

UniConfig

NVISION Series Router Configuration Utility v12.0.0

User's Guide

UG0022-05

25 Nov 2014



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Change History

Rev.	Date	ECO	Description	Approved
1.0	02 Oct 07	13619	Initial Release	DEM, RH, GW
1.1	13 Feb 09	15573	Software update. Corrections.	DEM, D.Cox
1.2	31 Mar 09	15703	Format change.	D.Cox
1.3	14 Dec 09	16272	Added EC9535 configuration, monitor connections.	DEM
2.1	25 Apr 13	18826	Added NV8140. Updated format. Corrected errors.	D.Cox
2.1	25 Nov 14	19357	Reformatted and slightly changed.	D.Cox

Safety Compliance

FC FCC Statement

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

CE Declaration of Conformance (CE)

All of the equipment described in this manual has been designed to conform with the required safety and emissions standards of the European Community. Products tested and verified to meet these standards are marked as required by law with the CE mark.

When shipped into member countries of the European Community, this equipment is accompanied by authentic copies of original Declarations of Conformance on file in the Grass Valley offices in Grass Valley, California USA.

Software License Agreement and Warranty Information

Contact Grass Valley for details on the software license agreement and product warranty.

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.

Restriction on Hazardous Substances (RoHs)

Grass Valley 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.

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

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

1-800-719-1900 (toll-free) or
1-530-265-1000 (outside the U.S.).

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 Grass Valley 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 Grass Valley 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 outlet that is easily accessible.
- To reduce the risk of electrical shock, plug each power supply cord into a separate branch circuit having a separate service ground.

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Preface

Chapter 1 provides an introduction to the UniConfig User's Guide.

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Chapter Structure

The following chapters provide detailed instructions for all aspects of Router Configuration Utility:

- Chapter 1, [Preface](#), (this chapter) outlines ways to use this guide, and provides a list of terms and conventions.
 - Chapter 2, [Introduction](#), provides a functional description of UniConfig.
 - Chapter 3, [UniConfig Basics](#), provides an overview of UniConfig's windows and menus.
 - Chapter 3, [Configuration Basics](#), provides an overview of configuration tasks.
 - Chapter 4, [Installation](#), provides information on installing UniConfig.
 - Chapter 5, [Communication](#), provides information on setting up communication between UniConfig and the router.
 - Chapter 6, [Partitions and Signal Types](#), provides information on creating partitions.
 - Chapter 7, [Switch Point Settings](#), provides information on making switch point settings.
 - Chapter 9, [Connections Window](#), provides information on crosspoints and performing takes.
 - Chapter 8, [Machine Control](#), provides information on machine control partitions and ports.
 - Chapter 10, [EC9535](#), provides information regarding the EC9535 GSC Node Controller, a router interface.
 - Chapter 11, [NV8500 Monitors](#), provides information regarding NV8500 input and output monitors.
 - Chapter 12, [Locks](#), provides information about releasing locks.
 - Chapter 13, [Salvos](#), provides information on salvos.
 - Chapter 14, [Firmware](#), provides information about updating firmware.
 - Chapter 15, [System Status](#), discusses the 'System Status' window.
 - Chapter 16, [Logs](#), discusses the 'Logs' window.
 - Chapter 17, [Technical Details](#), provides supplementary, but important, information.
- An [Index](#) and [Glossary](#) are 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 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:

- 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, page name, or label.
The AES3 reference connection is labeled 'AES3 REF 1'.

2 Introduction

Chapter 2 provides a brief functional description of UniConfig.

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UniConfig is a software application to set up and modify configurations of Grass Valley's NVISION series routers and to perform diagnostics. UniConfig runs on a PC and communicates with a router through the router's control card either serially or over Ethernet. UniConfig modifies settings on the router control card. Configuration settings vary depending on the router's matrix type, its communication protocol, and the level of complexity of the router's partitioning.

You can also use UniConfig to upload new firmware to router control cards and to perform minor adjustments, such as takes and lock releases, on a router that is in operation.

Product Overview

A router's control card handles communication between a router control system and the router's hardware.

There are several different protocols available by which the router control system can communicate with the control card.

In this chapter, we assume that UniConfig is interacting with one of Grass Valley's NV9000 family router control systems using Grass Valley's Ethernet protocol (NVEP). This protocol is always available through the router's Ethernet connection. NVSP (the serial protocol) is always available through the router's 'CTRL 2' connections.

Third-party protocols can be active through the serial 'CTRL 1' connection only. The control card allows only one third-party protocol to be loaded at any one time. For information on changing control system protocols, contact [Grass Valley Technical Support](#).

Storing Configuration Settings

Configuration settings are stored in non-volatile memory (EEPROM) located on the router motherboard. The EEPROM stores all configuration settings entered through UniConfig except the crosspoint switching data. Crosspoint data are stored on the control card in battery-backed RAM.

Each control card in a router has its own memory. Both cards, if two are present (for redundancy), must be configured separately and identically.

Utilities

UniConfig can be used to perform a variety of utility functions, such as running diagnostics or viewing system status. In addition, UniConfig can be used to test and update router crosspoint data independently of the router control system.

Grass Valley periodically updates UniConfig with new features and functionality. Contact [Grass Valley Technical Support](#) for the latest version of UniConfig.

UniConfig Version

This document describes UniConfig version 12.0.0 communicating with a control card running current firmware under Grass Valley's NVEP protocol. If your specific version of UniConfig and control card firmware and its protocol are different, some features or functions presented in this guide might not be available on your system. Contact [Grass Valley Technical Support](#) for information on obtaining the latest versions of UniConfig and firmware for your situation.

Upgrading control card firmware is recommended only if a specific feature or function you require is not provided by your current version. In some cases, new hardware may be required to execute the latest firmware revision.

Supported Routers

UniConfig currently supports the following NVISION routers:

NVISION Router	Control Card
NV5100 multi-format router (128×128)	EM0374
NV5128 multi-format router (128×128)	EM0374
NV5256 machine control router 256×256 expandable to 512×512	EM0374
NV7256 digital audio router (256×256) NV7256-Plus digital audio router 256×256 expandable to 512×512	EM0374
NV7512 digital audio router 512×512 expandable to 2048×2048	EM0374
NV8256-Plus digital video router 256×256 expandable to 1024×1024	EM0374
NV8288 digital video router (288×576) NV8288-Plus digital video router 288×288 expandable to 576×576	EM0529
NV8500 Family: NV8144 digital video router 144×144 NV8140 digital video router 144×288 NV8280 digital video router 288×576 NV8576 digital video router 576×1152 NV8576-Plus digital video router 576×576 expandable to 1152×1152	EM0666
EC9535 GSC Node Bus Converter (no signal inputs or outputs)	EM0374

Although the EC9535 is not a router, it is configurable in UniConfig.

The NV3512 expandable digital audio router, the NV3064 multi-format router, and the NV6000 series routers are not discussed in this document. Please contact [Grass Valley Technical Support](#) for assistance.

3 Configuration Basics

Chapter 3 discusses basic configuration tasks, including launching UniConfig, selecting a control card, viewing data, and writing changes.

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UniConfig is used for configuring the control cards of NVISION series routers (and other devices having control cards). A router cannot function properly until its control card(s) has been configured.

Configuration choices vary according to the router model and the communication protocol loaded on the control card. After UniConfig reads the router model and control card protocol, it determines which menu options and windows to display.

Before Starting a Configuration

Before starting configuration tasks, please review the following check list of required conditions:

- The Grass Valley router has all the desired input, output, crosspoint, and control cards installed and is powered up. All required reference signals have been connected.
- You have a configuration PC with UniConfig installed. See [Installation](#) on page 13. This PC must be on the same Ethernet network as the router(s) you wish to configure.
- The router control system that will be used to control the router is available and ready for configuration.

Launching UniConfig

How to Launch UniConfig

Select 'Programs > NVISION > UniConfig' from the Windows 'Start' menu, or click the UniConfig shortcut on your desktop:



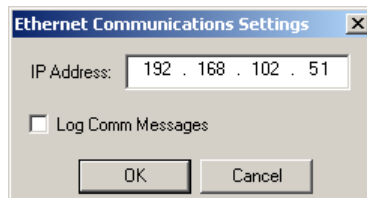
How to Connect to a Router Control Card

If you do not know the IP address of your router's control card, or if the control card is not accessible over Ethernet, on your PC, you *must* make a serial connection to the control card. The details of that are explained in [Communication](#) on page 17.

If your PC has an Ethernet connection to the control card, connection is much simpler.

Ethernet Connection

- 1 Click 'Ethernet' in the 'Communications' menu (if you have not done so already).
- 2 Either click 'Setup' in the 'Communications' menu and enter an IP address in the dialog:



- 3 Or, choose a control card from the control cards pane.
 - 4 In the 'Configuration' window for this control card, click 'Read All'.
- ▲ The control card must be accessible among the networks to which your PC is connected.

Serial Connection

- ▲ Serial connections require your PC to have either a serial port or a USB-to-serial adapter for use with a USB port.

Selecting a control card on a serial connection means running a serial cable from a COM port of your PC to a DE9 port of the control card itself. (The DE9 port to use is either at the front of the card or at the rear of the router frame.)

There are several methods for connecting to a control card serially. The method you choose depends on the router control card:

- EM0374— Use the DE9 connector at the front of the control card. (Routers that use the EM0374 are the NV5128, NV5256, NV7256, NV7512, NV8256-Plus, and the NV5100MC. The EC9535 also uses EM0374 control cards.)

The connection is RS-232, 9600 Baud, 8N1.

(You can use the router's rear connector after you first set up communication using the front connector.)

- EM0529— The NV8288 and the NV8288-Plus use this control card. Connect to the rear diagnostic port of the router frame. There are two ports. Use the one for the control card you want to configure. (Both control cards must eventually be configured identically.)

The connection is RS-232, 38400 Baud, 8N1.

- EM0666— This card is used by NV8500 family standard routers. Connect to the rear diagnostic port of the router frame. There are two ports. Use the one for the control card you want to configure. (Both control cards must eventually be configured identically.)

The connection is RS-232, 38400 Baud, 8N1.

See [Communication](#) on page 17 for complete details.

- ▲ The control cards on a router must be configured separately and identically.

Viewing Configurations

After you have connected to a control card, go to the 'Configuration' window.

How to View Current Configuration Settings

- 1 Select a control card.
- 2 Go to the 'Configuration' window:

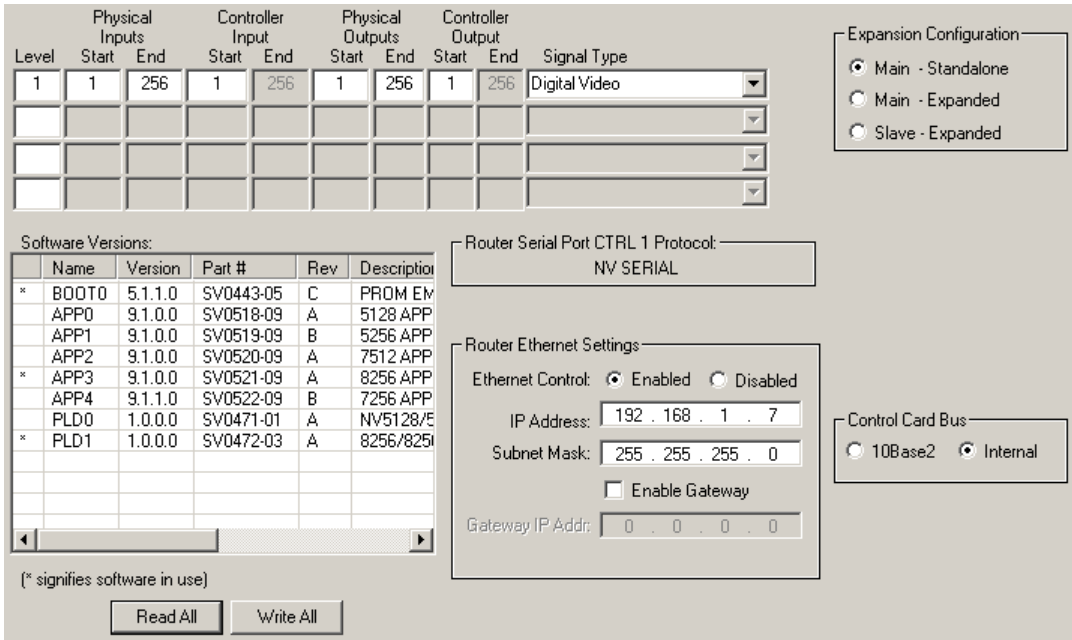


Fig. 3-1: Configuration Window (NV8256 Sample)

- 3 Click **Read All**. Current configuration data populate the 'Configuration' window. If 'Auto Refresh' is enabled, it is not necessary to click **Read All**. See [Automatic Refresh](#) on page 15.

Writing Changes to the Control Card

UniConfig does not save any changes in your PC's file system. Configuration changes you make are written to the EEPROM on the motherboard in the router frame. Each of a router's control cards has its own independent EEPROM. This means that changes must be made to each control card separately and identically.

- ▲ When written, changes are global and immediately overwrite any previous settings. There is no way to undo a "write."

How to Write Changes

- 1 In the currently open UniConfig window in which changes have been made, click **Write** or **Write All**. If the changes are successfully written to the control card, a dialog appears prompting you to reboot the control card.
- 2 Click **Yes** to reboot the control card. All crosspoint settings are maintained during the reboot cycle but crosspoints cannot be changed until the control card has finished rebooting.
Or, click **No** if you want to reboot at a later time. Changed settings are stored in EEPROM, but are not copied into the RAM used by the control card. The system will continue to run using the previous settings until a reboot is performed.

Applying Configurations to Another Control Card

Once a configuration has been defined, the configuration settings can be applied to multiple control cards.

How to Apply a Configuration to Another Control Card

- 1 Select a control card. (This the "from" control card.)
- 2 Go to the 'Configuration' window.
- 3 Click **Read All**. Current configuration settings for the selected control card populate the 'Configuration' window fields.
- 4 Ensure that 'Auto-refresh' is disabled. (See [Automatic Refresh](#) on page 15.)
- 5 Select another control card — one to which you want to copy the current configuration.

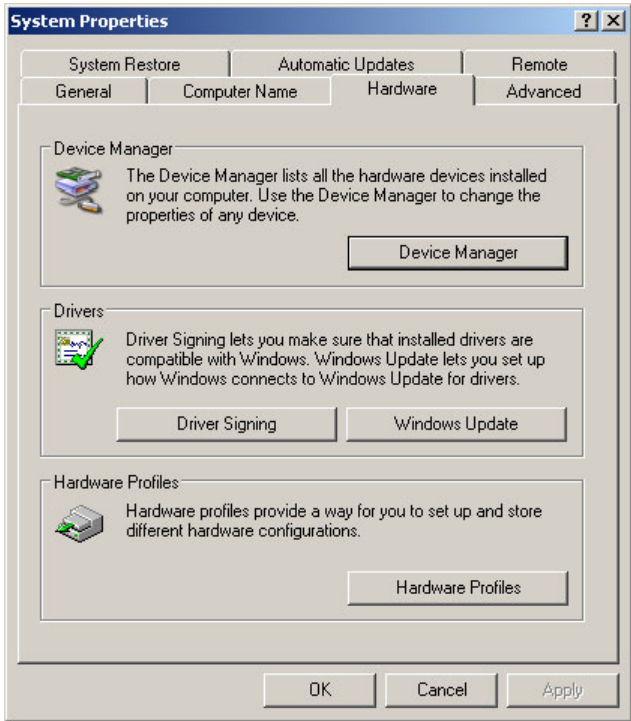
Do not click Read All.

- 6 **Important:** Enter the "to" control card's IP address (and its subnet mask and gateway address, if necessary) in the Ethernet settings section of the page.
If you do not change the IP address, you will write the configuration back to the "from" control card.
- 7 In the 'Configuration' window, click **Write All**. UniConfig sends the current configuration to the selected control card.
- 8 Repeat steps 5–7 for additional target control cards.

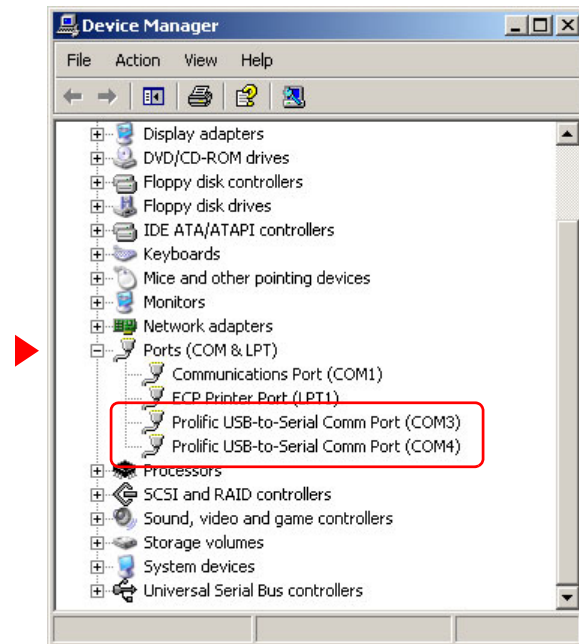
USB-to-Serial Adapters

Older PCs have one or more DE9 COM ports. Newer PCs do not have them. You can obtain a USB-to-serial conversion kit. With the software in the kit, a USB port acts a serial port. Following is one solution. Obtain a USB-to-Serial-Value kit from SIIG, Inc. (www.siig.com). The kit includes a software CD and a USB-to-DE9 cable. Install their driver. The driver (software) will perform USB-to-serial conversion. After loading the software, determine which COM ports are available:

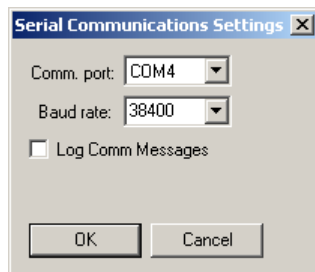
- 1 Go to the Windows System Properties dialog:



Click the 'Device Manager' button. The 'Device Manager' window opens:



- 2 Locate, and expand, the 'Ports (COM & LPT)' entry. You should see entries listing the COM ports that are associated with USB ports. (The window details and the nomenclature might differ if you are using Windows 7 or a driver from a different supplier.)
- 3 In UniConfig's 'Serial Communications Settings' dialog, choose one of those ports as the COM port:



Network Basics

For devices to communicate over Ethernet, all devices must reside on the same subnet or have access to the subnet through a gateway.

Each control card on an NV9000 router network must have a unique IP address.

An IP address is a 32-bit number divided into two portions, one identifying the subnet and the other specifying the address of a device within the subnet. A *subnet mask* specifies where in the IP address the division occurs.

An IP address is usually represented by four 8-bit values (octets) written in decimal. The typical IP address for a router in an NV9000 system is

192.168.1.*nnn* where *nnn* ranges from 1 to 254

and its subnet mask is typically 255.255.255.000. That mask means that 24 bits are used for the subnet and 8 bits are used for the device address.

(Device addresses 0 and 255 are reserved for other purposes and may not be used.)

IP addresses for router control cards must be fixed addresses. DHCP¹ is not used.

IP addresses are divided into classes. Specific classes are intended for different functions. For example, IP addresses on the 192.168.xxx.xxx subnet are known as class C addresses and are intended for use in private closed networks. This range is recommended for use with all Grass Valley products using a fixed IP structure.

Barring any IP addresses provided by your IT administrator, we suggest the following IP address settings for router control cards:

Router	Primary Control Card	Secondary Control Card
First router	192.168.1.5	192.168.1.6
Second router	192.168.1.7	192.168.1.8
Third router	192.168.1.9	192.168.1.10
Fourth router	192.168.1.11	192.168.1.12
...		

With these IP addresses, your configuration PC should be configured so that one of its IP addresses is 192.168.1.*nnn* where *nnn* is different from any address used by the routers.

All Grass Valley routers support Ethernet communication at 100 Mb/s.

1. Dynamic Host Configuration Protocol

4 Installation

Chapter 4 provides installation instructions.

Topics

<i>Preparing for Installation</i>	13
<i>Installing UniConfig</i>	14

Preparing for Installation

You will need a PC with the following features to use UniConfig:

- Windows® 2000, Windows XP Professional,® or Windows 7.® UniConfig does not run under any version of the Macintosh or Linux operating system.
- A late model Pentium-class processor, such as a Pentium III (or later) or an AMD Athlon.
- At least 90 MB of disk space.
- A CD drive.
- 256 MB or more RAM.
- At least one RS-232 serial port capable of running at 38400 bps or more. Note that many USB-to-serial adapters do not function correctly at higher Baud rates.
- A 10/100baseT Ethernet port that can use a fixed IP address on the same network as your NVISION series routers.

You will need the following items to use UniConfig:

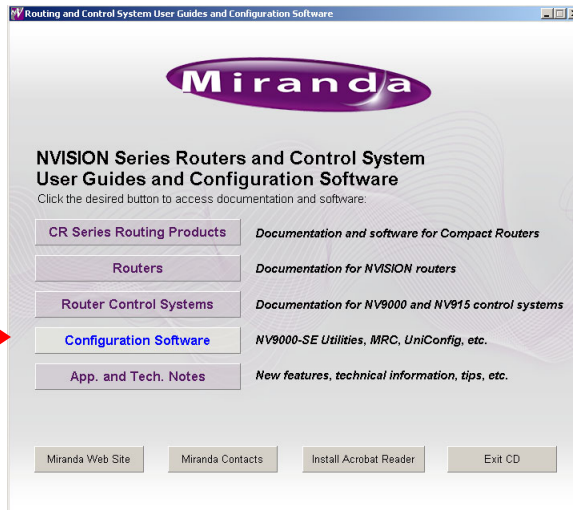
- 100Mb/s Ethernet switch with at least 4 ports.
- Ethernet cables (category 5 or better).
- Straight-through RS-232 serial cable.

Installing UniConfig

UniConfig is available on Grass Valley's Software and Documentation CD (SB0033-xx). You can obtain the most recent release of UniConfig through Grass Valley customer service.

How to Install UniConfig

- 1 Obtain the Software and Documentation CD (SB0033) and insert in your CD drive.
- 2 The CD should "autoplay." The main screen appears:



- 3 Click 'Configuration Software'. The configuration software page appears:



4 Click 'Install UniConfig'. You will see a warning message:



You may safely disregard the warning. Click 'Run' to proceed.

5 The UniConfig installer will launch:



6 Follow the simple instructions, clicking 'Next' to proceed from step to step. The actual installation takes about 30 seconds. By default, the installer creates an entry in the Windows 'Start' menu and also creates a shortcut on your desktop:



The default pathname of the application is:

C:\Program Files\NVISION\UniConfig\UniConfig.exe

The default path in the Windows Start menu is:

Programs > NVision > UniConfig

5 Communication

Chapter 5 discusses how UniConfig communicates with routers.

Topics

<i>Communicating with a Router</i>	17
<i>Serial and Ethernet Settings</i>	20
<i>Communications Options</i>	23
<i>Reading and Writing Control Card Configurations</i>	25
<i>Disabling an Ethernet Port</i>	25

UniConfig can communicate with any NVISION series router's control card through its Ethernet port. Depending on the router, it can also communicate either through a serial port located at the rear of the router, or through a serial port located at the front of the control card.

Note

If your router has two control cards, use UniConfig to configure each control card separately and identically. Each of the control cards must have a unique IP address, however.

- ▲ EC9535s are not routers but they do have (EM0374) control cards. For information on setting up EC9535 communication, see [EC9535](#) on page 93.
- ▲ Use MRC, not UniConfig, to configure NV8500 family *hybrid* routers (which have EM0833 control cards).

Communicating with a Router

Communicating with the Router for the First Time

The first time you configure a router, it is likely not to have an IP address. You must use the router's serial connection with UniConfig to assign the router's control card its IP address. If the router has two control cards, you must assign an IP address to both. After you perform this simple step, you can use the router's Ethernet connection to perform configuration tasks.

Ethernet is generally preferable. You can access multiple routers, perhaps remotely, and you do not have to make cable connections for each change. Ethernet is also faster when you are uploading firmware to the router.

Front Serial Connection

(Front serial connections apply only to routers with EM0374 control cards.)

Make a connection between the router and UniConfig. Run a cable from your PC's serial port to the DE9 serial port located on the front of the control card. This connection is set to a fixed rate of 9600 Baud. (The protocol is RS-232, 8N1, meaning 8 data bits, no parity, and 1 stop bit).

How to Make a Front Serial Connection

- 1 Open the router door and locate the control card.
- 2 Run a straight-through serial cable from your PC's serial port to the DE9 connector at the front of the control card.

If your PC does not have a serial port, you'll need a USB-to-serial adapter for the cable. See [USB-to-Serial Adapters](#) on page 9.
- 3 Close the router door as much as possible. The router might overheat if you leave the door open.
- 4 Set up serial communication in UniConfig. That is, choose serial mode and set the RS-232 settings to 9600. See [Changing UniConfig's Serial Communication Parameters](#) on page 20.
- 5 Read the control card configuration from the router. See [Reading a Control Card's Configuration](#) on page 25. If the read is successful, your serial connection is good.

(If the read is not successful, you will need to diagnose and correct the problem. The problem could be a faulty cable or that you have used a crossover cable by mistake. The problem might lie in UniConfig: its Baud rate not set to 9600, the wrong COM port or the wrong connector chosen.)
- 6 Be sure to close the router door again when you have finished with its control cards.

Rear Serial Connection (DIAG Port)

(The serial connection for routers with EM0529 control cards or EM0666 control cards must be made through the DIAG connectors at the rear of the router.)

(It is your option, after you have initially set up a router having an EM0374 control card, to access the control card through its rear DIAG port.)

There are two serial ports located on the router, labeled 'DIAG'. One is for the primary¹ control card and the other is for the secondary control card. By default, these ports are set to 38400 Baud, RS-232, but can be changed to RS-422 in UniConfig. **Do not change them to RS-422.**

1. The terms "primary" and "secondary" mean nothing more than to distinguish the two control cards.

How to Make a Rear Serial Connection

- 1 Locate the permanent serial ports on the rear of the router, as shown in Figure 5-2. On the NV8288 and NV8288-Plus, the ports are labeled 'DIAG (38400 Baud)':

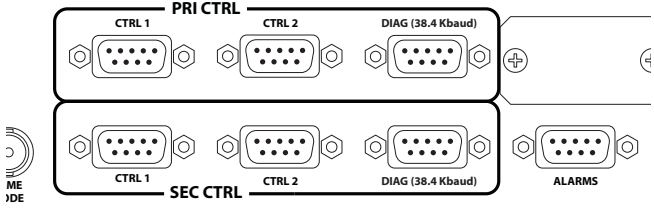


Fig. 5-1: Serial Ports (Rear View, NV8288, NV8288-Plus)

On the NV8500 family routers, the ports are also labeled 'DIAG (38400 Baud)', but in a different orientation: This shows the NV8144:

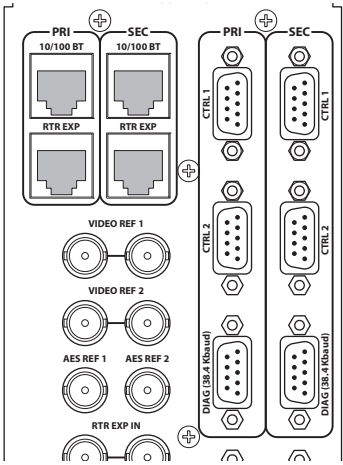


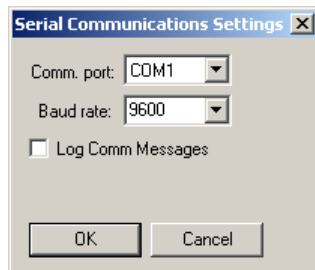
Fig. 5-2: Serial Ports (Rear View, NV8144)

- 2 Run a straight-through serial cable from your PC's serial port to the diagnostic connector. If your PC does not have a serial port, you'll need a USB-to-serial adapter for the cable. See [USB-to-Serial Adapters](#) on page 9.
- 3 Set up serial communication in UniConfig. That is, choose serial mode and set the RS-232 settings to 38400. See [Changing UniConfig's Serial Communication Parameters](#), following.
- 4 Ensure that the control card's DIAG port is set to RS-232 and 38400 Baud. See [Changing the Control Card's Serial Communication Parameters](#) on page 21.
- 5 Read the control card configuration from the router. See [Reading a Control Card's Configuration](#) on page 25. If the read is successful, your serial connection is good.
(If the read is not successful, you will need to diagnose and correct the problem. The problem could be a faulty cable or that you have used a crossover cable by mistake. The problem might lie in UniConfig: its Baud rate not set properly, the wrong COM port or the wrong connector chosen.)

Serial and Ethernet Settings

Changing UniConfig's Serial Communication Parameters

- 1 From the 'Communications' menu, click 'Serial'. This places UniConfig in serial mode.
- 2 Again from the 'Communications' menu, click 'Setup'. The 'Serial Communications' dialog appears:



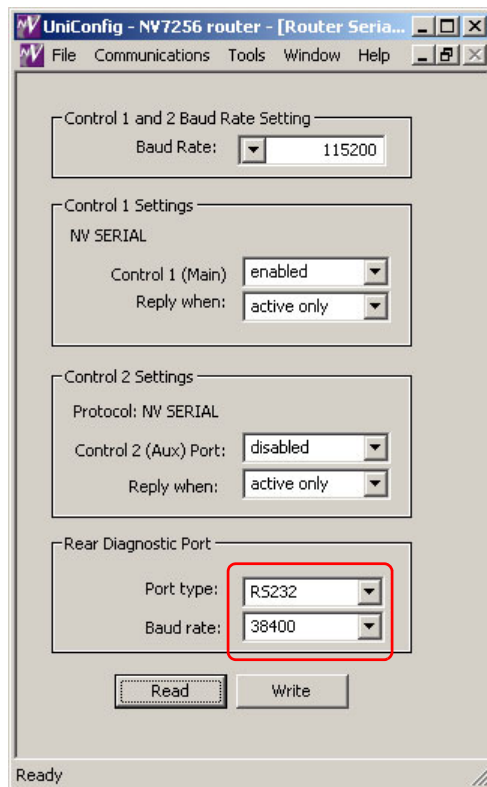
From the 'Comm port' drop-down list, select the communication port number that matches the port you are using on the configuration PC running UniConfig.

From the 'Baud Rate' drop-down list, select a Baud rate. Select 9600 for a front connection to EM0374 cards. Select 38400 for a rear DIAG connection to any router's control card.

- 3 Click **OK** to accept the settings or, click **Cancel** to close the dialog without making any-changes.

Changing the Control Card's Serial Communication Parameters

- 1 Select a control card. In Ethernet mode, use the control card pane or enter the card's present IP address manually. In serial mode, run a cable to the applicable serial port of the control card. See [How to Connect to a Router Control Card](#) on page 6.
- 2 From the 'Window' menu, select 'Router Serial Configuration'. The 'Router Serial Configuration' window appears:



- 3 Click **Read** to acquire the control card's settings. (Doing so might not be necessary, but it is not harmful, at this step.)
- 4 In the 'Router Serial Configuration' window, make settings as follows:

The first 3 regions of this window are for connections between the router and a router control system. Only the last region, "Rear Diagnostic Port" has any relation to UniConfig:

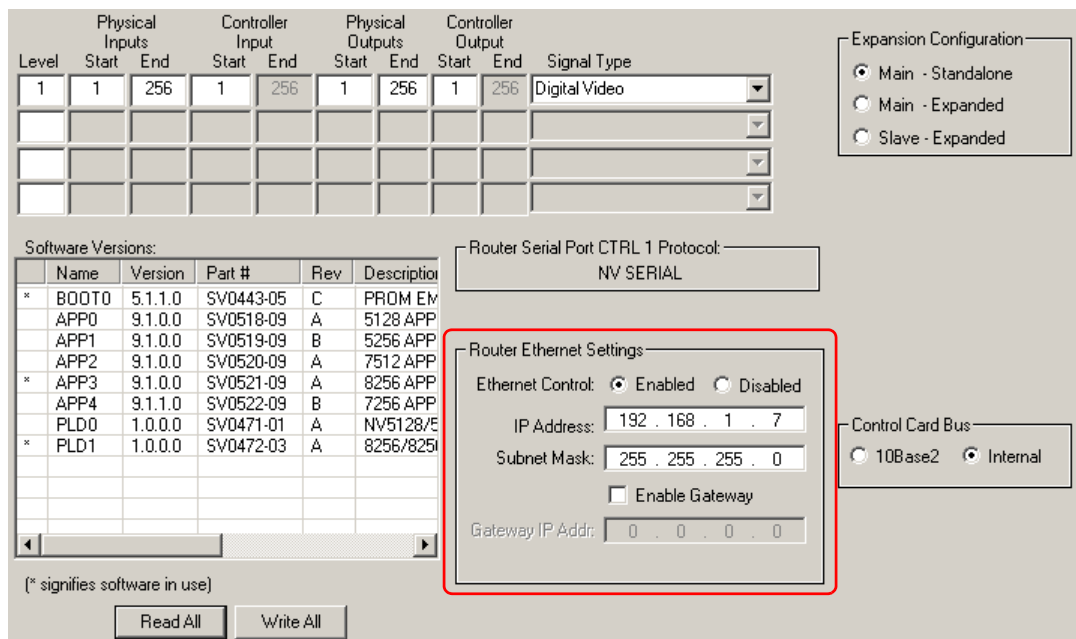
- a In the 'Rear Diagnostic Port' section, select a 'Port type' and 'Baud rate' from the drop-down lists. Choose 'RS232' and '38400'. (These are the defaults.)
- b Click **Write** to write changes to the control card.

WARNING

Do not click **Read** again before you have written the new data to the control card. Clicking **Read** reads all settings from the control card, overwriting any changes you have entered and does so without warning.

Changing the Control Card's IP Address

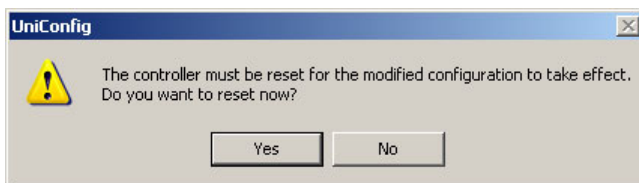
- 1 Select a control card. In Ethernet mode, use the control card pane or enter the card's present IP address manually. In serial mode, run a cable to the applicable serial port of the control card. See [How to Connect to a Router Control Card](#) on page 6.
- 2 From the 'Window' menu, select 'Configuration'. The 'Configuration' window appears. This example is the configuration window for an NV8256:



- 3 In the 'Configuration' window, click **Read All**. UniConfig populates the 'Configuration' window with the current router configuration.
- 4 In the 'Router Ethernet Settings' section, choose the 'Enabled' radio button to enable Ethernet communication.
Then, enter the IP address and subnet mask for this control card. (Keep in mind that you are doing this while your PC is connected to the router serially.) The subnet you specify should be the one that includes the router and your PC.
It is possible to enable, and specify the IP address of, a gateway in this dialog. See [Advanced Ethernet Communication Settings](#) on page 24 if you want to do that.
For background information, see [Network Basics](#) on page 10.
- 5 Click **Write All** to save changes to the control card. A confirmation message appears:



- 6 Click OK to dismiss the message. Then UniConfig asks permission to reset the control card.



Click **Yes** if you want to reset the control card at this time.

- 7 Repeat steps 1–6 for the other control card in the router frame if one is present.

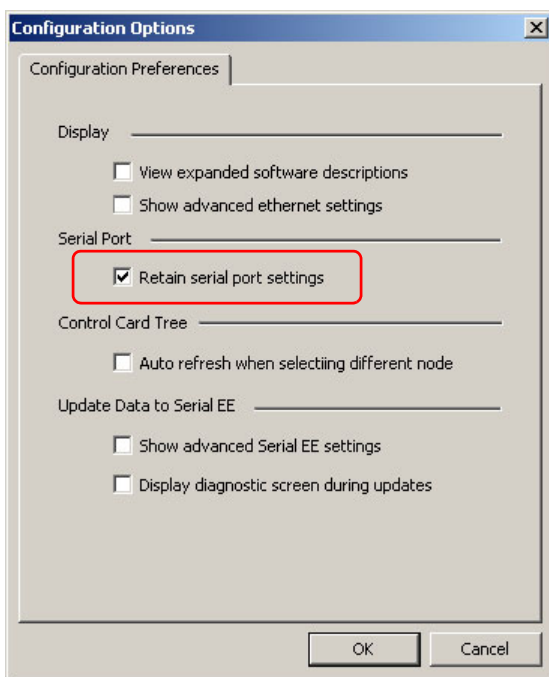
Communications Options

Retaining Serial Port Settings

You can specify that UniConfig is to retain its most recent serial settings. Otherwise, UniConfig uses the serial settings of the currently selected control card.

How to Retain the Most Current Serial Communication Settings

- 1 From the 'Tools' menu, select 'Options'. The 'Configuration Options' dialog appears:



- ▲ A different 'Configuration Options' dialog appears if you have the 'Connections' window open. If that occurs, close the 'Connections' window and re-issue the 'Options' command from the 'Tools' menu.
- 2 Check the 'Retain serial port settings' check box. By default this box is checked.
- 3 Click **OK** to save changes and close the dialog or click **Cancel** to close the dialog without saving changes.
- 4 Repeat steps 1 through 3 for each control card you want to update.

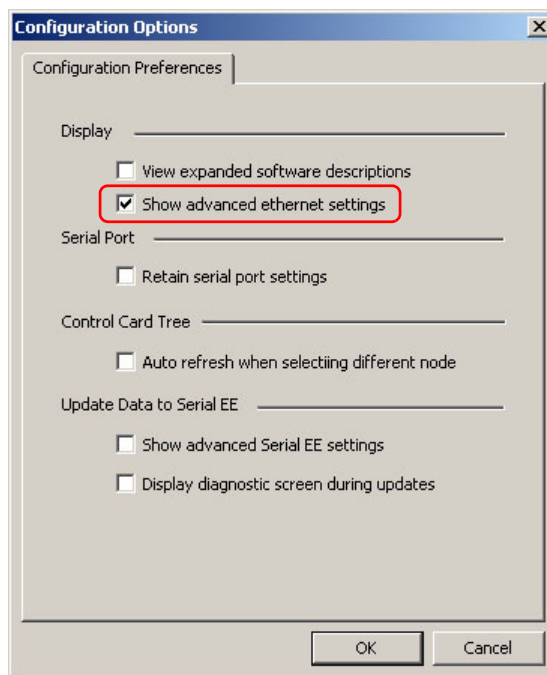
Advanced Ethernet Communication Settings

If your routers are on an Ethernet network, you can create a gateway to other sites. A gateway is a device, with an IP address, through which devices on one network can access devices on another network. For example, several facilities in different geographical locations can use a gateway to communicate with routers at another facility.

In UniConfig, you can assign a gateway address to each control card. Thus, you can control access to control cards on an individual basis.

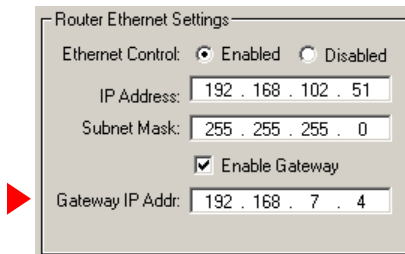
The advanced Ethernet option enables the use of gateway IP addresses.

- 1 From the 'Tools' menu, select 'Options'. The 'Configuration Options' dialog appears:



- ▲ A different 'Configuration Options' dialog appears if you have the 'Connections' window open. If that occurs, close the 'Connections' window and re-issue the 'Options' command from the 'Tools' menu.

- 2 Check the 'Show Advanced Ethernet settings' check box.
- 3 Click **OK** to save changes and close the dialog.
- 4 The 'Configuration' window now displays gateway settings in its 'Router Ethernet Settings' section:



- 5 It is now your option to enable, and specify, the IP address of a gateway.

Disabling an Ethernet Port

It is possible to disable the Ethernet port of a control card.

- ▲ If you do disable a control card's Ethernet port, you will have to use the card's serial connection when you want to restore the Ethernet port to operation.

How to Disable Communication with a Control Card

- 1 Select a control card. In Ethernet mode, use the control card pane or enter the card's present IP address manually. In serial mode, run a cable to the applicable serial port of the control card. See [How to Connect to a Router Control Card](#) on page 6.
- 2 From the 'Window' menu, select 'Configuration'. The 'Configuration' window appears.
- 3 Click **Read All**. The 'Configuration' window populates with the current router configuration.
- 4 In the 'Router Ethernet Settings' section, select the 'Disable' radio button. This disables the control card's Ethernet port.
- 5 Click **Write All**. The control card configuration is saved. After the control card restarts, its Ethernet port will be disabled.

Reading and Writing Control Card Configurations

Reading a Control Card's Configuration

- 1 Select a control card that is connected to your PC.
- 2 From the 'Window' menu, select 'Configuration'. The 'Configuration' window appears:

The screenshot shows the 'Configuration' window with several sections:

- Physical Inputs/Outputs Table:**

Level	Start	End	Start	End	Start	End	Start	End	Signal Type
1	1	256	1	256	1	256	1	256	Digital Video
- Expansion Configuration:**
 - Main - Standalone
 - Main - Expanded
 - Slave - Expanded
- Software Versions Table:**

	Name	Version	Part #	Rev	Description
*	BOOT0	5.1.1.0	SV0443-05	C	PROM EM
	APP0	9.1.0.0	SV0518-09	A	5128 APP
	APP1	9.1.0.0	SV0519-09	B	5256 APP
	APP2	9.1.0.0	SV0520-09	A	7512 APP
*	APP3	9.1.0.0	SV0521-09	A	8256 APP
	APP4	9.1.1.0	SV0522-09	B	7256 APP
	PLD0	1.0.0.0	SV0471-01	A	NV5128/E
*	PLD1	1.0.0.0	SV0472-03	A	8256/825
- Router Serial Port CTRL 1 Protocol:** NV SERIAL
- Router Ethernet Settings:**
 - Ethernet Control: Enabled Disabled
 - IP Address: 192 . 168 . 1 . 7
 - Subnet Mask: 255 . 255 . 255 . 0
 - Enable Gateway
 - Gateway IP Addr: 0 . 0 . 0 . 0
- Control Card Bus:**
 - 10Base2
 - Internal

At the bottom, there are 'Read All' and 'Write All' buttons, and a note: (* signifies software in use).

- 3 Click **Read All**. The 'Configuration' window populates with the current router configuration.

Writing a Control Card's Configuration

The reason to write a configuration to a control card is that you have made a change. It is presumed that you already have the control card selected and open for editing.

- 1 From the 'Window' menu, select 'Configuration'. The 'Configuration' window appears:

The Configuration window contains several sections:

- Physical Inputs/Outputs and Controller Input/Output:** A grid of fields for configuring levels, starts, ends, and signal types.
- Expansion Configuration:** Radio buttons for Main - Standalone, Main - Expanded, and Slave - Expanded.
- Router Serial Port CTRL 1 Protocol:** A dropdown menu set to NV SERIAL.
- Router Ethernet Settings:** Ethernet Control (Enabled/Disabled), IP Address (192.168.1.7), Subnet Mask (255.255.255.0), Enable Gateway checkbox, and Gateway IP Address (0.0.0.0).
- Control Card Bus:** Radio buttons for 10Base2 and Internal.
- Software Versions Table:**

	Name	Version	Part #	Rev	Description
*	BOOT0	5.1.1.0	SV0443-05	C	PROM EM
	APP0	9.1.0.0	SV0518-09	A	5128 APP
	APP1	9.1.0.0	SV0519-09	B	5256 APP
	APP2	9.1.0.0	SV0520-09	A	7512 APP
*	APP3	9.1.0.0	SV0521-09	A	8256 APP
	APP4	9.1.1.0	SV0522-09	B	7256 APP
	PLD0	1.0.0.0	SV0471-01	A	NV5128/E
*	PLD1	1.0.0.0	SV0472-03	A	8256/825

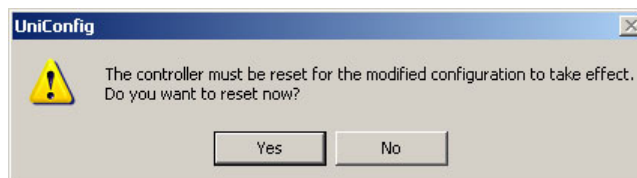
(* signifies software in use)

Buttons: Read All, Write All

- 2 Click **Write All** to save all changes to the control card. A confirmation message appears:



- 3 Click OK to dismiss the message. Then UniConfig asks permission to reset the control card.



Click **Yes** if you want to reset the control card. Click **No** to cancel.

Partitions and Signal Types



Chapter 6 provides an introduction to the UniConfig User's Guide.

Topics

<i>About Partitions</i>	27
<i>Configuration Window</i>	28
<i>Partition Types</i>	30
<i>Setting Up Partitions</i>	33
<i>Mono v. Stereo Audio</i>	40
<i>Defining a 'Monitor' Level</i>	42
<i>Defining an 'Output Follow' Level</i>	43

Creating partitions is one of the most critical parts of the configuration process. Router control systems use partition information to communicate with the router and manage its crosspoint connections.

All routers can have up to 4 partitions except the NV5100MC and the NV5128 which can have up to 6 partitions.

- ▲ Routers operating under SMS7000 control are limited to two partitions.
- ▲ The NV8500 family hybrid routers (having EM0833 control cards) should not be configured with UniConfig. NV8500 family standard routers that have EM0666 cards must be configured with UniConfig.
- ▲ The EC9535 is not a router but it has EM0374 control cards configurable with UniConfig. For information on configuring the EC9535, see [Setting Up EC9535 Partitions](#) on page 95.

About Partitions

Partitions are bounded regions within the router's crosspoint matrix that are used to organize switching. A signal type is associated with each region, allowing the control card to use the correct switching rules and reference signals.

Signals are switched within a partition, not between partitions. An input can be switched only to an output in the same partition. Every control card configuration defines at least one partition.

Please note that, In UniConfig, some entries in the partition table do not define boundaries of the crosspoint matrix, but define *other router functions*.

It is not a requirement that different signal formats be assigned to separate partitions. In fact, there are cases where doing that impedes system functionality. For example, on an NV5128 router having both SD I/O and analog video I/O (with analog-to-digital conversion), if the crosspoint matrix is divided into two partitions it would not be possible to route between the analog and digital signals even though the AVC cards are designed to allow this. Making one larger partition eliminates the problem.

In UniConfig, the term *physical level* (or simply *level*) can be used interchangeably with the term *partition*.

Configuration Window

It is in the 'Configuration' window that you specify the partitions of a router. The page has fields that exist for some routers and do not exist for other routers. Generally, the following sections and fields of the page are applicable to partitions:

Partition List

Level	Physical Inputs Start	Physical Inputs End	Controller Input Start	Controller Input End	Physical Outputs Start	Physical Outputs End	Controller Output Start	Controller Output End	Signal Type
1	1	256	1	256	1	256	1	256	Digital Video

Expansion Settings

Expansion Configuration:

- Main - Standalone
- Main - Expanded
- Slave - Expanded

Local: Inputs Outputs

End: 256 256

Index: 2

Control Card Bus:

- 10Base2
- Internal

Software Versions:

Name	Version	Part #	Rev	Description
* BOOT0	5.1.1.0	SV0443-05	C	PROM EM
APP0	9.1.0.0	SV0518-09	A	5128 APP
APP1	9.1.0.0	SV0519-09	B	5256 APP
APP2	9.1.0.0	SV0520-09	A	7512 APP
* APP3	9.1.0.0	SV0521-09	A	8256 APP
APP4	9.1.1.0	SV0522-09	B	7256 APP
PLD0	1.0.0.0	SV0471-01	A	NV5128/E
* PLD1	1.0.0.0	SV0472-03	A	8256/825

(* signifies software in use)

Router Serial Port CTRL 1 Protocol: NV SERIAL

Router Ethernet Settings:

Ethernet Control: Enabled Disabled

IP Address: 192 . 168 . 1 . 5

Subnet Mask: 255 . 255 . 255 . 0

Read All Write All

Fig. 6-1: Configuration Window (Sample, NV8256-Plus)

The expansion settings region applies to most NVISION series routers. The NV5128 and the NV5100MC routers do not support expansion. However, these two routers allow up to 8 partitions because they are "multi-format" routers and support multiple signal types.

This is a sample of the 'Configuration' window for an NV5128:

Partitions 1-4

Level	Physical Inputs Start	Physical Inputs End	Controller Input Start	Controller Input End	Physical Outputs Start	Physical Outputs End	Controller Output Start	Controller Output End	Signal Type
1	1	32	1	32	1	32	1	32	Video,Async AES,Timecode
1	33	128	1	96	33	128	1	96	Sync AES, Analog Audio
0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	

Software Versions:

Name	Version	Part #	Rev	Description
* BOOT0	5.1.1.0	SV0443-05	C	PROM EM
* APP0	9.1.0.0	SV0518-09	A	5128 APP
APP1	9.1.0.0	SV0519-09	B	5256 APP
APP2	9.1.0.0	SV0520-09	A	7512 APP
APP3	9.1.0.0	SV0521-09	A	8256 APP
APP4	9.1.1.0	SV0522-09	B	7256 APP
* PLD0	1.0.0.0	SV0471-01	A	NV5128/E
PLD1	1.0.0.0	SV0472-03	A	8256/825

(* signifies software in use)

Router Serial Port CTRL 1 Protocol: NV SERIAL

Router Ethernet Settings:

Ethernet Control: Enabled Disabled

IP Address: 192 . 168 . 1 . 5

Subnet Mask: 255 . 255 . 255 . 0

Control Card Bus:

- 10Base2
- Internal

Read All Write All

Fig. 6-2: Configuration Window (Sample, NV5128)

The page for the NV5128 lacks an expansion settings region but has a button with which to select either partitions 1–4 or partitions 5–8:



All other routers can have up to 4 partitions (under NV9000 control).

▲ Routers under SMS7000 control can have up to 2 partitions only.

Partition Table

Each row in the table represents either a real crosspoint partition or an artificial partition. (See [Artificial Partition Types](#) on page 30.)

The values in the partition table must be matched by the physical level definitions in the router control system you are using. Exactly what is meant by a “match” depends on the router control system.

Following are descriptions of the table's columns:

- Level

A number that uniquely identifies a partition. The range of acceptable values is 0–250. A value of 0 is used in some third-party control systems.
You must not create duplicate entries in this column.
- Physical Input Start and Physical Input End

Router port numbers that define the start and end of an input partition. The range of acceptable values is from 1 to the upper limit of the router.
- Controller Input Start and Controller input End

Logical input port numbers — also to be defined in the router control system — that map to the start and end of router's physical input port numbers. You can specify the “start” value. UniConfig derives the “end” value according to the signal type of the partition.

▲ You might note that for mono audio partitions (e.g., for the NV7512 router), the controller partition range is double the physical partition range.

The value in the “start” field is typically either 0 or 1 — 0 for some third-party control systems.
- Physical Output Start and Physical Output End

Router port numbers that define the start and end of an output partition. The range of acceptable values is from 1 to the upper limit of the router.
- Controller Output Start and Controller Output End

Logical output port numbers — defined in the router control system — that map to the start and end of router's physical output port numbers. You can specify the “start” value. UniConfig derives the “end” value according to the signal type of the partition.

▲ You might observe that for mono audio partitions (e.g., for the NV7512 router), the controller partition range is double the physical partition range.

The value in the “start” field is typically either 0 or 1 — 0 for some third-party control systems.
- Signal Type

This field contains a drop-down menu in which you specify the partition type. UniConfig provides a list of only the signal types applicable to the router.

Read All and Write All

At the bottom of the 'Configuration' window are two buttons: **Read All** and **Write All**.

When you open a configuration in this window, it is usually prudent to click **Read All** to be sure you are viewing the control card's most recent configuration.

Click **Write All** (at any time) to have UniConfig write the entire configuration to the control card.

- ▲ If you forget to click **Write All** and close UniConfig or open another control card, any changes you have made will be lost. UniConfig gives no warning.

Multiple Control Cards

Each control card in a router frame must be configured separately and identically (except for its IP address).

Expanded routers have multiple frames. The control cards in each frame must be configured identically (except for their IP addresses) but the configurations in the different frames will vary slightly.

See [Expanded Routers — Multiple Frames](#) on page 36.

Partition Types

A router's control card has no direct information regarding the type of signals actually being switched in its matrix.¹

Therefore, UniConfig defines the signal types for the control card. These are the supported partition types, for all routers:

Video	Audio	Machine Control
Video, Async AES, Time Code	Mono AES, Analog Audio	Machine Control Reverse
Digital Video	Analog Audio	Machine Control Broadcast
	Async AES	Machine Control Forward
	Sync AES, analog audio	Data X-Y
	Asynchronous AES *	

* (Asynchronous AES applies only to NV8500 family routers.)

Some partition types include more than one signal type. Some signal types are represented by more than one partition type.

Mono partitions are structured differently from stereo partitions and can be used differently.

The 4 machine control partition types behave differently.

Artificial Partition Types

UniConfig provides two additional *artificial* partition types:

- Monitor
- Output Follow

We say they are *artificial* because these types do not define a portion of the router's crosspoint matrix, but use UniConfig's partition table as a convenient way to define router functions.

1. Control cards in the NV8500 hybrid routers (configured with MRC) do have some information about the type of signals that can be switched.

(Control panel operators can use these levels, even though they are not part of the crosspoint matrix.)

Monitor “Partition”

All routers except the NV5128, NV5100MC, NV5256, and the NV8140 support the use of monitor cards. A monitor card is one that sends a copy of an output (or input) signal from the router to a monitoring device.

A monitor level (which is *not* a true partition) can be defined for those routers. The monitor level allows NV9000 control panel operators (and MRC users) to select an output or input for the monitor card to sample.

See [Defining a ‘Monitor’ Level](#) on page 42.

Output Follow “Partition”

All routers but the NV5128, NV5100MC, and the NV5256 support “output follow.”

“Output follow” is a concept that allows input *I*, routed to output *J*, to be routed to output *K* also. In such a case, we say that output *K* “follows” output *J*.

Such outputs can be cascaded: if *M* follows *L*, *L* follows *K*, and *K* follows *J*, then input *I* will be routed to outputs, *J*, *K*, *L*, and *M*.

A defined “output follow” level is not a partition of the crosspoint matrix. It is an artifice that uses the partition table to define the range of outputs that can follow or be followed.

The mechanism by which “output follow” operates is part of the control card’s configuration. Control panel operators start and stop “output follow” by performing takes on an “output follow” level. The takes must occur in a particular order.

See [Defining an ‘Output Follow’ Level](#) on page 43.

Note that there is an “Enable Output-Follow Take Mode” option that applies to the ‘Connections’ window. This mode allows you to perform output-follow takes using the ‘Connections’ page which normally affects the crosspoint matrix.

Signal Types

Here are brief definitions of the various signal types.

Audio

- Analog audio [NV5100MC, NV5128, NV7256, NV7512 only]
- Async AES [NV7256, NV7512, NV8500 family only]
Independent AES (pairs) not locked to a video signal. (This is in contrast to synchronous AES which is switched in sync with a video signal.)
- Mono AES [NV5100MC, NV5128, NV7256, NV7512 only]
Similar to ‘Async AES — AES not locked to a video signal — but the individual channels of the AES pairs are independently routable. The number of ‘Controller’ ports is therefore double the number of physical ports.
- Sync AES [NV7256, NV7512 only]
Signals of MADl ports are treated as synchronous AES.

Video

- Video [NV5128 only]
Analog (NTSC, PAL) or digital (SD, HD) video. (The term SWB represents I/O cards that can accommodate both HD and SD signals.)
- Digital video [NV8256, NV8288, NV8500 family only]
HD or SD video. The NV8256, NV8288, and NV8500 routers also switch 3Gig video.
- Time code [NV5128]
This means linear time code.
NVISION series routers do not support time code, even though the partition type is available.
Although the NV7256 and NV7512 can switch time code signals (as an analog audio partition), NVISION series routers cannot use time code signals in any way.

Machine Control

A partition in a machine control router can operate in one of 4 modes:

Forward Reverse Broadcast Data X/Y

Machine control ports are bi-directional. The ports are typically RS-422 or RS-232. Signal data flow in one direction and status flows in the other direction.

Except in data X-Y mode, machine control routes are *point-to-point*. In data X-Y mode, the router's partition acts like a true crosspoint matrix.

The modes are as follows:

- Forward
The direction of a connection is from a controlling device to a controlled device.
- Reverse
The direction of a connection is from a controlled device to a controlling device.
- Broadcast
One signal can be "broadcast" to several outputs.
- Data X-Y
Data X-Y mode lets a machine control router partition behave like an X-Y matrix.

For more information, see [Setting Up Machine Control Ports](#) on page 67.

▲ For the NV5128, machine control signals must be assigned to a single, individual partition. The 4 machine control partition types have different behavior.

Data X/Y Mode

Data X/Y mode lets a machine control router partition behave like an X/Y matrix. This mode is useful if you have serial *data* to route, and not just machines to control.

Normally machine control routes are point-to-point. One port may be connected to at most one port. (Ports can also be disconnected entirely.)

A data X/Y partition allows any input to be routed to any output or any set of outputs. Further, the partition is not bidirectional. Data flow from input to output.

Reference Signals

A partition's signal type determines the switching "rules" that the control card uses to make routes. Signal types vary according to the router type.

Depending on the signal type, the control card might require reference signals to determine when to perform the actual signal switch.

All NVISION series routers, regardless of format, have video reference and AES reference connections. For video references, SMPTE standards define where the switch should occur.

(For 525-line analog and SD video, the switch should occur at line 10. HD signals should be switched at HD line 4. For AES references, the reference signal should have a sample rate of 48 kHz, locked to the video reference signal.)

Partition Type and Reference Type Cross-Reference

This table lists the signal type selection in the UniConfig menu and the required reference signals.

Partition Type	Video Ref.	AES Ref.
Analog Audio	✓	✓*
Mono AES, Analog Audio	✓	✓
Sync AES, Analog Audio	✓	✓
Async AES	✓	✓
Digital Video	✓	
Video, Asynchronous AES, Time Code**	✓	
Machine Control Reverse, Machine Control Broadcast, Machine Control Forward, Data X-Y		

* If possible, connect an external 48.000 kHz AES reference signal.

** For the NV5128 and NV5100MC, video includes analog video (PAL or NTSC), SD, and HD.

Setting Up Partitions

How partitions are set up is determined by your router control system and the NVISION series routers in use. Grass Valley's NV9000 router control system uses the concept of *levels*—virtual and physical—to organize switching.

In many cases, it is necessary to create only a single partition for each router.

UniConfig presents different signal types for router partitions, depending on the router type. For example, if you are configuring a video router, UniConfig presents only video signal types. It does not allow you to choose, for example, an audio signal type for a video router. In contrast, the NV5128 multi-format router allows switching of almost any signal type.

Standalone v. Expanded Routers

NVISION series routers are categorized as either stand-alone routers or expanded routers.

A stand-alone router consists of a single router frame. An expanded router consists of multiple interconnected router frames. (Each frame contains one or two control cards.)

All NVISION series router frames can act as standalone routers.

The NV5256, NV7256-Plus, NV7512, NV8256-Plus, NV8288-Plus, and the NV8576-Plus routers can be connected to an other identical router frame (or frames) to create a router with a larger switching matrix.

When router frames are interconnected, one router is designated as the master (or main) frame and the other frames are considered the slave (or subsidiary) frames. The master frame communicates with the router control system. The slave frames communicate with the master frame.

Standalone Routers

For a standalone router, partitions are set up for the number of inputs and outputs being switched *by that router frame*.

For information on configuring the EC9535, see [Setting Up EC9535 Partitions](#) on page 95.

How to Set Up Partitions for a Standalone Router

- 1 Select a control card.
- 2 From the 'Window' menu, select 'Configuration'. The 'Configuration' window appears:

The screenshot shows the 'Configuration' window for a standalone router. It features several sections:

- Partitions 1-4:** A table with columns for Level, Physical Inputs (Start, End), Controller Input (Start, End), Physical Outputs (Start, End), Controller Output (Start, End), and Signal Type.

Level	Physical Inputs Start	Physical Inputs End	Controller Input Start	Controller Input End	Physical Outputs Start	Physical Outputs End	Controller Output Start	Controller Output End	Signal Type
1	1	32	1	32	1	32	1	32	Video, Async AES, Timecode
1	33	128	1	96	33	128	1	96	Sync AES, Analog Audio
0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	
- Software Versions:** A table with columns for Name, Version, Part #, Rev, and Description.

Name	Version	Part #	Rev	Description
* BOOT0	5.1.1.0	SV0443-05	C	PROM EV
* APP0	9.1.0.0	SV0518-09	A	5128 APP
APP1	9.1.0.0	SV0519-09	B	5256 APP
APP2	9.1.0.0	SV0520-09	A	7512 APP
APP3	9.1.0.0	SV0521-09	A	8256 APP
APP4	9.1.1.0	SV0522-09	B	7256 APP
* PLD0	1.0.0.0	SV0471-01	A	NV5128/E
PLD1	1.0.0.0	SV0472-03	A	8256/8256
- Router Serial Port CTRL 1 Protocol:** Set to NV SERIAL.
- Router Ethernet Settings:** Ethernet Control is set to Enabled. IP Address is 192.168.1.5 and Subnet Mask is 255.255.255.0.
- Control Card Bus:** Set to Internal.

At the bottom, there are 'Read All' and 'Write All' buttons, and a note: (* signifies software in use).

Fig. 6-3: Configuration Window (Sample, NV5128)

If the control card is for an expanded (or expandable) router, the router frame can be connected to an identical router frame to form an expanded switching matrix. The window for these routers displays an additional 'Expansion Configuration' region at the top right:

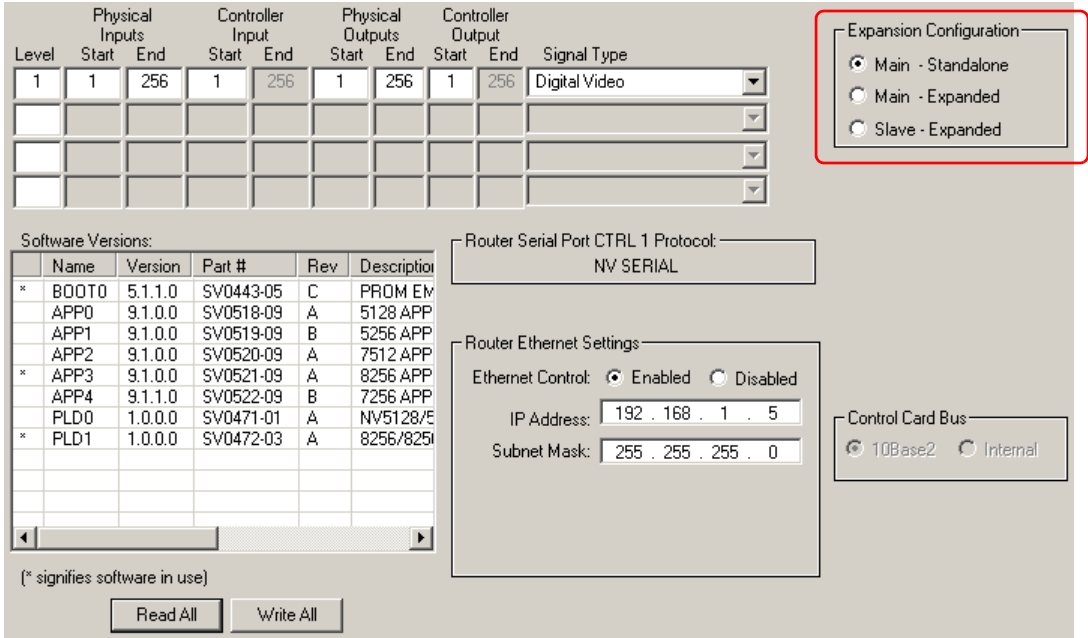


Fig. 6-4: Configuration Window (Sample, NV8256)

- 3 Click **Read All**. UniConfig populates the window with the control card's current partition configuration and Ethernet settings.
- 4 To make this a standalone router, choose the 'Main - Standalone' button in the expansion settings region.
- 5 To set up a partition, enter values in the fields of the row representing the partition. There are 4 rows. The first row initially contains default values for the router type. When you place a value in the 'Level' field of a row, the other fields in the row become enabled.
For the NV5100MC and NV5128, there are up to 8 partitions. Only four display at any one time. Click **Partition 1–4** or **Partition 5–8** to view the corresponding levels.
For all other routers, there are up to 4 partitions.

What you should configure in the partition table is subject to your router control system and your routing requirements and therefore beyond the scope of this document.

Choose the signal type according to the *input* signal format for the partition. The signal type, in conjunction with the switch point setup, determines the rules used by the router for switching the signals when operators execute a "take." For information on setting the switch point, see [Switch Point Settings](#) on page 47.

- 6 Click **Write All** to writes changes to the control card.
- 7 Repeat steps 1 through 6 for each control card being updated.

Expanded Routers — Multiple Frames

NV5256, NV7256-Plus, NV7512, NV8256-Plus, NV8288-Plus and NV8576-Plus router frames can be interconnected with like frames to form an expanded router with a larger switching matrix. For example, two NV8256 frames (nominally 256 × 256) can be connected to create a 512 × 512 switching matrix.

When router frames are connected, one frame is designated the *master* frame. All configuration and crosspoint information is copied from the master frame to all connected *slave* frame. This ensures synchronization of all connected frames. After a frame is designated a slave frame in UniConfig, any change made to the master frame's configuration is automatically copied to the slave frame's control cards. Slave frame configurations cannot be updated. Their configurations display in the 'Configuration' window, but are inactive. All their partition data are greyed out.

- ▲ It is prudent, but not necessary, to configure the main frame before you configure the slave frames.

How to Set Up Partitions for a Main Router Frame

- 1 Select the primary control card on the router acting as the master router.
- 2 From 'Window' menu, select 'Configuration'. The 'Configuration' window appears:

Level	Physical Inputs		Controller Input		Physical Outputs		Controller Output		Signal Type
	Start	End	Start	End	Start	End	Start	End	
1	1	576	1	576	1	576	1	576	Digital Video
0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	

Name	Version	Part #	Rev	Description
* BOOT0	5.1.1.0	SV0443-05	C	PROM EM
* APP0	10.0...	SV0518-10	A	5128 APP
APP1	10.0...	SV0519-10	A	5256 APP
APP2	10.0...	SV0520-10	A	7512 APP
APP3	10.0...	SV0521-10	A	8256 APP
APP4	10.0...	SV0522-10	A	7256 APP
PLD0	1.0.0.0	SV0471-02	A	NV5128/E
PLD1	1.0.0.0	SV0472-05	A	8256/8256

Router Serial Port CTRL 1 Protocol: NV SERIAL

Router Ethernet Settings:

Ethernet Control: Enabled Disabled

IP Address: 192 . 168 . 1 . 7

Subnet Mask: 255 . 255 . 255 . 0

Expansion Configuration:

Main - Standalone

Main - Expanded

Slave - Expanded

Local: Inputs: Outputs:

End: 576 288

Index: 1

(* signifies software in use)

Read All Write All

Fig. 6-5: Configuration Window (Sample, NV8288-Plus, Master Frame)

If the window does not show an 'Expansion Configuration' section, the router frame cannot be part of an expanded router.

- 3 Click **Read All**. UniConfig populates the window with the control card's current partition data and Ethernet settings.
- 4 Choose the 'Main - Expanded' radio button in the 'Expansion Configuration' section. Doing so designates the control card as belonging to the master (or main) router frame. Because of the router's frame interconnection, the master frame controls all the router's

slave frames. (The master frame is also the frame that communicates with the router control system.)

When you click 'Main - Expanded', additional fields appear in the 'Expansion Configuration' section:

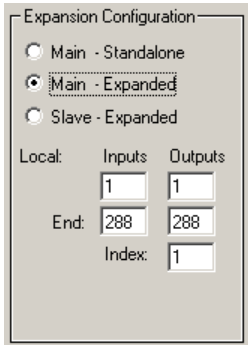


Fig. 6-6: Expansion Section (Sample, NV8288-Plus)

The expansion section identifies the range of physical inputs and outputs for the particular frame in the expanded router. The 'Index' value identifies the frame in the expanded router.

In the case of an NV7512-Plus audio router having 4 frames for a 2048 × 2048 (stereo) switching matrix,¹ the ranges for the frames are

Frame	Index	Input Range	Output Range
Main	1	1–2048	1–512
Slave	2	1–2048	513–1024
Slave	3	1–2048	1025–1536
Slave	4	1–2048	1537–2048

Other routers require different values in the 'Expansion Configuration' section. See [Router Expansion](#) on page 129.

- 5 Enter a number in the 'Index' field provided in the 'Expansion' section. The frames in the expanded router must have unique indexes. It is a good idea to specify 1 for the main frame.
- 6 Enter the range of inputs and outputs for the frame.
- 7 Enter partition data. As mentioned, these data are dependent on your system requirements and cannot be addressed here.

Reminder: the partition numbers must be unique.

Choose the signal type according to the *input* signal format for the partition. The signal type, in conjunction with the switch point setup, determines the rules used by the router for switching the signals when the operator executes a "take."

For information on setting the switch point, see [Switch Point Settings](#) on page 47.

- 8 Click **Write All** to write changes to the control card.
- 9 Repeat steps 1 through 8 for the secondary control card on the master router (if it exists).

1. This is equivalent to a 4096 × 4096 mono matrix.

How to Set Up Partitions for Slave Router Frames

Partition data for slave frames cannot be configured independently. All slave frames derive their partition data from the master frame.

If a slave Frame is to be changed, the changes must be made in the master frame. The changes are then propagated to the slave frames.

- 1 Select a control card on the slave frame.
- 2 From the 'Window' menu, select 'Configuration'. The 'Configuration' window appears:

Level	Physical Inputs		Controller Input		Physical Outputs		Controller Output		Signal Type
	Start	End	Start	End	Start	End	Start	End	
1	1	576	1	576	1	576	1	576	
0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	

Name	Version	Part #	Rev	Description
* BOOT0	5.1.1.0	SV0443-05	C	PROM EM
* APP0	10.0....	SV0518-10	A	5128 APP
APP1	10.0....	SV0519-10	A	5256 APP
APP2	10.0....	SV0520-10	A	7512 APP
APP3	10.0....	SV0521-10	A	8256 APP
APP4	10.0....	SV0522-10	A	7256 APP
PLD0	1.0.0.0	SV0471-02	A	NV5128/E
PLD1	1.0.0.0	SV0472-05	A	8256/825

Router Serial Port CTRL 1 Protocol: NV SERIAL

Router Ethernet Settings:
 Ethernet Control: Enabled Disabled
 IP Address: 192 . 168 . 1 . 7
 Subnet Mask: 255 . 255 . 255 . 0

Expansion Configuration:
 Main - Standalone
 Main - Expanded
 Slave - Expanded

Local: Inputs Outputs
 1 289
 End: 576 576
 Index: 2

(* signifies software in use)

Read All Write All

Fig. 6-7: Configuration Window (Sample, NV8288-Plus, Slave Frame)

If the window does not show an 'Expansion Configuration' section, the router frame cannot be part of an expanded router.

- 3 Click **Read All**. UniConfig populates the window with the control card's current partition data and Ethernet settings.
- 4 Choose the 'Slave - Expanded' radio button in the 'Expansion Configuration' section. Doing so designates the control card as belonging to the slave router frame. Because of the router's frame interconnection, the master frame controls all the router's slave frames. When you click 'Slave - Expanded', the partition fields of the window become disabled (greyed out).

When you click 'Slave - Expanded', additional fields appear in the 'Expansion Configuration' section:

Expansion Configuration

Main - Standalone
 Main - Expanded
 Slave - Expanded

Local: Inputs Outputs

 1 289

End: 576 576

 Index: 2

Fig. 6-8: Expansion Section (Sample, NV8288-Plus, Slave)

In the case of an NV8288-Plus having 2 frames for a 576 × 576 switching matrix, the ranges for the frames are

Frame	Index	Input Range	Output Range
Main	1	1–576	1–288
Slave	2	1–576	289–576

Other routers require different values in the 'Expansion Configuration' section. See [Router Expansion](#) on page 129.

- 5 Enter a number in the 'Index' field provided in the 'Expansion' section. The frames in the expanded router must have unique indexes. It is a good idea to specify 1 for the main frame.
- 6 Enter the range of inputs and outputs for the frame.
- 7 Click **Write All** to send changes to the control card.

The 'Level', 'Physical Inputs', 'Controller Inputs', 'Physical Outputs' and 'Controller Output' fields are greyed-out. All partition information is copied from the master router to the slave router.

In addition, all crosspoint information is copied to each slave router to ensure synchronization of all connected frames.

You can access crosspoint information in the 'Connections' window. (See [Connections Window](#) on page 69.)

- 8 Repeat steps 1 through 7 for the other control card on the slave frame and for control cards on other slave frames if there are any.

Updating Partitions

You can update partition data at any time.

If you are updating an expanded router, it is necessary to make changes only to the master frame. Those changes propagate to the slave frames automatically.

Important: If you make changes to the primary control card of a frame, copy the changes to the secondary control card (if there is one). See [How to Apply a Configuration to Another Control Card](#) on page 8.

Mono v. Stereo Audio

Most NVISION series routers that switch audio can switch the audio as stereo pairs or as individual “mono” channels. NV8500 standard routers do not support mono audio. Nor do they support analog audio.

Uniconfig can set up both stereo router partitions and mono partitions. NV9000 router control systems configurations support stereo switching and mono switching. Third-party control systems might or might not have support for stereo and mono.

Certain control system configuration problems arise when you want to route a signal as a stereo pair at one time and then switch the same signal as mono channels at a another time.

How do you configure—in the control system—an input to be both stereo and mono? The problems related to this question lie in making the control system conform to the routing requirements of your facility and accommodating the expectations of control panel operators.

The creation of audio partitions in UniConfig is involved in the configuration task.

We provide two methods for creating devices that can be used as either stereo or mono devices. To understand the methods better, please review the following definitions and concepts.

Definitions and Concepts

Audio signals arrive at, and depart from, the audio router as stereo pairs, whether they are AES, MADI, or analog audio.

In NVISION series routers, in UniConfig, and in this document, the term “stereo” means two audio signals combined into one. That is all it means. (The concept of left and right channels is supported but is by no means necessary.)

In NVISION series routers, in UniConfig, and in this document, “mono” means one or the other of the two parts of a “stereo” pair. That is all it means. We use the term “channel” for mono signals.

The NV9000 control system’s concept of breakaway is **not possible** for signals configured as stereo. Breakaway is possible, however, for the 2 (or more) mono signals that are defined in a level set. Third-party router control systems might differ.

On router backplanes, AES connectors are BNCs, DIN (1.0/2.3), or Phoenix 3-pin (shielded twisted pair) quick-release connectors.

On router backplanes, analog audio connectors are DB25s. (Each DB25 assigns 3 pins to a shielded twisted pair, and supports 8 channels or 4 “stereo” pairs.)

On router backplanes, MADI connectors can vary. (For the NV7512, the MADI input and output cards have two 75Ω BNCs for MADI (up to 64 channels). NV7512 configuration dictates how the ports are used.)

Regardless of the external signal type, and regardless of the router, all audio signals are treated uniformly as AES internally and are converted to AES (if necessary) at input and converted from AES (if necessary) at output.

When you create a “mono” partition in UniConfig, the number of ‘Controller’ ports is double the number of physical ports. That means the control system will recognize that there are two separate channels on each connector and that the router will treat them separately.

The “mono” port numbers (L,R) for any stereo connector (S) are easy to calculate:

$$R = S \times 2 \qquad L = R - 1$$

For example, connector 47 provides mono channels 93 and 94.

Method 1 (under NV9000)

Problem: how do you configure an input or output to be both stereo and mono?

Solution:

In UniConfig, create 2 overlapping partitions: one for stereo and one for mono. (The stereo partition and the mono partition use the same physical ports.)

In the NV9000 configuration, create two sets of devices, one for use as stereo, and one or use as mono. Both sets of devices refer to the same ports, but in a different way.

Here is a brief summary of the procedure.

- 1 In UniConfig, create 2 overlapping partitions, one for stereo and one for mono.
- 2 Switch to NV9000-SE Utilities.
- 3 Define the audio router and its two physical levels to match UniConfig.
- 4 Create virtual levels if none available have suitable names.
- 5 Create level sets: one for stereo and one for mono.
- 6 Create devices for the stereo level set, input and output.
- 7 Create 4 sets of mono devices: left input, left output, right input, right output.
- 8 Examine NV9000-SE Utilities' various tables to verify your work.

(The device names for both level sets should be similar so that operators can choose the correct device without thinking.)

For more detail, see [Method 1 Details](#) on page 132.

Method 2 (under NV9000)

Problem: how do you configure an input or output to be both stereo and mono?

Solution:

In UniConfig, create 1 mono partition. As mentioned, the number of mono (i.e., controller) ports is double the number of physical ports.

In the NV9000 configuration, create a level set containing two mono levels and create devices that use that level set. Operators can switch the devices as stereo. Using breakaway, operators can switch the individual channels.

Here is a brief summary of the procedure.

- 1 In UniConfig, create 1 mono partition.
- 2 Switch to NV9000-SE Utilities.
- 3 Define the audio router and its single physical level to match UniConfig.
- 4 Create a virtual level if none available has a suitable name.
- 5 Create a level set (for stereo).
- 6 Create devices for the stereo level set, input and output.
- 7 Examine NV9000-SE Utilities' various tables to verify your work.

(The device names for both level sets should be similar so that operators can choose the correct device without thinking.)

For more detail, see [Method 2 Details](#) on page 138.

Defining a 'Monitor' Level

UniConfig supports output monitoring for the NV7256, NV7512, NV8256, and NV8288.

- ▲ Although output monitoring was planned for the NV7256 and NV7512, it was never implemented.

The NV8256 and NV8288 each produce 2 monitor outputs.

The NV8500 routers allow monitoring of output signals *and* input signals. The NV8144 produces one "input" monitor signals and one output monitor signal. The other routers in the NV8500 family produce 2 "input" monitor signals and 2 "output" monitor signals.

Other routers — the NV5128, NV5100MC, and NV5256 — do not support monitoring.

In UniConfig, you can define a monitor level for the routers that support monitoring. You can also define monitor levels for the NV7256 and NV7512 even though they do not support monitoring.

- ▲ Monitor levels are not real partitions, but are artificial levels that use the partition table to define a router function.

To define a monitor level is relatively simple.

NV8500 Standard Routers

- ▲ Do not use UniConfig for NV8500 hybrid routers. Use MRC instead.

Create a monitor level this way

Level	Phys Input		Contr Input		Phys Output		Contr Output		Signal Type
99	A	B	C	D	1	4	E	F	Monitor

The monitor port range is 1 to 4. Use other values, A–F, based on your system, where

(A,B) define the max physical range of both your outputs *and* inputs.

(C,D) form the controller range based on your inputs *and* outputs.

(E, F) form the controller range based on the monitor port range.

Except for the NV8144, monitor outputs 1 and 2 represent the "output" monitors. The monitor outputs 3 and 4 represent the "input" monitors.

The NV8144 is the exception in the NV8500 family. It has only one "output" monitor and only one "input" monitor. Therefore, monitor ports 2 and 4 in your monitor level are null — they correspond to no output. Port 1 is for the single "output" monitor and port 3 is for the single "input" monitor.

NV7256, NV7512, NV8256, NV8288

▲ Output monitoring was never implemented in the NV7256 and NV7512.

Create a monitor level this way

Level	Phys Input		Contr Input		Phys Output		Contr Output		Signal Type
99	A	B	C	D	1	2	E	F	Monitor

The monitor port range is 1 to 2. Use other values, A–F, based on your system, where

(A,B) define the max physical range of your outputs (only).

(C,D) form the controller range based on your outputs.

(E, F) form the controller range based on the monitor port range.

Monitor outputs 1 and 2 represent “output” monitors. These routers do not have “input” monitors.

In NV9000-SE Utilities

To switch a signal to a monitor, an NV9000 control panel operator must route a signal to a monitor output on a monitor level. (This operation cannot be performed in UniConfig.)

Therefore, you must also configure a monitor level in NV9000-SE Utilities. There is no “monitor” virtual level type. You will need to define a physical level of the same type as the outputs (or inputs) being monitored with the same level number you defined in UniConfig. (In the preceding examples, that is level 99.) Then define a virtual level that maps to this new physical level.

Monitor signals can be switched on that virtual level.

▲ It is not possible to monitor two signals from the same input card or output card.

Defining an ‘Output Follow’ Level

All routers but the NV5128, NV5100MC, and the NV5256 support “output follow.”

“Output follow” is a concept that allows input *I*, routed to output *J*, to be routed to output *K* also. In such a case, we say that output *K* “follows” output *J*.

Such outputs can be cascaded: if *M* follows *L*, *L* follows *K*, and *K* follows *J*, then input *I* will be routed to outputs, *J*, *K*, *L*, and *M*.

A defined “output follow” level is not a partition of the crosspoint matrix. It is an artifice that uses the partition table to define the range of outputs that can follow or be followed.

The mechanism by which “output follow” operates is part of the control card’s configuration. Control panel operators start and stop “output follow” by performing takes, on an “output follow” level, in a particular order.

Note:

Outputs that follow can be dedicated to following (as when they are connected to monitoring equipment) or they can be interspersed in the set of normal outputs.

Creating an Output Follow Level

Creating an output follow level is very much like creating a normal level, with one exception.

You place a range of outputs that can be followed in the input columns. You place a range of outputs that do the following in the outputs column. Thus, the outputs that are followed are like inputs to the outputs that do the following.

Example 1

Here is an example where the follower outputs are separate from the normal outputs, i.e., they function as dedicated monitoring ports:

Level	Phys Input		Contr Input		Phys Output		Contr Output		Signal Type
1	1	256	1	256	1	240	1	240	Digital Video
77	1	240	1	240	241	256	241	256	Output Follow

The operator creates an “output follow” by taking, on level 77 in this example, an output in the range 1–240 to an output in the range 241–256. Let’s say the operator takes 1 to 241. Now output 241 follows output 1.

Then at some point, the operator takes input 3 to output 1, normally, on level 1. Input 3 will appear simultaneously on outputs 1 and 241.

At a later point, the operator takes input 7 to output 1, normally, on level 1. Input 7 then appears simultaneously on outputs 1 and 241.

In this scenario, outputs 241–256 are always reserved for monitoring.

In NV9000-SE Utilities, there is no “output follow” virtual level type. You’ll need to define a physical level of the same type as the outputs being followed with the same level number you defined in UniConfig. In this example, that is level 77. Then define a virtual level that maps to this new physical level.

Example 2

Here is an example where the follower outputs are mingled with the normal outputs, i.e., they are not dedicated monitoring ports:

Level	Phys Input		Contr Input		Phys Output		Contr Output		Signal Type
1	1	256	1	256	1	256	1	256	Digital Video
77	1	256	1	256	1	256	1	256	Output Follow

As in example 1, the operator creates an “output follow” by taking, on level 77 in this example, an output in the range 1–256 to another output in the range 1–256.

Consider this sequence:

The operator takes 3 to 1 (normally, on level 1).

The operator takes 7 to 105 (normally, on level 1).

The operator takes 1 to 105 on level 77. Now output 105 follows output 1. Input 3 appears simultaneously on both outputs 1 and 105.

At a later point, the operator takes input 7 to output 1, normally, on level 1. Now input 7 then appears simultaneously on outputs 1 and 105.

Still later, the operator takes input 12 to output 105 on level 1. Now output 105 no longer follows output 1 and input 12 appears normally on output 105.

In this scenario, you can clear an output follow situation by routing a source to the output on the normal level (not the output follow level).

In NV9000-SE Utilities, there is not "output follow" virtual level type. You'll need to define a physical level of the same type as the outputs being followed with the same level number you defined in UniConfig. In this example, that is level 77. Then define a virtual level that maps to this new physical level.

Cascading Outputs

In the scenario of example 2, suppose the operator takes 30 to 31 on the output follow level and then takes output 1 to output 30 on the output follow level.

Then the operator takes input 20 to output 1. Input 20 appears simultaneously on outputs 1, 30, and 31.

The operator can create multiple "cascading" output follow states by issuing the appropriate takes on the output follow level.

The operator can clear the output follow states by routing to those outputs on a normal level.



Switch Point Settings

Chapter 7 discusses UniConfig's 'Switch Point Setup' Window.

Topics

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Background

A “switch point” is a point in time at which an output is switched from its current source to a new source. Different video and audio formats require different switch points. UniConfig's 'Switch Point Setup' window lets you set switch point parameters for individual outputs.

Note

In UniConfig, all routers have a 'Switch Point Setup' window *except* the NV5256. The NV5256 routes machine control signals, which do not require a switch point.

The 'Switch Point Setup' page does not control the actual point in time at which an output switches. For that you need special equipment.

All the NVISION series routers have video and audio reference signals connections.

For video reference signals, there are two connectors labeled 'VIDEO REF'. The video reference connectors can use the same signal or different signals.

For audio reference signals, there are two connections labeled 'AES REF'. One or both connections are connected to a stable AES source at 48 kHz. If both AES reference are connected, one acts as a backup should the other AES reference source fail.

This section discusses how to make switch point settings for routers. For information on setting up EC9535 GSC Node Bus Converter switch points, see [Setting Up EC9535 Switch Points](#) on page 97.

Redundant v. Dual Video Reference

Each router has two video reference connectors. You can apply the same reference signal at both connectors or use a different reference at each connector. When you apply the same signal, the router has a “redundant” reference. If one reference fails, the control card automatically switches to the other reference.

If you use different references, the router has a “dual” reference. Router outputs can be configured to occur using one or the other reference. For example, you might connect an NTSC reference at 'Ref1' and a PAL reference at 'Ref2'.

The Switch Point Setup Window

This is the 'Switch Point Setup' window, showing dual reference:

Set selection(s) to:

Use Video Reference 1

Use Video Reference 2

Switch on Field Boundary

Switch on Frame Boundary

* Affects SWB XPTs only

Apply Changes to Selected Outputs

Dual Video Reference Option:

Redundant Dual

Output Range

Start: 1 End: 256

Read Outputs

Write Changes

Select Outputs to edit:

Output	Field/Frame	Ref1/Ref2
1	Frame	Ref1
2	Frame	Ref1
3	Field	Ref2
4	Field	Ref2
5	Field	Ref2
6	Field	Ref2
7	Field	Ref2
8	Field	Ref1
9	Field	Ref2
10	Field	Ref1
11	Field	Ref2
12	Field	Ref1
13	Frame	Ref1
14	Frame	Ref1
15	Frame	Ref1
16	Frame	Ref1
17	Frame	Ref1
18	Frame	Ref1
19	Frame	Ref1
20	Frame	Ref1
21	Frame	Ref1
22	Frame	Ref1
23	Frame	Ref1
24	Frame	Ref1
25	Frame	Ref1
26	Frame	Ref1
27	Frame	Ref1
28	Frame	Ref1

Specify an output range at the bottom of the page and click **Read Outputs** to display the router's outputs in the output list at the right side of the window.

At the left side of the page are two radio button where you can choose whether the router uses a dual reference or a redundant reference. (If you have a single reference connection, use either setting.)

If you have selected dual reference, you can specify which reference to use for selected outputs. Use click, shift-click, and control-click techniques to select any set of outputs. Then choose the the reference connector in the section at the left and click the 'Apply Changes to Selected Outputs' button. The changed outputs redisplay in the output list.

You can also change the switching mode of selected outputs. The choices are to switch on frame boundaries or field boundaries. Select one or more outputs. Then choose the switching mode in the section at the left and click the **Apply Changes to Selected Outputs** button. The changed outputs redisplay in the output list.

To save your changes, click **Write Changes** at the bottom of the screen. If you close UniConfig or switch to a different window, your changes will be lost without warning.

Other fields, not shown here, can appear in the window, depending on the router type. See [Setting Switching Parameters](#) on page 49 for details of individual routers.

About Video Signal Fields and Frames

An interlaced video frame is composed of two *fields*, field 1 and field 2. For NTSC, each frame is divided into 525 scan lines. Because a field is half a frame, each field is composed of 262.5 scan lines.

For NTSC interlaced video, for example, there are 29.97 frames per second or 59.94 fields per second. For NTSC progressive video, there are only frames, or put another way, frames and fields are equivalent, so there are 59.94 frames per second. Some other video frame rates differ.

Depending on the router type, UniConfig lets you specify the following:

- The outputs for which the router will switch video on a frame or a field basis
- Whether the router has dual reference or redundant reference and if dual, which outputs use reference 1 and which use reference 2.
- Which outputs switch according to SD format and which outputs switch according to HD.
- Which outputs use reclockers.
- Which outputs allow cross-fade (NV7512 only).

Setting Switching Parameters

You can set switching parameters for video or audio routers. Depending on the router being configured, different fields display. Differences for specific routers are noted in the following procedures. Be sure to follow the instructions for your specific router.

Most routers require a video reference connection for proper switching.

Note

Each control card in a router frame must be configured separately and identically.

The EC9535 is a "GSC node bus" converter and is not configured in the same way as other routers. For details on setting up switching parameters for an EC9535 see [Setting Up EC9535 Switch Points](#) on page 97.

Following are setup methods for these router types:

[NV5100MC or NV5128 Multi-Format Router](#)

[NV7256 and NV7256-Plus Routers](#)

[NV7512 and NV7512-Plus Routers](#)

[NV8256-Plus Routers](#)

[NV8288 and NV8288-Plus Routers](#)

[NV8500 Family Standard Routers](#)

Note that the NV5256 machine control router does not use switch points. Therefore, there is no 'Switch Point Page' for NV5256 routers.

NV5100MC or NV5128 Multi-Format Router

- 1 Select a control card (for an NV5100MC or NV5128).
- 2 From the 'Window' menu, select 'Switch Point Setup'. The 'Switch Point Setup' window appears. Specify an output range at the bottom of the page and click **Read Outputs**:

The screenshot shows the 'Switch Point Setup' window for an NV5128 Multi-Format Router. It is divided into several sections:

- Set selection(s) to :**
 - Use Video Reference 1
 - Use Video Reference 2
 - *Use Re-clocker
 - *Bypass Re-clocker
 - Switch on SD Line
 - Switch on HD Line
- *Affects SWB XPTs only**
- Apply Changes to Selected Outputs** (button)
- Dual Video Reference Option:**
 - Redundant
 - Dual
- NTSC/PAL Reference Options**
 - Ref1: 1080i 720p 1080p
 - Ref2: 1080i 720p 1080p
- Output Range**
 - Start: End:
 -
- Write Changes** (button)
- Select Outputs to edit:**

Output	Re-clock/bypass	HD/SD	Ref1/Ref2
1	Re-clock	HD	Ref1
2	Re-clock	HD	Ref1
3	Bypass	SD	Ref1
4	Bypass	SD	Ref1
5	Bypass	SD	Ref2
6	Bypass	SD	Ref2
7	Bypass	SD	Ref2
8	Bypass	SD	Ref2
9	Re-clock	SD	Ref2
10	Re-clock	SD	Ref2
11	Bypass	HD	Ref1
12	Re-clock	HD	Ref1
13	Bypass	HD	Ref1
14	Re-clock	HD	Ref1
15	Re-clock	SD	Ref2
16	Re-clock	HD	Ref1
17	Re-clock	HD	Ref1
18	Re-clock	SD	Ref2
19	Re-clock	HD	Ref1
20	Re-clock	HD	Ref1
21	Re-clock	SD	Ref2
22	Re-clock	HD	Ref1
23	Re-clock	HD	Ref1
24	Re-clock	SD	Ref2
25	Re-clock	HD	Ref1
26	Re-clock	HD	Ref1
27	Re-clock	HD	Ref1
28	Re-clock	HD	Ref1
29	Re-clock	HD	Ref1
30	Re-clock	HD	Ref1
31	Re-clock	HD	Ref1
32	Re-clock	HD	Ref1
33	Re-clock	HD	Ref1
34	Re-clock	HD	Ref1
35	Re-clock	HD	Ref1
36	Re-clock	HD	Ref1
37	Re-clock	HD	Ref1
38	Re-clock	HD	Ref1

Fig. 7-1: Switch Point Setup Window (NV5128)

This table describes each column in the output list:

Column	Description
Output	The number assigned to the signal for routing purposes. The number usually refers to the physical port through which the signal is distributed.
Reclock/bypass	Indicates whether the output bypasses re-clocking.
HD/SD	Indicates whether the output is a standard definition (SD) or high definition (HD) video signal.
Ref1/Ref2	Indicates whether the output uses video reference 1 or reference 2 (in dual reference mode only).

- 3 In the 'Dual Video Reference Option' section, choose 'Redundant' or 'Dual'.
- 'Redundant' — You declare that the router will use redundant references. Both 'VIDEO REF 1' and 'VIDEO REF 2' are the same. If one fails, the other will be used as a fail-over.
- 'Dual' — You declare that dual video references are in use. In this case, you can specify in step 6 which reference selected outputs are to use.

See [Redundant v. Dual Video Reference](#) on page 47.

- 4 In the 'NTSC/PAL Reference Options' section, you declare the type of reference signal for the reference connectors.

Select the radio button corresponding to the signal type being used as a video reference: '1080i', '720p' or '1080p'.

- ▲ These options appear only if the control card supports NTSC or PAL. (Both the NV5100MC and the NV5128 support NTSC and PAL.)

- 5 If you want to change any of the fields in the output list, select the outputs you want to change. Use standard Windows click, shift-click, and control-click techniques,

Or, to select all outputs, choose 'Select All' from the 'Edit' menu.

Or, to clear all outputs from the list, choose 'Remove All Outputs' from the 'Edit' menu.

- 6 In the switch settings section, check the check boxes that apply to reclocking, switching line (SD or HD), and video reference.

The following lists each check box and its function:

Check Box(es)	Description
Use Reclocker, Bypass Reclocker	Either use the output reclocker or bypass the output reclocker.
Switch on SD Line, Switch on HD Line	Choose 'Switch on SD Line' if the selected signals are SD (or analog video). Choose 'Switch on HD Line' if the selected signals are HD.
Use video reference 1, Use video reference 2	Choose whichever reference you want to apply to the selected outputs (in dual reference mode).

- 7 Click **Apply Changes to Selected Outputs**, or from the 'Edit' menu, choose 'Apply Changes'. This does *not* write your changes to the control card, but causes the output list to redisplay.
- 8 Finally, when you are satisfied that all your changes are correct, click **Write Changes**, or from the 'Edit' menu, choose 'Write Changes'. UniConfig writes your changes to the control card.

NV7256 and NV7256-Plus Routers

- 1 Select a control card (for an NV7256 frame).
- 2 From the 'Window' menu, select 'Switch Point Setup'. The 'Switch Point Setup' window appears. Specify an output range at the bottom of the page and click **Read Outputs**:

Output	Field/Frame	Ref1/Ref2
1	Frame	Ref1
2	Frame	Ref1
3	Field	Ref2
4	Field	Ref2
5	Field	Ref2
6	Field	Ref2
7	Field	Ref2
8	Field	Ref1
9	Field	Ref2
10	Field	Ref1
11	Field	Ref2
12	Field	Ref1
13	Frame	Ref1
14	Frame	Ref1
15	Frame	Ref1
16	Frame	Ref1
17	Frame	Ref1
18	Frame	Ref1
19	Frame	Ref1
20	Frame	Ref1
21	Frame	Ref1
22	Frame	Ref1
23	Frame	Ref1
24	Frame	Ref1
25	Frame	Ref1
26	Frame	Ref1
27	Frame	Ref1
28	Frame	Ref1
29	Frame	Ref1
30	Frame	Ref1
31	Frame	Ref1
32	Frame	Ref1
33	Frame	Ref1
34	Frame	Ref1
35	Frame	Ref1
36	Frame	Ref1
37	Frame	Ref1
38	Frame	Ref1

Fig. 7-2: Switch Point Setup Window (NV7256, NV7256-Plus)

This table describes each column in the output list:

Column	Description
Output	The number assigned to the signal for routing purposes. The number usually refers to the physical port through which the signal is distributed.
Field/frame	Indicates whether the output switches at every (video) field or at every (video) frame.
Ref1/Ref2	Indicates whether the output uses video reference 1 or reference 2 (in dual reference mode only).

- 3 In the 'Dual Video Reference Option' section, choose 'Redundant' or 'Dual'.
 'Redundant' — You declare that the router will use redundant references. Both 'VIDEO REF 1' and 'VIDEO REF 2' are the same. If one fails, the other will be used as a fail-over.

'Dual' — You declare that dual video references are in use. In this case, you can specify in step 5 which reference selected outputs are to use.

See [Redundant v. Dual Video Reference](#) on page 47.

- 4 If you want to change any of the fields in the output list, select the outputs you want to change. Use standard Windows click, shift-click, and control-click techniques,
Or, to select all outputs, choose 'Select All' from the 'Edit' menu.
Or, to clear all outputs from the list, choose 'Remove All Outputs' from the 'Edit' menu.
- 5 In the switch settings section, check the check boxes that apply to reclocking, switching line (SD or HD), and video reference.

The following lists each check box and its function:

Check Box(es)	Description
Use video reference 1, Use video reference 2	Choose whichever reference you want to apply to the selected outputs (in dual reference mode only).
Switch on Field Boundary, Switch on Frame Boundary	Choose whether the selected output(s) switch on field boundaries or frame boundaries.

- 6 Click **Apply Changes to Selected Outputs**, or from the 'Edit' menu, choose 'Apply Changes'.
This does *not* write your changes to the control card, but causes the output list to redisplay.
- 7 Finally, when you are satisfied that all your changes are correct, click **Write Changes**, or from the 'Edit' menu, choose 'Write Changes'. UniConfig writes your changes to the control card.

NV7512 and NV7512-Plus Routers

- 1 Select a control card (for an NV7512 frame).
- 2 From the 'Window' menu, select 'Switch Point Setup'. The 'Switch Point Setup' window appears. Specify an output range at the bottom of the page and click **Read Outputs**:

Output	CrossFade	Ref1/Ref2
1	Enabled	Ref1
2	Disabled	Ref1
3	Disabled	Ref1
4	Disabled	Ref1
5	Enabled	Ref1
6	Enabled	Ref1
7	Enabled	Ref1
8	Enabled	Ref1
9	Enabled	Ref1
10	Enabled	Ref1
11	Enabled	Ref1
12	Enabled	Ref1
13	Enabled	Ref1
14	Enabled	Ref1
15	Enabled	Ref1
16	Disabled	Ref1
17	Disabled	Ref1
18	Enabled	Ref1
19	Disabled	Ref1
20	Disabled	Ref1
21	Enabled	Ref1
22	Disabled	Ref1
23	Enabled	Ref1
24	Disabled	Ref1
25	Disabled	Ref1
26	Disabled	Ref1
27	Disabled	Ref1
28	Disabled	Ref1
29	Disabled	Ref1
30	Disabled	Ref1
31	Disabled	Ref1
32	Disabled	Ref1
33	Disabled	Ref1
34	Disabled	Ref1
35	Disabled	Ref1
36	Disabled	Ref1
37	Disabled	Ref1
38	Disabled	Ref1

Fig. 7-3: Switch Point Setup Window (NV7512, NV7512-Plus)

This table describes each column in the output list:

Column	Description
Output	The number assigned to the signal for routing purposes. The number usually refers to the physical port through which the signal is distributed.
Crossfade	Indicates whether crossfades (for outputs switched) are enabled or disabled.
Ref1/Ref2	Indicates whether the output uses video reference 1 or reference 2 (in dual reference mode only).

- 3 In the 'Dual Video Reference Option' section, choose 'Redundant' or 'Dual'.
 'Redundant' — You declare that the router will use redundant references. Both 'VIDEO REF 1' and 'VIDEO REF 2' are the same. If one fails, the other will be used as a fail-over.
 'Dual' — You declare that dual video references are in use. In this case, you can specify in step 5 which reference selected outputs are to use.

See [Redundant v. Dual Video Reference](#) on page 47.

- 4 If you want to change any of the fields in the output list, select the outputs you want to change. Use standard Windows click, shift-click, and control-click techniques,
Or, to select all outputs, choose 'Select All' from the 'Edit' menu.
Or, to clear all outputs from the list, choose 'Remove All Outputs' from the 'Edit' menu.
- 5 In the switch settings section, check the check boxes that apply to reclocking, switching line (SD or HD), and video reference.

The following lists each check box and its function:

Check Box(es)	Description
Use video reference 1, Use video reference 2	Choose whichever reference you want to apply to the selected outputs (in dual reference mode only).
Switch on Field Boundary, Switch on Frame Boundary	Choose whether the selected output(s) switch on field boundaries or frame boundaries.
Switch on Field Boundary, Switch on Frame Boundary	Choose whether the selected output(s) switch on field boundaries or frame boundaries.

- 6 Click **Apply Changes to Selected Outputs**, or from the 'Edit' menu, choose 'Apply Changes'. This does *not* write your changes to the control card, but causes the output list to redisplay.
- 7 Finally, when you are satisfied that all your changes are correct, click **Write Changes**, or from the 'Edit' menu, choose 'Write Changes'. UniConfig writes your changes to the control card.

NV8256-Plus Routers

- 1 Select a control card (for an NV8256-Plus frame).
- 2 From the 'Window' menu, select 'Switch Point Setup'. The 'Switch Point Setup' window appears. Specify an output range at the bottom of the page and click **Read Outputs**:

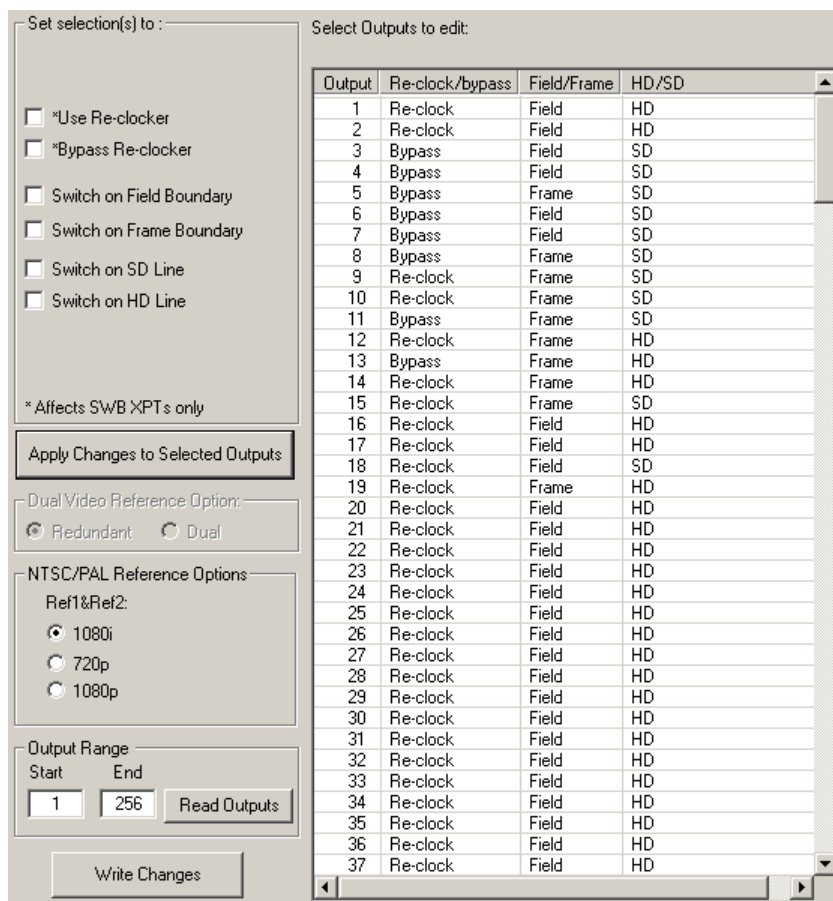


Fig. 7-4: Switch Point Setup Window (NV8256-Plus)

This table describes each column in the output list:

Column	Description
Output	The number assigned to the signal for routing purposes. The number usually refers to the physical port through which the signal is distributed.
Reclock/bypass	Indicates whether the output bypasses re-clocking.
Field/frame	Indicates whether the output switches at every (video) field or at every (video) frame.
HD/SD	Indicates whether the output is a standard definition (SD) or high definition (HD) video signal.

- 3 The 'Dual Video Reference Option' is disabled (greyed out). The NV8256-Plus does not support dual reference.

- 4 In the 'NTSC/PAL Reference Options' section, you declare the type of reference signal for the reference connectors.

Select the radio button corresponding to the signal type being used as a video reference: '1080i', '720p', or '1080p'.

- ▲ These options appear only if the control card supports NTSC or PAL. (The NV8256-Plus supports NTSC and PAL.)

Note

If the 'NTSC/PAL Reference Options' section does not appear, you have an older control card. Contact [Grass Valley Technical Support](#) for assistance.

- 5 If you want to change any of the fields in the output list, select the outputs you want to change. Use standard Windows click, shift-click, and control-click techniques,
Or, to select all outputs, choose 'Select All' from the 'Edit' menu.
Or, to clear all outputs from the list, choose 'Remove All Outputs' from the 'Edit' menu.
- 6 In the switch settings section, check the check boxes that apply to reclocking, switching line (SD or HD), and video reference.

The following lists each check box and its function:

Check Box(es)	Description
Use Reclocker, Bypass Reclocker	Either use the output reclocker or bypass the output reclocker.
Switch on Field Boundary, Switch on Frame Boundary	Choose whether the selected output(s) switch on field boundaries or frame boundaries.
Switch on SD Line, Switch on HD Line	Choose 'Switch on SD Line' if the selected signals are SD (or analog video). Choose 'Switch on HD Line' if the selected signals are HD.

- 7 Click **Apply Changes to Selected Outputs**, or from the 'Edit' menu, choose 'Apply Changes'. This does *not* write your changes to the control card, but causes the output list to redisplay.
- 8 Finally, when you are satisfied that all your changes are correct, click **Write Changes**, or from the 'Edit' menu, choose 'Write Changes'. UniConfig writes your changes to the control card.

NV8288 and NV8288-Plus Routers

- 1 Select a control card (for an NV8288 or NV8288-Plus frame).
- 2 From the 'Window' menu, select 'Switch Point Setup'. The 'Switch Point Setup' window appears. Specify an output range at the bottom of the page and click **Read Outputs**:

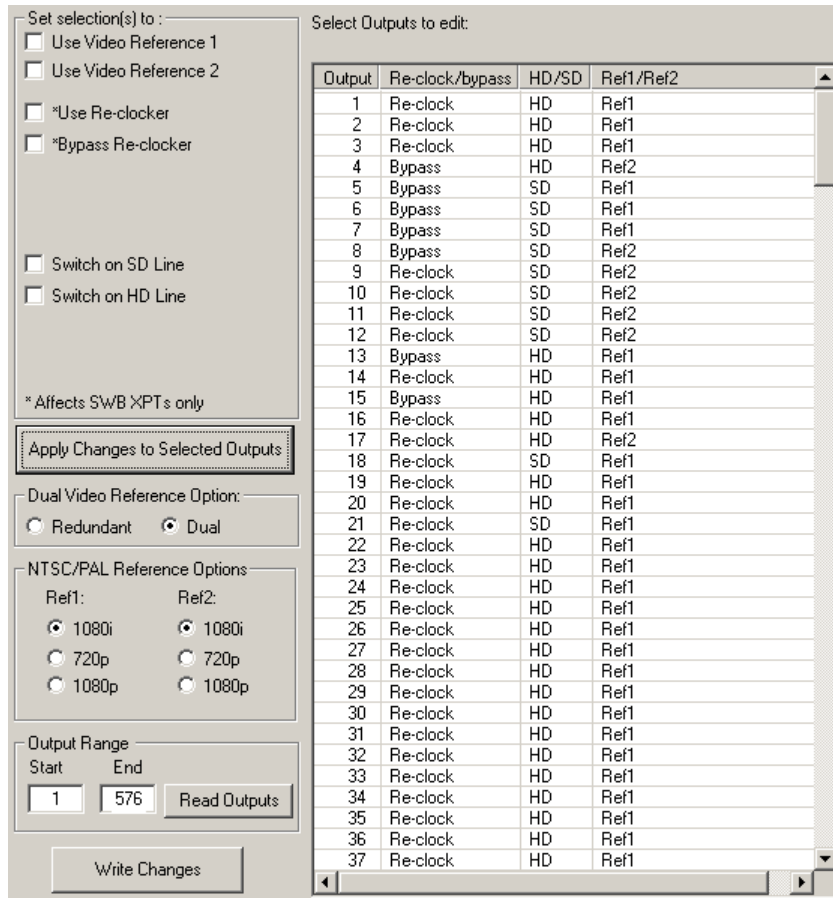


Fig. 7-5: Switch Point Setup Window (NV8288)

This table describes each column in the output list:

Column	Description
Output	The number assigned to the signal for routing purposes. The number usually refers to the physical port through which the signal is distributed.
Reclock/bypass	Indicates whether the output bypasses re-clocking.
HD/SD	Indicates whether the output is a standard definition (SD) or high definition (HD) video signal.
Ref1/Ref2	Indicates whether the output uses video reference 1 or reference 2 (in dual reference mode only).

- 3 In the 'Dual Video Reference Option' section, choose 'Redundant' or 'Dual'.
- 'Redundant' — You declare that the router will use redundant references. Both 'VIDEO REF 1' and 'VIDEO REF 2' are the same. If one fails, the other will be used as a fail-over.
- 'Dual' — You declare that dual video references are in use. In this case, you can specify in step 6 which reference selected outputs are to use.

See [Redundant v. Dual Video Reference](#) on page 47.

- 4 In the 'NTSC/PAL Reference Options' section, you declare the type of reference signal for the reference connectors.

Select the radio button corresponding to the signal type being used as a video reference: '1080i', '720p', or '1080p'.

▲ These options appear only if the control card supports NTSC or PAL.

- 5 If you want to change any of the fields in the output list, select the outputs you want to change. Use standard Windows click, shift-click, and control-click techniques,
- Or, to select all outputs, choose 'Select All' from the 'Edit' menu.
- Or, to clear all outputs from the list, choose 'Remove All Outputs' from the 'Edit' menu.
- 6 In the switch settings section, check the check boxes that apply to reclocking, switching line (SD or HD), and video reference.

The following lists each check box and its function:

Check Box(es)	Description
Use video reference 1, Use video reference 2	Choose whichever reference you want to apply to the selected outputs (in dual reference mode).
Use Reclocker, Bypass Reclocker	Either use the output reclocker or bypass the output reclocker.
Switch on SD Line, Switch on HD Line	Choose 'Switch on SD Line' if the selected signals are SD (or analog video). Choose 'Switch on HD Line' if the selected signals are HD.

- 7 Click **Apply Changes to Selected Outputs**, or from the 'Edit' menu, choose 'Apply Changes'. This does **not** write your changes to the control card, but causes the output list to redisplay.
- 8 Finally, when you are satisfied that all your changes are correct, click **Write Changes**, or from the 'Edit' menu, choose 'Write Changes'. UniConfig writes your changes to the control card.

NV8500 Family Standard Routers

- ▲ Use MRC, not UniConfig, to configure NV8500 hybrid routers—those having EM0833 control cards. You must use UniConfig to configure NV8500 routers that have EM0666 control cards.
- 1 Select a control card (for an NV8144, NV8140, NV8280, NV8576, or NV8576-Plus frame).
 - 2 From the 'Window' menu, select 'Switch Point Setup'. The 'Switch Point Setup' window appears. Specify an output range at the bottom of the page and click **Read Outputs**:

The screenshot shows the 'Switch Point Setup' window for an NV8280 router. It is divided into several sections:

- Set selection(s) to :**
 - Use Video Reference 1
 - Use Video Reference 2
 - *Use Re-clocker
 - *Bypass Re-clocker
 - Switch on SD Line
 - Switch on HD Line
- *Affects SWB XPTs only**
- Apply Changes to Selected Outputs** (button)
- Dual Video Reference Option:**
 - Redundant
 - Dual
- Output Range:**
 - Start:
 - End:
 - Read Outputs** (button)
- Write Changes** (button)
- Select Outputs to edit:** A table with 4 columns: Output, Re-clock/bypass, HD/SD, and Ref1/Ref2. The table lists 38 rows of output configurations.

Output	Re-clock/bypass	HD/SD	Ref1/Ref2
1	Re-clock	HD	Ref1
2	Re-clock	HD	Ref1
3	Re-clock	HD	Ref1
4	Re-clock	HD	Ref1
5	Re-clock	HD	Ref1
6	Re-clock	HD	Ref1
7	Re-clock	HD	Ref1
8	Re-clock	HD	Ref1
9	Re-clock	SD	Ref2
10	Re-clock	SD	Ref2
11	Re-clock	SD	Ref2
12	Re-clock	SD	Ref2
13	Re-clock	SD	Ref2
14	Re-clock	SD	Ref2
15	Re-clock	SD	Ref2
16	Bypass	HD	Ref1
17	Bypass	HD	Ref1
18	Bypass	HD	Ref1
19	Bypass	HD	Ref1
20	Bypass	HD	Ref1
21	Bypass	HD	Ref1
22	Bypass	HD	Ref1
23	Bypass	HD	Ref1
24	Bypass	HD	Ref1
25	Re-clock	HD	Ref1
26	Re-clock	HD	Ref1
27	Re-clock	HD	Ref1
28	Re-clock	HD	Ref1
29	Re-clock	HD	Ref1
30	Re-clock	HD	Ref1
31	Re-clock	HD	Ref1
32	Re-clock	HD	Ref1
33	Re-clock	HD	Ref1
34	Re-clock	HD	Ref1
35	Re-clock	HD	Ref1
36	Re-clock	HD	Ref1
37	Re-clock	HD	Ref1
38	Re-clock	HD	Ref1

Fig. 7-6: Switch Point Setup Window (NV8280)

This table describes each column in the output list:

Column	Description
Output	The number assigned to the signal for routing purposes. The number usually refers to the physical port through which the signal is distributed.
Reclock/bypass	Indicates whether the output bypasses re-clocking.
HD/SD	Indicates whether the output is a standard definition (SD) or high definition (HD) video signal.
Ref1/Ref2	Indicates whether the output uses video reference 1 or reference 2 (in dual reference mode only).

- 3 In the 'Dual Video Reference Option' section, choose 'Redundant' or 'Dual'.
- 'Redundant' — You declare that the router will use redundant references. Both 'VIDEO REF 1' and 'VIDEO REF 2' are the same. If one fails, the other will be used as a fail-over.
- 'Dual' — You declare that dual video references are in use. In this case, you can specify in step 6 which reference selected outputs are to use.

See [Redundant v. Dual Video Reference](#) on page 47.

- 4 If you want to change any of the fields in the output list, select the outputs you want to change. Use standard Windows click, shift-click, and control-click techniques,
- Or, to select all outputs, choose 'Select All' from the 'Edit' menu.
- Or, to clear all outputs from the list, choose 'Remove All Outputs' from the 'Edit' menu.
- 5 In the switch settings section, check the check boxes that apply to reclocking, switching line (SD or HD), and video reference.

The following lists each check box and its function:

Check Box(es)	Description
Use video reference 1, Use video reference 2	Choose whichever reference you want to apply to the selected outputs (in dual reference mode).
Use Reclocker, Bypass Reclocker	Either use the output reclocker or bypass the output reclocker.
Switch on SD Line, Switch on HD Line	Choose 'Switch on SD Line' if the selected signals are SD (or analog video). Choose 'Switch on HD Line' if the selected signals are HD.

- 6 Click **Apply Changes to Selected Outputs**, or from the 'Edit' menu, choose 'Apply Changes'.
- This does *not* write your changes to the control card, but causes the output list to redisplay.
- 7 Finally, when you are satisfied that all your changes are correct, click **Write Changes**, or from the 'Edit' menu, choose 'Write Changes'. UniConfig writes your changes to the control card.

Switch Point Settings

Switch Point Settings

8 Machine Control

Chapter 8 discusses machine control routing, machine control port types, and using the 'Connections' window for machine control routers.

Topics

<i>Background Information</i>	63
<i>The Port Configuration Window</i>	66
<i>Setting Up Machine Control Ports</i>	67

Background Information

Machine control routers switch signals between recording and playback equipment such as VTRs. These "machines" have control signals such as play, stop, and rewind, and can perform functions such as pre-roll and cueing.

Machine control ports are bi-directional and machine control routes are point-to-point. This means that (1) an input can be connected to at most one output and (2) signals flow both ways, from the input to the output and from the output to the input.

Because machine control routes are point-to-point, 2 ports are consumed for each route. Thus, a 256-port machine control router allows up to 128 routes.

The NV5256 is a 256-port machine control router. The NV5128 Multi-Format Router can include a small set of machine control ports, up to 64 ports.

Using the 'Connections' window (Chapter 9), you can view and test machine control ports.

Using the 'Partitions' window (Chapter 6), you can define machine control partitions.

Using the 'Machine Control Port Setup' window (described in this chapter), you can configure machine control ports.

Machine Control Ports

When two devices communicate, through a router, one is considered the *controlling* device and the other is considered the *controlled* device. One sends control signals to the other and receives status signals from the other.

Router ports can be configured to match the devices to which they connect—controlling or controlled—and they can be configured as flexible, either controlling or controlled as required at any given time.

Machine control ports can be configured with the following port types. All of these are variants on *controlling* and *controlled*:

- **Controlling**
Declares that the port connects to a device that normally functions as a *controlling* device (but may also serve as a controlled device).
- **Controlled**
Declares that the port connects to a device that normally functions as a *controlled* device (but may also serve as a controlling device).
- **Dynamic**
Declares that the port type can change to match the requirements of the current operation. The changes take place under the direction of the router control system.
Note: This is both the default and the recommended setting for most applications.
- **DTE**
Declares that the port connects to a controlling device. This port type is used only in RS-232 applications.
- **DCE**
Declares that the port connects to a controlled device. This port type is used only in RS-232 applications.
- **Master**
Declares that the port connects to a primary (or master) device. A dynamic port that is routed to or from a master port becomes a slave port.
- **Slave**
Declares that the port connects to a secondary (or slave) device. A dynamic port that is routed to or from a slave port becomes a master port.

By default, all machine control ports are set to 'Dynamic'.

Machine Control Partitions

The routers that support machine control (the NV5128 and the NV5256) have 4 machine control partition types:

Reverse Forward Broadcast Data X/Y

Reverse is the default because it is the most commonly applicable.

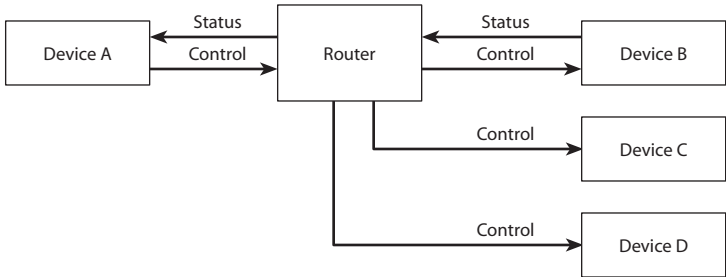
It is in the 'Partitions' window that you can configure a machine control partition as one of the following types:

- **Forward**
Signals flow from the controlling device to the controlled device.
- **Reverse**
Signals flow from the controlled device to the controlling device.
- **Broadcast**
Allows the router to send signals from the controlling device to multiple controlled devices. For more information, see [Broadcasting Machine Control Signals](#) on page 65.

- Data X/Y
The partition acts as if the machine control ports are standard I/O ports and not bidirectional and point-to-point. Signal flow is unidirectional and an input can be routed to any or all outputs.

Broadcasting Machine Control Signals

In a broadcast partition, the router can send signals from one device to one or more connected devices. The first receiving device returns status to the sending device. The other receiving devices do not return status:



Operators using an NV9000 control panel to perform broadcast takes use the methods appropriate for their panels. In non-specific terms, they perform these 2 steps to set up a broadcast scenario:

- 1 Set up normal communication between a controlling device (A) and one of the controlled devices (B). This is bidirectional communication, control in one direction and status in the other.
- 2 Set up unidirectional communication between the controlling device and all remaining controlled devices (C and D). These devices receive the control signals but do not return status. All status reporting is through the first controlled device.

Diagnostic Takes

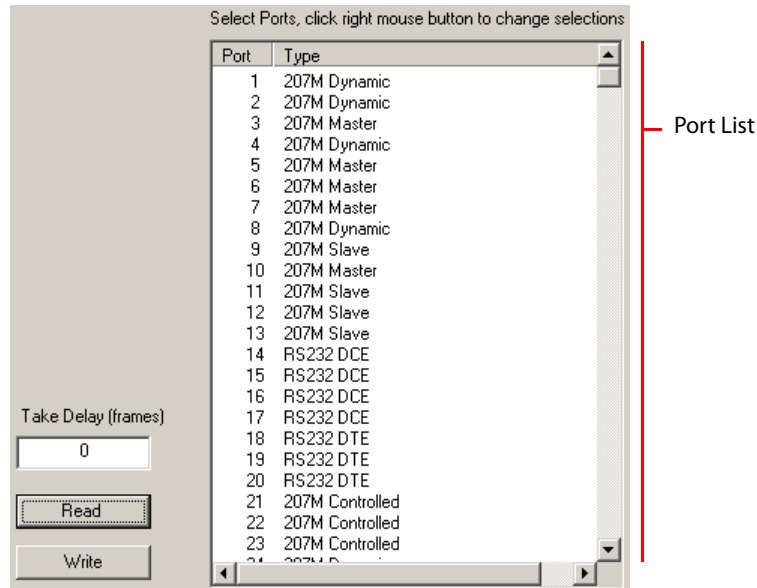
In UniConfig, you can perform diagnostic machine control takes — under reverse, forward, broadcast, or data X/Y modes — in the 'Connections' window. See [Connections Window](#) on page 69 for details.

In each of the mode, the characteristics of a take are different.

- ▲ The diagnostic crosspoint list of the 'Connections' window is not intended for general use by customers. It is not an effective way to perform takes in day-to-day operations.

The Port Configuration Window

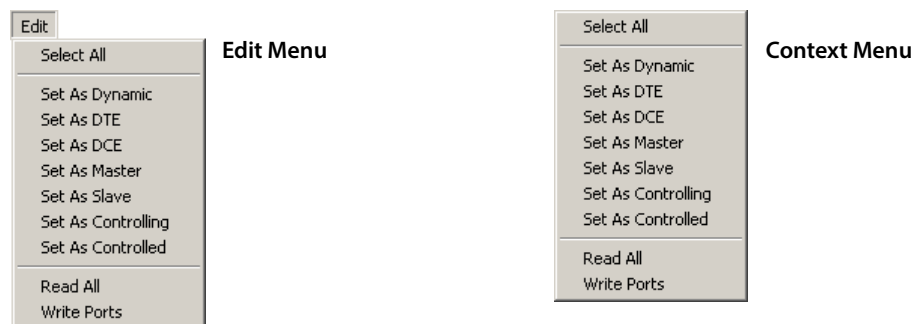
This is the 'Machine Control Port Setup' window:



Click **Read** to read the port configuration from the router. The port data appear in the port list.
Click **Write** to save any changes to the port configuration that you have made.

Machine Control Port Commands

When you have the machine control port window open, the 'Edit' menu provides commands that are appropriate to the machine control port window:



If you right-click anywhere in the machine control port window, a context menu appears that has the same commands as the 'Edit' menu.

You can use these commands to change the port types of the router.

See [Machine Control Ports](#) on page 63.

Setting Up Machine Control Ports

As described earlier, machine control ports can be configured with the following types:

Dynamic	Master	DTE
Controlling	Slave	DCE
Controlled		

By default, all machine control ports are set to 'Dynamic'. A dynamic port changes its configuration to match the current operation requirements as directed by the router control system.

- ▲ For the 'Connections' window to function properly for machine control routers, all the machine control port types must be set to "dynamic" in the 'Machine Control Port Setup' window.

This requirement is in conflict with the necessity of defining different port types for the machine control partition(s) you create (unless all your port types are in fact "dynamic"). The 'Connections' window is a diagnostic window. For machine control routers, it is effective only before you have configure machine control ports or when you have a serious problem to solve.

How to Configure Machine Control Ports

- 1 Select a control card (of an NV5128 or NV5256 router).
- 2 From 'Window' menu, select 'Machine Control Port Setup'. The 'Machine Control Port Setup' window appears:

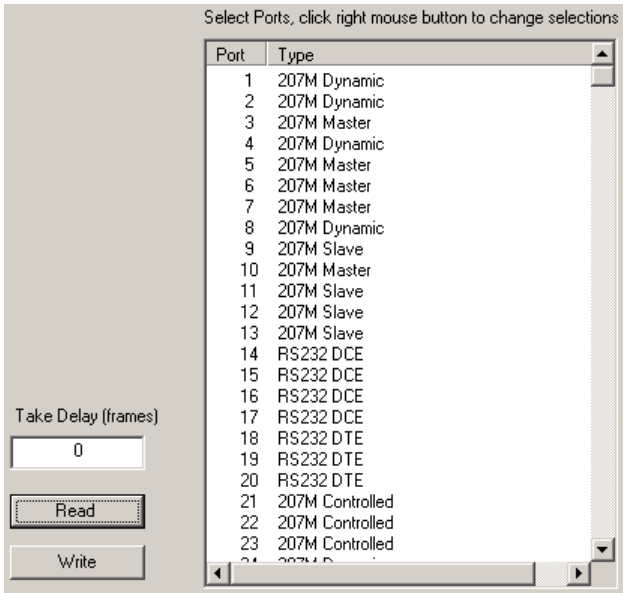


Fig. 8-1: Machine Control Port Setup Window

- 3 Click **Read**, or from the 'Edit' menu, choose 'Read All'. The current configurations of the router's ports appear in the port list.
- 4 Enter a value in the 'Take Delay' field. The "take delay" is the number of video frames between the time a port is disconnected from one device and connected to another. The delay is typically 20 to 30 frames. Be sure to verify that the delay is appropriate for your router.

- 5 In the port list, use standard Windows click, shift-click, and control-click techniques to select the ports you want to change to a particular type.
- 6 Choose a port type command from the 'Edit' menu or the context menu. That will apply the chosen port type to all the ports you had selected.
- 7 Repeat steps 5 and 6 for other ports of other types.
- 8 Click **Write** or, from the 'Edit' menu, choose 'Write Ports' to send the port settings to the control card of the router.
- 9 Repeat steps 1–8 for other control cards you are updating. (Both control cards in a router frame must be configured identically.)

Connections Window



Chapter 9 discusses UniConfig's 'Connections' window.

Topics

<i>Introduction</i>	69
<i>The Connections Window</i>	71
<i>Setting Connection Window Options</i>	76
<i>Viewing Diagnostic Crosspoint Data</i>	80
<i>Performing Takes</i>	81
<i>Special Takes</i>	87

Introduction

The 'Connections' window displays a *diagnostic* crosspoint matrix of the router you have selected and allows you to perform takes for testing or for other purposes.

Although you can use the 'Connections' window to perform takes, it is not intended for general use by customers, or as a control panel, but for diagnostics performed by Grass Valley service personnel.

We say it is a *diagnostic* crosspoint matrix because (1) it spans the entire space of the router's crosspoint matrix without regard to any of the partitions you have defined and (2) you can perform takes from almost any input to any output without regard to partition boundaries.

In the case of an NV5128 Multi-Format Router, where there are mixed signal types, it is possible to take a video input to a machine control output in the 'Connections' window. For routers that have an output-follow partition, the 'Connection' window can perform output-follow takes outside the output-follow partition.

(Such takes are not possible when the router is operating normally in a router control system.)

Depending on the router you have selected and the partitions you have defined for the router, the 'Connections' window has distinct modes and submodes and the window appears differently in the different modes:

- XY/standard

This mode applies to routers that have video partitions or stereo audio partitions. The term "XY" denotes that the matrix is a standard X/Y crosspoint matrix.

- XY/mono

This mode applies to routers that have mono audio partitions and has additional controls with which to specify mono channels. The term "XY" denotes that the matrix is a standard two-dimensional crosspoint matrix.

- Machine control

This mode applies to routers that have machine control partitions. When the 'Connections' window shows a machine control crosspoint list, there are 4 sub-modes available:

Reverse, Forward, Broadcast, Data X/Y

The 'Connections' behaves differently in the 4 submodes. Note that the 4 submodes correspond to the 4 machine control partition types, but the submodes do not affect the partitions, but only the behavior of the 'Connections' window.

- ▲ Important: for the 'Connections' window to execute machine control takes properly, you must have set the type of all machine control ports to "dynamic."
- ▲ Machine control matrices are not X/Y matrices. Machine control connections are bidirectional and point-to-point. Each connection consumes 2 ports. That is, in a 256-port machine control router, you can make up to 128 connections.

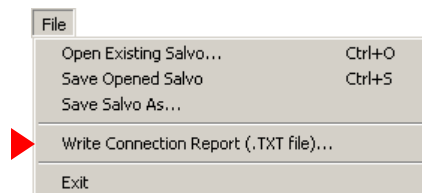
- Output-follow

This mode must be enabled and is available only when the router you have selected has an output follow partition.

When this mode is enabled, the 'Connection' window performs output-follow take functions. When this mode is disabled, the 'Connections' window performs normal take functions.

Writing Connections Reports

When you have the 'Connections' window open, the 'File' menu provides commands related to salvos and a 'Write Connections Report (.TXT file) . . .' command:



Click the command to write the report. A dialog appears in which you can browse your PC's file system to find a folder in which to save the report, create a name for the report file, and save the report.

The report is a text image of the output list of the 'Connections' window. The report has tab-separated fields in 4 columns: input, output, 'LPR', and status.

The Connections Window

This is a sample of the 'Connections' window for an NV8256:

Input	Output	LPR	Status
1	1		
2	2		
3	3		
4	4		
5	5		
6	6		
7	7		
8	8		
9	9		
10	10		
11	11		
176	12		
13	13		
14	14		
15	15		
16	16		
17	17		
18	18		
19	19		
20	20		

The NV8256 is a video router. For this router, the 'Connections' window shows one crosspoint list in XY/standard mode.

Connections Window

Connections Window

The window's fields might differ slightly for other routers. For example, the audio routers (NV7256 and NV7512) have an additional tab for an XY/mono view of the crosspoint list:

Physical Connections

Single Take

Input: 17 Output: 12

Execute Mono

Mono Output Range

Start: 1 End: 256

Read Outputs

Physical Mono Take

Input: [] Channel: 1

Output: [] Channel: 1

Execute

XY/Standard XY/Mono

Mono and Physical Connections:

Inputs			Outputs					
Mono	Phys	Chnl	-->	Mono	Phys	Chnl	LPR	Status
3	2	1	-->	1	1	1		
4	2	2	-->	2	1	2		
1	1	1	-->	3	2	1		
2	1	2	-->	4	2	2		
3	2	1	-->	5	3	1		
4	2	2	-->	6	3	2		
1	1	1	-->	7	4	1		
1	1	1	-->	8	4	2		
1	1	1	-->	9	5	1		
1	1	1	-->	10	5	2		
1	1	1	-->	11	6	1		
1	1	1	-->	12	6	2		
1	1	1	-->	13	7	1		
1	1	1	-->	14	7	2		
1	1	1	-->	15	8	1		
1	1	1	-->	16	8	2		
1	1	1	-->	17	9	1		
1	1	1	-->	18	9	2		
1	1	1	-->	19	10	1		
111	56	1	-->	20	10	2		

Mono Diagnostic Crosspoint List

Routers that support machine control have a machine control tab:

Physical Connections

Single Take

Input: 9 Output: 14

Execute

Physical Output Range

Start: 1 End: 256

Read Outputs

Machine Control

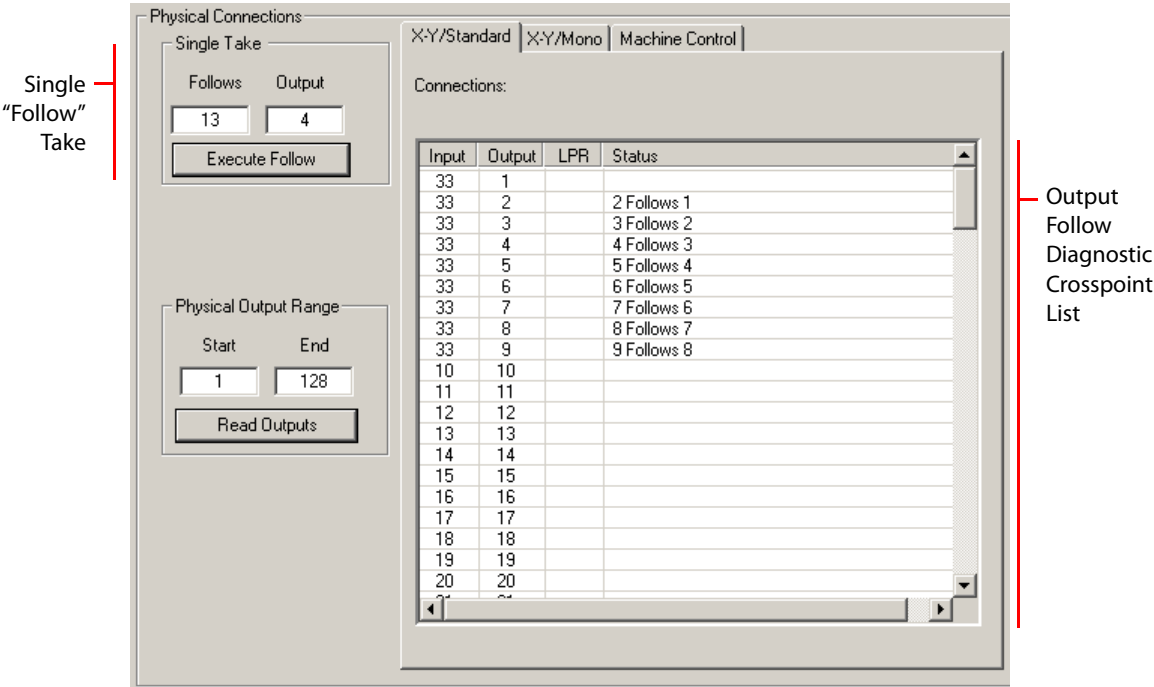
Connections:

Input	Output	LPR	Status
1	1		Tristate
2	2		Tristate
3	3		Tristate
4	4		Tristate
5	5		Tristate
6	6		Tristate
12	7		P2P Controlled
8	8		Tristate
14	9		P2P Controlled
10	10		Tristate
11	11		Tristate
7	12		P2P Controlling
13	13		Tristate
9	14		P2P Controlling
15	15		Tristate
16	16		Tristate
17	17		Tristate
18	18		Tristate
19	19		Tristate
20	20		Tristate
21	21		Tristate

Machine Control Diagnostic Crosspoint List

The controls for machine control views are the same as for XY/standard views.

If output follow takes have been enabled, the window enters "output follow" mode:



This example shows an NV5128 router. All three tabs remain in view when the window is in "output follow mode."

Window Features

Every 'Connections' window has one or more diagnostic crosspoint lists, depending on the router.

Every 'Connections' window has a section in which you can specify and execute a single take.

Every 'Connections' window has a section in which you can specify a range of outputs, and read those outputs from the router.

The audio routers have additional sections in which you can issue a mono take and specify a mono output range.

A context menu applies to the 'Connections' window. See [Setting Connection Window Options](#) on page 76.

Views

XY/Standard View

In the "XY/standard" view of the diagnostic crosspoint matrix, there are 4 columns:

- Input — the input that is routed to the output in the same row
- Output — the list is ordered by output port
- LPR — the "lock, protect, release" status of the output. An L in the field indicates that the output in that row is locked. A P indicates that the output is protected. A blank field means that there is no lock or protect on that output.
- Status — additional status or error states.

XY/Mono View

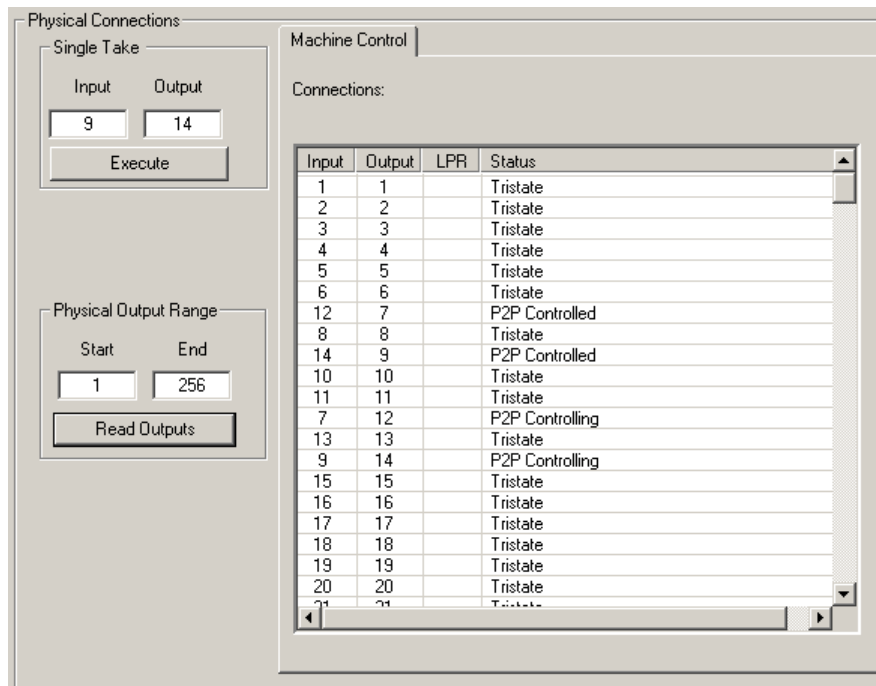
In the “X-Y/mono” view of the diagnostic crosspoint matrix, there are 8 columns:

- Mono (input) — the mono input port of the signal routed to the output in the same row.
- Phys (input) — the physical connector number of the signal routed to the output in the same row
- Channel (input) — The values can be either 1 or 2.
- Mono (output) — the mono output port.
- Phys (output) — the physical connector number of the output.
- Channel (output) — The values can be either 1 or 2.
- LPR — the “lock, protect, release” status of the output. An L in the field indicates that the output in that row is locked. A P indicates that the output is protected. A blank field means that there is no lock or protect on that output.
- Status — additional status or error states.

Machine Control View

Machine control crosspoints are different from video and audio crosspoints. Machine control routers are bi-directional and point-to-point. For every machine control take, there is an matching take in the opposite direction.

Further, machine control ports on the diagonal are tristated (i.e., turned off). This is a sample of the ‘Connections’ window for the NV5256:



In the machine control view, there are 4 columns:

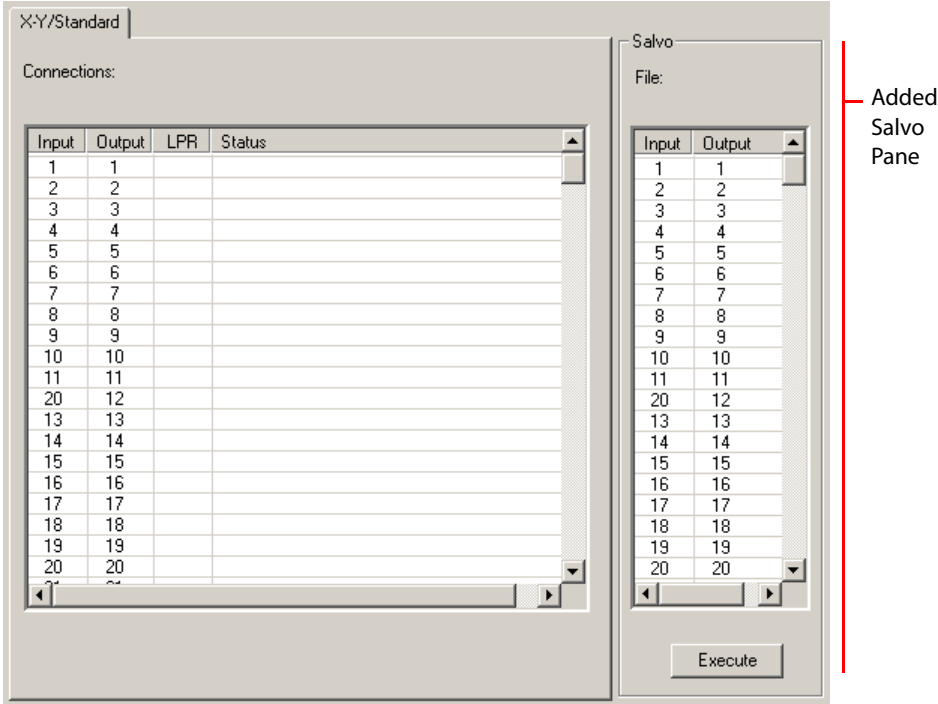
- Input — the input that is routed to the output in the same row
- Output — the list is ordered by output port

- LPR—the “lock, protect, release” status of the output. An L in the field indicates that the output in that row is locked. A P indicates that the output is protected. A blank field means that there is no lock or protect on that output.
- Status—indicates whether a port is tristated (i.e., disconnected) or, if the port is in use, whether it is “controlled” or “controlling.”

Saving and Loading Crosspoint States

You can create a “snapshot” of the current crosspoint matrix state that can be saved for loading at a future point. This snapshot is called a “salvo.” (These salvos are not the same as NV9000 system salvos.) For more information, see [Salvos](#) on page 107.

If you enable salvos, a salvo pane appears in the ‘Connections’ window, at the right of the crosspoints list:

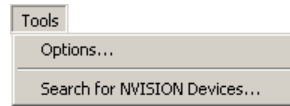


The salvo pane has an ‘Execute’ button. If the salvo is not empty, pressing the ‘Execute’ button causes the crosspoint connections defined in the salvo to be moved to the crosspoint matrix of the router. The crosspoint list of the window is updated accordingly.

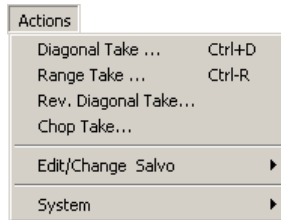
You can modify the entries in the salvo pane in several ways. See [Salvos](#) on page 107.

Setting Connection Window Options

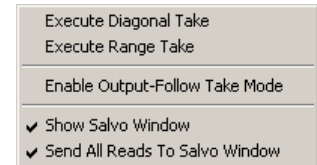
When you have the 'Connections' window open, the 'Actions' menu and the 'Options' command of the 'Tools' menu have specific commands that can be used with the 'Connections' window. A context menu is available if you right-click anywhere in the 'Connections' window:



Tools Menu



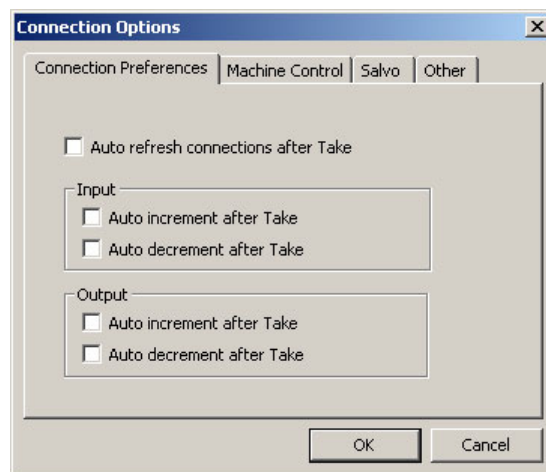
Actions Menu



Context Menu

For more detail, see [Special Takes](#) on page 87

When you click the 'Options' command, the 'Connection Options' dialog appears:



This dialog has several commands in these 3 tabs.

- Preferences
- Machine Control
- Salvo. (See chapter 13, [Salvos](#) on page 107.)
- Other

Connection Preferences Tab

Automatic Refresh After Take

When you check the 'Auto refresh connections after take' check box, UniConfig refreshes the crosspoint list each time you perform a take.

If you leave this check box unchecked, you must click 'Read Outputs' in the 'Connections' window to refresh the crosspoint list.

Automatic Increment and Decrement after Takes

These 4 options apply to the input and the output fields in the 'Single Take' section.

When you check the 'Auto increment after Take' check box, the input (or output) field increments every time you click the 'Execute' button in the 'Single Take' section of the 'Connections' window.

When you check the 'Auto decrement after Take' check box, the input (or output) field decrements every time you click the 'Execute' button in the 'Single Take' section of the 'Connections' window.

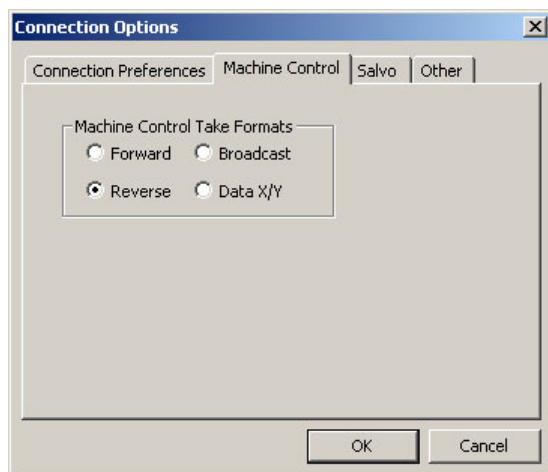
When you have one or two of these options checked, clicking 'Execute' repeatedly creates a take sequence that might be useful.

For example, if you check 'Auto increment after Take' for outputs but not for inputs, you can perform a small sequential range take.

For another example, if you check 'Auto increment after Take' for inputs but not for outputs, you can repeatedly take inputs, one after another, to the same output.

Machine Control Tab

If the router you are configuring is an NV5256, or an NV5128 that supports machine control, the 'Connection Options' dialog has a machine control tab:



Here there are 4 radio buttons that reflect the machine control partition types:

Forward Reverse Broadcast Data X/Y

Here, these radio buttons govern how the diagnostic crosspoint matrix in the 'Connections' window behaves. These options do *not* affect the partitions you have defined, but only how the 'Connections' window behaves.

- ▲ For the 'Connections' window to work correctly for machine control, the type of all the router's machine control ports must be defined as "dynamic."

For example, if you take port 7 to 12 in *reverse* mode, port 7 is "controlled" and port 12 is "controlling". if you take port 7 to 12 in *forward* mode, however, port 7 would be "controlling" and port 12 would be "controlled" — the reverse.

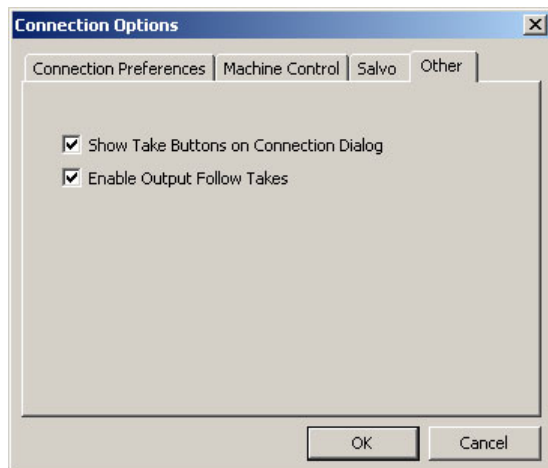
If you instead took port 12 to 7 in *reverse* mode, port 12 is "controlled" and port 7 is "controlling".

If you choose "data X/Y mode", you could take any input to multiple outputs.

Broadcast mode allows you to perform broadcast takes in the 'Configuration' window. See [Broadcasting Machine Control Signals](#) on page 65

'Other' Tab

There are two check box options in this tab:



Show Take Buttons on Connection Dialog

When you check this check box, a 'Diagonal Take' button and a 'Range Take' button appear in the 'Connections' window.

When you leave the check box unchecked, you must use the 'Actions' menu — or a context menu — to perform a diagonal take or a range take.

Enable Output-Follow Takes

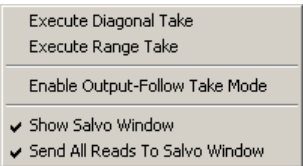
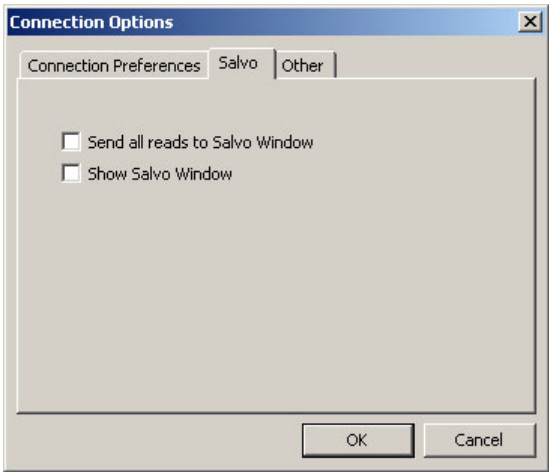
If you have defined an output follow partition for the selected control card and you check this box, the 'Connections' window treats the crosspoint list as an "output follow" crosspoint matrix. Fields in the window change and the status fields indicate where a "follow" occurs.

If your control card has no output follow partition, this option is not present in the dialog.

See [Output-Follow Takes](#) on page 89.

Salvo Tab

There are two check box options in this tab:



Context Menu

The two salvo options also appear in the context menu, providing a shortcut

There is *one salvo* at any time. The salvo can be large — it is often a copy of the diagnostic cross-point matrix. It can be as small as a single take. You can control the content of the salvo.

A single take copies all displayed outputs to the salvo. Adding a take (from the 'Actions' menu) to an empty salvo creates a salvo of one take. Adding a take to any salvo increases the size of the salvo by one take.

Show Salvo Window

When you check this check box, UniConfig shows a salvo pane in the 'Connections' window — to the right of the diagnostic crosspoint list.

The salvo pane shows a sequence of takes. The takes in the salvo pane are not necessarily in any particular order. But if you add takes to the salvo, they are placed at the bottom of the salvo.

The salvo window has an 'Execute' button. When you press that button, UniConfig executes the takes in the salvo, in this case in order from top to bottom. The takes occur in the router's cross-point and are reflected in the diagnostic crosspoint list.

You can clear the salvo pane with the 'Clear Salvo' command of the 'Actions' menu.

Send All Reads to Salvo Window

When you check this check box, UniConfig sends all crosspoint "reads" to the salvo pane. Whether you execute a single take or press Read Outputs, all displayed outputs are "read" and all are copied to the salvo pane.

Check this and the salvo window becomes checked automatically.

See chapter 13, [Salvos](#) on page 107.

If you are viewing the crosspoints of a video router (or the NV8500), only the 'X-Y/Standard' tab appears. If you are viewing the "crosspoints" of a machine control router, only the 'Machine Control' tab appears. If you are viewing the crosspoints of an NV5128 multi-format router, all three tabs appear. Choose the one you want to use.

- 4 To view crosspoints, enter a 'Start' and 'End' number in the fields of the 'Physical Output Range' section (or the 'Mono Output Range' section) and click **Read Outputs**. UniConfig displays the corresponding crosspoints in the tab.

The crosspoint list shows the input that has been routed to each output, its "LPR" state, and additional status. (If any output follow states exist, information about those states appears in the status fields.)

The column names for mono crosspoints are different from those of standard crosspoints. The 'Status' fields for machine control crosspoints show how the machine control ports are connected (or not connected).

Performing Takes

The purpose of the 'Connections' window is for you to perform 'takes'. Doing so, you can test standard, mono, and machine control switching. You can perform takes for any reason.

You can perform simple takes, diagonal takes, and range takes.

For information on machine control takes (for the NV5128 and the NV5256), see [Machine Control](#) on page 63.

- ▲ It is possible, in a multi-format router such as the NV5128, to perform takes from an input that do not match the output. You could, for example, route a video input to an audio output. Exercise care if you need to avoid making such routes.

XY/Standard Signals

The 'XY/Standard' tab appears for all routers except the NV5256. (Standard audio takes are stereo.)

How to Perform Standard Takes

- 1 Select a control card.
- 2 From the 'Window' menu, choose 'Connections'. The 'Connections' window appears with blank fields.
- 3 Select the 'XY/Standard' tab if it is not in front.
- 4 Select a range of outputs. In the 'Physical Output Range' section, enter a 'Start' and 'End' number and click **Read Outputs**. UniConfig displays the selected crosspoints in the diagnostic crosspoint list.
- 5 To take a single input to a single output, enter an input and an output number in the 'Single Take' section and click **Execute**.

(To be viewable, the output must in the diagnostic crosspoint list.)

- 6 To perform multiple takes, either choose a command from the 'Action' menu or right-click anywhere in the crosspoint list to open a context menu and select an option. If an option is not applicable, the option is greyed out (disabled).

These are the command options: 'Diagonal take', 'Range Take', 'Reverse Diagonal Take', and 'Chop Take'. See [Special Takes](#) on page 87 for details.

Mono Signals

The 'XY/Mono' tab appears only for the NV5100, NV5128, NV7256, NV7256-Plus, and NV7512 routers. If you have created no mono partitions, this tab is inactive.

(See [Partitions and Signal Types](#) on page 27.)

How to Perform Mono Takes

- 1 Select a control card (for a router that can switch mono channels).
- 2 From the 'Window' menu, choose 'Connections'. The 'Connections' window appears.
- 3 Select the 'X-Y/Mono' tab if it is not in front.
- 4 Select a range of outputs. In the 'Mono Output Range' section, enter a 'Start' and 'End' number and click **Read Outputs**. UniConfig displays the selected outputs in the diagnostic crosspoint list. Note that there are 'Mono', 'Phys', and 'Chnl' columns for both inputs and outputs.
- 5 To take a single mono input to a single mono output, enter a mono input and a mono output number in the 'Single Take' section and click **Execute Mono**.

Or, enter a *physical* input and a *physical* output number in the 'Physical Mono Take' section and select either channel 1 or channel 2, from the drop-down lists, for both the input and the output. Then click **Execute** (in the 'Physical Mono Take' section).

(To be viewable, the output must in the diagnostic crosspoint list.)

- 6 To perform multiple takes, either choose a command from the 'Action' menu or right-click anywhere in the crosspoint list to open a context menu and select an option. If an option is not applicable, the option is greyed out.

These are the command options: 'Diagonal take', 'Range Take', 'Reverse Diagonal Take', and 'Chop Take'. See [Special Takes](#), following, for details.

Machine Control Signals

The 'Machine Control' tab appears only for the NV5128 and NV5256 routers. (The NV5128 allows a 64-port machine control crosspoint matrix. UniConfig does not allow you to read or write beyond that range.)

See [Partitions and Signal Types](#) on page 27.

See Chapter 8, [Machine Control](#) on page 63, for details of machine control switching.

To use the 'Connections' window for machine control takes, you must select a machine control submode using the 'Options' command of the 'Tools' menu. There are 4 machine control submodes:

Reverse, Forward, Broadcast, Data X/Y

as described in [Machine Control Tab](#) on page 77.

How to Perform Machine Control Takes

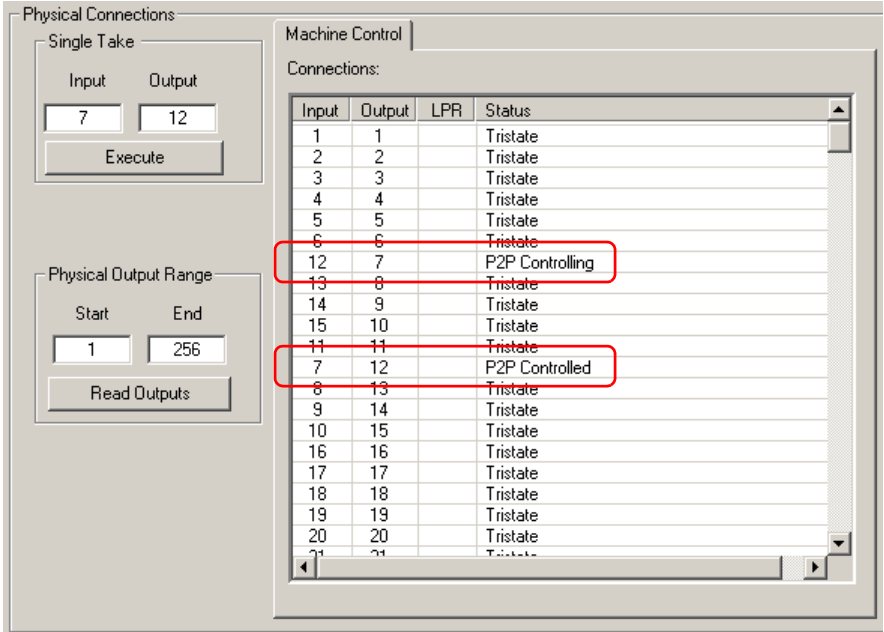
(The takes described here are performed in the 'Connections' window, not at an NV9000 control panel. Keep in mind that such takes are diagnostic takes and are made without regard to the existence of partitions and their boundaries.)

Forward Takes

To perform a single take:

- 1 Go to the 'Connections' window. Use the 'Options' command of the 'Tools' menu to place the 'Connections' window in *forward* mode.
- 2 Enter an input number and an output number in the 'Single Take' section and click 'Execute'.
- 3 The diagnostic crosspoints list shows the take results. You might have to scroll the list and you might have to click 'Read Outputs' to see the change.

This is an example:



Here, 2 entries in the list change. Because this is a *forward* take, port 7 is "controlling" and port 12 is "controlled." The term "P2P" is just a reminder that the take is point-to-point.

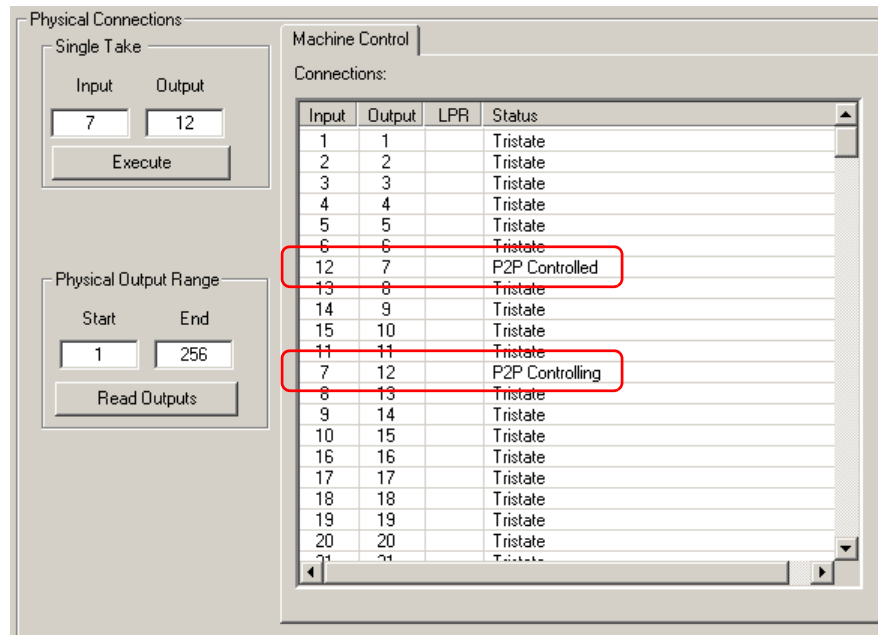
You can also perform diagonal takes and range takes. See [Special Takes](#) on page 87.

Reverse Takes

To perform a single take:

- 1 Go to the 'Connections' window. Use the 'Options' command of the 'Tools' menu to place the 'Connections' window in *reverse* mode.
- 2 Enter an input number and an output number in the 'Single Take' section and click 'Execute'.
- 3 The diagnostic crosspoints list shows the take results. You might have to scroll the list and you might have to click 'Read Outputs' to see the change.

This is an example:



Here, 2 entries in the list change. Because this is a *reverse* take, port 7 is “controlled” and port 12 is “controlling.” The term “P2P” is just a reminder that the take is point-to-point.

This is the opposite of a forward take.

You can also perform diagonal takes and range takes. See [Special Takes](#) on page 87.

Broadcast Takes

Broadcast takes involve multiple outputs. For information, see [Broadcasting Machine Control Signals](#) on page 65.

The example shown here takes input 7 to outputs 12, 13, 14, and 15. Port 12 returns status to port 7. Ports 13, 14, and 15 are passive and do not return status.

To perform a broadcast take:

- 1 Go to the ‘Connections’ window. Use the ‘Options’ command of the ‘Tools’ menu to place the ‘Connections’ window in *broadcast* mode.
- 2 In the ‘Single Take’ section, enter an input number and the output number of the first output. Click ‘Execute’. In our example, these ports are 7 and 12 respectively.

The diagnostic crosspoints list shows the take results. Thus far, the result is the same as a single forward take:

4	4		Tristate
5	5		Tristate
6	6		Tristate
12	7		P2P Controlling
8	8		Tristate
9	9		Tristate
10	10		Tristate
11	11		Tristate
7	12		P2P Controlled
13	13		Tristate
14	14		Tristate
15	15		Tristate
16	16		Tristate

3 In the 'Single Take' section, enter an input number and the output number of the next output. Click 'Execute'. In our example, the input remains 7 and the second output would be 13. The diagnostic crosspoints list shows the take results. Now port 7 changes from 'P2P Controlling' to 'Bcast Controlling' and the additional output, port 13, becomes 'RecvOnly Controlled':

4	4	Tristate
5	5	Tristate
6	6	Tristate
12	7	Bcast Controlling
8	8	Tristate
9	9	Tristate
10	10	Tristate
11	11	Tristate
7	12	P2P Controlled
7	13	RecvOnly Controlled
14	14	Tristate
15	15	Tristate
16	16	Tristate
17	17	Tristate

4 Repeat step 3 for any additional outputs.

In our example, broadcasting port 7 to ports 12–15, these are the results:

4	4	Tristate
5	5	Tristate
6	6	Tristate
12	7	Bcast Controlling
8	8	Tristate
9	9	Tristate
10	10	Tristate
11	11	Tristate
7	12	P2P Controlled
7	13	RecvOnly Controlled
7	14	RecvOnly Controlled
7	15	RecvOnly Controlled
16	16	Tristate
17	17	Tristate
18	18	Tristate

You can also perform a broadcast take as a range take if the receivers have contiguous port numbers. See [Special Takes](#) on page 87.

Data X/Y Takes

Takes in data XY mode are like normal takes for non-machine-control routers. They are not point-to-point or bidirectional.

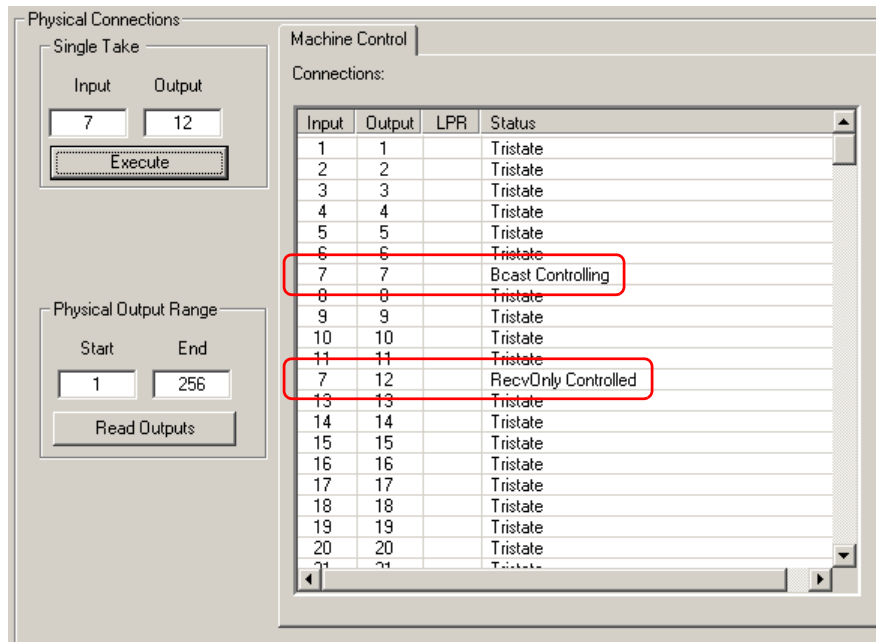
To perform a single take:

- 1 Go to the 'Connections' window. Use the 'Options' command of the 'Tools' menu to place the 'Connections' window in 'Data XY' mode.
- 2 Enter an input number and an output number in the 'Single Take' section and click 'Execute'.
- 3 The diagnostic crosspoints list shows the take results. You might have to scroll the list and you might have to click 'Read Outputs' to see the change.

Connections Window

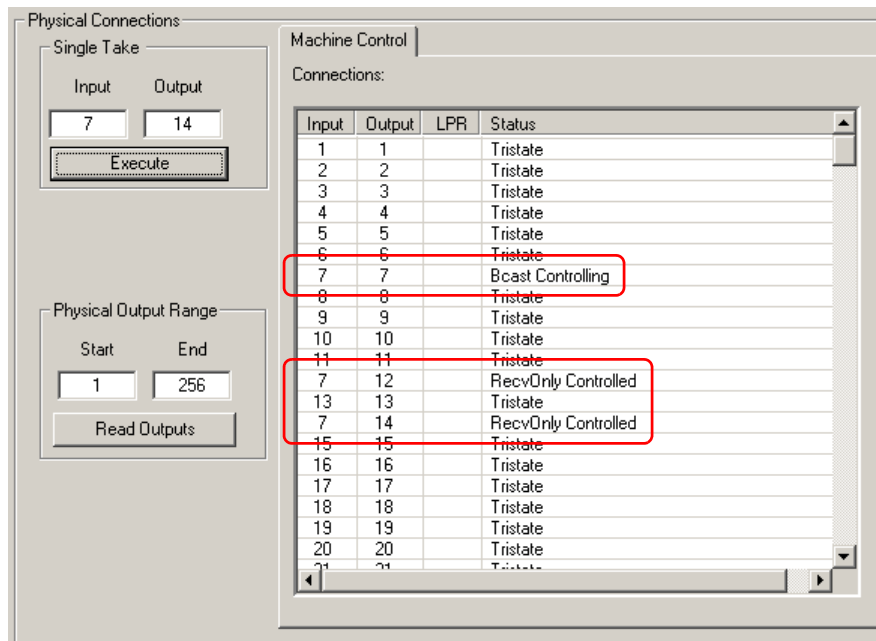
Connections Window

This is an example:



Here, 2 entries in the list change. Because this is a *data XY* take, the route to output 7 is not changed. Input 7 reports as “Bcast Controlling” and port 12 reports as “RecvOnly Controlled.”

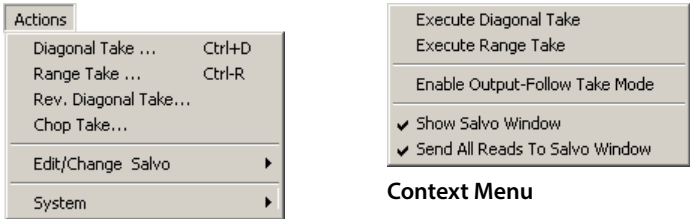
If you route the same input to another output, the results are similar:



You can also perform diagonal takes and range takes. See [Special Takes](#), following.

Special Takes

Use the 'Actions' menu or the context menu to have access to additional commands:

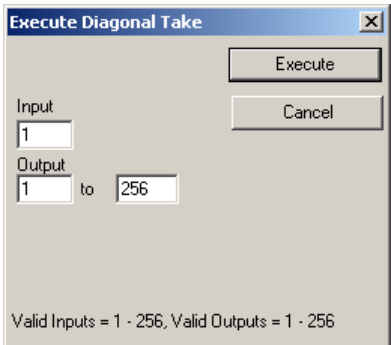


Actions Menu

In all case, the takes affect the crosspoint matrix in the router and the crosspoint states are reflected in the 'Connection' window's crosspoint list, either automatically or when you click **Read Outputs**.

Diagonal Takes

When you choose the 'Diagonal Take' command, a dialog appears:



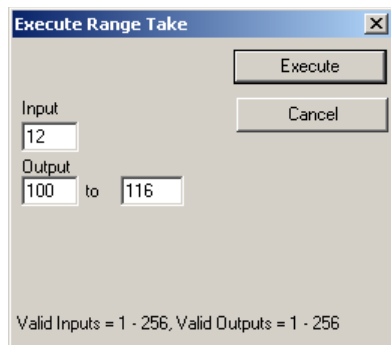
Specify the range of outputs that will be affected. Specify in the input field the starting point for the take. The inputs for the take *increment* from the starting point. The result for the take illustrated here is that input 1 switches to output 1, input 2 switches to output 2, and so on, for inputs 1–256 and outputs 1–256.

Notes

- 1 Diagonal takes need not start at input 1 or output 1.
- 2 Machine control ports "connected" on the diagonal (1 to 1, 2 to 2, and so on) are really tristated (disconnected) unless the partition in the router (or the diagnostic crosspoint list in UniConfig) is in data X/Y mode. In data X/Y mode, status fields in the crosspoint list read "Bcast controlled."

Range Takes

When you choose the 'Range Take' command, a dialog appears:



Specify the range of outputs that will be affected. Specify in the input field the (single) input for the take. The result for the take illustrated here is that input 12 switches to all outputs in the range 100–116.

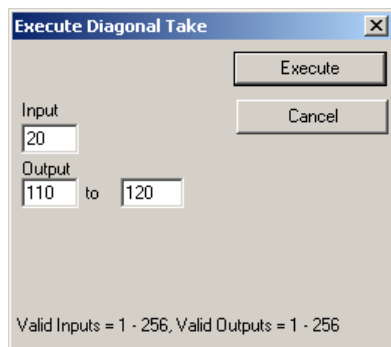
Notes

Range takes are **not** enabled for machine control partition types forward and reverse and are **not** enabled for these diagnostic crosspoint modes.

Range takes **are** enabled for broadcast and data X/Y partitions and for these diagnostic crosspoint modes as well.

Reverse Diagonal Takes

When you choose the 'Reverse Diagonal Take' command, a dialog appears:



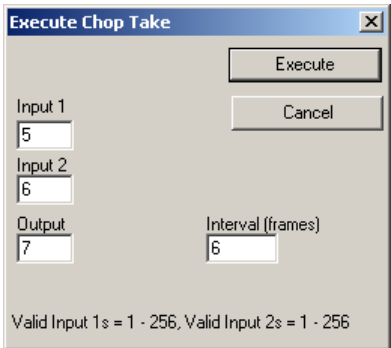
Specify the range of outputs that will be affected. Specify in the input field the starting point for the take. The inputs for the take **decrement** from the starting point. The result for the take illustrated here is that input 20 switches to output 110, input 19 switches to output 111, input 18 switches to output 112, and so on, for inputs 20–10 and outputs 110–120.

Notes

Machine control ports “connected” on the diagonal (1 to 1, 2 to 2, and so on) are really tristated (disconnected) unless the partition in the router (or the diagnostic crosspoint list in UniConfig) is in data X/Y mode. In data X/Y mode, status fields in the crosspoint list read “Bcast controlled.”

Chop Takes

When you choose the 'Chop Take' command, a dialog appears:



A "chop" switches one input to another input, and back again, to the specified output at a rate indicated by the value you place in the interval field.

The result for the chop take illustrated here is that output 7 switches from input 5 to input 6 after 6 frames, then switches back to input 5 after another 6 frames, and continues to switch at that interval indefinitely.

To terminate the chop, perform a single take to the affected output.

- ▲ Chop takes are available only for certain routers.

Output-Follow Takes

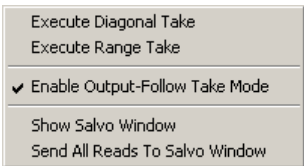
The "output-follow takes" feature is disabled unless the control card you are editing has an output follow partition.

If your control card has an output follow partition, you can enable the feature in the 'Connection Options' dialog that appears when you select the 'Options' command from the 'Tools' menu (when the 'Connections' window is open). You can also enable the feature in the context menu of the 'Connections' window.

How to Perform a Single Output-Follow Take

Follow these steps:

- 1 Go to the 'Connections' window. Choose the XY/standard, XY/mono, or machine control tab (if you have the choice) as required by your objective.
- 2 Right-click anywhere in the 'Connections' window to access the window's context menu. Check 'Enable Output-Follow Take Mode' to enable output-follow takes.

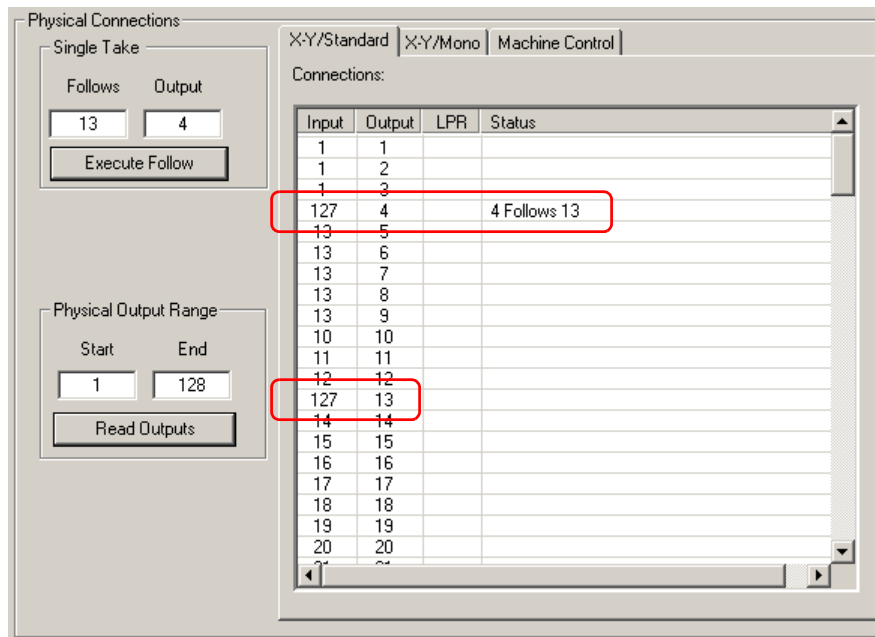


The 'Connections' window alters its appearance to support output-follow takes. For instance, the 'Input' field in the 'Single Take' section becomes the 'Follows' field.

Connections Window

Connections Window

- 3 Enter a "follows" number and an output number in the 'Single Take' section and click 'Execute':



Here, output 4 follows output 13. In the diagnostic crosspoint list, you can see that input 127 has been routed to output 13. Because output 4 follows output 13, input 127 appears at output 4 as well.

- 4 The diagnostic crosspoints list shows the take results. You might have to scroll the list and you might have to click 'Read Outputs' to see the change.

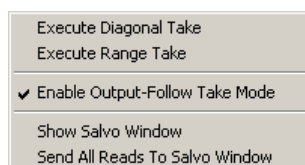
You can disable output-follow takes at any time if you wish to perform normal takes.

How to Perform an Output-Follow Diagonal Take

A diagonal take in output-follow mode creates a cascade of output-follow pairs. The result is multiple outputs emitting the same input signal.

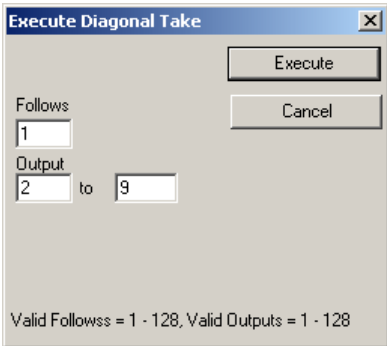
Follow these steps:

- 1 Go to the 'Connections' window. Choose the XY/standard, XY/mono, or machine control tab (if you have the choice) as required by your objective.
- 2 Right-click anywhere in the 'Connections' window to access the window's context menu. Check 'Enable Output-Follow Take Mode' to enable output-follow takes.

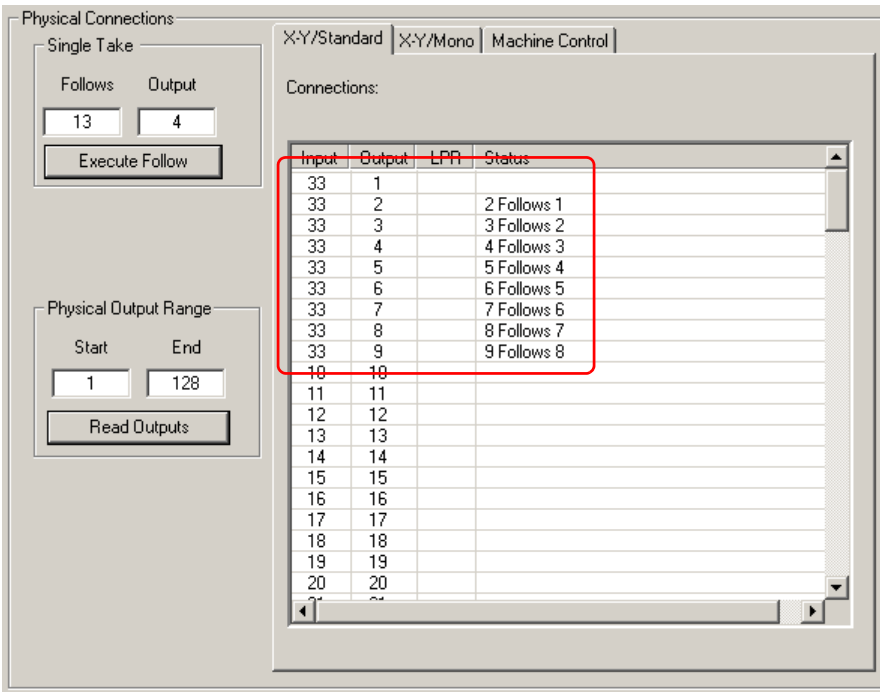


The 'Connections' window alters its appearance to support output-follow takes. For instance, the 'Input' field in the 'Single Take' section becomes the 'Follows' field.

3 Choose the 'Diagonal Take ...' command from the 'Actions' menu or choose 'Execute Diagonal Take' from the context menu:



Enter an initial "follows" number and a range of outputs and click 'Execute'. This is the result for the range specified above:



You can see that output N follows output $N-1$ where N ranges from 2 to 9. Because one follows the other in sequence, all of them follow output 1, which is the "follows" number you entered in the diagonal take dialog. Input 33 feeds output 1. Therefore input 33 feeds outputs 2–9 also.

Connections Window

Connections Window

10

EC9535

Chapter 10 discusses the EC9535 GSC Node Bus Converter.

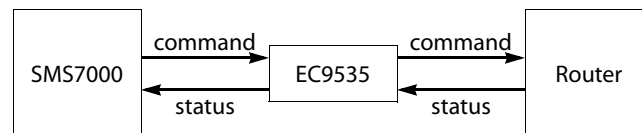
Topics

<i>Setting Up EC9535 Communication</i>	94
<i>Setting Up EC9535 Partitions</i>	95
<i>Setting Up EC9535 Switch Points</i>	97

The EC9535 GSC Node Bus Converter is a communications protocol converter designed to allow Miranda's NV8288, NV8288-Plus or NV8500 family routers (NV8144, NV8140, NV8280, NV8576, or NV8576-Plus) to communicate with an SMS7000 router control system.

To be used with an SMS7000 directly, a router must have (1) a GSC Node Bus connector and (2) a control card that follows the SMS7000 protocol. The NV8288, NV8288-Plus and the NV8500 family routers do not have these items.

The EC9535 provides the GSC Node Bus connector and the control cards that follow the SMS7000 protocol. The SMS7000 connects to the EC9535, which in turn, connects to the router:



The EC9535 interprets commands from the SM7000, sending equivalent commands to the router. It also interprets status messages from the router, returning their equivalent to the SMS7000.

Using UniConfig, you can configure the EC9535 so that the SMS7000, the EC9535, and the router can communicate.

Follow these broad steps to configure an EC9535. Details follow.

- 1 Set up communication between UniConfig and EC9535. See [Setting Up EC9535 Communication](#) on page 94.
- 2 If you intend to use an Ethernet connection to UniConfig, set up initial parameters so that UniConfig and EC9535 can communicate over Ethernet.
- 3 Set up the EC9535 partition. See [Setting Up EC9535 Partitions](#) on page 95.
- 4 Configure EC9535 switch points. See [Setting Up EC9535 Switch Points](#) on page 97.

For more information, especially regarding hardware connections, please refer to the *EC9535 GSC Node Bus Converter User's Guide*.

Setting Up EC9535 Communication

The control cards of the EC9535 can communicate with UniConfig either through diagnostic serial ports or over Ethernet.

Each control card has 2 diagnostic connectors, both DE9. One is at the front of the control card and the other is located at the rear of the EC9535, labeled 'DIAG'. You can use either one.

Each control card also has an Ethernet port.

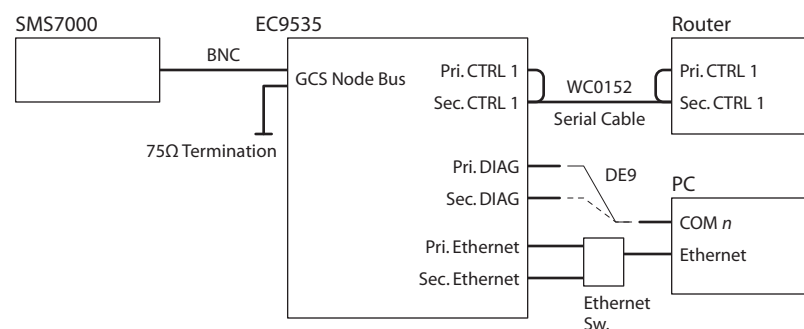
For the control card and UniConfig to communicate, the Ethernet or serial port must be initialized in UniConfig. The EC9535's IP address must be configured, initially, using a serial connection between UniConfig and the EC9535.

Note

Each control card in the EC9535 must be configured separately and identically.

Connections

This diagram shows the physical connections required the EC9535:



After you have made the physical connections between the EC9535 and the SMS7000 and between the EC9535 and the router, you can make a connection between UniConfig and the EC9535. This connection can either be serial or Ethernet.

The initial connection must be made to the diagnostic connector at the front of one of the EC9535's control cards. Using this connection, you can set up the control card's IP address and the Baud rate for its DIAG connector. If the EC9535 has a secondary control card, do the same for the secondary control card.

For details regard the initialization of the EC9535, see [Communicating with the Router for the First Time](#) on page 17.

EC9535 and Router Baud Rates

The Baud rates of the EC9535 and the router must match.

The EC9535's 'CTRL 1' serial port must be set to the same Baud rate as the router's 'CTRL 1' serial port rate. By default, the NV8288, NV8288-Plus and NV8500 family routers have the 'CTRL 1' ports set to 38,400 Baud. However, the number of destinations that can be switched per frame under SMS7000 is determined by the EC9535 and the router's Baud rates. You might want to set the serial ports at the highest available rate (115,200 Baud) unless doing so results in communication errors.

Follow these steps:

- 1 From the 'Window' menu, choose 'Router Serial Configuration'. The 'Router Serial Configuration' window appears:

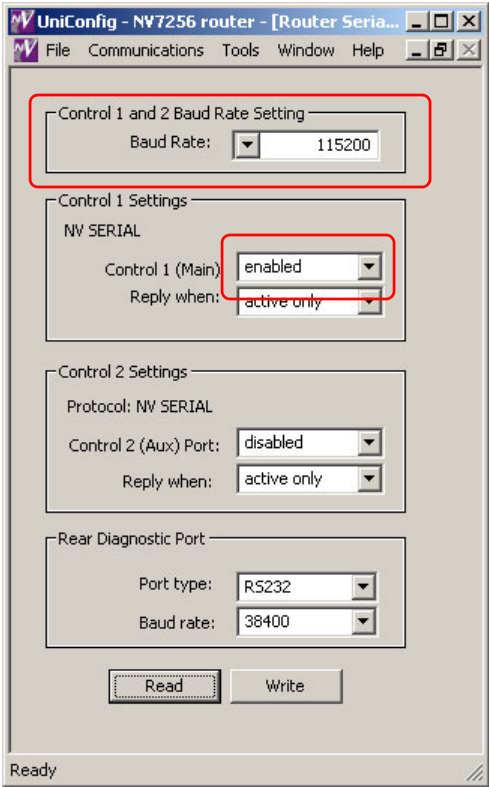


Fig. 10-1: Router Serial Configuration Window

- 2 Click **Read** to obtain the control card's current settings.
- 3 In the 'Control 1 and 2 Baud Rate Setting' section, select 115200 from the 'Baud Rate' drop-down list.
- 4 In the 'Control 1 Settings' section, choose 'enabled' in the 'Control 1 (Main)' field and 'active only' in the 'Reply When' field.
- 5 Ignore the 'Control 2' settings and the diagnostic settings.
- 6 Click **Write** to write changes to the control card, overwriting any previous settings.

Setting Up EC9535 Partitions

The EC9535 is allowed one partition. The partition data must support operation under the SMS7000 control system. (See [About Partitions](#) on page 27.)

How to Set Up Partitions for an EC9535

- 1 Select a control card.
- 2 From the 'Window' menu, choose 'Configuration'. The 'Configuration' window appears:

The screenshot shows the UniConfig Configuration window. At the top, there is a grid for partition configuration with columns for Level, Physical Inputs (Start, End), Controller Input (Start, End), Physical Outputs (Start, End), Controller Output (Start, End), and Signal Type. The first row is populated with: Level 0, Physical Inputs Start 1, End 1024, Controller Input Start 1, End 1024, Physical Outputs Start 1, End 1024, Controller Output Start 1, End 1024, and Signal Type 'Video, Async, AES, Timecode'. Below the grid is a 'Software Versions' table:

Name	Version	Part #	Rev	Description
* BOOT0	5.1.1.0	SV0443-05	C	PROM EM
* APP0	10.0.0.1	SV1002-10	A	9535 APP
* PLD0	1.0.0.0	SV0471-03	A	NV5128/E

Other settings panels include: Router Serial Port CTRL 1 Protocol: SMS7000; Router Ethernet Settings: Ethernet Control (Enabled), IP Address: 192.168.1.7, Subnet Mask: 255.255.255.0; and Control Card Bus: 10Base2. At the bottom are 'Read All' and 'Write All' buttons.

- 3 Click **Read All**. The 'Configuration' window populates with the current configuration and Ethernet settings. If no prior configuration is stored, many of the fields are blank.

- 4 Create a level.

To do so, enter 'Level', 'Physical Inputs', 'Controller Inputs', 'Physical Outputs' and 'Controller Output' information in the grid at the top of the window. Each row represents a level.

The EC9535 has only one partition. The level number must be 0 to be compatible with the requirements of the SMS7000.

The following is a list of the fields and the values you should enter (for an EC9535):

UniConfig Field	Description	Values
Level	Numeric value identifying the partition.	0
Physical Inputs	Starting and ending <i>physical</i> input connector numbers.	1–1024
Controller Input	Starting <i>logical</i> input connector number. The ending number is derived.	1
Physical Outputs	Starting and ending <i>physical</i> output connector numbers.	1–1024
Controller Output	Starting <i>logical</i> output connector number. The ending number is derived.	0
Signal Type	Acceptable signal types for the partition	'Video, Async, AES, Timecode'

These values are appropriate for the SMS7000 control system.

- 5 Click **Write All** to writes changes to the control card.
- 6 Repeat steps 1–5 for the other EC9535 control card.

Setting Up EC9535 Switch Points

A “switch point” is a point in time in which an output is switched from the current source to a new source. Different video formats require different switch points. UniConfig lets you set switch point parameters for individual outputs.

Important: in general, the video reference and AES reference on the EC9535 are *not used*. The reference signals that are applicable are those of the router that is connected to the EC9535. If you plan to connect reference signals to the EC9535, please contact [Grass Valley Technical Support](#) before proceeding.

Router outputs are managed through the ‘Switch Point Setup’ window.

For video reference signals, there are two connections labeled ‘VIDEO REF’. The two video reference connections can use the same signal or different signals. For audio reference, there are two connections labeled ‘AES REF’. One or both of these are connected to a stable 48 kHz AES source. If both AES references are connected, one is active and the other is a backup.

How to Make Switch Point Settings for the EC9535

- 1 Select a control card.
- 2 From the ‘Window’ menu, choose ‘Switch Point Setup’. The ‘Switch Point Setup’ window appears displaying current output settings for the EC9535:

Output	Re-clock/bypass	HD/SD	Ref1/Ref2
1	Re-clock	HD	Ref1
2	Re-clock	HD	Ref1
3	Re-clock	HD	Ref1
4	Re-clock	HD	Ref1
5	Re-clock	HD	Ref1
6	Re-clock	HD	Ref1
7	Re-clock	HD	Ref1
8	Re-clock	HD	Ref1
9	Re-clock	SD	Ref2
10	Re-clock	SD	Ref2
11	Re-clock	SD	Ref2
12	Re-clock	SD	Ref2
13	Re-clock	SD	Ref2
14	Re-clock	SD	Ref2
15	Re-clock	SD	Ref2
16	Bypass	HD	Ref1
17	Bypass	HD	Ref1
18	Bypass	HD	Ref1
19	Bypass	HD	Ref1
20	Bypass	HD	Ref1
21	Bypass	HD	Ref1
22	Bypass	HD	Ref1
23	Bypass	HD	Ref1
24	Bypass	HD	Ref1
25	Re-clock	HD	Ref1
26	Re-clock	HD	Ref1
27	Re-clock	HD	Ref1
28	Re-clock	HD	Ref1
29	Re-clock	HD	Ref1
30	Re-clock	HD	Ref1
31	Re-clock	HD	Ref1
32	Re-clock	HD	Ref1
33	Re-clock	HD	Ref1
34	Re-clock	HD	Ref1
35	Re-clock	HD	Ref1
36	Re-clock	HD	Ref1
37	Re-clock	HD	Ref1
38	Re-clock	HD	Ref1

- 3 In the 'Output Range' section, enter a 'Start' number of '1' and an 'End' number of '1024' and click **Read Outputs**. Outputs corresponding to the range entered display in the 'Select Outputs to edit' pane with default settings.

The following lists each column and the information it presents:

Column	Description
Output	The number of the output port.
Reclock/bypass	Specifies whether the router output bypasses re-clocking. See step 5.
HD/SD	Specifies whether the router output is SD or HD. See step 5.
Ref1/Ref2	Specifies whether the output uses 'VIDEO REF1' or 'VIDEO REF2' connection <i>on the router</i> . See step 5.

- 4 In the 'Select Outputs to edit' list, select any outputs being updated
To select specific outputs, use standard click, shift-click and control-click methods. Selected outputs are highlighted.
Or, to select all outputs, click 'Select All' in the 'Edit' menu.
Or, to clear all outputs currently displayed, click 'Remove All Outputs' in the 'Edit' menu.
- 5 In the 'Set selection(s) to' section, check the appropriate check boxes to apply switching parameters (video reference, bypass, and video format) for the outputs you have selected.

Note

Contact [Grass Valley Technical Support](#) before using an EC9535 video reference.

The following lists each check box and its function:

Check Box(es)	Description
Use Video Reference 1 Use Video Reference 2	Choose whether to use the 'VIDEO REF 1' or 'VIDEO REF 2' connection <i>on the router</i> as the reference. Either 'Ref1' or 'Ref2' appears in the 'Ref1/Ref2' column.
Use Reclocker Bypass Reclocker	Choose whether the router output should re-clock its signal or bypass the re-clocker, retaining the signal's current rate. Either 'Reclock' or 'Bypass' appears in the 'Reclock/Bypass' column.
Switch on SD Line Switch on HD Line	Choose 'Switch on SD Line' if the selected output is either SD or analog video. Choose 'Switch on HD Line' if the selected output is HD. Either 'SD' or 'HD' appears in the 'SD/HD' column.

- 6 In the 'Dual Video Reference Option' section, choose 'Redundant' or 'Dual'.

Note

Contact [Grass Valley Technical Support](#) before using an EC9535 video reference.

'Redundant' — Both 'VIDEO REF 1' and 'VIDEO REF 2' are used. If one fails, the other can be used as a fail-over. Both video reference signals should be identical in rate and format.

'Dual' — Choose which video reference signal to use, 'VIDEO REF1' or 'VIDEO REF 2'. In this instance, the reference signals can be different.

For information on dual or redundant references, see [Redundant v. Dual Video Reference](#) on page 47.

- 7 Click **Apply Changes to Selected Outputs**, or, in the 'Edit' menu, click 'Apply Changes' to apply your changes to the selected outputs. This does not write your changes to the control cards. The changes appear in the list of outputs.
- 8 Optionally, repeat steps 5–7 for other outputs that have different switching parameters.
- 9 Click **Write All**, or in the 'Edit' menu, click 'Write Changes' to write changes to the control card.
- 10 Repeat steps 1–9 for each control card being updated.

11 NV8500 Monitors

Chapter 11 Discusses input and output monitors for the NV8500 family routers and how UniConfig can be used to configure them.

Topics

<i>Monitor Overview</i>	101
<i>UniConfig Settings</i>	102
<i>Using the Monitor Level</i>	103

The NV8500 family of routers supports the monitoring of output and input signals. (Older routers support only output monitors.)

Your system will use third-party monitoring equipment to receive monitor signals from the router.

UniConfig is used to create a monitor level. Operators can then perform takes of either router inputs or router outputs to outputs on the monitor level.

NV8500 control cards running application versions 13.0.3.xx and older support *output* monitors only. NV8500 control cards running application versions 14.0.0.xx and newer support both input and output monitors.

To access and control monitor cards and monitor signals properly, a monitor level must be configured using either UniConfig v8.9.0.42, or later, or MRC.

Monitor Overview

The NV8500 family comprises the following routers:

Router	Switching Matrix	I/O Cards	Monitor Cards
NV8144	144 × 144	9 inputs, 18 outputs	1 (input and output)
NV8140	144 × 288	18 inputs, 18 outputs	none
NV8280	288 × 576	9 inputs, 18 outputs	2 (1 input, 1 output)
NV8576	576 × 1152	9 inputs, 18 outputs	4 (2 input, 2 output)
NV8576-Plus	576 × 576	9 inputs, 9 outputs	4 (2 input, 2 output)
Expanded NV8576-Plus	1152 × 1152 ¹	9 inputs, 9 outputs	8 (4 input, 4 output)

1. Two interconnected router frames

The NV8140 does not support monitoring.

For instructions on making connections to the monitor backplanes, please refer to the *NV8500 Family Routers User's Guide*.

UniConfig Settings

So that control panel operators and UniConfig users can access and control monitor signals, you must create a monitor level in UniConfig.

For the NV8280, NV8576, and NV8576-Plus, each output monitor backplane has two outputs. The outputs must come from different output cards.

For the NV8280, NV8576, and NV8576-Plus, each input monitor backplane also has two outputs. The outputs must come from different input cards.

The NV8144 has outputs for one output monitor and one input monitor. Therefore, the issue of multiple cards is not present.

Mapping to the Monitor Level

A monitor level, in UniConfig, is a partition having a maximum of 4 outputs:

Port	Description	NV8144	Other NV8500 routers
1	Output monitor 1	Used	Used
2	Output monitor 2	<i>Not used</i>	Used
3	Input monitor 1	Used	Used
4	Input monitor 2	<i>Not used</i>	Used

The NV8144 uses only the first and third ports of the partition.

The following shows how, for each router, the associated monitor backplane connectors, map to UniConfig Monitors on the Monitor Page, and to the ports on monitor Level:

Router	On Monitor Card	Partition Ports
NV8144	<i>Output Monitor</i>	Monitor 1
NV8144	<i>Input Monitor</i>	Monitor 3
NV8280, NV8576, NV8576-Plus	<i>Output Monitor 1</i>	Monitor 1
	<i>Output Monitor 2</i>	Monitor 2
NV8280, NV8576, NV8576-Plus	<i>Input Monitor 1</i>	Monitor 3
	<i>Input Monitor 2</i>	Monitor 4

How to Set Up a Monitor Level

- 1 Select a control card.
- 2 From the 'Window' menu, click 'Configuration'. The 'Configuration' window appears.
- 3 Click **Read All**. The 'Configuration' window populates with the control card's current configuration data. If no prior configuration is stored, many of the fields are blank.
- 4 On a blank row, in the 'Level' column, enter a unique number between 1 and 240. (You will also use this level number in the configuration of your router control system.)

5 Enter values for inputs and outputs for the level in the following fields.

For control cards having application version 13.0.3.xx and earlier, enter values selected from this table:

Router	Physical Input		Controller Input		Physical Output		Controller Output	
	Start	End	Start	End	Start	End	Start	End
NV8144	1	144	1	144	1	2	1	2
NV8280	1	576	1	576	1	2	1	2
NV8576, NV8576-Plus	1	1152	1	1152	1	2	1	2

For control cards having application version 14.0.0.xx and later, enter values selected from this table

Router	Physical Input		Controller Input		Physical Output		Controller Output	
	Start	End	Start	End	Start	End	Start	End
NV8144	1	144	1	144	1	4	1	4
NV8280/ NV8280-Plus	1	576	1	576	1	4	1	4
NV8576/ NV8576-Plus	1	1152	1	1152	1	4	1	4

▲ Note that controller 'End' values for input and output are derived. You cannot enter values in these fields (which are grayed out).

6 From the 'Signal Type' drop-down list, select the signal type 'Monitor'.

7 Click **Write All** to writes changes to the control card.

8 Repeat steps 1–7 for each control card in the router.

Using the Monitor Level

The control panel operator can switch signals to monitoring equipment if the router control system defines a monitor level that corresponds to the monitor level, in the router, that was defined in UniConfig.

Third-party control systems or software drivers can be used to control the monitoring of router inputs and outputs.

The ability to monitor NV8500 router inputs assumes that the control card in the router is running application version 14.0.0.xx and later (matching FPGA versions: CPLD, SV0900-07, SV0901-06 and newer).

NV8500 Monitors

NV8500 Monitors

12 Locks

Chapter 12 provides information about locks.

Under NV9000 family router control systems, router sources and destinations can be locked or protected. Operators at different control panels can set or clear those locks and “protects.”

Both inputs and outputs can be locked or protected “in the system controller.” Outputs, but not inputs, can also be locked or protected “in the router.” Refer to the *NV9000-SE Utilities User's Guide* for details.

UniConfig can release locks and protects that are set “in the router” but it cannot detect (or release) locks and protects that are set “in the system controller.”

Third-party router control systems might also provide a locking capability.

How to Remove Locks

- 1 Go to the ‘Connections’ window in UniConfig.
Having the ‘Connections’ window open enables certain commands in the ‘Actions’ menu.
- 2 Click ‘System > Clear > All Locks and Protects’ in the ‘Actions’ menu to release *all* locks.

13

Salvos

Chapter 13 discusses salvos.

Topics

<i>Introduction</i>	107
<i>Creating a Salvo</i>	110
<i>Building a Salvo</i>	111
<i>Salvo Management</i>	113
<i>Clearing a Salvo</i>	114

Introduction

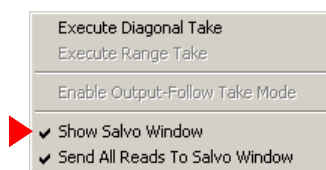
UniConfig's 'Configuration' window allows you to create, manipulate, and execute *salvos*. In UniConfig, a salvo is either (1) a "snapshot" of the currently displayed diagnostic crosspoint matrix or (2) a sequence of takes that you can define independently of the router's crosspoint matrix.

You can execute a salvo if it is displayed in the 'Connections' window. When you execute a salvo, UniConfig performs the takes that compose the salvo, in sequence. The takes occur in the crosspoint matrix of the router immediately.

You can also save salvos in your computer's file system and load them from your file system.

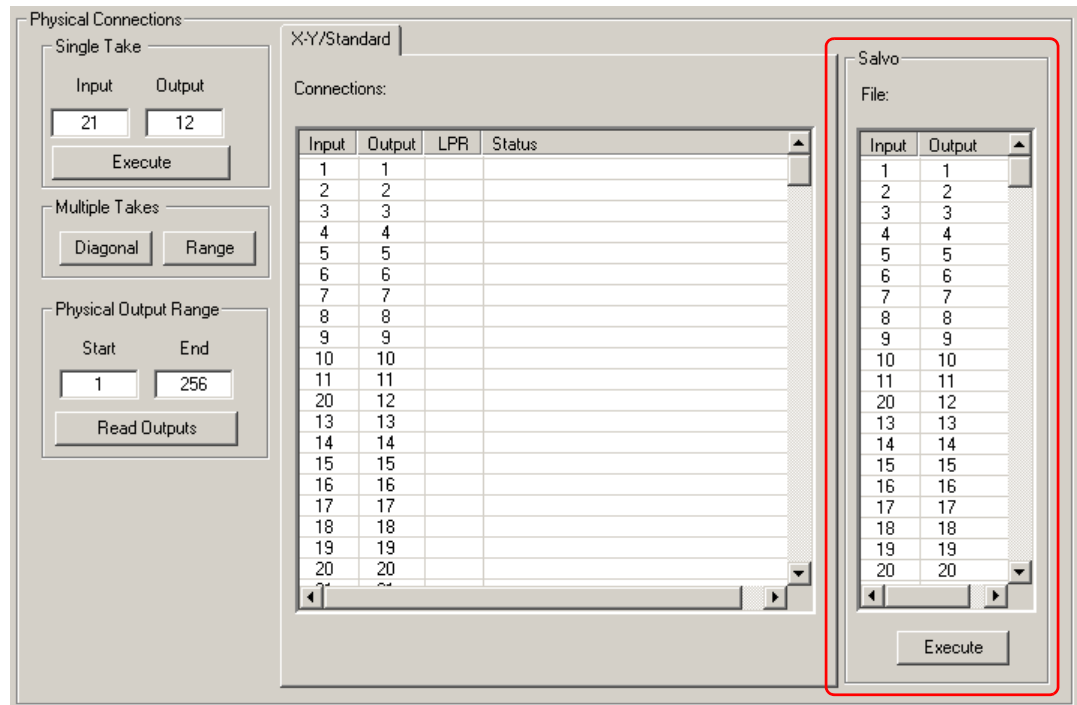
A salvo can be used to reset a crosspoint to a known state after a system failure.

The use of salvos is an option of the 'Connections' window that you can enable or disable. To enable salvos, click 'Show Salvo Window' in the context menu of the 'Connections' window:



The command is also available in the dialog that appears when you choose the 'Options' command from the 'Tools' menu.

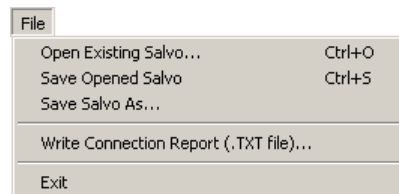
When salvos are enabled, the 'Connections' window has an additional salvo pane:



If you check the 'Send All Reads to the Salvo Window' option in the context menu, UniConfig will transfer the contents of the diagnostics crosspoint list to the salvo window every time you click the 'Read Outputs' button.

- ▲ If you have checked 'Auto Refresh After Take' in the 'Connection Options' dialog, the window automatically reads the output range specified and refreshes the display. Thus, the effects of single takes, range takes, and diagonal takes you have performed appear in the salvo automatically.

Using the 'Actions' menu, you can issue commands to edit the salvo in the salvo pane directly. When you have the 'Connections' window open, with salvos enabled, the 'File' menu provides commands related to salvos:



(Salvo files and connection reports are all text files that can be opened in NotePad, WordPad, and other PC applications. The default file extension for salvos is .svo. The default file extension for report files is .txt.)

These are the commands:

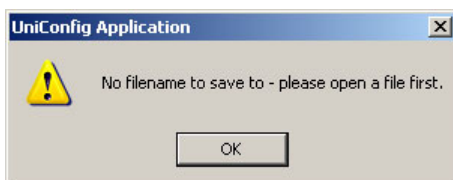
- Open existing salvo . . .

This command produces a dialog in which you can browse your PC's file system to locate and open a salvo file. The salvo in the file is copied to the salvo pane of the 'Connections' window.

If the salvo pane is not displayed, it becomes displayed when you open the salvo file.

- Save opened salvo . . .

If you have not opened a salvo file, this command will show an error message:



The command saves the salvo, in its current state, to the file that you had opened.

- Save salvo as . . .

Use this command to save the current salvo if you have not opened a salvo file.

This command produces a dialog in which you can browse your PC's file system to find a folder in which to save a salvo, create a name for the salvo file, and save the salvo. The salvo that is saved is the one in the salvo pane of the 'Connections' window.

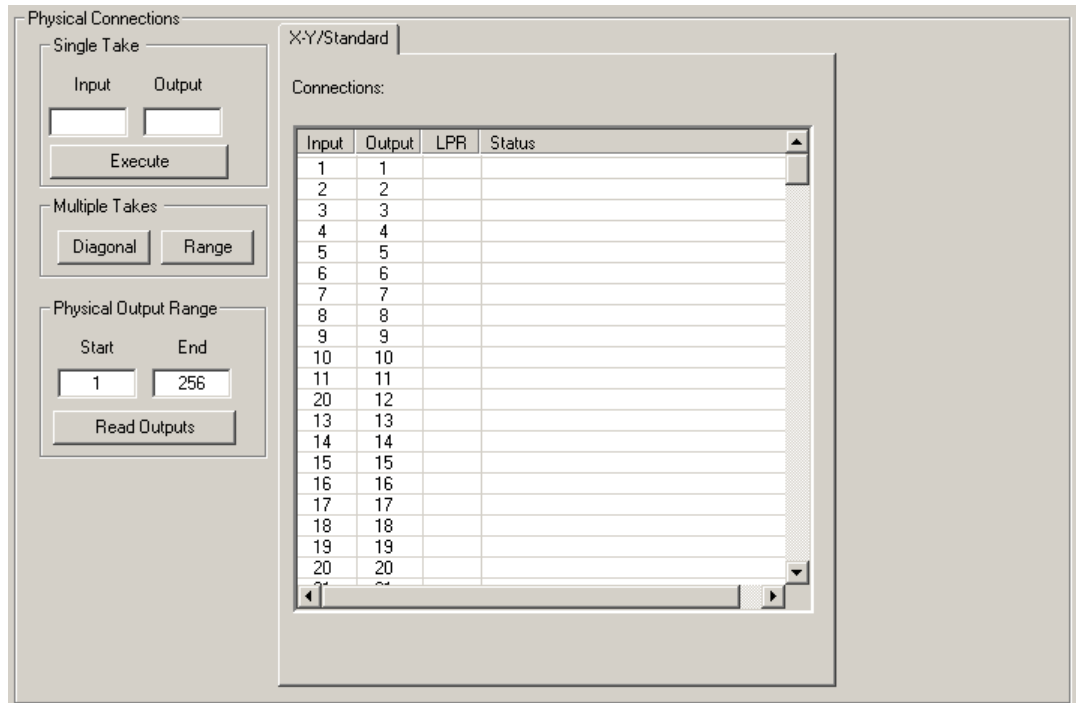
See [Writing Connections Reports](#) on page 70 for information about the 'Write connection report (.txt file) . . .' command.

Creating a Salvo

You can create a salvo by opening a salvo pane in the 'Connections' window. Follow these steps:

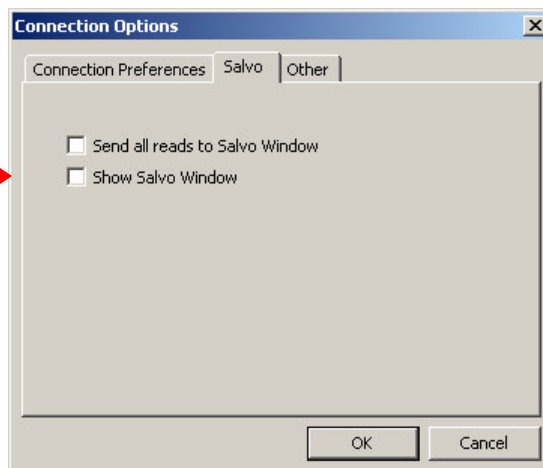
How to Create a Salvo

- 1 From the 'Window' menu, choose 'Connections'. The 'Connections' window appears:



Note that the 'Connections' window must be active if you are to use salvo commands.

- 2 From the 'Tools' menu, choose 'Options'. The 'Connection Options' dialog appears:



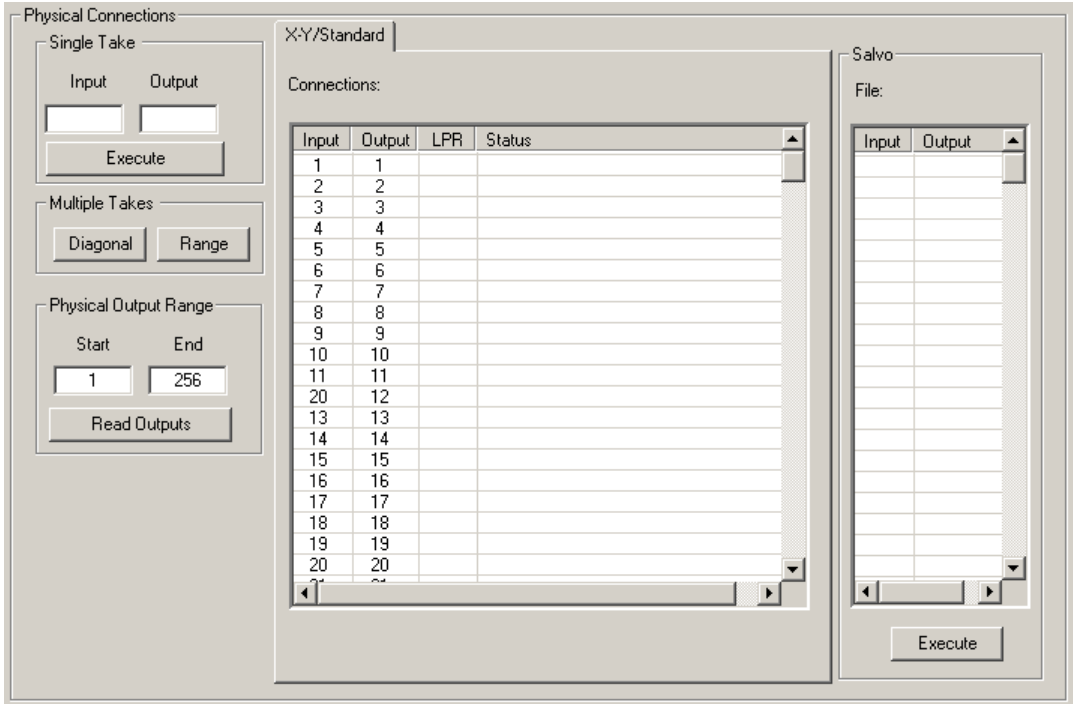
Select the 'Salvo' tab.

Check 'Show Salvo Window' to cause the 'Connections' window to display its salvo pane.

Check 'Send all reads to Salvo Window' to have cause the 'Connections' window to display data that are the result of a read or a take in the salvo pane.

Click 'OK' to dismiss the dialog and retain its settings.

When you have opted to "show salvo window," the salvo pane appears in the 'Connections' window:



The salvo pane, freshly created, is empty.

Building a Salvo

There are 3 ways to build a salvo:

- Read outputs from the router (if you have enabled 'Send reads to the Salvo Window').
- Add takes to the salvo.
- Edit individual takes in the salvo.

Reading Outputs from the Router

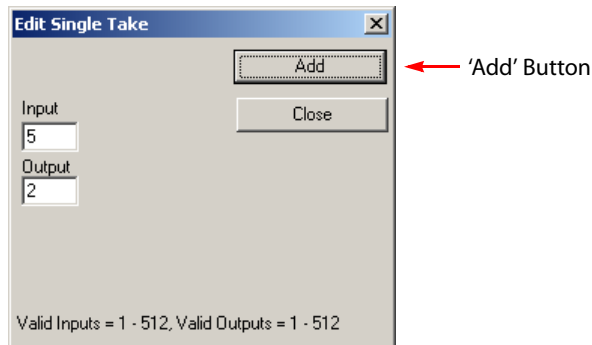
- 1 Go to the 'Connections' window and turn on the salvo pane if you have not done so.
- 2 Also enable 'Send reads to the Salvo Window' if you have not done so.
You can use the 'Connection Options' dialog to do this or you can check the 'Send reads to the Salvo Window' option of the 'Connections' window's context menu.
- 3 In the 'Connections' window, specify a range of outputs and click **Read Outputs**.
The outputs, with the inputs currently routed to them, are transferred to the salvo pane.

Adding Individual Takes

You can append individual takes to the salvo using the 'Add Single Take' command of the 'Actions' menu.

How to Add Individual Takes

- 1 Go to the 'Connections' window and turn on the salvo pane if you have not done so.
- 2 From the 'Actions' menu, choose 'Edit/Change Salvo > Add Single Take'. A dialog appears:



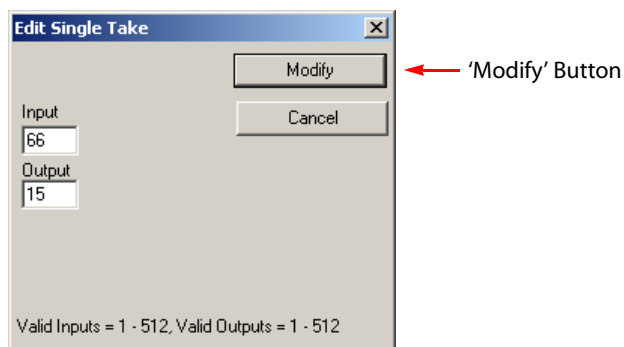
- 3 Enter an 'Input' number and an 'Output' number in the fields provided.
- 4 Click **Add**. The take you specified is appended to the salvo. (It appears at the end of the list of takes in the salvo, increasing the number of takes in the salvo by one.)
- 5 Repeat steps 3 and 4 until you have added the individual takes you wanted.
- 6 The dialog does not automatically close when you add a take. When you have finished, click **Close** to dismiss the dialog.

Modifying Individual Takes Within a Salvo

You can modify any take in a salvo.

How to Modify Individual Takes

- 1 Go to the 'Connections' window and turn on the salvo pane if you have not done so.
- 2 Select a take in the salvo. (You can select only one.)
- 3 From the 'Actions' menu, choose 'Edit/Change Salvo > Modify Single Take'. A dialog appears:



- 4 Enter an 'Input' number and an 'Output' number in the fields provided.

- 5 Click **Modify**. The take you selected is modified accordingly, in its place in the salvo.
Both the input and the output of the take can be changed. You can leave either one as it was.
After you click **Modify**, the dialog closes.
- 6 Repeat steps 2–5 until you have modified the individual takes you wanted to modify.

Salvo Management

Saving a New Salvo

- 1 Ensure that the 'Connections' window is active.
- 2 From the 'File' menu, choose 'Save Salvo As . . .' A dialog appears.
- 3 Click **Browse** in the dialog, then specify a folder and file name for the salvo.
- 4 Click **Save**.

Saving an Existing Salvo

If you have opened a salvo (that exists in your PC's file system), you can re-save the (possibly modified) salvo.

- 1 Ensure that the 'Connections' window is active.
- 2 From the 'File' menu, choose 'Save Opened Salvo'.
- 3 No further action is necessary.

Opening a Salvo

You can open salvo files at any time. When you open the file, the file's contents appears in the salvo window.

- ▲ If the file you open is not a salvo or the contents of the salvo file have been modified improperly, UniConfig will that the file is invalid.
- ▲ Be sure that the salvo you are opening contains the set of takes you want.

How to Open and Upload a Salvo

- 1 Go to the 'Connections' window.
- 2 From the 'File' menu, choose 'Open Existing Salvo'. A dialog appears.
- 3 Click **Browse** and navigate to the folder that contains the file.
- 4 Select the file and click **Open**.
The takes in the file appear in the salvo pane.
- 5 Optionally, click **Execute** in the salvo pane to execute the salvo (i.e., perform the takes in the salvo). The takes affect the router's crosspoint directly.

Clearing a Salvo

You can clear the current salvo. Clearing means removing all the takes from the salvo.

How to Clear a Salvo

The 'Connections' window must be active and a salvo must be displayed.

From 'Actions' menu, choose 'Edit/Change Salvo > Clear Salvo'. All takes are removed from the current salvo.

14

Firmware

Chapter 14 discusses control card firmware.

Topics

<i>Viewing Control Card Firmware</i>	115
<i>Uploading a Firmware File</i>	118
<i>Using Flash Configuration Files</i>	119

Using UniConfig, you can identify and update the firmware used by a router's control card. Firmware is stored in flash memory on the control card.

▲ In contrast, *configuration data* are stored in EEPROM associated with the control card.

For information on compatible control card firmware, contact [Grass Valley Technical Support](#).

Firmware files are listed either as an 'APP' or a 'PLD' in the 'Configuration' window.

Viewing Control Card Firmware

The firmware files currently loaded on a control card are listed in the 'Configuration' window. There are two settings for viewing: basic or expanded. The difference is that the software description fields are blank in the basic view and contain information in the expanded view.

How to View the Software List Using the 'Basic' Setting

- 1 Select a control card.
- 2 From the 'Window' menu, choose 'Configuration'. The 'Configuration' window appears:

Asterisks indicate files currently in use

Level	Physical Inputs Start	Physical Inputs End	Controller Input Start	Controller Input End	Physical Outputs Start	Physical Outputs End	Controller Output Start	Controller Output End	Signal Type
1	1	128	1	128	1	128	1	128	Async AES

Software Versions:				
Name	Version	Part #	Rev	Description
* BOOT0	0.0.0.0	SV0443-05	X	
APP0	12.0....	SV0518-16	X	
APP1	11.0....	SV0519-11	A	
APP2	11.0....	SV0522-11	A	
* APP3	11.0....	SV0520-11	A	
APP4	10.0....	SV1002-10	A	
PLD0	1.0.0.0	SV0351-00	A	
* PLD1	1.0.0.0	SV0337-01	B0	

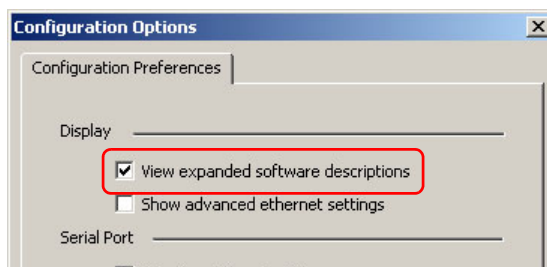
(* signifies software in use)

Read All Write All

- 3 Click **Read All**. Identifiers for currently loaded software appear in the 'Software Versions' section.

How to View the Software List Using the 'Expanded' Setting

- 1 Go to the 'Configuration' window.
- 2 From the 'Tools' menu, choose 'Options'. The 'Configuration Options' dialog appears:



- 3 Check the 'View expanded software descriptions' check box. By default, this box is not checked.
- 4 Click **OK** to save changes and close the dialog box.
Or, click **Cancel** to close the dialog box without saving changes.
- 1 Select a control card.
- 2 Click **Read All**. Current configuration settings for the selected control card populate the 'Configuration' window fields.

The 'Configuration' window displays full descriptions in the 'Description' column in the 'Software Versions' section:

The screenshot shows the UniConfig Configuration window. At the top, there is a table for hardware configuration:

Level	Physical Inputs		Controller Input		Physical Outputs		Controller Output		Signal Type
	Start	End	Start	End	Start	End	Start	End	
1	1	128	1	128	1	128	1	128	Async AES

Below the table is a 'Software Versions' section with a scrollable list:

Description
PROM EM0529 BOOT T2.2 Nov 17 2005 11:04:19
5128 APP T2.2-NV Mar 9 2012 11:17:48
5256 APP T2.2-NV Apr 23 2010 11:12:56
7256 APP T2.2-NV Apr 23 2010 11:17:24
7512 APP T2.2-NV Apr 23 2010 11:19:38
9535 APP T2.2-SMS7000 Sep 8 2009 16:10:58
8256/8256Plus, UNICON 99 Xilinx
NV5128/5256 NV7256/7512/7300 UNICON 99 Xilinx

Other configuration sections include:

- Expansion Configuration:** Radio buttons for Main - Standalone (selected), Main - Expanded, and Slave - Expanded.
- Router Serial Port CTRL 1 Protocol:** NV SERIAL.
- Router Ethernet Settings:** Ethernet Control (Enabled selected), IP Address (192 . 168 . 1 . 10), Subnet Mask (255 . 255 . 255 . 0).
- Control Card Bus:** Radio buttons for 10Base2 (selected) and Internal.

At the bottom, there are 'Read All' and 'Write All' buttons, and a note: (* signifies software in use).

To view the full text of a description, move the scroll bar at the bottom of the 'Software Versions' section.

Uploading a Firmware File

Firmware is saved in flash memory on the control card.

How to Upload New Firmware

- 1 Select a control card.
- 2 From the 'Window' menu, choose 'Configuration'. The 'Configuration' window appears:

The screenshot shows a configuration window with several sections:

- Partitions 1-4:** A table with columns for Level, Physical Inputs (Start, End), Controller Input (Start, End), Physical Outputs (Start, End), Controller Output (Start, End), and Signal Type. The first two rows are populated with values.
- Software Versions:** A table with columns for Name, Version, Part #, Rev, and Description. It lists three entries: BOOT0, APP0, and PLD0, each marked with an asterisk to indicate they are in use.
- Router Serial Port CTRL 1 Protocol:** A dropdown menu set to 'NV SERIAL'.
- Router Ethernet Settings:** Includes radio buttons for 'Enabled' (selected) and 'Disabled', and input fields for IP Address (192.168.1.5) and Subnet Mask (255.255.255.0).
- Control Card Bus:** Radio buttons for '10Base2' (selected) and 'Internal'.
- Buttons:** 'Read All' and 'Write All' buttons at the bottom.

- 3 Click **Read All**. The 'Configuration' window populates with current router information. The 'Software Versions' section shows all firmware files currently being used by the control card.
- 4 Make a note of the part number (SVxxxx-xx) of the file(s) you want to replace.
 - ▲ If you do not have the firmware files, you might have to request the files, by part number, from Miranda. (Firmware files have the extension .mx.)

5 From the 'Window' menu, choose 'Flash Memory'. The 'Flash Memory' window appears:

APP0	C:\TEST\SV0518-11A-NV5128.mx	Browse...	
APP1		Browse...	
APP2		Browse...	
APP3		Browse...	
APP4		Browse...	
APP5		Browse...	
PLD0		Browse...	
PLD1	C:\TEST\SV047206.mx	Browse...	
PLD2		Browse...	

Write Flash Status: _____

6 In the row corresponding to the firmware file you want to replace, (e.g., 'APP0'), click **Browse** and navigate to the location in your PC's file system of the new firmware file. Click **Open**.

The pathname of the firmware file appears in the row of the 'Flash Memory' window.

7 Repeat step 6 for additional firmware files that you want to update.

8 Click **Write Flash**. The 'Status' bar at the bottom of the window indicates the progress of the upload.

9 Again, from the 'Window' menu, choose 'Configuration'. The 'Software Versions' section of the window lists the new firmware.

10 Repeat steps 1–9 for each control card being updated.

Using Flash Configuration Files

The 'Flash Window' offers you a shortcut. You can save the names of the firmware files you use in a file. Then you can load the names back into the flash window rather than entering the file names by hand. This can save time if you have multiple control cards to configure.

The file extension for the name list is .flashcfg and the files are called flash configuration files.

To Save a Flash Configuration File

- 1 Populate the 'Flash Memory' window with the firmware files you want to use.
- 2 From the 'File' menu, choose 'Save As Flash Configuration File' to save the firmware file name(s) locally on your PC. A dialog appears in which you can browse to locate and name the .flashcfg file.

To Read a Flash Configuration File

From the 'File' menu, choose 'Read From Flash Configuration File' to read the firmware file name(s) from the file on your PC. A dialog appears in which you can browse to locate the .flashcfg file.

Reading the file restores the saved pathnames to the 'Flash Memory' page.

15

System Status

Chapter 15 discusses the 'System Status' window.

Viewing System Status

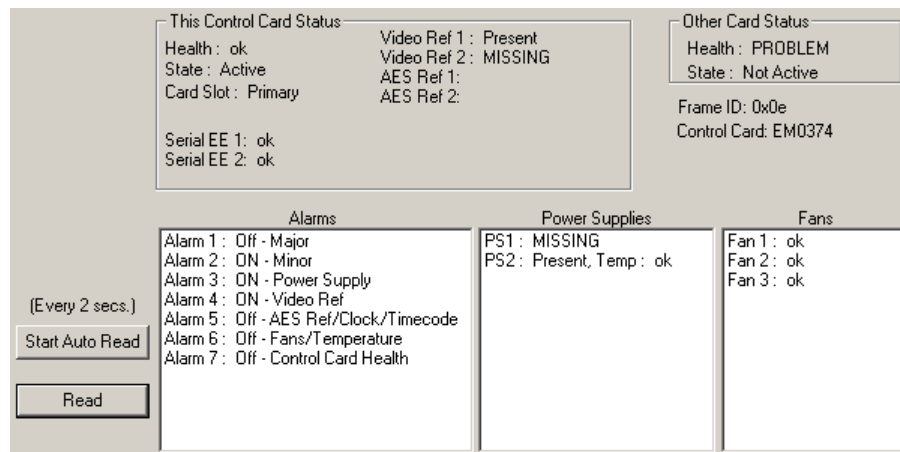
UniConfig's 'System Status' window displays the state of the router's power supplies, video and audio references, fans, and other components.

To view system status, you must have an Ethernet connection between the router's control card and UniConfig.

When the 'System Status' window is displayed, you can perform certain functions, using the 'Actions' menu, that affect the router. See [Performing System Tasks](#) on page 122.

How to View System Status

- 1 From the 'Window' menu, choose 'System Status'. The 'System Status' window appears:



This illustration is a sample for the NV5128. The details for other routers differ slightly.

- 2 Click **Read** to view the router's current status. The 'This Control Card Status' section displays the "health" of the reference connections and the control card to which UniConfig is connected. The 'Other Card Status' section displays the "health" of the other control card—if present—in the router frame.
- 3 Alarm, power supply, and fan status appear in the sections at the bottom of the window.
- 4 (Optionally) click **Start Auto Read** to have UniConfig automatically read and display system status every two seconds.

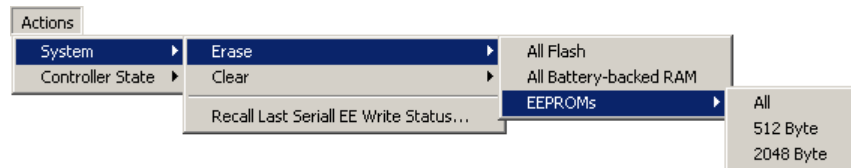
If you click **Start Auto Read**, the button legend changes to **Stop**. Click the button again to stop the automatic reads. When you click the button the second time, the legend again changes—to **Auto Upload**. This has the same meaning as **Start Auto Read**.

Performing System Tasks

When the 'System Status' window is active, the 'Actions' menu provides several commands. From the 'Actions' menu, choose either 'System' or 'Controller State' and then follow the submenus to select an option.

Following are the menu options.

System > Erase

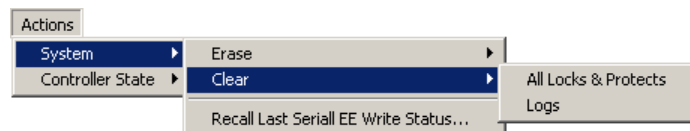


▲ Do *not* perform this operation unless directed to do so by a Grass Valley support engineer.

There are 3 options and a few sub-options:

- 'All Flash' — erases the entire flash memory, including all firmware.
- 'All Battery-Backed RAM' — erases the contents of battery-backed RAM.
- 'EEPROMS' — select either 'All', '512 Byte' or '2048 Byte'. This option erases the selected EEPROM(s).

System > Clear

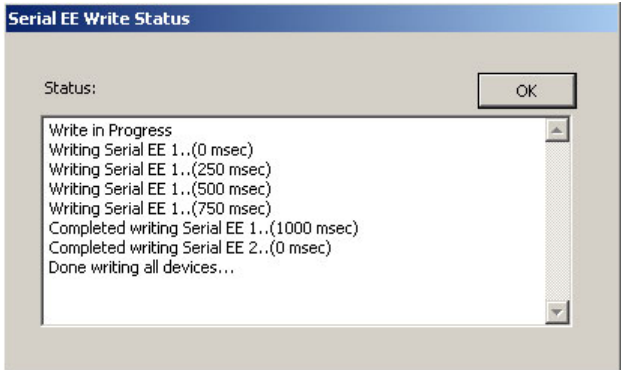


There are two options:

- 'All Locks and Protects' — releases *all* locks and protects that have been applied in the router control system. See [Locks](#) on page 105.
- 'Logs' — erases the log file.

System > Recall Last Serial EE Write Status

This is a diagnostic command. Choose this command to display the 'Serial EE Write Status' window:



The command takes no options. The display will be empty if you have not recently written to the control card's EEPROM.

Controller State > Other Controller

The word "controller" in this command means *control card*.



Note: If a secondary control card is not installed, the word 'Offline' appears.

There are two options:

- 'Hold Offline' — places, and retains, the secondary control card off-line.
- 'Release Offline' — places the secondary control card online.

Controller State > This Controller

The word "controller" in this command means *control card*.



There are 3 options:

'Offline' — forces this control card (the one with which UniConfig is communicating) off-line. (The other control card, if present, becomes active.)

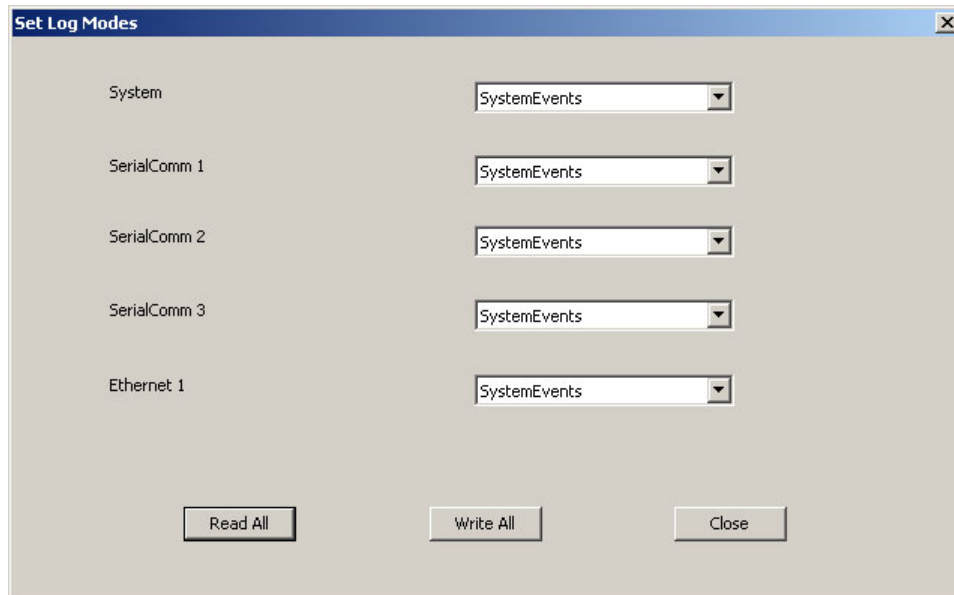
'Standby' — places this control card in standby mode. (The other control card, if present, becomes active.)

'Reset' — resets this control card.

Logging Modes

You can set the logging levels for several components of the router.

Click the 'Set Log Modes' button to set the logging level for system events, serial control events, and Ethernet control events. The 'Set Log Modes' dialog initially does not show the logging levels. Click the 'Read All' button to obtain the current logging levels in the current MCPM. The 'Set Log Modes' dialog appears:



The 5 router event categories are

- System
- Serial Comm 1, 2, 3
- Ethernet 1

For each of these components, you can choose a logging level, which controls when events are logged and with what kind of detail. These are the 7 logging levels, in increasing levels of severity and detail:

None	Log no events.
Errors	Log only errors.
Warnings	Log warnings and errors.
System events	Log warnings, errors, and system-level events.
Transactions	Log warnings, errors, system events, and all messages between system components.
All events	Log all events.
Debug	Log all events and provide debugging information.

All event categories are recorded in the same log, in order of occurrence.

If you change any of the logging levels, click 'Write All' to send the change to the control card. Click 'Close' to return to the 'Logs' page.

Operations

When you open the 'Logs' window, it is initially empty. Click the 'Read Logs' button to cause UniConfig to display the logs.

There are a few other buttons of interest:

- Save Logs to File . . .

Click this button to save the router's log to a file in your PC's file system. A dialog appears in which you can specify a location and a name for the file.

- Clear Log

Click this button to erase the log file in the router's control card. (The 'Logs' window also becomes empty.)

- Clear Display

Click this button to clear the 'Logs' window. The operation does not affect the log files in the router's control card.

17

Technical Details

Chapter 17 provides supplementary, but important, information about NVISION series routers and router architecture. Also provided are tips and techniques for creating mono and stereo partitions in UniConfig and in NV9000-SE Utilities.

Topics

<i>Router Expansion</i>	129
<i>Connectors</i>	132
<i>Mono and Stereo Configuration Methods</i>	132

Router Expansion

The following table lists the number of router frames and sizes for expanded routers:

Router	Number of Frames That Can be Connected
NV5256-Plus	2 frames at 256 ports each, resulting in 512x512 router
NV7256-Plus	2, 3, or 4 frames, 256 x 256 each, resulting in a 512x512, 768x768, or 1024x1024 router (1024x1024, 1536x1536, or 2048x2048 mono)
NV7512-Plus	2, 3, or 4 frames, 512 x 512 each, resulting in a 1024x1024, 1536x1536, or 2048x2048 router (2048x2048, 3072x3072, or 4096x4096 mono)
NV8256-Plus	2, 3, or 4 frames, 256 x 256 each, resulting in a 512x512, 768x768, or 1024x1024 router
NV8288-Plus	2 frames, 288x288 each, resulting in a 576x576 router
NV8576-Plus	2 frames, 576x576 each, resulting in an 1152x1152 router

Other NVISION series routers are not expanded and do not support expansion.

Expansion Configuration Settings

Listed here are the maximum values you can use in the 'Expansion Configuration' section of the 'Configuration' window.

The general idea for expansion settings is that each frame of an expanded router (1) receives inputs from all frames, i.e., receives *all* inputs and (2) produces its individual range of outputs.

NV5256 (Expanded)

The expanded NV5256 has a 512 x 512 matrix, as if it were two 512x256 routers. The values for the 'Expansion Configuration' section that give maximal range are:

	Main		Slave	
	Input	Output	Input	Output
Start	1	1	1	257
End	512	256	512	512

NV7256-Plus

The NV7256-Plus can be configured with 1, 2, 3, or 4 frames and its maximal matrix grows linearly with the number of frames: 256×256, 512×512, 768×768, or 1024×1024. Its architecture is the same as if it were 1, 2, 3, or 4 *nnn*×256 routers, where *nnn* is 256, 512, 768, or 1024. The values for the 'Expansion Configuration' section that give maximal range are:

Frames		Main		Slave1		Slave2		Slave3	
		In	Out	In	Out				
2	Start	1	1	1	257				
	End	512	256	512	512				
3	Start	1	1	1	257	1	513		
	End	768	256	768	512	768	768		
4	Start	1	1	1	257	1	513	1	769
	End	1024	256	1024	512	1024	768	1024	1024

The matrix sizes given represent stereo I/O. These can also be routed as up to 2048×2048 mono signals.

NV7512-Plus

The NV7512-Plus can be configured with 1, 2, 3, or 4 frames and its maximal matrix grows linearly with the number of frames: 512×512, 1024×1024, 1536×1536, or 2048×2048. Its architecture is the same as if it were 1, 2, 3, or 4 *nnn*×512 routers, where *nnn* is 512, 1024, 1536, or 2048. The values for the 'Expansion Configuration' section that give maximal range are:

Frames		Main		Slave1		Slave2		Slave3	
		In	Out	In	Out				
2	Start	1	1	1	513				
	End	1024	512	1024	1024				
3	Start	1	1	1	513	1	1025		
	End	1536	512	1536	1024	1536	1536		
4	Start	1	1	1	513	1	1025	1	1537
	End	2048	512	2048	1024	2048	1536	2048	2048

The matrix sizes given represent stereo I/O. These can also be routed as up to 4096×4096 mono signals.

NV8256-Plus

The NV8256-Plus can be configured with 1, 2, 3, or 4 frames and its maximal matrix grows linearly with the number of frames: 256×256, 512×512, 768×768, or 1024×1024. Its architecture is the same as if it were 1, 2, 3, or 4 *nnn*×256 routers, where *nnn* is 256, 512, 768, or 1024. The values for the 'Expansion Configuration' section that give maximal range are:

Frames		Main		Slave1		Slave2		Slave3	
		In	Out	In	Out				
2	Start	1	1	1	257				
	End	512	256	512	512				
3	Start	1	1	1	257	1	513		
	End	768	256	768	512	768	768		
4	Start	1	1	1	257	1	513	1	769
	End	1024	256	1024	512	1024	768	1024	1024

NV8288-Plus

The NV8288-Plus has a matrix up to 576 x 576. Its architecture is the same as if it were two 576×288 routers. The values for the 'Expansion Configuration' section that give maximal range are:

	Main		Slave	
	Input	Output	Input	Output
Start	1	1	1	289
End	576	288	576	576

NV8576-Plus

The *expanded* NV8576-Plus has a matrix up to 1152 x 1152. Its architecture is the same as if it were two 1152×576 routers. The values for the 'Expansion Configuration' section that give maximal range are:

	Main		Slave	
	Input	Output	Input	Output
Start	1	1	1	577
End	1152	576	1152	1152

Connectors

The following table shows the pinout for the DE9 connectors (RS-232) at the front of EM0374 control cards:

PC End	Pin	Router End
DCD	1	Ground
RXD	2	TXD
TXD	3	RXD
DTR	4	DSR
Signal Ground	5	Signal Ground
DSR	6	DTR
RTS	7	CTS
CTS	8	RTS
Ground	9	Ground

The same pinout applies to the DE9 connectors (RS-232) at the rear of the NV8288 and NV8288-Plus router (which use EM0529 control cards).

Mono and Stereo Configuration Methods

These methods are for NV9000 systems. We cannot address third-party router control systems.

Method 1

Problem: how do you configure an input or output to be both stereo and mono?

In UniConfig, create 2 overlapping partitions: one for stereo and one for mono. (The stereo partition and the mono partition use the same physical ports.)

In the NV9000 configuration, create two sets of devices, one for use as stereo, and one or use as mono. Both sets of devices refer to the same ports, but in a different way.

Method 1 Details

In UniConfig

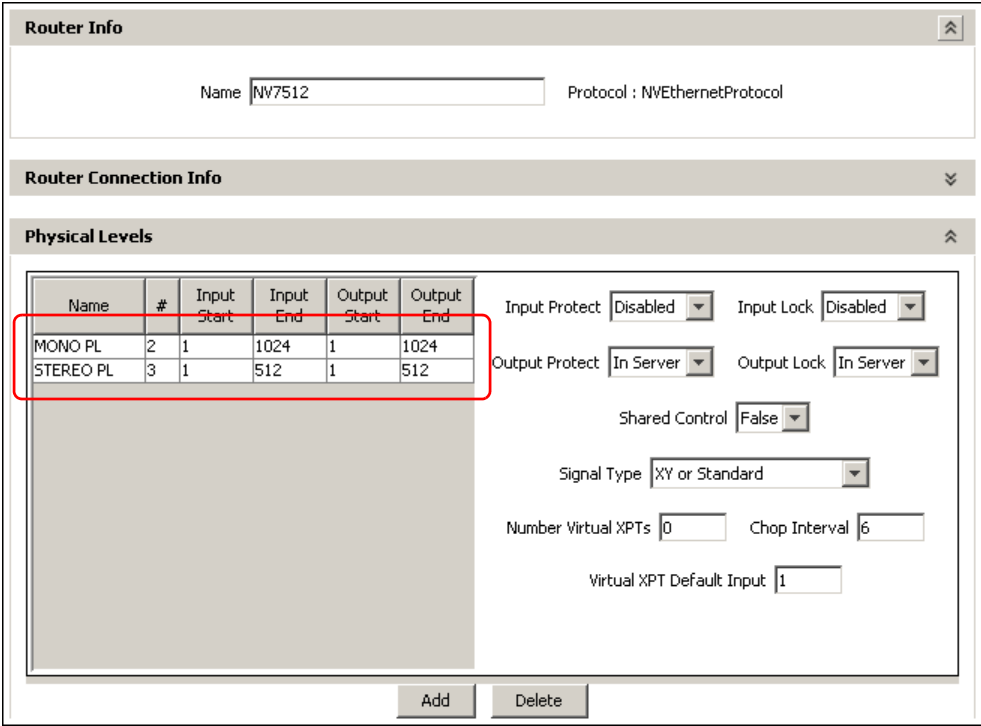
Create 2 overlapping partitions, one for stereo and one for mono. This is an example for the NV7512:

Level	Physical Inputs		Controller Input		Physical Outputs		Controller Output		Signal Type
	Start	End	Start	End	Start	End	Start	End	
2	1	512	1	1024	1	512	1	1024	Mono AES, Analog Audio
3	1	512	1	512	1	512	1	512	Sync AES, Analog Audio

Here we have 512 connectors supporting 512 stereo signals or 1024 mono channels. Here we chose levels 2 and 3 because, in the NV9000 system of this example, level 1 is for the HD router.

In NV9000-SE Utilities

1 Define the audio router and its two physical levels so that they match UniConfig:



(In this NV9000 configuration, an HD router was also defined, but it is not shown.)

2 Create virtual levels if none available have suitable names. In this configuration, we created two: "AES" for stereo and "MONO" for mono:

27	27	AUDIO 14
28	28	AUDIO 15
29	29	AUDIO 16
30	30	R5422
31	31	TIMECODE
32	32	MONO
33	33	AES

Virtual Level Table 1

48	AUDIO 14	AES Mono
49	AUDIO 15	AES Mono
50	AUDIO 16	AES Mono
51	MONO	AES Mono
52	AES	AES/EBU

Virtual Level Bindings Table 2

It is a 2-step process. First add the virtual levels to the virtual level table. Then, assign a signal type to the virtual level in the virtual level bindings table. The signal types are 'AES/EBU' (stereo) and 'AES mono'.

3 Create level sets: one for stereo and one for mono:

Display Index	Virtual Level	Physical Level	Free Source
1	HD	HD PL	
2	AES	STEREO PL	
3			
4			
5			

Display Index	Virtual Level	Physical Level	Free Source
1	HD	HD PL	
2	MONO	MONO PL	
3			
4			
5			

Stereo

Mono

The level sets includes the video level. The virtual levels map to the physical levels you defined for the router(s). The physical levels match what you defined in UniConfig.

4 Create devices for the stereo level set, input and output. Here we show the steps to create the stereo input devices. Creating output devices follows the same pattern.

In the tasks pane, click 'Add Multiple Devices'. The first of 3 windows appears:

Add Multiple Devices ✕

Fields labeled in red are required.

Prefix:

Description:

Suffix Start Value:

Fill Character:

Number of Devices:

Suffix Width:

LevelSet:

First Device Mnemonic:

Last Device Mnemonic:

This window defines the names of the devices and more importantly the level set to which the devices belong (stereo).

Fill in the appropriate values and click 'Next'. The second window appears:

Level	Max		Create		Start		Increment	
	Input	Output	Input	Output	Input	Output	Input	Output
HD	256	256	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	1	1	1
AES	512	512	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	1	1	1

Because we are defining input devices, we must uncheck both output check boxes and ignore the other columns labeled 'Output'. (If the devices we are creating were bidirectional, we would not ignore the outputs.)

For stereo, the inputs will start at 1 and increment by 1 (because there is one connector for each stereo input).

Complete the settings in this page and click 'Next' at the bottom of the window. The third and final window appears, in which is displayed a table of the devices that will be created:

Device	HD		AES	
	Input	Output	Input	Output
INS 1	1		1	
INS 2	2		2	
INS 3	3		3	
INS 4	4		4	
INS 5	5		5	
INS 6	6		6	
INS 7	7		7	
INS 8	8		8	
INS 9	9		9	
INS 10	10		10	
INS 11	11		11	
INS 12	12		12	
INS 13	13		13	
INS 14	14		14	
INS 15	15		15	
INS 16	16		16	
INS 17	17		17	

The table shows the ports for each of the virtual levels for each device. Note that the AES level (stereo) increments by 1.

If the proposed result appearing in this window is correct, click 'Finish'. Otherwise, amend or cancel your entries.

Perform the same 3-step process for stereo outputs. When you process the second step, ignore the input columns and assign starting and increment values for the outputs.

5 Create devices for the mono level set.

Here we create 4 sets of mono devices: left input, left output, right input, right output. The process for each these 4 sets are similar but differ in crucial small details. Here we show the steps to create the “mono left” input devices.

In the tasks pane, click ‘Add Multiple Devices’. The first of 3 windows appears:

Here, the level set to which the devices belong is ‘MONO’.

Fill in the appropriate values and click ‘Next’. The second window appears:

Enter Level Assignment Info:

Level	Max		Create		Start		Increment	
	Input	Output	Input	Output	Input	Output	Input	Output
HD	256	256	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	1	1	1
MONO	512	1024	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	1	2	1

Because we are defining input devices, we must uncheck both output check boxes and ignore the other columns labeled ‘Output’.

For “mono left” devices, the inputs will start at 1. Here, we increment by 2 (because each connector provides 2 mono inputs).

“Mono left” outputs will also start at 1 and increment by 2.

“Mono right” inputs will start at 2 and increment by 2.

“Mono right” outputs will start at 2 and increment by 2.

Notice that when you specify 2 as the increment for inputs, the max input value drops to half. Where it was 1024, it is now 512. The same will hold true for outputs.

Complete the settings in this page and click 'Next' at the bottom of the window. The third and final window appears, in which is displayed a table of the devices that will be created:

Device	HD		MONO	
	Input	Output	Input	Output
INL 1	1		1	
INL 2	2		3	
INL 3	3		5	
INL 4	4		7	
INL 5	5		9	
INL 6	6		11	
INL 7	7		13	
INL 8	8		15	
INL 9	9		17	
INL 10	10		19	
INL 11	11		21	
INL 12	12		23	
INL 13	13		25	
INL 14	14		27	
INL 15	15		29	
INL 16	16		31	
INL 17	17		33	
INL 18	18		35	

"Mono left" Inputs

Device	HD		MONO	
	Input	Output	Input	Output
INR 1	1		2	
INR 2	2		4	
INR 3	3		6	
INR 4	4		8	
INR 5	5		10	
INR 6	6		12	
INR 7	7		14	
INR 8	8		16	
INR 9	9		18	
INR 10	10		20	
INR 11	11		22	
INR 12	12		24	
INR 13	13		26	
INR 14	14		28	
INR 15	15		30	
INR 16	16		32	
INR 17	17		34	
INR 18	18		36	

"Mono right" Inputs

The table shows the ports for each of the virtual levels for each device. Note that the MONO left inputs start at 1 and increment by 2.

If the proposed result appearing in this window is correct, click 'Finish'. Otherwise, amend or cancel your entries.

Later, when you complete the mono right inputs, the MONO right inputs start at 2 and increment by 2. Thus, left/right pairs proceed (1,2), (3,4) (5,6) and so on.

Perform the same 3-step process for the remaining mono devices. When you process the second step, be aware of the starting port number for inputs or outputs. The increment for inputs and outputs is 2 for all mono device sets.

6 When you complete all 6 device sets, you can examine NV9000-SE Utilities' various tables to verify your work. This is an excerpt from the 'PhysConns' table showing input 55:

INL 55	HD	55
INL 55	MONO	109
INR 55	HD	55
INR 55	MONO	110
INS 55	HD	55
INS 55	AES	55

A few seconds of scrutiny shows that the stereo input (INS 55) is 55 as expected. The mono inputs (INL 55, INR 55) are 109 and 110, also as expected and fit the formulas given earlier:

$$R = S \times 2 \quad L = R - 1$$

(The device names for both level sets should be similar so that operators can choose the right device without thinking.)

The NV9000 configuration used in this example is somewhat contrived and simplistic, but it illustrates the method. It is easy to create variations of the method.

Method 2

Problem: how do you configure an input or output to be both stereo and mono?

In UniConfig, create 1 mono partition. As mentioned, the number of mono (i.e., controller) ports is double the number of physical ports.

In the NV9000 configuration, create a level set containing two mono levels (call them L and R if you like) and create audio devices that use that level set. You can switch the devices as stereo. Using breakaway, you can switch the individual channels.

Method 2 Details

In UniConfig

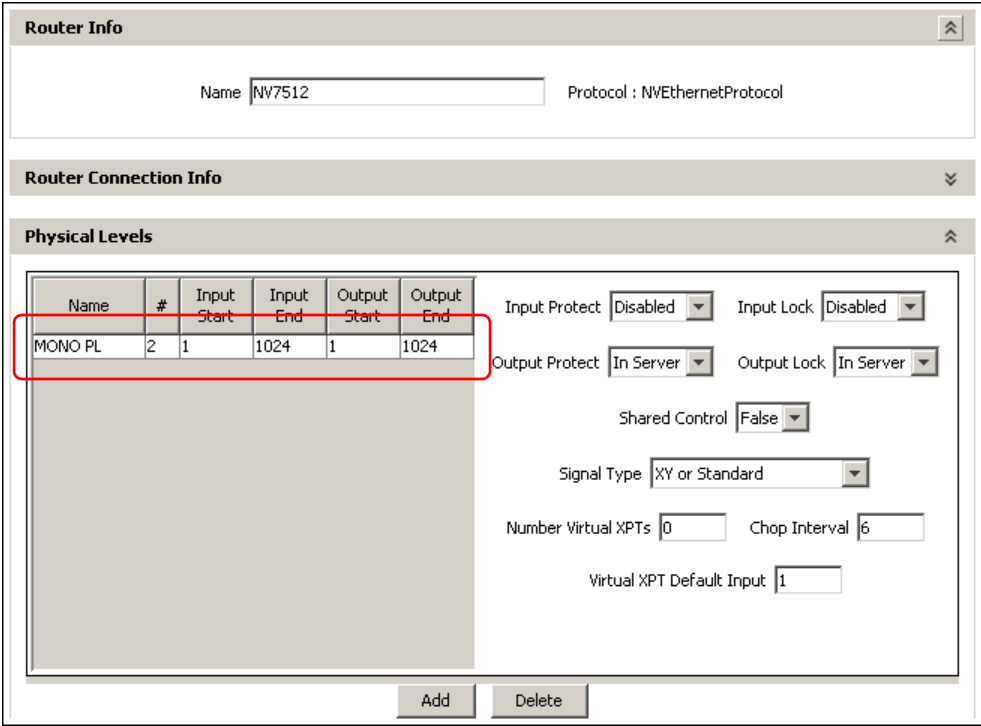
Create 1 mono partitions. This is an example for the NV7512:

Level	Physical Inputs		Controller Input		Physical Outputs		Controller Output		Signal Type
	Start	End	Start	End	Start	End	Start	End	
2	1	512	1	1024	1	512	1	1024	Mono AES, Analog Audio

Here we have 512 connectors supporting 1024 mono channels. We chose level 2 because, in the NV9000 system of this example, level 1 is for the HD router.

In NV9000-SE Utilities

1 Define the audio router and its physical level so that it matches UniConfig:



(In this NV9000 configuration, an HD router was also defined, but it is not shown.)

2 Create virtual levels if none available have a suitable name. In this configuration, we created two mono levels, "LEFT" and "RIGHT":

29	29	AUDIO 16
30	30	RS422
31	31	TIMECODE
32	32	LEFT
33	33	RIGHT

Virtual Level Table 1

48	AUDIO 14	AES Mono
49	AUDIO 15	AES Mono
50	AUDIO 16	AES Mono
51	LEFT	AES Mono
52	RIGHT	AES Mono

Virtual Level Bindings Table 2

It is a 2-step process. First add the virtual levels to the virtual level table. Then, assign a signal type to the virtual level in the virtual level bindings table. The signal type is 'AES Mono'.

3 Create a level set for stereo:

Display Index	Virtual Level	Physical Level	Free Source
1	HD	HD PL	
2	LEFT	MONO PL	
3	RIGHT	MONO PL	
4			

The level set includes the video level. The “stereo level set includes two mono virtual levels. The two virtual levels map into the single mono physical level you defined for the router. The physical level match what you defined in UniConfig.

4 Create devices for the stereo level set, input and output. Here we show the steps to create the stereo input devices. Creating output devices follows the same pattern.

In the tasks pane, click ‘Add Multiple Devices’. The first of 3 windows appears:

This window defines the names of the devices and more importantly the level set to which the devices belong (stereo).

Fill in the appropriate values and click ‘Next’. The second window appears:

Level	Max		Create		Start		Increment	
	Input	Output	Input	Output	Input	Output	Input	Output
HD	256	256	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	1	1	1
LEFT	512	1024	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	1	2	1
RIGHT	512	1024	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	1	2	1

Because we are defining input devices, we must uncheck both output check boxes and ignore the other columns labeled ‘Output’. (If the devices we are creating were bidirectional, we would not ignore the outputs.)

For stereo, the “left” inputs will start at 1 and the “right” inputs will start at 2. Both levels increment by 2 (because each connector provides 2 mono inputs).

Complete the settings in this page and click ‘Next’ at the bottom of the window. The third and final window appears, in which is displayed a table of the devices that will be created:

Device	HD		LEFT		RIGHT	
	Input	Output	Input	Output	Input	Output
IN 1	1		1		2	
IN 2	2		3		4	
IN 3	3		5		6	
IN 4	4		7		8	
IN 5	5		9		10	
IN 6	6		11		12	
IN 7	7		13		14	
IN 8	8		15		16	
IN 9	9		17		18	
IN 10	10		19		20	
IN 11	11		21		22	
IN 12	12		23		24	
IN 13	13		25		26	
IN 14	14		27		28	
IN 15	15		29		30	
IN 16	16		31		32	
IN 17	17		33		34	

The table shows the ports for each of the virtual levels for each device. Note that each of the mono levels increments by 2 and that the mono levels are paired for each device (1,2), (3,4), (5,6) and so on.

If the proposed result appearing in this window is correct, click ‘Finish’. Otherwise, amend or cancel your entries.

Perform the same 3-step process for stereo outputs. When you process the second step, ignore the input columns and assign starting and increment values for the outputs.

5 When you complete both input and output device sets, you can examine NV9000-SE Utilities’ various tables to verify your work. This is an excerpt from the ‘PhysConns’ table showing input 55:

IN 47	HD	47
IN 47	LEFT	93
IN 47	RIGHT	94

This table fragment shows that the stereo input (IN 47) has two mono levels that come from ports 93 and 94 as expected and fit the formulas given earlier:

$$R = S \times 2 \quad L = R - 1$$

(The device names for both level sets should be similar so that operators can choose the right device without thinking.)

The NV9000 configuration used in this example is somewhat contrived and simplistic, but it illustrates the method. It is easy to create variations of the method.

G

Glossary

3Gig	Video at 2.97 or 2.967 Gbps. In Grass Valley routers, 3Gig cards support HD and SD signals as well. Video at 3Gig conforms to SMPTE standard 424M.
Active control card	A router may have both a primary and a secondary control for redundancy. One of the two control cards is the active card and the other is the inactive or <i>stand-by</i> card.
AES	A term that represents the digital audio format (AES3id) generally supported at Grass Valley and switched by NVISION series routers. AES is an abbreviation of the Audio Engineering Society, Inc., New York (www.aes.org).
AES/EBU	(Audio Engineering Society/European Broadcasting Union) a professional serial interface for transferring digital audio from CD and DVD players to amplifiers and TVs. AES/EBU is typically used to transmit PCM and Dolby Digital 5.1, but is not tied to any sampling rate or audio standard.
AES3, AES3id	The AES routers support AES3id and provide 75Ω BNC connectors. AES3id is specified for 75Ω coaxial cable up to 1000 meters. (AES3 uses 110Ω shielded twisted pair (STP) cable with XLR connectors up to a distance of 100 meters.)
AES3, AES3id	NVISION series routers that switch audio generally support AES3id and provide 75Ω BNC connectors. AES3id is specified for 75Ω coaxial cable up to 1000 meters. (AES3 uses 110Ω shielded twisted pair (STP) cable, with XLR connectors, up to a distance of 100 meters.)
Analog Audio	A signal whose varying voltage represents the waveform of the audio.
Async AES, Sync AES	The term “Async AES” refers to an asynchronous (free-running) AES-compliant audio signal, whereas “Sync AES” refers to a synchronous (clocked) AES signal with a data rate of 48,000 samples per second.
AVC	Analog Video Conversion. A simple conversion from composite analog video input to digital output or vice versa.
Baud rate	The transmission rate of a serial communication link. Usually means bits per second.
D/A	Digital to analog
DB25	A DB25 connector is the common 25-pin D-type connector.
dBu	Unit of audio level where 0dBu is $0.775V_{RMS}$.
DC	Direct current
DCE	Data Communication Equipment (an RS-232 term).
DE9	Sometimes called a DB9 connector, a DE9 connector is the common 9-pin D-type connector.
Device	As the term is used in an NV9000 router control system, a device is a grouping of input and output ports, possibly spanning multiple routers of different types. These inputs and outputs typically connect to a single physical device such as a VTR.

DSP	Digital signal processing. A DSP sub-module that can be installed on the NV7512 router crosspoint card. The DSP sub-module enables gain adjustment, phase inversion, crossfade, and channel summing functionality for audio stereo signals. <i>The DSP module is no longer available.</i>
DTE	Data Terminal Equipment (an RS-232 term).
EEPROM	(EE or “serial EE” for short). Electrically erasable programmable read-only memory. In the context of UniConfig, this is non-volatile memory associated with a router control card. EE retains its data indefinitely in the field (unless it is reprogrammed).
EIA	Electronic Industries Alliance. The EIA (until 1997 Electronic Industries Association) is a trade organization for electronics manufacturers in the United States. EIA is accredited by the American National Standards Institute (ANSI) to help develop standards on electronic components, consumer electronics, electronic information, telecommunications, and Internet security.
ESD	Electrostatic discharge
HD	High-definition (video). An HD signal is a serial digital video format that conforms to the SMPTE 292M standard.
Hot-Swappable	A module that is “hot-swappable” can be safely removed and/or installed while power is applied to the system.
I/O	Inputs and outputs. The term “input port” is used interchangeably with “input” and the term “output port” is used interchangeably with “output.”
Jumpers	Jumpers are usually small conductors, in plastic sleeves, that fit over a set of pins on a circuit board. The placement of jumpers can enable or disable a board function, or configure a board function.
LED	Light Emitting Diode
Matrix	In general, a 2-dimensional array. In NVISION series routers, the switching mechanism is called a <i>crosspoint matrix</i> , that is, a 2-dimensional array of crosspoints. A crosspoint is a theoretical point where an input is connected to an output.
Module	Any removable subassembly may be called a module. UniConfig uses the term <i>module</i> to refer to I/O cards, backplane modules, monitor cards, control cards, etc.
MRC	A software application that configures and manages NV8500 hybrid routers primarily and that can perform some management tasks for other NVISION series routers.
Operator	The term operator usually refers to a control panel operator — a user that is not a system administrator. An operator is the person responsible for making routes.
P2P	An abbreviation for “point to point.”

Physical Level	<p>A physical level is a partition (i.e., a region) of a router's switching matrix (or crosspoint matrix). Often the router has a single partition and that partition is the entire matrix. The idea is that multiple routers provide different "levels" on which to switch the signals of devices in the router control system.</p> <p>Some routers switch signals of a single type; other routers can switch signals of multiple types (HD, SD, AES, etc.).</p> <p>In the NV9000 router control system, a route, or "take," can occur on multiple physical levels—whether in multiple routers or a single router—simultaneously.</p>
Port	<p>A port is a connection on a router. There are <i>input</i> ports, <i>output</i> ports, and <i>control</i> ports.</p> <p>Input ports and output ports are numbered in sequence, and each one usually corresponds to a physical connector, but in the case of MAD1, up to 64 ports are time-multiplexed on a single connector.</p>
RAM	Random Access Memory. (Contrasted with archaic sequential access memory.)
Reference Signal	A video reference is a timing signal used to synchronize the switching of video signals during a specific portion of the vertical retrace interval. An AES reference signal synchronizes the switching of AES signals.
RJ45, RJ-45	Registered Jack, type 45, as defined in the United States Code of Federal Regulations. A common 8-pin modular plug and/or jack used in the telecommunications and broadcast industry to transport Ethernet or machine control signals.
RS-422	A bidirectional serial communication standard. NVISION series routers usually have a DE-9 connector for RS-422 communication.
RU	Rack Units. A standard measure or size for frames (1.75 inches).
SD	Standard Definition. An SD signal is a serial digital video format that conforms to the SMPTE 259M standard.
SMPTE	Society of Motion Picture and Television Engineers. An international professional association, based in the United States.
Source/ Destination	The term "source device" is used interchangeably with "source" and the term "destination device" is used interchangeably with "destination." A source is a device, such as a camera, that is connected to one or more input ports. A destination is a device that is connected to one or more output ports. An example of such a device would be a monitor. A device can be both a source and destination. An example of such a device is a VTR.
SWB	(Super Wide Band). A term originating at Grass Valley that refers to the ability of a router to pass a wide range of digital video formats. Grass Valley's SWB supports data rates from about 15 Mb/s to 1.5 GB/s. (This term does not include 3Gig signals.)
Sync AES, Async AES	The term 'Async AES' refers to an asynchronous (free-running) AES-compliant audio signal, whereas 'Sync AES' refers to a synchronous (clocked) AES signal with a data rate of 48,000 samples per second.
System administrator	In this document, a system administrator is a person responsible for installing, configuring, or maintaining a router control system, including configuration workstations, routers, and control panels.

Glossary

System Controller	The name given to an NV9000, an NV915, or NV920. An NV9000 router control system includes one or more system controllers.
Time Code	A linear time code signal complying with SMPTE 12M or the corresponding EBU standard.
UniConfig	A Windows-based application used to configure NVISION series routers (other than NV8500 hybrid routers) and some other products. UniConfig has an easy-to-learn graphical user interface (GUI).

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