
# NK-3G320

## 3G/HD/SD Multi-Definition SDI Router

## User Guide

ROSS
Live Production Technology™

## NK-3G320 · User Guide

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Before using this product and any associated equipment, refer to the “Important Safety Instructions” listed below so as to avoid personnel injury and to prevent product damage.

Products may require specific equipment, and /or installation procedures be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these Specific requirements.

### Symbol Meanings

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product. Failure to heed this information may present a risk of damage or injury to persons or equipment.

**Warning**

The symbol with the word “**Warning**” within the equipment manual indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.

**Caution**

The symbol with the word “**Caution**” within the equipment manual indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

**Notice**

The symbol with the word “**Notice**” within the equipment manual indicates a situation, which if not avoided, may result in major or minor equipment damage or a situation, which could place the equipment in a non-compliant operating state.

**Warning Hazardous Voltages**

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This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.

### Important Safety Instructions

1. Read these instructions.
2. Follow all instructions and heed all warnings.
3. Refer all servicing to qualified service personnel.
4. The equipment's external power supply AC appliance inlets are the means to disconnect the product from the AC Mains and must remain readily operable for this purpose.
5. To avoid the risk of electrical shock and to completely disconnect the apparatus from the supply AC appliance inlets prior to servicing.

**Warning**

6. The safe operation of this product requires that a protective earth connection be provided. A grounding conductor in the equipment's external power supply line cord provides this protective earth. To reduce the risk of electrical shock to the operator and service personnel, this ground conductor must be connected to an earthed ground.
7. Indoor Use: WARNING: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

8. Warning: This product includes an "Ethernet Port" for connection to a local area network (LAN). This Ethernet port interface is designed for intra-building networks only.

   Do not connect this port to networks that go outside of the building.

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#### 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 Ltd. could void the user's authority to operate this equipment.

#### CANADA

This Class "A" digital apparatus complies with Canadian **ICES-003**.

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

#### EUROPE

This equipment is in compliance with the essential requirements and other relevant provisions of **CE Directive 93/68/EEC**.

#### INTERNATIONAL

This equipment has been tested to **CISPR 22:1997** along with amendments **A1:2000** and **A2:2002** 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.

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

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.

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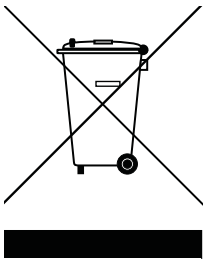
The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

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.

## Company Address


**Ross Video Limited**
8 John Street
Iroquois, Ontario
Canada, K0E 1K0

**Ross Video Incorporated**
P.O. Box 880
Ogdensburg, New York
USA 13669-0880

**Ross Video Australia**
Unit 3, 49 London Drive
Bayswater VIC 3153
Australia

**General Business Office**: (+1) 613 • 652 • 4886
**Fax**: (+1) 613 • 652 • 4425

**Technical Support**: (+1) 613 • 652 • 4886
**After Hours Emergency**: (+1) 613 • 349 • 0006

**E-mail for Technical Support**: techsupport@rossvideo.com
**E-mail for General Information**: solutions@rossvideo.com
**Website**: http://www.rossvideo.com

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# Introduction

Thank you for purchasing the Ross Video NK-3G320 3G/HD/SD Multi-Definition SDI Router. With Ross Video's reputation for delivering leading-edge routing switcher equipment and our unsurpassed level of customer service and support, you can look forward to many years of reliable broadcasting. Please read this manual thoroughly and retain it for future reference.

## Overview of this Guide

This manual is for system administrators, installers and operators of the Ross Video NK-3G320 3G/HD/SD Multi-Definition SDI Router. It provides instructions on how to connect the routing switcher system, and how to set up a configuration document for the routing switcher using the Phoenix Control Surface. It assumes that you are experienced with general broadcast concepts, and that you are familiar with the planning requirements for a routing switcher system.

# Overview

## Features

The NK-3G320 Routing Switcher provides the following features:

- economical and professional-quality design
- a powerful control system
- support for 3G and multi-definition digital video and AES digital audio
- 19 RU design
- control, switching matrix and power redundancy options
- hot swapping of all boards and power supplies
- smart fan control and monitoring
- enhanced LED indications via the heartbeat, all cards, and power supplies
- extensive monitoring via the Phoenix Control Surface
- firmware is fully upgradeable using the Phoenix Control Surface

## Overview of the NK-3G320 Routing Switcher

The NK-3G320 Routing Switcher handles high-bandwidth, broadcast quality, digital video and audio signals, and embedded audio signals. Digital video signals may be 3G, high definition, standard definition, DVB-ASI, or SDTI. The NK-3G320 supports SMPTE standards 424M, 344M, 259M, and 292M and AES.

The NK-3G320 is powered by four +15V DC, 500 W, providing redundancy. The PSUs are load-sharing.

The NK-3G320 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.

A routing switcher is a module that switches items of broadcast equipment from a nominated source to a nominated destination. All NK Series routing switchers in the system may be connected to other NK Series devices via the T-Bus control system, and may be connected to a video referencing signal (see *“**Connecting a Video Reference to NK Series Routing Switchers**” on page 3–8*). The NK-3G320 may be partitioned. Each partition may be assigned to a unique or common switching level.

For information on other routing switchers that are available from Ross Video, see the ***NK Series Routing Switchers Reference Manual***.

The NK-3G320 may be set up using the routing switcher’s editor in the Phoenix Control Surface (see *“**Setting Up a Routing Switcher**” on page 4–1*).

### The Front Panel

The front panel of the NK-3G320 Routing Switcher is a removable door, held in place by three latches. The heartbeat LED in the name badge indicates the operational and alarm status of the unit. For more information on the heartbeat LED see **Table 5.1**.


***Figure 2.1*** *Front panel of the NK-3G320 Routing Switcher*

The front panel of the door has a ventilation grill, and behind that, reusable filters. There are five 120mm fans on the inside of the front panel (see **Figure 2.2**). The fans draw in air at the front of the unit, then blow air over the matrix core and the input and output cards. The speed of each fan is monitored and varied as required for the measured temperature of the cards. If the fan is not at the correct speed, or the temperature of the cards is too high, a fault is indicated.

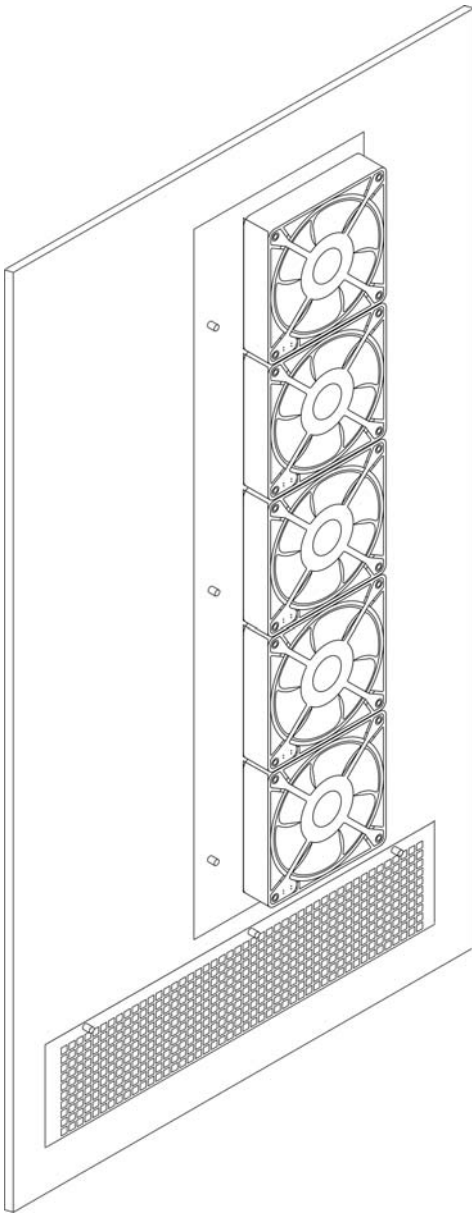

***Figure 2.2*** *Fans on the inside of the front panel*

### The Frame

All cards and power supplies are inserted via the front of the routing switcher. All input/output cards are inserted horizontally into the frame, mating with the motherboard at the rear of the routing switcher. Input cards are located on the left and output cards are located on the right when viewed from the front of the frame. Matrix cards and control cards are inserted vertically into the frame, mating with the motherboard. The motherboard sits vertically within the frame, approximately 2 cm in from the rear panel. The motherboard straddles the input, control, matrix and output slots, providing connectivity to all boards and power supplies.

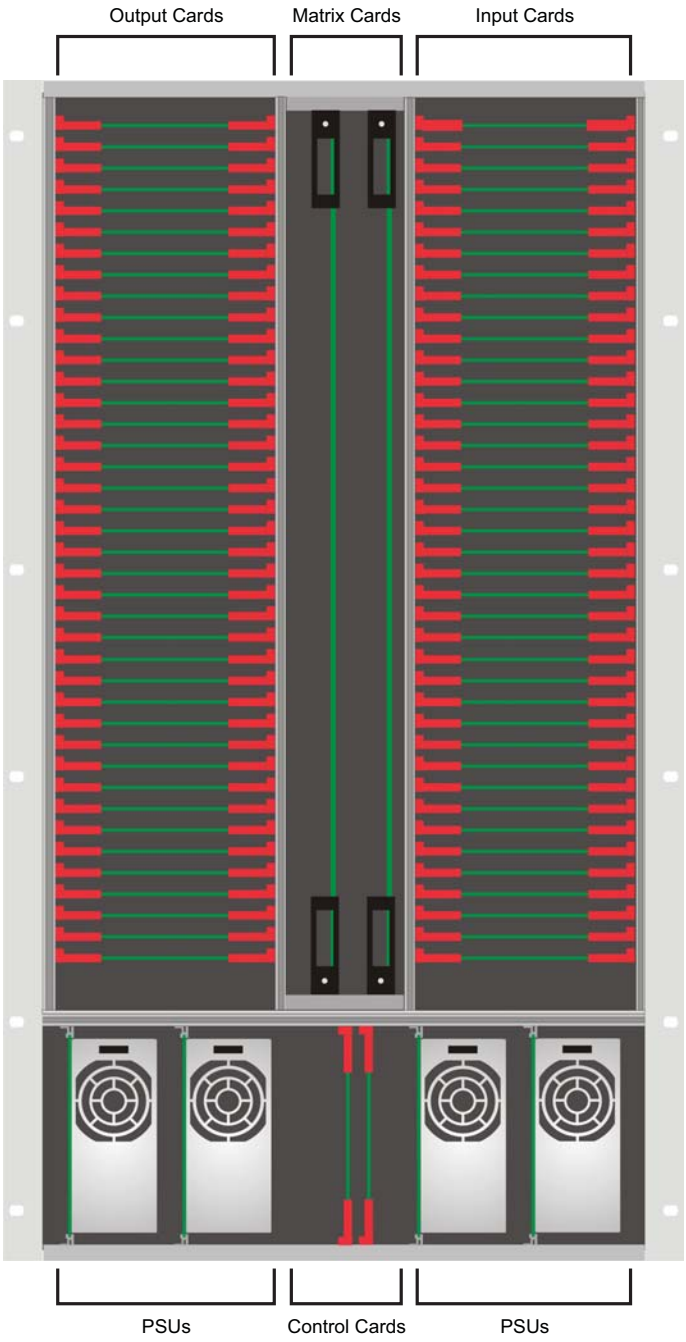


***Figure 2.3*** *Front view of the card frame inside the NK-3G320 Routing Switcher*

### Cards and Accessories

The NK-3G320 Routing Switcher is expandable from one input card and one output card, up to 40 input cards and 40 output cards. Each card supports eight inputs or outputs.

The control cards set the parameters for the input and output cards, and monitor their operation. The control cards are functionally responsible for the T-Bus control system, Alarm GPI, and video referencing.

The NK-3G320 has capacity for additional control and matrix cards, which provide redundancy.

***Table 2.1 NK-3G320 (3G and Multi-Definition SD/HD) Routing Switcher and Accessories***

| Model Number | Comment |
|---|---|
| NK-3G320(128) | 3G/HD/SD digital video routing switcher, 128 inputs, 128 outputs, expandable in groups of 8 per input card (NK-I3G) and output card (NK-O3G), up to 320 × 320<br>4 redundant PSUs, single control interface and matrix card |
| NK-3G320(144) | 3G/HD/SD digital video routing switcher, 144 inputs, 144 outputs, expandable in groups of 8 per input card (NK-I3G) and output card (NK-O3G), up to 320 × 320<br>4 redundant PSUs, single control interface and matrix card |
| NK-3G320(256) | 3G/HD/SD digital video routing switcher, 256 inputs, 256 outputs, expandable in groups of 8 per input card (NK-I3G) and output card (NK-O3G), up to 320 × 320<br>4 redundant PSUs, single control interface and matrix card |
| NK-3G320(288) | 3G/HD/SD digital video routing switcher, 288 inputs, 288 outputs, expandable in groups of 8 per input card (NK-I3G) and output card (NK-O3G), up to 320 × 320<br>4 redundant PSUs, single control interface and matrix card<br>Refer to **Figure 2.4**. |
| NK-3G320 | 3G/HD/SD digital video routing switcher, 320 inputs, 320 outputs, 4 redundant PSUs, single control interface and matrix card |
| NK-3G320-FRM | Digital video routing switcher frame |
| NK-I3G | 3G input card, 8 inputs per card |
| NK-O3G | 3G output card, 8 outputs per card |
| NK-I3G-RC | 3G input BNC rear connector strip (accepts 2 input cards) |
| NK-O3G-RC | 3G output BNC rear connector strip (accepts 2 output cards) |
| NK-C3G320 | Control card |
| NK-320X3G | Matrix card |
| NK-P3G | Power supply unit |

**Note:**

- The input cards may be installed in any of the 40 slots on the left-hand side of the frame, output cards may be installed in any of the 40 slots on the right-hand side of the frame. They do not have to be installed sequentially.

**For More Information on...**

- installing cards see "***Inserting a Card into the NK-3G320***" on page 3–6.

### The Rear Panel

The rear panel and frame provides a support structure for mounting an input or output BNC rear connector strip. There are ventilation grills in the rear panel that allow the hot air to escape from the routing switcher.

Each input and output card in the frame must have an input or output BNC rear connector strip connected to the corresponding position in the rear panel. One of these BNC rear connector strips supports two cards. For more information see "***Attaching a BNC Rear Connector Strip to the Rear Panel of the NK-3G320***" on page 3–5.

An EMC gasket is fitted to the frame. A blanking plate or an input/output BNC rear connector strip is attached through this gasket to the frame.

**Note:**

- If a BNC rear connector strip is not fitted, a rear blanking plate must be fitted in place of the connector strip to maintain EMC and cooling performance.

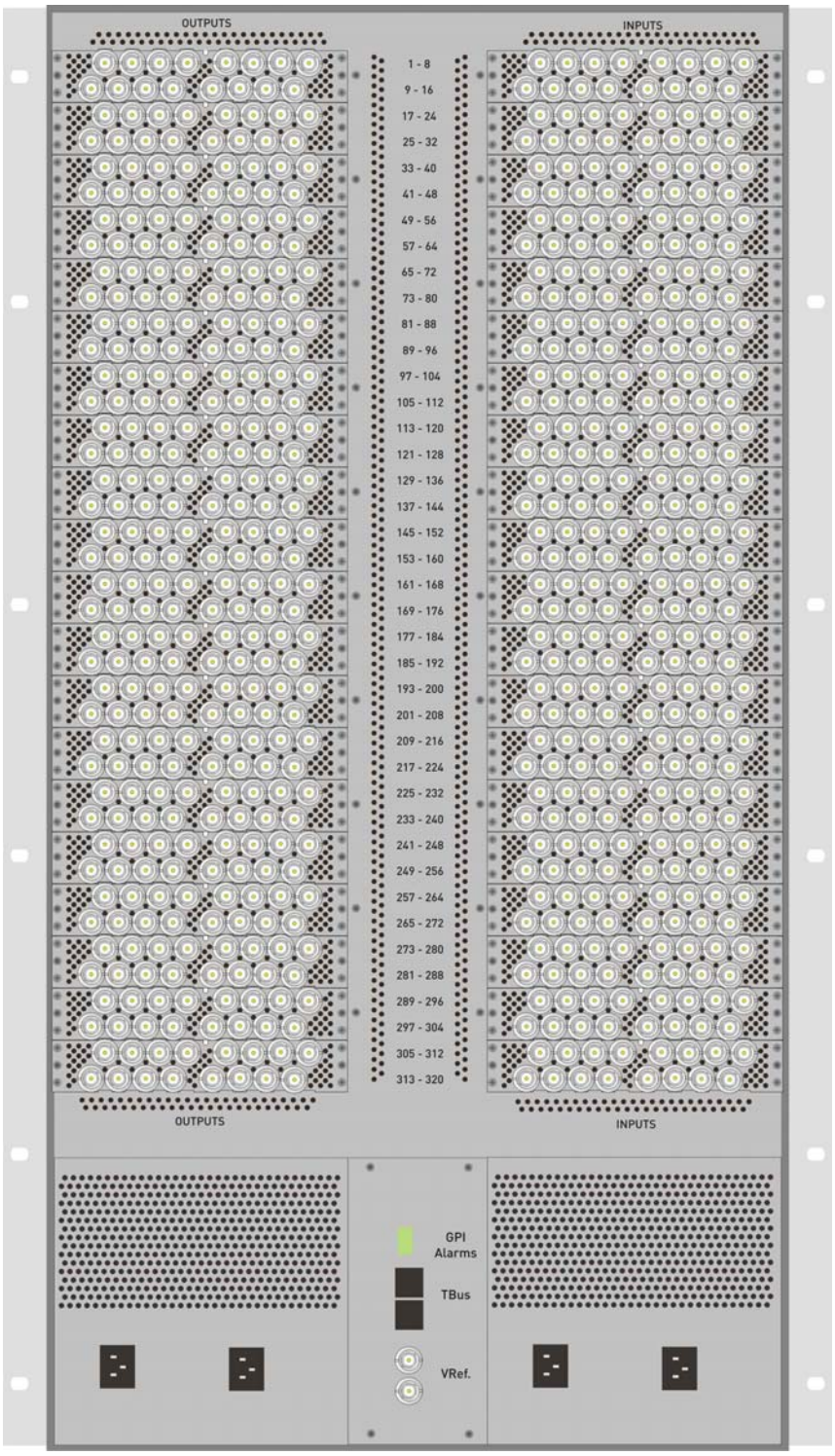


***Figure 2.4*** *Rear panel of the NK-3G320 Routing Switcher*

The control cards are functionally responsible for the T-Bus control system, Alarm GPI, and video referencing.

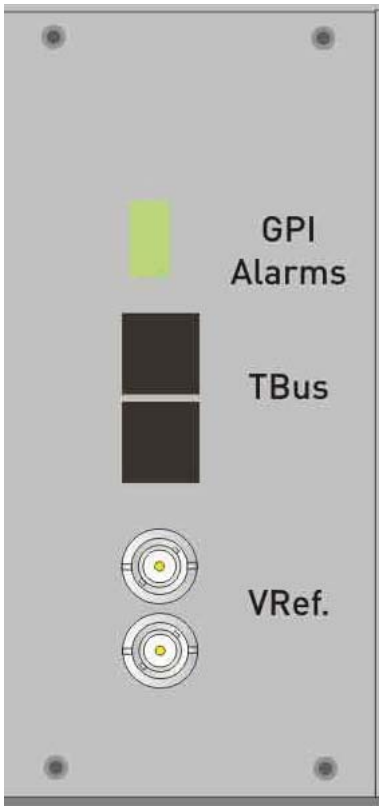


***Figure 2.5*** *Rear panel of the control cards*

#### T-Bus Control System

The T-Bus control system is a multi-drop RS485-based system that supports collision detection and half duplex communications. It may also be used to provide phantom power to some devices.

#### Power

The NK-3G320 has four IEC connectors that provide AC mains power to each of the +15 V DC, 500 W mounted in the frame.

#### Alarm GPI

The Alarm GPI connector is a relay contact output, activated in the event of a critical failure within the routing switcher.

The following conditions are monitored, and an alarm is generated if the status crosses a defined threshold:

- matrix power alarm
- remote control panel power alarm
- input/output power alarm

The conditions that generate an alarm are critical incidents that stop the routing switcher from working. If the routing switcher is not supervised or at a remote site, such an alarm is used to alert system technicians that a failure has occurred, or the alarm could be used to trigger a backup system.

#### For More Information on...

- the pinouts and typical uses of the Alarm GPI connector see "***Appendix A: Connectors***" on page 6–1.

#### Video Reference

The NK-3G320 Routing Switcher is capable of video referencing. If connected, a video reference ensures that switching occurs in the default vertical interval across all router levels. The default switching pulse complies with RP 168, line 6 for PAL, and line 10 for NTSC. Alternatively, you can set your own custom switching point to meet

the requirements of your system. For example, if the default settings for the switching pulse occur within the data elements of your signal, you need to assign your own switching point.

**Note:**

- If a video reference is not connected, the routing switcher internally generates a free-running switching pulse every 40 ms.

**For More Information on...**

- For more information see "***Connecting a Video Reference to NK Series Routing Switchers***" on page 3–8 and "***Setting Up Video Referencing***" on page 4–10.

## Typical System Equipment

NK Series routing switchers may be connected to other NK Series devices via the T-Bus control system to form a multi-level routing switcher system. For smaller routing applications, routing switchers may be used individually to provide switching across a single router level or signal type. The NK Series of routing switchers may be controlled by:

- an NK Series remote control panel
- the Phoenix NK Switchboard
- a Geneos CPU as a Kondor 2 level, via an NK-SCP/K2 RS485 Control Interface
- an automation system or RS232 terminal, via an NK-SCP/A ASCII/RS232 Control Interface
- the NK-VCP Virtual Control Panel
- the NK-GPI General Purpose Interface
- the NK-3RD Third Party Interface

Phoenix Control Surface software may be used to set up each routing switcher via an NK-IPS Network Bridge. These parameters can be saved in a configuration document and sent to a routing switcher at any time using Phoenix.

Typical equipment that is used in an NK Series routing switcher system includes:

- any of the NK Series routing switchers with its appropriate power supply
- an NK-IPS Network Bridge
- an RCP-NK1, RCP-NKM, or RCP-NKQ Remote Control Panel
- a PC running Phoenix Control Surface, connected via a CAT5 Ethernet cable to the NK-IPS
- standard source and destination equipment (for example, cameras, VTRs, servers)

**Note:**

- If you are connecting the PC directly to the NK-IPS, use a crossover CAT5 Ethernet cable.
- If you are connecting the PC indirectly via an Ethernet switch to the NK-IPS, use a straight-through CAT5 Ethernet cable.
- The NK-IPS and PC with Phoenix Control Surface are only required for setting up the configuration document, then sending this to the device. However, you can use the NK Switchboard feature in Phoenix to control and monitor a routing switcher system.

**For More Information on...**

- on controlling a routing switcher using a remote control panel see the documentation provided with the particular panel.

## System Overview

A routing switcher system may use distributed control across the internet, a LAN, or a VPN. The routing switcher system shown in **Figure 2.6** has been simplified.

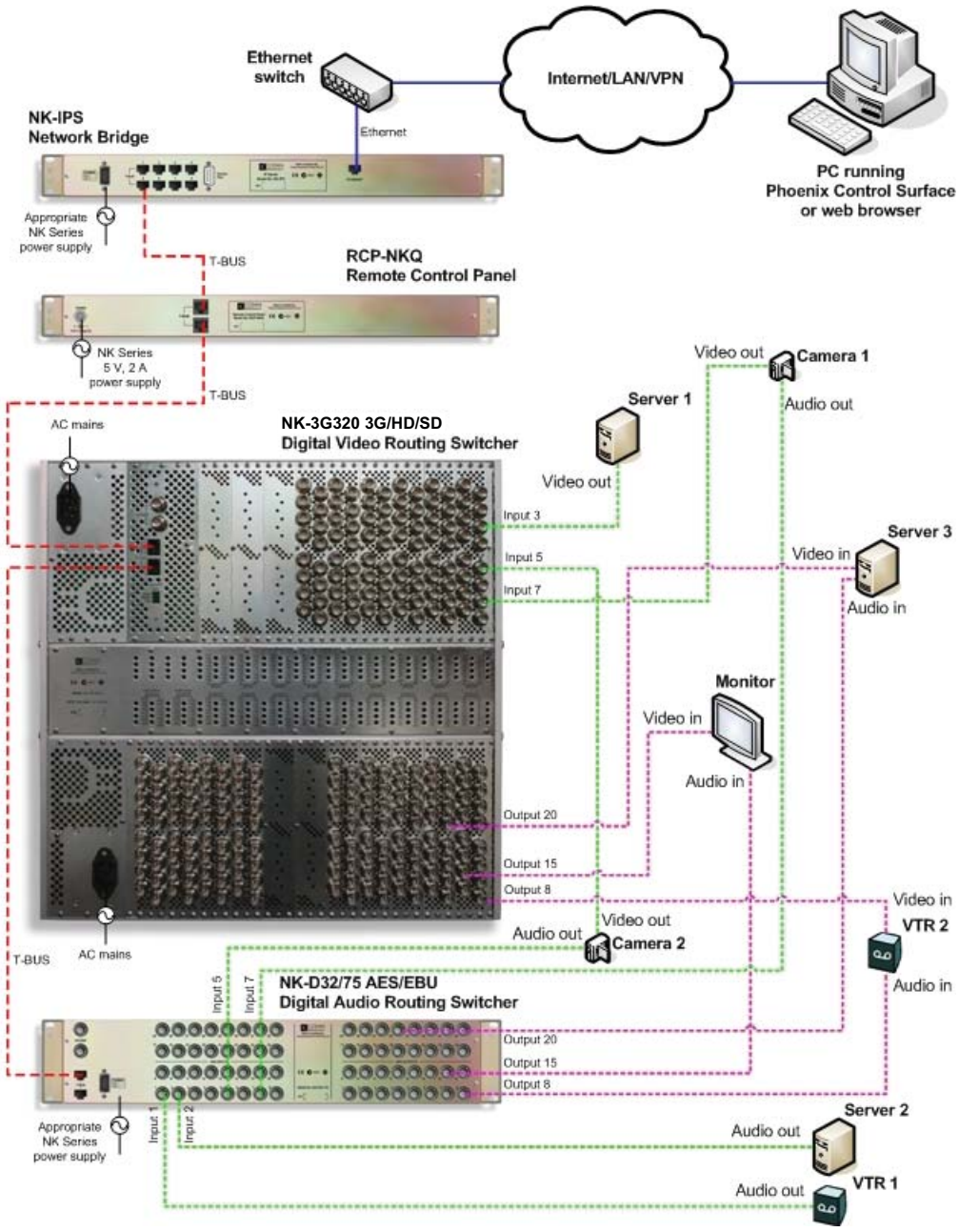


***Figure 2.6*** *Layout showing a simplified routing switcher system*

**Note:**

- All T-Bus connections between NK Series devices use straight-through CAT5 cables.

## How the Panels and Routing Switchers Communicate

### Switching

The control panel sends a switch request message to the routing switcher. The routing switcher recognizes the request, sets the crosspoint, then sends a response to the panel.

### Data Storage

The panel stores information on the menu, destination, level, breakaway, and machine control status. The routing switcher stores the crosspoint status in its internal memory.

When the system is powered up, the routing switcher restores its crosspoint status. The control panel requests the status of the routing switcher.

# Installation

## Unpacking the Equipment

On receiving your routing switcher, check the contents against the packing list. Make sure that all equipment itemized on the packing list is present and that there are no signs of damage before you start installing the routing switcher into your system.

If anything is missing or damaged, contact your Ross Video office immediately to obtain the correct warranty service procedures. This ensures prompt assistance, minimal turnaround time, and avoids any freight issues.

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

Before use, remove the transportation foam located between the front panel and the internal frame.

The PSUs are packed separately, and must be fitted correctly (see *"**Installing a PSU into the NK-3G320**" on page 3–2*).

**Warning** – *Always remove the PSUs before shipping the routing switcher.*

## General

These installation guidelines assume the following:

- The relevant NK Series equipment has been installed into a ventilated rack frame. The relative humidity in the environment of the equipment should be < 70% (non-condensing). The ambient temperature of the air entering the front panel should not exceed 30° C (86°F), and should not fall below 0°C (32°F). It is recommended to leave a 1 RU gap between each module.
- The routing switcher system has been well planned and designed. Consideration must be given to inputs and outputs across multiple router levels, and typical operating scenarios for breakaways.
- Correct IP addresses have been assigned to the equipment, where required.
- All NK Series equipment connected in the routing switcher system has firmware v2.00 or later. For information on updating the firmware in a device see the readme file that comes with the firmware. Firmware updates are available from the Ross Video website (www.rossvideo.com).

The NK-3G320 is designed to be operated with the front panel closed to ensure adequate cooling via the fans.

**Warning** – *Do not operate the NK-3G320 for extended periods with the front panel open.*

The NK-3G320 provides phantom power via the **T-BUS** connector to other NK Series devices (RCP-NK1, NK-GPI, NK-SCP/A). The NK-3G320 does not receive power via the **T-BUS** connector.

## Installing the Routing Switcher

The routing switcher is powered using the four +15 V DC, 500 W provided. These power supplies plug into the routing switcher from the front, and obtain their AC mains supply via four IEC connectors on the rear panel.

**Warning** – *Ensure that the AC mains supply complies with the PSU specification before making the connection.*

**Warning** – *The NK-3G320 must be connected to the mains earth via the IEC connectors.*

**Warning** – *An earthed neutral mains supply and residual current device is recommended for safe operation.*

### Installing a PSU into the NK-3G320

**ESD Susceptibility** – *Antistatic precautions must be taken when fitting or removing PSUs and the attached cards. Handle cards by the edges only. Wear an earthed wrist strap if possible, or place both hands on the metal rack frame before handling the cards. Use antistatic bags or trays to store and transport the cards.*

**To install a PSU into the routing switcher:**

1. Open the front door of the routing switcher.
2. Locate the spare position for the PSU.
3. Hold the PSU with the fan grill facing toward you.
4. Orientate the PSU so that the LED and fan are closest to the I/O card.
5. Align the PSU PCB carefully with its top and bottom guide rails, then gently push the PCB into the hole, connecting with the motherboard at the back of the frame.
6. Screw the PSU to the frame using the two captive screws in the PSU. The two captive screws should always be fastened to prevent movement of the PSUs in the frame.
7. Switch on the PSU using the switch on the front of the PSU.
8. Close the front door of the routing switcher.

### Installing the Routing Switcher System in a Daisy-Chain Layout

You may connect NK Series equipment in a daisy-chain layout. The items are connected via the T-Bus control system. However, if the T-Bus chain is broken, for example, by accidentally disconnecting a cable, downstream devices are also disconnected. T-Bus RJ-45 sockets on devices downstream from the NK-IPS are passively connected internally, so device failure or power disconnection does not disrupt communication with other devices in the chain.

Each **T-BUS** connector on the NK-IPS has an independent driver/receiver ensuring that each of the eight **T-BUS** connectors will not be affected by a device failure on any other connector. However, if another device on any fan out fails in such a way as to create a permanent busy state, then no devices will transmit. The only solution in this scenario is to remove the faulty device(s).

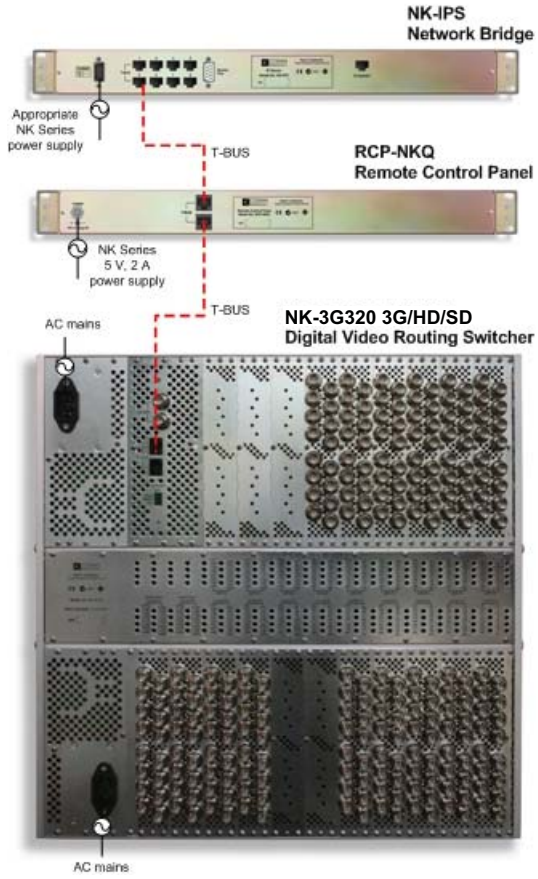


***Figure 3.1*** *NK Series Equipment in a Daisy-Chain Layout*

**To connect the NK Series equipment in a daisy-chain layout:**

1. Install the equipment into the rack frame, then fix in place with appropriate fasteners.
2. Connect the NK-3G320 directly to the AC mains via the IEC connectors on the rear panel.
3. Connect a straight-through CAT5 cable between the **T-BUS** connector on the rear panel of the NK-3G320 and a **T-BUS** connector on the rear panel of a remote control panel or other control device, another NK Series routing switcher, or an NK-IPS (see **Figure 3.1**).

   If required, make a similar connection between the remaining **T-BUS** connector on the rear panel of the NK-3G320 and a **T-BUS** connector on the rear panel of another item of NK Series equipment.
4. Connect the power supplies provided to the **POWER** connector on the rear panels of the NK Series equipment, if required.
5. Connect the cable from each power supply to a suitable AC mains supply.

**Note:**

- The NK-3G320 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.

### Installing the Routing Switcher System in a Star Layout

You may connect NK Series equipment to the NK-IPS in a star layout. The items are connected via the T-Bus control system. If any device connected directly to the NK-IPS is disconnected, it is only the downstream devices that become non-operational. All other devices remain operational.

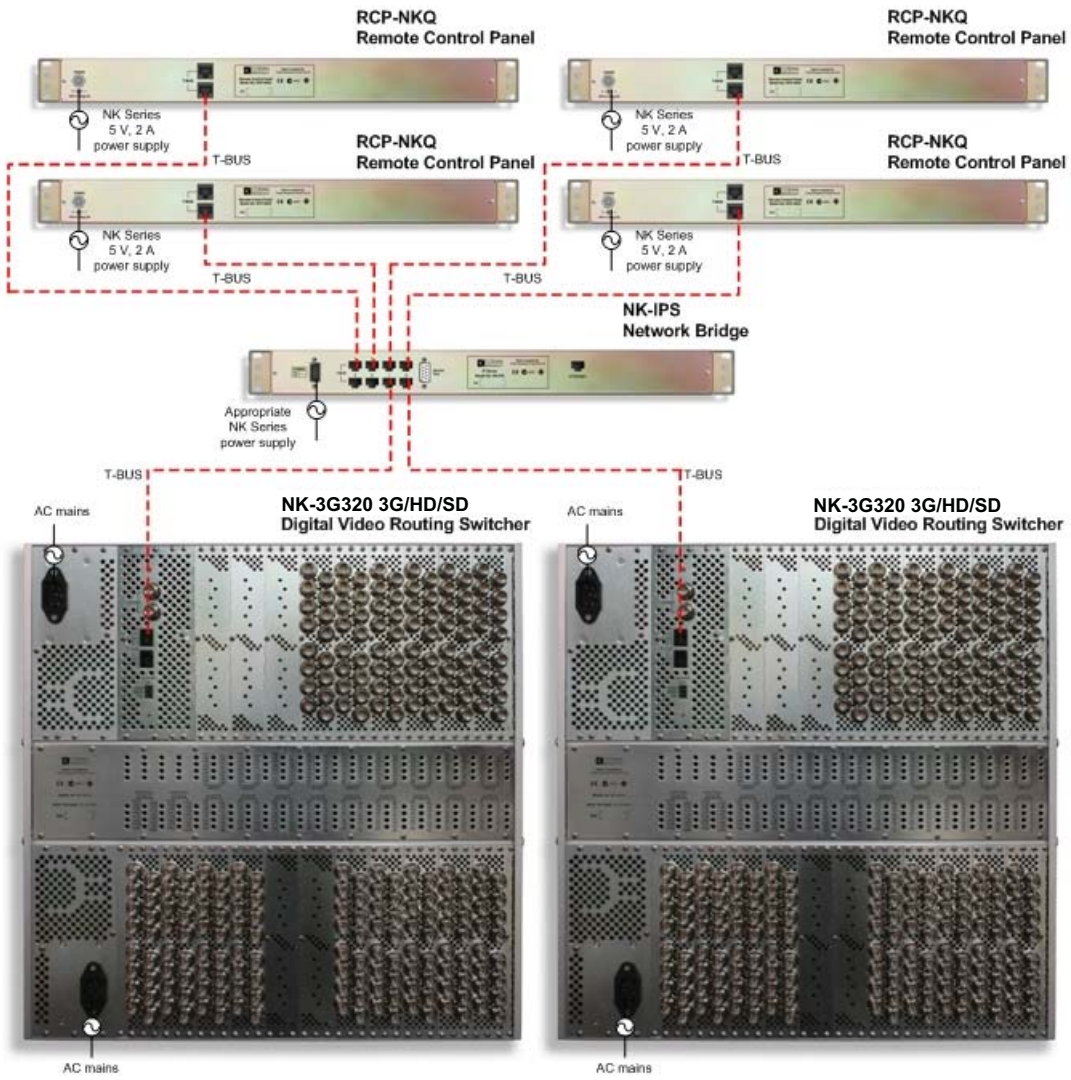


***Figure 3.2*** *NK Series Equipment in a Star Layout*

**To connect the NK Series equipment in a star layout:**

1. Install the routing switcher into the rack frame, then fix in place with appropriate fasteners.
2. Connect the NK-3G320 directly to the AC mains via the IEC connectors on the rear panel.
3. Connect a straight-through CAT5 cable between a **T-BUS** connector on the rear panel of the equipment and a **T-BUS** connector on the rear panel of the NK-IPS (see **Figure 3.2**).
4. Connect the power supply provided to the **POWER** connector on the rear panel of the NK Series equipment, if required.
5. Connect the cable from the power supply to a suitable AC mains supply.
6. Connect any remaining NK Series equipment in this manner.

**Note:**

- The NK-3G320 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.

### Attaching a BNC Rear Connector Strip to the Rear Panel of the NK-3G320

**ESD Susceptibility** – *Antistatic precautions must be taken when fitting or removing rear connector strips and attached cards. Handle cards by the edges only. Wear an earthed wrist strap if possible, or place both hands on the metal rack frame before handling the cards. Use antistatic bags or trays to store and transport the cards.*

There are two types of BNC rear connector strips that you can attach to the NK-3G320:

- NK-I3G-RC (9807-5104-x 3G input)
- NK-O3G-RC (9807-5103-x 3G output)

Each BNC rear connector strip has two columns of eight connectors each; it is specific to input or output. Each BNC rear connector strip supports two corresponding cards.

**To insert a BNC rear connector strip into the frame:**

1. Locate the part number on the BNC rear connector strip (on the outer end of the PCB).
2. On the rear panel of the routing switcher, remove the six screws from each blanking plate corresponding to the slots into which you want to insert cards (see **Figure 3.3**).

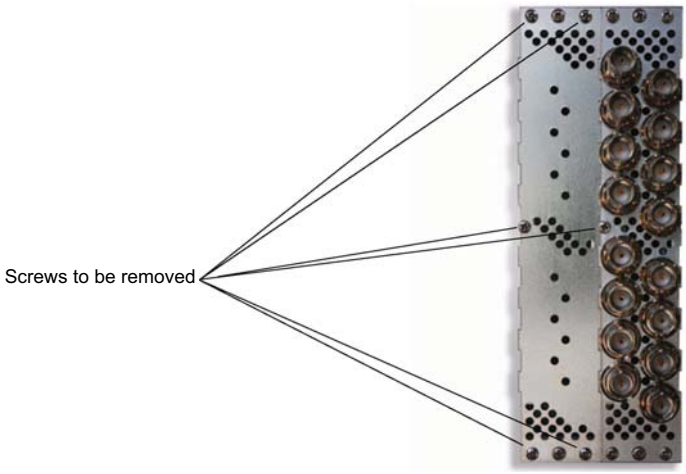


***Figure 3.3*** *Blanking Plate and BNC Rear Connector Strip*

3. Hold the BNC rear connector strip with the external BNC connectors facing away from the rear panel.
4. Orientate the input or output BNC rear connector strip so that the text on the PCB is up the correct way.
5. Align the BNC rear connector strip carefully with the cavity in the rear panel.

   The PCBs on the rear connector strip must line up with the guide rails in the frame that will hold the cards. These rails are on the top of the frame for input cards and the bottom of the frame for output cards.
6. Align the locating tabs along the edge of the bottom third of the PCBs with the holes in the motherboard.
7. Gently push the BNC rear connector strip into the cavity, ensuring that the locating tabs sit in the corresponding holes in the motherboard.
8. Attach the BNC rear connector strip to the rear panel using the 6 screws from the blanking plate.
9. Insert other BNC rear connector strips, as required.

### Inserting a Card into the NK-3G320

**ESD Susceptibility** – *Antistatic precautions must be taken when fitting or removing all cards. Handle cards by the edges only. Wear an earthed wrist strap if possible, or place both hands on the metal rack frame before handling the cards. Use antistatic bags or trays to store and transport the cards.*

✶ An input/output BNC rear connector strip must be installed into the rear panel before the corresponding card can be inserted into the frame.

There are four types of cards that you can insert into the NK-3G320 frame:

- NK-I3G (9807-5004-x 3G SDI input)
- NK-O3G (9807-5003-x 3G reclocking SDI output)
- NK-320X3G (9807-5012-x 320X320 3G matrix)
- NK-C3G (9807-5001-x 3G control)

**To insert a card into the frame:**

1. Locate the part number on the card (next to the manufacturer logo).
2. Open the front door of the routing switcher.
3. Locate an available slot position in the frame (see **Figure 3.4**).

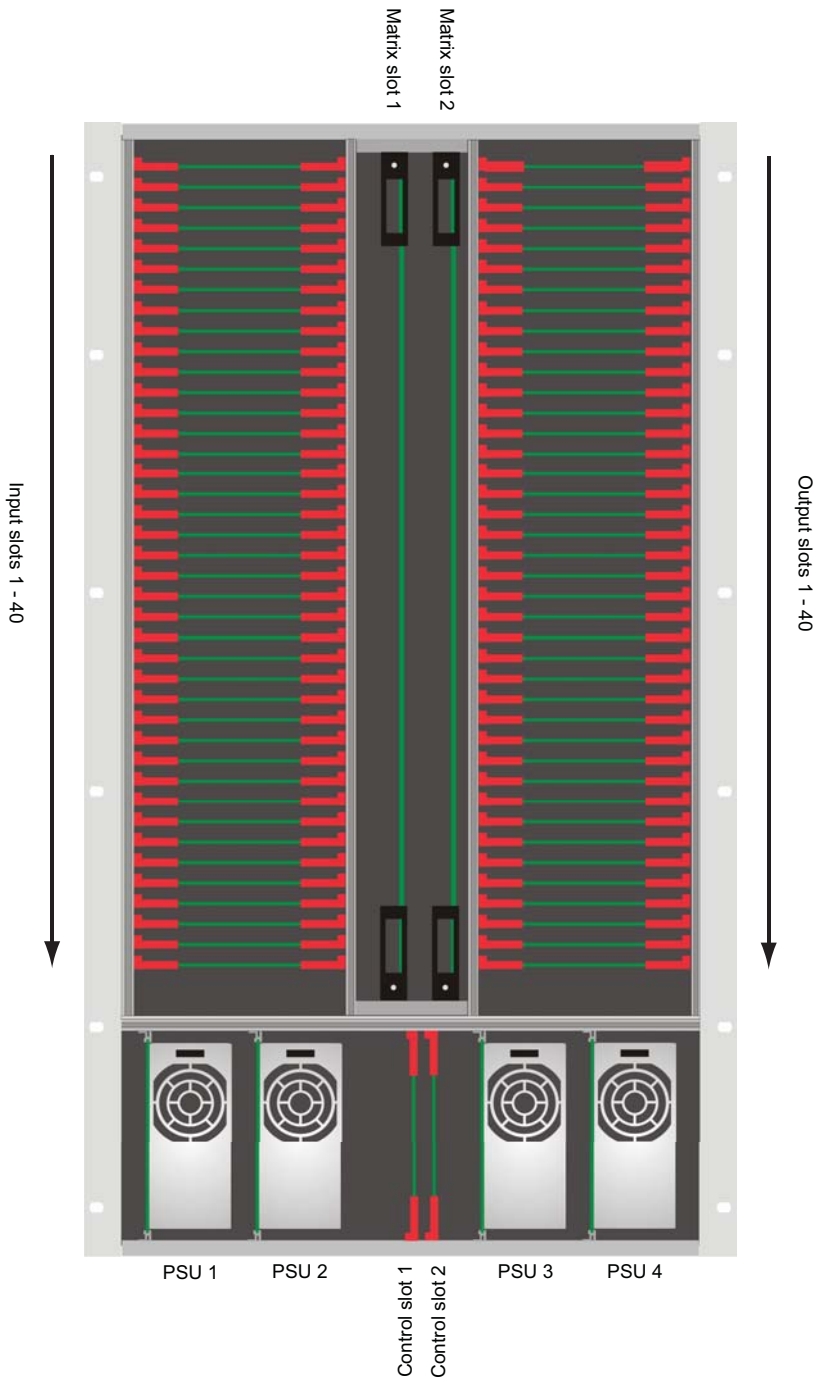


***Figure 3.4*** *Slot Positions in the Frame*

4. Hold the card along the edge that has the LEDs.
5. Do one of the following:
   - For input and output cards, orientate the card so that the component side is facing up when the card is held horizontally.
   - For matrix and control cards, orientate the card so that the component side is facing to the left when the card is held vertically.
6. Align the card carefully with the guide rails for the slot, then gently push the card into the slot, until the locking levers reach the front of the guide rails.
7. Swing the locking levers out from both ends of the card.

8. Seat the card with the motherboard and the rear connector by gently pushing the levers until they are flush with the card.

**Warning** – *Do not use excessive force to seat the card as damage may occur.*

9. Insert other cards, as required.
10. Close the front door of the routing switcher.
11. For input and output cards, set up the card as required via the Phoenix Control Surface.

**Note:**

- Input and output cards may be inserted in any of the 40 corresponding slots.
- If the card is a direct replacement, the setting information is automatically transferred from the control card.

## Connecting Source and Destination Devices

A routing switcher system requires careful planning. This may include allocating common connector numbers across several router levels or partitions within the routing switcher system to ensure that source and destination equipment switch on just one switch command. Alternatively, the inputs and outputs may be mapped across multiple levels using the NK-VRC Virtual Routing Core.

**ESD Susceptibility** – *Antistatic precautions must be taken when fitting or removing all cables. Wear an earthed wrist strap if possible, or place both hands on the metal rack frame before handling the cables.*

**Note:**

- Planning a routing switcher system of source and destination devices is not covered by this manual.

**To connect source and destination devices to the routing switcher:**

Connect a 75 Ω coaxial cable with BNC connectors between the source or destination device and the appropriate input or output connector on the rear panel of the NK-3G320. Ensure that the bayonet connector is locked correctly into place.

**Note:**

- A Trompeter tool may be useful for connecting BNC connectors in a densely wired routing switcher.

## Connecting a Video Reference to NK Series Routing Switchers

All NK Series video and audio routing switchers accept a video reference. If connected, this ensures that switching occurs in the vertical interval across all router levels, that is, a switching pulse that complies with RP1 68, line 6 for PAL, and line 10 for NTSC. If video referencing is not used, the routing switcher generates a random switching pulse every 40 ms.

**To connect the video referencing signal:**

1. Connect a 75 Ω coaxial cable between the video reference signal output and one of the **VID REF** connectors (75 Ω BNC) on the rear panel of the routing switcher.
2. Do one of the following:
   - Connect the remaining **VID REF** connector on the rear panel of the routing switcher to a **VID REF** connector on the rear panel of another routing switcher using a 75 Ω coaxial cable.
   - Connect the remaining **VID REF** connector on the rear panel of the routing switcher to a 75 Ω BNC termination.
3. Continue looping the **VID REF** connectors across the routing switchers that you want to have switching simultaneously.

For information on setting up how the video reference is used with the routing switchers, see *"**Setting Up Video Referencing**" on page 4–10*.

**Note:**

- The last routing switcher in the video referencing loop must have a 75 Ω BNC termination connected to its spare VID REF connector.

## Installing the Phoenix Control Service

Follow the directions provided with the Phoenix Control Surface Installation CD.

Ensure that Phoenix has all the latest module updates before proceeding. For information on updating Phoenix, see the online help.

## Connecting to the NK-IPS in the Routing Switcher System

Before you can set up and send a configuration document to the routing switcher, you must connect an NK-IPS to the routing switcher. Once the Phoenix Control Surface locates the NK-IPS, the attached devices are visible and can have configuration documents sent to them.

Most systems automatically detect an NK-IPS if its IP address uses the same subnet as the PC running the Phoenix Control Surface. However, if the device is not detected automatically, follow the steps below. For information on the NK-IPS, see the documentation provided with the equipment.

**To connect to the NK-IPS:**

1. Launch the Phoenix Control Surface.
2. Right-click in the **IPS Explorer** pane, then select **Add IPS**.
3. Enter the IP address of the NK-IPS in the **IP Address** field.

   If you do not know the IP address of the NK-IPS, it may be necessary to use the Ross Video Device Finder utility. This is available on the T-Bus Utilities CD provided with the NK-IPS, or from the Ross Video website (www.rossvideo.com).
4. Click **OK**.

   The IPS node appears in the **IPS Explorer** pane.
5. Expand the node to see all the connected NK Series devices.

## Checking the Firmware Version of a Device

The routing switcher must operate with other devices that have v2.00 firmware or later. Firmware may be updated easily using the Phoenix Control Surface. To check for the latest firmware versions, you need an internet connection to the Ross Video website (www.rossvideo.com).

### Using the Phoenix Control Surface to Check the Firmware Version

**To check the firmware version of any device using Phoenix:**

1. Launch the Phoenix Control Surface and connect to the NK-IPS (see *"**Connecting to the NK-IPS in the Routing Switcher System**" on page 3–9*).
2. In the **IPS Explorer** pane, click on the device for which you want to check the firmware version.
3. Click  to open the **Properties** pane.

   The firmware version is shown in the **Version** field in the **Properties** pane.

### Using a Web Browser to Check the Firmware Version

**To check the firmware version of any device using a web browser:**

1. Launch a web browser on your PC.
2. Enter the IP address of the NK-IPS in the routing switcher system into the address line of the browser, then press **Enter**.

   The web page for the NK-IPS is shown.
3. Click **Query Online Devices**.

   All NK Series devices that are attached to the NK-IPS are shown, including the firmware version.

## Upgrading the Firmware Version of a Device

For information on upgrading the firmware version of a device, see the readme file that comes with the firmware.

# Setting Up a Routing Switcher

## General

A routing switcher can be set up using the Phoenix Control Surface, or a web browser. You must have an NK-IPS connected into the system.

**Note:**

- Setting up a routing switcher via a web browser is not covered by this manual.
- Before setting up any parameters for the routing switcher, ensure that all NK Series devices in the routing switcher system have firmware v2.00 or later. For information on checking and upgrading firmware see *"**Checking the Firmware Version of a Device**"* on page 3–9 and *"**Upgrading the Firmware Version of a Device**"* on page 3–10.

The parameters for a routing switcher may be saved to a configuration document (see *"**Saving the Current Document for the Routing Switcher**"* on page 4–11).

### Opening the Routing Switcher Editor

**To open the routing switcher editor:**

1. Click  to open the **IPS Explorer** pane.
2. Double-click on the  icon corresponding to the NK-3G320 that you want to set up.

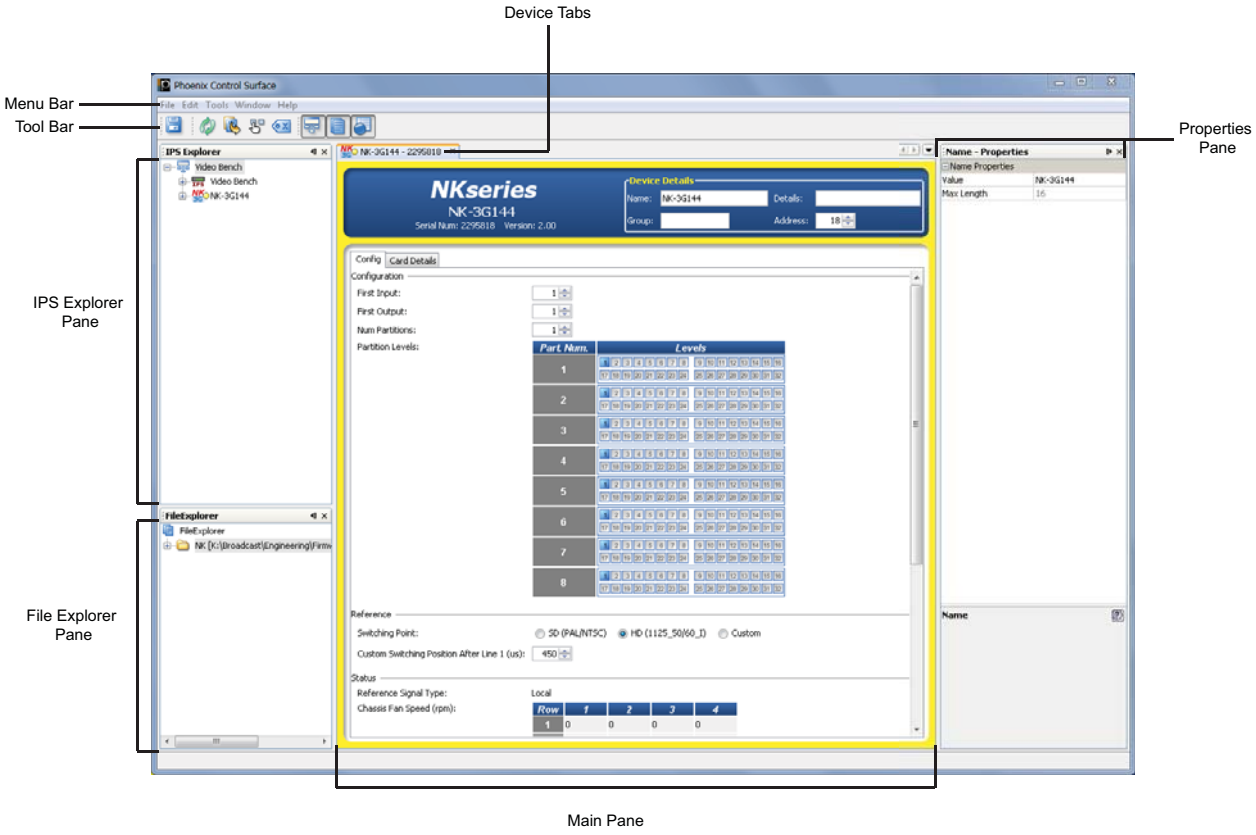


***Figure 4.1*** *The NK-3G320 Editor in the Phoenix Control Surface*

## Implementing Your System Plan

An effective routing switcher system takes careful planning. You may use multiple router levels across several input and output devices (see **Figure 2.6**).

The following process for setting up the routing switcher is recommended (see **Figure 4.2**).

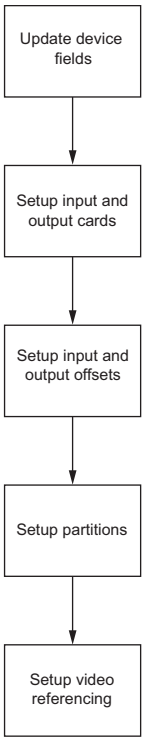


***Figure 4.2*** *Process for Setting Up the NK-3G320*

**Note:**

- Planning a routing switcher system of source and destination devices is not covered by this manual.

## Viewing and Changing Device Details

When a device attached to the NK-IPS is interrogated, a tab for the device appears in the main pane of the Phoenix Control Surface (see **Figure 4.1**). Information is read from the device and shown on the tab.

**To view the details for the routing switcher:**

Open the routing switcher editor (see "***Opening the Routing Switcher Editor***" on page 4–1).

The read-only parameters for the routing switcher are shown in the top section of the device's tab.

***Table 4.1 Device Details that are Read from the Routing Switcher***

| Item | Description |
|---|---|
| Serial Num | The serial number of the device. This parameter is read-only, unique to the device and set in the factory.<br>If you are working on a file that is stored under **File Explorer**, the serial number of the device is replaced by SAVED-FILE. |
| Version | The version status of the firmware detected in the device. This parameter is read-only.<br>If the firmware version for any connected NK Series device is earlier than v2.00, you must upgrade the firmware in that device (see "***Upgrading the Firmware Version of a Device***" on page 3–10). |
| Name | The name for the device. The default name for any routing switcher is its product number, for example, NK-3G320. This parameter may be changed to any name that uniquely identifies the device, for example, NK-3G320_1. The name may be up to 16 characters in length. The name is also displayed in IPS Explorer. |
| Group | The group to which the device belongs. This parameter is used to identify items of equipment that may be in the same location or used for a similar purpose, for example, equipment in the same rack, or a logical grouping of modules that may be operated as a group. The group identifier may be up to 10 digits in length. |
| Details | The meaningful details of the device. This parameter is used to specifically identify this device from other devices, for example, OBV Rack 1. The details may be up to 16 characters in length. |
| Address | The address is used by each device in the routing switcher system to identify itself to other devices during communication. The default address for a routing switcher is the last two digits of the serial number, plus 100. Devices should have a unique address.<br>Linked panels use the same address. |

**To change the details for a routing switcher:**

1. In the **Device Details** frame, click in the field that you want to change.
2. Enter the information as required (see **Table 4.1**), then press **Enter**.
3. Send the current document to the device (see "***Sending a Document to a Device***" on page 4–12).

**Note:**

- You should save the current document regularly (see "***Saving the Current Document for the Routing Switcher***" on page 4–11).

## Default Configuration

Every NK Series device leaves the factory with a default configuration. This default configuration is viewed by opening the editor for the device in the Phoenix Control Surface. If you have made changes to the configuration, but want to return to the default configuration, you can send the default document to the device (see "***Sending a Document to a Device***" on page 4–12).

### Router Levels

Each routing switcher is assigned a level, or number of levels if it has been partitioned. These level assignments may be changed through the routing switcher's editor in the Phoenix Control Surface.

***Table 4.2 Default Router Levels***

| Signal Format | Router Level |
|---|---|
| Multi-definition digital video (including 3G, HD, SD) | 1 |
| SD SDI video | 2 |
| AES/EBU digital audio 1 | 3 |
| AES/EBU digital audio 2 | 4 |
| Analog video | 5 |
| Analog audio (left) | 6 |
| Analog audio (right) | 7 |
| Machine control | 8 |

### Input Cards

Each signal on an input card may have line equalization independently enabled or disabled. By default, line equalization is enabled across all connectors on an input card.

### Output Cards

Each signal on an output card may have reclocking independently enabled or disabled. The output card can be set to automatically detect each signal, or it may be set for HD signals or SD signals to minimize detection time.

By default, reclocking and automatic signal detection are enabled across all connectors on an output card.

### Input and Output Offsets

Input and output offsets may be assigned to meet the requirements of your routing switcher system. By default, the first input and first output for a routing switcher are each set to 1.

### Partitions

Routing switchers may have up to eight partitions. By default, a routing switcher has one partition.

## Setting Up Input Cards

The input card allows you to enable or disable cable equalization, depending on the cable length and signal data rate for signals that comply with SMPTE 259M, 292M, 344M, 424M and DVB-ASI. When enabled, the cable equalizing inputs of the NK-3G320 adjust to the data rate and cable length to minimize jitter.

**To set up an input card:**

1. Open the routing switcher editor (see "***Opening the Routing Switcher Editor***" on page 4–1).
2. Select the **Inputs** tab.
3. On the simulated NK-3G320, click on the input card that you want to set up.

   The current details for that card are shown in the **Properties** pane.

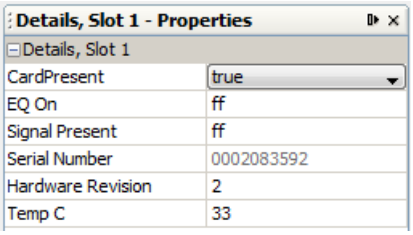


***Figure 4.3*** *Input Card Details*

In the main pane, if a signal is present on any of the connectors associated with this input card, the numbered **Signal Present** square corresponding to this connector is colored blue. If a signal is not present, the numbered square is gray.

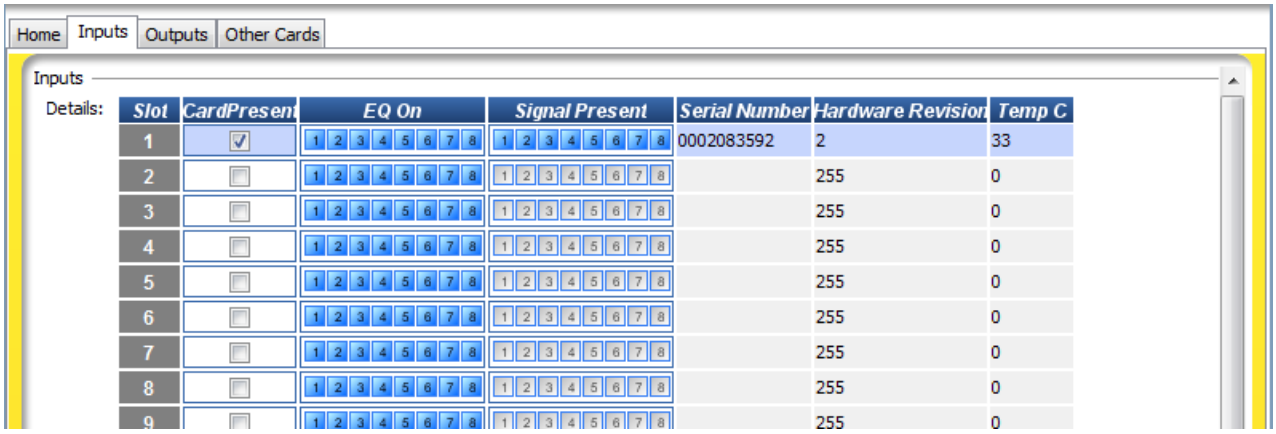


***Figure 4.4*** *Input Card Information*

4. Click on the numbered **EQ On** square to enable cable equalization for the corresponding connector.

   The square is colored blue when equalization is enabled.

5. Set up any other input cards, as required.

6. Send the current document to the device (see "***Sending a Document to a Device***" on page 4–12).

**Note:**

- If you click and drag across the squares, you can rapidly enable or disable cable equalization.
- You should save the current document regularly (see "***Saving the Current Document for the Routing Switcher***" on page 4–11).

## Setting Up Output Cards

The output card allows you to specify the type of signal, and whether or not reclocking is applied to the output.

**To set up an output card:**

1. Open the routing switcher editor (see "***Opening the Routing Switcher Editor***" on page 4–1).

2. Select the **Outputs** tab.

3. On the simulated NK-3G320, click on the output card that you want to set up.

   The current details for that card are shown in the **Properties** pane.

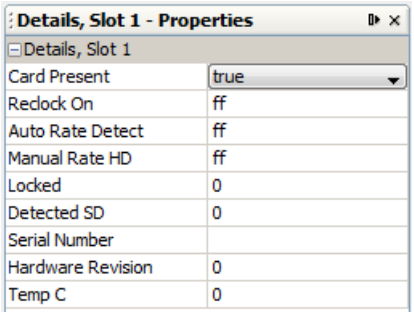


***Figure 4.5*** *Output Card Details*

In the main pane, if a signal is present and locked on any of the connectors associated with this output card, the numbered **Locked** square corresponding to this connector is colored blue. If a signal is not present, the numbered square is gray.

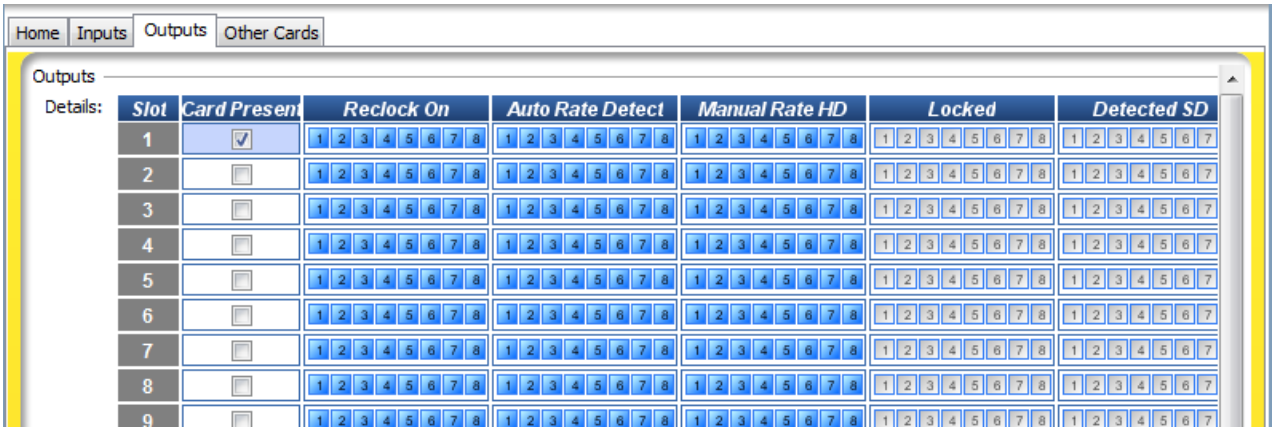


***Figure 4.6*** *Output Card Information*

4. If the signal that is passed to the output card has accumulated jitter that must be removed, click in the numbered **Reclock On** square for the corresponding output.

   The square is colored blue when reclocking is enabled.

   In some situations, you may want to disable reclocking to reduce cumulative effects of serial reclocking along a signal path.

5. Use the information in **Table 4.3** to set up the output card for the data rate of the signal.

***Table 4.3***

| | Automatic Detection of the Data Rate | HD Data Rate | SD Data Rate |
|---|---|---|---|
| **Auto Rate Detect** | Selected | Not selected | Not selected |
| **Manual Rate HD** | Not selected | Selected | Not selected |

   A square is colored blue when it is selected and gray when it is not selected.

6. Set up any other output cards, as required.

7. Send the current document to the device (see "***Sending a Document to a Device***" on page 4–12).

**Note:**

- If you click and drag across the squares, you can rapidly enable or disable reclocking.
- You should save the current document regularly (see "***Saving the Current Document for the Routing Switcher***" on page 4–11).

## Setting Up Input and Output Offsets

If you are using several routing switchers across the same router level, you can offset the input and output ranges of each routing switcher so that each can be addressed as required. You do this by assigning the first input and first output for the routing switcher via the Phoenix Control Surface.

You can offset routing switchers:

- with independent inputs and outputs (see **Figure 4.7**)
- with overlapping inputs and outputs (see **Figure 4.8**)
- with common inputs and parallel outputs (see **Figure 4.9**)

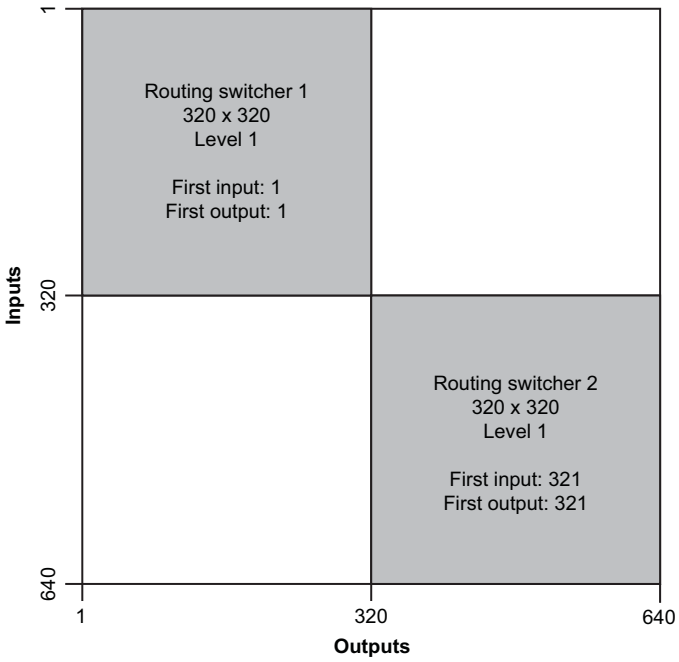


***Figure 4.7*** *Offsetting Two Routing Switchers for Independent Inputs and Outputs*

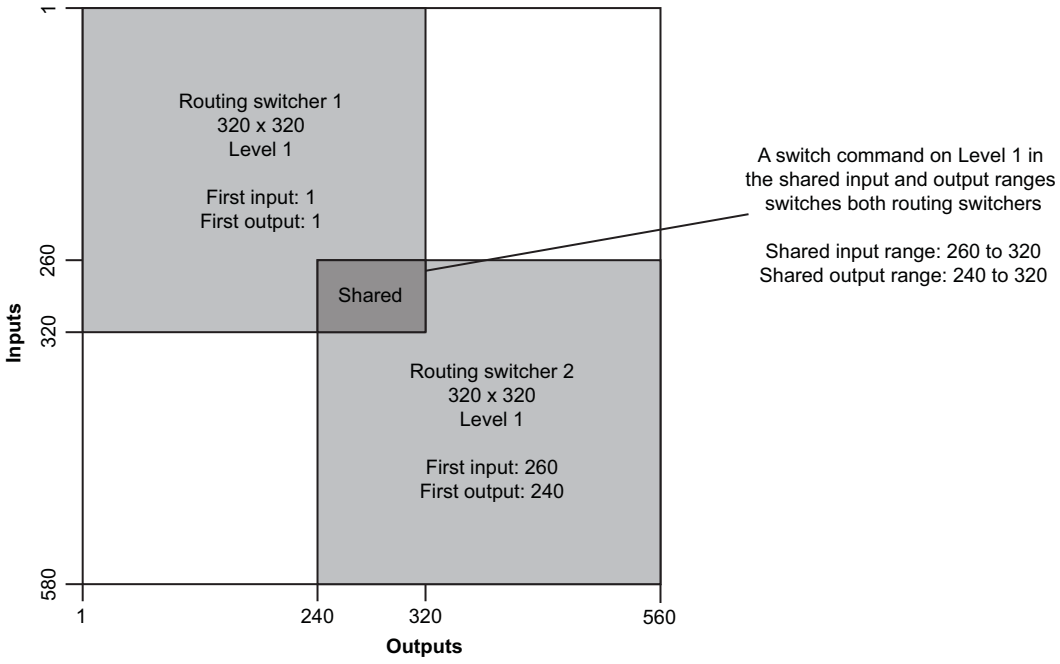


***Figure 4.8*** *Offsetting Two Routing Switchers for Overlapping Inputs and Outputs*

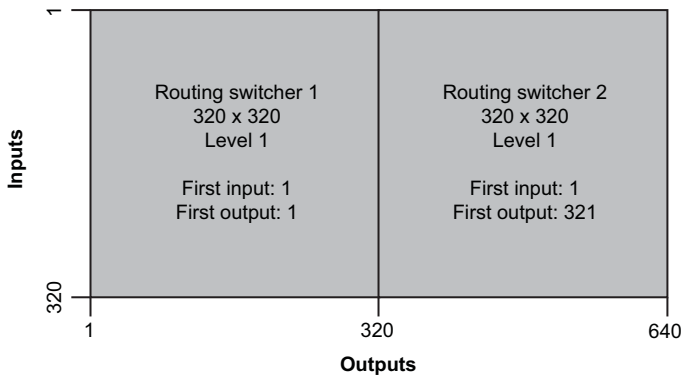


***Figure 4.9*** *Offsetting Two Routing Switchers for Common Inputs and Parallel Outputs*

**To setup offsets:**

1. Open the routing switcher editor (see "***Opening the Routing Switcher Editor***" on page 4–1).
2. Select the **Config** tab.
3. Enter the number that you want to define as the first input for the routing switcher into the **First Input** field.
4. Enter the number that you want to define as the first output for the routing switcher into the **First Output** field.
5. Send the current document to the device (see "***Sending a Document to a Device***" on page 4–12).

**Note:**

- You should save the current document regularly (see "***Saving the Current Document for the Routing Switcher***" on page 4–11).

## Setting Up Partitions

The routing switcher can be partitioned to group certain inputs and outputs together. These may be for functional groups of users, or to prevent certain input and outputs being switched (each partition only switches from inputs to outputs contained within the partition). A routing switcher may also be partitioned so that different router levels can be applied to each partition. Source and destination devices should be connected to the physical connectors on the routing switcher according to the relevant level of the partition.

A routing switcher can have up to eight partitions. The number of inputs/outputs per partition is calculated by dividing the matrix size of the routing switcher by the number of partitions. If this does not divide exactly, any remaining inputs and outputs cannot be used.

***Table 4.4 Partition Sizes for a 320 x 320 Routing Switcher***

| Number of Partitions | Input/Output Size | Leftover Inputs/Outputs (cannot be used) |
|---|---|---|
| 1 | 320 x 320 | 0 |
| 2 | 160 x 160 | 0 |
| 3 | 106 x 106 | 2 |
| 4 | 80 x 80 | 0 |
| 5 | 64 x 64 | 0 |
| 6 | 53 x 53 | 2 |
| 7 | 45 x 45 | 5 |
| 8 | 40 x 40 | 0 |

For example, a 320 × 320 routing switcher may be partitioned as shown in **Figure 4.10**, **Figure 4.11**, or **Figure 4.12**.

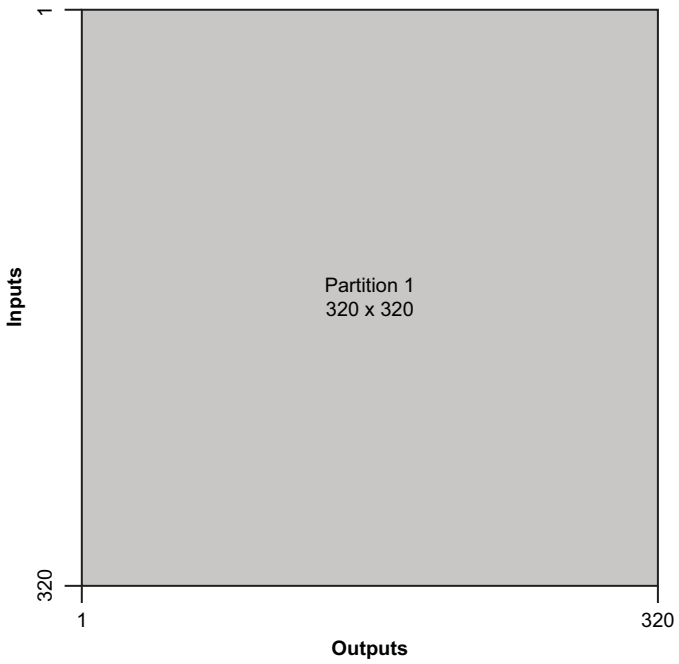


***Figure 4.10*** *Example of a 320 x 320 Routing Switcher with One Partition*

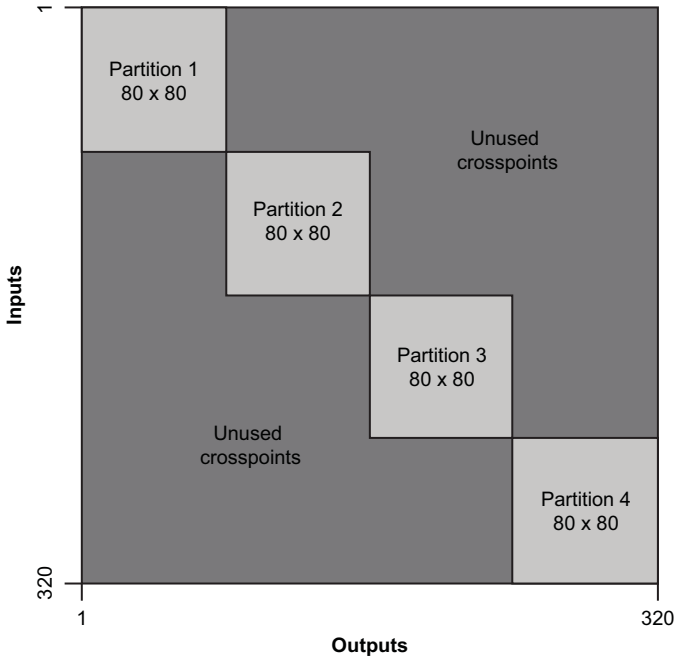


***Figure 4.11*** *Example of a 320 x 320 Routing Switcher with Four Partitions*

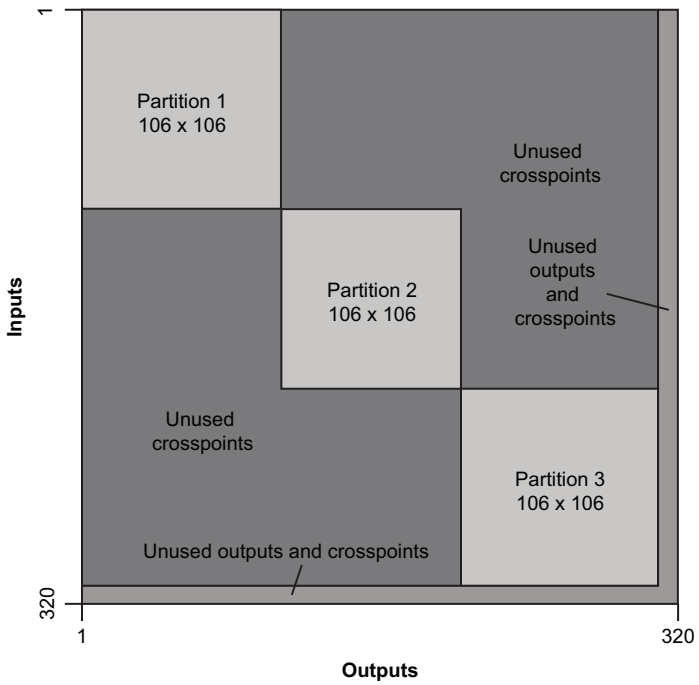


***Figure 4.12*** *Example of a 320 x 320 Routing Switcher with Three Partitions*

**To setup partitions:**

1. Open the routing switcher editor (see "***Opening the Routing Switcher Editor***" on page 4–1).
2. Select the **Config** tab.
3. Enter the number of partitions that you want to use in the **Num Partitions** field.
4. For each partition number, click on the router level that you want to use.

   A selected router level is indicated by a blue square.
5. Send the current document to the device (see "***Sending a Document to a Device***" on page 4–12).

**Note:**

- If you click and drag across the level mask, you can rapidly select or de-select router levels.
- If you want all partitions to switch on the same router level, highlight the same square across all partitions.
- You should save the current document regularly (see "***Saving the Current Document for the Routing Switcher***" on page 4–11).

## Setting Up Video Referencing

If you have installed your routing switchers for video referencing (see "***Connecting a Video Reference to NK Series Routing Switchers***" on page 3–8), you need to set up the switching point to a pre-defined line for a particular format, or you can set up a custom switching line to match the timing requirements of your system.

**To setup video referencing:**

1. Open the routing switcher editor (see "***Opening the Routing Switcher Editor***" on page 4–1).
2. Select the **Config** tab.

3. Use the information in **Table 4.5** to select the point on which you want the signal switching to occur:

***Table 4.5 Switching Points***

| Switching Point | Description |
|---|---|
| SD (PAL/NTSC) | Used for all SD signals.<br>The routing switcher automatically detects either of the following signals:<br>• 625 lines interlaced at 25 frames per second with PAL composite color encoding (625/50i), or<br>• 525 lines interlaced at 30 frames per second with NTSC composite color encoding (525/60i)<br>The routing switcher switches within the vertical interval as defined in SMPTE RP 168. |
| HD (1 125_50/60_I) | Used for all HD signals (1 125/50i or 1125/60i). The switching line for HD is line 7. |
| Custom | Used for any signal where the switching point lies outside the range of pre-defined SD and HD switching points. A variety of switching points across the routing switchers may be required to deal with the range of digital video formats that are available. |

4. If you have selected a switching point of **Custom**, use the information in **Table 4.6** to set the custom switching point.

***Table 4.6 Custom Switching Point***

| Custom Switching Point | Description |
|---|---|
| Custom Switching Line | The custom switching line sets the line number on which switching occurs. |
| Custom Switching Position | The custom switching position is the time in µs from the start of the custom switching line to the actual switching event. |

5. Send the current document to the device (see "***Sending a Document to a Device***" on page 4–12).

**Note:**

- You should save the current document regularly (see "***Saving the Current Document for the Routing Switcher***" on page 4–11).

## Saving the Current Document for the Routing Switcher

The parameters that you have set up on the device tab for a routing switcher are stored in a configuration document. When you have finished making changes to the configuration of the routing switcher, you should save the document, then add the location of this document to the **File Explorer** pane so that you can open it later.

**To save a new document:**

1. Select the device tab containing the document that you want to save.
2. Click  to save the current document.
3. The default location is Desktop\My Documents.
4. Navigate to the folder in which you want to save the configuration document.
5. Click **Save**.

**To add the document location to the File Explorer pane:**

1. Right-click on FileExplorer in the **File Explorer** pane, then select **Add Directory...**.
2. Navigate to the folder in which you saved the configuration document.
3. Click **Add**.

   The folder and any saved documents may now be accessed via the **File Explorer** pane.

**To save an existing document:**

1. Select the device tab containing the configuration document that you want to save.
2. In the **File Explorer** pane, select the document to which you want to save the current document.
3. Click to save the current document.

**To open a saved document:**

1. In the **File Explorer** pane, navigate to the saved configuration document that you want to open.
2. Double-click on the icon for the document.

## Sending a Document to a Device

When you have made changes to the configuration of a device, the changes are not activated in the device until the document containing the changes is sent to the device. You can open a saved configuration document, make changes to it, save it, then send it to a device.

**To send the current document to a device:**

1. Select the device tab containing the configuration document that you want to send to a device.
2. In the **IPS Explorer** pane, select the corresponding device.
3. Click .

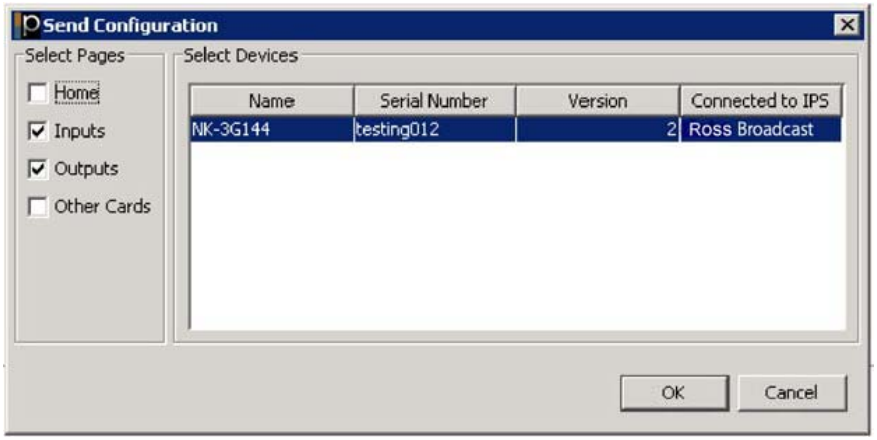


***Figure 4.13*** *Send Configuration Window*

4. Select the device to which you want to send the current document from the **Select Devices** list.
5. Click **OK**.
6. In the **IPS Explorer** pane, right-click on the device, then select **Reload This Device**.

# Operating a Routing Switcher

## General

A routing switcher responds to switch commands from NK Series control devices. These commands contain source, destination, and level designations. Routing switchers respond to the control device with its new crosspoint switch status.

NK Series control devices include remote control panels, the virtual control panel (NK-VCP), Phoenix NK Switchboard, NK-GPI, NK-SCP/A and NK-SCP/K2. For more information see the documentation provided with the control device.

## LED Indicators

LED indicators may be used to check the current operating status of a routing switcher. The primary heartbeat LED indicator is situated on the front panel of a router, in the name badge. The NK-3G320 has additional LEDs on the power supplies, and all of the cards. Details of the status of each LED are provided below.

### Heartbeat LED

The front panel of the NK-3G320 has a heartbeat LED. Following power-up, this LED flickers while the NK-3G320 is initializing.

During normal operation, the LEDs indicate the flow of requests and responses between the remote control panel and the routing switcher.

***Table 5.1 Indicators for the Heartbeat LED***

| Color | Status | Function |
|---|---|---|
| Green | Flicker | The routing switcher has performed a valid switch or protect request. |
| White | Pulse every 5 s | The CPU is running. |
| Blue | Flicker | The routing switcher has received a message. |
| Red | Flicker | The routing switcher has not performed the switch or protect requested because it has been blocked by a protect, or there is some other error. |
| | Pulse every 2.5 s | An alarm condition is current. |
| Green, white, blue or red | Solid | The CPU is not operating correctly. |

### Input Card LEDs

*Table 5.2 Indicators for the Input Card LEDs*

| LED | Status | Function |
|---|---|---|
| PWR | Green, solid | 3.3 V is present on the input card. |
| FUSE | Red, solid | An overcurrent condition on the 15 V supply is present. |
| TEMP | Red, solid | The temperature of the input card is above 65°C. |

### Output Card LEDs

*Table 5.3 Indicators for the Output Card LEDs*

| LED | Status | Function |
|---|---|---|
| PWR | Green, solid | 3.3 V is present on the output card. |
| FUSE | Red, solid | An overcurrent condition on the 15 V supply is present. |
| TEMP | Red, solid | The temperature of the output card is above 65°C. |

### Control Card LEDs

*Table 5.4 Indicators for the Control Card LEDs*

| LED | Status | Function |
|---|---|---|
| REF | Green, solid | An external reference signal has been detected. |
| LOCK | Green, solid | The external reference signal is a valid PAL/NTSC signal, and the clock generator has locked to the signal. |
| PWR | Green, solid | The on-board switchmode power supply is providing 5 V. |
| FUSE | Red, solid | An overcurrent condition on the 15 V DC supply to the control card is present. |
| STAT | Green, flicker | Active card mirrors front panel heartbeat LED. Backup CPU card flickers green when communicating with active CPU. |

### Matrix Card LEDs

*Table 5.5 Indicators for the Matrix Card LEDs*

| LED | Status | Function |
|---|---|---|
| TEMP | Red, solid | The temperature of the matrix card is above 65°C. |
| FUSE | Red, solid | An overcurrent condition on the 15 V supply is present. |
| REG | Red, solid | At least one of the power regulators on the matrix card is no longer providing fixed and regulated DC voltages from the PSUs to the matrix card. |
| FAN | Red, solid | The speed of a fan is not adequate for the maximum recorded temperature of the cards. |
| PWR | Red, solid | The supply is ±5% outside of its nominal value. |
| ACT | Green, solid | Indicates currently active matrix. |

### PSU LED

*Table 5.6 Indicators for the PSU LED*

| Status | Function |
|---|---|
| Green, solid | The PSU is producing 15 V output and there are no fault conditions current for the PSU. |
| Red, solid | 14.6 V is present on the motherboard (from the other PSU), but there is no output from this PSU, or a fault condition exists for the PSU.<br>Fault conditions for a PSU include:<br>• over temperature<br>• fan is not operating<br>• output voltage is off<br>• current drawn from PSU is > 40 A |

**Note:**

- If a fault condition occurs on the PSU, the mains supply to the PSU needs to be switched off then on again to re-establish the 15 V output from the PSU.

## Monitoring the NK-3G320 via the Phoenix Control Surface

The status of the NK-3G320 may be monitored via the Phoenix Control Surface. You can monitor the overall status on the **Config** tab, or monitor the status of the cards on the **Card Details** tab.

**To monitor the overall status of the NK-3G320 via Phoenix:**

1. Open the routing switcher editor (see "***Opening the Routing Switcher Editor***" on page 4–1).
2. Select the **Config** tab.

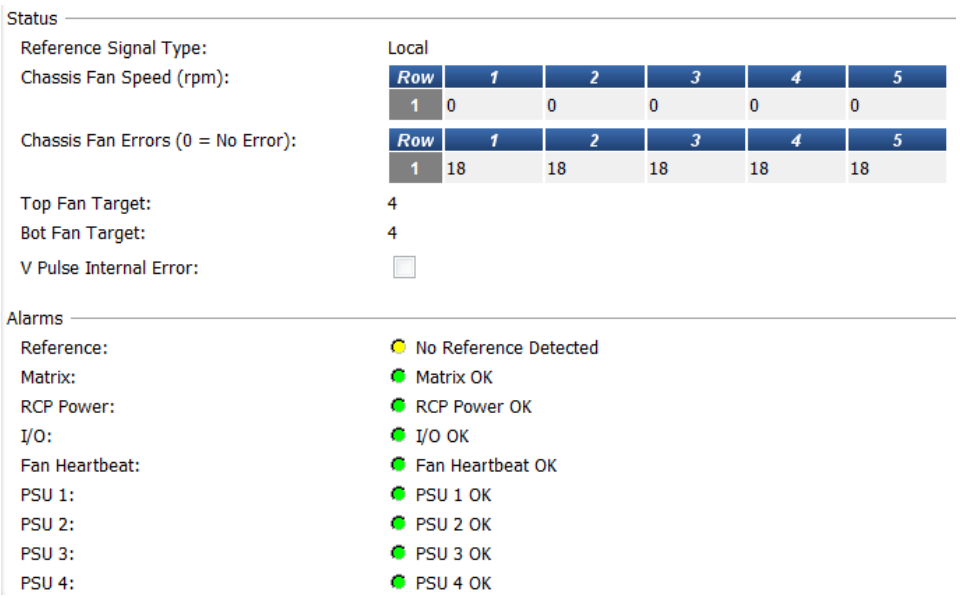


*Figure 5.1 Status and Alarms window*

The following status is shown:

***Table 5.7 Status Description***

| Item | Description |
|---|---|
| Reference Signal Type | Local: the routing switcher is generating a random switching pulse every 40 ms.<br>Reference Present (PAL/NTSC and tr-level HD): the routing switcher has detected an external video reference signal. |
| Chassis Fan Speed | The table represents the fans as they are viewed with the door of the routing switcher open. |
| Chassis Fan Errors | The number shown for each fan is the total of the following conditions:<br>0: no errors<br>1: startup speed warning<br>2: startup speed failure<br>4: running speed warning<br>8: running speed failure<br>16: stopped (failure) |

The following alarms are shown:

***Table 5.8 Alarm Descriptions***

| Item | Color | Description |
|---|---|---|
| Reference | Green | Reference Present: a video reference signal is detected. The type of signal detected is shown in the Status frame, Reference Signal Type (PAL or NTSC). |
| | Yellow | No Reference Detected: a video reference signal is not present, so the routing switcher generates a random switching pulse every 40 ms. Reference Signal Type is Local. |
| Matrix | Green | Matrix OK: the power to and from the matrix is within acceptable limits. The fuse is intact. |
| | Red | Matrix Error: Fuse open, on-card voltage error, or temperature > 80°C. |
| RCP Power | Green | RCP Power OK: the phantom power supply provided via the **T-BUS** connector to NK Series devices is OK. |
| | Red | RCP Power Error: an overcurrent condition in the supply to the **T-BUS** connector has been detected. |
| I/O | Green | I/O OK: all indicators on the input and output boards are OK. |
| | Red | I/O Error: at least one LED indicator on one of the input or output boards has a fault condition. |
| Fan Heartbeat | Green | Fan Heartbeat OK: the speed of the fans is appropriate for the detected temperature of the cards. The fuse is intact. |
| | Red | Fan Heartbeat Error: at least one fan has a fault condition, or the fuse has blown. |
| PSU 1 | Green | PSU 1 OK: PSU 1 is operating correctly. |
| | Red | PSU 1 Error: PSU 1 has a fan fault, an internal fault, or the PSU has been removed. |

*Table 5.8 Alarm Descriptions*

| Item | Color | Description |
|---|---|---|
| PSU 2 | Green | PSU 2 OK: PSU 2 is operating correctly. |
| | Red | PSU 2 Error: PSU 2 has a fan fault, an internal fault, or the PSU has been removed. |
| PSU 3 | Green | PSU 3 OK: PSU 3 is operating correctly. |
| | Red | PSU 3 Error: PSU 3 has a fan fault, an internal fault, or the PSU has been removed. |
| PSU 4 | Green | PSU 4 OK: PSU 4 is operating correctly. |
| | Red | PSU 4 Error: PSU 4 has a fan fault, an internal fault, or the PSU has been removed. |

**To monitor the status of the cards via Phoenix:**

1. Open the routing switcher editor (see "***Opening the Routing Switcher Editor***" on page 4–1).
2. Select the **Card Details** tab.

   The input and output cards show which signals are present.
3. On the simulated NK-3G320, click on the card for which you want to view the details.

**Note:**

- If a fuse has opened on a card, or the regulators have failed, the card will not be displayed on the **Card Details** tab.

## Replacing a Matrix or Control Card

You may need to replace a matrix or control card during scheduled maintenance. Before removing a matrix or control card, you should ensure that the card is not the primary card.

**To replace a matrix or control card:**

1. Open the routing switcher editor (see "***Opening the Routing Switcher Editor***" on page 4–1).
2. Select the **Other Cards** tab.
3. On the simulated NK-3G320, click on the matrix or control card that you want to remove.

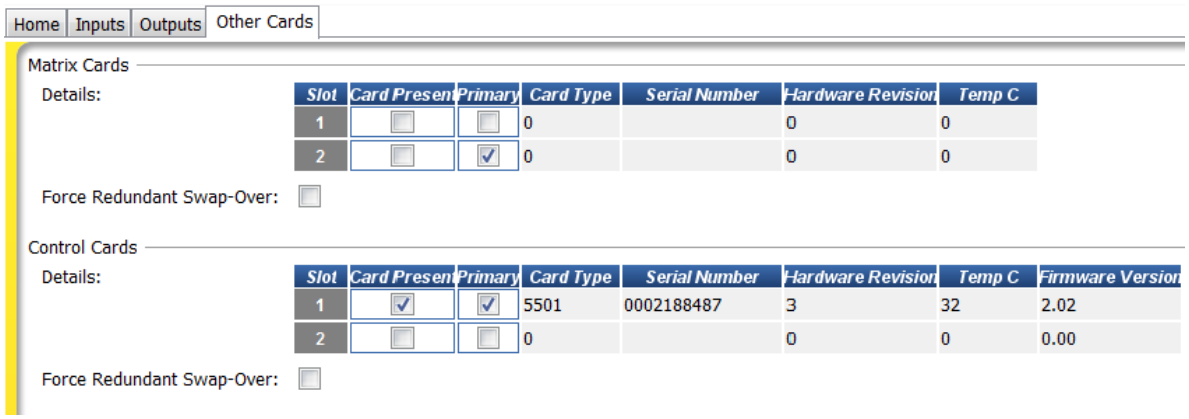


*Figure 5.2 Matrix and Control Cards*

If the matrix or control card is the primary card, the **Primary** check box is selected.

If the **Primary** check box is not selected, you may remove the card.

4. If the card that you want to replace is the primary card, select **Force Redundant Swap-Over**.

5. Send the current document to the device (see *"**Sending a Document to a Device**"* on page 4–12).
6. Remove the card.

## Disabling the Alarm for a Power Supply Card

If you need to remove a power supply card from the NK-3G320, you can disable the alarm for the power supply card.

**To disable the alarm for a power supply card that has been removed from the frame:**

1. Open the routing switcher editor (see *"**Opening the Routing Switcher Editor**"* on page 4–1).
2. Select the **Other Cards** tab.
3. On the simulated NK-3G320, click on the power supply card that you have removed or switched off.

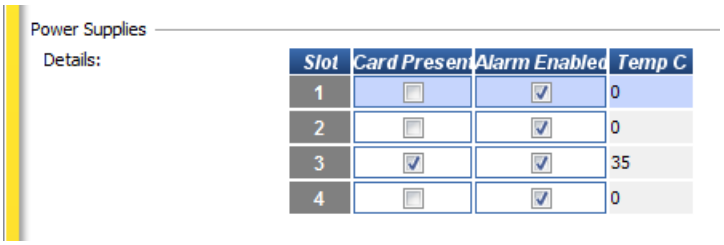


***Figure 5.3*** *Power Supplies Window*

4. Clear the **Alarm Enabled** check box.
5. Send the current document to the device (see *"**Sending a Document to a Device**"* on page 4–12).

## Resetting the NK-3G320

If you want to return to a known operating state and configuration, you can:

- restart the software and switch to backup CPU if fitted, then reset the device
- send the default configuration document to the NK-3G320 (see *"**Sending a Document to a Device**"* on page 4–12) to load the default settings

If the NK-3G320 fails to accept any documents that are sent to it, you should reset the device. When you perform a reset, the NK-3G320 takes on the last-known operating state and configuration that is stored in memory.

**To reset a device:**

In the **IPS Explorer** pane, right-click on the NK-3G320 that you want to reset, then select **Reset Device**.

# Appendix A: Connectors

## T-BUS Connector

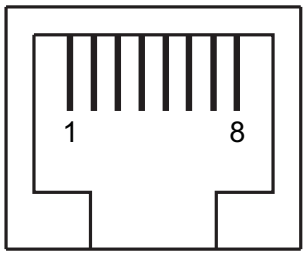


***Figure 6.1*** *External View of the T-BUS Connector (RJ45 Female)*

***Table 6.1 Pinouts for the T-BUS Connector***

| Pin | Function |
|---|---|
| 1 | Ground |
| 2 | Ground |
| 3 | Tx/Rx RS485+ |
| 4 | |
| 5 | |
| 6 | Tx/Rx RS485- |
| 7 | +14.4 V RCP |
| 8 | Phantom power |

## Alarm GPI Connector

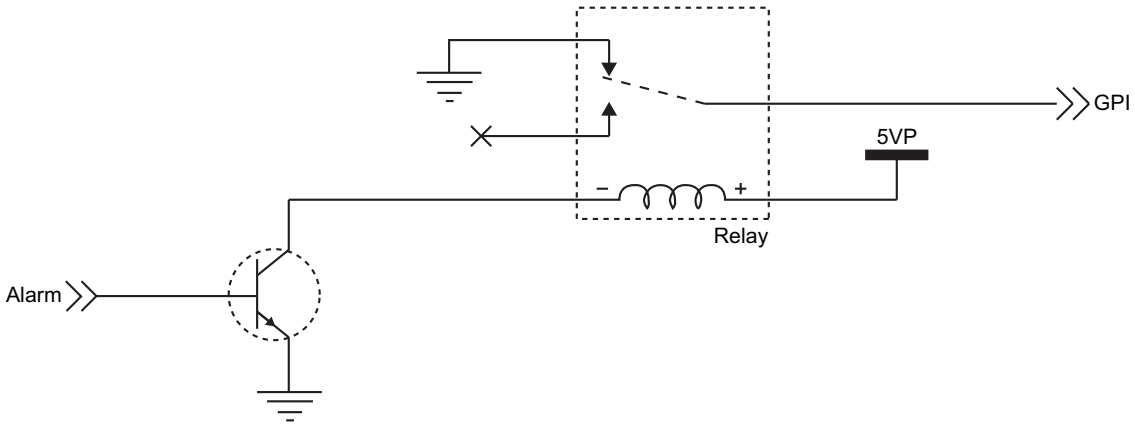


***Figure 6.2*** *Alarm GPI Connector*

# Appendix B: Specifications

*Table 7.1 NK-3G320 Specifications*

| Item | Specification |
|---|---|
| **Inputs** | |
| Connection | 75 Ω BNC |
| Total number of inputs | Up to 144 in groups of eight |
| Return loss | > 15 dB, 5 MHz to 1.5 GHz<br>> 10 dB, 1.5 GHz to 3.0 GHz |
| Level | 800 mV p–p, ± 10% |
| Cable equalization | Up to 100 m Belden 1694A or equivalent at 3.0 Gbps |
| Jitter | < 0.2 UI for SD and HD signals<br>0.3 UI for 3G signals |
| **Outputs** | |
| Connection | 75 Ω BNC |
| Total number of outputs | Up to 320 in groups of 8 |
| Return loss | > 15 dB, 5 MHz to 1.5 GHz > 10 dB, 1.5 GHz to 3.0 GHz |
| Level | 800 mV p–p, ± 10% |
| Re-clocking | Automatic at SMPTE 424M, 292M, 259M data rates<br>Individually bypassable |
| Slew rate | Automatic at SMPTE 424M, 292M, 259M data rates<br>Programmable via Phoenix or web browser |
| Jitter | < 0.2 UI for SD and HD signals<br>0.3 UI for 3G signals |
| **General** | |
| Standards | SMPTE 424M, 344M, 259M, 292M, DVB-ASI |
| Partitioning | Up to 8 partitions with independent level assignment |
| Configuration | Phoenix Control Surface via NK-IPS<br>Web browser via NK-IPS |

*Table 7.1 NK-3G320 Specifications*

| Item | Specification |
|---|---|
| Dimensions | 19 RU × 390 mm, 19" rack |
| Power consumption | < 1200 W |
| Power supply | +15 V DC, 32 A, load sharing when two PSUs present<br>Input: 100 to 240 VAC, 50 to 60 Hz, 8.2 to 4.1 A<br>Output: 14.6 V, 34 A, 500 W maximum<br>Fuse: 10 A, slow blow |
| Fan speed | Slow: 800 rpm (minimum)<br>Medium: 1300 rpm<br>Fast: 2000 rpm<br>Full: 2500 rpm<br>Fan starts at full speed for 5 s when routing switcher is powered up, then changes speed to suit the detected card temperature |
| Operating temperature | 0 to 30°C<br>(32 to 86°F) |

**Note:**

- Specifications subject to change without notice