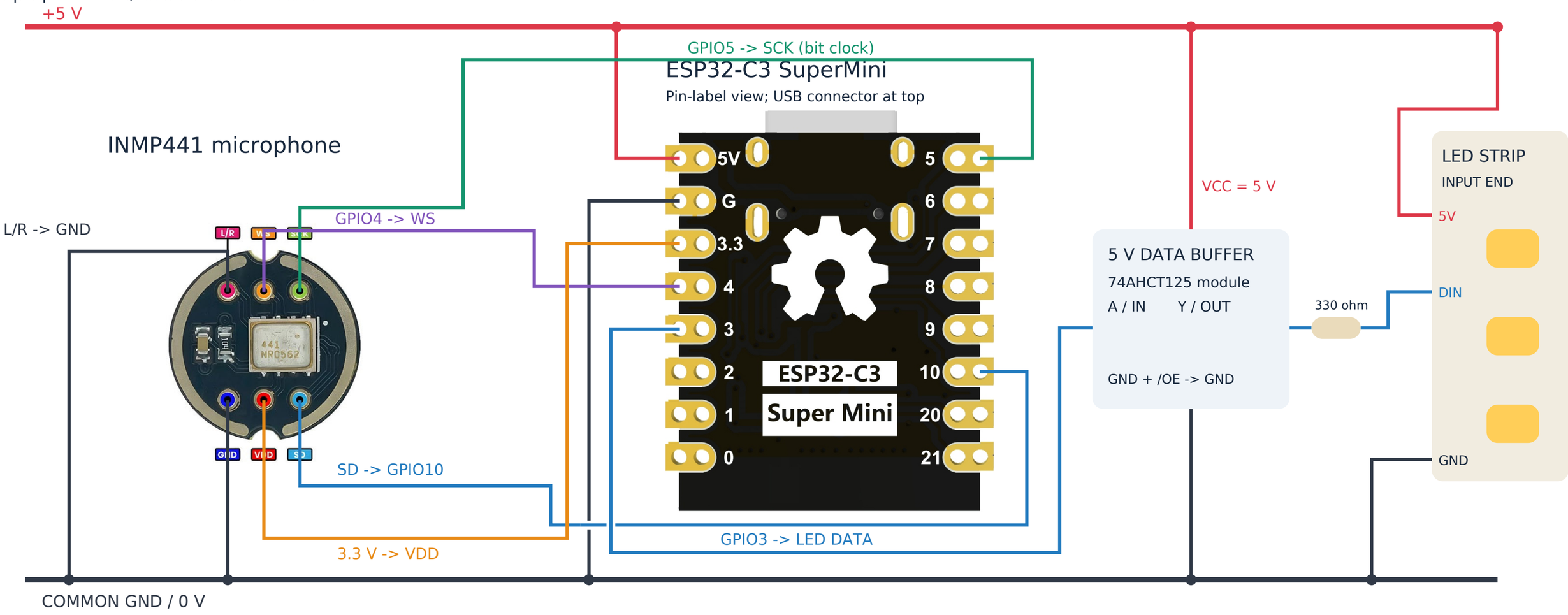
STUDIO LIGHT / OFF-THE-SHELF WIRING

Firmware 1.0.0 pin assignments | ESP32-C3 SuperMini + INMP441

REGULATED 5 V INPUT

Split power here, before the ESP32 board.



CONNECT BY PRINTED PIN LABELS

Mic: VDD -> 3.3 V | GND + L/R -> GND | SCK -> GPIO5 | WS -> GPIO4 | SD -> GPIO10

LED: GPIO3 -> 5 V AHCT buffer -> 330 ohm -> DIN. The buffer shifts the data signal to 5 V.

Feed LED power directly from the 5 V bus. Do not route strip current through the ESP32 board.

Disconnect external 5 V before plugging the ESP32 USB port into a powered computer. Microphone VDD is 3.3 V only.

Reference images show standard module layouts; check your boards' silkscreen before soldering. Dots indicate joined wires.

PIN MAP & IMPLEMENTATION NOTES

Firmware signal / supply	ESP32-C3 SuperMini	Off-the-shelf connection
MIC_BCLK_PIN / SCK	GPIO5 / pad 5	INMP441 SCK
MIC_WS_PIN / WS	GPIO4 / pad 4	INMP441 WS
MIC_DIN_PIN / SD	GPIO10 / pad 10	INMP441 SD
LED_PIN / data	GPIO3 / pad 3	AHCT buffer input
3V3	3.3 / 3V3	INMP441 VDD
GND	G / GND	Supply -, mic GND + L/R, buffer, strip GND
+VBUS	5V	Supply +5 V, buffer VCC, strip +5 V

The custom PCB uses an ICS-43434; this version substitutes an INMP441 I2S microphone.
L/R is grounded on both designs: configure firmware to receive the left I2S channel.
Pins match lightControl firmware 1.0.0 config.h. Verify I2S format, sample rate and gain for the microphone.
Original 33-ohm series resistors on SCK, WS and SD are omitted from this short-wire module diagram.
For closer electrical matching, fit 33 ohm near the ESP32 on SCK/WS and near the microphone on SD.
The INMP441 datasheet recommends a 100k SD-to-GND pulldown; add it if the breakout lacks one.
Use a 5 V-powered AHCT125 / AHCT1G125 buffer breakout, with the used channel /OE tied to GND.
The buffer module should include local 100 nF supply decoupling. Tie unused buffer inputs to a defined level.
Direct GPIO3-to-DIN wiring omits the original level shifter; compatibility depends on the LED strip input threshold.
Power-input protection, bulk capacitance and the user button from the custom PCB are outside this simplified view.

REFERENCES

ESP32 board image / pin layout

INMP441 board image / pin layout

ESP32-C3 GPIO mapping

INMP441 electrical interface

Pin source: lightControl firmware/lightControl/config.h, version 1.0.0. Revised 9 November 2026.