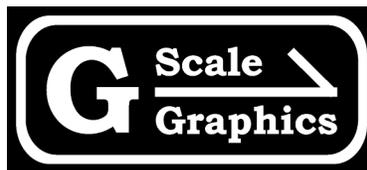
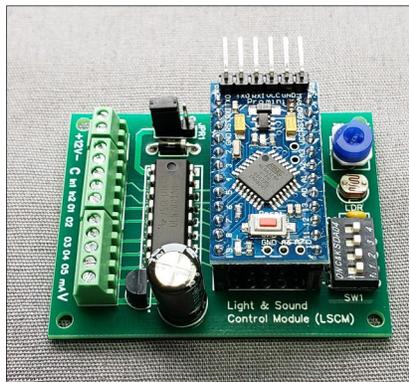


# LSCM

## Light & Sound Control Module

### Operation and Installation Manual



G-Scale Graphics  
5860 Crooked Stick Dr.  
Windsor, CO 80550  
970-581-3567

GScaleGraphics@comcast.net  
[www.GScaleGraphics.net](http://www.GScaleGraphics.net)

# LSCM

The **Light & Sound Control Module** is intended for use in a large scale garden railroad building to control individual room lights and sounds in a random fashion to simulate activity in the building. It can control LEDs, light bulbs, sound boards, and other loads up to 500ma.

The LSCM uses an Arduino as the controller, which allows users familiar with the Arduino to modify the factory program or create their own for a custom application.

## Input Power

Input power should be 12 VDC (not AC). We have a low cost plug-in power supply available (Not included with LSCM). It can be used to power all of your building's LSCM's and Sound Clip Modules. Extend 22 ga. Wire from the adapter plug as needed around your railroad.



A 3-pin On/Off jumper header is provided on the board. Or a SPST switch can be connected to the ON terminals for remote on/off capability.

The on-board light sensor can be used to turn on lights at night. Turn adjustment counter clockwise until lights just turn on at desired darkness. This option should be used when powered by a 12V power supply, as there will be a small current draw with lights off. Turn adjustment full clockwise to keep lights and other outputs enabled during the day.

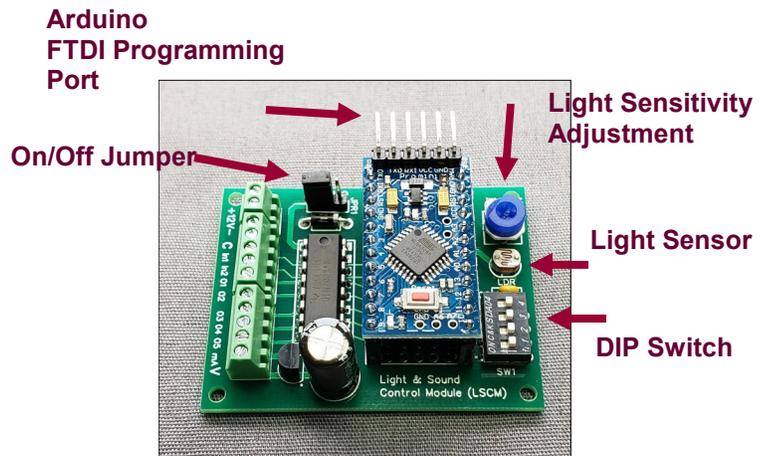
## Programming

The 4 position DIP switch determines if outputs 1-3 are for lights or sound triggers. DIP 1 programs Out1, DIP 2, Out 2, and DIP 3, Out 3. DIP 4 is not used.

- Switch OFF sets the output for use with lights. When the output is turned on at random, it will stay on until it is turned off.
- Switch ON sets the output for use with a Sound Clip Module. When the output is turned on at random, it will only stay on momentarily.

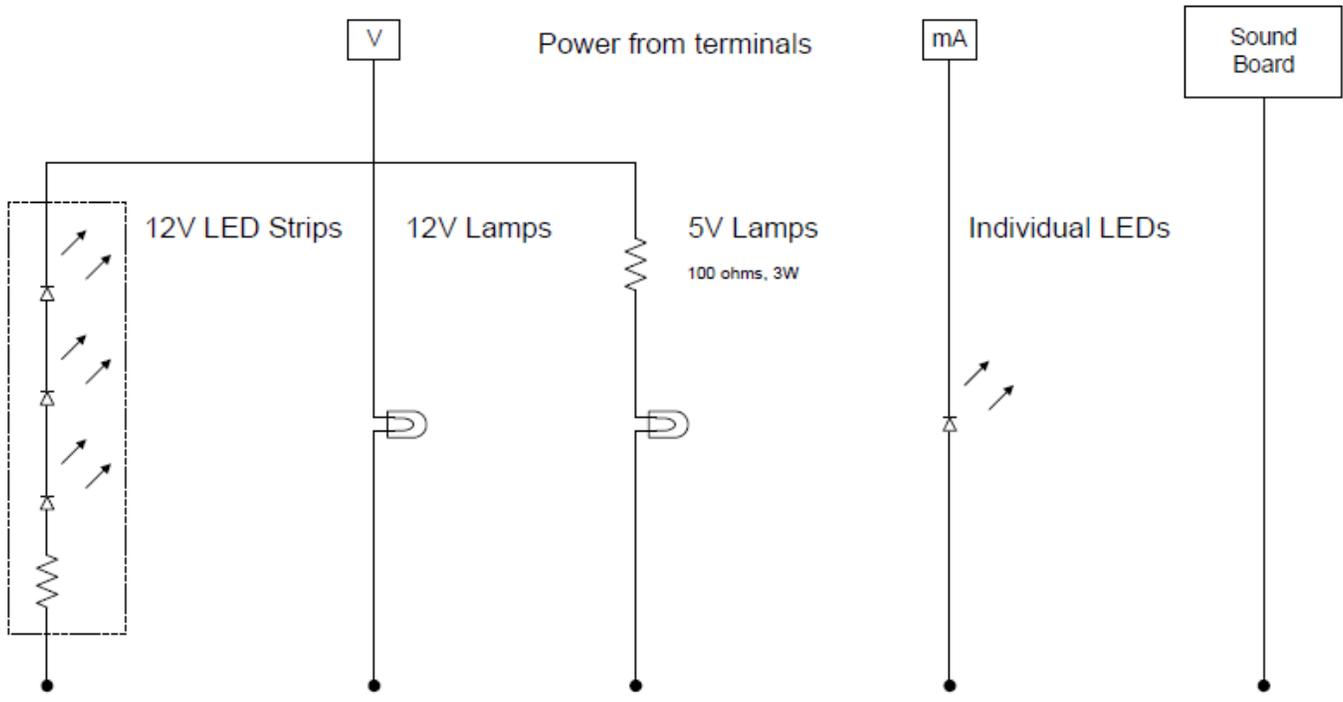
## Outputs

All outputs are open collector, i.e. the output terminal is connected to common (power -) when activated. The other side of the load needs a power source. 12V LED strips should be connected to the V terminal (+12V); individual LEDs should be connected to the mA terminal (20ma); and a sound board will have its own internal pull-up resistor to provide the power it needs. (See wiring diagram).

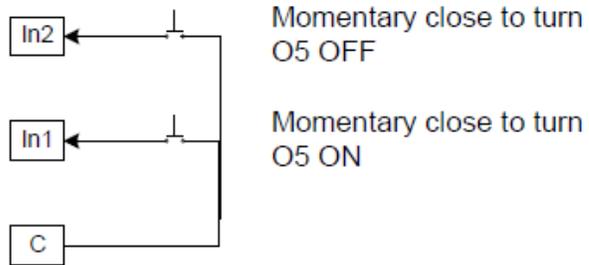
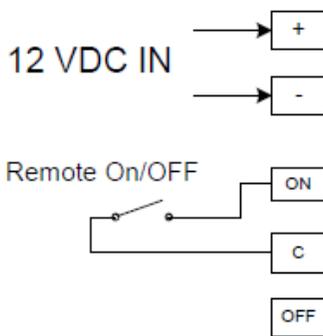


# LSCM

## Light & Sound Control Module Wiring diagram



To Output switching terminals O1,O2,O3,O4,or O5 as desired. 500ma max each.  
O1 thru O4 switch at random. O5 controlled by In1,In2.



## Installation

The board needs to be protected from the weather and water. Additional protection, other than just the structure it may be placed in, is recommended. e.g. a small plastic project box (e.g. [www.AllElectronics.com](http://www.AllElectronics.com) CAT# TB-2) with a hole just large enough for wiring entry/exit.

## LED Strips

Our LED Strips (available separately) have 3 LEDs with 12" of either bare wire, or terminated in a locking connector.



## Power Distribution

You only need one 12V power supply for all of your buildings. Route the 12V supply around your layout and then use 2-wire locking connectors at each building to allow easy removal of the building from the layout for maintenance or storage.



## Arduino

The LSCM is shipped with an Arduino Pro-Mini. It can be programmed using the Arduino IDE software and an FTDI to USB serial programming adapter. *Further explanation of the Arduino environment and programming is beyond the scope of this manual.*

LSCM.ino is the source code for the default program. This is an excellent starting point to modify or create you own application for the LSCM. LSCM.ino can be downloaded from our website.

### Arduino I/O

In1	2	Contact closures to common, terminal "C".
In2	3	
O1	4	Open collector outputs
O2	5	
O3	6	
O4	7	
O5	8	
LDR	A0	Light Dependent Resistor
DIP1	10	4 position DIP switch
DIP2	11	
DIP3	12	
DIP4	13	Not used
VCC	3.2V or 5V	Used to power LDR



# LSCM - Hardware Specifications

Revision "New"

## Mechanical

PCB: 2.2"L X 1.7"W X 1.75"H

## Electrical

Power Input: 12 VDC from battery pack or DC power supply at terminals "-12V+".  
12V nominal to operate 12V LED strips. LSCM will operate from 6 to 12.6VDC max.  
Reverse polarity protection.

Power Outputs: Voltage output to loads on terminal "V" equals input voltage minus 0.6V. Current output to loads on terminal "mA" = 20 ma, intended for individual LEDs.

Control Inputs - normally open, momentary close to common

Turn ON Output 5, Terminals "In1" to "C".

Turn OFF Output 5, Terminals "In1" to "C".

DIP4 switch, User Programming

Control Outputs - O1 thru O5

Open collector outputs, each rated for 500ma max.

**Made by G-Scale Graphics in Windsor, Colorado, USA**

This optional mounting base and cover provide some minimal protection from the weather. However, the module still needs installed in a protected space.

The base provides a nice flat insulated mounting surface to protect the PCB circuitry. The cover provides some protection for the Arduino module, while leaving the user controls and light sensor exposed.

