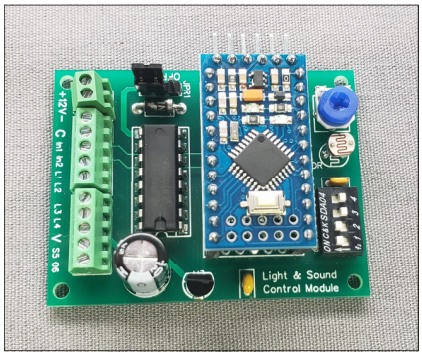
LSCM2

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

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LSCM2

The **Light & Sound Control Module** is intended for use in a large scale garden railroad building to control individual room lights and sounds to simulate activity in the building.

Four outputs (L1-L4) are dedicated to operating room lights in a random fashion to simulate activity in the building.

Two more outputs (S5 and O6) can be user configured to operate 12V LED light strips, light bulbs, sound boards, and other loads up to 500ma. They can be triggered via switch inputs, motion detectors, or set for random operation.

The LSCM uses an Arduino as the controller, which allows users familiar with Arduino programming to modify the factory program or create their own 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 which would drain batteries. Turn adjustment full clockwise to keep lights and other outputs enabled during the day.

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), and a sound board will have its own internal pull-up resistor to provide the power it needs. (See wiring diagram). Total current draw for all outputs summed together must not exceed 500ma.

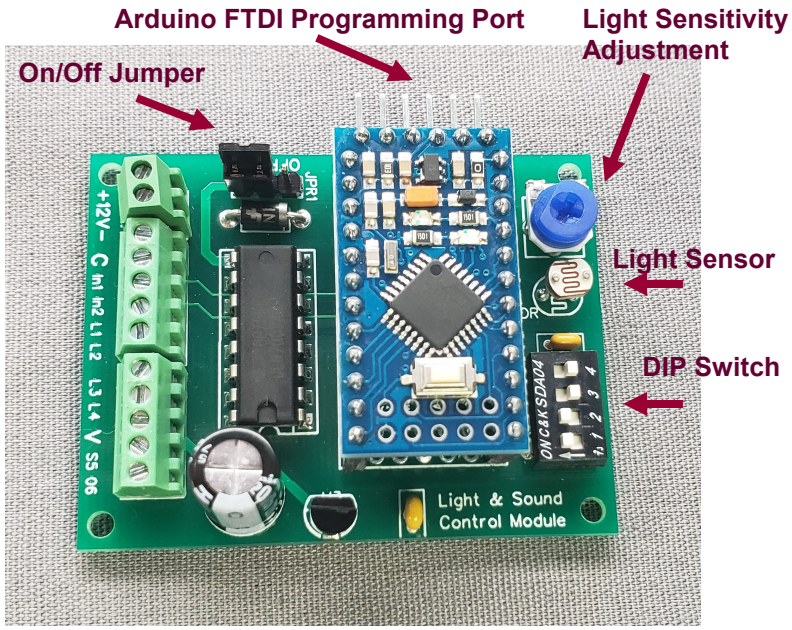
Four outputs (L1-L4) can be used for room lighting. Output 1 stays on most of the time and should be assigned to a main room, while Outputs 2,3,4 turn on and off randomly at shorter intervals indicating activity in the other rooms. A built-in light sensor will turn these outputs on at night, and off in the daytime.

Output S5 can be used to trigger a sound module. The trigger can be initiated via a switch (momentary push-button), a motion sensor, or just trigger at random intervals. (See User Programming below).

Output O6 can be used to turn on lights or any other kind of 12V load (See Specification below for max current).

Outputs S5 and O6 are not affected by the light sensor.

Programming



The DIP switch is used to configure the operation of Inputs 1 and 2, and Outputs S5 and O6.

Inputs 1 and 2 can be used to trigger lights and sound via switch contacts. Closing In1 or In2 to terminal C (common) activates. Inputs 1 and 2 can also be used with our motion detector module. (See wiring diagram).

Output S5 is always used as a sound trigger. It will switch low (to common) momentarily to activate the sound.

Output O6 can be used to operate 12V LED strips, lights, or other loads.

The Arduino FTDI programming port is used for factory programming, and can be used by experienced Arduino programmers, if desired, but you are on your own ! We cannot support your programming efforts.

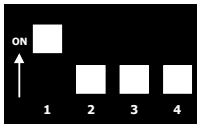
In1,In2 S5,O6 Configurations

0 0 0 0

S5 is triggered by a momentary switch closure; In1 to Common.

O6 is turned ON by a momentary switch closure: In2 to Common, and turned OFF automatically 30 seconds later.

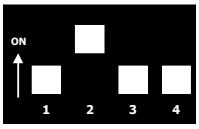
1 0 0 0



S5 is triggered automatically at random intervals. (In1 is not used).

O6 is turned ON by a momentary switch closure: In2 to Common, and turned OFF automatically 30 seconds later.

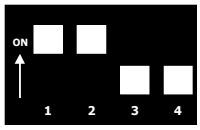
0 1 0 0



S5 is triggered automatically at random intervals.

O6 is turned ON by a momentary switch closure: In1 to Common, and turned OFF by a momentary switch closure: In2 to Common. (Could be used for a grade crossing light, turned on and off by reed switches in the track, magnet on the loco).

1 1 0 0



S5 is triggered by motion detector (detector output to In1, detector power from In2).

O6 is turned ON by a momentary switch closure: In1 to Common, and turned OFF automatically 30 seconds later.

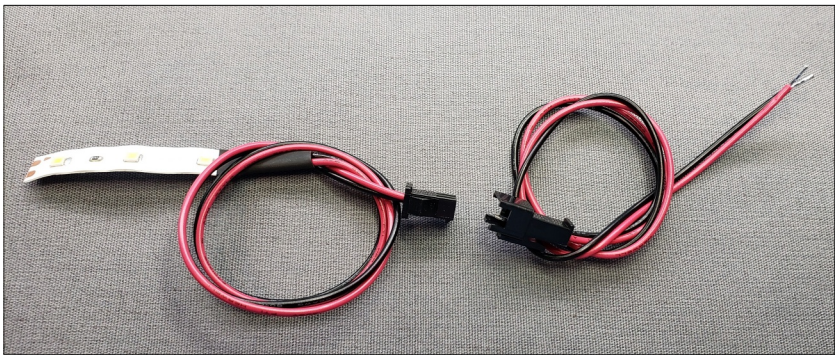
Note: Power down after making a change to the DIP switch. Your changes will take effect upon power-up.

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 CAT# TB-2) with a hole just large enough for wiring entry/exit.

LED Strips

Our LED Strips (available separately) have either 3 LEDs or 6 LEDs with 12" of either bare wire, or terminated in a locking connector.



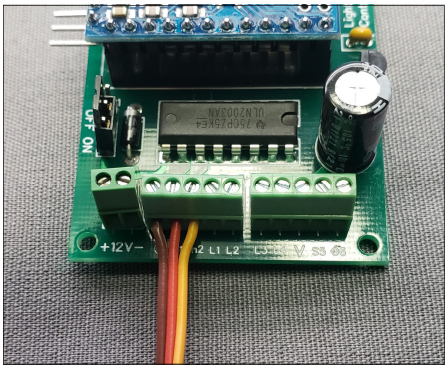
Building Power Connectors

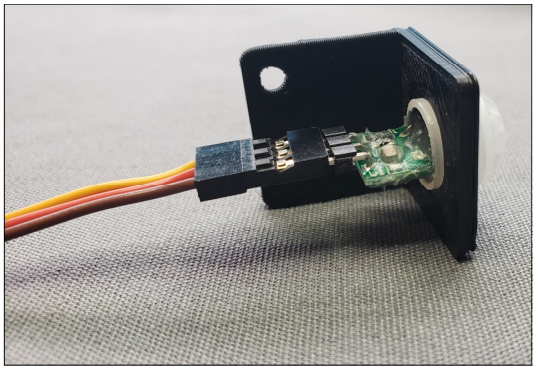
Power Distribution

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.

PIR Motion Detector

PIR stands for Passive Infra Red. Our sensor will detect motion within about 10 feet. It is connected to the In1,In2 and C terminals. Make sure the of the connections, as reverse polarity will damage the PIR !





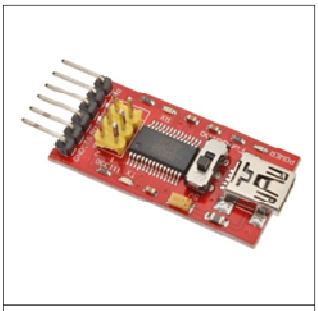
Arduino

The LSCM2 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.*

LSCM2.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. LSCM2.ino can be downloaded from our website.

Arduino I/O

In1	2	Contact closures to common, terminal “C”.
In2	3	
L1	4	Open collector outputs
L2	5	
L3	6	
L4	7	
S5	8	
O6	9	
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



FTDI Programmer
(Not included)

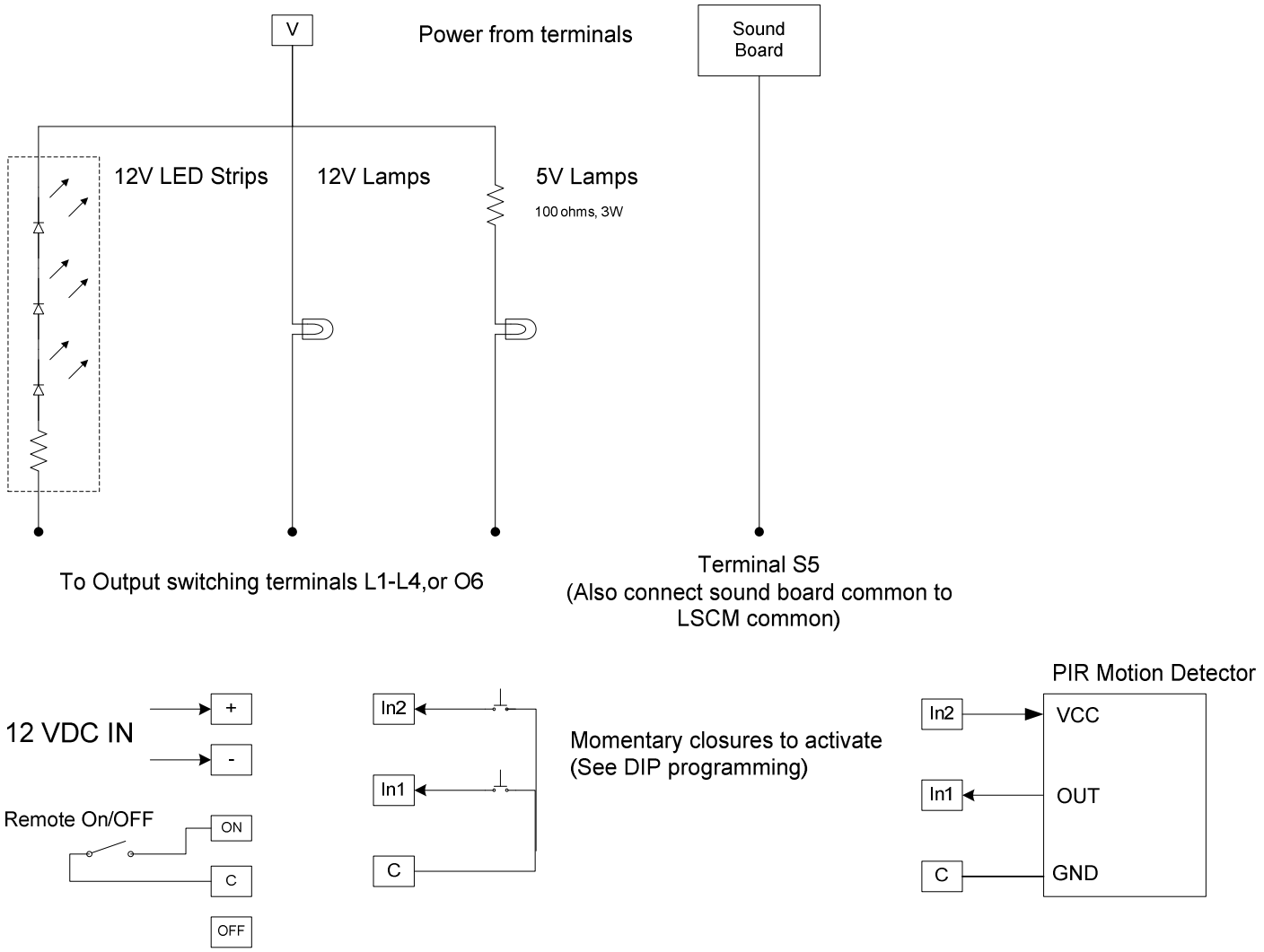
LSCM2 Scenarios ...

for use with 12V LED strips and Sound Clip Modules

- Random house lights - 4 LED outs latching on/off at random intervals. L1 thru L4 are always random light outputs under program control.
- House sounds - Random, PIR (or other input) triggers. 1 or 2 Sound outputs.
- External loads - Random, PIR (or other input) triggers. 1 or 2 Lights or other loads.
- Grade Crossing - 1 input (reed switch) turns output ON, the other input turns it OFF
- S5 and O6 are user programmable via DIP switch.

LSCM

Light & Sound Control Module
Wiring diagram



LSCM2 - 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.

Control Inputs - In1, In2
Normally open, momentary close to common
With DIP 1 and 2 ON, In2 provides 5V power to motion detector (25ma max).

Control Outputs - L1-L4,S5,O6

Open collector outputs, rated for a total of 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.