NV8256-Plus
Digital Video Router

User's Guide

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- **Revision**: 1.4
- **Software Version**: -none-
- **Part Number**: UG0017-04

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Note Return Material Authorization (RMA) required for all returns.

Change History

The table below lists the changes to the Digital Video Router User's Guide.

- User's Guide Part # UG0017-04
- Software version: -none-

Rev	Date	ECO	Description	Approved By
1.0	09 Apr 07	12960	New document.	DEM/Eng
1.1	07 Aug 08	13430	Updated Configuration chapter to reference the UniConfig User's Guide. Updated specifications.	DEM/Eng
1.2	20 Oct 08	14426	Removed UniConfig material. Updated formatting. Minor corrections.	DEM
1.3	31 Mar 09	15703	Corrections. Format change.	DEM/D.Cox
1.4	10 Oct 09	16114	Corrected contact information.	DEM

Restriction on Hazardous Substances (RoHS)

Miranda is in compliance with EU Directive RoHS 2002/95/EC governing the restricted use of certain hazardous substances and materials in products and in our manufacturing processes.

Miranda has a substantial program in place for RoHS compliance that includes significant investment in our manufacturing process, and a migration of Miranda product electronic components and structural materials to RoHS compliance.

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Important Safeguards and Notices

This section provides important safety guidelines for operators and service personnel. Specific warnings and cautions appear throughout the manual where they apply. Please read and follow this important information, especially those instructions related to the risk of electric shock or injury to persons.

Warning

Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any service other than that contained in the operating instructions unless you are qualified to do so.

Symbols and Their Meanings

The lightning flash with arrowhead symbol within an equilateral triangle alerts the user to the presence of dangerous voltages within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle alerts the user to the presence of important operating and maintenance/service instructions.

The Ground symbol represents a protective grounding terminal. Such a terminal must be connected to earth ground prior to making any other connections to the equipment.

The fuse symbol indicates that the fuse referenced in the text must be replaced with one having the ratings indicated.

The presence of this symbol in or on Miranda equipment means that it has been designed, tested and certified as complying with applicable Underwriter's Laboratory (USA) regulations and recommendations.

The presence of this symbol in or on Miranda equipment means that it has been designed, tested and certified as essentially complying with all applicable European Union (CE) regulations and recommendations.

General Warnings

A warning indicates a possible hazard to personnel which may cause injury or death. Observe the following general warnings when using or working on this equipment:

- Heed all warnings on the unit and in the operating instructions.
- Do not use this equipment in or near water.
- This equipment is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting the equipment inputs or outputs.
- Route power cords and other cables so they are not likely to be damaged.
- Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp cloth.
- Dangerous voltages may exist at several points in this equipment. To avoid injury, do not touch exposed connections and components while power is on.
- Do not wear rings or wristwatches when troubleshooting high current circuits such as the power supplies.
- To avoid fire hazard, use only the specified fuse(s) with the correct type number, voltage and current ratings as referenced in the appropriate locations in the service instructions or on the equipment. Always refer fuse replacements to qualified service personnel.
- To avoid explosion, do not operate this equipment in an explosive atmosphere.
- Have qualified service personnel perform safety checks after any service.

General Cautions

A caution indicates a possible hazard to equipment that could result in equipment damage. Observe the following cautions when operating or working on this equipment:

- When installing this equipment, do not attach the power cord to building surfaces.
- To prevent damage to equipment when replacing fuses, locate and correct the problem that caused the fuse to blow before re-applying power.
- Use only the specified replacement parts.
- Follow static precautions at all times when handling this equipment.
- This product should only be powered as described in the manual. To prevent equipment damage, select the proper line voltage on the power supply(ies) as described in the installation documentation.
- To prevent damage to the equipment, read the instructions in the equipment manual for proper input voltage range selection.
- Some products include a backup battery. There is a risk of explosion if the battery is replaced by a battery of an incorrect type. Dispose of batteries according to instructions.
- Products that have (1) no on/off switch and (2) use an external power supply must be installed in proximity to a main power output that is easily accessible.

Table of Contents

Table of Contents

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1. Preface

Chapter 1 provides an overview of the NV8256-Plus User's Guide. The following topics are discussed:

- Chapter Structure
- The PDF Document
- Terms, Conventions and Abbreviations

Chapter Structure

The following chapters provide detailed instructions for all aspects of NV8256-Plus operation:

- Chapter 1, Preface, (this chapter) outlines easy ways to use this guide; provides a list of terms and conventions.
- Chapter 2, Introduction, provides an introduction and general description of the router.
- Chapter 3, Installation, provides installation and connection instructions.
- Chapter 5, Configuration, points to UniConfig.
- Chapter 4, Operation, provides general operation information.
- Chapter 6, Maintenance, provides maintenance information.
- Chapter 8, Technical Details, provides electrical, video, audio, mechanical, and environmental specifications, product drawings, and default settings.
- Chapter 7, Glossary, is a glossary.
- Appendix 9, Part Numbers, presents a list of part numbers for Miranda cables, connectors and cards for the NV8256-Plus.
- An Index is also provided for your reference.

The PDF Document

This guide is provided in PDF format, allowing you to use Acrobat's "bookmarks" to navigate to any desired location. You can also print a hardcopy. Please note:

- Use the Table of Contents or the bookmarks page to jump to any desired section.
- Many hyperlinks are provided within the chapters.
- Use the Index to jump to specific topics within a chapter. Each page number in the index is a hyperlink.

- Use Acrobat's 'Go to Previous View' and 'Go to Next View' buttons to retrace your complete navigational path.
- Use the 'First Page', 'Previous Page', and 'Next Page', and 'Last Page' buttons to go to the first, previous, next, or last page within a PDF file.

Note

To display the navigation buttons, right-click the Tool Bar area, and check 'Navigation'.

- Use Acrobat's extensive search capabilities, such as the 'Find' tool and 'Search' tool to perform comprehensive searches as required.

Terms, Conventions and Abbreviations

The following conventions are used throughout this guide:

- The symbol ▲ denotes either an example or a special message.
- Notes, Cautions and Important messages are presented in note boxes.
- Entries written in bold-face or capital letters denote physical control panel buttons or GUI buttons.
  - Click **Apply** to ...
  - Press the **SRC 12** button.
- Entries in single quotes denote a field name, tab name or label.
  - The AES reference connection is labeled 'AES REF 1'.

2. Introduction

Chapter 2 provides an introduction to the NV8256-Plus Digital Video Router. It presents the following topics:

Product Summary

The NV8256-Plus manages standard-definition (SD), high-definition (HD) and 3.0 Gb/s ("3Gig") signal routing. See Signal Rates Supported on page 4. The routers can manage SD separately, or SD, HD and 3.0 Gb/s signals combined. Support for SD and HD is called Super Wide Band (SWB). Support for SD, HD, and 3.0 Gb/s is called "3Gig."

The NV8256-Plus is a robust system capable of supporting signal rate of 10 Mb/s up to 3.0 Gb/s. This enables you to invest in a single router to meet current routing needs and potential future growth as industry standards evolve.

The router features a flexible I/O design enabling the implementation of a wide range of configurations. A single NV8256-Plus can manage up to 256 inputs and 256 outputs. Using expansion ports, two routers can be connected together to manage up to 512 inputs and 512 outputs. Within one router, or between two connected routers, configurations can start at 16 inputs and 16 outputs, increasing in increments of 16, up to 256 per router. Because inputs and outputs are independent, configurations are based on 16, but do not have to be squared (i.e., 256×256, 512×512). For example, if using the NV8256-Plus as a standalone router, switching configurations of 16 inputs and 256 outputs, 32 inputs and 256 outputs, 256 inputs and 48 outputs, and so on are valid. Similarly, if two routers are connected together, non-square configurations of inputs and outputs can be created, increasing in increments of 16 up to a maximum of 512 inputs and 512 outputs.

In addition, the NV8256-Plus features conversion of video signals from analog composite to SD and SD to analog composite.

Frame Rack

The NV8256-Plus mounts in a rack with minimum dimensions of 22RU high by 19″ wide by 18″ deep. When placing the rack in your facility, be sure to leave enough space for air flow through the

front of the router and within easy access of an AC power source. For installation instructions, see Rack Mount on page 25.

Cooling

The router has a fan tray housing three fans. The fan tray is located at the top of the chassis and accessed from the front of the frame. The fans draw cooling air from the front of the router, through the door, and exhaust it through the rear of the frame. The router must have the door correctly installed and closed for proper airflow through the chassis.

Caution | If airflow is impeded, overheating may occur.

There are three removable air filters: two are located on the inside of the door assembly and one inside the router. It is recommended that you perform regular maintenance on the fan tray and filters. For more information, see Maintenance on page 57.

Signal Rates Supported

The NV8256-Plus supports SD, HD, 3Gig and analog composite video signals. Incoming analog signals are converted to digital format for internal routing. Outgoing SD signals can be converted to analog composite for distribution.

The following table lists the SMPTE standard and rates for SD, HD and 3Gig signals, and for analog-to-digital and digital-to-analog conversion. Each signal type is managed by a specific input or output card (circuit board). For a description of each card and corresponding card part number, see Input Cards (page 15) and Output Cards (page 15).

Type	SMPTE	Re-clock At	Pass Through
Standard Definition (SD)	259M 344M	143, 177, 270, 360 and 540 Mb/s	10 Mb/s to 540 Mb/s
Super Wide Band (SD and HD combined)	259M 344M 292M	143, 177, 270, 360 and 540 Mb/s; 1.483 and 1.485 Gb/s	10 Mb/s to 1.5 Gb/s
3Gig (SD, HD and 3.0 Gb/s combined)	259M 292M 424M	270, 1.483, 1.485, 2.966 and 2.970 Gb/s	10 Mb/s to 3.0 Gb/s
Analog-to-SD (analog to SD-SDI)	Input: PAL or NTSC analog composite video Converted to: SMPTE 259M-C, (4:2:2), 270 Mb/s		
SD-to-Analog (SD-SDI to analog)	Input: SMPTE 259M-C, (4:2:2), 270 Mb/s Converted to: PAL or NTSC analog composite video		

Switching Configurations

The NV8256-Plus is designed to be highly flexible, enabling the creation of a variety of configurations for managing incoming and outgoing signals. A single router can manage a maximum of 256 inputs and 256 outputs. By connecting two routers together, the number of signals managed

can be doubled to a maximum of 512 inputs and 512 outputs. Each input card and output card manage 16 signals each. This means that switching configurations can be based on 16, increasing in increments of 16, up to the maximum number of inputs and outputs allowed. Each switching configuration is created by installing crosspoint cards, input cards, and output cards in specific slots on each router.

Crosspoint Card Slots and Managed Signals

The crosspoint card manages signal switching with each card managing up to 256 inputs and outputs. The router frame has three slots for housing crosspoint cards. (See Figure 2-2 on page 8.) Depending on the slot in which it is installed, the crosspoint card performs different switching functions. Slots are listed by location when facing the front of the router, as follows:

- Left Slot — Manages all inputs and outputs for the local router (inputs 1–256).
- Center Slot — An optional crosspoint card can be installed for redundancy as a backup for another crosspoint card. The crosspoint card can take over active control from the crosspoint card installed in the left slot or right slot, but not both. For more information, see Setting Redundant Crosspoint Card Switching on page 52.
- Right Slot — Manages all signals received through the expansion connections. The crosspoint card receives signals from a second, connected router (inputs 257–512) and sends the signals to local outputs 1–256.

Because the crosspoint cards installed in a specific slot manage specific outputs, depending on your configuration, not all crosspoint cards may need to be installed. For example, if only outputs 1–256 have output cards, then a crosspoint card is only required in the *left* slot. The *right* slot can remain empty. The *middle* slot is optional.

For more information on inputs and outputs and assigned numbers, see Slots and Corresponding Signal Numbers on page 9.

Combining Input Cards and Output Cards

When connecting two routers together, different combinations of input cards and output cards can be installed to meet switching configuration needs while minimizing cost. ‘Standard’ input cards receive signals from the router’s local input connections and from a second, connected router through expansion cables. ‘Filler’ input cards receive signals only from expansion cables when two routers are connected together, but not local inputs. Because filler cards perform less signal processing, they are less expansive then standard input cards. If a switching configuration requires two routers, but local inputs to only one of the two routers, filler cards can be used in the router not receiving local inputs.

Output cards manage outgoing signals. If a router is only used for receiving incoming signals, such as in a 512 inputs and 256 outputs configuration, output cards are not needed on both routers. Output cards are only required on routers distributing outgoing signals through local coaxial connectors.

Examples of Switching Configurations

The following table lists possible switching configurations when two routers are connected together. For each configuration, the table lists in which slot crosspoint cards are installed, on

which router, what type of input card is used, and if the router requires output cards. For a description of each type of card, see Active Cards on page 15. The two connected routers are listed as Router 1 and Router 2. Although the examples list a full complement of input cards, the number of cards installed depends on the number of inputs and outputs being managed by a specific switching configuration. The optional, redundant crosspoint card (installed in the center crosspoint card slot) is not included in the following examples. Only required crosspoint cards are listed.

Inputs × Outputs	Number of Frames	Number of Crosspoint Cards	Crosspoint Card Slot	Type of Input Card	Output Cards in Router
256×256	1	1	Left	Standard	Router 1
256×512	2	2	Router 1: Left Router 2: Right	Router 1: Standard Router 2: Filler	Router 1, Router 2
512×256	2	2	Router 1: Left, Right Router 2: None	Router 1: Standard Router 2: Standard	Only on Router 1
512×512	2	4	Router 1: Left, Right Router 2: Left, Right	Router 1: Standard Router 2: Standard	Router 1, Router 2

Power Supply

The power supply for the NV8256-Plus is an external, separate frame, the NV6257. The NV6257 uses the PS6000 series power supply module. The NV8256-Plus router requires four PS6000 power supply modules. For redundancy, an additional four PS6000 modules can be installed. The NV6257 can house a total of four primary and four redundant PS6000 power supply modules. This means that one NV6257 power supply frame can power one NV8256-Plus router frame.

The PS6000 power supply module accepts a wide range of AC input voltages and produces five +48 VDC outputs. The power supply automatically senses the AC input voltage (90–130 and 180–250 VAC) and adjusts to maintain a relatively constant DC output; no voltage selection is required.

The five regulated outputs are directed to modules in the router where on-board regulators produce the DC voltages required by the local circuits. Each +48VDC output powers one of the five green LEDs and output test points located on the front of the power supply. Under normal operation, all five LEDs are lit. For more information, see Indicator LEDs on page 58.

Figure 2-1 shows the power supply architecture.

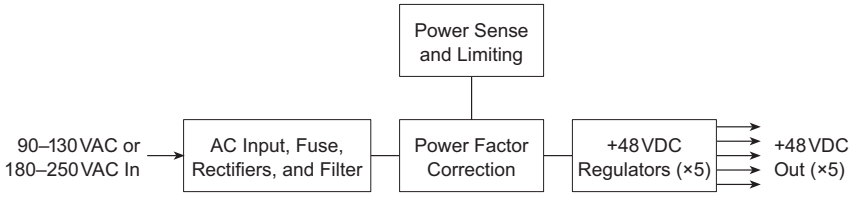


Figure 2-1. PS6000 Power Supply Module Diagram

For information on making power supply connections, see Making Power Connections on page 26.

Fuses

Fuses for AC power inputs are located on the PS6000 power supply modules. When an NV6257 is ordered, fuses appropriate for line voltage in use at the country of destination are installed on the PS6000 power supply modules. Be sure to check the fuse ratings for compliance with specific requirements in your area. A 7.5 A fuse is required for 90–130 VAC applications. For 180–250 VAC operation, a 3.75 A fuse is required. For information on replacing fuses, see Fuse Replacement on page 57.

Cooling

There are four low-speed fans located along the front edge of each PS6000 power supply module. Each fan pulls a small quantity of air across the internal heat sinks. An additional fan on the NV6257 frame also provides cooling and is serviceable.

Module Slots and Rear Connections

The NV8256-Plus has slots for input, output, monitor, control and crosspoint cards. Cards are installed in slots from the front of the router frame. The rear of the router is a solid backplate containing connections for receiving and distributing signals and connecting to system functions, such as a control system, alarms or references.

Front Slots

Figure 2-2 on page 8 shows the front of the NV8256-Plus with the door removed. From this view, in the slots that do not have an active card installed (right-hand side), the backside of the backplate and the motherboard connections are visible. The router features 16 upper bay slots for output cards and 16 lower bay slots for input cards. In the center of the router are three vertical slots for crosspoint cards. Above the crosspoint card slots is the monitor card slot. Near the bottom of the router frame are two horizontal slots for the control cards. For more information on each type of card, see Active Cards on page 15.

From this view, the fan tray at the very top of the router chassis is also visible. For more information on frame cooling, see Cooling on page 4.

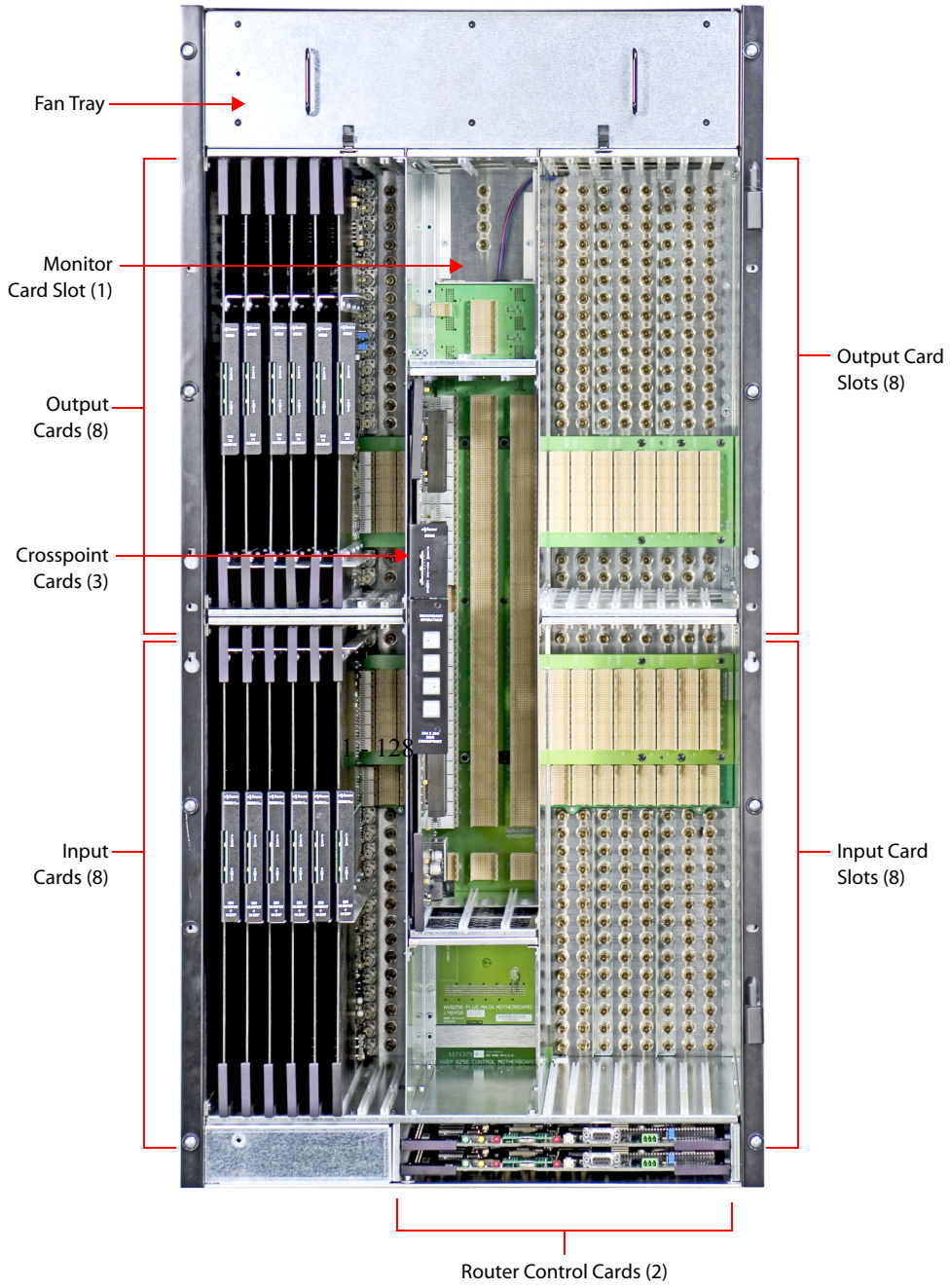


Figure 2-2. NV8256-Plus Router with Door Removed (Front View)

Slots and Corresponding Signal Numbers

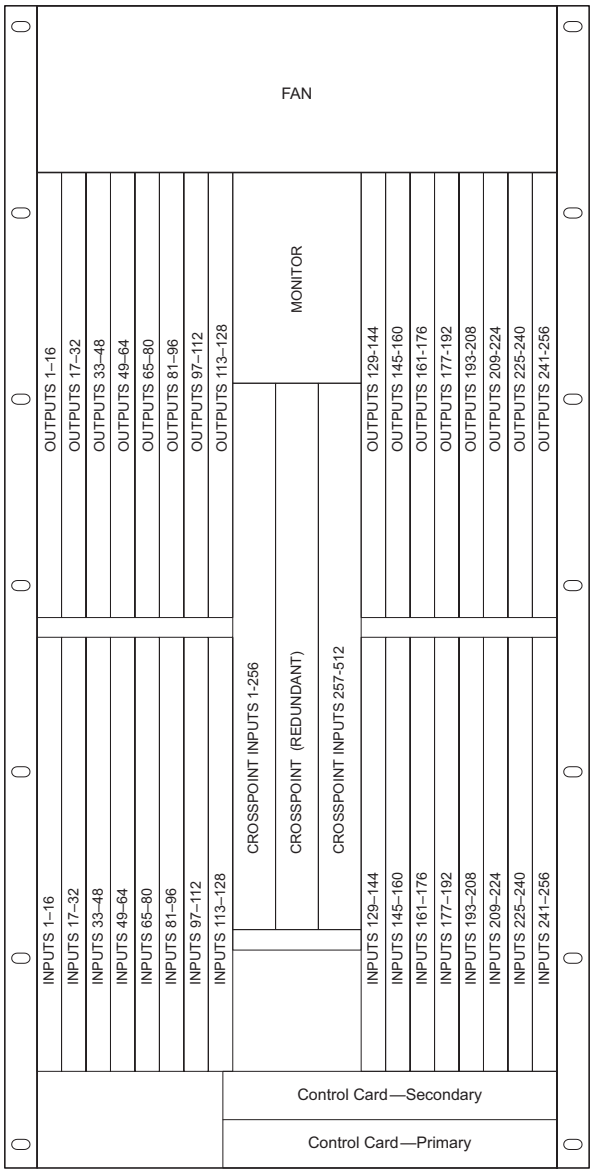


Figure 2-3. Inputs and Outputs, Numbers Assigned (Front View)

Each input card slot and output card slot, and the card it holds, receives or distributes signals through 16 BNC connectors. Each signal is assigned a number that corresponds to the physical input or output connection. The numbers correspond to the slot in which an input card or output card is installed. This means that input slot 1 corresponds to inputs 1–16, input slot 2 corresponds to inputs 17–32, and so on, up to 256, as shown in Figure 2-3.

Output slots are similarly numbered, such that output slot 1 corresponds to outputs 1–16, output slot 2 corresponds to outputs 17–32, and so on, up to 256, as shown in Figure 2-3.

Similarly, the location of an input card or output card in the router frame determines the inputs and outputs managed by that card. For example, an input card located in slot 1 manages inputs 1–16. An input card located in input slot 2 manages inputs 17–32, and so on.

If the NV8256-Plus router is used as a standalone router, up to 256 incoming signals can be received and up to 256 outgoing signals distributed. The crosspoint card installed in the *left* crosspoint card slot manages inputs 1–256. If two NV8256-Plus routers are connected together, signals coming into one router can be sent to a second, connected router. This can double the number of signals managed by the two routers to a maximum of 512 inputs and 512 outputs. The crosspoint card installed in the *right* crosspoint card slot manages inputs from the second router: 257–512.

A crosspoint card installed in the *middle* slot acts as a redundant crosspoint card for fail-over. For more information on crosspoint cards, see Crosspoint Card Slots and Managed Signals on page 5. For information on installing cards in modules slots, see Installing Active Cards on page 30.

Rear Connections

The rear of the NV8256-Plus (Figure 2-4 on page 10) features a backplate containing BNC connections: 256 for receiving signals and 256 for distributing signals. These connections are passive and pass the signals through to active, receiving connections on the input cards and output cards.

An additional set of four BNC connections, located in the upper, center area of the frame, send signals to the monitor card. In the lower region of the frame are connections for system and power functions, as shown in Figure 2-5 on page 11. In the center of the frame are connections for expansion cables used to send signals between two connected NV8256-Plus router frames. In Figure 2-4 on page 10, the expansion connections are shown with the cover plates still on.

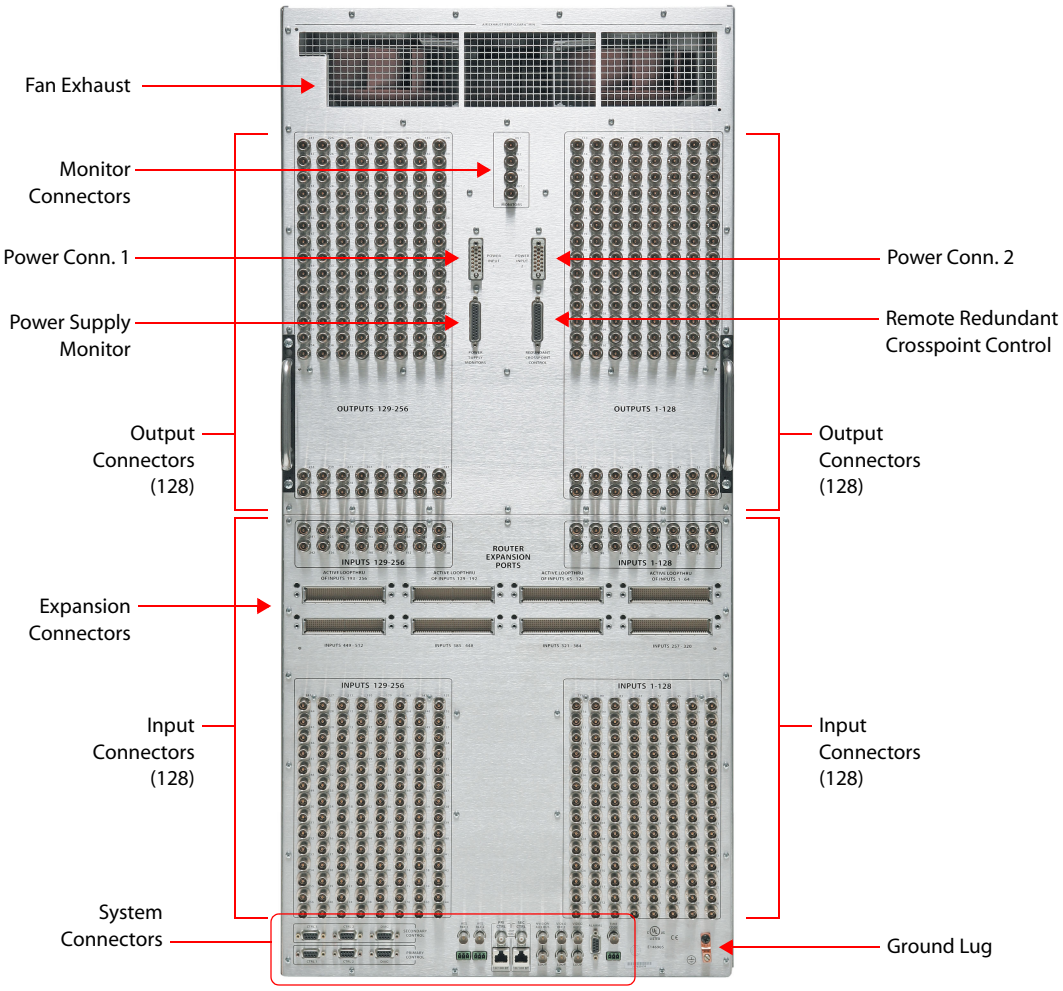


Figure 2-4. NV8256-Plus Router (Rear View)

System Connections

The NV8256-Plus features connections for managing system functions, located on the rear of the router. These connections enable you to connect to:

- A router control system using either serial, Ethernet, or GSC Node Bus connectors.
- A stable source of video signal for reference purposes.

- The UniConfig application, installed on a PC, used to perform configuration tasks.
- The system alarm that sends notification of a system failure, such as a fan or power supply malfunction.

Figure 2-5 shows the system connections. AES3 and Time Code references are not supported at this time and not discussed in this manual.

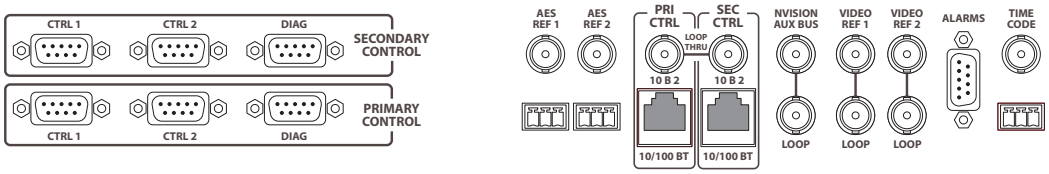


Figure 2-5. System and Power Connections for the NV8256Plus (Rear View)

Router Control System Connections

Router control systems are usually run on a separate unit (e.g., PC), which is then connected to the router. The NV8256-Plus provides three different methods for connecting the router to a router control system: serial, Ethernet or GSC Node Bus. The router control system determines which connection is used. For example, to connect to the NV9000 control system an Ethernet connection is preferred.

Serial Control Connections

The NV8256-Plus has four serial ports, as shown in Figure 2-6 on page 11. The ports are divided into two sets, one primary (‘PRIMARY CONTROL’) and one secondary (‘SECONDARY CONTROL’). Primary control is the connection to the primary control card. Secondary control is the connection to the secondary (optional for redundancy) control card. Each set is further divided into connections that correspond to router control systems: ‘CTRL 1’ corresponds to the primary control system and ‘CTRL 2’ corresponds to an alternate control system. Using ‘CTRL 2’ connections, you can connect to an alternate control system (i.e., backup system) or set up dual control, if desired. For installation instructions, see Serial Control Connections on page 36.

Serial control ports implement SMPTE 207M tributary.

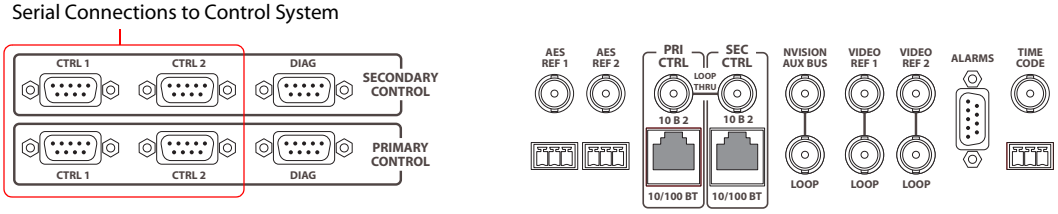


Figure 2-6. Serial Connections to Router Control System (Rear View)

Ethernet Control Connections

The NV8256-Plus has two Ethernet ports, as shown in Figure 2-7. The ports are divided into two sets, one primary (‘PRI CTRL’) and one secondary (‘SEC CTRL’). Primary control is the connection to the primary control card. Secondary control is the connection to the secondary (optional for redundancy) control card. Each port connects the local router to the control system. Unlike serial connections, there are no connections to alternate router control systems because you can connect

to alternate control systems using the same Ethernet connection via a network. For installation instructions, see Ethernet Control Connections on page 37.

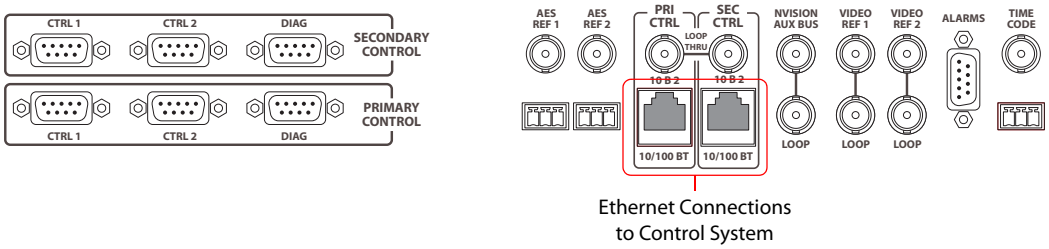


Figure 2-7. Ethernet Connections to Router Control System (Rear View)

GSC Node Bus Control Connections

Some third-party router control systems require a GSC Node Bus connection. The GSC Node Bus connection is located on the rear of the router, as shown in Figure 2-8. The NV8256-Plus has one GSC Node Bus connection, labeled ‘NVISION AUX BUS’. The connection is shared by both the primary and secondary control card. To use the GSC Node Bus connection, an optional module must be installed on each control card. For details, contact Miranda. For contact information, see page iii. For installation instructions, see GSC Node Bus Control Connections on page 38.

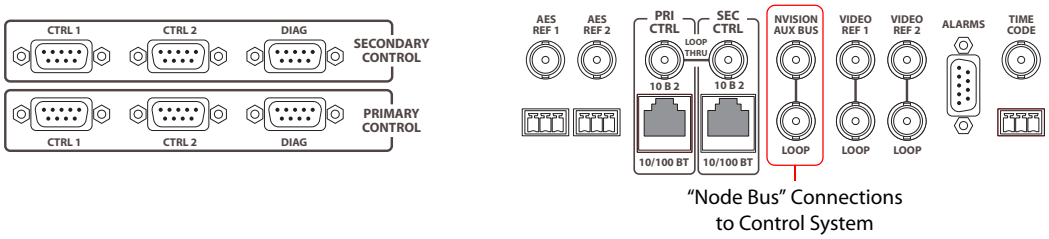


Figure 2-8. GSC Node Bus Connections to Router Control System (Rear View)

Diagnostic

The diagnostic connections enable the NV8256-Plus to communicate with the UniConfig application. UniConfig runs on a PC separate from the router and is used to perform system setup tasks, and configure and monitor the router. For information about using UniConfig, see the *UniConfig User’s Guide*.

Diagnostic connections connect the router to the PC running the UniConfig application. There are two types of diagnostic connections: temporary and permanent. A temporary diagnostic serial connection is located on the front of each control card. Permanent diagnostic connections are located on the rear of the router, labeled ‘DIAG’, as shown in Figure 2-9. There are two permanent ‘DIAG’ ports, one primary (‘PRIMARY CONTROL’) and one secondary (‘SECONDARY CONTROL’). The primary control connects to the primary control card. The secondary control connects to the secondary (optional for redundancy) control card.

For instructions on making temporary or permanent diagnostic connections, see Making Diagnostic Connections on page 40.

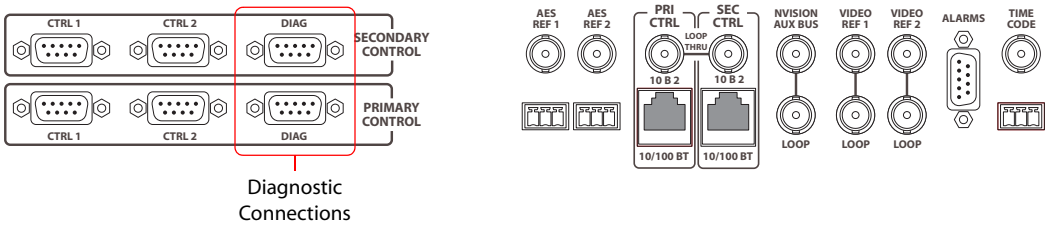


Figure 2-9. Permanent Diagnostic Connections (Rear View)

Router Control System Expansion Connections

In order to manage two connected NV8256-Plus routers, router control system expansion connections need to be connected between the routers. Router control expansion system connections are located on the rear of the router, as shown in Figure 2-10.

When making router control system connections, only one router is connected directly to the router control system. This router acts as the *primary* router. When making router control system expansion connections, connections from the remaining router, the *secondary* router, are made to the *primary* router. This enables the router control system to communicate with both routers through the primary router.

For instructions on making control system expansion connections, see Control System Expansion Connections on page 39.

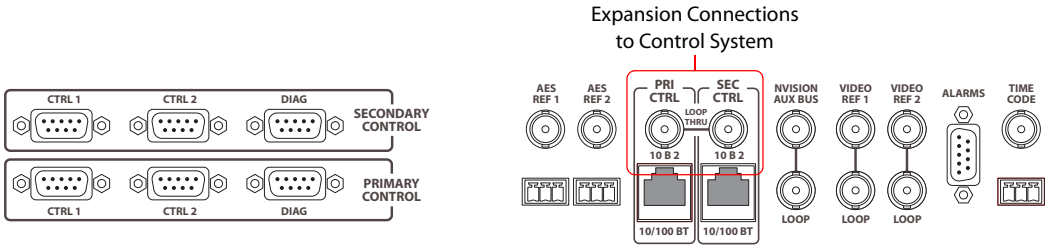


Figure 2-10. Router Control System Expansion Connections (Rear View)

Video Reference

The NV8256-Plus provides timing reference connections for video signals, labeled ‘VIDEO REF 1’ and ‘VIDEO REF 2’, as shown in Figure 2-11. Located on the rear of the router, these connections provide a reference input for determining the router’s video frame switch point. The video reference connections require a stable source of PAL, NTSC or tri-level sync.

If a video reference is present, signals switch at the defined frame and line switch points. If a video reference is not present, the router still performs the switch, but to an internal reference. If a video reference is not connected, the control card displays a lit red LED. (See Indicator LEDs on page 58.) For instructions on making video reference connections, see Making Video Reference Connections on page 43.

Redundant and Dual References

There are two video reference connections. The same reference can be used for both connections or a different reference for each connection. When using the same, or “redundant,” references for both

connections, if one reference fails, the control card fails-over to the redundant reference. When using different references, or “dual” references, switch takes can occur based on one or the other reference. For example, ‘VIDEO REF 1’ uses NTSC as a reference and ‘VIDEO REF 2’ uses PAL as a reference. Using UniConfig, the type of setting is selected: redundant or dual, and if dual, which outputs reference which video reference on an output by output basis.

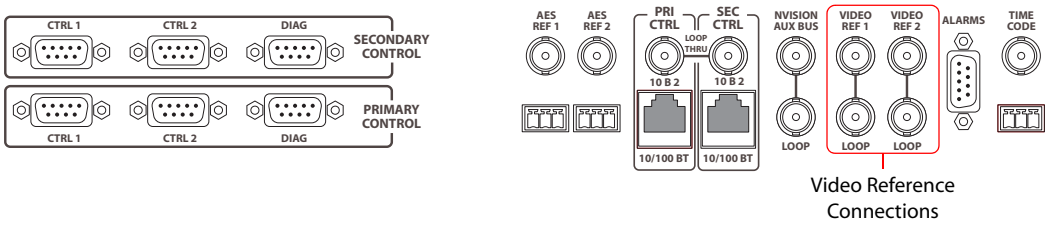


Figure 2-11. Connections to Video References (Rear View)

Alarm

The NV8256-Plus provides system alarms that send notification of a malfunction, such as when a fan or power supply is not functioning properly. Alarms can be connected to indicators that display visual signals when an alarm is activated. The NV6257 (power supply) and the NV8256-Plus each have alarm connections that can be connected to external indicator. Creation of an external indicator is outside the scope of this manual. However, basic instructions on wiring the alarm connection for external monitoring is provided. See Alarm Indicator Equipment on page 46.

In addition to an alarm connection, the NV8256-Plus can be connected to a router control system that receives status information from the router’s control card(s). See Making Router Control System Connections on page 35. The control card reads the status of NV6257’s power supply and fans through the ‘Power Supply Monitors’ connection. (See Power Supply on page 6.) In addition, the control card monitors the router’s power supply, fans, and video reference connections. Both NV6257 and router information is sent to the control system and is viewable using UniConfig.

A SNMP agent can be installed on the router control system (i.e., NV9000) to communicate system status information to a SNMP manager. Installation of SNMP agents and use of SNMP managers is outside the scope of this User’s Guide.

The alarm connection is labeled ‘ALARM’ and is located on the rear of the router, as shown in Figure 2-12. For instructions on making alarm connections, see Making Alarm Connections on page 46.

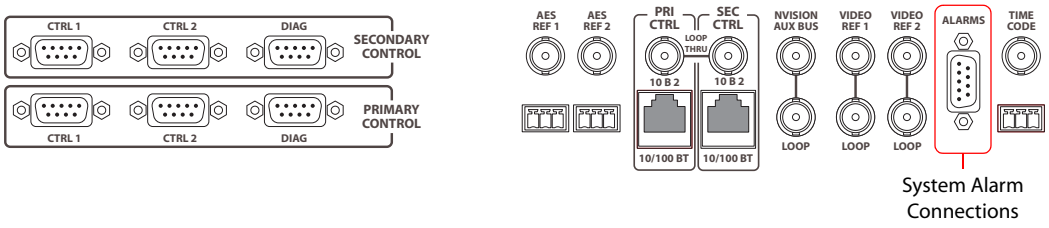


Figure 2-12. Alarm Connection (Rear View)

Active Cards

The NV8256-Plus features several active cards that manage incoming signals, process commands from the control system, perform signal switching, and distribute outgoing signals. Each card slides into a card guide and has a lever that holds the card in place and aids card ejection.

There are:

- 2 control cards — one primary, one secondary (optional for redundancy)
- Up to 16 input cards — SD, SWB, 3Gig signals or analog-to-SD conversion.
- Up to 16 output cards — SD, SWB, 3Gig signals or SD-to-analog conversion.
- Up to 3 crosspoint cards — one primary, one optional for redundancy, and one for expansion.
- 1 monitor card (optional)

Each card and function is described in the following section. For information on installing cards, see Installing Active Cards on page 30.

Note All crosspoint cards in this section are referred to by the slot in which the card is installed—*left*, *middle* or *right*—when facing the front of the router with the door open.

Control Cards

The router has two control cards (EM0374), one primary and one secondary used for standby (optional for redundancy). Each card receives commands from the router control system, and in turn, controls the input, output, crosspoint and monitor cards. Only one control card is active at a time, with the active card updating the stand-by card.

The control card includes a status reporting circuit. Four LEDs on the front of the control card indicate the card's status: low battery (Red), alarm (Red), active (Amber) and "healthy" (Green). For more information, see Indicator LEDs on page 58.

Input Cards

The router frame can house up to 16 input cards, each processing up to 16 signals. Input cards receive incoming signals through coaxial connectors or through expansion connectors when two routers are connected together. There are three categories of input cards: Standard, filler, and analog-to-SD. The standard input card manages incoming signals from the coaxial connections and from the expansion connections when two routers are connected. The filler input card manages incoming signals only from the expansion connections when two routers are connected. Both standard and filler input cards can manage SD, SWB or 3Gig signals. Analog-to-SD input cards convert incoming analog composite video signals to SD. Different categories of input cards can be intermixed in a single frame to meet specific switching configuration needs. For more information on switching configurations, see Switching Configurations on page 4.

The following is a list of the different input cards available. Each card is listed by the function it performs (category) — standard, filler or analog-to-SD — and the type of signal it manages — SD,

SWB, 3Gig or analog. For your convenience, the part number for each card has been included. For a detailed description of a card's function, see Input Card Functions on page 16.

Input Card Category	Signal Type	Standard (SMPTE)	Rates	Part Number
Standard	SD	259M 344M	< 546 Mb/s	EM0449
Standard	SWB	259M 344M 292M	≤ 1.5 Gb/s	EM0437
Filler	SWB	259M 344M 292M	≤ 1.5 Gb/s	EM0437-50
Standard	3Gig	259M 292M 424M	≤ 3.0 Gb/s	EM0619
Filler	3Gig	259M 292M 424M	≤ 3.0 Gb/s	EM0619-50
Analog-to-SD	Input: PAL or NTSC analog composite video Converted to: SMPTE 259M-C, (4:2:2), 270 Mb/s			EM0451

Status Reporting

All input cards feature a circuit that performs status reporting and drives the card's functions. Two LEDs on the front of the input card indicate the card's status: alarm (Red), power good (Green). Three additional LEDs situated further back on the card indicate if software is loaded (Amber), if there is good communication with the control card (Green) or bad communication with the control card (Red). For more information, see Indicator LEDs on page 58.

Input Card Functions

Input cards process up to 16 incoming signals. The functions of each type of card are described in the following sections. Inputs cards are organized by category — standard, filler or analog-to-SD.

Standard Input Cards

A standard input card manages either SD (EM0449), SWB (EM0437) or 3Gig (EM0619) incoming signals from local coaxial connectors and from expansion connectors when two routers are connected together.

Each card receives 16 signals from the local coaxial connectors. Each of the 16 inputs is forwarded to one of 16 cable equalizers. The equalizers equalize the signal and distribute three copies of the signal. One copy is sent to a buffer and then the motherboard, which forwards the signal to the crosspoint card in the *left* slot (inputs 1–256). The second copy is sent to a cable driver and then the motherboard, which forwards the signal to the expansion connectors. When two routers are connected together, the expansion connectors feed local signals to the second router. The third copy is sent to a 2×1 MUX which selects a signal to send to the motherboard, which forwards the signal to the crosspoint card in the *middle* slot (redundant crosspoint). For more information on each crosspoint card and crosspoint card slot functions, see Crosspoint Cards on page 18.

If two routers are connected together, the standard input card also receives 16 inputs from the expansion connections. Each input is forwarded to one of 16 cable receivers, which create two cop-

ies of the signal. One copy is sent to a 2×1 MUX and then a buffer. The buffer forwards the signal to the motherboard, which sends the signal to the crosspoint card in the *middle* slot (redundant crosspoint). The other copy is sent to a buffer and then the motherboard, which forwards the signal to the crosspoint card in the *right* slot (inputs 257–512).

Figure 2-13 shows the signal flow for a standard input card.

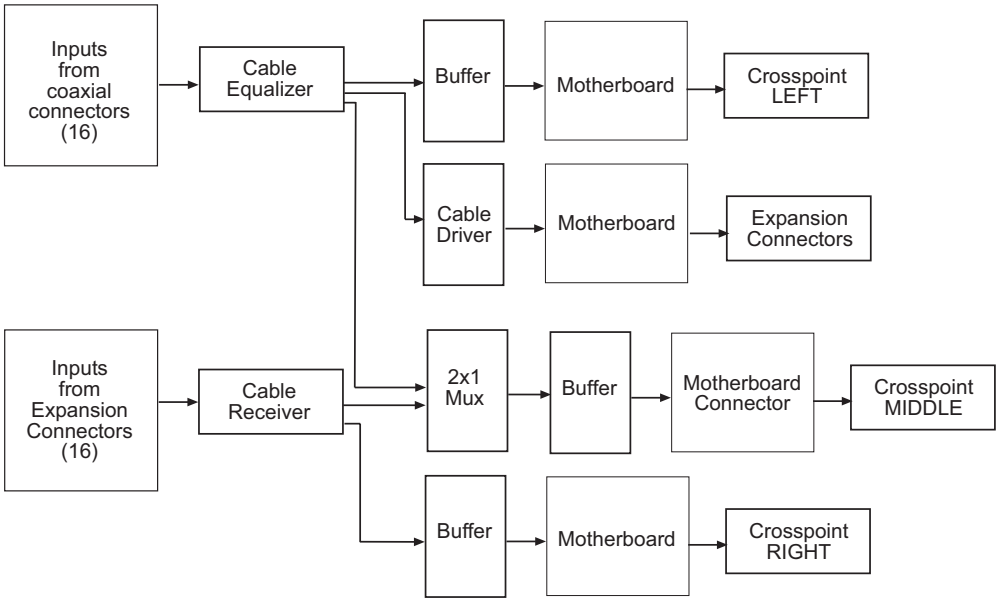


Figure 2-13. Standard Input Card Block Diagram

Standard output cards on the local router and standard output cards on a second connected router "mirror" each other, performing identical tasks.

Filler Input Cards

A filler input card manages SWB (EM0437-50) or 3Gig (EM0619-50) incoming signals from expansion connectors when two routers are connected together. Filler input cards receive signals only through the expansion connections and not through the coaxial connections.

The filler input card receives 16 inputs from the expansion connectors. Each input is forwarded to one of 16 cable receivers, which creates two copies of the signal. Both copies are sent to a buffer and then the motherboard. The motherboard forwards one copy to the crosspoint card in the *middle* slot (redundant crosspoint) and one copy to the crosspoint card in the *right* slot (inputs 257–512).

Figure 2-14 shows the signal flow for a filler input card.

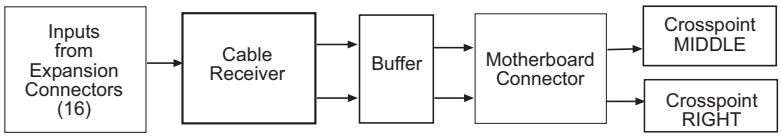


Figure 2-14. Filler Input Card Block Diagram

Analog-to-SD Input Cards

An analog-to-SD input card (EM0451) converts incoming analog PAL or NTSC composite video signals to SMPTE 259M-C digital component signals (4:2:2, 270 Mb/s).

The input card receives 16 signals from the local coaxial connectors. Each input is forwarded to an analog-to-digital converter that converts the signals to digital. Each digital input is forwarded to one of 16 distribution amplifiers, which distributes three copies of the signal. One copy is sent to a buffer and then the motherboard, which forwards the signal to the crosspoint card in the *left* slot (inputs 1–256). The second copy is sent to a cable driver and then the motherboard, which forwards the signal to the expansion connectors. When two routers are connected together, the signals are forwarded to the second router through the expansion connectors. The third copy is sent to a 2×1 MUX and then the motherboard, which forwards the signal to the crosspoint card in the *middle* slot (redundant crosspoint). For more information on each crosspoint card and crosspoint card slot functions, see Crosspoint Cards on page 18.

If two routers are connected together, the analog-to-SD input card also receives 16 inputs from the expansion connections. Each input is forwarded to one of 16 cable receivers, which create two copies of the signal. One copy is sent to a 2×1 MUX and then a buffer. The buffer forwards the signal to the motherboard, which forwards the signal to the crosspoint card in the *middle* slot (redundant crosspoint). The other copy is sent to a buffer and then the motherboard, which forwards the signal to the crosspoint card in the *right* slot (257–512).

Figure 2-15 shows the signal flow for an analog-to-SD input card.

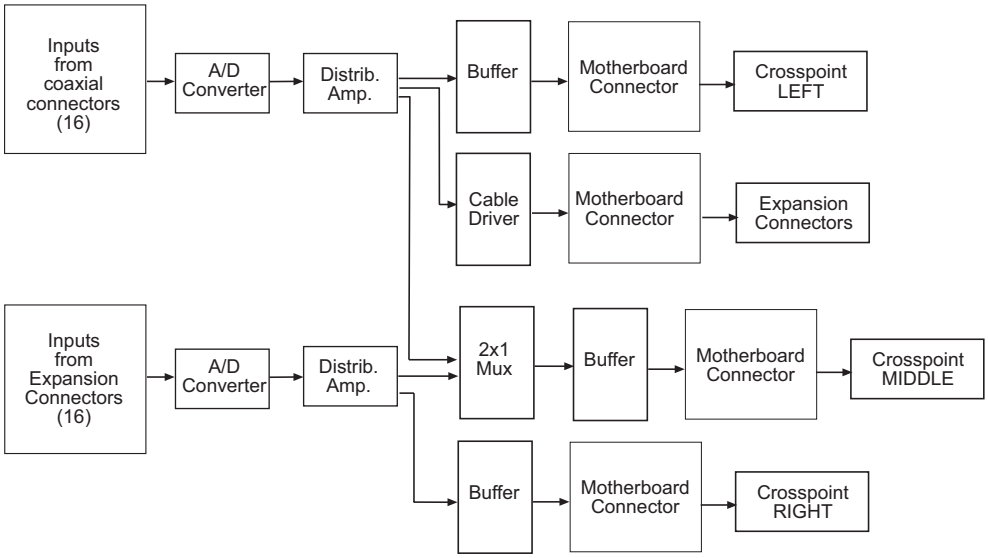


Figure 2-15. Analog-to-SD Input Card Block Diagram

Crosspoint Cards

Crosspoint cards (EM0439) receive signals from the input cards (via the motherboard). The crosspoint card then performs switching as directed by the control card, sending signals to the output cards (via the motherboard). Each crosspoint card can receive and distribute up to 256 individual SD, SWB or 3Gig signals (signal rates from 10 Mb/s to 3.0 Gb/s).

The crosspoint card slot into which the crosspoint card is installed determines which signals are managed.

Left and Right Slot Functions

When facing the front of the router, crosspoint cards installed in either the *left* or *right* slots manage signals as follows:

- Left Slot — local inputs 1–256, received through local coaxial connections.
- Right Slot — expansion inputs 256–512, received through the expansion connections.

(See Front Slots on page 7.)

Middle Slot Functions

An optional, redundant crosspoint card can be installed in the *middle* crosspoint card slot. When a crosspoint card is installed in this slot, four buttons located on the front of the card becomes active. By pressing one of two designated buttons, the crosspoint card can be set to take over active control from another crosspoint card or act as a 'hot" backup in stand-by mode. If set to take active control, the redundant crosspoint card takes over the current functions of the crosspoint card installed in the *left* or *right* crosspoint card slots. If set to be a backup, the card acts as a fail-over should the primary crosspoint card be removed. For details on redundant crosspoint card set up, see Setting Redundant Crosspoint Card Switching on page 52.

The fourth button on the redundant crosspoint card enables you to use remote control to manage the card. For information on using remote control, see Using Remote Control on page 54.

Minimum Crosspoint Cards Required

The switching configuration being implemented determines the minimum number of crosspoint cards required. For a list of required crosspoint cards required and the slot in which a crosspoint card must be installed, see Switching Configurations on page 4.

Figure 2-16 shows the flow of signals through the crosspoint card.

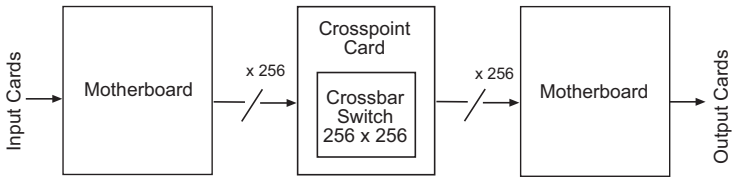


Figure 2-16. Crosspoint Card Block Diagram

Status Reporting

The crosspoint card includes a status reporting circuit. Five LEDs on the front of the crosspoint card indicate the card's status: alarm (red), power good (green), FPGA loaded (amber), good communication with the control card (green) and bad communication with the control card (red). For more information, see Indicator LEDs on page 58.

Output Cards

The router frame can house up to 16 output cards, each processing up to 16 signals. There are two categories of output cards: Standard and SD-to-analog. Standard output cards can manage SD, SWB or 3Gig signals. SD-to-analog output cards convert internal SD signals to analog composite video signals.

The following is a list of the different output cards available. Each card is listed by the function it performs — standard or SD-to-analog — and the type of signal it manages — SD, SWB, 3Gig or

analog. For your convenience, the part number for each card has been included. For a detailed description of a card's function, see Output Card Functions on page 20.

Output Card	Signal Supported	Standard (SMPTE)	Re-Clock At	Pass Through	Part Number
Standard	SD	259M 344M	143, 177, 270, 360, and 540 Mb/s	10 Mb/s to 540 Mb/s	EM0474
Standard	SWB	259M 344M 292M	143, 177, 270, 360 and 540 Mb/s; 1.483 and 1.485 Gb/s	10 Mb/s to 1.5 Gb/s	EM0444
Standard	3Gig	259M 292M 424M	270 Mb/s; 1.483, 1.485, 2.966 and 2.970 Gb/s	10 Mb/s to 3.0 Gb/s	EM0620
SD-to-Analog	Input: SMPTE 259M-C, (4:2:2), 270 Mb/s Converted to: PAL or NTSC analog composite video				EM0452

Status Reporting

All output cards feature a circuit that performs status reporting and drives the card's functions. Two LEDs on the front of the output card indicate the card's status: alarm (Red), power good (Green). Three additional LEDs situated further back on the card indicate if software is loaded (Amber), if there is good communication with the control card (Green) or bad communication with the control card (Red). For more information, see Indicator LEDs on page 58.

Output Card Functions

Output cards process up to 16 incoming signals. The functions of the standard and SD-to-analog output cards are similar.

Standard Output Cards

A standard output card manages either SD (EM0474), SWB (EM0444) or 3Gig (EM0620) signals received from local crosspoint cards and distributes outgoing signals to coaxial connectors.

Each output card receives 16 inputs from each crosspoint card, which are forwarded to a 3×1 MUX. The control card directs which crosspoint signal the 3×1 MUX selects. The 3×1 MUX sends the selected signal to a re-clocker. (See Signal Rates Supported on page 4.) The re-clocker creates two copies of the signal, feeding one copy to a cable driver and one copy to a 16×1 monitor MUX. The cable driver forwards the output to the coaxial connector to distribute outgoing signals. The 16×1 MUX sends the output to the motherboard, which in turns forwards the output to the monitor card for monitoring.

Figure 2-17 shows the signal flow for the standard output card.

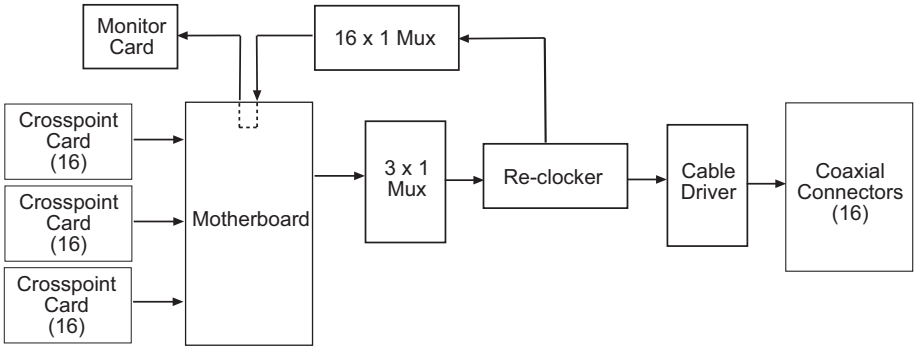


Figure 2-17. Standard Output Card Block Diagram

SD-to-Analog Output Card

A SD-to-analog output card (EM0452) converts SMPTE 259M-C (4:2:2, 270 Mb/s) digital component signals to PAL or NTSC composite video analog. Each output card receives 16 digital signals from local crosspoint cards and distributes outgoing analog signals to coaxial connectors.

The SD-to-analog output cards perform the same functions as the standard output card, with one exception: Instead of the 3×1 MUX sending the selected signal to a re-clocker, the 3×1 MUX forwards two copies of the signal. One copy is fed to a digital-to-analog converter, which converts the signal to analog. The signal is then forwarded to a composite video encoder and an analog cable driver, which sends the signals to a coaxial connector that distributes outgoing signals. The other copy is sent to 16×1 MUX. The 16×1 MUX sends the output to the motherboard, which in turns forwards the output to the monitor card for monitoring.

Figure 2-18 shows the signal flow for the SD-to-analog output card.

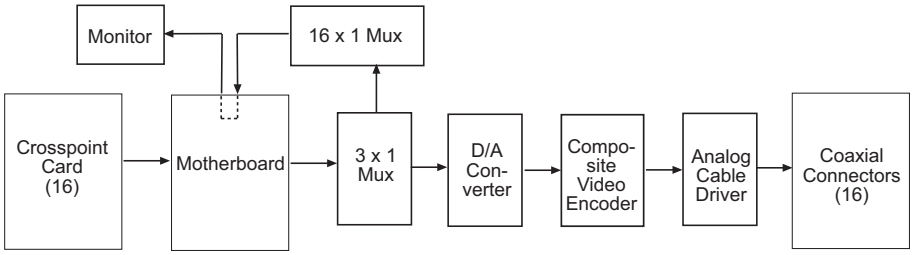


Figure 2-18. SD-to-Analog Output Card Block Diagram

Monitor Card

A monitor card receives one signal from each output card and then sends two outgoing signals. These outgoing signals can be sent to monitoring equipment for the purpose of monitoring outgoing signal quality. There are two monitoring cards available: one for SWB signals (1143408) and one for 3Gig signals (EM0633).

The SWB monitor card receives video signal rates of 270 Mb/s and 1.5 Gb/s. The 3Gig monitor card receives video signal rate of 270 Mb/s, 1.5 Gb/s and 3.0 Gb/s. All other rates pass through.

There are two monitor connections. Using UniConfig, each connection can correspond to a unique signal level, enabling the control system to monitor two signal rates at the same time. For more information on levels, see the UniConfig User's Guide.

Depending on which monitor card is installed, the following levels can be configured:

- SWB Monitor Card — SD and SWB.
- 3Gig Monitor Card — SD and SWB, or SD and 3Gig, or SWB and 3Gig.

When two NV8256-Plus routers are connected together, the two monitor outputs on one router are connected to the two monitor inputs on the other router through monitor expansion connections. This enables the monitoring of all outgoing signals from both routers through a single set of monitoring connections. For information on making monitor connections, see Making Monitor Connections on page 43.

Frame Expansion

Two NV8256-Plus router frames can be connected together to create a switching matrix of up to 512 inputs and 512 outputs. The two frames are linked by connecting expansion connections on one router to expansion connections on a second router.

The expansion connections are:

- I/O Signals — each frame has 8 signal expansion connections, each forwarding 64 signals between two connected routers. All 8 connections must be connected. See Signal Expansion Connections on page 34.
- Control System — one router is connected directly to the router control system. Using control system expansion connections, control system connections are also made between the two routers. This enables the control system to see both routers through one control system connection. See Control System Expansion Connections on page 39.
- Monitor System — one router is connected directly to the monitoring equipment. Using monitor expansion connections, monitor connections also made between the two routers. This enables the monitoring equipment to see both routers through one monitor connection. See Monitor Expansion Connections on page 44.

Depending on your switching configuration, each frame may have one, two, or three crosspoint cards, standard, filler or analog-to-SD input cards, and standard or SD-to-analog output cards. For detailed information about switching configurations, see Switching Configurations on page 4.

Figure 2-19 shows the flow of signals between two connected routers. The signals are forwarded to the connected router through signal expansion connections.

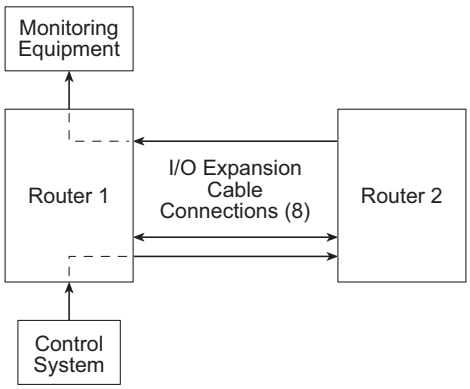


Figure 2-19. Frame Expansion Diagram

3. Installation

Chapter 3 provides installation and connection instructions. It presents the following topics:

Summary

When setting up the NV8256-Plus for the first time, or reconfiguring an existing router configuration, there are certain steps that must be performed. It is recommended that initial installation and later reconfiguration tasks be performed in a specific order to avoid possible complications.

Perform installation and reconfiguration tasks in the following order:

1 Mount the router in a rack. If reconfiguring, skip this step if the router is already rack mounted and not being remounted. See Rack Mount on page 25.

2 Connect power, being sure to install PS6000 modules *after* power is connected. See Making Power Connections on page 26.

3 Install active cards in the appropriate front card slots. If reconfiguring, remove cards and reinstall in the newly desired slots. Make sure that the appropriate backplane is installed for each active card. See Installing Active Cards on page 30.

4 Make connections between the source of incoming signals and the destination of outgoing signals, and the router. If reconfiguring, change signal connections to match new backplane and active card configuration. See Making Signal Connections on page 33.

5 Make connections between the router and the router control system. If reconfiguring, skip this step if all necessary router control system connections are still adequate. See Making Router Control System Connections on page 35.

6 Make permanent or temporary diagnostic connections. Diagnostic connections enable the router and UniConfig to communicate. This is important when initially configuring the router and any time the router is reconfigured. See Making Diagnostic Connections on page 40.

7 Make connections to signals acting as references video signals. If reconfiguring, verify that all necessary reference connections are made for the signals being routed. See Making Video Reference Connections on page 43.

8 Make connections to external equipment for the monitoring of signal quality. See Making Monitor Connections on page 43.

9 Connect the alarm connection on the router to an external indicator. If reconfiguring, skip this step if alarm connections are still adequate. See Making Alarm Connections on page 46.

- Install UniConfig. If reconfiguring, UniConfig does not need to be reinstalled. See the *UniConfig User's Guide*.

Package Contents

When your NV8256-Plus products from Miranda arrive, immediately inspect the shipping container for any obvious damage. If the container is damaged, unpack and inspect the contents. If the contents are damaged, notify the carrier immediately.

When unpacking the shipping container, look for the packing slip and compare it against the contents to verify that everything ordered was received. If anything is missing (or if equipment is damaged unrelated to shipping), please contact Miranda. For contact information, see Technical Support Contact Information on page iii.

The package does not contain mounting rack, network cables, video cables, mounting screws, or grounding wire.

Note The NV8256-Plus has a separate power supply frame (NV6257).

This document does not address the shipment or installation of any other equipment or software that can be used in conjunction with the routers, including control systems or configuration software.

Preparing for Installation

You will need the following items before getting started:

☐ A PC running Windows® 2000 or higher, or Windows XP Professional.® This PC is required only for system configuration.

PC hardware requirements:

☐ CD drive.

☐ RS-232 serial COM port (DE9) capable of operating at 38.4 Kbps, 9600 baud.

☐ 10BaseT or 10/100BaseT (preferred) Ethernet port.

- ☐ 100 Mb/s Ethernet switch or hub.
- ☐ Ethernet cables (category 5) with RJ-45 connectors.
- ☐ DE9 connectors and serial cables.
- ☐ 75 Ω BNC connectors and coaxial cables.
- ☐ 50 Ω BNC connectors and coaxial cables.
- ☐ Reference video source (BNC) at the line rate appropriate for your system.
- ☐ Frame rack suitable for mounting the router.

Depending on the nature of your usage, you will also need an assortment of video cables, video sources, video monitors, and tools.

Rack Mount

The NV8256-Plus and the NV6257 power supply, which provides power to the router, are designed to mount in a 19" (482.6 mm) EIA rack. Although it is not required that both the router and NV6257 power supply be mounted in the same rack, this manual assumes only one rack frame is being used.

How to Rack Mount the Router and the NV6257

1. Determine the placement of the router frame and NV6257 power supply frame in the rack, and the rack in the facility. When placing the frames and rack, keep in mind the following requirements. (For details, see Frame Rack on page 3.)
   - The router requires 22RUs of vertical space.
   - The NV6257 power supply requires 5RUs of vertical space.
   - Be sure to locate the rack near an accessible AC source power outlet. The AC source is used to power the NV6257 power supply, which supplies power to the router.
   - To ensure proper cooling, leave space for unrestricted air flow through the front of the router, and a minimum of six inches clearance at the rear where the cooling fans are located.
2. Locate the NV6257 power supply frame.
3. If the NV6257 was shipped with the PS6000 power supply modules in the frame, remove them to make the frame lighter for installation.

   Important Do not reinstall the PS6000 power supply modules. The modules are installed after power is connected. For more information, see Connecting Power to the NV6257 and the Router on page 27.
4. Lift the NV6257 frame into position and attach the NV6257 frame to the front of the rack with the appropriate screws. Be sure to leave room for the NV8256-Plus frame to be mounted in the rack. Place screws in all frame mounting screw holes.

5 Remove the front door by turning the retaining screws counter clockwise, opening the door, and lifting it free of the hinges.

Caution Do ***not*** use the front door handle to lift the entire frame. Doing so may damage the door.

6 If the router was shipped with the circuit boards and fan tray in the frame, consider removing them to make the frame lighter for installation. If removing circuit boards, be sure to note which card was installed in which slot for later reinstallation.

Caution Handle all circuit boards with care. Be sure to use electrostatic discharge (ESDI) protection and place the circuit boards in ESDI bags or on an ESDI surface.

7 Lift the frame into position and attach the router frame to the front of the rack with the appropriate screws. Be sure to place screws in all frame mounting screw holes.

Caution An equipment jack or two people are required to lift and install the router frame. The router frame is considered too heavy for one person to lift and install in the rack.

8 If removed, reinstall the fan tray in the fan slot at the top of the router. The tray is inserted right-side up.

9 If removed, reinstall circuit boards. Be sure to install them in the correct location. For installation instructions, see Installing Active Cards on page 30.

10 Reinstall the front door.

Making Power Connections

The power supply for the NV8256-Plus router is mounted externally in a separate frame, the NV6257. The NV6257 uses the PS6000 power supply module. The NV8256-Plus requires a minimum of four PS6000 power supply modules (plus four optional modules for redundancy).

The connectors and cables used to connect the router to the NV6257 are provided by Miranda, as follows:

- Two, NV8256-Plus power supply cables (WC0085-00)
- One, NV8256-Plus monitor cable (WC0046-00)

The NV8256-Plus has a ground lug on the back of the router. Whether to ground or not is optional and failure to connect the ground does not affect normal operation. However, grounding helps protect you and your equipment in case of a power anomaly such as a lightning strike.

Power Supply Monitor and Alarms Connections

The NV6257 has two DB25 connections, located on the rear. One connection, labeled ‘Power Supply Monitor’ carries alarm and temperature signals to the router. This connection is connected at the same time the power connections are made. The other connection, labeled ‘Alarms’ presents

isolated alarm signals that can be connected to an external alarm indicator. For information on connecting NV6257 alarms connections, see Making Alarm Connections on page 46.

Power Cords and Branch Circuits

For added protection in the event of a mains power failure, it is recommended that each power cord connected to the NV6257 power supply be connected to a separate branch circuit. A wire bail can be used to hold the power cable in place to reduce the possibility of an accidental disconnect.

The power cords are the only means of disconnecting AC power. Clearly mark the line side power connection with its function so that in the event of an emergency, power can be disconnected quickly.

Connecting Power to the NV6257 and the Router

The NV8256-Plus uses both power connections on the NV6257. To make this connection, Miranda provides two power cables (WC0085-00).

Caution

Make power connections between the router and NV6257 *before* connecting the NV6257 to an AC power source. Insert PS6000 power supply modules *after* connecting the NV6257 to an AC power source.

Connecting to AC power before the router is connected, or after PS6000 modules are installed, may result in an electric shock.

How to Connect Power:

1 Locate the power cords, PS6000 power supply modules, and cables supplied by Miranda.

2 If not already removed, remove all PS6000 power supply modules.

3 Facing the rear of the **NV6257**, using one of the two power supply cables (WC0085-00), connect to ‘Output Power 1’, as shown in Figure 3-1.

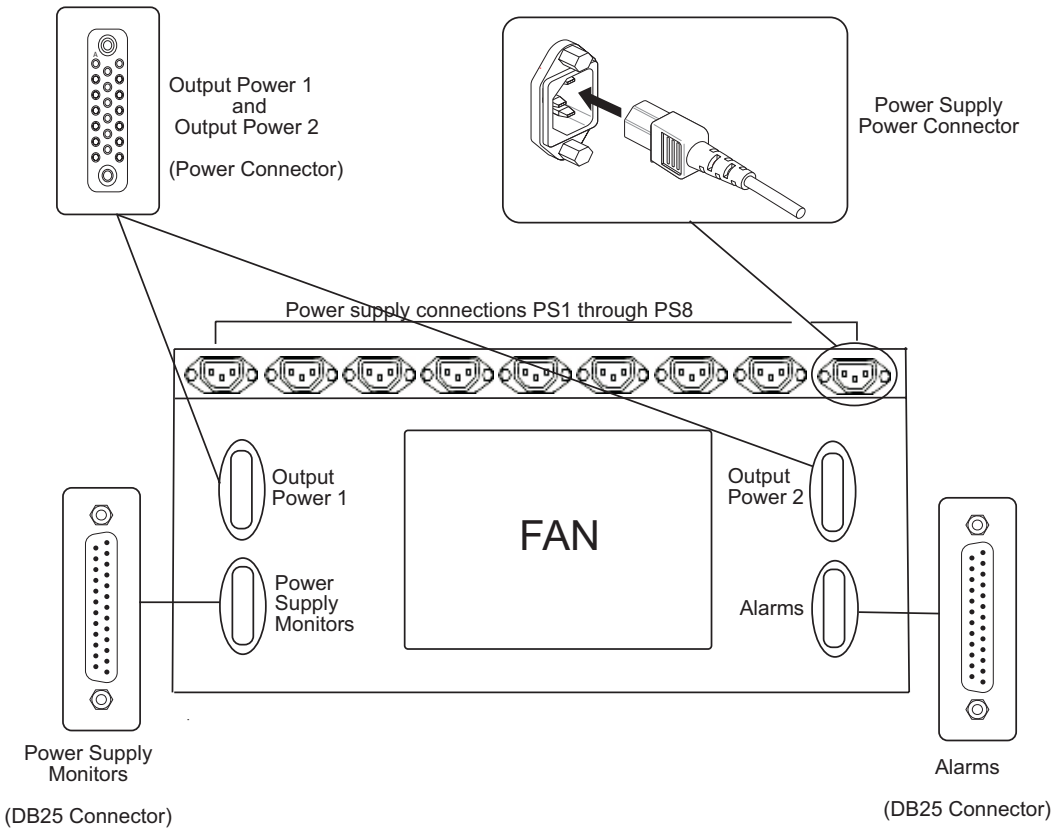


Figure 3-1. NV6257 Power Supply (Rear View)

4 Facing the rear of the **router,** connect the other end of the power supply cable to 'Power Input 1', as shown in Figure 3-2 on page 29.

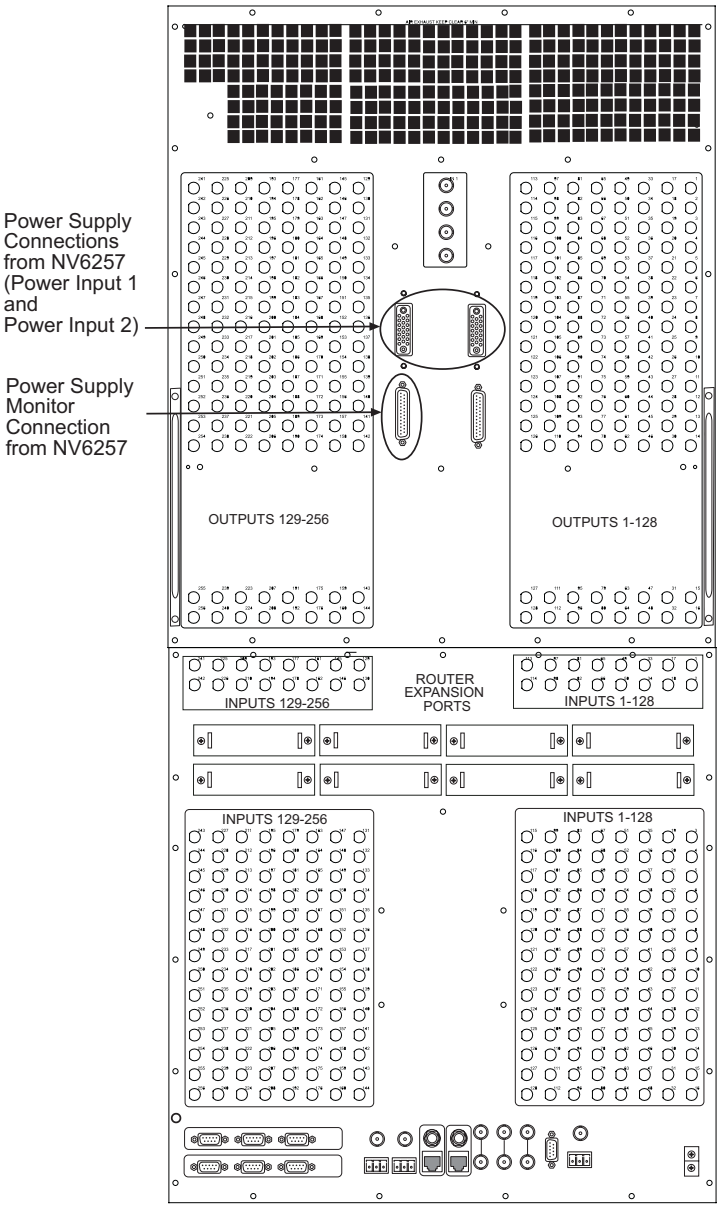


Figure 3-2. Power Supply Connections and Power Supply Monitor Connection on Router (Rear View)

5 Facing the rear of the **NV6257**, using the remaining power supply cable, connect to 'Output Power 2', as shown in Figure 3-1 on page 28.

6 Facing the rear of the **router**, connect the other end of the power supply cable to 'Power Input 2', as shown in Figure 3-2.

7 Facing the rear of the **NV6257**, connect one end of the monitor cable (WC0046-00) to the 'Power Supply Monitors' DB25 connection, as shown in Figure 3-1 on page 28.

8 Facing the rear of the **router**, connect the other end of the monitor cable to 'Power Supply Monitor', as shown in Figure 3-2.

9 Facing the rear of the NV6257, connect power cords from an AC power source (90–230 VAC, 50–60 Hz) into power connections *PS 1* through *PS 8*, as shown in Figure 3-1 on page 28. You must connect one power cord for each PS6000 power supply module installed. (See step 10.)

10 Install the PS6000 power supply modules as follows:

a Facing the front of the NV6257, install the primary PS6000 power supply modules in slots *PS 1*, *PS 3*, *PS 5* and *PS 7*, as shown in Figure 3-3.

Note The NV6257 fan is powered by slot *PS 1* or *PS 2*. A PS6000 power supply module must be installed in one of these slots.

b (Optional) Facing the front of the NV6257, install the redundant PS6000 power supply modules in slots *PS 2, PS 4, PS 6* and *PS 8*, as shown in Figure 3-3.

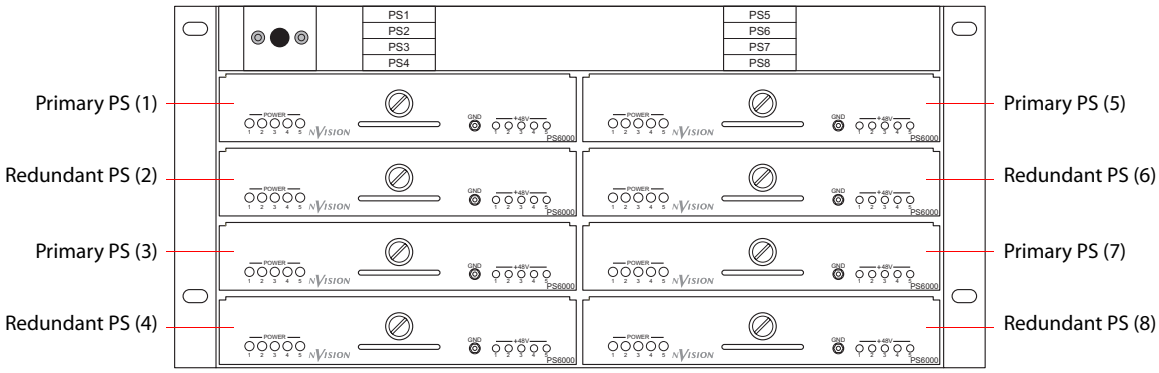


Figure 3-3. NV6257 Power Supply (Front View)

11 Facing the rear of the router, connect the ground lug to ground using a copper wire from 14 to 6 AWG. The ground lug is located in the lower, right-hand corner of the frame.

Installing Active Cards

The NV8256-Plus router features several active cards that manage incoming signals, forwarding of control system commands, signal switching, and distribution of outgoing signals. Cards slide into a card guide such that the connectors on the rear of the card interface with the motherboard. Each card has two levers—one at the top and one at the bottom—that help insert the card into place for installation and eject the card for easy removal. For a description of each card, see Active Cards on page 15.

All cards can be inserted and removed with the power on.

How to Install Active Cards:

Caution Do not drop, roughly handle, or stack circuit boards. If a board does not easily remove or insert, stop installation activities and contact Miranda Technical Support. (See Technical Support Contact Information on page iii.)

1 Locate the slots for the control, input, output, crosspoint and monitor cards, as shown in Figure 3-4 on page 32.

2 Insert the cards into the frame by sliding them into card guides from the front of the router. Use the levers to fully seat the card into the motherboard connectors. On all cards, the text on the card edge should be facing outward.

Insert the card in designated slots only, as follows. (See Figure 3-4 on page 32.)

- Control cards — insert in horizontal slots, located near the bottom of the frame. Levers are located at the right and left edges of each card.
- Input cards — insert in the vertical, *lower* bay slots. Levers are located at the top and bottom of each card.
- Output cards — insert in vertical, *upper* bay slots. Levers are located at the top and bottom of each card.
- Crosspoint cards — insert in the vertical, center slots: Levers are located at the top and bottom of each card.

  In the *left* slot, insert a crosspoint card for inputs 1–256.

  (Optional) In the *middle* slot, insert a crosspoint card. The card is automatically in "hot" standby mode and acts as a backup for the crosspoint cards installed in the right or left crosspoint card slots. For more information, see Middle Slot Functions on page 19.

  In the *right* slot, insert a crosspoint card for inputs 257–512. These inputs are received through the I/O signal expansion connections. Signal Expansion Connections on page 34.

  For information about crosspoint cards, crosspoint card slots and outputs managed, see Crosspoint Cards on page 18.
- (Optional) Monitor card — insert in the vertical, upper-middle slot. Levers are located at the top and bottom of each card.

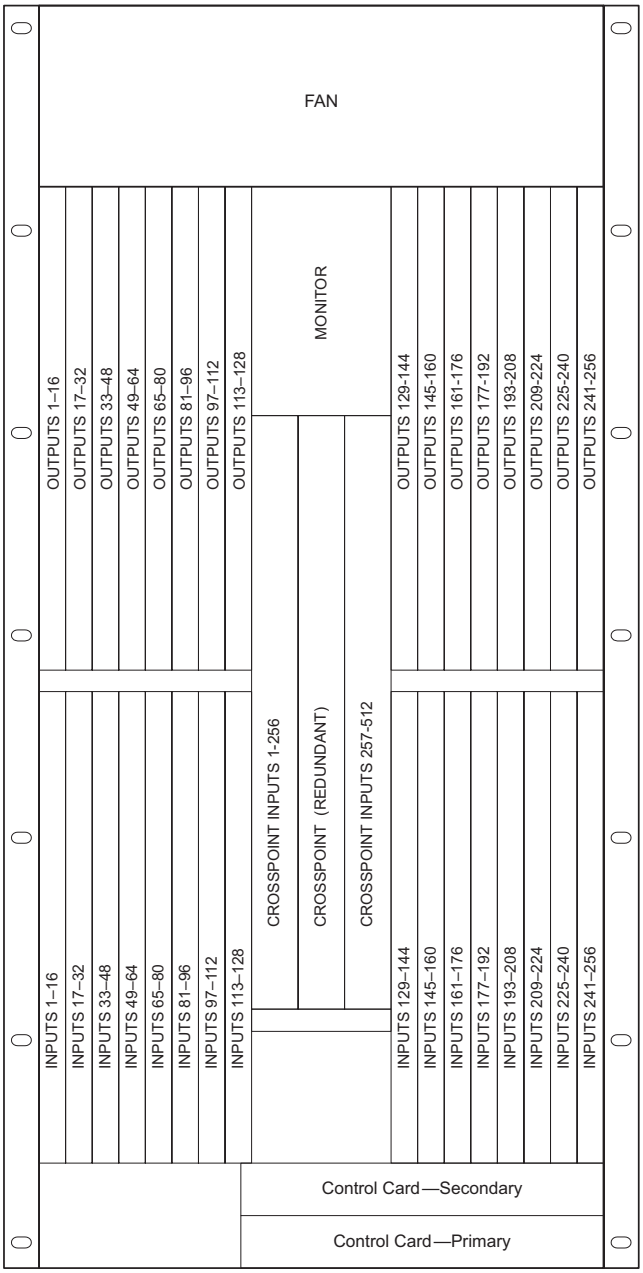


Figure 3-4. Card Locations in Router Frame (Front View)

3 On each card, press both levers inward, making sure each card is fully seated in the card guide and slot.

4 Reinstall and close the frame front door after all cards have been installed. The door must be closed for the router cooling system to work properly.

Making Signal Connections

In order for the NV8256-Plus to properly manage incoming and outgoing signals, the I/O connections on the rear of the router must be connected to cables that receive and distribute the signals. The NV8256-Plus contains up to 256 input connections and up to 256 output connections.

If two NV8256-Plus routers are being connected together, the signal expansion connections need to be connected between the two routers. These connections enable each router to send local inputs to the other router. (See Signal Expansion Connections on page 34.)

Local Signal Connections

Cables are connected to the I/O connections using 75 Ω BNC connectors and coaxial cable. Connections must be made for each source of incoming signals and each signal distribution source.

How to Make Signal Connections

1 Locate the *input* connections at the rear of the router, as shown in Figure 3-5. There are 16 columns of 16 BNC connections each.

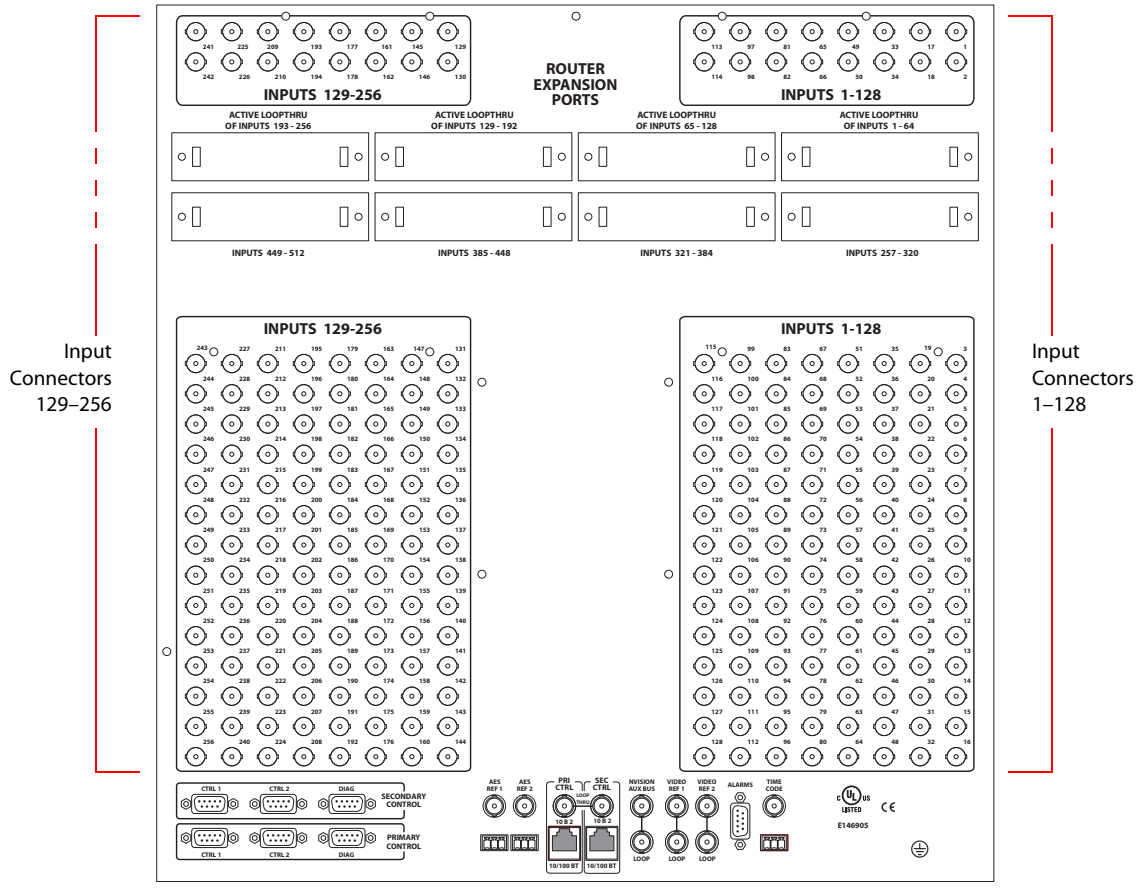


Figure 3-5. BNC Connector and Signal Connections

2 For each input, connect to an input connection using a 75 Ω BNC connector and coaxial cable.

3 Connect the other end of the cable to the source of the incoming signal.

4 Locate the *output* connections on the rear of the router, as shown in Figure 3-5. There are 16 columns of 16 BNC connections each.

5 For each output, connect to each output connection using a 75Ω BNC connector and coaxial cable.

6 Connect the other end of the cable to the distribution destination for the outgoing signal.

7 If connecting two NV8256-Plus routers together, connect the signal expansion connections. (See Signal Expansion Connections, following.)

Signal Expansion Connections

As a standalone router, the NV8256-Plus can manage up to 256 inputs and 256 outputs. Using the NV8256-Plus signal expansion connections two routers can be connected, increasing the number of signals managed up to 512 inputs and 512 outputs. Connected routers must be situated physically next to each other, either top to bottom or side to side.

The NV8256-Plus contains 8 expansion connections, located on the rear of the router. All 8 expansion connections must be connected to properly connect two frames together. Each signal expansion connection manages 64 inputs. The connections are labeled according to the signals managed: 'Inputs 1–64', 'Inputs 65–128', and so on up to 512 signals. (See Figure 2-2 on page 8.) Facing the rear of the router, the signals are labeled in descending order from right to left.

The signal expansion connections use proprietary expansion cables provided by Miranda (WC0056-00).

How to Make Signal Expansion Connections between Two Routers

1 Locate the signal expansion connections on the rear of the two router frames being connected, as shown in Figure 3-6. The routers should be located close together.

The signal expansion connections are labeled 'Router Expansion Ports'.

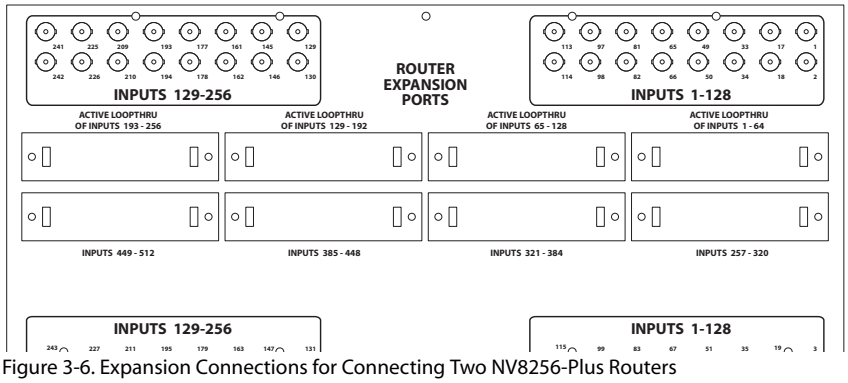


Figure 3-6. Expansion Connections for Connecting Two NV8256-Plus Routers

2 Using a screwdriver, remove the cover plates covering the signal expansion connections.

3 Facing the rear of the **first router** (Router 1), connect the signal expansion connector (WC0056-00) to expansion connection 'Inputs 193–256' (A), as shown in Figure 3-7.

4 Facing the rear of the **second router** (Router 2), connect the other end of the signal expansion cable6 to expansion ‘Inputs 449–512’ (A), as shown in Figure 3-7.

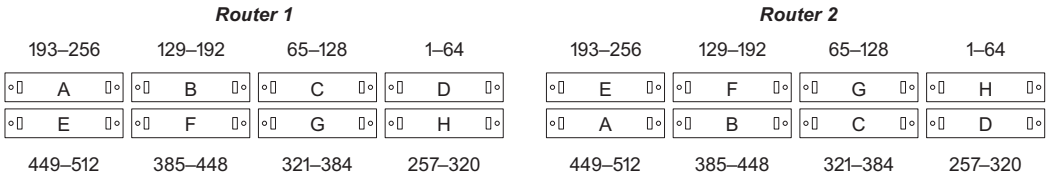


Figure 3-7. Expansion Connections on NV8256-Plus Routers (Rear View)

Important

Do not force connectors. If a connector does not install easily, stop installation and contact Miranda. For contact information, see Technical Support Contact Information on page iii.

5 Repeat Step 3 and Step 4 until all expansion connections are connected, as follows:

Router 1	Router 2	Inputs on Router 1	Inputs on Router 2
A	A	193–256	449–512
B	B	129–192	385–448
C	C	65–128	321–384
D	D	1–64	257–320
E	E	449–512	193–256
F	F	385–448	129–192
G	G	321–384	65–128
H	H	257–320	1–64

Making Router Control System Connections

To manage signal switching in the NV8256-Plus, connections need to be created between the router control system and the router.

Connections are as follows:

- Serial Control — use to connect to a third-party router control system requiring serial control connections.
- Ethernet Control — use to connect to the NV9000 router control system and to create network connections.
- NVISION Aux Bus — use to connect to a third-party router control system requiring a GSC Node Bus connection.

If connecting two NV8256-Plus routers together, only one router is directly connected to the router control system. This router acts as the *primary* router. Additional control system expansion connections are then made between the primary router and the secondary, connected router. This enables the router control system to communicate with both routers. (See Control System Expansion Connections on page 39.)

In order for the router control system to communicate with the router, Comm port and Baud rate information must be entered in each control card using UniConfig. This information is entered using a temporary diagnostic connection between the router and UniConfig. (See Temporarily Connecting to UniConfig on page 41.) After the information is entered, the router control system connections can "see" the router and the router control system connections can be configured.

Serial Control Connections

Serial control connections are used to connect a router to the router control system. Serial connections are often used for third-party control systems. Although serial connections can be used for the NV9000 control system, it is recommended that an Ethernet connection is used instead. (See Ethernet Control Connections on page 37.)

The serial control ports are divided into two sets that communicate with the primary control card or the secondary control card. Additional ports enable you to connect to an alternate control system (i.e., backup system) or to set up dual control, if desired. For a detailed description of the serial control connections, see Serial Control Connections on page 11.

In order for the router to communicate with the router control system through a serial connection, Comm port and Baud rate settings need to be set in the control card.

Serial control connections use SMPTE 207M DE9 connectors and serial (RS-422/485) cable.

How to Make Serial Control Connections

1 Locate the serial control connections on the rear of the router, as shown in Figure 3-8. Serial control connections are labeled 'PRIMARY CONTROL' for the primary control card and 'SECONDARY CONTROL' for the secondary control card.

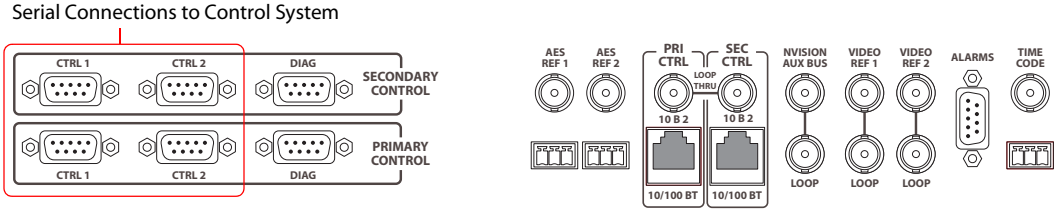


Figure 3-8. Serial Connections to Router Control System (Rear View)

2 Connect to the 'CTRL 1' connection in the 'PRIMARY CONTROL' section using a DE9 connector and serial cable.

3 Connect the other end of the serial cable to the (primary) router control system using a DE9 connector.

The following lists the pin wiring for the DE9 connectors:

Control End	Pins	Router End
Ground	1 ----------1	Ground
Rx–	2 ----------2	Tx–
Tx+	3 ----------3	Rx+
Tx Common	4 ----------4	Rx Common
N/C	5 ----------5	N/C
Rx Common	6 ----------6	Tx Common

Control End	Pins	Router End
Rx+	7 ----------7	Tx+
Tx–	8 ----------8	Rx–
Ground	9 ----------9	Ground

4 If a secondary control card (optional for redundancy) is installed, connect to the ‘CTRL 1’ connection in the ‘SECONDARY CONTROL’ section as described in Step 2 and Step 3. See Control Cards on page 15.

5 If an alternate control system (e.g., for redundancy or dual control) is being used, make connections as follows:

a Connect to the ‘CTRL 2’ connection in the ‘PRIMARY CONTROL’ section using a DE9 connector and serial cable.

b Connect the other end of the serial cable to the *secondary* router control system using a DE9 connector. Wire connectors as described in Step 3.

c Connect to the ‘CTRL 2’ connection in the ‘SECONDARY CONTROL’ section using a DE9 connector and serial cable.

d Connect the other end of the serial cable to the *secondary* router control system using a DE9 connector. Wire connectors as described in Step 3.

6 If two NV8256-Plus routers are being connected together, connect the control system expansion connections. (See Control System Expansion Connections on page 39.)

Or

If the NV8256-Plus is being used as a standalone router, install 50 Ω BNC terminators on the control system expansion connections. See Terminating Unused Control System Expansion Connections on page 40.

Important Terminators must be installed on all unused BNC control system expansion connections.

Ethernet Control Connections

Ethernet control connections connect the router to the router control system using Ethernet connectors. Ethernet connections are especially helpful if the PC running the router control system is going to be on a network. An Ethernet connection is recommended for the NV9000 control system.

The Ethernet ports are divided into two sets that communicate with the primary control card or the secondary control card. For a detailed description of the Ethernet connections, see Serial Control Connections on page 11. Unlike serial control connections, there are no Ethernet connections to redundant control systems because redundant control systems can be connected through Ethernet network connections.

In order for the router to communicate with the router control system through an Ethernet connection, an IP address for the router needs to be set in the control card. The IP address is set using UniConfig.

The Ethernet control system connections use RJ45 connectors and Cat5, or better, cable. The Ethernet port is 10/100BT.

How to Make an Ethernet Connection to the Router Control System

1 Locate the Ethernet connections on the rear of the router, as shown in Figure 3-9. Ethernet control connections are labeled ‘PRI CTRL’ and ‘SEC CTRL’.

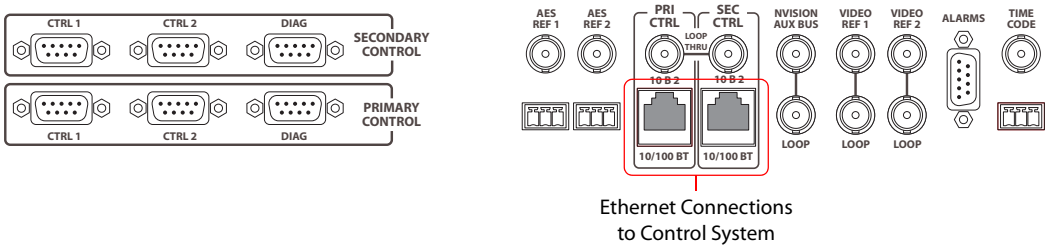


Figure 3-9. Ethernet Connections to Control System (Rear View)

2 Connect to the ‘10/100 BASE T’ Ethernet connection in the ‘PRI CTRL’ section using a RJ45 connector and Cat5, or better, cable.

3 Connect the other end of the cable to an Ethernet hub or switch on the router control system using a RJ45 connector.

4 If a secondary (optional for redundancy) control card is installed, connect to the ‘10/100 BASE T’ Ethernet connection in the ‘SEC CTRL’ section as described in Step 2 and Step 3. See Control Cards on page 15.

5 If two NV8256-Plus routers are being connected together, connect the control system expansion connections. (See Control System Expansion Connections on page 39.)

Or

If the NV8256-Plus is being used as a standalone router, install 50 Ω BNC terminators on the control system expansion connections. See Terminating Unused Control System Expansion Connections on page 40.

GSC Node Bus Control Connections

Some third-party router control systems require a GSC Node Bus connection to connect the router to the router control system. The NV8256-Plus has one GSC Node Bus connection, labeled ‘NVISION AUX BUS’. The connection is shared by both the primary and secondary control cards. For a detailed description of the GSC Node Bus connection, see GSC Node Bus Control Connections on page 12.

To use the GSC Node Bus connection, an optional module must be installed on each control card. For details, contact Miranda. For contact information, see Technical Support Contact Information on page iii.

The GSC Node Bus connection uses 75 Ω BNC connectors and coaxial cable.

How to Make a GSC Node Bus Connection to the Control System

1 Locate the GSC Node Bus connection on the rear of the router, as shown in Figure 3-10. The GSC Node Bus connection is labeled ‘NVISION AUX BUS’.

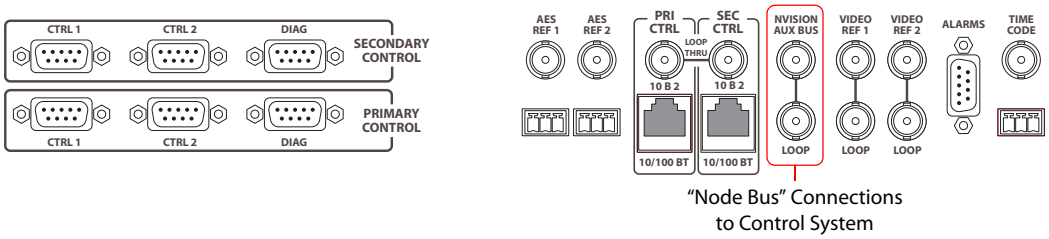


Figure 3-10. GSC Node Bus Connection to Control System (Rear View)

2 Connect to the ‘NVISION AUX BUS’ connection using a 75 Ω BNC connector and a coaxial cable.

3 Connect the other end of the coaxial cable to the router control system.

4 On all unused ‘NVISION AUX BUS’ connections, be sure to terminate the loop-through by installing a 75 Ω BNC terminator.

5 If you are connecting two NV8256-Plus routers together, you need to connect the control system expansion connections. (See Control System Expansion Connections, following.)

Or

If the NV8256-Plus is being used as a standalone router, install 50 Ω BNC terminators on the control system expansion connections. See Terminating Unused Control System Expansion Connections on page 40.

Control System Expansion Connections

Control system expansion connections enable both routers to communicate with the router control system when two NV8256-Plus routers are connected. When making control system connections, only one router is connected directly to the router control system. This router acts as the *primary* router. When making control system expansion connections, a separate connection is made from the *primary* router to the *secondary* router. This enables the router control system to manage both routers through the primary router connection. For simplicity, this procedure refers to each router as the *primary* or *secondary* router.

When connecting two routers together, any unused control system expansion connections on the *secondary* router must be terminated with a 50 Ω BNC connector.

The control system expansion connections are 10Base2 ports using 50 Ω BNC connectors and Cat3, or better, coaxial cable. The BNC terminator is supplied by Miranda (part 12115898).

How to Make Control System Expansion Connections between Two Routers

1 Locate the control system expansion connections on the rear of the two routers, as shown in Figure 3-11. The connections are labeled ‘10 B 2’.

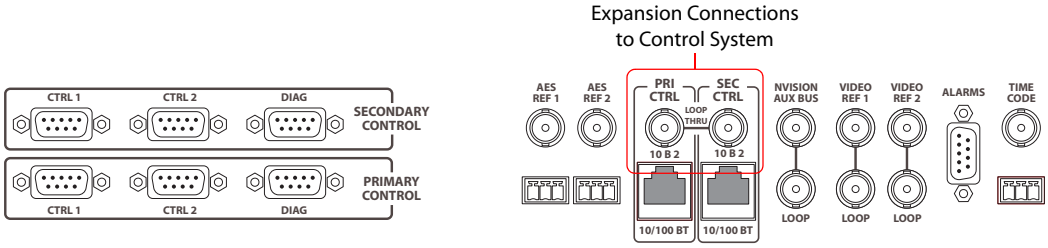


Figure 3-11. Expansion Connections to Control System (Rear View)

2 On the *primary* router (the router directly connected to the control system), connect to the ‘10 B 2’ BNC connection in either the ‘PRI CTRL’ or ‘SEC CTRL’ section using a 50 Ω BNC connector (12115898) and 10Base2 cable.

3 Connect the other end of the cable to the ‘10 B 2’ BNC connection in either the ‘PRI CTRL’ or ‘SEC CTRL’ section on the *secondary* router using a 50 Ω BNC connector.

4 On all unused control system expansion BNC connections, install a 50 Ω BNC terminator.

Terminating Unused Control System Expansion Connections

All unused control system expansion connections must have terminators. Unused control system expansion connections are terminated with a 50 Ω BNC terminator. The BNC terminator is supplied by Miranda (part 1211598).

How to Terminate Unused Control System Expansion Connections

1 Locate the control system expansion connections on the rear of the router, as shown in Figure 3-11. The connections are labeled ‘10 B 2’. See Figure 3-11.

2 On all unused control system expansion BNC connections, install a 50 Ω BNC terminator (Miranda part number 1211598).

Important Terminators must be installed on all unused BNC control system expansion connections.

Making Diagnostic Connections

The diagnostic connections enable the NV8256-Plus to communicate with the UniConfig application. UniConfig is installed on a unit, separate from the router (e.g., PC), and is used to perform system setup tasks, and configure and monitor the router. For information about using UniConfig, see the *UniConfig User’s Guide*.

Diagnostic connections are made by connecting the router to the unit running the UniConfig application. There are two types of diagnostic connections: temporary and permanent. A temporary diagnostic serial connection is located on the front of each control card. Permanent diagnostic serial connections are located on the rear of the router, labeled ‘DIAG’. For a detailed description of the serial connections, see Diagnostic on page 12.

Router IP Address

If you are using an Ethernet connection between the router and the router control system, an IP address for the router needs to be set on the control card. The IP address is set using UniConfig. However, the PC running UniConfig cannot communicate with the router until an IP address for the router is entered. To solve this problem, a temporary diagnostic connection to UniConfig can be created, enabling you to enter the IP address before completing all router connections and configurations. (See Temporarily Connecting to UniConfig on page 41.) After an IP address is entered, the temporary diagnostic connection can be disconnected and a permanent diagnostic connection made. (See Permanently Connecting to UniConfig on page 41 and Ethernet Control Connections on page 37.)

Temporarily Connecting to UniConfig

A temporary connection is created through the DE9 port located on the front of the primary control card. The baud rate for this port is locked to 9600.

How to Make Temporary Diagnostic Connections

1 Locate the primary control card slot, as shown in Figure 2-2 on page 8. When facing the front of the router, the control cards are located in the lower, right-hand section.

2 On the front of the control card, connect to the serial port using a DE9 connector and a serial cable. The following lists the DE9 pin connectors for RS-232:

PC End (DCE)	Pins	Router End (DTE)
DCD	1 ----------1	Ground
RXD	2 ----------2	TXD
TXD	3 ----------3	RXD
DTR	4 ----------4	DSR
Signal Ground	5 ----------5	Signal Ground
DSR	6 ----------6	DTR
RTS	7 ----------7	CTS
CTS	8 ----------8	RTS
Ground	9 ----------9	Ground

3 Connect the other end of the cable to the PC running the UniConfig application using a DE9 connector. (See Figure 3-19 on page 48.)

4 Using UniConfig, enter the IP address for the Ethernet control system connection.

5 When done configuring, remove the temporary connection.

Permanently Connecting to UniConfig

There are two diagnostic ports located on the rear of the router, labeled ‘DIAG’. The diagnostic ports default to 38,400 baud, RS-232, but can be set to RS-422 using UniConfig. For more information, see the UniConfig User’s Guide.

How to Make Permanent Diagnostic Connections:

1 Locate the diagnostic connections on the rear of the router, as shown in Figure 3-12. The diagnostic connections are labeled ‘DIAG’.

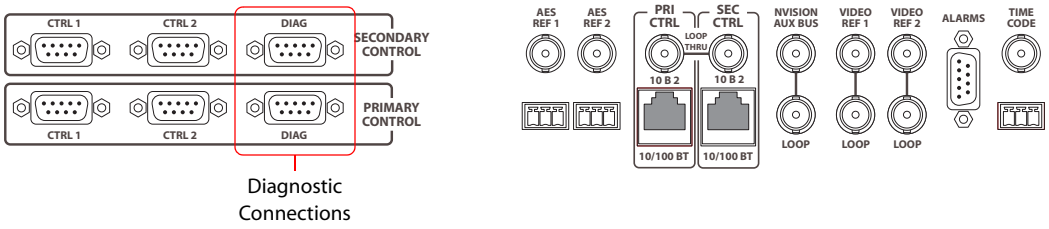


Figure 3-12. Diagnostic Connections (Rear View)

2 Connect to the ‘DIAG’ connection in the ‘PRIMARY CONTROL’ section using a DE9 connector and a serial cable. The ports are set for RS-232, but you can also use RS-422:

- The following lists the DE9 pin connectors for RS-232:

PC End (DCE)	Pin Numbers	Router End (DTE)
DCD	1 ----------1	Ground
RXD	2 ----------2	TXD
TXD	3 ----------3	RXD
DTR	4 ----------4	DSR
Signal Ground	5 ----------5	Signal Ground
DSR	6 ----------6	DTR
RTS	7 ----------7	CTS
CTS	8 ----------8	RTS
Ground	9 ----------9	Ground

- The DE9 connector can be set for RS-422, but adjustments will need to be made in UniConfig. For more information, see the UniConfig User’s Guide.

  The following lists the DE9 pin connectors for RS-422:

PC End	Pin Numbers	Router End
Ground	1 ----------1	Ground
Rx–	2 ----------2	Tx–
Tx+	3 ----------3	Rx+
Tx Common	4 ----------4	Rx Common
N/C	5 ----------5	N/C
Rx Common	6 ----------6	Tx Common
Rx+	7 ----------7	Tx+
Tx–	8 ----------8	Rx–
Ground	9 ----------9	Ground

3 Connect the other end of the cable to the PC running the UniConfig application.

4 If a secondary (optional for redundancy) control card is installed, connect to the ‘DIAG’ connection in the ‘SECONDARY CONTROL’ section using a DE9 connector and a serial cable as described in Step 2 and Step 3. For more information, see Control Cards on page 15.

Making Video Reference Connections

The NV8256-Plus provides timing reference connections for analog video signals, labeled ‘VIDEO REF 1’ and ‘VIDEO REF 2’. The control card uses these references to perform takes at the proper point in time (per SMPTE RP168), determining the router’s video frame switch points. The video reference connections require a stable source of PAL, NTSC or tri-level sync. Both video reference connections use 75 Ω BNC connectors and coaxial cable. For a detailed description of the video reference connections, see Video Reference on page 13.

Each ‘VIDEO REF’ connection can be use the same reference source (redundant) or two unique reference sources (dual). For more information, see Redundant and Dual References on page 13.

If a video reference is present, signals switch at the defined frame and line switch points. If a video reference is not present, the router performs takes using an internally generated reference signal and the control card displays a lit red LED. (See Indicator LEDs on page 58.)

How to Make Connections to the Video References

1 Locate the video reference connections on the rear of the router, as shown in Figure 3-13. Video reference connections are labeled ‘VIDEO REF 1’ and ‘VIDEO REF 2’.

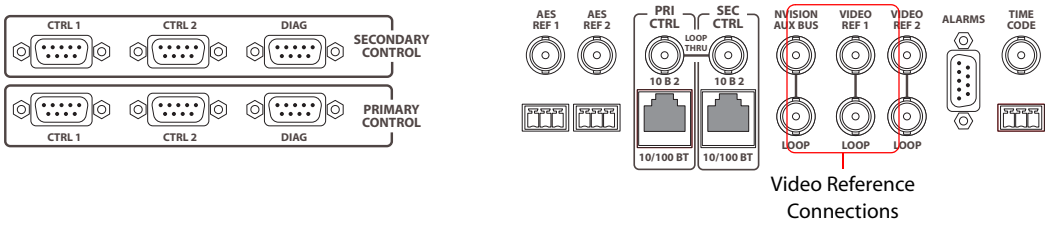


Figure 3-13. Video Reference Connections (Rear View)

2 Connect to the ‘VIDEO REF 1’ connection using a 75 Ω BNC connector and coaxial cable.

3 Connect the other end of the cable to a reference signal. Be sure the incoming signal is from a stable source. The signals can be:

PAL
NTSC
Tri-level sync (1080i 50, 59.94, 60 and 720p 50, 59.94, 60)

4 On all unused video reference connections, be sure to terminate the loop-through by installing a 75 Ω BNC terminator.

5 Connect to the ‘VIDEO REF 2’ input connection, as described in Steps 2 through 4.

Making Monitor Connections

The monitor connections on the rear of the NV8256-Plus enable the monitoring of outgoing signals. The monitor connections forward signals from the monitor card, which receives one signal

from each output card in the router. By connecting monitoring equipment to the monitor connections, the quality of signals being distributed from the router can be verified.

If connecting two NV8256-Plus routers together, only one router is connected directly to the monitoring equipment. This router acts as the *primary* router. Monitor expansion connections are then made between the primary router and the secondary, connected router. This enables the monitoring equipment to see both routers through the monitor connections on the primary router. (See Monitor Expansion Connections on page 44.)

Local Monitor Connections

There are two monitor connections: 'OUT 1' and 'OUT 2', located on the rear of the router. Each connection can be configured to match a level set up in the control system. Depending on how levels are configured, 'OUT 1' and 'OUT 2' can each monitor one signal type: SD, SWB or 3Gig. For more information, see Monitor Card on page 21.

How to Make Monitor Connections

1 Locate the monitor connections on the rear of the router, as shown in Figure 3-14.

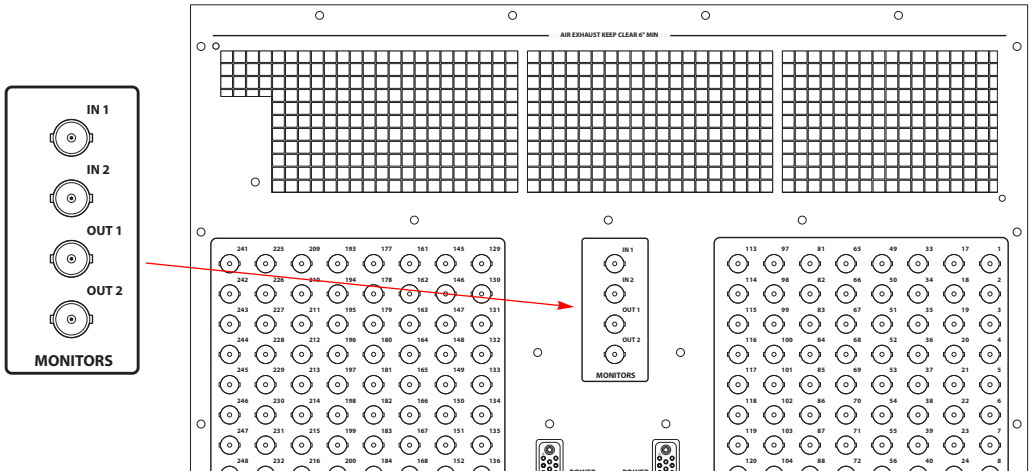


Figure 3-14. Monitor Connections (Rear View)

2 Connect to the 'OUT 1' monitor connection using a 75Ω BNC connector and coaxial cable.

3 Connect the other end of the cable to the monitoring equipment being used to monitor outgoing signals.

4 Connect to the 'OUT 2' monitor connection using a 75Ω BNC connector and coaxial cable.

5 If connecting two NV8256-Plus routers together, connect the monitor expansion connections. (See Monitor Expansion Connections on page 44.)

Monitor Expansion Connections

If two NV8256-Plus routers are connected together, monitor expansion connections need to be connected between the routers. One router acts as the *primary* router. This router is directly connected to the monitoring equipment. (See Making Monitor Connections on page 43.) The *secondary*, connected router is connected to the primary router's monitor expansion connections. This enables you

to monitor signals for both routers through the primary router's connection to the monitoring equipment. For simplicity, this procedure refers to each router as the *primary* or *secondary* router.

Monitor expansion connections are created by connecting the 'OUT' monitor connections on the *secondary* router to the 'IN' monitor connections on the *primary* router.

Note

Unused 'IN' connections on the secondary router do not need to be terminated with a BNC terminator.

How to Make Monitor Expansion Connections

1 Locate the monitor connections on the rear of the router, as shown in Figure 3-14 on page 44.

2 On the *secondary* router (the router that does *not* have direct connections to the monitoring equipment), connect to the 'OUT 1' monitor connection using a 75 Ω BNC connector and coaxial cable.

3 Connect the other end of the cable to the 'IN 1' monitor connection on the *primary* router using a 75 Ω BNC connector (the router with direct connections to the monitoring equipment), as shown in Figure 3-15.

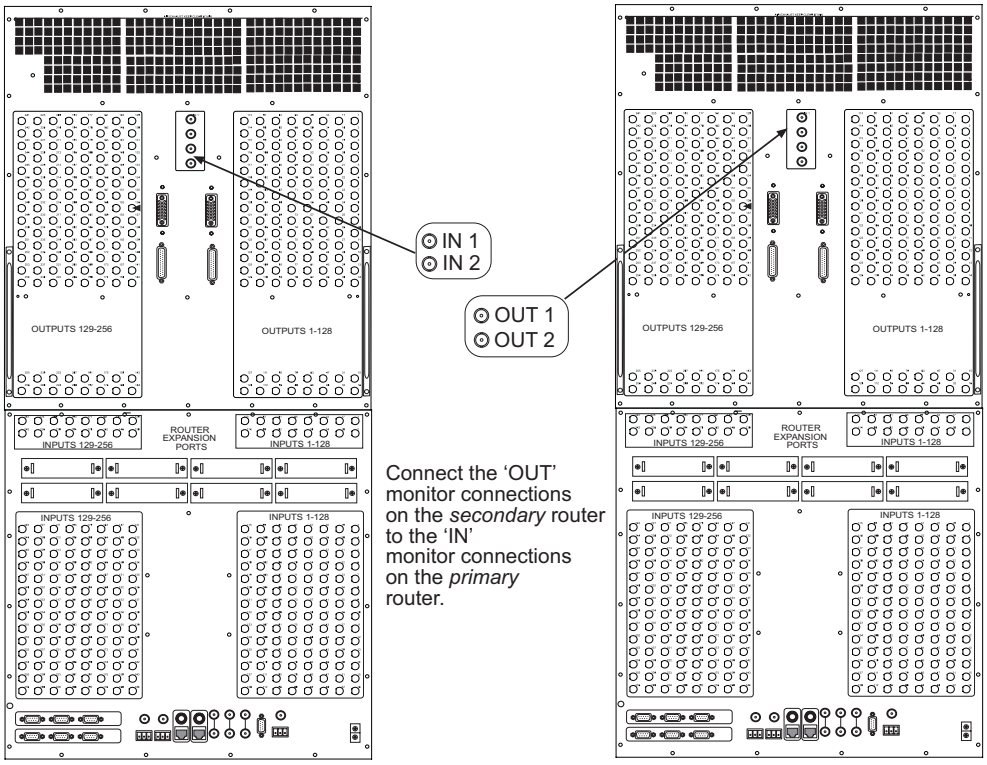


Figure 3-15. Monitor Expansion Connections Between Two Routers (Rear View)

4 On the *secondary* router, connect to the 'OUT 2' monitor connection using a 75 Ω BNC connector and coaxial cable.

5 Connect the other end of the cable to the 'IN 2' monitor connection on the *primary* router using a 75 Ω BNC connector, as shown in Figure 3-15.

Making Alarm Connections

The NV8256-Plus provides system alarms that notify you of a malfunction, such as when a fan or power supply is not functioning properly. Alarms can be connected to an external alarm indicator that displays visual cues when an alarm is activated. The NV6257 (power supply) and the NV8256-Plus each have alarm connections. Miranda does not provide external indicator equipment, but does provide instructions on wiring the alarm connections. See Alarm Indicator Equipment on page 46.

Both the NV6257 and the router send status information to the router control system. For more information on the alarm connections, see Alarm on page 14.

How to Make Alarm Connections

1 On the rear of the **NV6257**, locate the 'Alarms' connection, as shown in Figure 3-16.

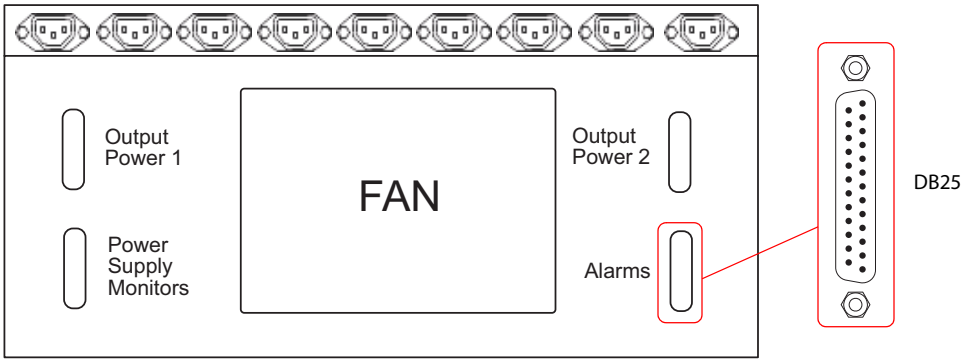


Figure 3-16. Power Supply Alarms Connection on the NV6257 (Rear View)

2 Connect to the 'Alarms' connection using a DB25 connector and cable.

3 Connect the other end of the cable to an external alarm indicator. See NV6257 Alarms on page 47 for information on wiring the DB25 connector.

4 On the rear of the **router,** locate the 'ALARMS' connection, as shown in Figure 3-17.

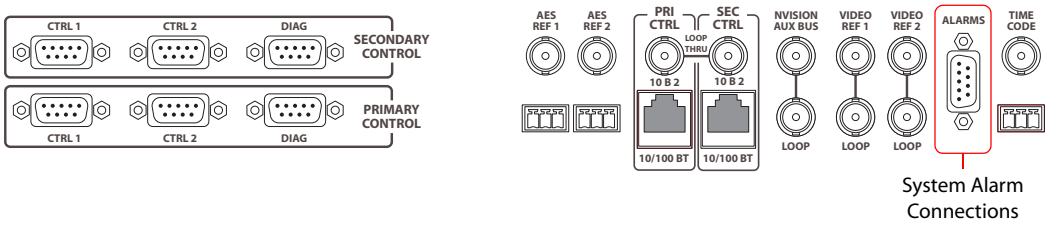


Figure 3-17. System Alarm Connection on Router (Rear View)

5 Connect to the 'ALARMS' connection using a DE9 connector and cable.

6 Connect the other end of the cable to an external alarm indicator. See Router Alarms on page 47 for information on wiring the DE9 connector.

Alarm Indicator Equipment

An external alarm indicator can be created to display visual cues when a failure has occurred on the NV6257 power supply or the NV8256-Plus router frame. LEDs can be wired to specific pins on a DE9 or DB25 connector. Each LED indicates what specific router module has failed.

- For NV6257 alarms, see NV6257 Alarms on page 47.
- For NV8256-Plus alarms, see Router Alarms on page 47.

NV6257 Alarms

The ‘Alarms’ connection on the rear of the NV6257 uses a DB25 connector. An “alarm” or ON condition occurs when the connection between an alarm pin and Alarm_COM (common) opens. The alarm turns OFF when the connection between Alarm_COM and the alarm pin closes again. If you remove any PS6000 power supply module, the alarm circuit remains open.

To create an indicator box, connect to the ‘Alarms’ connection using a DB25 female connector, wiring as shown in Figure 3-18. Each pin monitors a specific function and activates a specific alarm.

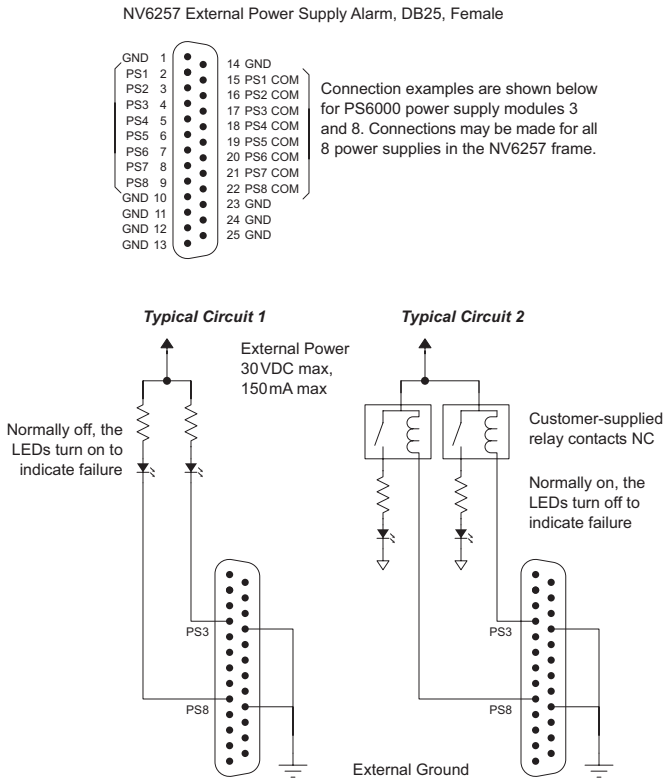


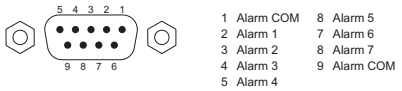
Figure 3-18. NV6257 Power Supply Alarms Connection

Caution The power supply for the alarm circuit must not exceed 30 VDC. Load resistor value depends on power supply voltage.

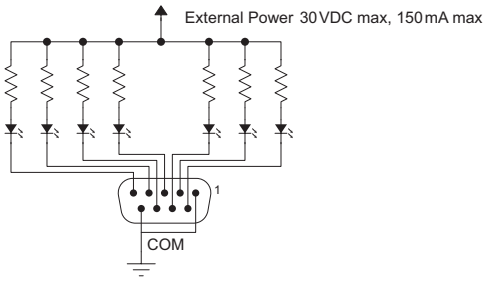
Router Alarms

The ‘ALARM’ connection on the rear of the NV8256-Plus uses a DE9 connector. An “alarm” or ON condition occurs when the connection between an alarm pin and Alarm_COM (common) opens. The alarm turns OFF when the connection between Alarm_COM and the alarm pin closes again.

To create an indicator box, connect to the ‘ALARM’ connection using a DE9 female connector, wiring as shown in Figure 3-19. Each pin monitors a specific function and activates a specific alarm.



Typical Circuit 1
Normally ON, the LEDs turn off to indicate failure



Typical Circuit 2
Normally OFF, the LEDs turn on to indicate failure

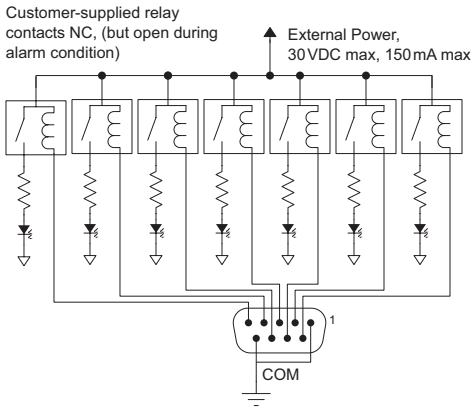


Figure 3-19. Alarm Connections and On/Off Switches

The following lists each DE9 pin and the associated alarm. The pin number listed corresponds to the pin numbers in Figure 3-19:

Pin	Signal	Description	Possible Conditions Causing the Alarm
1, 9	Alarm_COM	Common	Common connection for all alarm pins.
2	Alarm_1	Major Alarm	Indicates missing reference inputs, or missing power supplies.
3	Alarm_2	Minor Alarm	Alarm_3, or Alarm_4, or Alarm_5, or Alarm_6
4	Alarm_3	Power Supply	Missing power supply module.
5	Alarm_4	Video Ref	Missing Video Ref 1 or Video Ref 2.
6	Alarm_5	AES3 ref	Not used in NV8256-Plus.
7	Alarm_6	Fans or temperature	Indicates a fan failure or module over temperature.
8	Alarm_7	Control module health	Any control module not “healthy.”

Verification

When installation is complete, perform the following checks to make sure the router is operating properly:

- On the NV6257 power supply, check that all 5 green power LEDs on the front of each PS6000 power supply module are lit. If any or all LEDs are off:

  Check that the PS6000 power supply module is fully seated in its slot.

  Check the AC fuse on the PS6000 power supply module.

  Check for +48 volts at each of the 5 front test points.

- On the NV8256-Plus, check that the LEDs on the input cards, crosspoint cards, control cards, and output cards are lit and indicating a “healthy” system. See Indicator LEDs on page 58 for a list of normal and alert LED states.

- Make sure that the flow of air through the front of the router is unimpeded and the door is properly installed and closed. For more information, see Air Flow on page 59.

4. Operation

Chapter 4 provides general operating information for the NV8256-Plus. It presents the following topics:

Overview

A router control system is required to use the NV8256-Plus router. The control system provides an interface for operations and maintenance personnel. Through the control system, signal switching can be actively configured, reference inputs selected, partitions for organizing signal switching created, and certain system functions monitored.

The NV8256-Plus is designed to partner with the NV9000 control system. However, Miranda's NVISION series routers are designed with a degree of flexibility and can be used with certain third-party control systems. For detailed information on using the NV9000 or NV915 control system, see the associated User's Guide. For information on using third-party control systems, see the third-party vendor literature. For more information on compatible control systems. For contact information, contact Miranda. For contact information, see Technical Support Contact Information on page iii.

NV9000 Control Systems

Most facilities require multi-level switching capability (audio follow video, for example) and intuitive device naming capabilities. The control system used dramatically affects how operators use the NV8256-Plus and the ease with which devices are accessed.

Miranda's NV9000 control system runs on a unit (e.g., PC) separate from the router. The router control system can be loaded on a primary server only, or on both primary and secondary (redundant) servers, creating a fail-over backup. The control system hardware provides control panels for managing routers and other network equipment.

Miranda's router control systems offer a variety of control surfaces, support redundancy, and facilitate expansion as routing needs change. The control system is also capable of interfacing with third-party signal routing equipment. Because of the variety of features, capabilities and limitations of other manufacturers' equipment, users are urged to work closely with Miranda's technical staff and with the supplier of the third-party equipment when integrating it into an NV9000 control system.

Third-Party Control Systems

Miranda provides assistance to users wanting to configure Miranda products to function with third-party control systems. However, because Miranda does not manufacture or warrant control systems from other vendors, we cannot guarantee overall performance or answer all possible configuration-related questions. For assistance, contact the manufacturer of the control system in use.

In many cases, router features and functionality are limited when using a third-party control system. For example, the third-party system may not optimally manage mono routing, while the NV9000 control system easily manages this function.

Please consult with Miranda if you are considering using a third-party interface to control an NV8256-Plus router. For contact information, see Technical Support Contact Information on page iii.

Setting Redundant Crosspoint Card Switching

The NV8256-Plus crosspoint card features four buttons located on the front of the card. When the card is installed in the *middle* crosspoint card slot —the slot for the optional, redundant crosspoint card—the buttons become active and can be used to change which signals the crosspoint card manages. (See Figure 4-1 on page 53.)

By pressing a button on the front of the crosspoint card, the card can be directed to take over active control of signal switching from another crosspoint card, become a standby crosspoint, or enable external control. By setting the redundant crosspoint card to take over active control of the primary card's signals, a primary crosspoint card can be removed without experiencing any downtime.

The brightness level of the buttons indicate the current status: full-brightness indicates that the remote and local control is active; half-brightness indicates local control only is active.

How to Set Redundant Crosspoint Card Operations

1 Facing the front of the router with the door open, locate the redundant crosspoint card, as shown in Figure 4-1.

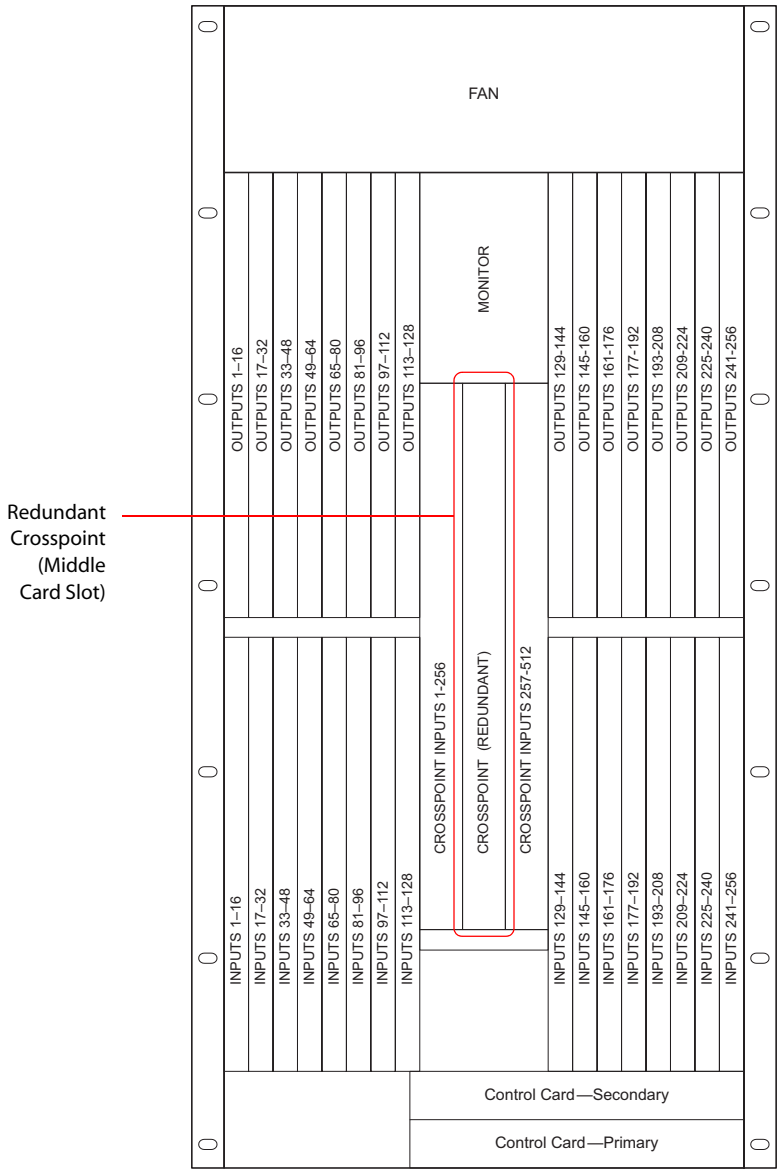


Figure 4-1. Location of Redundant Crosspoint Card (Front View)

2 The front panel buttons should be lit. Press a button to activate that function:

- **Replace XPT (1–256)** — take over active control of inputs 1–256 from the local crosspoint card installed in the *left* crosspoint card slot.
- **Standby Mode** — sets redundant card to act as a backup to the local crosspoint card should the card fail.
- **Replace XPT (257–512)** — take over active control of inputs 257–512 from the crosspoint card installed in the *right* crosspoint card slot.

- **Remote Control** — allows external remote control of the redundant crosspoint card. For information on remote control, see Using Remote Control, following.

For more information on which signals are controlled by which crosspoint card slot, see Crosspoint Card Slots and Managed Signals on page 5.

3 The selected function will remain active until another button is pressed and a new function selected.

Using Remote Control

The redundant crosspoint card can be controlled remotely by creating an external circuit. To create the circuit, use momentary switches with a series resistance of 50 Ω or less. The switches should be connected in parallel with an LED cathode attached to ground (GND). The output signals are nominally +3.3 V. The selected diode should have a maximum forward bias current of 10 mA and maximum forward bias voltage of 1.5–2.2 V.

Figure 4-2 shows the remote control connector pinout and required circuit.

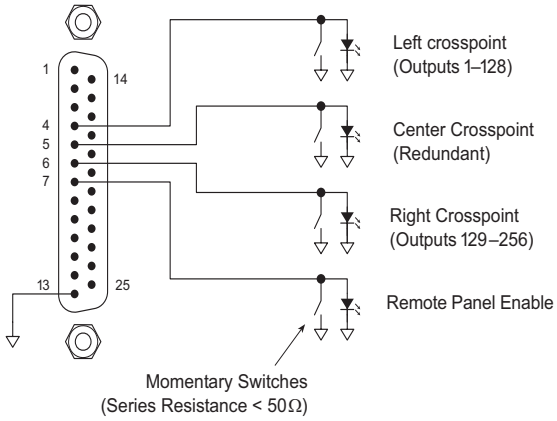


Figure 4-2. Redundant Crosspoint Card Connector

5. Configuration

Chapter 5 is a place-holder, essentially a pointer to *UniConfig*.

UniConfig

Before being placed into service, the NV8256-Plus router needs to be configured for your particular facility and router control system. Configuration includes initializing ports so that the router and UniConfig can communicate, setting up partitions, switch point settings, and testing switching configurations. Configuration tasks are performed using the UniConfig application, which resides on a unit (e.g., PC) separate from the router. For detailed information on using UniConfig, see the *UniConfig User's Guide*.

6. Maintenance

Chapter 6 provides maintenance instructions. It discusses the following topics:

General Maintenance

The NV8256-Plus does not require any periodic electrical or physical maintenance. Other than cleaning the fan air intake filter, all that is required is periodic inspection of the system to make sure no failures have occurred.

It is recommended that the system's indicator LEDs be checked on a regular basis to ensure that the system is operating properly. (See Indicator LEDs on page 58.) It is also a good idea to regularly make sure cooling air flow to the power supply fans is unobstructed.

Caution — Only qualified service personnel should perform procedures in this section.

Fuse Replacement

Fuses are located on each of the frame modules. If a problem occurs on a module, it is a good to check the fuses. The following table lists the fuses on each module:

Location	Fuse Value
Power supply AC line fuse	8 Amp, 5 × 20 mm, slow-blow
Control card DC fuse	1 Amp, auto reset (not user serviceable)
Crosspoint card	1 Amp, auto reset (not user serviceable)

Warning — Dangerous voltages are present at the rear AC power connector and on the power supply module. Take precautions to prevent electric shock: Do not touch exposed wires or connecting pins.

Indicator LEDs

Indicator LEDs indicate whether AC power is present and if a card is operating normally. LEDs are visible when the router front door is closed. In the following sections, LEDs are listed in the order they appear on the cards, from top to bottom.

Power Supplies

The five green LEDs on the front of the power supply modules indicate presence of the five +48 VDC outputs of the five branch circuits. All five LEDs should be lit at all times when AC power is present. If any LED is off, either the power supply has failed or the branch circuit is shorted.

Control Cards

The LEDs on the control cards can be monitored to determine whether the card is operating normally. The meanings of the LED indicators are as follows:

LED Indicator	Indicator Function
Red (low battery)	Normally OFF. If lit, indicates that the battery needs replacing. See Battery Replacement on page 59.
Red (alarm)	Normally OFF. If lit, indicates a problem or fault. Check the external reference signals. If that does not resolve the problem, refer to the system status window in UniConfig for additional information. If you cannot resolve the problem, call Miranda Technical Support. For contact information, see Technical Support Contact Information on page iii.
Amber (active card)	Normally ON. Indicates the card is the active control card. On the standby control card, this LED should be OFF.
Green (health, power)	Normally ON. Indicates the card has power and is operating normally.

Input, Crosspoint, and Output Cards

The LEDs on the input, output, and crosspoint cards can be monitored to determine whether the cards are operating normally. The LEDs indicate the following:

LED Indicator	Indicator Function
Red (alarm)	Normally OFF. If lit, it indicates a problem. Replace the card or call Miranda Technical Support. For contact information, see Technical Support Contact Information on page iii.
Green (power)	Normally ON. Indicates the card has power and is operating normally.
Amber (health)	Normally ON. Indicates software has loaded and the card is operating normally.
Green (good communication)	Normally ON. Indicates good communication with the control card.
Red (bad communication)	Normally OFF. If lit, indicates that communication is not working properly with the control card; the communication is “bad.”

Air Flow

The NV8256-Plus draws cooling air from the front of the router, through the door, and exhausts heated air through the rear of the frame. The router must have the door properly installed and closed for proper airflow through the chassis. For maximum air flow, regularly inspect router fans and filters.

Caution | If airflow is impeded overheating may occur.

Fan Cleaning and Replacement

One plug-in fan tray containing three cooling fans is located at the top of the router frame. The tray can be removed for inspection or cleaning by opening the frame front door, sliding the latches that hold the fan module in place, and pulling the module out of the frame. If the fans become dusty or clogged with lint, use a vacuum or compressed air to clean the dust off. Also check the openings at the back of the frame where air enters and exits to be sure dust and lint have not accumulated.

The fan tray is easily replaced simply by sliding it out of the front of the frame and inserting a new tray. The fans on the tray are held in place by four screws and a pluggable connector. To replace the fans, remove the screws and unplug the connector.

Intake Filter Screen Cleaning

The NV8256-Plus has three fan filters. Two intake filters are located on the front door assembly. To access the filters, open the router door by releasing the two thumbscrew locks and then slide the filters up and to the right to remove. This process may be easier if the entire door is removed by lifting it straight up while open.

The system can be operated safely with the door removed for short periods of time. If the filter is only lightly contaminated with debris, clean the filter by vacuuming up loose debris or by blowing air from the clean side to the dirty side. For filters badly loaded with debris, rinse with cold water or wash with warm water and mild detergent. Be sure the filter is completely dry before re-installing it.

Battery Replacement

If the red Low Battery LED indicator on the control card is lit, the battery located on the front edge of the card needs replacing. Grasp the exposed edge of the battery with your fingers and pull it towards you to remove it.

Important | Do not use a metallic tool to remove the battery.

Call Miranda for replacement battery information. For contact information, see Technical Support Contact Information on page iii.

When you insert the new battery, be careful to observe the correct polarity.

Caution

To prevent explosion of the battery and possible equipment damage or harm to personnel, be sure the battery is oriented with the correct polarity. Polarity markings are visible on the card's battery housing.

Troubleshooting

Many system troubles are caused by easily corrected errors, such as poor quality or missing input or reference signals, incorrect configuration, and so on. This section lists common problems and their solutions in the most likely order of occurrence. Refer also to the Introduction on page 3 for an overview of the system and its major components. Try troubleshooting the system yourself, and if you are not successful, call Miranda Technical Support as explained near the front of this manual.

In the event that a problem is caused by a bad circuit board, swapping the bad board with a replacement circuit board is the quickest solution. To order replacement boards or other components, contact Miranda. For contact information, see Technical Support Contact Information on page iii.

Symptom	Possible Causes and Solutions
System not powering up.	Verify that the power cord(s) are plugged into the frame and the AC power source. Use a voltmeter to verify the presence of power. Check the AC line fuse on the PS6000 power supply module. See Fuse Replacement on page 57.
One or a few cards or PS6000 power supply modules are not powering up or not operating properly.	Check that the card or module is fully seated in the frame. Reset the card or module by reseating it in the frame. Check that all five green LEDs on the front of the PS6000 power supply modules are lit. If an LED is not lit, it indicates a branch circuit may be faulty, which could affect only certain modules in the frame. Replace the PS6000 power supply module. Check the PS6000 module and card fuses. See Fuse Replacement on page 57.
Intermittent signal on one or two outputs.	Check input and output cable continuity and cable terminations. Possible bad card. Swap each card in the signal path with another card to see if the problem moves with the card. If so, replace the card. If all cables, terminations, and cards check out OK, call Technical Support. (See Technical Support Contact Information on page iii.)
Intermittent or missing signals on all outputs.	Check the control card, which processes the references to produce sync. A synchronous system requires an operational control card in order to pass signals. An asynchronous system will operate in its last state even if the control card is removed. Change over to the reserve control card to see if the problem goes away. Possible low voltage on PS6000 power supply module. Check power test points on the module. Voltages at power supply test points may be slightly high in lightly loaded systems. Replace the PS6000 power supply module if any test points indicate low voltage.

Obtaining Service

For service advice, warranty exchange, warranty repair, or out-of-warranty repair:

1 Call Miranda Customer Support at the telephone number given under Technical Support Contact Information on page iii. Our Customer Service Personnel will help you resolve any service issues.

2 If you need an exchange or repair, Miranda will assign you a Return Material Authorization (RMA) number. **Do not return equipment without first receiving an RMA number.** Miranda uses the RMA to track receipt of the equipment and to record repair or replacement information.

   For out-of-warranty equipment, the Miranda Technical Support Engineer estimates the cost of repair when you call and requests a purchase order payable to Miranda.

   If repair or exchange is required, package the assembly in an antistatic bag and place it in a shipping box with plenty of padding to prevent damage.

3 Address the package using the shipping address listed given under Technical Support Contact Information on page iii, and ship the equipment to Miranda at your company's expense.

4 When repair or replacement of in-warranty equipment is complete, Miranda return ships the items at our expense. For out-of-warranty equipment Miranda charges a shipping and handling fee. The standard shipping method is "second day."

   For out-of-warranty service, Miranda will send your company an invoice following the repair or replacement.

7. Glossary

Chapter 7 is a glossary.

Glossary

3Gig	The combination of SD, HD and 3.0 Gp/s video signals. Rates 270, 1,483, 1,485, 2,996, 2,970 Mb/s up to 3.0 Gb/s.
AC	Alternating current.
A/D	Analog-to-digital conversion. In this manual, the digital signal is SD.
CE	Conformité Européenne. European health and safety product label.
D/A	Digital-to-analog conversion. In this manual, the digital signal is SD.
dBu	Unit of audio level where 0 dBu is 0.775 V rms.
DC	Direct current.
EIA	Electronic Industries Alliance. A trade organization for electronics manufacturers in the United States. The organization helps develop standards on electronic components, consumer electronics, electronic information, telecommunications, and Internet security.
ESD	Electrostatic discharge.
HD	High definition (HD-SDI). Video signal rates: SMPTE 259M at 1.483 and 1.485 Gb/s.
IEC	International Electrotechnical Commission. An international standards organization dealing with electrical, electronic and related technologies.
IEEE	Institute of Electrical & Electronics Engineers. An international non-profit, professional organization for the advancement of technology related to electricity.
IMD	Inter-modulation distortion.
I/O	Input/output.
LAN	Local area network.
LED	Light-emitting diode.
RU	Rack units. A standard measure or size for frames (1.75 inches).
SD	Standard definition (SD-SDI). Video signal rates: SMPTE 259M at 143, 177, 270 and 360 Mb/s and SMPTE 344M at 540 Mb/s.
SMPTE	Society of Motion Picture and Television Engineers. www.smpte.org. An international professional association, based in the United States of America, of engineers working in the motion imaging industries.
SWB	Super wide band. The combination of SD and HD signal rates up to 1.5 Gb/s.

UL	Underwriters Laboratory Incorporated. Develops standards and test procedures for materials, components, assemblies, tools, equipment and procedures, chiefly dealing with product safety and utility.
UniConfig	Software used to configure the router control system.
V	Volts.
VAC	Volts, alternating current.
VDC	Volts, direct current.

8. Technical Details

Chapter 8 provides technical specifications for the NV8256-Plus router and the NV6257 power supply.

Power Specifications (NV6257, PS6000)

Power is supplied through a separate frame, the NV6257 Power Supply. The following table provides power specifications for the NV6257 for powering the NV8256-Plus:

Type	Parameter
AC input	90–130/180–250 VAC, 50/60 Hz, auto-ranging.
AC fuses	Power Supplies: 8A (HB0145-00), slow-blow; 90–130 V. 6.3A (HB0031-00), slow-blow, 180–250 V.
AC connectors	8, IEC 320 (one for each PS6000 module installed).
AC power	PS6000, 660 Watts, one IEC 320.
AC power usage	Power based on PS6000 modules; 4 primary (4 optional redundant): 1,175 Watts nominal (256 × 256 SD or SWB), power factor corrected.
Modules and module slots	Required minimum number of PS6000 modules: 4 primary (4 optional redundant). One NV6257 power supply frame can power one router.
Dimensions	5RU high (8.72 inches, 221.5 mm). 19.0 inches (482.6 mm) wide. 21.0 inches (533.4 mm) deep.
Weight	55 lbs (25 kg); 105 lbs (47.5 kg) fully loaded.
DC power	Miranda connector and DC cable (WC0085).
Power supply alarm connection	DB25 (reads status from each PS6000).
Power supply monitor connection	DB25.

Type	Parameter
Environmental	Operating temperature: 0 to 40°C. Relative humidity: 0 to 90%, non-condensing.
Regulatory compliance	UL listed and CE compliant.

Physical Specifications

The following table provides physical specifications for the NV8256-Plus.

Specification	Detail
Dimensions	22RU (38.47 inches, 997.1 mm) high. 19.0 inches (482.6 mm) wide. 18.0 inches (457.2 mm) deep.
Weight	132 lbs (60 kg); 328 lbs (149.1 kg) fully loaded.
Mounting	EIA 310-C, 19.0 inches (482.6 mm).
Grounding terminal	Copper, accepts 14–6 AWG.
Modules and module slots	16 input cards, 16 input signals plus 16 expansion signals. 16 input filler cards, 16 expansion signals. 16 output cards, 16 signals each. 3 crosspoint cards (2 primary, 1 optional redundant). 2 control cards (1 primary, 1 optional secondary). 1 monitor card. 1 fan module.
Diagnostic	Type: serial port. Standard: SMPTE 207M, EIA-422/EIA-232, configurable. Connectors: 2, DE9
Serial control	Type: Serial port (2 per control card). Standard: SMPTE 207M, EIA-422. Connectors: 4, DE9.
Ethernet	Type: 10/100baseT Standard: IEEE 802.3 Protocol: NVISION Ethernet protocol Connectors: 2, RJ45
NVISION Aux bus control	Type: serial Standard: proprietary Connectors: 2, BNC, loop-through, non-terminating pair Impedance: 75 Ω
Output signal monitor	Type: standard definition and high definition digital video. Standard: see related section of this specification for standard for each monitored signal type. Connectors: BNC. Impedance: 75 Ω. Signal details: See related section of this specification for details for each monitored signal type, including jitter, I/O levels and return loss.

Specification	Detail
I/O expansion	Type: proprietary. Standard: See related section of this specification for standard for each signal type sent between routers. Connectors: 8, proprietary, Miranda cable WC0056-00. Signal details: See related section of this specification for details for each signal type, I/O levels and return loss.
Control expansion	Type: 10base2 port. Connectors: 2, BNC, loop-through. Impedance: 50 Ω.
Redundant crosspoint control	Connectors: DB25.
Power supply monitor	Connectors: DB25.

Environmental Specifications

The following table provides environmental specifications for the NV8256-Plus.

Specification	Detail
Operating temperature	0–40°C.
Relative humidity	0 to 90%, non-condensing.

Audio Specifications

The following table provides audio specifications for the NV8256-Plus.

Specification	Detail
Audio reference input	Type: serial digital audio Standard: AES3 or AES3id Sample rate: 48 kHz Connectors: 2, BNC or Phoenix Impedance: 75 Ω or 110 Ω Input level: 0.5 Vpp to 2.0 Vpp

Video Specifications

The following table provides video specifications for the NV8256-Plus.

Specification	Detail
Video reference input	Type: analog video reference. Standard: PAL, NTSC, or tri-level sync. Connectors: loop-through, BNC. Impedance: 75 Ω or Hi-Z (> 20 kΩ), not selectable. Input Level: 0.5 Vpp to 2.0 Vpp. Input Return Loss: ≥ 30 dB to 5 MHz
SD inputs and outputs	Type: standard definition, serial digital video. Standard: SMPTE 259M and 344M. Data rates: auto re-clocking: 143, 177, 270, 360 or 540 Mb/s or auto bypass. Data rates: pass-through, 10 Mb/s to 540 Mb/s. Connectors: BNC. Impedance: 75 Ω. Cable equalization: 350 m Belden 1694A, 200 m Belden 1855A, or equivalent cable, at 270 Mb/s. Router path: non-inverting. Input and output return loss: > 15 dB, 5 to 540 MHz. Output level: 800 mVpp ± 10%. Output rise/fall time: 600 ps ± 10%. Output overshoot: ≤ 10% of amplitude max. Output alignment jitter: ≤ 0.2 UI pp from 1.0 kHz to 27 MHz. Output Timing Jitter: ≤ 0.2 UI pp from 10 Hz to 1.0 kHz.
SWB (SD and HD) inputs and outputs	Type: high definition, serial digital video. Standard: SMPTE 259M, 344M and 292M. Data rate: auto re-clocking at 143, 177, 270, 360, 540 Mb/s and 1.483 and 1.485 Gb/s or auto bypass. Data rate: pass-through at 10 Mb/s to 1.5 Gb/s. Connectors: BNC. Impedance: 75 Ω. Cable equalization: 150m Belden 1694A, 85m Belden 1855A, or equivalent cable, at 1.5 Gb/s. Router path: non-inverting. Output level: 800 mVpp ± 10%. Input and output return loss: > 15 dB, 5 MHz to 1.5 GHz. Output rise/fall time: ≤ 270 ps. Output overshoot: ≤ 10% of amplitude max. Output alignment jitter: ≤ 0.2 UI pp from 100 kHz to 150 MHz. Output timing jitter: ≤ 1.0 UI pp from 10 Hz to 100 kHz.

Specification	Detail
3Gig (3.0 Gb/s, HD and SD) inputs and outputs	Type: high definition, serial digital video. Standard: SMPTE 259M-C, 292M and 424M. Data rate: auto re-clocking at 270 Mb/s and 1.483, 1.485, 2.966, 2.970 Gb/s or auto bypass. Data rate: pass-through at 10 Mb/s to 3.0 Gb/s. Connectors: BNC. Impedance: 75 Ω. Cable equalization (for cables listed or equivalent cable): 400 m Belden 1694A, 250 m Belden 1855A at 270 Mb/s. 150 m Belden 1694A, 100 m Belden 1855A at 1.5 Gb/s. 100 m Belden 1694A, 45 m Belden 1855A at 3.0 Gb/s. Router path: non-inverting. Output level: 800 mVpp ± 10%. Input and Output Return Loss: > 15 dB, 5 MHz to 1.5 GHz; > 10 dB, 1.5 GHz to 3.0 GHz. Output rise/fall time: ≤ 135 ps. Output overshoot: ≤ 10% of amplitude max. Output alignment Jitter: ≤ 0.3 UI pp from 100 kHz to 300 MHz. Output timing jitter: ≤ 2.0 UI pp from 10 Hz to 100 kHz.
Analog/Digital Video Conversion	Type: analog to digital video conversion. Standard: NTSC, PAL analog composite video. Connectors: BNC. Impedance: 75 Ω. Level: 1 Vpp, nominal. Common mode range: ±2 Vpp. Frequency response (input): ± 0.5 dB to 5.5 MHz (luminance). Frequency response (output): ± 0.2 dB to 5.5 MHz (luminance). Luma/chroma delay: < 12 ns. Luma/chroma gain inequality: < 0.5 dB. Differential gain: < 0.3%. Differential phase: < 0.3 degrees. Pedestal (input): > 75 dB unweighted. Pedestal (output): > 75 dB unweighted. Ramp (input): > 50 dB unweighted. Ramp (output): > 62.5 dB unweighted.

Time Code Specifications

The following table provides time code specifications for the NV8256-Plus.

Specification	Detail
Time-code reference input	Type: 1 BNC, 1 Phoenix. Standard: SMPTE 12M. Connectors: BNC (terminating), Phoenix. Data rates: 1/30 to 80 times normal. Impedance: 75 Ω or 110 Ω.

9. Part Numbers

Chapter 9 provides a list of parts used in the NV8256-Plus router and NV6257 power supply:

Cards

EM0374	Control card.
EM0437	Input card — standard for SWB signals.
EM0437-50	Input card — filler for SD and SWB signals.
EM0439	Crosspoint card.
EM0444	Output card for SWB signals.
EM0449	Input card — standard for SD signals.
EM0451	Input card — Analog-to-digital signal conversion.
EM0452	Output card — Digital-to-analog signal conversion.
EM0474	Output card for SD signals.
EM0619	Input card — Standard for 3Gig signals.
EM0619-50	Input card — Filler for 3Gig signals.
EM0620	Output card for 3Gig signals.
EM0633	Monitor for SD, SWB and 3Gig signals.
1143408	Monitor for SD and SWB signals.

Power Supply

PS6000	Power supply module for the NV6257.
WC0046-00	Power supply monitor cable.
WC0085-00	Power supply cable for connecting one router to one NV6257 power supply.

Frame Expansion

WC0056-00	Expansion cable for connecting two routers together and transmitting signals between routers.
12115898	50Ω BNC terminator for unused control system expansion connections.

Index

0–9

A

B

C

D

E

F

G

H

I

L

M

N

O

P

R

S

T

U

V

W

X

Index