20 ms of a steady reading.

Green and blue weak

VCC on 3V3 is under the LED's 3.5 V minimum. Expected.

Specifications

Switch	MX-style, blue stem, 18 mm keycap	**Key output**	HIGH when pressed; 10 kΩ pull-down
LED	XL-2020RGBC-WS2812B, 2 × 2 mm	**LED data**	24 bits, green first; HIGH from half of VCC
LED supply	3.5 to 5.5 V; full from 4.5 V	**LED current**	0.5 mA dark, 5 mA per colour
Supply	Your board's logic voltage on VCC	**Height**	24.06 mm, board bottom to keycap