

ESP32-S3 PinPulse Shield

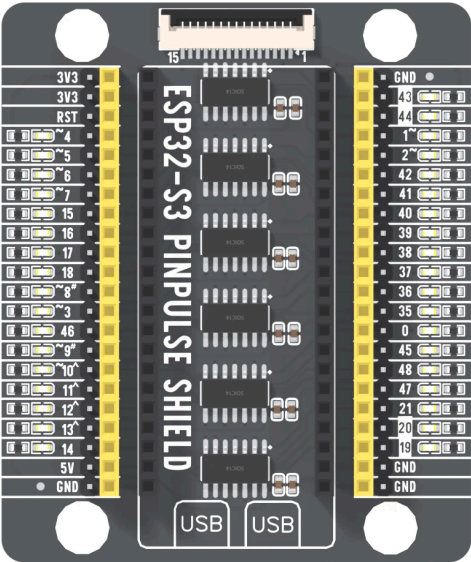
Every GPIO on a pin and a socket with its own LED, and the standard 15-way display plug.



Seat the board first, plug the cable in second

The ESP32-S3 fits end for end as well, and that way its 3.3 V output lands on the shield's ground row: a short across the regulator. Its two USB sockets go over the two boxes printed USB.

The shield



Pin 1 of each edge is at the display plug. The outer row is male pins, the yellow row inside is female sockets, wired together pin for pin: 22 signals twice, not 44.

The display plug: contact to GPIO

#	SIGNAL	ESP32-S3	WHAT IT DOES
1	GND	GND	ground
2	3V3	3V3	the display's supply, 3.3 volts
3	BL	GPIO 41	backlight: the lamp behind the glass
4	RST	GPIO 42	reset: a clean start for the controller
5	DC	GPIO 2	data or command: says what the byte on the wire is
6	MISO	GPIO 13	data back from the display; a write-only panel leaves it unused
7	SCK	GPIO 12	the SPI clock
8	MOSI	GPIO 11	the pixels and commands, out to the display
9	CS	GPIO 10	chip select: this display is the one being addressed
10	D2	GPIO 1	spare, a TFT panel leaves it unused
11	D3	GPIO 15	spare, a TFT panel leaves it unused
12	D4	GPIO 7	spare, a TFT panel leaves it unused
13	D5	GPIO 4	spare, a TFT panel leaves it unused
14	D6	GPIO 6	spare, a TFT panel leaves it unused
15	D7	GPIO 5	spare, a TFT panel leaves it unused

Any Lonely Binary display with the 15-way ribbon plugs straight in: contacts 1 to 9 are in the same order on every one, and on an ESP32-S3 the display library's default pins are these GPIOs. The back of the board prints contacts 10 and 11 as 20 and 22; the wiring above is right.

The lights cannot disturb a bus

The LED is not on your pin. Each GPIO drives one 74HC04 inverter input, at most 10 pF and 1 μ A, and the LED runs from the 3.3 V rail through the inverter's output. On I²C, 10 pF behind a 4.7 k Ω pull-up adds about 40 ns of the 300 ns allowed at 400 kHz. SPI is driven both ways by its chip, so there is no pull-up to disturb. The shield adds no pull-ups of its own.

The first program, a light down every safe pin

Arduino IDE · Board ESP32S3 Dev Module · USB CDC On Boot Enabled · Flash 16MB · PSRAM OPI PSRAM · Serial Monitor 115200 · no wiring

```
const int PINS[] = {
  4, 5, 6, 7, 15, 16, 17, 18, 8, 3, 46, 9, 10, 11, 12, 13, 14, // left
  1, 2, 42, 41, 40, 39, 38, 0, 45, 48, 47, 21, // right
};
const int COUNT = sizeof(PINS) / sizeof(PINS[0]);

void setup() {
  Serial.begin(115200);
  for (int i = 0; i < COUNT; i++) {
    pinMode(PINS[i], OUTPUT); // driven, so none of these LEDs floats
    digitalWrite(PINS[i], LOW);
  }
  delay(1500); // let native USB enrol
  Serial.printf("chasing %d pins\n", COUNT);
}

void loop() {
  for (int i = 0; i < COUNT; i++) {
    digitalWrite(PINS[i], HIGH);
    delay(80);
    digitalWrite(PINS[i], LOW);
  }
  for (int i = 0; i < COUNT; i++) digitalWrite(PINS[i], HIGH); // all
  delay(600);
  for (int i = 0; i < COUNT; i++) digitalWrite(PINS[i], LOW);
  delay(300);
}
```

chasing 29 pins
GPIO 43 and 44 (serial), 19 and 20 (native USB) and 35 to 37 (PSRAM) are left out on purpose: driving one stops the board.

When it does not work

An LED flickers when I touch the board

Its pin is floating: nothing has set it. Make it an OUTPUT, or use INPUT_PULLUP, and it stops.

The display stays blank

Ribbon fully in, square, latch closed, contacts facing the socket's. Then check the driver matches the chip behind the glass.

The upload fails

That is the cable or the Port setting. Try the other USB socket, or hold BOOT, tap RST, release BOOT.

LEDs are lit before I upload anything

GPIO 0, 20, 43 and 44 are pulled up inside the chip at reset. 45 and 46 are pulled down and stay dark.

I²C finds nothing

The shield has no pull-ups. Check the address, the wiring and that the bus has its own pull-ups. The LEDs are not the cause.

No light at all

The shield has no power of its own. Seat the board and plug in the cable; if the board's red LED is off, unplug at once and check which way round it went.

Specifications

Fits	44-pin ESP32-S3, rows 22.86 mm apart	GPIOs at the edge	36, on a pin and a socket each
LEDs	36, about 0.27 mA each, from 3.3 V	Buffers	6 × SN74HC04, 3.3 V supply
Load on a pin	10 pF, 1 µA at most	Display plug	15-way FPC, 1.0 mm
Mounting	4 holes, 4.7 mm	Size	61 × 73 mm, 10.3 mm tall