Strand

r21

POWERED RACEWAY

Built-To-Order
Distributed Dimming & Switching System

Document Number: **2-450333-010 Rev. A**

Version as of: **08 January 2014**

R21 Powered Raceway Operation & Maintenance Guide

IMPORTANT SAFEGUARDS

1.   Equipment Warnings

When using electrical equipment, basic safety precautions should always be followed including the following:

   a. **READ AND FOLLOW ALL SAFETY INSTRUCTIONS**.

   b. Do not use outdoors.

   c. Do not mount near gas or electric heaters.

   d. Equipment should be mounted in locations and at heights where it will not readily be subjected to tampering by unauthorized personnel.

   e. The use of accessory equipment not recommended by the manufacturer may cause an unsafe condition.

   f. Do not use this equipment for other than intended use.

   g. Refer service to qualified personnel.

SAVE THESE INSTRUCTIONS.

WARNING! The unit is to be stored and operated in and environment that is at or below the following conditions - Ambient Temperature: 32 to 104º F / 0 to 40º C with a relative humidity of 5%-95% Non-Condensing. At no time should the unit be stored, operated, or installed outdoors.

2.   Installation and Operational Warnings

WARNING: You must have access to a main circuit breaker or other power disconnect device before installing any wiring. Be sure that power is disconnected by removing fuses or turning the main circuit breaker off before installation. Installing the device with power on may expose you to dangerous voltage and damage the device. A qualified electrician must perform this installation.

WARNING: Refer to National Electrical Code® and local codes for cable specifications. Failure to use proper cable can result in damage to equipment or danger to persons.

WARNING: This equipment is intended for installation in accordance with the National Electric Code® and local regulations. It is also intended for permanent installation in indoor applications only. Before any electrical work is performed, disconnect power at the circuit breaker or remove the fuse to avoid shock or damage to the control. It is recommended that a qualified electrician perform this installation.

CAUTION: Wire openings MUST have fittings or lining to protect wires/cables from damage. Use 90° C copper wire only! Aluminum wire may not be used.

TABLE OF CONTENTS

PREFACE

1. About This Guide

The document provides installation instructions for all configurations of the R21 Powered Raceway. Please read all instructions before installing or using this product. *Retain this guide for future reference*.

- R21 Powered Raceway Configuration: **96350- aa-bb(bb)-cc(cc)-dd(dd)-e(e)-ff(ff)**

Item	Description
aa	Total Length in Feet
bb	Number of 2400 Watt Dual-Dimmer Modules
(bb)	Number of 20 Amp Dual-Relay Modules
cc	Number of Dimmer Load Connectors
(cc)	Number of Relay Load Connectors
dd	Dimmer Load Connector Type (GP - Grounded Stage Pin / GTL - Twistlock / GR - Edison)
(dd)	Relay Load Connector Type (GP - Grounded Stage Pin / GTL - Twistlock / GR - Edison)
e	Dimmer Connector Style (F - Flush / P - Pigtail)
(e)	Relay Connector Style (F - Flush / P - Pigtail)
ff	If Pigtail, Specify Dimmer Pigtail Length in Inches (note, standard length is 18 inches)
(ff)	If Pigtail, Specify Relay Pigtail Length in Inches (note, standard length is 18 inches)

Note: Each R21 Powered Raceway is a customer specific, built-to-order distributed dimming system. For specific information on your system, please refer to Strand Lighting or contract drawings

DMX Output Options

Item	Description
96350-DMXHE	R21 Raceway Headend (one required per universe)
96350-DMX	R21 Raceway DMX Single Plate (A5F panel connector)

Mounting Hardware Options

Item	Description
71440	Single-Pipe Rigged Hanger Bracket
71441	Double-Pipe Rigged Hanger Bracket
71442	Wall-Mount Hanger Bracket
71443	Double-Pipe Offset Hanger Bracket
71444	Single -Pipe Overhung Pipe Hanger Bracket
71445	Single-Pipe Threaded Rod Hanger Bracket

2. Additional Resources

Other Manuals

For additional installation and setup information, please see the following Strand Lighting manual:

- R21 Powered Raceway Installation Guide *(provided with unit)*

Note: R21 Powered Raceway information and manuals may be downloaded at www.vari-lite.com.

Additional Resources for DMX512

For more information on installing DMX512 control systems, the following publication is available for purchase from the United States Institute for Theatre Technology (USITT), "Recommended Practice for DMX512: A Guide for Users and Installers, 2nd edition" (ISBN: 9780955703522). USITT Contact Information:

USITT
315 South Crouse Avenue, Suite 200
Syracuse, NY 13210-1844 USA
1-800-938-7488 or 1-315-463-6463
www.usitt.org

OVERVIEW

1.   Description

The R21 Powered Raceway from Strand Lighting replaces a conventional dimmer rack, relay panel, and connector strip system with a single lightweight device. Raceway dimmers utilize Strand Lighting's patented Insulated Gate Bipolar Transistor (IGBT) dimming technology, which provides significant performance advantages over conventional SCR-based dimming equipment. Due to the IGBT dimmer's chokeless lightweight design and its quiet operation, the dimmer can be installed directly into the electrical raceway and placed anywhere needed.

Each R21 Powered Raceway can be up to 96 feet in length and contain up to forty-eight 2400W dual dimmer or relay modules, for a total of 96 individual dimmer or relay circuits. *Either side of the dual dimmer or relay module may be loaded up to 20A (2400W) when used alone, or when the two dimmers or relays are operated at the same time, any combination of loads may be connected, as long as the combined total of both dimmers or relays does not exceed 20A (2400W).*

Features List:

- Chokeless IGBT dimming - no magnetics, no noise, less wasted energy and heat.
- Contact relay modules - One 20 Amp circuit breaker provides the shared power to the two relays each module.
- Natural convection - quiet operation, no cooling fans or air filters.
- 800 microsecond reverse phase or forward phase control - quiet loads.
- Absolute voltage and current regulation - longer lamp life.
- LOW HARM mode - reduces neutral harmonic currents.
- Focus button on each dimmer and relay module - saves setup time.
- Use standard DMX512 or Strand ShowNet.
- Up to 96 circuits per Raceway - combined dimmers and relays.
- Available in lengths from 8 to 96 feet.
- Lightweight at 6.5 lbs per foot (estimated).
- Optional cable trays keep cables neat.
- Takes up the same space as a standard connector strip.
- DMX output modules.

Note: Basic product specifications are provided in "Appendix B." on page 22 and on the Strand Lighting web site at www.vari-lite.com. Also, please refer to your project drawings for your system's configuration and additional information.

2.   Operation Overview

Control

The R21 Powered Raceway accepts the following control inputs:

• DMX512

• Strand ShowNet

• Strand Vision.net

Configuration

The R21 Powered Raceway can be configured directly via a rack-mounted RCM using the built-in LCD Menu *or* configured using a personal computer running Dimmer.net software.

• For more information about configuration using the RCM LCD Menu, refer to "Configuration Using RCM LCD Menu" on page 12.

• For more information about configuration using Dimmer.net software, refer to the Dimmer.net manual. Dimmer.net software and manuals may be downloaded at www.vari-lite.com.

Note: Basic product specifications are provided in "Appendix B." on page 22 and on the Strand Lighting web site at www.vari-lite.com. Also, please refer to your project drawings for your system's configuration and additional information.

COMPONENTS

1.   R21 Powered Raceway

The R21 Powered Raceway - up to 96 feet long - contains one DMX Headend (one required per universe), up to forty-eight 20A Dual Dimmer and/or Relay Modules, and at least one Power Terminal Box (PTB). The number of Power Terminal Boxes is determined by the location and the number of necessary power feeds.

Power Feed Multi-conductor Cable with Strain Relief (optional)

Hanger Bracket
- *six types available*

Relay Modules
(2 Relays, 20 Amps total) **D**

Flush Receptacle *(choice of stage pin, twistlock, or Edison connectors)*

FRONT VIEW

A

B   *See next pages*

C   *for detail illustrations.*

D

E

C Dual Dimmer Modules
(2400 Watts total)

Focus Button / LED Indicator

Power Terminal Box (PTB)

DMX Single Plate (output) **E**

Pigtail Receptacle - Standard Length 18"
(choice of stagepin, twistlock, or Edison connectors)

DMX Headend **B**
(one required per universe)

SIDE VIEW

EXAMPLE CONFIGURATION
Raceway Components May Vary

Control Cable Tray *(optional)*

1-1/2" Schedule 40 Pipe
(not provided, available by others)

Note: All components are pre-wired at the factory except terminal box line input connections.

Power Terminal Box Interior View (Typical)

Input Power Feed

Ground Terminal

Input Power Terminals

Output Power Wiring
(pre-wired at factory)

19.0"

3.469"

A
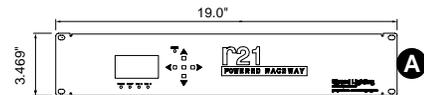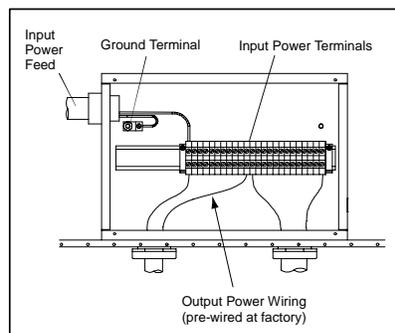
Rack Mount Processor
Front View
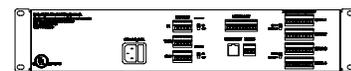
Rack Mount Processor
Rear View

Figure 1: R21 Powered Raceway Component Overview

2.   Raceway Control Module

The Raceway Control Module (RCM) option is used to configure the R21 Powered Raceway. The RCM comes in a 19-inch "rack mount" configuration for local applications.

FRONT VIEW

Status LEDs*

*For more information, refer to "LCD Menu Operation" on page 12.

REAR VIEW
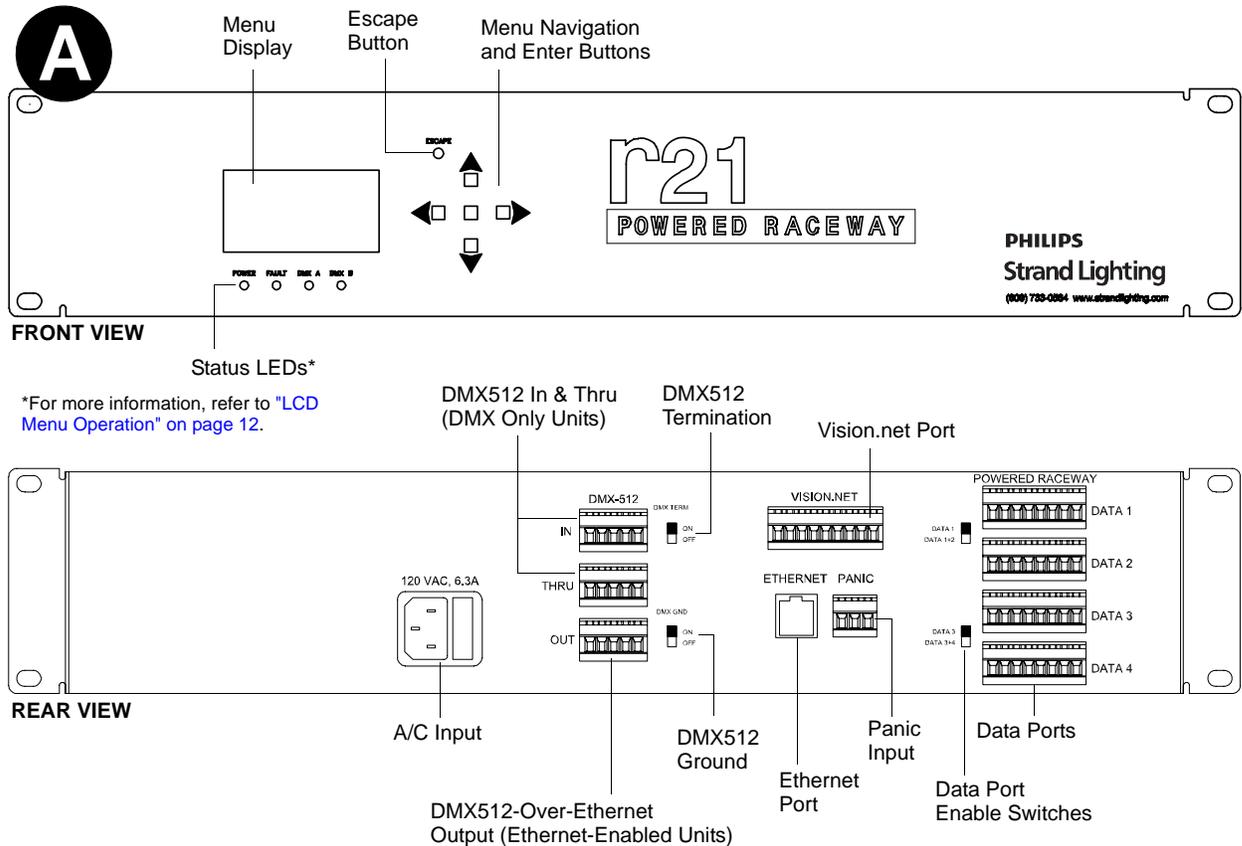
Figure 2: Rack Mount RCM Components

3.   DMX Headend

The DMX Headend is a central connection point for the R21 Powered Raceway dimming system. One DMX Headend is required for each universe. The incoming DMX universe is wired inside the DMX Headend and the headend distributes its connected DMX universe to all dimmers, relay modules, and DMX outlets (as applicable) within the R21 Powered Raceway chassis.

DMX Headend
(one required per universe)

EXAMPLE CONFIGURATION
Raceway Components May Vary
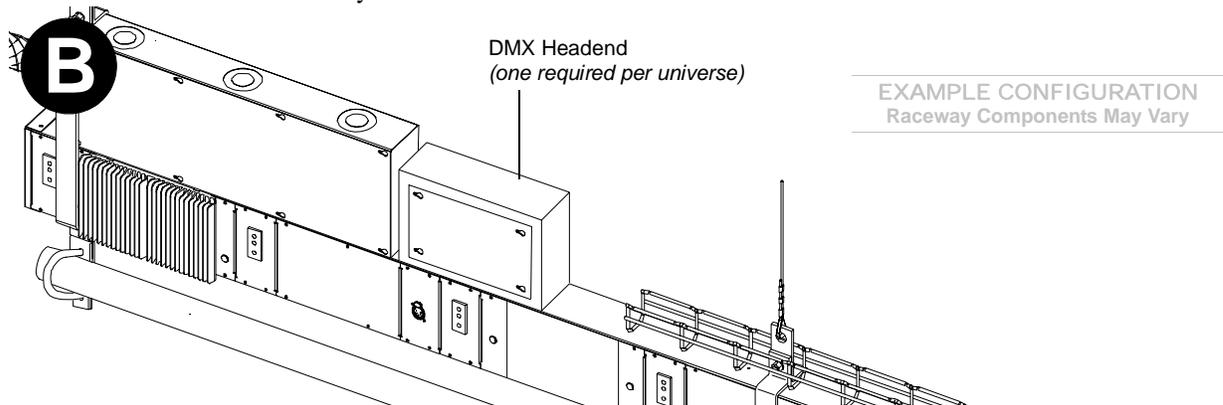
Figure 3: Rack Mount RCM Components

4. Dimmer Modules

Overview

R21 Powered Raceway Dimmer Modules contain one 20A dual dimmer with 20A (2400W) power shared between the two dimmers. Each dual dimmer module includes two Focus/LED Indicator buttons, which function as both focus adjustment controls and status indicators.

Dimmer A Focus
Button / LED Indicator

Dimmer B Focus
Button / LED Indicator

Figure 4: Dimmer Module Detail

Dimmer Module - Focus Buttons

The Focus Buttons can be used to quickly set the output level or test the module as follows:

- If the module is Off, a tap on the button will take it to full on.

- If the module is On, a tap will turn it off.

- Whether On or Off, pressing and holding the button will ramp up the intensity level. Releasing the button will hold the setting at an intermediate level.

Note: Fixtures turned on by the Focus Button will remain on until a control console sets a non-zero DMX512 level for the module. The module's level setting will be cancelled and it will now follow console control. If the module is already set to a non-zero DMX512 level by the console, the button becomes a "Flash-to-Full" control, overriding the level only while the button is pressed.

Dimmer Modules - LED Indicators

Each focus button contains two LEDs associated that are associated with each dimmer and report various operating conditions. The Red LED turns on for approximately 4 seconds on power-up, and after that the indications are as follows:

Red LED	Green LED	Condition
Off	Off	Normal Operation
Off	Flashing	No Load
Off	On	Focus mode (controlled at dimmer)
Flashing *(1.5 sec On, 0.5 sec Off)*	Off	Oversized Load or Overload
Flashing *(0.5 sec On, 0.5 sec Off)*	Off	Over Operational Temperature
On	Off	No Communications with Head-end Processor
Flashing	Flashing	Over Voltage

5.   Relay Modules

Overview

R21 Powered Raceway Relay Modules contain one 20A dual relay with 20A (2400W) power shared between the two single pole relays. Each dual relay module includes two Focus/LED Indicator buttons, which function as both focus adjustment controls and status indicators.
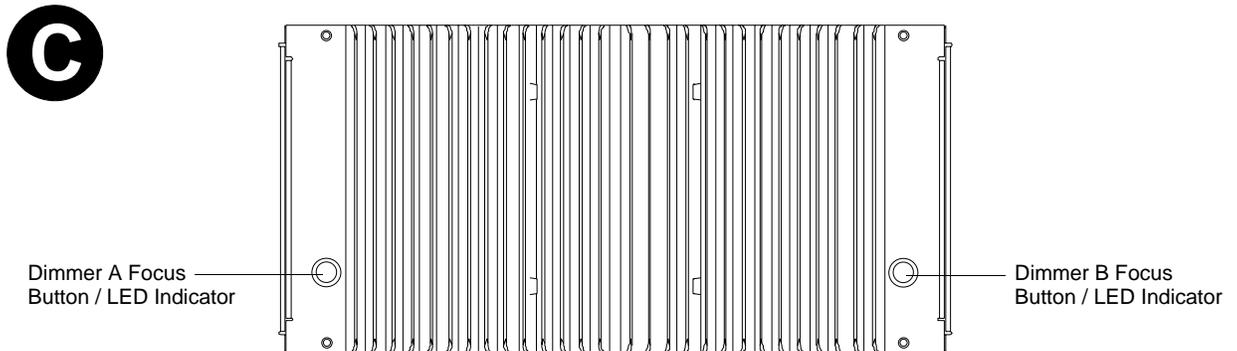

Figure 5: Relay Module Detail

Relay Module - Focus Buttons

The Focus Buttons can be used to quickly set the relay operation or test the module as follows:

• If the module is Off, a tap on the button will turn on the relay.

• If the module is On, a tap will turn it off.

Note: Fixtures turned on by the Focus Button will remain on until a control console sets a non-zero DMX512 level for the module. The module's level setting will be cancelled and it will now follow console control. If the module is already set to a non-zero DMX512 level by the console, the button becomes a "Flash-to-Full" control, overriding the level only while the button is pressed.

Relay Modules - LED Indicators

Each focus button contains two LEDs associated that are associated with each relay and report various operating conditions. The Red LED turns on for approximately 4 seconds on power-up, and after that the indications are as follows:

Red LED	Green LED	Condition
Off	Off	Normal Operation
Off	Flashing	No Load
Off	On	Focus mode (controlled at relay)
Flashing *(1.5 sec On, 0.5 sec Off)*	Off	Oversized Load or Overload
Flashing *(0.5 sec On, 0.5 sec Off)*	Off	Over Operational Temperature
On	Off	No Communications with Head-end Processor
Flashing	Flashing	Over Voltage

6.   DMX Single Output Plate

Overview

As an option, the R21 Powered Raceway can be configured to include single DMX output plates to connect DMX controlled equipment that may be hung with the R21 Powered Raceway, but not controlled by a dimmer or relay module. The DMX Single Output Plate is wired directly into the R21 Powered Raceway, so additional wiring is not required.
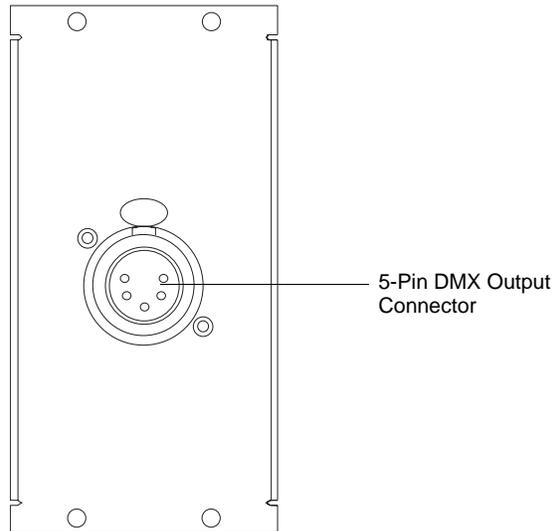

Figure 6: DMX Single Output Plate Detail

CONFIGURATION USING RCM LCD MENU

1. Overview

The R21 Powered Raceway can be configured directly via the Rack Mounted Raceway Control Module (RCM - refer to "Raceway Control Module" on page 8 for additional information) using the built-in LCD Menu. Please note that while the built in LCD menu will display all system status information, it provides only basic configuration capabilities. Strand Lighting's Dimmer.net software provides an advanced interface for configuring R21 Lighting Control System options. Where applicable, refer to the Dimmer.net manual for full explanations of each configuration option. Dimmer.net software and manuals may be downloaded at www.vari-lite.com.

2. LCD Menu Operation

The RCM's LCD Menu provides local control for accessing all system status information and for making a limited amount of configuration changes to that particular Raceway RCM. (If there are multiple RCMs in the system, changes would need to be made at each RCM.)

Upon power up, the LCD Menu will display the Strand Lighting logo followed by the current RCM software version and RCM name. If no name has been assigned, the unit will display Not Set in the name field. After briefly displaying this information, the MAIN MENU will appear.

Note: To return to the power up screen after boot up, press the [Escape] button.
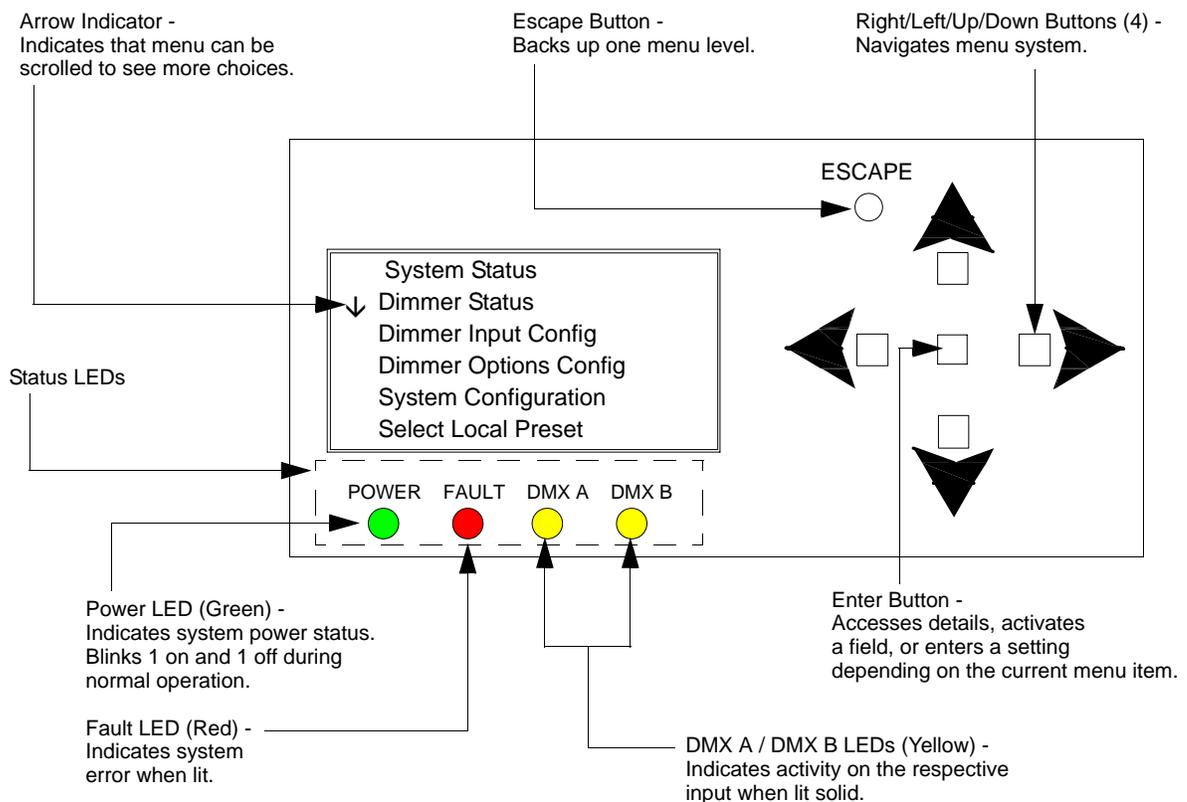

Figure 7: LCD Menu and Status LEDs

The Head-End Processor LCD Display Menu system consists of eight main categories. To navigate the menus, press the four navigation buttons as required (**Figure 7**). When the desired menu is reached, press [Enter] to display the menu options. Use navigation and [Enter] buttons to view status and configure the LCD Menu as required.

LCD Menu Structure

```
MAIN MENU

- System Status (SYSTEM STATUS)
- Dimmer Status (DIMMER STATUS)
- Dimmer Input Config (DIMMER INPUT)
- Dimmer Options Config (DIMMER OPTIONS)
- System Configuration (SYSTEM CONFIG)
- Select Local Preset (SELECT PRESET)
- Local Presets Config (EDIT PRESETS)
- Menu Configuration (MENU CONFIG)
```

Note: "Dimmer" or "Dimmers" in the menu system also refers to "Relay" or "Relays".

SYSTEM STATUS (status information shown, no user-selectable options)

Sub Menu	Options	Comments
Name	N/A	Displays Name
Location	N/A	Displays Location
Serial #	N/A	Displays Unit's Serial Number
Type	N/A	Displays product type
Dimmer Status	N/A	Displays either OK (no errors) or Errors
Dimmer Present	N/A	Displays the number of dimmers in raceway.
Dimmers with Errors	N/A	Displays the number of dimmers with errors
Firmware	N/A	Displays Processor's current firmware version as: 86-**XXXX** v**X.XX**

DIMMER STATUS (status information shown, no user-selectable options)

Sub Menu	Options	Comments
Dimmer	N/A	Displays dimmer (1 through X) for the dimmer to be configured, and its DMX512 address (DMX XXX)
Type	N/A	Displays module type - Dimmer or Relay
Level	N/A	Displays dimmer's current operational level (in percentage)
TMP *(only shown when module is a dimmer)*	N/A	Displays current temperature of dimmer (displayed in both C and F)
Line *(only shown when module is a dimmer)*	N/A	Displays input line voltage (in VAC). If a relay module, "- -" is shown.
Load *(only shown when module is a dimmer)*	N/A	Displays connected load to dimmer (displayed in watts)
Status	N/A	Status of dimmer Normal, Non-Dim, or Breaker Off? (if no power to dimmer)
Errors	N/A	Displays if the dimmer is experiencing any errors
Current	N/A	Displays current load. If a relay module, "- -" is shown.
Mod	N/A	Displays module type
Version	N/A	Displays dimmer's firmware version
If [Enter] button is pressed, the following fields change in Dimmer Status as follows:		
Level	N/A	[0] to [255]
Status	N/A	[00] Config: [XX]
Errors	N/A	[00] Panel: [XX]

Continued next page

LCD Menu Structure (continued)

Continued from previous page

DIMMER INPUT

Sub Menu	Options	Comments
Dimmer	N/A	Dimmer number
DMX A	N/A	Dimmer number specified for DMX A
DMX B (Ethernet)	N/A	Dimmer number specified for DMX B
Room	N/A	Room number
Channel	N/A	Channel number
DMX A Priority	None / Primary / Fallback	Sets priority level for DMX A
DMX B Priority	None / Primary / Fallback	Sets priority level for DMX B
Present Priority	None / Primary / Fallback	Sets priority level for Present

DIMMER OPTIONS

Sub Menu	Options	Comments
Dimmer	N/A	Displays dimmer (1 through X) for the dimmer to be configured, and its DMX512 address (DMX XXX)
Mode [1]	RPC (Reverse Phase Control) / FPC (Forward Phase Control) / Non-Dim / LED - RPC, LED-FPC	Sets dimmer operation. Also allows user to set the dimmer to Non-Dim operation (as a On or Off device). LED mode is for line voltage LED fixtures that require locked reverse phase control dimming (set at 400µS).
Voltage at Full (VAC) [1]	100 / 110 / 115 / 120	Sets dimmer operational voltage. Using a lower voltage than lamp specification can prolong lamp life.
Transition (µS) *(in microseconds)* [1]	400 / AUTO*	Options available (in both FPC and RPC) are either 400µS (set) or AUTO (automatically and continuously adjusts between 400µS to 800µS)
	*Note, when "LED" option is selected in "Mode", the dimmer is set to 400 µS and cannot be changed to AUTO.	
Dimmer Curve	Linear / Square Law / Invert / Slow Bottom / Fast Bottom / Fast Top / Full at 1 / Out at 100 / Preheat 5% / Preheat 10% / Hot Patch / Adv Mark 10 (Advance Mark 10 fluorescent ballasts)	Sets dimmer curve (dimming operation) for each dimmer in the dimmer cabinet
High Trim *(maximum level)* [2]	1 to 100%	Sets the top end (maximum level) of the dimmer operational limit
Low Trim *(minimum level)* [2]	0 to 99%	Sets the low end (minimum level) of the dimmer operational limit
Always On	Yes or No	If set to "Yes", then the dimmer stays on to the Low Trim (minimum level) setting.
Preheat [1]	Yes or No	Allows dimmer to be set to preheat mode. Normally preheat mode is used to "speed up" large wattage lamps so they behave more like smaller ones

<u>Notes</u>:

1) *Applies to dimmer modules only. Relay modules do not respond to these settings.*

2) *For relay modules, High Trim sets the level where the relay turns ON. Low Trim sets the level where the relay turns OFF. For all levels between High Trim and Low Trim, the relay will stay either latched ON or OFF (depending on initial state).*

LCD Menu Structure (continued)

Continued from previous page

SYSTEM CONFIG

Sub Menu	Options	Comments
DMX A	Enabled / Disabled	Enables or disables the DMX A port
DMX B (Pathport)	Enabled / Disabled	Enables or disables the DMX B port
Vision.net Network	Enabled / Disabled	Enables or disables the Vision.net Network port
Vision.net Station ID	Off / 1 thru 255	Sets Vision.net Station ID for the unit
DMX Hold (hh:mm) *(in hours:mins)*	None / 0:01 / 0:05 / 0:10 / 0:15 / 1:00 / 2:00 / 4:00 / 12:00	Sets the amount of time the dimmer cabinet will keep and adhere to the last DMX512 levels
Power-up Preset	None / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8	Sets what preset the dimmers go to when dimmer cabinet is initially powered
Power-up Hold	Forever / 0:01 / 0:05 / 0:10 / 0:15 / 1:00 / 2:00 / 4:00 / 12:00 / 24:00	Sets the amount of time the dimmers will stay at their preset level (if set) when the raceway is initially powered. Will follow DMX512 commands at anytime.
Preset Clear	None / DMX	Sets how Presets are cleared via Vision.net, DMX512 or any combination thereof.
Config Port	Ethernet / RS232	Sets configuration port to Ethernet or RS232 input
Panic Inputs	Normally Open / Normally Closed	Sets panic inputs to open or closed

SELECT PRESET

Sub Menu	Options	Comments
Select a Preset	None / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8	Manually selects a local preset via the unit's processor (used for testing processor communication and dimmer operation)

EDIT PRESETS

Sub Menu	Options	Comments
Dimmer	N/A	Selects dimmer to be edited.
Preset	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8	Selects the preset to be programmed
Level (%)	0 to 100% (in 1% increments)	Selects the preset level of the dimmers (each dimmer is individually programmable)
Dimmer Set	One / All / Capture (Yes / No)* * Next selection is "Capture ALL Dimmers? (Yes / No)	Allows users to set preset to one or all dimmers (at the same time) or Capture (snapshot) a look from all dimmers

Continued next page

LCD Menu Structure (continued)

Continued from previous page

MENU CONFIG

Sub Menu	Options	Comments
Display On (min) *(in minutes)*	Always (always on) / 1 to 60 minutes (in 1 minute increments)	Sets the amount of time the unit's processor LCD display backlight is on after the last button press
LED ON (MIN)	Always (always on) / 1 to 60 minutes (in 1 minute increments)	Set the amount of time the status LEDs flash during operation. The Power LED normally flashes (as a heartbeat) when set to Always. When the option is set to a specific time, the LED will only flash in the time increment (e.g., every five minutes).
Display Contrast (%)	0 to 100% (in 1% increments)	Sets the contrast level of the LCD Display
Set New Password	# # # #	Allows the raceway to be password protected - so parameters cannot be changed. **NOTE**: Strand Lighting does not keep user-defined passwords. After entering and setting your password, record it and put it someplace safe in case you forget your password.

SERVICE

1. Contacting Strand Lighting

Please have the following information ready before you call:

- Your venue name and location.
- Any error messages that appear.

Contact Strand Lighting Customer Service at: 1-800-4STRAND (U.S.) or 1-214-647-7880 (international).

If you call outside of our normal business hours you will be able to leave an emergency voicemail. Be sure to leave a phone number where you can be reached. A technician will be paged and call you back as soon as possible.

Before you call the factory for service, you might try the troubleshooting tips that follow. These will help you answer the technician's questions and help diagnose your problem quickly.

2. Troubleshooting

A PC running Dimmer.net software can tell you many things about the system.

To physically examine the system:

Step 1. Check LEDs at front of RCM. (Refer to "LCD Menu Operation" on page 12.)

Step 2. At main circuit breaker(s), check for tripped circuits.

Step 3. Disconnect power to R21 Powered Raceway.

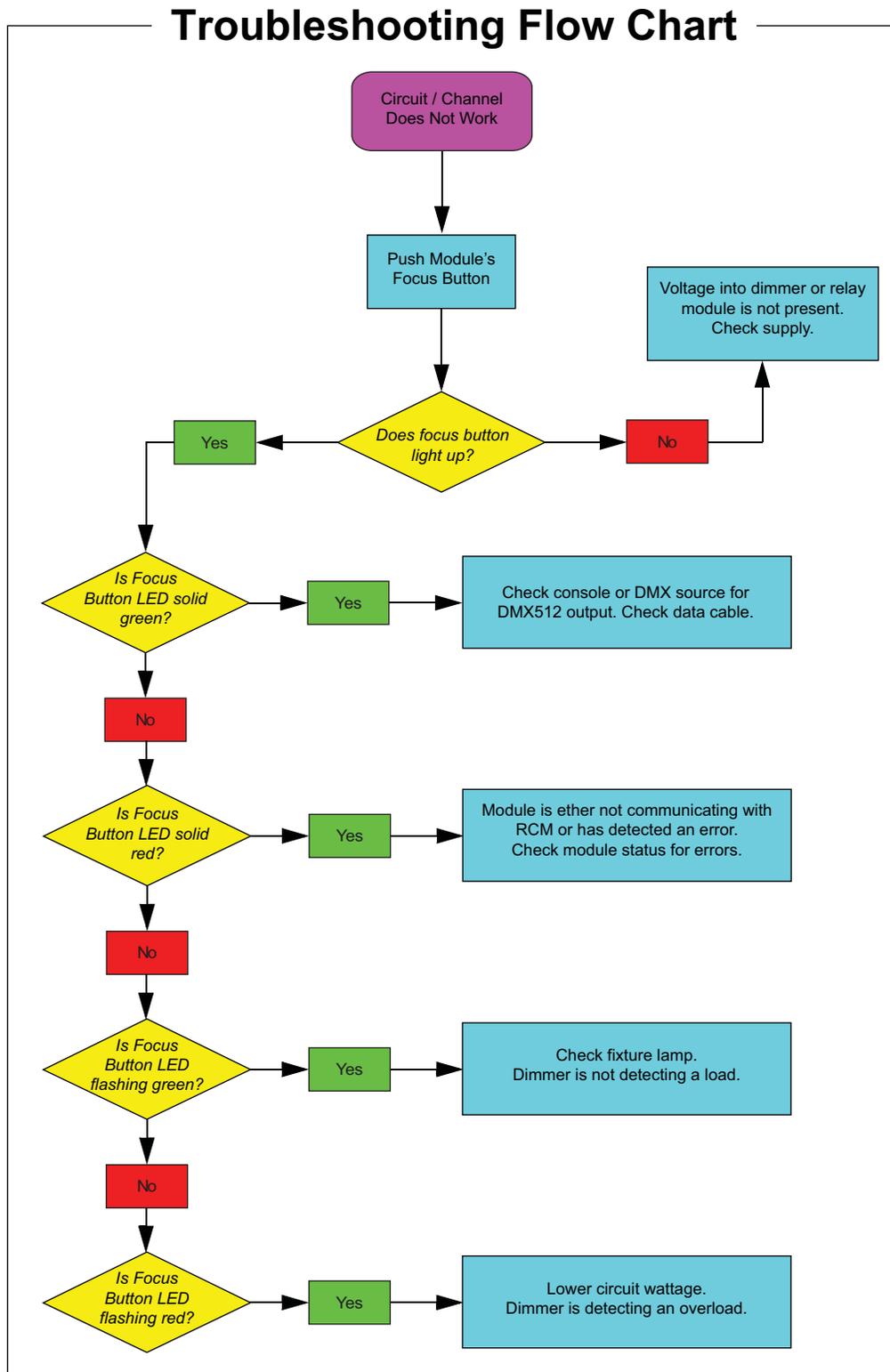**WARNING!** Failure to disconnect power before servicing may result in injury.

Step 4. Check for damaged or loose control and/or load connections.

To further troubleshoot:

Refer to the Troubleshooting Flow Chart on the following page.

Troubleshooting Flow Chart

Note: Use the Troubleshooting Flow Chart below for basic troubleshooting. For additional assistance, please contact Strand Lighting technical support as described in "Contacting Strand Lighting" on page 17.

Troubleshooting Flow Chart

Circuit / Channel Does Not Work

Push Module's Focus Button

Voltage into dimmer or relay module is not present. Check supply.

Does focus button light up?
Yes → No →

Is Focus Button LED solid green?
Yes → Check console or DMX source for DMX512 output. Check data cable.
No ↓

Is Focus Button LED solid red?
Yes → Module is ether not communicating with RCM or has detected an error. Check module status for errors.
No ↓

Is Focus Button LED flashing green?
Yes → Check fixture lamp. Dimmer is not detecting a load.
No ↓

Is Focus Button LED flashing red?
Yes → Lower circuit wattage. Dimmer is detecting an overload.

3. Changing/Addressing Dimmer or Relay Modules

Raceway dimmer and relay modules are easy to remove or insert.

Note: Figure 8 shows a dimmer module; replacement procedure described herein is same for both dimmer and relay modules.

⚠️ **WARNING!** Failure to disconnect power before servicing may result in injury.

To replace a dimmer or relay module:

Step 1. Turn off all power to R21 Powered Raceway.

Step 2. At dimmer or relay module, loosen four screws and partially remove from system (**Figure 8**).

Step 3. Disconnect all wiring and completely remove module.

Step 4. At new dimmer or relay module, set DIP switches to same address as previous module (indicated on dimmer module back panel label and "Appendix A." on page 20). *Note*: The address must exactly match the address of the dimmer or relay being replaced. Failure to re-address the new dimmer or relay module will result in improper operation.

Step 5. Connect three Neutral connections, 1 Line, Load A and Load B to new dimmer or relay module.

Step 6. Insert new module into Raceway and replace four mounting screws.

Step 7. Power up and test.
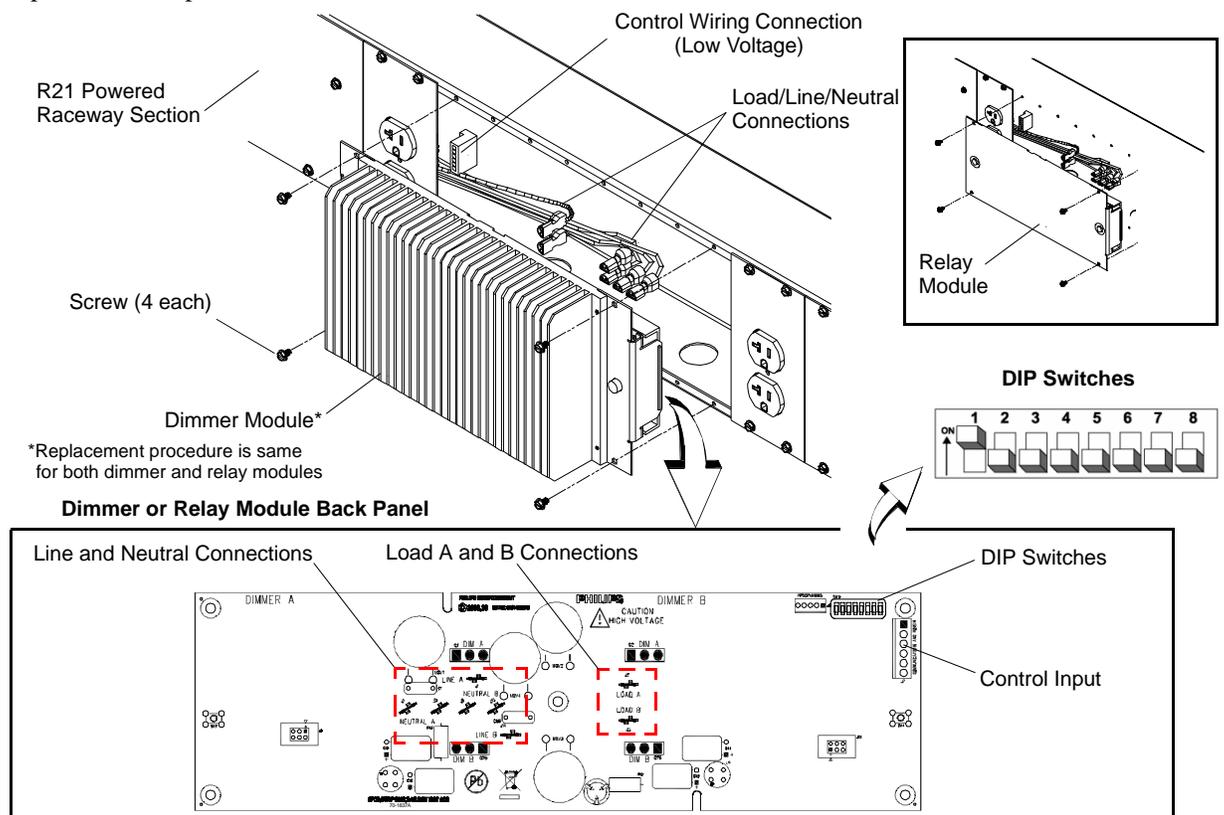

Figure 8: Removing and Replacing a Dimmer or Relay Module

APPENDIX A.

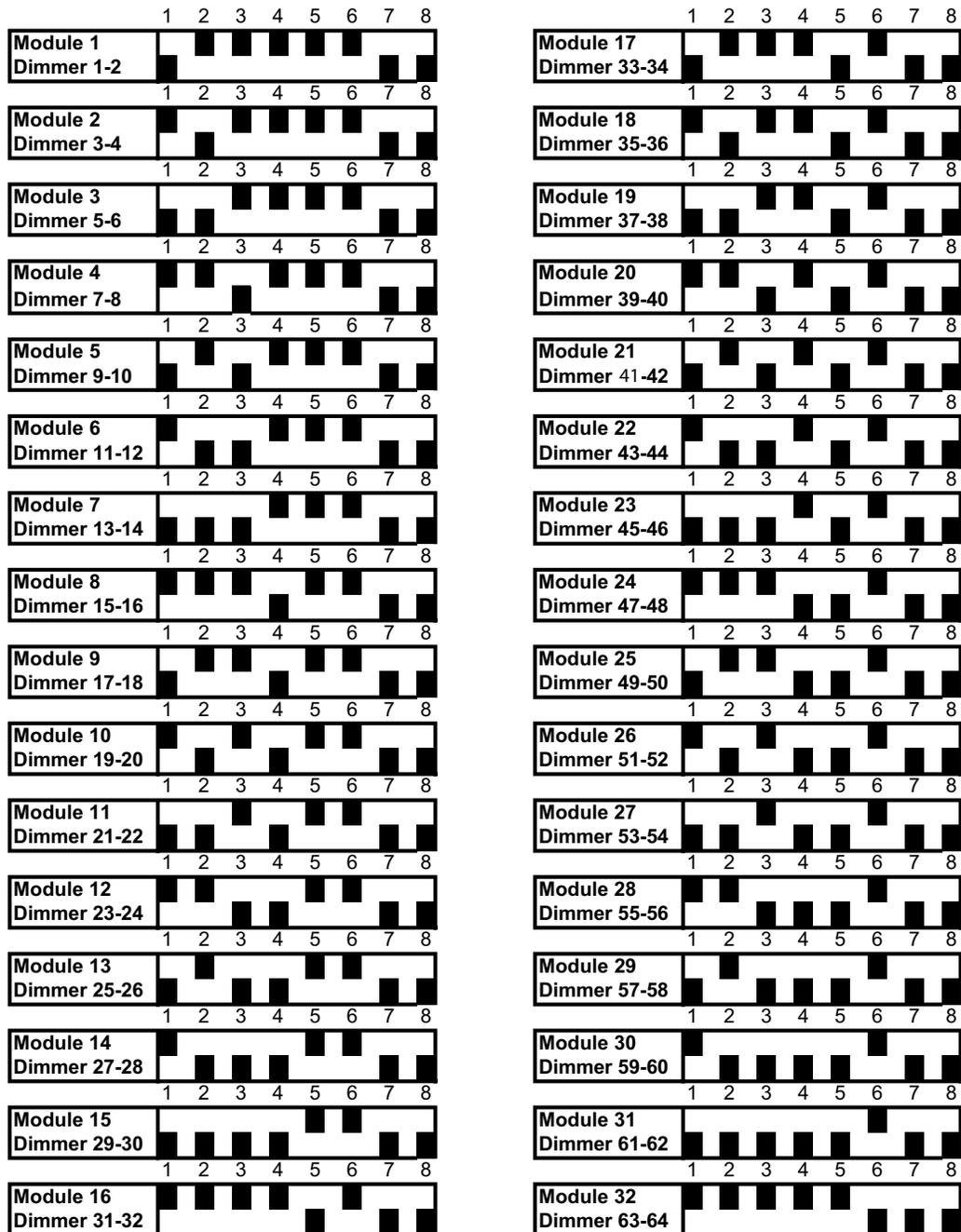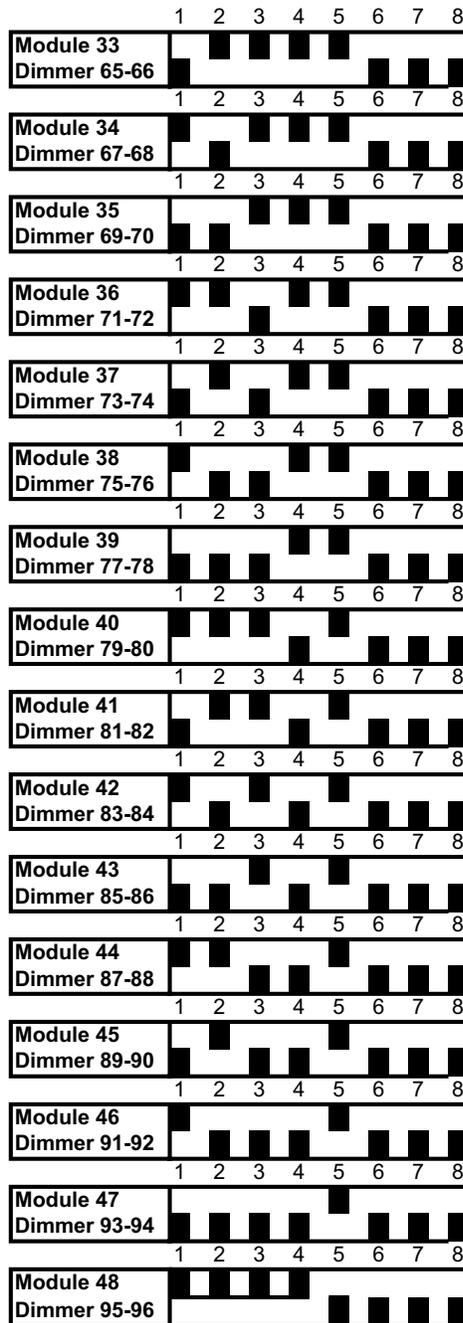## 1. R21 Powered Raceway Dimmer / Relay Module DIP Switch Settings

	1 2 3 4 5 6 7 8		1 2 3 4 5 6 7 8
Module 1 Dimmer 1-2		Module 17 Dimmer 33-34	
Module 2 Dimmer 3-4		Module 18 Dimmer 35-36	
Module 3 Dimmer 5-6		Module 19 Dimmer 37-38	
Module 4 Dimmer 7-8		Module 20 Dimmer 39-40	
Module 5 Dimmer 9-10		Module 21 Dimmer 41-42	
Module 6 Dimmer 11-12		Module 22 Dimmer 43-44	
Module 7 Dimmer 13-14		Module 23 Dimmer 45-46	
Module 8 Dimmer 15-16		Module 24 Dimmer 47-48	
Module 9 Dimmer 17-18		Module 25 Dimmer 49-50	
Module 10 Dimmer 19-20		Module 26 Dimmer 51-52	
Module 11 Dimmer 21-22		Module 27 Dimmer 53-54	
Module 12 Dimmer 23-24		Module 28 Dimmer 55-56	
Module 13 Dimmer 25-26		Module 29 Dimmer 57-58	
Module 14 Dimmer 27-28		Module 30 Dimmer 59-60	
Module 15 Dimmer 29-30		Module 31 Dimmer 61-62	
Module 16 Dimmer 31-32		Module 32 Dimmer 63-64	

Figure 9: Dimmer / Relay Module DIP Switch Setting Chart (Part 1)

Figure 10: Dimmer / Relay Module DIP Switch Setting Chart (Part 2)

Note: Last module in network must have DIP switches 7 and 8 set to the UP position. (All other modules on the network have their DIP switches 7 and 8 set to the DOWN position.)

APPENDIX B.

1.   Technical Information

Each R21 Powered Raceway is a customer specific, built-to-order distributed dimming system. Below are the common features and specifications of the R21 Powered Raceway dimming system. For specific information on your system, please refer to Strand Lighting or contract drawings.

Number of Circuits:	Up to 96 (dimmer and/or relays (48 modules)
Output Voltage:	115/120 Volts AC (max.)
Minimum Load:	1 watt
Maximum Load:	2400 Watts (per dimmer module) / 20 Amps (per relay module)
Insertion Loss:	2.5 Volts AC (max.)
Power Feed:	3-Phase, 4 Wire 120/208 volts, 20 Amps per 3 Dimmer or Relay Modules
Frequency:	50/60Hz
Ambient Temperature:	32 to 104° F / 0 to 40° C
Humidity:	5%-95% Non-Condensing
Cooling:	Natural Convection
Height:	6 in. (14.5 in. with terminal box)
Depth:	5.25 in. (including module heatsink)
Length:	8 to 96 Feet
Weight:	6.5 lbs. per Foot
Connector Types:	GP – Grounded Stage Pin / GTL – Twistlock / GR – Edison NEMA 5-20R (note, connectors can be either flush or pigtail mount. Depends on customer order.

2.   Mounting Hardware

All mounting hardware is sold separately. For information on hardware mounting, refer to "Mounting Hardware Options" on page 3 and information in the installation manual provided with your unit or your project submittal drawings.

Notes

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TECHNICAL SUPPORT

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