



grass valley

A **BELDEN** BRAND

# NV9642

NV9000 CONTROL PANEL

## User's Guide

VERSION 1.3

UG9642-03

2015-07-02

[www.grassvalley.com](http://www.grassvalley.com)

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Title	NV9642 User's Guide
Part Number	UG9642-03
Revision	2015-07-02, 14:23

## Electrostatic Discharge (ESD) Protection



Electrostatic discharge occurs when electronic components are improperly handled and can result in intermittent failure or complete damage adversely affecting an electrical circuit. When you remove and replace any card from a frame always follow ESD-prevention procedures:

- Ensure that the frame is electrically connected to earth ground through the power cord or any other means if available.
- Wear an ESD wrist strap ensuring that it makes good skin contact. Connect the grounding clip to an *unpainted surface* of the chassis frame to safely ground unwanted ESD voltages. If no wrist strap is available, ground yourself by touching the *unpainted* metal part of the chassis.
- For safety, periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms.
- When temporarily storing a card make sure it is placed in an ESD bag.
- Cards in an earth grounded metal frame or casing do not require any special ESD protection.

## Cautions for LCD and TFT Displays



Excessive usage may harm your vision. Rest for 10 minutes for every 30 minutes of usage.

If the LCD or TFT glass is broken, handle glass fragments with care when disposing of them. If any fluid leaks out of a damaged glass cell, be careful not to get the liquid crystal fluid in your mouth or skin. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all times.

## Protection contre les décharges électrostatiques (DES)



Une décharge électrostatique peut se produire lorsque des composants électroniques ne sont pas manipulés de manière adéquate, ce qui peut entraîner des défaillances intermittentes ou endommager irrémédiablement un circuit électrique. Au moment de remplacer une carte dans un châssis, prenez toujours les mesures de protection antistatique appropriées :

- Assurez-vous que le châssis est relié électriquement à la terre par le cordon d'alimentation ou tout autre moyen disponible.
- Portez un bracelet antistatique et assurez-vous qu'il est bien en contact avec la peau. Connectez la pince de masse à une *surface non peinte* du châssis pour détourner à la terre toute tension électrostatique indésirable. En l'absence de bracelet antistatique, déchargez l'électricité statique de votre corps en touchant une surface métallique *non peinte* du châssis.
- Pour plus de sécurité, vérifiez périodiquement la valeur de résistance du bracelet antistatique. Elle doit se situer entre 1 et 10 mégohms.
- Si vous devez mettre une carte de côté, assurez-vous de la ranger dans un sac protecteur antistatique.

- Les cartes qui sont reliées à un châssis ou boîtier métallique mis à la terre ne nécessitent pas de protection antistatique spéciale.

## Précautions pour les écrans LCD et TFT



Regarder l'écran pendant une trop longue période de temps peut nuire à votre vision. Prenez une pause de 10 minutes, après 30 minutes d'utilisation.

Si l'écran LCD ou TFT est brisé, manipulez les fragments de verre avec précaution au moment de vous en débarrasser. veillez à ce que le cristal liquide n'entre pas en contact avec la peau ou la bouche. En cas de contact avec la peau ou les vêtements, laver immédiatement à l'eau savonneuse. Ne jamais ingérer le liquide. La toxicité est extrêmement faible, mais la prudence demeure de mise en tout temps.

## Recycling

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## Certification and Compliance

### Safety Compliance



c

This equipment complies with the requirements of CSA/UL/IEC/EN 60950-1, 2<sup>nd</sup> Ed. + AM1, Safety of information technology equipment.

us The power cords supplied with this equipment meet the appropriate national standards for the country of destination.

### Electromagnetic Compatibility



This equipment has been tested for verification of compliance with FCC Part 15, Subpart B requirements for class A digital devices.

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Note: 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.

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This equipment has been tested and found to comply with the requirements of the EMC directive 2004/108/EC:

- EN 55022 Class A Radiated and conducted emissions
- EN 61000-3-2 Limits for harmonic current emissions
- EN 61000-3-3 Limitation of voltage fluctuations and flicker

- EN 61000-4-2 Electrostatic discharge immunity
- EN 61000-4-3 Radiated, radio-frequency, electromagnetic field immunity
- EN 61000-4-4 Electrical fast transient immunity
- EN 61000-4-5 Surge transient immunity
- EN 61000-4-6 Conducted disturbances immunity
- EN 61000-4-8 Power frequency magnetic field immunity
- EN 61000-4-11 Voltage dips, short interruptions and voltage variations immunity



# toc

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# 1

## Preface

Chapter 1 is an introduction to the NV9642 User's Guide.

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## Chapter Structure

The following chapters provide detailed information regarding the NV9642 control panel:

- Chapter 1, [Preface](#), (this chapter) outlines ways to use this guide.
- Chapter 2, [Introduction](#), provides a functional description of the NV9642.
- 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](#) and [Glossary](#) are also provided for your reference.

## The PDF Document

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

- Use the Table of Contents or the bookmarks page to jump to any desired section.
- Many hyperlinks are provided within the chapters.
- Use the Index to jump to specific topics within a chapter. Each page number in the index is a hyperlink.
- Use Acrobat's 'Go to Previous View' and 'Go to Next View' buttons to retrace your complete navigational path.

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

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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 given 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 NV9642 control panel and to NV96xx control panels, in general.
- "High tally" means that a button is brightly illuminated.
- "Low tally" means that a button is illuminated at low intensity. Most buttons assume a low tally state until selected.
- "MD" is an abbreviation for multi-destination.
- "SE" is an abbreviation for NV9000-SE Utilities.

## Other Documentation and Software

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

- NV960, NV920, or NV915 Quickstart Guide(s).
- 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 family router control systems.

# 2 Introduction

Chapter 2 provides a basic functional description of the NV9642.

## Summary

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## Summary

The NV9642<sup>1</sup> is a hierarchical control panel featuring 34 LCD function buttons (illuminated in various colors and having 1 to 3 lines of text) and a small vacuum fluorescent display having 4 lines of 22 characters. It can operate in X-Y mode or in multi-destination (MD) mode. Operators can switch between modes at any time. The up and down buttons allow you to scroll the display.

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



Alphanumeric Display      Up/Down Buttons      LCD Function Buttons (34)

Fig. 2-1: NV9642 Front

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:



Fig. 2-2: NV9642 Rear

The NV9642 provides a *tree-structured* (or hierarchical) button layout. Configurers can define a “tree” of buttons in such a way that each of the 30 LCD buttons can either (1) execute a function or (2) select a subtree (i.e., present an entirely new set of functions at a different level in the tree). The tree, with its subtrees, is not limited in size.

1. An equivalent NV9642V—a GUI that is called a “virtual panel”—is available. It emulates the NV9642.

We use the term “button page” or “page” to mean the set of 34 button functions at any particular level in the tree.

Configurers will use ‘Navigate’ buttons to create new button pages (subtrees). During operation, NV9642 users will press a ‘Navigate’ button to access a subtree. However, ‘Navigate’ buttons are typically not labeled “Navigate”; they would be labeled according to the specific function they perform in your system.

The panel can also display predefined button pages. For instance, a “category” button, when pressed, will display one or more pages of sources or destinations through which the operator may browse. A “menu” button presents a page of menu options.

## Panel “Stacking”

The NV9642 can operate under one of two behavioral models:

- Standalone
- Stacking

The *standalone* model is what you can call “normal” — the panel operating by itself.

*Stacking* means that the NV9642 is coupled with from one to seven NV9646s. The group of panels combine to form a larger “panel” that has more physical buttons. Among other uses, the additional buttons allow more devices to be presented during category device selection.

If you have selected panel stacking as the behavioral model, NV9000-SE Utilities will ask you for the identities of up to 7 NV9646s. Those NV9646s appear in the panel graphic below the image of the NV9642. (The panel graphic window is scrollable.) The configuration of those NV9646 is performed within the NV9642 configuration page. The expansion NV9646s cannot be configured independently.

At release v6.6.4, performance issues limit the number of NV9646 extensions to one only.

See Chapter 4, [Configuration](#), for full detail.

## Panel Organization

### Function Buttons

The NV9642 has two rows of 17 LCD buttons — a total of 34 LCD buttons. Each has 3 lines of text (up to 8 characters per line). The buttons can display one of seven colors dynamically: nominally red, green, blue, purple, amber, yellow, or grey. An eighth color exists — “dark” — when the LCD is off.

If the button text occurs on only one or two lines, the button displays larger text, centered on the button.

During configuration, you can assign any color to a button.

Each LCD button has *four* levels of brightness: off, low, medium, and high, and supports *three* operational levels: high tally, low tally, and off. High tally can be either medium or high brightness and low tally can be either low or medium brightness. High tally is always constrained to be brighter than low tally. See [LCD Buttons](#), on page 95, for a color chart.

Although you can see a list of the pages in the tree during configuration, the structure of the tree is not evident on the panel itself. The panel operator must commit the tree structure to memory to be able to use the panel. It is up to the person configuring the panel to design a usable tree structure.

Some buttons functions are assigned by the system depending on the context. For example, if a button page is to represent all sources in a category, and that list changes, the button subtree adjusts in size dynamically. The panel software adds a "forward" button and a "back" button if there are more sources than buttons. Pressing the 'Forward' button takes you to the next page of sources. Pressing the 'Back' button takes you to the previous page of sources.

Some button states depend on context. Many buttons remain unlit when their functions are disabled. For example, 'Page Up' and 'Page Down' buttons remain unlit until there is an opportunity to scroll selection buttons. By default, an XY/MD button turns green for X-Y mode and amber for multi-destination mode. 'Save Preset' goes low tally when you press 'Clear Preset'.

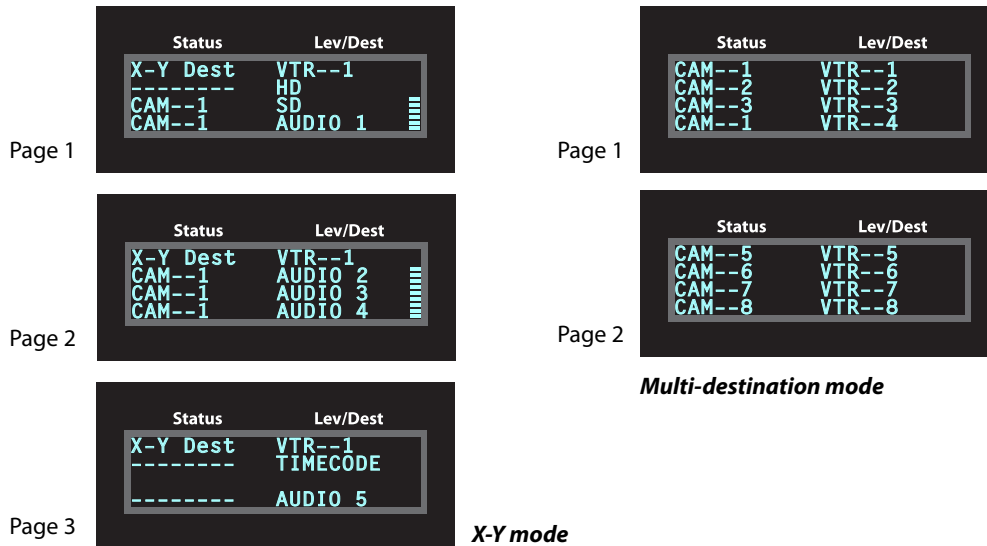
The LCD buttons display a menu if the operator presses a menu button. When the operator make a menu selection, viewable data are displayed on the LCD buttons. In some cases, the operator can enter data (such as panel ID or LCD brightness) using buttons that allow data entry.

Configurers can define 'Selection' buttons that select a level during a breakaway setup. (Configurers *must* do so if the operator is to make such selections.)

Scrolling is necessary when a list of items—for instance, source devices—exceeds the number of buttons available for the items. The panel adds 'Forward' and 'Back' buttons as necessary. Panels that use multi-destination mode will probably require 'Page Up' and 'Page Down' buttons.

## Alphanumeric Display

The 4×22 alphanumeric display provides real-time feedback for the operators as they press buttons to execute takes and other operations. The panel functions in two modes: X-Y or multi-destination and the display changes according to the mode:



In either case, the display has 4 rows. Operators might need to scroll the display to see additional information. (The up and down buttons, right next to the display, are for scrolling the display.)

### Display Fields

The display has 2 columns:

- Level/Dest.

In X-Y mode, this column identifies the levels of the currently selected destination. That destination is identified in the information column. In the illustration above, 'VTR--1' was selected. Operators might need to scroll to see or select a level.

In MD mode, the 'Level/Dest' column presents all the MD destinations defined in the NV9642 configuration. (Actual destinations are defined in the NV9000 configuration.) Operators might need to scroll to see or select a destination.

- Status.

The status column indicates what source was routed to a destination.

In X-Y mode, the status column represents the levels of a source or the levels of multiple sources under breakaway. These are called the *current source(s)*. The presence of '-----' in the status or preset columns means that that particular level is not defined for the destination. Therefore, no source selection for that level is possible. The illustration above shows that levels HD and 'TimeCode' are not defined for VTR 1.

In MD mode, the status column represents the sources routed to each of the destinations in the 'Level/Dest' column. Again, these are the *current sources*.

In X-Y mode, the display uses its top row to show the selected destination. Therefore, in X-Y mode, the display scrolls 3 lines at a time.



In multi-destination (MD) mode, the display uses all 4 lines to show MD destinations. In MD mode, the display scrolls 4 lines at a time.

The display fields can show either aliases or system mnemonics for devices 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

The display also shows flags of different kinds next to the sources and destinations.

### Selection Marks

At the far right of the display are marks (3 small bars) that turn on to indicate selections.

In X-Y mode, the marks turn on to indicate that a level is selected and are not visible otherwise. (The operator makes level selections in the button array.)

In MD mode, a mark appears to the right of the currently selected destination (and of all the currently selection destinations in hold mode).

### Other Signs

A plus sign (+) indicates that additional information is available. There is an 'Info' button that operators may press to view the additional information.

In MD mode, an asterisk (\*) directly after a source indicates a breakaway on that destination.

An 'L' indicates that a device has been locked. A 'P' indicates that a device has been protected. NV9642 operators may lock, protect or release destinations. It is important for operators to know that other operators may lock, protect, or release sources and destinations.

## 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. 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 NV9642 behavior that depends on the tally inputs.

What you connect to the tally interface is, of course, up to you. Grass Valley 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 labelled a "GPI interface."

See Chapter 6, [GPIO](#), on page 81, for complete detail.

## Modes of Operation

The NV9642 can operate under the standalone model or the stacking model. The panel has the same operating modes under both models.

The panel operates in either X-Y mode or multi-destination (MD) mode. A single button (XY/MD) can toggle between the modes. A third mode—called “single-bus,” “single-destination,” or “button-per-source” mode—can be emulated in either X-Y mode or MD mode.

The primary modes of operation are:

- X-Y mode—individual control of all router *levels*. Choose a destination, optionally choose desired breakaway levels, choose a source, and press ‘Take’ to complete a desired route.
- Multi-destination mode—lets you control multiple destinations. The LCD buttons display destinations and sources. You can scroll through destination lists using the ‘Page Up’ and ‘Page Down’ buttons. Select a destination using selection buttons, choose a source, and repeat for all desired routes. Then press ‘Take’. Takes are “all level,” and breakaways cannot be performed.
  - ▲ The alphanumeric display scrolls independently of the selection buttons. Use the fixed up/down buttons to scroll the display.
  - ▲ The ‘Hold’ button allows you to select many MD destinations at once.
- Single-destination mode.

Single-destination” mode is not a distinct mode, but we mention it because it is a mode on some other panels and can be simulated on the NV9642. It can be combined with the other two modes. You can create many different forms of “single-destination” mode. This mode may in fact have more than a single destination.

To understand single-destination mode, you must understand the different button types. Please read the Configuration and Operation chapters and then see [Single-Destination Mode](#), on page 44.

The secondary modes of panel operation are:

- Setup mode—where the NV9642 is freshly powered up, but disconnected from the network. In this mode, you can preset the NV9642’s panel ID and perform a few diagnostic tasks.
- Salvo mode—pressing a Salvo button (and then the ‘Take’ button) executes a salvo. (The duration of a salvo is indeterminate.)
- Menu mode—pressing a Menu button places the NV9642 in “menu” mode. In menu mode, the LCD button array becomes a menu that changes as needed during menu operation.

Other modes of operation are:

- Hold mode—when you press the ‘Hold’ button, hold mode becomes active and when you press it again, hold mode becomes inactive. See [Hold](#), on page 64.
- Save preset mode—when you press the ‘Save Preset’ button, ‘Save Preset’ mode becomes active and when you press it again, ‘Save Preset’ mode becomes inactive. See [Save Preset](#), on page 68.

## Other NV9642 Functions

The NV9642 can be configured to perform the following additional functions:

- Previous source, free source, “quick” source, and source/destination buttons.
- Return to a pre-defined (or default) state.
- Hold breakaway levels.
- System salvos.
- Lock/protect/release for destinations.
- Forced release of locked or protected devices.
- Device selection using indexes or suffixes.

The NV9642 provides the following additional features:

- The NV9642 supports multiple-level breakaways in X-Y mode. This lets you route multiple sources to the same destination *on different levels*.
- The panel supports gang or dub switching in multi-destination mode.
- Broadcast data routing in X-Y mode.
- Level mapping.
- Button page “templates”—global navigation templates and suffix templates—for easier configuration.

The NV9642 has two behavioral models: standalone and stacking. The standalone model is considered “normal.” The stacking model allows the NV9642 to be used with from one to seven NV9646s to form a larger “panel.” See Chapter 4, [Configuration](#), on page 13, for full detail.



# 3 Installation

Chapter 3 provides installation and connection instructions.

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## Package Contents

If you have ordered one or more NV9642 control panels from Grass Valley, 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.

Depending on your order, the NV9642 items that can ship include:

- One or more NV9642 control panels.
- One or two power supplies for each NV9642, with straps that secure the AC power cords to the power supplies.
- 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 NV9642 (including any system controllers, other NV96xx control panels, EC9700 GUI, EC9710 GUI, and configuration programs such as UniConfig, MRC, 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.

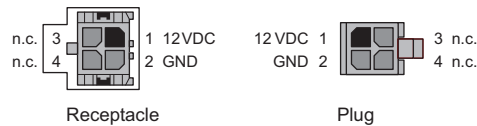
## Installation

Follow these steps to install a NV9642 control panel:

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

The NV9642 is designed to mount in a 19 in rack. Rack-mounting is not a requirement. Place the panel in position in your rack. Attach the panel to the rack frame, using screws appropriate for your rack. The panel's mounting slots are spaced 1.75" (44.5 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 NV9642.
- 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 87 for details on the PS0001 power supply. See also [Power Cord Retention](#), on page 96.

- 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 81, for detail regarding the tally interface.

## Panel Stacking

If the NV9642 is to be used, under the panel stacking model with NV9646s, install the NV9646s in the same way. (No special connections are required for the stacked panels.)

## Installing Software and Documentation

This document is available through the Grass Valley web site.

You must use NV9000-SE Utilities to configure the NV9642 control panel. Contact Grass Valley if you need to obtain the latest version of this NV9000 configuration software.

You may use the Panel IP Configuration Utility if you want to your NV9642 to have a static IP address or to use DHCP. The panel, as it comes from the factory, defaults to DHCP.

## Initialization

Before your system controller can communicate with an NV9642, you must give the NV9642 a panel ID. Follow these steps for each NV9642 you are installing:

- 1 Power up the NV9642. Do not connect its Ethernet cable. (Disconnect it if it is connected.)

After a few seconds, the alphanumeric display will show 'Acquire IP Address' at the top and show the panel's current panel ID. The right-most button in the top row illuminates and reads 'Menu':



- 2 Press the 'Menu' button to enter the menu. The menu button now displays 'Exit'. At any time during this process, you can press the exit button to "back out of" the process. You might have to press it more than once.
- 3 Find and press 'Enter Panel ID' among the panel buttons on the left.



The 'Panel ID' button shows the current panel ID—in this example, it is 4200.

- 4 After you press 'Enter Panel ID', the panel illuminates 10 "digit" buttons on the top row of buttons. Press the digits of your intended panel ID in order—up to 8 digits. Then press the 'Save' button (on the right) to save the ID, press the 'Clear' button to discard the ID, or press 'Exit' to return to the menu.
- 5 You may use any other menu function at this time. When you are finished, press the exit button (which reappears) to leave the menu.
- 6 After you designate the panel ID, reconnect the Ethernet cable. The system controller will detect your panel in a few seconds. (**All** panel IDs must be unique.)

You can now prepare an NV9642 configuration in NV9000-SE Utilities and upload the configuration to the NV9642. You need the panel ID to create a NV9642 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.

## Panel Stacking

If the NV9642 is to be used, under the panel stacking model with one or more NV9646s, initialize the NV9646's panel ID in the same way. You will have provided the NV9646's panel ID to configure it under the page for the NV9642.

It is *very important* to remember the pane IDs of the NV9646s you assign to the NV9642. To recover their IDs requires examining the text of the configuration file for the NV9642.

## Testing

As shown previously, in step 3, a panel test function is available when the NV9642 is disconnected from the system controller. Run the test to determine the health of your NV9642. See [Setup Mode](#), on page 77, for detail. Press the 'Software Versions' button to review the versions of installed software and firmware.

These are points to consider after you install your NV9642 control panel(s):

- 1 Do the buttons illuminate? When an NV9642 powers up, its two leftmost LCD buttons are supposed to turn green. Does it pass the panel test mentioned above?
- 2 When the NV9642 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 that configuration should light in the colors appropriate for the top-level button page of that configuration.

If you continue to see "No Server," "Acquiring IP Address," or "Locating Network" on button 2, you have a problem. Reboot everything and try again.

- ▲ The NV9642, by default, acquires its IP address through DHCP on the system controller'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 on the display, you have either not initialized the panel or no configuration has been created for your panel in NV9000-SE Utilities.

- 3 Is the 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?

The design of an NV9642 "operator interface" is non-trivial. 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 NV9642.

## Summary

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Persons not interested in NV9642 configuration need not read this chapter.

## Summary

The NV9642 has a “multi-page” user interface. Each of its 34 buttons (illuminated in various colors and having 3 lines of text) can either (1) execute a function or (2) select another button page (i.e., present an entirely new set of functions). The set of button pages is not limited in size. Panel operators navigate to different button pages to perform different tasks.

We say that the user interface is tree-structured (or hierarchical) although it is not always a “tree” in the strictest sense. (You can construct a tree-like graph of the button pages.)

The NV9642, in addition, has an 4×22 alphanumeric display that presents the status of operations as they occur. The NV9642 panel has up and down buttons next to the display with which the operator can scroll the display.

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 NV9642. Figure 4-1, following, shows the default NV9642 panel configuration page from NV9000-SE Utilities.

## Adding a Panel to an NV9000 Configuration

You must create configurations for the NV9642 using NV9000-SE Utilities. We assume that you are familiar enough with NV9000-SE Utilities that you can understand the following

## Configuration

### Adding a Panel to an NV9000 Configuration

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.

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

Control Panels x

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

ID	Panel ID	Panel	Panel Type	Configuration Name	User
2	6424	9642-4	NV9642	\\nvision\envy\usersys\live\prod 6424.642	EnvyUser

Edit Selected Control Panels **Add Control Panel** Delete Control Panel

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

Add Control Panel x

Type: NV9642

ID: 6428

Name: Demo642

User: EnvyUser

Configuration Options:

New, named:  copied from: PROD 6423.642

Existing: PROD 6423.642

New (default), named: D642

Previous Next Finish Cancel Suffix Navigate

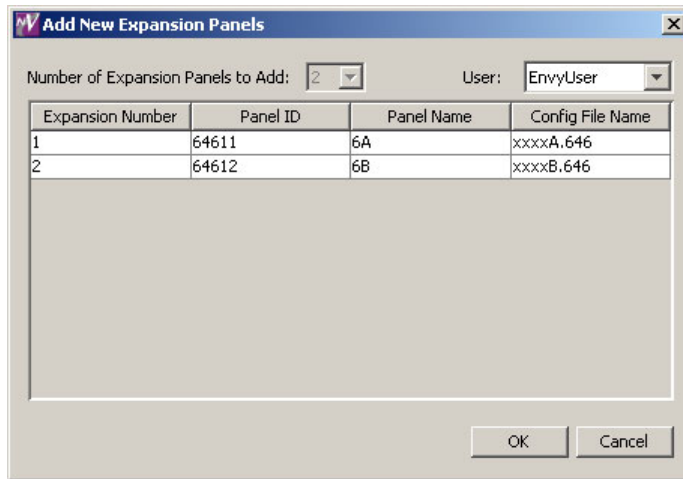
Choose "NV9642" from the 'Type' field. In the ID field, enter the panel ID you assigned to the panel while it was in setup mode. Give a name to the panel in the name field and select a user.

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.

If you make a copy of a NV9642 panel configuration that is configured in stacking mode — having one or more NV9646 extensions, the software will ask you to provide the identities of the NV9646 extensions that will be coupled with the new NV9642. The number of NV9646 extensions must be the same as for the NV9642 you are copying. You must create new, and unique, panel IDs for those NV9646 extensions.

This is a sample of the dialog that appears in this situation:



The panel names and configuration file names can be anything you like, subject to the norms of storage under the Windows file system.

- 2 Use an existing configuration file. (This allows several panels to share a single configuration.)
- 3 Create an entirely new configuration file.

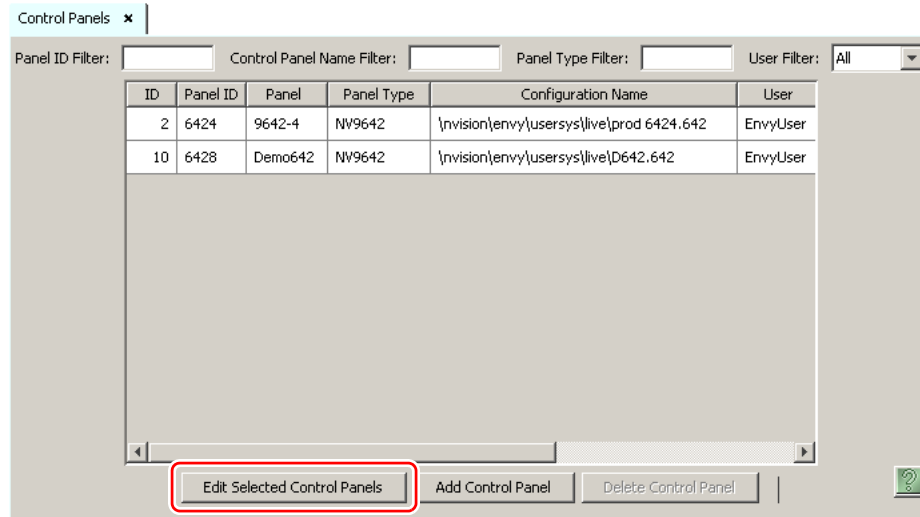
In the first and third cases, you will create a new configuration file whose name you designate. The file extension for an NV9642 configuration file is .642. Click 'Next' or 'Finish' to proceed.

- ▲ There are 2 other buttons: 'Suffix' and 'Navigate'. Pressing either of these buttons creates a button page template, not a panel configuration. See [Extended Structure](#), on page 46.

## Configuration

### Adding a Panel to an NV9000 Configuration

Return to the 'Control Panels' page to view your new entry. To edit an NV9642 configuration, either double-click its list entry or select the entry with a check in the checkbox and then click 'Edit Selected Control Panels':



You will then see the panel configuration page for the selected NV9642.

The following section of this guide discusses using the panel configuration page in which you configure an NV9642 or a panel stack consisting of one NV9642 and from one to seven NV9646s.

- ▲ The entries in the list can be (1) actual panel configurations (2) global navigation templates or (3) global "suffix" templates. See [Extended Structure](#), on page 46.

## NV9642 Panel Configuration Page

This is the default NV9642 panel configuration page in NV9000-SE Utilities:

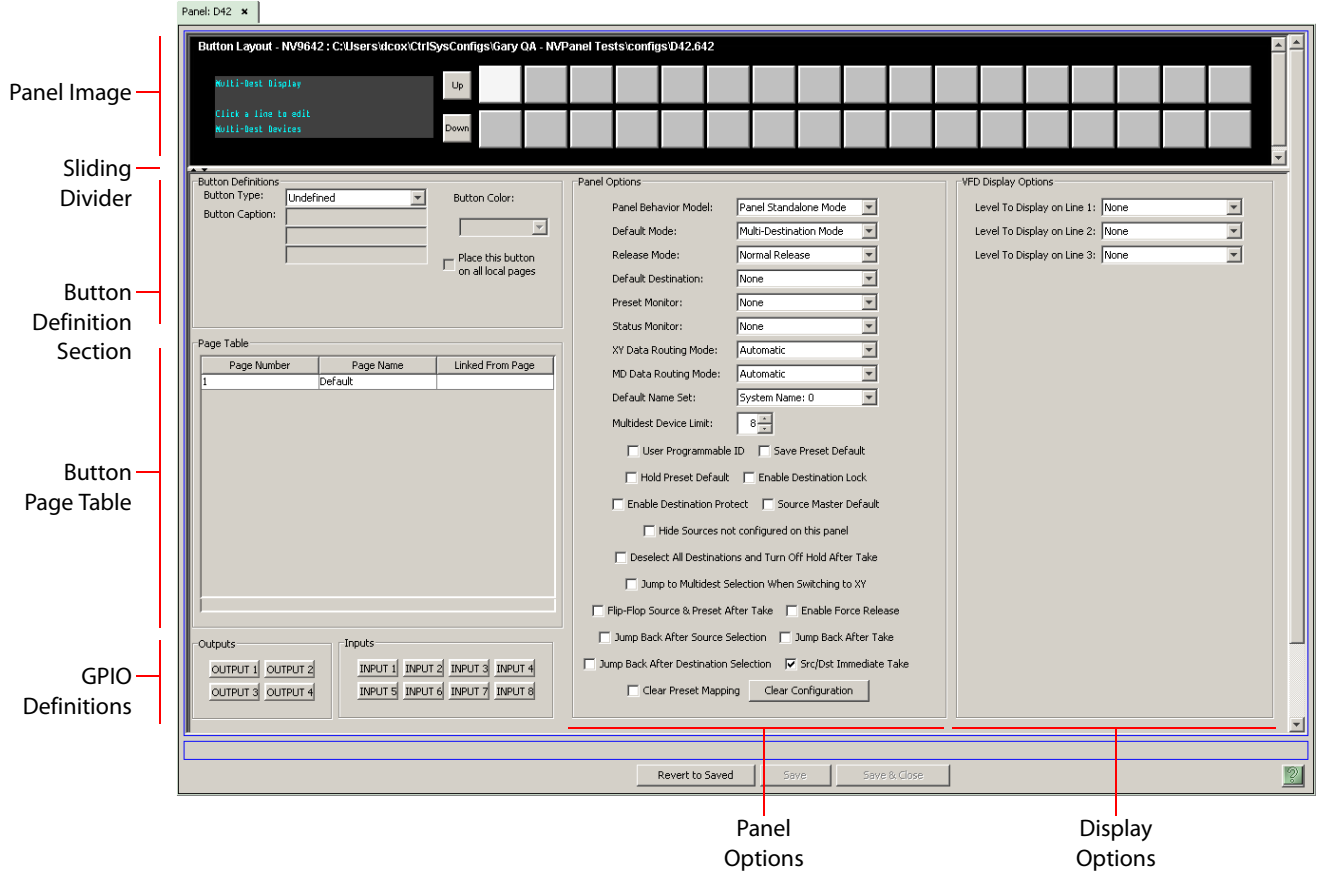


Fig. 4-1: NV9642 Configuration Page (Default, under the Standalone Model)

Similar pages exist for NV9642 suffix templates and for global navigation templates. See [Extended Structure](#), on page 46.

A newly created NV9642 configuration appears in *standalone* mode. You can use the first panel option to switch the NV9642 to *stacking* mode.

If you switch from standalone mode to stacking mode, you will receive a warning that everything in the standalone configuration will be reset:



Click 'Yes' if you want to switch to stacking mode.

When you click 'Yes', the software presents a stacking dialog in which you specify the identity (or identities) of NV9646 panel extensions. See [Defining NV9646 Extensions](#), next page.

(Note that if you switch from stacking mode to standalone mode, a similar dialog appears.)

## Defining NV9646 Extensions

When you switch to stacking mode, using the first panel option, the software presents a dialog in which to specify the identity of up to 7 NV9646 panels:

Number	Panel ID	Config Name	File Name
1	6428	Fred1	Ginger1
2	6429	Fred2	Ginger2
3			
4			
5			
6			
7			

You must specify 3 items for each expansion panel:

- Panel ID. The panel ID must be an integer that is unique among all panels in your system.
- Config name. This will appear as the 'Panel Name' in the control panel window.
- File name. This will appear as the file name in the 'Configuration Name' column of the control panel window.

After specifying these items, click 'OK'. The NV9642 is now in stacking mode and the window will display NV9646 graphics below the NV9642 graphic.

You must edit the NV9646 buttons in the NV9642 page. It is not possible to open the NV9646 extensions separately in the control panel window.

This is a typical NV9642 panel configuration page under the *panel stacking* model:

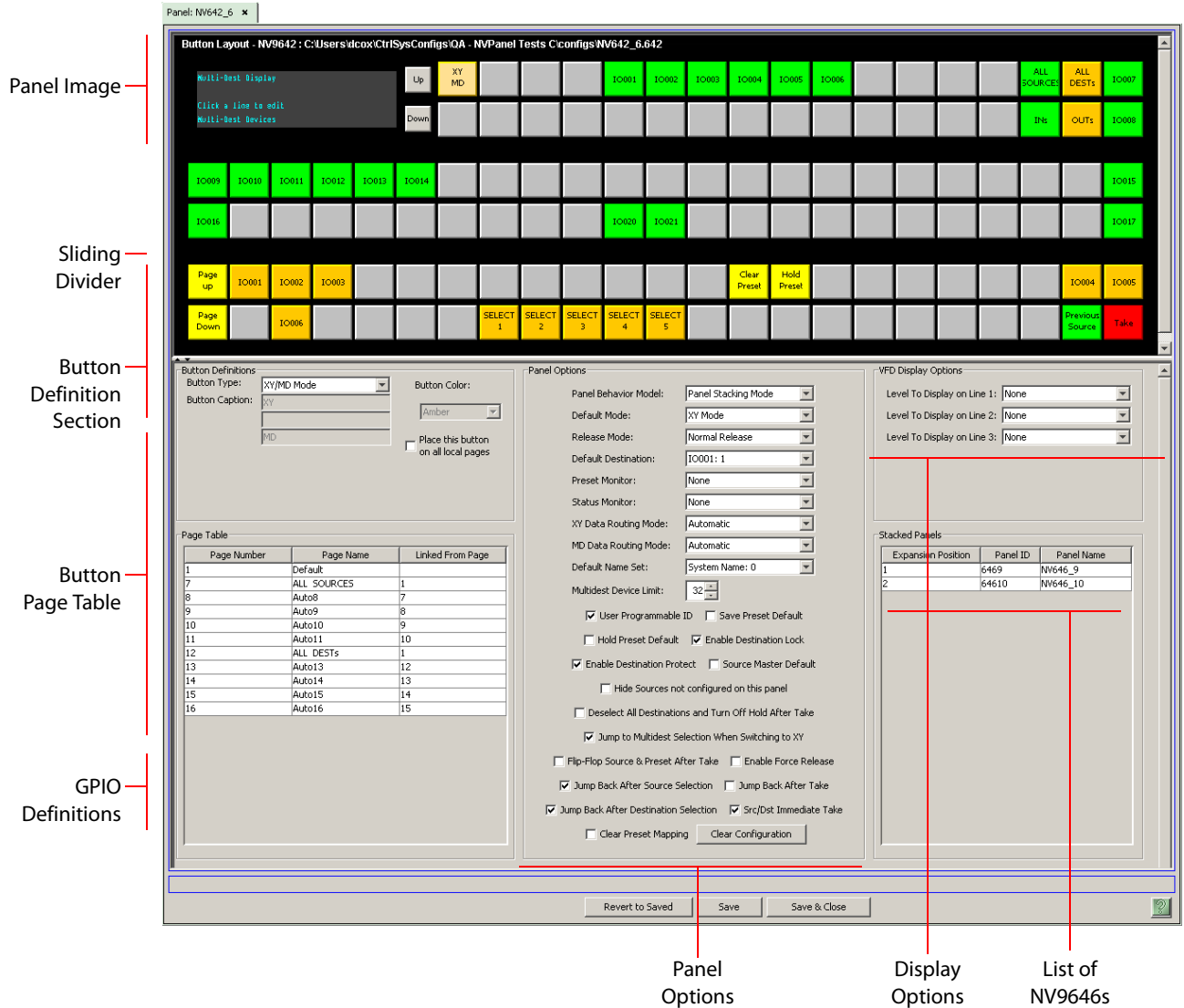


Fig. 4-2: NV9642 Configuration Page (Default, under the Stacking Model)

A similar page exists for NV9642 global navigation templates and a similar page exists for NV9642 suffix templates. The suffix template is considerably less complex. See [Extended Structure](#), on page 46.

After you configure buttons, and button pages, the appearance of the panel buttons will have changed.

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 8 main components:

- Sliding divider.

You can move the sliding divider (which is the lower edge of the panel graphic) up or down.

If you have chosen panel stacking mode for the NV9642, you must slide the divider down to reveal button matrices for NV9646s included in the extended panel. Figure 4-2 shows the sliding divider lowered to reveal one NV9646.

- A graphic representation of the NV9642 panel.

The image of the NV9642 has 36 function button images on the right. Two of those, at the left end, are physically just pushbuttons. These are not configurable. The remainder are colored, re-legendable, LCD buttons.

Click on a button to assign a function to it. In some cases, you can click or double-click certain buttons to execute the button function. Double-clicking a 'Navigate' button, for instance, causes the button's "subpage" to appear.

Click anywhere in the image of the alphanumeric display (which says "click a line to edit Multi-Des devices") to launch the multi-dest editor. See [Multi-Destination Configuration](#), on page 44. Pressing either the up or down button (next to the display) does nothing.

Double-clicking a 'Page Up' or 'Page Down' button (which are *not* the same as the fixed up and down buttons) allows you to scroll through multi-destination pages that are represented in the image of the alphanumeric page.

If you have placed the NV9642 in stacking mode, you must drag the sliding divider downward so that images of the NV9646s appear. (The NV9646 has 46 colored, re-legendable LCD buttons, and its image shows those buttons.)

- ▲ Generally, the configurable buttons can be illuminated in several colors: green, amber, yellow, red, blue, purple, and grey. There are 3 levels of illumination: high tally (bright), low tally (muted) and off. Undefined buttons are turned off (dark) on the actual panel and are gray in the configuration page.
- ▲ Active buttons that are disabled during operation have text, but are dark on the control panel. Undefined buttons are dark and have no text.

- Button definitions.

In this section, configurers make button assignments, using its pull-down menus and text fields. The menus and fields vary with the button type.

See [Button Definitions](#), following.

- Button page table.

This section—the region below the button definition section—displays a list of the individual pages of the tree structure. The button page at the top of the list is the *root* of the tree. This page is named "Default."

During operation, category buttons can display device subpages when pressed. Those subpages are not definable in NV9000-SE Utilities. The button page list does not display the device subpages accessed through category buttons. Category buttons can also display suffix pages when pressed. Suffix pages are included in the button page table.



See [Button Page List](#) on page 39.

- 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 81, 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.

You use the first panel option, 'Panel Behavioral Model', to select whether the panel is in standalone mode or stacking mode.

- Display options.

In this section, configurers may partially specify the behavior of the display when the panel is in X-Y mode.

In X-Y mode, the display shows 3 lines of level information. (The display also scrolls by 3 lines at a time.) The display options let you specify explicitly what levels appear on those 3 lines. The specification applies, however, only to the first page of the level display.

For example, if your NV9000 configuration has levels HD, SD, AES12, AES34, AES56, AES78, timecode, and 'Ctrl' defined, and you specify that HD, AES12, AES34 are to appear on lines 1, 2, and 3, that will always happen. Then levels SD, AES56, and AES78 will appear on page 2, and 'timecode' and 'Ctrl' will appear on page 3 as the operator scrolls.

During configuration, you may leave any of the fields in this section blank. If you leave all 3 fields blank, the display will present levels *in their default order* (according to their display index, as defined in NV9000-SE Utilities).

If you leave only one or two fields blank, those display lines will appear blank, while the line for which you specified a level will show that level.

- List of NV9646s.

This list presents the identities of the NV9646 extensions to the NV9642. Each one is identified by a panel ID. The panel IDs of the NV9646s should be unique and not in use for any other purpose. You can assign any name to these NV9646 panels.

The NV9646 panels are listed and numbered in the order they appear in the display graphic.

## Configuration Tasks

The person configuring an NV9642 panel will want to consider how best to use the hierarchical nature of the button tree 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:

- Choose the panel's behavioral model.
- Select panel options.
- Assign functions to buttons.
- Create pages (subtrees) of buttons. (Do this using the Navigation button type).
- Define logic for some or all of the tally inputs and outputs.

A configuration should lead the operator through required tasks. It is possible to make navigation through the tree structure of panel operations intuitive through the judicious use of color and text on the LCD buttons.

The configurer must keep in mind that the operator generally cannot view the entire button tree at a glance.

The configurer must also keep in mind that the operator must be able to reach any page in the tree. In particular, the operator, having navigated down a subtree, must have some way to navigate back up the subtree. There are several ways to ensure this. Two ways are listed here:

- Place a "Back" button on each subpage. The "back" button causes the NV9642 to redisplay the *previous* page.
- Place a "Navigate" button on each page, where the navigate button causes the NV9642 to display a *specific* page.
- ▲ The operator can always return from system-generated pages (e.g., device lists) using the 'back' button.

The panel operator, in most cases, needs a 'Take' button and at least one selection button. In addition to their basic function, selection buttons provide feedback about the preset source device and level mapping. A 'Clear Preset' button is strongly recommended.

- ▲ We recommend that you place exactly 8 selection buttons on a page and that they reference all display indexes.

## Commitment Buttons

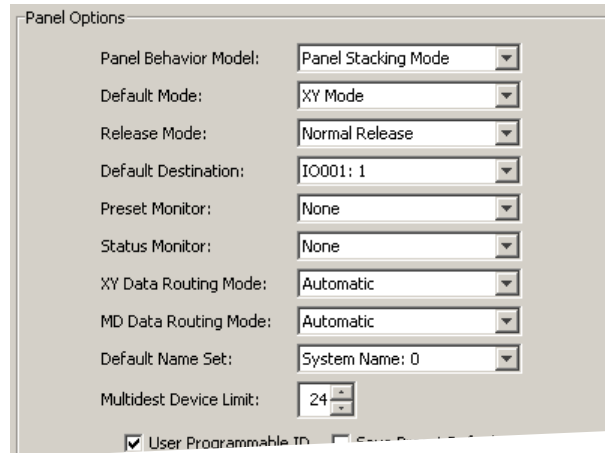
Two buttons at the bottom of the configuration page are self-explanatory and present on most configuration pages:

- 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.

## Panel Options

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



These are the options:

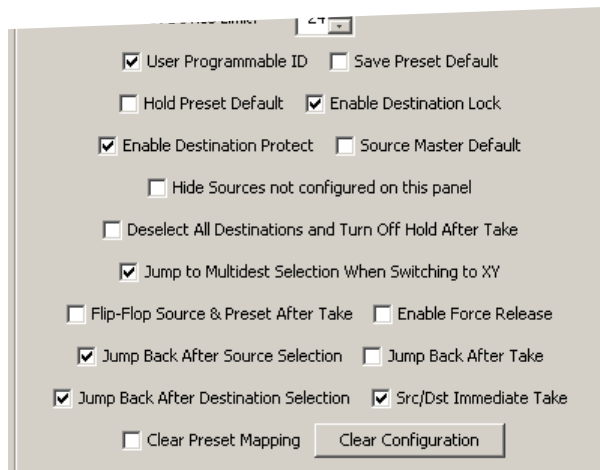
Panel Behavioral Model	<p>Panel <i>standalone</i> mode</p> <p>Panel <i>stacking</i> mode</p>	<p>In the panel's <i>standalone</i> mode, the panel behaves "normally" — as any panel should. At this release, all button functions under standalone mode are implemented.</p> <p>In the panel's <i>stacking</i> mode, the panel functions in combination with an NV9646 to form a larger "panel" with more buttons. At this release, not all button functions are implemented in stacking mode.</p> <p>Note that if you choose stacking mode, you will be asked for the identity of the corresponding NV9646. However, it is in the NV9642 configuration that you configure the NV9646. (The NV9646 extension cannot be opened even though it is present in the control panel list.) You must drag the sliding divider at the bottom of the panel graphic downward to reveal the button matrix of the NV9646.</p>
Default Mode	<p>X-Y Mode</p> <p>Multi-Dest Mode</p>	<p>Starts the panel in XY mode after a reset. See <a href="#">Defaults</a> on page 90.</p> <p>Starts the panel in multi-destination mode after a reset.</p>
Release Mode	<p>Normal Release</p> <p>Force Release</p>	<p>This panel can release "locks" and "protects" set by the designated user (at this panel or any other panel).</p> <p>This panel can release locks and protects set by any user.</p>
Default Destination	<p>None</p> <p>&lt;device&gt;</p>	<p>After a reset, the panel displays no destination device. (This is not recommended.)</p> <p>The Panel uses the specified device as the destination after a reset. (The 'Default State' button also returns the panel to this destination.)</p>

Preset Monitor	None <device>	<p>The preset source video is not sent to a monitor.</p> <p>The preset source video for the selected destination appears on the specified monitor (device).</p>
Status Monitor	None <device>	<p>The current source video is not sent to a monitor.</p> <p>The current source video for the selected destination appears on the specified monitor (device).</p>
XY Data Routing Mode	Automatic	<p>If a machine control (i.e., data) level is involved in a route, the system makes the route on the control level even if the control port is in use on the source or destination device. It breaks the previous control connection and then makes a new control connection for the route in progress.</p>
	Semi-automatic (recommended)	<p>If the control port is in use for the source or destination device, the system takes all (selected) levels except control and allows the operator to perform the control level route by pressing 'Take' a second time. The operator may cancel the control-level take by pressing a button other than 'Take.' If the control port is not in use, the control level take occurs normally.</p>
	Manual	<p>If the control port is in use for the source or destination device, the system takes all (selected) levels except control. It <b>does not</b> perform the control level route.</p> <p>If the control port is not in use, the control level take occurs normally.</p> <p>To carry out a take on a machine control port that is in use, the operator must first free the port by performing a "tristate" take on the port, that is, taking the device (as a source) to itself (as a destination) on the control level.</p> <p>A take can occur on the machine control level if, in the status column of the display, the source entry is "FREE."</p>
MD Data Routing Mode	Automatic	<p>If a machine control (i.e., data) level is involved in a route, the system makes the route on the control level even if the control port is in use on the source or destination device. It breaks the previous control connection and then makes a new control connection for the route in progress.</p>
	Manual	<p>If the control port is in use for the source or destination device, the system takes all (selected) levels except control. It <b>does not</b> perform the control level route.</p> <p>If the control port is not in use, the control level take occurs normally.</p> <p>To carry out a take on a machine control port that is in use, the operator must first free the port by performing a "tristate" take on the port, that is, taking the device (as a source) to itself (as a destination) on the control level.</p> <p>An operator can determine whether the control level is free by switching momentarily to X-Y mode and examining the destination's levels.</p>

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, device name aliases. Do <b>not</b> choose 'System Name' if you are configuring any 'Name Set Toggle' buttons.
Multidest Device Limit	(Selectable in multiples of 8)	The number of multi-destination entries you are defining. (Strictly speaking, this is not a limit, but a <i>count</i> .) The default, and lowest value, is 8. The maximum is 512. (If you have more entries than devices, you can leave some MD destinations unassigned.)

## 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 except 'Src/Dst Immediate Take'. That particular option is enabled by default.

The 'Clear Configuration' button removes **all** configuration data from the panel. The panel then has a blank configuration. If you click this button by mistake, you can regain the previously saved configuration by clicking the 'Revert to Saved' button.

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).
- Save preset default.  
Makes 'Save Preset' mode active when the panel reverts to its default state (after a Default State button is pressed, or when the panel is restarted).
- ▲ A 'Save Preset' button is needed only when you want the operator to be able to view or change the mode.

- Hold preset default.  
Makes “hold” mode active when the panel reverts to its default state (after a Default State button is pressed, or when the panel is restarted).
  - ▲ **Note:** a ‘Hold’ button is needed only when you want the operator to be able to view or change hold mode.
- Enable destination lock.  
Check ‘Enable Destination Lock’ so that any ‘Destination Lock’ button on the panel will function.
- Enable destination protect.  
Check ‘Enable Destination Protect’ so that any ‘Destination Protect’ button on the panel will function.
- 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.
- Deselect all destinations and turn off hold after take.  
After selecting many MD destinations (with ‘Hold’ mode on), it can be time-consuming and error-prone to find them all (and no others) to deselect them after a take. When you enable this option, the NV9642 does exactly that (and turns off hold mode).
- Jump to multi-dest selection when switching to XY.  
Makes the currently selected multi-destination device the current destination when you switch from MD mode to X-Y mode.
  - ▲ The X-Y destination shown will be the default destination when the panel is in MD “hold” mode and multiple destinations are selected—if a default destination is specified in the configuration. Otherwise, no destination will be selected.
- Flip-flop source and preset after take.  
Swaps the preset source and the currently routed source for this destination after a take.
- Enable force release.  
Allows operators to execute a force release.
- Jump back after source selection.  
After you make a source selection, the panel reactivates the *default* button page.
- Jump back after take.  
After you press a ‘Take’ button, the panel reactivates the *default* button page.

- Jump back after destination selection.  
After you make a destination selection, the panel reactivates the *default* button page.
  - ▲ Jumping back to the default page is usually helpful, but in some configuration designs, might not be. You can design your panel configuration to take advantage of the jump-back behavior.
- Src/dst immediate take.  
A 'Src/Dst' button connects a source to a destination. When this box is checked (as it is in the default NV9642 configuration) the button performs an immediate take. When the box is clear, the button sets up the take and the operator must press a 'Take' button to complete the take.
- Clear Preset Mapping.  
If you check this box, all preset mappings (channels, or levels, mapped and tieline presets) clear at the beginning of each suffix button press.  
If you clear this check box, all preset mappings are retained. Note that the most recently made tieline preset (if one was made) is retained even if the ultimately taken source does not require a tieline. The tieline is wasted.

## Button Definitions

There are four 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 'Navigate' and 'Back'. These functions allow the panel operator to move from one button page to another. (The Navigate button is unique: it initiates a dialog in which you create a subtree.)
- System-generated button functions. These are buttons that are generated dynamically (by the router control system) during operation. An example of system-generated buttons is a device list generated when the user presses a category button. The set of devices in a category can change over time (as the configuration database changes); the NV9642 device list changes also.

The number and names of categories can also change over time and the NV9642 will track those changes too.

When a device list appears on the panel, the system lights the 'up' button so the operator can easily return to the page containing the category button.

---

### Note:

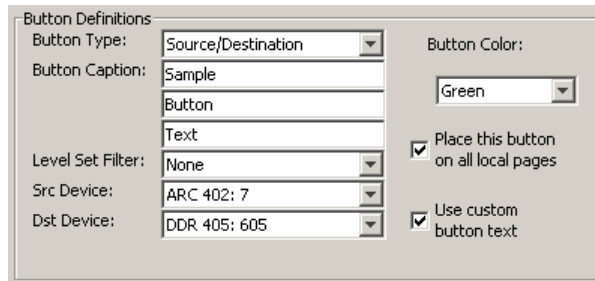
Certain button fields, such as for categories, sources, destinations, or salvos, contain a colon (:) and number, after the data in the field. The number is the record ID of the device (or other configuration object) in the NV9000 configuration database. The record IDs can be ignored but might be of some use when the configurer is searching for items in the configuration database.

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There are different sets of button types for global suffix pages and for global navigation pages. See [Extended Structure](#), on page 46.

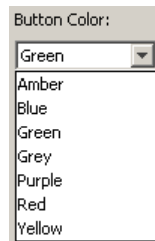
## Button Specification

The button definitions section has several controls:



The controls vary according to the button type.

- |                |   |
|----------------|---|
| Button Type    | A pull-down menu where you may select a button type.  |
| Button Caption | Three text boxes in which you can enter three lines of button text up to 8 characters each. SE provides a default for the button caption.<br><br>Some buttons do not allow you to enter button text. Category buttons, for example, use the category mnemonic as the button text. |
| Button Color   | A pull-down menu where you can select a button color: amber, blue, green, grey, purple, red, or yellow:   |



Each of the 7 defined colors has two brightness levels.

**Note:** in usage, buttons are dark if their functions are disabled. Buttons are low tally if they are available. Buttons are high tally when they are active. (An exception to this is the LCD brightness submenu when the panel is in menu mode.) Some button types are never high-tally.

- |           |   |
|-----------|---|
| Check box | “Place this button on all local pages.” When the operator presses a navigation button, its target page appears on the buttons. Any page can have multiple navigation buttons and therefore multiple target pages. If you check this option, the button you are defining will occur, <i>in the same position</i> , on all pages in the subtree available through the navigation button.<br><br>A “back” button is a good candidate for such a button. The back button returns the operator to the previous page. (Back buttons are automatically placed on list pages and most navigation target pages.) |
| Check box | “Use custom button text.” This checkbox is not present for all button types.  |

The option allows you to define specific button text for certain buttons such as the ‘Src/Dst’ button. By default, the button gets the source



name and destination name as text. The option, when checked, overrides the default.

Be careful: unchecking this box alters the text you entered.

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.

There are other button definition options that become available when you are defining a category button or a global navigation button and you have defined one or more suffix pages or global navigation pages. These options are described under [Extended Structure](#), on page 46.

The Navigate button is a special case. It invokes an "Edit Navigate Button" dialog during configuration. See ['Edit Navigation Button' Dialog](#), on page 36.

## Button Functions

Note that different subsets of these button types are available when you are defining a global suffix template or a global navigation template. See [Extended Structure](#), on page 46.

Note that the 'Up' and 'Down' buttons (not configurable) are available in all modes.

These are the button types available for NV9642 configurations:

Type	Description
Back	<p>The 'Back' function places the predecessor of the current button page on the panel.</p> <p>The panel software can introduce a "back" button if an automatically generated list has more entries than can fit on a page.</p>
Broadcast	<p>On the data (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 is useful in dubbing applications or when a backup (redundant) device is in use. See <a href="#">Broadcast Routes</a>, on page 73.</p> <p>See also the <a href="#">Source Master</a> button, following.</p>

Type	Description
Category	<p>Displays a category's input or output device list or displays a suffix page.</p> <p>When you assign a category button, two additional drop-down menus appear: 'Src Category' and 'Dst Category'. Choose a category from one of the category lists. When you choose a source category, the destination categories become inaccessible and vice versa: a category button must be either a source category or a destination category. You must choose 'None' in either category list to switch to the other category list.</p> <p>When you choose either 'Src Category' and 'Dst Category', the 'Use global suffix page to select devices' checkbox becomes enabled and a 'Suffix Page' drop-down menu appears. You can select a suffix template in the drop-down menu.</p> <p>If you choose a suffix template, when the operator clicks the category button, the suffix page appears. If you do not, a list of devices in the category appears. See <a href="#">Extended Structure</a>, on page 46 for further detail.</p> <p>The default button text will be the category name. You can override the default text.</p>
Chop	<p>When a chop function is supported by the 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>
Clear Preset	<p>Erases preset entries, while leaving the panel in the same mode. This button is recommended as a "safety" feature.</p> <p>The clear preset button has the side effect of switching off 'Save Preset' mode.</p>
Default State	<p>Returns the panel to its most recent power-up state. That is called the <i>default state</i>.</p>
Destination	<p>Selects a destination.</p> <p>When you assign a destination button, a drop-down menu appears: 'Destination Device'. Choose a device from the list.</p> <p>The 'None' entry is merely a placeholder. Do not choose 'None'.</p>
Destination Lock	<p>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>In MD mode, an "L" appears next to the destination when it is locked.</p> <p>In X-Y mode, an "L" appears next to selected levels when they are locked.</p>

Type	Description
Destination Protect	<p>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><b>Note:</b> 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>In MD mode, a “P” appears next to the destination when it is protected. In X-Y mode, a “P” appears next to selected levels when they are protected.</p>
Free Source	<p>Defines a phantom device that can be used to release or “free” devices on the data (control) level. A free source is also used with tielines to free the tieline for others to use. The free source is configured in the <i>Level Set Details</i> page of NV9000-SE Utilities.</p>
[Forward]	<p>The panel software can introduce a “forward” button if an automatically generated list has more entries than can fit on a page.</p> <p>A ‘Forward’ displays and activates the next button page in an automatically generated sequence.</p> <p>There is no explicit ‘Forward’ button type; configurers cannot create forward buttons explicitly.</p>
Global Navigate	<p>A global navigation button is very much like a navigation button to the operator. However, during configuration, it selects a previously defined “global navigation” template. The template itself may have structure that ordinary button pages have. It can include any button type except additional global navigate buttons. See <a href="#">Extended Structure</a>, on page 46.</p>
Hold	<p>In multi-destination mode, Hold retains destination selections after a take. In X-Y mode, Hold retains breakaway levels after a take. (There are other effects. See <a href="#">Selection Buttons</a>, on page 41.)</p>
Information	<p>The information button displays auxiliary information about level mapping and perhaps other matters. The operator presses the information button once to see the information and again to hide the information.</p>
Level Map	<p>Cross-connects levels (in the same physical router). The function is typically used to shuffle audio channels, for example, to connect AES1/2 to AES3/4. The Level Map mode is cancelled when the next normal take is performed involving the selected destinations.</p>
Menu	<p>This button puts the NV9642 panel in menu mode and displays a menu on the LCD buttons that provides access to a variety of panel options. The button is required if you want the user to have access to the menu.</p> <p>By pressing certain LCD buttons, the user makes menu selections and may enter data (such as panel ID) or change LCD brightness values. The LCD button text varies greatly with context in menu mode. See <a href="#">Menu Mode</a>, on page 75.</p>

Type	Description
Multi-Dest Paging Mode	<p>The 'Multi-Dest Paging Mode' button allows panel operators to select a multi-destination "page" by pressing the page number on a keypad.</p> <p>When you configure a button of this type, the button definition section of the configuration page presents a field in which you select a panel ID of the suffix page you want panel operators to use with the 'Multi-Dest Paging Mode' button. (The suffix page should contain a keypad.)</p> <p>When a panel operator presses the 'Multi-Dest Paging Mode' button, the panel shows the suffix page assigned to the button. The operator enters the number of the desired multi-destination page, then presses 'Back'. The panel returns to the earlier page and switches the page's selection buttons to the multi-destination page selected.</p> <p>Note that it is the set of selection buttons on the page of the 'Multi-Dest Paging Mode' button that is affected by the page number the operator selects. Selection buttons on any other page are not affected.</p>
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>
Navigate	<p>During operation, a navigate button selects and displays a "target" button page. During configuration, a navigate button presents a dialog in which you can enter details of the target page. After you do so, SE displays the target page's buttons on the panel image and adds the subtree to the tree window in the lower left corner if it is not there.</p> <p>(You'll use the navigate function to create new button pages.)</p> <p>The default text for a Navigate button depends on what you assign it. Sometimes it is "Navigate." You will probably want to change it to something meaningful.</p> <p>See <a href="#">'Edit Navigation Button' Dialog</a>, on page 36 for detail.</p>
Page Down	<p>(1) Scrolls the levels or MD destinations on the selection buttons <i>down</i> or (2) scrolls a list <i>down</i>. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the list.</p>

Type	Description
Page Up	<p>(1) Scrolls the levels or MD destinations on the selection buttons <i>up</i> or (2) scrolls a list <i>up</i>. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the list.</p> <p>When the panel is displaying the <i>first page</i> of a list of devices in a category, the 'Page Up' button returns the operator to the page containing the category button.</p>
Panel Lock	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 red. Pressing the Panel Lock button again reverts the panel to its previous mode.
Preset Release	Removes locks and protects from preset source devices. This button is not needed if source locks and protects are not used in your system.
Previous Source	<p>Presets the previously routed source to the currently selected destination. The operator must next press take to restore the previous source. This function is useful when a user makes a route in error.</p> <p>The button does <b>not</b> restore the previous destination. If the user changed the destination and presses 'Previous Source', the take will not restore the previous route.</p>
Quick Source	<p>A quick source button selects a source and performs an immediate take. When you assign a quick source button, a drop-down menu appears in which you choose a source device.</p> <p>The 'None' entry is merely a placeholder. Do not choose 'None'.</p>
Salvo	<p>Executes a salvo.</p> <p>When you assign a Salvo button, a drop-down list appears in which you select a system salvo.</p> <p>The 'None' entry is merely a placeholder. Do not choose 'None'.</p> <p>(You can generate salvo buttons automatically in the 'Edit Navigation Button' dialog when you create a navigation button.) See '<a href="#">Edit Navigation Button Dialog</a>, on page 36.</p>
Save Preset	When this function is enabled (its button is high tally), whatever is on preset is retained (on preset) after a take. When the function is disabled (its button is low tally), preset is cleared after a take.

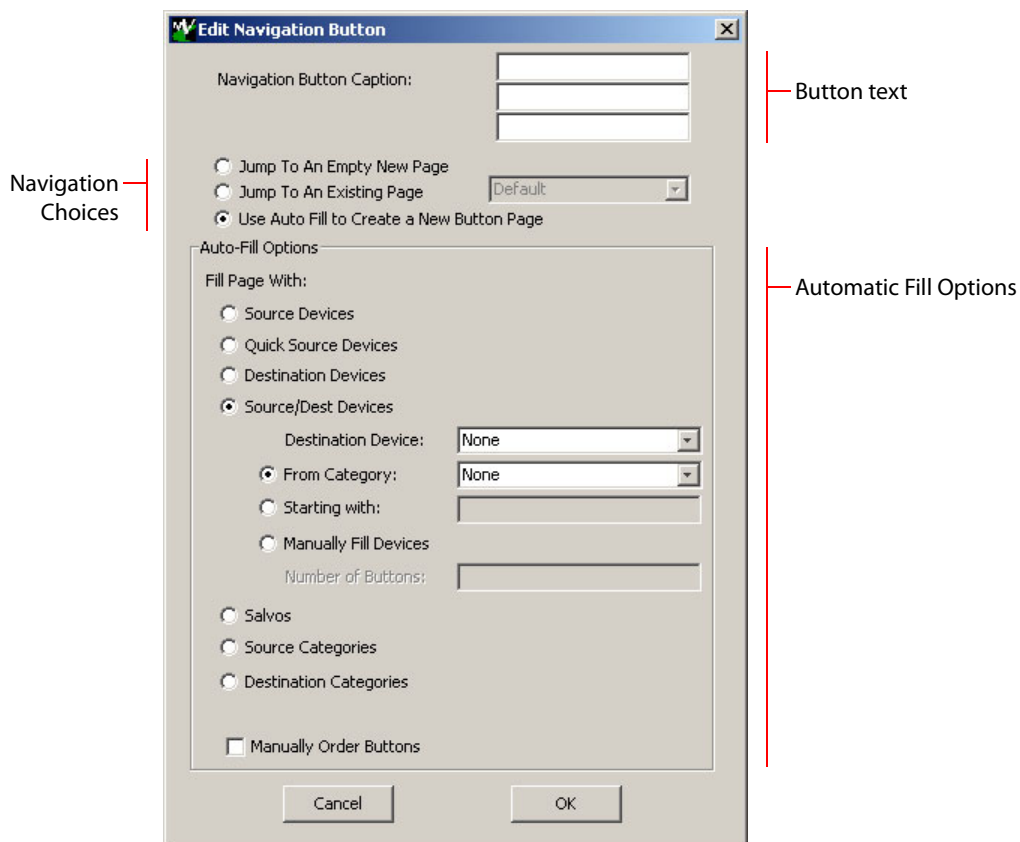
Type	Description
Selection	<p>Selection buttons have many functions, not the least of which is to give feedback (e.g., source and destination mnemonics) when the operator is performing takes.</p> <p>When the panel is in XY mode, a set of selection buttons presents a set of virtual levels for the selected destination device. If there are more levels than selection buttons, the operator can use 'Page Up' or 'Page Down' buttons to scroll through the virtual level list.</p> <p>▲ Note that the up/down buttons next to the display scroll the <i>display</i>, and do not scroll the level list represented on the selection buttons. Operators need 'Page Up' and 'Page Down' buttons to scroll the MD devices on the selection buttons.</p> <p>When the panel is in MD mode, a set of selection buttons presents a set of MD devices. If there are more destinations than selection buttons, the up/down buttons activate and the operator can scroll through the destination list — on the display.</p> <p>▲ Here too, note that the up/down buttons next to the display scroll the <i>display</i>, and do not scroll the MD destination list represented on the selection buttons.</p> <p>See <a href="#">Selection Buttons</a>, on page 41, for further detail.</p> <p>During configuration, when you assign a selection button, two additional drop-down menus appear: 'Display Index' and 'Multidst Device'. The 'Multidst Device' field does not become enabled until you choose a display index.</p> <p>The drop-down menu for the button's <i>display index</i> has as many entries as the current page has selection buttons, but only up to a limit of 8. You must choose a display index for the selection button. Normally, your set of display indexes would be sequential from left to right.</p> <p>The drop-down menu for the <i>multi-destination device</i> allows you to specify the MD destination for the button. Do this for all the destination devices that you want to be selectable in MD mode.</p> <p>On the configuration page, when there are more MD devices than selection buttons, you can double-click a 'Page Up' or 'Page Down' button to scroll through the set of MD devices to assign them to selection buttons. (You can have up to 512 MD devices, in multiples of 8. See the 'Multidest Device Limit' box under <a href="#">Panel Options</a>, on page 23.) You do not have to commit every MD device to a button. MD buttons that are uncommitted are no-ops.</p>
Source	<p>A source button selects a source. (Note that a quick source button selects a source and also performs an immediate take.)</p> <p>When you assign a source button, a drop-down menu appears: 'Source Device'. Choose a device from the list.</p> <p>The 'None' entry is merely a placeholder. Do not choose 'None'.</p>

Type	Description
Source Master	<p>Means "source is the master" and makes the source device the master. Otherwise, the destination is the master. It applies to machine control routes.</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" control routes. See <a href="#">Broadcast Routes</a>, on page 73.</p>
Source/Destination	<p>A source/destination button selects both a source and a destination at one time.</p> <p>A source/destination button can be configured to perform an immediate take. If it is not, the operator must also press a 'Take' button to effect a take.</p>
Take	<p>In X-Y mode, a take button switches the preset source device to the selected destination device on selected levels.</p> <p>In MD mode, a take button switches the preset source device(s) to the selected destination device(s) on all levels.</p> <p>In most cases, configurers should provide the operator a 'Take' button.</p>
Undefined	<p>Makes the button undefined and inactive. On the actual panel, it will remain unlit (dark).</p>
Virtual Level Contract	<p>In X-Y mode, this button causes the alphanumeric display to show virtual levels at the <i>highest</i> level of grouping (with the least detail). The button affects only virtual levels that have been grouped. See <a href="#">Level Grouping</a>, on page 59.</p> <p>The button has no effect in multi-destination mode.</p> <p>This button has no configuration options.</p>
Virtual Level Expand	<p>In X-Y mode, this button causes the alphanumeric display to show virtual levels at the <i>lowest</i> level of grouping (with the most detail). The button affects only virtual levels that have been grouped. See <a href="#">Level Grouping</a>, on page 59.</p> <p>The button has no effect in multi-destination mode.</p> <p>This button has no configuration options.</p>

Type	Description
XY Display	<p>The 'X-Y Display' button displays current route status—in X-Y mode, MD mode, or in limited X-Y mode. Pressing this button has no effect. It also displays other messages in other circumstances, as required.</p> <p>Prior to a take, the 'X-Y Display' button displays the preset destination name (and turns low-tally red if that destination is locked or protected by another user.)</p> <p>After a take, the 'X-Y Display' button also displays the current source name. If there is no destination selected, the 'X-Y Display' button says so.</p>
XY/MD Mode	<p>Switches the panel between X-Y and multi-destination modes.</p> <p>The configuration page lets you specify a color for this button, but the color you specify is ignored. The button is always green for XY mode and amber for multi-destination mode.</p>

### 'Edit Navigation Button' Dialog

During configuration, when you choose 'Navigate' for a selected button, NV9000-SE Utilities displays an 'Edit Navigate Button' dialog in which you specify navigation button details:





At the top, this dialog presents 3 lines on which you can enter text for the button caption. In this dialog, The 3 lines you enter here are concatenated to form the name of the page in the button page table and *might be* the button caption, depending on context.

- ▲ The button caption is independent of the page name. You can change either without affecting the other.

The dialog has 3 navigation choices:

- Jump to an empty new page.

This option creates a new page in the button tree. During operation, the navigation button you are creating will cause the NV9642 to display, or jump to, that page. The name of the page and the button caption are what you type in the three lines for the button caption. You can change the name of the page in the button page table. At the time you create it, the page is empty. After the page is created, you can select it at any time and edit its buttons.

- Jump to an existing page.

This option does **not** create a new page in the button tree. The navigation button you are creating will cause the NV9642 to display the page you select in the associated drop down menu. The button caption is what you type in the three lines for the button caption.

- Use "auto fill" to create a new button page.

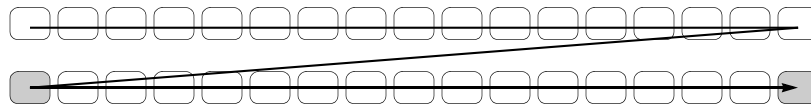
NV9000-SE Utilities (SE) creates at least one new button page, filling the page(s) with button functions according to the fill options you specify. Automatic fill has several suboptions:

Source buttons	Salvo Source category buttons
Destination buttons	Destination category buttons
Source/destination buttons	Salvo buttons
Quick source buttons	

Automatic fill has a "manually order buttons" option where you can reorder the list items as you wish. See [Automatic Fill Options](#), following.

Automatic fill creates as many new pages in the button tree as required to support the number of fill items. If the number of items is greater than 29, SE places 28 items on a page where the bottom left button is a back button and the bottom right button is a "forward" button. The last page of the automatic fill will not have a forward button and might not be completely filled.

The fill occurs in left-to-right, top-down, order:



During operation, the navigation button will cause the NV9642 to display the first of the auto-fill pages. The operator uses the back and forward buttons to scroll through the list.

The button caption is what you type in the three lines for the button caption. You can change the names of the automatic fill pages in the button page list. After the pages are created, you can select any of them at any time and edit its buttons.

During configuration, you can double-click a navigation button to view and edit its target page. Any page can have navigation buttons. You can also select pages by double-clicking on the page's page number field in the button page list.

### Automatic Fill Options

- Source Devices

SE assigns sources to buttons in new button subpage(s). If it has too many sources to fit on the subpage, it creates further subpages as needed. The software adds 'Back' and 'Forward' buttons when more than one subpage is required.

There are 3 sub-options under 'Source Devices':

- 'From Category'. Specify a category other than 'None'. The fill list will include all the devices in the category.
- 'Starting with'. Specify an initial substring. For example, if you specify "V," all sources whose names start with "V" are included in the list.
  - ▲ If you leave the 'Starting with' field blank, the page will list all devices.
- 'Manually Fill Devices'. Specify the number of buttons you want to be assigned. The software creates as many subpages as are required to hold the buttons. The buttons are source buttons, but remain blank so that you can assign sources to them manually.

- Quick Source Devices

Automatic fill using quick source buttons for source devices is the same as for source devices, except that quick source buttons are used. In the case of manual fill, blank quick source buttons are created.

- Destination Devices

Automatic fill using destination devices is the same as for source devices, except that destination devices are chosen. In the case of manual fill, blank destination buttons are created.

- Source/Dest Devices

This option creates subpages of 'Source/Destination' buttons. All use the same destination, which you specify in the 'Destination Device' field that becomes enabled for this option. The sources can vary according to the sub-option:

- 'From Category'. The fill list will include all the source devices in the category you choose.
- 'Starting with'. Specify an initial substring. For example, if you specify "CA," all sources whose names start with "CA" are included in the list.
  - ▲ If you leave the 'Starting with' field blank, the page(s) will create 'Src/Dst' buttons for all source devices.
- 'Manually Fill Devices'. Specify the number of buttons you want to be assigned. The software creates as many subpages as are required to hold the buttons. The buttons are 'Src/Dst' buttons, but remain blank so that you can assign sources and destinations to them manually.

- Salvos

SE assigns salvos to buttons in new button subpage(s). If it has too many salvos to fit on the subpage, it creates further subpages as needed. The software adds 'Back' and 'Forward' buttons when more than one subpage is required.

- **Source Categories**  
SE assigns source categories to buttons in new button subpage(s). If there are too many source categories to fit on the subpage, it creates further subpages as needed. The buttons are labeled with the category names. You can edit the button captions. The software adds 'Back' and 'Forward' buttons when more than one subpage is required. Categories that are both source and destination categories are included.
- **Destination Categories**  
Automatic fill using destination categories is the same as for source categories, except that destination categories are chosen.
- **Manually order buttons**  
If you check the 'Manually order buttons' box, SE presents a dialog that lists the sources, destinations, categories, or salvos you selected. You may reorder the items. To do so, **double-click** on a row in the ordered list and drag it up or down to the position that you want. The new position will be indicated by a slightly heavier black line. The row you selected is re-positioned where the black line is when you release your mouse button.

## Button Page List

This section is the region below the button definition section. It lists the pages of the button tree. It has 3 columns: Page Number, Page Name, and "Link to Page Num(s)."

The button page at the top (or root) of the tree is called "Default." Initially, the tree has just the default page, until you add other pages.

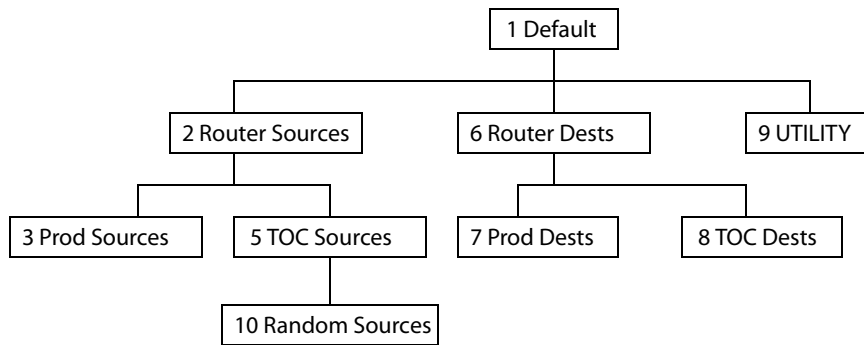
To delete a page or pages from the tree, select the pages in the button page list, right-click the list, and choose one of the deletion commands from the context menu that appears.

- ▲ Be aware when deleting pages from the tree that the deletion does **not** remove any navigation buttons from any button page.

This is a sample of a button page list:

Page Number	Page Name	Links to Page Num(s)
1	Default	
2	Router Sources	1
3	Prod Sources	2
5	TOC Sources	2
6	Router Dests	1
7	PROD Dests	6
8	TOC Dests	6
9	UTILITY	1
10	Random Sources	5

It represents this tree structure:



You can change the name of a page by double-clicking the page's name field and editing its text. Changing the name of a page does not cause a change to the caption of the navigation button and vice versa.

During configuration, you will use 'Navigate' buttons to create new pages. During configuration, you can double-click a 'Navigate' button to jump to its page.

During operation, panel operators will press navigation buttons, global navigation buttons, or category buttons to jump to other pages.

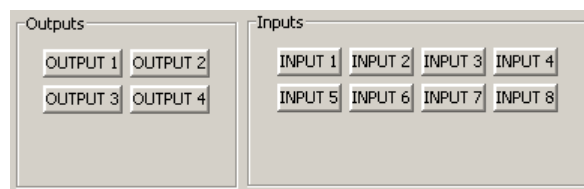
- ▲ Navigation buttons do not jump to global suffix pages or global navigation pages. Only global navigation buttons jump to global navigation pages; only category buttons jump to suffix pages. However, the operator will probably see no appreciable difference between the button types. See [Extended Structure](#), on page 46.

When you double-click the page number field of a page you want to edit, the image of that page appears in the panel graphic area.

The "Links to Page Num(s)" column lists, for any page, the other pages that refer to it. Using the links column you can mentally examine the tree structure or create a sketch of the tree structure. You might note that if the link field of a page is empty, the page is inaccessible during operation. (The exception is the default page which is always available after reset. It might become unavailable in a configuration that has subpages with no 'back' buttons.)

## 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 NV9642 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 81.

## Selection Buttons

Selection buttons have many functions, not the least of which is to provide feedback (e.g., source and destination mnemonics on the face of the buttons) when the operator is performing tasks.

Selection buttons support level selection in XY mode and device selection in multi-destination mode.

You should configure at least one selection button (for feedback). You may configure as many selection buttons as are suitable for your system. For instance, if your system has a maximum of 12 levels for any device, it might make sense to have 12 selection buttons.

Operators can scroll, using 'Page Up' and 'Page Down' buttons, through multiple pages of levels in X-Y mode and through multiple pages of devices in MD mode.

When an operator scrolls the selection buttons, they scroll modulo the number of buttons. For instance, if there are 9 buttons, they scroll in groups of 9 items.

Selection (of levels or MD devices) is affected by 'Hold' mode. (See the [Information](#) button, page 31.) The user may toggle Hold mode at any time. Using the selection buttons follows hold mode or normal mode, whichever is in effect at the moment. Normal mode is the default—unless you specify otherwise in the [Panel Options](#).

## Selection Button Behavior

### XY Mode

When the panel is in XY mode, a set of selection buttons presents a set of virtual levels. The levels displayed on the buttons correspond to the levels in the level set of a selected destination device. If a selection button is dark and blank, the level does not exist in the level set. If a selection button is dark, but has text, the level exists, but is not defined for the selected device. If a selection button is high-tally, the level is selected. If a selection button is low-tally, the level is not selected.

If there are more levels than selection buttons, the operator can scroll through the levels using 'Page Up' and 'Page Down' buttons. The levels list scrolls module the number of selection buttons.

▲ The up/down buttons next to the display scroll the display only.

### MD Mode

When the panel is in MD mode, a set of selection buttons presents a set of MD devices. The selection buttons correspond to MD destinations.

If a selection button is blank, an MD device was not assigned to it. If a selection button is high-tally, the MD device is selected. If a selection button is low-tally, the MD device is not selected.

(Configurers perform MD destination population by (1) scrolling through the MD destination list by double-clicking 'Page Up' or 'Page Down' buttons and (2) configuring the selection buttons that appear as a result of scrolling. The button page must, of course, have 'Page Up' and 'Page Down' buttons and the configurer must create them.

It is usually the case that there are more destinations than selection buttons. The operator can scroll through the destinations using 'Page Up' and 'Page Down' buttons. Including those buttons on the button page that has the selection is strongly recommended.

- ▲ The up/down buttons next to the display scroll the display only.
- ▲ Note that the number of MD destinations is configured in multiples of 8, from 8 to 512.

## Selection

### XY Mode— Normal

When the operator selects a destination, all selection buttons that have levels defined for the destination turn on (high-tally). The operator may select or deselect any levels as required, by pressing selection buttons and perhaps scrolling the display.

- ▲ Note that if the operator selects a level when all levels are on, all the *other* levels become unselected (low-tally).

Selecting a new destination again turns on all selection buttons that have levels defined.

- ▲ Source/Destination buttons are “all level”—not subject to level selection.

### XY Mode— Hold Mode

In hold mode, when the operator selects a destination, previously deselected levels (defined for the destination) remain selected for additional takes and previously unselected levels remain deselected. (Individual levels turn on or off as the user selects them.)

### MD Mode— Normal

When the user selects an MD device, all selection buttons are mutually exclusive: when the operator presses one button, any others that were selected turn off. To perform MD takes, the operator alternately selects an MD device and then a source until all intended devices have been preset. Then the operator presses ‘Take’.

(In normal mode, any selected MD devices become unselected after the take.)

### MD Mode— Hold Mode

In hold mode, selection buttons are **not** mutually exclusive. To perform MD takes, the operator selects one or more MD devices. All of them turn on (high-tally). The operator then selects a source (which becomes preset for all the selected devices).

The operator can preset another source to another set of destinations by deselecting selected destinations, selecting other destinations, and selecting another source.

When all intended destinations are preset, the operator then presses ‘Take’.

(In hold mode, the MD devices remain selected after the take.)

## Configuration

You can configure selection buttons on any page you want. During configuration, when you assign a selection button, two additional drop-down menus appear: ‘Display Index’ and ‘Multidst Device’.

- ▲ It is advisable to create all selection buttons for the page before you actually configure them.

## Display Index

The drop-down menu for the button's *display index* has as many entries as the current page has selection buttons, *but only up to a limit of 8*.

Assign a display index to each of the selection buttons for when the buttons are used in X-Y mode. Normally, your set of display indexes would be sequential from left to right. The display indexes you assign to selection buttons apply to **all** defined level sets.

- ▲ During configuration, you can scroll through the selection buttons to access the range of MD destinations. Scrolling during configuration does **not** affect the display indexes.
- ▲ During operation, the operator can scroll the buttons through all levels when a level set has more levels than there are buttons. Similarly, the operator can scroll through all MD destinations. During operation, the display indexes are not explicitly evident but they do provide the ordering of the levels on the selection buttons.
- ▲ To review the virtual levels and their display indexes, go to the 'Level Sets' page in NV9000-SE Utilities and view any of the level sets in your configuration.

## MD Device

The drop-down menu for the MD device allows you to specify the MD destination for the button. Do this for all the destinations that you want to be selectable in MD mode.

On the configuration page, when there are more MD devices than selection buttons, the up and down buttons become active and you can scroll through the set of MD devices to assign them to selection buttons.

(You can enable up to 512 MD devices, in multiples of 8. See the 'Multidest Device Limit' box under Panel Options on page 23.) You do not have to commit every selection button to an MD device. MD buttons that are uncommitted are dark and do not operate.

## How to Configure Selection Buttons

Follow these steps to assign virtual levels and MD devices to selection buttons.

- 1 Decide how many selection buttons you want on the button page. We strongly recommend 8 selection buttons. Create those selection buttons by clicking on the buttons and choosing 'Selection' as the button type. For each one, assign the button a display index. (Display indexes range from 1 to 8.)
- 2 Choose a number of MD destinations (in multiples of 8) in the 'Multidest Device Limit' box under the panel options. The maximum is 512.
- 3 For each selection button, choose an MD destination. You may use 'none' if you do not want to assign an MD destination to the button.
- 4 Press the down button if, after configuring each selection button, you have additional MD destinations to commit to selection buttons. The next set of selection buttons appears on the NV9642 image.
- 5 Repeat steps 3 and 4 until you have committed all the MD destinations that you want. Remember that MD destinations (and virtual levels) scroll modulo the number of buttons on the page.

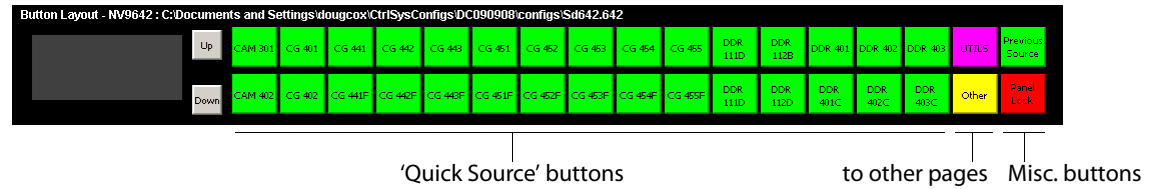
When you are done, the selection buttons you have defined support some or all virtual levels and support some or all MD devices.

## Single-Destination Mode

Single-destination mode (a.k.a., “single-bus” or “button-per-source” mode) can be emulated in either X-Y mode or MD mode.

Single-destination mode is not a distinct mode. It can be blended with either of the other two modes. You can create many different forms of “single-destination” mode. This mode *need not have a single destination*.

The simplest form presents a group of “quick source” buttons. This illustration shows 25 quick source buttons, coupled with a few navigation buttons for (1) selecting a destination and (2) other functions:



If you configure a default destination in the panel options, all the quick sources could be taken to a (single) default destination with no need for destination selection.

Other more complex forms of “single-destination” mode are conceivable.

Single-destination mode can apply whether you are configuring an NV9642 in stacking mode or in standalone mode. In stacking mode, with additional NV9646s, there are more buttons available.

## Multi-Destination Configuration

Multi-destination (MD) devices are a subset of all destination devices. You can configure a panel to have from 8 to 512 MD destinations in increments of 8 destinations. Not all of those need be used. Those that are not used are considered “undefined.”

- ▲ It is possible to have duplicate entries in the MD destination set. For example, it might be useful to have one or two MD destinations visible at all times.
- ▲ You should make sure your configuration page shows a ‘Page Up’ and a ‘Page Down’ button if the operator will be required to scroll through MD devices.

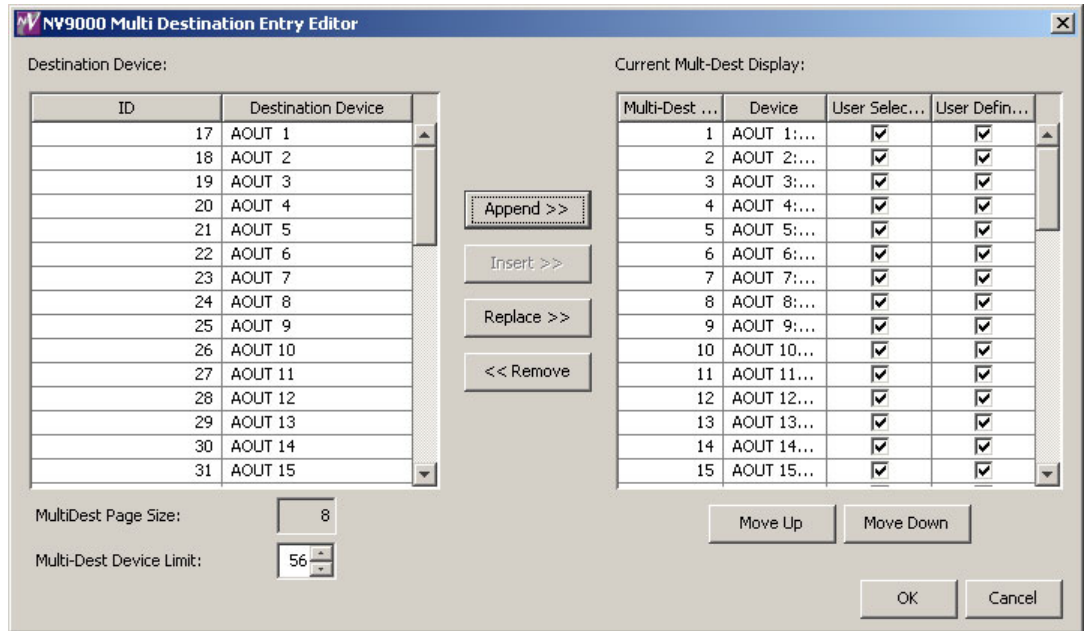
The limit to the number of MD devices is a panel option. If the limit is 64, for example, and your panel has 16 selection buttons, the display can scroll through 4 pages of 16 selection buttons, regardless of whether these rows have been assigned a destination.



## How to Configure MD Devices

Follow these guidelines.

- 1 Click anywhere in the display section of the panel graphic. The multi-destination entry editor appears:



On the left is a list of *all* destinations defined in the NV9000 system. On the right is a table of the MD destinations you are defining. The number of rows in this table is equal to the maximum number of MD destinations your configuration allows. The MD device list is initially empty.

To define an MD destination, select a destination on the left and copy it, using either the 'Append' button, the 'Insert' button, or the 'Replace' button, to the right.

The 'Append' button *appends* the selected destination(s) to the end of your set of MD destinations.

The 'Insert' button places the selected destination(s) immediately *above* whatever MD destination you have highlighted on the right.

The 'Replace' button *replaces* whatever MD destination(s) you have highlighted on the right with the selected destination from the left.

The 'Remove' button *removes* highlighted MD destinations from the right.

At the bottom left, there is a scroll box in which you can adjust the maximum number of MD destinations. (The page size field is grayed out and irrelevant.)

At the bottom right, are 'Move Up' and 'Move Down' buttons. You can use these to adjust the position in the list of any MD destination.

After you have finished configuring MD destinations, click OK (or cancel, if you want to discard your entries). The MD destinations you have configured will appear on the selection buttons or the display of a running panel having this configuration (when it is operating in MD mode).

You can edit the set of MD devices later, adding or removing entries as you wish. (To edit the MD devices, again click anywhere in the display section of the panel graphic.)

## MD Destination Options

On the right side of the multi-destination entry editor, each MD destination has two checkboxes. One is in the 'User Definable' column and the other is in the 'User Selectable' column.

### User-Definable

When the MD destination is "user definable," the operator may choose a different destination using the panel buttons. "User definable" is the default for all MD destinations. Uncheck the 'User Definable' box if you want to prevent the operator from changing this MD destination.

### User-Selectable

When the MD destination is "user selectable," the operator may select it and assign a different source to it using the panel buttons. That is also the default for all MD destinations. Uncheck the 'User Selectable' box if you want to prevent the operator from taking a source to this destination.

## Extended Structure

NV9000-SE Utilities provides "extended structure" pages for NV9642 control panels. Extended structure pages are templates—patterns—that may be used and reused in the creation of many NV9642 configurations.

There are two types of extended structure pages:

- Suffix' pages.
- 'Global Navigate' pages.

Either of these templates may define a single button page or an entire subtree of pages.

The templates must be of the same "shape" as the NV9642. If the NV9642 is configured in stacking mode, with NV9646 extensions, any suffix page or global navigation page it uses must have the same number of NV9646 extensions.

Suffix pages are accessed when the panel operator presses a 'Category' button. Global navigation pages are accessed when the panel operator presses a 'Global Navigate' button.

## Global Navigation Templates

Global navigation templates support all button functions except 'Global Navigate'. That is because global navigation templates cannot be nested.

Remember that templates themselves are *not* NV9642 configurations.

Follow these steps to create either type:

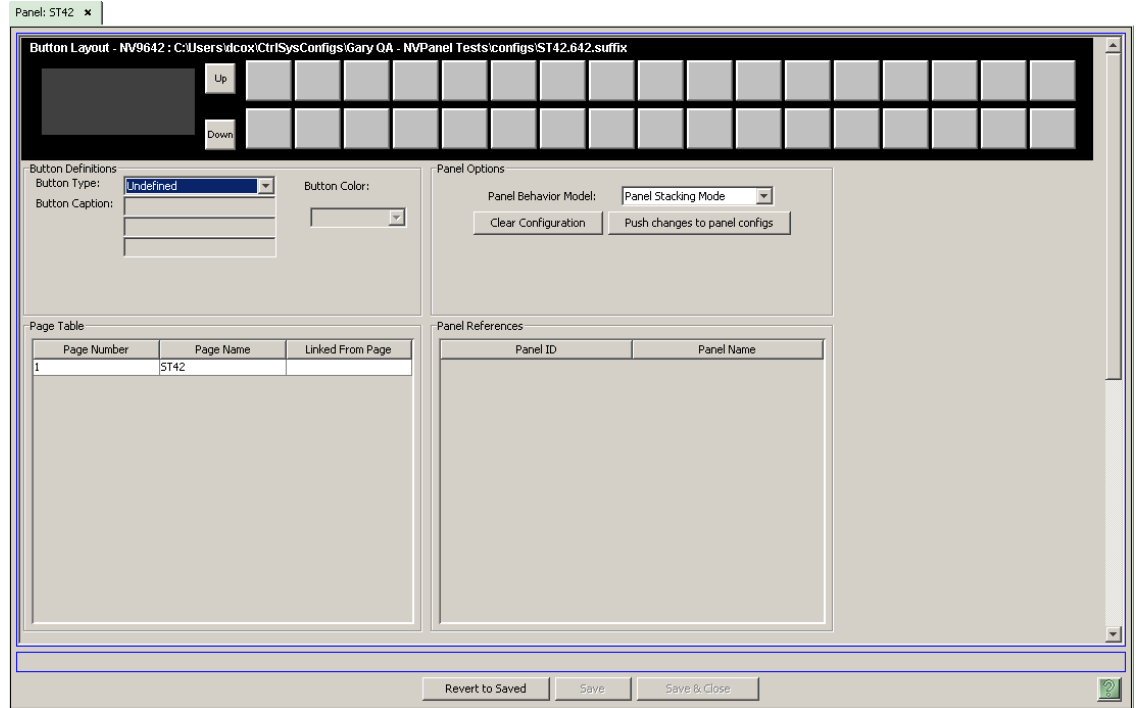
- 1 Choose 'Control Panels' from the 'Configuration' pane. Then click 'Add Control Panel'.
- 2 In the 'Add Control Panel' page, complete the details as you would for a panel: The panel type is NV9642. Specify a panel ID, a name, and choose 'New' in the options section.
- 3 Rather than click the 'Next' or 'Finish' button, click either the 'Suffix' or 'Navigate' button. Doing so creates an extended structure page of the appropriate type.

Using a suffix page is different from using a navigation page.

## Suffix Templates

You can configure a suffix template in either standalone mode or stacking mode (with from one to seven NV9646 extensions). When you reference a NV9642's suffix template, it must have the same number of NV9646 extensions as the NV9642.

This is a standalone NV9642 suffix template:



The configuration page for NV9642 suffix templates is different. The buttons allowed in a suffix template are a small subset of the buttons supported by NV9642 configurations:

Back	Category	Clear
Clear Preset	Hold	Take

## Names

After adding global navigation templates to your N9000 configuration, you will see them identified as such in the control panel list:

ID	Panel ID	Panel	Panel Type	Configuration Name
2	6404	9640-4	NV9640	\nvision\envy\usersys\live\pROD 6404.640
3	6402	9640-2	NV9640	\nvision\envy\usersys\live\pROD 6404.640
23	6422	Demo642	NV9642	\nvision\envy\usersys\live\D642.642
25	6423	SFx642	NV9642 Suffix	\nvision\envy\usersys\live\p642.suffix
26	6424	Gnav642	NV9642 Navigation	\nvision\envy\usersys\live\G642.navigate

The words "Navigate" and "Suffix" appear in the 'Panel Type' and 'Configuration Name' columns.

## Referencing a Suffix Template

Suffix pages can be accessed through 'Category' buttons.

When you create a 'Category' button, the button type region displays a checkbox option: 'Use global suffix page to select devices':

When you check the option, an addition 'Suffix Page' field appears. Choose one of the suffix templates in the drop-down list. The suffix page appears in the panel configuration's button page list:

Page Number	Page Name	Links to Page Num(s)
1	Default	
2	Breakawy	1
10	Sfx1	1
11	Nav1	1
12	Gnav Sub Page	11

- ▲ The suffix page is a copy of the suffix template. It is *not* the template or a link to the template. Category buttons in the panel configuration that reference a suffix template do have links to their templates.

- ▲ The suffix page allows operators to enter a **numerical** suffix (that is, an index).

The suffix page typically has a simulated numeric keypad with which operators enter a device index in the category-index paradigm used under NV9000 systems. The paradigm is where the device name is expressed as the category name concatenated with the index. For example, the device name for index 114 in category VTR is "VTR114."

- ▲ There are different ways to join the category with the index (such as with hyphens). Refer to the *NV9000-SE Utilities User's Guide* if you need information about that.

In addition to its numeric keypad, the suffix page must have a 'Back' button. It could have a 'Take' button and a few other buttons.

The same suffix template can be used for both source and destination categories.

If you do not check the 'Use global suffix page to select devices' box, the category button produces, during operation, a list of all the devices in the category, on one or more button pages. You cannot view those (dynamically created) button pages in NV9000-SE Utilities.

## Referencing a Global Navigation Template

Global navigate pages are accessed through 'Global Navigate' buttons.

When you create a 'Global Navigate' button, the button definition has a 'Navigation Btn' field:

Button Definitions

Button Type: Global Navigate

Button Caption: Global

Navigation Btn: Nav1: 14

Button Color: Blue

Place this button on all subsequent child pages

Choose a global navigation page in that field. The global navigation page and any of its subpages appears in the panel configuration's button page list:

Page Number	Page Name	Links to Page Num(s)
1	Default	
2	Breakawy	1
10	Sfx1	1
11	Nav1	1
12	Gnav Sub Page	11

Global navigation page(s)

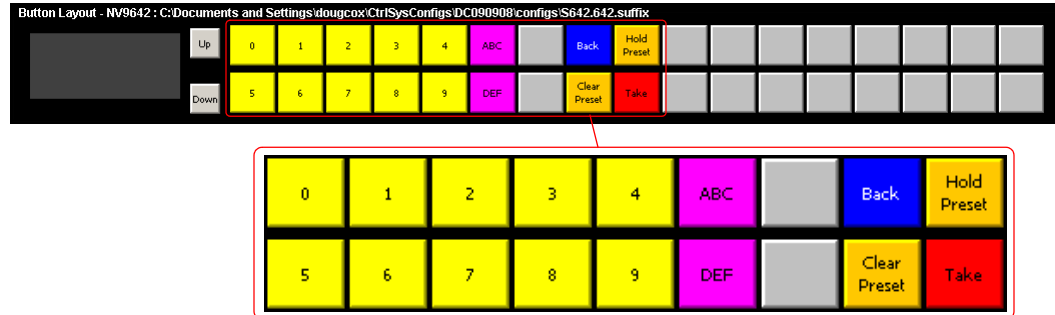
- ▲ The global navigation pages are copies made from the navigate template. They are **not** the template or link(s) to the template. The 'Global Navigate' buttons in the panel configuration that reference a global navigation template do have links to their templates.

The global navigation template provides all the button types available for panel configurations except additional 'Global Navigate' buttons. Otherwise, a global navigation page is functionally identical to any NV9642 page.

A global navigation page should at least have a back button.

## Composing Suffix Templates

Suffix templates have only a few button types. Essentially what you can do with a suffix template is create a “keypad.” This is an example:



The keypad itself consists of ‘Category’ buttons. The designation “category button” has no relation to “category buttons” in panel configurations. Here, the category button simply places a numeral or a suffix on the button page. When the operator presses a numeral or a suffix, the numeral or suffix is appended to the mnemonic of the device being identified.

- ▲ It is an NV9000-SE Utilities feature that certain numerals become disabled if there is no device index in the category that contains that numeral. It is possible for *all* numerals to be disabled. For example, if there are 23 devices in the category that caused the suffix page to be displayed, then after the operator presses two numerals, all further entry is disabled.
- ▲ It is logical to include a ‘Take’ button on suffix templates used by source categories. It is not logical to include a ‘Take’ button on suffix templates used by destination categories. However, if a suffix template can be used for either sources or destinations, then a ‘Take’ button is at your discretion.

The operator can use a ‘Clear Preset’ button to cancel a mistaken entry and start over.

Every suffix template must have a ‘Back’ button, and may have a ‘Take’ button, a ‘Clear Preset’ button, or a ‘Hold’ button. There are no other button types. You can duplicate buttons. The arrangement of the “keypad” is at your discretion.

### Template Changes

If you make a *change* to a suffix template and it is in use (you’ll see the entries in the list) you’ll probably want to click ‘Push changes to panel configs’. When you do, the configuration software adjusts all NV9642 panel configurations to use the modified suffix template. This might override changes you have made to the copy of the suffix page in some panel configuration.

If you want to update the suffix page in only some of your panel configurations, create an alternate version of your suffix template and change the panel configurations to use one or the other as desired.

## Composing Global Navigation Templates

Composing a global navigate template is not substantially different from composing panel configurations. The only difference is that navigate templates do not have ‘Global Navigation’ buttons.

Usage differs, however. Navigate templates can be referenced by panel configurations. And that is the point of having templates: you can create multiple panel configurations that, because they reference a navigate template, can all be guaranteed to include the same button pages.

(Navigation templates themselves are not panel configurations.)

### **Template Changes**

If you make a *change* to a global navigation template and it is in use (you'll see the entries in the list) you'll probably want to click 'Push changes to panel configs'. When you do, the configuration software adjusts all panel configurations to use the modified global navigation template.

If you want to update the global navigation page in only some of your panels, create an alternate version of your global navigation template and change the panel configurations to use one or the other as desired.





# 5 Operation

Chapter 5 provides operating instructions for the NV9642 control panel.

## Summary

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This chapter is intended specifically for the NV9642 panel **operator**.

## Summary

As an NV9642 operator, you will be confronted initially with a relatively small panel — 34 buttons of various colors and a small alphanumeric display.

The NV9642 can operate under one of two behavioral models: standalone mode and stacking mode. Standalone mode is “normal” — what you would expect from any NV9000 control panel. Under stacking mode, the NV9642 is coupled with from one to seven NV9646s to form a larger panel. The buttons of the NV9646 and the NV9642 work together.

Because the NV9642 is a “hierarchical” control panel, you can view, at any one time, one button “page” of a potentially large number of pages in the hierarchy of a button “tree.” Pressing certain buttons — such as navigation buttons — causes the panel to display different button “pages.”

The design of the user interface is entirely at the discretion of the configurer. You, the user, depend on the configurer having designed a logical and usable tree structure.

The user interface of an NV9642 in one installation can be radically different from the user interface of an NV9642 in another installation. It is impossible to describe operations in great detail because there is no one interface. What we can do, however, is give you general advice and, of course, specific information on the behavior of the different button types and operational modes.

Because some of the panel’s buttons can have arbitrary legends, a button’s legend might or might not indicate its function. Operators and configurers will have to communicate about the meaning of the buttons in the button tree.

The alphanumeric display (4 lines of 22 characters) shows the status of takes (pending or complete) in X-Y mode or multi-destination mode under normal circumstances. The display presents information or menu items as isolated cases warrant.

Physically, you will find

- Navigation buttons to go up or down in the button tree, or to a specific page in the tree.
- Function buttons (e.g., select a source or lock a destination).
- Lists of sources, destinations, source categories, destination categories, or salvos.
- Virtual level buttons (in X-Y mode) or MD destination buttons (in MD mode).
- Status of preset and current sources and the selected destination(s).

At any particular time, some of the buttons are enabled or disabled. Some are high-tally; some are low-tally; and some might be off (undefined). The buttons have different colors, the choices of which depend on the configurer's intentions.

- ▲ 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 NV9642 can operate under the *standalone* model or the *stacking* model. The panel has the same operating modes under both models.

The panel operates primarily in either "X-Y mode" or a "multi-destination mode." A single button (XY/MD) can toggle between the modes. (The configurer can specify the default mode.)

The primary modes of operation are:

- X-Y mode—individual control of router *levels*. Choose a destination, optionally choose desired breakaway levels, choosing a source or sources, and press 'Take' to complete a desired route. Sources are taken only on selected levels.
- Multi-destination (MD) mode—lets you view and control multiple destinations. The button tree presents destination devices on selection buttons. You can scroll through the MD device list using 'Page Up' and 'Page Down' buttons. Select one or more MD devices, choose a source, and repeat for all desired routes. Then press 'Take'. Takes are "all level," and breakaways cannot be performed.

MD mode allows you to make multiple routes in a single take.

- Single-destination mode—A single destination is defined during configuration. You have only to choose a (quick) source. The take is automatic when you are using quick sources.

Single-destination mode is not a distinct mode and actually need not involve only a single destination. It can be combined with X-Y mode or multi-destination mode.

Secondary modes are:

- Setup mode—where the NV9642 is freshly powered up, but *disconnected from the network*. In this mode, the configurer can preset the NV9642's panel ID and perform a few diagnostic tasks.

Usually, only configurers need be concerned with setup mode.

See [Setup Mode](#), on page 77.

- Salvo mode—pressing a 'Salvo' button and then a 'Take' button executes a salvo. The duration of a salvo is indeterminate, but typically very brief.

- Menu mode — pressing a 'Menu' button places the NV9642 in "menu" mode. In menu mode, the LCD button array becomes a menu button panel that changes as needed during menu operation. Some menu data are presented on the alphanumeric display. The menu button is for operators. There is nothing in the menu that concerns operators except LCD brightness. An operator may use the menu to set LCD 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 75.

## Button Legends

There are many different button function types (about 31) and the legend that appears on any button varies with the type and depends on the configurer's intentions. Button legends have 3 lines of 8 characters. One or more lines of a button legend can be blank.

Buttons are also color-coded. The colors are specified in the NV9642 configuration. In most cases, buttons that are high-tally (bright) are active or selected. Buttons that are low-tally (muted) are inactive or unselected. Buttons that are dark either have no function or are momentarily disabled. As an example, a 'Take' button is disabled until you have a destination and a source selected. Then, the 'Take' button goes high tally (red, by default).

By default, category buttons show the category mnemonic and source buttons show the source device mnemonic. By default, destination buttons show the destination device mnemonic and salvo buttons show the salvo mnemonic.

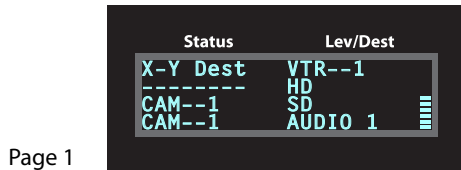
Of particular interest are the legends on the selection buttons and the 'X-Y Display' button in both X-Y and multi-destination modes. These buttons carry 3 lines of important information.

### Levels

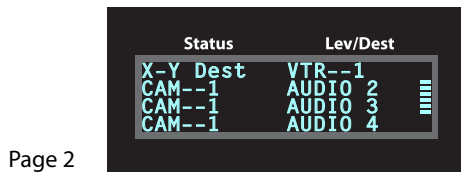
In X-Y mode, a set of selection buttons presents a set of virtual levels that you can select and deselect for breakaway takes. Call them "level" buttons for the sake of simplicity. You can also use the level buttons to perform level-mapping. See the [Level Map](#) function on page 65.

If you have more levels than buttons, you can use 'Page Up' and 'Page Down' scroll selection buttons to view all the levels. (Those buttons are disabled when there is nothing to scroll.)

The display shows 4 levels at a time, as determined by the current destination:

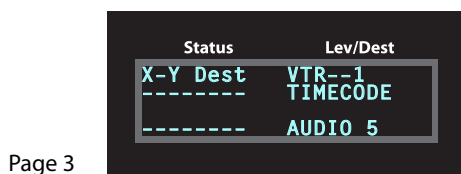


The display shows the current destination at the top. Here, it is VTR--1. The left column shows the current source. The right column shows the level names for the current destination.



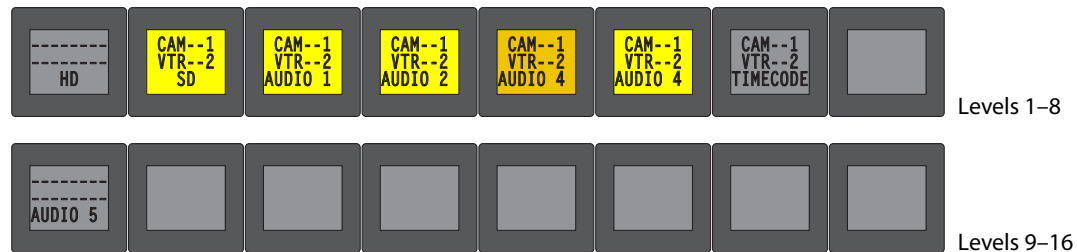
The symbols at the very right of the display indicate whether a level is selected. Here, levels HD and timecode are **not** selected.

It might be necessary to scroll the display to view all levels.



The preset source(s)—those that are pending a take—are viewable *on selection buttons*, but *not on the display*.

In X-Y mode, the selection buttons represent levels. Each displays 3 lines of text:



The *top* line of text identifies the current source and should be identical to the matching entry in the 'Status' column of the display. The *middle* line identifies the *preset* source, not visible in the display. If there is no 'Take' pending, the preset fields will be blank. The *bottom* row of text shows a level for the current destination and should be identical to the matching entry in the 'Level/Dest' column of the display.

When a preset is pending for a take, the selection buttons turn yellow. After a take where there is nothing preset, the selection buttons revert to their original color.



If the current destination had a breakaway, the sources will be different across the levels. If the destination does not include a particular level, that button will be dark, but it will show the level name, as is the case with 'HD', and 'Timecode' here. (Audio 3 is available but not selected and is therefore low-tally.)

Level buttons for which there is no level defined remain blank. Lines in the display for which there is no level defined also remain blank.

- ▲ The display and the selection buttons scroll independently. Use the fixed up/down buttons next to the display to scroll the display and use 'Page Up' and 'Page Down' buttons to scroll the levels on the selection buttons.

## Level Mapping

If a level was level-mapped, the display shows a plus sign next to the level name.

See [Level Map](#), on page 65 for usage information.

## MD Devices

In multi-destination (MD) mode, a set of selection buttons presents a set of MD devices. To perform an MD take, you assign sources to as many MD devices as you like and then press 'Take'. The multiple takes occur simultaneously. Call these "dest" buttons for the sake of simplicity.

To assign a source to an MD destination, select the destination using a selection button and locate and press a source button. You might have to scroll the display to find the MD destination of interest. (In hold mode, you can assign a source to several MD destinations at once.)

In this example, the displays shows that two sources, CAM--4 and CAM--5, were preset to 2 destinations, VTR--2 and VTR--3, respectively:

Status	Lev/Dest
CAM--1	VTR--1
CAM--2	VTR--2
CAM--3	VTR--3
CAM--4	VTR--4

The preset sources are not visible on the display, but are visible on the selection buttons when the MD destinations are visible on the selection buttons.

In MD mode, the selection buttons represent destinations in the MD destination set. Each displays 3 lines of text:

CAM--1	CAM--2	CAM--3	CAM--4	CAM--5	CAM--6	CAM--7	CAM--8
VTR--1	CAM--4	CAM--5	VTR--4	VTR--5	VTR--6	VTR--7	VTR--8
	VTR--2	VTR--3					

The top line of text shows the current sources. The middle line of text shows the *preset* sources. The bottom line shows the destinations. If you scroll through the MD destinations, the legends on the selection buttons change.

- ▲ The display and the selection buttons scroll independently. Use the fixed up/down buttons to scroll the display and use 'Page Up' and 'Page Down' buttons to scroll the levels on the selection buttons.

If an MD destination is undefined, it has no name on the display, and the matching button has is not illuminated and has no text.

After a take, the preset source becomes the current source. The preset column of the display becomes blank and the middle text rows of the selection buttons become blank.

## Lists

The NV9642 can produce lists of devices, categories, and salvos automatically—on the buttons.

Lists of categories and salvos are generated statically—during configuration. Lists of sources and destinations can be generated dynamically—on-the-fly during operation—and might vary from day to day. Long lists (more than 28 items) are characterized by the presence of "Back" and "Forward" buttons in the list. You can move to the next set of entries

in the list by pressing the forward button. Press the back button to go to the previous set. A final “back” returns to the page containing the button that displayed the list.

## Operating Concepts

Status for most or all operations is presented on the alphanumeric display (and occasionally on certain buttons).

### Panel Stacking

The NV9642 can operate under one of two behavioral models: standalone or stacking. Under the standalone model, the panel behaves normally, by itself. Under stacking mode, the NV9642 is coupled with from one to seven NV9646s to form a larger panel having more buttons. (Each NV9646 adds 46 buttons.)

### Levels

In the 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 level mapping.

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

#### Breakaway

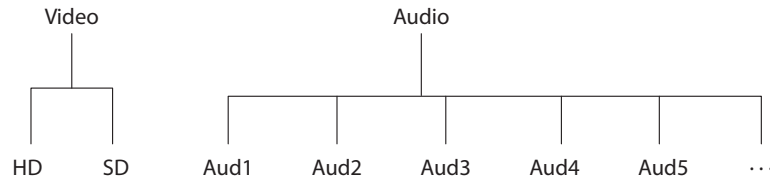
Routes can be all-level in which case they are taken on all levels defined for the destination. The acceptable sources for a route have the same levels as, or some configured mapping to, the levels of the destination.

A breakaway can occur in X-Y mode. 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 Grouping

Virtual levels can be grouped. This diagram illustrates grouping:



There are two types of virtual levels: basic and abstract. Basic virtual levels are those that correspond to actual physical levels. Abstract virtual levels do not correspond to physical levels. In the illustration, the 5 "Aud x" levels are grouped under 'Audio'. The two video levels are grouped under 'Video'.

The levels 'Video' and 'Audio' are abstract levels; the other levels are basic levels.

Press a 'Virtual Level Expand' button to cause the panel to display *all* virtual levels. Press a 'Virtual Level Contract' button to cause the panel to display just the level group names.

## Hold

Hold mode (and hold buttons) apply in both X-Y mode and multi-destination mode.

### Breakaway

In X-Y mode, a hold button retains breakaway levels after a take.

Simply press the hold button at any time before the take.

A hold button is a toggle. Press it once to put the panel in hold mode; press it again to remove hold mode.

### Multi-Destination Mode

In multi-destination mode, hold mode allows you to select more than one MD destination at a time. In addition, MD selections are retained after a take.

## Category Selection

In the NV9000 system, devices are assigned to categories, where the devices within the categories are either numbered or identified by alphanumeric suffixes. For instance, a category representing cameras might be CAM and the cameras in the category might be named CAM1, CAM2, and so on.

NV9642 category buttons can represent either a source category or a destination category (but not both). When you pressing category buttons to begin device selection, one of two things occurs:

- The panel displays a list of all devices in that category. If the list has more entries than will fit on the available buttons, you can scroll through multiple pages of devices using 'Back' and 'Forward' buttons to find the device you want.
- The panel displays a "suffix page" which contains a keypad containing numerals and possibly alphanumeric suffixes, and perhaps some other functions. By pressing keys of the keypad, you can "construct" a device name. Each press of the keypad appends a

digit or a suffix to the category name. The device name appears on the level buttons after you return from using the keypad.

Suffixes may be numeric or alphanumeric, and up to 4 characters in length. Any device may have up to 8 suffixes. However, device mnemonics are limited to 8 characters. Therefore, the usual — and default — suffixes are just the numerals 0–9.

Example: you want to select the source device CAM\_12.

- 1 Press the category button labeled 'CAM'.  
The display for this source shows 'CAM'.
- 2 If you see a list of devices, scroll until you find CAM\_12 and press that button.
- 3 Or if you see a keypad, press '1' and then press '2'.
- 4 When you have the desired source selected, press a 'Back' button to return to the previous page.

## Buttons

The NV9642 has four classes of button functions:

- Dedicated functions, such as 'Default State', 'Chop' or 'Quick Source'.
- 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. A button page will usually contain more than one category, source, or destination button. Often, category lists, source lists, and destination lists span multiple pages.
- Special functions, such as 'Navigate', 'Global Navigate', 'Back', and 'Forward'. These functions allow the panel operator to move from one button page to another.
- System-generated button functions. When you press a category button, the router control system either (1) generates a list of devices belonging to the category or (2) displays a "suffix page." See [Extended Structure](#), on page 46. A device list, if it is long, spans more than one button page.

At present, there are 36 button types, not including "undefined" which is not a true button type. A check mark represents those commands in the stacking mode command set:

Back	Hold	Quick Source
Broadcast	Information	Source is Master
Category	Level Map	Salvo
Chop	Menu	Save Preset
Clear Preset	Multi-Dest Paging Mode	Selection
Default State	Name Set Toggle	Source
Destination	Navigate	Source/Destination
Destination Lock	Page Down	Take
Destination Protect	Page Up	Virtual Level Expander
Free Source	Panel Lock	Virtual Levels Contract
Forward	Preset Release	X-Y Display
Global Navigate	Previous Source	XY/MD Mode



## Back

Redisplay the previous button page. (The previous buttons become active.)

A back button may have any legend and be any color, but typically its legend is just "BACK" and typically, its color is blue, as for back buttons generated automatically for lists. A back button is never high-tally.

A back button has no effect on the contents of the alphanumeric display.

See also [Forward](#).

## 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 73, 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 either (1) displays a category's device list or (2) displays a "suffix page." See [Extended Structure](#), on page 46. A category button is associated with either a source category or destination category.

The button text is normally the category name, but the configurer can give it any text. Category names tend to be short.

## Device List

When you press a category button, the NV9642 displays the first of perhaps several pages of device buttons. You can scroll the pages using back and forward buttons. If you press 'Back' while on the first page of the list, the NV9642 returns to the page containing the category button.

The button text is normally the category name, but the configurer can give it any text. Category names tend to be short.

It is a common convention that buttons for source categories and devices are green and buttons for destination categories and devices are amber.

## Suffix Page

When you press a category button, the NV9642 can display a suffix page which will contain buttons forming a numeric keypad, other buttons that represent alphanumeric suffixes and perhaps a few other buttons. Use the keypad to enter an index or suffixes of a device within the category. If you make a mistake, press the 'Clear Preset' button and try again.

When you have finished entered an index or suffixes, press either the back button or the take button if present. The panel will have tracked your entries by concatenating the index or suffixes to the current destination name (for a destination category) or to a preset source name (for a source category).

While you are pressing digits to enter an index, some of the numeric buttons can become disabled. They do so because there are no further categories that can be selected using

those buttons. For example, if you have 14 devices in a category, numbered 1–14, after you press the digit 1, digits 5, 6, 7, 8, and 9 go dark. The digits 0–4 remain because they can be part of a valid index.

The same is true for suffixes: if a suffix cannot be used for a device name, it is disabled.

- ▲ Keep in mind that device names are limited to 8 characters.
- ▲ A keypad normally has 10 buttons, 0–9. However, it is possible for a suffix page to have fewer buttons.

## 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 Preset

The ‘Clear Preset’ button removes all preset entries (while leaving the panel in the same mode).

The clear preset button has the side effect of switching off ‘Save Preset’ mode.

The default button text is “Clear Preset” but the button can have any legend.

## Default State

This button returns the NV9642 to its most recent power-up state. You may consider this button an emergency button or a “soft reset” button.

- ▲ This button does **not** affect any previous routes. Only the panel itself is reset.

The default button text is “Default State” but the button can have any legend.

## Destination

This button selects a destination.

A destination button can occur on any page, but destination buttons often appear in destination lists. Destination lists can occur either (1) in automatically configured, but static, pages or (2) as a result of pressing a destination category button, in which case, the destinations buttons are generated dynamically. In either case, you navigate through multiple pages by pressing the back and forward buttons.

The button text is normally the destination name, but the configurer can give it any text. Dynamically generated destination lists, however, use the device names defined in the NV9000 configuration. of

Destination names are often created as a concatenation a category mnemonic with a device index.

- ▲ An MD destination button is actually a selection button and is not a destination button.

### 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.

#### MD Mode

In MD mode, a locked destination has an "L" next to it when it appears in the display. When you select a locked MD destination with a button, the 'Destination Lock' button goes high-tally.

The 'Destination Lock' button text is normally "Dest Lock" and when a selected MD destination is locked, the button legend becomes "Dest Unlock."

To lock or unlock MD destinations, select the destinations and press a 'Destination Lock' button.

#### X-Y Mode

In X-Y mode, you may lock or unlock the current destination on each of its levels. Select the level(s) and press the 'Destination Lock' button to perform the lock. Select locked levels and press the 'Destination Lock' button to unlock them. A locked level has an "L" next to it when it appears in the display.

In MD mode, a locked destination appears bright red and its button legend is 'LOCKED by <user>' and the 'X-Y Display' button turns dark red.

In X-Y mode, the 'X-Y Display' button turns dark red for a locked destination.

See [Lock, Protect, and Release](#), on page 71.

### 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 'Destination Protect' button text is normally "Dest Protect" and when a selected MD destination is protected, the button legend becomes "Dest Unprotect."

#### MD Mode

In MD mode, a protected destination has a "P" next to it when it appears in the display. When you select a protected MD destination with a button, the 'Destination Protect' button goes high-tally.

To protect or unprotect MD destinations, select the destinations and press a 'Destination Protect' button.

### **X-Y Mode**

In X-Y mode, you may protect or unprotect the current destination on each of its levels. Select the level(s) and press the 'Destination Protect' button to perform the protect. Select protected levels and press the 'Destination Protect' button to unprotect them. A protected level has a "P" next to it when it appears in the display.

See [Lock, Protect, and Release](#), on page 71.

### **Free Source**

This button selects a phantom device that can be used to release or "free" devices on the data (control) level. A free source can also be used with tielines to free the tieline for others to use.

Use it as if it were a source.

(The actual free source is configured in the *Level Set Details* page of NV9000-SE Utilities.)

The default button text is "Free Source" but the button can have any legend.

### **Forward**

This button displays and activates the next button page of an automatically generated list.

A forward button is never high-tally. A forward button is generated by the system when the current page of a list has more than 28 or 29 elements. Otherwise, the list is at its last page and a forward button would do nothing. Forward buttons are always accompanied by "back" buttons.

See also [Back](#).

### **Hold**

The 'Hold' (a.k.a. 'Hold Preset') button is a toggle. Press it once to activate "hold" mode, press it again to deactivate "hold." The button is high-tally when hold mode is active and low-tally when it is not.

You can activate or deactivate hold mode at any time during an MD selection or a breakaway selection in X-Y mode. Your selection remains intact and the panel subsequently operates in hold mode or non-hold mode according to the hold button state.

The default button text is "Hold Preset" but the button can have any legend.

### **MD Mode**

In MD mode, turning hold mode on allows you to select more than one destination button at a time. When you select a source, the source applies to all selected (high-tally) destinations. If hold is still on when you press 'Take', the selected destinations remain selected and the display reflects the selected destinations. The buttons for the selected destinations remain high-tally.

Without hold enabled, the panel has no destinations selected after an MD take and the buttons for the selected destinations go low-tally.

When hold is active, all selected MD destinations get the source you selected most recently (in case you change your mind and selected another source).

### **X-Y Mode**

In X-Y mode, the hold button causes breakaway levels to be retained after a take. The levels you selected (and deselected) remain lit (or unlit) as they were before the take.

### **Information**

The 'Information' button presents auxiliary information on the alphanumeric display. Such information might be level-mapped sources.

The default button text is "Info" but the button can have any legend.

### **Level Map**

The 'Level Map' button cross-connects levels (typically in the same physical router). The function is typically used to shuffle audio channels, for example, to connect AES1/2 to AES3/4.

Follow these steps to create a level mapping:

- 1 Select a preset source. Here, the source is CAM-14:
- 2 Press 'Level Map'. The button goes bright and the 'XY Display' button tells you to "Select Source Level."  
Press a level (selection) button.
- 3 The the 'XY Display' button now says "Select Dest Level."  
Press another level (selection) button.
- 4 At this point, the level mapping is complete.
- 5 You can view the mapping using an 'Information' button. After you view the information, press the 'Information' button again to return to the X-Y display.
- 6 Finally, press 'Take'. After the take, a plus sign appears in the status column next to the mapped level. You can review the level mapping after the take.

You can create multiple level mappings. Level mappings are typically used for AES levels.

The level map mode is cancelled when the next normal take is performed involving the selected devices.

The default button text is "Level Map" but the button can have any legend.

### **Menu**

The button puts the NV9642 panel in menu mode and places a small menu on the LCD buttons, that provides access to a variety of panel options.

By pressing any of the menu buttons, you may enter data (such as panel ID) or change LCD brightness values or you can view panel data. The LCD button text varies with context in menu mode.

See [Menu Mode](#), on page 75, for more detail.

## Multi-Dest Paging Mode

This button allows you to select a multi-destination “page” by entering the page number on a keypad.

When you press the ‘Multi-Dest Paging Mode’ button, the panel shows the suffix page assigned to the button. Enter the number of the desired multi-destination page, then press ‘Back’. The panel returns to the earlier page and switches that page’s selection buttons to the multi-destination page you entered.

Note that it is the set of selection buttons on the page of the ‘Multi-Dest Paging Mode’ button that is affected by the page number the operator selects. Selection buttons on any other page are not affected.

## 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.

## Navigate

A navigate button displays and activates one of the button pages defined in the panel configuration. We call that the “target” button page.

The target page can be an ordinary button page (defined during configuration) or it can be the first page of a list. Lists are characterized by “back” and “forward” buttons on the panel. Such lists can be categories (source or destination), sources, destinations, or salvos.

Navigate buttons have no specific default text and it is the configurer’s job to provide text that is meaningful. The text should help identify the contents of the target page.

Just press the navigate button to access the target page.

Other kinds of buttons can cause the display of a target page. These include ‘Global Navigate’ buttons and category buttons. In practice, navigate buttons, global navigate buttons, and category buttons are nearly indistinguishable, although the pages they display can be quite different.

See the [Category](#) button type.

## Global Navigate

A ‘Global Navigate’ button functions the same way a navigate button does. Global navigate buttons exist mainly for the convenience of the configurer. Operators should rarely notice any difference between global navigation buttons and other navigation buttons.

Global navigation buttons, however, access only static button pages. They do not access list pages. That is because configurers have no list options for global navigate buttons.

### Page Down

This button scrolls the alphanumeric display *down*. Scrolling is necessary when the number of lines to display is greater than 8. The 'Page Down' button becomes enabled when it is possible to scroll down and is disabled when it is not possible.

The default button text is "Page Down" but the button can have any legend.

### Page Up

This button scrolls the alphanumeric display *up*. Scrolling is necessary when the number of lines to display is greater than 8. The 'Page Up' button becomes enabled when it is possible to scroll up and is disabled when it is not possible.

The default button text is "Page Up" but the button can have any legend.

### Panel Lock

A panel lock button prevents 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 red.

The button is a toggle: press the 'Panel Lock' button to lock the panel. Press it again to unlock the panel.

The button text is either "Panel Lock" or "Panel Unlock."

### Preset Release

This button removes locks and protects from preset source devices. (If source locks and protects are not used in your system, this button is not needed.)

If you select a source and someone else has locked or protected the source, your panel will illuminate the 'Preset Release' button and tell you who locked or protected the source. You can release it if your panel has "forced release" enabled. (Note that you cannot lock or protect sources with the NV9642.)

Press the 'Preset Release' button to release the source.

The default button text is "Preset Release" but the button can have any legend.

### Previous Source

This button presets the previously selected source for the current destination. This function is useful when you make a route in error.

To recover the previous source, press 'Previous Source'. When you do, the 'Take' button goes high-tally. Then press 'Take' to recover the source.

The default button text is "Previous Source" but the button can have any legend.

### Quick Source

A quick source button selects a source and performs an immediate take.

Quick source and source buttons are similar, except that the quick source performs a take. Be aware of which buttons are quick sources so you do not perform an accidental take.

Normally, the button text is the source's mnemonic, but the configurer can assign any text to the button.

### Salvo

This button executes a system salvo. A salvo is a pre-defined set of NV9000 commands.

The button text is the salvo's mnemonic.

Pressing the salvo button puts the panel in "salvo" mode. To confirm that you want to execute the salvo, press a 'Take' button. (You might have to navigate to a 'Take' button.) When you press the take button, the salvo begins executing immediately. Salvos are typically short in duration.

If you want to cancel the salvo before it executes, press the salvo button again.

If you press an 'Information' button while the panel is in salvo mode, the panel presents the salvo commands on the display. You may scroll the display to view the entire salvo.

System salvos are defined in NV9000-SE Utilities. You can review the defined salvos in NV9000-SE Utilities or communicate with the panel's configurer regarding the function of any salvos in your panel configuration.

### Save Preset

This button is a toggle: it enables or disables "save preset" mode. When this function is enabled (and the button is high tally), whatever is on preset is retained on preset after a take. When the function is disabled (its button is low tally), whatever is on preset is discarded after a take.

The default button text is "Save Preset" but the button can have any legend.

### Selection

In X-Y mode, the display shows levels and selection buttons select or deselect levels. In MD mode, the display shows MD destinations and the selection buttons select or deselect MD destinations. A selection button is high-tally when its associated level or MD destination is selected and low-tally when it is not selected. Sometimes selection buttons are dark, meaning that the level or MD destination is either not in use or not available.

### X-Y Mode

When the panel is in X-Y mode, a selection button represents a virtual level present on the alphanumeric display. Pressing one or more selection buttons selects (or deselects) the levels associated with the buttons. A marker appears in the right-most column of the display for selected levels.

- ▲ When all levels are selected, pressing a level button turns them all off except the one pressed.

- ▲ If there are more than levels than buttons, scrolling is enabled. Deselecting virtual levels in X-Y mode prepares a breakaway.

Hold mode preserves the level selection after a take. See [Hold](#).



## MD Mode

When the panel is in MD mode, a selection button represents an MD destination. If there are more MD destinations than selection buttons, scrolling is enabled. Pressing a selection button selects the destination.

- ▲ Certain MD destinations might be unassigned. They appear blank in the display and the corresponding buttons are dark.

When your panel is in hold mode, you can select more than one destination at once. If your panel is not in hold mode, MD destinations are mutually exclusive: you can select only one at a time.

### If you have enabled 'Hold' mode,

- 1 Select one or more MD devices. Scroll the MD device display as needed.
- 2 Select a source.
- 3 Repeat steps 1 and 2 until your presets are complete.
- 4 Press 'Take'. The selected MD devices remain selected.

### If you have *not* enabled 'Hold' mode,

- 1 Select an MD device. Scroll the MD device display as needed.
- 2 Select a source.
- 3 Repeat steps 1 and 2 until your presets are complete.
- 4 Press 'Take'. The selected MD devices become unselected.

If the configurer has turned on the option, you may redefine any MD destination. To do so is simple: (1) select an MD destination on a selection button, (2) choose a destination that is not on a selection button. You might have to navigate or scroll through a destination list to choose one.

## Source

A source button selects a source. (Note that a quick source button selects a source and also performs an immediate take.)

Quick source and source buttons are similar, except that the quick source performs a take. Be aware of which buttons are quick sources so you do not perform an accidental take.

Normally, the button text is the source device's mnemonic, but the configurer can assign any text to the button.

See [Preset Release](#), on page 67, and [Destination](#), on page 62.

## Source/Destination

A source/destination button selects both a source and a destination and optionally performs an immediate take. The take is an all-level take.

A configuration option governs source/destination buttons. When the option is enabled, source/destination buttons perform an immediate take, without requiring the operator to press a take button.

When the option is disabled, the button merely selects the source and destination (on all levels). The operator must then press the take button.

By default, the button shows the source name and the destination name, but the configurer may assign other text to the button.

### Source is Master

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 reverts the roles.

The 'Source is Master' button is used to initiate "broadcast" control routes. See [Broadcast Routes](#), on page 73.

▲ Pressing the 'Source is Master' button turns off the 'Broadcast' button and vice versa. The default button text is "Source Master" but the button can have any legend.

### Take

In X-Y mode, a take button routes the preset source device(s) on selected levels to the selected destination device.

In MD mode, a take button switches the preset source device(s) to the selected destination device(s) on all levels.

The default button text is "Take" but the button can have any legend.

### Undefined

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

### Virtual Level Expander

In X-Y mode, this button causes the alphanumeric display to show virtual levels at the *lowest* level of grouping (with the most detail). The button affects only virtual levels that have been grouped. See [Level Grouping](#), on page 59.

The button has no effect in multi-destination mode.

### Virtual Levels Contract

In X-Y mode, this button causes the alphanumeric display to show virtual levels at the *highest* level of grouping (with the least detail). The button affects only virtual levels that have been grouped. See [Level Grouping](#), on page 59.

The button has no effect in multi-destination mode.

### X-Y Display

The 'X-Y Display' button displays status — in either X-Y mode or MD mode. It also displays other messages in other circumstances, as required. Pressing this button has no effect.

Prior to a take, the status includes the selected destination and *current* source. After a take, the status includes current source and current destination. The 'X-Y Display' button turns low-tally red if that destination is locked (by anyone) or protected (by another user).

If there is no destination selected, this button says so.

The button appears in whatever color the system assigns it—typically amber or dark red.

- ▲ Prior to a take, the *preset* source name is displayed on any selection buttons present on the panel. After a take, the selection buttons continue to display the source name, which is now the *current* source name.

In MD mode, the X-Y Display button shows (1) current source, (2) preset source, and (3) destination for one of the selected MD devices — the first one if more than one are selected.

### XY/MD Mode

This button switches the panel between X-Y and multi-destination modes.

The button is green for X-Y mode and amber for multi-destination mode.

The button text changes to read “XY-MD In XY Mode” or “XY-MD In MD Mode” according to the mode you have selected. The alphanumeric display also reflects the current mode.

## 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 NV9642 provides locks and protects for destinations only.*

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 in 3 scenarios.

### XY Mode

- 1 If required, enter X-Y mode. (Use the XY/MD button.)
- 2 If required, select a destination.
- 3 Optionally choose levels.
- 4 Select a source and press 'Take'.  
OR
- 5 Select a quick source. The take is automatic.

### Single-Destination Panel

(This scenario assumes that a destination was pre-selected during configuration.)

- 1 Select a source and press 'Take'.  
OR
- 2 Navigate to a quick source, and select it. The take is automatic.

### MD Mode

- 1 If required, enter MD mode. (Use the XY/MD button.)
- 2 Scroll to a destination and select it.
- 3 Select a source.
- 4 Repeat steps 2 and 3 for all destinations you intend to use.
- 5 Press 'Take'.

When 'Hold' is enabled in MD mode, you can select many MD destinations at once. Subsequently selecting a source assigns the source to all selected MD destinations. You can turn 'Hold' on and off as you require during an MD take.

## 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.
- ▲ In MD mode, with hold mode active, you can select multiple broadcast destinations with a single take.

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.

## Data Routing

There are 3 data routing options that affect sources and destinations that have a machine control level (i.e., a data level).

### Automatic Data Routing

A take involving a machine control level occurs naturally on all selected levels, including the machine control level, regardless of whether an affected machine control port is in use. The

system breaks any existing control connections involved with the source and destination and makes a new control connection for the source and destination. This data routing option applies in both operating modes.

### Manual Data Routing

If a control port for the source or destination is "in use," a take involving a machine control level occurs on all levels *except* the machine control level. You must break either the source's control connection, the destination's control connection, or both of those existing connections before you can take the source to the destination on the machine control level. To break a connection, route a device (as a source) to itself (as a destination) on the machine control level. When the connection is broken, the status column of the display reads "FREE" for the machine control level (in X-Y mode). If your panel is in multi-destination mode, you might switch to X-Y mode momentarily to see this.

When a take involving a machine control level is blocked on the control level, the 'Information' button, if you have one on your panel, becomes active. If you press the information button, the display shows a message about the control ports that are "in use."

If neither of the control ports for the source or destination are in use, the take occurs naturally without any further action required. Note that the ports will become "in use" after the take you are performing.

This data routing option applies in both operating modes.

### Semi-Automatic Data Routing

This data routing option applies only in X-Y mode.

If a control port for the source or destination is "in use," a take involving a machine control level occurs on all levels *except* the machine control level. Nevertheless, you are given the opportunity to complete the take on the machine control level by pressing the 'Take' button a second time.

If neither of the control ports for the source or destination are in use, the take occurs naturally without any further action required. Note that the ports will become "in use" after the take you are performing.

Follow these steps to take the data level as a breakaway:

- 1 Select a destination.
- 2 Select a source.
- 3 If the Take button is still high-tally, press the 'Take' button again to complete the take.

You can cancel the control-level take by pressing a button other than 'Take'.

## Chop

The chop function is a diagnostic function for routers that support chop. It allows you to switch rapidly between two sources at a particular destination. The chop interval is defined in the NV9000 configuration. The default chop interval is 6 *fields*.

Follow these steps to use chop:

- 1 Select a destination. The 'Destination' field of the display shows the destination you chose.

- 2 Select a source. This is the first source.
- 3 Press the chop button.
- 4 Select another source. This is the second source. The chop is immediately activated on the routers (of the default destination) that support chop.

To terminate the chop, (1) press the chop button again to turn it off, (2) select the destination you had chosen for the chop, then (3) select any source.

## Salvo Mode

The NV9642 enters a minor “salvo mode”<sup>1</sup> when you press a salvo button. Salvo mode is a temporary mode, usually brief, where you are given an opportunity to reconsider the salvo you are about to execute. Press ‘Take’ to execute the salvo you selected. If you press an ‘Information’ button while the panel is in salvo mode, the panel displays the salvo commands. (Press ‘Information’ once again to clear the information display.)

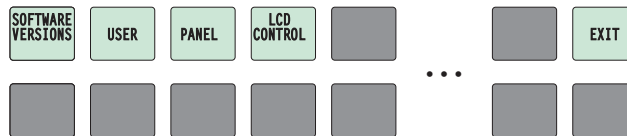
If you wish to cancel the salvo before it executes, press the salvo button again.

When you press take or when you cancel the salvo, the panel returns to its previous mode. See [Salvo](#) on page 68.

## Menu Mode

The NV9642 enters menu mode when it has a menu button and you press it.

The menu has 4 menu choices and an exit button:



Press ‘Exit’ when you want to leave the menu and return to the previous button page.

## Software Versions

Press the ‘Software Versions’ button to view the software and firmware versions:



The 3 buttons on the left tell you the current versions of the software in the NV9642. Generally, this is of no relevance unless you are in a diagnostic situation.

Press ‘Exit’ on the right to return to the menu.

---

1. Other panels, such as the NV9601, have a more extensive “salvo mode.”

## User

Press the 'User' button to view user data:



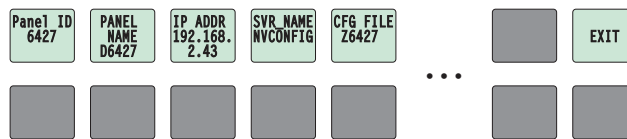
The 2 buttons on the left tell you the user name and user ID as determined by the router control system. These are **not** the Windows user name or ID.

- ▲ User names are important in lock, protect, and release situations. The user who “owns” a lock or protect is identified by a user name.

Press 'Exit' on the right to return to the menu.

## Panel

Press the 'Panel' button to view panel data:



The 5 buttons on the left tell you the panel ID, and other useful information about the panel, in particular, the panel's IP address. These are useful in a diagnostic situation. This information helps you ensure that you are sending the correct configuration file to the correct panel.

- ▲ The panel acquires its IP address through DHCP on the system controller's panel/router network. (You can use the Panel IP Configuration Utility to change panels to have static IP addresses.)

If the 'Panel ID' button is high-tally, you may change the panel ID. Normally, only your system administrator would do that.

Press 'Exit' on the right to return to the menu.

## LCD Control

Press the 'LCD Control' button to view and change LCD brightness. When you do, the current LCD button state appears on the 14 top left buttons:

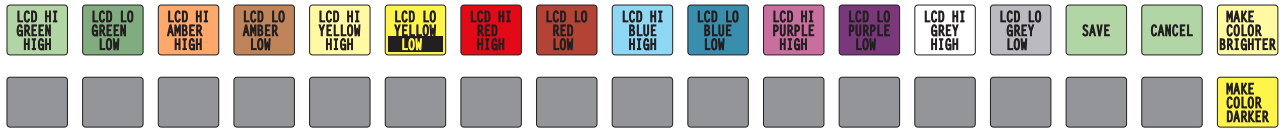


The 14 buttons occur in pairs — one pair for each defined color. The pair shows the high tally and low tally values for the particular color.

You can change high-tally from high to medium brightness and change low tally to medium or low brightness, as long as high tally is brighter than low tally. (They cannot both be medium, for instance.)



To change a color's brightness, select the button for the color you want to change. Press either the 'Make Color Lighter' button or the 'Make Color Darker' button, whichever is available:



Controls (only one or the other of these is available at any moment)

If you make a change, press 'Save' to commit the change or press 'Cancel' to discard the change. If you have made no changes, just press 'Exit' to return to the menu.

The actual colors cannot be represented accurately in print or in a PDF file displayed on your screen. There is a small amount of variation in color from button to button. See [LCD Buttons](#) on page 95 for a color chart.

## Setup Mode

Setup mode occurs when the NV9642 is disconnected from its network and is freshly powered up. In setup mode, you can set or change the panel ID, determine software versions, and perform a test of the panel's buttons. It is in setup mode that you must initially set the panel ID.

## Panel Stacking

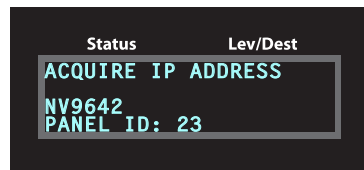
If the NV9642 is in stacking mode, the NV9642 is coupled with from one to seven NV9646s to form a larger panel (having more buttons). The NV9646s can also be placed in setup mode. See [NV9646 Setup Mode](#), on page 79.

The panel powers up with the top right button illuminated in green and reading 'Menu':



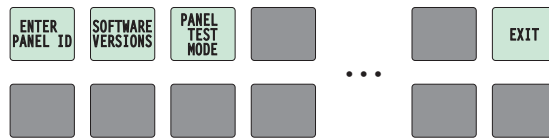
▲ It can take a few seconds for the menu buttons to appear.

In addition, the display shows the panel ID:



In this illustration, the panel ID was already set to 23. The "Acquire IP Address" is a status message during initialization. Until you connect the panel to its network, the status message will remain the same.

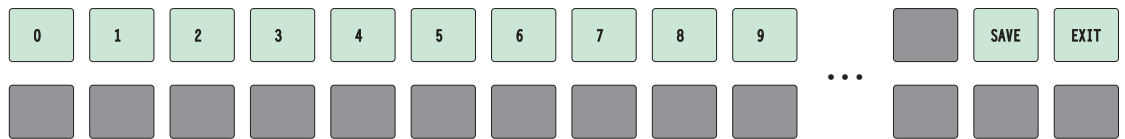
Press the 'Menu' button at the far right to access the setup menu:



There are 3 setup menu choices. The 'Exit' button at the far right allows you to leave the menu.

- Panel ID Entry.

Press the Panel ID Entry button to set the panel ID. A numeric button array appears:

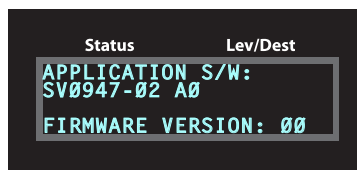


Use the numeric button array as a keypad to enter a panel ID. What you enter appears on the 'Panel ID' button at the top left.

To make the ID permanent, press 'Save'; to cancel your entry, press 'Cancel'. In either case, you will be returned to the setup menu.

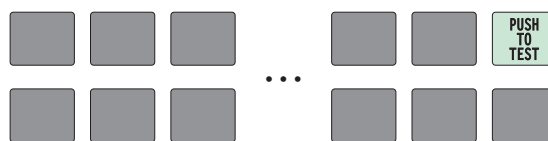
- Software Versions.

In the setup menu, press the 'Software Versions' button. The display shows the version numbers:



- Panel Test Mode.

In the setup menu, press the 'Panel Test Mode' button. One button appears:



Press the 'Push to Test' button repeatedly to execute the test. When you do so, the display shows a '#' in all character positions.

Each time you press the button, the panel illuminates all its LCD buttons in a single color, changing the color each time you press the button. Keep pressing the button until all 7 colors (high and low tally) have been displayed and 'Button Number' appears on the display.

Press any button. The button will flash and the button number will appear on the display. You may continue to test different buttons.

When you are finished using the setup menu, press 'Exit' one or more times to return the panel to its normal pre-connected state.

When you connect the panel to its network, the panel leaves its setup state and begins to initialize in its normal operational state. After a short time, the panel will have initialized to its configured state and will display its default button page.

## NV9646 Setup Mode

Setup mode occurs when the NV9642 is disconnected from its network and is freshly powered up. In setup mode, you can set or change the panel ID, determine software versions, and perform a test of the panel's buttons. It is in setup mode that you must initially set the panel ID.

The panel powers up with 3 buttons illuminated in green:



▲ It can take up to 30 seconds for the menu buttons to appear.

In this illustration, the panel ID was already set to 6412. The “Acquire IP Address” is a status message during initialization. Until you connect the panel to its network, the status message will remain the same.

Press the ‘Menu’ button at the far right to access the setup menu:



There are 3 setup menu choices. The ‘Exit’ button at the far right allows you to leave the menu.

- Panel ID Entry.

Press the Panel ID Entry button to set the panel ID. A numeric button array appears:



Use the numeric button array as a keypad to enter a panel ID. What you enter appears on the ‘Panel ID’ button at the top left.

To make the ID permanent, press ‘Save’; to cancel your entry, press ‘Cancel’. In either case, you will be returned to the setup menu.

- Software Versions.

In the setup menu, press the ‘Software Versions’ button. Three buttons appear:



The 2 buttons at the top left display the software version numbers. Use the ‘Exit’ button on the right to return to the setup menu.

- Panel Test Mode.

In the setup menu, press the 'Panel Test Mode' button. One button appears:



Press the 'Push to Test' button repeatedly to execute the test.

Each time you press the button, the panel illuminates all its LCD buttons in a single color, changing the color each time you press the button. Keep pressing the button until all 7 colors (high and low tally) have been displayed.

The panel test shows you (1) whether all the buttons are working and how well and (2) whether the software and firmware are working.

When you are finished using the setup menu, press 'Exit' one or more times to return the panel to its normal pre-connected state.

When you connect the panel to its network, the panel leaves its setup state and begins to initialize in its normal operational state. After a short time, the panel will have initialized to its configured state and will display its default button page.

# 6 GPIO

Chapter 6 provides information about the tally (GPIO) interface.

## Summary

<i>The Interface</i> .....	81
<i>GPIO Configuration Concepts</i> .....	82
<i>Configuring Outputs</i> .....	83
<i>Configuring Inputs</i> .....	85

## The Interface

Under the panel stacking model, the NV9642 combines with an NV9646 to form a larger “panel.” Although the NV9642 and the NV9646 both have GPIO ports, when the NV9642 is operating under the stacking model, it will use only its own GPIO ports. The GPIO ports of the NV9646 are ignored.

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 NV9642—in the router control system. The router control system can trigger events that—through the relays in the NV9642—switch your tally devices.

The DB25 connector, labeled “GPI Interface” at the rear of the NV9642 presents the tally signals. There are 8 input signals and 4 pairs of output signals.

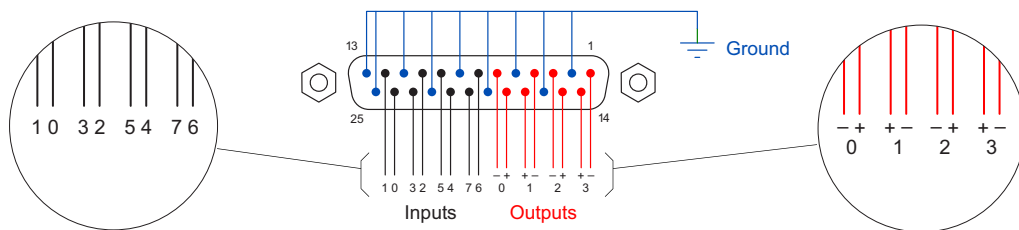


Fig. 6-1: GPI Interface

## Input

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

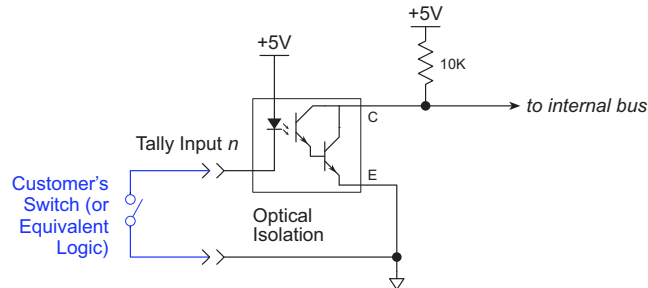


Fig. 6-2: GPI Input

When the input transitions off or transitions on, the NV9642 notifies the router control system, which carries out the task defined for the input (if a task has been configured).

During contact closure, a current of 1.2mA flows. A maximum of 48VDC can be applied to the tally input for less than 5 seconds without failure. No voltage above 5VDC 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 200VAC.

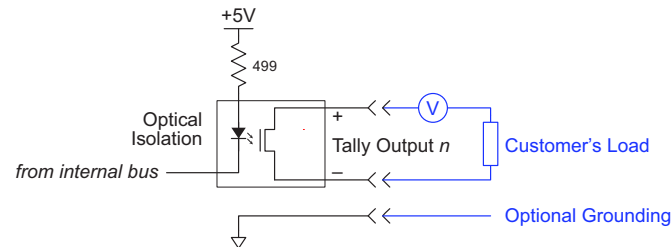


Fig. 6-3: GPI Output

When a condition (defined for the relay) occurs, the router control system notifies the NV9642 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

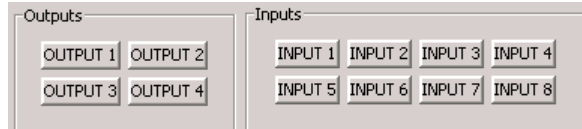
These are the I/O characteristics of the NV9642's tally interface:

- 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 NV9642 Page

SE's NV9642 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 NV9642 control panel.

## Configuring Outputs

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

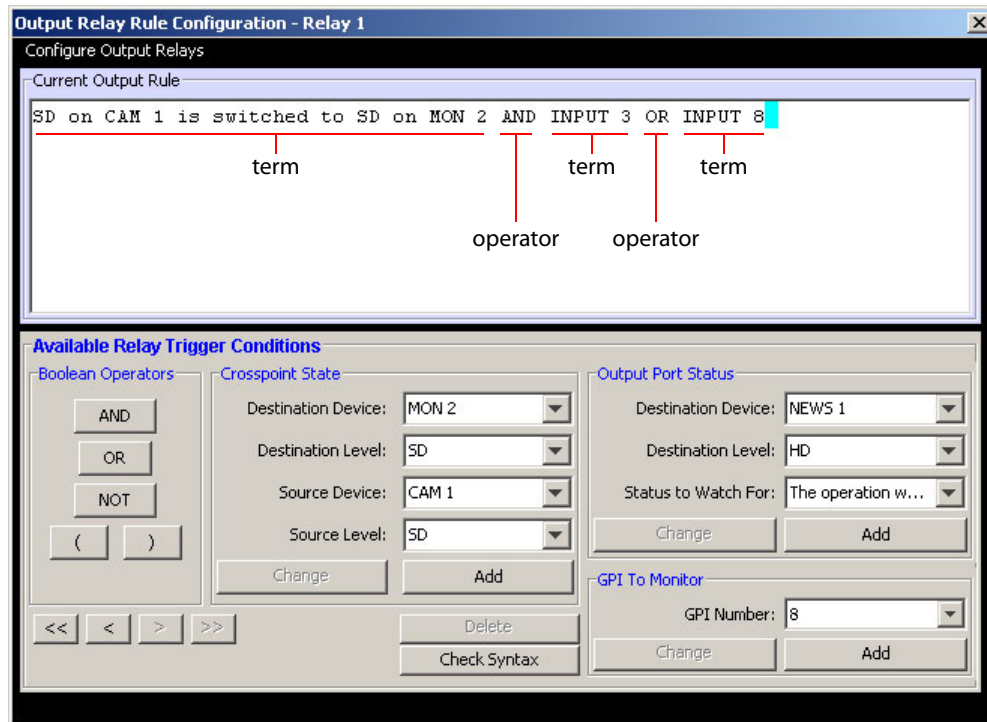


Fig. 6-4: Relay Rule Dialog

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

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 NV9642 inputs and other system-wide events. The router control system sends signals to the NV9642 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.

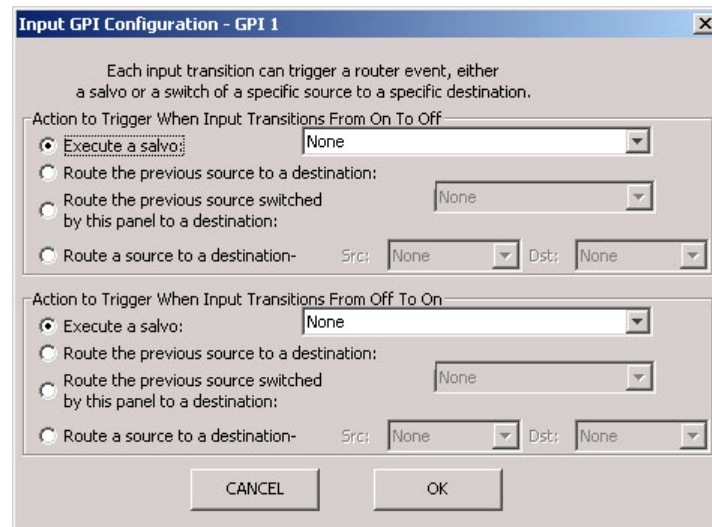
This is a summary of Boolean operations:

- 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 NV9642 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 NV9642 has 4 relays that can switch on or off your external devices, based on (1) NV9642 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 NV9642 can respond with one of 4 actions, such as executing a salvo. (It is the system that actually executes the salvo.)

# 7 Technical Details

Chapter 7 provides electrical and mechanical specifications for the NV9642.

## Summary

<i>Power Specifications</i> .....	87
<i>NV9642 Specifications</i> .....	88
<i>Environmental Specifications</i> .....	89
<i>Defaults</i> .....	90
<i>Drawings</i> .....	90

## Power Specifications

### NV9642 Power Specifications

Specification	Detail
DC power	External power supply: 12 VDC $\pm$ 10%, 5 A.
Power consumption	11 W maximum, 6 W nominal.
Regulatory	UL listed and CE compliant.

### NV9646 Power Specifications

Specification	Detail
DC power	External power supply: 12 VDC $\pm$ 10%, 5 A.
Power consumption	12.0 W
Regulatory	CE compliant: directive 2004/108/EC directive 2011/65/EU FCC part 15, subpart B, class A.

### 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	1.06 lb (0.48 kg).
Regulatory	UL listed and CE compliant.

The power supply is an Grass Valley PS0001-00:

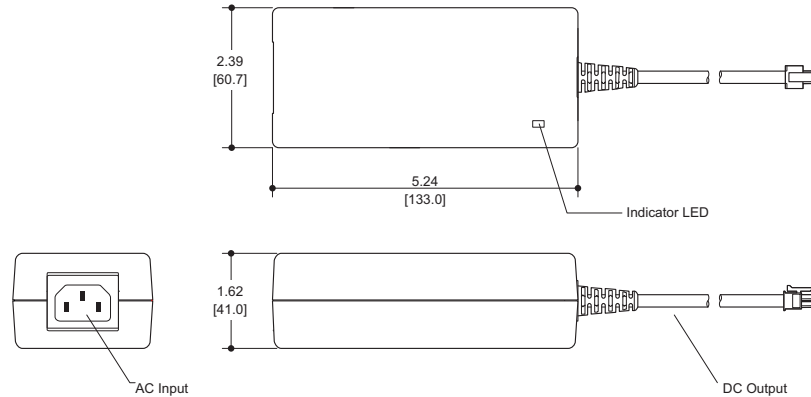


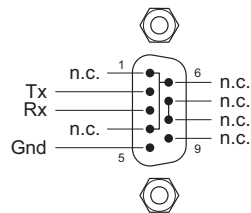
Fig. 7-1: The power output has Molex 4-pin plug. See [Power Cord Retention](#), on page 96.

## NV9642 Specifications

### NV9642 Physical Specifications

Specification	Detail
Dimensions	Height: 43.7 mm (1.72 in), fits EIA 2 RU (44.5 mm or 1.75 in), Width: 482.6 mm (19.0 in).
Depth	51.1 mm (2.01 ± 0.01 in), enclosure. 68.3 mm (2.69 in) overall.
Power	≤ 11 W max at 120VAC; 6 W nominal.
Weight	1.543 kg (3.40 lb)
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: ≤ 5VDC continuous; ≤ 48VDC 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:



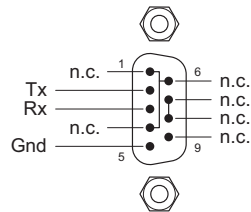
Pins 1, 4, and 6 are tied together and pins 7 and 8 are tied together. None of those pins are connected to any circuitry.

## NV9646 Specifications

### NV9646 Physical Specifications

Specification	Detail
Dimensions	Height: 43.7 mm (1.72 in), fits EIA 1 RU (44.5 mm or 1.75 in), Width: 482.6 mm (19.0 in).
Depth	64.5 mm (2.54 ± 0.01 in), overall.
Power	12.0 W
Weight	1.605 kg (3.54 lb)
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

### NV9642 Environmental Specifications

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

### NV9646 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

Multi-destination mode or X-Y mode, selectable.  
Destination: the configured default.  
Buttons: high-tally is maximum brightness; low-tally is low brightness.

### Configuration Page

The initial button page for a new NV9642 configuration is empty.

The default panel options are:

Behavioral model:	Standalone.
Panel mode:	Multi-destination.
Release mode:	Normal.
Default destination:	None.
Preset Monitor:	None
Status Monitor:	None
XY Data Routing:	Automatic.
MD Data Routing:	Automatic.
Default name set:	System names
Multidest Device Limit:	8. (This is the lowest value. The upper limit is 512.)
Src/Dst Immediate Take	Enabled (checkbox checked).
<i>All other options:</i>	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.

### Drawings

The drawings on the following pages identify features and provide overall and critical dimensions.

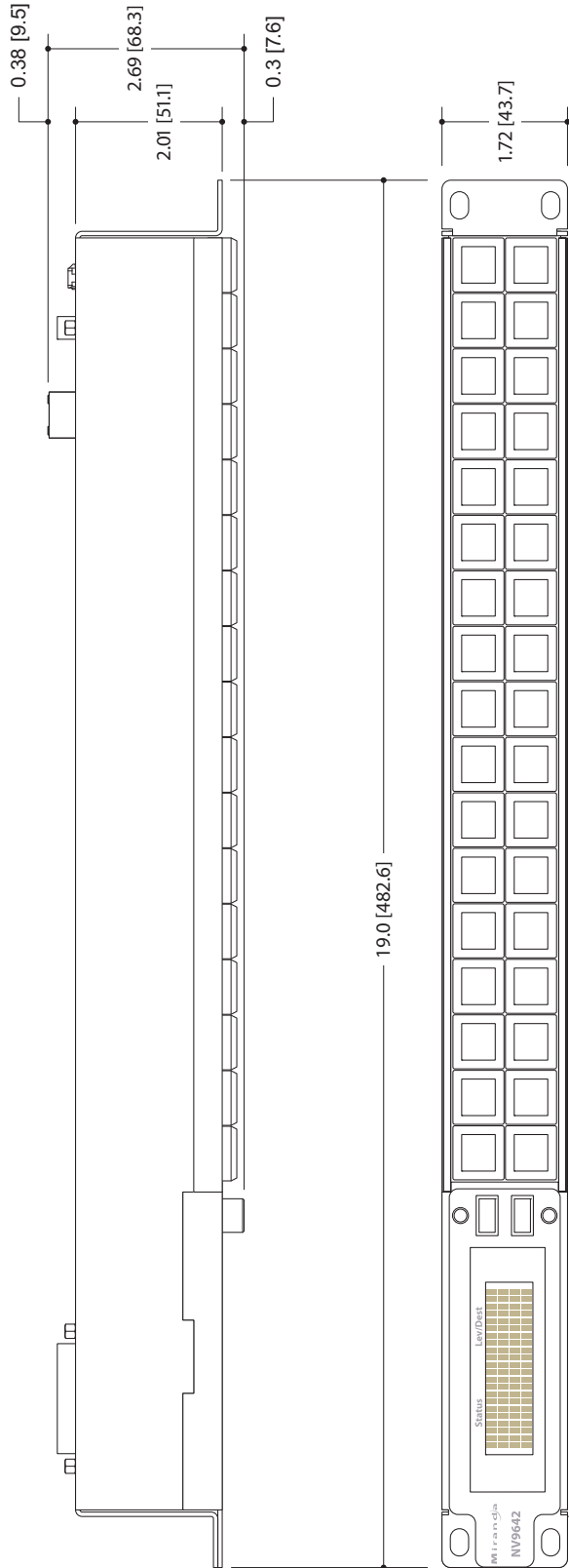


Fig. 7-2: Front and Top Views of the NV9642

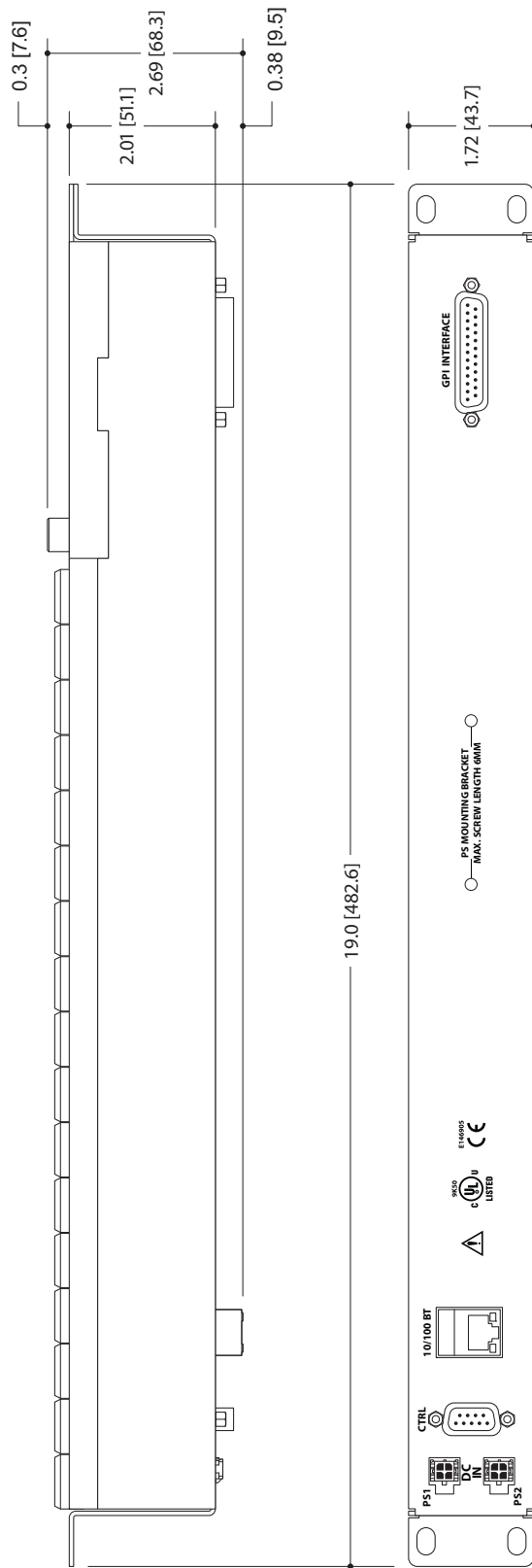


Fig. 7-3: Rear and Top Views of the NV9642



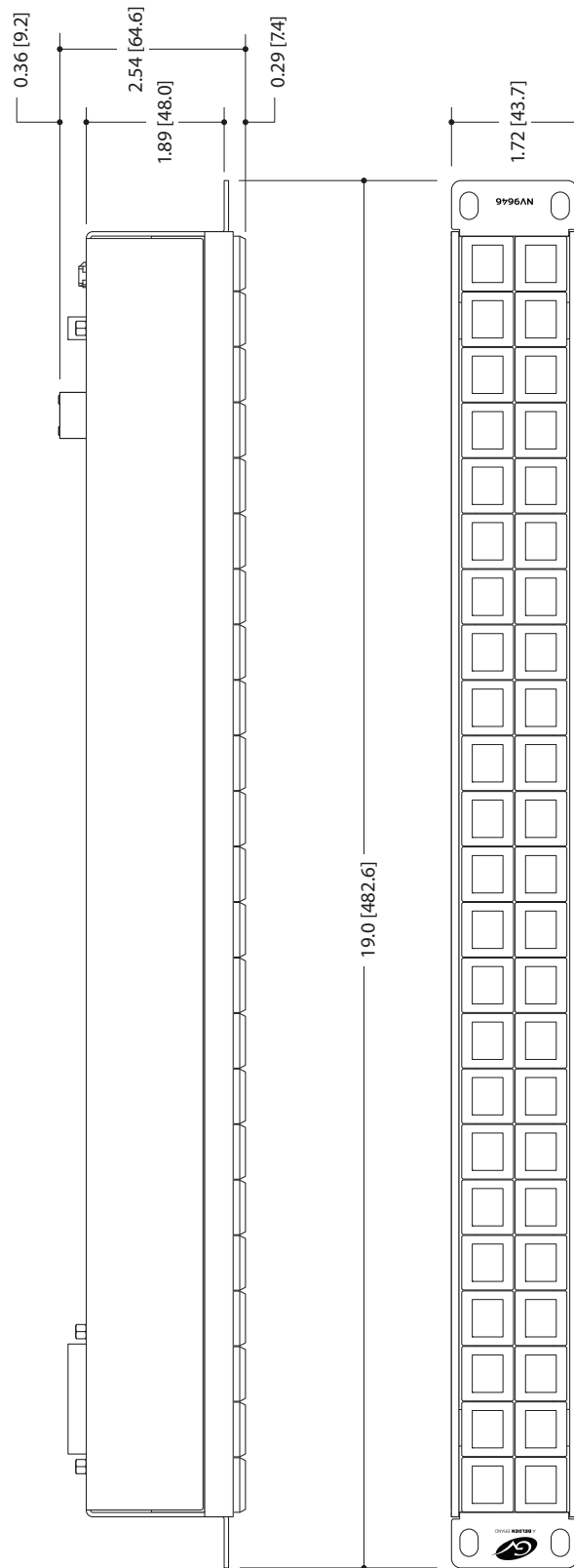


Fig. 7-4: Front and Top Views of the NV9646

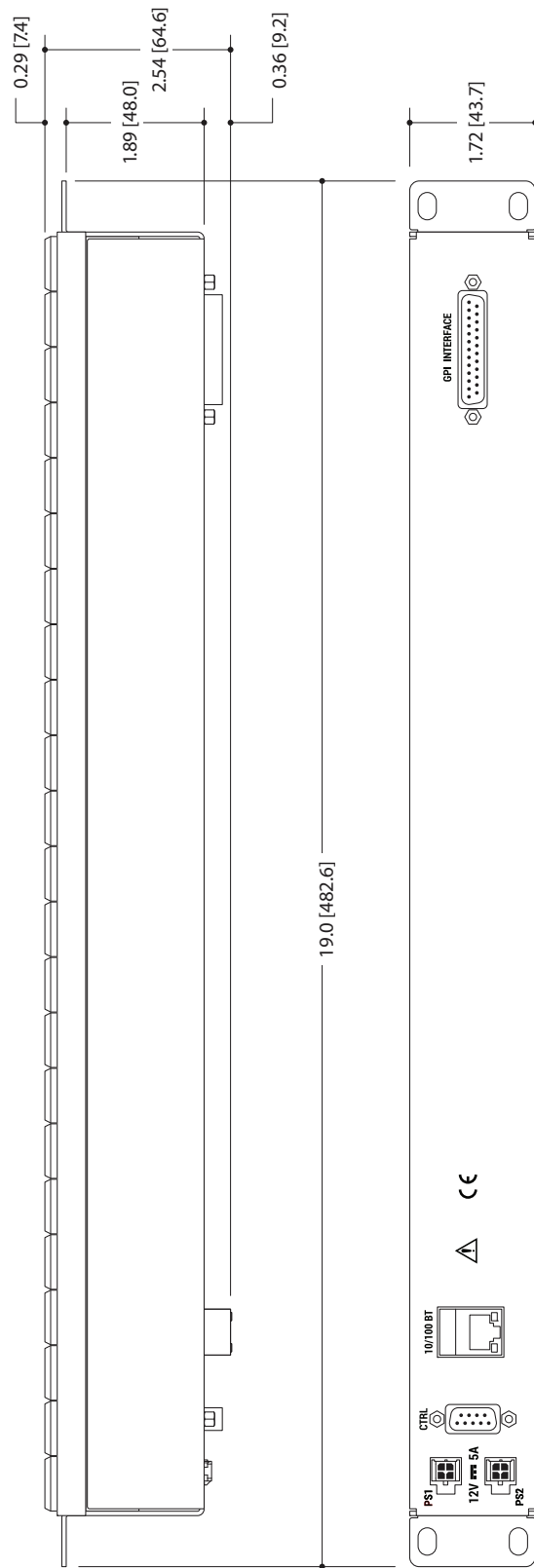


Fig. 7-5: Rear and Top Views of the NV9646

Chapter 8 provides the following:

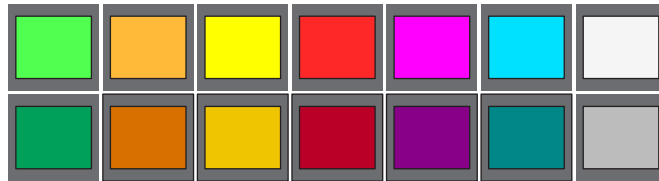
### Summary

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## LCD Buttons

The 16 LCD buttons have 3 lines of text, 8 characters each. The text can be blank. The buttons can be of 7 colors in 4 brightness levels: high, medium, low, and off. “Off” is not quite black—you can read black text on the “off” background.

The following is an approximate representation of the 14 button colors:



*Fig. 8-1: Button Colors*

The best way to view this illustration is on a computer monitor. A color printer cannot represent these colors nor can a black and white printer.

Each color is represented in Figure 8-1 as a (high-tally, low-tally) pair.

The colors of the up and down buttons are fixed. When they are off, they are white. When they are on, they are said to be “amber.” This amber is not the same as for the LCD buttons: it is pale and almost yellow.

The buttons are 19 mm × 18 mm with the LCD portion about 13 mm × 11 mm. The button legend appears in a 64×32 pixel matrix.

When one or two lines of text appears on the button, the characters are taller than when three lines of text appears and the characters are shorter.

## 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 NV9642 components:

PS0001	12V power supply, 4-pin Molex connector, with cord, and cord retention strap.
NV9642	NV9000 control panel. 34 button, 1 RU, XY/MD, hierarchical.
NV9646	NV9000 control panel. 46 button, 1 RU, XY/MD, hierarchical.
WC0053	Optional breakout cable for the tally interface



# abc

## Glossary

<b>(AES/EBU</b>	(Audio Engineering Society/European Broadcasting Union). AES and EBU are standards organizations.
<b>Breakaway</b>	A condition where a destination has multiple sources on different levels.
<b>Category</b>	<p>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.</p> <p>The NV9642 does not support categories or category selection.</p>
<b>Data routing</b>	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 NV9642 provides certain data routing options including a 'Broadcast' button.
<b>Device</b>	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.
<b>GPIO</b>	General Purpose Input and Output. A generic term for the NV9642's tally interface. The tally interface is called the "GPI Interface" at the rear of the NV9642.
<b>Level set</b>	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.
<b>Multi-Destination (Mode)</b>	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.
<b>Operator</b>	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.
<b>Physical level</b>	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.
<b>PIN</b>	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.
<b>Port</b>	A port is the physical connection on a router. A port can only be an input port or an output port.
<b>Salvo</b>	A salvo is a stored group of commands that can be recalled and executed at an NV9000 control panel.

<b>Source/ Destination</b>	<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>
<b>System administrator</b>	<p>The system administrator is the person responsible for installing, configuring, and maintaining a router control system.</p>
<b>Tally</b>	<p>(1) High or low button illumination.</p> <p>(2) Tally interface <i>to be defined</i>.</p>
<b>Virtual level</b>	<p>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.</p>
<b>X-Y (mode)</b>	<p>A mode on an 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.</p>



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