
LITTLE LIGHTS CONTROLLER USERS GUIDE

D5 DEM Model Smiths

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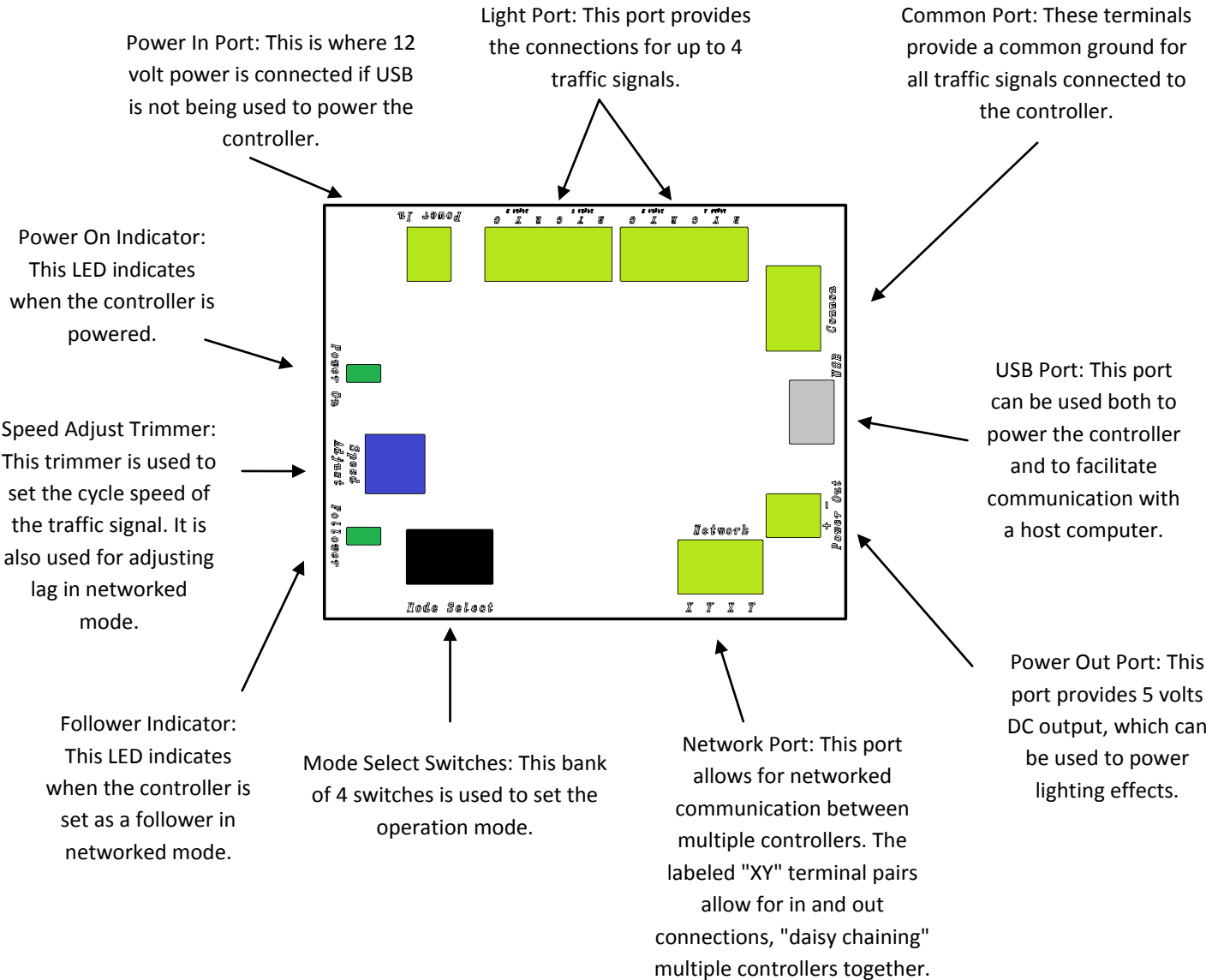
CONTROLLER OVERVIEW

Our Little Lights Controller is the ultimate scale model traffic signal control module! This controller is specially designed to provide the most flexible and authentic traffic light operation at any scale model intersection.

This controller allows for full control over the traffic signal cycle speed, so you can dial in the timing just as you need. Additionally, our controller has several different modes of operation, so you can run standard red/yellow/green traffic lights, red/green traffic lights, and flashing red and yellow lights. This full control with minimal setup means that you can dial in the exact lighting effect you need.

Additionally, our controller allows for networked operation, meaning you can link multiple intersections together to work in tandem! Simply set one controller as the leader, and each follower controller operates in conjunction with the leader. You can even set a delay between controllers, allowing for a realistic lag between multiple intersections along one road.

CONTROLLER DIAGRAM



CONTROLLER FEATURES

"POWER IN" PORT

The power port is one of two ways to power the controller. To use this port, a 12 volt power supply connection must be used. Either an AC or DC source can be used.

"POWER ON" INDICATOR

This indicator is used to ensure the module is receiving power.

"SPEED ADJUST" TRIMMER

The speed adjust trimmer serves two purposes. In standard operating mode, the trimmer is used to adjust the speed at which the controller cycles the traffic signals, as well as the flash rate when configured for flashing red or yellow lights. Using a small screwdriver, simply turn the knob clockwise to slow the cycle down, and turn it counter-clockwise to speed the cycle up. In leader-follower mode, the speed adjust trimmer is used to set the lag between the leader module and the follower module. Refer to the **Networked Operation** section for details.

"FOLLOWER" INDICATOR

This indicator is used to identify follower controllers when set up in leader/follower mode. Under normal operation, this indicator is turned off. Refer to the **Networked Operation** section for details.

"MODE SELECT" SWITCHES

The mode select switches are used to set the operation mode for the module. This includes setting the lighting pattern, as well as enabling the leader-follower mode. These switches can be adjusted any time to modify the behavior of the traffic signals. Refer to the **Operation Modes** section for details.

"NETWORK" PORT

This port is used to connect modules together when in leader-follower mode. Note that this port has both an input and an output; this allows for more than two controllers to be "daisy chained" together to create a large network. This means that one "XY" pair operates as an input, while the other "XY" pair operates as an output. Refer to the **Networked Operation** section for details.

"POWER OUT" PORT

This port provides 5 volts DC power output which can be used for other lighting. This can be used to power street lamps, building lights, or any other simple LED lighting effect in a model railroad or diorama. This port cannot be used to power incandescent bulbs, as the maximum output current is only 500 mA.

"USB" PORT

The built-in Micro-USB port can be used both to power the Little Lights Controller and to facilitate communication between the controller and a host computer. Using a Micro-USB to USB-A cable, plug the Micro-USB end into the controller, and plug the USB-A end into either a computer USB port or a wall charging adapter. This connection powers the module, so if this option is used, the power port should be left disconnected. In order for a host

computer to communicate with the controller, Virtual COM Port (VCP) drivers will need to be installed on the host computer. This port is available for future software updates and computer communication protocols.

"COMMON" PORT

The common port is used to connect the common cathodes (ground connections) from the traffic signals. The black wire from each traffic signal must be connected to this port for the traffic signals to work correctly. Refer to the **Basic Setup** section for details.

"LIGHT" PORT

This port is used to connect the signals to the controller. The port allows for up to 4 individual red/yellow/green traffic signals to be connected. Refer to the **Basic Setup** section for details.

BASIC SETUP

Setting up the Little Lights Controller is exceptionally straightforward and easy!

First, connect the traffic signals to the controller using the provided flathead screwdriver. When considering the orientation of the traffic signals, note that signals A and C are identical, as are signals B and D. This means that in a scale model 4-way intersection, signals A and C are directly opposite each other, and signals B and D are perpendicular to A and C. For a "T" intersection, note that the D signal is not used.

When connecting the signal wires, the colored wires must be attached to the *Light Port*. Be sure to connect the red wire to the red terminal, the yellow wire to the yellow terminal, and the green wire to the green terminal. Connect the black wire from the signal to one of the terminals in the *Common Port*

Next, connect power to the controller using one of two options. If a 12 volt power supply is available, simply the two wires from the power supply to the two terminals in the *Power In Port*. If a 12 volt supply is not available, simply use the *USB Port*. Plug one end of the cable into the controller, and plug the other end into either a computer USB Port or a USB wall adapter.

That's all there is to it! Once power is connected, the *Power On Indicator* should light up, and the traffic signals should be illuminated. Refer to the **Operation Modes** section for details on how to fine-tune the traffic signal operation.

OPERATION MODES

The Little Lights Controller has several modes of operation to configure traffic signals to suit any need. Operation is set by changing the *Mode Select Switches* on the controller. The different settings are outlined in the table below. Note that the columns labeled 1 through 4 refer to the numbered switch positions on the *Mode Select Switch*. Additionally, note that in the table, a white box indicates the position of the switch, as the switches on the *Mode Select Switch* are white.

1	2	3	4	Mode
White	White	White	White	Red/Yellow/Green Signals, Standalone/Leader Mode
White	White	White	Grey	Red/Green Signals, Standalone/Leader Mode
White	White	White	White	Flashing Yellow Signals, Standalone/Leader Mode
White	White	White	White	Flashing Red Signals, Standalone/Leader Mode
White	White	White	White	Flashing Red and Yellow Signals, Standalone/Leader Mode
White	White	White	White	Signals Disabled, Standalone/Leader Mode
White	White	White	White	Red/Yellow/Green Signals, Follower Mode
White	White	White	White	Red/Green Signals, Follower Mode
White	White	White	White	Flashing Yellow Signals, Follower Mode
White	White	White	White	Flashing Red Signals, Follower Mode
White	White	White	White	Flashing Red and Yellow Signals, Follower Mode
White	White	White	White	Signals Disabled, Follower Mode

Under normal operation, it is important to use one of the first 6 modes outlined in the table. Standalone Mode allows for a single controller to operate autonomously. A controller should only be set to Follower Mode if it is being used as part of a network. Refer to the **Networked Operation** section for details.

Once an appropriate operation mode has been selected, the *Speed Adjust Trimmer* should be used to dial in the cycle speed of the model intersection. By rotating the trimmer clockwise, operation of the intersection is slowed to a more realistic pace. By rotating the trimmer counter-clockwise, operation of the intersection is sped up. The provided screwdriver should be used to carefully adjust the trimmer to yield an appropriate operation speed.

NETWORKED OPERATION

A unique feature of the Little Lights Controller is that multiple controllers can be networked together, allowing for synchronized operation of traffic signals at multiple intersections. This operation works on a leader/follower principle. In this scheme, one controller in the network is designated as the leader, as it sets the pace of operation. All other controllers in the network are set as followers, as they operate at the same pace as the leader.

NETWORK SETUP

The first step in setting up a network of controllers is to set up the leader controller. To set a controller as the leader, make sure the *Mode Select Switch 1* is in the down position. Refer to the **Operation Modes** section for clarification. Note that the setting for leader mode is exactly the same as the setting for the standalone, non-networked mode of operation.

Next, set each of the follower controllers in the network to the follower mode by moving the *Mode Select Switch 1* to the up position. Refer to the **Operation Modes** section for clarification. Make sure that the *Follower Indicator* light turns on; if the follower light remains off, this means that the controller is not set as a follower.

WARNING: There can be only one leader controller in any given network. Before connecting any controllers together, ensure that only one controller is set as the leader and all other controllers are set as followers.

After properly configuring the controllers, connect them together using the *Network Port* and a light gauge twisted wire pair. Note that each controller has two pairs of terminals; these correspond to inputs and outputs. This allows for multiple controllers to be "daisy chained" together. On the leader controller, connect one wire to a terminal labeled "X" and connect the second wire to a terminal labeled "Y". On the first follower controller, connect the other end of the "X" wire to a terminal labeled "X" and connect the other end of the "Y" wire to a terminal labeled "Y". This process can be repeated for subsequent follower controllers.

After the connection between the *Network Ports* and the position of the *Mode Select Switch 1* for each controller has been verified, power should be connected. Each controller must be powered individually to operate correctly. Refer to the procedure in the **Basic Setup** section for details on how to properly power each controller.

NETWORK TUNING

Operation of the signal network can be tuned using the *Speed Adjust Trimmers* on the leader and follower controllers. To change the speed of the lighting sequence, use the *Speed Adjust Trimmer* on the leader controller. This adjustment changes the speed of the sequence on all controllers in the network. Note that this configuration is exactly the same as the standalone mode setting as outlined in the **Operation Modes** section.

To adjust the lag between the leader and a follower, use the *Speed Adjust Trimmer* on each follower controller. By turning the trimmer counter-clockwise, the signal sequence for that follower falls behind the leader signal. Note that all signals still operate at the same rate, but there is now a delay in operation between the leader and the follower.

When manually tuning each follower controller, it is possible that the controllers will momentarily become out of sync. This is normal operation, as it takes a few cycles for the controllers to communicate and sync with each other. To speed up this process, it is recommended to increase the speed on the leader controller to maximum while configuring the lag on the followers. This will quickly show the difference in operation between the separate controllers. Once an acceptable lag has been set, return the leader controller to an appropriate speed.

It is not necessary for the leader controller and the follower modules to have the same lighting sequence as outlined in the **Operation Modes** section. As an example, the leader may be set to use a red/yellow/green sequence, while one follower is set in a flashing yellow mode and another follower is set in a flashing red mode. All three controllers still operate at the same speed, with lag as determined by each follower's trimmer setting.

TROUBLESHOOTING

Below are some general troubleshooting tips for if your controller does not operate as expected. In the event that these tips do not resolve the problem, please get in touch at service@d5dem.com and one of our staff can help resolve the issues.

1. None of the traffic lights light up
 - a. Check to make sure the controller is powered. If the *Power On Indicator* is not lit up, this means that the controller is not receiving power.
 - b. Check the other *Mode Select Switches* to make sure the controller is set to a normal operation mode. Refer to the **Operation Modes** section for details on how to set these switches.
 - c. Make sure the common wire of the traffic signal is connected to the *Common Port*. Make sure also that the red, yellow, and/or green wires from the traffic signal are connected to the *Light Port*.
 - d. Make sure you are using a common cathode LED traffic light. This controller is not designed for use with incandescent lights. Additionally, this controller is designed for use with only common cathode (common ground) traffic signals. Traffic lights configured for common anode operation will not work with this controller.
 - e. Make sure the traffic light you are using is designed to operate at 5 volts. This controller operates at 5 volts, so traffic lights designed for 12 volt controllers may not work.
2. The traffic signals have an unusual, unexpected light pattern.
 - a. Refer to the **Operation Modes** section to ensure you have set the *Mode Select Switches* set appropriately.
 - b. Make sure you connected the correct wires to each *Light Port* connection.
3. The traffic signals are stuck in one lighting configuration and don't change.
 - a. Make sure the *Speed Adjust Trimmer* is not set too high.
 - b. If you are using one standalone controller, make sure the controller is not set as a follower. If only one controller is being used, then the *Follower Indicator* must be turned off. Set the *Mode Select Switch 1* to the down position for normal operation.
 - c. Reboot the controller.

4. In networked mode, the follower controllers are not cycling.
 - a. Make sure that the "X" terminals are connected and the "Y" terminals are connected between the leader and followers. Do not switch the "X" and "Y" connections.
 - b. Make sure both the leader and the follower controllers are being powered.
 - c. Make sure that all follower controllers show the *Follower Indicator* turned on. There can only be one leader in a network.