# Large Digit Driver Hookup Guide

Introduction

Large numerical displays are a great addition to any project where you want to be able to see information at a distance. Scorekeepers and lap timers would be a great application for large 7-segment LED displays. The Really Big 7-Segment Display (6.5") fits that bill nicely. Driving several displays at the same time would be handy, which is where the Large Digit Driver board comes in.
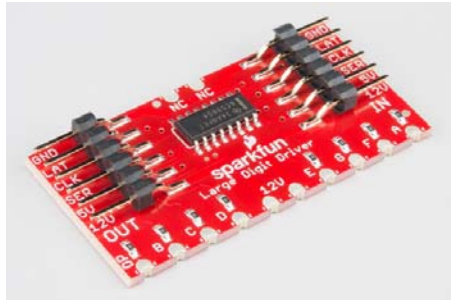
The Large Digit Driver can be soldered directly to the bottom of the 7-Segment Display.

Several Large Digit Drivers can be chained together to create a display with multiple digits.
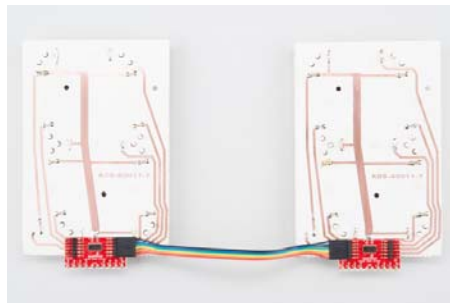
Covered in This Tutorial

In this tutorial, we will give you an overview of the Large Digit Driver and provide an example of hooking up the driver to an Arduino:

- Board Overview – To begin, we'll go over each of the pins on the breakout board and their function.
- Hardware Hookup – In this section, we'll show you how to hook the Large Digit Driver up to an Arduino.
- Example: One Large Digit – Here, we give an example of an Arduino sketch to control one of the large 7-segment displays through the Large Digit Driver.
- Example: Two Large Digits – We show how to daisy chain two large 7-segment displays together and control them with two Large Digit Drivers.
- Resources and Going Further – This section gives some additional resources for getting more out of the Large Digit Driver.

Materials Used

You will need a few components and tools to follow along with this tutorial. Here is what you will need:

Large Digit Driver Hookup Guide SparkFun Wish List

	Jumper Wires Premium 6" M/F Pack of 10
	PRT-09140
	This is a SparkFun exclusive! These are 155mm long jumpers termin…
	Wall Adapter Power Supply - 12VDC 600mA
	TOL-09442
	This is a high quality AC to DC 'wall wart' which produces a regulated…
	SparkFun RedBoard - Programmed with Arduino
	DEV-12757
	At SparkFun we use many Arduinos and we're always looking for the…
	7-Segment Display - 6.5" (Red)
	COM-08530
	No really - it's 6 inches (153mm) tall! This very large 7-segment displa…

For each additional digit you want to add, you will need:

- 7-Segment Display - 6.5" (Red)
- Large Digit Driver
- Jumper Wire - 0.1", 6-pin, 4"

Recommended Reading

Before getting started with the Large Digit Driver, there are a few concepts that you should be familiar with. Consider reading some of these tutorials before continuing:

- What is an Arduino? – We will use an Arduino to control the Large Digit Driver
- Shift Registers – The Large Digit Driver uses a shift register to move data to each digit
- How to Solder - Castellated Mounting Holes – You will need to solder the Large Digit Driver to the back of the 7-segment LED display

Board Overview

Pin Descriptions

The Large Digit Driver has 6 input pins and 6 output pins.
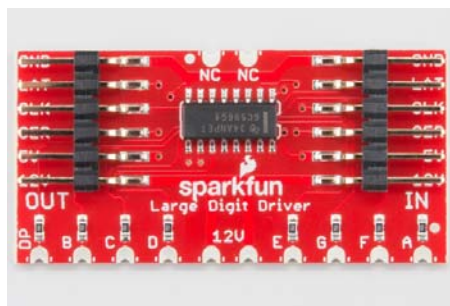
IN Pin	Description
GND	Connect to ground
LAT	Data transfer in from SER on the rising edge of the latch pin
CLK	Data transfer in from SER on the rising edge of the clock pin
SER	Serial data in
5V	Connect to power (5V)
12V	Connect to power (12V)

| OUT Pin	Description

|	
GND	Connect to ground (used to provide a ground pin to the next Large Digit Driver in the chain)
LAT	Connect to the LAT pin on the next Large Digit Driver in the chain
CLK	Connect to the CLK pin on the next Large Digit Driver in the chain
SER	Serial data out to the next Large Digit Driver
5V	5V out to the next Large Digit Driver
12V	12V out to the next Large Digit Driver

Hardware Hookup

Protect the Board

Before you attach the Large Digit Driver to the 7-segment display, you will need to isolate the exposed vias on the back of the board. Some of the Driver boards are created with through-hole vias that are not covered with solder mask. As a result, this could likely short out the traces on the back of the 7-segment display.

We recommend using a piece of electrical tape or high temperature tape to cover the vias on the back of the Driver board.
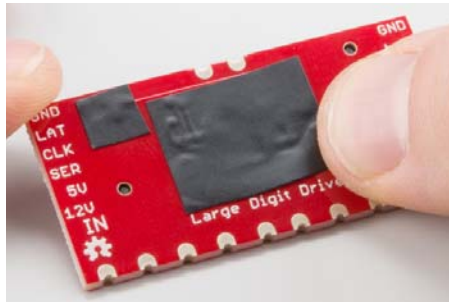

Attach the Board

You will need to solder the Large Digit Driver to the back of the 7-segment display. Have the Driver's 10 pins facing toward the bottom of the large 7-segment display and lined up with the traces on the back of the 7-segment display. Follow the Soldering Castellated Vias Guide to solder all 10 of the castellations as well as the 2 castellations at the top of the board (these should be attached to the 12V line and are just for mechanical support).
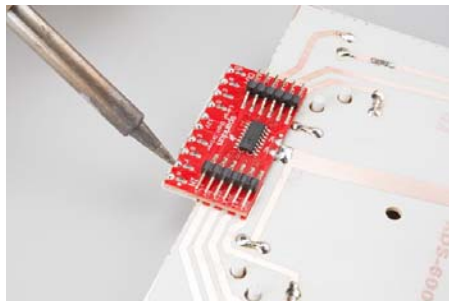
Connect the Board

We will be using the Arduino's regulated 5V and unregulated 12V (from the wall adapter) to power the 7-segment display and Large Digit Driver.

Connect the Large Digit Driver to the the following pins on the Arduino.
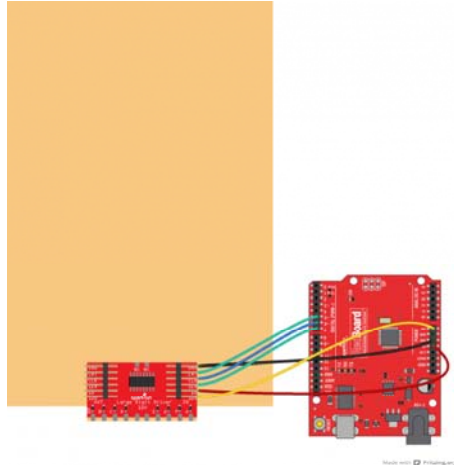
Large Digit Driver	Arduino
GND	GND
LAT	5
CLK	6
SER	7
5V	5V
12V	VIN

Example: One Large Digit

Load the Single Digit Example Code

Plug your Arduino into your computer via USB cable. Open up the Arduino program and copy in the following sketch.

```
Large Digit Driver - 1 Digit (https://codebender.cc/sketch:129172?
referrer=ShawnHymel) by ShawnHymel
(https://codebender.cc/user/ShawnHymel?referrer=ShawnHymel)
  3    By: Nathan Seidle
  4    SparkFun Electronics
  5    Date: February 25th, 2015
  6    License: This code is public domain but you buy me a beer
  7
  8    The large 7 segment displays can be controlled easily with
  9    one display.
 10
 11    Here's how to hook up the Arduino pins to the Large Digit
 12
 13    Arduino pin 6 -> CLK (Green on the 6-pin cable)
 14    5 -> LAT (Blue)
 15    7 -> SER on the IN side (Yellow)
 16    5V -> 5V (Orange)
 17    Power Arduino with 12V and connect to Vin -> 12V (Red)
 18    GND -> GND (Black)
 19
 20    There are two connectors on the Large Digit Driver. 'IN' i
 21    your microcontroller (the Arduino). 'OUT' is the output si
 22    digits.
 23
 24    Each display will use about 150mA with all segments and de
 25    */
 26
 27    //GPIO declarations
 28    //-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
 29    byte segmentClock = 6;
 30
```
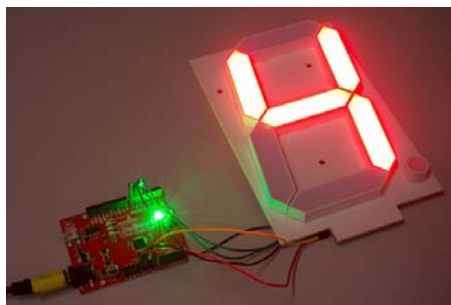
Loading Boards...   → Run on Arduino

Run

Upload the sketch to your Arduino, and plug the 12V adapter into the Arduino.
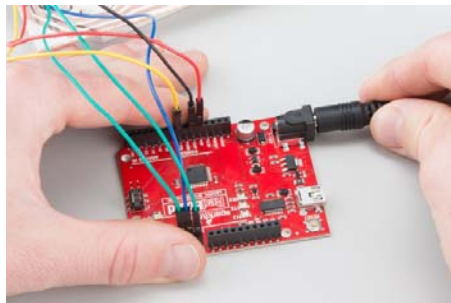

Flip the 7-segment display over. You should see it count the digits 0-9 (the decimal point will appear on 9).

Example: Two Large Digits

Attach a Second Digit

Use the 6-pin jumper wire to attach a second 7-segment display to the first display unit. Make sure that you connect GND of the OUT on the first display to the GND of the IN on the second display, LAT of the OUT on the first display to the LAT of the IN on the second display, and so on.
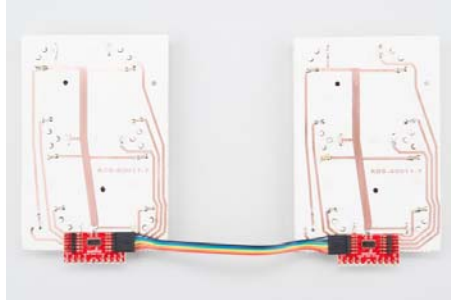
You will want to connect the Large Digit Driver on the right to the Arduino as per the Hardware Hookup section.

Load the Two Digit Example Code

Make sure the Arduino is plugged into your computer using a USB cable. Copy the following sketch into the Arduino program.

```
Large Digit Driver - 2 Digits (https://codebender.cc/sketch:122910?
referrer=ShawnHymel) by ShawnHymel
(https://codebender.cc/user/ShawnHymel?referrer=ShawnHymel)

  3    By: Nathan Seidle
  4    SparkFun Electronics
  5    Date: February 25th, 2015
  6    License: This code is public domain but you buy me a beer
  7
  8    This code demonstrates how to post two numbers to a 2-digi
  9
 10    Here's how to hook up the Arduino pins to the Large Digit
 11
 12    Arduino pin 6 -> CLK (Green on the 6-pin cable)
 13    5 -> LAT (Blue)
 14    7 -> SER on the IN side (Yellow)
 15    5V -> 5V (Orange)
 16    Power Arduino with 12V and connect to Vin -> 12V (Red)
 17    GND -> GND (Black)
 18
 19    There are two connectors on the Large Digit Driver. 'IN' i
 20    your microcontroller (the Arduino). 'OUT' is the output si
 21    digits.
 22
 23    Each display will use about 150mA with all segments and de
 24
 25  */
 26
 27  //GPIO declarations
 28  //-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
 29  byte segmentClock = 6;
 30
```

Loading Boards... → Run on Arduino

Run

Upload the sketch to your Arduino, and plug in the 12V supply. The 7-segment display (now two digits!) should count from 00 to 99.
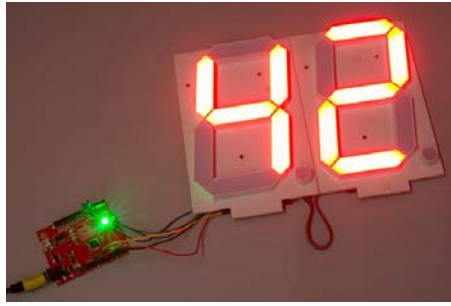
Resources and Going Further

Now that we have tested the large 7-segment displays, they are ready to be used in your project! Feel free to change the code to display other numbers or symbols on the displays.
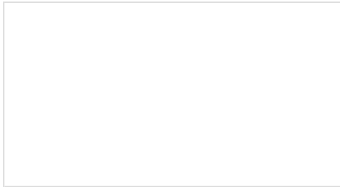
Resources

Here are some additional resource to help you with the Large Digit Driver:

- Large 7-Segment Display Datasheet
- Datasheet for the shift register on the Large Digit Driver
- Large Digit Driver GitHub Repository

Other Tutorials

What will you make with the Large Digit Driver? If you need some inspiration, check out these related tutorials:
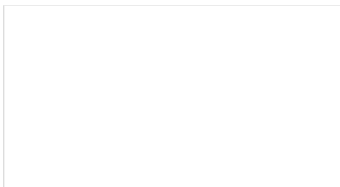

Dungeons and Dragons Dice Gauntlet
A playful, geeky tutorial for a leather bracer that uses a LilyPad Arduino, LilyPad accelerometer, and seven segment display to roll virtual 4, 6, 8, 10, 12, 20, and 100 side dice for gaming.
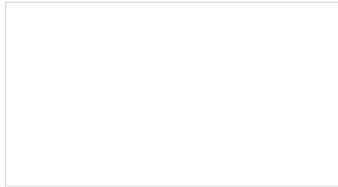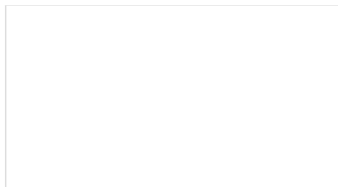

Galileo Unread Email Counter
How to create a simple unread-email checker with the Intel/Arduino Galileo.

Interactive Hanging LED Array
Learn how we converted 72 lightbulbs into an interactive LED array for our conference room.

Alphanumeric GPS Wall Clock
This is a GPS controlled clock - a clock you truly never have to set! Using GPS and some formulas, we figure out what day of the week and if we are in or out of daylight savings time.