QUICK REFERENCE · TK36

Active Buzzer

HIGH beeps, LOW stops. One 2.4 kHz note, made inside the buzzer.

No pull-down: pick a pin that is LOW at boot

SIGNAL goes through 1 kΩ to a transistor's base and nowhere else, so the buzzer does whatever your pin does before the sketch starts. **On an ESP32-S3 avoid GPIO 0, 43 and 44**: they are HIGH at reset, and on GPIO 0 the block can stop the board running your sketch. Use GPIO 4, and drive it LOW first in setup().

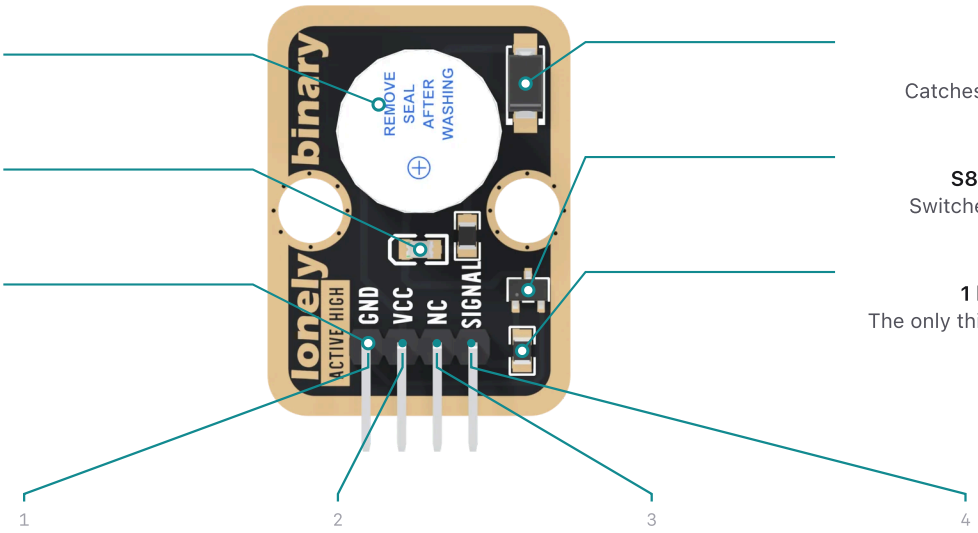
Pins, and which to wire

Parts up, header at the bottom. Wire GND, VCC and SIGNAL; NC is connected to nothing on the board. Peel the paper seal off the buzzer.

TMB12A05, Ø12 mm
Rated 5 V, for 3 to 7 V.
Peel the seal off.

Red LED
Lit while it is driven.
Not a power light.

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



SS14 diode
Catches the coil's kick at switch-off.

S8050 transistor
Switches the buzzer's ground side.

1 kΩ to the base
The only thing on SIGNAL: no pull-down.

Front	GND	VCC	NC	SIGNAL
On / off	GND	VCC	●	SIGNAL

One note, made inside The oscillator is in the can: a steady HIGH gives 2400 ± 300 Hz. tone() and analogWrite only chop that note; they do not set its pitch, or cleanly its volume. Use digitalWrite.

What it takes, and from where

From your pin

2.6 mA at 3.3 V

Into the base through 1 kΩ. The weakest S8050 needs 0.13 mA: about 21 times over.

VCC on 5V

22 mA, typical

The rated voltage: at least 95 dB at 10 cm. Plus 3 mA for the LED.

VCC on 3V3

15 mA, typical

About 3 dB quieter, near the bottom of its 3 to 7 V range.

The buzzer's current comes from VCC, never your pin, so any board can drive it. Wire VCC to 5V for its rated loudness; 3V3 works, a little softer.

Arithmetic on the TMB12A05 specification (2023-11-07) and CJ's S8050 datasheet; currents and loudness from the buzzer's typical curves, not measured. The sketch compiles for an ESP32-S3 and an Uno; the block has not been bench-tested for this sheet.

The first beep, on an ESP32-S3

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

```
// The pin SIGNAL is wired to.
// Uno: 9. ESP32: 4. ESP32-S3: 4. Pico: 15.
const int BUZZER_PIN = 4;

void setup() {
  // First, before anything else: the board has no pull-down, so
  // SIGNAL is whatever this pin is until the sketch drives it.
  pinMode(BUZZER_PIN, OUTPUT);
  digitalWrite(BUZZER_PIN, LOW);

  Serial.begin(115200);
}

void loop() {
  digitalWrite(BUZZER_PIN, HIGH);   // transistor on: beep
  Serial.println("beep");
  delay(200);

  digitalWrite(BUZZER_PIN, LOW);    // off: silence
  delay(800);
}
```

```
beep
beep
```

Serial Monitor at 115200, once a second, with a short beep and the red LED each time.

Wiring

	FRONT	S3	UNO	ESP32	PICO
1	**GND**	GND	GND	GND	GND
2	**VCC**	5V	5V	5V	VBUS
3	**NC**				
4	**SIGNAL**	GPIO 4	D9	GPIO 4	GP15

Hole 1 is the square pad. VCC is 5V here: the ESP32 boards' 5V and the Pico's VBUS carry 5 V while on USB. It never reaches SIGNAL, so it is safe beside a 3.3 V board. 3V3 works, quieter.

Pins that beep at boot

With no pull-down, the buzzer follows the pin from power-up until setup() drives it. ESP32-S3 GPIO 0 carries the BOOT button's 10 kΩ pull-up: it sounds the buzzer, and the base holds GPIO 0 at about 0.9 V, too low for the HIGH the chip needs to run your sketch. GPIO 43 and 44 are the serial port, pulled up at reset. An Uno's D13 chirps with the bootloader. GPIO 4, D9 and GP15 stay quiet.

When it does not work

Silent, and the LED dark

VCC, GND or SIGNAL is off, or the sketch drives another pin. Count from the square pad.

LED lit, but silent

The switch works; the fault is the buzzer or its leads. Fitted backwards, it is silent.

Quieter than expected

Peel the paper seal off, then move VCC from 3V3 to 5V.

Beeps at power-up

The pin is HIGH before setup(): GPIO 0, 43, 44 on an S3. Use GPIO 4; write LOW first.

Sounds rough

tone() or analogWrite chop its own note. Use digitalWrite HIGH and LOW.

Never stops

Pull SIGNAL's wire. If it stops, the pin is HIGH: check the sketch writes LOW.

Specifications

Buzzer	TMB12A05, electromagnetic, Ø12 mm	**Note**	2400 ± 300 Hz, fixed
Rated	5 V, 3 to 7 V	**Current**	30 mA max; about 22 mA at 5 V
Loudness	95 dB min at 10 cm, 5 V	**Switch**	S8050 NPN, hFE 200 to 350
SIGNAL	1 kΩ to the base, no pull-down	**Protection**	SS14 flyback diode