



# Model Train<sup>TM</sup> TECHNOLOGY

## 8 Port Fiber Light Controller *with 8 detection ports and DCC*

### USER MANUAL



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# QUICK START

PLUG POWER INTO THE POWER SOCKET.



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

THE BLUE POWER LIGHT WILL BE LIT.

By default, all the ports are set to MODE=2, Alternate Flashing.

Check the back of the unit where the fiber manifold is located – you should see alternate flashing light emanating from the holes.





## Fiber Lighting Connector Pins



There are three fiber pin sizes: .75mm, 1.0mm and 1.5mm to match the most common fiber cable sizes. The top of the .75mm pin is square. The other two are round but the 1.5mm pin head and hole visibly is larger than the 1.0mm pin head.

The Fiber Lighting Pins hold the fiber to the lighting manifold with friction. “Hold” is not meant to be so tight it cannot be removed by hand but strong enough to hold the fiber in place.

Slide the fiber optic cable into the pin so that it extends past the end. Gently push the pin and cable into the manifold hole and let the fiber slide through the pin so that it rest against the LED lens inside and you feel the pin resting snug. This “self-adjusts” the fiber inside the manifold. Then while applying gentle pressure, rotate the pin ¼ turn. This will set the fiber against the lens of the LED and prevent the pin from falling out of the manifold.

### WARNING:

Don’t force the fiber cable into the hole since excess force will damage the LED. Do not put/poke anything else into the Manifold hole as it may also damage the LED.

The LEDs of the Fiber Lighting Controller are set to a fixed brightness level. You can adjust (reduce) the amount of light that is emitted at the light end of the fiber by pulling the fiber out of the pin slightly.

# INTRODUCTION

The *Fiber Light Controller* is a powerful but simple-to-use animation controller for use with fiber optic lighting. Three special effects behaviors have been preprogrammed so it's simply a matter of selecting an output port and assigning a number representing that behavior.

- 0 Always Off
- 1 Always ON
- 2 Alternate Flashing with adjacent Ports
- 3 Individual Port Blink with adjustable timing

The *Fiber Light Controller* is either "running", what is call Animate Mode, or it is in Configuration Mode. When you turn the power on, the blue light on top will light and then the LED digits on the top will go through a startup sequence where you will see the either (1111 or 2222) indicating which DCC decoder mode the unit is set for, the address of the device (default 3), and then 1234. 1234 is the indication that the unit is ready to go; all working. The next thing that happens is the unit enters Animate Mode and the lights will blink, flash or stay as they were configured.

There are 8 ports (controllable circuits) with two light holes per port. Each port can operate separately, or multiple ports can be "coordinated" to create effects. For example, the alternate flashing mode allows any two adjacent ports to, you guessed it, alternate flash. If you set all 8 ports to this mode, you will have a marquee lighting effect. This one controller can run the police lights, a crossing gate, and much more.

The ***Fiber Light Controller*** also has 8 Input detector circuits to which you can connect most train detection systems that are “open drain”. This simply means they have a ***To-Ground*** logic (connect the input line to ground (black wire usually). Don’t panic, there are some easy ways for you to trigger the circuit without track detection. For example, you can use a simple on-off switch or push button toggle. Since there are eight ports and 8 detection circuits you can assign one-to-one; detector line #1 to light port #1 (default setting), detector #2 to light Port #2, etc. You can also assign the same detector to multiple ports so that one detector activates more than one port at the same time.

Additionally, if you have an NMRA® DCC Command System for running your trains, you can connect the ***Fiber Light Controller*** and control (turn on and off) these effects from your DCC hand controller. That means you can use jmri ([www.jmri.org](http://www.jmri.org)) or similar control software. Our favorite is Railroad Automation (<https://www.perecli.com/rrauto/>) Please see the DCC section of the manual for more information about DCC.

You can power the entire unit from your DCC power alone. With all the light ports lit, the system uses less than 100 ma (milliamps). If you are worried about draining power from the track for your engines, you can simply set up a “lighting zone” with a booster which will be separate from track power.

The most common method is to power the ***Fiber Light Controller*** with the included power supply and connect the DCC track power lines to the DCC input – and switch the ***Fiber Light Controller*** power switch setting to the right. In this set up, only the SIGNAL part of the DCC line will be used – about 10ma (nothing really) while the CPU and lights are run off the external power supply.

We've enclosed the *Fiber Light Controller* inside a sleek 3D printed case. This printing technology is state-of-the-art and allows smaller companies to manufacture high quality products in small quantities. You may find very small imperfections in the case as a result. The unit will probably reside under your layout and out of sight, so this is a good tradeoff between cost and function.

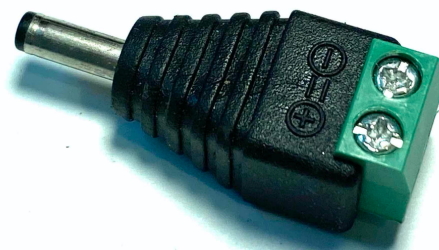
There is also available a specially designed magnet base so you can just snap the unit on and off your layout.

## OVERVIEW

### 1. POWERING the *Fiber Light Controller* (12-18V DC or AC, 1A)



To provide maximum convenience and adaptability, the *Fiber Light Controller* has a 1.35 mm barrel plug for the 18vdc power supply that is included with your system. There is also available a *Power Connection Adapter* - a 1.3mm barrel plug with terminal screws to connect your own wires and power supply. You can use any power supply that provides a FIXED voltage of 12 -18 AC or DC. Do not use a variable speed transformer.



1.35 mm Barrel Plug Adapter



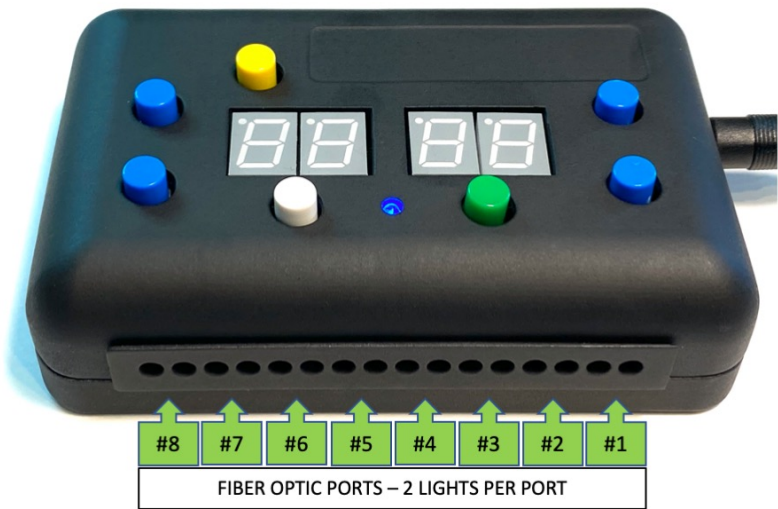


To turn on the *Fiber Light Controller*, slide the right-hand slide **ON/OFF** switch to the RIGHT.

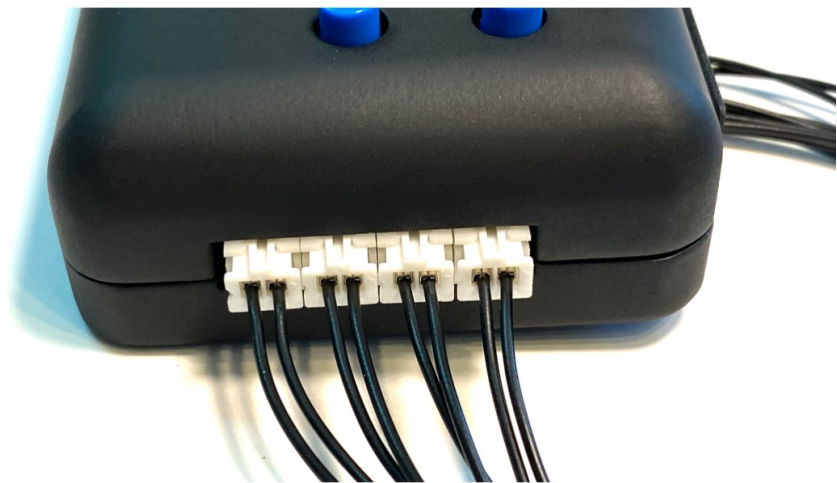
The blue LED on the top of the case will turn on.

The arrow keys have a "fast" mode. If you hold the key down for 2-5 seconds, the rate of change roughly doubles.

**YOU TOGGLE BETWEEN ANIMATION MODE AND CONFIGURATION MODE BY PRESSING THE GREEN BUTTON.**



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.



# QUICKSET Configuration

The *Fiber Light Controller* comes pre-configured with all the ports behaviors set to MODE = 2 (Alternate Flashing). You can plug the unit in, turn the power on and the fiber port lights will alternate Flash.

There are 7 single digit **Quick Set** configuration modes, 0 though 6. Setting a port to a one of these numbers will set the special effect listed. This *Fiber Light Controller* also has 8 detection ports so that you can have a detector on your layout trigger the port to go on. When a port goes "ON" in this context it means "run the behavior" that the port is set to. If the port is set to Blink, a detector trigger on that port will cause the fiber port light to blink.

The chart below shows the basic **Quick Set** configuration options. Choosing one of these either with or without the trigger will allow you to be up and running in under 60 seconds!

**Quick Set** Chart:

DEFAULT

↓

	0	1	2	3	4	5	6
"Singles"	OFF	ON	Flashing	Blink	ON	Flashing	Blink
	NO DETEECTOR TRIGGERS				TRIGGER ON PORT		

\*note – "trigger on port" means that Port #1 will be triggered by trigger #1. You can change this later if you like.

# QuickSet® Configuration Table

[illegible]

- When a FLASH speed is chosen, it applies to ALL ports that are set to FLASHING. This will cause all the MODE numbers to change to match.

\*\*\* When a BLINK speed is chosen, it only applies to the selected port.

\*\*\* Purple is the default setting for "singles"

### Flashing

## **Quick Set:** CHANGE THE FLASHING AND BLINKING RATES

The **Quick Set** chart shows a table of numbers organized into rows and columns. Down the left-hand side are the row numbers 2, 3. These represent two groups of predefined setting that allow you to adjust the behavior of the PORTS.

By entering the row/column value into the controller, the pre-defined behavior will be set for the selected port.

Take a look at the **Animation Setting Table**. All the numbers in the rows of the chart are for reference as to the speed of the Alternate Flashing (rows 2) and the Rates of Blinking (rows 3)

The best way to get familiar with this chart is to experiment.

### **EXAMPLE #1:**

The default Alternate Flashing rate is 50. When you set the MODE of any port to 2, the alternate flash rate will be always be 50.

Let's say you want it to flash faster than 50. Let's try 30. A lower number means a **shorter time** between flashes. We won't worry about the triggers for now. On row 2, column 2 you see the number 30. To program the ports to Alternate Flash at rate 30, set the MODE = 22 (row 2, column 2).

- Press the Green button for one second to enter Configuration Mode.
- Press the right side blue up/down buttons to arrive at 22.
- Press the Yellow save button.



- Press the Green button for one second to leave configuration mode and enter Animate Mode.

*Important note: When one port's alternate flashing rate is changed, then ALL ports set to alternate flashing will adjust to the same rate of flashing.*

To make the Alternate Flashing go slower, you might choose 150. That would be row 2 and column 7.

- Press the Green button to toggle back to Configuration mode.
- Use the right 2 blue buttons to select the mode number:
- Put 27 into the MODE (right side number) and press SAVE. The display will flash to confirm that it worked. Remember, all ports set to flashing will now be changed to "27".
- Press the Green button to toggle back to Animation mode.

## EXAMPLE #2:

**Blinking** has two settings, so this is where entering in just one number into the controller makes this very easier. There is an amount of time that the light is on, TIME ON. And then a pause or TIME OFF where the light is OFF. Looking across ROW 3 you can see a range of combinations of ON and OFF times.

A blink that looks like a "Blip" of a water tower red beacon will have a short ON time and a longer OFF time. ROW 3 COLUM 3 has an ON TIME of 10 and an OFF time of 100.

To set a PORT to "blip" Blink:

- Press the Green button for one second to enter configuration mode.
- Using the left-hand side up and down blue buttons to select the PORT you want to configure.

If this is the first time to change the behavior of this port, you will see the value of 2 on the right-hand display. You may recall that "2" is the default behavior value for all ports.

- Using the righthand blue buttons (up and down) change the value of 2 to 38 – that is ROW 3. COLUMN 8.
- Press the yellow button to SAVE this setting. The display will flash to confirm that it worked.
- Press the Green button to toggle back to Animation mode.

The port you selected will now be blinking 1 unit on and 25 units off. The Units are approximately 100 milli seconds or 1/10 of a second. The actual display speed is a little slower than that, but you can experiment with other values 30 through 39 to set the effect that you want.

NOTE: if you hold any blue button down for 5 seconds the rate of change from one number to the next will double in speed. Just let go and the speed will revert to standard speed.

## MORE WAYS TO CONFIGURE YOUR CONTROLLER

## HOW TO CHANGE MODES:

If you just received your *Fiber Light Controller* and plugged in the power supply and turn the power on without DCC connected, then the unit will automatically go into Animate Mode after the start up sequence. You will see alternate flashing lights shine out of the back of the box through the Fiber Optic Connection Manifold. (that thing with 16 holes in the back).

To switch the unit into Configuration Mode, hold the Green On/Off button for 1 second. The left most PORT 1 will now be lit ON. #1 will be shown on the left-hand display. The MODE selected for the port will be shown on the righthand side. Since the default MODE is 2, the number 2 will be shown on the right-hand display. It will look like this:



Use the LEFT side blue buttons (Up/Down) to scroll through the PORTS 1 through 8. The actively selected PORT Fiber Optic Light will be ON as you scroll through the ports 1 to 8. Since all the ports are set to Mode = 2, you won't see any change on the right-hand side.

## TO CHANGE THE SPECIAL EFFECT MODE OF A PORT

To change the MODE setting of any port, press the RIGHT-HAND blue buttons up and down to change the MODE of the Port selected. The numbers will go through the sequence of all the valid ports MODE behaviors listed in the Animation Setting Table. Some numbers will automatically be skipped since they are not valid settings.

To Save the new setting, press the yellow (SAVE) button once. The display will flash to confirm that it worked. If you press the LEFT side buttons to change the port number before you press SAVE, the ***Fiber Light Controller*** will ignore what is on the right side display and will revert to the previously save setting.

To observe the effect if you changed the MODE setting, switch the ***Fiber Light Controller*** back into Animation Mode by pressing the On/Off (GREEN) button for 1 second.

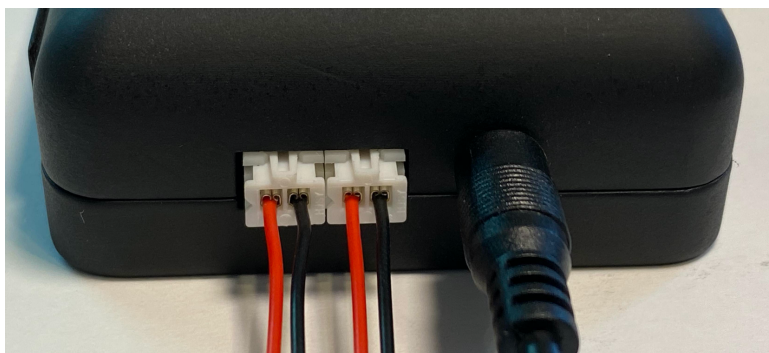
**YOU TOGGLE BETWEEN ANIMATION MODE AND CONFIGURATION MODE BY PRESSING THE GREEN BUTTON.**

Don't forget to press the YELLOW button to SAVE any change you make.

## TRIGGERS:

There are two ways to configure a trigger; hardware wiring or via software. We will discuss the wiring approach first.

All the input lines are expecting a LOW signal which is to say a connection to GROUND. The *Fiber Light Controller* has two 5VDC+ power sockets for use to connect power to third party remote detection units (Iowa Scale Engineering, Azatrax or Model Train Technology LLC).







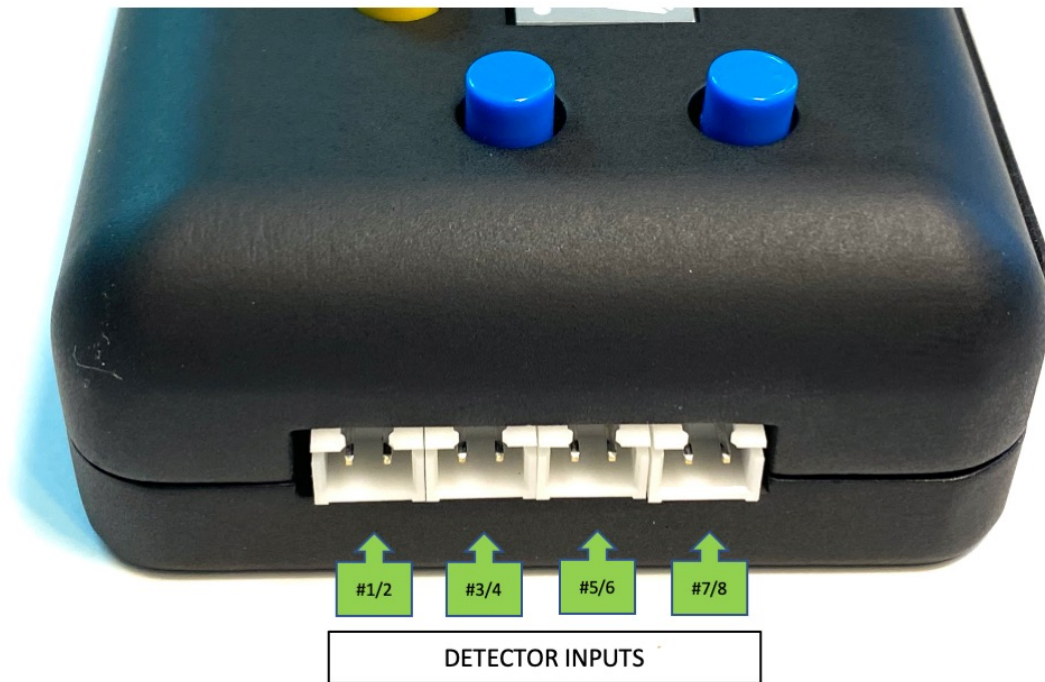
Almost all detector systems need some kind of external power. We added these two power sockets for convenience so if you need 5VDC, its available. We know that Azatrax and Iowa Scaled Engineering detection systems will both work with the ***Fiber Light Controller*** power source.

This means you only need to connect one signal wire from your detector to the INPUT of side of the ***Fiber Light Controller***.

Your ***Fiber Light Controller*** came with 2 sets of prewired JST connectors that have Red & Black wires that you should use for the 5VDC power source. Red is Positive voltage (+) and Black is Negative voltage (-). You can use either of the JST plugs on the left side of the ***Fiber Light Controller***. They are identical.

Your kit also includes either an 8-port connection block or 4 black only prewired with JCT connectors. Use the black only connectors for the Detection circuits.

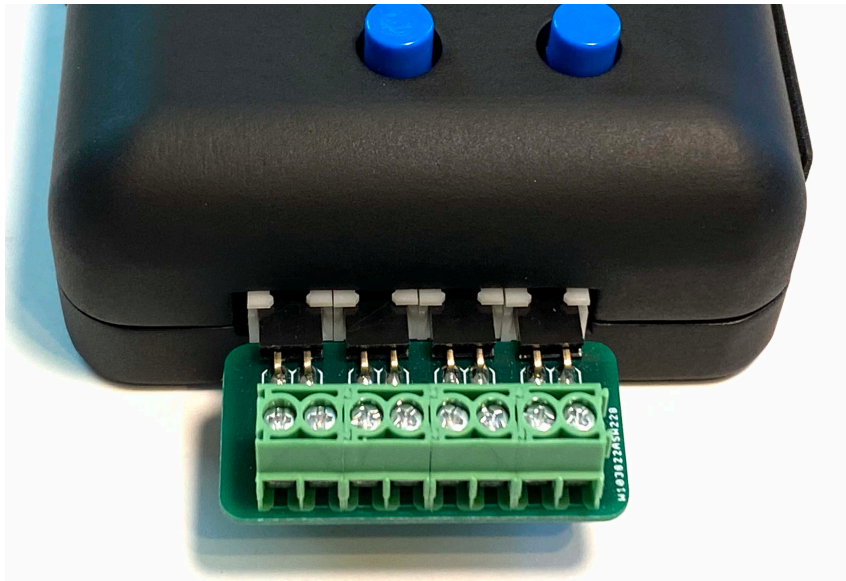
The simplest way to test a trigger is to connect a black wire from the Red/black 5VDC side from one of these two sources to any of the Detector Pins via the Black connection wire plugged into the detector port or via the 8 Port connector (sold separately).



The triggers are listed LEFT to RIGHT 1 to 8:

## DETECTOR INPUTS

Each JST plug has two wires and each wire is its own detection circuit. The **Fiber Light Controller** has four prewired JST plugs with ONLY black wires. Use these for the Detector Inputs. You may also want to use the plug-in terminal adapters available separately.



When a detector circuit is “tripped” whatever PORT#1 is set to do (FX MODE) it will do. By default, if you trip Trigger #1, Port #1 will flash. Trigger #2 will activate Port #2 and so forth.

What you may want to do is cause BOTH ports #1 and #2 to Animate with a single trigger. There are two ways to accomplish this. One is via hardware(wiring) and the other via software configuration. Both works equally well.

If you connect Trigger # 1 and Trigger #2 with a single wire – when you trip that Trigger both port# 1 and Port # 2 will light. You can test this by connecting it to the Black wire of the power supply. You can

connect all 8 ports together or in any combination of one to eight circuits with any of your detector circuits. You can have Triggers 1 and 2 connected, Triggers 3 and 4 and then have 5,6,7 and 8 connected together.

The second method to configure triggers is via CV's (Configuration Variable) which is explained in the advanced section.

## TRIGGER TIMEOUT

When trigger #1 is tripped by a passing train – or however you do it – the trigger will stay activated as long as the detector has the LOW signal or black wire connected to Ground. After the train leaves the detection zone or the switch to ground is shut off, the port lights will continue to Animate for 5 seconds and then turn off. The trigger Timeout STARTS after the detector is OFF.

You can change the duration of the Trigger Timeout as described below.

## Trigger Timeout Settings

Trigger Timeout is the amount of time that Animation continues AFTER a detector has stopped detecting – by whatever means you have set up. To change the Timeout settings, switch the **Fiber Light Controller** into Configuration Mode. To do that, Press and Hold the Green Button for about 1 second and then release.

*The Fiber Light Controller has a lot of advanced options and you are now drifting into those areas – the deep end of the pool. Pay special attention to the decimal points on the various digits since this is one important way how the keypad tells you what is going on.*

When sensors on your layout activate a trigger, the trigger stays on for five seconds by default. Then the trigger shuts off unless the sensor is still active. The trigger will stay on until the sensor stops, and then for five seconds more. You can shorten or lengthen the amount of time that the trigger stays active after the sensor has stopped. The shortest time is immediately, the longest time is 255 seconds ( 4 ½ minutes).

To change the Trigger Timeout, while in Configuration Mode, press the white button momentarily. The right-hand display will show the currently set timeout and the decimal point will be displayed on the right-hand digit. The default is 5 (five seconds. Use the blue up and down buttons on the RIGHT to change this value. Press the Yellow button to SAVE this value. Press the White button again to switch back to standard configuration mode. You will still be in configuration mode until you press the Green button. The Blue buttons on the LEFT will change (scroll through) the Port number. Port numbers on the LEFT and Settings on the RIGHT.



## ADVANCED TOPICS:

### Setting and Changing Triggers and Trigger Timeout

You may have noticed a decimal point on the port number (left side display numbers). This indicates that the port is set to activate with a trigger. If you are expecting something to happen with a port – and nothing is – check that dot. With the dot active, the port light will only light when it is triggered.

A quick way to override the trigger setting and to deactivate a port trigger is to use the trigger setting mode. Press the White button as you did when setting the Timeout value. Decimal points will be display on the right-hand display.

Without changing the value of the timeout, press the SAVE button. If the Trigger was on, it will now be off. You will know because the decimal point dot on the LEFT side PORT number will be off. If you press the SAVE button again without changing the timeout value the dot will reappear and the port will be set back to Trigger ON. As you see, this toggles the Trigger on and off for the selected port.

Using this method to change the trigger on and off will be **OVERWRITTEN** if you subsequently change the mode value setting for any port.

**IMPORTANT NOTE:** When you enter a value from the table as a mode setting for Alternate Flashing, the controller makes that change to all ports set to Alternate Flashing.

Why you may ask? With all the flexibly to configure the unit we needed to make sure that any two odd/even port combinations would

indeed “alternate” flash and be synchronized. Thus, we impose this configuration requirement. You can try this by trying to set any two ports to Blink with the exact same settings. They won’t stay exactly in sync as either or both will “time slide”. We don’t use a Real Time Clock (RTC) so these cycles are simply software wheels going around.

# Configuration Variable Address Map

	CV Range	Value	PORT NUMBER							
			1	2	3	4	5	6	7	8
Animation Mode	144-151	0-3	144	145	146	147	148	149	150	151
Time On	160-167	0-255	160	161	162	163	164	165	166	167
Time Off	176-183	0-255	176	177	178	179	180	181	182	183
Trigger Port assignment	208-215	1-8	208	209	210	211	212	213	214	215
Tigger Timeout	224-231	0-255	224	225	226	227	228	229	230	231

MODE OPTIONS:

Disabled	0
Always On	1
Flashing	2
Blink Port	3

- Decoder Type471 = Multifunction Decoder, 0 = Accessory Decoder\*\* (Power OFF to restart)
- Fast Boot501=ON, 0 is OFF, skips Kepad check and display.
- Flashing Speed124Default setting is 50

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## Changing Configuration Values Directly with the Keypad.

If you are new to DCC, and even if you NEVER plan to use or connect a DCC system to the **Fiber Light Controller**, you will want to get acquainted with the term "CV" or Configuration Variable. Put simply, CV's are memory slots inside the computer chip. You have probably heard of RAM as the memory in your desktop, laptop, phone, etc. CV's are similar but not identical. A CV is a single slot that can store a number between 0 and 255.

Why 255? You can skip this if you want.

*Computers work in 1's and 0's. The computer chip we use is called an 8-bit MCU. That means that it works in packs of 8 bits at a time. If you line up 8 bits of 1's or 0's the max you can get is "11111111". Since there are two options for each bit, a 1 or a 0, this is called counting in base 2. 2 to the 8<sup>th</sup> power is 256. Since computers start at 0, the last number will be 255, not 256. Another way to represent this is by counting the max of each bit as you add a "1". That would go like this: 2,4,8,16,32,64,128 – and 256. So for our purposes, the largest value you can store in a CV is 255.*

The **Fiber Light Controller** uses CV's to store and remember your configuration. When you press the SAVE button you are saving a value to a specific CV location. CV's are numbered so we can find them. Which CV's we can use is also determined by our compliance with the NMRA (National Model Railroad Association) standards.

Take a look at the Configuration Variable Address Map. It shows which CV locations are used to store which information. Using the keypad earlier we showed you a simplified method to configure the **Fiber Light Controller**. The choices of speeds for flashing and of the On OFF settings for Blink were simply preset values that we used to

set the CV's. By setting your own values for CV's you can fine tune ALL the operating aspects of the *Fiber Light Controller*.

If you are familiar with DCC systems, you probably know how to set CV's from your DCC hand controller. If you want, you CAN connect the programming track wires to the *Fiber Light Controller* to read and write to CV's in the same manner. The *Fiber Light Controller* also supports mainline OPS mode for writing CV's while connected to the main track. However, you can only READ CV's back while using the programming track methods. The same as all DCC systems that are NMRA® compliant.

If your eyes are glazing over and you don't have DCC and don't care – DONT WORRY!

We have been using DCC since it was invented and oftentimes found it cumbersome to work with. With that in mind we made it simple and easy to READ and WRITE all the CV's you need directly from the keypad and without the programming track.

## HOW TO READ AND WRITE CVs WITH THE KEYPAD

1. Enter Configuration Mode (Green Button)
2. **Press and Hold** the lower two BLUE buttons (one on the left and one on the right) on the keypad for 3 to 4 seconds.
3. The Keypad will switch into CV mode and show C 2 0 8.

You are now in CV mode. The "C" indication the CV location. In this case it is 208. Take a look at the CV Address map and find 208 in the Port #1 column. You will see that it is the Trigger Port Assignment.

Pressing the RIGHTSIDE blue buttons will change the CV Address up and down. If you press the UP blue button the CV address will change to 209, 210, 211, etc. When you get to 215 – there is no 216. The next number will be 224 – the Trigger Duration for Port #1.

The keypad will only scroll through the valid CV addresses in sequence.

Next, get yourself back to C208.

Press either of the LEFTSIDE Blue buttons once. The keypad display will read “- \_\_\_\_0”. Zero is the default Trigger – which is to say No Trigger. When you turn on power to the **Fiber Light Controller** and a port has a zero for a trigger, it will automatically enter Animate mode and perform the behavior you set with for the MODE (Off, On, Flash, Blink).

The value in CV #208 is “0”. Press the LEFTSIDE blue button again to TOGGLE back and forth between the CV Address and the CV Value.

With the “- \_\_\_\_0” showing, press the RIGHTSIDE up or down blue button. If you press UP, the value of 0 will change to 1, 2, 3, etc. When you get to 8 the next value will be back to 1. Since this is the Trigger Port assignment and there are only 8 triggers, the **Fiber Light Controller** knows that and keeps you “in bounds”.

We are going to set CV 208 with the value of 1. This means that when Trigger Port 1 is triggered, the PORT 1 Fiber Optic Light port will light.

With the display showing “- \_\_\_\_1”, press the yellow SAVE button. The display will flash indicating a successful save.



Now that you have some of the CV mode navigation under control, let's explain how to use this option to have multiple light PORTs activate with a single Trigger Port. You may recall that the other method is to simply wire the Trigger Ports together and set the triggers on from the Trigger configuration mode.

NOTE: the trigger configuration mode always assigns Triggers to its matching port number. Trigger 1 to Port 1, etc. In CV Mode you can change that. But if you use Trigger Mode to configure the triggers it will overwrite what you do here with CV's.

By using the CV address for the Trigger Port Assignment, you can set a PORT to Activate with ANY trigger.

The most fundamental set up for two Light ports is a crossing signal. The **Fiber Light Controller** has two lights per port. To set up an alternate flashing railroad crossing you need two adjacent ports that will alternate flash. In this example we will use ports #1 and #2. You could have used #2 and #3 or #5 & #6, etc.

Setting up port #1 to light with trigger #1 is easy. You already set CV 208 to a value of 1. That means that trigger #1 will activate port#1. To set Port #2 to activate simultaneously with Port#1, set CV209 value = 1. That means that Trigger 1 will also activate Port #2.

Remember to SAVE with the yellow button.

You could have set Port #1 to trigger with ANY of the triggers (1-8). Likewise, will all the other ports. And there is no limit on how many ports are connected to any single trigger – all or none is fine.

You should now see that you can also set the other CV's according to your individual needs. If you scroll to CV224 and press the left blue button to see its value, you will see the default value of "5". That

means that AFTER the trigger/detector is released, the light PORT will continue its animation for 5 seconds and then shut off.

## WATCH OUT:

Trigger Port Assignment tells the *Fiber Light Controller* which Trigger to listen for. Trigger duration is for the Trigger not the light port. In the example above since both light port 1 and 2 are connected to trigger #1, they will both stay animating until the trigger expires, in this case Trigger #1. If you want to lengthen the time, change the Trigger Timeout. That is, change the value of CV224 from "5" to "10" – and SAVE. The range of Trigger Timeout is 0 to 255 or about 4 minutes, 15 seconds.

As you will also see on the CV Address Map sheet, there is a single CV that adjusts the rate of flashing for all light ports set to flashing. Earlier you used the preset mode to change this. Using the CV124 you can change the flashing rate to anything from 1 to 255. The default pace is 50 but if you experiment with this you will see that a value of 10 or even 5 will give you a lighting effect (fast flashing) that you might use for a police car or something else.

Keep in mind and as we mentioned earlier, only ONE Alternate Flashing speed is allowed per *Fiber Light Controller* so all ports set to flashing will flash at the same speed.

Let's discuss the other three CV settings for ports. Animation mode is simple enough. It is the same that you set with the keypad in the quick start section. You can use the CV's to set this but using the standard configuration mode with the keypad is easier.

## HOW TO SET THE BLINK RATES

Using the quick start option and the preset table you were provided 10 different Blink settings. Using CV's, you now have over 65,000 variations of how you can set any single light port. Unlike Alternate Flashing, the blink behavior you give any port is independent of all other ports. The two CV's are for the length of time the light is ON and the length of time the light is OFF. The pattern will just repeat.

## FAST BOOT: CV50

When the *Fiber Light Controller* starts up it displays three sets of numbers. First it shows which decoder type it is set to, then the DCC address and then 1234 to show all is working.

You can disable this and speed up the boot up process by setting CV50 = 1.

1 is Fast Boot on, no display, 0 (zero) is OFF (shows the display).

## DECODER TYPE: CV47 (1=MF, 0 = Accessory)

In the DCC universe there are two types of decoders: Multi-Function Decoders and Accessory Decoders. Unlike ANY OTHER device we are aware of, your *Fiber Light Controller* can be set to operate in EITHER mode.

A multifunction decoder is what you use in your engines. It responds to a single DCC address. Additionally, there is a speed control and

function keys. Typically, the function keys turn on the headlights and sound the horn. The ***Fiber Light Controller*** uses these same capabilities to respond to your commands via your DCC hand controller. You can turn on all the lights, only one light, flash all lights and put the ***Fiber Light Controller*** into animation mode.

An Accessory decoder has a single “master” address and then can have any number of sub address. Some Accessory decoders only have one address. Some have 4. The ***Fiber Light Controller*** has eight – one for each Trigger. Unlike the Multifunction decoder that can do many things for one DCC address, the accessory decoder can really do only one. It’s either Thrown or Closed for any given address. On or Off. But that’s fine. We’ll use eight sequential addresses to trigger each of the eight Trigger ports.

When the ***Fiber Light Controller*** boots up with power it has to pick one or the other mode to operate in. If you change the Decoder Type CV47, you have to turn OFF the power and then back on.

Set CV47 = 1 for Multi- Function Operation  
(1111 will display on boot up)

Set CV47 = 0 for Accessory Decoder operation  
(2222 will display on boot up)

## DCC CONTROL OF THE *Fiber Light Controller*

As mentioned, you can control the *Fiber Light Controller* from your DCC control system (and JMRI for those using software) in either “Engine” (multifunction) mode or “Accessory” mode.

Here are the available commands in Multi-Function mode:

F0	All lights on
F1	Use the speed dial to light a port 1-8
F5	Turn on/off Animation mode
F8	Alternate Flash all pins regardless of setting
F11-F18	In Animation mode (F5 on) – Trigger 1 -8
	In Static Mode (F5 off) – Turn on Port 1 -8

### In Multi-Function Mode:

When DCC is connected to the *Fiber Light Controller*, the unit detects the DCC signal and puts the unit into DCC listen mode. That means that DCC is in control and the auto start into animation may not activate. There are several scenarios where for example, the unit was first powered by DCC, then the external power supply was turned on – or the other way around. It may take up to 5 seconds for the unit to recognize the DCC signal and if the unit was in Animate mode with an external power supply – things were happening – then until you press a function key on your DCC controller the *Fiber Light Controller* behavior won't change.

Since the *Fiber Light Controller* doesn't know ahead of time what the state of the Function keys is you may have to cycle (turn on and off) the function key for the unit to sync up.

The cool thing is that the Function Keys F11-18 are connected up with the Trigger system. That means that you can "manually" and in parallel, trigger a crossing signal or any other combination of effects from your DCC hand controller. For example, if F11 is on, then trigger #1 turns on Ports #1 and # 2 of the crossing signals will activate- or whatever you have configured. Turn F11 off and the Trigger Timeout will countdown and then turn off the lights. If a Train comes along and triggers the circuit, that too will activate the ports.

## In Accessory Mode:

If you switch your *Fiber Light Controller* to Accessory mode right out of the box without changing anything, you will have default address 3-10 lined up as "switches." From your DCC hand controller, select switch #3 and press the THROWN option. This will activate the first Trigger since 3 is the first address – and thus Port #1 will animate. Switch 10 will activate Trigger #8, the last trigger. Press CLOSE (Off) and the trigger will deactivate, and the Trigger Timeout sequence will begin.

For convenience, in accessory mode the number of the switch is briefly shown on the keypad and then disappears after two seconds. You will also note that the decimal is on with the digit if the Trigger is ON and there will not be a decimal if the trigger is off – this is as you press Thrown and Closed for the switch.

There isn't much else to explain here since that is all that Accessory decoders do.

But how do I change the Address of the *Fiber Light Controller*?

## SETTING THE DCC ADDRESS OF THE *Fiber Light Controller*

1. Press the Green button to enter configuration mode.
2. Press and hold the WHITE button for 8-10 seconds.

The display will flash "8888" and then show the currently assigned address with a blinking decimal point. The ONLY time and place where there are blinking decimal points is in address setting mode.

To change the address, press the RIGHTSIDE blue buttons up and down.

\*\* holding down the up or down button will speed up the changing of the numbers. Holding for more that 50 digits will put the scrolling into hyper speed scrolling. Release to stop.

Press the yellow SAVE button to save the new address.

If you are using Multi-Function decoder mode, remember to change the loco address on your DCC Hand controller to the new address you assigned. For Accessory mode it doesn't matter.

In Accessory mode the address of the *Fiber Light Controller* is always the first Trigger.



## RESET

There are a few reasons that you may want to reset the *Fiber Light Controller* 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 *Fiber Light Controller*, turn on configuration mode. It doesn't matter what the display is showing, just that the display is on.

Then, PRESS AND HOLD the two Blue UP 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 "2".

# Fiber Lighting Cable Selection and Use

Selection of the fiber size is completely up to you based on your desired application. Below are a few helpful tips on the use of fibers.

## **Fiber Length:**

The length of the fiber has relatively little impact on the light intensity exiting from the end. Once the light enters the fiber, the majority remains in the fiber until it exits at the other end.

## **Fiber Cutting:**

Fibers should always be cut with a sharp shearing action or with a sharp utility knife. You do not need to polish the end of the fiber, but it is important to have a clean face to it in order to maximize the light transmission. The fiber does not require any special treatment to be used.

## **Light intensity:**

As a general rule, going from 0.75mm to 1.0mm to 1.5mm diameter fibers doubles the amount of light you will get from any pin inserted into a port.

## **Flexibility:**

The smaller the diameter of a fiber the easier it is to bend. Hence, lighting small objects that may require inserting the fiber through and around small areas, will require the use of the smaller diameter fibers.

### **Permanent Bends in Fibers:**

Fibers, like wires, are relatively easy to bend. However, to hold the bend, it is best to insert the fiber into near boiling water and it will immediately take the desired shape. This is further explained and demonstrated in videos on our website.

### **Coloring fibers:**

Unlike LED's, fibers are extremely easy to color. Use a translucent paint and put a very small amount on the end of the fiber that enters into your scenery. Let it dry for a minute and then wipe off any excess paint. Recommended paints are The Tamiya paints are highly recommended for this application.

### **Fiber size and types of Animation:**

Flashing lights on the top of emergency vehicles: 0.75 to 1mm fibers. Railroad crossings: 1mm fiber for HO, 1.5mm for O and 0.75 for N scale. Train Signals: 1mm fiber for HO, 1.5mm for O and 0.75 for N scale.

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

Press and hold the lower left BLUE button and the upper right up BLUE button 5 seconds. The display will blank and then the Product type number, Assembly number and Software version (Edition) number will appear. They repeat twice and then 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 we will be constantly improving the performance and functionality of the *Fiber Light Controller*. Therefore, here is our upgrade policy:

We will upgrade your software on the *Fiber Light Controller* for two years 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.

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

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**ONE YEAR MANUFACTURER WARRANTY:** The product is warranted 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.

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Version 1.5 *Fiber Light Controller*

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