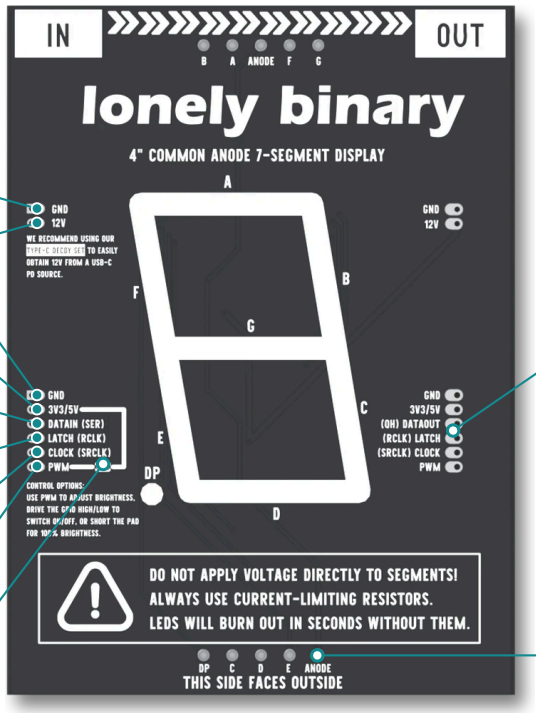
4-inch 7-Segment Display

One common-anode digit on its own driver board, with a dimmer. This sheet is for this version, the one with the PWM pad; the earlier version had no dimming.

It ships dark The PWM pad is open, so a module with nothing on PWM stays dark whatever you send. Short the pad, or drive PWM. **The 12 V is its own supply:** only the two-hole 12V pair takes it, never the 3V3/5V hole or a signal pin.

The IN edge, and what to wire

Drawn from the back, the face you wire, with IN on the left. Names are the board's own; the Uno pins are the ones the sketch on page 2 uses.



12 V PAIR

12 V supply minus	GND
12 V supply plus	12V

SIX SIGNAL HOLES

Uno GND	GND
Uno 5V or 3V3	3V3/5V
Uno D8	DATAIN (SER)
Uno D11	LATCH (RCLK)
Uno D12	CLOCK (SRCLK)
Uno D9, or empty	PWM

SB1, the PWM pad
Open as shipped. Solder across it for full brightness. Undone by desoldering.

OUT edge
The same eight holes. DATAIN becomes DATAOUT, to the next module. PWM is one wire.

Bare pads, top and bottom
The display's own pins. Leave them.

Not the logic pin The digit does not run from the logic pin. Its current comes from the 12 V pair, through the switch Q2 to the common anode, and leaves through the ULN2803A to ground. The 3V3/5V hole feeds only the shift register. **A 1 in the byte lights a segment** because the ULN2803A inverts: a high input switches that segment on.

Three ways to use the PWM pad

Short the pad

100 % always

`solder across SB1`

Leave the PWM hole empty: it is already held at the logic rail.

A GPIO

0/100 % on or off

`digitalWrite(PWM, HIGH)`

High lights the digit, low blanks it. The pad stays open.

A PWM output

0–100 % any level

`analogWrite(PWM, 128)`

Any brightness, every segment at once. The pad stays open.

Short the pad when the digit should simply be on. Use a GPIO to blank it from code, PWM to dim it. Do not do two at once: a shorted pad holds PWM at the logic rail, and a pin wired to it would be fighting that.

Test conditions: arithmetic and datasheets, nothing measured. The three ways follow from the board's net list and bill of materials and from the SN74HC595, ULN2803A and AO3407A datasheets; the Uno sketch on page 2 was compiled, not timed. Segment current, the supply current of a lit digit and the PWM frequency at which flicker stops were not measured, so none is quoted.

Fade a digit, on an Uno

Arduino IDE · Board: Arduino Uno · no libraries · Serial Monitor not used

```
// 4-inch 7-segment module, Uno: one digit fades in and out.
// Back of the module toward you, IN edge on the left.
// Wiring: see the table. Supply minus and Uno GND are one wire.
// Leave the PWM pad open: if it is shorted, D9 fights it.
// Arduino IDE: Board Arduino Uno. No libraries.
#define SER  8
#define LAT 11
#define CLK 12
#define PWM  9              // about 490 Hz on D9

// Bit 0 is segment A, bit 6 is G, bit 7 is the point.
const uint8_t d[] = {
  0x3F, 0x06, 0x5B, 0x4F, 0x66, 0x6D, 0x7D, 0x07, 0x7F, 0x6F
};

void show(uint8_t b) {
  digitalWrite(LAT, LOW);
  shiftOut(SER, CLK, MSBFIRST, b);
  digitalWrite(LAT, HIGH);
}

void setup() {
  pinMode(SER, OUTPUT);
  pinMode(LAT, OUTPUT);
  pinMode(CLK, OUTPUT);
  pinMode(PWM, OUTPUT);
  analogWrite(PWM, 0);      // dark until PWM goes high
  show(d[0]);
}

void loop() {
  static uint8_t digit = 0;
  for (int i = 0; i <= 255; i++) { analogWrite(PWM, i); delay(6); }
  for (int i = 255; i >= 0; i--) { analogWrite(PWM, i); delay(6); }
  digit = (digit + 1) % 10;
  show(d[digit]);           // sent while the digit is dark
}
```

Expect digit 0 to fade in over about 1.5 s and out again, then 1 to appear in the dark, and so on from 0 to 9 and round. It prints nothing. If it stays dark, the PWM pad is the first thing to check.

Wiring

HOLE	FRONT NAME	UNO	SHORT	PWM
P1	GND	12 V –	✓	✓
P2	12V	12 V +	✓	✓
1	GND	GND	✓	✓
2	3V3/5V	5V / 3V3	✓	✓
3	DATAIN (SER)	D8	✓	✓
4	LATCH (RCLK)	D11	✓	✓
5	CLOCK (SRCLK)	D12	✓	✓
6	PWM	D9	–	✓

Holes are numbered down the IN edge as the back prints them. **Short:** the pad is soldered and PWM is left empty. **PWM:** the pad is open and D9 drives PWM. The 12 V pair is a separate supply, grounds joined at the Uno's GND.

Chaining

Join a module's OUT edge to the next module's IN edge, all eight holes. DATAOUT becomes the next DATAIN; the rest is one wire per name, so one supply, one PWM wire and one latch serve the chain. A pad shorted on any module holds every module at full brightness. Send one byte per module and latch once; the first byte sent finishes furthest away.

When it does not work

Dark, and the sketch runs

Check the PWM pad first: it ships open. With 12 V on, touch a wire from PWM to 3V3/5V. If the digit lights, solder the pad shut or drive PWM from a pin that goes high.

12 V reads fine, and it is still dark

Measure the 12V hole with the black probe on the Uno's GND, not the supply's minus. Then check the two grounds are one wire, power off.

The shapes are nonsense

Swap MSBFIRST and LSBFIRST: the wrong one mirrors every byte, so 0x3F becomes 0xFC. Check the PWM pad before the code if nothing lights at all.

Full brightness, and PWM does nothing

A pad is shorted, on this module or another in the chain. It holds PWM at the logic rail. Desolder the bridge, or leave PWM unwired.

Only the first module lights

The join between modules is not made. Check DATAOUT to DATAIN with a continuity test, and NUM_DIGITS against the modules joined.

Flicker, or bands on a phone camera

The PWM frequency is low. A camera shows it sooner than an eye does. On an Uno, pins 5 and 6 run at about 980 Hz, twice the others. No threshold was measured.

Specifications

Display	4-inch digit, common anode, 15 mm deep	**Board**	About 89 × 122 mm, 1.6 mm thick
Logic	74HC595, 2 to 6 V on the 3V3/5V hole	**Driver**	ULN2803A, inverting: a 1 lights a segment
Segments	12 V, its own supply, through switch Q2	**Dimmer**	PWM hole or SB1 pad; all segments together
Resistors	75 ohm on A to G, 510 ohm on the point	**Headers**	Not fitted: strips and sockets in the bag