You can individually control **10 LEDs** using an **integrated circuit (IC)** in several ways, depending on how you want to control them. Here are some common methods:

**1️⃣ Using a Shift Register (74HC595)**

If you need to control **many LEDs but have limited ESP32 GPIO pins**, use a **74HC595 shift register**. This IC lets you control **8 LEDs with only 3 GPIOs** and can be **daisy-chained** to control more LEDs.

**Wiring:**

* **ESP32** → **74HC595**
  + GPIO (Data) → DS (pin 14)
  + GPIO (Clock) → SHCP (pin 11)
  + GPIO (Latch) → STCP (pin 12)
  + LEDs connect to **Q0 - Q7** (pins 15, 1, 2, 3, 4, 5, 6, 7)

**Code (MicroPython)**

from machine import Pin

import time

data = Pin(23, Pin.OUT) # Data pin

clock = Pin(18, Pin.OUT) # Clock pin

latch = Pin(5, Pin.OUT) # Latch pin

def shift\_out(byte):

latch.off()

for i in range(8):

bit = (byte >> (7 - i)) & 1

data.value(bit)

clock.on()

time.sleep\_us(10)

clock.off()

latch.on()

# Example: Light up LED 0, 2, and 4

shift\_out(0b00010101)

✔ **Pros**: Simple, requires only 3 GPIOs  
❌ **Cons**: Limited to 8 LEDs per IC (but expandable)

**2️⃣ Using a LED Driver (TLC5940, MAX7219)**

If you want **brightness control (PWM)**, a **LED driver** is better than a shift register.

* **TLC5940**: 16-channel **PWM control**
* **MAX7219**: Controls up to **64 LEDs (8x8 matrix)**

**Example with MAX7219**

The MAX7219 uses **SPI** (4 GPIOs). You can control 10 individual LEDs using one IC.

✔ **Pros**: Brightness control, scalable  
❌ **Cons**: More complex wiring

**3️⃣ Using a GPIO Expander (MCP23017, PCF8574)**

If you need **more GPIOs** to directly control LEDs, a **GPIO expander** helps.

* **MCP23017**: Adds **16 GPIOs via I2C** (uses only 2 ESP32 pins).
* **PCF8574**: Adds **8 GPIOs via I2C**.

**Example Wiring for MCP23017**

* **ESP32** (I2C: SDA, SCL) → MCP23017
* **MCP23017 GPIOs** → 10 LEDs

✔ **Pros**: I2C, requires only 2 GPIOs  
❌ **Cons**: No PWM control

**4️⃣ Direct Control with ESP32 GPIOs**

The ESP32 has enough GPIOs to **directly control 10 LEDs** if you are not using many other peripherals. Just connect LEDs with **resistors (~220Ω)** to individual GPIOs.

✔ **Pros**: Simple, no extra ICs  
❌ **Cons**: Uses 10 GPIOs

**Which Option Fits Your Project?**

* **Limited GPIOs?** → **Use 74HC595 or MCP23017**
* **Need PWM dimming?** → **Use TLC5940 or MAX7219**
* **Just 10 LEDs?** → **Direct ESP32 control** works fine!

Let me know which method you prefer, and I can help with more detailed wiring and code! 🚀