



NK-RP1 Series User Guide

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You've made a great choice. We expect you will be very happy with your purchase of Ross Technology. Our mission is to:

1. Provide a Superior Customer Experience
 - offer the best product quality and support
2. Make Cool Practical Technology
 - develop great products that customers love

Ross has become well known for the Ross Video Code of Ethics. It guides our interactions and empowers our employees. I hope you enjoy reading it below.

If anything at all with your Ross experience does not live up to your expectations be sure to reach out to us at solutions@rossvideo.com.



David Ross
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Ross Video Code of Ethics

Any company is the sum total of the people that make things happen. At Ross, our employees are a special group. Our employees truly care about doing a great job and delivering a high quality customer experience every day. This code of ethics hangs on the wall of all Ross Video locations to guide our behavior:

1. We will always act in our customers' best interest.
2. We will do our best to understand our customers' requirements.
3. We will not ship crap.
4. We will be great to work with.
5. We will do something extra for our customers, as an apology, when something big goes wrong and it's our fault.
6. We will keep our promises.
7. We will treat the competition with respect.
8. We will cooperate with and help other friendly companies.
9. We will go above and beyond in times of crisis. *If there's no one to authorize the required action in times of company or customer crisis - do what you know in your heart is right. (You may rent helicopters if necessary.)*

NK-RP1 Series · User Guide

- Ross Part Number: **9807DR-0011-02**
- Release Date: December 5, 2017.

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Patents

Patent numbers US 7,034,886; US 7,508,455; US 7,602,446; US 7,802,802 B2; US 7,834,886; US 7,914,332; US 8,307,284; US 8,407,374 B2; US 8,499,019 B2; US 8,519,949 B2; US 8,743,292 B2; GB 2,419,119 B; GB 2,447,380 B; and other patents pending.

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Safety Notices

Refer to the “**Important Regulatory and Safety Notices**” document that accompanied your product.

Statement of Compliance

This product has been determined to be compliant with the applicable standards, regulations, and directives for the countries where the product is marketed.

Compliance documentation, such as certification or Declaration of Compliance for the product is available upon request by contacting techsupport@rossvideo.com. Please include the product; model number identifiers and serial number and country that compliance information is needed in request.

EMC Notices

US FCC Part 15

This equipment has been tested and found to comply with the limits for a class A Digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a Commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Notice — *Changes or modifications to this equipment not expressly approved by Ross Video Limited could void the user's authority to operate this equipment.*

Canada

This Class A device complies with Canadian ICES-003 rules.

Cet appareil numérique de la classe "A" est conforme a la norme NMB-003 du Canada.

European Union

This equipment is in compliance with the essential requirements and other relevant provisions established under regulation (EC) No 765/2008 and Decision No 768/2008/EC referred to as the "New Legislative Framework".



Warning — *This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.*

Australia/New Zealand

This equipment is in compliance with the provisions established under the Radiocommunications Act 1992 and Radiocommunications Labeling (Electromagnetic Compatibility) Notice 2008.

Korea

This equipment is in compliance with the provisions established under the Radio Waves Act.

Class A equipment (Broadcasting and communications service for business use).

This device is a business-use (Class A) EMC-compliant device. The seller and user are advised to be aware of this fact. This device is intended for use in areas outside home.

Type of Equipment	User's Guide
A급 기기 (업무용 방송통신기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.
Class A Equipment (Industrial Broadcasting & Communication Equipment)	This equipment is Industrial (Class A) electromagnetic wave suitability equipment and seller or user should take notice of it, and this equipment is to be used in the places except for home.

International

This equipment has been tested under the requirements of CISPR 22:2008 or CISPR 32:2015 and found to comply with the limits for a Class A Digital device.

Notice — *This is a Class A product. In domestic environments, this product may cause radio interference, in which case the user may have to take adequate measures.*

Warranty and Repair Policy

The product is backed by a comprehensive one-year warranty on all components.

If an item becomes defective within the warranty period Ross will repair or replace the defective item, as determined solely by Ross.

Warranty repairs will be conducted at Ross, with all shipping FOB Ross dock. If repairs are conducted at the customer site, reasonable out-of-pocket charges will apply. At the discretion of Ross, and on a temporary loan basis, plug in circuit boards or other replacement parts may be supplied free of charge while defective items undergo repair. Return packing, shipping, and special handling costs are the responsibility of the customer.

This warranty is void if products are subjected to misuse, neglect, accident, improper installation or application, or unauthorized modification.

In no event shall Ross Video Limited be liable for direct, indirect, special, incidental, or consequential damages (including loss of profit). Implied warranties, including that of merchantability and fitness for a particular purpose, are expressly limited to the duration of this warranty.

This warranty is TRANSFERABLE to subsequent owners, subject to Ross' notification of change of ownership.

Environmental Information

The equipment may contain hazardous substances that could impact health and the environment.

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Ross Video encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

The crossed-out wheeled bin symbol invites you to use these systems.



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration. You can also contact Ross Video for more information on the environmental performances of our products.

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Introduction

Thank you for selecting Ross Video's NK-RP1 Series Redundant Power Supply. This user guide will help you to install, configure and operate your NK-RP1 Series unit.

This guide includes the following chapters:

- “**Introduction**” summarizes the guide and provides important terms, and conventions.
- “**Overview**” provides a basic introduction to the NK-RP1 Series front and rear panels.
- “**Physical Installation**” provides instructions for the basic physical installation of the NK-RP1 Series.
- “**Monitoring the NK-RP1 Series**” provides additional information for monitoring the LEDs on the NK-RP1 Series chassis.
- “**Technical Specifications**” provides the specifications, such as dimensions and relative power output, for the NK-RP1 Series.
- “**Making Custom Cables**” provides instructions for creating custom cables using the included Phoenix terminal block and back-shell.

If you have questions pertaining to installation of this Ross Video product, please contact us at the numbers listed in the section “**Contacting Technical Support**” on page 1–10. Our technical staff is always available for consultation, training, or service.

Related Publications

It is recommended to consult the following Ross documentation before installing your NK-RP1 Series:

- *NK-3RD User Guide*, Ross Part Number: 9807DR-1020
- *NK-IPS User Guide*, Ross Part Number: 9807DR-1004
- *NK-JBX User Guide*, Ross Part Number: 9807DR-0110
- *NK Series User Guide*, Ross Part Number: 9807DR-0100
- *NK-VRC User Guide*, Ross Part Number: 9807DR-1009
- *RCP-NKM User Guide*, Ross Part Number: 9807DR-0103
- *RCP-NKQ User Guide*, Ross Part Number: 9806DR-0100

Documentation Conventions

Special text formats are used in this guide to identify parts of the user interface, text that a user must enter, or a sequence of menus and sub-menus that must be followed to reach a particular command.

Interface Elements

Bold text is used to identify a user interface element such as a dialog box, menu item, or button. For example:

In the **Save Layout** dialog, click **OK**.

User Entered Text

Courier text is used to identify text that a user must enter. For example:

In the **Language** box, enter **English**.

Referenced Guides

Italic text is used to identify the titles of referenced guides, manuals, or documents. For example:

For more information, refer to the *NK Series User Guide*.

Menu Sequences

Menu arrows are used in procedures to identify a sequence of menu items that you must follow. For example, if a step reads “**File > Save**,” you would click the **File** menu and then click **Save**.

Important Instructions

Star icons are used to identify important instructions or features. For example:

- ★ We recommend that the equipment is installed by qualified and experienced personnel, to any relevant standards and approvals.

Contacting Technical Support

At Ross Video, we take pride in the quality of our products, but if problems occur, help is as close as the nearest telephone.

Our 24-hour Hot Line service ensures you have access to technical expertise around the clock. After-sales service and technical support is provided directly by Ross Video personnel. During business hours (Eastern Time), technical support personnel are available by telephone. After hours and on weekends, a direct emergency technical support phone line is available. If the technical support person who is on call does not answer this line immediately, a voice message can be left and the call will be returned shortly. This team of highly trained staff is available to react to any problem and to do whatever is necessary to ensure customer satisfaction.

- **Technical Support:** (+1) 613-652-4886
- **After Hours Emergency:** (+1) 613-349-0006
- **E-mail:** techsupport@rossvideo.com
- **Website:** <http://www.rossvideo.com>

Overview

The NK-RP1 Series offers a reliable, fault tolerant, and fail-safe option for Ross NK Series routers and peripheral devices. It supplies redundant power to up to four routers or devices, delivering up to a maximum of 100W.

The NK-RP1 provides balancing of the power load, delivering high reliability to all connected routers and devices. When configured as a dual redundant positive and negative power supply, it has greater than 80% efficiency as a negative power source, providing both efficient and low-temperature operation.

The NK-RP1/P comes standard as a positive power rail supply. A negative power rail option can be installed as an upgrade by simply removing the front panel and inserting two NK-RP1-NEG option cards (required for NK-A16/32 and NK-V16/32 router levels).

The NK-RP1/PN comes pre-installed with two NK-RP1-NEG option cards to provide both a positive and negative power rail.

Features

The NK-RP1 Series includes the following features:

- Provides up to 100W of redundant power
- Supplies redundant power to up to four routers or devices
- GPI alarm outputs
- Front access for easy module replacement

Supported Ross Devices

The NK-RP1 Series supports the following Ross devices:

- All NK 164, 16, 32, 34, 64, and 72 routers
- NK-IPS Network Bridge
- NK-VRC Virtual Routing Core
- NK-3RD Third Party Interface
- NK-JBX Geneos RCP Interface
- RCP-NKM and RCP-NKQ Remote Control Panels

Front Panel Overview

This section outlines the major features of the NK-RP1 Series front panel.



Figure 2.1 NK-RP1 Series — Front Panel

1. Front Panel LED

The front panel LED on the bottom-left of the front of the NK-RP1 provides an indication that the unit is operating normally. This LED monitors the power supply status and signifies a problem by pulsating at a noticeable fast rate.

Rear Panel Overview

This section outlines the major features of the NK-RP1 Series rear panel.

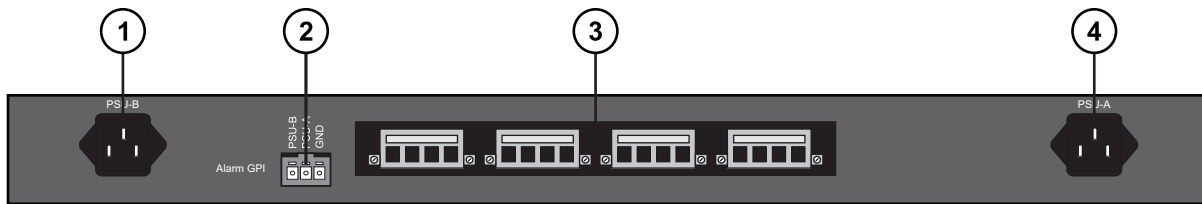


Figure 2.2 NK-RP1 Series — Rear Panel Overview

- | | |
|------------------------|-----------------------|
| 1) PSU-B Socket | 3) Phoenix Connectors |
| 2) Alarm GPI Connector | 4) PSU-A Socket |

1. PSU-B Socket

This connector is designated as the AC connector for the second power supply.

2. Alarm GPI Connector

This 3-pin block connector provides GPI outputs for alarming in the event that a power supply has failed.

3. Phoenix Connectors

The Phoenix connectors provide redundant power to up to four Ross routers or devices.

4. PSU-A Socket

This connector is designated as the AC connector for the first power supply.

Internal Block Diagram

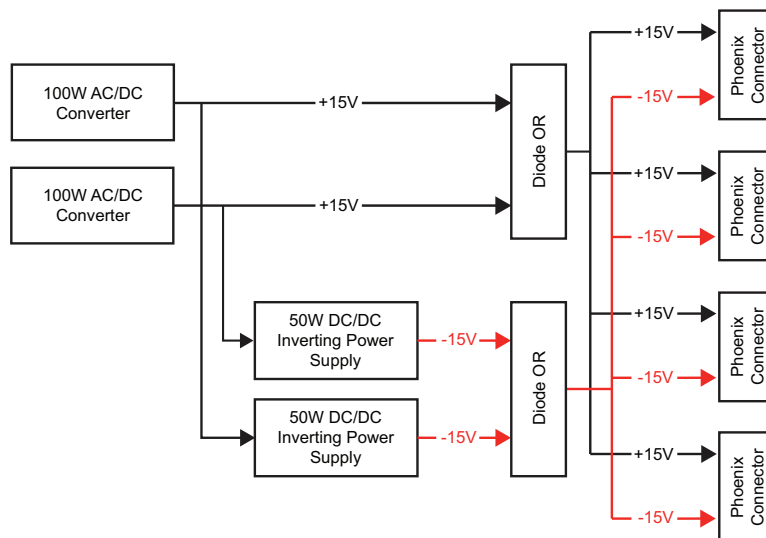


Figure 2.3 NK-RP1 Series Internal Block Diagram

Example Configuration

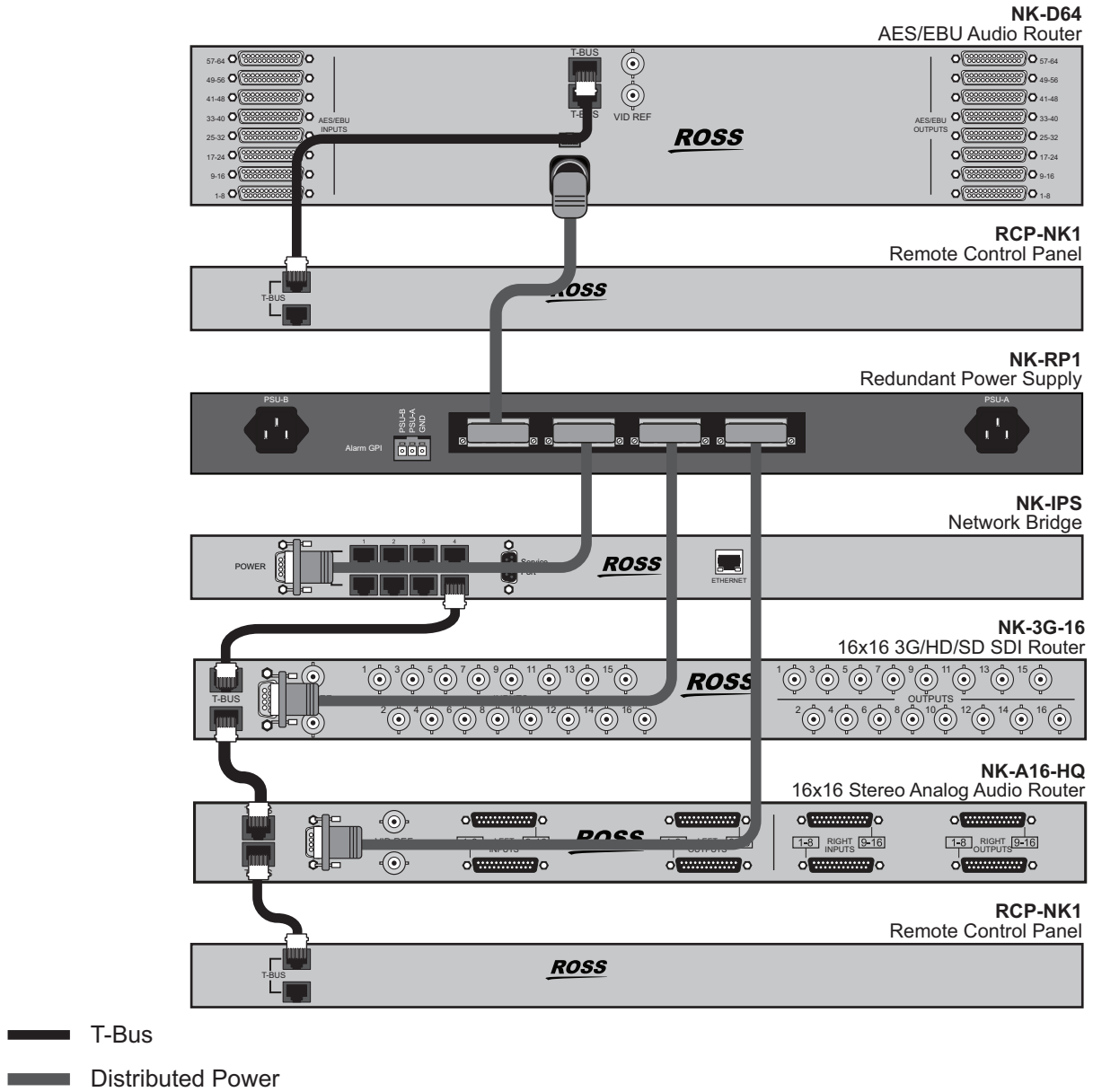


Figure 2.4 NK-RP1 Series Example Configuration

Physical Installation

If you have questions pertaining to the installation of your NK-RP1 Series, please contact us at the numbers listed in the section “**Contacting Technical Support**” on page 1–10.

Static Discharge

Throughout this chapter, please heed the following cautionary note:



ESD Susceptibility — *Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas and when synthetic fiber clothing is worn. Always exercise proper grounding precautions when working on circuit boards and related equipment.*

Unpacking the Equipment

On receiving your NK-RP1 Series, check the contents against the packing list. Ensure that all equipment itemized on the packing list is present and there are no signs of damage before installing the NK-RP1 Series in your system.

If anything is missing or damaged, contact Ross Video immediately to obtain the correct warranty service procedures.

- ★ We recommend that the equipment is installed by qualified and experience personnel, to any relevant standards and approvals.

Mounting Requirements

The NK-RP1 Series is designed for installation into a standard 19” equipment rack. It has integrated rack ears, allowing it to be screwed in using standard screws and cage nuts.

The NK-RP1 Series mounts in the rack frame by means of four rack screws fastened through the front and back mounting ears. This should normally be sufficient to carry the load, including the weight of accompanying cables.

For More Information on...

- the technical specifications for the NK-RP1 Series, refer to the chapter “**Technical Specifications**” on page 5–25.

Connecting to a Power Source

For redundancy, each power cord should be connected to a separate power source for protection against failure of the A/C power circuit. In the event of one power supply failure, the panel load is seamlessly transferred to the other connected redundant power supply.

To connect the power cables to the NK-RP1 Series

1. Connect the female end of one provided AC power cable into the socket marked **PSU-A**.

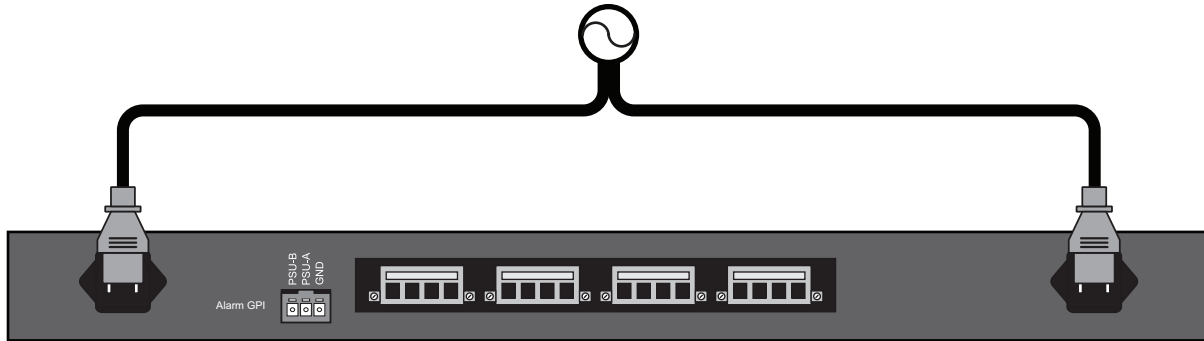


Figure 3.1 NK-RP1 Series — Power Connections

2. Connect the remaining power cable into the socket marked **PSU-B**.
3. Connect each supplied power cable's three-prong male connector to Mains Power.

Powering Routers and Devices from the NK-RP1 Series



Caution — Do not exceed 100W total power for all connected devices. Damage can occur and the NK-RP1 Series will not be able to supply redundant power if the 100W limit is exceeded. Refer to the appropriate user guide for the maximum power consumption of each device, or contact Ross Video Technical Support.

There are two power supply connectors located on the NK-RP1 Series rear panel. Depending on the router or device being connected, one of two cables will be used: a cable with a DB9 connector or a cable with a Neutrik® speakON® connector.

Ross NK Devices with a DB9 Connector

The NK-D12/PN has a Phoenix connector on one end to connect to the NK-RP1/P or NK-RP1/PN, and a DB9 connector on the other to connect to a router or control device.

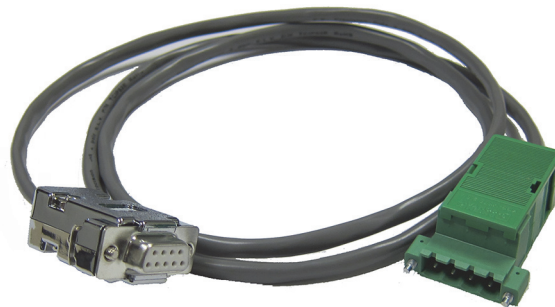


Figure 3.2 NK-D12/PN Cable with a DB9 Connector

The following routers use the DB9 connector for power:

- All NK-164 routers
- All NK-16 routers
- All NK-32 routers
- All NK-34 routers

- NK-IPS Network Bridge
- NK-VRC Virtual Routing Core
- NK-3RD Third Party Interface
- NK-JBX Geneos RCP Interface
- RCP-NKM and RCP-NKQ Remote Control Panels

Ross NK Devices with a Neutrik® speakON® Connector

The NK-S12/P has a Phoenix connector on one end to connect to the NK-RP1/P or NK-RP1/PN, and a Neutrik® speakON® connector on the other to connect to a 3RU 64x64 or 72x72 router.



Figure 3.3 NK-S12/P Cable with a Neutrik® speakON® Connector

The following routers use the Neutrik speakON connector for power:

- All NK-64 routers
- All NK-72 routers

Connecting the NK-RP1 Series to a Ross Router or NK Device

★ You can connect up to four NK-D12/PN or NK-S12/P cables to the NK-RP1/P or NK-RP1/PN to provide redundant power to up to four Ross NK routers or devices.

To connect the NK-D12/PN cable and NK-S12/P cable

1. Connect the Phoenix connector of the NK-D12/PN or NK-S12/P cable to the NK-RP1.
2. Tighten the two screws on the sides of the Phoenix connector to secure the cable connection.

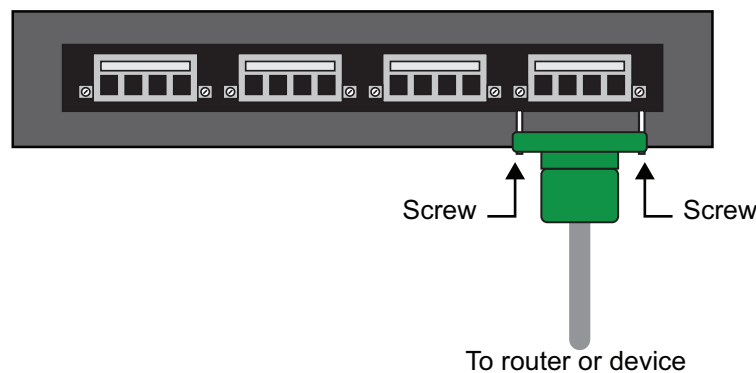


Figure 3.4 NK-RP1 Series Rear Panel — Phoenix Connector

3. Connect the other end of the NK-D12/PN or NK-S12/P cable to the router or device.

Configuring the GPI Alarm

The NK-RP1/P provides two GPI alarms to indicate the status of the two main +15V power supplies. If a power supply fails, the associated GPI pin is shorted to ground. Under normal operation, the GPI output is open.

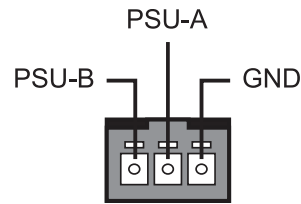


Figure 3.5 NK-RP1 Series Rear Panel — GPI Alarm Pin Assignment

Replacing the Power Supplies

The Power Supplies are accessed via the front of the NK-RP1 Series chassis and requires that you remove the door first. The door is secured to the front of the chassis with a rare earth magnet on each side.

To remove the door from the chassis



ESD Susceptibility — *Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas and when synthetic fiber clothing is worn. Always exercise proper grounding precautions when working on circuit boards and related equipment.*

1. Disconnect the AC power cord of the failed power supply.
2. With your left hand, grasp the top and bottom of the door at the left sides.
3. With your right hand, grasp the top and bottom of the door at the right side.
- ★ If you are having trouble removing the door from the chassis, you can insert a flathead screwdriver into the notch on either side of the door for added leverage.
4. Pull the right side of the door towards you to disengage it approximately 1.0” from the chassis.
5. Pull the left side of the door towards you to fully disengage the door from the chassis.



Caution — *Pull the door off without twisting or rotating it at too steep of an angle.*

6. Note the location of the Power Supply Retaining bar (**Figure 3.6**). You will need to remove it before accessing the power supplies inside the chassis.

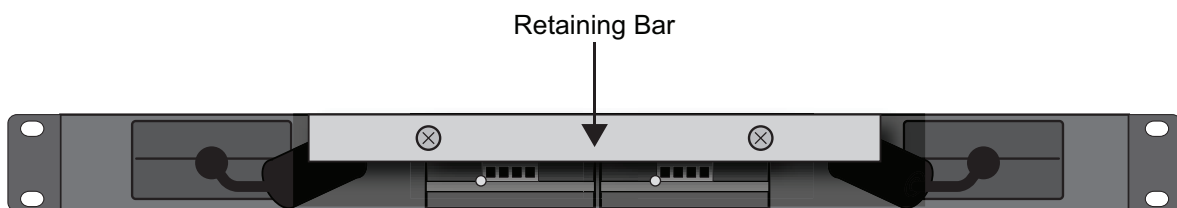


Figure 3.6 NK-RP1 Series — Door Removed from Chassis

To remove the retaining bar from the chassis

1. Unscrew the two thumbscrews on the power supply retaining bar.
2. Remove the power supply retaining bar.

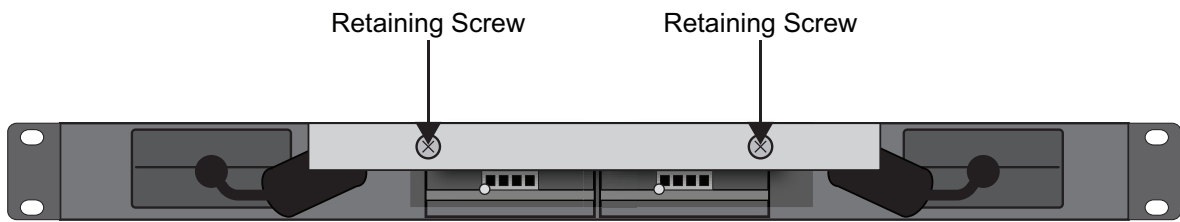


Figure 3.7 NK-RP1 Series — Retaining Screws Locations

To remove a failed power supply from the NK-RP1 Series

1. Disconnect the failed power supply from the NK-RP1 Series chassis.

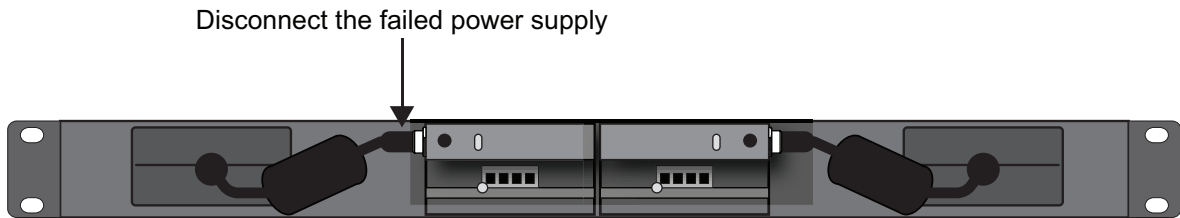


Figure 3.8 Disconnecting the Failed Power Supply

2. Remove the failed power supply by gently pulling it towards you and away from the chassis.

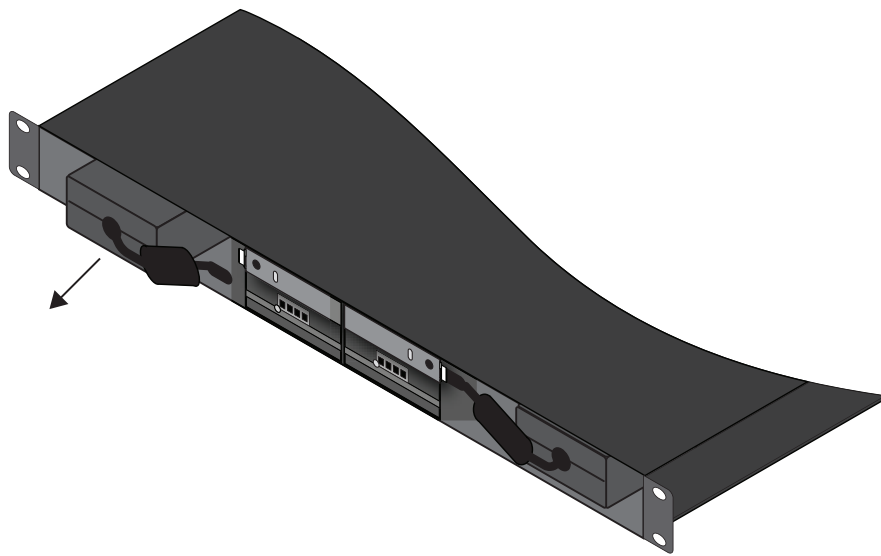


Figure 3.9 Removing the Failed Power Supply

To install a new power supply into the NK-RP1 Series chassis

1. Before proceeding, ensure that you have:
 - a. removed the front door as outlined in the section “**To remove the door from the chassis**” on page 3–18.
 - b. removed the power supply retaining bar as outlined in the section “**To remove the retaining bar from the chassis**” on page 3–18.
 - c. if you are replacing a failed power supply, remove the failed power supply as outlined in the section “**To remove a failed power supply from the NK-RP1 Series**” on page 3–19.
2. Insert the new power supply into the available slot inside the NK-RP1 chassis.

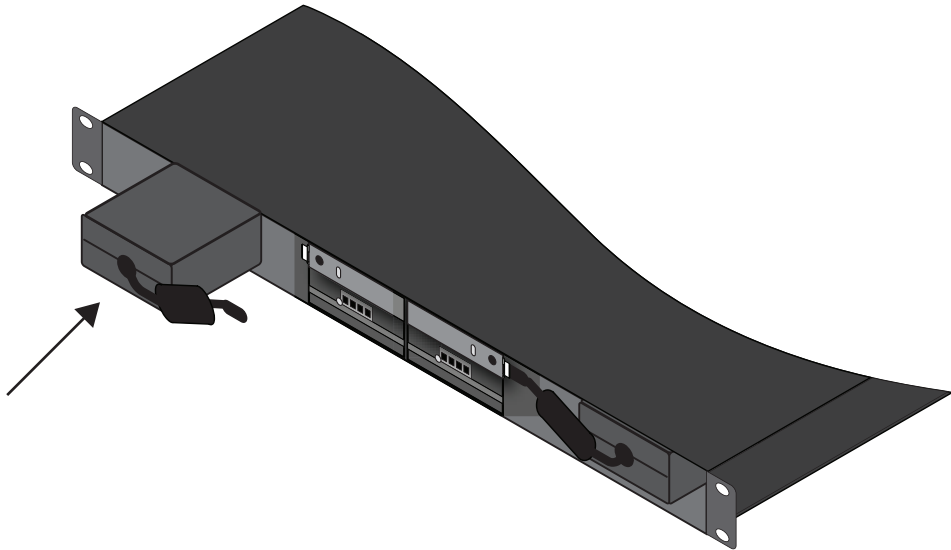


Figure 3.10 Inserting a Power Supply into the Chassis

3. Connect the power supply to the NK-RP1.

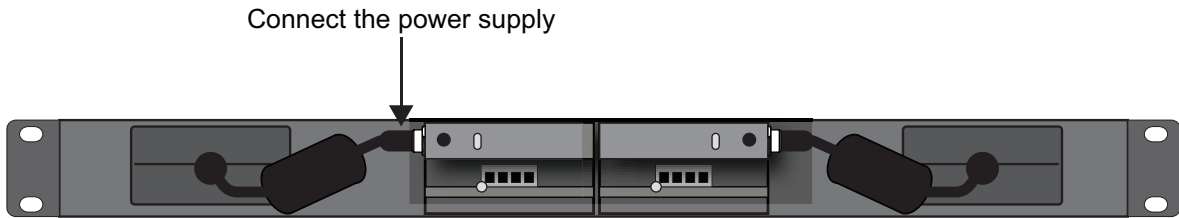


Figure 3.11 Connecting the New Power Supply

To install the retaining bar in the chassis

1. Place the power supply retaining bar on the NK-RP1.
2. Tighten the two thumbscrews on the power supply retaining bar.

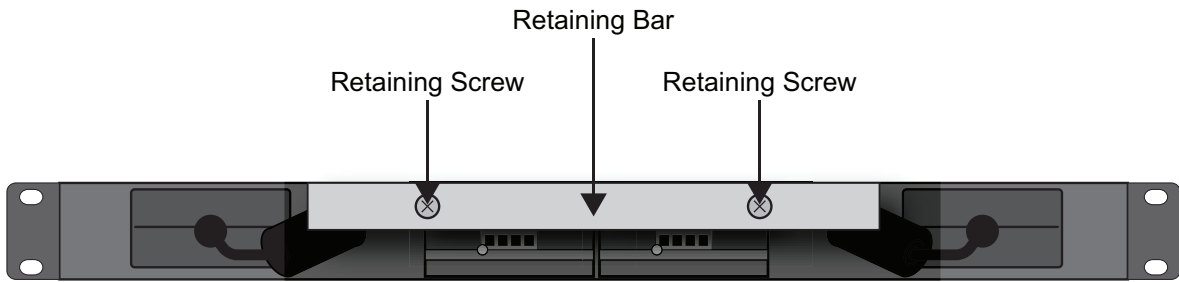


Figure 3.12 Installing the Retaining Bar

To re-install the door to the chassis

1. Align the door to the front of the NK-RP1 Series chassis, ensuring that the door is oriented upright, the corner with the NK logo is in your left hand, and the corner with the Ross logo is in your right hand.



Caution — *Re-installing the door incorrectly or misaligned can damage the door or internal components.*



ESD Susceptibility — *Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas and when synthetic fiber clothing is worn. Always exercise proper grounding precautions when working on circuit boards and related equipment.*

2. Align the left-side of the door against the chassis.
3. Align the right-side of the door, gently rotating the door into position.
4. Verify that the door is fully seated in place with the magnets securing it to the chassis.
5. Connect the AC power cord for the new power supply.

Adding or Replacing the NK-RP1-NEG Power Module



ESD Susceptibility — *Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas and when synthetic fiber clothing is worn. Always exercise proper grounding precautions when working on circuit boards and related equipment.*

To remove an NK-RP1-NEG power module

1. Before proceeding, ensure that you have:
 - a. removed the front door as outlined in the section “**To remove the door from the chassis**” on page 3–18.
 - b. removed the power supply retaining bar as outlined in the section “**To remove the retaining bar from the chassis**” on page 3–18.
2. Remove the failed NK-RP1-NEG power module by clasping the edge of the module and gently pulling it towards you until the module is fully disengaged from the chassis slot.

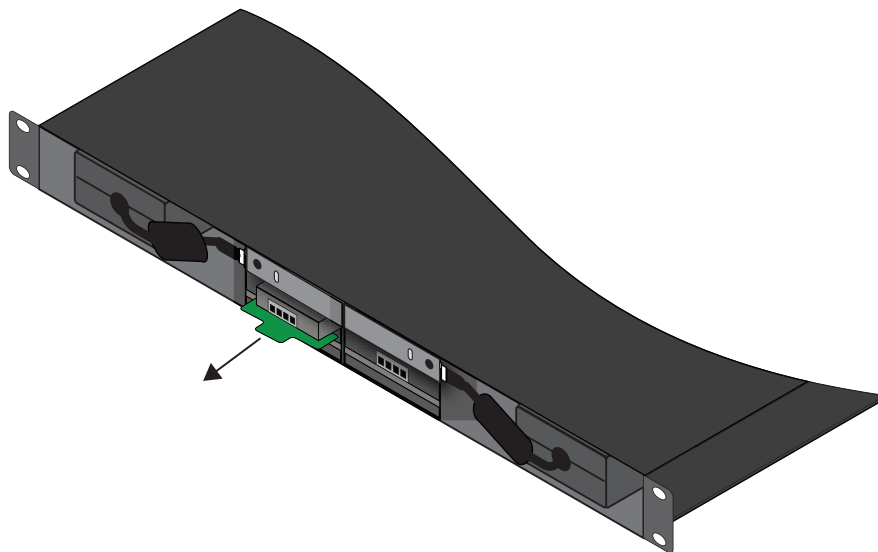


Figure 3.13 Removing the NK-RP1-NEG Power Module

To install an NK-R1-NEG power module

1. Align the new NK-RP1-NEG power module with the available slot inside the NK-RP1 chassis, ensuring the green PCB end is closest to you.
2. Gently insert the new NK-RP1-NEG power module into the available slot.

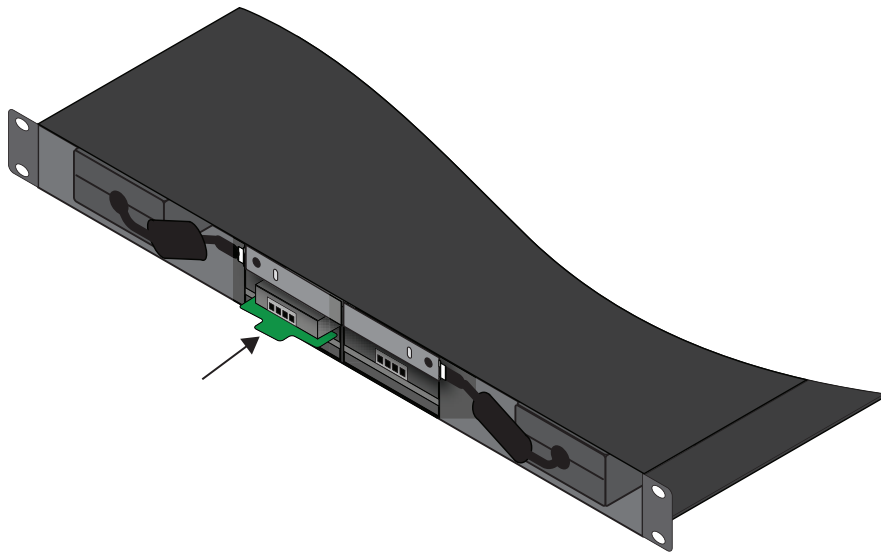


Figure 3.14 Installing the NK-RP1-NEG Power Module

3. Install the power supply retaining bar as outlined in the section “**To install the retaining bar in the chassis**” on page 3–20.
4. Install the front door as outlined in the section “**To re-install the door to the chassis**” on page 3–21.

Monitoring the NK-RP1 Series

Both the NK-RP1/P and NK-RP1/PN have an LED on the front panel to indicate if the unit is operating normally. There are also up to four LEDs inside to indicate if the power supplies are functional. Two of these LEDs are located on the NK-RP1-NEG power modules and indicate if they are providing -15V to the system.

Monitoring via the Front Panel LED

The front panel LED on the NK-RP1/P and NK-RP1/PN indicates when the unit is operating normally. If the LED is not illuminated, one or both of the +15V power supplies are not operating.

Table 4.1 Front Panel LED

LED	Status	Description
Front Panel	On	When the LED is lit, both of the +15V power supplies are active and providing redundant power to the connected devices.
	Off	When the LED is not lit, one or both of the +15V power supplies are not operating.

For More Information on...

- the location of the front panel LED, refer to the section “**Front Panel Overview**” on page 2–11.

Monitoring the Power Supply LEDs

Two LEDs behind the power supply retaining bar indicate the status of each +15V power supply.

For More Information on...

- removing the power supply retaining bar, refer to the section “**To remove the retaining bar from the chassis**” on page 3–18.

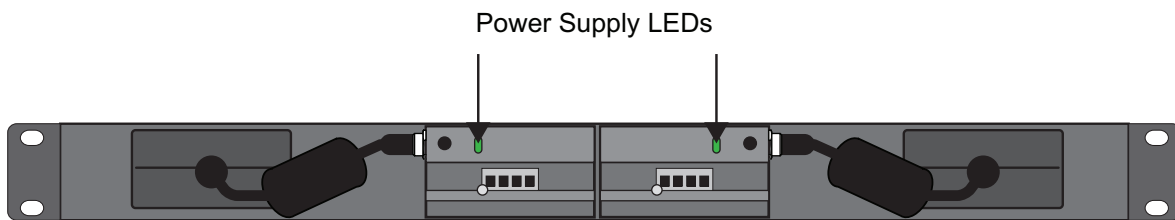


Figure 4.1 Inside the Chassis — Power Supply LEDs

Table 4.2 Power Supply LEDs

LED	Status	Description
PSU	On	When the LED is lit, the specified power supply is operating normally.
	Off	When the LED is not lit, the respective power supply is not providing +15V to the NK-RP1/P and may be caused by one of the following: <ul style="list-style-type: none"> No AC power — Ensure that there is a good AC connection to that power supply. A failed power supply — Replace the power supply. Contact Ross Video for a replacement power supply.

NK-RP1-NEG Power Modules

Each NK-RP1-NEG power module also has an LED indicating that it is operating normally.

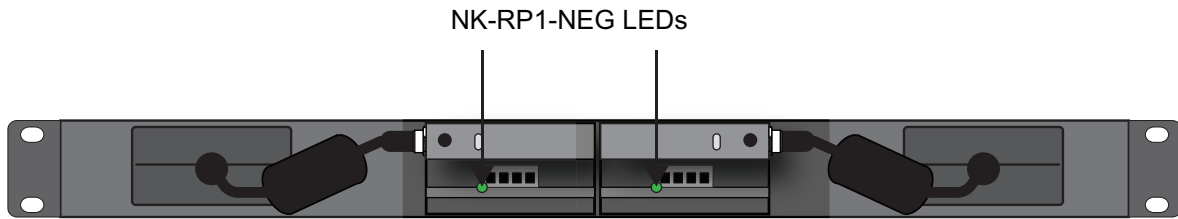


Figure 4.2 Inside the Chassis — NK-RP1-NEG LEDs

Table 4.3 Power Module LEDs

LED	Status	Description
NK-RP1-NEG Power Module	On	When the LED is lit, the specified NK-RP1-NEG power module is operating normally.
	Off	When the LED on the NK-RP1-NEG module is not lit, the respective power supply is not providing -15V to the NK-RP1/P and may be caused by one of the following: <ul style="list-style-type: none">• It is not receiving +15V from the main power supply — Ensure that the main power supply is operating correctly as described above.• The NK-RP1-NEG has failed — Replace the power module. Contact Ross Video for a replacement power module.

Technical Specifications

This chapter provides technical information for the NK-RP1 Series. Note that specifications are subject to change without notice.

General Specifications

Table 5.1 General Specifications

Item	Specifications
Inputs	100V to 240V @1.5A (47Hz to 63Hz)
Positive Output	+15V @ 6.67A (100W)
Negative Output	-15V @ 3.33A (optional)
Maximum Total Output	100W
On-board Cooling	2 x 4.0cm fans
Dimensions	1RU x 19.0cm deep

Relative +/- Power Output

Table 5.2 Relative +/- Power Output Specifications

Item	Power Distribution (W)						
Positive Power	100	90	80	70	60	50	40
Negative Power	0	8.4	16.8	25.2	33.6	42	50

Making Custom Cables

The NK-D12/PN and NK-S12/P cables are 1m in length. If longer cables are required, cables can be custom made using the included Phoenix terminal block and backshell.

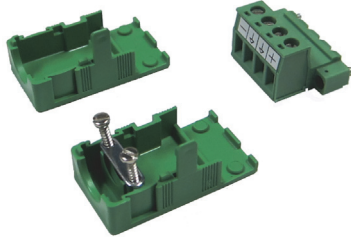


Figure 6.1 Phoenix Terminal Block and Open Backshell

Making an NK-D12/PN Cable

To make a custom NK-D12/PN cable, a female DB9 connector and a 5 conductor cable (minimum size of 22 AWG) are required.

To make a custom NK-D12/PN cable

1. Attach one end of the cable to the open Phoenix connector as follows:
 - a. Attach one wire to the negative contact (**Figure 6.2**).
 - b. Attach one wire to a ground (**Figure 6.2**).
 - c. Attach the ground wire to the second ground (**Figure 6.2**).
 - d. Attach two wires to the positive contact (**Figure 6.2**).

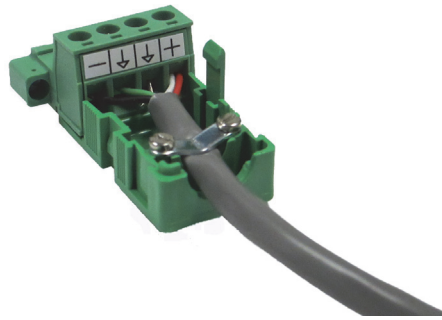


Figure 6.2 Open NK-D12/PN

2. Attach the other end of the cable to the open female DB9 connector.
 - a. Attach the wire on the negative contact of the Phoenix connector to pins 8 and 9 on the DB9 connector (**Figure 6.3**).
 - b. Attach the wire on one of the grounds of the Phoenix connector to pin 4 on the DB9 connector (**Figure 6.3**).
 - c. Attach the ground wire on the other ground of the Phoenix connector to pin 5 on the DB9 connector as well as the surface of the DB9 connector (**Figure 6.3**).
 - d. Attach the two wires on the positive contact of the Phoenix connector to pins 6 and 7 on the DB9 connector (**Figure 6.3**).



Figure 6.3 Open Female DB9 Connector

Making an NK-S12/P Cable

To make a custom NK-S12/P cable, a Neutrik NL4FX connector and a 2-conductor cable (minimum size of 20 AWG) are required.

To make a custom NK-S12/P cable

1. Attach one end of the cable to the open Phoenix connector.
 - a. Attach one wire to the ground (**Figure 6.4**).
 - b. Attach the other wire to the positive contact (**Figure 6.4**).

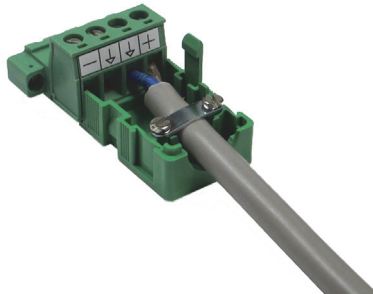


Figure 6.4 Open NK-S12/P Phoenix Connector Backshell with Terminal Block

2. Attach the other end of the cable to the open Neutrik NL4FX connector.
 - a. Attach the wire on the positive contact of the Phoenix connector to the +1 contact on the Neutrik NL4FX connector (**Figure 6.5**).
 - b. Attach the wire on the ground of the Phoenix connector to the -1 contact on the Neutrik NL4FX connector (**Figure 6.5**).

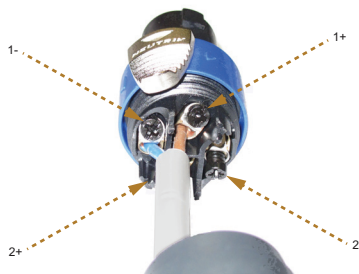


Figure 6.5 Open Female DB9 Connector