

# 12LEDstick User Manual

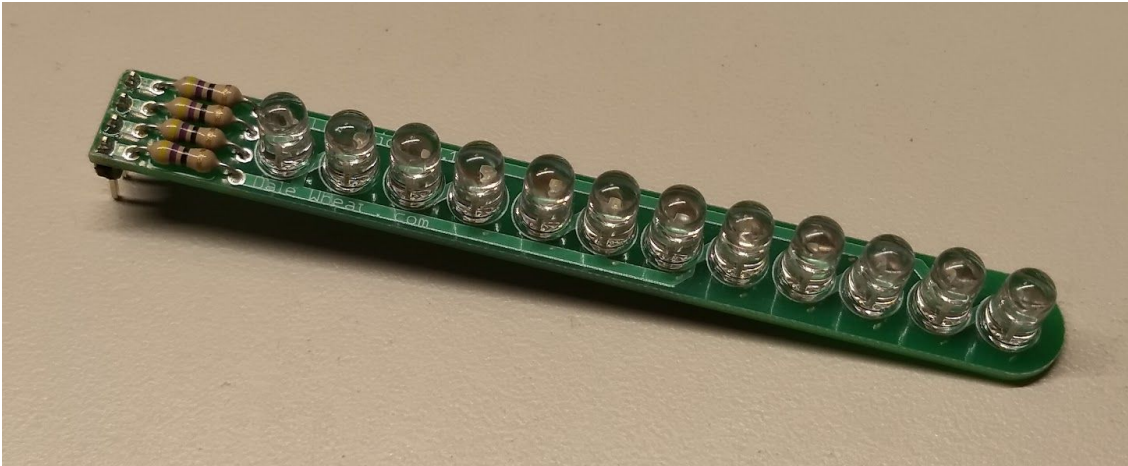


Figure 1. The assembled 12LEDstick, using the conventional placement of components

The 12LEDstick is a multiplexed linear array of LEDs. See Figure 1. Up to twelve individual LEDs can be controlled with only four signals. The 12LEDstick is compact, easy to assemble as well as easy to use. An Arduino library with example sketches is available for download from:

<https://www.dalewheat.com/ledstick/>

## Schematic

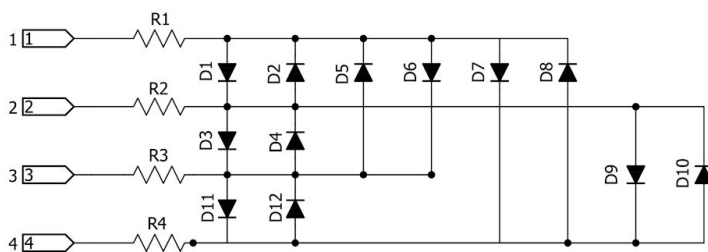


Figure 2. The schematic diagram of the 12LEDstick v0.1

## Use With Arduino

Perhaps the simplest way to control the 12LEDstick is to use an Arduino. Download the LEDstick library. Use the Arduino IDE to install the library, using the “Sketch / Include Library /

Add ".ZIP Library..." menu item. You can now load the example sketch with the "File / Examples / LEDstick / 12LEDstick" menu item.

## Sketch Listing

```
// 12LEDstick sketch
// 13 September 2019 - Dale Wheat
// https://dalewheat.com
// dale@dalewheat.com
//
// Driving the 12 LEDs on the 12LEDstick the easy way

#include <LEDstick.h>

LEDstick stick(2, 3, 4, 5); // single instance, defining pins used

void setup() {
  // no special setup needed when using the LEDstick library
}

void loop() {

  // Light up each of the 12 LEDs one at a time
  // Asking for LED 0 means to turn them all off

  for(int i = 0; i < 13; i++) {
    stick.led(i);
    delay(250); // short delay
  }
}
```

Listing 1. The example sketch for the 12LEDstick Arduino library

## Install the 12LEDstick

Assuming your 12LEDstick's header is installed in a manner similar to the one in Figure 1, you can simply plug the 12LEDstick into the header of the Arduino at pins D2-D5. See Figure 4.

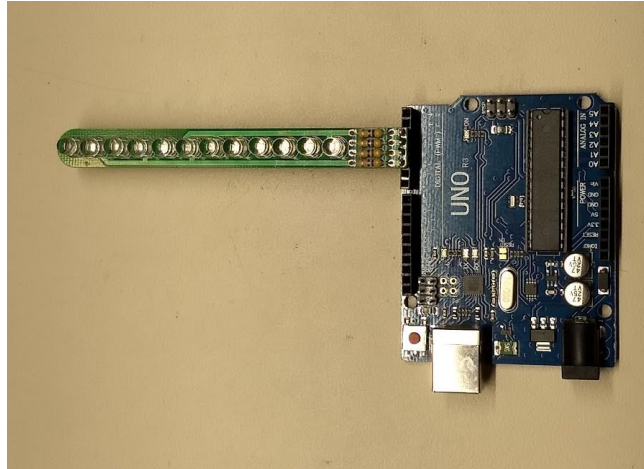


Figure 4. The 12LEDstick installed on an Arduino UNO clone

Feel free to use any four consecutive digital or analog pins that you wish. Just be sure to change the pins numbers referenced in the LEDstick object instantiation statement:

```
LEDstick stick(2, 3, 4, 5); // single instance, defining pins used
```

Compile and upload the sketch to the Arduino using the “Sketch / Upload” menu item. You should observe a slow walk of illuminated LEDs, starting nearest the Arduino and moving outward. Make sure you’ve selected the correct board type and port from the “Tools” menu.

## Multiple 12LEDsticks

You can use more than one 12LEDstick at a time. See Listing 2.

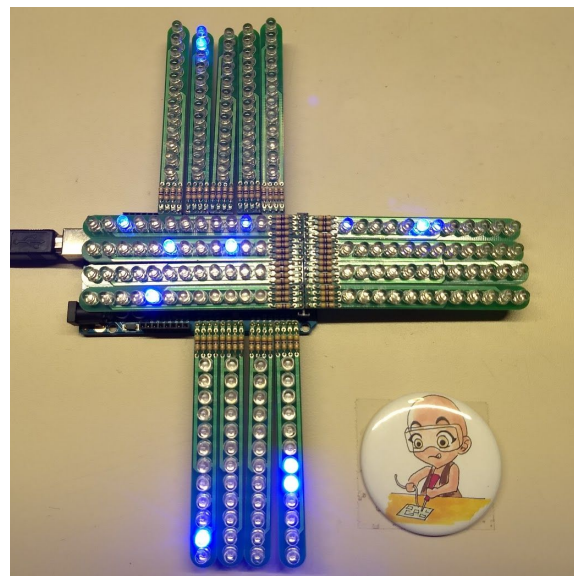


Figure 5. Seventeen 12LEDsticks installed on an Arduino MEGA

Be sure to not exceed the maximum drive current that the Arduino's processor can supply. For the ATmega328P, this limit is 200mA, which is sufficient to drive as many as 8 LEDs at once (and nothing else). The same limit applies to the ATmega2560 on the Arduino MEGA board. See Figure 5.

```
// LEDstick_library_test
// test the LEDstick library
// 1 November 2016 - Dale Wheat - https://www.dalewheat.com

#include <LEDstick.h>

//LEDstick stick(4, 5, 6, 7); // single instance

LEDstick stick[] = {
  LEDstick(21, 20, 19, 18), // SCL, SDA, RX1, TX1 - ghosting due to I2C
  pullups
  LEDstick(17, 16, 15, 14), // RX2, TX2, RX3, TX3 - all OK
  LEDstick(0, 1, 2, 3), // RX0, TX0, 2, 3 - ghosting due to conflict with RX0
  LEDstick(4, 5, 6, 7), // all OK
  LEDstick(8, 9, 10, 11), // all OK
  LEDstick(A0, A1, A2, A3), // all OK
  LEDstick(A4, A5, A6, A7), // all OK
  LEDstick(A8, A9, A10, A11), // all OK
  LEDstick(A12, A13, A14, A15), // all OK
  LEDstick(22, 24, 26, 28), // all OK - can short to USB connector
  LEDstick(30, 32, 34, 36), // all OK - can short to USB connector
  LEDstick(38, 40, 42, 44), // all OK
  LEDstick(46, 48, 50, 52), // all OK
  LEDstick(29, 27, 25, 23), // all OK
  LEDstick(37, 35, 33, 31), // all OK
  LEDstick(45, 43, 41, 39), // all OK
  LEDstick(53, 51, 49, 47) // all OK
};

void setup()
{
  // note: no special setup required when using library

  // note - do not exceed device capability - no more than 8 LEDs on a time
}

// single pixel walk

void single_pixel_walk(void)
{
  byte LED, n;
```

```

for(n = 0; n < 17; n++) {
  for(LED = 0; LED < 13; LED++) {
    stick[n].led(LED);
    delay(100);
  }
  stick[n].led(0); // turn off LED
}
}

void random8(void)
{
  // illuminate up to 8 random pixels

  byte n;

  // clear all LEDs first to prevent exceeding current capabilities of the
  chip

  for(n = 0; n < 17; n++)
  {
    stick[n].led(0); // LED off
  }

  // illuminate some random LEDs

  for(n = 0; n < 8; n++)
  {
    stick[random(0, 17)].led(random(1,13));
  }
  delay(100); // short delay
}

void loop()
{
  //single_pixel_walk();
  random8();
}

```

Listing 2. Lighting as many as 8 random LEDs on seventeen 12LEDsticks

## Using Other Controllers

You can use any microcontroller with four available programmable pins provided each pin can be reconfigured as a high output, a low output or a high-impedance input. Additionally, each pin

must be able to sink or source as much as 20-25mA to effectively illuminate the LEDs on the 12LEDstick.

To make the logic of pin management more understandable, please see Table 1.

LED	Pin 1	Pin 2	Pin 3	Pin 4
1	+5V	0V	-	-
2	0V	+5V	-	-
3	-	+5V	0V	-
4	-	0V	+5V	-
5	0V	-	+5V	-
6	+5V	-	0V	-
7	+5V	-	-	0V
8	0V	-	-	+5V
9	-	+5V	-	0V
10	-	0V	-	+5V
11	-	-	+5V	0V
12	-	-	0V	+5V

Table 1. Connections required to illuminate individual LEDs on the 12LEDstick.

## Thank You

Thank you for your support of Dale Wheat . com products. Please contact us if you have any questions or comments about this product:

<https://www.dalewheat.com/contact/>

