Strand

r21

POWERED RACEWAY

INSTALLATION GUIDE

Built-To-Order
Distributed Dimming & Switching System

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R21 Powered Raceway Installation Guide

IMPORTANT SAFEGUARDS

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.

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 operation, maintenance, and setup information, please see the following Strand manuals:

- R21 Powered Raceway Operation and Maintenance Guide

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. Installation and Checkout Sequence

The R21 Powered Raceway is shipped from the factory in a ready-to-install configuration. The following steps will be required to successfully install the unit(s) at your location:

1) **Unpack and Inspect**
Remove all components from shipping container(s) and inspect for damage. Compare the equipment you received to the packing list. If these do not match, contact Strand Lighting Customer Service at: 1-800-4STRAND (U.S.) or 1-214-647-7880 (international).

2) **Review ALL Instructions**
Read this entire installation guide *before* you start the installation.

3) **Gather Tools**
Obtain all tools and supplies listed in "Tools and Supplies" on page 10.

4) **Choose Appropriate Installation Location**
Ensure installation location meets the requirements listed in "Installation Location" on page 10.

5) **Plan Wire Routing**
Decide where line and control wiring will enter the unit.

6) **Install Unit**
Following the instructions provided in "Installation Procedure" on page 12, mount and wire the unit.

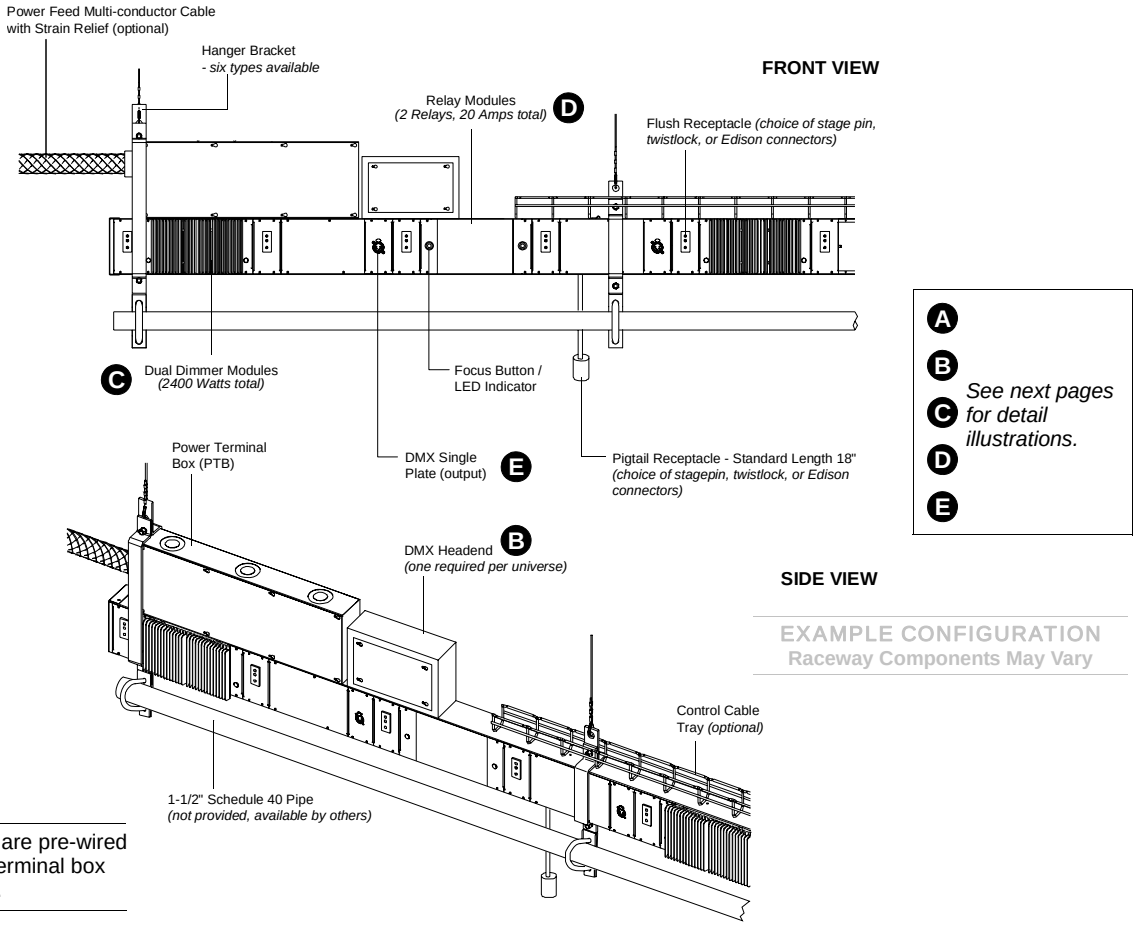
7) **Checkout**
Perform the steps listed in "Complete and Test" on page 21 to ensure that the unit has been properly installed.

8) **Call For Approval**
DO NOT ENERGIZE the R21 Powered Raceway until the wiring has been approved by an authorized technician. Call Strand Lighting to schedule an Engineering Checkout.

COMPONENTS

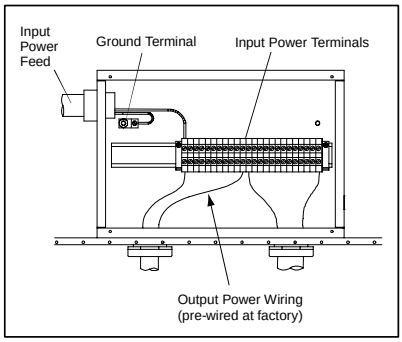
1. R21 Powered Raceway

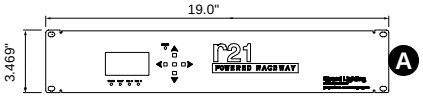
The R21 Powered Raceway - up to 96 feet long - contains one DMX Headend (one required per universe), up to forty-eight 20A Dual Dimmer and/or Relay Modules, and at least one Power Terminal Box (PTB). The number of Power Terminal Boxes is determined by the location and the number of necessary power feeds.



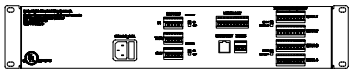
Note: All components are pre-wired at the factory except terminal box line input connections.

Power Terminal Box Interior View (Typical)





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

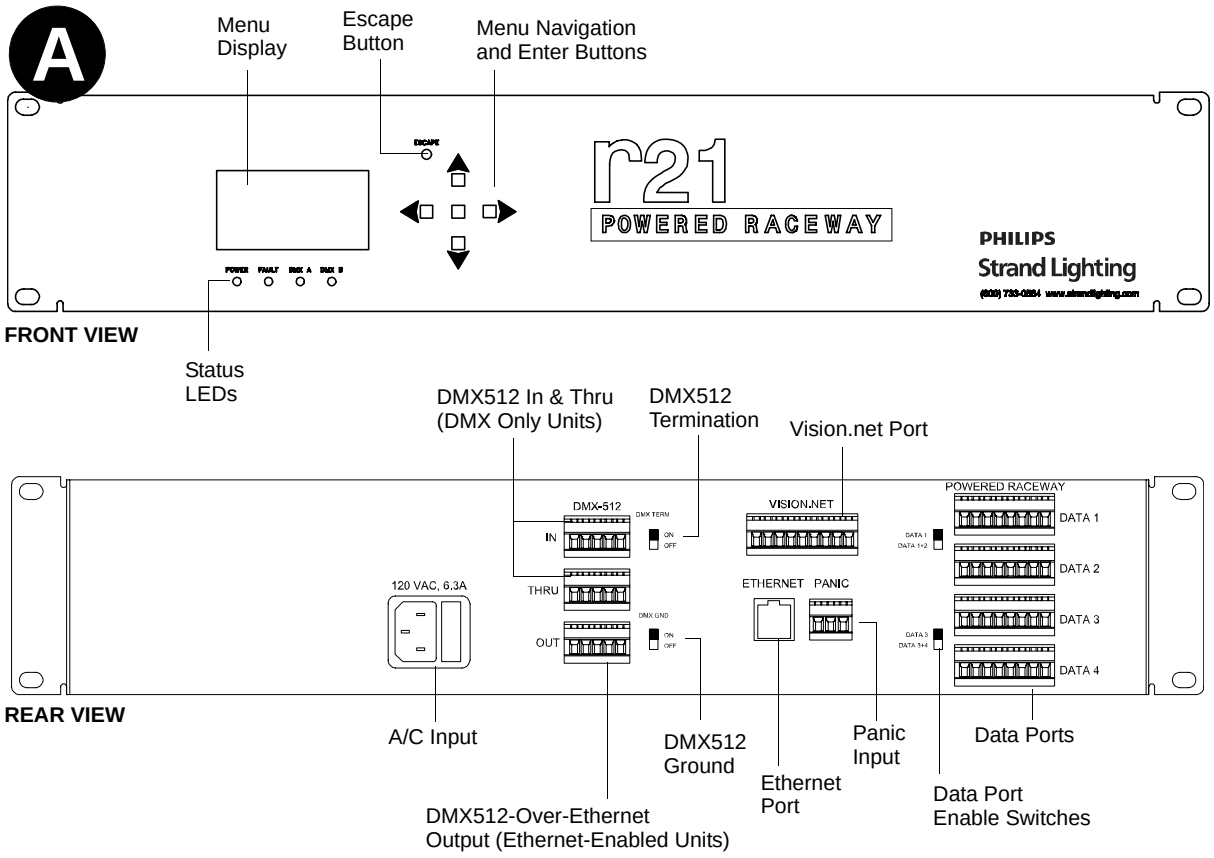


Figure 2: Rack Mount RCM Components

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.

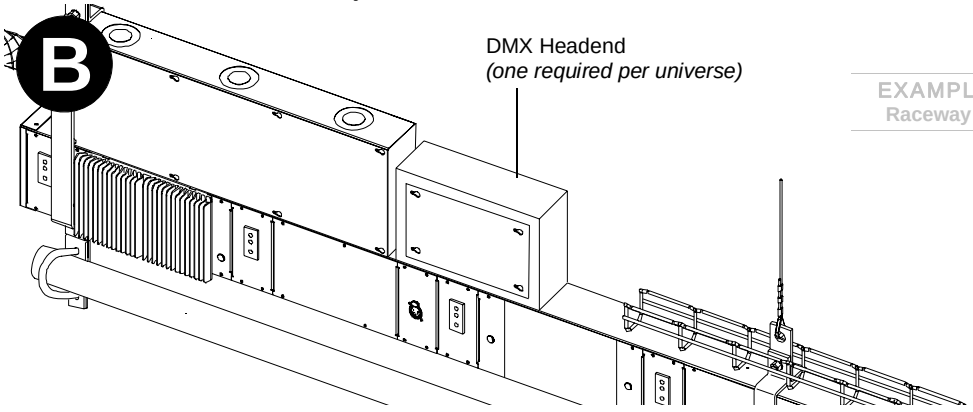


Figure 3: Rack Mount RCM Components

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.

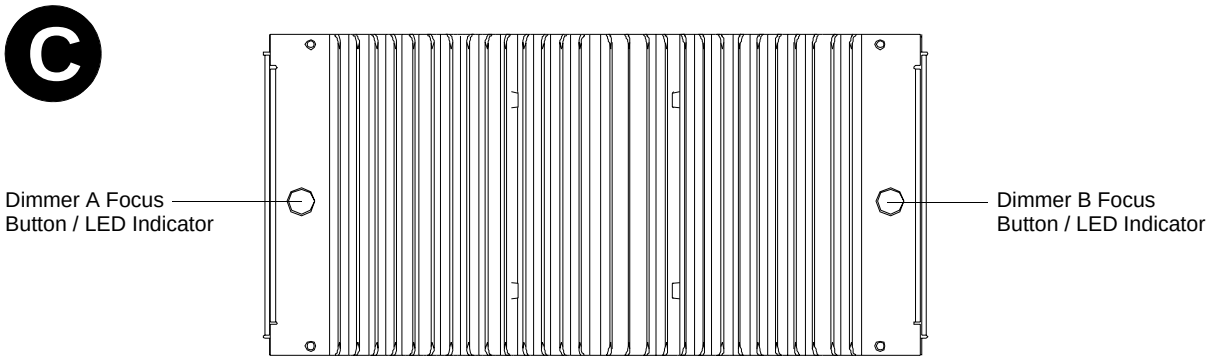


Figure 4: Dimmer Module Detail

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 relays. Each dual relay module includes two Focus/LED Indicator buttons, which function as both focus adjustment controls and status indicators.

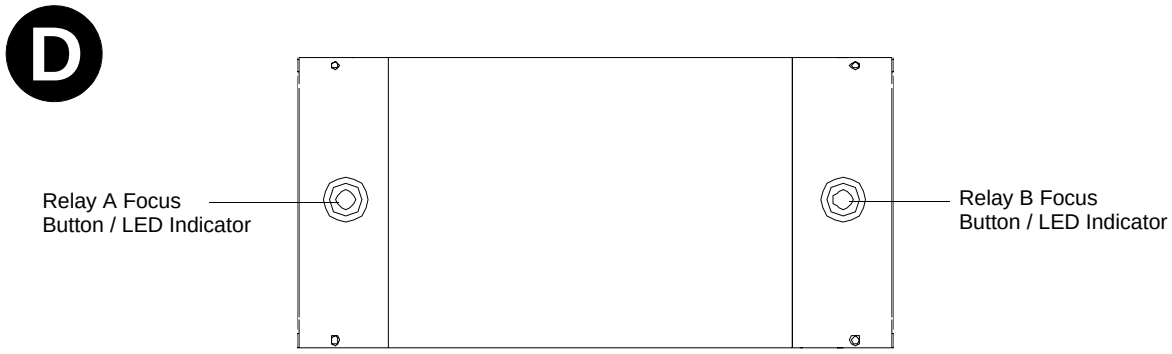


Figure 5: Relay Module Detail

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.

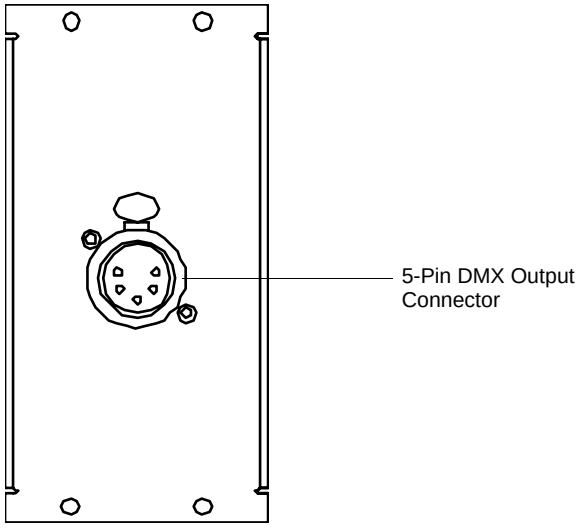


Figure 6: DMX Single Output Plate Detail

MECHANICAL CONSIDERATIONS

1. Tools and Supplies

The following tools and supplies will be required:

- Phillips and slotted screwdrivers
- Adjustable open-ended wrench
- Ratchet and assorted socket set
- Wire cutter and stripper
- Cable/box connectors and fittings
- Digital voltmeter / RMS
- Hammer (for terminal box knock-out holes)

Note: This is a basic list. Depending on your specific installation, additional tools may be required.

2. Installation Location

The location planned for installation MUST meet the following requirements:

- **Weight Load Capacity** - The R21 Powered Raceway should be installed using mounting brackets with sufficient load capacity to support it. Choose one of six approved mounting configurations. Refer to "Mounting the Unit" on page 12.
- **Ventilation Allowance** - The room must have sufficient space to allow air to circulate and cool. The R21 Powered Raceway must have a minimum of 12 inches of clear space above it to allow for proper convection cooling.
- **Indoor Use Only** - The R21 Powered Raceway is rated for indoor use only.

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.

- **Dry Locations Only** - The R21 Powered Raceway can only be installed in an "office clean" area that is never exposed to moisture of any kind. Strand Lighting is not responsible for damage to equipment caused by paint, dust, solvents, cleaning supplies, improper storage or abuse.

CAUTION: Refer to National Electrical Code® and local codes to determine whether additional requirements must be met.

3. Wire Routing

Before deciding a final mounting position, consider all wire routing as follows:

- Line power wiring may enter the unit through the top or side of the Power Terminal Box. See **Figure 12** under "Line Power" on page 15.

Note: The RCM *does not* contain any field serviceable components.

WARNING! You must have access to a main circuit breaker or other power disconnect devices in order to install any wiring. Failure to disconnect power before installing or servicing the unit may result in injury.

4. Wiring Requirements

- For control wire-type requirements, refer to your job drawings as prepared by Strand Lighting.
- For power wire-type requirements, refer to Strand Lighting drawings, contract drawings, and applicable codes.

Note: For assistance or questions regarding installing or connecting power to the R21 Powered Raceway, please contact your Authorized Strand Lighting Dealer or Strand Lighting technical support at 1-214-647-7880.

INSTALLATION PROCEDURE

1. Connecting Sections

Before mounting the R21 Powered Raceway, it will be necessary to connect all modular sections. Sections are connected using three metal connector plates and screws (provided). Refer to **Figure 7** below.

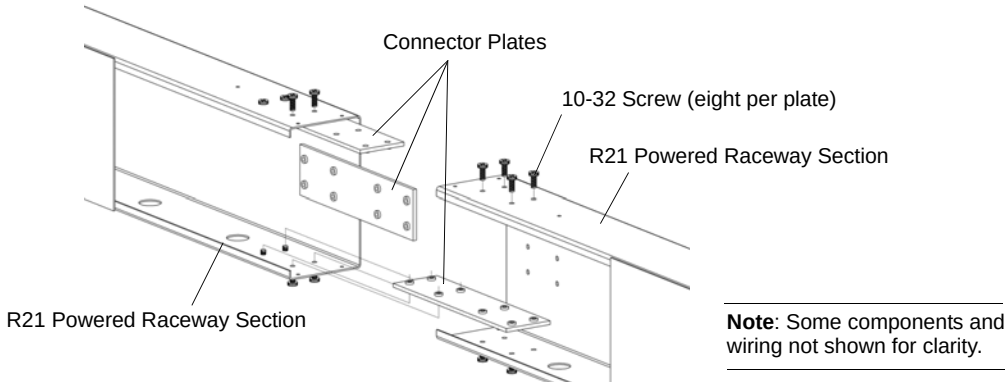


Figure 7: Connecting Modular Sections

2. Mounting the Unit

The R21 Powered Raceway can be mounted in one of six configurations depending on your specific requirements. Regardless of type, brackets cannot be spaced more than 5 feet apart per National Electrical Code®.

Single-Pipe Methods

The 71444 Single-Pipe Overhung Hanger Bracket is used to attach an R21 Powered Raceway to a single 1-1/2" schedule 40 pipe with no additional overhead support.

The 71440 Single-Pipe Rigged Hanger Bracket is used to suspend a single 1-1/2" schedule 40 pipe and an R21 Powered Raceway from a rigging system or a ceiling.

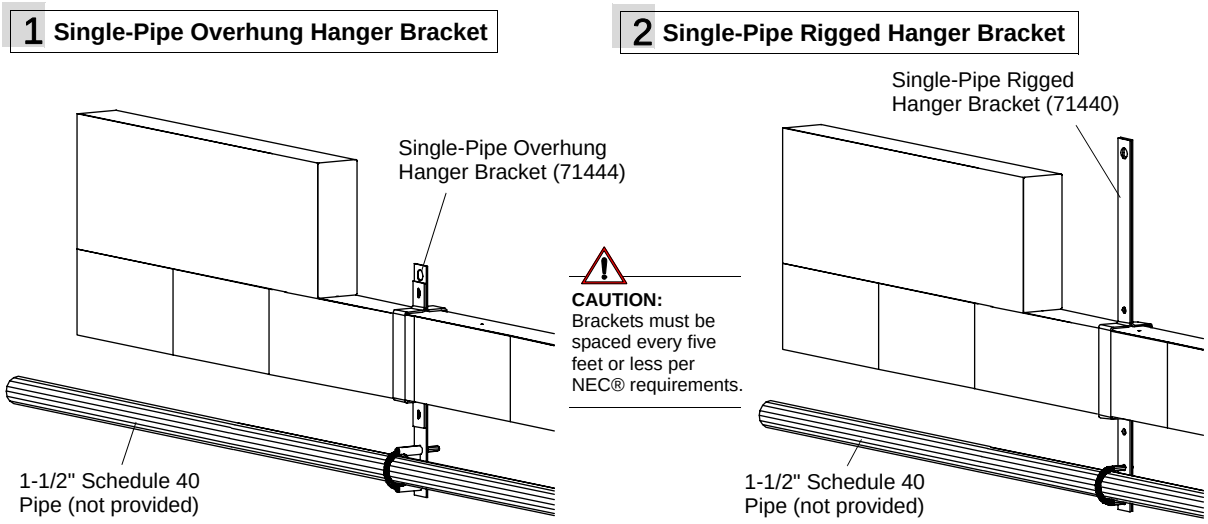


Figure 8: Single-Pipe Methods

Double-Pipe Methods

The 71443 Double-Pipe Offset Hanger Bracket is used to attach an R21 Powered Raceway to two 1-1/2" schedule 40 pipes with no additional overhead support. Components are supported in an offset position in front of the two battens.

The 71441 Double-Pipe Rigged Hanger Bracket is used to suspend two 1-1/2" schedule 40 pipes and an R21 Powered Raceway from a rigging system. Components are supported midway between the two battens.

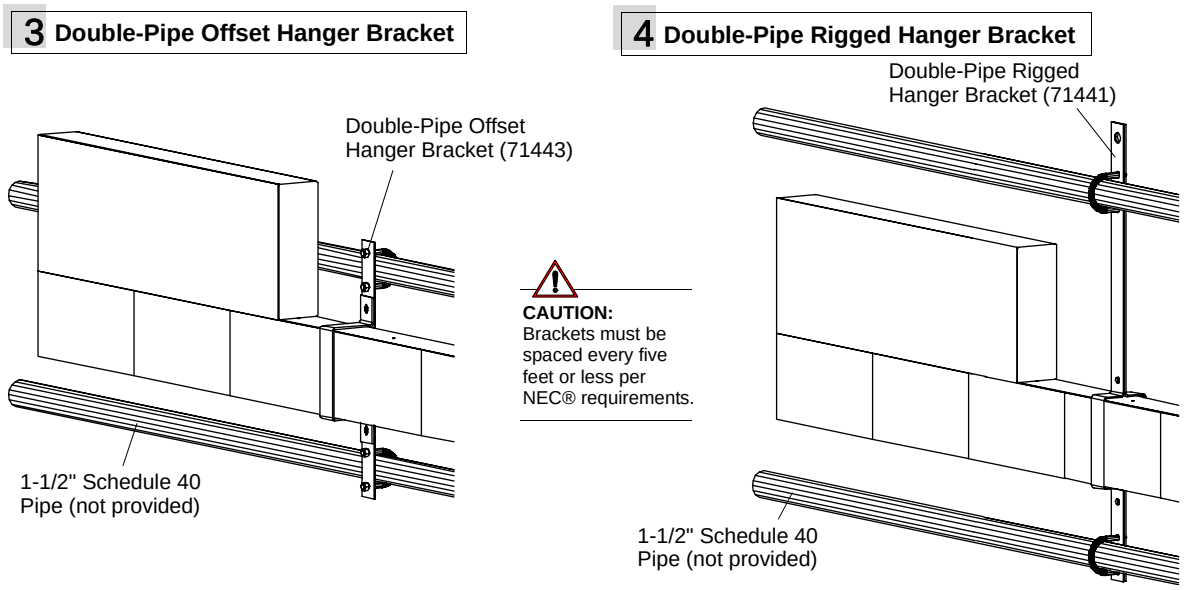


Figure 9: Double-Pipe Methods

Threaded Rod and Wall Mount Methods

The 71445 Threaded Rod Bracket is used to suspend one 1-1/2" schedule 40 pipe and an R21 Powered Raceway from a rigging system using threaded rod support.

The 71442 Wall Mount Hanger Bracket is used to permanently mount an R21 Powered Raceway to a wall.

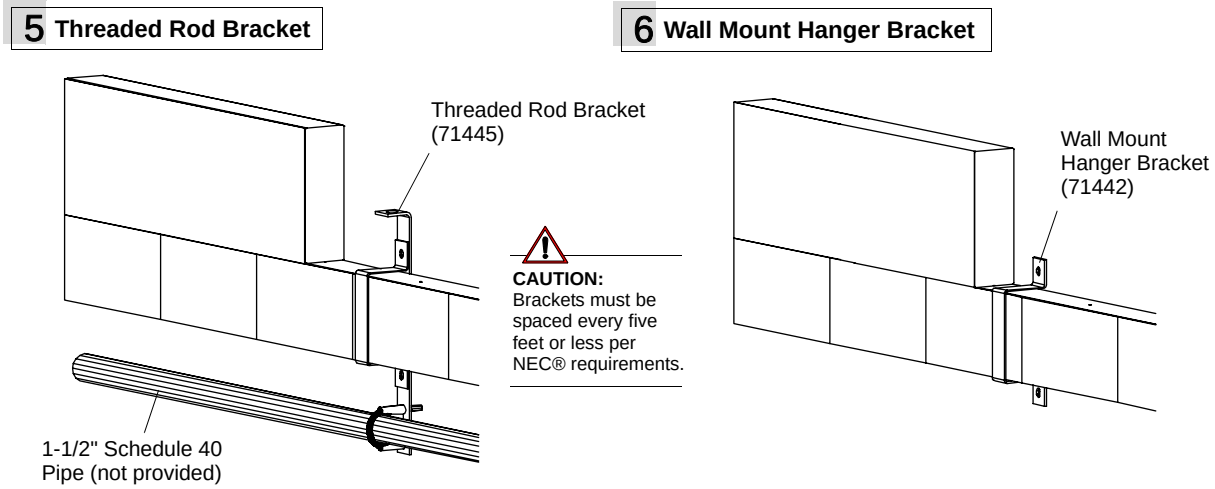


Figure 10: Threaded Rod and Wall Mount Methods

3. Connecting Power Wiring

Overview

The R21 Powered Raceway is designed to be wired from the top or side of the Power Terminal Box (see **Figure 12** on next page). Eight knock-out holes are provided (four on top, two on each side) for this purpose. We recommend connecting the Line Power wiring and Grounds (if applicable) first, and the Load Neutral and Load Hot wires last. Refer to **Figure 11** below for wiring key.

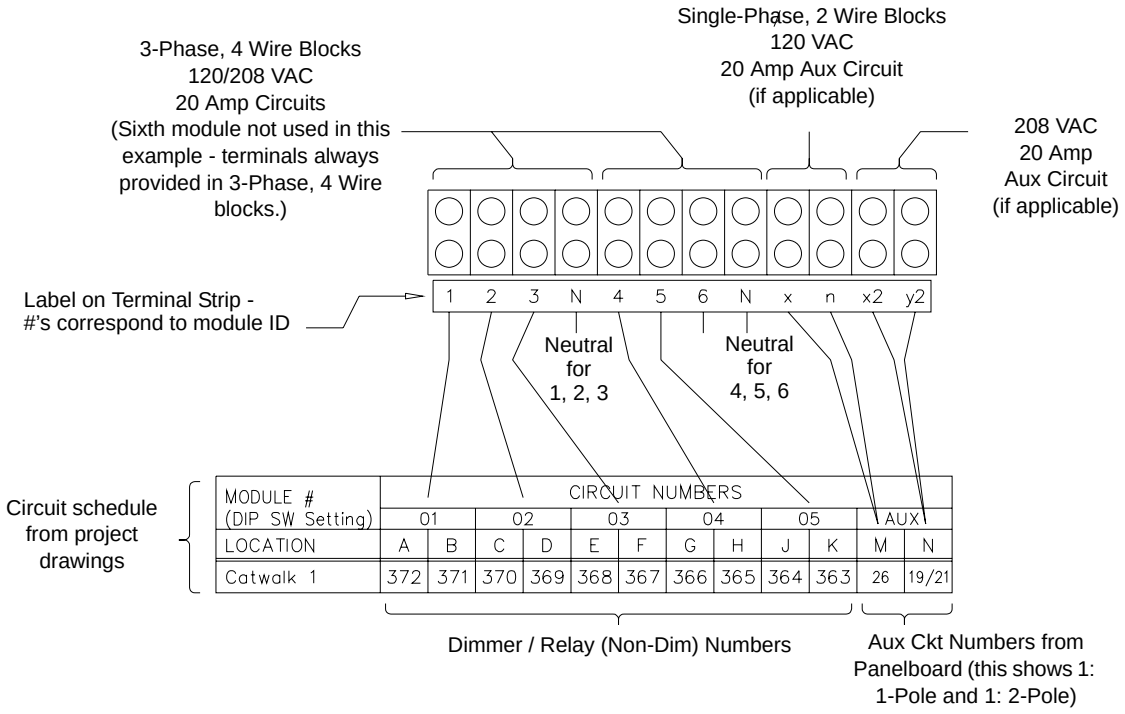


Figure 11: Terminal Box Wiring Key

Line Power

WARNING! You must have access to a main circuit breaker or other power disconnect devices in order to install any wiring. Failure to disconnect power before installing or servicing the unit may result in injury.

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.

CAUTION: Wire openings MUST have fittings or lining to protect wires/cables from damage.

CAUTION: Use 90° C copper wire only!

To connect Line Power:

Step 1. Turn off all power at main breaker or disconnect device.

Step 2. Route line power wiring from power source to top or side of terminal box (**Figure 12**).

Step 3. Remove terminal box cover.

Step 4. Punch holes as required and install conduit fittings *or* lining materials into opening.

Step 5. Feed line power cables through prepared openings.

Step 6. At end of each cable, strip insulation as appropriate.

Step 7. Dress all wires to back of box.

Step 8. At appropriate lugs, terminate Phase, Neutral and Ground wires. Line connections are color coded as follows:

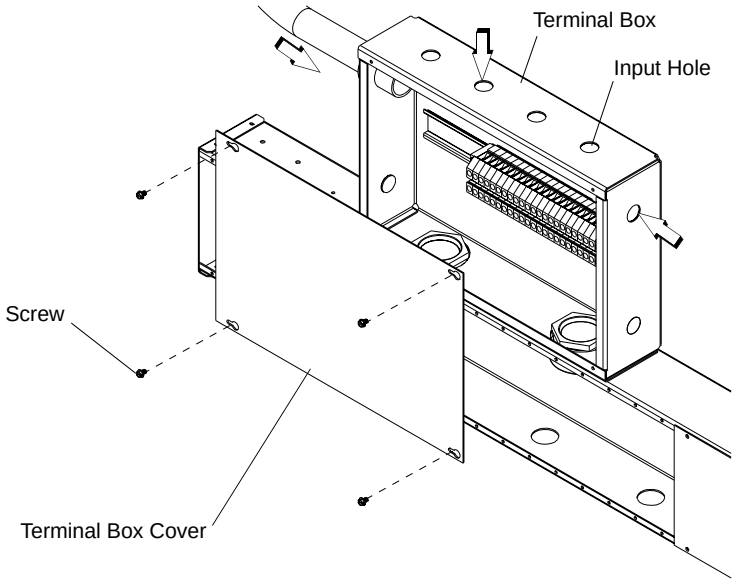


Figure 12: Connecting Line Power - Removing Terminal Box Cover

Wire	Color
Phase A	Black
Phase B	Red
Phase C	Blue

CAUTION: Failure to use proper torque setting will cause premature equipment failure.

Step 9. Tighten lug set screws to proper torque settings as provided by label inside terminal box.

4. Connecting Control Wiring

Overview

For details regarding the specific low-voltage control cable wiring for your project, refer to your project drawings as prepared by Strand Lighting. The low-voltage control cable will connect to the R21 Raceway Control Module (RCM). The RCM comes in a 19-inch "rack mount" configuration for remote applications.

Note: These generic details are for reference only, you must consult your specific project drawings for final connection details.

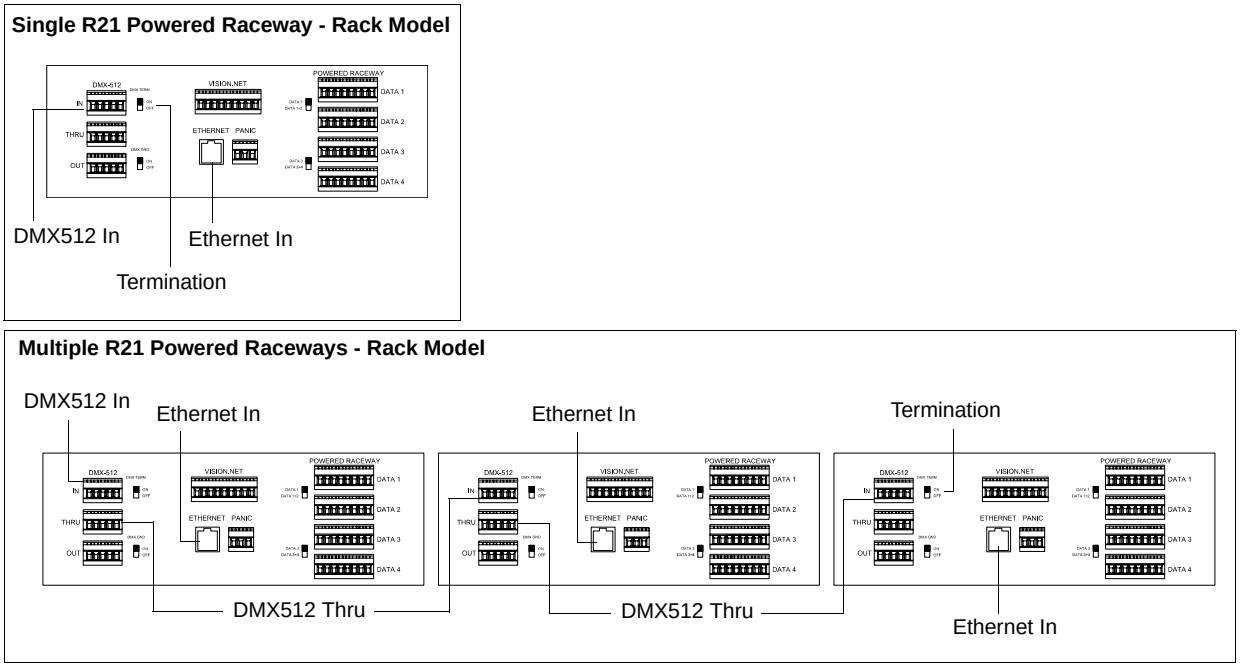


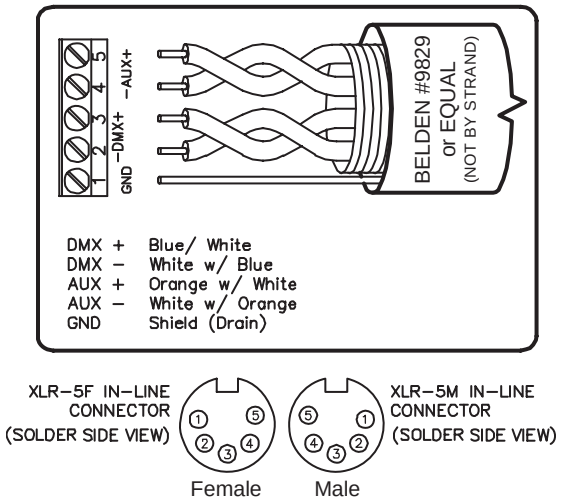
Figure 13: Example Control Connections

DMX512

DMX512 Terminal	XLR Pin Name	WE Color Code (e.g., Belden #8132)	IECA Color Code	Belden Standard Color Code	CAT5e Color Code
GND	1	Drain Wire (Shield)	Drain (Shield)	Drain (Shield)	Brown (8) White/Brown (7)
DMX -	2	White w/ Blue	Black	Black (of Red pair)	Orange (2)
DMX +	3	Blue w/ White	White	Red	White/Orange (1)
AUX -	4	White w/ Orange	Red	Black (of White pair)	Green (6)
AUX +	5	Orange w/ White	Green	White	Green/White (3)

Contractor is Responsible for All Terminations

1) Only approved EIA-485 cable types may be used. Approved types are:
   Belden #9829 and TMB Proplex #PC224T
   An acceptable plenum rated cable is: Belden #89729.
2) Category 5e cable may be used for DMX512. Approved types are: Belden #1583A and Belden #1585A (Plenum).
3) Cable MUST be terminated exactly as shown here.
4) DMX512 cable runs MUST be routed in a "Daisy-Chain" configuration as shown in your drawing set, if provided. DO NOT convert these cables to home runs.
5) DMX512 cable runs should all be in metal conduit. Runs in exposed areas must be in metal conduit. Maximum cable run should not exceed 1000 feet.



Additional Resources for DMX512

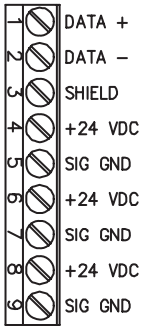
For more information on installing DMX512 control systems, the following publication is available for purchase from the United States Institute for Theatre Technology (USITT)*:

- Recommended Practice for DMX512: A Guide for Users and Installers, 2nd edition (ISBN: 9780955703522)

Note: *See "Additional Resources" on page 3 for USITT contact information.

Vision.net Networks (SVN/485)

Pin Number	Signal Name	CAT5e Wire Color
1	Data +	White w/ Orange
2	Data -	Orange
3	SHIELD	Shield
4	+24 VDC	White w/ Green
5	Signal GND	Green
6	+24 VDC	White w/ Blue
7	Signal GND	Blue
8	+24 VDC	White w/ Brown
9	Signal GND	Brown



Contractor is Responsible for All Terminations

1) Only approved cable types may be used. Approved types are: Belden #1583A and Belden #1585A
2) Cable MUST be terminated exactly as shown here. Total length of cable in Vision.net Network Wiring must NOT exceed 1000 feet.
3) Cable runs should be routed in a "Daisy-Chain" configuration as shown in your drawing set, if provided. DO NOT convert these cables to home runs.
4) Maximum station quantity subject to power supply and system requirements. Please consult factory for specific information.

Termination of Shielded Cable

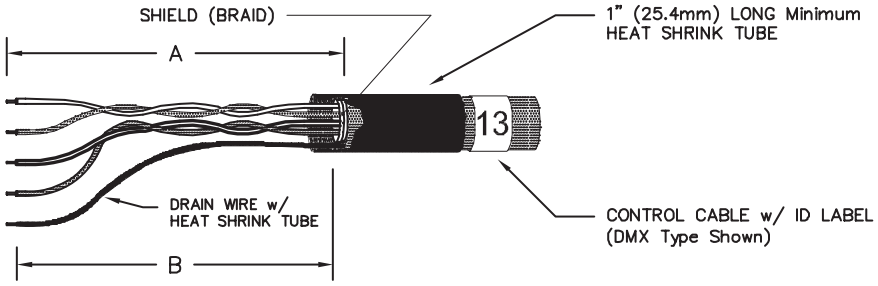
Dimension	Name	Minimum	Maximum for Terminal	Maximum for LXR (In-Line)
A	Remove Cable Jacket	1" (25.4mm)	2-1/4" (60mm)	1-1/4" (31.8mm)
B	Drain Wire Heatshrink	Dim 'A' - 1/8" (3.2mm)	-	-

To terminate shielded cable:

Step 1. Strip off specified length of outer jacket.

Step 2. Cut shield (foil or braid) flush to outer jacket. DO NOT cut drain wire.

Step 3. Fit specified length of 1/16" heat shrink tubing over the drain wire.



Step 4. For solder connections, fit a 1/2" length of 1/16" heat shrink tubing over each conductor.

Step 5. Fit a 1" length of 3/8" heat shrink tubing over the entire cable. Position it so that 3/4" of its length is over the cable jacketing, and 1/4" of its length is over the loose conductors.

Step 6. Strip 1/8" inch of the insulation from each of the conductors.

Step 7. Terminate the conductors on the terminal block, or solder the terminals as specified.

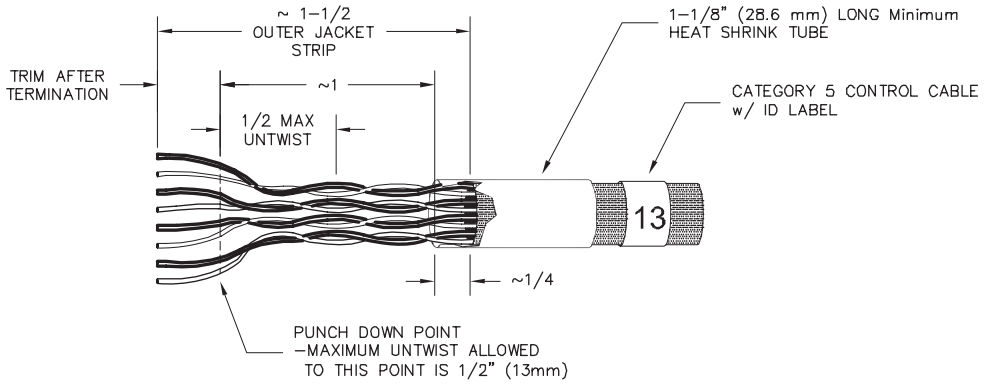
Step 8. For solder connections, shrink the individual 1/2" lengths of heat shrink tubing over the solder terminals.

Step 9. Shrink the remaining heat shrink tubing.

Step 10. Apply the appropriate ID label to the cable at the end of the outer heat shrink tubing.

Termination of Ethernet Cable

Function	Pair #	Pin Out (T568B)	Wire Color
(T1) (R1)	1	5 4	White w/ Blue Blue
Tx + (T2) Tx - (R2)	2	1 2	White w/ Orange Orange
Rx + (T3) Rx - (R3)	3	3 6	White w/ Green Green
(T4) (R4)	4	7 8	White w/ Brown Brown



Cable Type (10/100 Base-T Ethernet)	Description
Belden #1583A Nominal O.D. 0.214" (5.54 mm)	CATEGORY 5e: Non-plenum rated 4-Unshielded Twisted Pairs (UTP) #24 AWG
Belden #1585A Nominal O.D. 0.206" (5.23 mm)	CATEGORY 5e: Plenum rated 4-Unshielded Twisted Pairs (UTP) #24 AWG

To terminate Ethernet cable:

Step 1. Strip off outer jacket - approximately 1-1/2" (37.6mm)

Step 2. Fit a piece of 1-1/8" (28.6mm) long heat shrink tubing over the cable extending out 1/4" (8.25mm) from outer jacket.

Step 3. Terminate approximately 1/2" (12.2mm) from end of conductors on Type 110 punch down block or connector per schedule (T568B)

- Maximum untwist of conductors to terminations is 1/2" (12.2mm)
- Trim excess leads.

Step 4. Shrink tubing and add appropriate ID label to the cable at the end of the heat shrink tubing.

System topology and labeling should follow TIA/EIA-568B and TIA/EIA-606 as applicable.

Per TIA/EIA-568B, Maximum length of any horizontal cable run (i.e. between Ethernet RJ-45 receptacle (work area) and Patch Panel) is 90 meters; Maximum length of any CATEGORY 5e cables at the Ethernet RJ-45 receptacle (work area) is 3 meters.

Ethernet equipment (e.g. Patch Panels, Hubs or Switches) should be maintained in an environment of 18°-24° C (64° - 75° F) and 30% - 55% relative humidity per TIA/EIA-569-A.

Maximum length of any segment (cable run - including device cables - between Hub or Switch and Node) is 90 meters. Maximum network diameter (distance between any two Nodes) is 180 meters.

Master/Slave Wiring (DIM96)

Pin Number	Signal Name	CAT5e Wire Color
1	+ 24 VDC	White w/ Orange
2	+24 VDC	Orange
3	+ RX	White w/ Green
4	- RX	Green
5	+ TX	White w/ Blue
6	- TX	Blue
7	GND	White w/ Brown
8	GND	Brown

Contractor is Responsible for All Terminations

1) Only approved cable types may be used. CAT5e is the only approved type.
2) Cable MUST be terminated exactly as shown here. Total length of cable in Master/Slave wiring MUST NOT exceed 1000 feet.
3) Cable runs MUST be routed in a "Daisy-Chain" configuration as shown in your drawing set, if provided.
4) Total number of dimmers (Dual Dimmer Modules = 2 dimmers; Quad Dimmer Modules = 4 dimmers) in Master/Slave system MUST NOT exceed 96 total dimmers.

Panic Input

Pin Number	Signal Name
1	NC
2	IN
3	COM

Contractor is Responsible for All Terminations

1) To be used with:
   PANIC INPUT #1 - Fire Alarm Input (activates Preset 8)
   PANIC INPUT #2 - Panic Input (activates Preset 7)
2) Only to be used with Dry Contact Input.

5. Installing Cable Tray (if applicable)

Once the R21 Powered Raceway is mounted, install the cable tray (basket) if this optional component has been included. The cable tray is installed using the appropriate holes at the top of the unit. Dress control cables in cable tray as required.

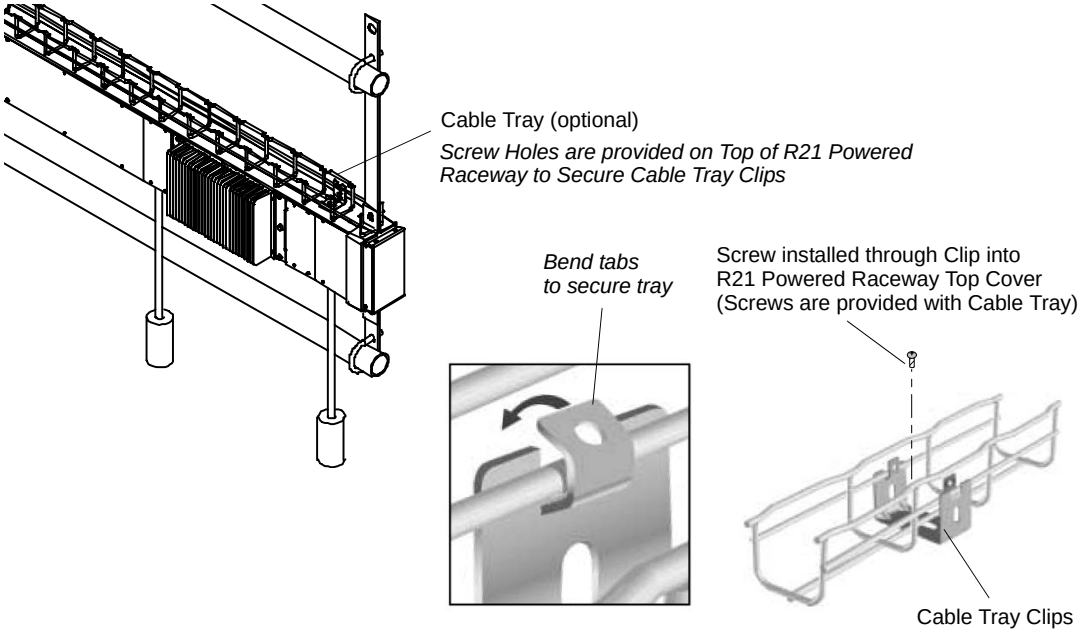


Figure 14: Installing Cable Tray Finish and Test

6. Complete and Test

After the unit is mounted and wired, use the following procedures to finish out the installation and test for proper connection.

1) **Clean**
Remove all metal pieces, shavings and wire scraps from Power Terminal Box. Vacuum out any dust or dirt.

2) **Double Check Terminations**
Check for loose connectors, improperly torqued terminations, bare wires, and damaged insulation.

3) **Check Line Power Wiring**
Using a digital voltmeter, check resistance between phases. The following results are typical:

- Resistance phase to phase should be 10 MΩ or higher.
- Resistance all phases to ground should be 10 MΩ or higher.
- Resistance neutral to ground should be 0Ω.
- Resistance phase to neutral should be 10Ω or higher.

4) **Call For Approval**
Do not energize your R21 Powered Raceway until the wiring has been approved by an authorized technician. Call Strand Lighting to schedule an Engineering Checkout.

TECHNICAL & ACCESSORIES

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^{o} F / 0 to 40^{o} 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 "Mounting the Unit" on page 12.

MAINTENANCE PROCEDURES

1. Replacing a Dimmer or Relay Module

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

Note: Figure 15 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 15**).

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 24). *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.

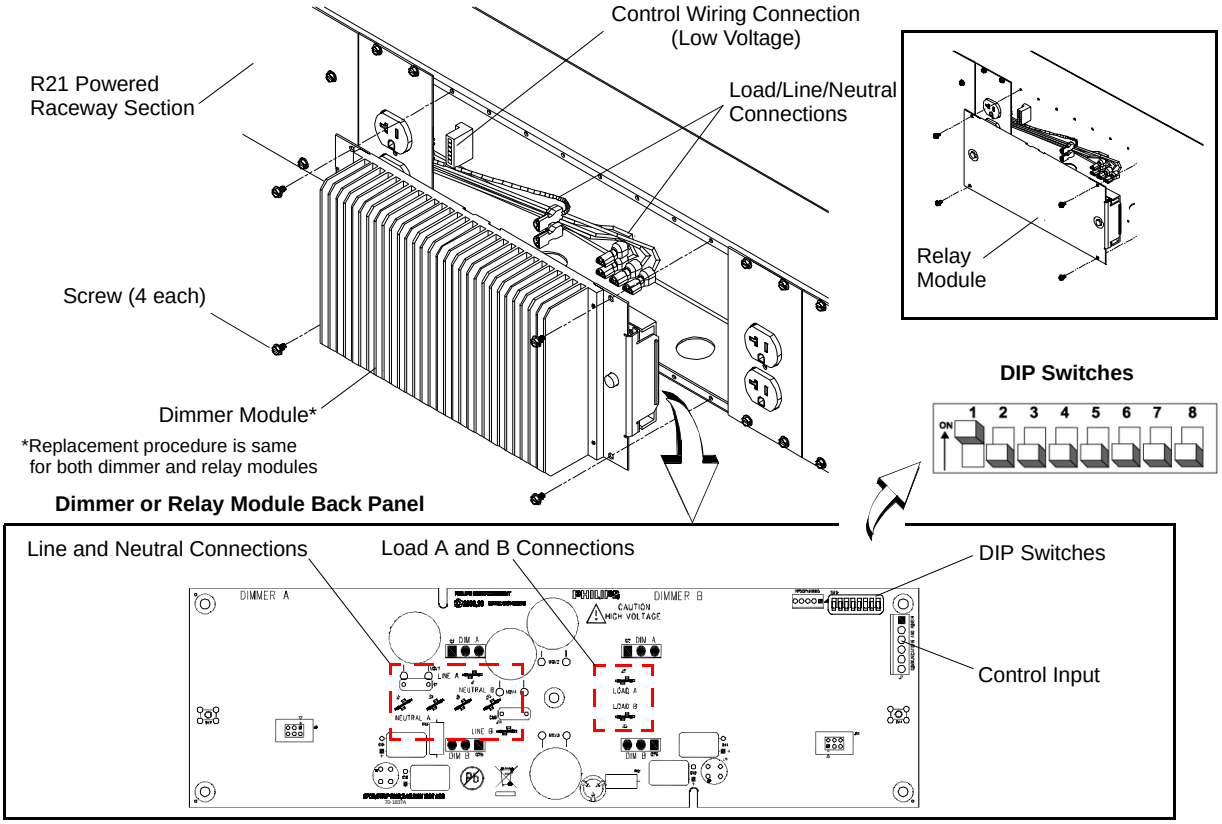


Figure 15: Removing and Replacing a Dimmer or Relay Module

APPENDIX A.

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

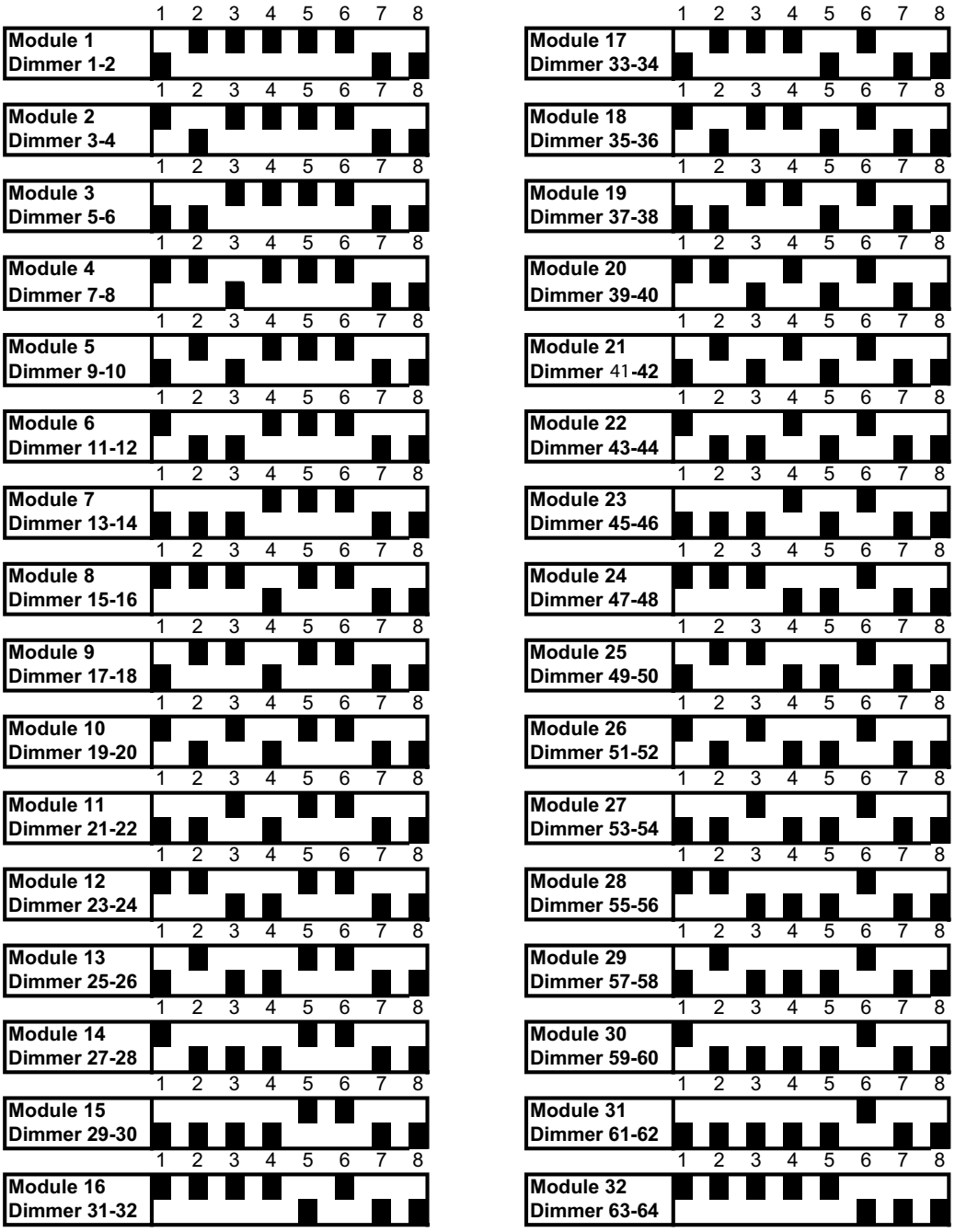
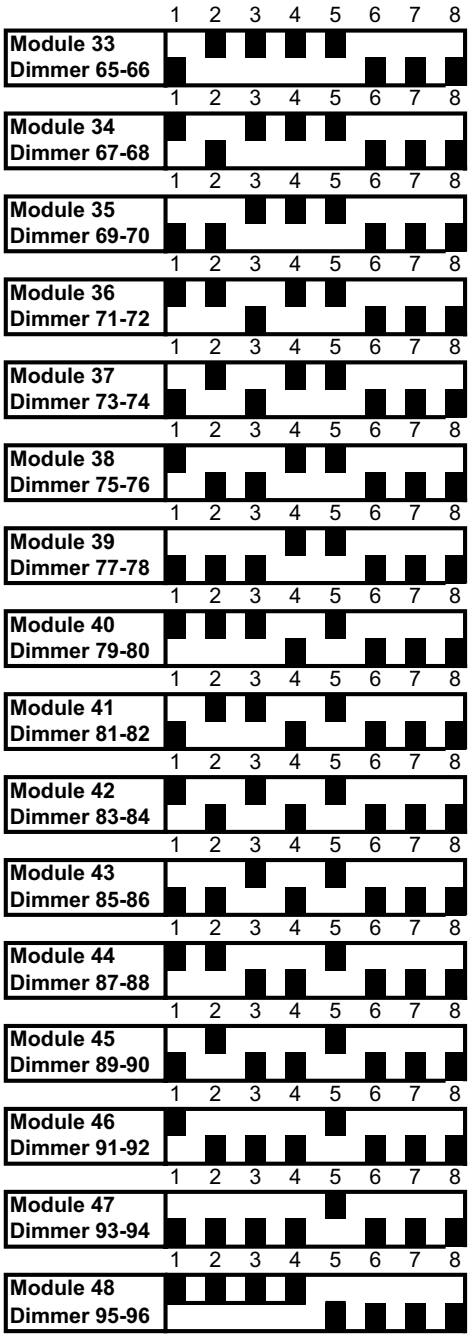


Figure 16: Dimmer / Relay Module DIP Switch Setting Chart (Part 1)



	1	2	3	4	5	6	7	8
Module ??	x	x	x	x	x	x	■	
Dimmer ??-??	x	x	x	x	x	x		■

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.)

Figure 17: Dimmer / Relay Module DIP Switch Setting Chart (Part 2)

TECHNICAL SUPPORT

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entertainment.service@signify.com

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entertainment.service@signify.com

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Call: +31 (0) 543 542 531
entertainment.europe@signify.com