JACKSON RAILCAR

BECAUSE DETAILS MATTER

RAILNET

Layout Lighting Controller

VMR2001 • USER MANUAL

48 lighting channels • 8 banks • browser-based control

Professional layout lighting control without programming or a dedicated app.

Start Here

The RailNet Layout Lighting Controller is designed to make sophisticated LED lighting practical on a model railroad. One controller provides 48 lighting outputs arranged as 8 banks of 6 channels. Each bank can have its own brightness and lighting effect, while individual outputs within a bank can be enabled or disabled.

48 total outputs	8 banks × 6 channels
9–24V DC input	12V 2A supply included in Pro Kit
20 mA max/output	120 mA max/bank
960 mA max total	Designed for LED lighting

In this manual

- 1. What is included and how the system is organized
- 2. Electrical limits and safe installation
- 3. Connecting breakout boards and LEDs
- 4. Powering up and opening the WebUI
- 5. Configuring banks, channels, brightness, and effects
- 6. Using the global trigger
- 7. Lighting mode reference
- 8. Troubleshooting and installation tips

IMPORTANT: CAT6 IS NOT ETHERNET

RailNet uses standard CAT6 patch cables as convenient wiring between the VMR2001 controller and its breakout boards. The RailNet CAT6 ports are not network/Ethernet ports. Do not connect them to a router, switch, computer, PoE injector, or other Ethernet equipment.

HARDWARE

1. System Overview

How the controller is organized

The controller has eight lighting banks. Each bank provides six lighting outputs through a remote breakout board. Think of a bank as one lighting zone: a row of buildings, streetlights, an industry, a yard, a traffic intersection, or another group of lights that should share the same brightness and effect.

- Banks 1–8: eight independently configured lighting zones.
- Channels 1–6 within each bank: individual LED outputs that can be enabled or disabled.
- Brightness: set for the entire bank.
- Lighting effect: set for the entire bank.
- Global trigger: activates/deactivates the controller as a whole; VMR2001 does not provide separate trigger inputs for each bank.

Pro Kit contents

RailNet Layout Lighting Controller (VMR2001)	**1**
ELC breakout boards	**8**
ELC LED test board	**1**
CAT6 patch cables	**4**
0402 cool-white LEDs	**10**
0402 warm-white LEDs	**10**
12V 2A power supply	**1**

You do not need all eight breakout boards connected to begin.

Start with one breakout board and the included LED test board. Once you understand the bank/channel workflow, expand the installation one area at a time.

READ BEFORE WIRING

2. Electrical Limits & Safety

VMR2001 is intended for low-voltage LED lighting. Staying within the published current limits protects the controller and keeps effects operating correctly.

Input voltage	9–24V DC
Included power supply	12V DC, 2A
Maximum current per output	20 mA
Maximum current per bank	120 mA
Maximum total output current	960 mA

Installation rules

- Use DC power only and observe the polarity markings on the controller.
- Do not exceed 20 mA on any single output.
- Do not exceed 120 mA total load on any one six-channel bank.
- Do not exceed 960 mA total load across all eight banks.
- The controller is designed for LED lighting. Do not connect motors, relays, incandescent lamps, track power, or other loads unless specifically approved for the controller.
- Make wiring changes with the controller powered off.
- Keep the controller dry and provide normal ventilation around the board.

WHY THE INCLUDED 12V 2A SUPPLY IS LARGER THAN 960 mA

The controller itself and its regulation circuitry also consume power, and a supply should not be operated continuously at its absolute limit. The included supply provides appropriate headroom while the lighting outputs remain limited by the controller specifications.

3. Connecting Breakout Boards & LEDs

Breakout board connection

1. Power off the VMR2001 controller.
2. Choose the lighting bank you want to use.
3. Connect a standard CAT6 patch cable from that bank on the controller to an ELC breakout board.
4. Connect LEDs to the numbered outputs on the breakout board, observing LED polarity.
5. Reconnect power and test the bank before installing the LEDs permanently.

CAT6 cable length

The Pro Kit includes four 3 ft CAT6 patch cables. CAT6 is used so replacement or longer patch cables are inexpensive and easy to obtain. Use normal straight-through patch cables and keep RailNet wiring separate from actual Ethernet/PoE connections.

Planning banks

Bank example	Good use
Bank 1	Station / platform lighting
Bank 2	Downtown building interiors
Bank 3	Streetlights
Bank 4	Industrial scene
Bank 5	Traffic signal or animated effect

A bank is most useful when its six channels belong to lights that should share one brightness level and one behavior. Individual outputs can still be turned on or off within that bank.

BROWSER CONTROL

4. Power Up & Open the WebUI

RailNet uses a built-in browser interface. No dedicated app is required, and normal configuration can be completed from a phone, tablet, or computer.

1. Connect at least one breakout board and a test LED before powering the system for the first time.
2. Connect the included 12V 2A power supply to the controller.
3. Allow the controller to finish starting up.
4. On your phone, tablet, or computer, open Wi-Fi settings and connect to the RailNet lighting controller network.
5. Open a modern web browser and enter the local RailNet address provided with the production quick-start card.
6. Complete the setup screen if it appears, then open the main controller dashboard.

Production network credentials

The exact Wi-Fi network name, password, and local WebUI address are firmware-specific production values. Use the credentials printed on the quick-start card supplied with your controller. This manual intentionally does not publish an unverified default credential.

If the WebUI does not open

- Confirm your device is connected to the RailNet controller Wi-Fi network, not your normal home Wi-Fi.
- Temporarily disable VPN software or private relay features that can block access to local device pages.
- If your phone says the RailNet network has no internet connection, choose to remain connected. Internet access is not required to configure the controller.
- Close and reopen the browser after reconnecting.
- Power-cycle the controller and try again if the local page remains unavailable.

WEBUI

5. Configuring the Controller

Recommended first-time workflow

1. Start with Bank 1 only.
2. Enable one output and confirm the connected LED lights correctly.
3. Enable the remaining outputs you want to use in that bank.
4. Set the bank brightness.
5. Choose a lighting effect.
6. Adjust the timing controls for that effect.
7. Test the bank, then save the settings.
8. Repeat for Banks 2–8 as needed.

Bank controls

Control	What it changes
Bank selection	Chooses which of the eight banks you are editing.
Channel on/off	Enables or disables individual outputs within the selected bank.
Brightness	Sets the output level for the entire selected bank.
Mode / effect	Selects the lighting behavior for the entire selected bank.
Timing / effect settings	Changes speed, dwell, or other parameters used by the selected effect.

BANK-LEVEL VS. CHANNEL-LEVEL CONTROL

Brightness and the selected lighting effect belong to the bank. The six individual channels within that bank can be enabled or disabled, but they do not each get separate brightness or separate effect settings.

Saving settings

Use the WebUI save control after making changes. Saved configuration is stored in the controller rather than in your phone or computer. Your browser is only the interface used to change it.

OPERATION

6. Global Trigger

VMR2001 provides one global trigger for the controller. The trigger is not divided by bank. When the controller is activated, each bank runs according to its own saved configuration; the effect assigned to that bank controls how its six outputs behave.

- The trigger applies to the controller as a whole.
- Banks cannot be independently turned on/off from separate physical trigger inputs on VMR2001.
- A bank can still have individual channels disabled in its configuration.
- Animated effects continue to sequence, flash, chase, randomize, or run traffic/lightning behavior while the controller is active.

Trigger wiring

Use the trigger connection exactly as labeled on the controller/quick-start sheet. Do not apply external voltage to the trigger terminals unless the production documentation specifically calls for it. When in doubt, use a dry-contact switch or the approved RailNet accessory.

EFFECTS

7. Lighting Mode Reference

Mode	What it does	Typical use
On / Off	Steady illumination. Enabled channels in the bank turn on when the system is active and off when inactive.	Building interiors, platforms, streetlights, general scene lighting.
Flash	Enabled outputs flash together using the bank timing setting.	Warning beacons, attention lights, emergency effects.
Alternating Flash	Outputs alternate between two groups rather than flashing at the same time.	Crossing-style flashes, emergency lighting, alternating warning lamps.
Sequence	Outputs progress through the bank in order.	Progressive building lights, runway/path effects, staged illumination.
Chase	A moving pattern travels through the six outputs.	Marquees, animated signage, industrial or display effects.
Random	Outputs turn on and off in a changing randomized pattern. Random mode does not independently dim each output; the bank brightness setting applies to the bank.	Occupied building windows, neighborhoods, irregular activity.
Traffic Light	Uses the six outputs in a coordinated traffic-signal sequence suitable for two directions of red/yellow/green indications.	Street intersections and road scenes.
Lightning	Produces rapid, irregular flashes intended to imitate lightning activity.	Thunderstorms, dramatic weather scenes, display effects.

Traffic Light channel planning

A six-output bank is naturally suited to a two-direction, three-aspect intersection. A typical installation uses three outputs for one direction and three for the cross direction. Match the WebUI effect to the physical red/yellow/green LED wiring before final installation.

Test effects before burying wiring

Use the included LED test board or temporary LEDs to verify channel order and timing first. It is much easier to correct a channel assignment on the workbench than after streetlights or structures are permanently installed.

SUPPORT

8. Troubleshooting

Symptom	Check first	Then check
No lights at all	Power supply connected and correct polarity	Global trigger state, bank brightness, saved configuration
One bank not working	CAT6 cable fully seated at controller and breakout	Bank enabled, total bank load below 120 mA
One LED not working	LED polarity and channel enabled	LED/wiring fault; output load below 20 mA
Effect looks wrong	Correct bank and effect selected	Channel order and timing settings
Random mode seems too bright/dim	Bank brightness setting	Remember random mode changes on/off state, not per-output dimming
WebUI will not load	Connected to RailNet Wi-Fi	Local address, VPN/private relay, power-cycle
Settings revert	Use the Save control after changes	Wait for save to complete before removing power

Installation tips

- Label each breakout board with its bank number before installing it under the layout.
- Label both ends of every CAT6 cable.
- Configure and test one bank at a time.
- Leave a small service loop in LED wiring so structures can be removed for maintenance.
- Use the test board to confirm bank operation before troubleshooting individual LEDs.
- Record what each bank controls in a layout wiring diagram or maintenance notebook.

REFERENCE

9. Specifications

Product	RailNet Layout Lighting Controller
Model / SKU	VMR2001 / JRCVMR2001
Total lighting channels	48
Lighting banks	8
Channels per bank	6
Input voltage	9–24V DC
Maximum per output	20 mA
Maximum per bank	120 mA
Maximum total output	960 mA
Configuration	Built-in browser-based WebUI

Current product limitations

- No DCC interface is required for operation, and VMR2001 should not be described as a DCC controller.
- There is one global trigger, not eight independent bank triggers.
- Brightness and lighting effects are configured by bank.
- Individual outputs support on/off enable/disable within the bank.
- Configuration export/import is not provided on the current production unit.
- Over-the-air firmware updating is not a supported customer feature on the current production unit.

LIGHTING SHOULD DO MORE THAN TURN ON.

RailNet gives each scene its own rhythm, variation, and life.

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RailNet • Intelligent control for the model railroad.