QUICK REFERENCE · TK85

Matrix Keypad I2C Adapter

A 4×4 keypad on two I2C wires instead of eight pins, at address 0x20.

VCC is your board's logic voltage

The pull-ups on SDA and SCL end at VCC, so the bus rests at whatever VCC is. **5V on an Uno, 3V3 on an ESP32 or ESP32-S3.** 5V on VCC beside a 3.3 V board puts 5 V on two of its pins. The chip runs from 2.5 V.

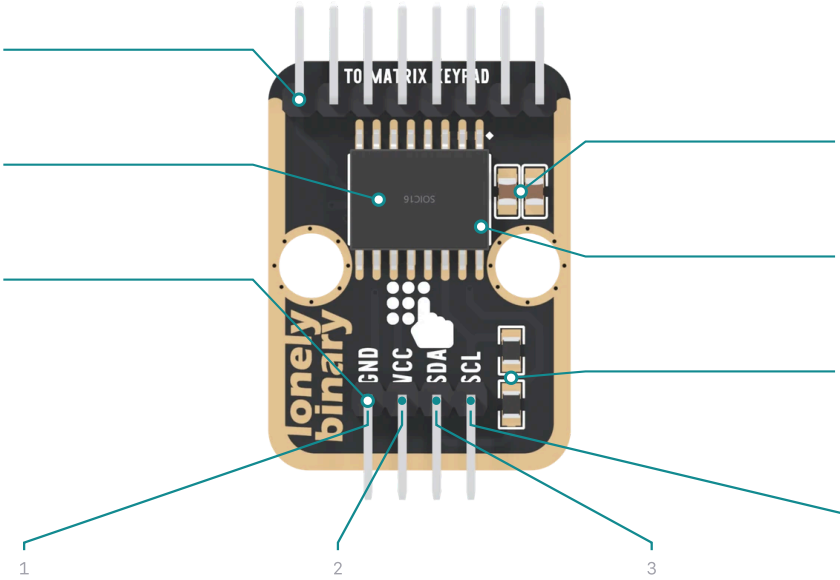
Pins, and which to wire

Parts up, keypad header at the top. Wire all four pins at the bottom to your board; the keypad's ribbon goes on the eight pins at the top.

Keypad header, P7 to P0
Soft keypad: rows on the left four, columns right.

PCF8574 at 0x20
A0 to A2 on GND: fixed. One TK85 per I2C bus.

GND on the left
Then VCC, SDA, SCL. The back prints no names.



10 µF and 100 nF
Across VCC, beside the chip. No regulator.

I2C PULLUP cut pad
On the back, behind here. Joined as shipped.

Two pull-ups to VCC
10 kΩ on SDA and SCL, through the cut pad.

Front	GND	VCC	SDA	SCL
I2CKeyPad	GND	VCC	SDA	SCL

The key number is not the key

The library reports which two pins a key joined, 0 to 15. A keymap string turns that into the printed character, and the soft and heavy-duty keypads need different ones. With the wrong map 2 prints 4 and A prints *; 1, 5, 9 and D look fine.

Three numbers on the bus

Address

0x20 fixed

A0, A1 and A2 are wired to GND. A second TK85 needs a second I2C bus.

Clock

100 kHz at most

The PCF8574's rating. A key still reads in well under a millisecond.

Pull-ups

10 kΩ, SDA and SCL

Up to 6 adapters at 5 V, 10 at 3.3 V, with every set left on.

Every adapter on a bus adds its own pair of pull-ups in parallel. Past 6 at 5 V the chip cannot pull SDA low enough; keep one set and cut the I2C PULLUP pad on the rest.

From TI's PCF8574 sheet (SCPS068K) for the NXP PCF8574T fitted: 2.5 to 6 V, SDA sinks 3 mA at 0.4 V. The keymaps are the ones found on the two keypads. The compact adapter in the keypad packs is the same circuit with three address pads (0x20 to 0x27); this sheet is the TK85. Not measured on a bench.

The first keypress, printed once

Arduino IDE · Library: I2CKeyPad by Rob Tillaart · Serial Monitor 115200

```
#include <Wire.h>
#include "I2CKeyPad.h"

// 16 keys, then N (no key) and F (fail). Pick your keypad's.
char keymap[19] = "DCBA#9630852*741NF";     // soft keypad
// char keymap[19] = "D#0*C987B654A321NF";  // heavy-duty

I2CKeyPad keyPad(0x20);   // fixed on the TK85
char last = 'N';

void setup() {
  Serial.begin(115200);
  delay(500);
  Wire.begin();
  Wire.setClock(100000);   // the PCF8574 is rated for 100 kHz
  if (!keyPad.begin()) {
    Serial.println("No keypad at 0x20 — check the four wires.");
    while (true) delay(1000);
  }
  keyPad.loadKeyMap(keymap);
  Serial.println("Ready. Press a key.");
}

void loop() {
  char c = keyPad.getChar();
  if (c != last) {                  // only when something changed
    if (c != 'N' && c != 'F') Serial.println(c);
    last = c;
  }
  delay(20);
}
```

```
Ready. Press a key.
1
5
A
```

One line per key as it goes down. Holding a key prints nothing more.

Wiring

	FRONT	UNO	ESP32	S3
1	**GND**	GND	GND	GND
2	**VCC**	5V	3V3	3V3
3	**SDA**	A4	GPIO 21	GPIO 8
4	**SCL**	A5	GPIO 22	GPIO 9

Holes counted from the left, parts up. VCC is the board's logic voltage. The SDA and SCL pins are each board's defaults, so Wire.begin() needs no arguments. The keypad plugs onto the top header, face up.

Two keypads, two keymaps

Soft membrane keypad (the one photographed with the TK85): `"DCBA#9630852*741NF"`. Heavy-duty keypad: `"D#0*C987B654A321NF"`. A keypad from anywhere else: press every key once in printed order and note which number each gives. A second TK85 goes on a second bus: `I2CKeyPad right(0x20, &Wire1);` on an ESP32.

When it does not work

No keypad at 0x20

No power, or SDA and SCL swapped. On an Uno they are A4 and A5, not digital pins.

A row or column of keys is dead

The ribbon's socket is one pin off, or not pushed fully home.

Two TK85s on one bus

Both answer at 0x20 and cannot move. Use a second I2C bus.

Every key prints another key

The other keypad's keymap is loaded. Swap which line is commented out.

F when typing fast

Two keys held for a moment. The sketch ignores F; release the first key.

Bus stops with many boards

Too many pull-ups in parallel. Cut I2C PULLUP on all but one.

Specifications

Chip	NXP PCF8574T/3, SOIC-16	**Address**	0x20, fixed (A0 to A2 on GND)
Supply	2.5 to 6 V: your logic voltage	**Clock**	I2C up to 100 kHz
Pull-ups	10 kΩ to VCC, cut pad, on	**Keypad header**	8-pin right-angle, P7 to P0
Bus header	4-pin right-angle: GND VCC SDA SCL	**Board**	22.4 × 30.4 mm, 2 LEGO holes 16 mm apart