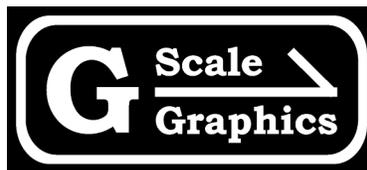
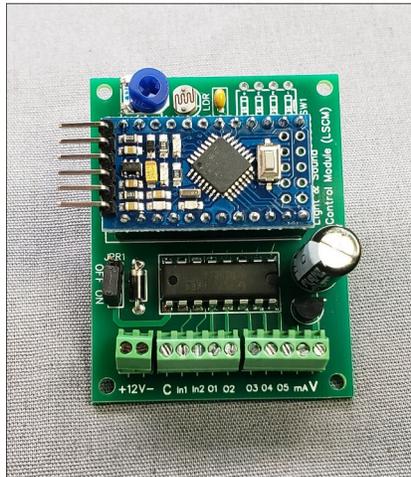


LSCM

Light & Sound Control Module

Operation and Installation Manual



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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). Low cost plug-in power supplies can be purchased from many sources, e.g. www.AllElectronics.com (catalog numbers shown).

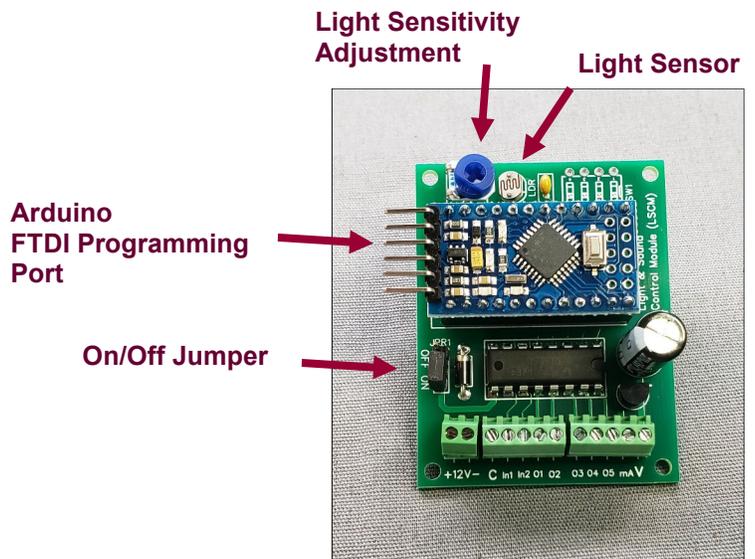


A 3-pin On/Off jumper header is provided on the board. Or a SPST switch can be connected to the ON terminals for remote on/off capability.

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.

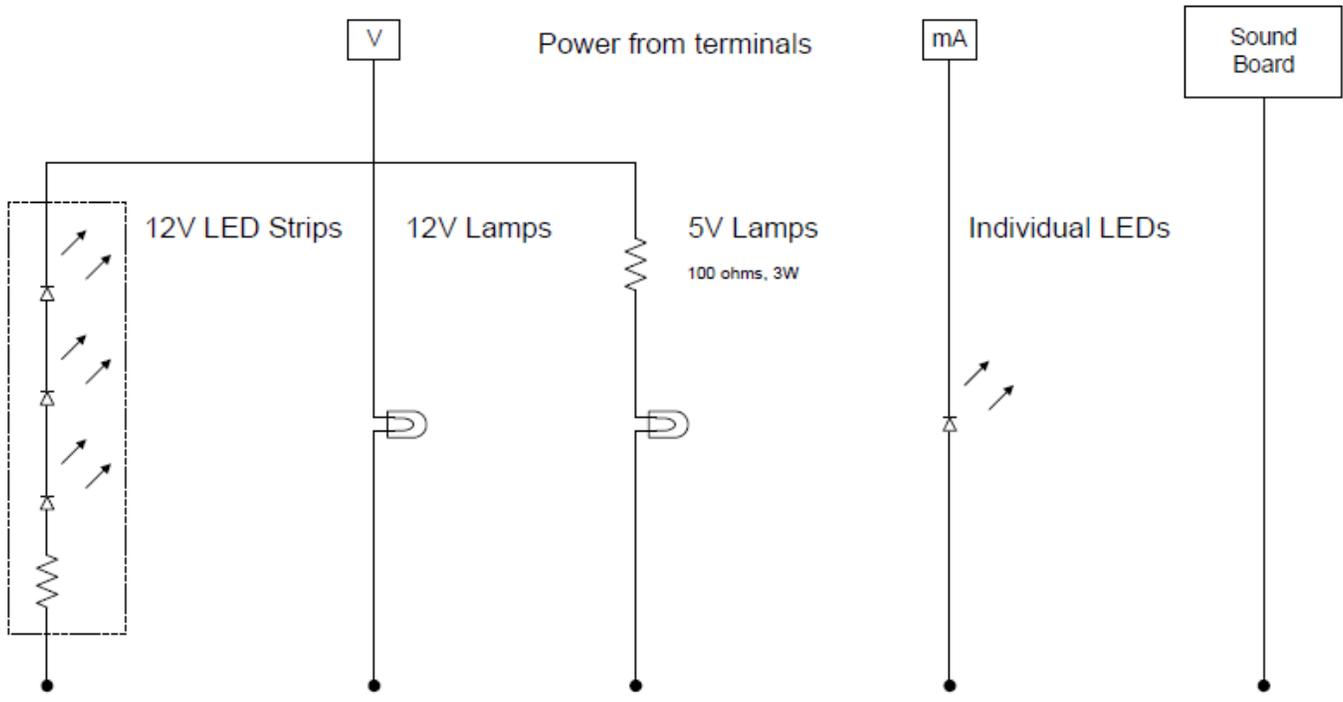
Outputs

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).

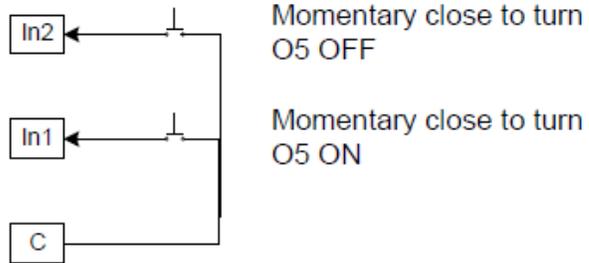
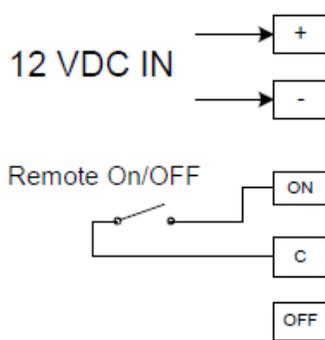


LSCM

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

LED Strips

“LED Strips” are a bunch of LEDs mounted on plastic tape. Every 3 LEDs have a current limiting resistor on the tape. The strips are powered by 12 VDC. You can cut the tape at each 3 LED interval to create the desired length, then either solder wires directly to the LED strip or you can use special 8mm connectors.

Bangood.com is a low cost, long lead time, source. You can get a 300 LED strip with a 12VDC power supply for less than \$10. They also have the connectors.



300 LED Strip



8mm LED Strip 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.



Building Power Connectors

Arduino

The LSCM is shipped with a 5V 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	Optional 4 position DIP switch
DIP2	11	
DIP3	12	
DIP4	13	
VCC	5V	Used to power LDR



FTDI Programmer

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 (not populated or used).

Control Outputs - O1 thru O5

Open collector outputs, each rated for 500ma max.

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