RadioShack®

2760339
User's Guide

39.3" (1m)
Tricolor LED Strip

Thank you for purchasing your Tricolor LED Strip from ***RadioShack****. Please read this user's guide before setting up and using your new LED Strip.*

Package Contents

- Programmable Tricolor LED Strip — 39.3" (1 meter)
- User's Guide

Features

- Build LED patterns or shapes using program codes for your Arduino board (not included)
- Light the entire strip or cut it into 10-cm segments for more flexibility in making designs
- Includes Arduino programs for tutorial

Required Tools and Hardware

- Arduino board
- Solder
- Soldering iron
- Scissors
- Utility knife
- Diagonal cutters
- Adhesive tape
- 20-gauge insulated hookup wire
- DC power (12 V, 1 A) with 5.5 mm barrel plug

Connect to the Arduino Board

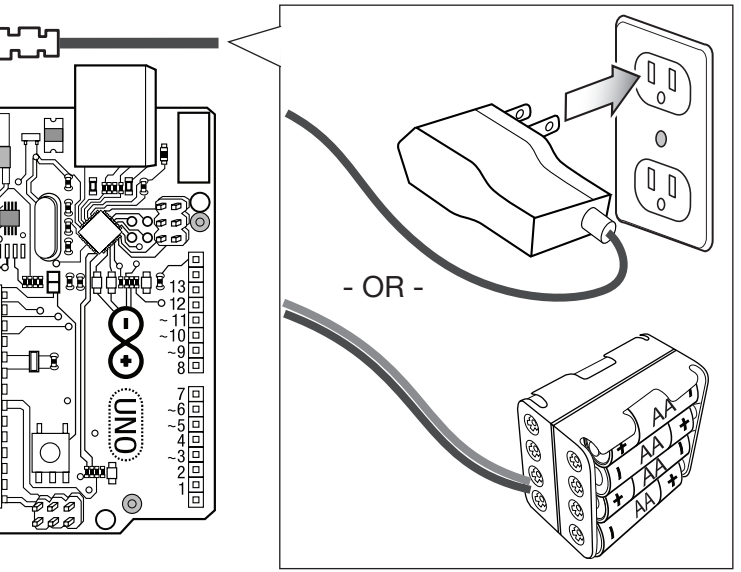
Connect the three wires on your LED Strip to your Arduino board.

- **+12 V** (red) to **Vin**
- **GND** (black) to **GND**
- **DIN** (green) to **A0**

Connect to DC Power

Connect your Arduino board to an external DC power supply with a 5.5 mm barrel plug.

Note: *The power source must supply 12 V DC and deliver at least 1 A. Its center tip must be set to positive and its plug must fit the DC 12 V jack. Using an adapter that does not meet these specifications could damage the product or adapter.*



Download the Support Files

1. Go to shack.net/LED0339
2. At the end of the blog post, click **RadioShack Tricolor LED Strip Support Files** and save the folder to your computer.

Verify and Upload the Program

1. Open 2760339_Program.ino in the Arduino development window.
2. Upload the program to your Arduino board.

Your LED strip will now work with your Arduino board.

Note:

- *2760339_Program.ino is designed for Arduino Uno only. To use this program with other Arduino models, modify the pin definitions to match your Arduino.*
- *See "LED Driver/Controller IC" on* **page 9** *for information on modifying the LED Strip program.*

Optional: Feeling Creative?

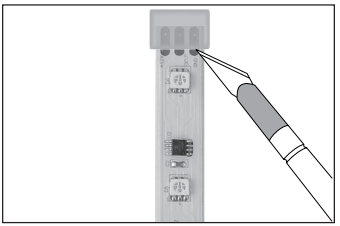
You can cut your LED Strip into ten 10-cm segments to make different designs.

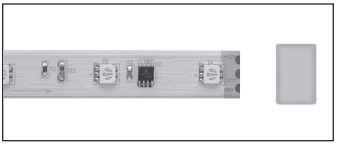
Warning: *Before cutting the LED Strip, be sure to disconnect the strip from the Arduino board and the power supply.*

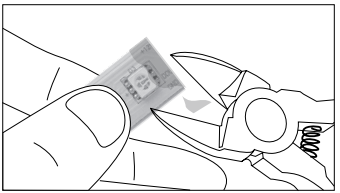
The silicone glue on the ends of the strip protect it from water and moisture. Remove this glue from the printed circuit board (PCB) before soldering.

1. On the end of the strip opposite the three wires, use a utility knife to cut the glue between the tube and the cap.
2. Remove the cap from the tube.
3. Use diagonal cutters to remove the glue from the PCB inside the tube.

Note: *Be sure not to damage the soldered pads on the end of the strip.*

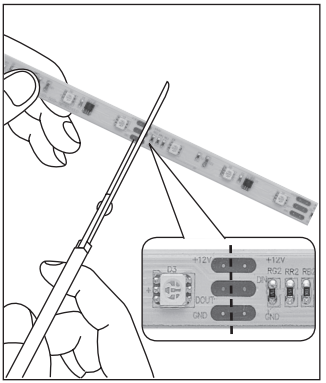


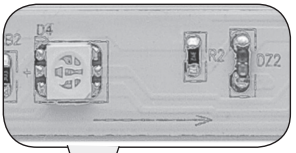


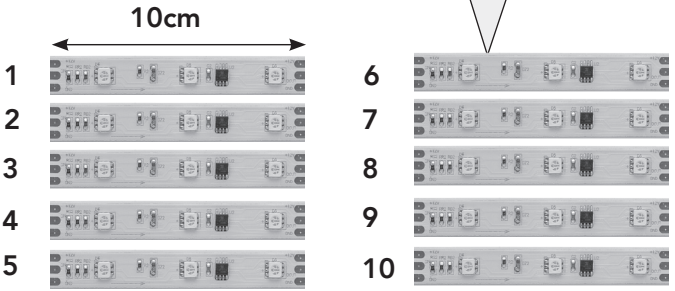


4. Cut through the middle of the copper pad to divide the strip into segments.

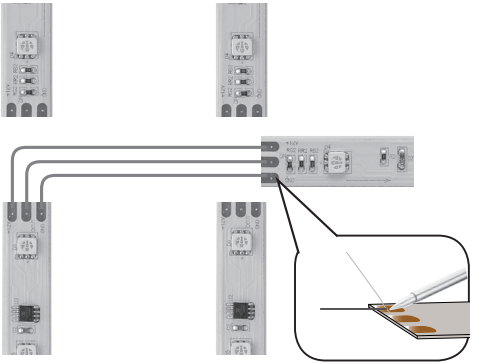
5. An arrow is located in each segment indicating the direction of signal flow. Be sure each segment faces the same direction.







6. Draw your design on a sheet of paper, paying attention to the signal flow. Using a temporary adhesive, place the segments into your design.
7. Solder the segments in order according to your design. Be sure that the signal flows through each strip in the same direction.



8. After you construct the design, upload your program to your Arduino board (see"Verify and Upload the Program" on **page 5**).

LED Driver/Controller IC

The LED driver/controller integrated circuit (TM1803) is the key integrated circuit (IC) for the LED strip. You can modify the settings to change the colors and flash rate of each LED segment.

In the **RadioShack Tricolor LED Strip Support Files** folder, and open **TM1803.pdf** for information that can help you understand how to control this IC for program modifications.

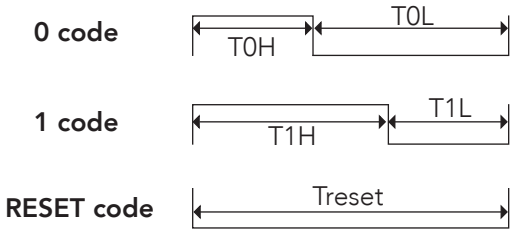
TM1803 Description

Your LED Strip features a TM1803 IC chip, which uses a single wire to communicate a return-to-zero (RZ) code method to send signals. At the power-on reset status — when the chip receives complete 24-bit data from data in (DIN) — it begins transmitting data to the next chip via data out (DO). Before transmission, DO will be at a low level. Three pulse width modulations (PWM) — OUTR, OUTG, OUTB — output different duty signals every 4 milliseconds according to different data per 24 bits. If the input signal is reset, the chip can receive new data after displaying all of the received data. When the chip receives a new 24 bits of data, it will transmit them to next chip via DO.

The TM1803 features auto-shape and signal transmission. The number of cascade is not limited by signal transmission, but is limited by screen refresh speed.

Timing Waveform

Input Pattern

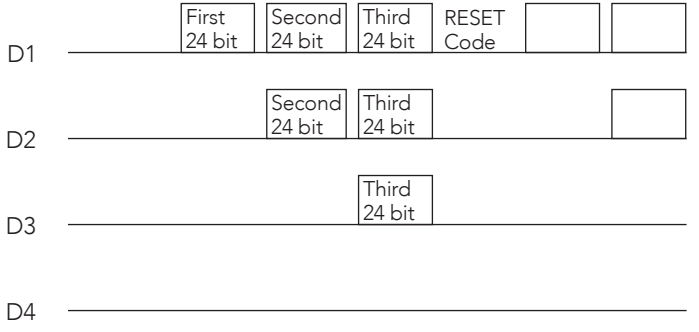


Name	Description	TYP	Tolerance
T0H	0 code, high time	0.7us	±200ns
T1H	1 code, high time	1.8us	±200ns
T0L	0 code, low time	1.8us	±200ns
T1L	1 code, low time	0.7us	±200ns
Treset	Reset code, low time	24us	—

Note: *When on high-speed mode, these times are decreased by half.*

Connection Method

Data Transfer Method



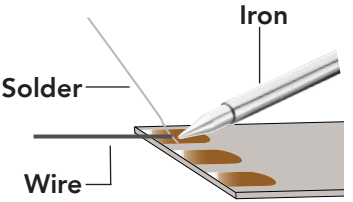
24-Bit Data Structure

R 7	R 6	R 5	R 4	R 3	R 2	R 1	R 0	G 7	G 6	G 5	G 4	G 3	G 2	G 1	G 0	B 7	B 6	B 5	B 4	B 3	B 2	B 1	B 0

Note: *Upper bit first, sent data in accordance with R, G, B order.*

How to Solder

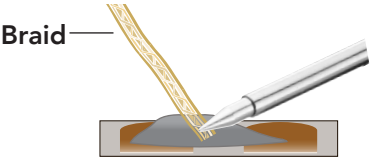
1. Place the wire on the correct pad.
2. Press the iron to the pad, and heat the pad for a few seconds, so that the solder will flow smoothly and evenly.



3. Do not move the iron. Instead, touch the solder to the point where the iron, pad, and wire all meet.
4. Flow a small amount of solder onto the joint. The solder joint should have enough solder to hold the wire, but should not extend beyond the pad and should extend only slightly above the pad.

Bridges

A **bridge** forms if solder flows over the board, connecting two pads that should not be connected.



To Fix:

1. Place the end of your desoldering braid directly on the solder.
2. Press the iron on top of the braid. When the solder melts, the braid will soak up the excess.

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