



# Model Train Technology™

16 Port DCC LED Scene Controller II

## KEYPAD USER MANUAL



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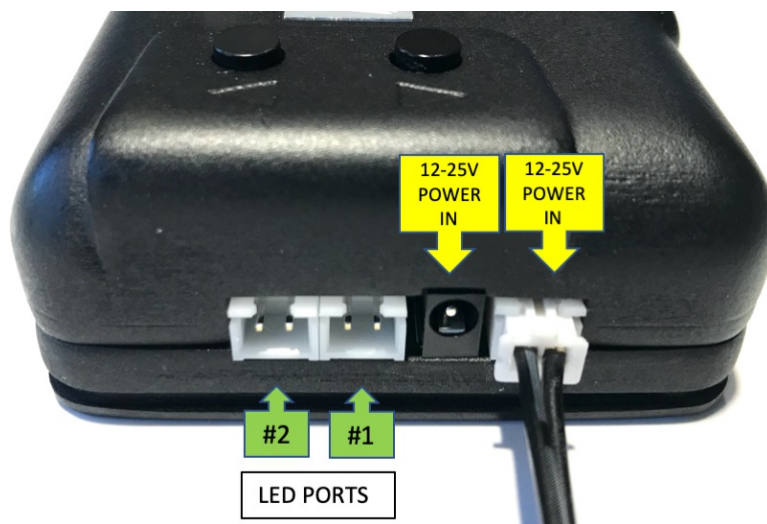
[support@modeltraintechology.com](mailto:support@modeltraintechology.com)



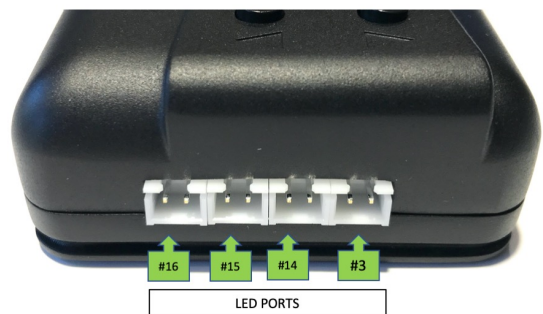
# QUICK START

PLUG POWER INTO ONE OF THE POWER SOCKETS.

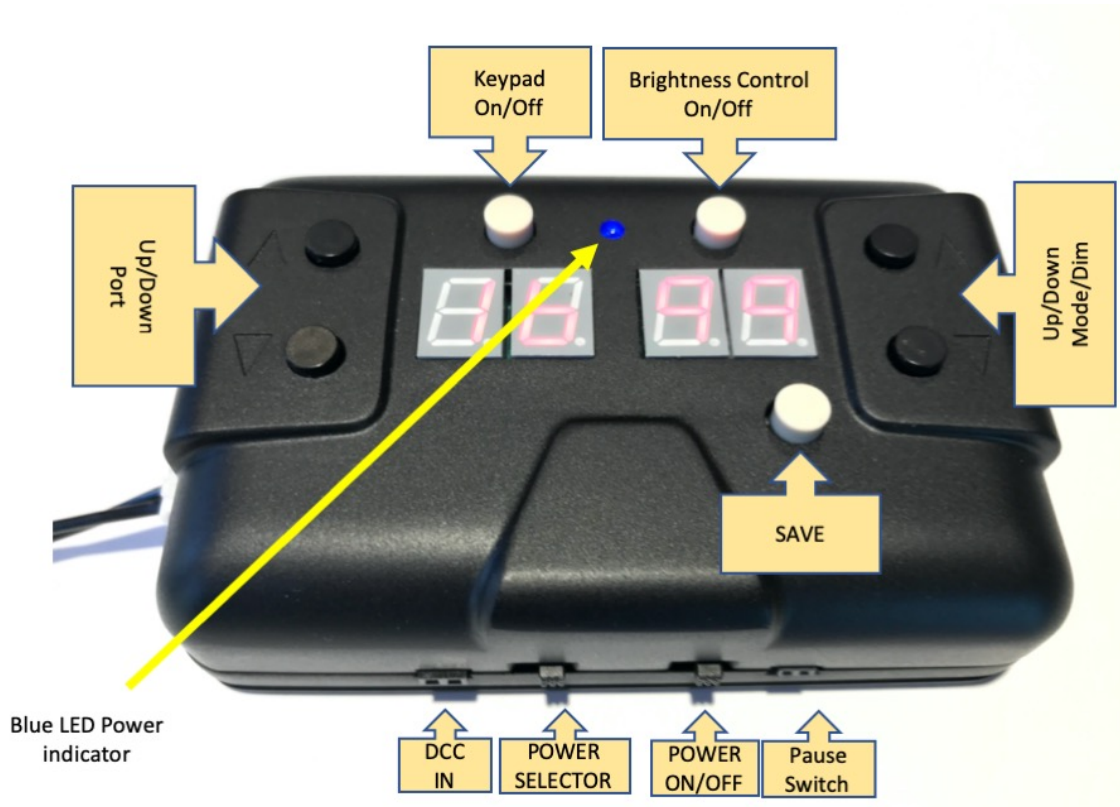
There are two options, use either but not both.



Since this view is the back of the controller the numbers may seem backward but, when viewed from the top of the LSC II the numbers move left to right from 1 to 16, counterclockwise.



PLUG YOUR LEDS INTO ANY OF THE LED 16 LED PORTS IDENTIFIED IN GREEN IN THESE PICTURES.



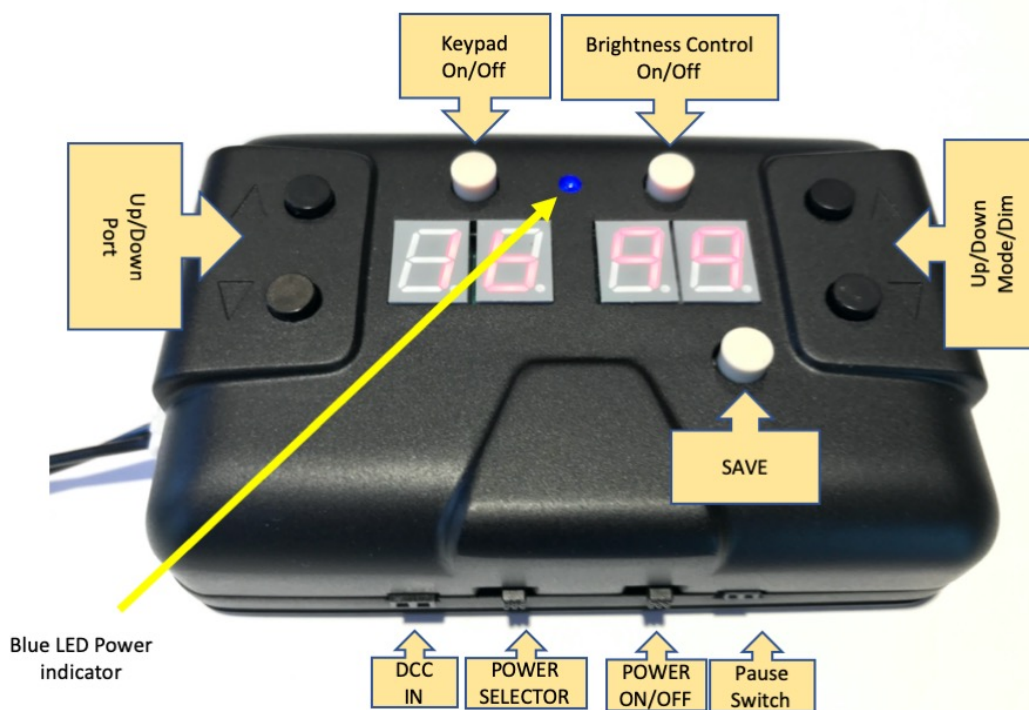
SLIDE THE **POWER SELECTOR** TO THE RIGHT FOR THE JST (WOODLAND SCENIC) POWER INPUT AND TO THE LEFT FOR THE ROUND BARREL INPUT (18V Adapter if you bought our kit).

SLIDE THE **POWER ON/OFF** SWITCH TO THE RIGHT.

THE DISPLAY WILL SHOW **1234** AND THEN GO BLANK.

THE BLUE POWER LIGHT WILL BE LIT.

AND SO, WILL YOUR LEDS!



TO CHANGE THE ANIMATION ON PORT#1:

MAKE SURE AN LED IS PLUGGED INTO PORT #1

PRESS AND HOLD THE **KEYPAD ON/OFF** FOR 1 SECOND.

THE DISPLAY WILL LIGHT AND SHOW: 

1
---

1
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PRESS THE RIGHT HAND BLACK UP BUTTON TWICE SO THAT THE RIGHTHAND DISPLAY SHOWS "3".

PRESS THE **SAVE** KEY ONCE. THE DISPLAY WILL FLASH.

PRESS THE **KEYPAD ON/OFF** FOR 1 SECOND – TO TURN IT OFF.

PORT #1 LED WILL BE BLINKING.

## INTRODUCTION

The LED Scene Controller II (LSC II) is a powerful but simple-to-use LED animation controller. 100 behaviors have been preprogrammed so it's simply a matter of selecting an output port and then assigning a number representing that behavior. There are 16 ports and depending on what type of LED you are using and at what brightness setting you can connect as many as 64 LEDs. Use our 1-to-4 connector to connect up to four LEDs per port.

The LSC II has a 1Amp capacity.

Each pin can operate separately, or multiple pins can be "coordinated" to create other effects. For example, the alternate flashing mode allows any two adjacent pins to, you guessed it, alternate flash. If you set all 16 pins to this mode, you have a marquee lighting effect. This one controller can run the police lights, a crossing gate, multiple random on off ports, a rotating beacon, fade street lights on and off and show a TV simulation in a building – all at the same time!

Additionally, if you have a DCC Command System for running your trains, you can connect the LSC II and control (turn on and off and configure) any combination of those effects from your hand controller.

A common challenge with using LEDs is deciding what voltage and resistor value to use so as not to burn them out. To solve this the LSC II allows you to control the effective output voltage



by setting the maximum brightness. This allows you to mix and match 3.3v and 12v LED on the same LSC II.

We've enclosed the LSC II inside a sleek case and designed the base of the unit with a slot that allows you to slide the LSC II onto a matching mounting bracket.

Here are the special effect categories for reference.

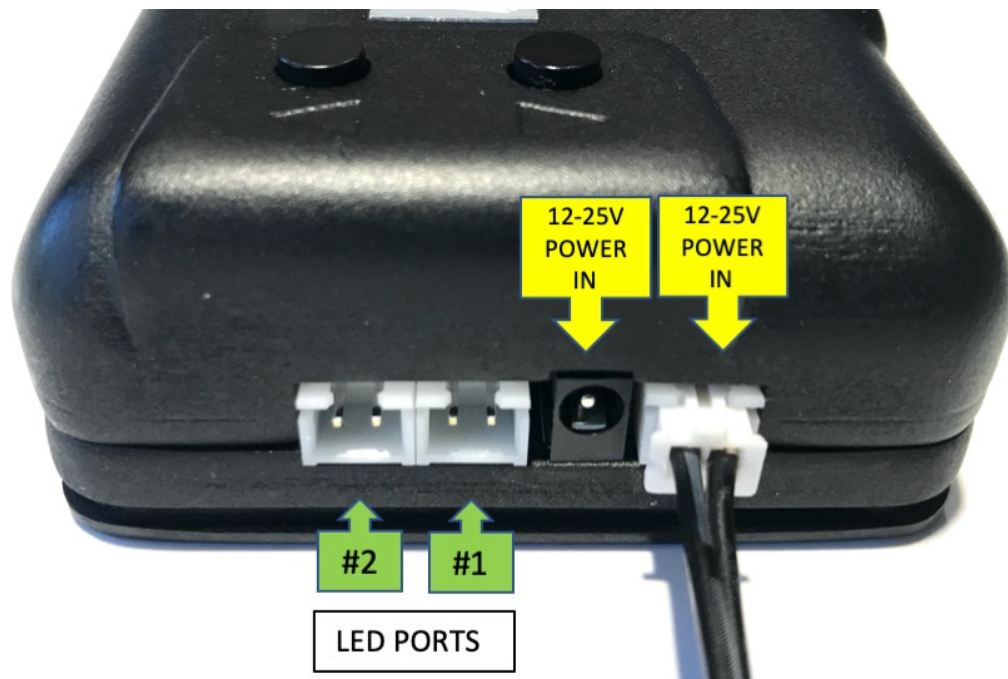
- Adjust each LED for individual "brightness"
- Flickering
- Blinking with individual pin on/off speeds
- Rotating Beacon (simulation)
- MARS simulation
- Fade all, one or groups of pins with up to 18 hour timer.
- Random on/off with adjustable pace (all pins or one pin)
- Step, Chase, Race – each LED on/off in sequence
- Alternate 2-pin Flashing
- TV Simulation (use 2,3 or 4 LEDs)
- Arc Welding
- Lighting

*\*\* Some speed settings apply to all LEDs whereas blinking and brightness settings apply individually to each LED (they can be different). If you have multiple boards with the same DCC address but you program them separately, they will perform based on the board specific configuration.*

You can also configure and control the LSC II from your NMRA® DCC system. That also means you can use jmri ([www.jmri.org](http://www.jmri.org)) or similar control software. Our favorite is Railroad Automation (RRAuto.com) Please see the LSC II DCC Manual.

## OVERVIEW

### 1. POWERING the LSC II (12-25V DC or AC, 1A)



To provide maximum convenience and adaptability, the LSC II has two types of sockets into which you can connect power.

### YOU ONLY NEED ONE POWER SUPPLY.

There is a slide switch on the front of the LSC II that allows you to select which input plug you want to use. Even if you plug in two power supplies ONLY one will be active at a time.

Here are the options:

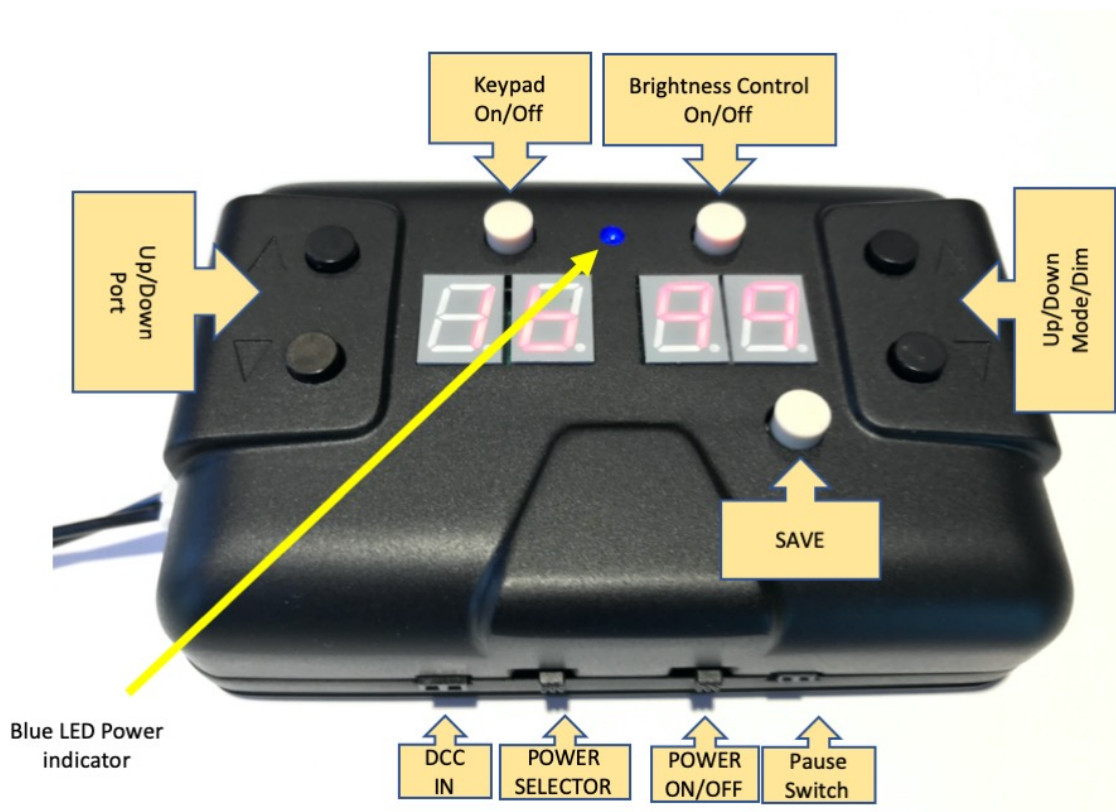
### 2. The Woodland Scenic power adapter can plug directly into the LSC II via the WHITE JST socket.



3. An adapter (12-18vDC 1A recommended) with a 1.3mm Barrel plug.  
(available at this link or via our store)
4. 1.3mm barrel plug with terminal screws to connect your own wires to the LSC II. (Included)
5. JST "pigtail" and connect wires that way. Black/Red orientation for the power supply does not matter.

Note: While our LSCI MICRO board allows you to power the board via your DCC system, The LSC II with Keypad requires an external power supply to operate properly. If you connect DCC to the LSC II it will only read the digital signal, which is only a few milliamps, and will not draw current to power the LEDs.

## OPERATIONS



Use the **POWER SELECTOR** switch to select your power source. To turn on the LSC II, slide the right-hand slide **POWER ON/OFF** switch to the RIGHT.

The blue LED on the top of the case will turn on.

The 4-number LEDs may flash or have an odd segment lit but after 2 seconds you will see "1234" on the display and then the numbers will disappear. This indicates that all is working. At that point the LEDs that you plugged in will all turn on depending on what FX setting you set. The default mode for each port is ON and the brightness setting is 20%.

The LSC II has two modes. It is either in Animation Mode or Configuration Mode. If you see any red numbers on the top of the LSC II, the LSC II is in Configuration Mode. If they are off and the blue light is on, the LSC II is in Animation Mode.

If the blue light is off, the LSC II power is Off.

To switch between Animation mode and Configuration mode, push and hold button the LEFT TOP **Keypad On/Off** button for about 1 second and release. Pushing this button toggles back and forth between these two modes. The LSC II will not react to a very quick push. If your push is too long the LSC II will switch back and forth. After a few tries you will get the hang of it.

There are two pairs of “number” LEDs on the top of the LSC II. On the left is the number of the selected Port. When you switch to configuration mode this will always start at “1”.

To change the port number, push the Up or Down black buttons on the left side top of the LSC II.

On the right side are the two digits that represent the configured special effects behavior. There are 99 built-in special effect options, plus “0” (zero) which is OFF for that port. See the chart.

To configure a Port to behave with a specific special effect, select the port number on the left and then select the behavior number on the right side.

Press the **SAVE** button once to save this to the LSC II. The digits will blink indicating a successful save. The setting is saved even when power is turned off or disconnected.

You can change the setting as many times as you want.

Remember to press Save.

To see the behavior, switch back to Animation mode.

## ADJUSTING THE LED BRIGHTNESS:

To adjust the brightness of any Port, switch the LSC II into Configuration mode. Press the Right-side button on the top once. You will see decimal points on each displayed digit of the

LSC II. The number on the right now indicates the brightness level 0-99% of the port that is selected on the left. Push the black Up and Down buttons on the right side of the LSC II to adjust the brightness up or down.

### 3.3V and 12V settings

The LSC II is configured so that a 100% brightness setting is ~14VDC. This is a few volts higher than 12V which is maximum for the Woodland Scenic Roomette® products as well as other 12V LEDs. The default brightness of all the ports is set at 10%. This is the MAXIMUM value for 3.3V LEDs with a 25V power source. In this way if you plug in only 3.3V LEDs when you start up you won't have any problems. And then you can adjust them as you need.

It is possible to burn out 3.3V LEDs very quickly by applying excess voltage above the 10% setting. We opted to give you this flexibility so that you can mix and match 3V and 12V LEDs on the same LSC II. Please use this wisely.

Here are the approximate voltages for different power sources:

<u>Power Adapter Output</u>	<u>Maximum Port voltage output</u>
25vdc (Woodland Scenic)	14.0v
18v	13.9v
12v (for 3.3V LED only)	8.6v

Press the **SAVE** button to save the new setting. If you don't press Save and you change ports or switch modes, the LSC II will revert to the previously saved setting.

To switch out of adjusting the brightness, press the Right-side button once more. The decimal points will disappear, and the number will change to the value representing the special effect setting. Pressing the button again will toggle back and forth between setting the Brightness and setting the special effects Behavior for the port number that is shown on the left.

If you forget what the button does and you have lost this piece of literature, flip the LSC II upside down to see the reference key.

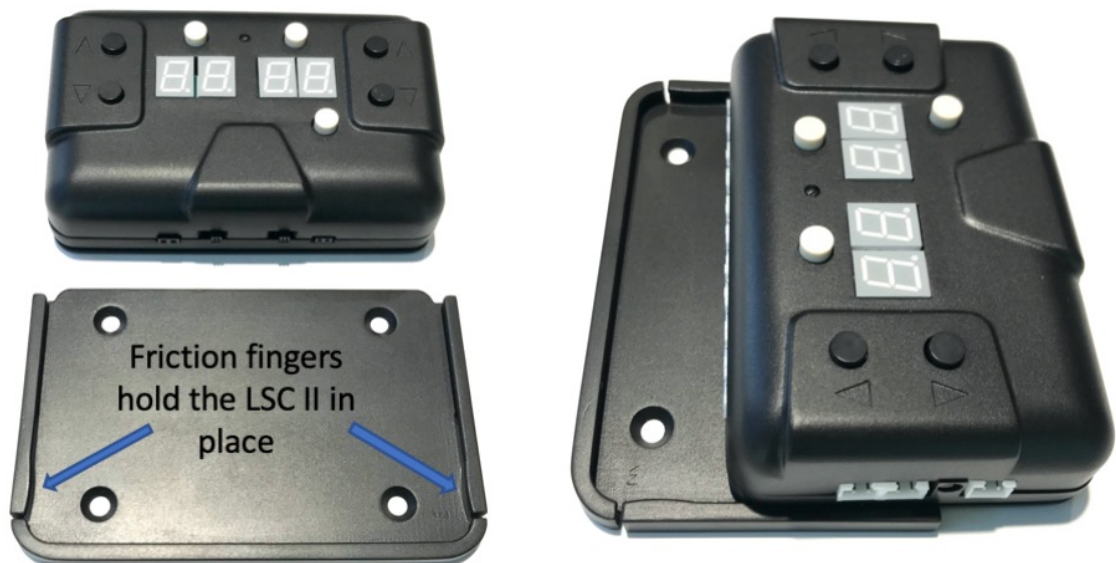


The arrow keys have a "fast" mode. If you hold the key down for 2 seconds, the rate of change roughly doubles.

**MOUNTING BRACKET** (Be careful NOT to overtighten the screws)



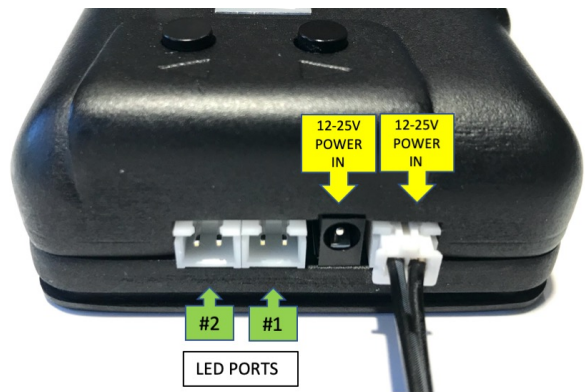
## Mounting Bracket



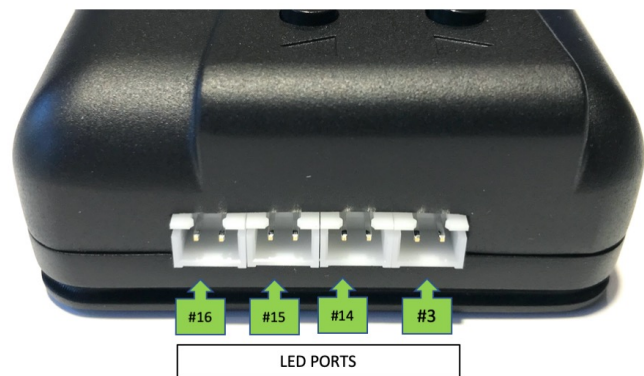
The LSC II can be mounted back or front side in.

## CONNECTING LEDs

The LSC II has 16 Ports, labeled counterclockwise as viewed from the top of the LSC II. You can use the ports in any order.



Since this view is the back of the controller the numbers may seem backward but, when viewed from the top of the LSC II the numbers move left to right from 1 to 16, counterclockwise.





## CONFIGUREING THE LSC II for Special Effects

We suggest you start with some basic setting so you can quickly become familiar with how the LSC II works. Let's start with what we call "singles". Most of the special effects are grouped into TENs with the first digit representing the basic FX. In the chart below, 2 is the number for Flicker. If you set a port to 2 it will Flicker at the default setting. As you will see in the 100 Chart, all the "2" are grouped. So any effect whether 2 or 21 or 25 will Flicker. Likewise, with 3. All effects that begin with 3 will blink.

Try some of the settings below to get the effect (pun intended).



### LED Scene Controller II – FX Settings "Singles"

Special Effect		Special Effect	
0	Port Always OFF	8	Alternate Flashing
1	Port Always ON	9	TV Simulation
2	Flicker	10	Mars
3	Blink	11	Mimic F11 <input checked="" type="checkbox"/>
4	Beacon	12	Mimic F12 <input checked="" type="checkbox"/>
5	<i>Fade</i>	13-15	Arc Welding (3 timings)
6	Random	16-18	Lightning (3 Timings)
7	Step		

☒ Requires DCC control

FEATURE: When you have more than one Port set to a common first value, say all set to 22, when you change ANY Port that has a leading 2, all the ports will change to that same new number. If you change Port 5 from 22 to 24, all pins that were 22 before will now change to 24. This is necessary to keep the integrity of the timing of the flicker behavior. There are some exceptions:

FX that begin with 1 will not change.

FX that begin with 3 (Blink) will not change.

FX that begin with 5 (Fade) will not change

FX that begin with 9 will not change.



# LED Scene Controller II – FX Settings

0 ~ 9	"Singles"	0	1	2	3	4	5	6	7	8	9
		OFF	ON	Flicker	Blink	Beacon	Fade	Random	Step	Flash	TV
11 ~ 18	"Singles"	Mars	Mimic F11	Mimic F12	Welding 1	Welding 2	Welding 3	Lightning 1	Lightning 2	Lightning 3	7BD
20 ~ 29	Flicker	Short	40	20	10	20	30	40	50	60	100
		Long	80	50	40	10	10	20	30	40	50
30 ~ 39	Blink*	On	5	1	1	1	5	50	15	10	100
		Off	10	10	25	90	50	10	5	100	10
40 ~ 49	Beacon	Speed	40	20	30	50	60	70	100	150	255
50 ~ 59	Fade*	Time On	Manual	60	300	1200	1800	7200	3000	7200	14.4K
		Time Off	Manual	60	120	600	300	600	6000	3600	1800
60 ~ 69	Random	Speed	25	25	25	50	50	100	100	100	100
		% On	60	40	20	80	40	80	60	40	20
70 ~ 79	Step	Type	CHASE								
		Delay	10	20	30	60	10	3	1	2	3
80 ~ 89	Flash	Speed	15	5	10	20	35	100	150	200	255
90 ~ 99			DCC signal Scan delay (sec.) (No Pin Effect)								
		0	5	10	15	20	60	TV Sim	TV Sim	TV Sim	RELAY
								Game Show	Movies	News	

\*\* Blink & Fade -unique settings can be configure for each pin, all other setting affect all pins in that MODE.

## OTHER NOTES:

- Some FX work with several ports in unison. Step, Chase, Race and TV sim work this way by design. But you can also mix effects on different ports. For example, you might use an Arc Welding FX with a flicker effect on a red LED to simulate the hot metal.

On one of our displays we have a HO police car that we kit bashed from Woodland Scenic. We connect the headlights, rear lights and the top Red beacon to three different LSC II ports and three different effects.

Step, Chase and Race require a group of adjacent pins to make sense. The effect will turn each light on in sequence with a small timing gap between them.

- The MARS effect uses the Beacon Timing. Therefore, to set the speed of the MARS effect, set the PORT to the Beacon setting that corresponds to the desired speed. Save it. Then change the Port FX to Mars.
- Mimic F11 and Mimic F12 are specific to use with a DCC System. Hitting F11 or F12 on the DCC hand controller will cause any Port set to Mimic to turn on and off with Port 1 if F11 and Port 12 with F12.
- Fade – Fade timing is by default in 10 second increments. This can be increased or decrease via CV #127. The range is 1-255. The duration of the ON time and OFF time are set via the keypad or CV's. (see the chart). The range is 1 to 255. Thus with 255 set to a port ON and the seconds increment set to 255 you can have a timer that is 65,025 second or 18 hours long! That is extreme but this wide range allows you to set your layout animation to turn the lights on and off to a 24-hour cycle. For example, ON for 12 hours and then OFF for 12 hours, or On for 18 hours and OFF for 6. The LSC II does not have a real-time-clock (RTC) so it's only counting seconds from when

the device is powered and animation is activated. It doesn't know what time of day it is.

- Fade = 50. If you set a port to Fade using the preprogrammed value of 50, it will disable the Fade timer for that pin but set the pin to fade on command. This allows you to have a Fade effect on ports that you control only via DCC. To return the port to an active timer, select either "5" or any other 50's value (like 51) other than "50". Think of the zero of the 50 as "off".
- Welding 1,2 and 3 use different time gaps between activity. 1 is the shortest and 3 is the longest. Combine these on different Ports so that one activity FX is the white-hot arcing and the longer period could be a RED led meant to show the red-Hot arcing.
- Lighting – setting them Mode to 16 follows the value in CV 125 which is a 1-minute delay by default. Lighting 17 divides this by ½ and Lighting 18 doubles the value.
- The Step FX turns on and off LEDs in sequence starting at Port 1 (if it is set to a 7 series) through to 16. It will skip Ports that are not set to a 7 series 71-79)
  - The Race sequence repeats by starting at 1
  - The Chase sequence repeats by going backward from 16, then forward at 1, so back and forth.
  - Each LSC II can either Race or Chase but not both simultaneously.
- DCC Signal Scan is the amount of time that the LSC II waits after power on to switch into animation mode if it does not detect a DCC Signal. You can select ANY Port since it affects the entire device, select the value for the delay option and press SAVE. The previous FX behavior for that Port will NOT change.

To see the effect, you must switch OFF the LSC II. After it's start up cycle you will be able to detect a change in time that it takes to start

the animations – assuming you are not connected to DCC. If you are connected to DCC, you must press F5 (Animation ON/OFF) to activate the device animation.

- TV Simulation works with a White and Blue LED on separate Ports or in Color with a 3 separate Ports connected to an RGB (Red-Green-Blue) LED. The LED type is common Anode. (You can buy the proper RGB LED chip from our store.) The different settings are meant to simulate different types of TV activity. It's not perfect but it is effective, nonetheless. You can mix the FX on each color line if you want. This effect is a Random-on-Random effect so it may be very difficult to track the differences.
- Relay – The LSC II will drive the digital inputs of both 5VDC and 12VDC Relays which use a 5V digital signal. When you select 99 for relay, the LSC II will automatically set the power setting to 27% assume a 25vdc input. Adjust accordingly for different input voltages to get 5vdc output.

## RESET

There are a few reasons that you may want to reset the LSC II back the factory defaults. One is that you forgot the DCC Address. Or, you just want to get back to the default settings.

TO RESET THE LSC II, turn on keypad mode. It doesn't matter what the display is showing, just that the display is on.

Then, PRESS AND HOLD the two black UP ARROW buttons. After about 5 seconds, the display will read all ZERO. Release the buttons. Once the reset is complete the display will blink a few times and then return the display showing PORT #1 set to "1".

## WRITING CVs WITH THE KEYPAD

If you don't have a DCC system, it is still possible to change CV values in the range of 112 to 191 with the keypad. Check the MASTER CV LIST for the specific value you may want to change.

**After using the Keypad to change CV values you must turn OFF the LSC II to allow it to reload the new values and keep all the internals straight.**

To enter CV write mode, Press and Hold the two black DOWN ARROW keys (one on the left and one on the right). The display will show a "C" and then the number 112, which is the first CV value that can be configured. Use the up and down keys on the RIGHT side to select the CV you want to change. Then, using the LEFT side Up/Down keys you switch the display to show a dash "-" followed by the current CV value.

Using the right side Up/Down keys select the new value for the CV.

Use the left side arrow keys to switch between CV Address and CV value. Press **SAVE** to write the new CV value.

To exit the CV mode, press the Keypad On/Off button.

**Remember to turn power OFF and back on to restart the LSC II with the new values.**

Note: you cannot change the DCC address of the board using this method. Use your DCC System to change the board address – which make sense. If you are using the LSC II without DCC, there is no need to change the board address.

Why the strange values of 112-191? The LSC II was designed to be used with NMRA (National Model Railroad Association) compatible DCC systems. To assure compatibility among different manufactures a range of memory location was reserved for their use. There are a couple of blocks of these numbers that start at 1 and go to over 1000. 112 is the start of



one of those blocks and for the LSC II the user addressable CVs stopped at 191.

### **Reading the Product, Assembly and software Edition numbers:**

Press and hold the lower left arrow key and the upper right arrow key for 5 seconds. The display will blank and then the Product type number, Assembly number and Software version (Edition) number will appear. After 10 seconds the keypad will revert to normal mode.

## Software Updates and new functionality.

We are constantly receiving feedback from customers about new features and we add them as we can and seem appropriate. That means that your LSC II will have “old” software a week after we ship. Therefore, here is our upgrade policy:

We will upgrade your software on the LSC II for two year FREE of charge, less shipping. Simply send us the device and we will return it with the latest and greatest. Order the upgrade shipping kit on our website and then send the device to the address listed. In the future you will be able to update the software from your computer.

Except where noted, all software, product designs and circuits are copyright of Model Train Technology LLC.

We use open source software and adhere to the GNU licenses.

We have Patents Pending for our products.

**ONE YEAR MANUFACTURER WARRANTY:** We warrants this **product** to be free from defects in workmanship and materials, under normal residential use and conditions, for a period of one (1) year for the original invoice date. Shipping and handling fees are to be paid for by the customer.

**LIMITATION OF LIABILITY.** UNDER NO CIRCUMSTANCE SHALL COMPANY OR ITS AFFILIATES, PARTNERS, SUPPLIERS OR LICENSORS BE LIABLE FOR ANY INDIRECT , INCIDENTAL, CONSEQUENTIAL, SPECIAL OR EXEMPLARY DAMAGES ARISING OUT OF OR IN CONNECTION WITH YOUR USE, OR INABILITY TO USE THE PRODUCT, WHETHER OR NOT THE DAMAGES WERE FORESEEABLE AND WHETHER OR NOT COMPANY WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, COMPANY’S AGGREGATE LIABILITY TO YOU SHALL NOT EXCEED THE AMOUNT OF THE PRODUCT. THE FOREGOING LIMITATION WILL APPLY EVEN IF THE ABOVE STATED REMEDY FAILS OF ITS ESSENTIAL PURPOSE.





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Version 1.1 LSC II

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