



grass valley

A **BELDEN** BRAND

NV9649

NV9000 CONTROL PANEL

User's Guide

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www.grassvalley.com

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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.

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

Visit www.grassvalley.com for recycling information.

Certification and Compliance

Safety Compliance



C

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

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.

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.



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

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1

Preface

Chapter 1 is an introduction to the NV9649 User's Guide.

Summary

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Chapter Structure

The following chapters provide detailed information regarding the NV9649 Control Panel:

- Chapter 1, [Preface](#), (this chapter) outlines ways to use this guide.
- Chapter 2, [Introduction](#), provides a functional description of the NV9649.
- 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 a [glossary](#) are also provided for your reference.

The PDF Document

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

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

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

Note:

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

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

Terms, Conventions and Abbreviations

The following conventions are used throughout this guide:

- The symbol ▲ denotes either an example or a special message.
- Entries enclosed in single quotation marks or Capital Letters denote physical control panel buttons, configuration buttons, or menu items.

Click 'Apply' to ...

Press the SRC 12 button ...

The following terms and abbreviations are used throughout this guide:

- The term "control panel" refers to the NV9649 control panel and to NV96xx control panels, in general.
- "High tally" means that a button is brightly illuminated. High-tally usually means that the button function is selected or active.
- "Low tally" means that a button is illuminated at low intensity. Most buttons assume a low tally state until selected.
- "SE" is an abbreviation used in this document for NV9000-SE Utilities.

Other Documentation and Software

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

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

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

2 Introduction

Chapter 2 provides a functional description of the NV9649.

Summary

- Summary 3
- Function Buttons and Displays 4
- Tally Interface 6
- Modes of Operation 7
- Additional Modes 9
- Other NV9649 Functions 10

Summary

The NV9649 is a 2RU half-width control panel, approximately 3 in deep. Two NV9649s can be mounted in a rack side-by-side with a rack mounting kit (part number NV9649-48-RMK).

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

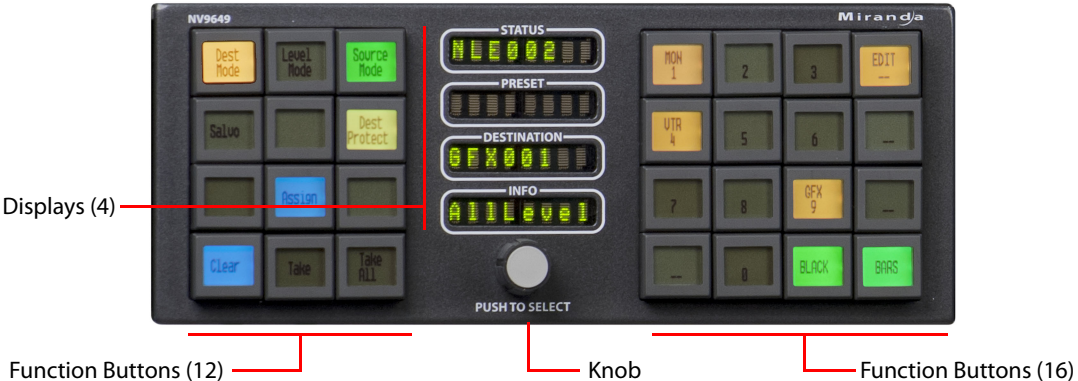


Fig. 2-1: NV9649 Front

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

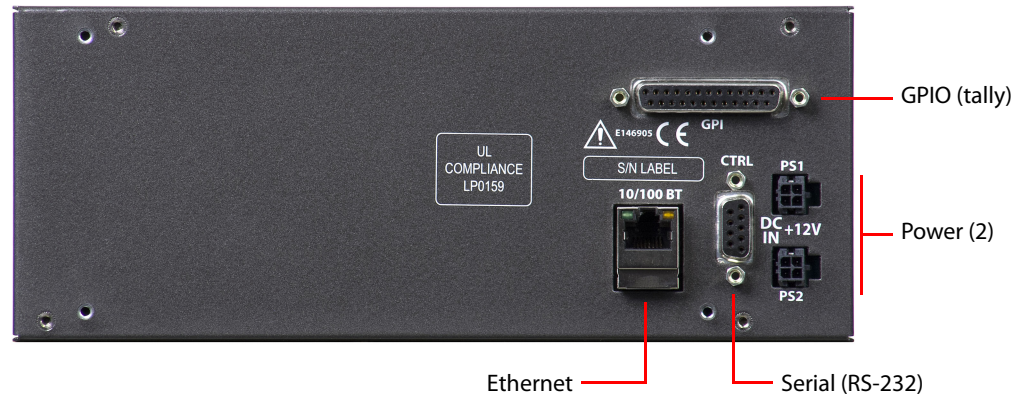


Fig. 2-2: NV9649 Rear

The NV9649 has 3 very different operating modes (or behavioral models):

- 'Panel Server' mode. For brevity, we can call this "server" mode.
When the panel is in "server" mode, it operates in conjunction with a number of NV9648 control panels. The NV9649 is the "server" and the NV9648s are the "clients." The NV9649 and the NV9648s combine to form, in essence, a larger panel—actually a cluster of many small panels. The NV9649, being the server, can change which sources and destinations the NV9648s can use. See '[Panel Server' Mode](#), on page 7.
- 'NV9609 Panel' mode. For brevity, we can call this "NV9609" mode.
When the panel is in "NV9609" mode, it functions exactly like an NV9609, but with buttons that have LCD legends instead of backlit simple buttons.
(You can refer to the *NV9609 Users Guide* for reference.)
In this mode, the panel operates standalone, without regard to any NV9648s.
- 'LCD XY/MD' mode.
In this mode also, the panel operates standalone, without regard to any NV9648s.
When the panel is in "LCD XY/MD" mode, it has a larger function set than it does when operating in the other two modes.
The panel's buttons are used in a hierarchical fashion: pressing a 'navigation' button causes the panel to display a new set of button functions or a "button page." There can be many such pages, organized in a configurable tree structure.
The operator can switch the panel between "X-Y mode" and multi-destination (MD) mode. In X-Y mode, the operator can perform takes (and locks) on individually selected levels. In MD mode, takes occur on all levels, but the operator can perform takes to multiple destinations simultaneously. See '[LCD XY/MD' Mode](#), on page 9.

The panel's 28 buttons and 4 displays are used in very different ways in the 3 models.

Function Buttons and Displays

At the front, the panel has 2 button sections, 12 buttons on the left and 16 on the right. Between the sections are four 8-character displays and a knob. Refer to Figure 2-1. You can turn the knob to scroll through device categories and device lists. Pressing the knob selects

the category to which you have scrolled. The knob moves in about a millimeter when you press it and you can feel the knob click.

Each function button incorporates a 64×32 LCD. The buttons' LCDs can be illuminated in 7 colors: red, green, yellow, blue, purple, amber, and grey. Each LCD can be off, bright (high-tally) or dim (low-tally) depending on what the operator is doing and what functions are selected.

A button's LCD (when it is not off) presents the button legend. Some button legends are fixed. Source and destination buttons, for example, show the source or destination mnemonic. Some button legends vary. Selection buttons have 3 lines of text, the top line displaying the current source, the middle line displaying the preset source, and the bottom line displaying the level (in X-Y mode) or MD device in MD mode.

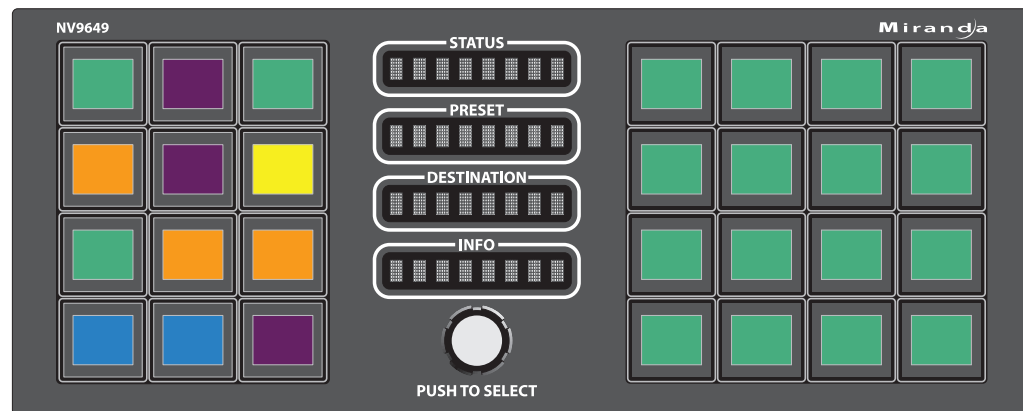
The buttons and displays are used differently in the 3 operating modes.

The displays generally show, respectively, from top to bottom, (1) the current source, (2) the preset source, (3) the selected destination, and (4) level information.

When the panel is in LCD XY/MD mode, the 28 function buttons form a "button page" in a hierarchical structure of button pages.

Button Functions (Server Mode)

When the NV9649 is operating under the 'Panel Server' model, its buttons have additional functions:



When the operator presses the 'Manage Configs' button of the panel's menu, the left group of 12 buttons function as a matrix of "panel setup" buttons. With these buttons, the operator can save, recall, and clear named client setups. See [Menus under the Server Model](#), on page 116.

The panel can be configured so that device selection is performed using "category pages." When the panel is so configured, the 16 buttons at the right form a "page" of category buttons, each representing a device category. The panel operator can use the panel's knob to scroll through any number of such pages to locate a category. The pages are named; the names appears in the 'Info' display when the operator is scrolling.

Display Fields

The display area has four separate 8-character display fields: These are their functions:

- Status.

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

If the operator is scrolling through levels in *level mode*, the 'Status' field changes to indicate the source for each level of the current destination. Level mode is available only when the panel is operating under the NV9609 model. See [Level Mode](#), on page 9.

- Preset.

The 'Preset' field has two different functions:

(1) It shows the source that will be routed to the currently selected destination when the operator presses the 'Take' button or will be assigned to a client.

(1) It shows the source that will be assigned to a source button of a client NV9648 when the panel is operating under the 'Panel Server' model.

The 'Preset' field also shows source or destination categories and source or destination devices during category selection. See [Category Selection](#), on page 88.

- Destination.

The 'Destination' field shows the currently selected destination.

- Information.

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

When the panel is operating under the NV9609 or LCD XY/MD model, the 'Status', 'Preset', and 'Destination' fields can show either alternate device names (from a name set) or system mnemonics depending on (1) the state of the 'Name Set Toggle' button (if the panel has one), (2) the default name set (3) the existence of name sets in the NV9000 configuration. (An alias is a name defined in a name set.) The panel does not use name sets under the server model.

Flags

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

- ▲ This does not occur when the panel is in 'Panel Server' mode.
- ▲ The asterisk will obscure the last character of the source name if the name has 8 characters.

Tally Interface

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

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

During configuration, you can prescribe NV9649 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 labeled a "GPI interface."

See chapter 6, [GPIO](#), on page 129, for complete detail.

Modes of Operation

The NV9649 has 3 operating modes (or behavioral models). The panel's 28 buttons and 4 displays are used in very different ways in the 3 modes.

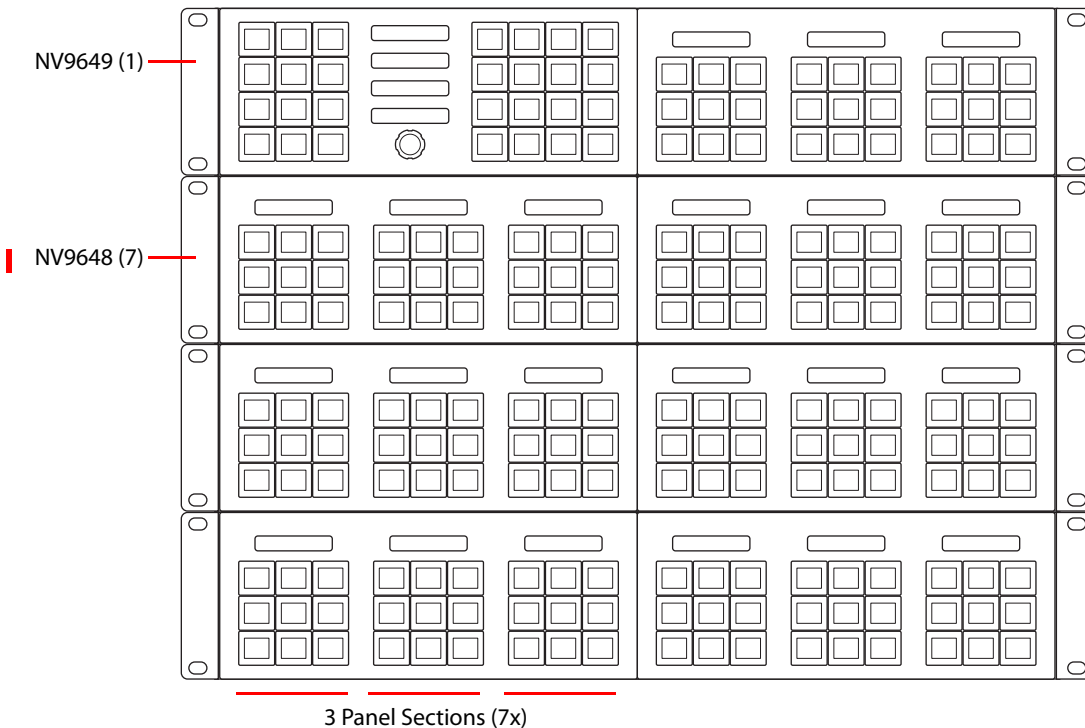
'Panel Server' Mode

When the panel is in "server" mode, it operates in conjunction with a number of NV9648s. The NV9649 is the "server" and the NV9648s are the "clients." The NV9649 and the NV9648s combine to form, in essence, a larger panel—actually a cluster of many small control units. The NV9649, being the server, can change which sources and destinations the NV9648s can use.

Each NV9648 has 3 identical sections and, in client mode, each section functions as a complete and separate control unit, unrelated to any other NV9648 section. Each displays shows a destination chosen by the operator of the NV9649. (The NV9649 can also assign sources to the source buttons of individual NV9648 control units.)

The display in each of the clients' control units shows the control unit's current source when the NV9649 is in *source mode* and show the control unit's destination when NV9649 is in *destination mode*. See [Special Modes](#), on page 10.

Here is an example of a system with an NV9649 and 7 NV9648 clients:



In this example, there are 21 control sections in addition to the controls of the NV9649. At any moment, the operator can route to 21 destinations. The operator can assign different destinations to the control units at any time. The function buttons in each individual control unit apply only to the destination assigned to that control unit.

Saved Client Assignments

Every time an operator assigns a destination to an NV9648 client or assigns a source to a source button of a client, those assignments are recorded within the NV9000 system controller. Therefore, if and when the system controller undergoes a power cycle, the source and destination assignments of all the NV9648 clients are preserved.

The NV9649 can be configured so that up to 12 different sets of client assignments (or "set-ups" as they are called in the NV9649's menu) can be defined, selected, redefined, and otherwise managed as different operators choose.

A NV9649 always has a default setup and may have eleven other named setups.

'NV9609 Panel' Mode

When the panel is in "NV9609" mode, it functions exactly like an NV9609, but with buttons that have LCD legends instead of backlit simple buttons.

In this mode, the panel operates standalone, without regard to any NV9648s.

Please refer to the *NV9609 Users Guide* for more detail.

'LCD XY/MD' Mode

When the panel is in LCD XY/MD mode, it operates standalone, without regard to any NV9648s, and has a moderately richer function set than a panel in the other two modes.

The panel's buttons can be used in a hierarchical fashion: pressing a 'navigation' button causes the panel to display a new set of configured button functions, called a "button page." There can be many such pages, organized in a configurable tree structure.

The operator can switch the panel between "X-Y mode" and multi-destination (MD) mode. In X-Y mode, the operator can perform takes (and locks) on individually selected levels for a single destination at a time. In MD mode, takes occur on all levels, but the operator can perform takes to multiple destinations simultaneously.

In LCD XY/MD mode, the panel supports the use of multiple 'selection' buttons. When the panel is in X-Y mode, the selection buttons select levels. When the panel is in MD mode, the selection buttons select MD devices (which are destinations). If there are more levels (or more MD devices) than there are selection buttons, the operator can press a 'Page Up' or 'Page Down' button to scroll through the list of levels (or, in MD mode, the list of MD devices).

Additional Modes

Level Mode

When the panel is operating under the NV9609 model, operators can switch the panel in and out of *level mode* (if the panel has a 'Level Mode' button). Level mode allows you to select one of the destination's levels (by scrolling). A take in level mode is a single-level breakaway.

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

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

Secondary Modes

Additional but secondary modes of panel operation are:

- Setup mode—where the NV9649 is freshly powered up, but disconnected from the network. In this mode, you can preset the NV9649's panel ID and perform a few diagnostic tasks. See [Setup Mode](#), on page 125
- Salvo mode—pressing a salvo button places the NV9649 in salvo mode, where it is expected that the operator will choose a salvo and then the 'Take' button to executes a salvo. (The duration of a salvo is indeterminate, but usually short.) See [Salvo Mode](#), on page 115.
- Menu mode—pressing a menu button places the NV9649 in "menu" mode. In menu mode, the buttons lose their normal functions and become part of a menu that changes as needed during menu operation. See [Menu Mode](#), on page 116. (The panel does not have a menu in server mode.)

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

Special Modes

When the panel is in server mode or NV9609 mode, two additional modes can be applied:

- Source mode—when the operator places the panel in source mode, category buttons produce source lists and, under server mode, operations involving NV9648s refer to sources.
- Destination mode—when the operator places the panel in destination mode, category buttons produce destination lists and, under server mode, operations involving NV9648s refer to destinations.

When the panel is in LCD XY/MD mode, one additional mode can be applied:

- Hold mode—when the operator has pressed a 'Hold Preset' button. See [Selection Buttons](#), on page 65.

Other NV9649 Functions

The NV9649 can be configured to perform the following additional functions:

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

3 Installation

Chapter 3 provides a functional description of the NV9649.

Summary

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| <i>Installation</i> | 12 |
| <i>Installing Software and Documentation</i> | 13 |
| <i>Initialization</i> | 13 |
| <i>Testing</i> | 14 |

Package Contents

If you have ordered one or more NV9649 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 NV9649 items that can ship include:

- One or more NV9649 control panels.
- One or two power supplies for each NV9649, with straps that secure the AC power cords to the power supplies.
- One or more rack-mounting kits (NV9649-48-RMK).
- Optional WC0053 breakout cable.

The package does not contain network cables, serial cables, or mounting screws. (The rack-mounting kit, if present, does contain screws.)

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

This document **does** address the relationship of the NV9649 to the NV9648. Otherwise, this document does **not** address the shipment or installation of any other equipment or software that can be used in conjunction with the NV9649 (including the NV9000 system controller, NV915 system controller, other NV96xx control panels, EC9700 GUI, EC9710 GUI, and configuration programs such as UniConfig or NV9000-SE Utilities).

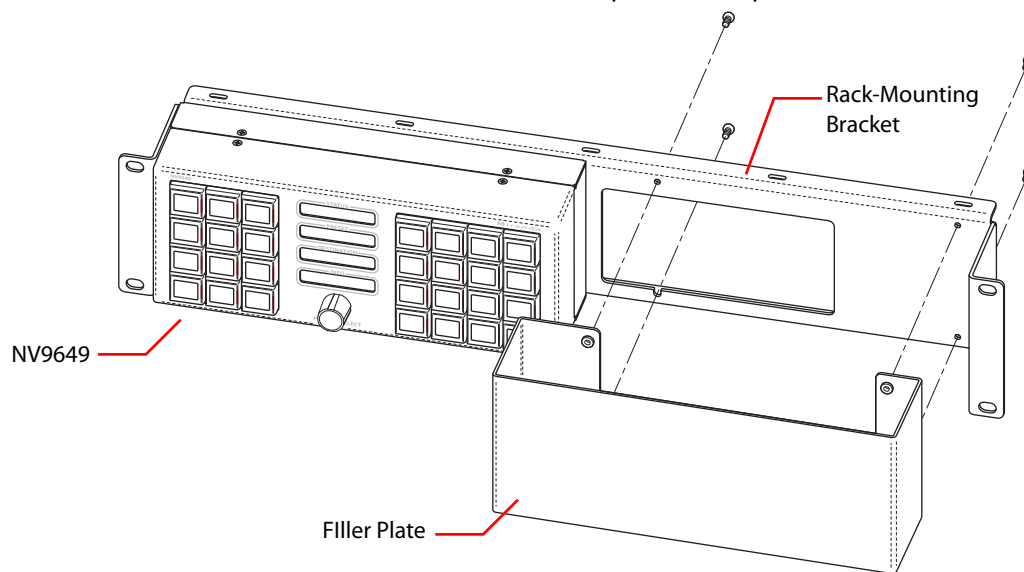
This document **does** briefly address the use of NV9000-SE Utilities and the Panel IP Configuration Utility as they pertain to panel configuration.

Installation

Follow these steps to install a NV9649 control panel:

- 1 Mount, and secure, the panel(s) in the rack.

The NV9649 is designed to mount in a 19" rack. Rack-mounting is not a requirement. The NV9649 is a 2RU half-width panel: you can install two of them side by side in a rack. Rack mounting (either one or two NV9649s) requires a rack mounting bracket such as the one in Grass Valley's NV9649-48-RMK (rack-mounting kit). The kit contains two parts, (1) the bracket itself and (2) a filler plate for brackets that will hold only one panel. The kit provides 8 mounting screws for attaching the panels to the bracket. The NV9649 mounts on the kit's bracket using 4 screws. The bracket has two apertures in which the connectors at the rear of the panel are exposed:



The filler plate and the NV9649 attach to the bracket in the same way. Each may be placed on either side of the bracket.

See [Drawings](#), on page 138 for bracket dimensions.

Once the panel(s) are attached to the bracket, you can place the bracket in position in your rack. Attach the bracket to the rack frame, using screws appropriate for your rack. The bracket's mounting slots are spaced 3.00 in (76.2 mm) vertically and allow approximately 1/8 in (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 NV9649.
- 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 135 for details on the PS0001 power supply. See also [Power Cord Retention](#), on page 142.

- 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 129 for detail regarding the tally interface.

Installing Software and Documentation

This document is available through the Grass Valley web site.

You must use NV9000-SE Utilities to configure the NV9649 control panel. Contact Grass Valley if you need to obtain the latest version of this NV9000 configuration software.

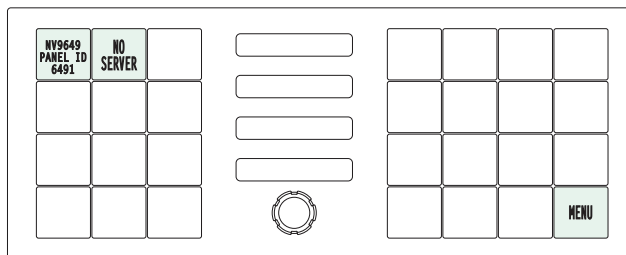
You may use the Panel IP Configuration Utility if you want to your NV9649 to have a static IP address (with respect to the NV9000) or to use DHCP. The panel, as it comes from the factory, defaults to DHCP.

Initialization

Before your NV9000 system controller can communicate with an NV9649, you must give it a panel ID. Follow these steps for each NV9649 you are installing:

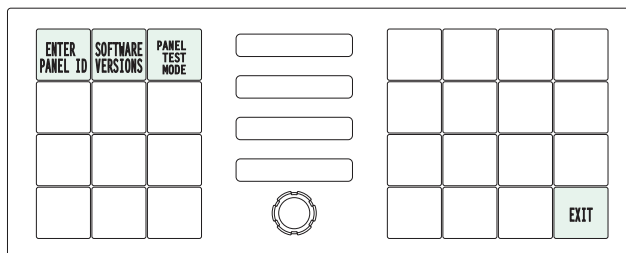
- 1 Power up the NV9649. Do **not** connect its Ethernet cable. (Disconnect it if it is connected.)

After a few seconds, the display will show either 'No Service' or 'Acquire IP Address' at the top left and show the panel's current panel ID:



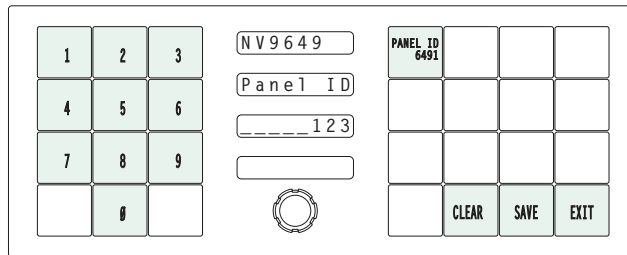
The menu button, with which to access the setup functions, is at the lower right.

- 2 Press the menu button. The panel now displays a menu of 3 items:



Press 'Enter Panel ID' to go to the panel ID menu. Or press 'Exit' to leave the menu.

- 3 The panel ID menu has a numeric “keypad” with which you can enter a new panel ID:



The panel shows the current panel ID on the top left button of the right-hand button matrix. It shows the panel ID you are entering in the third display (labeled ‘Destination’).

If you make a mistake, press ‘Clear’ to erase your entry and start over.

When you have entered a panel ID correctly, press ‘Save’.

Press ‘Exit’ at any time to leave the panel ID menu. You might have to press ‘Exit’ more than once to leave the menu entirely.

- 4 After you enter the panel ID, reconnect the Ethernet cable. The NV9000 system controller can detect your panel in a few seconds. But it will do so only when the NV9000 has a panel configuration defined for this panel ID.

(All panel IDs must be unique.)

You can now prepare an NV9649 configuration in NV9000-SE Utilities and upload the configuration to the NV9000. You need the panel ID to create a NV9649 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.

When you restart the NV9000 system controller with the appropriate panel configuration, the NV9649 you have configured should become active. Its buttons and displays will turn on, showing meaningful data.

Testing

A panel test function is available when the NV9649 is disconnected from the system controller. Run the test to determine the health of your NV9649. See [Setup Mode](#) on page 125 for detail. You can also view the software version numbers under setup mode.

These are points to consider after you install your NV9649 control panel(s):

- 1 Do the buttons illuminate? When an NV9649 powers up, one or more of its buttons are supposed to turn green or amber. Does it pass the panel test mentioned above?
- 2 When the NV9649 powers up and it is connected to the system controller, it should initialize completely. (That takes a few seconds.) The NV9000 system should load whatever configuration exists for that panel and the buttons appropriate for its configuration should light.

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

- ▲ The NV9649, by default, acquires its IP address through DHCP on the NV9000's panel/router network. You can use the Panel IP Configuration Utility to force the panel to have a static IP address.

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

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

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

4 Configuration

Chapter 4 provides configuration instructions for the NV9649.

Summary

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| <i>Adding a Panel to an NV9000 Configuration</i> | 17 |
| <i>NV9649 Panel Configuration Page(s)</i> | 19 |
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| <i>Tally (GPIO) Window</i> | 76 |
| <i>Global Navigation</i> | 76 |

This chapter addresses configurers. Operators and other persons not interested in NV9649 configuration need not read this chapter.

Summary

The NV9649 is a relatively simple panel. It has 28 function buttons in 2 sections, a small display area, a knob for device selection, and a GPIO (tally) interface.

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 NV9649. Figure 4-4, following, shows the default NV9649 panel configuration page from NV9000-SE Utilities.

Adding a Panel to an NV9000 Configuration

You must create configurations for the NV9649 using NV9000-SE Utilities. We assume that you are familiar enough with NV9000-SE Utilities that you can understand the following material. It is not difficult material, but some of the concepts might not be familiar to everyone.

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

Configuration

Adding a Panel to an NV9000 Configuration

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

| Panel ID | Panel Name | Panel Type | Configuration Name | User | Description |
|----------|------------|------------|--------------------------------------|----------|-------------|
| 6401 | D640 | NV9640 | \\nvision\envy\usersys\live\D640.640 | EnvyUser | |

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

The 'Add Control Panel' page appears:

Type: NV9649

ID: 6493

Name: N649

User: EnvyUser

Configuration Options:

New, named: [] copied from: []

Existing: []

New (default), named: N649

Previous Next Finish Cancel Suffix Navigate

Choose "NV9649" 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.

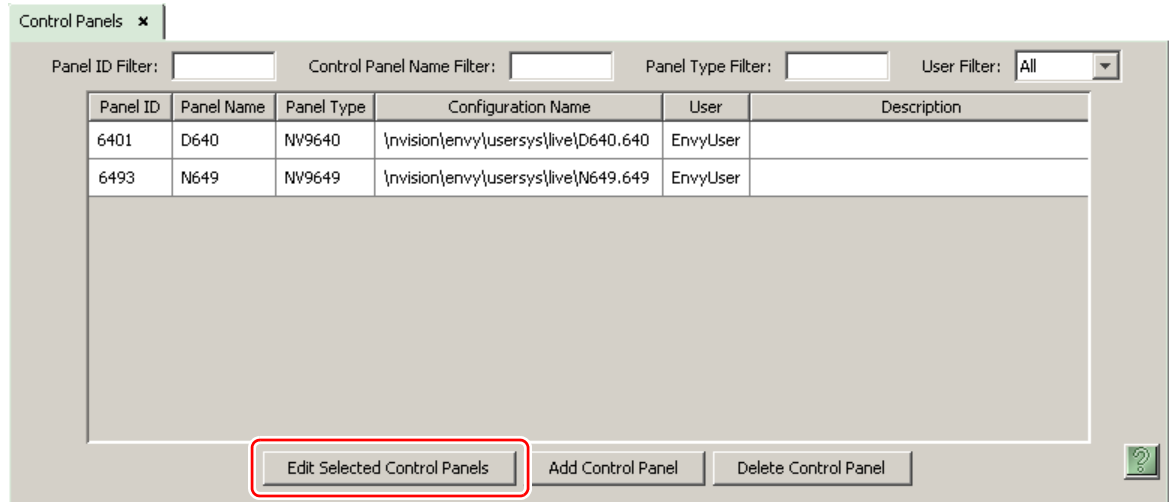
When you are creating a panel configuration you have 3 options. These options are presented in the 'Configuration Options' area:

- 1 Make a copy of an existing configuration file, giving it a new file name.
- 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 NV9649 configuration file is .649. Click 'Next' or 'Finish' to proceed.

Return to the 'Control Panels' page to view your new entry. To edit an NV9649 configuration, either double-click its list entry or select the entry and then click 'Edit Selected Control Panels':



You will then see the panel configuration page for the selected NV9649.

The following section of this guide discusses using the panel configuration page in which you configure an NV9649.

NV9649 Panel Configuration Page(s)

The NV9649 panel can be configured to operate under 3 behavioral models:

- 'Panel Server' mode.
- 'NV9609 Panel' mode.
- 'LCD XY/MD' mode.

(The behavioral model is selected in the first entry of the panel options. That entry is a drop-down list.)

The panel configuration pages for the 3 models differ greatly. The set of button functions differ and the panel options also differ.

- ▲ If you change the behavioral model for a configuration, the software reinitializes the configuration to the default (empty) configuration. Any configuration you have thus far created will be lost. Therefore, choose the appropriate behavioral model first.

Common Page Features

Please refer to figures 4-1, 4-3, and 4-4, following.

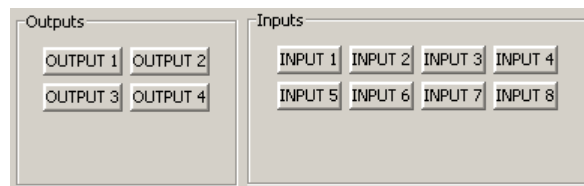
Panel Graphic

At the top of the page is a graphic representation of the NV9649 panel. Above the graphic is the pathname of the panel's configuration file. (This file corresponds to what you are editing, which will eventually be sent to the NV9000.)

Configurers must click a button "proxy" in the graphic to select the button for configuration.

GPIO Section

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. The section has two parts: inputs and outputs.



By clicking on one of the input or output buttons, you can configure the input or output. (The NV9649 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 129.

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.

The 'Save and Close' button, also at the bottom, dismisses the configuration page in addition to saving the configuration changes.

Clear Configuration Button

The 'Clear Configuration' button, located in the 'Panel Options' regions, completely empties the configuration, reverting to default values. The button does not, however, change the selected behavioral model.

Common Configuration Tasks

The person configuring an NV9649 panel will want to consider how best to use the buttons to support the devices and routers in the router control system at hand. The task is non-trivial. In support of that effort, the configurator will do the following:

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

Configuration Page for the Server Model

This is a sample NV9649 panel configuration page under the 'Panel Server' model:

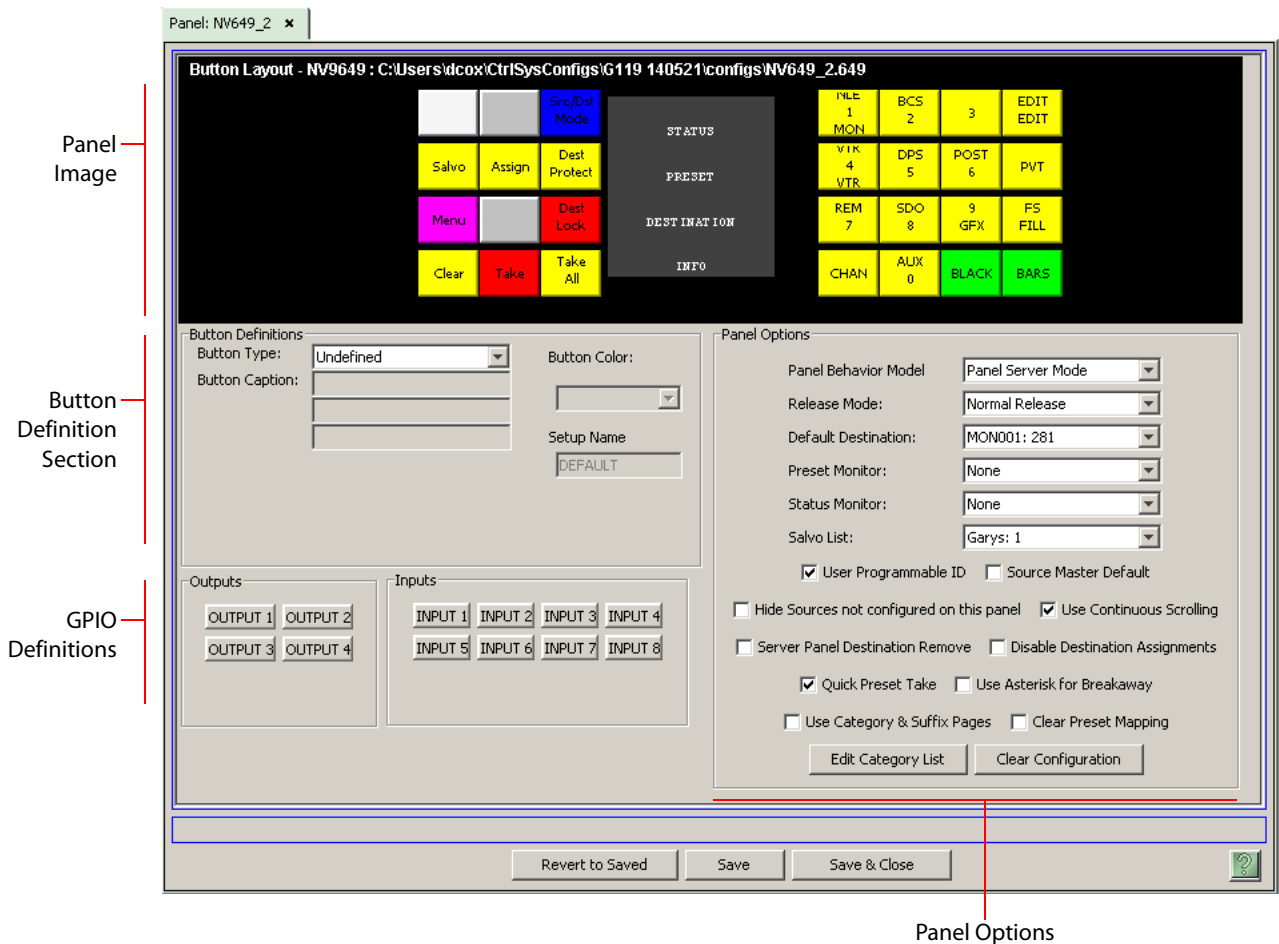


Fig. 4-1: NV9649 Configuration Page (for Server Mode, using Category Lists)

The panel can be configured to select devices by category list or using category pages. The choice is a panel option. Figure 4-1 shows the panel options where category lists are in effect.

See [Server Mode Panel Options](#), on page 24 for more information.

Figure 4-2, following, shows the panel options where category pages are in effect.

This is a server mode NV9649 panel configuration page for which category and suffix pages have been chosen:

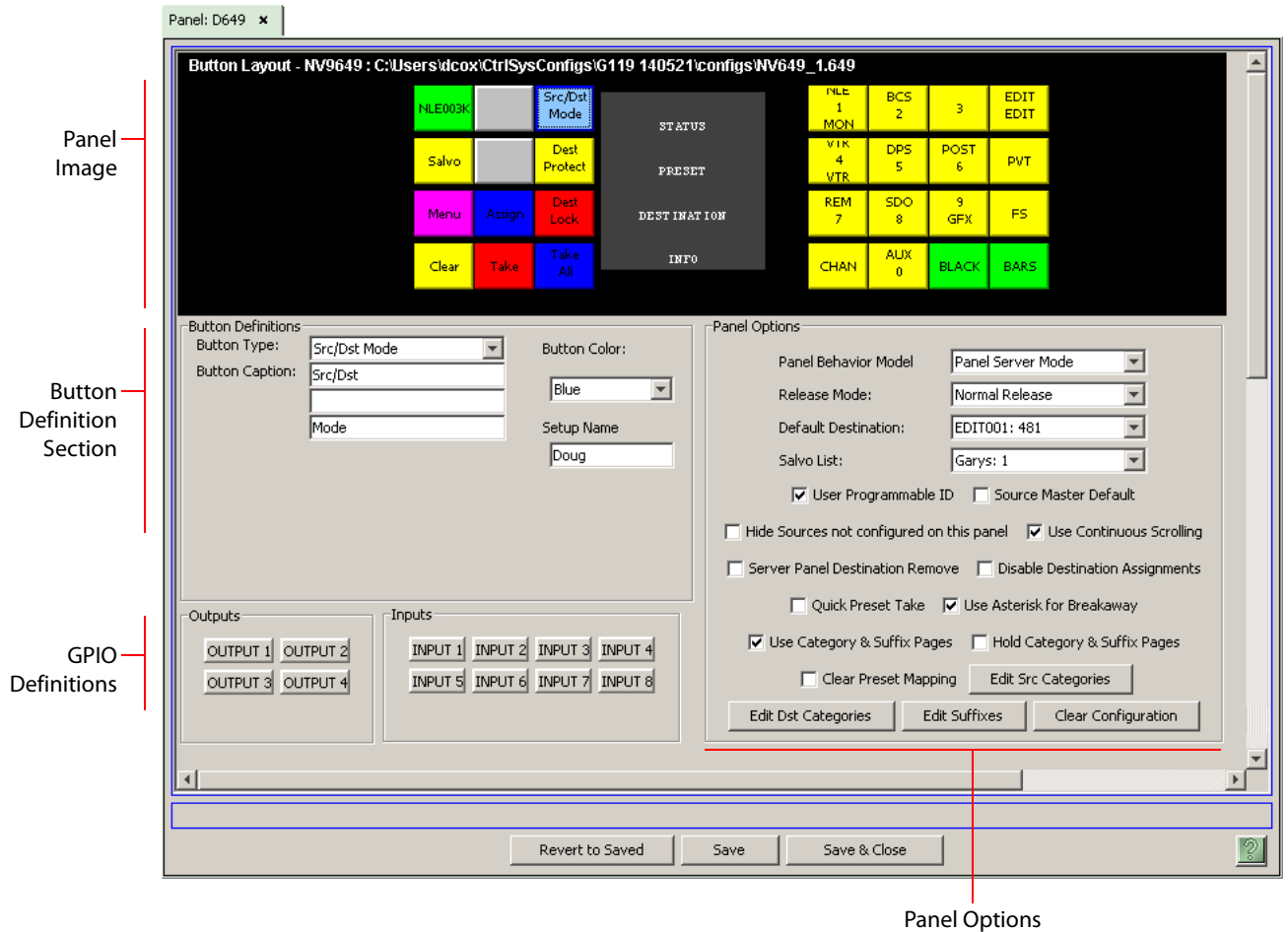


Fig. 4-2: NV9649 Configuration Page (for Server Mode, using Category and Suffix Pages)

Button Functions

There are 17 button function types for a panel in server mode (not counting 'Undefined'):

- | | | | |
|---------------------|-------------|------------------|------------------|
| Assign | Broadcast | Category | Chop |
| Clear | Destination | Destination Lock | Destination Mode |
| Destination Protect | Menu | Quick Source | Salvo |
| Source | Source Mode | Src/Dst Mode | Take |
| Take All | | | |

These are described in [Button Functions for Server Mode](#), on page 49.

Characteristics of Server Mode

The NV9649 (the “server”) operates in conjunction with one or more NV9648s (the “clients”). The NV9649 can assign a destination to any of an NV9648’s 3 control sections and also assign sources to the source buttons of any of an NV9648’s control units.

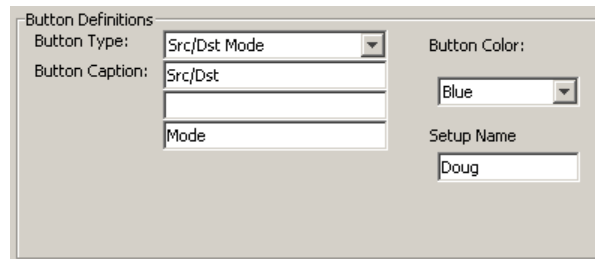
(The NV9648 has 3 sections that are independent control units. Each unit — having one display and 9 buttons — corresponds to a destination.)

The NV9648s show current sources in their displays when the NV9649 is in source mode and show the sections' destinations when the NV9649 is in destination mode. (Please refer to the *NV9648 Users' Guide* for information regarding NV9648 control panels.)

- ▲ The NV9649's panel ID is referenced by the configurations of the NV9648s. Those references link the NV9648s to the NV9649.

Button Definitions Section

Under the server model, the 'Button Definitions' section has 4 main parts:



These are:

- Button type
- Button Caption
- Button color
- Setup name

Other fields can be present in this section. These vary with the button function you have selected.

Button Type

The 'Button Type' field is a drop-down menu in which you can choose a function for the selected panel button.

Button Caption

Using the 3 'Button Caption' fields, you can specify the legend that appears on the panel button. (Button legends have up to 3 lines of 8 characters. If you specify only one or two lines of text, the panel button displays the text in a larger "font.")

For some button functions (such as 'Destination Lock', the button legend is fixed and cannot be changed.

Button Color

You can assign a button color to most, but not all, buttons. The 'Button Color' field is a drop-down list. Supported colors are amber, blue, green, grey, purple, red, and yellow.

Setup Name

When the panel is being configured for the server model **and** you have selected (clicked on) one of the 12 buttons on the left side of the panel image, the 'Button Definitions' section has an additional 'Setup Name' field.

This field is not present for the 16 buttons at the right side of the panel image. Nor is it present for any of the other behavioral models.

The 12 buttons at the left become displayed when panel operator presses a 'Menu' button and then presses the 'Manage Configs' button of the menu. Each of the 12 buttons represents one of 12 sets of client assignments.

What is a set of client assignments?

Every time an operator assigns a destination to an NV9648 client or assigns a source to a source button of a client, that assignment is recorded within the NV9000 system controller. Therefore, if and when the system undergoes a power cycle, all of the assignments made for the NV9648 clients are preserved. The typical NV9649-NV9648 configuration has multiple NV9648s. The *set of client assignments* includes all source and destination assignments to all NV9648s that are clients of the NV9649.

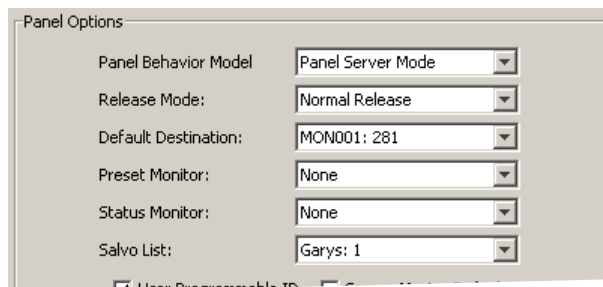
By pressing one of the 12 buttons (in the 'Manage Config' page of the panel's menu) an operator can select one of 12 sets of client assignments. In the menu itself, a set of client assignments is called a "set-up." A NV9649 always has one default setup and may have up to eleven other named setups. (It is the upper left button that is assigned to the default setup.)

By entering a name in the 'Setup Name' field for one of the 12 buttons (other than the default button) you define a setup—that is, you create a name (and a resulting storage area in the system controller) for the client assignments belonging to that setup. An operator can choose this setup if the panel has a menu. Changes made to NV9648s are always recorded into the chosen set of states. Other sets of states are not affected by changes made to the currently chosen setup.

See [Menus under the Server Model](#), on page 116 for further detail.

Server Mode Panel Options

In a server mode configuration, the panel options section, at the right of the configuration page, has 4 drop-down menus (and 6 check box options). These are the drop-down menus:



The screenshot shows a window titled "Panel Options" with the following settings:

| | |
|----------------------|-------------------|
| Panel Behavior Model | Panel Server Mode |
| Release Mode: | Normal Release |
| Default Destination: | MON001: 281 |
| Preset Monitor: | None |
| Status Monitor: | None |
| Salvo List: | Garys: 1 |

- ▲ By making a selection in the behavioral model field, you change the content of the entire configuration page, including the set of panel options. *Changing the model clears the entire configuration.*

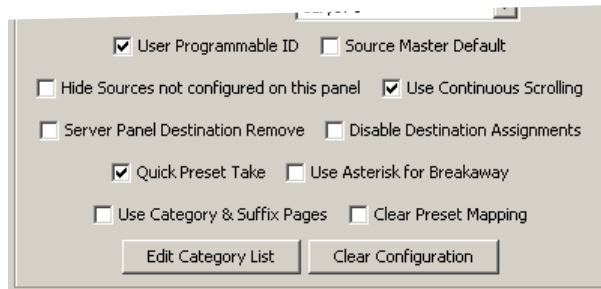
These are the drop-down menu options for the panel in server mode:

| | | |
|------------------------|-------------------|--|
| Panel Behavioral Model | Panel Server Mode | In server mode, the panel interoperates with a number of NV9648s, the NV9648s being configured as the "clients." |
| | NV9609 Panel Mode | In NV9609 mode, the panel behaves exactly like an NV9609. Please refer to the <i>NV9609 Users Guide</i> for additional details. |
| | LCD XY/MD Mode | In LCD XY/MD mode, the panel has a slightly larger function set than under the other two models. Under this model, the operator can choose either X-Y mode or multi-destination (MD) mode. |
| Release Mode | Normal Release | This panel can release "locks" and "protects" set by the designated user (at this panel or any other panel). |
| | Force Release | This panel can release locks and protects set by any user. |
| Default Destination | None | After a reset, the panel displays no destination device. (This is emphatically not recommended.) |
| | <device> | The Panel uses the specified device as the destination after a reset. (The 'Default State' button also returns the panel to this destination.) |
| Preset Monitor | None | The preset source video is not sent to a monitor. |
| | <device> | The preset source video for the selected destination appears on the specified monitor (device). |
| Status Monitor | None | The current source video is not sent to a monitor. |
| | <device> | The current source video for the selected destination appears on the specified monitor (device). |
| Salvo List | [none] | Salvo lists appear in the drop-down menu. A salvo list designates the particular salvos (among potentially many) from which the operator can choose when the panel is in salvo mode. Salvo lists are defined, in NV9000-SE Utilities, under the 'Views' pane, using the 'Salvo Lists' table and the 'Salvo List Details' table. The NV9000 configuration might not have any salvo lists, in which case 'None' is the only entry in the drop-down menu. |

Checkbox Options

The checkbox options are at the bottom of the panel options section. A check in the box enables the option. Clearing the checkbox disables the option.

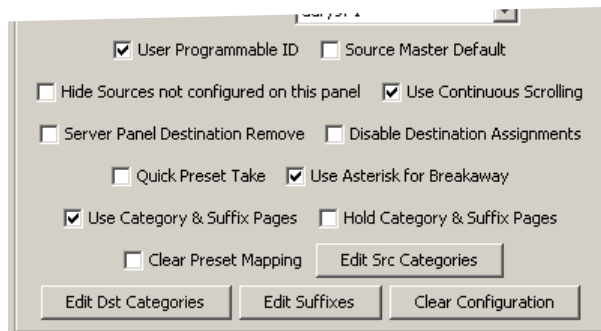
The list of options differs according to whether you have checked the 'Use Category & Suffix Pages' option. These are the panel options when that option is not checked:



Clearing the 'Use Category & Suffix Pages' option enables the use of *category lists* and the panel options includes an 'Edit Category Lists' button. See [Category List](#), on page 28.

See also [Clear Configuration Button](#), on page 20.

Checking the 'Use Category & Suffix Pages' option enables *category pages*:



When you have enabled category pages, the panel options include 3 buttons: (1) 'Edit Src Categories', (2) 'Edit Dst Categories', and (3) 'Edit Suffixes'. See [Category and Suffix Pages](#), on page 30.

The use of category lists and the use of category pages are two mutually exclusive ways to perform device selection.

The following items are the checkbox options:

- User-Programmable ID.
Allows the Panel ID to be changed locally at the control panel (in menu mode).
- Source Master Default.
Makes a control-level source the *controlling* device (or master device) by default. Otherwise, the destination is the master by default. (The option is specifically for use with NV9000 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.
- 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.

- Use continuous scrolling.
If you check this box, the panel will scroll source or destination devices continuously (or indefinitely). That is, the display will show the first device in the list following the last when you are scrolling up, and will show the last device after the first if you are scrolling down.
If you leave this box unchecked, the panel will stop scrolling when it reaches either the beginning or end of the list.
This option does **not** affect scrolling of salvos when the panel is in salvo mode.
- Server panel destination remove.
This option, when checked, prevents the NV9649 from being able to perform takes. Under this option, 'Take' buttons do not illuminate when a source is preset.
The NV9649's destination display and status display remain blank.
The underlying consideration is that takes are to be performed on the NV9648 clients only.
- Disable destination assignments.
If you check this option, the NV9649's ability to assign destinations to NV9648 sections is disabled.
- Quick preset take.
If you check this option, when the operator presets a source, all 'Take' buttons in all NV9648 control units go high-tally. The operator may then use the 'Take' button in the control unit that corresponds to the destination to which the take is intended.
If you leave this option unchecked, the 'Take' buttons in the NV9648 units do not go high-tally. Takes are not enabled on the NV9648s when the operator presets a source at the NV9649.
- Use asterisk for breakaway.
If you check this option, the panel displays source names under breakaway with an asterisk in the 8th character position.
This feature might not be suitable at some facilities. Therefore it is an option.
- Use category and suffix pages.
If you check this option, the panel uses category pages (with associated suffix pages) to perform device selection.
If you clear this option, the panel uses category lists to perform device selection.
Further, the panel options section shows different buttons according to whether you have checked this option.
See [Category List](#), following, for details regarding category list configuration.
See [Category and Suffix Pages](#), on page 30 for details regarding category page configuration.
- 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.

Category Lists and Category Pages

Under the 'Panel Server' model, panel operators may select devices using either a category list or category pages. (The two methods are mutually exclusive. A panel can be configured in one way or the other.)

An NV9649 that is configured for device selection by category list shows "CatLists" in its 'Info' display. An NV9649 that is configured for device selection by category page shows "CatPages" in its 'Info' display.

Category List

Using a category list, panel operators can select devices in 3 steps:

- 1 Place the panel in either source mode or destination mode, as required.
- 2 Turn the knob until the desired device category mnemonic appears in the preset display. Then press the knob to select that category.
- 3 When the category has been selected, the operator can now either turn the knob to select a device within the category, or press suffix (or index) buttons to "build" a device name from the category mnemonic and the pressed suffixes. The operator can actually use both techniques to select a device in the category.

To minimize the number of categories through which the operator must search, the configurer must define a *category list* that includes only the categories through which the operator may browse using the knob. The list is independent of the categories represented on buttons.

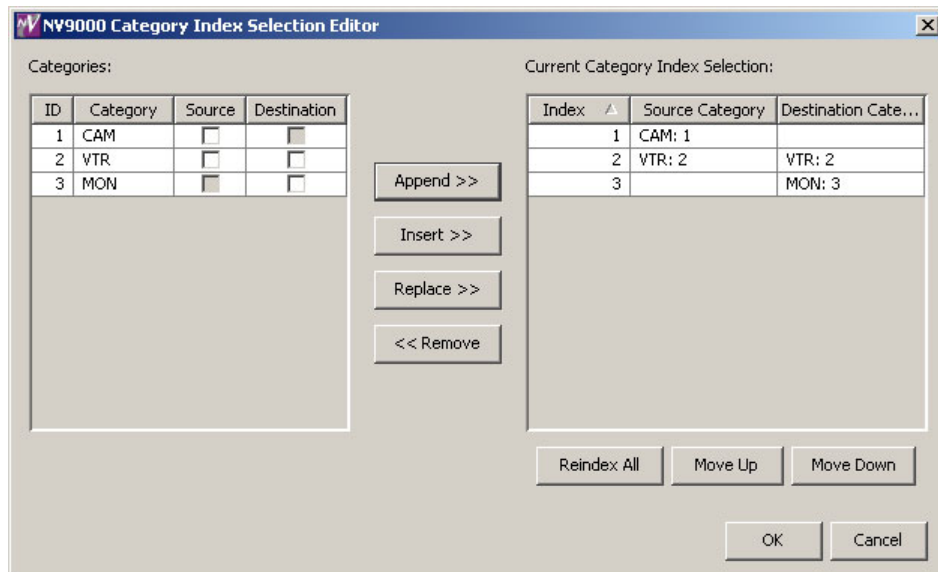
- ▲ The operator cannot select categories with the knob unless you define two category lists, one for sources and one for destinations. The category list may, of course, include all categories.

How to Create a Category List

Follow these guidelines.

- 1 Go to the NV9649 configuration page in NV9000-SE Utilities. (The page must be for a configuration using the server model and for which the panel option 'Use Category & Suffix Pages' is unchecked.)

- Click the 'Edit Category List' button. The 'Category Index Selection Editor' window appears:



On the left is a list of *all* categories defined in the NV9000 system. On the right is a list of the categories in the list you are defining. Initially the list for the panel configuration is empty.

- Modify the list.

To add categories to the list, select one or more categories on the left and copy it to the right, using either the 'Append' button, the 'Insert' button, or the 'Replace' button.

The categories are either source categories or destination categories or both, as indicated by check boxes on the left. To select or unselect a category, click the box. A selected category has a check mark in the box.

The 'Append' button *appends* the selected categories to the end of your list.

The 'Insert' button places the selected categories immediately *above* whatever category you have highlighted on the right.

The 'Replace' button *replaces* whatever categories you have highlighted on the right with the selected categories from the left.

The 'Remove' button *removes* highlighted categories from the right.

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

Also at the bottom right is a 'Reindex All' button. Click this button to renumber the categories consecutively (in the order in which you placed them in the list) and without gaps in the ordering.

When you have finished editing the category list, click OK to save the list. You can click 'Cancel' if you want to discard any changes you have made to the list.

You will have actually defined two lists, one for sources and one for destinations. These lists define the categories through which the operator may browse using the knob at the front of the panel.

Category and Suffix Pages

Using category pages (and suffix pages) during panel operation, panel operators can select devices in 4 steps:

- 1 Place the panel in either source mode or destination mode, as required.

Note that if any category buttons are already showing on the panel, those category buttons can be used to select a category (and the operator may skip to step 4 below).

- 2 Turn the knob until the desired category page appears. Then press one of those buttons to select that category.

The different category page names show in the 'Info' display as you turn the knob.

- 3 When the category is selected, the first of the suffix pages (if any have been defined) appears. If no suffix pages have been defined, the panel's buttons will be blank and the operator must use step 4b below.

- 4 The operator now has a choice: (a) use the suffix pages, appending suffixes to the category mnemonic, or (b) use the knob to scroll through device names.

- a Use the suffix pages.

The operator forms a device name by appending suffixes to the category mnemonic. The operator may press any suffix button in any suffix page. The operator can use the panel's knob to scroll through suffix pages.

When the operator stops entering suffixes, the device is considered selected.

- b Use the knob to scroll through devices.

To use this method of device selection, the operator must *press* the knob. When the operator presses the knob, the panel enters a mode in which the operator can turn the knob to scroll through the list of devices that belong to the category selected in step 2.

When the operator stops turning the knob, the device is considered selected.

You, the configurer, will define one or more "pages" for source categories, one or more pages for destination categories, and (usually) one or more pages for suffixes. The pages need not be fully populated.

- ▲ If your panel is using category pages, you must create at least one page of source categories and at least one page of destination categories. Suffix pages are optional.

There are 3 buttons available when you have checked the 'Use Category & Suffix Pages' panel option:

- Edit Src Categories
- Edit Dst Categories
- Edit Suffixes

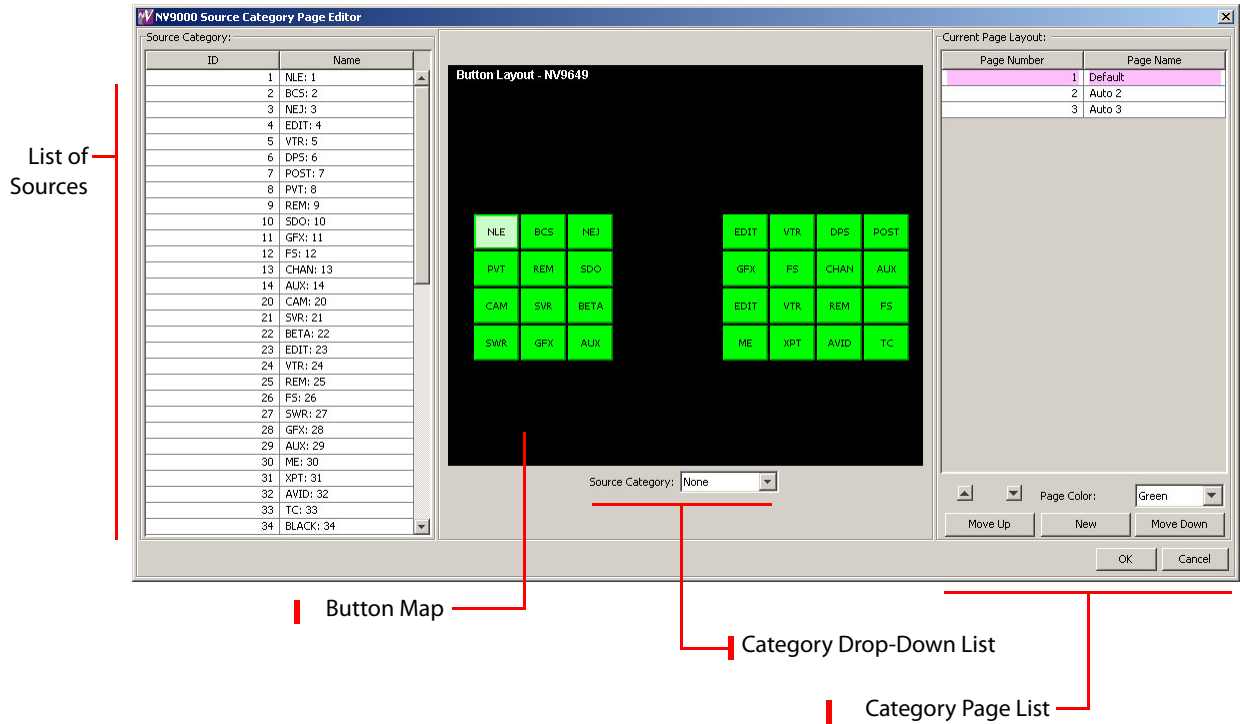
Click any of these buttons to create or modify category pages and suffix pages. When you click the button, the appropriate configuration dialog appears.

- ▲ Suffix pages used by category pages under the 'Panel Server' model have no relationship to the global suffix pages available for NV9649 panels configured under the LCD XY/MD model.

How to Create Category Pages

The methods and configuration dialogs for source and destination categories are the same. Therefore this section describes the source category page editor only. What is said here also applies to the destination category page editor.

This is the source category page editor that appears when you click 'Edit Src Categories':



There are 4 main parts to this dialog:

- List of sources
- Button map
- Category drop-down list
- Category page list

List of sources

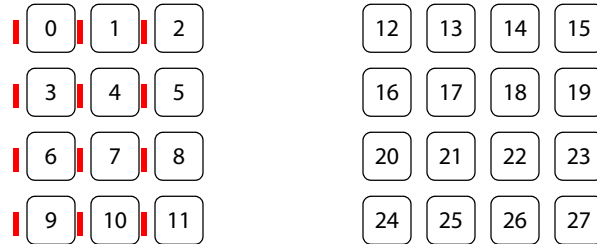
This list contains all the source categories presently defined in your NV9000 configuration.

You can click and drag items from the list of sources onto buttons in the button map.

▲ Note that you must click, *then* drag. Merely dragging has no effect.

Button Map

This is a list of the 28 panel buttons at the right side of the panel that form the currently displayed button "page." The buttons are numbered from 0 to 27, thus:



The button map shows the source categories that were assigned to the button array for the currently displayed button *page*.

You can use the arrow buttons in the middle of the *category page list* to select and show different button pages.

Click a button to select it.

Category Drop-Down List

The drop-down list contains all the source (or destination) categories defined in your configuration. Choose a category to assign it to the button selected in the map.

It is here that you can choose 'None' if you want a button to be unassigned.

Category Page List

This is a list of all the source (or destination) category pages you have defined in your configuration.

This section has two arrow buttons. These buttons allow you to select a page of buttons to edit.

The section has three other buttons: 'Move Up', 'Move Down', and 'New'. Use the 'Move Up' and 'Move Down' buttons to move a selected button page up or down in the list. Use the 'New' button to create a new button page.

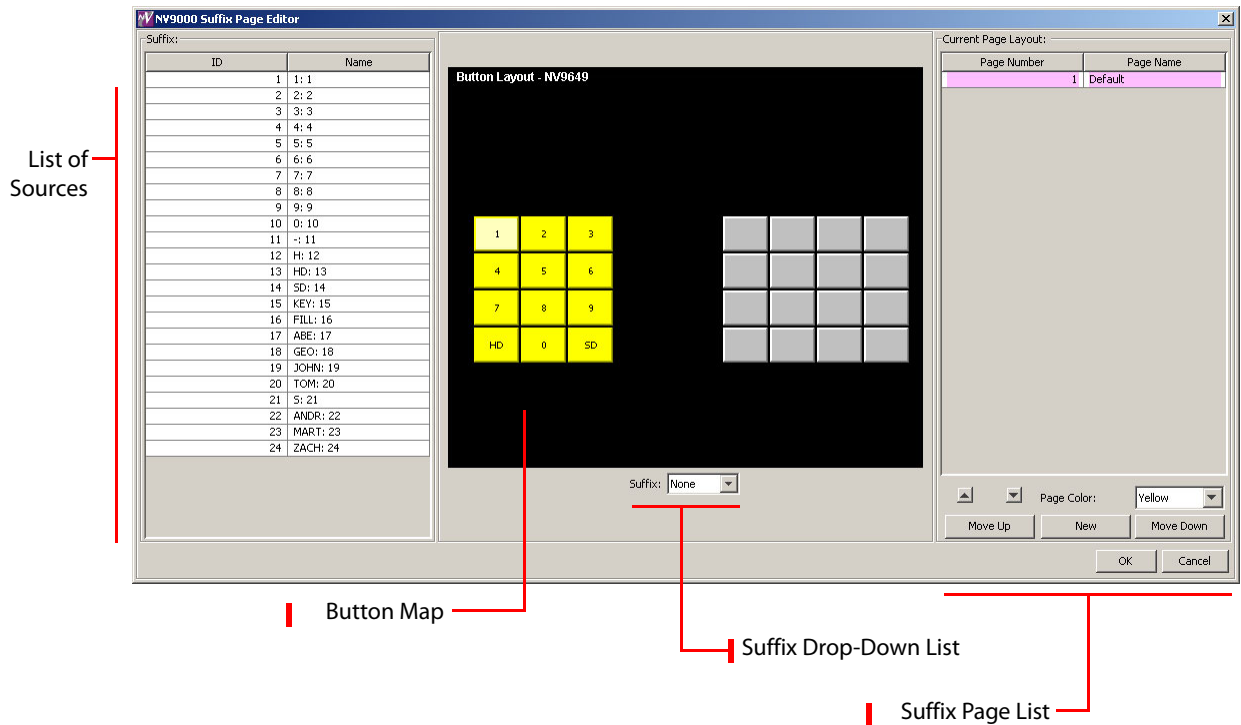
When you have completed your changes to the category list, either click 'OK' to commit your changes, or click 'Cancel' to discard your changes.

How to Create Suffix Pages

The process of selecting devices using category pages can benefit from the existence of suffix pages. (Suffix pages, if they exist, appear when the operator selects a category.)

Defining suffix pages is quite similar to defining category pages, but the dialog is slightly different.

To define suffix pages, click 'Edit Suffixes' in the panel options section of the NV9649 configuration page. The 'Suffix Page Editor' dialog appears:



There are 4 main parts to this dialog:

- List of sources
- Button map
- Suffix drop-down list
- Suffix page list

List of suffixes

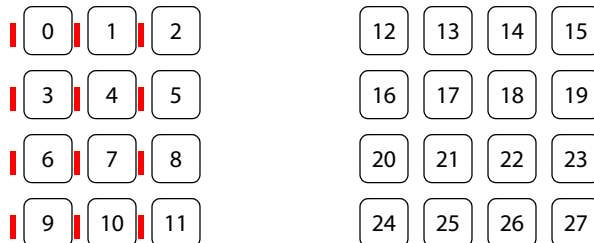
This list contains all the suffixes presently defined in your NV9000 configuration.

You can click and drag items from the list of suffixes onto buttons in the button map.

▲ Note that you must click, *then* drag. Merely dragging has no effect.

Button Map

This is a list of the 28 panel buttons at the right side of the panel that form the currently displayed button "page." The buttons are numbered from 0 to 27, thus:



The button map shows the suffixes that were assigned to the button array for the currently displayed button *page*.

You can use the arrow buttons in the middle of the *category page list* to select and show different button pages.

Click a button to select it.

Category Drop-Down List

The drop-down list contains all the suffixes defined in your configuration. Choose a category to assign it to the button selected in the map.

It is here that you can choose 'None' if you want a button to be unassigned.

Category Page List

This is a list of all the suffixes pages you have defined in your configuration.

This section has two arrow buttons. These buttons allow you to select a page of buttons to edit.

The section has three other buttons: 'Move Up', 'Move Down', and 'New'. Use the 'Move Up' and 'Move Down' buttons to move a selected button page up or down in the list. Use the 'New' button to create a new button page.

When you have completed your changes to the suffix list, either click 'OK' to commit your changes, or click 'Cancel' to discard your changes.

Configuration Page for the LCD XY/MD Model

This is a sample NV9649 panel configuration page for LCD XY/MD mode:

Panel: L649 x

Panel Image:

Button Definition Section:

Button Type: Category
 Button Caption: VTR
 Level Set Filter: None
 Src Category: None
 Dst Category: VTR: 2

Button Color: Amber
 Place this button on all local pages
 Use global suffix page to select devices.

Page Table:

| Page Number | Page Name | Linked From Page |
|-------------|-----------|------------------|
| 1 | Default | |
| 2 | UTILS | 1 |

GPIO Definitions:

Outputs: OUTPUT 1, OUTPUT 2, OUTPUT 3, OUTPUT 4
 Inputs: INPUT 1, INPUT 2, INPUT 3, INPUT 4, INPUT 5, INPUT 6, INPUT 7, INPUT 8

Panel Options:

Panel Behavior Model: LCD XY/MD Mode
 Default Mode: Multi-Destination Mode
 Release Mode: Normal Release
 Default Destination: AOUT 1: 17
 Preset Monitor: MON 1: 116
 Status Monitor: MON 2: 117
 XY Data Routing Mode: Automatic
 MD Data Routing Mode: Automatic
 Default Name Set: System Name: 0
 Multidest Device Limit: 56

User Programmable ID Save Preset Default
 Hold Preset Default Enable Destination Lock
 Enable Destination Protect Source Master Default
 Hide Sources not configured on this panel
 Deselect All Destinations and Turn Off Hold After Take
 Jump to Multidest Selection When Switching to XY
 Flip-Flop Source & Preset After Take Enable Force Release
 Jump Back After Source Selection Jump Back After Take
 Jump Back After Destination Selection Src/Dst Immediate Take
 Clear Preset Mapping

Revert to Saved Save Save & Close

Fig. 4-3: NV9649 Configuration Page (for LCD XY/MD Mode)

In LCD XY/MD mode, the panel is standalone — independent of any NV9648s.

There are 31 button function types for a panel in LCD XY/MD mode (not counting 'Undefined'):

| | | |
|--------------------|------------------|---------------------|
| Back | Broadcast | Category |
| Chop | Clear Preset | Default State |
| Destination | Destination Lock | Destination Protect |
| Free Source | Global Navigate | Hold |
| Level Map | Menu | Name Set Toggle |
| Navigate | Page Down | Page Up |
| Panel Lock | Preset Release | Previous Source |
| Quick Source | Salvo | Save Preset |
| Selection | Source | Source Master |
| Source/Destination | Take | X-Y Display |
| XY/MD Mode | | |

These are described in [Button Functions for LCD XY/MD mode](#), on page 53.

Characteristics of LCD XY/MD mode

The panel in LCD XY/MD mode has a somewhat more extensive function set than panels in server mode or NV9609 mode. In LCD XY/MD mode, the panel does *not* interoperate with NV9648s.

All 28 function buttons form a "button page" in a hierarchical structure of button pages. The panel's buttons can be used in a hierarchical fashion: pressing a 'navigation' button (or a 'global navigation' button) causes the panel to display a new set of configured button functions, called a "button page." There can be many such pages, organized in a configurable tree structure.

The panel supports the use of multiple 'selection' buttons. When the panel is in X-Y mode, the selection buttons select levels. When the panel is in MD mode, the selection buttons select MD devices (which are destinations). If there are more levels (or more MD devices) than there are selection buttons, the operator can press a 'Page Up' or 'Page Down' button to scroll through the list of levels (or, in MD mode, the list of MD devices).

The Button Page Table

In LCD XY/MD mode, the configuration page has an additional section, the button page table, just below the button definition section. This is an example:

| Page Number | Page Name | Linked From Page |
|-------------|-----------|------------------|
| 1 | Default | |
| 2 | A SRCs | 1 |
| 3 | B SRCs | 1 |
| 4 | C SRCs | 1 |
| 7 | A DSTs | 1 |
| 8 | B DSTs | 1 |
| 9 | C DSTs | 1 |

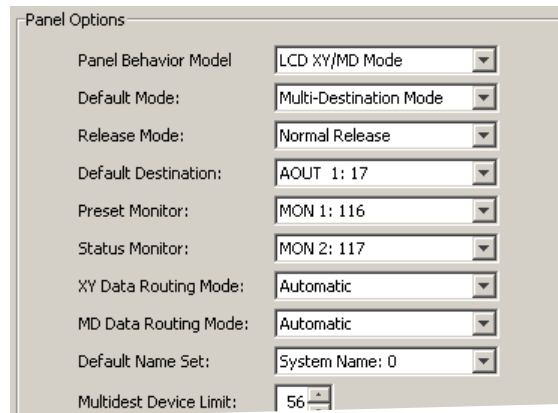
This section displays a list of the individual pages of the tree structure. The button page at the top of the list (or root of the tree) is called "Default."

During operation, category buttons can display device subpages when pressed. Those subpages are not explicitly 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. Global navigation and suffix pages are included in the button page table.

See [Button Page List](#) on page 42.

LCD XY/MD mode Panel Options

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



These are its drop-down menu options:

| | | |
|------------------------|-------------------|---|
| Panel Behavioral Model | Panel Server Mode | In server mode, the panel interoperates with a number of NV9648s, the NV9648s being configured as the "clients." |
| | NV9609 Panel Mode | In NV9609 mode, the panel behaves exactly like an NV9609. Please refer to the <i>NV9609 Users Guide</i> for additional details. |
| | LCD XY/MD Mode | In LCD XY/MD mode, the panel has a slightly larger function set than under the other two models. Under this model, the operator can choose either X-Y mode or multi-destination mode. |
| Default Mode | X-Y Mode | Starts the panel in XY mode after a reset. See Defaults , on page 137. |
| | Multi-Dest Mode | Starts the panel in multi-destination mode after a reset. |
| Release Mode | Normal Release | This panel can release "locks" and "protects" set by the designated user (at this panel or any other panel). |
| | Force Release | This panel can release locks and protects set by any user. |

Configuration

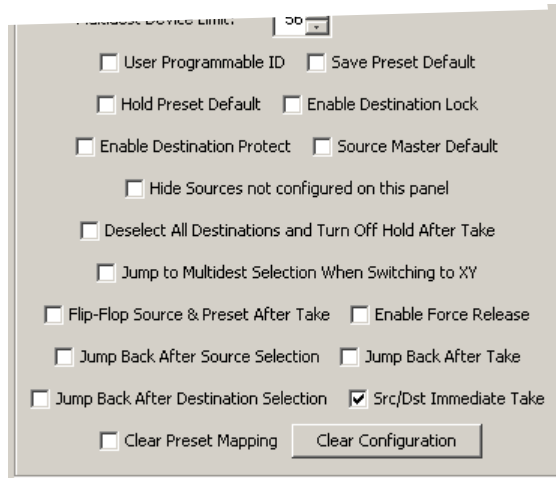
Configuration Page for the LCD XY/MD Model

| | | |
|----------------------|------------------------------|--|
| Default Destination | None | After a reset, the panel displays no destination device. (This is not recommended.) |
| | <device> | The Panel uses the specified device as the destination after a reset. (The 'Default State' button also returns the panel to this destination.) |
| Preset Monitor | None | The preset source video is not sent to a monitor. |
| | <device> | The preset source video for the selected destination appears on the specified monitor (device). |
| Status Monitor | None | The current source video is not sent to a monitor. |
| | <device> | The current source video for the selected destination appears on the specified monitor (device). |
| XY Data Routing Mode | Automatic | 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. |
| | Semi-automatic (recommended) | 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. |
| | Manual | If the control port is in use for the source or destination device, the system takes all (selected) levels except control. It does not perform the control level route. If the control port is not in use, the control level take occurs normally. 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. A take can occur on the machine control level if, in the status column of the display, the source entry is "FREE." |

| | | |
|------------------------|--------------------------------|--|
| MD Data Routing Mode | Automatic | 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. |
| | Manual | If the control port is in use for the source or destination device, the system takes all (selected) levels except control. It does not perform the control level route. If the control port is not in use, the control level take occurs normally. 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. An operator can determine whether the control level is free by switching momentarily to X-Y mode and examining the destination's levels. |
| 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 not 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 allowing. Make this value equal to or greater than the number of MD devices you need. The default, and lowest value, is 8. The maximum is 512. (Elsewhere in the configuration, you will create a list of MD 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 unchecked except 'Src/Dst Immediate Take'. That particular option is enabled by default.

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 the 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 machine control source the *controlling* device (or master device) by default. Otherwise, the destination is the master by default. (The option is specifically for use with NV9000 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.

- 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 NV9649 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 NV9649 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 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.

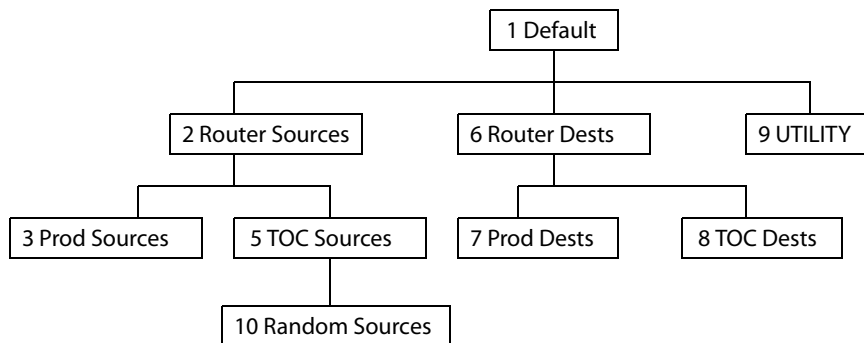
To delete a page or pages from the tree, select the pages in the button page list, right-click the list, and choose one of the deletion commands from the context menu that appears.

- ▲ 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, category buttons or global navigation buttons to jump to other pages.

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.)

Configuration Page for the NV9609 Model

This is the default NV9649 panel configuration page for NV9609 mode:

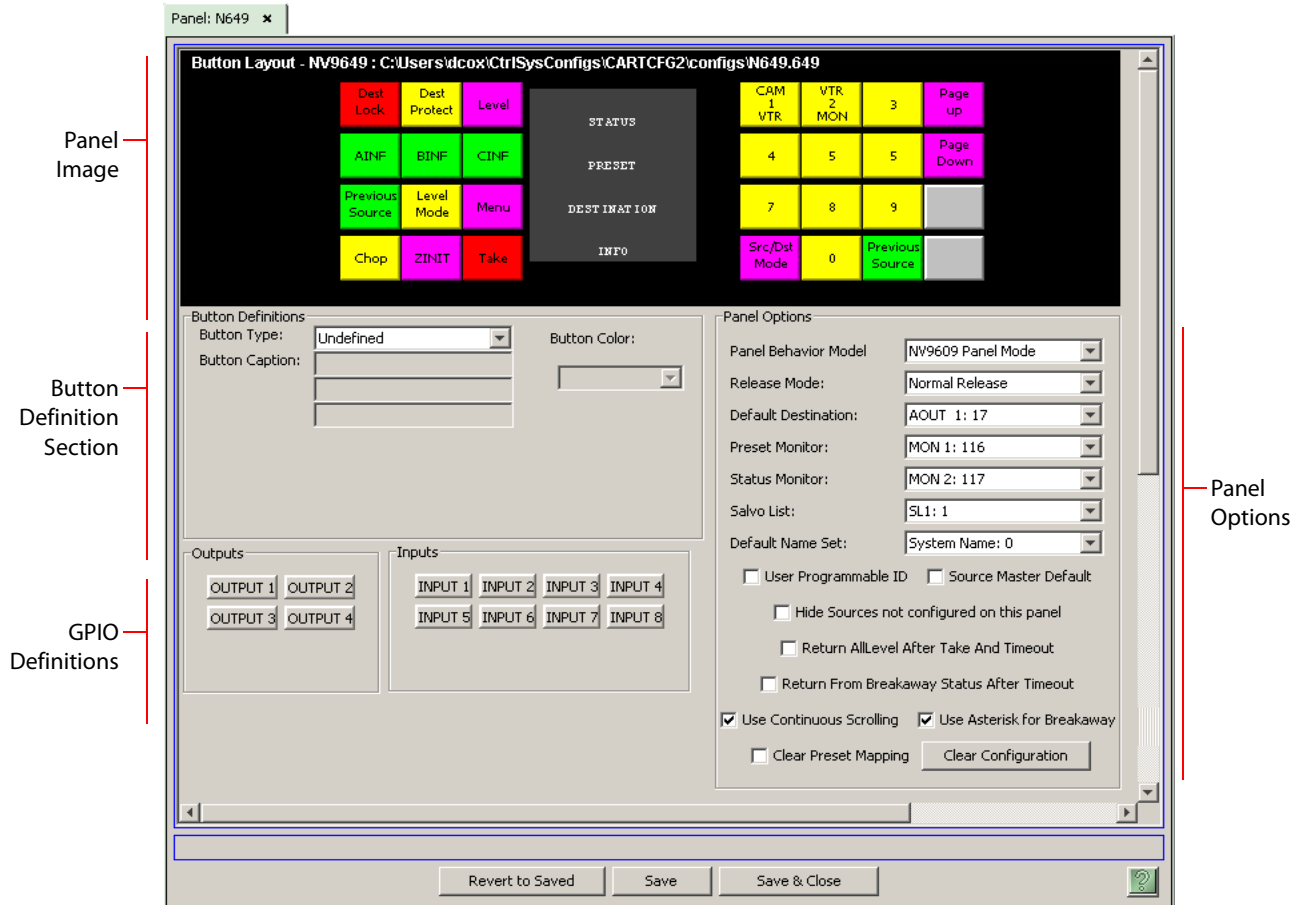


Fig. 4-4: NV9649 Configuration Page (for NV9609 Mode)

In NV9609 mode, the panel is standalone — independent of any NV9648s.

There are 24 button function types for a panel in NV9609 mode (not counting 'Undefined'):

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

These are described in [Button Functions for NV9609 Mode](#), on page 69.

Characteristics of NV9609 Mode

Under the NV9609 model, the NV9649 exactly emulates the NV9609 control panel, which has the same physical layout of buttons and displays and has roughly the same size as the NV9649.

The NV9649's knob can be used to emulate the 'Page Up' and 'Page Down' functions of the NV9609.

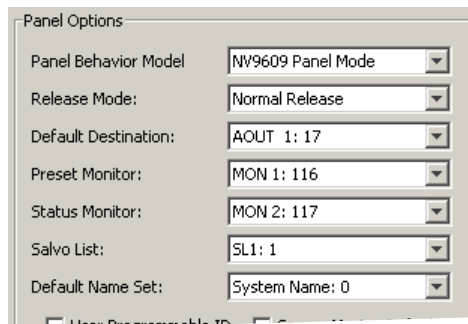
The major difference between the NV9609 and the NV9649 is that the NV9649 has LCD buttons whereas the NV9609 has backlit buttons that do not have LCD legends.

The NV9609, and thus the NV9649, is characterized by having a "level mode." See [Level Mode](#), on page 85. (Refer also to the *NV9609 Users' Guide*.)

- ▲ Under the NV9609 model, the NV9649 is a standalone panel and is independent of any NV9648s.

NV9609 Mode Panel Options

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



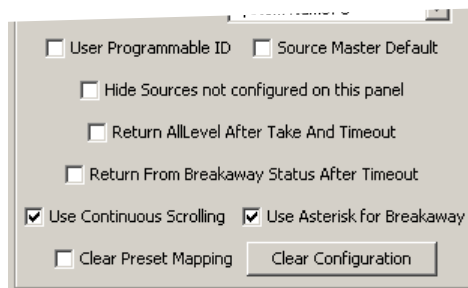
These are its drop-down menu options:

| | | |
|------------------------|-------------------|---|
| Panel Behavioral Model | Panel Server Mode | In server mode, the panel interoperates with a number of NV9648s, the NV9648s being configured as the "clients." |
| | NV9609 Panel Mode | In NV9609 mode, the panel behaves exactly like an NV9609. Please refer to the <i>NV9609 Users Guide</i> for additional details. |
| | LCD XY/MD Mode | In LCD XY/MD mode, the panel has a slightly larger function set than under the other two models. Under this model, the operator can choose either X-Y mode or multi-destination mode. |
| Release Mode | Normal Release | This panel can release "locks" and "protects" set by the designated user (at this panel or any other panel). |
| | Force Release | This panel can release locks and protects set by any user. |
| Default Destination | None | After a reset, the panel displays no destination device. (This is not recommended.) |
| | <device> | The Panel uses the specified device as the destination after a reset. (The 'Default State' button also returns the panel to this destination.) |

| | | |
|------------------|------------------|--|
| Preset Monitor | None <device> | The preset source video is not sent to a monitor. The preset source video for the selected destination appears on the specified monitor (device). |
| Status Monitor | None <device> | The current source video is not sent to a monitor. The current source video for the selected destination appears on the specified monitor (device). |
| Salvo List | [none] | Salvo lists appear in the drop-down menu. A salvo list, as you might think, is a list of salvos. The salvos in the list you choose are the salvos the operator can choose in salvo mode. Salvo lists are defined, in NV9000-SE Utilities, under the 'Views' pane, using the 'Salvo Lists' table and the 'Salvo List Details' table. The NV9000 configuration might not have any salvo lists, in which case 'None' is the only entry in the drop-down menu. |
| Default Name Set | System Name | A list of "name sets" appears in the drop-down menu. The name sets can be defined under the System Management pane of NV9000-SE Utilities. Choose 'System Name' in this list if you do not want, or do not care about, alternate device names. Do not choose 'System Name' if you are configuring any 'Name Set Toggle' buttons. |

Checkbox Options

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



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

By default, all the check box options are clear.

The following items are the checkbox options:

- User-Programmable ID.
Allows the Panel ID to be changed locally at the control panel (in menu mode).
- Source Master Default.
Makes a control-level source the *controlling* device (or master device) by default. Otherwise, the destination is the master by default. (The option is specifically for use with NV9000 series machine control routers.)

“Source is master” is used for duplication, or broadcast routing, on a machine control level. “Destination is master” is for machine-to-machine editing. If you do not select the “source master default” option, you can place a ‘Source is Master’ button on the panel.

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

- Hide sources not configured on this panel.

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

- Return all-level after take and timeout.

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

If you leave this box unchecked, the panel will **not** revert to an all-level state.

The default timeout period is 30 seconds. See [LCD Buttons](#) on page 141.

- Return from breakaway status after timeout.

If you check this option, a panel that is in level mode will leave level mode after the timeout period.

The default timeout period is 30 seconds. See [LCD Buttons](#) on page 141.

- Use continuous scrolling.

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

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

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

- Use asterisk for breakaway.

If you check this box, the software places asterisks in the 8th character position of source names that contribute to breakaway.

If you clear this box, the software leaves source names unchanged.

- 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

The NV9649 panel can be configured to operate under 3 behavioral models:

- ‘Panel Server’ mode.
- ‘NV9609 Panel’ mode.
- ‘LCD XY/MD’ mode.

The set of button functions for the 3 behavioral models differ greatly.

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 NV9649 device list changes also.

The number and names of categories can also change over time and the NV9649 will track those changes too.

Note:

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

Button Specification

The button definitions section has several controls:

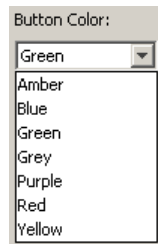
The screenshot shows a window titled "Button Definitions". It contains the following controls:

- Button Type:** A pull-down menu with "Selection" selected.
- Button Caption:** Three stacked text boxes. The first contains "Sel".
- Display Index:** A pull-down menu with "1" selected.
- Button Color:** A pull-down menu with "Yellow" selected.
- Place this button on all local pages:** A checked checkbox.
- Edit Multi-Dest Devices:** A button at the bottom.

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. Some buttons do not allow you to enter button text. Category buttons, for example, use the category name 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:



On the panel, each of the 7 defined colors has two brightness levels: "high-tally" and "low-tally." Buttons are dark if their functions are disabled. Buttons are low tally if they are available and unselected. Buttons are high tally when they are selected. (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, *in the same position*, on all pages in the subtree available through the navigation button.

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.

The Navigate button is a special case. It invoking an "Edit Navigate Button" dialog during configuration. See ['Edit Navigation Button' Dialog](#), on page 62.

Button Functions for Server Mode

These are the button types available for NV9649 configurations under the server model:

| Type | Description (under Server Mode) |
|-----------|---|
| Assign | <p>When the panel is in destination mode, the button is used to assign a selected destination to an NV9648 control unit.</p> <p>When the panel is in source mode, the button is used to assign a preset source to a source button of an NV9648 control unit.</p> <p>(Pressing a source button of the desired NV9648 control unit completes the assignment.)</p> <p>See Operating Methods, on page 112 for detail.</p> <p>Changes made to the assignments made for all NV9648 clients are preserved in the NV9000 system controller and persist across power cycles. We call these sets of client assignments "setups." Up to 12 setups may be defined and used. When you use the 'Assign' button, it applies to the currently selected setup and other setups remain unaffected. You may select one of the defined setups using the panel's menu (if it has one). See Menus under the Server Model, on page 116</p> |
| Broadcast | <p>On the data (machine control) level, the button enables a broadcast take to an <i>additional</i> controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the <i>first</i> controlled device.</p> <p>The button definition has no fields to configure.</p> <p>A broadcast button is useful in dubbing applications or when a backup (redundant) device is in use. See Broadcast Routes, on page 90.</p> <p>See also the Source Master button, following.</p> |

| Type | Description (under Server Mode) |
|----------|--|
| Category | <p>During operation, the button has 3 functions:</p> <ol style="list-style-type: none">1 Display a source category's device list when the panel is in source mode.2 Display a destination category's device list when the panel is in destination mode.3 Present a suffix (or a digit) to be appended to a device name during category selection. <p>Thus, when you configure a category button, it has 3 drop-down lists in the button definition section: 'Src Category', 'Dst Category', and 'Suffix'. You should choose a category from each category list. (You may choose 'None' in either category list.)</p> <p>The button definition section also presents a "level set filter" drop-down list in which you can select a level set to reduce the number of categories through which to browse.</p> <p>Each category button displays 2 lines of text: (1) either the source category name or the destination category name, and (2) suffix text, in that order. If the button has no suffix text, the second line shows dashes.</p> <p>When the operator first presses a category button, the category mnemonic appears in the 'Preset' display. After the category is thus selected, the operator uses a keypad (button array) to enter the device index within the category. (The keypad is a set of category buttons to which indexes or suffixes have been assigned.)</p> <p>Pressing a category button when the panel is in source mode starts the "construction" of a source device name. Pressing a category button when the panel is in destination mode starts the "construction" of a destination name.</p> <ul style="list-style-type: none">▲ Operators can also use the knob to scroll through sources or destinations after choosing a category. <p>The default button text is the category name. You can override the default text.</p> <p>See Category List, on page 28.</p> <ul style="list-style-type: none">▲ Note that category buttons in server mode function differently from category buttons under LCD XY/MD mode and NV9609 mode. There are differences in the configuration of these buttons too. |
| Chop | <p>When a chop function is supported by a router, the button is a toggle that enables and disables rapid switching of the selected destination device between the current source and the preset source. This chop function is used to test system timing.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |
| Clear | <p>The button reverts to the most recent preset. You may think of this as a "backspace key." It erases the suffixes you entered under category select in reverse order. Operators can press 'Clear' multiple times; each press is another</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |

| Type | Description (under Server Mode) |
|---------------------|--|
| Destination | <p>Selects a destination.</p> <p>When you configure a destination button, a drop-down menu appears: 'Destination Device'. Choose a device from the list. The 'None' entry is merely a placeholder. Do not choose 'None'.</p> <p>The button definition section also presents a "level set filter" drop-down list in which you can select a level set to reduce the number of sources through which to browse.</p> <p>The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.</p> |
| Destination Lock | <p>Sets or removes a "lock" on the current destination device. The lock can be removed only by an operator using a panel that same user ID as the user ID associated with the lock, or by a panel that has "Force Release" enabled.</p> <p>The button definition has no fields to configure. Its legend cannot be changed.</p> |
| Destination Mode | <p>The button places the panel in destination mode. Category selections in destination mode select destination devices. Under the server model, source categories are ignored when the panel is in destination mode.</p> <p>Categories that include both source and destinations appear in both source mode and destination mode.</p> <p>The button definition has no fields to configure.</p> |
| Destination Protect | <p>Sets or removes a "protect" on the current destination device. The protect can be removed only by an operator using a panel that same user ID as the user ID associated with the protect, or by a panel that has "Force Release" enabled.</p> <p>Note: a protect prevents <i>others</i> from routing to a destination; a lock prevents <i>anyone</i>— even the user who issued the lock— from routing to the destination.</p> <p>The button definition has no fields to configure. Its legend cannot be changed.</p> |
| Menu | <p>This button puts the NV9649 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 only if you want the operator to have access to the menu.</p> <p>By pressing certain LCD buttons, the operator makes menu selections and may enter data (such as panel ID) or change LCD brightness values. The LCD button text varies with context in menu mode. See Menu Mode on page 116.</p> |

| Type | Description (under Server Mode) |
|--------------|--|
| Quick Source | <p>A quick source button selects a source and performs an immediate take to the current destination of the NV9649 unless 'the panel option 'Server Panel Destination Remove' is checked in the configuration.</p> <p>When you assign a quick source button, a drop-down menu appears in which you choose a source device. (The 'None' entry is merely a placeholder. Do not choose 'None'.)</p> <p>The button definition section also presents a "level set filter" drop-down list in which you can select a level set to reduce the number of sources through which to browse.</p> <p>The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.</p> |
| Salvo | <p>A salvo button places the panel in salvo mode. In salvo mode, the operator scrolls through the salvo list configured for the panel (as a panel option) to select a salvo. When the desired salvo is selected, the operator presses a 'Take' button to execute the salvo. The panel then returns to normal operating mode.</p> <p>The button definition has no fields to configure.</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>The source selected by a source button is preset to be take to the current destination of the NV9649. (No takes can occur at the NV9649 if the panel option 'Server Panel Destination Remove' is checked in the configuration.)</p> <p>When you configure a source button, a drop-down menu appears: 'Source Device'. Choose a device from the list. (The 'None' entry is merely a placeholder. Do not choose 'None'.)</p> <p>The button definition section also presents a "level set filter" drop-down list in which you can select a level set to reduce the number of sources through which to browse.</p> <p>The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.</p> |
| Source Mode | <p>The button places the panel in source mode. Category selection in source mode selects a source device. Under server mode, destination categories are ignored when the panel is in source mode.</p> <p>Categories that include both source and destination devices appear in both source mode and destination mode.</p> <p>The button definition has no fields to configure.</p> |

| Type | Description (under Server Mode) |
|--------------|---|
| Src/Dst Mode | <p>The button toggles between source and destination modes. Category selections in source mode select source devices. Category selections in destination mode select destination devices.</p> <p>Categories that include both source and destination devices appear in both source mode and destination mode.</p> <p>The button definition has no fields to configure.</p> |
| Take | <p>In normal mode, a take button routes the preset source to the selected destination on selected level or levels. (By default, takes are on all levels.)</p> <p>In salvo mode, a take button executes a selected salvo.</p> <p>A take button is disabled (and dark) until it is possible for the operator to execute a take.</p> <p>Configurers should provide the operator a 'Take' button. The button definition has no fields to configure.</p> |
| Take All | <p>The button takes the selected (i.e., preset) source to <i>all</i> NV9648 control units.</p> <p>The button definition has no fields to configure.</p> |
| Undefined | <p>Makes the button undefined and inactive. On the actual panel, it will remain unused (dark).</p> |

Button Functions for LCD XY/MD mode

These are the button types available for NV9649 configurations under the LCD XY/MD model:

| Type | Description (under LCD XY/MD Mode) |
|-----------|--|
| 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> <p>The button definition has no fields to configure. Its legend is arbitrary (except that it is always "Back" when placed on a page by the system).</p> |
| Broadcast | <p>On the machine control level, the button enables a broadcast take to an <i>additional</i> controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the <i>first</i> controlled device.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> <p>A broadcast button is useful in dubbing applications or when a backup (redundant) device is in use. See Broadcast Routes, on page 90.</p> <p>See also the Source Master button, following.</p> |

| Type | Description (under LCD XY/MD Mode) |
|---------------|--|
| Category | <p>Pressing the button displays a category's device list.</p> <p>▲ Note that category buttons in LCD XY/MD mode function differently from category buttons under server mode and NV9609 mode. There are differences in the configuration of these buttons too.</p> <p>When you configure a category button, two drop-down lists 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. The list might span several pages. See Global Navigation on page 76 for further detail. (The suffix page is intended to give the operator a keypad with which to enter device suffixes or indexes.)</p> <p>The button definition section also presents a "level set filter" drop-down list in which you can select a level set to reduce the number of categories through which to browse.</p> <p>The default button text is the category name. You can override the default text.</p> |
| Chop | <p>When a chop function is supported by a router, the button is a toggle that enables and disables rapid switching of the selected destination device between the current source and the preset source. This chop function is used to test system timing.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |
| Clear Preset | <p>Erases preset entries, while leaving the panel in the same mode. We recommend you use this button because it is a "safety" feature.</p> <p>The clear preset button has the side effect of switching off 'Save Preset' mode.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |
| Default State | <p>Returns the panel to its most recent power-up state. That is called the <i>default state</i>.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |

| Type | Description (under LCD XY/MD Mode) |
|---------------------|--|
| Destination | <p>Selects a destination.</p> <p>When you configure a destination button, a drop-down menu appears: 'Destination Device'. Choose a device from the list. The 'None' entry is merely a placeholder. Do not choose 'None'.</p> <p>The button definition section also presents a "level set filter" drop-down list in which you can select a level set to reduce the number of sources through which to browse.</p> <p>The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.</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>The button definition has no fields to configure. Its legend cannot be changed.</p> |
| 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>Note: a protect prevents <i>others</i> from routing to a destination; a lock prevents <i>anyone</i>— even the user who issued the lock— from routing to the destination.</p> <p>The button definition has no fields to configure. Its legend cannot be changed.</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> <p>The button definition has no fields to configure. Its legend is arbitrary.</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> |

| Type | Description (under LCD XY/MD Mode) |
|--------------------|---|
| Global Navigate | <p>To the operator, a global navigation button is very much like a navigation button. The difference arises primarily during configuration.</p> <p>During configuration, you must select a previously defined “global navigation” template from the drop-down list provided. The global navigation page is the target of a jump which the button will execute.</p> <p>The template itself may have structure that ordinary button pages have. It can include any button type except additional global navigate buttons. See Global Navigation on page 76.</p> <p>The button legend is arbitrary.</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 Selection Buttons on page 65.)</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</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.</p> <p>The Level Map mode is cancelled when the next normal take is performed involving the selected destinations.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |
| Menu | <p>This button puts the NV9649 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 Menu Mode, on page 116.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</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. Its legend is arbitrary.</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> |

| Type | Description (under LCD XY/MD Mode) |
|-----------------|---|
| Navigate | <p>During operation, a navigate button selects and displays a “target” button page.</p> <p>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 can 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 ‘Edit Navigation Button’ Dialog on page 62 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> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |
| 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> <p>The button definition has no fields to configure.</p> |
| Panel Lock | <p>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.</p> <p>The button definition has no fields to configure. Its legend cannot be changed.</p> |
| Preset Release | <p>Removes locks and protects from preset source devices. This button is not needed if source locks and protects are not used in your system.</p> <p>The button definition has no fields to configure.</p> |
| 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 not restore the previous destination. If the user changed the destination and presses ‘Previous Source’, the take will not restore the previous route.</p> <p>The button definition has no fields to configure.</p> |

| Type | Description (under LCD XY/MD Mode) |
|--------------|---|
| Quick Source | <p>A quick source button selects a source and performs an immediate take.</p> <p>When you assign a quick source button, a drop-down menu appears in which you choose a source device. (The 'None' entry is merely a placeholder. Do not choose 'None!')</p> <p>The button definition section also presents a "level set filter" drop-down list in which you can select a level set to reduce the number of sources through which to browse.</p> <p>The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.</p> |
| Salvo | <p>The button presets a salvo. (Subsequently pressing the 'Take' button actually executes the salvo.)</p> <p>When you assign a Salvo button, a drop-down list appears in which you select a system salvo (previously defined in NV9000-SE Utilities).</p> <p>The 'None' entry is merely a placeholder. Do not choose 'None'.</p> <p>(You can cause the panel to generate salvo buttons automatically using the options of the 'Edit Navigation Button' dialog when you create a navigation button.) See 'Edit Navigation Button' Dialog on page 62.</p> |
| Save Preset | <p>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.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |

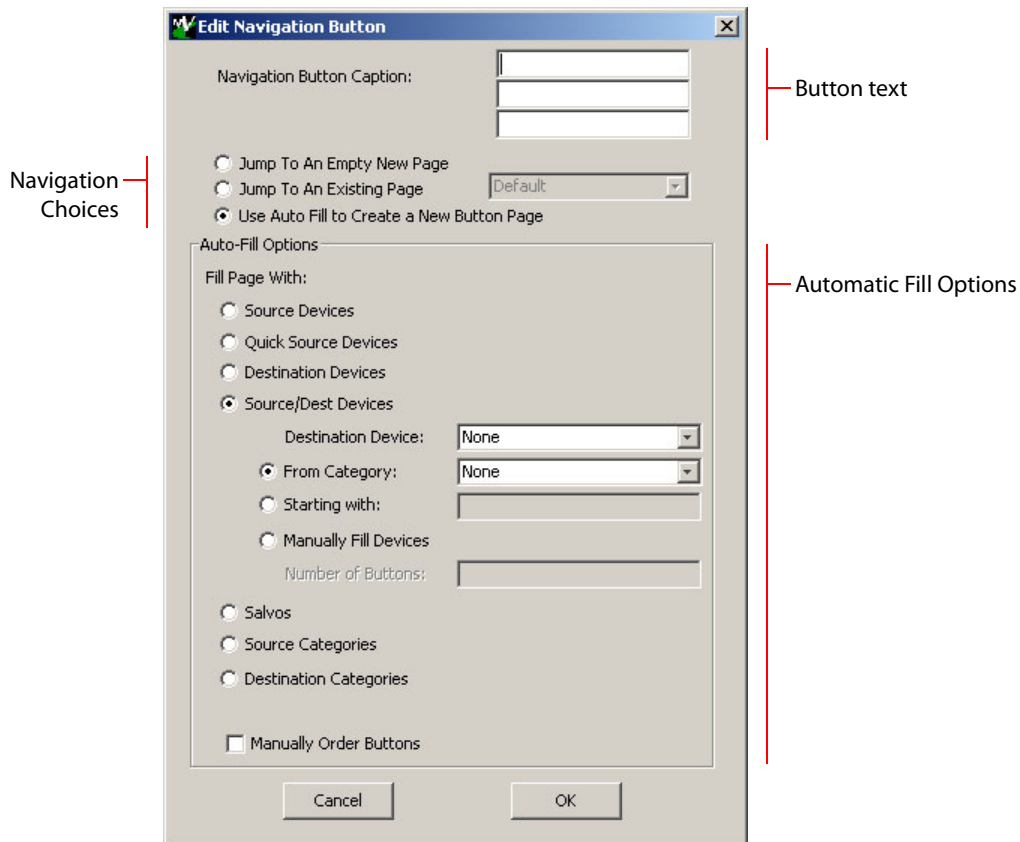
| Type | Description (under LCD XY/MD Mode) |
|-----------|--|
| Selection | <p>Typically, at least one button page should provide a set of selection buttons. Operators press selection buttons to select levels (when the panel is in XY mode) or to select MD devices (in MD mode). Each selection button represents one level or one MD device.</p> <p>You may configure any number of selection buttons (on any button page). The selection buttons can be arranged anywhere on the button page.</p> <p>When there are more levels, or more MD devices, than buttons on a page, the panel enables scrolling. The operator presses 'Page Up' or 'Page Down' to scroll through the levels or MD devices to make selections.</p> <p>See Selection Buttons on page 65 for further detail.</p> <p>During configuration, when you assign a selection button, a drop-down menu appears in the button definition area: 'Display Index'. An 'Edit Multi-Dest Devices' button also appears.</p> <p>The drop-down menu for the button's <i>display index</i> has as many entries as the the number of selection buttons you have defined. Choose consecutive display indexes from 1 to the number of selection buttons on the page.</p> <p>Use the 'Edit Multi-Dest Devices' button to define MD devices. It opens a window in which you can define MD devices. They are assigned to selection buttons in the order in which you define them. See Multi-Destination Configuration, on page 67.</p> <p>▲ You can also obtain the MD device editing window by right-clicking the display area of the panel graphic.</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 configure a source button, a drop-down menu appears: 'Source Device'. Choose a device from the list. (The 'None' entry is merely a placeholder. Do not choose 'None'.)</p> <p>The button definition section also presents a "level set filter" drop-down list in which you can select a level set to reduce the number of sources through which to browse.</p> <p>The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.</p> |

| Type | Description (under LCD XY/MD Mode) |
|------------------------|---|
| 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 Broadcast Routes, on page 90.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</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> <p>When you configure a source/destination button, two drop-down menus appear: ‘Src Device’ and ‘Dst Device’. Choose a device from each list. (You may choose ‘None.’)</p> <p>The button definition section also presents a “level set filter” drop-down list in which you can select a level set to reduce the number of sources through which to browse.</p> <p>The button legend is composed of the source and destination device names, unless you check ‘Use Custom Button Text’ and assign the button your own text.</p> |
| Take | <p>In X-Y mode, a take button switches the preset source device(s) 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> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |
| Undefined | <p>Makes the button undefined and inactive. On the actual panel, it will remain unlit (dark).</p> |

| Type | Description (under LCD XY/MD Mode) |
|------------|---|
| 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.</p> <p>If there is no destination selected, the 'X-Y Display' button says so.</p> <p>The button definition has no fields to configure. Its legend is defined by the system and varies in context.</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> <p>The button definition has no fields to configure. Its legend is defined by the system and varies in context.</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 the navigation button's 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 NV9649 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 list. 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 NV9649 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.

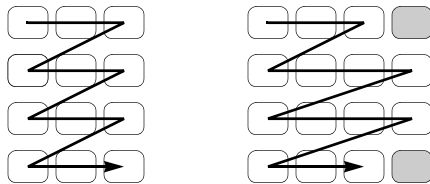
NV9000-SE Utilities creates at least one new button page, filling the page(s) with button functions according to the fill options you specify. Automatic fill has several sub-options:

| | |
|----------------------------|------------------------------|
| Source buttons | Salvo buttons |
| Destination buttons | Source category buttons |
| Source/destination buttons | Destination category 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, but in two sections:



During operation, the navigation button will cause the NV9649 to display the first of the auto-fill pages. The operator uses the 'Page Up' and 'Page Down' buttons to page through the list. These are placed in the right-most column of buttons, and are indicated by gray buttons in the illustration above.

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/Dst 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.

Selection Buttons

- ▲ Selection buttons are available only when the panel is configured under the LCD XY/MD model.

Operators use selection buttons to select *levels* when the panel is in X-Y mode and *MD devices* when the panel is in MD (multi-destination) mode. Selection buttons also provide feedback (e.g., source and destination mnemonics on the face of the buttons) when the operator is performing takes.

A set of selection buttons supports (1) level selection in XY mode and (2) 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 through multiple pages of levels in X-Y mode and through multiple pages of devices in MD mode.

Selection (of levels or MD devices) is affected by 'Hold' mode. 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.

Selection Button Behavior

X-Y Mode

When the panel is in X-Y 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 'Page Up' and 'Page Down' buttons activate and the operator can scroll through the levels.

MD Mode

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

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.

If 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.

- ▲ Note that the maximum number of MD destinations is configured in multiples of 8, from 8 to 512.

Populating the MD Device List

The 'Edit Multi-Destination Device' button appears when you are configuring a selection button. Click this button to get the 'Multi-Destination Entry' window. The window presents a list of all destinations on the left and a set of MD devices at the right. The MD device set is initially empty and becomes populated as you add destination devices from the left. You can add devices in any order. The order is preserved and is the order in which the MD devices appear on the selection buttons under scrolling.

See [Multi-Destination Configuration](#), on page 67.

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.)

Display Indexes

You can configure selection buttons on any of your button pages. During configuration, when you assign a selection button, an additional drop-down menu appears: 'Display Index'.

The drop-down menu for the button's *display index* has as many entries as there are selection buttons. Creating a new selection button creates a new display index.

It is possible but probably wasteful for two or more selection buttons to have the same display index.

Single-Destination "Mode"

The panel, when it is in server mode, is — by definition — a single-destination panel. (The destination is defined as a panel option at configuration.)

- ▲ This does not contradict the idea that the server can assign destinations to its associated NV9648 clients.

The panel, in either LCD XY/MD or NV9609 mode, can be configured as a single-destination panel by defining a default destination during configuration and providing no destination selection buttons.

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

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 includes a 'Page Up' and a 'Page Down' button if the operator will be required to scroll through MD devices.

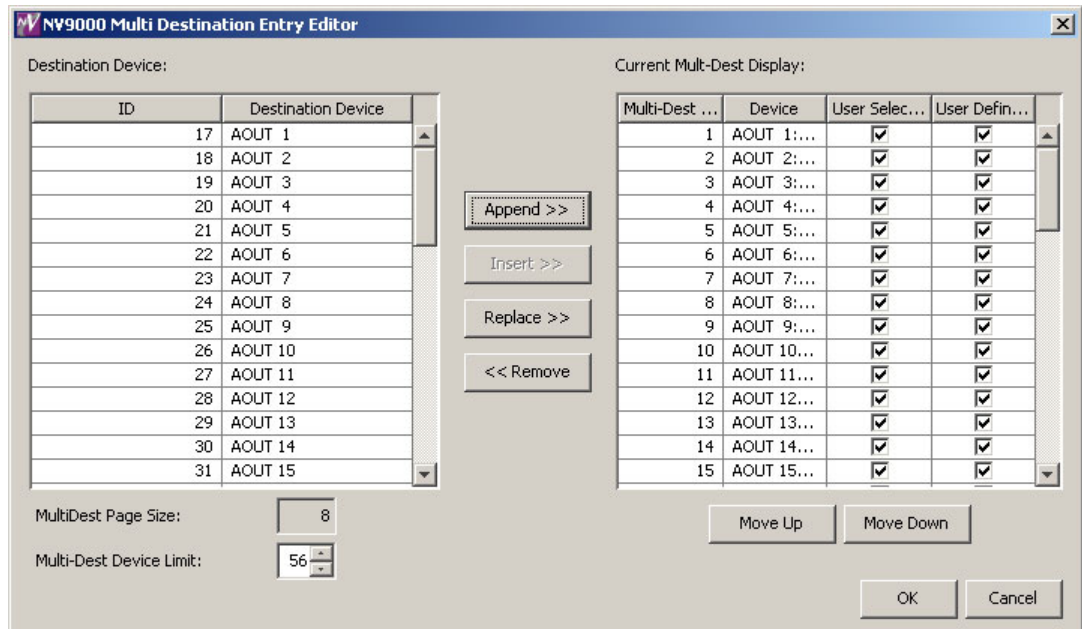
The limit to the number of MD devices is a panel option. If the limit is 64, for example, the display can scroll through 8 pages of 8 rows, regardless of whether these rows have been assigned a destination. Similarly, the operator could scroll through 4 pages of 16 selection buttons.

How to Configure MD Devices

Follow these guidelines.

- 1 Go to the NV9649 configuration page of NV9000-SE Utilities.
- 2 Click any button in the panel image. In the button definition section, choose 'Selection' from the drop-down list.
A 'Display Index' field and an 'Edit Multi-Dest Devices' button appear in the button definition section.

3 Click 'Edit Multi-Dest Devices'. 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 choose a selection button in the panel graphic and click the 'Edit Multi-Dest Devices' button.)

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.

Button Functions for NV9609 Mode

These are the button types available for NV9649 configurations under the NV9609 model:

| Type | Description (under NV9609 Mode) |
|-----------|---|
| Broadcast | <p>On the data (machine control) level, the button enables a broadcast take to an <i>additional</i> controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the <i>first</i> controlled device.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> <p>A broadcast button is useful in dubbing applications or when a backup (redundant) device is in use. See Broadcast Routes, on page 90.</p> <p>See also the Source Master button, following.</p> |

| Type | Description (under NV9609 Mode) |
|----------|---|
| Category | <p>The button selects a device category. The button can operate in source mode or destination mode. (Source category buttons operate in level mode; destination category buttons do not.)</p> <p>During configuration, you can specify a source category for the button, a destination category, and a suffix. Any of those fields can be 'None'. When the field is 'None', the button is inapplicable in that context.</p> <p>Thus, when the panel is in source mode, category buttons that are not configured with a source category become disabled. When the panel is in destination mode, category buttons that are not configured with a destination category become disabled. Category buttons configured with both source and destination categories are available in either mode. Category buttons that have only a suffix configured are disabled until a category becomes selected.</p> <p>After a category button has been pressed, the operator must then press number or suffix buttons to perform a device selection within the category. The operator may also use the knob to select devices within the category.</p> <p>When the panel is in source mode, pressing a category button places the category mnemonic in the 'Preset' display. As the operator enters suffixes to select a source, the name of a source constructed from the category name and suffixes thus far entered appears in the 'Preset' field.</p> <p>When the panel is in destination mode, pressing a category button places the category mnemonic in the 'Preset' display. As the operator enters suffixes to select a destination, the suffixes are appended to the contents of the 'Preset' field, and the name of a destination constructed from the category name and suffixes thus far entered appears in the 'Destination' field.</p> <p>If you want your panel to have a keypad, you must use category buttons to implement the keypad. Any particular category button can represent 3 items: a source category, a destination category, and a suffix (which is typically numeric).</p> <p>The names of devices in categories are composed of the category name followed by one or more suffices. (Device names are limited to 8 characters, however.)</p> <p>NV9000-SE Utilities allows configurers to designate a separator character which is inserted between the parts of the device name.</p> <p>▲ Note that category buttons in NV9609 mode function differently from category buttons under LCD XY/MD mode and server mode. There are differences in the configuration of these buttons too.</p> |
| Chop | <p>When a chop function is supported by a router, the button is a toggle that enables and disables rapid switching of the selected destination device between the current source and the preset source. This chop function is used to test system timing.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |

| Type | Description (under NV9609 Mode) |
|------------------|---|
| Clear | <p>The button reverts to the most recent preset. You may think of this as a “backspace key.” It erases the suffixes you entered under category select in reverse order.</p> <p>(If the operator is in level mode, or in salvo mode, ‘Clear’ brings the panel back to normal mode.)</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |
| Destination | <p>The button selects a destination. The destination name appears in the ‘Destination’ display. The destination is the target of an upcoming take, which will route a source to that destination.</p> <p>Pressing a destination button has two side effects: it clears — or partially clears — the ‘Preset’ display, and (2) it turns off the ‘Take’ button if it is on.</p> <p>When you configure a destination button, a drop-down menu appears: ‘Destination Device’. Choose a device from the list. The ‘None’ entry is merely a placeholder. Do not choose ‘None’.</p> <p>The button definition section also presents a “level set filter” drop-down list in which you can select a level set to reduce the number of sources through which to browse.</p> <p>The button legend is the source name, unless you check ‘Use Custom Button Text’ and assign the button your own text.</p> |
| Destination Lock | <p>The button sets or removes a “lock” on the current destination device. The lock can be removed only by the user that originally set the lock, or by a panel that has “Force Release” enabled.</p> <p>The button definition has no fields to configure. Its legend cannot be changed.</p> <p>The NV9649 provides no explicit indication, during operation, whether a destination is locked or unlocked.</p> |
| Destination Mode | <p>The button places the panel in destination mode. Category selections in destination mode select destination devices. Category buttons that are not configured with destination categories become disabled.</p> <p>Categories that include both source and destinations appear in both source mode and destination mode.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |

| Type | Description (under NV9609 Mode) |
|---------------------|--|
| Destination Protect | <p>The button sets or removes a “protect” on the current destination device. The protect can be removed only by the user that originally set the protect, or by a panel that has “Force Release” enabled.</p> <p>Note: a protect prevents <i>others</i> from routing to a destination; a lock prevents <i>anyone</i>— even the user who issued the lock— from routing to the destination.</p> <p>The button definition has no fields to configure. Its legend cannot be changed.</p> <p>The NV9649 provides no explicit indication, during operation, whether a destination is locked or unlocked.</p> |
| Free Source | <p>The button selects a pre-defined phantom device that can be used to release or “free” devices on the data (machine control) level. A free source is also used with tielines to free the tieline for others to use. The free source is defined in the <i>Level Set Details</i> page of NV9000-SE Utilities.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |
| Level | <p>The button selects a level.</p> <p>The button definition has one field to configure: the level.</p> <p>If the panel has multiple level buttons, operators can select multiple levels. When all level buttons are selected, a take is “all-level.” When one or more level buttons are selected, a take occurs on those levels. (If a panel has a level button for all levels of the current destination, and they are all selected, that condition would be “all level” too.)</p> <p>You must select levels before selecting the source, otherwise multi-level takes do not work. They are all level.</p> <p>(Multi-level takes — and level buttons — are not available in <i>level mode</i>.)</p> <p>Operators that want to examine the levels of a destination may press ‘Level Mode’ and scroll through the levels. The ‘Status’ display shows the source for each individual level as you scroll and shows whether the source is a breakaway source.</p> |
| Level Mode | <p>The button toggles the panel in and out of level mode. “All Level” appears in the ‘Info’ display when level mode is off.</p> <p>Level mode allows operators (1) to examine the levels of the current destination and (2) to perform single-level takes.</p> <p>Source buttons and destination buttons, and some other button types, are disabled in level mode. The only means to select a source are source category buttons.</p> <p>The operator must start the selection of a source (using a category button) while in level mode for single-level breakaway. The panel exits level mode when the operator starts the source selection. The level chosen in level mode remains in effect for the take.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |

| Type | Description (under NV9609 Mode) |
|-----------------|--|
| Menu | <p>This button puts the NV9649 panel in menu mode and displays a menu on the buttons that provides access to a variety of panel functions. Without the button, the operator has no access to the menu functions.</p> <p>By pressing certain buttons, the operator makes menu selections and may enter data (such as panel ID) or change brightness values. When the panel is in menu mode, the menu button cycles through the functions of the menu. See Menu Mode on page 116.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</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. Its legend is arbitrary.</p> <p>If the default name set is the system name set, the button would be a no-op. Therefore configurers should not create a 'Name Set Toggle' button if the default name set is 'System Names'.</p> <p>The status, preset, or destination displays use the active name set—either the default name set (aliases) or the system name set. However, that when the panel is displaying aliases, and a device does not have an alias, the panel displays the system name.</p> |
| Page Down | <p>The button scrolls <i>down</i>.</p> <p>Scrolling devices within a category: 'Page Down' moves to the next <i>lower</i> device in the category's device list. (Example: if the current device is CAM_4, the next lower device would probably be CAM_3, subject to the device definitions in the NV9000 configuration.) Scrolling devices is possibly only when a category selection is in progress. Whether the list wraps around at the beginning or end is governed by the 'Use Continuous Scrolling' panel option.</p> <p>Scrolling salvos in salvo mode: 'Page Down' moves to the salvo with the next <i>lower</i> index in the salvo list. A valid salvo list must have been specified in the panel options.</p> <p>Scrolling levels in level mode: 'Page Down' moves first to "All levels" and then to the first level and then to the <i>next</i> levels defined for the destination. Using the 'Page Down' button, an operator can cycle through all the levels (including "All Levels") indefinitely.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |

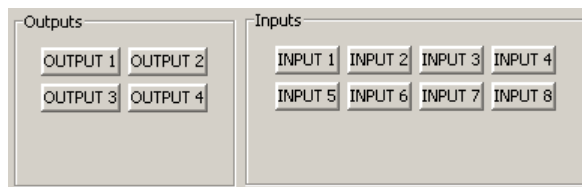
| Type | Description (under NV9609 Mode) |
|-----------------|--|
| Page Up | <p>The button scrolls <i>up</i>.</p> <p>Scrolling devices within a category: 'Page Up' moves to the next <i>higher</i> device in the category's device list. (Example: if the current device is VTR_12, the next higher device would probably be VTR_13, subject to the device definitions in the NV9000 configuration.) Scrolling devices is possibly only when a category selection is in progress. Whether the list wraps around at the beginning or end is governed by the 'Use Continuous Scrolling' panel option.</p> <p>Scrolling salvos in salvo mode: 'Page Up' moves to the salvo with the next <i>higher</i> index in the salvo list. A valid salvo list must have been specified in the panel options.</p> <p>Scrolling levels in level mode: 'Page Up' moves first to "All levels" and then to the last level and then to <i>previous</i> levels defined for the destination. Using the 'Page Up' button, an operator can cycle through all the levels (including "All Levels") indefinitely.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |
| Panel Lock | <p>The button prevents accidental changes to the panel settings, especially router crosspoints. When the panel is locked, the button array becomes blank except for the Panel Lock button which becomes high tally amber. Pressing the panel lock button again reverts the panel to its previous state.</p> <p>The button definition has no fields to configure. Its legend cannot be changed.</p> |
| Previous Source | <p>The button presets the previously routed source to the currently selected destination. The operator must next press 'Take' to restore the previous route. This function is useful when an operator makes a route in error.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> <p>The button does not 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.</p> <p>When you assign a quick source button, a drop-down menu appears in which you choose a source device. (The 'None' entry is merely a placeholder. Do not choose 'None'.)</p> <p>The button definition section also presents a "level set filter" drop-down list in which you can select a level set to reduce the number of sources through which to browse.</p> <p>The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.</p> |

| Type | Description (under NV9609 Mode) |
|---------------|--|
| Salvo | <p>A salvo button places the panel in salvo mode. In salvo mode, the operator scrolls through the salvo list configured for the panel (as a panel option) to select a salvo. When the desired salvo is selected, the operator presses a 'Take' button to execute the salvo. The panel then returns to normal operating mode.</p> <p>The button definition has no fields to configure.</p> |
| Source | <p>The button selects a source. The source name appears in the 'Preset' display. During configuration, when you assign a source button, a drop-down menu appears: 'Source Device'. Choose a device from the list. The 'None' entry is merely a placeholder. Do not choose 'None'.</p> <p>The button definition section also presents a "level set filter" drop-down list in which you can select a level set to reduce the number of sources through which to browse.</p> <p>The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.</p> |
| Source Master | <p>Means "source is the master" and makes the source device the master. Otherwise, the destination is the master. This button (and these concepts) apply only to machine control routes.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> <p>The button is a toggle: Press it once to make the source the master (it goes high-tally); press it again to make the destination the master (the button is low-tally).</p> <p>A panel option allows you to make "source is master" the default. In this case, the button still toggles between "source is master" and "destination is master," and the button, if present, is high-tally by default.</p> <p>The 'Source is Master' button is also used to initiate "broadcast" machine control routes. See Broadcast Routes, on page 90.</p> |
| Source Mode | <p>The button places the panel in source mode. Category selections in source mode select source devices. Category buttons that are not source categories become disabled in source mode.</p> <p>Categories that include both source and destinations appear in both source mode and destination mode.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |
| Src/Dst Mode | <p>The button toggles between source and destination modes. Category selections in source mode select source devices. Category selections in destination mode select destination devices.</p> <p>The button definition has no fields to configure. Its legend is arbitrary.</p> |

| Type | Description (under NV9609 Mode) |
|-----------|---|
| Take | <p>In normal mode, a take button routes the preset source to the selected destination on selected level or levels.</p> <p>In salvo mode, a take button executes a selected salvo.</p> <p>A take button is disabled (and dark) until it is possible for the operator to execute a take.</p> <p>Configurers should provide the operator a 'Take' button. The button definition has no fields to configure. Its legend is arbitrary.</p> |
| Undefined | <p>This button type is a placeholder: during configuration, it makes the button undefined and inactive. On the actual panel, the undefined button remains unlit (dark).</p> |

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 NV9649 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 129.

Global Navigation

NV9000-SE Utilities supports what are known as “global navigation” pages for NV9649 control panels. Global navigation pages are templates — patterns — that may be used and reused in the creation of NV9649 configurations.

▲ Global navigation pages are allowed only under the LCD XY/MD model.

There are two types of global navigation pages: ‘Suffix’ and ‘Navigate’. A navigate template may define a single button page or an entire subtree of pages. A suffix template is a single page only. The buttons allowed in a suffix template are a small subset of the buttons supported by NV9649 configurations. Navigate templates support all functions except ‘Global Navigate’. That is because templates cannot be nested.

Templates themselves are **not** NV9649 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 NV9649. Specify a panel ID, a name, and choose 'New' in the options section.
- 3 Rather than click the 'Next' or 'Finish' button, click the 'Suffix' or 'Navigate' button. Doing so creates a global navigation page of the appropriate type.

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

- ▲ Global suffix pages under the LCD XY/MD model have no relationship to the suffix pages used by category pages under the 'Panel Server' model.

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 | 6492 | Demo649 | NV9649 | \nvision\envy\usersys\live\D642.649 |
| 25 | 6493 | SFx649 | NV9649 Suffix | \nvision\envy\usersys\live\S64.649.suffix |
| 26 | 6494 | Gnav649 | NV9649 Navigation | \nvision\envy\usersys\live\G64.649.navigate |

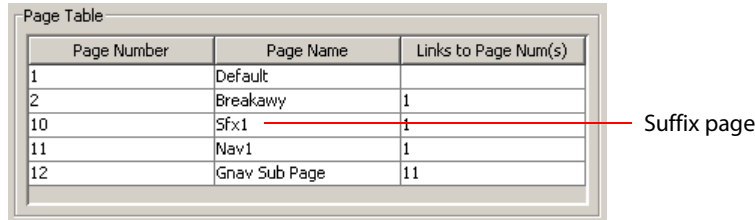
The words "Navigate" and "Suffix" appear in the 'Panel Type' and 'Configuration Name' columns.

Referencing a Suffix Template

Suffix pages can be accessed through 'Category' buttons.

When you create a 'Category' button (under LCD XY/MD mode), the button definition 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 your defined 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 | Breakaway | 1 |
| 10 | Sfx:1 | 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.

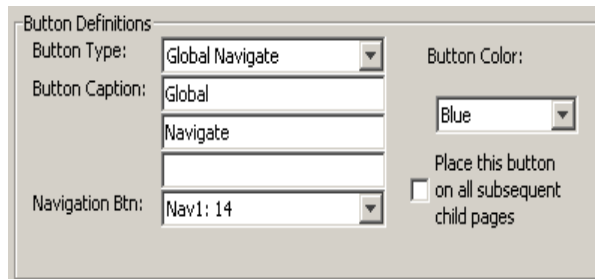
The same suffix template can be used for both source and destination categories.

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 Navigate Template

Navigate pages can be 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 navigate template 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 | Sfx:1 | 1 |
| 11 | Nav1 | 1 |
| 12 | Gnav Sub Page | 11 |

Global navigation page(s)

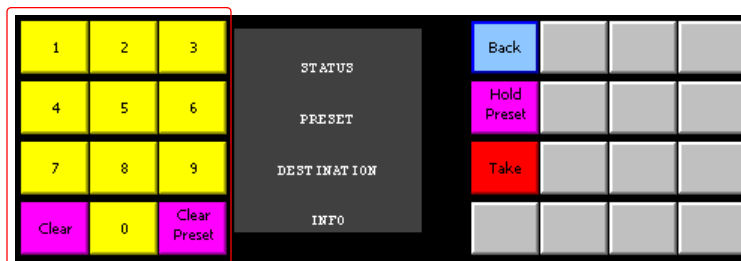
- ▲ The global navigation pages are copies made from the navigate template. They are not the template or a link to the template. The 'Global Navigate' buttons in the panel configuration that reference a navigate template do have links to their templates.

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 a navigation 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:



Keypad

The keypad itself consists of 'Category' buttons. On a suffix page, a "category button" simply places a numeral or a suffix on the suffix template. When the operator presses a numeral or a suffix, the numeral or suffix is appended to the mnemonic of the device being identified for selection.

- ▲ Certain numerals become disabled when 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 needed.

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

The operator can use a 'Clear' button to erase a mistakenly entered digit.

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 can see the entries in the list) you will probably want to click 'Push changes to panel configs' on the configuration page. When you do, the configuration software adjusts all NV9649 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 Navigate Templates

Composing a 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: 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 navigate 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 navigate template.

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

5 Operation

Chapter 5 provides instructions for the NV9649 control panel.

Summary

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This chapter is intended specifically for the NV9649 panel **operator**.

Summary

As an NV9649 operator, you will be confronted initially with a relatively small and simple panel— 28 buttons, four 8-character displays, and a knob (that you can rotate and push).

The panel can operate according to 3 behavioral models (or operating modes):

- Server mode.
The NV9649 (the “server”) operates in conjunction with a number of NV9649s (which are the “clients”).
- NV9609 mode.
The panel operates almost exactly like an NV9609.
- LCD XY/MD mode.
The panel has a hierarchical (tree-like) structure of button “pages”. You can switch at any time between “X-Y mode” (in which you can select individual levels for a take) to MD (multi-destination) mode where you can perform many simultaneous takes that are all-level.

Communicate with your system administrator (or whoever designed the control system or configured its control panels) to understand the model in which the panel was configured and how it operates.

- ▲ If your panel operates under the server model, it will operate in conjunction with a number of NV9649s (the “clients”). You will need to understand how to operate the NV9649s as well.
- ▲ 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.

Buttons and Button Legends

Each of the NV9649's 28 LCD buttons has 1, 2, or 3 lines of text, 8 characters per line. When there are one or two lines of text, the characters are large; when there are 3 lines of text, the characters are smaller. (One or all of the lines of text might be blank). The buttons can display one of seven colors dynamically: nominally red, green, blue, purple, amber, yellow, or grey. We say a button is "dark" when its LCD is turned off.

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 141, for a color chart.

The panel's LCD XY/MD behavioral model supports a hierarchical (or tree-structured) set of button pages. Although one can see a list of the pages in the tree during configuration, the structure of the tree is not evident on the panel itself. You, the panel operator, must commit some or all of 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.

Under the LCD XY/MD model, 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 "Page Down" button and a "Page Up" button if there are more sources than buttons. Pressing the 'Page Down' button takes you to the next page of sources. Pressing the 'Page Up' 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 up or down, respectively. By default, an XY/MD button turns green for X-Y mode and amber for multi-destination mode.

The LCD buttons display a menu if the operator presses a menu button. When the operator make a menu selection, the panel displays viewable data 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.

Under the XY/MD model, the panel will probably have 'Selection' buttons. In X-Y mode, selection buttons report the preset source, current source, and the levels for the current destination. In multi-destination (MD) mode, selection buttons report the preset source, current source, and destination device.

A reverse field (light letters on a dark background) indicates that a breakaway exists or that level mapping has been performed on a source.

The user interface of an NV9649 in one installation can be radically different from the user interface of an NV9649 in another installation.

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.

Behavioral Models

The panel can operate according to 3 behavioral models (or operating modes):

- Server mode.
- NV9609 mode.
- 'LCD XY/MD' mode.

Your panel will operate in only one of these modes. It is not possible to change modes except by reconfiguration. It is not likely that your panel will be reconfigured often.

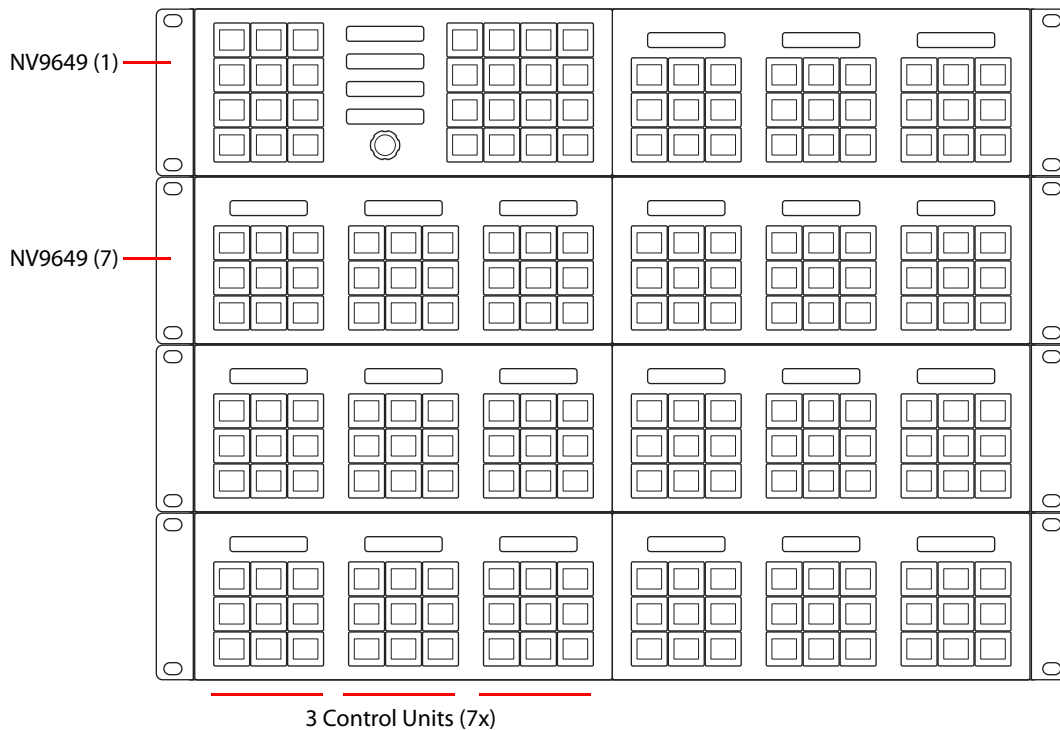
'Panel Server' Mode

When the panel is in "server" mode, it operates in conjunction with a number of NV9649s. The NV9649 is the "server" and the NV9649s are the "clients." The NV9649 and the NV9649s combine to form, in essence, a larger panel — actually a cluster of many small control units. The NV9649, being the server, can control which sources and destinations the NV9649s can select.

Each NV9649 has 3 identical sections and each section functions as a complete and separate control unit, unrelated to any other NV9649 section. Each section controls a destination you choose at the NV9649. The section's display usually shows that destination.

The NV9649 can also assign sources to the source buttons of individual NV9649 control units.

Here is an example of a system with an NV9649 and 7 NV9649 clients:



In this example, there are 21 control sections in addition to the controls of the NV9649. At any moment, the operator can route to 21 destinations. You can assign different

destinations to the control units at any time. The function buttons in each individual control unit apply only to the destination assigned to the unit.

Saved Client Assignments

Every time an operator assigns a destination to an NV9649 client or assigns a source to a source button of a client, those assignments are recorded within the NV9000 system controller. Therefore, if and when the system controller undergoes a power cycle, the source and destination assignments of all the NV9649 clients are preserved.

The NV9649 can be configured so that up to 12 different sets of client assignments (or “set-ups” as they are called in the NV9649’s menu) can be defined, selected, redefined, and otherwise managed as different operators choose.

A NV9649 always has a default setup and may have eleven other named setups.

Button Functions

There are 17 button function types for a panel in server mode (not counting ‘Undefined’):

| | | | |
|---------------------|-------------|------------------|------------------|
| Assign | Broadcast | Category | Chop |
| Clear | Destination | Destination Lock | Destination Mode |
| Destination Protect | Menu | Quick Source | Salvo |
| Source | Source Mode | Src/Dst Mode | Take |
| Take All | | | |

These are described in [Buttons for the Server Model](#), on page 92. See [Operating Methods](#), on page 112 for how to assign sources and destinations to the NV9649 control units.

Please refer to the *NV9649 Users Guide* for information regarding the use of the NV9649.

'NV9609 Panel' Mode

When the panel is in “NV9609” mode, it functions exactly like an NV9609, but with buttons that have LCD legends instead of simple backlit buttons.

In this mode, the panel operates standalone, without regard to any NV9649s.

Please refer to the *NV9609 Users Guide* for additional information.

There are 24 button function types for a panel in NV9609 mode (not counting ‘Undefined’):

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

These are described in [Buttons for the NV9609 Model](#), on page 105.

LCD XY/MD Model

When the panel is in LCD XY/MD mode, it operates standalone, without regard to any NV9649s, and has a moderately richer function set than a panel in the other two modes.

The panel's buttons can be used in a hierarchical fashion: pressing a 'navigation' button causes the panel to display a new set of configured button functions, called a "button page." There can be many such pages, organized in a configurable tree structure.

You can switch the panel between "X-Y mode" and multi-destination (MD) mode. In X-Y mode, you can perform takes (and locks) on individually selected levels for a single destination at a time. In MD mode, takes occur on all levels, but you can perform takes to multiple destinations simultaneously.

The panel supports the use of multiple 'selection' buttons. When the panel is in X-Y mode, the selection buttons select levels. When the panel is in MD mode, the selection buttons select MD devices (which are destinations). If there are more levels (or more MD devices) than there are selection buttons, you can press a 'Page Up' or 'Page Down' button to scroll through the list of levels (or, in MD mode, the list of MD devices).

There are 31 button function types for a panel in LCD XY/MD mode (not counting 'Undefined'):

| | | |
|--------------------|------------------|---------------------|
| Back | Broadcast | Category |
| Chop | Clear Preset | Default State |
| Destination | Destination Lock | Destination Protect |
| Free Source | Global Navigate | Hold |
| Level Map | Menu | Name Set Toggle |
| Navigate | Page Down | Page Up |
| Panel Lock | Preset Release | Previous Source |
| Quick Source | Salvo | Save Preset |
| Selection | Source | Source Master |
| Source/Destination | Take | X-Y Display |
| XY/MD Mode | | |

These are described in [Buttons for the LCD XY/MD Model](#), on page 96.

Additional Modes

Level Mode

When the panel is operating under the NV9609 model, operators can switch the panel in and out of *level mode* (if the panel has a 'Level Mode' button). Level mode allows you to select one of the destination's levels (by scrolling). A take in level mode is a single-level breakaway.

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

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

Secondary Modes

Additional but secondary modes of panel operation are:

- Setup mode—where the NV9649 is freshly powered up, but disconnected from the network. In this mode, you can preset the NV9649's panel ID and perform a few diagnostic tasks.
- Salvo mode—pressing a salvo button places the NV9649 in salvo mode, where it is expected that the operator will choose a salvo and then press a 'Take' button to execute a salvo. (The duration of a salvo is indeterminate, but usually short.)
- Menu mode—pressing a menu button places the NV9649 in "menu" mode. In menu mode, the buttons lose their normal functions and become part of a menu that changes as needed during menu operation. (Menu mode is not available under the server model.)

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

Special Modes

When the panel is in server mode or NV9609 mode, two additional modes can be applied:

- Source mode—when the operator places the panel in source mode, category buttons produce source lists and, under server mode only, operations involving NV9649s refer to sources.
- Destination mode—when the operator places the panel in destination mode, category buttons produce destination lists and, under server mode only, operations involving NV9649s refer to destinations.

When the panel is in LCD XY/MD mode, one additional mode can be applied:

- Hold mode—when the operator has pressed a 'Hold Preset' button. See [Selection Buttons](#), on page 65.

Operating Concepts

Saved Client Assignments

Every time an operator assigns a destination to an NV9649 client or assigns a source to a source button of a client, those assignments are recorded within the NV9000 system controller. Therefore, if and when the system undergoes a power cycle, the assignments made for all the NV9649 clients are preserved. The typical NV9649-NV9649 configuration has multiple NV9649s. The source and destination assignments of *all* the NV9649 clients of the NV9649 are a "set of client assignments."

A set of client assignments is called a "setup."

The panel can be configured so that it will allow up to 12 different "setups." One setup is always present and is the default setup. The other 11 setups are optional. Configurers and operators can collaborate on exactly how these 12 setups are used. For instance, different setups can be assigned to different operators or perhaps be used at different times of the day.

It is in the panel's 'Manage Config' sub-menu (if the panel has a menu button) that an operator can select one of the defined setups. This sub-menu uses the 12 buttons at the left side of the panel. The upper left button is always reserved for the default setup. Some of the other 11 buttons might be blank.

Operators may press the 'Recall Set-Up' button to activate one of the available setups.

Operators may press the 'Clear Set-Up' button to revert one of the available setups to its originally configured condition. That is, the clients revert to the sources and destinations defined for them in the NV9000 configuration, as specified in NV9000-SE Utilities.

Operators may press the 'Save Set-Up' button to save the current setup as one of the named setups, overwriting the previous assignments of that named setup.

- ▲ Whenever you recall, save, or clear any named setup, that setup becomes the *current* setup. Subsequent source and destination assignments are recorded in the current setup and other setups are not affected.

See [Menus under the Server Model](#), on page 116 for further detail.

Levels

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

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

Levels are usually called "virtual levels" in NV9000-SE Utilities.

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

Breakaway

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

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

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

Level Mode

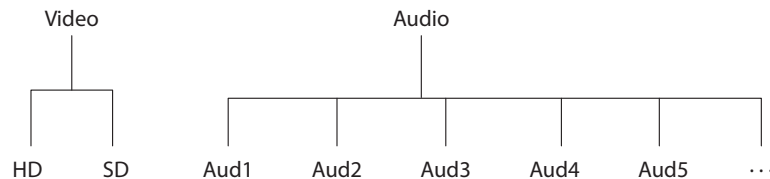
As stated earlier, you can switch the panel in and out of level mode (if the panel has a 'Level Mode' button). Level mode allows you to select exactly one of the destination's levels (by scrolling). A take in level mode is a *single-level breakaway*.

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

- ▲ Level mode is available only under the NV9609 model.

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 "Audx" 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.

- ▲ If you have chosen a destination whose basic levels are grouped, the panel's selection buttons show only the basic level names. (Other panels can show level group names.)

We discuss level groups — a feature of the router control system — only to state that the NV9649 does **not** have support for level groups.

Hold

Under the LCD XY/MD model, 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.

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.

NV9649 category buttons can represent a source category or a destination category. When you press a category button to begin device selection, the panel displays a list of all devices in that category. You can scroll through multiple pages of devices using 'Page Up' and 'Page Down' buttons to find the device you want.

You can also use the panel's knob to perform device selection by category. The panel will be in either source mode or destination mode. Turning the knob scrolls through categories. Pressing the knob selects the category displayed in the 'Preset' display. When you press the knob, the panel allows you use the knob to scroll through devices within the selected category or to append suffixes to the category mnemonic, using a "keypad," to form the desired device name. The device so named becomes the selected device.

The knob is used only when the panel is operating under the 'Panel Server' model.

See [Procedure H — Perform Device Selection by Category List](#), on page 114

See [Procedure I — Perform Device Selection using Category Pages](#), on page 115.

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 NV9649 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

A "take" is a route as it is being performed.

In X-Y mode, a take can be a route from one source, on all levels, to a destination or it can be a router from multiple sources, on different levels, to a destination.

In MD mode, a take is (1) a route of a source to a destination on all levels or (2) several such routes executed simultaneously.

A take can occur in 4 ways:

- You have selected a destination and then a source. A 'Take' button lights and you press the 'Take' button.
 - You have selected a destination and press a 'Quick Source' button (or a 'Src/Dst' button). The take occurs immediately.
 - There is a default destination (or a destination assigned by an NV9649) and you select a source. A 'Take' button lights and you press the 'Take' button.
 - There is a default destination (or a destination assigned by an NV9649) and you press a 'Quick Source' button (or a 'Src/Dst' button). The take occurs immediately.
- ▲ Immediate takes on 'Src/Dst buttons' is a panel option that can be enabled or disabled.

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. 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:

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

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

- ▲ The panel might use a name set. The panel option is available only under the LCD XY/MD model. You cannot switch between the specified name set and the default name set.

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). These options govern what happens when a source or destination device is to be used.

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 display displays the message "Control 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 Examine the display and the take button.
- 4 If the display shows “Control in Use” and 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’.

Button Functions

The NV9649 has 3 behavioral models. The sets of button functions differ in the 3 models.

Buttons for the Server Model

There are 17 button function types for a panel in server mode (not counting ‘Undefined’):

| | | | |
|-------------------------------------|-----------------------------|----------------------------------|----------------------------------|
| Assign | Broadcast | Category | Chop |
| Clear | Destination | Destination Lock | Destination Mode |
| Destination Protect | Menu | Quick Source | Salvo |
| Source | Source Mode | Src/Dst Mode | Take |
| Take All | | | |

Assign

When the panel is in destination mode, the button begins the assignment of a selected destination to an NV9649 control unit.

When the panel is in source mode, the button begins the assignment of a selected source to a source button of an NV9649 control unit.

See [Operating Methods](#), on page 112 for detail.

- ▲ Destinations and sources assigned with this function are preserved (in the system controller) even when power fails. Destination and source assignments can be grouped into different sets to be used perhaps by different users or at different times of the day, or for any reason.

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 90 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

Each category button represents 3 items: a source category, a destination category, and a device suffix (or a numerical index).

A category button displays 2 lines of text: (1) either the source category name when the panel is in source mode, or the destination category name when the panel is in destination mode, and (2) its suffix text. If the button has no suffix text, the second line shows dashes.

When you first press a category button, the category mnemonic appears in the 'Preset' display. After the category is thus selected, you use a keypad (which is a button array) to enter the device index within the category. (The keypad is a set of category buttons to which indexes or suffixes have been assigned.)

(Typically the category buttons are arranged to form a keypad on your panel in which the digits or suffixes are logically arranged.)

Pressing a category button when the panel is in source mode starts the "construction" of a source device name. Pressing a category button when the panel is in destination mode starts the construction of a destination name.

- ▲ Note that category buttons in server mode function differently from category buttons under LCD XY/MD mode and NV9609 mode. There are differences in the configuration of these buttons too.
- ▲ The names of devices in categories are composed of the category name followed by one or more suffixes. NV9000-SE Utilities allows configurers to designate a separator character which is inserted between the parts of the device name. (Device names are limited to 8 characters, however.)
- ▲ You can also perform device selection either by category list or by category pages using the panel's knob. See [Procedure H — Perform Device Selection by Category List](#), on page 114 and [Procedure I — Perform Device Selection using Category Pages](#), on page 115.

Chop

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

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

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

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

Clear

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

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

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

Destination

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

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

Destination Lock

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

- ▲ The NV9649 provides no explicit indication, during operation, whether a destination is locked or unlocked.

Destination Mode

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

When the panel is in destination mode, you can assign a destination to a control unit of an associated NV9649. See [Operating Methods](#), on page 112.

Destination devices are represented on the ‘Destination’ display.

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 NV9649 provides no explicit indication, during operation, whether a destination is locked or unlocked.

Menu

A 'Menu' button gives operators or administrators access to information about the panel (such as its panel ID or software version numbers) and lets operators manage client "setups." See [Saved Client Assignments](#), on page 86.

See [Menu Mode](#), on page 116 for details on menu operation.

Quick Source

A quick source button selects a source and performs an immediate take (to the destination of the control unit in which the quick source button is located).

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

The salvo button places the panel in salvo mode. In salvo mode, you can the knob to select a salvo from the salvo list configured for the panel (as a panel option). When the desired salvo is selected, press a 'Take' button to execute the salvo. The panel then returns to normal operating mode.

You can also press 'Page Up' and 'Page Down' buttons to browse through the salvo list.

Pressing a button other than 'Take', 'Page Up', or 'Page Down' returns to its normal operating mode.

Source

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

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

Source Mode

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

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

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

Src/Dst Mode

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

Take

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

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

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

Take All

Use the 'Take All' button to take a source you have selected to the destinations of *all* the NV9649 control units.

Undefined

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

(Other buttons, temporarily disabled, might also appear dark. They are not necessarily undefined.)

Buttons for the LCD XY/MD Model

There are 31 button function types for a panel in LCD XY/MD mode (not counting 'Undefined'):

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

Back

Redisplay the previous button page. (The previous button page becomes 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 it is for back buttons generated automatically for lists. A back button is never high-tally.

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 90 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

Each category button represents (1) either a source category or a destination category, and (2) a device suffix (or a numerical index).

A category button displays 2 lines of text: (1) a source category name when the panel is in source mode or a destination category name when the panel is in destination mode, and (2) its suffix text. If the button has no suffix text, the second line shows dashes.

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

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

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

When the panel is in source mode, category buttons that are not configured with a source category become disabled. When the panel is in destination mode, category buttons that are not configured with a destination category become disabled. Category buttons configured with both source and destination categories are available in either mode. Category buttons that have only a suffix configured are disabled until a category becomes selected and the set of device names in the category include the digit or suffix on the button. If, for example, the devices in the category number from 1 to 7, buttons for the digits 8 and 9 will be disabled.

A typical NV9649 configuration has a "keypad" — possibly on a suffix page — with which you can enter device indexes or suffixes. Keypad buttons are actually category buttons. Any keypad button can also be a source category button and a destination category button.

▲ Note that category buttons in server mode function differently from category buttons under LCD XY/MD mode and NV9609 mode. There are differences in the configuration of these buttons too.

- ▲ The names of devices in categories are composed of the category name followed by one or more suffixes. NV9000-SE Utilities allows configurers to designate a separator character which is inserted between the parts of the device name. (Device names are limited to 8 characters, however.)
- ▲ You cannot perform a name set change using a 'Nameset Toggle' button while a category selection is in progress.

Chop

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

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

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

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

Clear Preset

The 'Clear Preset' button removes any preset entries.

The default button text is "Clear Preset" but the button might have any legend.

Default State

This button returns the NV9649 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 might have any legend.

Destination

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

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

Destination Lock

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

- ▲ The NV9649 provides no explicit indication, during operation, whether a destination is locked or unlocked.

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 NV9649 provides no explicit indication, during operation, whether a destination is locked or unlocked.

Free Source

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

Use this button as if it were a source button.

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](#).

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 navigate 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.

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.

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

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

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

By pressing certain buttons, you makes menu selections and enter data (such as panel ID) or change brightness values. When the panel is in menu mode, you must press the 'Menu' button to cycle through the functions of the menu. See [Menu Mode](#) on page 116.

The button definition has no fields to configure.

Name Set Toggle

An 'Name Set Toggle' button toggles the panel between its default name set and the "system name" set. Whichever name set you select becomes the "active" name set.

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

Navigate

- ▲ It is not likely that you will see any button labeled "navigate" on your panel. The configurer will have labeled such buttons according to their actual purpose.

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

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, 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.

Category buttons can also cause the display of a target page. In practice, navigate buttons and category buttons are nearly indistinguishable, although the pages they display can be quite different.

See the [Category](#) button type.

Page Down

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

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

Page Up

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

- Scrolling devices within a category: 'Page Up' moves to the next *higher* device in the category's device list. (Example: if the current device is VTR_12, the next higher device would probably be VTR_13, subject to the device definitions in the NV9000 configuration.) Scrolling devices is possibly only when a category selection is in progress.
- Scrolling salvos in salvo mode: 'Page Up' moves to the salvo with the next *higher* index in the panel's salvo list. (It is expected that if the panel has a salvo button, it also has a salvo list.)
- Scrolling levels in level mode: 'Page Up' moves first to "All Level" and then to the last level and then to *previous* levels defined for the destination. Using the 'Page Up' button, you can cycle through all the levels (including "All Level") indefinitely.

Panel Lock

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

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

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 NV9649.)

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

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

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

Quick Source

A quick source button selects a source and performs an immediate take (to the destination of the control unit in which the quick source button is located).

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

The button presets a salvo. (Subsequently pressing the 'Take' button actually executes the salvo.)

The default button text is the salvo name but the button can have any legend.

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.

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

The button selects a specific source. The source name appears in the 'Preset' display. Selecting a source activates the 'Take' button, which you must press to complete the route.

Source/Destination

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

Source is Master

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

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

The 'Source is Master' button is also used to initiate "broadcast" machine control routes. See [Broadcast Routes](#), on page 90.

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

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

The 'Source is Master' button is used to initiate "broadcast" control routes. See [Broadcast Routes](#), on page 90.

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

- ▲ Pressing the 'Source is Master' button turns off the 'Broadcast' button and vice versa.

Take

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

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

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

Undefined

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

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.

Buttons for the NV9609 Model

There are 24 button function types for a panel in NV9609 mode (not counting 'Undefined'):

| | | |
|----------------------------------|-------------------------------------|----------------------------------|
| Broadcast | Category | Chop |
| Clear | Destination | Destination Lock |
| Destination Mode | Destination Protect | Free Source |
| Level | Level Mode | Menu |
| Name Set Toggle | Page Down | Page Up |

| | | |
|-----------------------------|---------------------------------|----------------------------------|
| Panel Lock | Previous Source | Quick Source |
| Salvo | Source | Source is Master |
| Source Mode | Src/Dst Mode | Take |

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 90 for more information.

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

Category

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

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

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

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

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

A typical NV9649 configuration has a "keypad" with which you can enter device indexes or suffixes. Keypad buttons are actually category buttons. Any keypad button can also be a source category button and a destination category button.

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

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

Chop

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

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

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

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

Clear

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

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

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

Destination

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

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

Destination Mode

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

Destination devices are represented on the ‘Destination’ display.

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

Destination Lock

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

- ▲ The NV9649 provides no explicit indication, during operation, whether a destination is locked or unlocked.

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 NV9649 provides no explicit indication, during operation, whether a destination is locked or unlocked.

Free Source

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

Use this button as if it were a source button.

Level

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

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

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

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

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

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

Level Mode

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

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

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

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

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

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

Menu

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

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

By pressing certain buttons, you makes menu selections and enter data (such as panel ID) or change brightness values. When the panel is in menu mode, you must press the 'Menu' button to cycle through the functions of the menu. See [Menu Mode](#) on page 116.

The button definition has no fields to configure.

Name Set Toggle

An 'Name Set Toggle' button toggles the panel between its default name set and the "system name" set. Whichever name set you select becomes the "active" name set.

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

Page Down

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

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

Page Up

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

- Scrolling devices within a category: 'Page Up' moves to the next *higher* device in the category's device list. (Example: if the current device is VTR_12, the next higher device

would probably be VTR_13, subject to the device definitions in the NV9000 configuration.) Scrolling devices is possibly only when a category selection is in progress.

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

Panel Lock

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

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

Previous Source

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

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

Quick Source

A quick source button selects a source and performs an immediate take (to the destination of the control unit in which the quick source button is located).

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

The salvo button places the panel in salvo mode. In salvo mode, you can the knob to select a salvo from the salvo list configured for the panel (as a panel option). When the desired salvo is selected, press a 'Take' button to execute the salvo. The panel then returns to normal operating mode.

You can also press 'Page Up' and 'Page Down' buttons to browse through the salvo list.

Pressing a button other than 'Take', 'Page Up', or 'Page Down' returns to its normal operating mode.

Source

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

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

Source Mode

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

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

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

Src/Dst Mode

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

Source is Master

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

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

The 'Source is Master' button is also used to initiate "broadcast" machine control routes. See [Broadcast Routes](#), on page 90.

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

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

The 'Source is Master' button is used to initiate "broadcast" control routes. See [Broadcast Routes](#), on page 90.

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

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

Take

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

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

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

Undefined

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

Operating Methods

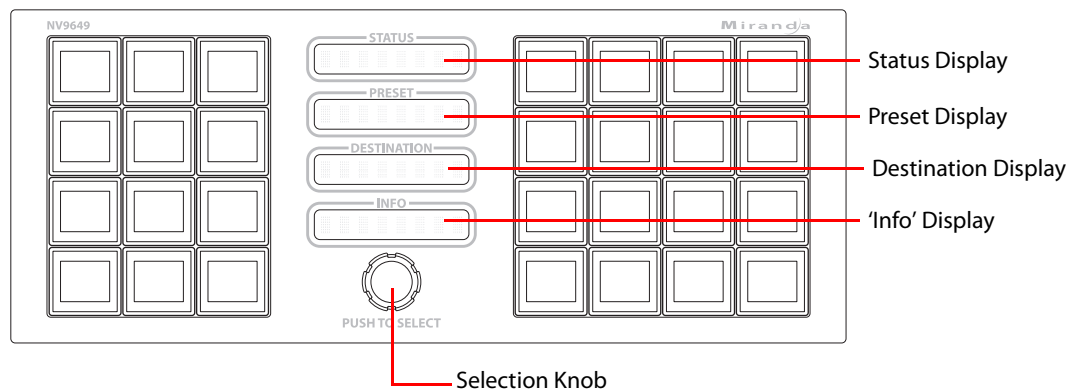
Operating the NV9649 in either NV9609 mode or LCD XY/MD mode is relatively straightforward. The NV9609 model is simple; the XY/MD model is more complex.

The server model is also simple but not at all obvious because of the interaction between the NV9649 and the multiple NV9649s.

To summarize that interaction, the NV9649 can assign destinations to each of the individual control units (9 buttons, 1 display) of the associated NV9649s. The NV9649 can also assign sources to source buttons of the individual control units of the associated NV9649s.

(The NV9649 button that applies in this interaction is the ‘Assign’ button. The NV9649’s knob can be used to perform device selection by category. The NV9649 will have been configured in “server” mode.)

This is a view of the NV9649 panel, identifying the different features that apply to server mode:



Client-Server Model Procedures

Preset procedures, A and B, are used by the “Assign” procedures, C and D, following, next page.

Procedure A — Preset a Source Using the Knob

To preset a source in the preset display of the NV9649 (server):

- 1 Ensure that the NV9649 is in *source* mode. Press a ‘Source Mode’ button or press a ‘SRC/DST Mode’ button when the panel is in destination mode.
- 2 Turn the knob on the NV9649, clockwise or counter-clockwise, to scroll through the categories that were configured for the panel.
- 3 When you reach the desired category, identified in the NV9649’s preset display, push the knob. (You can feel it click.) The NV9649’s preset display will show the mnemonic of the selected category.

- 4 Use the knob now to scroll through the devices in the category until you see the desired device in the preset display. (Device names consist of the category mnemonic followed by a (usually) numeric suffix.
- 5 At any time, you can press a 'Clear' button to erase the preset entry you have selected. You might have to press 'Clear' more than once.

Procedure B — Preset a Source Using a Keypad

To preset a source in the preset display of the NV9649 (server):

- 1 Ensure that the NV9649 is in *source* mode. Press a 'Source Mode' button or press a 'SRC/DST Mode' button when the panel is in destination mode.
- 2 Use a category button to select the desired category. The selected category will be displayed in the preset display. (The panel must have been configured with one or more category buttons.)
- 3 After choosing a category, use the panel's keypad to "type in" the index of the desired device contained in the category. For example, if the category is VTR and the device is VTR_12, type in 1, then 2. (The panel must have been configured with one or more suffix buttons, which are category buttons that provide suffixes.)

As you press keys of the keypad, a device that currently matches the string of indexes will be displayed in the 'Preset' display.

Note also that you can use the knob to scroll forward or back from any point in the device selection (starting at that whatever index you have entered so far).

- ▲ During device selection by keypad, certain keys in the keypad become disabled if it is not possible to use the keys to perform further selection. For instance, if you have devices numbered 1–16 in a category and you press 2 (e.g., VTR2), all keys in the keypad become disabled because another digit would create an index of 20, 21, or similar, which is beyond the range of 1–16.
- 4 At any time, you can press a 'Clear' button to go back **one key press at a time** as you require.

Procedure C — Assign a New Source to a NV9649 Source Button

To assign a new source to a source button of an NV9649's control unit:

- 1 Ensure that the NV9649 is in *source* mode. Press the 'Source Mode' button or press a 'SRC/DST Mode' button if the panel is in destination mode.
- 2 Use procedure A or procedure B described above to select (i.e., preset) the desired source.
- 3 Press an 'Assign' button on the NV9649.
- 4 Press the intended source button — in the intended control unit of the intended NV9649. The software assigns the source selected at the NV9649 to that button. The source text appears on the button's LCD.

Procedure D — Assign a New Destination to a NV9649 Control Unit

To assign a new destination to a control unit of an NV9649:

- 1 Ensure that the NV9649 is in *destination* mode. Press the 'Destination Mode' button or press a 'SRC/DST Mode' button if the panel is in source mode.

- 2 Select a destination device by (1) turning the knob or (1) selecting the category and device index using a “keypad.” Use the method described under procedures A or B. But because you have placed the NV9649 in destination mode, the method selects a destination.
- 3 Press an ‘Assign’ button on the NV9649.
- 4 Press any *source* button in the intended control unit of the intended NV9649. (To help you do this, the source buttons of NV9649s — and only the source buttons — will be lighted.)

Note: because the NV9649 is in destination mode, the new destination mnemonic will immediately appear in the display of the intended control unit.

Procedure E — Takes Using Source Buttons

To perform a take to a single destination using an NV9649 control unit having standard source buttons:

- 1 Press a source button in the control unit that corresponds to your intended destination. The source becomes selected and the source button goes high-tally. The take button in the same control unit goes high-tally red.
- 2 Press the take button. The take is completed.

Procedure F — Takes Using Quick Source Buttons

To perform a take to a single destination using an NV9649 control unit having quick source buttons:

- 1 Press a quick source button in the control unit that corresponds to your intended destination.
- 2 2) That source is immediately taken to the destination of that control unit.

Procedure G

To perform a ‘Take All’:

- 1 Ensure that the NV9649 is in *source* mode. Press the ‘Source Mode’ button or press a ‘SRC/DST Mode’ button if the panel is in destination mode.
- 2 Use procedure A or procedure B described above to select (i.e., preset) the desired source.
- 3 Press a ‘Take All’ button on the NV9649.
- 4 The source is taken to the destinations of *all* NV9649 control units, regardless of how many there are.

Procedure H — Perform Device Selection by Category List

An NV9649 panel in server mode can be configured to allow operators to perform device selection by category list. When the NV9649 is so configured, it shows ‘CatLists’ in the ‘Info’ display.

This method involves using the panel’s knob.

To perform device selection by category list:

- 1 Place the panel in either source mode or destination mode, as you need.

- 2 Turn the knob until the desired device category mnemonic appears in the 'Preset' display. Then press the knob to select that category.
- 3 When the category has been selected, you can now either turn the knob to select a device within the category, or press suffix buttons to "build" a device name from the category mnemonic and the suffixes you press. You can actually use both techniques to select a device in the category.

(You can press a 'Clear' button if you make a mistake. 'Clear' removes the most recently entered suffix.)

Procedure I — Perform Device Selection using Category Pages

An NV9649 panel in server mode can be configured to allow operators to perform device selection using *category pages*. When the NV9649 is so configured, it shows 'CatPages' in the 'Info' display. This method also involves use the panel's knob.

To perform device selection by category page:

- 1 Place the panel in either source mode or destination mode, as required.
If any category buttons are already showing on the panel, you can use those category buttons to select a category (and then skip to step 4 below).
- 2 Turn the knob until the desired category page appears. Then press one of those buttons to select that category.
The different category page names show in the 'Info' display as you turn the knob.
- 3 When you have selected a category, the first of the suffix pages (if any have been defined) appears. If no suffix pages have been defined, the panel's buttons will be blank and you must use step 4b below.
- 4 You now have a choice: (a) use the suffix pages, appending suffixes to the category mnemonic, or (b) use the knob to scroll through device names.
 - a Use the suffix pages.
You will form a device name by appending suffixes to the category mnemonic. You may press any suffix button in any suffix page. Use the panel's knob to scroll through suffix pages.
When you stop entering suffixes, the device is considered selected.
 - b Use the knob to scroll through devices.
To use this method of device selection, you must press the knob. When you do so, the panel enters a mode in which you can turn the knob to scroll through the list of devices that belong to the category selected in step 2.
When you stop turning the knob, the device is considered selected.

(You can press a 'Clear' button if you make a mistake. 'Clear' removes the most recently entered suffix.)

Salvo Mode

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

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

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

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

Menu Mode

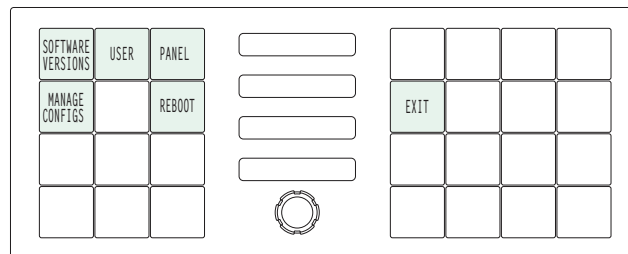
The NV9649 enters menu mode if it has a menu button and you press the menu button.

- ▲ The menu uses the buttons on your panel. The legends and functions of these buttons in normal operating mode do not apply while the panel is in menu mode.
- ▲ When you press the menu button of the NV9649, all the NV9649 clients become inactive, that is, their buttons become disabled (and dark).

The menu and its sub-menus differ among the 3 different behavioral models.

Menus under the Server Model

This is the menu that appears when you press a menu button and the panel is operating under the 'Panel Server' model:



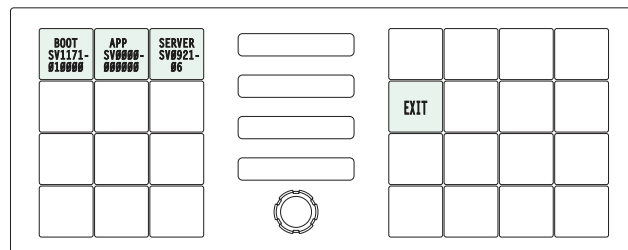
There are 5 submenus:

Software version User Panel Manage Configs Reboot

You can always use the 'Exit' button at the right to leave the menu or a submenu.

Software Versions

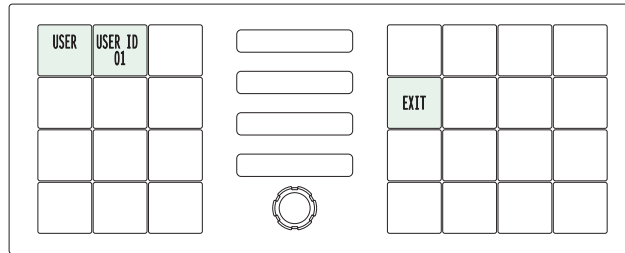
The software versions submenu appears first when you press the 'Software Versions' button:



Press 'Exit' to leave the submenu.

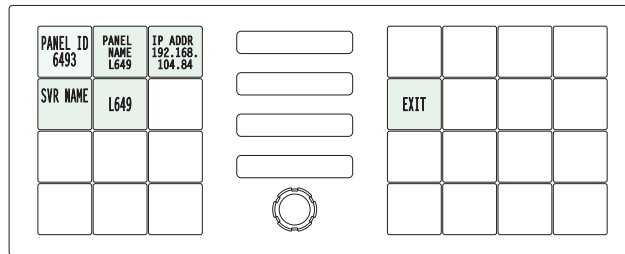
User

The 'User' submenu merely displays the configured user ID. (You cannot change it.)



Panel

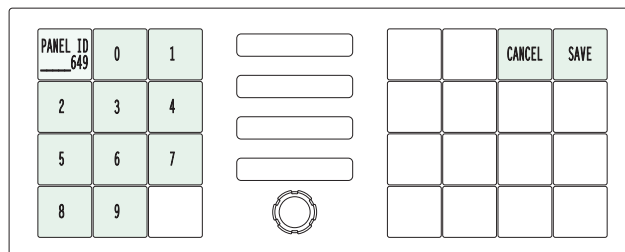
The panel submenu displays facts about the panel:



The 5 buttons at 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 configurers ensure that they are sending correct configuration file to the correct panel.

- ▲ The panel acquires its IP address through DHCP on the NV9000's panel/router network.

If the 'Panel ID' button is high-tally, you may change the panel ID. Normally, only your system administrator would do that. To change the panel ID, press the panel ID button. A panel ID entry menu appears containing a keypad:



Press the keys of the keypad to enter a number. The number you enter is displayed on the panel ID button.

Press Cancel to leave the submenu without changing the panel ID.

Press Save to accept your change to the panel ID and leave the submenu.

'Manage Configs'

The NV9649 (as the server) and the NV9649s (as the clients) are designed so that when the panel operator uses the NV9649's 'Assign' button to assign destinations or sources to the

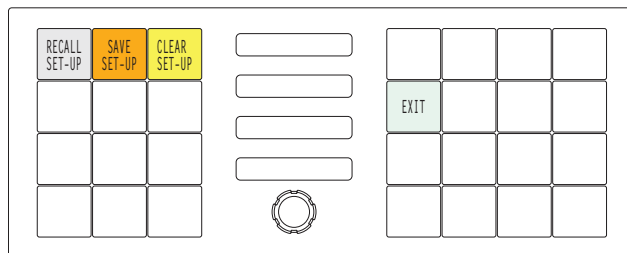
various clients, the assignments are not lost after a restart (owing perhaps to a power failure).

The assignments to the clients are saved in the system controller to which the NV9649 and the NV9649s are connected. We call the set of all client assignments a “setup.” The NV9649 and the NV9649s are further designed so that you can define up to 12 different *named* setups. Panel operators can select any of the different setups for purposes that suit the operations at your facility. For example, different operators may prefer to use their own client setup. Different client setups could be used at different times of the day. The choices are flexible.

One setup always exists. That is the “default” setup. The other setups are optional and are named in the NV9649 configuration page.

There are up to 12 setups because they conveniently fit on the 12 buttons at the left side of the NV9649.

It is through the ‘Manage Config’ button of the menu that operators can manage these different setups:

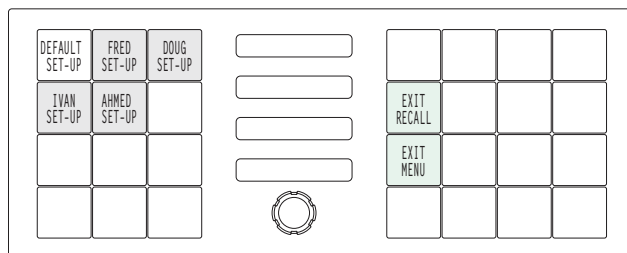


The ‘Manage config’ menu has 3 buttons:

- ‘Recall Set-Up’
- ‘Save Set-Up’
- ‘Clear Set-Up’

‘Recall Set-Up’

This button presents the ‘Recall’ menu in which you can activate one of the named setups. This button is gray and so are the buttons of the ‘Recall’ menu:



The button for the currently active setup is high-tally.

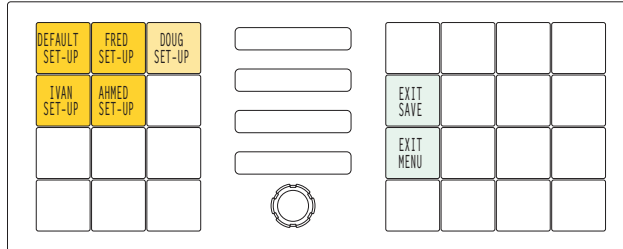
To activate a different setup, simply press the button for any named setup.

To go back to the ‘Manage Configs’ menu, press ‘Exit Recall’ at the right.

- ▲ Whenever you recall, save, or clear any named setup, that setup becomes the *current* setup. Subsequent source and destination assignments are recorded in the current setup and other setups are not affected.

'Save Set-Up'

This button presents the 'Save' menu. The 'Save' menu lets you save the *current* setup as one of the named setups. This button is amber and so are the buttons of the 'Save' menu:

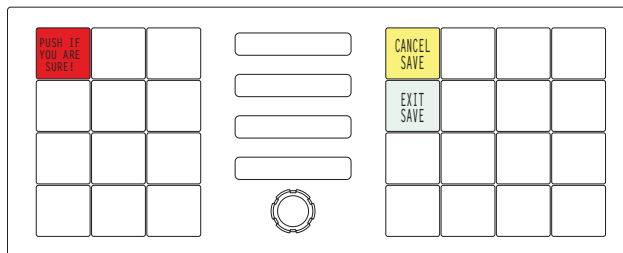


The button for the currently active setup is high-tally.

To go back to the 'Manage Configs' menu, press 'Exit Save' at the right.

To save the current setup, simply press the button for any named setup.

Be cautious: doing so overwrites all the client assignments of the named setup you select. The menu presents a warning to which you must respond before you can proceed:



Press the red button (that read "Push if you are sure") to continue with the save.

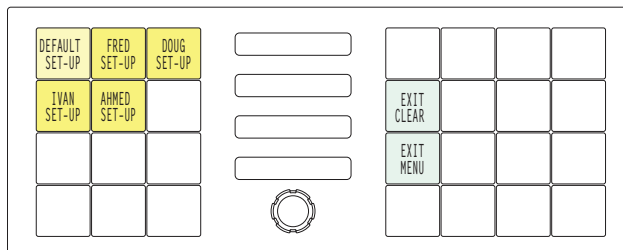
- ▲ Whenever you recall, save, or clear any named setup, that setup becomes the *current* setup. Subsequent source and destination assignments are recorded in the current setup and other setups are not affected.

'Clear Set-Up'

This button (in the 'Manage Configs' menu) presents the 'Clear' menu. The 'Clear' menu lets you revert all the NV9649 clients to their configured assignments *with respect to one of the named setups*. (Other named sets remain unaffected.)

The "configured assignments" are the ones defined (in NV9000-SE Utilities) in the configuration of the NV9000 control system in effect.

This button is yellow and so are the buttons of the 'Clear' menu:

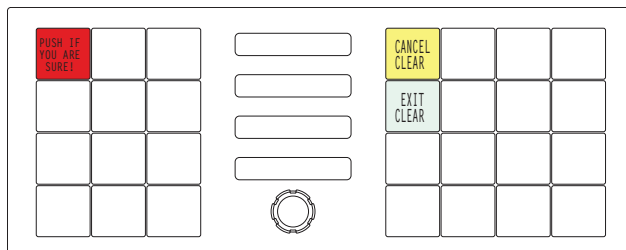


The button for the currently active setup is high-tally.

To go back to the 'Manage Configs' menu, press 'Exit Recall' at the right.

To clear a named setup, simply press the button for that named setup.

Be cautious: doing so removes data that cannot easily be recovered. The menu presents a warning to which you must respond before you can proceed:



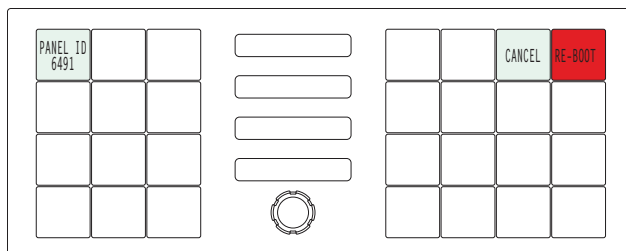
Press the red button (that read "Push if you are sure") to continue with the clear.

- ▲ Whenever you recall, save, or clear any named setup, that setup becomes the *current* setup. Subsequent source and destination assignments are recorded in the current setup and other setups are not affected.

Reboot

The 'Reboot' button of the menu lets you restart the NV9649 and all the NV9649 clients associated with it.

If you press the reboot button, the menu presents a cautionary sub-menu:



Press 'Reboot' (the red button) if you want to proceed. A reboot takes several seconds.

Press 'Cancel' if you do not want to reboot.

Menus under the NV9609 Model

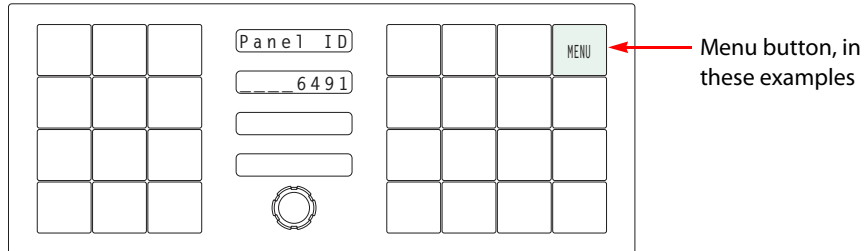
Under the NV9609 behavioral model, the menu functions as if it were an NV9609 menu as much as is possible. (Under this model, the menu presents information in the 4 displays in the middle of the panel.)

By pressing the menu button repeatedly, you can cycle through 8 sub-menus:

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

Panel ID

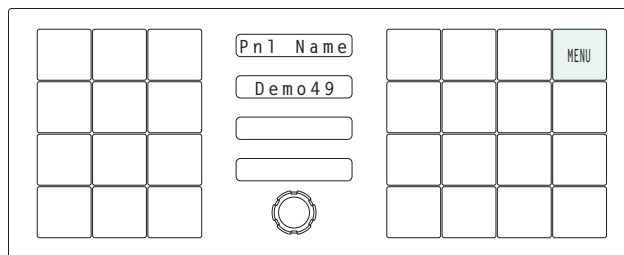
The panel ID sub-menu is the first sub-menu that appears when you first press the menu button:



The panel shows the panel ID in the 'Preset' field of the display. It is not possible to set the panel ID in this sub-menu.

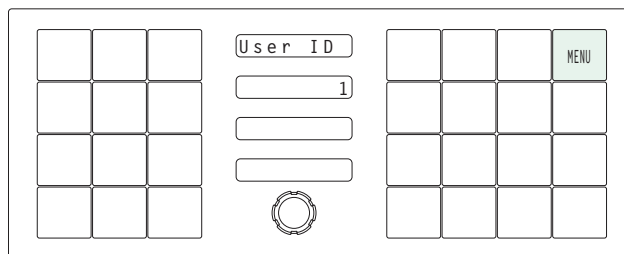
Panel Name

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



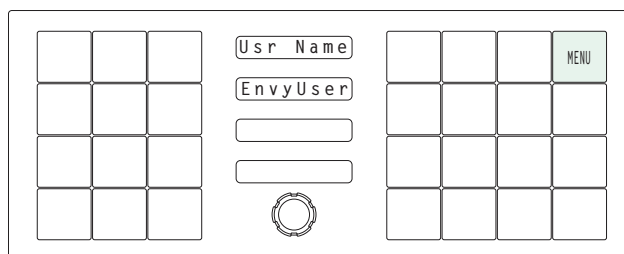
User ID

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



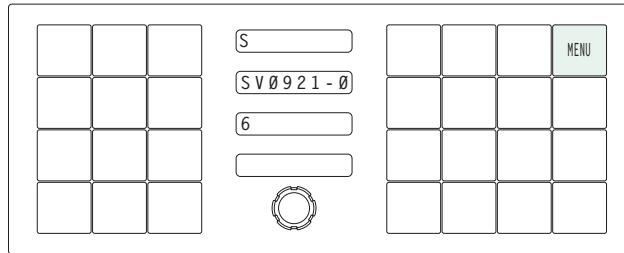
User Name

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

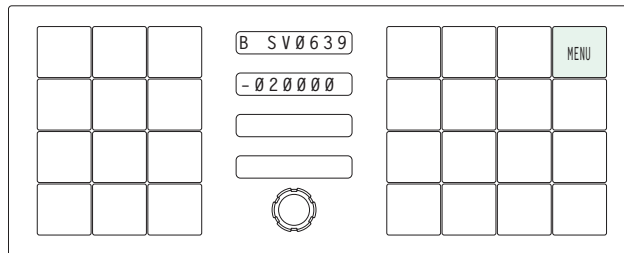


Software Versions

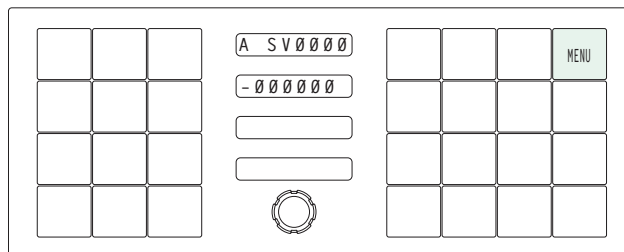
The fifth submenu displays the software version:



The sixth submenu displays the boot version:

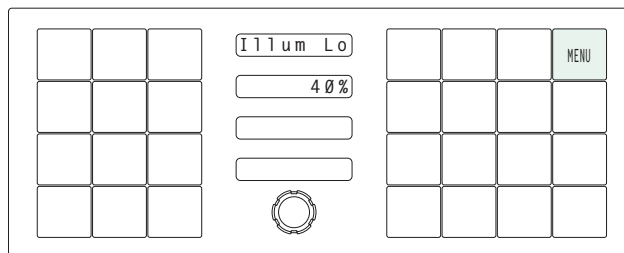


The seventh submenu displays the application version:



Button Illumination

The last submenu displays the illumination setting:

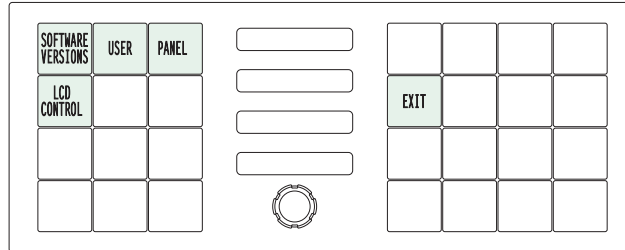


Because of a bug, the legend on the 'Status' and 'Preset' display fields is incorrect.

At present, you cannot set the button illumination levels with this sub-menu.

Menus under the LCD XY Model

This is the menu that appears when you press a menu button and the panel is operating under the LCD XY model:



There are 4 submenus:

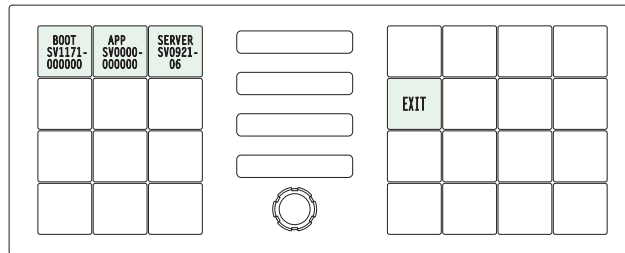
Software version User Panel LCD Control

You can always use the 'Exit' button at the right to leave the menu or a submenu.

Software Versions

▲ The software versions submenu is available under all 3 behavioral models.

The software versions submenu appears first when you press the 'Software Versions' button:

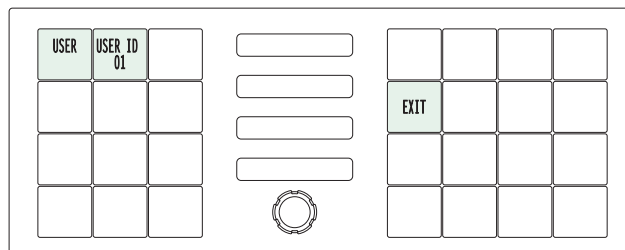


Press 'Exit' to leave the submenu.

User

▲ The user submenu is available under all 3 behavioral models.

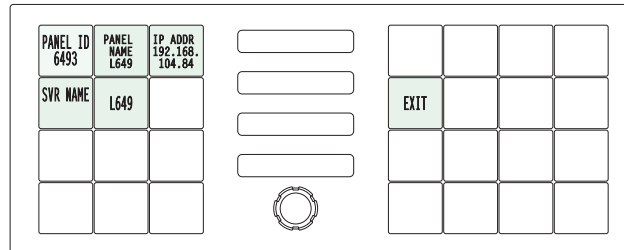
The 'User' submenu merely displays the configured user ID. (You cannot change it.)



Panel

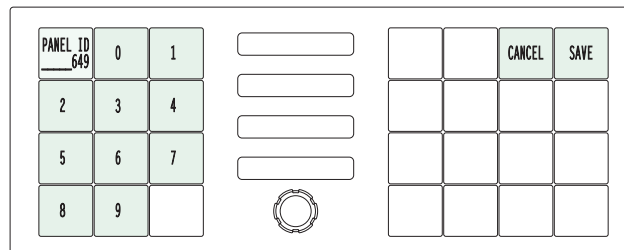
- ▲ The panel submenu is available under all 3 behavioral models.

The panel submenu displays facts about the panel:



The 5 buttons at 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 configurers ensure that they are sending correct configuration file to the correct panel.

- ▲ The panel acquires its IP address through DHCP on the NV9000's panel/router network. If the 'Panel ID' button is high-tally, you may change the panel ID. Normally, only your system administrator would do that. To change the panel ID, press the panel ID button. A panel ID entry menu appears containing a keypad:



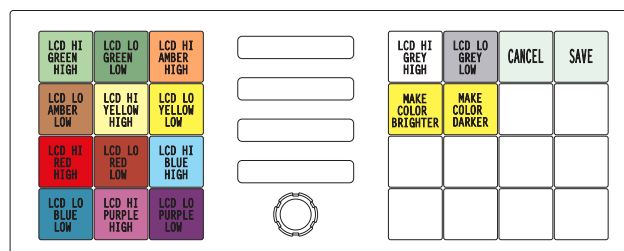
Press the keys of the keypad to enter a number. The number you enter is displayed on the panel ID button.

Press Cancel to leave the submenu without changing the panel ID.

Press Save to accept your change to the panel ID and leave the submenu.

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:



There are 14 buttons for the 7 button colors. They occur in pairs. 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 brightness.)

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

If you make a change, press 'Save' to commit the change or press 'Cancel' to discard the change. Pressing either button returns you to the panel menu.

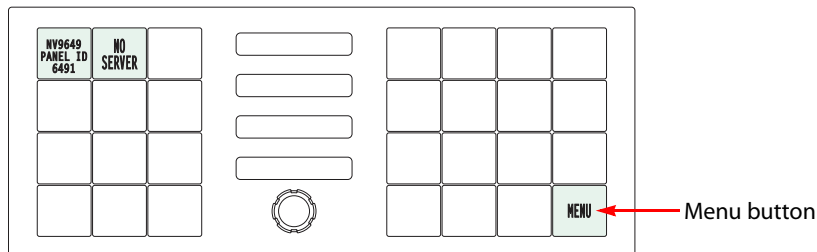
The actual colors cannot be represented accurately in print or in a PDF file displayed on your screen. There is a small amount of variation in color from button to button. See [LCD Buttons](#), on page 141 for a better color chart.

Setup Mode

Setup mode occurs when the NV9649 is disconnected from its network and is freshly powered up. In setup mode, you can set or change the panel ID, identify the software version, and perform a test of the panel's buttons. It is in setup mode that you must initially set the panel ID.

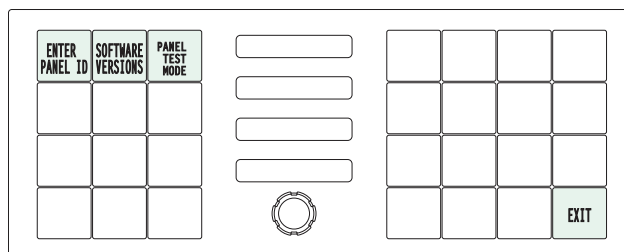
▲ It can take several seconds for the buttons to appear.

The panel powers up with 2 buttons at the top left, and a 'Menu' button at the lower right, illuminated in green. The button at the top left shows the current panel ID. The panel ID is usually set to 0 at the factory:

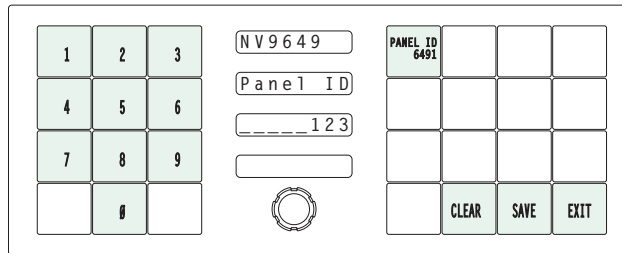


Panel ID

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



Now press the 'Enter Panel ID' button. The buttons on the left side of the panel light up and form a numeric keypad:



The current panel ID is shown on the top-left button of the right-hand button section. At the lower right are 'Clear', 'Save', and 'Exit' buttons.

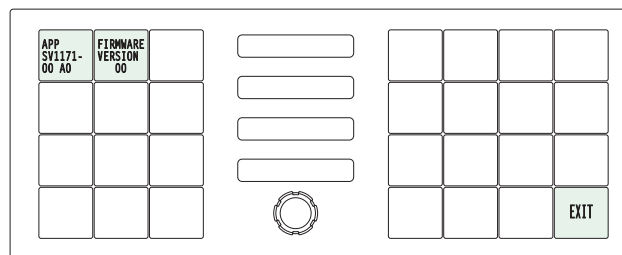
Enter a panel ID (up to 8 digits). The ID you enter appears in the third display (the 'Preset' display). Press 'Clear' if you make a mistake.

Press 'Save' to complete your entry and leave the submenu.

Press 'Exit' to leave the panel ID submenu without changing the panel ID.

Software Versions

Press the 'Software Versions' button to view the panel's current software and firmware versions:



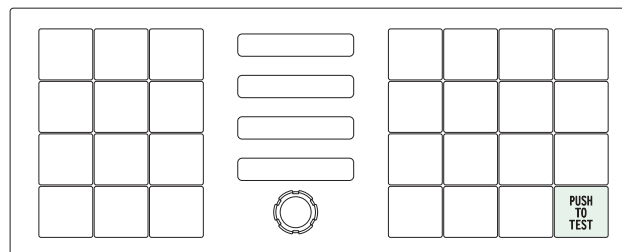
The software part number and its revision number and the firmware version appear on the two top-left buttons.

Press 'Exit' to leave the submenu.

Panel Test

Press the 'Panel Test Mode' button to perform a panel test. The test reveals the color and viability of the 4 displays and the 28 function buttons.

The submenu shows a 'Push to Test' button at the lower right:

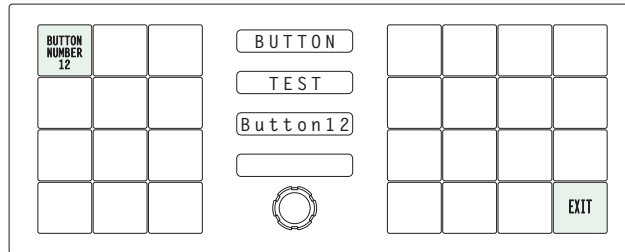


Press that button to proceed to the display test.

The display test should show that the pixels of the character elements of the displays are brightly lit.

Press the 'Push to Test' button again to start the color test. The first segment of this test shows all the buttons illuminated in high-tally green. Press the 'Push to Test' button again. The next segment shows low-tally green.

Keep pressing that button until all the colors have been displayed—green, amber, yellow, red, blue, purple, grey, and white and high and low-tally for each. At this point, the displays now read button test. Pause for a moment. Do not press 'Exit':



Press any button—except the 'Exit' button—to test it. The button will flash a few times rapidly and the number of the button will appear on the display.

Pressing the exit button will terminate the button test and return you to the initial display of setup mode. At this point—if you have assigned your NV9649 a suitable panel ID—you may connect your NV9649 to the panel network of your NV9000 system.

6 GPIO

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

Summary

| | |
|--|-----|
| <i>The Interface</i> | 129 |
| <i>GPIO Configuration Concepts</i> | 130 |
| <i>Configuring Outputs</i> | 131 |
| <i>Configuring Inputs</i> | 133 |

The Interface

The tally interface includes 8 optically isolated inputs and 4 solid-state relay outputs (also optically isolated). Tally devices you connect to inputs can trigger events—through the NV9649—in the router control system. The router control system can trigger events that—through the relays in the NV9649—switch your tally devices.

The DB25 connector, labeled “GPI Interface” at the rear of the NV9649 presents the tally signals. There are 8 input signals and 4 pairs of output signals.

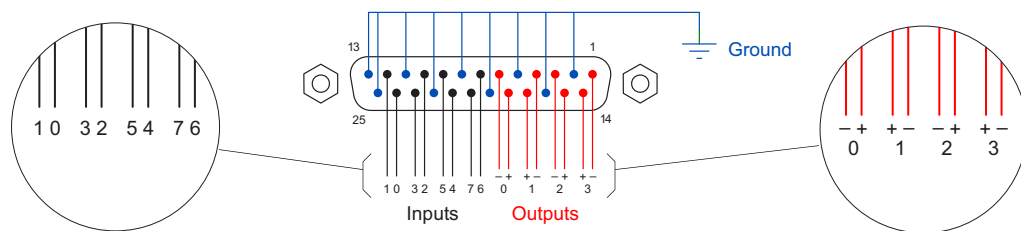


Fig. 6-1: GPI Interface

Input

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

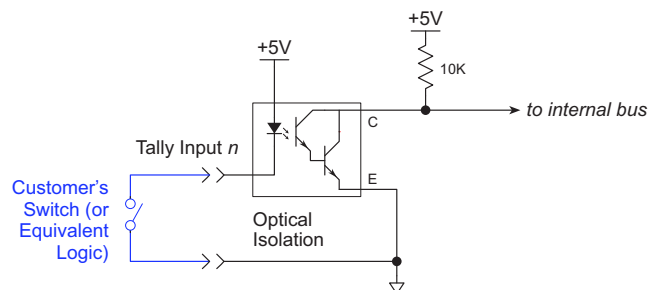


Fig. 6-2: GPI Input

When the input transitions off or transitions on, the NV9649 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.

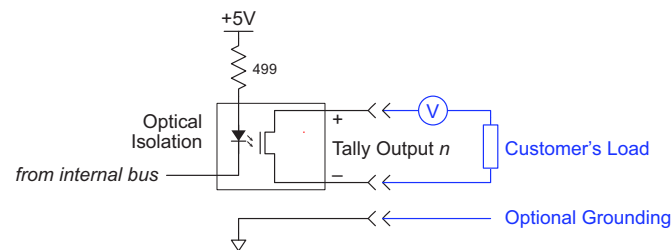


Fig. 6-3: GPIO Output

When a condition (defined for the relay) occurs, the router control system notifies the NV9649 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.)

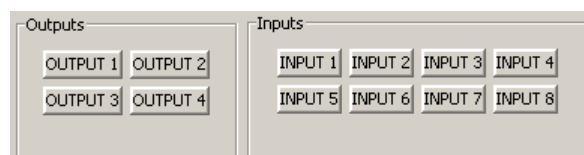
GPIO Configuration Concepts

These are the I/O characteristics of the NV9649's tally interface:

- Eight optically isolated inputs (sometimes called GPIOs) 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 NV9649 Page

SE's NV9649 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 NV9649 control panel.

Configuring Outputs

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

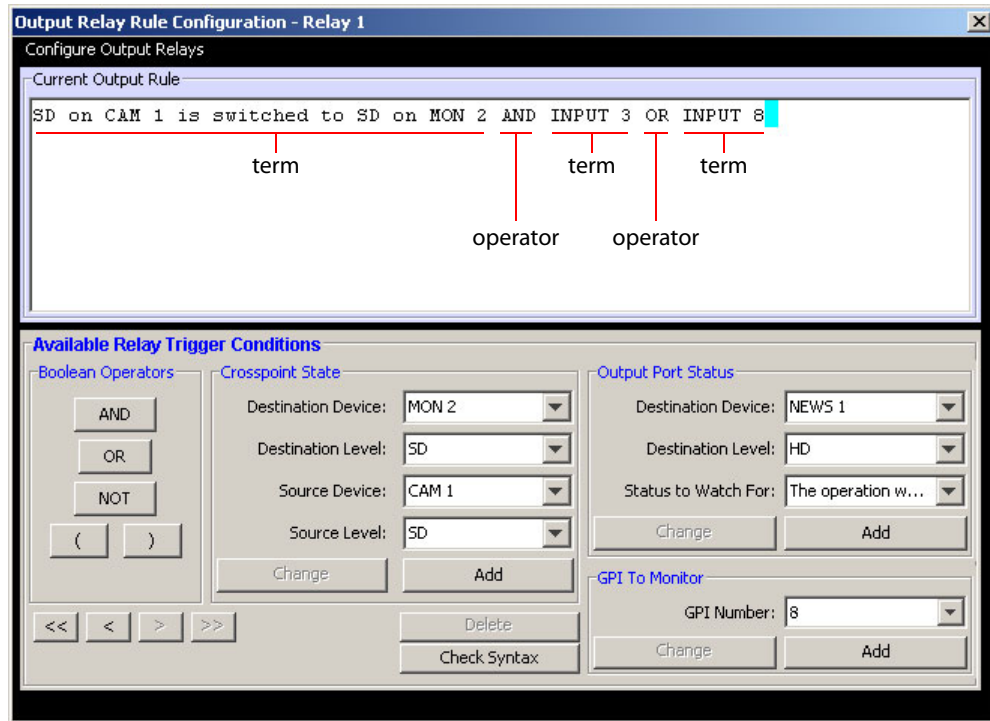


Fig. 6-4: Relay Rule Dialog

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 | |

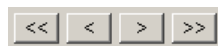
As an example, choosing 'Used as broadcast slave', device VTR3, and level CTRL for output port status produces the sub-expression:

```
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 NV9649 inputs and other system-wide events. The router control system sends signals to the NV9649 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.

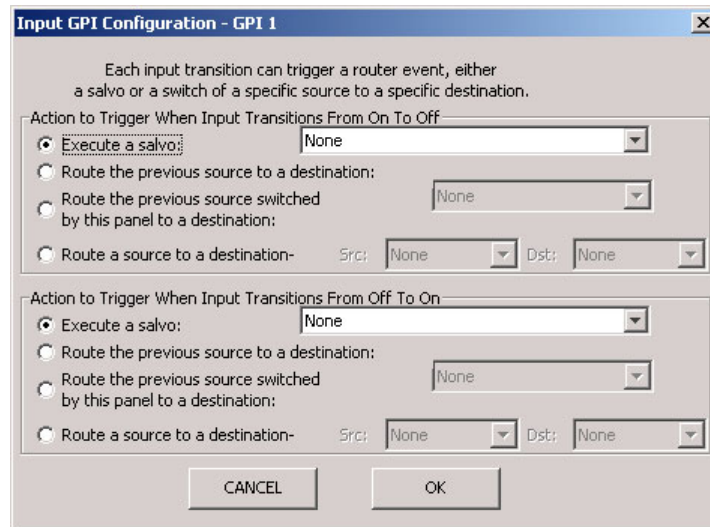
This is a summary of Boolean operations:

- 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 NV9649 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 NV9649 has 4 relays that can switch on or off your external devices, based on (1) NV9649 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 NV9649 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 the following:

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Power Specifications

Power specifications for the NV9649 control panels.

| Specification | Detail |
|-------------------|---|
| DC power | External power supply: 12VDC \pm 10%, 5A. |
| Power consumption | 10.2 W |
| Regulatory | UL listed and CE compliant. |

Specifications for the PS0001 power supply.

| 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:

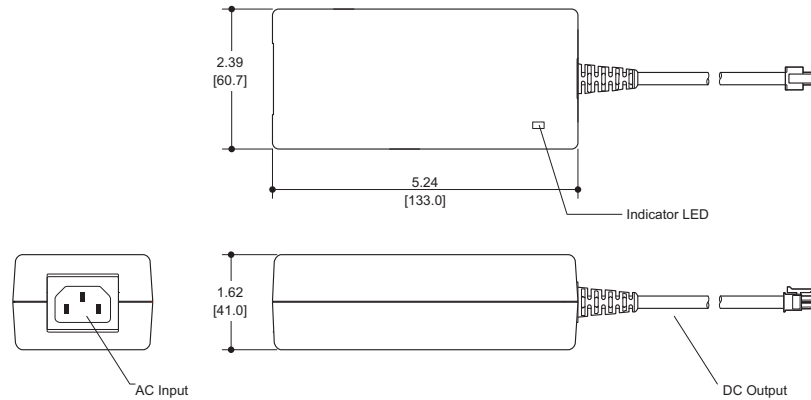


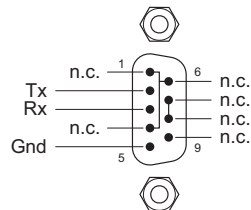
Fig. 7-1: The power output has Molex 4-pin plug. See [Power Cord Retention](#) on page 142.

NV9649 Specifications

Specifications for the NV9649.

| Specification | Detail |
|------------------------|--|
| Dimensions | Height: 3.47 in(88.1 mm), fits EIA 2 RU (3.5 in or 88.9 mm), Width: 8.7 in (221.0 mm). The panel mounts in one of the two apertures of the main bracket of the NV9648-48-RMK (rack-mounting kit) which is 19 in wide and 3.47 in high (2RU). |
| Depth | 2.46±0.01 in (62.5 mm), enclosure. 2.99 in (75.9 mm) overall. |
| Power | 10.2 W |
| Weight | 1.022 kg (2.25 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.

Environmental Specifications

Environmental specifications for the NV9649.

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

Defaults

Initial Panel State

Destination: the configured default.

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

Configuration Page

The initial NV9649 configuration has no buttons defined. The default panel options are:

| | |
|------------------------|---|
| Behavioral model: | LCD XY/MD mode. |
| Default mode: | Multi-destination mode. |
| Release mode: | Normal. |
| Default destination: | None. |
| Preset monitor: | None |
| Status monitor: | None |
| Data routing: | Automatic. |
| Salvo list: | None |
| Default name set: | System names |
| Use continuous scroll: | Enabled (check box checked) |
| Other options: | All disabled (check boxes clear) except 'Src/Dst Immediate Take'. |

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

These drawings identify features and provide overall and critical dimensions:

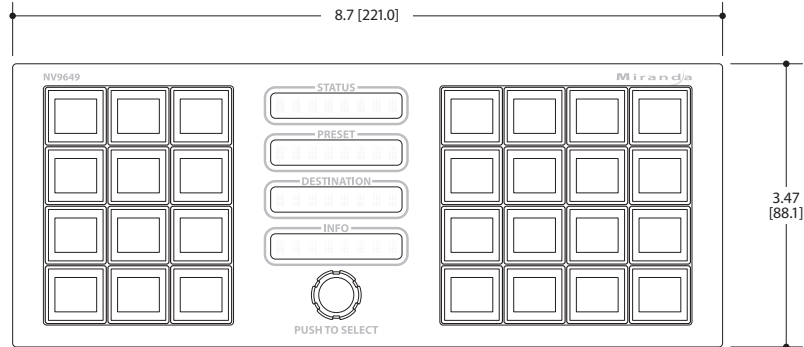


Fig. 7-2: Front View of the NV9649

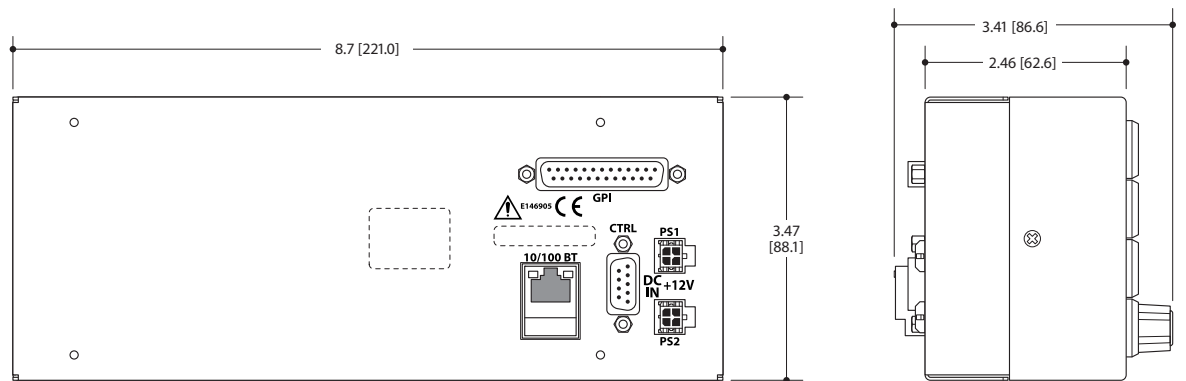


Fig. 7-3: Rear and Side View of the NV9649

This is the NV9649's rack mounting filler plate:

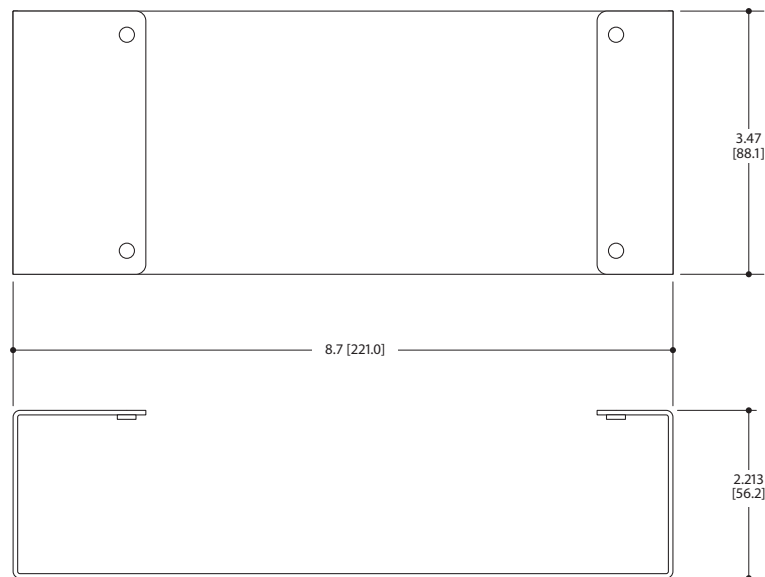


Fig. 7-4: NV9649 Rack Mounting Filler Plate

This drawing provides overall dimensions of the NV9649's rack mounting bracket:

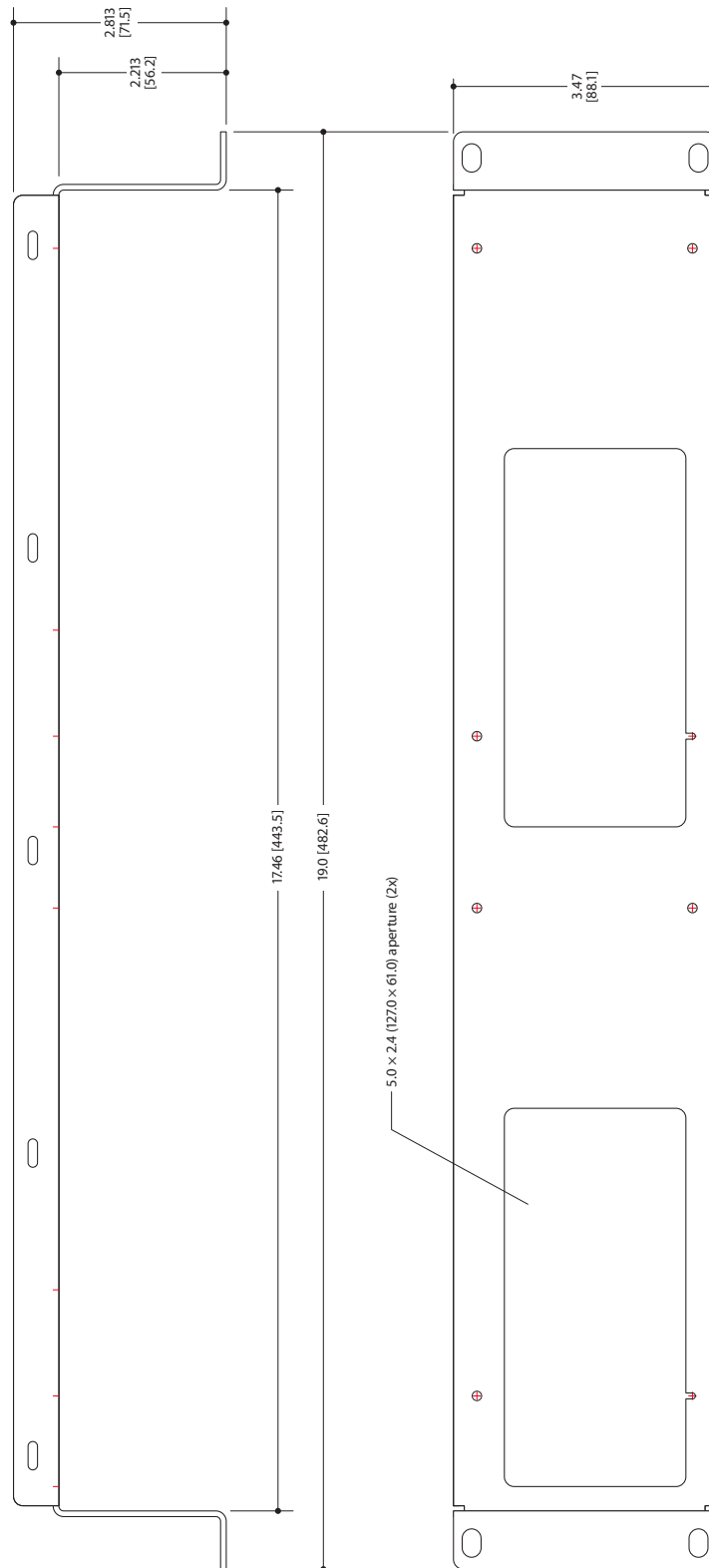


Fig. 7-5: NV9649-48-RMK Rack Mounting Bracket

For reference, this is a view of the NV9648:

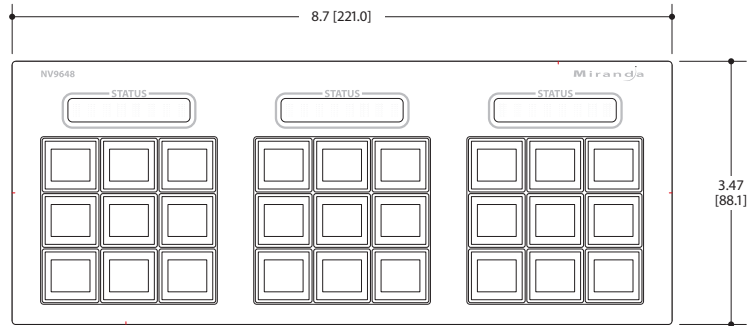


Fig. 7-6: Front View of the NV9648

Chapter 8 provides the following:

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| <i>LCD Buttons</i> | 141 |
| <i>Power Cord Retention</i> | 142 |
| <i>Ordering Information</i> | 143 |

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:

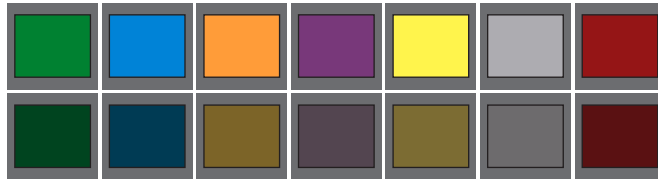


Fig. 8-1: Button Colors

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 24.5 mm × 23.5 mm with the LCD portion about 20 mm × 16.5 mm. The button legend appears in a 64×32 pixel matrix.

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 NV9649 components:

| | |
|--------|---|
| PS0001 | 12V power supply, 4-pin Molex connector, with cord, and cord retention strap. |
| NV9649 | NV9000 control panel. 30 button, 2RU, XY/MD, hierarchical. |
| WC0053 | Optional breakout cable for the tally interface |

| | |
|---------------------------------|--|
| (AES/EBU | (Audio Engineering Society/European Broadcasting Union). AES and EBU are standards organizations. |
| Breakaway | A condition where a destination has multiple sources on different levels. |
| Category | A category represents a set of devices. (The concept of categories exists to make it easier to select devices at a control panel.) A category can contain sources, destinations, or devices that are both sources and destinations. Each device in the category has a unique selection index within that category. Each category has a mnemonic ID associated with it. The NV9649 does not support categories or category selection. |
| Data routing | Data routing (a.k.a., machine control routing) is a bidirectional form of routing. Routes are characterized by a controlling device and controlled device(s). The NV9649 provides certain data routing options including a 'Broadcast' button. |
| Device | A "device" is a grouping of input and output ports that define a logical entity. (The logical entity often represents a real device, but it does not have to be a real entity.) For example, a system might have 3 levels: video, AES, and time code. A hypothetical device in this system is Camera 1, which consists of video on input port 1 of the video router, AES on input port 5 of the AES router, and time code on input port 8 of the time code router. |
| GPIO | General Purpose Input and Output. A generic term for the NV9649's tally interface. The tally interface is called the "GPI Interface" at the rear of the NV9649. |
| Level set | A level set is a group of virtual levels that are commonly used together when switching devices. A level set also defines the mapping of each virtual level within the level set to a single physical level. All levels in a level set have a unique display index within that level set. |
| Multi-Destination (Mode) | A mode on an NV9000 control panel that presents many destinations at once, in contrast to X-Y mode. An operator may route sources to multiple destinations in a single take. Multi-destination mode does not permit the selection of breakaway levels. |
| Operator | The term operator (a.k.a. user) usually refers to users other than the system administrator or configurer. An operator is responsible for making the routes. |
| Physical level | Multiple routers provide different "physical levels" on which to switch the signals of devices. Any particular device might send or receive HD, SD, AES, time-code, or machine-code signals. |
| PIN | The system administrator may create a single "super user" personal identification number (PIN) that functions as a passcode. A PIN is 4–6 digits in length. The PIN allows certain operators to perform functions such as (1) forced release on a control panel that is configured for normal release or (2) changing the ID of a control panel. |
| Port | A port is the physical connection on a router. A port can only be an input port or an output port. |
| Salvo | A salvo is a stored group of commands that can be recalled and executed at an NV9000 control panel. |

| | |
|--------------------------------|---|
| Source/ Destination | <p>The term “source device” is used interchangeably with “source” and the term “destination device” is used interchangeably with “destination.” A source is a device that is connected to one or more input ports. A destination is a device that is connected to one or more output ports. An example of such a device would be a monitor.</p> <p>A device can be both a source and destination. An example of such a device is a VTR.</p> |
| System administrator | <p>The system administrator is the person responsible for installing, configuring, and maintaining a router control system.</p> |
| Tally | <p>(1) High or low button illumination.</p> <p>(2) Tally interface <i>to be defined</i>.</p> |
| Virtual level | <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> |
| X-Y (mode) | <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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