NV5256
Machine Control Router

User's Guide

NV5256 Machine Control Router — User's Guide

- **Revision**: 1.7

- **Software Version**: -na-

- **Part Number**: UG0018-07

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

Change History

The table below lists the changes to the Machine Control Router User's Guide.

- User's Guide Part # UG0018-07
- Software version: -na-

Rev	Date	ECO	Description	Approved By
0.9	30 Mar 07	12960	New document. Preliminary Release	D.Cox
1.1	12 Jul 07	13355	Corrections.	D.Cox
1.2	07 Aug 07	13430	The wiring in the BP-PORT-64 breakout panel has been corrected.	D.Cox
1.3	22 Jan 08	14014	Added a pinout diagram of the AES 3-pin reference connectors.	D.Cox
1.4	22 Oct 08	14426	Updated formats.	DEM/D.Cox
1.5	31 Mar 09	15703	Format change.	DEM/D.Cox
1.6	10 Oct 09	16114	Corrected contact information.	DEM
1.7	18 Aug 10	17186	Added reference to PS6100. Minor corrections..	D.Cox

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.

It is our objective at NV to maintain compliance with all relevant environmental and product regulatory requirements. Detailed information on specific products or on the RoHS program at Miranda is available from Miranda Customer Support at

1-800-719-1900 (toll-free) or
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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

1. Preface

Chapter 1 provides an introduction to the NV5256 User's Guide. It presents the following topics:

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

Chapter Structure

The following chapters provide information regarding the NV5256 Machine Control Router:

- Chapter 1, Preface, (this chapter) outlines easy ways to use this guide and provides a list of terms and conventions.
- Chapter 2, Introduction, is a brief introduction to the NV5256.
- Chapter 3, Detail, discusses the features and functions of the NV5256.
- Chapter 4, Configuration, discusses configuration of the NV5256.
- Chapter 5, Maintenance, discusses the features and functions of the NV5256.
- Chapter 6, Specifications, presents the electrical, mechanical, and other specifications for the NV5256.
- Chapter 7, Misc. Topics, presents miscellaneous information.

An Index is also available 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 easily 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.

• Entries enclosed in single quotes denote the names of control panel buttons and knobs, or menu items.

  • Choose 'Aux' to ...

  • Press 'Keyer 2' button ...

The following terms and abbreviations are used throughout this guide:

• The term "router" refers to the NV5256 machine control router, unless it used in a broader context such as "NV9000 Router Control System."

• The terms "panel" and "control panel" refer to NV9000 control panels.

2. Introduction

Chapter 2 provides an introduction to the NV5256 User's Guide. It presents the following topics:

- Prerequisites
- Overview
- Installation
- Functions

Prerequisites

Please observe the following important prerequisites:

- Equipment and software properly installed.
- NV9000 requirements met.
- All control panels properly configured.

Overview

The NV5256 is a machine control router — a successor to the NV3256. A machine control router transmits control messages and responses between devices such as VTRs and edit stations.

Physically, the NV5256 has an 8RU frame that holds the following items:

- 16 I/O cards (RS-422/485 or RS-232)
- 16 RJ-45 backplanes.
- 2 expansion cards (for redundancy).
- 2 control cards (for redundancy).
- 2 power supplies (for redundancy).

A single NV5256 frame provides a 256×256 routing matrix. Two NV5256 frames can be connected in tandem, using expansion cables, to provide a 512×512 matrix. A frame need not be fully populated. The NV5256 can be as minimal as a 16×16 router.

The following figures show the NV5256 features.
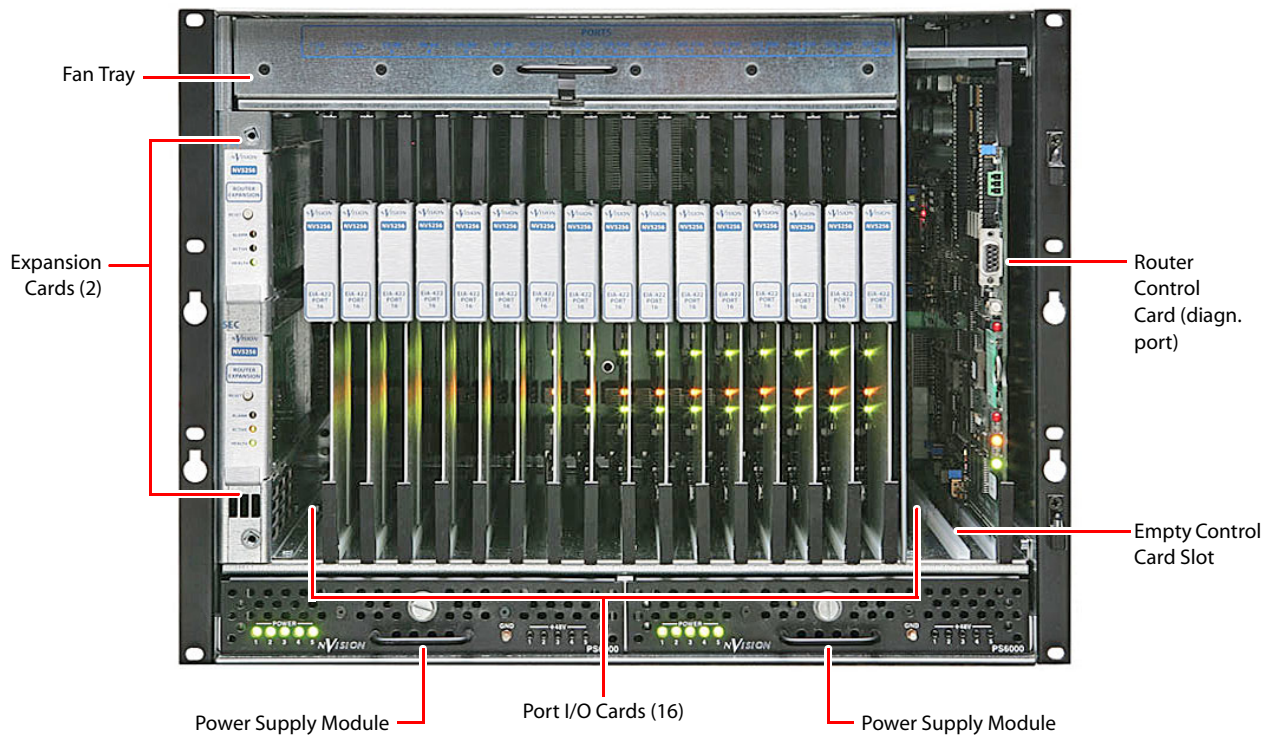
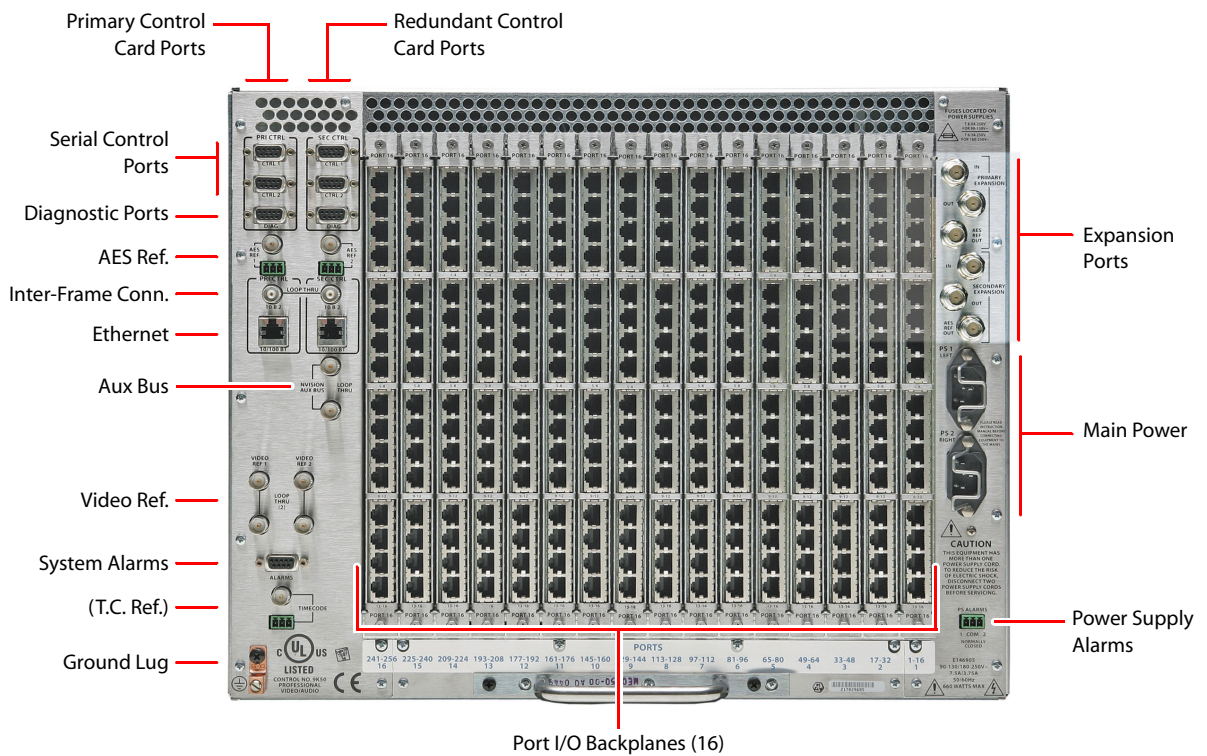# 2. Introduction

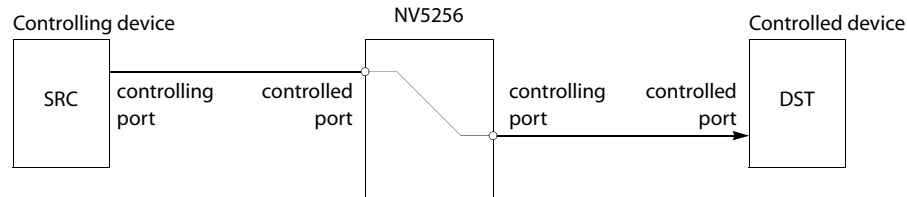Overview

Figure 2-1. NV5256, Front View
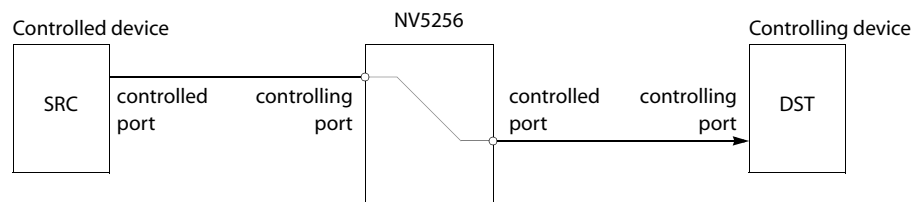

Figure 2-2. NV5256, Rear View

I/O Signals

I/O signals are serial (either RS-422 or RS-232) at up to 115.2 kBaud. Signals are bidirectional: commands in one direction; responses in the other.

A port can be considered a "controlled" port or a "controlling" port.

A destination can also be the controlling device:

For example, a recording VTR sends signals from an edit list to various source machines in an edit suite.

In most, if not all, cases a controlling device must communicate with a controlled device and not another controlling device. (The reason is that a transmitter must connect to a receiver.)

▲ The Tx-to-Rx connection, of course, depends on the cable. Straight-through cables are considered preferable.

Router Configuration

The NV5256 router has several configurable options. It supports several signal options that can be configured for each port.

The router can be (and must be) configured to operate according to your system constraints. You will need to specify the size of the router matrix, the type of ports, communication parameters, and so on.

Your router control system must also be configured. In an NV9000 router control system, you will specify source and destination device names, router names, levels, level sets, and so on.

The NV5256 itself must be initialized through UniConfig.

Router Control

The NV5256 can be controlled by an NV9000 Router Control System. An NV9000 system controls one or more routers of different types. Central to the system are the NV9000 servers. The NV9000 can include one or more control panels with which operators may perform routes through the NV5256 and through other routers.

Alternatively, you can use a compatible third-party control system such as the SMS7000.

▲ Using an SMS7000 control system requires specially configured router control cards.

The NV5256 has these control connections:

- Ethernet, from an NV9000 router/panel network (through a switch), to primary and redundant control cards.
- Serial control from primary server and secondary server to primary and secondary control cards (4 connections).
- Video reference (4 connections). Loop-through for main and redundant reference signal.
- AES reference. Two BNC and two STP connectors for each control card.
- "Node Bus" interface for SMS7000.
- System alarm outputs and power supply alarm outputs

Router Expansion

Two NV5256 frames can be connected to create an expanded router. Six expansion ports are at the top right at the rear of the router. There are 6 BNC connections—3 coming in and 3 going out.

Router Options

Breakout Panel

A 64-port breakout panel is available that has RJ-45 connectors on one side and DE9 (female) connectors on the other. This panel can make it easier to use DE9 connectors if you prefer them.
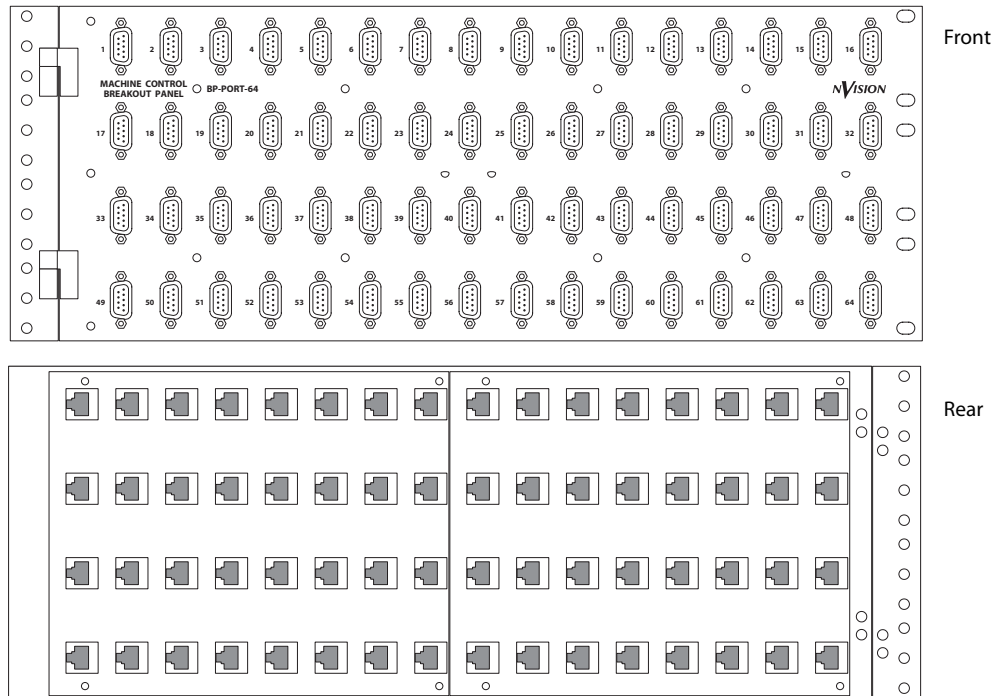
The breakout panel is RS-422 only

▲ Older versions of the breakout panel might not function correctly.

SMS7000

If you are using an SMS7000 router control system, you will require an SMS7000 mezzanine card installed on all router control cards.

Functions

The NV5256 router can be configured with partitions of 4 types. Each partition is considered a physical level. The physical levels can be of 4 "signal types." The signal types accommodate the different characteristics of Miranda's NVISION series routers and third-party routers.

Any of the router's ports can be specified as one of 7 different types, generally configuring the port as a controlling port, a controlled port, or a port whose type can be changed dynamically.

The port types accommodate (1) the different devices you might have in use and (2) the connection requirements that differ between RS-422 and RS-232 ports.

The signal types and port types are specifiable as parameters in UniConfig. Those parameters, however, affect the behavior and operating characteristics of the router, which are discussed briefly here.

See Chapter 4, for more information.

Signal Types

Four "signal types" are available:

Machine Control Forward	Machine Control Broadcast
Machine Control Reverse	DataXY

NV5256 physical levels in NV9000 router control systems always are "machine control forward." Third-party control systems are "machine control reverse."

A controlling device sends commands to a controlled device. The controlled device passes responses (such as status) back to the controlling device. A source device can be a controlling device or a controlled device. A destination device can be a controlling device or a controlled device.

When you are configuring some NV9000 control panels, you can create a "source is master" button that toggles whether the source or the destination is the master (i.e., controlling device).

Some control panels have a broadcast button that allows one source to control multiple destination devices. ("Source is master" is a requirement for machine control broadcast.)

Machine Control Forward

"Machine control forward" means that the source device is the controlling device.

Machine Control Reverse

"Machine control reverse" means that the destination device is the controlling device.

Machine Control Broadcast

This level type applies only to third-party router control systems. Use this level type if you have a third-party control system and you want to be able to perform broadcast machine control takes.

DataXY

"DataXY" is a type of physical level on which data flow, much like video and audio signals in a normal X/Y router. There is no concept of command and response on this type of level.

Port Types

Seven port types are available:

Controlling	DTE	Master	Dynamic
Controlled	DCE	Slave	

Controlling and Controlled

These port settings fix the direction of the router port to "controlling" or "controlled." The port's connection for Tx and Rx is fixed. This allows the port to be routed as a source or destination while maintaining, for example, Rx on pins 7 and 2 and Tx on pins 8 and 3.

▲ Pins for Tx on a controlling machine are 8 and 3. Tx pins for a controlled machine are 7 and 2.

▲ For more about machine control data, review the SMPTE 207M standard.

DTE

DTE has the same meaning for RS-232 as "controlling" does for RS-422.

DCE

DCE has the same meaning for RS-232 as "controlled" does for RS-422.

Dynamic

A dynamic port can be a controlling or controlled port depending on whether it is connected to a master port or slave port. The port's configuration is dynamic and can change during operation.

Dynamic ports are typically assigned to VTRs.

Master

Any dynamic port connected to a "master" port will be a controlled port.

The NV5256 applies logic to the port direction setting when a master port is connected to a dynamic port. In this case, the machine at the dynamic port is always *controlled* and the machine at the master port is always *controlling*.

A good example is an Avid editor controlling two VTRs.

Slave

"Slave" means the opposite of "master": any dynamic port connected to a slave port will be a controlling port.

Summary

In general, a controlling machine must connect, through the router, to a controlled machine. That is because Tx must connect to Rx and vice versa.

▲ In NV9000-SE Utilities, when you add the NV5256 router to your system, set 'Signal Type' to 'Machine Control'. Also set both 'Output Protect' and 'Output Lock' to 'In Server'.

▲ In NV9000-SE Utilities, when you configure a control panel, 'semi-automatic' is the preferred setting for 'XY data routing mode'. This is defined in the SE documentation:

> "If the device to be acquired is already in use on the data level, alert the user—but allow the user to perform the route by pressing 'Take' a second time. If 'Take' is not pressed again, the route is cancelled. If the device is not in use, the take occurs automatically. This is the recommended mode."

> The alternatives are 'fully automatic' and 'manual'.

▲ In NV9000-SE Utilities, you have the choice of making "source is master" the control panel default or not.

Installation

The NV5256 is intended to mount in a standard 19-inch equipment rack. The frame is heavy (approximately 100 lb, or 45 kg, fully loaded). Enlist the help of several persons during the mounting process.

To help reduce weight, you can remove the power supplies and modules temporarily. Make note of their location prior to removal. Do not drop or stack the modules.

To mount the equipment frame into a rack:

1 Swing the front door open all the way and then lift it up to remove it.

2 Lift the frame into the desired position within the rack. Have several helpers keep the frame in position. Or use a jack.

3 Do not use the cards or other internal components as hand holds. Follow anti-static precautions to protect the circuit boards. The handle on the bottom rear of the frame may be used for lifting the frame.

4 Install rack screws into the 8 holes provided. *It is important to use all 8 screw holes.*

5 Replace any assemblies (power supplies, circuit cards) that you removed and replace the front door.

The front rack-mounting brackets include keyway openings to accept an optional lifting bar. If you wish, you can obtain a lifting bar by contacting your sales representative or Miranda Technical Support.

2. Introduction

Mounting Slot (8 places)

Keyway Slot (4 places)

Power Supply 1   Power Supply 2   Rear handle
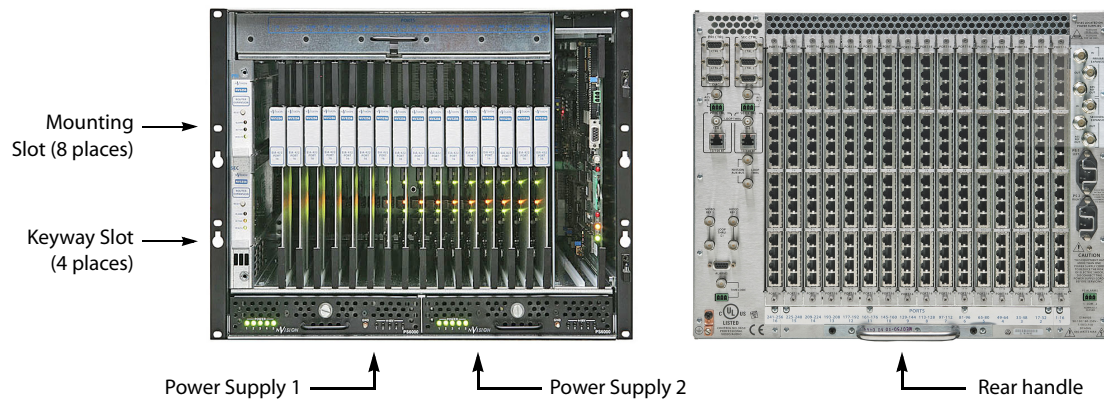
▲ **_Warning:_** Make certain that your work area is free of unnecessary objects that block personnel movement or that might interfere with their footing. Careless handling of the NV5256 frame could result in personal injury.

▲ **_Warning:_** Disconnect power, if it is connected, before mounting the frame in the rack.

▲ **_Warning:_** The NV5256 draws cooling air from the front through the door and exhausts it at the top rear edge of the frame. Make certain that airflow is not blocked at these locations. If air flow is restricted, overheating may occur. The frame must have its door installed **_and closed_** for proper airflow through the chassis. Filters are located on the inside of the door assembly and should be maintained regularly.

▲ Rear panel cover plates (placed in backplane slots that have no backplanes) are essential for cooling. Although you can remove them temporarily, make sure that unused backplane slots have cover plates during normal operation.

3. Detail

Chapter 3 describes the structure and use of the NV5256 Machine Control Router. It presents the following topics:

- Connections
- Alarms
- Power
- I/O Cables
- Port Cards
- Expansion
- Terminators
- Jumpers

Connections

The rear of the router has a bay that holds up to 16 I/O backplanes. Unused backplane slots are generally covered with a plate that improves cooling air flow. Each backplane has 16 RJ-45 connectors. All the backplanes are identical, but the I/O cards are of two types: RS-422 and RS-232.

▲ Ports on a single card are either all RS-422 or all RS-232.

To the left of the backplanes are a variety of control connectors and reference connectors. To the right of the backplanes are expansion connectors and power connectors.

Control Ports

At the top left portion of the rear of the NV5256 frame are 6 DE9 connectors, and further below that are 2 Ethernet connectors:
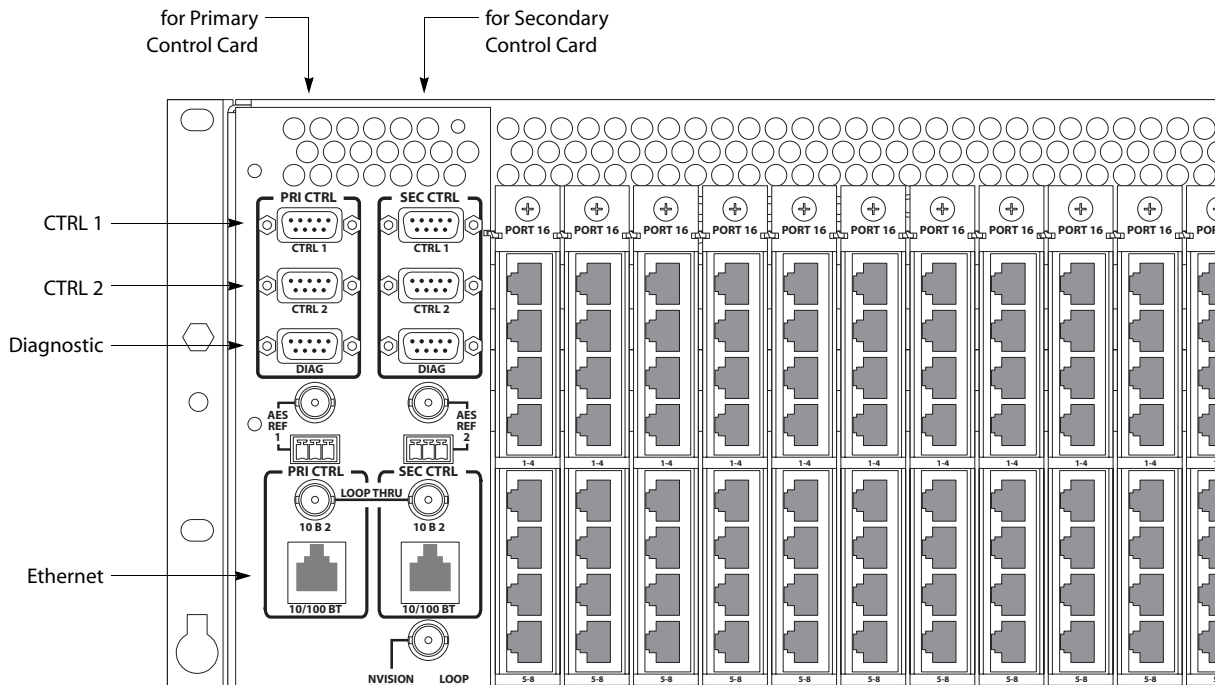
▲ A secondary (router) control card is for redundancy and is not required. If you have an expanded system (two router frames), make connections only to one frame. The frame to which you make connections is the "master" frame and it controls the second frame.

Serial Control

The CTRL1 and CTRL2 ports are DE9, female, RS-422. See <u>Control Port Connectors</u>, page 43, for their pinout information.

You can use these connectors for control using a serial protocol from (1) a primary or secondary NV9000 router control system, (2) a primary or secondary third-party router control system, or (4) a router automation system.

Cases:

1 If you are using an NV9000 control system with a serial protocol or if you are using a third-party control system, connect the primary CTRL1 port to a COM port on the control system's server. Similarly connect the secondary CTRL1 port if your router has a secondary control card.

2 If you have a redundant server, connect the primary CTRL2 port to a COM port on the redundant server. Similarly connect the secondary CTRL2 port if your router has a secondary control card.

3 If you do not have a redundant server, but have an automation system, connect the primary CTRL2 port to a COM port of the automation system. Similarly connect the secondary CTRL2 port if your router has a secondary control card.

Ethernet Control

The Ethernet connectors are used when you have an NV9000 connected using an Ethernet protocol.

Cases:

1 If you are using an NV9000 control system with an Ethernet protocol, connect the primary Ethernet port to the "Router/Panel" network switch connected to the NV9000 server. Similarly connect the secondary Ethernet port if your router has a secondary control card.

2 If you have a redundant server, then no router connections are required, but the redundant server should be connected to the "Router/Panel" network switch.

3 If you have an automation system, connect a COM port of the automation system to *either* primary serial port, CTRL1 or CTRL2. Similarly connect a COM port to either secondary serial port if your router has a secondary control card.

The server's COM ports must be set up to be compatible with the router's serial ports— the same Baud rate, parity settings and so on.

An automation system's COM ports must also be compatible with the router's serial ports.

Diagnostic Ports

The DIAG ports are DE9, female, RS-232 or RS-422. See Control Port Connectors, page 43, for their pinout information.

These ports are for configuration, firmware uploads, and testing. The ports are typically used with UniConfig to initialize either the primary control card or the secondary control card.

The DIAG ports are not used during normal operation.

See Chapter 4, Configuration, on page 27, for information about UniConfig and its use.

AES Reference

AES reference is used to "clock-lock" the data traffic between two frames in an expanded router. If you have a stand-alone router, you do not need AES reference.

If you do have an expanded router, choose one of the following 2 methods:

1 Supply an AES reference to the primary control card of both frames. You can use either connector. If you have a secondary control card, supply an AES reference to that also.

Use the connectors at the top *left* portion at the rear of the NV5256 frame:
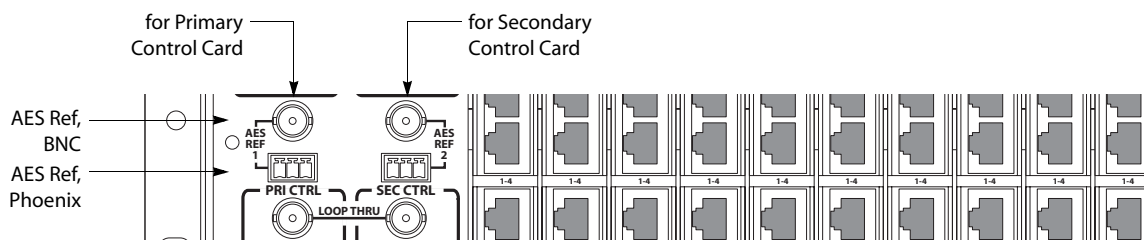
See AES Reference Connectors on page 43 for the Phoenix pinouts.

2 Connect the primary AES reference output on the *master* frame to the primary AES reference input of the *slave* frame. If you have redundant expansion cards, connect the redundant AES reference output of the master frame to the redundant AES reference input of the slave frame.

Use the connectors at the top *right* portion at the rear of the NV5256 frame:
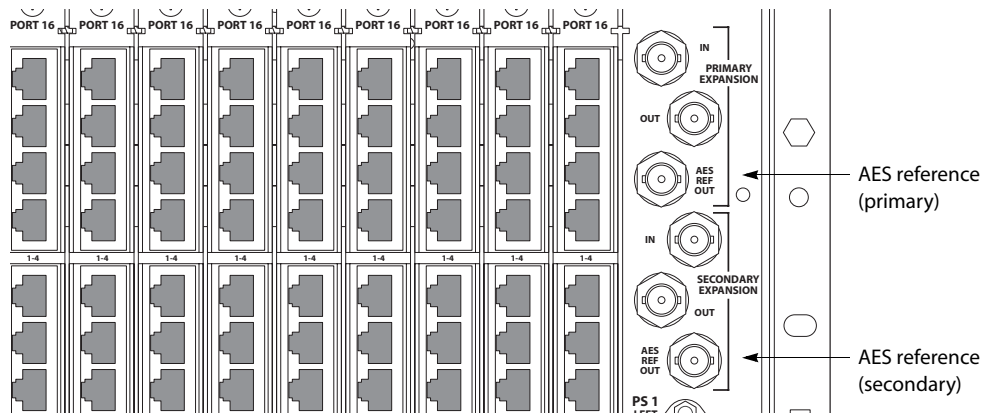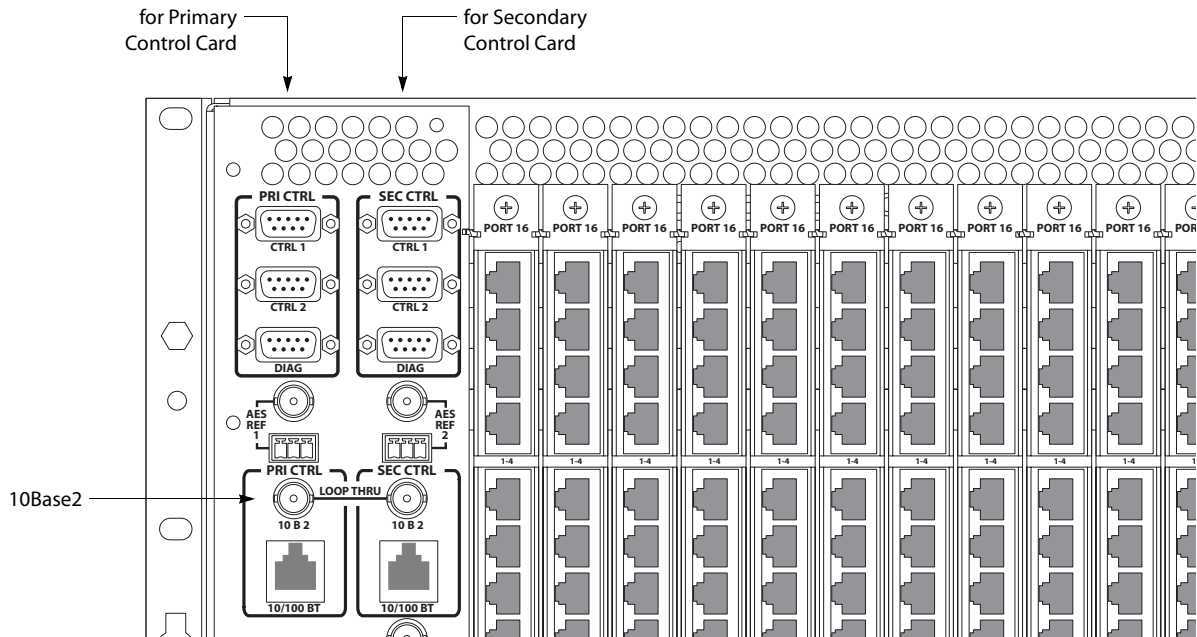

See [Expansion](#) on page 23 for additional information.

(The video reference does *not* lock the cards.)

If the frames in an expanded router are not clock-locked, data errors will occur when the router uses ports across frame boundaries.

Inter-Frame Communication

At the top left portion of the rear of the NV5256 frame are two 10Base2 (BNC) connectors:

The 10Base2 connectors are used to connect two frames in an expanded router. If you have a stand-alone router, you do not need the connectors.

If you have an expanded router, connect the primary 10Base2 connector on one frame to the primary 10Base2 connector on the other.

Do *not* connect the secondary 10Base2 connectors, even if you have a secondary control card.

▲ In older routers, stand-alone termination is required. In newer routers, it is not. In an older system, place 50Ω terminators on both connectors.

In any expanded router, place 50Ω terminators on unused 10Base2 connectors.

Aux Bus

At the middle left portion of the rear of the NV5256 frame are 2 'NVISION Aux Bus' (BNC) connectors:
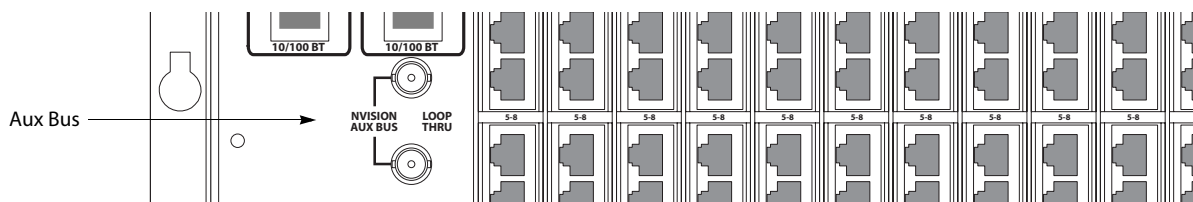
If you are using an SMS7000 router control system with the NV5256, connect the SMS7000 to the NVISION Aux Bus (a.k.a. Node Bus) connector.

The NV5256 has two aux bus connections. The connection is loop-through: you can pass the SMS7000 "node bus" control signals on to another device if it is required. You can connect a redundant control system on the "node bus."

If you are using an SMS7000 control system, terminate the "node bus" with 75Ω terminators.

▲ Using an SMS7000 requires an SMS7000 mezzanine card installed on each router control card. Jumpers J4 and J6 must be set. See Jumpers, page 26, for detail.

Video Reference

At the lower left portion of the rear of the NV5256 frame are 4 Video Reference (BNC) connectors:
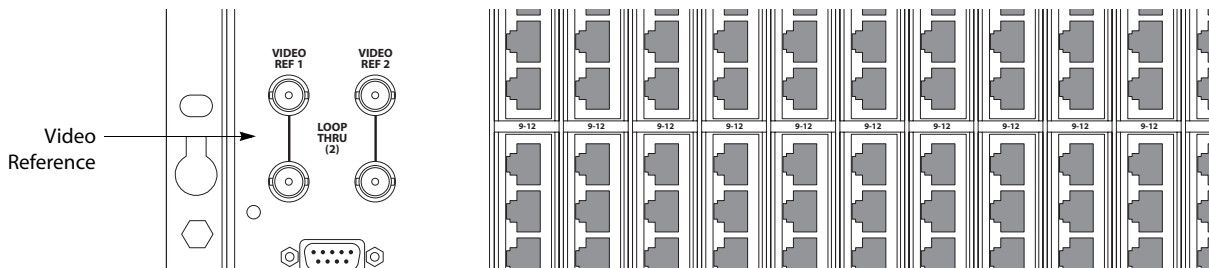
The NV5256 provides video reference connections 'VIDEO REF 1' and 'VIDEO REF 2'. These connections allow you to synchronize port switches with a video frame's switch point. The video reference can be NTSC, PAL, or tri-level sync.

▲ Tri-level sync is not supported on older EM0374 control cards.

At least one video reference connection must be connected. Otherwise, the control card's front red LED remains lit and takes will not occur at defined switch points.

Redundant Reference

There are two video reference connections. You can use the reference connectors in 2 ways:

• Single reference.

• Redundant reference.

A redundant reference uses identical, but distinct, reference signals. If one reference source fails, the other acts as a fail-over.

▲ The NV5256 does not support "dual reference" mode.

If you have an expanded router, use the loop-through connector to connect the master and slave frames. Terminate any reference chains with 75Ω terminators.

Time Code Reference

At the lower left portion of the rear of the NV5256 frame are 2 connectors for time-code reference:
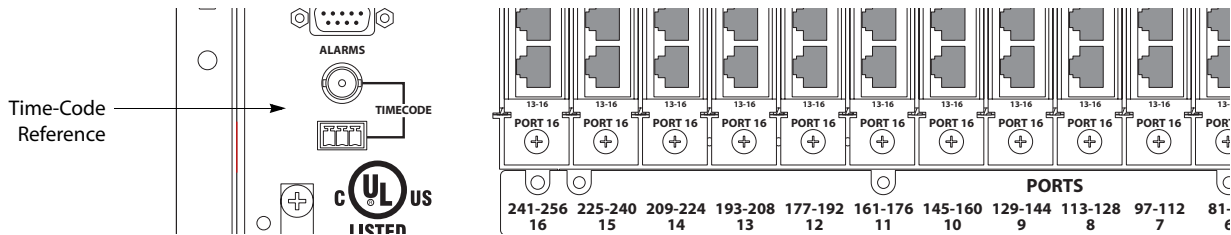
The NV5256 does not use time-code reference. You can ignore these connectors.

Alarms

Two alarm connectors (system, and power-supply) allow you to construct alarm indicator circuits of your own.

System Alarm Outputs

At the lower left portion of the rear of the frame is a female DE9 connector for system alarms:
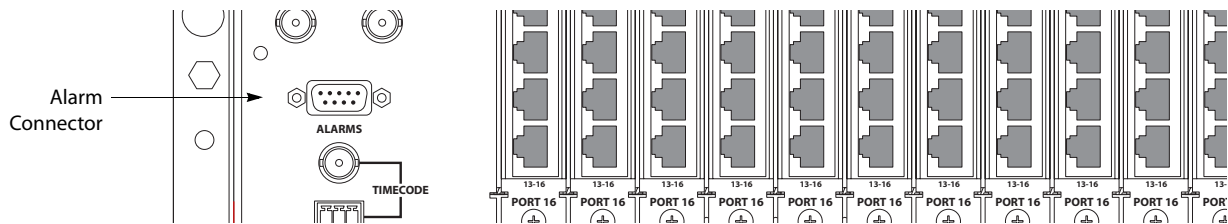
This connector allows you to create alarm circuits of your own.

The internal alarm signalling is provided by solid-state relays that turn on in the event of an alarm condition. Table 3-1 describes the individual alarm connections:

Table 3-1. Alarm Signals

Pin	Signal	Description	Possible Alarm Condition(s)
1, 9	Alarm Com	Common	Common connection for all alarm signalling pins. This is a "return" for an external circuit.
2	Alarm 1	Major alarm	Missing reference inputs, possible failure of fans or over-temperature conditions on one or more modules.
3	Alarm 2	Minor alarm	Any of alarms conditions 3, 4, 5 or 6.
4	Alarm 3	Power supply	Main power supply module is missing.
5	Alarm 4	Video reference	Missing video reference signal 1 or 2 (if applicable).

Table 3-1. Alarm Signals

Pin	Signal	Description	Possible Alarm Condition(s)
6	Alarm 5	AES or time code reference	Missing AES reference signals or loss of system clock. (AES is optional. Note: AES does not generate alarm in standalone case.)
7	Alarm 6	Fans or internal Temperature	Failure of any one of three fans. Over-temperature conditions on one or more modules.
8	Alarm 7	Controller health	Control card(s) are not "healthy."

▲ Pins 2 through 8 signal alarm conditions that are signalled on either the primary or secondary control cards. The connector offers no way to distinguish which control card has an alarm.

Figures 3-1 and 3-2 show sample system-level alarm circuits. (You can use alarm signalling devices other than LEDs, or in addition to LEDs.)
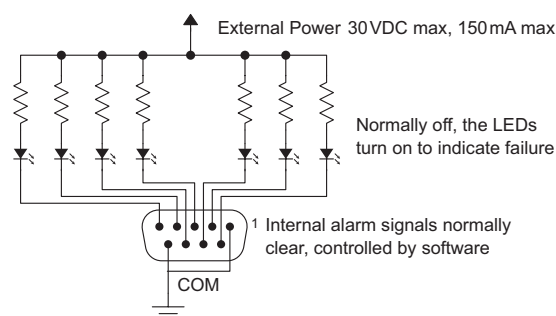
Figure 3-1. Simple Alarm Circuit

Here, LEDs are all *off* unless a failure occurs. The LED for the failed circuit turns *on*.

This is an alarm circuit that can drive heavier loads, not just LEDs.
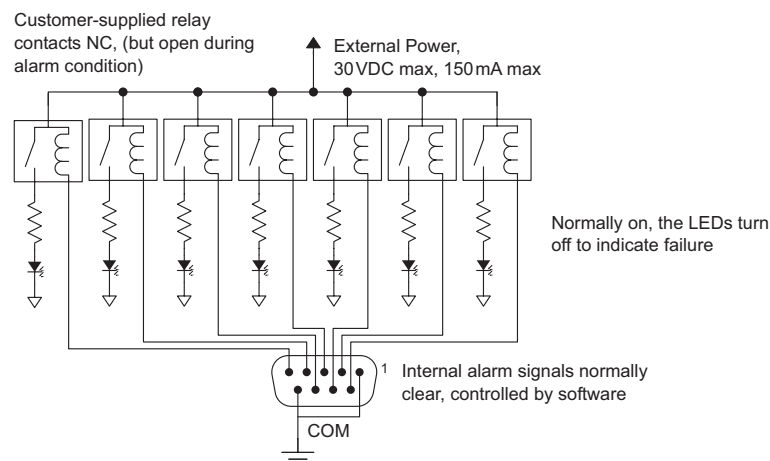
Figure 3-2. Alarm Circuit to Drive Loads

In this case, the LEDs are normally *on* and turn *off* when a failure occurs.

CAUTION: If the alarm load is inductive, protect the internal alarm relay contacts with a reversed-biased diode. The external supply voltage should not exceed ±30 VDC and the load resistors should be sized to limit contact current to less than 150 mA.

Power Supply Alarms

At the lower right portion of the rear of the NV5256 frame is a Phoenix 3-pin connector for power supply alarms:
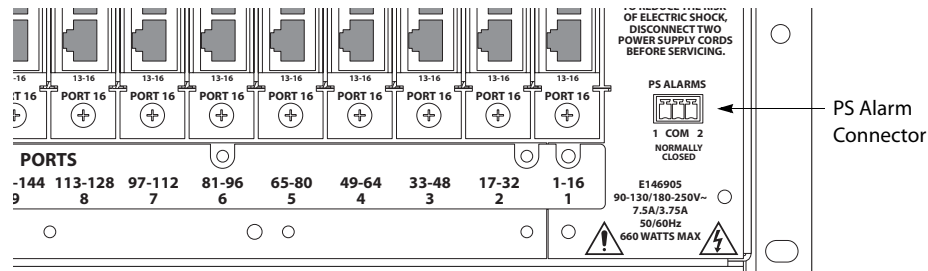
The NV5256 has alarm outputs for each power supply installed in the frame. An internal solid-state relay is provided for each supply. The relay turns on when there is an alarm condition.

Figure 3-3 shows suggested alarm circuit implementations. You can use signalling devices other than LEDs or in addition to LEDs. For example, you can operate a buzzer or other audible alarm to warn operators of a potential problem.
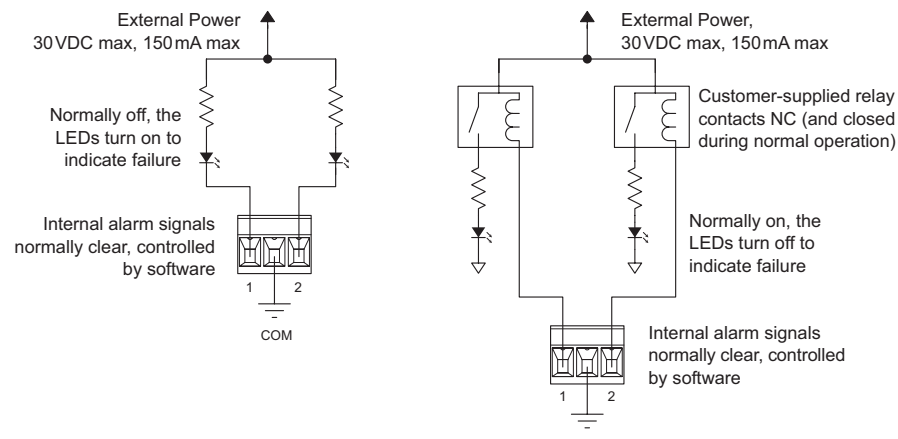
Figure 3-3. Power Supply Alarms

CAUTION: The voltage of the external power supply for alarm signalling should not exceed ±30 VDC. Resistors should be sized to limit the current through each internal alarm contact to less than 150 mA.

If the load is inductive, the alarm contacts should be protected with a parallel, reverse-biased diode.

Power

The NV5256 has two power supply bays (and two power connectors) to support redundancy. Only one power supply is actually required.

Connectors

At the middle right portion of the rear of the NV5256 frame are 2 AC connectors:
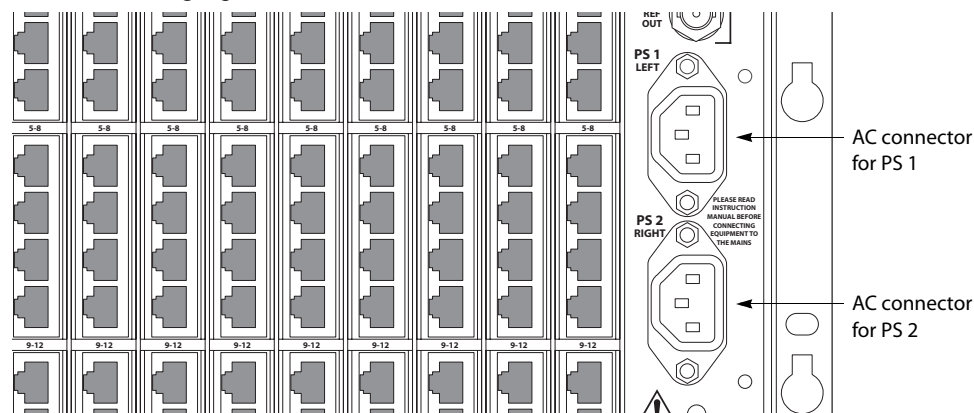
The NV5256 frame has one (IEC) 3-conductor power connection for each of its 2 power supplies. These should be connected to a 90–130 VAC or 180–250 VAC 15A grounded circuit wired in accordance with local electrical codes.

Fuses for both AC power inputs are located on their respective power supplies. Ensure that the fuse ratings comply with specific requirements in your area. A 7.5 A fuse is required for 110/120 VAC applications. For 220/240 VAC operation, a 3.75 A fuse is required.

For increased protection against loss of power, we suggest that each power supply be connected to a separate branch circuit. A wire bail can be used to grip the power cable and hold it in place to reduce the possibility of accidental loss of power.

The power cords represent the only means of disconnecting main power from the NV5256. Make sure to clearly mark the line side power connection with its function so that in the event of an emergency, power can be disconnected quickly. Make sure to disconnect both power cords before servicing any internal frame components.

Power Supply

The PS6100[1] power supply accepts a wide range of AC input voltages and produces five +48 VDC outputs. Each of the five circuits producing the +48 volt outputs is identical. The power supply automatically senses the AC input voltage (90–130 VAC or 180–250 VAC) and adjusts itself to maintain a relatively constant DC output. You do not have to select the voltage. The five regulated outputs are directed to the various regulators that produce the DC voltages required by the local circuits.

Each +48 VDC output powers one of the five green LEDs and output test points on the front of the power supply. Under normal operation, all five LEDs should be on. If any is not, it is likely that the corresponding branch circuit has failed. When the power supply output voltages are measured at the test points, the voltage should be approximately +48 VDC under a full load. If modules have been removed from the frame or options are not installed, some or all of the test point voltages could be somewhat higher than +48 VDC.

1. Older master control frames in the field might still use PS6000 power supplies.

There are four low-speed fans located at the front edge of the power supply. They pull a small quantity of air across the internal heat sinks.

The top power connector on the rear panel corresponds to the power supply on the left and the bottom connector corresponds to the power supply on the right (as you face the front of the frame).
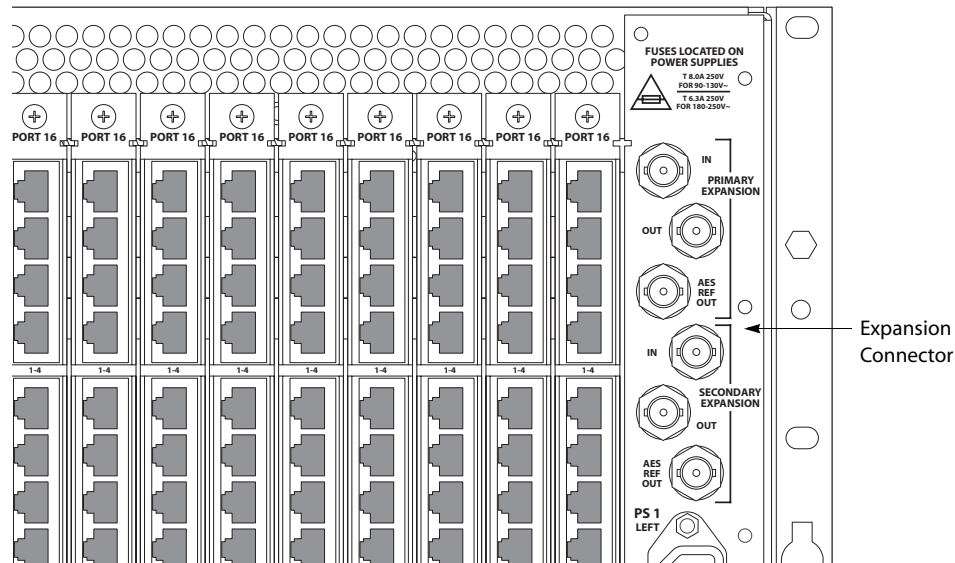
Ground Lug

At the lower left portion of the rear of the NV5256 frame is a ground lug:
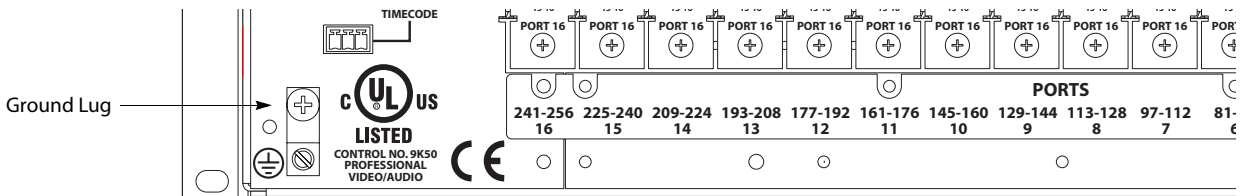
Connect this "lug" to earth ground using 8–14 AWG wire.

Expansion Connectors

At the top right portion of the rear of the NV5256 frame are 6 Expansion (BNC) connectors:

See

I/O Cables

All ports are serial, either RS-422 or RS-232, operating at up to 115.2 kBaud. The backplane interface is RJ-45. Each RJ-45 port on each port backplane has the following pinout:
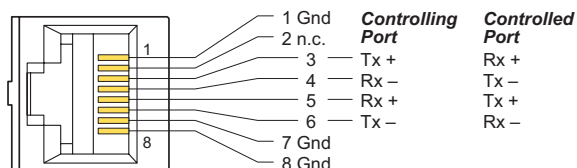
It use 4 wires whose usage is controlled by the following circuit. The port can be configured as "controlling" or "controlled" when the port's I/O card is RS-422/485 and DTE or DCE when the port's I/O card is RS-232. That is because the definition of the port can be reversed during configuration or during operation. This is the circuit:
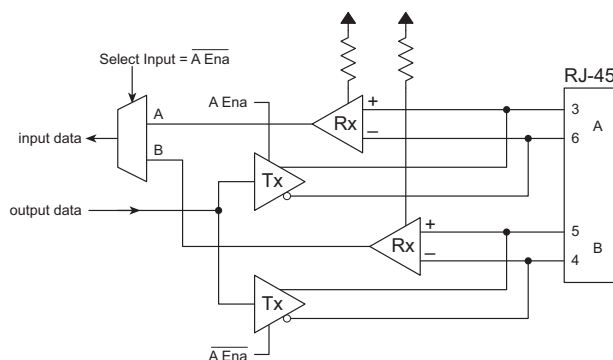
When Tx A is enabled (A Ena), Rx B is selected and the port passes Rx B data;

Tx B is enabled when Tx A is disabled ($\overline{\text{A Ena}}$). Rx A is selected, and the port passes Rx A data.

These are the functions of the pins:

Pin	RS-422		RS-232	
	Controlling	Controlled	DTE	DCE
3	Tx+	Rx+	Tx	Rx
4	Rx–	Tx–	Gnd	Gnd
5	Rx+	Tx+	Rx	Tx
6	Tx–	Rx–	Gnd	Gnd

(The other pins are grounded except for pin 2 which is not connected.)

Breakout Panel

If you are using the BP-PORT-64 breakout panel, you might need to know the mapping of the signals from the RJ-45 side to the 9-pin (female) side. The breakout panel is RS-422/485 only. See Breakout Panel on page 6 for an illustration.

This is the RJ-45 to DE9 mapping for RS-422:
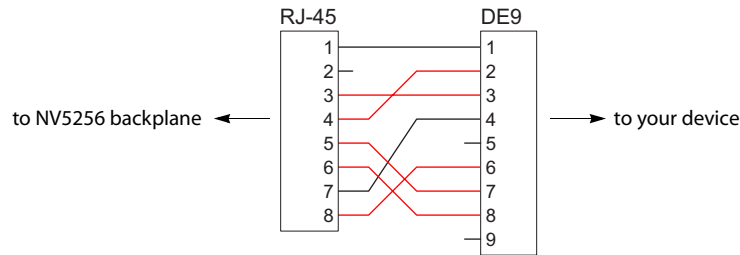
This cable wiring is applicable whether the port is a controlling port or controlled port.

▲ Older breakout panels might have incorrect wiring. Contact Miranda if your breakout panel does not function correctly.

RS-232 Cables

If you make your own RS-232 cables, follow this pattern:
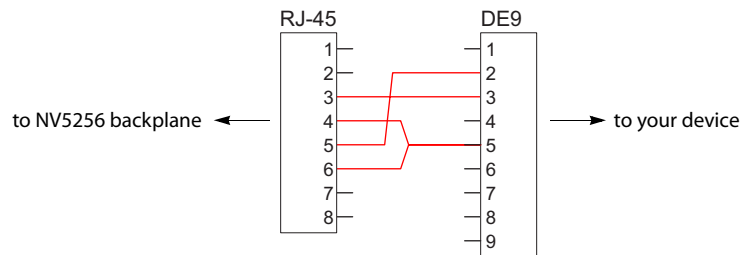
This cable wiring is applicable whether the port is DTE or DCE.

General Notes

Any DE9-to-DE9 cables you might use will be straight-through.

Port Cards

The NV5256 has slots for 16 port I/O cards. Each card supports 16 inputs from its corresponding backplane. There are two types of port cards:

• The EM0503-01 module, supporting RS-422/485.

• The EM0503-50 module, supporting RS-232.

Other than this distinction, the cards are functionally identical. You can install any port card in any slot that is useful to your system design.

▲ The NV5128 frame and its I/O cards are nearly identical in appearance to the NV5256 frame and its I/O cards. Therefore, the NV5256 cards and slots are keyed so that you cannot successfully insert an NV5128 card into the NV5256 frame.

LEDs

Five LEDs are on the front of the card. (Note that there is metal card extender in front of the card. The LEDs are nevertheless visible.) There names and functionality are as follows:

Name	Color	Function
Alarm	Red	A power rail is under voltage by 10% or more.
Power	Green	The power rails are good.
FGPA Loaded	Yellow	The FPGA has loaded properly.
COM Good	Green	Communication with the router control card is good.
COM Bad	Red	Communication with the router control card is bad.

The LEDs are listed in the order they appear at the front of the card.

Under normal operation, the 'Power' light is green, the 'FPGA loaded' light is yellow, and the 'COM good' light is green. The other lights are off.

Another LED—serial link error—exists in the center of the board. This LED indicates whether the frame's expansion link is invalid. This LED is red. It lights when the frame's expansion cards are absent or when the frame receives errors from the expansion card. In a stand-alone router, this LED will be on.

Expansion

The NV5256 can be expanded to a maximum of 512 ports. To accomplish this, interconnect two NV5256 frames. The frames share each other's input space. The first frame receives commands from the router control system and acts as the master to the second frame.

The interconnect is simple and uses the frame expansion connectors at the back of the frame.
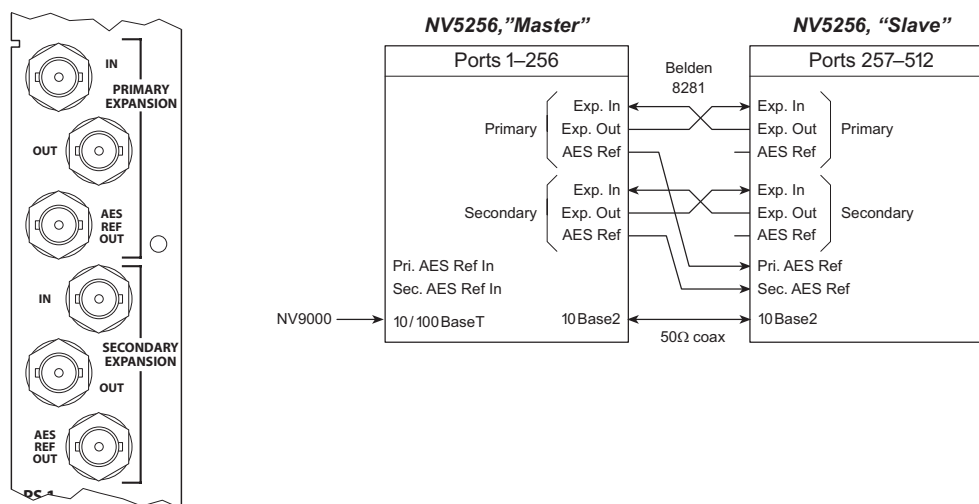
Figure 3-4. Expansion Connectors and Expansion Connections

The frame expansion connectors are driven by the frame expansion cards (EM0502-00) in the frame. A frame really requires only one expansion card; the second is recommended for redundancy. If both cards and links are installed, the frame will switch from one expansion link to the other if the current link goes bad.

A frame expansion card multiplexes (TDM) the local frames inputs and sends them out the frame expansion "Out" port to the other frame. It receives the other frame's inputs from the "In" port.

Connect the primary input on the master frame to the slave frame's primary output. Connect the primary output on the master frame to the primary input on the slave frame. If you have a redundant expansion card, connect the secondary expansion connections the same as the primary connections.

The expansion cards have built-in redundancy control. Each card reports its own health to the other card and to the router control card. The first healthy card to start up during initial boot takes over the expansion link and is the main transmitter and receiver. If, at any time, the link becomes "unhealthy," the other expansion card takes over the expansion link if it is healthy.

You can use 75Ω Belden 8281 cable, up to 250 meters, to make these connections.

The Expansion Card

The NV5256 has 2 slots for expansion cards. A stand-alone router requires no expansion card. One card is required for expansion. The second expansion card provides redundancy.

Release Switch

An expansion card has a front panel reset switch. It forces the active card to release, so that the other expansion card can take over.

LEDs

Three leds are on the front of the card. Their name and functionality are as follows:

Name	Function
Alarm	Indicates when the serial link is not error-free or the P.S. is bad.
Active	Indicates the card is healthy and supplying the Frame TDM stream to the frame.
Health	Indicates Good power, Good Serial link, FPGA loaded

A red 'serial link error' LED is in the center of the card. This LED indicates whether the frame TDM link is invalid (has data bit errors).

Clock Lock

For the expanded router to operate correctly, the frames must be "clock-locked" to each other. The following is a list of ways to accomplish the clock locked frames.

1 Supply an AES reference to both frames.

2 Connect the primary AES reference output on the master frame to the primary AES reference input of the slave frame. If you have a redundant expansion card, connect the secondary AES reference output of the master frame to the second AES reference input of the slave frame.

The video reference does *not* lock the cards.

If the frames are not clock-locked, data errors will occur when the router uses ports across video frame boundaries.

Inter-Frame Communication

The expansion connections transport machine control data.

Additionally, the two frames must communicate with each other. Connect one 10Base2 connector on the master frame, with 50Ω coaxial cable, to a 10Base2 connector on the slave frame. Place a 50Ω terminator on each unused 10Base2 connector.

Terminators

10Base2

The NV5256 ships with two 50Ω terminators for each frame. The terminators are required for an expanded router.

▲ In older routers, termination for a stand-alone router is required. In newer routers, it is not.

If you have an expanded router, use terminators as described under Inter-Frame Communication.

Ethernet

The NV5256 ships with 1 Ethernet terminator for each router control card. These terminators are required if you do not use Ethernet (for example, if you are using a third-party router control system). The router control cards will not come out of reset without either an Ethernet connection or an Ethernet terminator.

(The terminator looks like an RJ-45 plug without the cable.)

Plug a terminator into the Ethernet port of every router control card that does not use Ethernet.

Jumpers

The control card has several jumper sets:
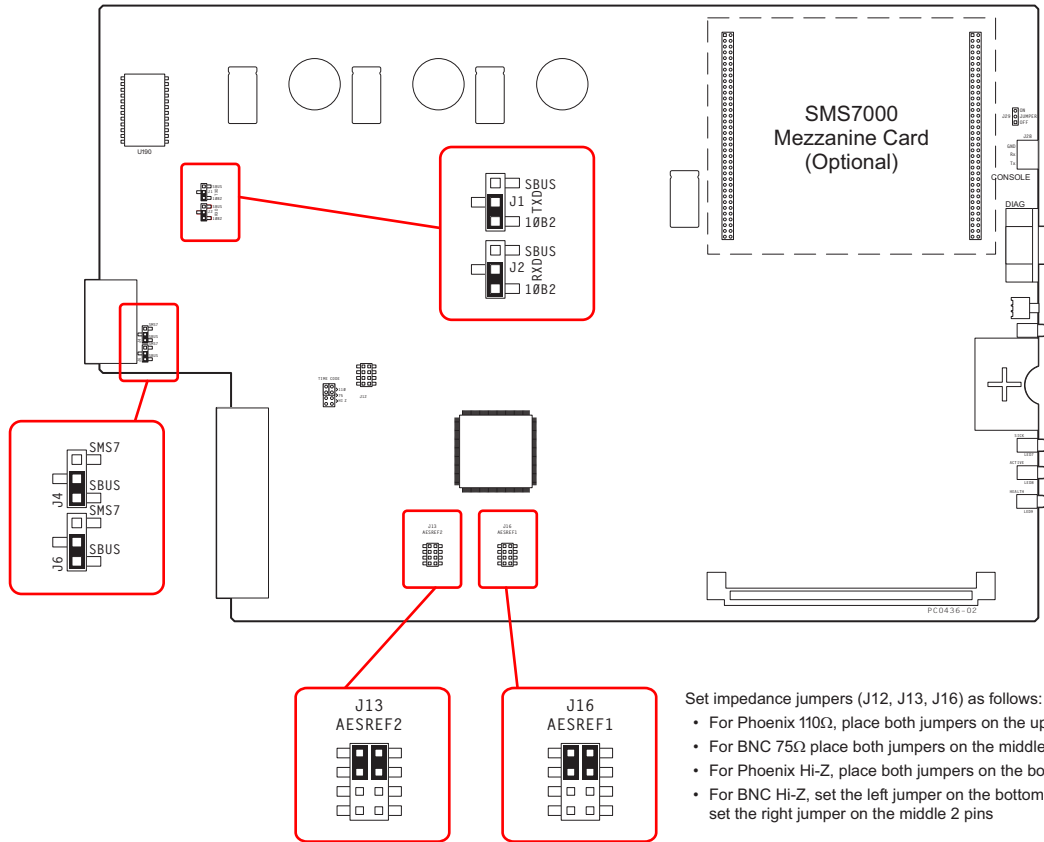
Figure 3-5. EM0374 Router Control Card Jumpers

Table 3-2 describes the jumpers appropriate to the NV5256. Jumpers not listed should be left in the factory position:

Table 3-2. EM0374 Jumpers

Jumper	Settings
J1, J2	Frame-to-frame communication. Leave these jumpers in the 10B2 position. The control card (and therefore the NV5256) does not support SBus yet.
J4, J6	SMS7000 option. Place the jumpers in the SMS7 position to use a SMS7000 control system and the Node Bus connectors. Otherwise, leave the jumpers in the SBus position. (SBus is not supported.) *Note:* Using an SMS7000 requires an SMS7000 mezzanine card to be installed.
J13, J16	AES reference termination options. See Figure 3-5 for jumper settings.

4. Configuration

Chapter 4 describes the structure and use of the NV5256 Machine Control Router. It presents the following topics:

- Summary
- UniConfig—Stage 1
- UniConfig—Stage 2

Summary

There are several phases to configuring an NV5256 router.

1 Use UniConfig (first) to define its network address and (second) to define its basic partitions and specify its port types.

2 Then, use the NV9000 "browser" application or NV9000-SE Utilities to define its device connections and "add" the router to the router control system.

We discuss UniConfig briefly. Refer to the NV9000 User's Guide and the NV9000-SE Utilities documentation for additional information.

UniConfig runs on a PC that you will connect to your router control card. In all cases, to launch UniConfig, do either of the following:

1 Double-click UniConfig.exe in the software folder. The default pathname is:

```
C:\nvision\utils\UniConfig.exe
```

2 Double-click a UniConfig icon on your desktop:
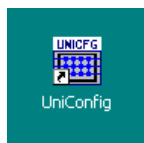
UniConfig—Stage 1

You must assign IP addresses to the NV5256's router control card(s) before you proceed with other configuration steps.

1 Connect an RS-232 cable from your PC's COM port (generally COM1) to the DE9 connector (female) at the front of a router control card.

4. Configuration

2 Launch UniConfig. In the Communications menu, check 'Serial':
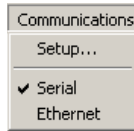
3 Then choose 'Setup' from the Communications menu, The following window appears:
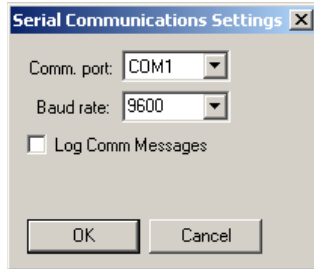
Specify your PC's COM port. Choose 9600 for the Baud rate.

4 From the Windows menu, choose 'Configuration'. The following window appears:
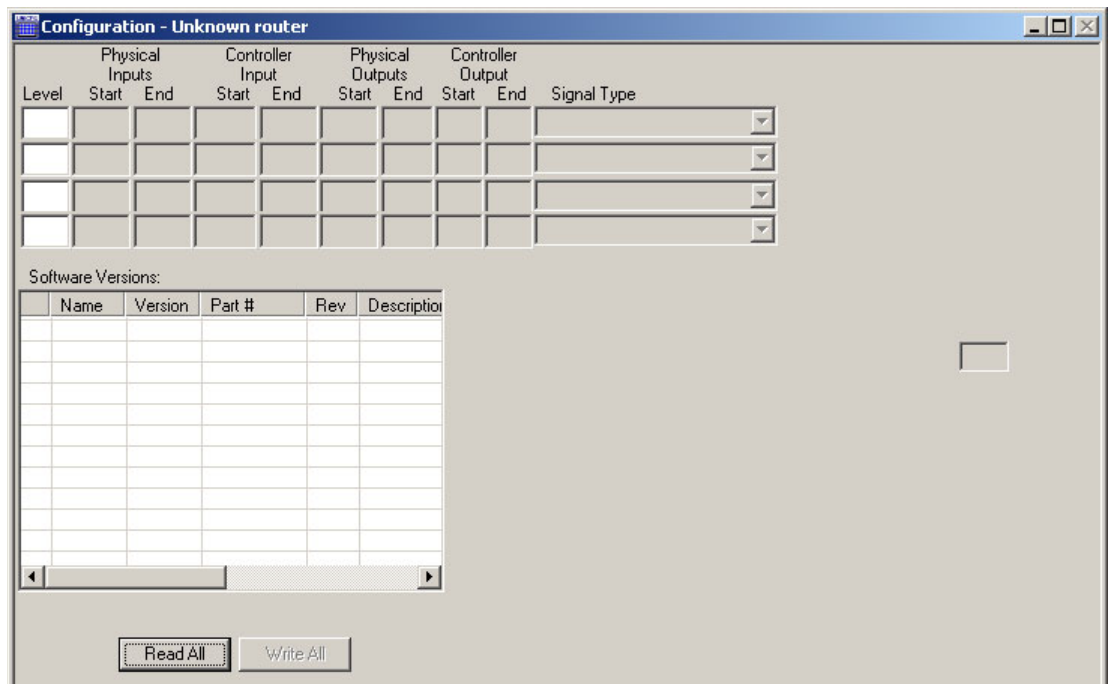
Click 'Read All' to obtain the NV5256 parameters and the router control card's software and firmware versions.

5 UniConfig now displays NV5256 data:
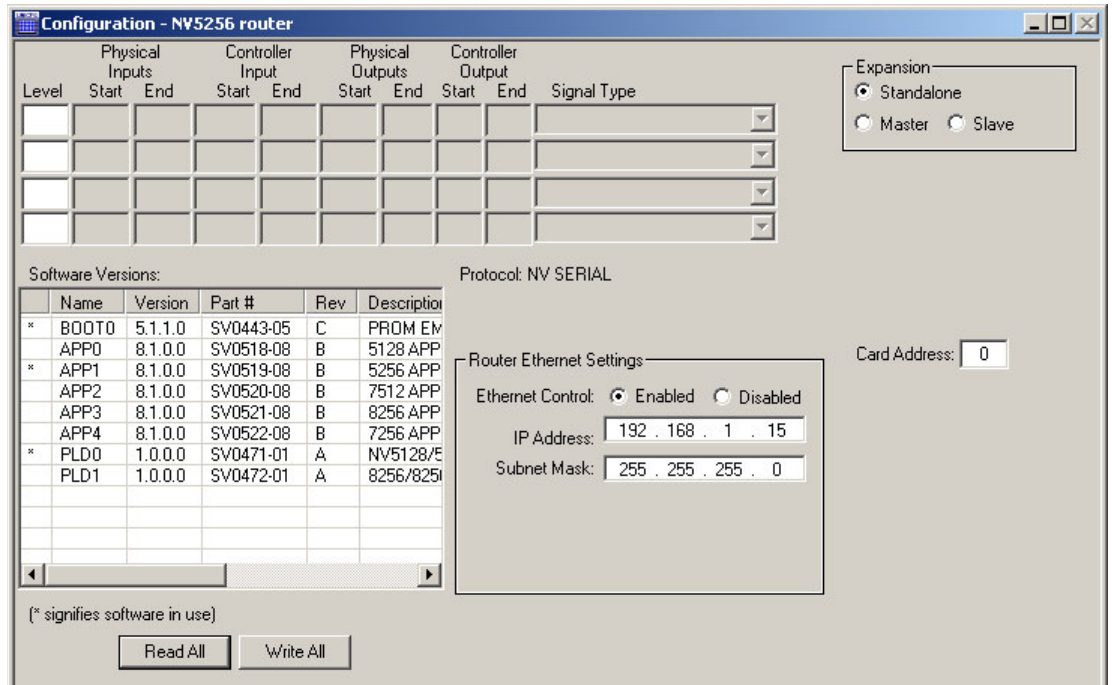
Asterisks (*) indicate which modules are in effect. (APP1 should indicate that it is an NV5256 application. PLD0 should indicate that it is an NV5256 PLD.)

6 Enter the IP address for this NV5256 control card. Also enter the IP subnet mask. The mask should always be 255.255.255.0. Make sure Ethernet control is enabled.

7 If you have a standalone NV5256 (256×256) choose 'Standalone' at the top right.

8 If you have an expanded NV5256 (2 frames for a 512×512 matrix) choose 'Master' when you are configuring a control card in the "master" frame. Choose 'Slave' when you are configuring a control card in the 'slave' frame. (You will have to designate one frame as the master.). The display changes according to which option you selected:
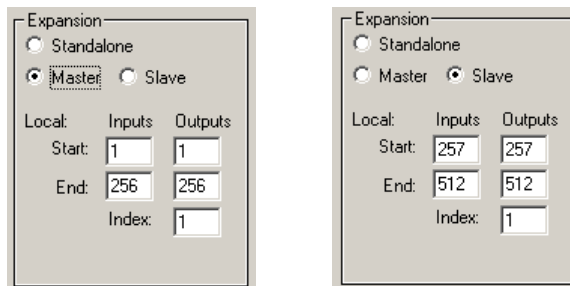
▲ The physical levels section will be disabled (greyed out) when you choose 'slave'.

9 Populate the physical level section according to the requirements of your system. There are several options, especially concerning signal type. This is an example:

See Signal Types on page 7 for more information.

10 After specifying the physical levels, go back to the 'Expansion' section, and verify that you have chosen the right option (standalone, master, or slave) and that you have entered the correct range of inputs and outputs for the option you have chosen.

11 When everything is correct, click 'Write All' (next to 'Read All') to send the configuration data to the NV5256. Now the router control card has its IP address and its basic partitioning.

12 Repeat this entire process for each router control card in each NV5256 frame. The redundant control card in any frame should be configured the same as the primary control card.

  ▲ You can ignore the 'Card Address' field. It is not used.

You can now proceed to stage 2. You will rarely, if ever, repeat stage 1.

UniConfig — Stage 2

When stage 1 is complete, you can perform more detailed configuration and you can use a higher speed connection to do so. You can use the Ethernet connection to the control card or you can use the 'DIAG' serial port for the control card. Both are at the rear of the NV5256.

If you are running UniConfig on an NV9000 server, the Ethernet connection should already have been established. If you are using a separate PC to configure the router, you might need to reconfigure your PC's Ethernet port. This can be a nuisance on a separate PC. The serial alternative is easy and very fast, but not quite as complete.

To use the DIAG port (which typically operates at 38,400 Baud), you will use a PC COM port set to the same Baud rate as the DIAG port.

In stage 2, you will configure the port type for each port. (You are advised to plan your connections carefully beforehand.)

You can also perform routes in UniConfig if you wish to test the operation of the router.

Stage 2 requires some knowledge of the different port types and the semantics of machine control routing.

Configure Port Types

Follow these steps to configure the port types:.

1 Connect either to the DIAG port of the router control card you are configuring or to its Ethernet port. Launch UniConfig, choose 'Configuration' from the Window menu, and click 'Read All' to get the control card's current configuration.
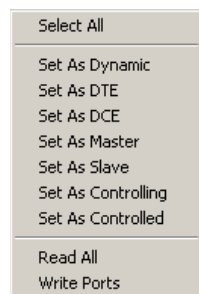
▲ Always read the current configuration before making changes.

2 Choose 'Machine Control Port Setup' from the Window menu:
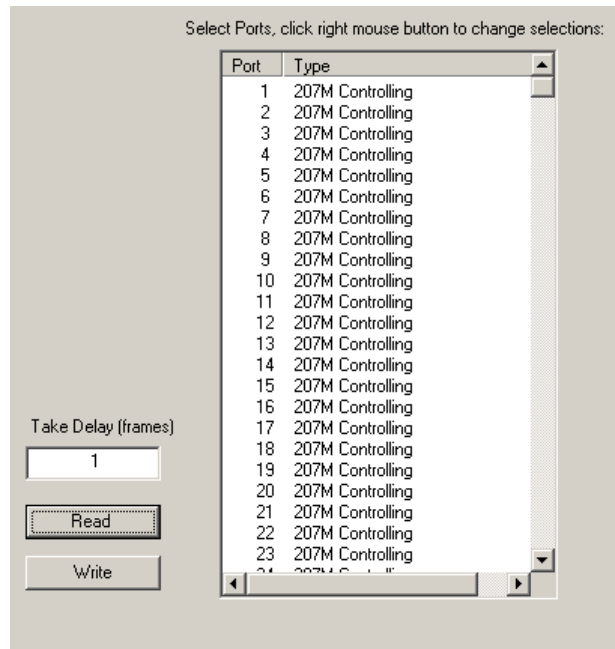
Click 'Read' to get a list of port types. Initially, all ports are of the default type.

3 Select one or more of the ports in the list and right-click your mouse. The context menu that appears contains a list of port types:
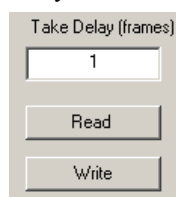

Choose one of the types to apply to your selection and release the mouse button.

See Port Types on page 8 for information on port types.

4 Click the 'Write' button at any time to send the port type definitions to the NV5256.

5 The 'Machine Control Port Setup' window also has an option where you can specify the take delay:

Enter a number in this field. The number is typically 1 or some small value. The delay is the time between the "break" of the previous connection and the "make" of the new connection (as a number of frames).

Perform Takes in UniConfig

UniConfig is not intended to be a "GUI." However, you can perform limited takes to test the operation of the router.

Follow these steps to perform individual takes in UniConfig:

▲ You can do this with a serial connection, but it is more effective to do this with an Ethernet connection.

1 Launch UniConfig. If your installation permits, choose 'Ethernet' from the Communications menu. Otherwise, use a serial connection. Select and read the NV5256 configuration.

2 Choose 'Connections' from Window menu:

Click 'Read Outputs' to obtain the current crosspoint status. You can specify the range of outputs to read.

The table shows the status for each output. Remember that ports are both inputs and outputs, so port 10, for instance, appears in the input column and the output column. The 'LPR' column represents the "lock, protect, and release" status of the ports. The term "tristate" indicates that the port is disconnected.

3 To perform a take is simple: specify an input and output in the 'Single Take' area at the top left and click 'Execute'. Then click 'Read Outputs'. The example above shows input 10 taken to output 3 where the ports are "machine control reverse." That is to say, port 3, the output, is for the *controlling* device and port 10, the input, is for the *controlled* device.

If the ports' physical level were designated machine control forward, port 3 (the output) would be the controlled device, and port 10 (the input) would be the controlling device.

4 It is not possible to write any of this to the NV5256 control card, because these takes are not part of its configuration.

During normal operation, users perform NV5256 takes at NV9000 control panels and automation systems can perform takes using one of the router's serial connections.

Other

If you chose to perform takes in UniConfig using a serial connection, the port status window shows the information is a somewhat less "elegant" format:

Input	Output	Flags
1	1	0011
2	2	0011
10	3	0001
4	4	0011
5	5	0100
6	6	0000
7	7	0011
8	8	0000
9	9	0011
3	10	0010
11	11	0011
6	12	0000
13	13	0000
14	14	0000
15	15	0011
16	16	0000
17	17	0100
18	18	0000
19	19	0000
20	20	0000

Physical Connections — Single Take — Input: 10, Output: 3 — Execute

Physical Output Range — Start: 1, End: 256 — Read Outputs

Machine Control — Connections:

There is no "LPR" status, and the "tristate," "controlled," and "controlling" states are rendered as bit patterns.

4. Configuration

UniConfig — Stage 2

5. Maintenance

Chapter 5 provides instructions regarding maintenance. It discusses the following topics:

- Routine Maintenance
- Intake Air Filter Cleaning
- Battery Replacement
- Fuse Replacement
- LED Status Indicators

Routine Maintenance

The NV5256 requires very little in the way of routine or preventative 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.

You might want to examine the system's LED Status Indicators occasionally to ensure that the system is operating normally and to make sure that air flow to the power supply fans is unobstructed.

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

Periodic Inspection

Periodically inspecting the NV5256 for signs of trouble is the best way to prevent unplanned outages. Begin the inspection at the front of the frame. Open the door to the matrix and make these observations.

1. Check the +48 VDC LEDs on the front of the PS6000 power suppl(ies). An LED that is off or very dim indicates a failed or failing supply.

2. Place your hand lightly across the air intakes on the front of the power supplies. You should feel slight air movement that indicates that the internal cooling fans are running. Use a flashlight to verify that the fan blades are rotating.

3. Examine each I/O card and verify that none of the red alarm LEDs are illuminated. Normally, the green and yellow LEDs are illuminated. See LED Status Indicators on page 38, following.

4. Examine the router control card(s) and verify that the green and yellow LEDs are illuminated on the active controller, and that the green LED is on for the standby controller (if you have one). Verify that the 'low battery' LED is off. See LED Status Indicators on page 38, following.

5. Inspect the air intake filter located in the door. If the filter is dirty or clogged, clean it. Refer to Intake Air Filter Cleaning on page 36, next, for instructions.

Next, move around to the rear of the matrix frame.

1 Ensure that there are no missing backplane cover plates. Cover plates (used where there are no backplanes installed) are required for proper cooling in the frame.

2 Place your hand near the air exhausts (at the top). You should feel strong, evenly distributed air pressure across the entire opening.

3 Check cable connectors for any sign of unseating.

4 Verify that one or both AC cords are firmly seated at both ends. Make sure that the power cord retainers on the rear of the frame are in place.

Intake Air Filter Cleaning

The air intake filter is located on the front door assembly of the NV5256. Slide the filter up and to the right to remove it. The process might be easier if you remove the entire door. To remove the door, simply open the door and lift it straight up. The router can be operated safely with the door removed for short periods of time.

Note	Be sure to replace and close the door when you are done. The door ensures that air entering the frame is properly filtered.

If the filter is only lightly contaminated with debris, remove loose debris and dirt with a vacuum cleaner or by blowing air from the clean side to the dirty side. For filters that are badly clogged, a rinse with cold water might prove effective. You can wash the filter with warm water and mild detergent. Make sure the filter is completely dry before re-installing it.

Battery Replacement

A CR2330 lithium coin cell is located on the front edge of the router control card. This battery provides power to maintain the memory contents when power is lost.

If the router control card is continuously powered, the battery should last for several years or more. If the router control card is frequently powered down, the battery should be replaced every 6 months. A red LED, located directly above the battery holder, illuminates when the battery is low.

The battery can be replaced while the router control card is powered up and operating. Simply pull the battery from its holder to remove the spent cell. Insert the replacement in the holder while carefully observing the polarity of the battery.
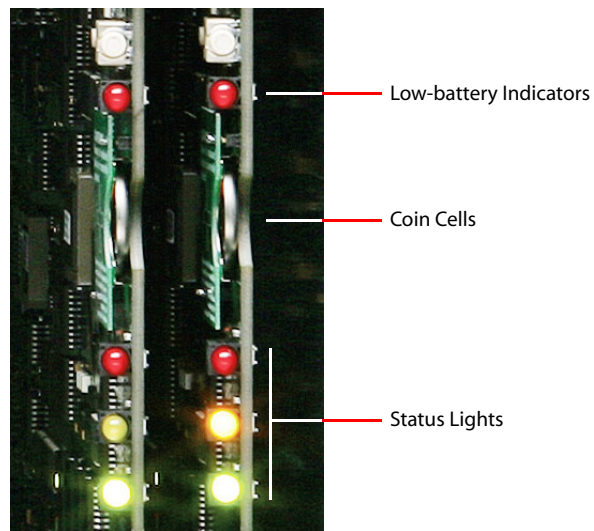
Figure 5-1. EM0374 Battery Replacement

Note	Reinstall battery with positive terminal (+) facing *away* from the main circuit board. (That is to your left if the control card is in installed in the frame.) Inserting the battery backwards may result in an explosion.

Fuse Replacement

The I/O cards and the control cards include non-serviceable, self-resetting thermal fuses. These fuses open in the event of a serious overload, preventing major damage. They will self-reset if allowed to cool.

A replaceable AC fuse cartridge is used on the PS6100 power supply modules. The correct fuse is 15A (1.25″ × 0.25″ fast-blow).

The correct fuse for the *older* PS6000 power supply is given in this table:

90–130 VAC	8.0 A, 5×20 mm, slow-blow fuse
180–250 VAC	6.3 A, 5×20 mm, slow-blow fuse

If a fuse fails, locate the cause of the trouble rather than simply replacing the fuse blindly. Although fuses that have been in service for years may fail due to cumulative stress, a fuse normally fails for a significant reason. Please contact Miranda for assistance if a fault cannot be isolated.

Figure 5-2 shows the location of the fuse on either power supply module.

Figure 5-2. Fuse Location, PS6000 or PS6100 Power Supply

LED Status Indicators

Each I/O card has status indicators (LEDs). Table 5-1 lists the control card's main LEDs:

Table 5-1. Router Control Card LEDs

LED	Function	Description
Red (above battery holder)	Battery status	If LED is on, replace battery.
Green	Health	If this LED is on, operation is normal. The control card has successfully booted. The on-module power supplies are OK. The control card is active or ready to go active.
Yellow	Active	If this LED is on, the control card is active.
Red	Alarm	If this LED is on, the control card is in a fault state: Bad or missing video reference or AES reference. Bad on-module power supply. Microprocessor failure.

6. Specifications

Chapter 6 provides specifications for the NV5256. It presents the following topics:

- Electrical Specifications
- Mechanical Specifications
- Environmental Specifications
- I/O Card Specifications
- Expansion Card Specifications
- Communication Port Specifications
- Reference Port Specifications

Electrical Specifications

Table 6-1. Electrical Requirements for the NV5256

Parameter	Specification
AC power	90–130 or 180–250 VAC, 50/60 Hz, auto-ranging. 660 W maximum, power factor corrected. 325 W average, fully loaded.
Receptacles	Two (2) standard IEC 60320 C13/C14, filtered. One receptacle for each of two power supplies. The second power supply is optional.
Agency approvals	UL listed, CE compliant

Mechanical Specifications

Table 6-2. Mechanical Specifications for the NV5256

Parameter	Specification
I/O card slots	16 (16 inputs each)
Control card slots	2, primary and secondary (optional). Accepts EM0374 router control card
Power supply slots	2, primary and secondary (optional). Accepts PS6100 power supplies.
Dimensions	13.97″ (8 RU) × 19.0″ W × 18.5″ D (354.8 mm × 482.6 mm × 469.9 mm).
Weight	95 lb (43.09 kg) maximum, with all components installed.

Environmental Specifications

Table 6-3. Environmental Requirements for the NV5256

Parameter	Specification
Operating temperature	0–40°C (32–104°F)
Humidity	0–90%, non-condensing

I/O Card Specifications

Table 6-4. I/O Card Specifications for the NV5256

Parameter	Specification
Ports per card	16
Input voltage	200 mV to 10 V p-p
Output voltage	RS-422: 5V p-p. RS-232: ± 5 V (min.)
I/O connector	RJ-45, wired according to SMPTE 207M
Input Impedance	110 Ω
Data rate	≤ 115.2 kBaud
Power	≤ 8 W
EIA-422/485	Controlled or controlling (selectable)
EIA-232	DTE or DCE selectable

Expansion Card Specifications

Table 6-5. Expansion Card Specifications for the NV5256

Parameter	Specification
Output	1 V p-p; < 50 mV offset
Cable length	≤ 250 m, Belden 8281 without repeaters.
I/O connector	BNC, 75Ω
Power	≤ 7 W

Communication Port Specifications

Table 6-6. Communications Port and Related Specifications for the NV5256

Parameter	Specification
Serial communication ports	One primary DE9 female (CTRL1) and one secondary DE9 female (CTRL2) RS-422 receptacles for each control card (4 in total). Ports comply with the SMPTE 207M standard. Signalling protocol and communication parameters are software-dependant.
Ethernet ports	One RJ-45 connector (10/100baseT) for each control card (2 in total). Connection speed is auto-negotiated. Port employs NVISION Ethernet protocol. One BNC connector adhering to 10base2 specification for each control card (2 in total). Connection shared between controllers. Use for inter-frame expansion only.
Diagnostic ports	One DE9 female diagnostic connector for each control card (2 in total).
Rear panel	Software configured for RS-232 (default) or RS-422 interface specification.
Front edge of control card	RS-232 (9600, 8, N, 1)
Alarm ports	One DE9 female receptacle (system-level alarms). One 3-pin Phoenix receptacle (power supply alarm).

Reference Port Specifications

Table 6-7. NV5256's Reference Port Specifications

Parameter	Specification
Video reference ports	2 looping BNC input pairs, one for each installed control module. External terminators are required. Ports accept NTSC, PAL or HD tri-level reference signals. Inputs may be of differing rates. Redundant and dual modes are supported. Return Loss > 30 dB to 5 MHz.
AES reference ports	2 BNC input receptacles, one for each installed control module. Ports accept AES3id format signals at 48 kHz sample rate OR 2 Phoenix twisted pair screw terminal blocks, one for each installed control module. Phoenix ports accept AES3 format signals at 48 kHz sample rate. Note: only one connector type may be used on each AES reference input. 24-bit silence. Locked to the control card's 24.576 MHz clock.
Time-code reference port	Not used.

6. Specifications

Reference Port Specifications

7. Misc. Topics

Chapter 7 provides the following:

- Control Port Connectors
- AES Reference Connectors
- Ordering Information

Control Port Connectors

There are two sets of these connectors—one for the primary control card and one for the redundant control card.
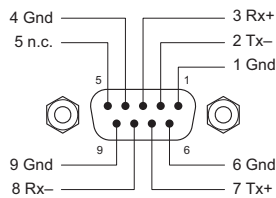
CTRL1, CTRL2   DIAG
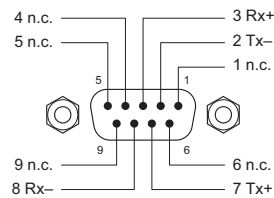
The connectors are female DE9s.

AES Reference Connectors

There are two sets of AES reference connectors, one for the primary control card and one for the secondary control card. You can use either the BNC connector or the Phoenix 3-pin STP connectors. This figure shows the pinouts of the Phoenix connectors:
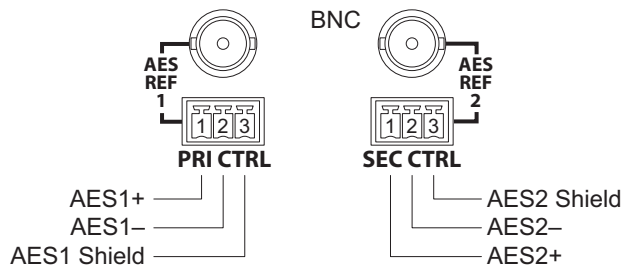
Ordering Information

These are the NV5256 components:

FR0007-00	NV5256 frame
EM0501	NV5256 motherboard
EM0405	Power distribution
EM0407	Power interconnect
EM0503-01	RS-422 I/O card
EM0503-50	RS-232 I/O card
EM0502	Expansion card
EM0483	I/O backplane
BP2-PORT-64	64-Port RJ-45-to-DE9 Breakout Panel (FR0008-00)
SM0220	SMS7000 Mezzanine Card Option

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