

# lamaPLC: PCF857x I/O Expander chip/modul with I<sup>2</sup>C communication

The PCF857x series consists of I<sup>2</sup>C-based general-purpose I/O (GPIO) expanders manufactured by NXP and Texas Instruments. They allow microcontrollers (such as Arduino, ESP32, or Raspberry Pi) to control multiple digital pins with only two wires: Serial Data (SDA) and Serial Clock (SCL).



Feature	PCF8574 / PCF8574A	PCF8575
<b>GPIO Count</b>	8-bit (8 pins)	16-bit (16 pins)
<b>I<sup>2</sup>C Base Address</b>	<b>0x20</b> (PCF8574) / <b>0x38</b> (PCF8574A)	<b>0x20</b>
<b>Max Devices on 1 Bus</b>	8 units	16 units
<b>Operating Voltage</b>	2.5V to 6V	2.5V to 5.5V
<b>Interrupt Output</b>	Yes (Open-drain INT)	Yes (Open-drain INT)

The current limits of the PCF857x are heavily lopsided because of its quasi-bidirectional architecture. It handles current entirely differently depending on whether you are sinking current (outputting 0/LOW) or sourcing it (outputting 1/HIGH).

## Main Control & Power Header

- **VCC:** Power input. Connects to **3.3V or 5V** to match your microcontroller's logic levels.
- **GND:** Common ground reference.
- **SDA:** Serial Data line for I<sup>2</sup>C communication.
- **SCL:** Serial Clock line for I<sup>2</sup>C communication.
- **INT:** Interrupt output (Active Low). Pulls low to alert the microcontroller when an input pin changes state, eliminating the need for software polling.

## 8/16-Bit I/O Extension Pins

- **Port 0** (P00 to P07): The first group of 8 quasi-bidirectional GPIO pins.
- **Port 1** (PCF8575 only, P10 to P17): The second group of 8 quasi-bidirectional GPIO pins.

## Sinking Current (Output LOW / Connecting to Ground)

- **Maximum per individual pin:** 25 mA (typical) / 20 mA for extended use.
- **Maximum combined total (all 16 pins combined):** 100 mA.
- **The Math:** If you activate all 16 pins simultaneously at LOW logic, you can only allocate a maximum of 6.25 mA per pin ( $100\text{ mA} \div 16$ ) to avoid overloading the chip.

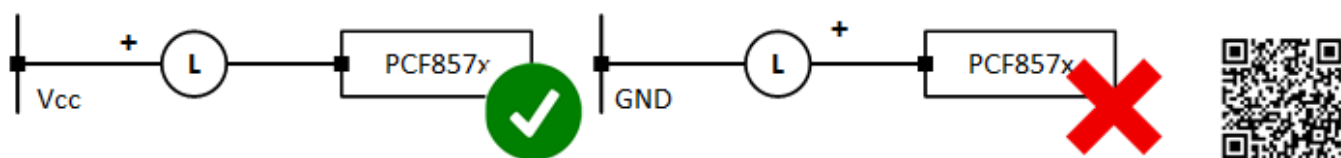
## Sourcing Current (Output HIGH / Connecting to VCC)

This is the weak mode meant mostly for sensing state changes.

- **Maximum per individual pin:** Only 100  $\mu$ A (0.1 mA).
- **The Limit:** This current is too weak to directly light up an LED or actuate a standard relay trigger.

### How to Correctly Wire Components

- **Correct (Sinking):** Connect your load's positive wire to VCC, and the negative side (through a current-limiting resistor) directly to the PCF8575 I/O pin. Setting the pin LOW completes the path to ground and activates the load.
- **Incorrect (Sourcing):** Connecting your load's positive wire to the PCF8575 I/O pin and the negative side to Ground will fail, as the pin cannot supply sufficient current.



<https://lamapl.com/doku.php?id=sensor:pcf857x>



## I<sup>2</sup>C topics on lamaPLC

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• <a href="#">lamaPLC project: Sension SCD CO<sup>2</sup> measurement module</a>	2026/04/15 19:34	scd30, scd40, scd41, iaq, ndir, sensor, i2c, arduino code
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• <a href="#">LamaPLC: APDS - Avago ALS and proximity detection sensors with I<sup>2</sup>C communication</a>	2026/04/23 21:52	avago, apds-9900, apds-9930, apds-9960, als, proximity, detection, gesture recognition, gesture, i2c, communication, sensor, arduino, code
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• <a href="#">LamaPLC: BMP/BME Bosch Temperature/Humidity/Pressure sensors with I<sup>2</sup>C communication</a>	2026/04/23 21:52	bme280, bme680, bme688, bmp180, bmp280, hw-611, hw611, bosch, temperature, humidity, pressure, sensor, arduino, i2c, communication, ai, cjmcu, volatile organic compounds, vocs, volatile sulfur compounds, vscs, iaq

- [LamaPLC: CJMCU-219/INA-219 breakout board/IC with I<sup>2</sup>C communication](#) 2026/04/23 21:52 [cjmcu-219, ina-219, ina219, breakout board, i2c, communication, sensor, voltage, current, arduino, code, cjmcu](#)
- [LamaPLC: CJMCU-3216 / AP-3216 integrated digital ambient light and proximity sensor module/IC with I<sup>2</sup>C communication](#) 2026/04/23 21:52 [cjmcu-3216, cjmcu, ap-3216, ap3216, ambient light, proximity, sensor, arduino, code, i2c, communication](#)
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- [LamaPLC: DPS Infineon Temperature/Pressure sensors with I2C communication](#) 2026/04/23 21:52 [dps310, infineon, temperature, pressure, sensor, arduino, i2c, communication, code](#)
- [LamaPLC: Energy, power, current, and voltage](#) 2025/05/31 23:32 [i2c, i c, communication, arduino, energy, power, current, sensor, ina226](#)
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- [LamaPLC: ESP32 / ESP8266](#) 2025/11/22 00:07 [esp8266, esp32, esp32-c2, esp32-c3, esp32-c5, esp32-c6, esp32-c61, esp32-h2, esp32-s2, esp32-s3, esp32-p4, espressif systems, communication, ethernet, ip, wi-fi, thread, zigbee, matter, homekit, bluetooth, mqtt, adc, spi, uart, i2c, i2s, rmt, pwm, usb, usb otg, twai](#)
- [LamaPLC: Gas sensors](#) 2023/07/01 17:29 [gas, sensor, i2c, onewire, communication, mq-3, mq-4, mq-5, mq-6, mq-7, mq-8, mq-9, mq-135, gm-102b, gm-302b, gm-502b, gm-702b, alcohol, ch4, natural gas, smoke, lng, co, co2, lpg, h2, iso-butane, nox, nh3, benzene, town gas, formaldehyde, propane, humidity, temperature, voc, grv gas sens v2](#)
- [LamaPLC: GY-511 6DOF sensor module](#) 2026/03/22 01:44 [stmicroelectronics, lsm303dlhc, i2c, lsm303, sensor, gy-511, 6dof, pololu, module, arduino](#)
- [LamaPLC: GY-9250 MPU-9250/6500 9-axis Attitude Sensor Board](#) 2026/04/23 21:52 [ak8963, gy-9250, mpu-9250, 9-axis, motion detection, magnetometer, communication, i c, i2c, spi](#)
- [LamaPLC: HDC Texas Instruments Temperature/humidity sensors with I<sup>2</sup>C communication](#) 2026/04/23 21:52 [sht21, htu21, si7021, gy-21, gy-213v, hdc1080, gy-213v-hdc1080, cjmcu, cjmcu-1080, texas instruments, temperature, humidity, sensor, i2c, communication, arduino, code](#)
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• <a href="#">lamaPLC: MLX90614 (GY-906) infrared non-contact thermometer</a>	2026/05/08 00:03	<a href="#">communication, i2c, temperature, mlx90614, gy-906, modul, infrared, non-contact thermometer, dsp, pwm, smbus, hailege</a>
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• <a href="#">lamaPLC: RP2040_ETH_Modul: I<sup>2</sup>C scanner</a>	2026/05/12 16:20	<a href="#">code, micropython, 2026, rp2040 eth, i2c, comunication</a>
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• <a href="#">LamaPLC: SC16IS750 / SC16IS752: One or two serial (UART) ports from microcontroller via I<sup>2</sup>C or SPI communication</a>	2026/04/23 21:52	<a href="#">cjmcu-750, cjmcu-752, cjmcu, nxp, sc16is750, sc16is752, uart, serial, i2c, spi, modul, converter, arduino, code</a>
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