

NV9609 Control Panel

User's Guide



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NV9609 Control Panel—User's Guide

- **Revision:** 1.1
- **Software Version:** 6.0.8
- **Part Number:** UG0047-01
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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.

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. (See [Symbols and Their Meanings](#) on page v.)

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Software License Agreement and Warranty Information

Technical Support Contact Information

Nevada City, CA 95959, USA Grass Valley, CA 95945, USA

Return Material Authorization (RMA) required for all returns.

Change History

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

- User's Guide Part # UG0047-01
- Software version: 6.0.8

Rev	Date	ECO	Description	Approved By
1.0	29 Mar 10	16272	Initial release	D. Cox
1.1	05 Nov 10	17286	Conforms to SE version 6.0.8.	D. Cox

Restriction on Hazardous Substances (RoHS)

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

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

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

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

Important Safeguards and Notices

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

Warning

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

Symbols and Their Meanings



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



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



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



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



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



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

General Warnings

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

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

General Cautions

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

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



Table of Contents

Chapter 1	Preface.....	1
	Chapter Structure	1
	The PDF Document	1
	Terms, Conventions and Abbreviations	2
	Other Documentation and Software	2
Chapter 2	Introduction.....	3
	Summary	3
	Panel Organization	4
	Function Buttons	4
	Alphanumeric Display	5
	Display Fields	5
	Flags.....	5
	Tally Interface	6
	Modes of Operation	6
	Level Mode	6
	Secondary Modes	6
	Other NV9609 Functions.....	7
Chapter 3	Installation	9
	Package Contents	9
	Installation	10
	Installing Software and Documentation.....	10
	Initialization	11
	Testing	12
Chapter 4	Configuration	13
	Summary	13
	Adding a Panel to an NV9000 Configuration	13
	NV9609 Panel Configuration Page	16
	Regions of the Configuration Page	17
	Configuration Tasks.....	17
	Commitment Buttons	17
	Panel Options	18
	Checkbox Options	19
	Button Definitions	20
	Button Specification.....	20
	Button Types	21
	Tally (GPIO) Window	26

Table of Contents

Chapter 5	Operation	27
	Summary	27
	Modes of Operation	27
	Level Mode	28
	Secondary Modes	28
	Button Legends	28
	Operating Concepts	29
	Levels	29
	Breakaway	29
	Level Mode	29
	Buttons	29
	Broadcast	30
	Category	30
	Chop	31
	Clear	31
	Destination	31
	Destination Mode	31
	Destination Lock	31
	Destination Protect	32
	Free Source	32
	Level	32
	Level Mode	32
	Menu	33
	Name Set Toggle	33
	Page Down	33
	Page Up	33
	Panel Lock	34
	Previous Source	34
	Salvo	34
	Source	34
	Source Mode	34
	Src/Dst Mode	34
	Source is Master	35
	Take	35
	Undefined	35
	Lock, Protect, and Release	35
	Takes	36
	Scenario 1 — All Level	36
	Scenario 2 — Single Level	36
	Scenario 3 — Multiple Levels	37
	Name Sets	38
	Broadcast Routes	38
	Making Broadcast Routes	38
	Removing Broadcast Routes	39
	Salvo Mode	39
	Menu Mode	39
	Panel ID	40
	Panel Name	40
	User ID	41
	User Name	41
	Software Versions	41
	Button Illumination	42
	Setup Mode	42

Table of Contents

Chapter 6	GPIO	45
	The Interface	45
	Input	45
	Output	46
	GPIO Configuration Concepts	46
	The GPIO Section of the NV9609 Page	46
	Configuring Outputs	47
	Configuring Inputs	49
Chapter 7	Technical Details	51
	Power Specifications	51
	NV9609 Specifications	52
	Environmental Specifications	53
	Defaults	53
	Initial Panel State	53
	Configuration Page	53
	DHCP	53
	Drawings	54
Chapter 8	Misc. Topics	55
	Glossary	55
	Setting the Timeout Value	57
	Power Cord Retention	58
	Ordering Information	59
Index	61

Table of Contents

1. Preface

Chapter 1 is an introduction to the NV9609 User's Guide. It presents the following topics:

- [Chapter Structure](#)
- [The PDF Document](#)
- [Terms, Conventions and Abbreviations](#)

Chapter Structure

The following chapters provide detailed information regarding the NV9609 Control Panel:

- Chapter 1, [Preface](#), (this chapter) outlines ways to use this guide.
- Chapter 2, [Introduction](#), provides a functional description of the NV9609.
- Chapter 3, [Installation](#), provides installation, connection, and initialization instructions.
- Chapter 4, [Configuration](#), provides configuration instructions.

This chapter is for configurers, primarily.

- Chapter 5, [Operation](#), provides operating instructions.

This chapter is for operators, primarily.

- Chapter 6, [GPIO](#), describes the tally (a.k.a. GPIO) interface and tells you how to configure it.
- Chapter 7, [Technical Details](#), provides electrical, mechanical, and environmental specifications, product drawings, and default settings.
- Chapter 8, [Misc. Topics](#), presents a glossary and miscellaneous instructions and information.
- An [Index](#) is also provided for your reference.

The PDF Document

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

1. Preface

Terms, Conventions and Abbreviations

- Use the ‘First Page’, ‘Previous Page’, and ‘Next Page’, and ‘Last Page’ buttons to go to the first, previous, next, or last page within a PDF file.

Note

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

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

Terms, Conventions and Abbreviations

The following conventions are used throughout this guide:

- The symbol ▲ denotes either an example or a special message.
- Entries enclosed in single quotation marks or Capital Letters denote physical control panel buttons, configuration buttons, or menu items.
 - Click ‘Apply’ to ...
 - Press the SRC 12 button ...

The following terms and abbreviations are used throughout this guide:

- The term “control panel” refers to the NV9609 control panel and to NV96xx control panels, in general.
- “High tally” means that a button is brightly illuminated. High-tally usually means that the button function is selected or active.
- “Low tally” means that a button is illuminated at low intensity. Most buttons assume a low tally state until selected.
- “SE” is an abbreviation used in this document for NV9000-SE Utilities.

Other Documentation and Software

You should read and be familiar with the material presented in the following documents:

- NV9000 Quickstart Guide.
- NV9000-SE Utilities User’s Guide (or NV9000-SE Utilities help files).
- The router manuals for whatever routers you have in your system.

You should also be familiar with the NV9000-SE Utilities software and NV9000 router control systems.

2. Introduction

Chapter 2 provides a functional description of the NV9609. It presents these topics:

- [Summary](#)
- [Panel Organization](#)
- [Modes of Operation](#)
- [Other NV9609 Functions](#)

Summary

The NV9609¹ is a limited X-Y control panel featuring 2 sets of backlit function buttons and a small display. The display has 4 distinct readouts each having 8 characters.

The NV9609 is a 2RU half-width panel, slightly more than 1" deep. Two NV9609s can be mounted in a rack side-by-side with a rack mounting kit (part number NV9606-RMK).

The panel is organized as shown in figures 2-1 and 2-2:



Function Buttons

Display

Function Buttons

Figure 2-1. NV9609 Front

¹ An equivalent NV9609V — a GUI that is called a “virtual panel” — is available. It emulates the NV9609.

2. Introduction

Panel Organization

At the rear, in addition to power, serial, and network connectors, is a 25-pin GPIO (tally) connector that supports 4 optically isolated relay outputs and 8 optically isolated inputs:

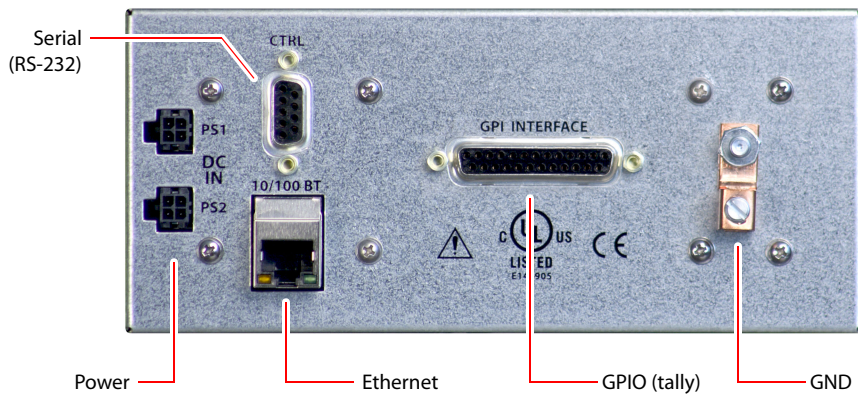


Figure 2-2. NV9609 Rear

The NV9609 has some features that other NV96xx control panels do not. One such feature is *level mode*. Another characteristic of the NV9609 is that it is one of the few panels that provides a *salvo mode* where an operator can choose a salvo to execute. Not all panels support salvos that way.

Two of the NV9609's panel options are not available in other panels.

Panel Organization

Function Buttons

The NV9609 has an array of 12 function buttons on the left and 16 function buttons on the right. There is no restriction on how they may be configured, but typically it is necessary to have scrolling buttons ('Page Up' and a 'Page Down') and a 'Take' button. Configurers will probably also want to create a numeric pad for operators to enter category suffixes. A 'Clear' button is also useful. The "clear" function is similar to a cancel or undo function.

- ▲ The term "page" as it applies to the scrolling buttons is a misnomer. There are no "pages" in the NV9609. Operators should think of these as "up" and "down" buttons.

Each button has *three* operational levels: high and low tally (green or amber), and off. Operators can adjust the low tally levels in increments of 10% using the panel's menu. Buttons that are turned off are said to be dark. (Physically, they are actually white or gray.)

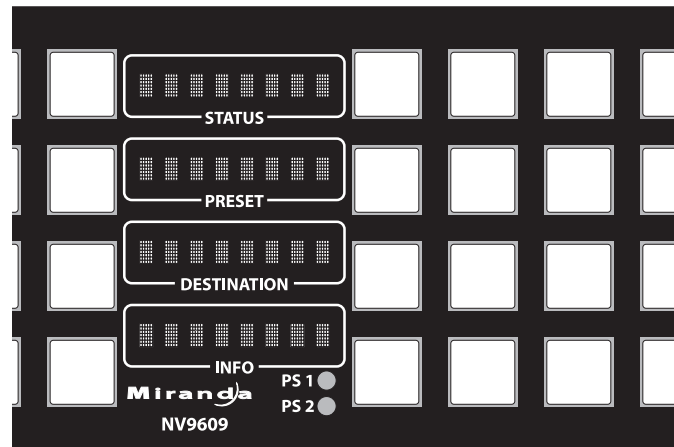
The function buttons each have clear plastic keycaps under which you may place plastic inserts for button legends. It is a simple matter to change button legends.²

Scrolling is necessary in level mode and salvo mode. It is optional when the panel operator is choosing a device in a category (i.e., when you have pressed a category button). The NV9609 scrolls using 'Page Up' and 'Page Down' buttons.

² The NV9609V (virtual panel) has automatically generated button legends. For instance, a destination button's legend is the destination name. As another example, a category button on the virtual panel has 3 (optional) lines of text: the source category, suffix, and destination category.

Alphanumeric Display

The display has 4 separate display fields.



Display Fields

The display has 4 fields:

- Status.

The 'Status' field shows the source that was routed to the currently selected destination, which is identified in the 'Destination' field.

If the operator is scrolling through destinations during category selection, the 'Status' field changes with each destination.

If the operator is scrolling through levels in level mode, the 'Status' field changes to indicate the source for each level of the current destination.

- Preset.

The 'Preset' field shows the source that will be routed to the currently selected destination when the operator presses the 'Take' button.

- Destination.

The 'Destination' field shows the current destination.

- Information.

Under normal operating conditions, the 'Information' field displays the level (or levels) that will be changed in the next take. The field displays either "All Level" or the mnemonic for a selected level.

The 'Status', 'Preset', and 'Destination' fields can show either alternate device names (from a name set) or system mnemonics depending on (1) the state of the 'Name Set Toggle' button (if the panel has one), (2) the default name set (3) the existence of name sets in the NV9000 configuration. (An alias is a name defined in a name set.)

Flags

When a destination is in breakaway, the 'Status' field indicates the breakaway with an asterisk in its eighth character position.

- ▲ The asterisk will obscure the last character of the source name if the name has 8 characters.

2. Introduction

Modes of Operation

Tally Interface

At the rear of the panel is a DB25 connector that provides 8 tally inputs and 4 tally outputs. (The outputs are solid state relay outputs.) Both inputs and outputs are optically isolated.

During configuration, you can construct Boolean logic that switches the outputs on or off. The terms of the logic expressions are states of the source and destination devices, etc., controlled by the NV9000 control system.

During configuration, you can prescribe NV9609 behavior that depends on the tally inputs.

What you connect to the tally interface is, of course, up to you. Miranda provides a breakout cable (WC0053) for the tally connector as a purchase option.

The NV9000-SE Utilities on-line help documentation calls the tally interface a GPIO interface. On the rear of the panel, it is labeled a “GPI interface.”

See Chapter 6, [GPIO](#), on page 45, for complete detail.

Modes of Operation

The NV9609 operates as an X-Y panel.

Level Mode

Operators can switch the panel in and out of *level mode* (if the panel has a ‘Level Mode’ button). Level mode allows you to select one of the destination’s levels (by scrolling). A take in level mode is a single-level breakaway.

When the panel is *not* in level mode, takes occur on either all levels or selected levels of the current destination. Takes on all levels are said to be “all level.”

If the panel has multiple ‘Level’ buttons, operators can perform multiple-level breakaway.

Secondary Modes

Additional but secondary modes of panel operation are:

- Setup mode—where the NV9609 is freshly powered up, but disconnected from the network. In this mode, you can preset the NV9609’s panel ID and perform a few diagnostic tasks.
- Salvo mode—pressing a salvo button places the NV9609 in salvo mode, where it is expected that the operator will choose a salvo and then the ‘Take’ button to executes a salvo. (The duration of a salvo is indeterminate, but usually short.)
- Menu mode—pressing a menu button places the NV9609 in “menu” mode. In menu mode, the buttons lose their normal functions and become part of a menu that changes as needed during menu operation.

When the panel is not in setup mode, salvo mode, or menu mode, we say it is in *normal mode*. Normal mode might or might not include level mode.

Other NV9609 Functions

The NV9609 can be configured to perform the following additional functions:

- Previous source and free source.
- System salvos.
- Lock/protect/release for destinations.
- Device selection using categories and indexes or suffixes.
- Multiple- and single-level breakaways.
- Broadcast data routing.

2. Introduction

Other NV9609 Functions

3. Installation

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

- [Package Contents](#)
- [Installation](#)
- [Installing Software and Documentation](#)
- [Installation](#)
- [Testing](#)

Package Contents

If you have ordered one or more NV9609 control panels from Miranda, inspect the shipping container for damage. If you find any container damage, unpack and inspect the contents. If the contents are damaged, notify the carrier immediately.

As you unpack the shipping container, look for the packing slip and compare it against the contents to verify that you received everything as ordered. If anything is missing (or if you find equipment damage unrelated to shipping), please contact technical support. Refer to [Technical Support Contact Information](#) on page iii.

Depending on your order, the NV9609 items that can ship include:

- One or more NV9609 control panels.
- One or two power supplies for each NV9609, with straps that secure the AC power cords to the power supplies.
- One or more rack-mounting kits (NV9609-RMK).
- Optional WC0053 breakout cable.

The package does not contain network cables, serial cables, or mounting screws.

You do not need to take any special precautions regarding ESD.

This document does not address the shipment or installation of any other equipment or software that can be used in conjunction with the NV9609 (including the NV9000 system controller, NV915 system controller, other NV96xx control panels, EC9700 GUI, EC9710 GUI, and configuration programs such as UniConfig or NV9000-SE Utilities).

This document does briefly address the use of NV9000-SE Utilities and the Panel IP Configuration Utility as they pertain to panel configuration.

3. Installation

Installation

Follow these steps to install a NV9609 control panel:

- 1 Mount, and secure, the panel in the rack.

The NV9609 is designed to mount in a 19" rack. Rack-mounting is not a requirement.

The NV9609 is a 2RU half-width panel: you can install two side by side in a rack. Rack mounting (either one or two NV9609s) requires a rack mounting bracket such as Miranda's NV9609-RMK.

The NV9609 mounts on the kit's bracket using its own 4 screws, nuts and washers. The bracket has two apertures in which to mount NV9609s. The kit includes a plate to cover an unused aperture. See [Drawings](#) on page 54 for bracket details.

Once the NV9609(s) are attached to the bracket, you can place the bracket in position in your rack. Attach the bracket to the rack frame, using screws appropriate for your rack. The bracket's mounting slots are spaced 3.00" (76.2 mm) vertically and allow approximately 1/8" (3 mm) of movement horizontally.

- 2 We assume that you have an Ethernet switch connected to the "Panel and Router Network" port of your system controller. Connect an Ethernet cable from that switch to the RJ-45 port at the rear of the NV9609.
- 3 Connect one or both power supplies. First connect the 4-pin connector to PS1 or PS2 on the rear of the router. The connectors are keyed and snap into place. There is only one way they fit. Do not force them. Then connect the power supply to AC power.



A second power connection is for redundancy only (protection against failure) and is not a requirement for operation.

Refer to [Power Specifications](#) on page 51 for details on the PS0001 power supply. See also [Power Cord Retention](#) on page 58.

- 4 Connect tally (GPIO) input devices and output devices at the DB25 GPI connector.

You can use the optional WC0053 breakout cable to make these connections.

See Chapter 6, [GPIO](#), on page 45 for detail regarding the tally interface.

Installing Software and Documentation

This document is available through the Miranda web site.

You must use NV9000-SE Utilities to configure the NV9609 control panel. Contact Miranda if you need to obtain the latest version of this NV9000 configuration software.

You may use the Panel IP Configuration Utility if you want your NV9609 to have a static IP address (with respect to the NV9000) or to use DHCP. The panel, as it comes from the factory, defaults to DHCP.

Initialization

Before your NV9000 system controller can communicate with an NV9609, you must give it a panel ID. Follow these steps for each NV9609 you are installing:

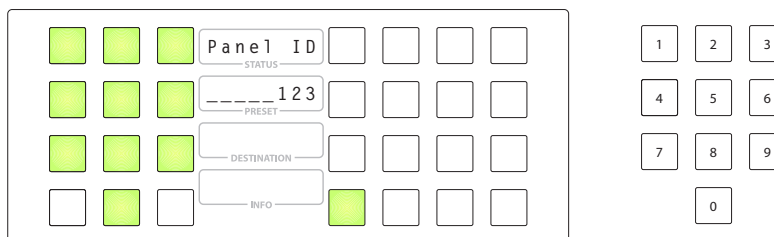
- 1 Power up the NV9609. Do **not** connect its Ethernet cable. (Disconnect it if it is connected.)

After a few seconds, the display will show ‘ACQ IP’ at the top and show the panel’s current panel ID. One of the buttons is high-tally green:



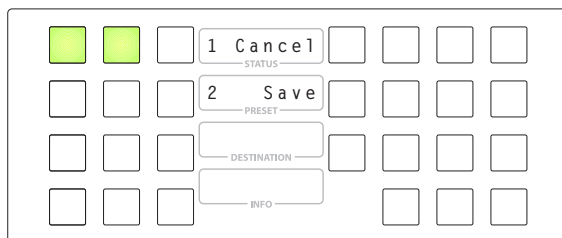
We call that the “setup” button while the panel is disconnected from the network.

- 2 Press the setup button. The panel now allows you to enter the panel ID using a buttons at the left that function as a numeric keypad. The numbers of the keypad are shown here:



Enter the panel ID using the keypad. Then press the setup button again.

- 3 The panel displays a confirmation message:



Press the left button to cancel your entry; press the right button to save your entry.

- 4 Press the setup button once again and continue to press the setup button until the panel displays ‘ACQ IP’ once again as in step 1.
- 5 After you enter the panel ID, reconnect the Ethernet cable. The NV9000 system controller will detect your panel in a few seconds. (**All** panel IDs must be unique.)

You can now prepare an NV9609 configuration in NV9000-SE Utilities and upload the configuration to the NV9609. You need the panel ID to create a NV9609 configuration. When you upload the configuration, the panel ID you entered in NV9000-SE Utilities designates the actual panel to which the upload will occur. If no actual panel has that ID, the upload cannot occur.

3. Installation

Testing

Testing

A panel test function is available when the NV9609 is disconnected from the system controller. Run the test to determine the health of your NV9609. See [Setup Mode](#) on page 42 for detail. You can also view the software version numbers under setup mode.

These are points to consider after you install your NV9609 control panel(s):

- 1 Do the buttons illuminate? When an NV9609 powers up, one or more of its buttons are supposed to turn green or amber. Does it pass the panel test mentioned above?
- 2 When the NV9609 powers up and it is connected to the system controller, it should initialize completely. (That takes a few seconds.) The NV9000 system should load whatever configuration exists for that panel and the buttons appropriate for its configuration should light.

If you continue to see “No Server,” “ACQ IP,” or “Locating Network,” you have a problem. Reboot everything and try again.

- ▲ The NV9609, by default, acquires its IP address through DHCP on the NV9000’s panel/router network. You can use the Panel IP Configuration Utility to force the panel to have a static IP address.

If (in setup mode) you do not see your designated panel ID in the ‘Preset’ display field, you have either not initialized the panel or no configuration has been created for your panel in NV9000-SE Utilities.

- 3 Is the NV9000 system controller actually running? With the typical noise levels in a facility, it can sometimes be difficult to tell. Use the ‘System’ pages of NV9000-SE Utilities to make the determination.
- 4 Is NV9000-SE Utilities installed and operating? If so, can you upload a configuration to the specified panel?
- 5 Does the configuration actually work? Is it useful? Can the operator perform tasks and perform other operations?

You might want to consider how well your operator interface works in addition to the basic question of whether it works.

4. Configuration

Chapter 4 provides configuration instructions for the NV9609. It presents the following topics:

- [Summary](#)
- [Adding a Panel to an NV9000 Configuration](#)
- [NV9609 Panel Configuration Page](#)
- [Commitment Buttons](#)
- [Panel Options](#)
- [Button Definitions](#)
- [Tally \(GPIO\) Window](#)

This chapter addresses configurers. Operators and other persons not interested in NV9609 configuration need not read this chapter.

Summary

The NV9609 is a relatively simple panel. It has 28 function buttons, a small display, and a GPIO (tally) interface.

An NV9609 panel should usually be configured with a 'Page Up' button, a 'Page Down' button, and a 'Take' button.

At the rear of the panel, a DB25 connector supports 8 tally inputs and 4 tally outputs.

NV9000-SE Utilities is the software with which to configure the NV9609. Figure 4-1, following, shows the default NV9609 panel configuration page from NV9000-SE Utilities.

Adding a Panel to an NV9000 Configuration

You must create configurations for the NV9609 using NV9000-SE Utilities. We assume that you are familiar enough with NV9000-SE Utilities that you can understand the following material. It is not difficult material, but some of the concepts might not be familiar to everyone.

It takes only a few seconds to add a new panel configuration.

4. Configuration

Adding a Panel to an NV9000 Configuration

After launching NV9000-SE Utilities, choose 'Control Panels' from the Configuration pane in the navigation area. The 'Control Panels' configuration page appears:

Click 'Add Control Panel' at the bottom of the configuration page. The 'Add Control Panel' page appears:

Choose "NV9609" from the 'Type' field. In the ID field, enter the panel ID you assigned to the panel while it was in setup mode. (You can change the panel ID in NV9000-SE Utilities.) Give a name to the panel in the name field and select a user.

When you are creating a panel configuration you have 3 options. These options are presented in the 'Configuration Options' area:

- 1 Make a copy of an existing configuration file, giving it a new file name.
- 2 Use an existing configuration file. (This allows several panels to share a single configuration.)
- 3 Create an entirely new configuration file.

In the first and third cases, you will create a new configuration file whose name you designate. The file extension for an NV9609 configuration file is .609. Click 'Next' or 'Finish' to proceed. Click 'Previous' to go back the previous page. Click 'Cancel' to terminate the entry operation.

- ▲ There are 2 other buttons, 'Suffix' and 'Navigate', both dim (disabled). These do not apply to the NV9609.

4. Configuration

Adding a Panel to an NV9000 Configuration

Return to the 'Control Panels' page to view your new entry. To edit an NV9609 configuration, double-click its list entry:

Control Panels x

Panel ID Filter: Control Panel Name Filter: Panel Type Filter: 609 User Filter: All

Panel ID	Panel Name	Panel Type	Configuration Name
6094	9609-4	NV9609	\\nvision\envy\usersys\live\prod 6094.609
123	Demo 09	NV9609	\\nvision\envy\usersys\live\D09.609

Edit Selected Control Panels Add Control Panel Delete Control Panel

You will then see the panel configuration page for the selected NV9609.

The following section of this guide discusses using the panel configuration page in which you configure an NV9609.

4. Configuration

NV9609 Panel Configuration Page

This is the default NV9609 panel configuration page in NV9000-SE Utilities:

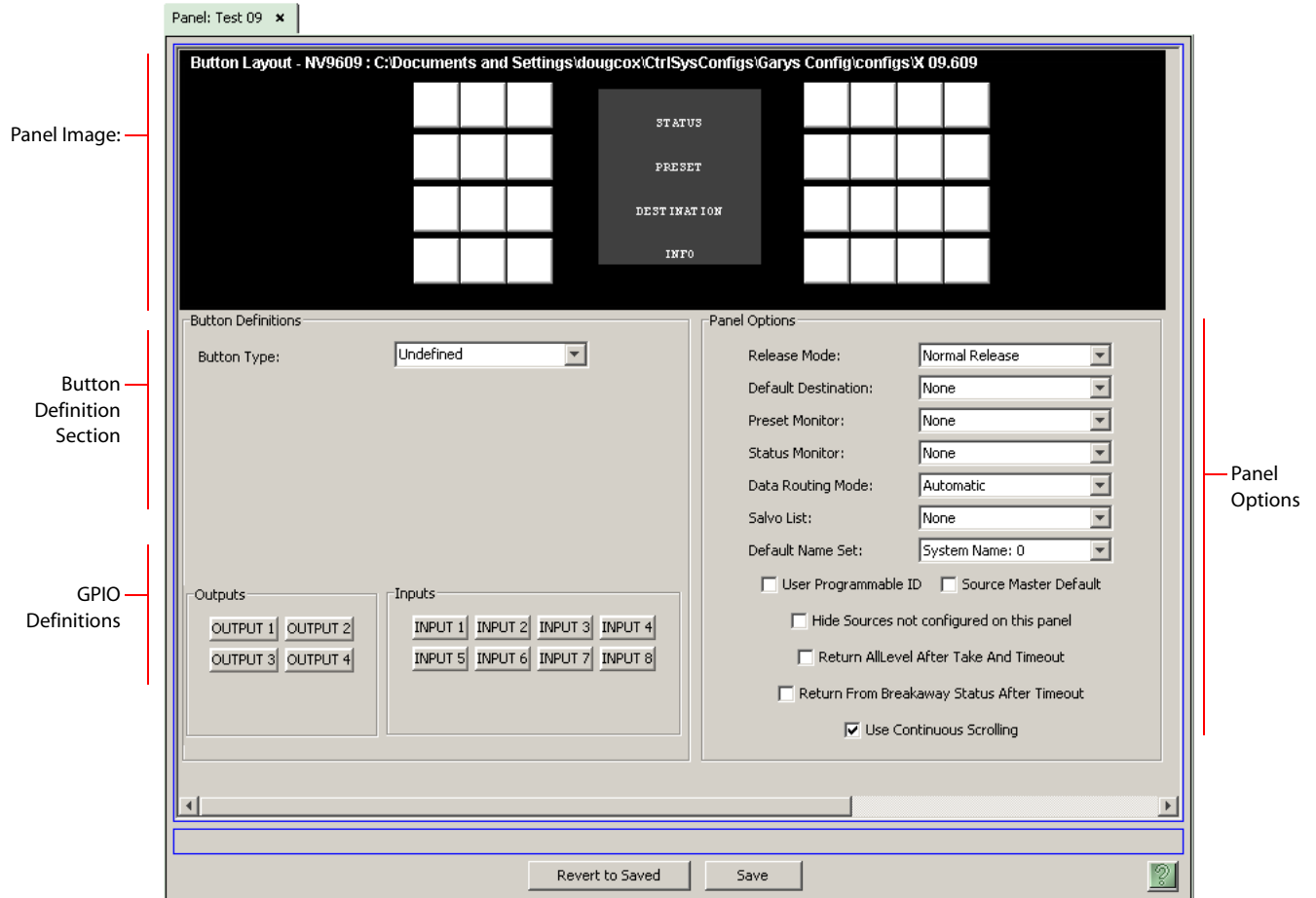


Figure 4-1. NV9609 Configuration Page (Default)

After you configure buttons the appearance of the panel buttons will have changed. The panel buttons on this page will show legends, determined from the button type assigned to the button. (The panel's actual buttons have clear plastic keycaps that you can remove and insert button legends, graphic or text, of your own design.)

At the bottom of the page are two important configuration buttons: 'Revert to Saved' and 'Save'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made.

Regions of the Configuration Page

Above the ‘Revert to Saved’ and ‘Save’ buttons (always present) there are 4 main regions:

- A graphic representation of the NV9609 panel.
Configurers must click a button “proxy” to select the button for configuration.
- Button definitions.
In this section, configurers make button assignments, using its pull-down menus and text fields. See [Button Definitions](#), following.
- GPIO definitions.
In this section, configurers may define GPIO logic. The control panel has a rear connector that provides 4 relay outputs and 8 optically isolated inputs. See [GPIO](#), page 45, for more information. (Note that the graphical buttons represent *connector terminals* and not actual buttons.)
- Panel options.
In this section, configurers may specify the behavioral characteristics of the panel. See [Panel Options](#), following.

Configuration Tasks

The person configuring an NV9609 panel will want to consider how best to use the buttons to support the devices and routers in the router control system at hand. The task is non-trivial.

In support of that effort, the configurer will do the following:

- Select panel options.
- Assign functions to buttons.
- Define logic for some or all of the tally inputs and outputs.

The panel operator, in most cases, needs a ‘Take’ button, a ‘Page Up’ button, and a ‘Page Down’ button. A ‘Clear’ button is strongly recommended.

Commitment Buttons

Two buttons at the bottom of the configuration page are self-explanatory and appear on most configuration pages:

- Revert to Saved. Press this button if you want to discard any recent changes you have made.
- Save. Press this button to commit all your recent changes.

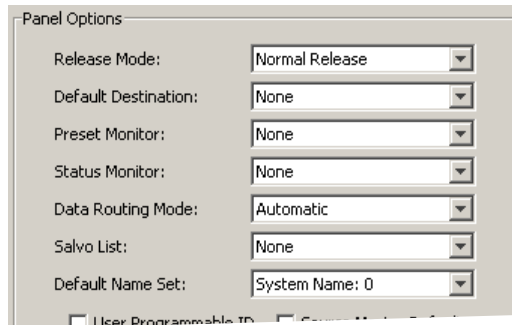
Neither of these actions is reversible.

4. Configuration

Panel Options

Panel Options

The panel options section, at the right of the configuration page, has two parts: drop-down menus and checkbox options. These are the drop-down menus:



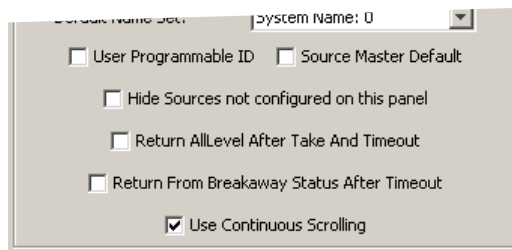
These are its drop-down menu options:

Release Mode	Normal Release	This panel can release “locks” and “protects” set by the designated user (at this panel or any other panel).
	Force Release	This panel can release locks and protects set by any user.
Default Destination	None	After a reset, the panel displays no destination device. (This is not recommended.)
	<device>	The Panel uses the specified device as the destination after a reset. (The ‘Default State’ button also returns the panel to this destination.)
Preset Monitor	None	The preset source video is not sent to a monitor.
	<device>	The preset source video for the selected destination appears on the specified monitor (device).
Status Monitor	None	The current source video is not sent to a monitor.
	<device>	The current source video for the selected destination appears on the specified monitor (device).
Data Routing Mode	Automatic	If a data (i.e., machine control) level is involved in the route, make the route on the control level even if the control port is in use on the source or destination device.
	Semi-automatic (recommended)	If the control port is in use on the source or destination device, take all levels except control and allow the user to perform the control level route by pressing ‘Take’ a second time. If ‘Take’ is not pressed again, the route is cancelled. If the control port is not in use, the control level take occurs automatically.
	Manual	A take on the data level must be performed manually as a breakaway on the control level. The control level will never switch as part of a multi-level take.

Salvo List	[none]	Salvo lists appear in the drop-down menu. A salvo list, as you might think, is a list of salvos. The salvos in the list you choose are the salvos the operator can choose in salvo mode. Salvo lists are defined, in NV9000-SE Utilities, under the 'Views' pane, using the 'Salvo Lists' table and the 'Salvo List Details' table. The NV9000 configuration might not have any salvo lists, in which case 'None' is the only entry in the drop-down menu.
Default Name Set	System Name	A list of "name sets" appears in the drop-down menu. The name sets can be defined under the System Management pane of NV9000-SE Utilities. Choose 'System Name' in this list if you do not want, or do not care about, alternate device names. Do not choose 'System Name' if you are configuring any 'Name Set Toggle' buttons.

Checkbox Options

The checkbox options section is just below the panel options section, enclosed in the same region:



A check in the box enables the option. Clearing the checkbox disables the option.

By default, all the check box options are clear.

The following items are the checkbox options:

- User-Programmable ID.

Allows the Panel ID to be changed locally at the control panel (in menu mode).

- Source Master Default.

Makes a control-level source the *controlling* device (or master device) by default. Otherwise, the destination is the master by default. (The option is specifically for use with NVISION series machine control routers.)

"Source is master" is used for duplication, or broadcast routing, on a machine control level.

"Destination is master" is for machine-to-machine editing. If you do not select the "source master default" option, you can place a 'Source is Master' button on the panel.

▲ **Note:** a 'Source is Master' button is a toggle that reverses the direction of data routing for devices used in data level (machine control) takes.

- Hide sources not configured on this panel.

Causes the names of source devices that are not presently configured for this particular panel to be effectively hidden. When another panel changes the source to one not configured for this panel, this panel displays asterisks instead.

- Return all-level after take and timeout.

If you check this box, the panel will revert to all-level state after the timeout period following a breakaway take.

If you leave this box unchecked, the panel will revert to all-level state immediately.

4. Configuration

Button Definitions

The difference is the timeout period. The default timeout period is 30 seconds. See [Setting the Timeout Value](#) on page 57.

- Return from breakaway status after timeout.

After the timeout period, a panel that is in level mode will leave level mode and revert to all-level status.

See [Setting the Timeout Value](#) on page 57.

- Use continuous scrolling.

If you check this box, the panel will scroll source or destination devices continuously (or indefinitely). That is, the display will show the first device in the list following the last when you are scrolling up, and will show the last device after the first if you are scrolling down.

If you leave this box unchecked, the panel will stop scrolling when it reaches either the beginning or end of the list.

This option does *not* affect scrolling of salvos when the panel is in salvo mode or levels when the panel is in level mode.

Button Definitions

There are three classes of button functions:

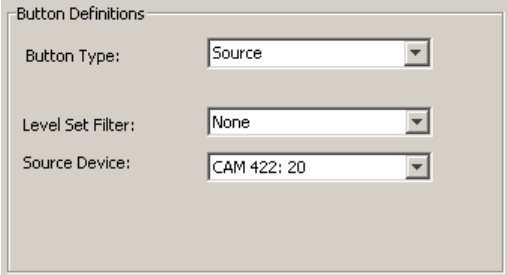
- Dedicated functions, such as 'Default State' or 'Chop'.
- Variable functions, such as 'Category' or 'Source'. With this type of button, additional selections are needed to complete the button configuration.
- Special functions, such as 'Menu' and 'Salvo'.

Note

During configuration, certain button fields contain a colon (:) and number after the data in the field. The number is the record ID of the object in the NV9000 configuration database. The record IDs can be ignored but might be of some use when the configurator is searching for items in the configuration database.

Button Specification

The button definition section configures the button you have selected in the image of the NV9609:



The screenshot shows a window titled "Button Definitions". It contains three rows of configuration options, each with a label and a drop-down menu:

- Button Type:** The drop-down menu is set to "Source".
- Level Set Filter:** The drop-down menu is set to "None".
- Source Device:** The drop-down menu is set to "CAM 422: 20".

When you choose a button type, additional drop-down menus can appear, depending on the button type, allowing you to further specify the button's behavior. Available options and selections vary from button type to button type.

Button Types

These are the button types available for NV9609 configurations:

Type	Description
Broadcast	<p>On the data (machine control) level, the button enables a broadcast take to an <i>additional</i> controlled device, after a broadcast route has been initiated with a “source is master” control-level take to the <i>first</i> controlled device.</p> <p>The button definition has no fields to configure.</p> <p>A broadcast button is useful in dubbing applications or when a backup (redundant) device is in use. See Broadcast Routes on page 38.</p> <p>See also the Source Master button, following.</p>
Category	<p>The button selects a device category. The button can operate in source mode or destination mode. (Source category buttons operate in level mode; destination category buttons do not.)</p> <p>During configuration, you can specify a source category for the button, a destination category, and a suffix. Any of those fields can be ‘None’. When the field is ‘None’, the button is inapplicable in that context.</p> <p>Thus, when the panel is in source mode, category buttons that are not configured with a source category become disabled. When the panel is in destination mode, category buttons that are not configured with a destination category become disabled. Category buttons configured with both source and destination categories are not disabled in either mode. Category buttons that have only a suffix configured are disabled until a category becomes selected.</p> <p>After a category button has been pressed, the operator must then press number or suffix buttons to perform a device selection within the category. The operator may also use scroll buttons (‘Page Up’ and ‘Page Down’) to select device indexes within the category if the panel has scroll buttons.</p> <p>When the panel is in source mode, pressing a category button places the category mnemonic in the ‘Preset’ display. As the operator enters suffixes to select a source, the name of a source constructed from the category name and suffixes thus far entered appears in the ‘Preset’ field.</p> <p>When the panel is in destination mode, pressing a category button places the category mnemonic in the ‘Preset’ display. As the operator enters suffixes to select a destination, the suffixes are appended to the contents of the ‘Preset’ field, and the name of a destination constructed from the category name and suffixes thus far entered appears in the ‘Destination’ field.</p> <p>If you intend to have a keypad, you must use category buttons to implement the keypad. Any particular category button can represent 3 items: a source category, a destination category, and a suffix (which might be numeric).</p> <p>The names of devices in categories are composed of the category name followed by one or more suffixes. (Device names are limited to 8 characters, however.)</p> <p>NV9000-SE Utilities allows configurers to designate a separator character which is inserted between the parts of the device name.</p>

4. Configuration

Button Definitions

Type	Description
Chop	<p>When a chop function is supported by a router, the button is a toggle that enables and disables rapid switching of the selected destination device between the current source and the preset source. This chop function is used to test system timing.</p> <p>The button definition has no fields to configure.</p>
Clear	<p>The button reverts to the most recent preset. You may think of this as a “backspace key.” It erases the suffixes you entered under category select in reverse order.</p> <p>(If the operator is in level mode, or in salvo mode, ‘Clear’ brings the panel back to normal mode.)</p>
Destination	<p>The button selects a destination. The destination name appears in the ‘Destination’ display. The destination is the target of an upcoming take, which will route a source to that destination.</p> <p>When you assign a destination button, a drop-down menu appears: ‘Destination Device’. Choose a device from the list. The ‘None’ entry is merely a placeholder. Do not choose ‘None’.</p> <p>Pressing a destination button has two side effects: it clears—or partially clears—the ‘Preset’ display, and (2) it turns off the ‘Take’ button if it is on.</p>
Destination Lock	<p>The button sets or removes a “lock” on the current destination device. The lock can be removed only by the user that originally set the lock, or by a panel that has “Force Release” enabled.</p> <p>The button definition has no fields to configure.</p> <p>The NV9609 provides no explicit indication, during operation, whether a destination is locked or unlocked.</p>
Destination Mode	<p>The button places the panel in destination mode. Category selections in destination mode select destination devices. Category buttons that are not configured with destination categories become disabled.</p> <p>Categories that include both source and destinations appear in both source mode and destination mode.</p> <p>The button definition has no fields to configure.</p>
Destination Protect	<p>The button sets or removes a “protect” on the current destination device. The protect can be removed only by the user that originally set the protect, or by a panel that has “Force Release” enabled.</p> <p>Note: a protect prevents <i>others</i> from routing to a destination; a lock prevents <i>anyone</i>—even the user who issued the lock—from routing to the destination.</p> <p>The button definition has no fields to configure.</p> <p>The NV9609 provides no explicit indication, during operation, whether a destination is locked or unlocked.</p>
Free Source	<p>The button selects a pre-defined phantom device that can be used to release or “free” devices on the data (machine control) level. A free source is also used with tielines to free the tieline for others to use. The free source is defined in the <i>Level Set Details</i> page of NV9000-SE Utilities.</p> <p>The button definition has no fields to configure.</p>

Type	Description
Level	<p>The button selects a level.</p> <p>The button definition has one field to configure: the level.</p> <p>If the panel has multiple level buttons, operators can select multiple levels. When all level buttons are <i>deselected</i>, a take is “all-level.” When one or more level buttons are selected, a take occurs on those levels. (If a panel has a level button for all levels of the current destination, and they are all selected, that condition would be “all level” too.)</p> <p>You must select levels before selecting the source, otherwise multi-level takes do not work. They are all level.</p> <p>(Multi-level takes—and level buttons—are not available in <i>level mode</i>.)</p> <p>The color of the level buttons reflect the levels of the current destination in a limited way. With just two colors, it is not possible to represent all possible combinations of sources taken to a destination.</p> <p>Operators that want to examine the levels of a destination may press ‘Level Mode’ and scroll through the levels. The ‘Status’ display shows the source for each individual level as you scroll and shows whether the source is a breakaway source.</p>
Level Mode	<p>The button toggles the panel in and out of level mode. “All Level” appears in the ‘Info’ display when level mode is off.</p> <p>Level mode allows operators (1) to examine the levels of the current destination and (2) to perform single-level takes.</p> <p>Source buttons and destination buttons, and some other button types, are disabled in level mode. The only means to select a source are source category buttons.</p> <p>The operator must start the selection of a source (using a category button) while in level mode for single-level breakaway. The panel exits level mode when the operator starts the source selection. The level chosen in level mode remains in effect for the take.</p>
Menu	<p>The button definition has no fields to configure.</p> <p>This button puts the NV9609 panel in menu mode and displays a menu on the buttons that provides access to a variety of panel functions. Without the button, the operator has no access to the menu functions.</p> <p>By pressing certain buttons, the operator makes menu selections and may enter data (such as panel ID) or change brightness values. When the panel is in menu mode, the menu button cycles through the functions of the menu. See Menu Mode on page 39.</p> <p>The button definition has no fields to configure.</p>

4. Configuration

Button Definitions

Type	Description
Name Set Toggle	<p>The button toggles the panel between its default name set and the “system name” set. One or the other becomes the active name set.</p> <p>The button definition has no fields to configure.</p> <p>If the default name set is the system name set, the button would be a no-op. Therefore configurers should not create a ‘Name Set Toggle’ button if the default name set is ‘System Names’.</p> <p>The status, preset, or destination displays use the active name set—either the default name set (aliases) or the system name set. However, that when the panel is displaying aliases, and a device does not have an alias, the panel displays the system name.</p>
Page Down	<p>The button scrolls <i>down</i>.</p> <p>Scrolling devices within a category: ‘Page Down’ moves to the next <i>lower</i> device in the category’s device list. (Example: if the current device is CAM_4, the next lower device would probably be CAM_3, subject to the device definitions in the NV9000 configuration.) Scrolling devices is possibly only when a category selection is in progress. Whether the list wraps around at the beginning or end is governed by the ‘Use Continuous Scrolling’ panel option.</p> <p>Scrolling salvos in salvo mode: ‘Page Down’ moves to the salvo with the next <i>lower</i> index in the salvo list. A valid salvo list must have been specified in the panel options.</p> <p>Scrolling levels in level mode: ‘Page Down’ moves first to “All levels” and then to the first level and then to the <i>next</i> levels defined for the destination. Using the ‘Page Down’ button, an operator can cycle through all the levels (including “All Levels”) indefinitely.</p> <p>The button definition has no fields to configure.</p>
Page Up	<p>The button scrolls <i>up</i>.</p> <p>Scrolling devices within a category: ‘Page Up’ moves to the next <i>higher</i> device in the category’s device list. (Example: if the current device is VTR_12, the next higher device would probably be VTR_13, subject to the device definitions in the NV9000 configuration.) Scrolling devices is possibly only when a category selection is in progress. Whether the list wraps around at the beginning or end is governed by the ‘Use Continuous Scrolling’ panel option.</p> <p>Scrolling salvos in salvo mode: ‘Page Up’ moves to the salvo with the next <i>higher</i> index in the salvo list. A valid salvo list must have been specified in the panel options.</p> <p>Scrolling levels in level mode: ‘Page Up’ moves first to “All levels” and then to the last level and then to <i>previous</i> levels defined for the destination. Using the ‘Page Up’ button, an operator can cycle through all the levels (including “All Levels”) indefinitely.</p> <p>The button definition has no fields to configure.</p>

Type	Description
Panel Lock	<p>The button prevents accidental changes to the panel settings, especially router crosspoints. When the panel is locked, the button array becomes blank except for the Panel Lock button which becomes high tally amber. Pressing the panel lock button again reverts the panel to its previous state.</p> <p>The button definition has no fields to configure.</p>
Previous Source	<p>The button presets the previously routed source to the currently selected destination. The operator must next press ‘Take’ to restore the previous route. This function is useful when an operator makes a route in error.</p> <p>The button definition has no fields to configure.</p> <p>The button does <i>not</i> restore the previous destination. If the user changed the destination and presses ‘Previous Source’, the take will not restore the previous route.</p>
Salvo	<p>The salvo button places the panel in <i>salvo mode</i> where the operator can scroll through the salvo list assigned to the panel (as a panel option). When the operator finds the salvo of interest, he or she presses the ‘Take’ button to execute the salvo. After the salvo executes, the panel returns to its normal mode.</p> <p>The button definition has no fields to configure.</p> <p>Pressing the salvo button again while the panel is in salvo mode resets the salvo selection to nothing. Pressing any other button while the panel is in salvo mode returns the panel to its normal mode.</p>
Source	<p>The button selects a source. The source name appears in the ‘Preset’ display.</p> <p>During configuration, when you assign a source button, a drop-down menu appears: ‘Source Device’. Choose a device from the list. The ‘None’ entry is merely a placeholder. Do not choose ‘None’.</p>
Source Master	<p>Means “source is the master” and makes the source device the master. Otherwise, the destination is the master. This button (and these concepts) apply only to machine control routes.</p> <p>The button definition has no fields to configure.</p> <p>The button is a toggle: Press it once to make the source the master (it goes high-tally); press it again to make the destination the master (the button is low-tally).</p> <p>A panel option allows you to make “source is master” the default. In this case, the button still toggles between “source is master” and “destination is master,” and the button, if present, is high-tally by default.</p> <p>The ‘Source is Master’ button is also used to initiate “broadcast” machine control routes. See Broadcast Routes on page 38.</p>
Source Mode	<p>The button places the panel in source mode. Category selections in source mode select source devices. Category buttons that are not source categories become disabled in source mode.</p> <p>Categories that include both source and destinations appear in both source mode and destination mode.</p> <p>The button definition has no fields to configure.</p>

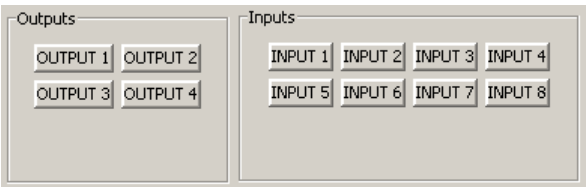
4. Configuration

Tally (GPIO) Window

Type	Description
Src/Dst Mode	The button toggles between source and destination modes. Category selections in source mode select source devices. Category selections in destination mode select destination devices.
Take	<p>In normal mode, a take button routes the preset source to the selected destination on selected level or levels.</p> <p>In salvo mode, a take button executes a selected salvo.</p> <p>A take button is disabled (and dark) until it is possible for the operator to execute a take.</p> <p>Configurers should provide the operator a ‘Take’ button. The button definition has no fields to configure.</p>
Undefined	This button type is a placeholder: during configuration, it makes the button undefined and inactive. On the actual panel, the undefined button remains unlit (dark).

Tally (GPIO) Window

Below the tree window is the tally section of the configuration page.



It has two sections: inputs and outputs. By clicking on one of the input or output buttons, you can configure the input or output.

(The NV9609 has no actual tally buttons. These buttons represent the DB25 connector at the rear. The buttons are present in the configuration page to allow you to configure the tally interface.)

If you are interested in configuring the tally interface, read Chapter 6, [GPIO](#), on page 45.

5. Operation

Chapter 5 provides operating instructions for the NV9609 control panel. It presents these topics:

- [Summary](#)
- [Operating Concepts](#)
- [Salvo Mode](#)
- [Menu Mode](#)
- [Setup Mode](#)

This chapter is intended specifically for the NV9609 panel *operator*.

Summary

As an NV9609 operator, you will be confronted initially with a relatively small and simple panel—28 buttons with four 8-character displays.

The panel's buttons can have arbitrary legends (using plastic inserts under the button caps). A button's legend should indicate its function. Some buttons can be applied differently in other modes (such as menu mode). Operators and configurers will have to communicate about the meaning of the buttons.

The alphanumeric display (4 lines of 8 characters) shows the status of takes (pending or completed) under normal circumstances. The display presents information or menu items in certain cases.

Physically, you will find

- Function buttons (e.g., select a source or lock a destination).
- Source, destination, category, level, or salvo buttons.
- Status of preset and current sources and the selected destination.

At any particular time, some of the buttons are enabled or disabled. Some are high-tally; some are low-tally; and some might be undefined. Active buttons are of two colors, green and amber.

▲ Please refer to the *NV9000-SE Utilities User's Guide* (or the NV9000-SE Utilities help files) if you are unfamiliar with the concepts used in this chapter.

Modes of Operation

The NV9609 operates as an X-Y panel. The panel routes one source to one destination at a time and (suitably configured) has control of individual router *levels*. In general, you choose a destination, optionally choose a desired breakaway level, choose a source, and press 'Take' to complete a desired route. Sources can be taken on selected levels or on all levels.

5. Operation

Summary

Level Mode

You can switch the panel in and out of *level mode* (with a ‘Level Mode’ button).

Level mode allows you to select one of the destination’s levels (by scrolling). A take in level mode is a single-level breakaway.

When the panel is not in level mode, takes occur on either all levels or selected levels of the current destination. Takes on all levels are said to be “all level.”

If the panel has multiple ‘Level’ buttons, you can perform multiple-level breakaway when the panel is not in level mode.

Secondary Modes

Secondary modes are:

- Source mode—exists briefly while you are choosing a source.
- Destination mode—exists briefly while you are choosing a destination.
- Setup mode—where the NV9609 is freshly powered up, but *disconnected from the network*. In this mode, the configurer can preset the NV9609’s panel ID and perform a few diagnostic tasks. Usually, only configurers need be concerned with setup mode.

See [Setup Mode](#) on page 42.

- Salvo mode—pressing a salvo button places the NV9609 in salvo mode, where it is expected that you will choose a salvo and then press the ‘Take’ button to execute the salvo. (The duration of a salvo is indeterminate, but usually short.)
- Menu mode—pressing a menu button places the NV9609 in “menu” mode. In menu mode, the buttons lose their normal functions and become part of a menu that changes as needed during menu operation.

There is nothing in the menu that concerns operators except button brightness. An operator may use the menu to set button brightness. Administrators and configurers may use the menu to view or change the panel ID, or to determine the software and firmware revisions.

See [Menu Mode](#) on page 39.

When the panel is not in setup mode, salvo mode, or menu mode, we say it is in *normal mode*. Normal mode might or might not include level mode.

Button Legends

There are about 23 different button functions. Typically, buttons have graphic or text legends that are plastic inserts placed under the clear button caps.

There are button templates available. Use these or your own to create button graphics. Print the graphics on clear plastic, cut the button graphics apart and insert these under the button caps.

Buttons are also color-coded to a limited degree. Green represents sources. Amber represents destinations. Those colors are used for other functions, however. High-tally (bright) buttons are those that are selected; low-tally (dim) buttons are those that are not selected. Dark (white or gray) buttons are those that are disabled.

Operating Concepts

Levels

In NV9000-SE Utilities and in the NV9000 router control system, routes occur on *levels*. A level is typically SD, HD, analog video, AES, analog audio, or machine control. Various devices are defined as sending and receiving signals on certain levels. The set of levels handled by a device belong to what is called a *level set*.

A source can be routed to a destination if it has the same set of levels, i.e., it belongs to the same named level set. A source can be routed to a destination in a different level set if the NV9000 configuration has the appropriate inter-level set mapping.

The effect of this is that when you, the operator, choose a destination, the NV9000 recognizes which source devices are allowed to be routed to the destination and limits your selection to those sources.

Breakaway

Routes can be all-level in which case they are taken on all levels defined for the destination. The acceptable sources for a route have the same levels as, or some configured mapping to, the levels of the destination.

A breakaway is where you take different sources to the same destination—on different levels.

It is not possible to take different sources to the destination on the same level. For instance, you cannot take SD from two different sources. The outcome would be noise even if you could do it. (That is because routers are not mixers.)

Level Mode

As stated earlier, you can switch the panel in and out of level mode (if the panel has a ‘Level Mode’ button). Level mode allows you to select exactly one of the destination’s levels (by scrolling). A take in level mode is a *single-level breakaway*.

When the panel is **not** in level mode, takes occur on either all levels or selected levels of the current destination. If the panel has multiple ‘Level’ buttons, you can perform multiple-level breakaway when the panel is not in level mode.

Buttons

The NV9609 has 3 classes of button functions:

- Dedicated functions, such as ‘Default State’ and ‘Chop’.
- Variable functions, such as ‘Category’, ‘Source’, or ‘Destination’. A category button identifies a specific category. A source button identifies a specific source. A destination button identifies a specific destination.
- Special functions, such as ‘Menu’, ‘Page Up’, and ‘Page Down’.

5. Operation

Operating Concepts

At present, there are 23 button types, not including “undefined” which is not a true button type:

Broadcast	Free Source	Previous Source
Category	Level	Salvo
Chop	Level Mode	Source
Clear	Menu	Source Mode
Destination	Name Set Toggle	Source is Master
Destination Mode	Page Down	Src/Dst Mode
Destination Lock	Page Up	Take
Destination Protect	Panel Lock	Undefined

Broadcast

A broadcast button applies to a data (or machine control) level only. The button assigns one controlling device (the master) to multiple controlled devices (the slaves). The function is useful in dubbing applications. See [Broadcast Routes](#) on page 38 for more information.

▲ Pressing the ‘Broadcast’ button turns off the ‘Source is Master’ button and vice versa.

The default button text is “Broadcast” but a broadcast button can have any legend.

Category

A category button selects a category. The button operates in source mode or destination mode or both. In source mode, it selects a source category. In destination mode, it selects a destination category. After you press a category button, you must then press number or suffix buttons to perform a device selection within the category. You may also use scroll buttons (‘Page Up’ and ‘Page Down’) to select device indexes and suffixes within the category if the panel has scroll buttons.

When the panel is in source mode, a category button places the category mnemonic in the ‘Preset’ display. As you enter suffixes to select a source, the name of a source constructed from the category name and suffixes thus far entered appears in the ‘Preset’ field.

In destination mode, a category button places the category mnemonic in the ‘Preset’ display. As you enter suffixes to select a destination, the suffixes are appended to the contents of the ‘Preset’ field, and the name of a destination constructed from the category name and suffixes thus far entered appears in the ‘Destination’ field.

▲ Source category buttons operate in level mode; destination category buttons do not.

When the panel is in source mode, category buttons that are not configured with a source category become disabled. When the panel is in destination mode, category buttons that are not configured with a destination category become disabled. Category buttons configured with both source and destination categories are not disabled in either mode. Category buttons that have only a suffix configured are disabled until a category becomes selected.

A typical NV9609 configuration has a “keypad” with which you can enter device indexes or suffixes. Keypad buttons are actually category buttons. Any keypad button can also be a source category button and a destination category button. The button legend should indicate its functions.

The names of devices in categories are composed of the category name followed by one or more suffixes. NV9000-SE Utilities allows configurers to designate a separator character which is inserted between the parts of the device name. (Device names are limited to 8 characters, however.)

- ▲ You cannot perform a name set change using a ‘Nameset Toggle’ button while a category selection is in progress.

Chop

When a “chop” function is supported by a router, the button is a toggle that enables and disables “chop.” Chop is a rapid switching of the selected destination device between the current source and the preset source.

The chop function is used to test system timing and would **not** be used during normal operation.

The default button text is “Chop” but a chop button can have any legend.

Select a preset source and press ‘Chop’ to start the chop function. Press ‘Chop’ again to stop the chop function.

Clear

The ‘Clear’ button reverts the panel to the most recent preset. (It does not cause any changes to the routers, control system, or its signals.)

You may think of this as a “backspace” or “cancel” key. During category/suffix device selection, it erases the suffixes you entered in reverse order.

(If you are in level mode or in salvo mode, ‘Clear’ brings you back to normal mode.)

Destination

The button selects a destination. The destination name appears in the ‘Destination’ display. The destination is the target of an upcoming take, which will route a source to that destination.

Pressing a destination button has two side effects: it clears—or partially clears—the ‘Preset’ display, and (2) it turns off the ‘Take’ button if it is on.

Destination Mode

The button places the panel in destination mode. Category selections in destination mode select destination devices. Category buttons that are not configured with destination categories become disabled.

Destination devices are represented on the ‘Destination’ display.

Categories that include both source and destinations appear in both source mode and destination mode.

Destination Lock

This button is a toggle that sets or clears a *lock* on the current destination. The lock can be removed at the panel that originally set the lock, at a panel that has the same user ID, or by a forced release at any panel.

- ▲ The NV9609 provides no explicit indication, during operation, whether a destination is locked or unlocked.

5. Operation

Operating Concepts

Destination Protect

This button is a toggle that sets or clears a *protect* on the current destination device. The protect can be removed at the panel that originally set the protect, at any panel that has the same user ID, or by a forced release at any panel.

- ▲ **Note:** a protect prevents *others* from routing to a destination; a lock prevents *anyone*—even the user who issued the lock—from routing to the destination.
- ▲ You may lock a protected destination, but you cannot change a locked destination to a protected destination directly. You must first unlock it.
- ▲ The NV9609 provides no explicit indication, during operation, whether a destination is locked or unlocked.

Free Source

The button selects a pre-defined phantom device that can be used to release or “free” devices on the data (machine control) level. A free source is also used with tielines to free the tieline for others to use. The actual free source used is defined in the NV9000 configuration.

Use this button as if it were a source button.

Level

The button selects a level. If the button’s level is not defined for the current destination, the button is disabled however.

Level buttons are not available in level mode. A level is selected differently in level mode.

If the panel has multiple level buttons, operators can select multiple levels. When all level buttons are *deselected*, a take is “all-level.” When one or more level buttons are selected, a subsequent take occurs on those levels.

You must select level(s) before selecting the source, otherwise the level selection does not work and the take will be all-level.

The color of the level buttons reflect the levels of the current destination in a limited way. (With just two colors, it is not possible to represent all possible combinations of sources taken to a destination.) If the destination has breakaway levels, some of the level buttons will be amber; some will be green. Otherwise, they will all be green.

If you want to examine the levels of a destination, press ‘Level Mode’ and scroll through the levels. The ‘Status’ display shows the source for each individual level as you scroll and shows whether the source is a breakaway source.

Level Mode

The ‘Level Mode’ button toggles the panel in and out of level mode. “All Level” appears in the ‘Info’ display when level mode is turned off.

Level mode allows operators (1) to examine the levels of the current destination and (2) to perform single-level takes.

Source buttons and destination buttons, and several other button types, are disabled in level mode. The only means to select a source in level mode are *source category buttons*.

To effect a single-level take in level mode, (1) scroll to choose a level, then (2) start the selection of a source (using a category button) while in level mode. The panel exits level mode immediately after you start the source selection. Complete the source selection.

The level chosen in level mode remains in effect for the take. After completing the source selection, press the ‘Take’ button which will have become enabled.

- ▲ The ‘Level Mode’ button is disabled until a destination has been selected.

Menu

This button puts the panel in menu mode and produces a menu on the buttons and in the displays that provides access to a variety of panel functions.

Without the button, the operator has no access to the menu functions.

By pressing certain buttons, you makes menu selections and enter data (such as panel ID) or change brightness values. When the panel is in menu mode, you must press the ‘Menu’ button to cycle through the functions of the menu. See [Menu Mode](#) on page 39.

The button definition has no fields to configure.

Name Set Toggle

An ‘Name Set Toggle’ button toggles the panel between its default name set and the “system name” set. Whichever name set you select becomes the “active” name set.

- ▲ ‘Name Set Toggle’ buttons are disabled while a category selection is in progress.
- ▲ The panel requires that category/suffix device selection be performed using the names in the system name set. However, it displays the device you selected using the active name set. We recommend that you switch to the system name set prior to category/suffix device selection and return to your preferred name set afterward.

Page Down

The button scrolls *down*. The meaning of scrolling varies with context:

- Scrolling devices within a category: ‘Page Down’ moves to the next *lower* device in the category’s device list. (Example: if the current device is CAM_4, the next lower device would probably be CAM_3, subject to the device definitions in the NV9000 configuration.)
Scrolling devices is possibly only when a category selection is in progress.
- Scrolling salvos in salvo mode: ‘Page Down’ moves to the salvo with the next *lower* index in the panel’s salvo list. (It is expected that if the panel has a salvo button, it also has a salvo list.)
- Scrolling levels in level mode: ‘Page Down’ moves first to “All levels” and then to the first level and then to the *next* levels defined for the destination. Using the ‘Page Down’ button, you can cycle through all the levels (including “All Levels”) indefinitely.

Page Up

The button scrolls *up*. The meaning of scrolling varies with context:

- Scrolling devices within a category: ‘Page Up’ moves to the next *higher* device in the category’s device list. (Example: if the current device is VTR_12, the next higher device would probably be VTR_13, subject to the device definitions in the NV9000 configuration.) Scrolling devices is possibly only when a category selection is in progress.

5. Operation

Operating Concepts

- Scrolling salvos in salvo mode: ‘Page Up’ moves to the salvo with the next *higher* index in the panel’s salvo list. (It is expected that if the panel has a salvo button, it also has a salvo list.)
- Scrolling levels in level mode: ‘Page Up’ moves first to “All Level” and then to the last level and then to *previous* levels defined for the destination. Using the ‘Page Up’ button, you can cycle through all the levels (including “All Level”) indefinitely.

Panel Lock

The button prevents accidental changes to the panel settings, especially router crosspoints. When the panel is locked, the button array becomes blank except for the Panel Lock button which becomes high tally amber.

The button is a toggle: press the panel lock button again to revert the panel to its previous state.

Previous Source

The button presets the previously routed source to the currently selected destination. To restore the previous route, you must next press ‘Take’ assuming you have not changed the destination. This function is useful when you make a route in error.

The button does *not* restore the previous destination. If you changed the destination and press ‘Previous Source’, the take will not restore the previous route.

Salvo

The salvo button places the panel in *salvo mode*. In salvo mode, most buttons become disabled. In salvo mode, you can scroll through the salvo list assigned to the panel. When you find the salvo of your choice, press the ‘Take’ button to execute the salvo. After the salvo executes, the panel returns to its normal mode.

Pressing the salvo button again while the panel is in salvo mode to reset the salvo selection. Press any other button (such as ‘Clear’) while the panel is in salvo mode to return the panel to its normal mode.

Source

The button selects a specific source. The source name appears in the ‘Preset’ display.

Selecting a source activates the ‘Take’ button, which you must press to complete the route.

Source Mode

The button places the panel in source mode. Category selections in source mode select source devices. Category buttons that are not source categories become disabled in source mode.

Categories that include both source and destinations appear in both source mode and destination mode.

In source mode, a category selection appears at the beginning of the ‘Preset’ display.

Src/Dst Mode

The button toggles between source and destination modes. Category selections in source mode select source devices. Category selections in destination mode select destination devices.

Source is Master

Means “source is the master” and makes the source device the master. Otherwise, the destination is the master. This button (and these concepts) apply only to machine control routes.

The button is a toggle: Press it once to make the source the master (it goes high-tally); press it again to make the destination the master (the button is low-tally).

The ‘Source is Master’ button is also used to initiate “broadcast” machine control routes. See [Broadcast Routes](#) on page 38.

During data level (i.e., machine control) takes, this button makes the source device the master. Otherwise, the destination is the master.

The button is a toggle that reverses the direction of data routing. For example, if the destination is the master and the source is the slave, pressing a ‘Source is Master’ button reverses their roles. Pressing the button again reverses the roles.

The ‘Source is Master’ button is used to initiate “broadcast” control routes. See [Broadcast Routes](#) on page 38.

The panel can be configured so that “source is master” is the default state or so that “destination is master” is the default. The button still toggles between “source is master” and “destination is master.”

▲ Pressing the ‘Source is Master’ button turns off the ‘Broadcast’ button and vice versa.

Take

In normal mode, a take button routes the preset source to the selected destination on selected level or levels.

In salvo mode, a take button executes a selected salvo.

A take button is disabled (and dark) until it becomes possible for the operator to execute a take.

Undefined

An undefined button cannot be used and appears dark (unlit) on the panel. The term “undefined” has meaning primarily to the configurer.

Lock, Protect, and Release

In a multi-user system, routes made by one user can be made safe from being accidentally or maliciously change by another user.

Definitions

Owner	The user ID of a panel where a lock or protect was issued.
Source lock	No one can use the source.
Source protect	No one but the owner can use the source.
Destination lock	No one can route to the destination.
Destination protect	No one but the owner can route to the destination.
Release	To remove a lock or protect.

Some control panels can lock or protect both sources and destinations. However, *The NV9609 provides locks and protects for destinations only.*

5. Operation

Operating Concepts

A forced release is when the lock or protect is removed by someone other than the owner. A forced release can be performed:

- At any panel configured with release mode set to “forced release”.
- At any other panel with “force release” enabled.

The ‘Destination Lock’ and ‘Destination Protect’ buttons are toggles. Press the lock (or protect) button to lock (or protect) a destination. Press the button again to release the lock (or protect).

Takes

Following are brief instructions on how to perform a take under 3 scenarios.

Scenario 1 — All Level

This scenario is the simplest of the three.

- 1 If required, select a destination.

You can use a dedicated destination button if you have one for the destination.

Otherwise, switch to destination mode if your panel is in source mode.

Press a category button, followed by one or more suffix buttons. You can use scroll buttons to browse through devices in the category. The name of your intended destination appears in the ‘Destination’ display (and the ‘Preset’ display while you are entering the device’s suffixes).

- 2 Select a source.

You can use a dedicated destination button if you have one for the source.

Otherwise, switch to source mode if needed.

Press a category button, followed by one or more suffix buttons. You can use scroll buttons to browse through devices in the category. The name of your intended source appears in the ‘Preset’ display.

- 3 When you have chosen the desired source and destination, press ‘Take’. That is all. (The ‘Take’ button remains disabled until you have selected a source and a destination.)

Scenario 2 — Single Level

This scenario requires that you enter *level mode* after selecting a destination. The result is a take on a single level.

- 1 If required, select a destination.

You can use a dedicated destination button if you have one for the destination.

Otherwise, switch to destination mode if your panel is in source mode.

Press a category button, followed by one or more suffix buttons. You can use scroll buttons to browse through devices in the category. The name of your intended destination appears in the ‘Destination’ display (and the ‘Preset’ display while you are entering the device’s suffixes).

- 2 Press the ‘Level Mode’ button.

Many of your buttons become disabled in level mode. Among those that remain are source category buttons, a ‘Clear’ button, and the scrolling buttons.

Choose a level by scrolling up or down. Your level selection appears in the ‘Information’ display. (The levels are those defined for the destination.) One of the permitted level choices is “All Level.”

3 Select a source

At this point, the panel is still in level mode.

Press a category button. (It will be a source category.) The panel immediately leaves level mode. All normally enabled buttons become enabled again.

Press one or more suffix buttons. You can use scroll buttons to browse through devices in the category. The name of your intended source appears in the 'Preset' display.

4 When you have chosen the desired source and destination, press 'Take'. That is all. (The 'Take' button remains disabled until you have selected a source and a destination.)

The take occurs on the level you selected, from the source you selected. Other levels of the destination remain unaffected.

Depending on panel options, your panel might either revert to an all-level state after a suitable time-out period following the take or return to the all-level state immediately.

Scenario 3—Multiple Levels

This scenario requires that you **not** enter level mode and requires that your panel have at least one level button, with one level button for each of the levels you potentially want to take simultaneously.

1 If required, select a destination.

You can use a dedicated destination button if you have one for the destination.

Otherwise, switch to destination mode if your panel is in source mode.

Press a category button, followed by one or more suffix buttons. You can use scroll buttons to browse through devices in the category.

2 Press one or more 'Level' buttons.

Level buttons are toggles. Press one to select a level; press it again to deselect the level.

▲ There is an exception to this: if you press a level button while all level buttons are high-tally, doing so turns off all those you did not press, leaving the button you did press high-tally.

Continue to toggle the level buttons until the buttons for the levels you want are high-tally.

3 Select a source.

You can use a dedicated destination button if you have one for the source.

Otherwise, switch to source mode if needed.

Press a category button, followed by one or more suffix buttons. You can use scroll buttons to browse through devices in the category. The name of your intended source appears in the 'Preset' display.

4 When you have chosen the desired source and destination, press 'Take'. That is all. (The 'Take' button remains disabled until you have selected a source and a destination.)

5. Operation

Operating Concepts

Name Sets

NV9000-SE Utilities allows configurers to define multiple *name sets*. Each name set contains aliases (alternate names) for any and all devices in the NV9000 system. The aliases can appear in the displays of your panel.

Further, your panel can have a ‘Name Set Toggle’ buttons that allows you to switch between the “default” name set and the “system name” set. Whichever name set you are currently using is the *active* name set.

There is always a ‘System Name’ set. That name set includes the device names defined within the NV9000 configuration. Any other name sets are optional.

Device selection using categories and suffixes requires that you enter device names using the *system name set*. However, the display shows the device name as it is represented in the *active name set*.

For example, suppose the system name for a destination is “VTR_42” and its alias is “Prod_A.” Follow these steps to select the device using category selection:

- 1 Switch to destination mode if necessary.
- 2 Press a VTR category button. (Suffix buttons become enabled.)
- 3 Press 4, then 2. The device is selected, but the name appearing in the destination display is “PROD_A.”

In this example, you could press the ‘Name Set Toggle’ button a number of times to see that PROD_A and VTR_45 are, in fact, the same device.

If you are using aliases, we recommend that you switch to the system name set during device selection and switch back to your preferred name set afterward.

Note that when the panel is displaying aliases, and a device does not have an alias, the panel displays the system name.

Broadcast Routes

It is easy and normal to route a source to multiple destinations for audio and video routers. In contrast, machine control routes are typically point-to-point. Therefore, to control multiple machines requires that you perform a “broadcast” operation using a ‘Broadcast’ button.

During broadcast, the source device controls one or more destination devices.

Making Broadcast Routes

Follow these steps to broadcast control signals:

- 1 Ensure that the panel is in “source is master” mode. It is either in “source is master” mode by default or you must press a ‘Source is Master’ button to activate the mode. The mode is active when the ‘Source is Master’ button is high-tally.
- 2 Select a destination and preset a source. Then press ‘Take’.
- 3 Press the ‘Broadcast’ button.
- 4 Select a destination and preset a source. Then press ‘Take’.
- 5 Repeat steps 3 and 4 to add other machines to the set of controlled devices.

Implicit in the 'Broadcast' button is the "source is master" mode. It is not necessary to press 'Source is Master' repeatedly. The reason you must press 'Source is Master' the first time is that "broadcast mode" is not yet active.

Removing Broadcast Routes

To cancel a route, route the source to another destination normally.

To remove a destination from the set of broadcast destinations, route another source (e.g., the free source) to the destination.

Salvo Mode

The panel must be configured to have a salvo list. Otherwise, salvo mode does not function.

The salvo button places the panel in *salvo mode* where the operator can scroll through the panel's salvo list. When you find the salvo of your choice, press the 'Take' button to execute the salvo. After the salvo executes, the panel returns to its normal mode.

Press the salvo button again while the panel is in salvo mode to reset the salvo selection to nothing.

Press any other button while the panel is in salvo mode to return the panel to its normal mode.

Menu Mode

The NV9609 enters menu mode if it has a menu button and you press the menu button.

▲ The menu uses some of the buttons on your panel. The legends and functions of these buttons in normal operating mode do not apply while the panel is in menu mode.

While the panel is in menu mode, you will use the menu button to cycle through the various parts of the menu. There are 8 parts:

- Panel ID
- User ID
- Software version
- Application Version
- Panel name
- User name
- Boot version
- Low button illumination level

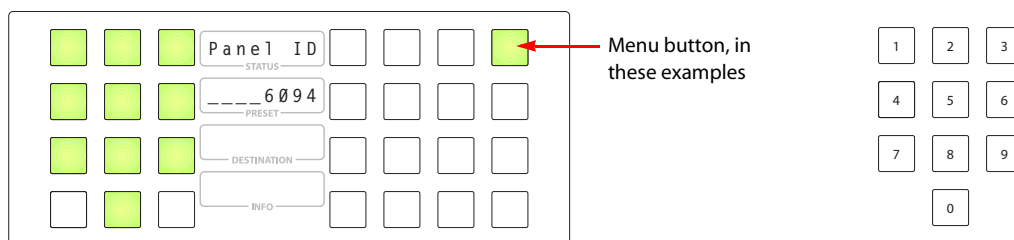
Configurers should ensure that the menu button is not part of the numeric keypad that becomes available in the panel ID submenu. See [Panel ID](#), following.

5. Operation

Menu Mode

Panel ID

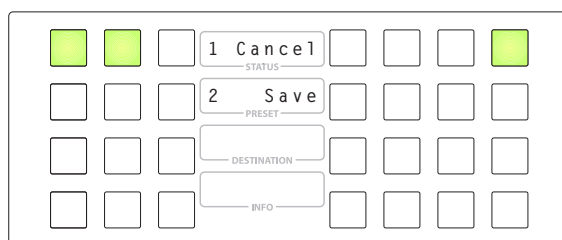
The panel ID submenu appears first when you press the menu button:



The illuminated buttons at the left form a numeric keypad on which you may enter a panel ID (if the panel was configured to allow it). The numbers on the keypad are shown at the right.

▲ To use the keypad, you will have to disregard whatever legends are on the buttons.

After you enter a panel ID, press the menu button again. A confirmation message appears:

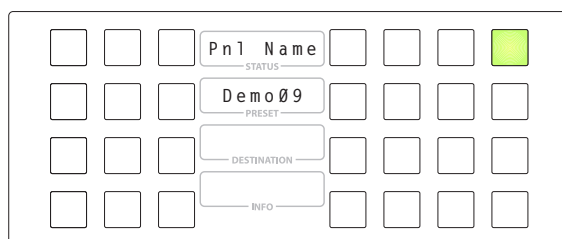


Press the left button to cancel the operation or press the right button to save your new panel ID. After you save the panel ID, the panel leaves menu mode and returns to normal mode.

If you do not want to change the panel ID, simply press the menu button again to skip to the 'Panel Name' submenu.

Panel Name

The second submenu merely displays the configured panel name. You cannot change it.



User ID

The third submenu merely displays the configured user ID. You cannot change it.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Usr ID	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
			STATUS				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			PRESET				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			DESTINATION				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			INFO				

User Name

The fourth submenu merely displays the configured user name. You cannot change it.

The diagram shows a 4x4 grid world. The robot is at the top-left cell (0,0). The goal is at the top-right cell (0,3). There are obstacles at (1,1), (1,2), (2,1), (2,2), (3,1), and (3,2). The cells are labeled as follows:

Robot			Goal
	Obstacle	Obstacle	
	Obstacle	Obstacle	
	Obstacle	Obstacle	

Software Versions

The fifth submenu displays the software version:

A 4x9 grid of squares. The top row contains three empty squares, followed by a square with the label 'S', a square with the label 'STATUS', and three empty squares. The second square in the top row is highlighted in light green. The second row contains three empty squares, followed by a square with the label 'SV0921-0', a square with the label 'PRESET', and three empty squares. The third row contains three empty squares, followed by a square with the label '5', a square with the label 'DESTINATION', and three empty squares. The fourth row contains three empty squares, followed by a square with the label 'INFO', and three empty squares.

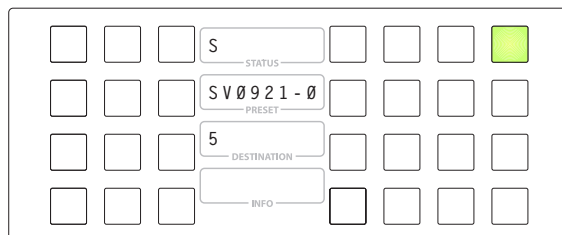
The sixth submenu displays the boot version:

[illegible]

5. Operation

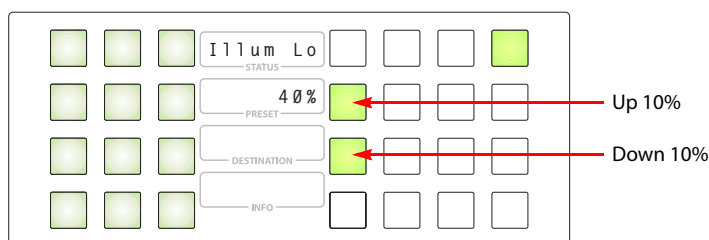
Setup Mode

The seventh submenu displays the application version:



Button Illumination

The last submenu displays the illumination setting:



The 12 buttons on the left indicate the low illumination level.

The 'Up' and 'Down' buttons change the illumination level by 10%. The default level is 40%. You can compare the low illumination level with the high illumination level (100%) of the buttons on the right.

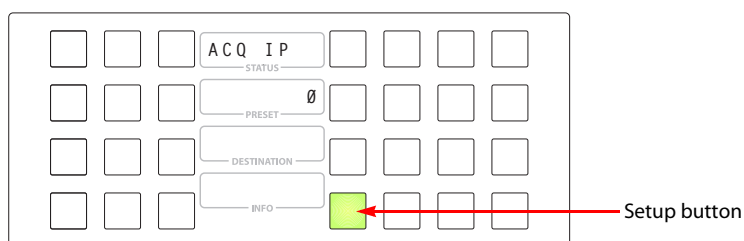
When you are satisfied with the illumination level you have chosen, press the menu button once again. At this last step, the panel leaves menu mode and returns to normal mode.

Setup Mode

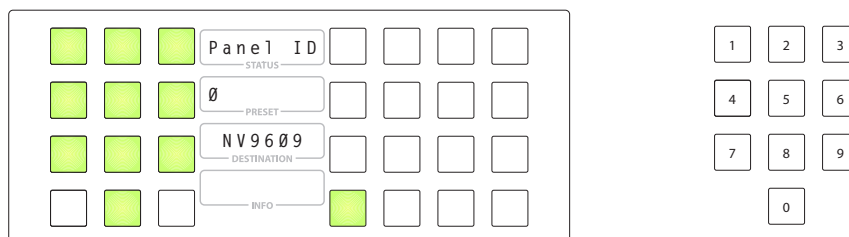
Setup mode occurs when the NV9609 is disconnected from its network and is freshly powered up. In setup mode, you can set or change the panel ID, identify the software version, and perform a test of the panel's buttons. It is in setup mode that you must initially set the panel ID.

▲ It can take several seconds for the buttons to appear.

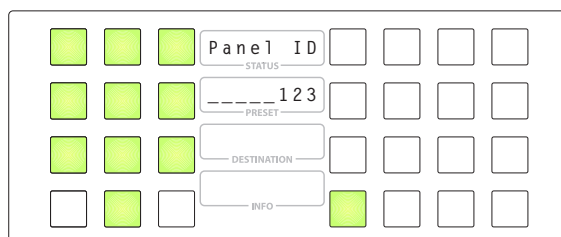
The panel powers up with 1 button (here called the "setup" button) illuminated in green and a display of the current panel ID. The panel ID is usually set to 0 at the factory:



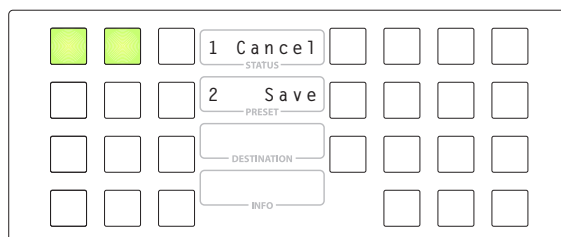
Press the setup button to proceed to the first part of setup which is to set the panel ID:



The buttons on the left side of the panel light up and form a numeric keypad. The numbers on the keypad are shown above. Enter a panel ID (up to 8 digits):



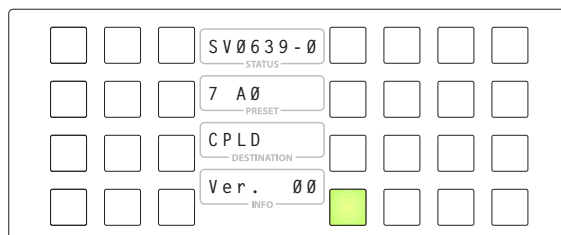
Press the setup button to complete the entry. A confirmation message appears:



Press 1 (the button on the left) to cancel your entry or press 2 (the button on the right) to save your entry. Thereafter, your panel will have the panel ID you assigned, unless you or someone else changes it.

If you do not want to change the panel ID, just press the setup button again, without entering a number, to proceed to the next step.

Following the panel ID is the display of the software version:

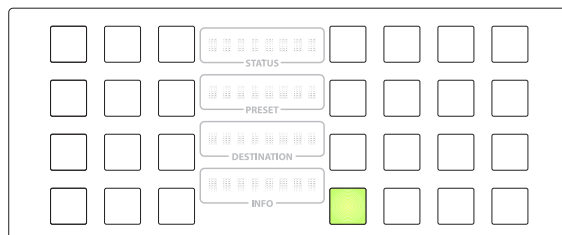


The software part number and its revision number wrap around the first two lines of the display. In the illustration above, the part number is SV0639-07 and the revision is A0. The CPLD version number is 00.

5. Operation

Setup Mode

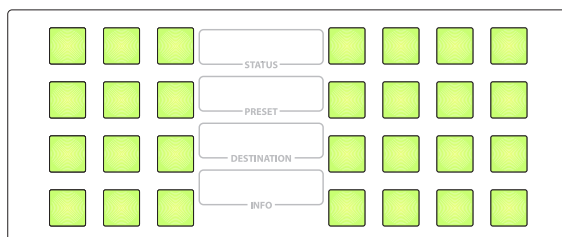
Press the setup button to proceed to the color test:



In this test, all the dots in each character of the 4 displays should be illuminated.

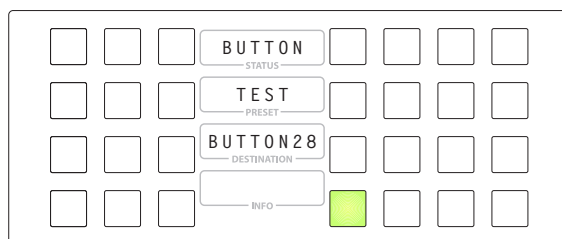
Press the setup button to proceed to the color test. This test has 4 parts:

- All buttons turn low-tally amber.
- All buttons turn high-tally amber.
- All buttons turn low-tally green.
- All buttons turn high-tally green. This is an example:



To proceed through this test, press the setup button (still in the same place although it is now changing color) 3 more times.

Finally, you will reach the button test:



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

Press any button to test it. The button will flash a few times rapidly and the number of the button will appear on the display (as shown). The button numbering is shown at the right.

Pressing the setup button (i.e., button 25) will terminate the button test and return you to the initial display of setup mode. At this point—if you have assigned your NV9609 a suitable panel ID—you may connect your NV9609 to the panel network of your NV9000 system.

6. GPIO

Chapter 6 provides information about the tally (GPIO) interface. It discusses the following topics:

- [The Interface](#)
- [GPIO Configuration Concepts](#)
- [Configuring Outputs](#)
- [Configuring Inputs](#)

The Interface

The tally interface includes 8 optically isolated inputs and 4 solid-state relay outputs (also optically isolated). Tally devices you connect to inputs can trigger events—through the NV9609—in the router control system. The router control system can trigger events that—through the relays in the NV9609—switch your tally devices.

The DB25 connector, labeled “GPI Interface” at the rear of the NV9609 presents the tally signals. There are 8 input signals and 4 pairs of output signals.

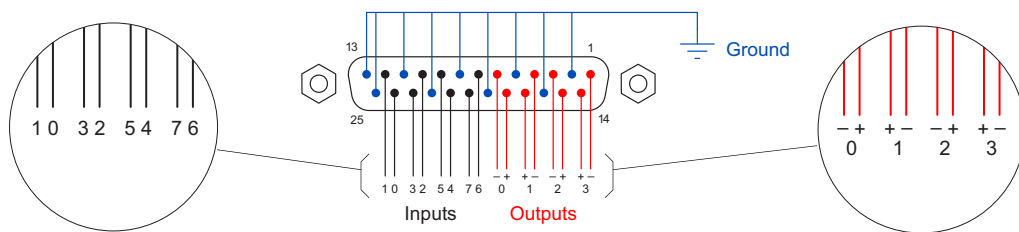


Figure 6-1. GPI Interface

Input

The tally inputs expect contact closure to ground, through the ground pins on the connector, to trigger a GPI input event.

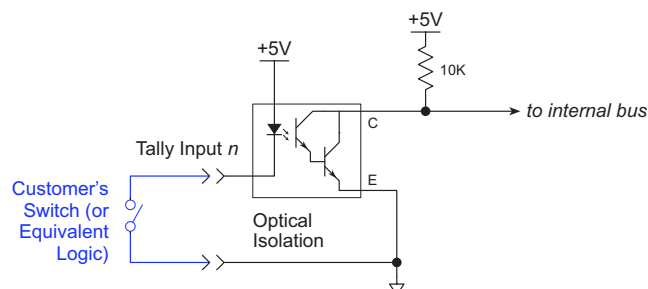


Figure 6-2. GPI Input

When the input transitions off or transitions on, the NV9609 notifies the router control system, which carries out the task defined for the input (if a task has been configured).

6. GPIO

GPIO Configuration Concepts

During contact closure, a current of 1.2mA flows. A maximum of 48 VDC can be applied to the tally input for less than 5 seconds without failure. No voltage above 5 VDC should be continuously applied.

Output

A tally output is a solid state relay (no audible click) with a maximum resistance of 10Ω and current capability of 150mA. It can withstand 200 VAC.

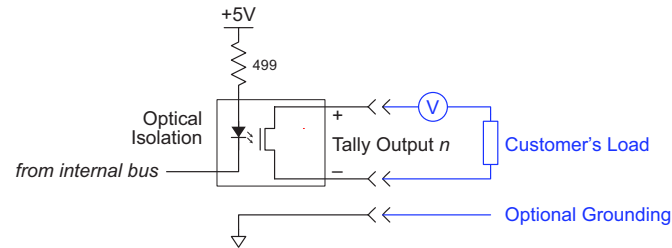


Figure 6-3. GPI Output

When a condition (defined for the relay) occurs, the router control system notifies the NV9609 which then opens or closes the relay. The relay switches the customer's circuit on or off. (It does not power the circuit. Customers must provide their own power.)

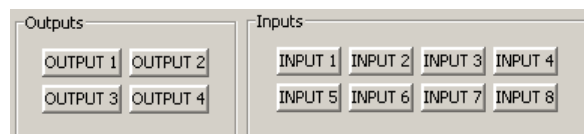
GPIO Configuration Concepts

These are the I/O characteristics of the NV9609's tally interface:

- Eight optically isolated inputs (sometimes called GPIs) that can be configured to trigger an event when the input transitions from off to on and to trigger another event on a transition from on to off. Events include:
 - Execute a salvo.
 - Route the "previous source" switched by *any* panel to a destination.
 - Route the "previous source" switched by *this* panel to a destination.
 - Route a source to a destination.
- Four relays that can be configured to switch on a number of conditions:
 - One or more routes occurring on specific levels.
 - Conditions involving output ports (destination, level).
 - A transition on one or more of the panel's tally inputs.

The GPIO Section of the NV9609 Page

SE's NV9609 configuration page provides a GPIO section, below the tree window:



Click on a button under ‘Outputs’ to configure one of the 4 tally outputs.

Click on a button under ‘Inputs’ to configure one of the 8 tally inputs.

▲ There are no actual GPIO *buttons* on the NV9609 control panel.

Configuring Outputs

Clicking an output button (one of 4) displays a “Relay Rule” dialog for the output:

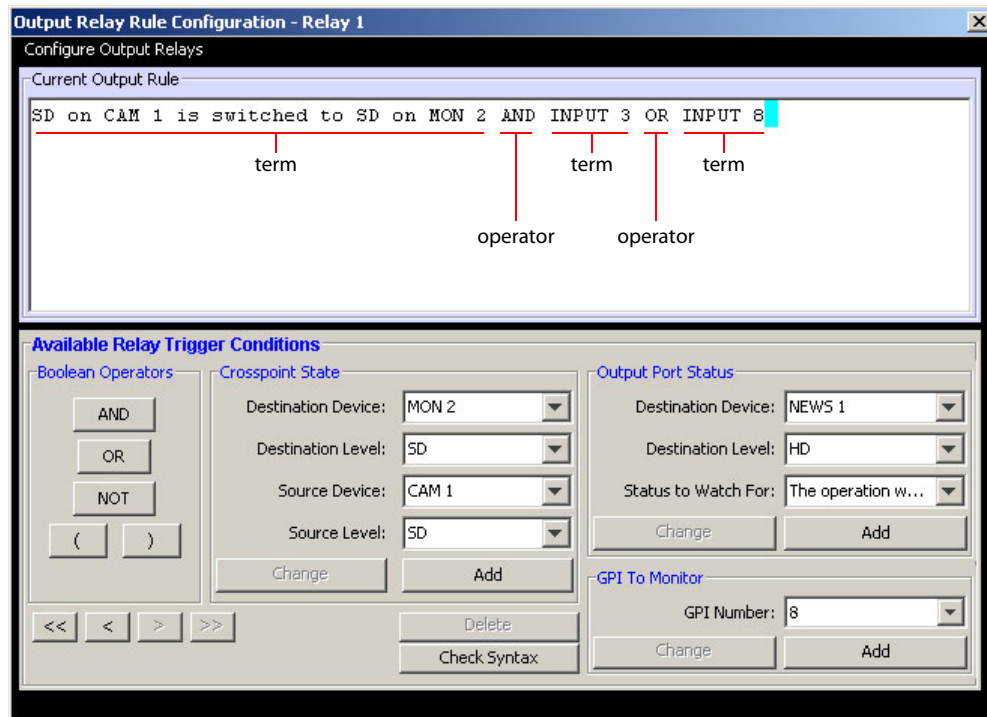


Figure 6-4. Relay Rule Dialog

In this dialog, you create a Boolean expression involving sources destinations, port status, and GPI (input) status. When the conditions of the Boolean expression are met (i.e., the expression is “true”) the relay closes. When the conditions are not met, the relay opens. Figure 6-4 shows one such Boolean expression.

Boolean expressions comprise *terms* and *operators*. The operators include those indicated on the left: AND, OR, and NOT. Expressions can be parenthesized to control the order of evaluation. Operator precedence is normally NOT > AND > OR. All parenthesized expressions are evaluated first; expressions in nested parentheses are evaluated before those in outer parentheses.

Terms (i.e., operands) are generated by choosing entries in the other fields in this dialog and clicking ‘ADD’. The example shows the following:

Dest. Device: MON2 Dest. Level: SD
Source Device: CAM1 Source Level: SD

Choosing these items (and clicking ADD) produces the Boolean sub-expression:

SD on CAM1 is switched to SD on MON2

6. GPIO

Configuring Outputs

In Figure 6-4, that sub-expression is ANDed with another sub-expression

```
INPUT 3 OR INPUT 8
```

The relay will turn on when the *entire* expression is true. That is, when the switch occurs and either of the inputs (3 or 8) transitions from off to on.

(To allow a relay to switch when an input transitions from on to off, precede the input term by “NOT.” For example, the expression

```
INPUT 3 OR NOT INPUT 8
```

will evaluate TRUE when either input 3 goes on or input 8 goes off.)

You can also include one or more sub-expressions regarding the state of output ports. You must choose a entry in the drop-down menu. These are the choices:

The operation was successful	Destination port locked
Destination port protected	Router offline / unavailable
No tieline available	Used as master point to point
Used as master without responses	Used as broadcast master
Used as slave point to point	Used as slave without responses
Used as broadcast slave	

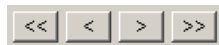
As an example, choosing ‘Used as broadcast slave’, device VTR3, and level CTRL for output port status produces the sub-expression:

```
CTRL on VTR3 has status of ‘Used as broadcast slave.’
```

which you can combine with other sub-expressions as you require.

The actual logic takes place in the router control system, based on the state of the NV9609 inputs and other system-wide events. The router control system sends signals to the NV9609 instructing it to open or close its relays.

Four arrow buttons at the lower left corner of the relay dialog allow you to traverse the expression you are building:



The left double arrows highlights the first term or operator in the expression. The right double arrow positions you at the very end of the expression where you may add more items.

The single arrows select and highlight the previous or next terms, operators, or spaces between terms and operators. If you wish to change a term, you may highlight it, reconstruct the term in the appropriate entry fields, and click the ‘Change’ button to effect the change.

Using the arrows is the only way to position between two items or at the end of the expression. You can double-click a term or an operator to select it directly.

You can click ‘Check Syntax’ to evaluate the syntax of your complete expression. Generally, an syntax error will have occurred because you forgot an operator between terms or you have an extra operator at the end. You can click ‘Delete’ to delete a selected term.

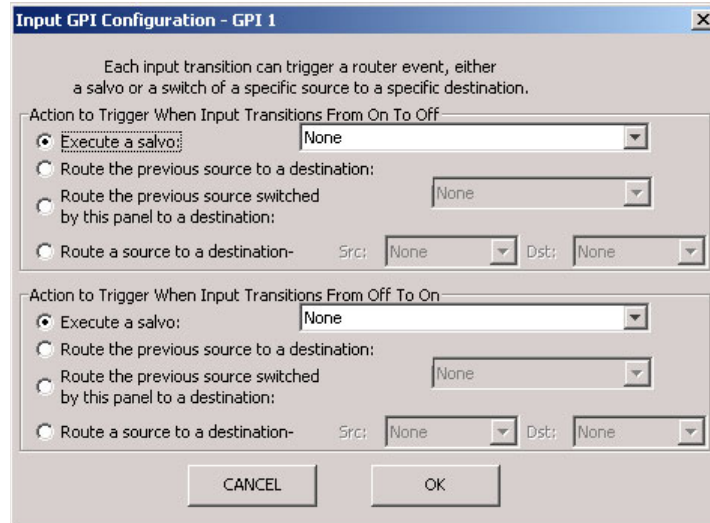
This is a summary of Boolean operations:

- All operands evaluate either TRUE or FALSE.
- AND = true if ALL terms are true; false if ANY term is false.
- OR = false if ALL terms are false; true if ANY term is true.
- NOT = true if term is false; false if term is true (i.e., negation).

▲ Relay output expressions can be as rich (or complex) as you require.

Configuring Inputs

Clicking an input button (one of 8) displays the GPI input dialog:



An event is signalled when a transition occurs on the input from on to off or from off to on. You can configure the NV9609 to recognize either occurrence on any of the 8 inputs, and specify one of 4 behaviors for each event or both:

- 1 Execute a salvo.

If you choose this behavior, select a salvo ID in the salvo drop-down list.

Note: Although it is not evident in the GPIO input dialog (or anywhere else), a ‘Previous Source’ command in a salvo chooses the most recent source that is *different* from the current source (for a designated destination).

- 2 Route the “previous source” (that was switched by **any** control panel) to a destination, even if it is the same as the current source.

If you choose this behavior, select a destination in the destination drop-down list.

- 3 Route the “previous source” switched by **this** panel to a destination, even if it is the same as the current source.

If you choose this behavior, select a destination in the destination drop-down list.

- 4 Route a source to a destination.

If you choose this behavior, select a source and a destination in the two drop-down lists.

GPIO Summary

The NV9609 has 4 relays that can switch on or off your external devices, based on (1) NV9609 input transitions and (2) events in the router control system.

Its 8 inputs can be switched on or off by your external devices. When an input transitions on or off, the NV9609 can respond with one of 4 actions, such as executing a salvo. (It is the system that actually executes the salvo.)

6. GPIO

Configuring Inputs

7. Technical Details

Chapter 7 provides electrical and mechanical specifications for the NV9609. It discusses these topics:

- [Power Specifications](#)
- [NV9609 Specifications](#)
- [Environmental Specifications](#)
- [Defaults](#)
- [Drawings](#)

Power Specifications

Table 7-1 provides power specifications for the NV9609 control panels.

Table 7-1. NV9609 Power Specifications

Specification	Detail
DC power	External power supply: 12 VDC \pm 10%, 5 A.
Power consumption	\leq 10 W
Regulatory	UL listed and CE compliant.

Table 7-2 provides specifications for the PS0001 power supply.

Table 7-2. Power Supply Specifications

Specification	Detail
AC power	90–264 VAC (127–300 VDC), 47–447 Hz. Inrush current $<$ 50 A at 230 VAC, cold start, at 25°C, Input current $<$ 2.0 A rms at 115 VAC; $<$ 1.0 A at 230 VAC.
DC power	\leq 60 W, 12 VDC, 5 A (5.4 A peak), Regulation \pm 2%. Ripple \leq 120 mV.
Efficiency	Efficiency $>$ 80% at full load typical, 115 VAC.
Weight	1.085 lb (0.492 kg).
Regulatory	UL Listed and CE Compliant.

7. Technical Details

NV9609 Specifications

The power supply is an Miranda PS0001-00:

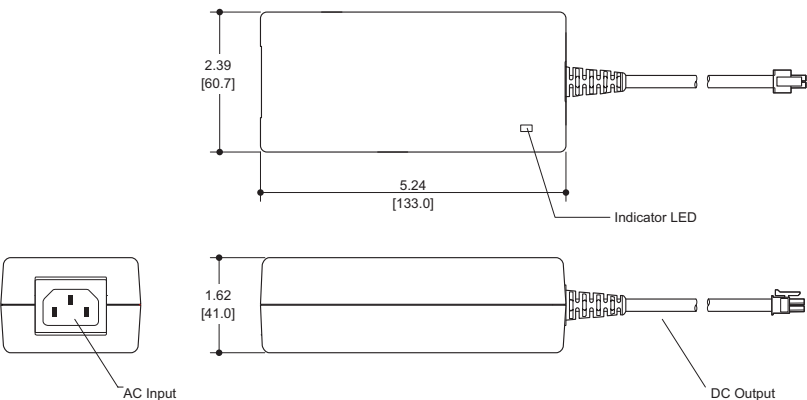


Figure 7-1. The power output has Molex 4-pin plug. See [Power Cord Retention](#) on page 58.

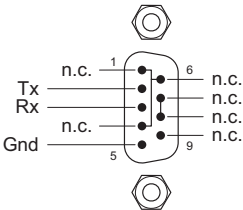
NV9609 Specifications

Table 7-3 provides specifications for the NV9609.

Table 7-3. NV9609 Physical Specifications

Specification	Detail
Dimensions	Height: 3.46" (87.9 mm), fits EIA 2 RU (3.5" or 88.9 mm), Width: 8.0" (203.2 mm). The panel mounts in one of the two apertures of the main bracket of the NV9609-RMK (rack-mounting kit) which is 19" wide and 3.47" high (2RU).
Depth	1.05 ± 0.01" (26.7 mm), enclosure. 1.65" (41.9 mm) overall.
Power	≤ 10 W
Weight	1.085 lb (0.492 kg).
Connectors	Power: 2 connectors, Molex 4-pin, keyed. Ethernet: 1 connector, 10/100baseT, RJ-45 jack. RS-232: 1 connector, 9-pin D type, for diagnostics and upgrades. GPIO: DB25.
Tally Interface (GPIO)	Input: ≤ 5 VDC continuous; ≤ 48 VDC for less than 5 seconds; 1.2 mA when on. Output: ≤ 150 mA; ≤ 200 VAC.
Grounding terminal	None.

The RS-232 connector has this pinout:



Pins 1, 4, and 6 are tied together and pins 7 and 8 are tied together. None of those pins are connected to any circuitry.

Environmental Specifications

Table 7-4 provides environmental specifications for the NV9609.

Table 7-4. NV9609 Environmental Specifications

Specification	Detail
Operating temperature	0–40° C, ambient.
Relative humidity	0 to 90%, non-condensing.
Cooling	No fan required.

Defaults

Initial Panel State

Destination: the configured default.

Buttons: low-tally is 40% brightness by default and stays at its most recent setting.

Configuration Page

The initial NV9609 configuration has no buttons defined. The default panel options are:

Release mode:	Normal.
Default destination:	None.
Preset monitor:	None
Status monitor:	None
Data routing:	Automatic.
Salvo list:	None
Default name set:	System names
Use continuous scroll:	Enabled (check box checked)
All other options:	Disabled (check boxes clear).

The tally inputs and outputs are all initially undefined.

DHCP

The panel is set up to respond to DHCP from the factory. It is possible to assign the panel a fixed IP address using the Panel IP Configuration Utility.

7. Technical Details

Drawings

Drawings

These drawings identify features and provide overall and critical dimensions:

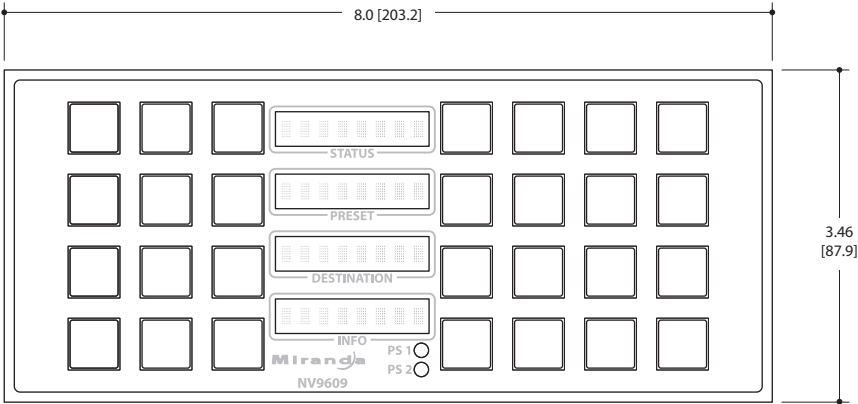


Figure 7-2. Front View of the NV9609

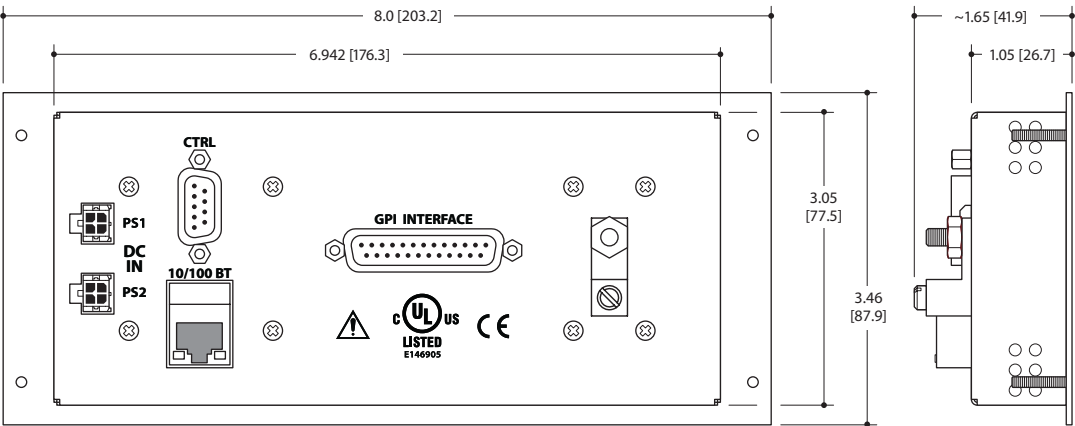


Figure 7-3. Rear and Side View of the NV9609

This drawing provides overall and critical dimensions of the NV9609 rack mounting bracket:

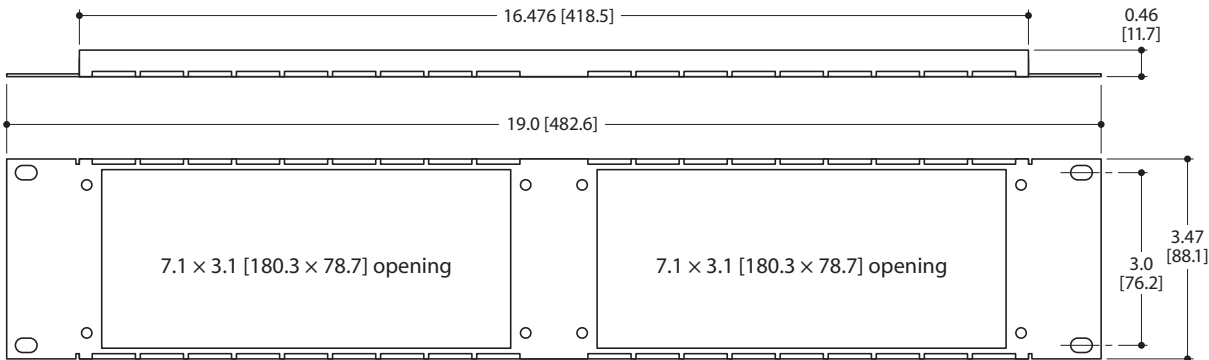


Figure 7-4. NV9609 Rack Mounting Bracket

8. Misc. Topics

Chapter 8 provides the following:

- [Glossary](#)
- [Setting the Timeout Value](#)
- [Power Cord Retention](#)
- [Ordering Information](#)

Glossary

AES/EBU	(Audio Engineering Society/European Broadcasting Union). AES and EBU are standards organizations.
Breakaway	A condition where a destination has multiple sources on different levels.
Category	A category represents a set of devices. (The concept of categories exists to make it easier to select devices at a control panel.) A category can contain sources, destinations, or devices that are both sources and destinations. Each device in the category has a unique selection index within that category. Each category has a mnemonic ID associated with it.
Data Routing	Data routing (a.k.a., machine control routing) is a bidirectional form of routing. Routes are characterized by a controlling device and controlled device(s). The NV9609 provides certain data routing options including a 'Broadcast' button.
Device	A "device" is a grouping of input and output ports that define a logical entity. (The logical entity often represents a real device, but it does not have to be a real entity.) For example, a system might have 3 levels: video, AES, and time code. A hypothetical device in this system is Camera 1, which consists of video on input port 1 of the video router, AES on input port 5 of the AES router, and time code on input port 8 of the time code router.
GPI/O	General Purpose Input and Output. A generic term for the NV9609's tally interface. The tally interface is called the "GPI Interface" at the rear of the NV9609.
Level set	A level set is a group of virtual levels that are commonly used together when switching devices. A level set also defines the mapping of each virtual level within the level set to a single physical level. All levels in a level set have a unique display index within that level set.
Multi-Destination (Mode)	A mode on an NV9000 control panel that presents many destinations at once, in contrast to X-Y mode. An operator may route sources to multiple destinations in a single take. Multi-destination mode does not permit the selection of breakaway levels.
Operator	The term operator (a.k.a. user) usually refers to users other than the system administrator or configurer. An operator is responsible for making the routes.
Physical Level	Multiple routers provide different "physical levels" on which to switch the signals of devices. Any particular device might send or receive HD, SD, AES, time-code, or machine-code signals.

8. Misc. Topics

Glossary

PIN	The system administrator may create a single “super user” personal identification number (PIN) that functions as a passcode. A PIN is 4–6 digits in length. The PIN allows certain operators to perform functions such as (1) forced release on a control panel that is configured for normal release or (2) changing the ID of a control panel.
Port	A port is the physical connection on a router. A port can only be an input port or an output port.
Salvo	A salvo is a stored group of commands that can be recalled and executed at a NV9000 control panel.
Source/ Destination	<p>The term “source device” is used interchangeably with “source” and the term “destination device” is used interchangeably with “destination.” A source is a device 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.</p> <p>A device can be both a source and destination. An example of such a device is a VTR.</p>
System administrator	The system administrator is the person responsible for installing, configuring, and maintaining a router control system.
Tally	<p>(1) High or low button illumination.</p> <p>(2) Tally interface <i>to be defined</i>.</p>
Virtual level	Virtual levels allow the system administrator to define a single physical router level as multiple levels. Within a physical level, any port can be mapped to any virtual level. For example, an AES matrix could be divided into AES 1/2 and AES 3/4 <i>virtual</i> levels.
X-Y (mode)	A mode on a control NV9000 control panel that switches one destination at a time, in contrast to multi-destination mode. In X-Y mode, some panels can display the virtual levels for the selected destination. Operators using those panels can perform breakaway level selection and level mapping.

Setting the Timeout Value

The NV9609 has panel options that use a timeout value. You can set the timeout value in NV9000-SE Utilities. Choose the 'SysParams' table from the 'Tables' folder under the 'Views' navigation pane. Click 'Add' and enter a timeout value as shown:

SysParams Table x

Name Filter:

	ID	Name*	Value	Description
1	1	PANEL_PRESET_TIMEOUT	30	Timeout delay in seconds for preset blanking o...
2	219	NV_LAST_WRITE_TIME	2009-12-23 13:52:58.804	dcox:Garys Config

Add Delete

* Required column.

Revert to Saved Save

Figure 8-1. SysParams Table (in NV9000-SE Utilities)

The name of the parameter must be exactly as you see it here. The timeout value (expressed in seconds) must be a non-negative value. A suggested value is 120 seconds (two minutes) or more. The default timeout value is 30 seconds.

- ▲ The timeout value applies to all panels in your NV9000's panel and router network.
- ▲ If you do not add a timeout value to the 'SysParams' table, the timeout period will be the default of 30 seconds.

8. Misc. Topics

Power Cord Retention

Use the supplied retention strap to keep the AC power cord firmly connected to the power supply. Follow these steps to use the strap:

- 1 Firmly insert the AC power cord into the power supply. Examine the last figure in this section to see how the strap should be applied.
- 2 Placed the Velcro retention strap, fuzzy side up, on top of the power supply with the buckle loop approximately 1 inch from the AC input side and the remaining strap around the cord end and down:



- 3 Holding the buckle in place, lift the strap up and around the cord end so the strap overlaps itself:



- 4 Holding the buckle loop in place, route the strap around the back of the supply diagonally across so that it sticks out on the left below the output cord:



- 5 Continue the strap around toward the buckle loop and through the loop. Cinch the strap tightly. While keeping tension, place the 2 inch strap end (with Velcro loops) down on the fuzzy part to complete the process:



- 6 Examine the strap though its path around the cord and power supply. Be sure that no slack exists and that it is tight the full length of the strap. If necessary, adjust and cinch it more tightly.

Ordering Information

These are the NV9609 components:

PS0001	12V power supply, 4-pin Molex connector, with cord, and cord retention strap.
NV9609	NV9000 control panel. 30 button, 2RU, XY/MD, hierarchical.
WC0053	Optional breakout cable for the tally interface

8. Misc. Topics

Ordering Information

Index

A

ACQ IP (message) 11–12
 Acrobat usage
 bookmarks 1
 hyperlinks 1
 navigating and searching 1
 Add control panel (button) 14
 Add control panel (page) 14
 Address
 mailing iii
 shipping iii
 AES (Audio Engineering Society) 55
 AES/EBU 55
 All level 19, 28, 32, 34
 Alphanumeric display 5, 27
 Application version (submenu) 42
 Asterisk 5

B

Bookmarks, Acrobat 1
 Boolean
 expressions 47
 operators 47
 terms 47
 Boot version (submenu) 41
 Breakaway 5–7, 19–20, 23, 27–29, 55
 Breakout cable (WC0053) 6, 9–10, 59
 Broadcast (button) 21, 30, 35, 38–39
 Broadcast data routing 7
 Broadcast mode 39
 Broadcast routes 38
 Button
 add control panel 14
 broadcast 21, 30, 35, 38–39
 category 21, 29–30
 chop 22, 31
 clear 4, 17, 22, 31
 destination 22, 29, 31
 destination lock 22, 31, 36

 destination mode 22, 31
 destination protect 22, 32, 36
 finish 14
 free source 7, 22, 32
 level 23, 28–29, 32, 37
 level mode 23, 28, 32–33
 menu 6, 23, 28–29, 33, 39
 name set toggle 5, 24, 33, 38
 next 14
 page down 4, 13, 21, 24, 29–30, 33
 page up 4, 13, 17, 21, 24, 29–30, 33
 panel lock 25, 34
 previous source 7, 25, 34
 revert to saved 16–17
 salvo 25, 34
 save 16–17
 source 25, 29, 34
 source is master 19, 25, 30, 35, 38
 source mode 25, 34
 source/destination 26, 34
 take 4, 17, 25–26, 35
 undefined 26, 35
 Button classes 20, 29
 Button color 27–28
 Button definition section 16, 20
 Button definitions 17, 20
 Button functions 29
 Button legends 4, 28
 Button test 44
 Button types 21
 Buttons
 commitment 17
 control panel 2
 function 3–4

C

Cable, breakout (WC0053) 6, 9–10, 59
 Cable, Ethernet 10–11
 Categories 24
 Category, lists 27

Index

Category (button)	21, 29–30
Category (defined)	55
CE declaration	ii
Chapter structure	1
Chapters	
1, Preface	1
2, Introduction	3
3, Installation	9
4, Configuration	13
5, Operation	27
6, GPIO	45
7, Technical details	51
8, Misc. Topics	55
Checkbox options	19
Chop (button)	22, 31
Clear (button)	4, 17, 22, 31
Color test	44
Color, button	27–28
Commitment buttons	17
Configuration	2, 13
NV9609	13
options	14
page	16
page, default	16, 53
pane	14
tasks	17
Connectors	
DB25	4, 6, 26, 45
Ethernet	10
GPIO	4, 6, 26, 45
power	10
RJ-45	10
RS-232	52
tally	4, 6, 26, 45
Contact information	
technical support	iii
Continuous scrolling	20
Control panel	2, 9–10, 56
buttons	2
installation	10
NV96xx	9, 56
Control panels (page)	14–15
Control system, NV9000	56
Controlled device	30
Controlling device	30
Copyright notice	ii

D

Data routing	7
Data routing (defined)	55

Data routing mode	18, 53
DB25 connector	4, 6, 13, 26, 45
Declaration of conformance (CE)	ii
Default	
destination	18, 53
NV9609 configuration page	16, 53
source is master	19
Default name set (option)	19, 53
Defaults	53
Destination	
default	18, 53
lists	27
locks	35
protects	35
Destination (button)	22, 29, 31
Destination (defined)	56
Destination (display)	5, 30–31
Destination lock (button)	22, 31, 36
Destination mode	21–22, 26, 28, 31, 34
Destination mode (button)	22, 31
Destination protect (button)	22, 32, 36
Device (defined)	55
Devices	
source	19
switching	55
DHCP	9–10, 12, 53
Dimensions	54
Disabled buttons	28
Display	5, 27
destination	5, 30–31
information	5
preset	5, 25, 30, 34
status	5
Document	
part number	ii
revision	ii
Documentation	10
other	2
Drawings	54
NV9609, front view	54
NV9609, rear view	54
NV9609, side view	54
NV9609-RMK, front view	54
NV9609-RMK, top view	54
Dubbing applications	30

E

EBU	55
EC9700 (GUI)	9
EC9710 (GUI)	9

Electrical specifications	
NV9609	51–52
power supply	51
Electrostatic discharge	9
Email address	
tech support	iii
Environmental specifications, NV9609	53
ESD	9
Ethernet cable	10–11
Ethernet connector	10
European broadcasting union (EBU)	55
Examples, symbol for	2
Expressions, Boolean	47

F

FCC statement	ii
Figures	
NV9609, front view	54
NV9609, front, photo	3
NV9609, rear view	54
NV9609, rear, photo	4
NV9609, side view	54
NV9609-RMK, front view	54
NV9609-RMK, top view	54
Find, Acrobat	2
Finish (button)	14
First page, Acrobat	2
Forced release	18, 31, 35–36, 56
Free source (button)	7, 22, 32
Function buttons	3–4

G

Glossary	55
Go to first page, Acrobat	2
Go to last page, Acrobat	2
Go to next page, Acrobat	2
Go to next view, Acrobat	1
Go to previous page, Acrobat	2
Go to previous view, Acrobat	1
GPI interface	6, 45
GPIO	10, 13, 17, 26, 45, 53
connector	4, 6, 26, 45
inputs	4, 6, 10, 13, 45, 49, 53
interface	6
options	46
outputs	4, 6, 45–46, 53
GPIO definitions	16

H

Hide sources not configured on this panel	19
High tally	2, 28
How to	
initialize the NV9609	11
install the NV9609	10
make a broadcast route	38
Hyperlinks, Acrobat	1

I

ID, panel	11–12, 19, 23, 28, 33, 44
Illumination (submenu)	42
Information (display)	5
Initial panel state	53
Initialization	11
Initializing the NV9609	11
Inputs	
GPIO	4, 6, 10, 13, 45, 49, 53
tally	6, 10, 13, 45, 53
Installation	9
NV9609 control panel	10
package contents	9
receiving and unpacking	9
Introduction	3
IP addresses	9–12, 53
IP configuration	9–10, 53

K

Keycaps	4
Keypad	21, 30
Kit, rack-mount	3, 9–10, 54

L

Last page, Acrobat	2
Legends, button	4, 28
Level	
mapping	29
physical	55–56
sets	55
virtual	55–56
Level (button)	23, 28–29, 32, 37
Level mode	4–6, 23–24, 28, 30, 32–34, 36–37
Level mode (button)	23, 28, 32–33
Level set	29
Levels	23, 27, 29

Index

Lists
 category 27
 destination 27
 salvo 27
 source 27
Locating network (message) 12
Locks 7, 22, 27, 31, 35
 destination 35
 source 35
Low tally 2, 28

M

Machine control 30, 32, 35
Mailing address iii
Mapping levels 29
Mapping, virtual to physical level 55
Menu
 application version 42
 boot version 41
 illumination 42
 panel ID 40
 panel name 40
 software version 41
 user ID 41
 user name 41
Menu (button) 6, 23, 28–29, 33, 39
Menu mode 6, 23, 28, 33, 39
Messages
 acquiring IP address 11–12
 locating network 12
 no server 12
Miranda
 email, tech support iii
 mailing address iii
 main number iii
 sales number iii
 shipping address iii
 technical support iii
 website address iii
Misc. Topics 55
Mode
 broadcast 39
 data routing 18, 53
 destination 21–22, 26, 28, 31, 34
 level 4–6, 23–24, 28, 30, 32–34, 36–37
 menu 6, 23, 28, 33, 39
 multi-destination 55–56
 normal 6, 26, 39
 release 18, 53
 salvo 6, 24–26, 28, 33–34, 39

 setup 6, 28, 42
 source 21, 25–26, 28, 31, 34
 source is master 38
 X-Y 6, 27, 55–56
Modes of operation 6
Monitor 53
Monitor, preset 18
Monitor, status 18
Multi-destination mode 55–56

N

Name set toggle (button) 5, 24, 33, 38
Name sets 19, 24, 38, 53
Next (button) 14
Next page, Acrobat 2
Next view, Acrobat 1
No server (message) 12
Normal mode 6, 26, 39
Normal release 18
NV9000
 router control system 2
 system controller 9, 11
 user's guide 2
NV9000 configuration 13
NV9000-SE Utilities 2, 6, 9–14, 16, 21, 27, 30, 57
 user's guide 2
NV915, system controller 9
NV9609 2–3, 9–10, 13, 59
 configuration 13
 front view 54
 initialization 11
 installation 9
 rear view 54
 side view 54
NV9609-RMK 3, 9–10, 54
 front view 54
 top view 54
NV96xx control panels 9, 56

O

Operating modes 6
Operating temperature 53
Operation 27
Operator 55
Operators, Boolean 47
Options
 checkbox 19
 configuration 14

default name set	19
GPIO	46
panel	17
Ordering Information	59
Other documentation	2
Outputs	
GPIO	4, 6, 45–46, 53
relay	4, 6, 45–46
tally	13, 45–46, 53

P

Package contents	9
Page (SE)	
add control panel	14
control panels	14–15
NV9609 configuration	16
Page down (button)	4, 13, 21, 24, 29–30, 33
Page up (button)	4, 13, 17, 21, 24, 29–30, 33
Pane, configuration	14
Panel	
initial state	53
options	17
organization	4
Panel configuration	13
Panel configuration (page)	16
Panel ID	11–12, 19, 23, 28, 33, 44
Panel ID (submenu)	40
Panel image	16
Panel IP configuration utility	9–10, 53
Panel lock (button)	25, 34
Panel name (submenu)	40
Panel options	16–18
Panel/router network	12
Panels, control	2, 9–10, 56
NV96xx	9, 56
Part number, document	ii
PDF documents	1
navigating and searching	1
Photos	
NV9609, front	3
NV9609, rear	4
power cord retention	58
Physical level	55–56
Physical specifications, NV9609	52
PIN	56
Port (defined)	56
Power connectors	10
Power cord retention	9, 58
Power specifications	
NV9609	51

power supply	51
Power supply	9–10, 52, 58–59
Preface	1
about PDF documents	1
chapter structure	1
terms, conventions and abbreviations	2
Preset (display)	5, 25, 30, 34
Preset monitor	18, 53
Previous page, Acrobat	2
Previous source (button)	7, 25, 34
Previous view, Acrobat	1
Protects	7, 32, 35
destination	35
source	35
PS0001 (power supply)	10, 52, 59
PS1, PS2	10

R

Rack mount	10
Rack mounting kit	3, 9–10, 54
Receiving and unpacking shipments	9
Relay outputs	4, 6, 45–46
Relay rule (dialog)	47
Release	7, 35–36
forced	18, 31, 35–36, 56
mode	18, 53
normal	18
Return all-level after take and timeout (option)	19
Return from breakaway status	
after timeout (option)	20
Return Material Authorization (RMA)	iii
Revert to saved (button)	16–17
Revision, document	ii
RJ-45 connector	10
RMA	iii
Router control system	2
RS-232 connector	52
Rules, relay	47

S

Sales number	iii
Salvo (button)	25, 34
Salvo (defined)	56
Salvo list	53
Salvo lists	19, 27, 39
Salvo mode	6, 24–26, 28, 33–34, 39
Salvos, system	7, 49
Save (button)	16–17

Index

SB00339–10, 28, 59
Scenarios, take36
Scrolling4, 6, 20, 24, 30, 33, 53
SE (abbreviation for NV9000-SE Utilities)
Search, Acrobat2
Separator character30
Setup mode6, 12, 28, 42
Shipping addressiii
Software10
Software versionii
Software version (submenu)41
Software, configuration2
Source
 devices19
 lists27
 locks35
 protects35
Source (button)25, 29, 34
Source (defined)56
Source is master
 as default19
 mode38
Source is master (button)19, 25, 30, 35, 38
Source mode21, 25–26, 28, 31, 34
Source Mode (button)34
Source mode (button)25
Source/destination (button)26, 34
Special messages, symbol for2
Specifications
 environmental, NV960953
 NV960951–52
 power supply51
Static9
Status (display)5
Status monitor18, 53
Strap, power cord retention9, 58
Suffixes21, 30, 37
Switching devices55
Symbols
 for examples2
 for special messages2
SysParams (table)57
System administrator56
System controller2, 10–12
 NV90009, 11
 NV9159
System salvos7, 49

T

Tables

environmental specifications, NV960953
physical specifications, NV960952
power specifications, NV960951
power specifications, power supply51
Take (button)4, 17, 25–26, 35
Take scenarios36
Takes36, 55
Tally
 connector4, 6, 26, 45
 high2
 inputs6, 13, 45, 53
 inputs, connecting10
 interface6, 10, 13, 52–53
 low2
 outputs13, 45–46, 53
Technical details51
Technical supportiii
Telephone number
 mainiii
 salesiii
 technical supportiii
Temperature, operating53
Terms, Boolean47
Terms, conventions and abbreviations2
Testing your installation12
Tielines32
Timeout19–20, 57
Trademarksiii

U

Undefined (button)26, 35
UniConfig9
Use continuous scrolling (option)20, 24, 53
User ID (submenu)41
User name (submenu)41
User's guide, chapter structure1
User-programmable panel ID19

V

Velcro strap9, 58
Version, softwareii
Virtual levels55–56

W

WC00536, 9–10, 59
Website, Mirandaiii

X

X-Y mode6, 27, 55–56

Index