grass valley
A BELDEN BRAND

NV9000-SE UTILITIES

CONFIGURATION SOFTWARE FOR NV9000 ROUTER CONTROL SYSTEM

User's Guide

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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

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 Introduction

Chapter 1 provides a brief introduction to NV9000-SE Utilities.

Summary

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Summary

NV9000-SE Utilities is a configuration program that runs on PCs under Windows XP or Windows 7. Its purpose is to configure most, and perhaps all, aspects of an NV9000 router control system. A configuration is created and stored in a data base on the configuration PC and modified using NV9000-SE Utilities. The configuration is subsequently transferred to a *system controller,* in which it resides until it is overwritten, at some later date, by an updated configuration. The control software in the system controller references the configuration data as it executes.

There are 2 system controllers available:[1]

- NV960. A 2RU unit having 3 PCI expansion slots which are committed to a mix of Ethernet and serial ports.
- NV920. Two NV920s fit in a 1RU enclosure. Each NV920 has 3 Ethernet ports and 1 serial port. The NV920 is smaller and less expensive than an NV960, but the NV960 has more port options.

Two system controllers form a redundant pair: if the active controller fails, the stand-by controller takes over.

We refer to the system controlled by the NV960 or NV920 as the *router control system* or just "the system." The system comprises all routers, control panels, and other peripherals as well as the system controller itself. The system also includes all configured behaviors for each component. The components and the behaviors are described in the system's configuration.

Specifically, NV9000-SE Utilities does these principal things:

- Configures and identifies the links between the system controller and the routers and control panels in the system.
- Configures and identifies the control panels in the system.

1. The NV915, a third system controller, is now obsolete.

- Configures and identifies tielines (as a licensed option). Tielines are connections of various kinds between routers. The system controllers manage a pool of tielines that can be used as needed.
- Configures and identifies, in detail, the many signal connections to and from routers.

Note that NV9000-SE Utilities does not exactly configure routers. For router configuration, there are 3 main configuration programs:

- MRC. This program configures NV8500 hybrid routers (only).
- Uniconfig. This program configures all other NVISION series routers, such as the NV7512, including NV8500 standard routers (those with EM0666 control cards).
- CRSC. This program configures compact routers.

The system controller receives commands from control panels, issues switching commands to routers based on those commands, and returns status to the control panels.

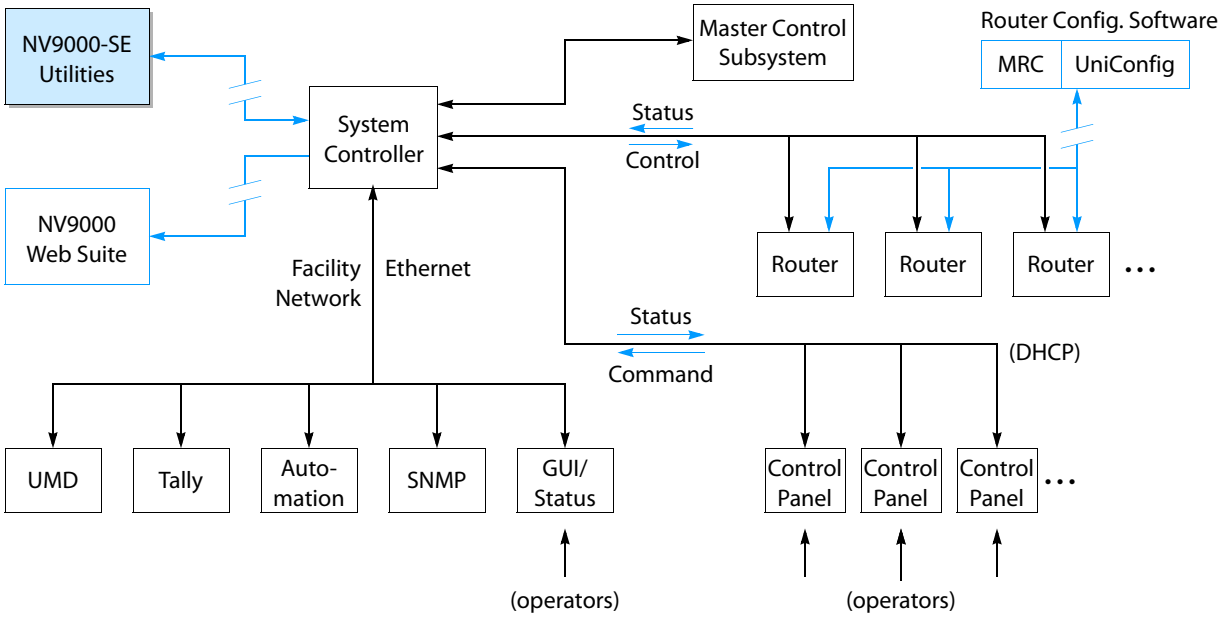
If the tieline option is enabled, the system controller also performs tieline management. A system controller can also perform certain other services.

Administrators can use NV9000-SE Utilities to view router status and tieline status, and to perform certain system management tasks.

The NV9000 system provides sources that can be used and manipulated by master control subsystems (which include iMC master control panels).

The *NV9000 Web Suite* (a browser application viewing DHP, tieline, and crosspoint data) can be used to view system status remotely.

This is a schematic representation of an NV9000 system:



Control panels include

- Physical panels (such as the NV901, NV9640, or NV9649).
- CR series panels (such as the CP1604 or CP3232).

- Virtual panels (such as the NV9601V or NV9640V).

  Virtual panels are software applications that emulate hardware panels and run on PCs on the facility network.
- Software panels, or GUIs (such as the EC9700 and EC9710).

Routers include

- NVISION series routers such as the NV8576, NV5128, or NV7512.
- NVISION series compact routers (for instance, the CR1616-HD).
- Third-party routers that are compatible with NV9000 software.

A system controller can communicate with third-party router control systems such as the (GVG) SMS7000 or (Probel) Cougar.

▲ In the case of the SMS7000, the system controller runs an SMS7000 service to communicate with the SMS7000. (The service must be enabled with a license key.)

A system controller can also control other system controllers.

Some router control systems can include an NV5100MC master control subsystem.[2] In general, the master control subsystem is configured using specific master control configuration software and not in NV9000-SE Utilities. It is in NV9000-SE Utilities, however, that the router ports used by the master control subsystem are specified.

NVISION series routers are generally controlled over Ethernet (TCP/IP). However, they can be controlled serially. Many third-party routers require serial control. The system controller can control routers either way. Compact routers are UDP and are controlled over Ethernet only.

The NV960 system controller can have up to 32 serial ports per NIC. The typical NV960 system controller has two NICs for Ethernet ports and one for serial ports. The NV920 has one serial port.

To be able to use NV9000-SE Utilities, you need familiarity with the concepts native to NVISION series routers, control panels, and NV9000 router control systems. Panel operators should also become familiar with these concepts. The concepts are not difficult, but they might not be the same as in the control system architecture from other vendors. Some configuration concepts are suitable for some customers and unsuitable for other customers. Much depends on what your requirements are.

Usage

You proceed with NV9000-SE Utilities either by creating a configuration or by opening an existing configuration and writing the configuration to a system controller. You can also read a configuration from a system controller, change it, and write the configuration back to the system controller, or to another system controller.

2. The NV5100MC is now obsolete. Support is still available, but units are no longer shipped. Now available are master control systems involving several Imagestore processors and iMC control panels.

NV9000-SE Utilities usage occurs in roughly 4 phases:

1 Establish the identities of the system controllers in your system. This information persists across configurations and sessions using NV9000-SE Utilities.

2 Access and modify a configuration.

   You can do this by (a) creating a new, empty configuration, (b) opening an existing configuration, or (c) reading a configuration from a system controller.

   You can define many different configurations. You can use whichever configuration you find best suited to the different parts of your system.

3 Write configuration(s) to selected system controller(s).

4 Manage and validate system components and settings.

Modifying a configuration is the most involved and complex task. In any configuration, you will:

- Identify and ***characterize*** the routers to be controlled. Routers will have already been configured in MRC or UniConfig (or possibly CRSC). Routers are identified by the IP addresses of their control cards. Routers generally have two redundant control cards, one active and one standby.

  Each IP address must be unique on its network.

  Routers may also be connected serially, in which case, the port and protocol are specified, not the IP address.

5 Identify and ***configure*** the control panels in the system. It is in NV9000-SE Utilities that control panels are configured. Control panels are identified by panel ID. Their IP addresses are determined by DHCP.

   Panels may share configurations. Each panel's ID must be unique.

   You must identify and configure all panels that are to be used. That includes hardware panels, virtual panels, and any instances of the two software panels (EC9700 and EC9710).

6 Define signal connections. Doing this involves defining *levels, level sets, devices, and device categories.* These terms will be defined later.

7 (Optionally) define tielines. This involves specifying which router ports are connected on the tieline. The tielines thus defined form the pool of tielines the system controller uses during operation. (Tieline design is not trivial.)

User Interface Basics

▲ ***Important note:*** A system configuration is a data base. Changes made to the data base are immediate *without* the possibility of an undo. However, many of the operations that modify the data base include a 'Commit' button or 'Save' button so that you can perform the operations in relative safety. If you choose not to press the 'Save' button, operations that you perform are discarded. After you press the 'Save' button — committing your changes — the changes cannot be easily undone.

▲ A technique that can help you as you work is to save successive copies of your configuration as you develop it. If, in a later copy of your configuration, you make a terrible mistake — one that would require much time spent in its correction — you can simply revert to a previously saved version of the configuration.

Launching NV9000-SE Utilities

There are 3 basic ways to launch NV9000-SE Utilities.

1 Double-click the desktop shortcut for NV9000-SE Utilities.
2 Choose Programs > NVISION > NV9000-SE Utilities from the Windows Start menu.
3 Double-click the executable file directly. Its default pathname is

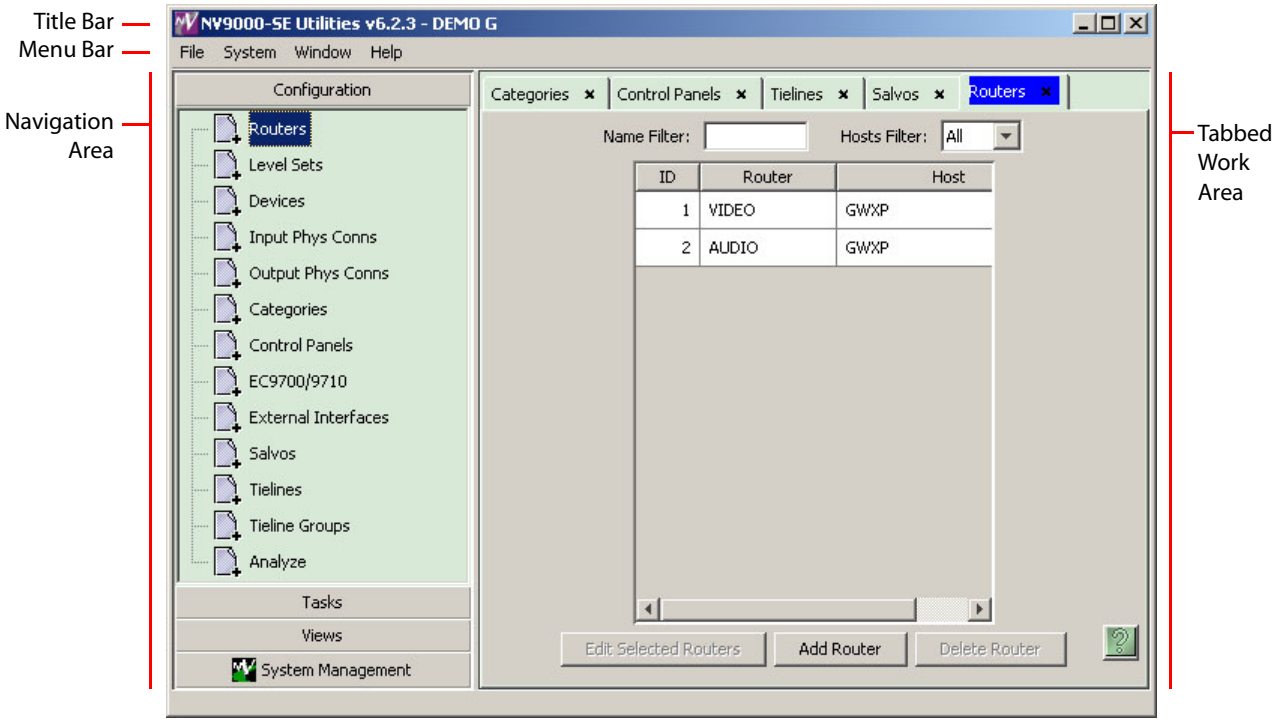
```
C:\Program Files\NVISION\NV9000-SE Utilities\NV9000-SE Utilities.exe
```

In your installation, the pathname might differ.

(See also Installation, on page 29.)

Layout

After you launch NV9000-SE Utilities, you will see that its window has several sections:



The title bar shows the revision number of NV9000-SE Utilities and the name of the configuration that you are viewing or editing.

The menu bar has 4 menus. See Menus, on page 11.

The work area can contain many tabbed work "pages." Click on the tab of one of the open pages to bring it to the foreground. You can click the "×" of a tab to close that page.

The navigation area consists of 4 panes:

- Configuration
- Tasks
- Views
- System Management.

Click on the title of one of the panes and it expands open and the other panes collapse shut. The entries in each of the panes represent work pages. Click on the entry in the pane to open the work page. For example, click 'Routers' in the Configuration pane to open the routers page (as shown in the illustration above).

Many work pages have buttons arrayed at the bottom of the page that open other work pages. For example, in the illustration above, the routers page has an 'Add Router' button that opens a page in which you can start the definition a router to be added to the configuration.

Configuration Pane

The configuration pane provides these basic configuration pages:

- 'Routers' page
- 'Level Sets' Page
- Devices Page
- 'Input Phys Conns' Page
- 'Output Phys Conns' Page
- Categories Page
- Control Panels Page
- EC9700/EC9710 Page
- 'External Interfaces' page
- Salvos Page
- Tielines Page
- Tieline Groups Page
- Analyze Page

Clicking any entry in the configuration pane makes the corresponding page available, and visible, in the work area.

Tasks Pane

The tasks pane provides these slightly more complex configuration pages:

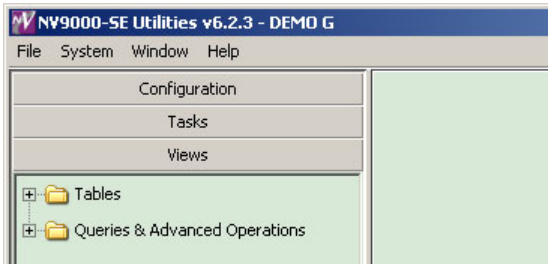
- 'Add Router' page
- 'Add Nvision Master Control' Page
- 'Add Level Set' Page
- 'Add Device' Page
- 'Add Mutiple Devices' Page
- 'Add Category' Page
- 'Add Control Panel' Page
- 'Add SW Panel' Page
- 'Add Salvos' Page
- 'Add Tieline' Page
- 'Add Tieline Group' Page
- 'Add External Interface' page
- Import Data File
- Export to File
- 'View Router Ports' page
- 'Find Routers' page

Clicking any entry in the tasks pane makes the corresponding page available, and visible, in the work area.

Of these, the 'Add Mutiple Devices' Page page is a considerable time-saver.

Views Pane

The views pane provides access to more detailed views of configuration data. The pane has two sub-branches, 'Tables' and 'Queries & Advanced Operations':



This illustration shows the two branches collapsed. To expand a branch, click the "+" next to the folder icon. If the branch is expanded, the icon will have changed to a "–" and clicking the "–" will collapse the branch again.

Tables

The 'Tables' branch contains these entries:

- Aliases Table
- Apps Table
- Categories Table
- Category Details Table
- Control Points table
- Control Systems Table
- Devices Table
- GUIs Table
- Hosts Table
- 'Level Sets' Table
- 'Level Set Details' Table
- Panels Table
- Paths Table
- 'PhysConns' Table
- 'PhysLevels' Table
- 'Router Controls' table
- 'Routers' table
- Salvo Lists Table
- Salvo List Details Table
- Salvos Table
- 'Signal Type' Table
- Suffixes Table
- 'SysParams' Table
- Tieline2 Table
- Tieline2 Exclusions Table
- Tieline2 Group Table
- Tieline2 Group Binding Table
- Tieline2 Path Table
- Tieline2 Path Detail Table
- Tieline2 Port Binding Table
- Tieline2 Signal Binding Table
- Users Table
- 'Virtual Levels' Table
- 'Virtual Level Groups' Table
- 'Virtual Level Signal Binding' Table
- 'XptExclusions' Table

Note that Xpt (in XptExclusions) means "crosspoint."

Note that the "2" in "Tieline2" means exactly nothing. It is present because of an artifact of the database manager.

Clicking any entry in the list of tables brings the corresponding page to the work area.

Queries and Advanced Operations

The 'Queries & Advanced Operations' branch contains 2 entries:

'Physical Connections' Query 'Orphaned Physical Connections' Query

Clicking either of these entries brings the corresponding page to the work area.

System Management Pane

The system management pane does not provide access to configuration data, but lists the system controllers in your system that you have identified:

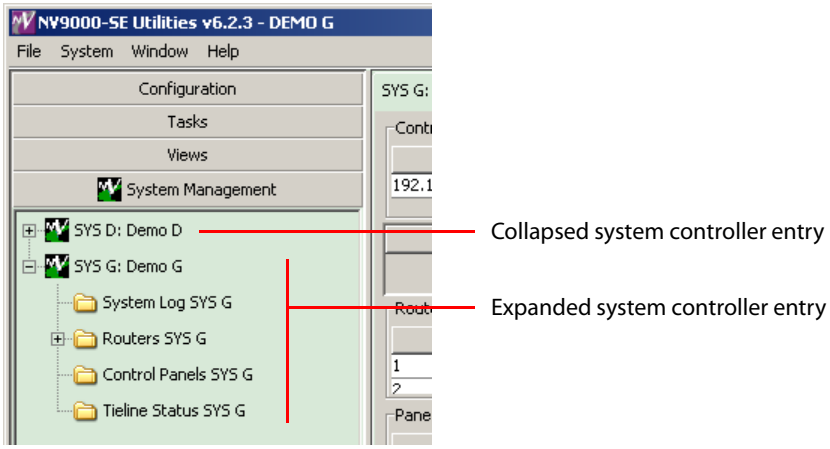


Fig. 1-1: Identified System Controllers

You can select any system controller in this pane to review its status, to start or stop the system controller, or to perform maintenance tasks.

Figure 1-1 shows two system controllers 'SYS D' and 'SYS G'. Next to the name of each system controller, separated by a colon (:), is the name of the configuration it uses.

Figure 1-1 shows SYS G expanded, revealing several folder icons: 'System Log', 'Routers', 'Control Panels', and 'Tieline Status'. Figure 1-1 shows that SYS D is not expanded. To expand the view of a system controller, click the "+" next to the system controller's icon. To collapse the view of a system controller, click the "–" next to its icon.

The color of a system controller's icon gives a rough indication of its state:

Green: the controller is connected (to your PC) and healthy.

Yellow: the controller is connected (to your PC) but is not healthy. Nevertheless, it is capable of responding to NV9000-SE Utilities on your PC).

Red: the controller is not connected to your PC or is not functioning.

Clicking any entry in the system management pane causes a status and control page to appear in the work area:

- Click a system controller to view a page in which you can *start, stop, or restart* a system controller.

- Clicking a 'System Log' folder causes the *system log page* for the applicable system controller to appear.
- Clicking a 'Control Panels' folder causes a *control panels page* for the applicable system controller to appear.
- Clicking a 'Tieline Status' folder causes a *tieline status page* for the applicable system controller to appear. This is a graphical representation of tielines defined in your configuration. The diagram indicates the number of tielines between router (partitions) and the number of tielines actually in use. A table of tieline usage data accompanies the diagram.

The 'Routers' entry is slightly different: it is an expandable icon. Click the "+" to expand the entry or click the "–" to collapse the entry. When it is expanded, the entry lists the routers named in the system controller's configuration. See Figure 1-2, following.

Click any router sub-entry to view the router page for that router:

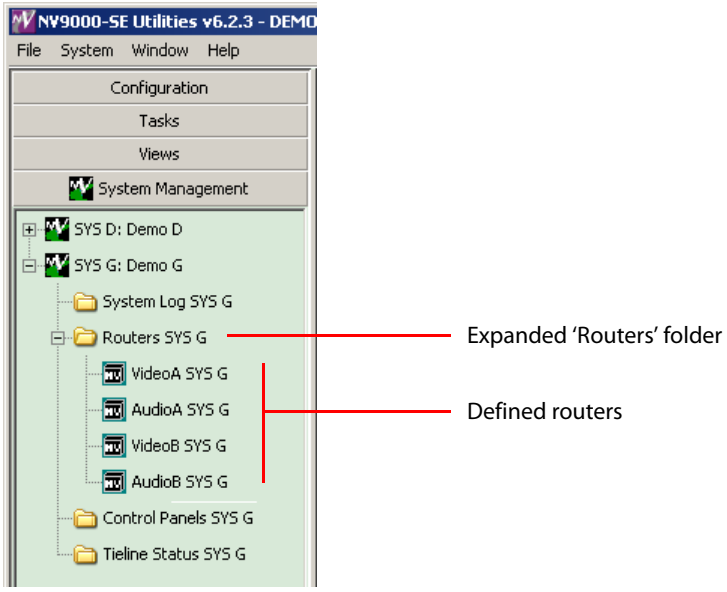
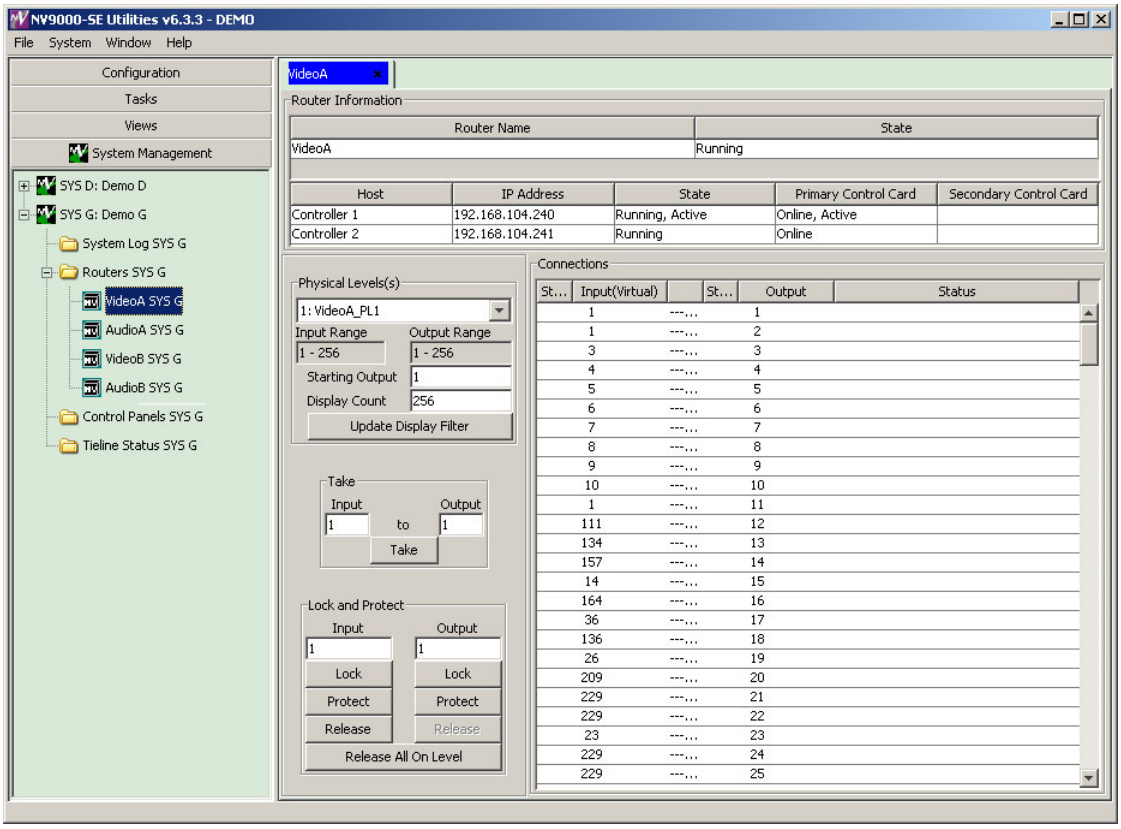


Fig. 1-2: Expanded Router Section

Each router page includes a representation of the router's crosspoints and tools with which you can perform takes or locks or unlocks with respect to that router:

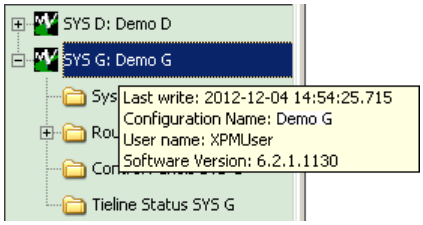


The system management pane and the working pages it references are independent of configurations. The information contained in the system management pages is determined by (1) the routers and control panels in your system, (2) the system controllers you have identified, and (3) the state of the routers and control panels in your system.

It is through the system management pages that you can control the operation of the system controllers and perform major and minor maintenance tasks on your system. That is, it is through the system management pages that you can (1) upload and download configurations to system controllers, (2) apply certain changes dynamically, (3) start, stop, and restart system controllers, and (4) set and clear locks, and change router crosspoint states.

Hovering

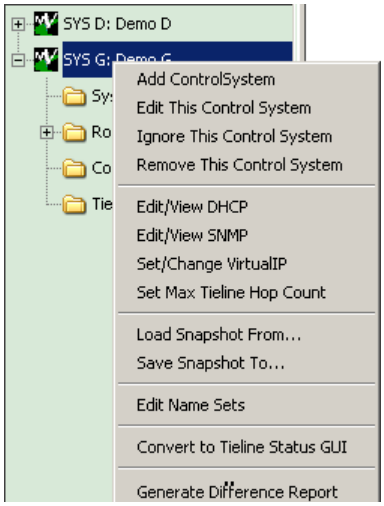
If you hover your cursor over a system controller in the system management pane, an information message pops up briefly:



This message tells you the name of the system controller's configuration, the date on which it was configured, and the software version of the system controller.

Context Menu

If you right-click any system controller in the system management pane, a context menu appears allowing you to configure additional aspects of the system controller:



The commands of the context menu are discussed under Navigation Pane, on page 86.

Menus

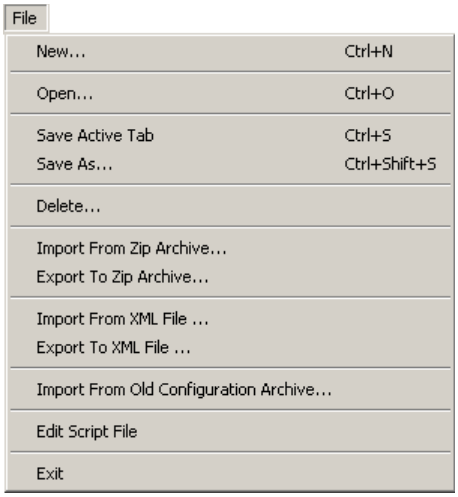
NV9000-SE Utilities has 4 very simple menus:

- File
- System
- Window
- Help

Of these, the 'File' menu is the largest.

File Menu

The 'File' menu has several commands:



You can find more detail about the File menu commands under File Menu, on page 19.

Most of the commands relate to opening or saving a configuration, either in the database repository on your PC or opening or saving an external file.

The 'File' menu also has an 'Exit' command. The 'Exit' commands terminates an NV9000-SE Utilities session.

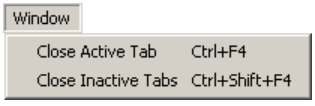
System Menu

The 'System' menu has one command:

The 'Add Control System' command adds a system controller (or a redundant pair of system controllers) to NV9000-SE Utilities's System Management page. After you add the system controller, the System Management page can communicate with the actual system controller.

Window Menu

The 'Window' menu has two commands:

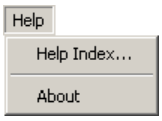


The 'Close Active Tab' command closes one tabbed page: the page that is currently displayed, i.e., the one that is in front of all other tabbed pages.

The 'Close Inactive Tabs' command closes all tabbed pages except the one that is active, i.e., it does not close the one that is in front of all other tabbed pages.

Help Menu

The 'Help' menu has two commands:



The 'Help Index . . .' command causes NV9000-SE Utilities' on-line help information to appear. You can search the help information or browse through it. The content of the on-line help is largely the same information as this PDF manual.

The 'About' command provides the current software revision of NV9000-SE Utilities.

Using Tables

Most configuration pages present data in tables. Each table row represents one record in the configuration data base. All records in the data base have an identification number.[3] Most — but not all — of the tables in NV9000-SE Utilities show the record identification number in the first column of the table. A notable exception is the control panels table, where the first column represents the panel ID and not the data base record ID.

Note that It is possible to import data to, and export data from, certain tables, mainly the input and output device tables. See Importing and Exporting, on page 547.

This is an example:

The table columns, of course, show the fields of the records represented on the table rows. The column titles are the field names.

3. These are SQL IDs.

Below the table, you will find one or more buttons with which to manipulate the table and its entries. In this illustration showing the 'Devices' page, the buttons are

- Edit Selected Devices.
- Add Device
- Delete Device.

The buttons for other configuration pages will be different.

You can select one or more rows in the table using standard techniques. Click a row to select a row. Click a row, then shift-click another row to select multiple contiguous rows. Control-click multiple rows to create a disjoint (or non-contiguous) selection.

In the 'Devices' page, if you select one or more rows, and then click 'Edit Selected Devices', NV9000-SE Utilities opens a configuration page for each device that you have selected.

If you select one or more rows, and then click 'Delete Device', NV9000-SE Utilities deletes each device that you have selected. (NV9000-SE Utilities will present a confirmation alert message before it deletes the rows).

If you click 'Add Device', NV9000-SE Utilities opens an 'Add Device' page in which you can specify a new device.

The many configuration pages in NV9000-SE Utilities contain different data, but all of their data tables function in much the same way.

Table Ordering

Tables can be adjusted to make viewing information easier. You can:

- Adjust the position and width of the table columns by sliding the column dividers between the column headers.
- Sort the table based on the data in a specific column by clicking the column header. Clicking once gives an ascending order; clicking again gives a descending order.
  - ▲ The initial view of a table follows NV9000-SE Utilities' default ordering.

Entering Data

Data are entered in table cells which correspond to data base *fields*. Fields can be "free text" in which you type in the data or fields can have drop-down lists from which you choose an entry. Clicking in a field either activates it for text entry or activates the field's drop-down list.

Filters

Many configuration pages have fill-in text areas or drop-down lists located at the top of the window. These are called *filters*. Filters let you reduce the number of items listed to only those that *contain* the text you entered in the filter(s). For example, if you enter "99" as a filter for a list of devices, only those devices that contain "99" in their name are displayed.

Many tables have a level set filter. Choose a level set in the drop-down list for these filters to restrict the table to those items that correspond to devices in the level set.

Table Shortcuts

These following key strokes, or shortcuts, help you position the *focus* of your activity on a particular table cell. That is, these shortcuts help you select a table cell:

- Tab and shift-tab

  Pressing tab, on your keyboard, advances through the cells of a table in the page, one cell at a time. If you press tab when the focus is at the end of a row, NV9000-SE Utilities moves the highlight to the next row and the focus to the first entry in that row.

  Pressing shift-tab advances through the cells of a table, but in reverse order.

  (Tabbing through a table does not help you unless you move the "focus" to a cell that is editable.)

- Up and down arrow keys

  These arrow keys move the "focus" up or down through the rows of a configuration table.

  The up and down arrows primarily select the next, or previous, row.

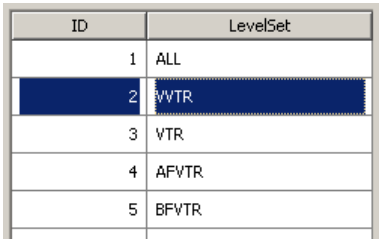
- Left and right arrow keys

  These arrow keys move the "focus" left or right through the fields of a table row — without advancing to another row.

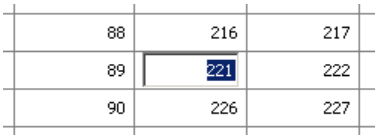
  (Moving within a row does not help you unless you move the "focus" to a cell that is editable.)

  Which table cell is selected might be hard to see, especially if the table row is highlighted. The selected cell is indicated

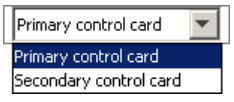
  (1) by a thin dotted line around the cell (in which case, the cell is not editable):



  (2) by the cell changing to an editing format:



  or (3) by the cell changing to a drop-down list:



- Single-clicking

  Single-click a table cell to edit the data in the cell.

- Double-clicking

  Double-click a table cell (that is not editable) to access the configuration page for the data represented by the row that contains the cell.

Shortcuts

NV9000-SE Utilities has several shortcut commands. All shortcuts are performed using keys on your keyboard.

Double-Click Option

To select and open any item in any page listed in the 'Configuration' pane, simply double-click on it. A page opens displaying details for that item.

File Menu

The following keyboard shortcuts relate to the 'File' menu:

- Ctrl+N — Creates a new configuration.
- Ctrl+O — Opens an existing configuration.
- Ctrl+S — Saves the current configuration.
- Ctrl+Shift+S — A "save as" command that saves the current configuration under a new name.

The 'File' menu lists the shortcuts next to the commands to which they apply.

When Configuring a Control Panel

These shortcuts are available when you are using NV9000-SE Utilities to configure a control panel:

- 'D' or 'd' — Makes the currently selected button a destination button. If the last button you selected was also a destination button, the new destination button is assigned the next destination in the list of destinations.
- 'S' or 's' — Makes the currently selected button a source button. If the last button you selected was also a source button, the new source button is assigned the next source in the list of sources.
- 'L' or 'l' — Makes the currently selected button a level button. If the last button you selected was also a level button, the new level button is assigned the next (virtual) level in the list of levels.
- 'C' or 'c' — Makes the currently selected button a category button. If the last button you selected was also a category button, the new category button is assigned the next category in the list of categories.
- 'U' or 'u' — Makes the currently selected button "undefined."
- 'Delete' key — The same as pressing 'U' or 'u'.
- 'T' or 't — Changes the panel selection focus to the 'Button Type' drop-down list. Same as clicking in the 'Button Type' field of the panel configuration page.

  When you are choosing an entry in the 'Button Type' field, you can press letter keys repeatedly to browse the lists of button types that start with that letter. For instance, pressing "S" repeatedly would cause the button type selection to become "Salvo," "Save Preset," "Selection," "Source," "Source Master," and "Source/Destination" in succession.

- ▲ Note that such changes in button type occur in the context of the 'Button Type' field. Pressing "S" (or any other letter) when you are not in the button type field has a different result, as noted above.

- '1', '2', '3' or '4' — Places the focus in the first, second, third or fourth (as applicable) drop-down list *after* the 'Button Type' field.
  - ▲ For these keys to work, you must have just previously selected a button proxy in the panel graphic.
- 'Alt' + 'b' — Moves the configuration page focus to the image (or proxy) of the button being configured.
- 'Alt' + 'Shift' + 'b' — Same as 'Alt' + 'b'.
- 'Tab' — If a button is selected, pressing tab moves the focus to the next button (in the button ordering). If a check box, text field, or drop-down box is selected, the focus is advanced to the next check box, text field, or drop-down box, in cyclical rotation.
- 'Shift' + 'Tab' — If a button is selected, the focus is moved to the previous button. If a check box, text field, or drop-down box is selected, focus is reverted to the previous check box, text field, or drop-down box in cyclical rotation.

What to Do and When to Do It

NV9000-SE Utilities is an integral part of getting your system controller up and running effectively and efficiently. Before using NV9000-SE Utilities, determine how data is going to be managed in your facility and decide what inputs and outputs can be grouped together. Inputs and outputs can be grouped together if they have a common attribute, such as a signal type, facility room, and so on. In general, signal type is the best grouping to use. Figuring this out from the start will make configuration easier, faster and help minimize having to make changes in the future.

Before using NV9000-SE Utilities, all routers should be configured using MRC or UniConfig configuration software for Grass Valley routers, or for third-party routers, configured according to the manufacturer's directions.

The levels entered for the routers (for Grass Valley routers, the levels are entered in MRC or UniConfig) will later be matched to the physical levels entered in NV9000-SE Utilities.

NV9000-SE Utilities saves all initial configurations and configuration changes to the database. Once changes are saved, there is no "undo" function; the configuration is permanently altered. To implement configuration changes, the NV9000 system controller must write the configuration and then be restarted.

Configuration Steps

All changes can be made offline and later implemented, or changes may also be made dynamically if NV9000-SE Utilities is currently connected to the system controller.

1. If necessary, add system controllers to NV9000-SE Utilities.
2. Add routers to NV9000-SE Utilities.

   Routers are added by entering the physical levels (partitions) to NV9000-SE Utilities. At this time, virtual levels can be mapped to physical levels. Virtual levels are abstractions that can be applied to any device or router and allow for inter-device communication.

3 Create level sets in NV9000-SE Utilities.

4 Add devices to NV9000-SE Utilities.

   Describe each device connected to the routers: what devices are sending a signal to the router and what devices are receiving signals from the router. Devices can only be added *after* level sets have been created. When added, each device should be assigned to a level set. The level sets should reflect the signals used by the device. NV9000-SE Utilities has no way of determining what signal type is being used by a device without assigning it a virtual level within a level set.

   Device information may also be imported from a spreadsheet.

5 Group devices by category in NV9000-SE Utilities.

   Organize devices into categories. Categories are groupings of devices with common attributes, such as device type (e.g., monitor), or location (e.g., studio A), or use (e.g., editing). Category labels display on control panels for operators, making selection quick and easy.

   A category can only be added *after* devices have been added to NV9000-SE Utilities. Not all devices must be added, but adding as many devices as possible before creating categories ensures that the categories accurately define the devices in your facility.

   Category information may also be imported from a spreadsheet.

6 Add control panels to NV9000-SE Utilities.

   Control panels, both hardware and software, are configured using NV9000-SE Utilities. Configuration control panel interfaces is relatively easy because NV9000-SE Utilities mimics the control panel layout and displays what the operator will see on the screen or panel.

7 Add or manage additional features in NV9000-SE Utilities:

   Depending on your facility needs, you can also:

   - Create salvos.
   - Create tielines.
   - Update hosts.
   - Add Master Control.
   - Manage users.

2 Menus

Chapter 2 describes the NV9000-SE Utilities menus.

Summary

Summary *19*
File Menu *19*
System Menu *26*
Window Menu *27*
Help Menu *27*

Summary

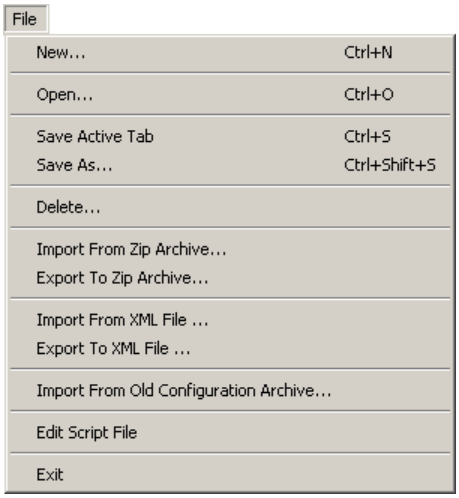
NV9000-SE Utilities has 4 menus:

- File
- System
- Window
- Help

Of these, the 'File' menu is the largest.

File Menu

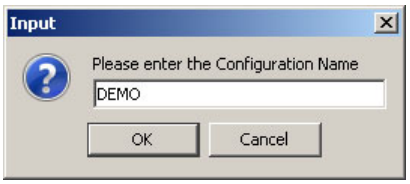
The 'File' menu primarily accesses configuration files. It has 12 commands:



These are the commands:

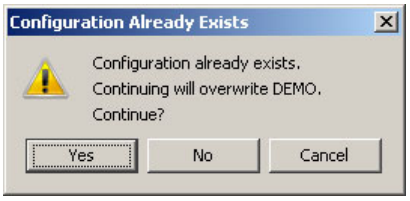
- New

  The 'New' command creates a new configuration. When you click 'New' — or type Ctrl-N — NV9000-SE Utilities presents a dialog in which you can specify the new configuration's name:



  Enter the new configuration name and click 'OK' to create the new configuration. Click 'Cancel' otherwise.

  If a configuration by the name you give already exists, NV9000-SE Utilities presents a confirmation dialog to protect you from overwriting existing data:

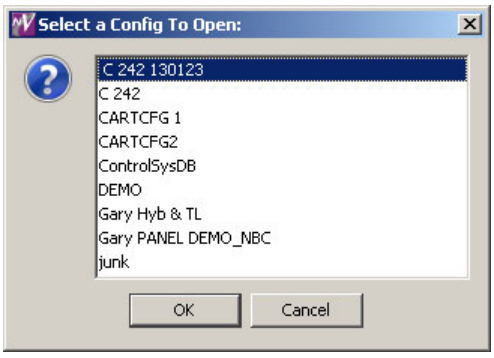


  Click 'Yes' to continue, 'No' to return to the dialog to enter another name, and 'Cancel' to abort the 'New' command.

  (The configuration created is stored — in a subfolder — in the folder `C:\Users\<user>\CtrlSysConfigs`.)

- Open

  The 'Open' command opens an existing configuration. When you click 'Open' — or type Ctrl-O — NV9000-SE Utilities presents a list of existing configurations from which you may choose one to open:



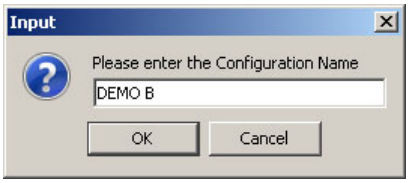
  The configurations listed are those named — as subfolders — in the folder `C:\Users\<user>\CtrlSysConfigs`. It is possible to move configurations (subfolders) in and out of `CtrlSysConfigs`. A configuration subfolder must have been created in NV9000-SE Utilities, otherwise NV9000-SE Utilities cannot open the configuration.

- Save Active Tab

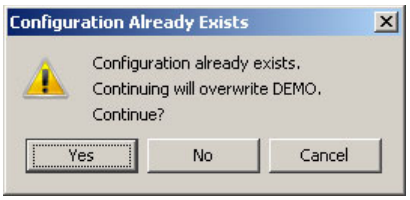
The 'Save Active Tab' command commits changes you have made in the active configuration (if that page that has a 'Save' button). Its function is exactly the same as the 'Save' button's function. The keyboard shortcut for this command, Ctrl-S, is a convenient way to save changes quickly and frequently.

- 'Save As . . .'

  The 'Save As . . .' command saves the configuration you are editing under another name. When you click 'Save As . . .' — or type Ctrl-Shift-S — NV9000-SE Utilities presents a dialog in which you can specify the new configuration's name:



  If a configuration by the name you give already exists, NV9000-SE Utilities presents a confirmation dialog to protect you from overwriting existing data:

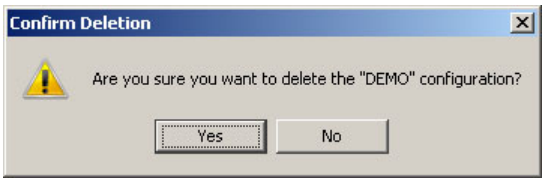


  Click 'Yes' to continue, 'No' to return to the dialog to enter another name, and 'Cancel' to abort the 'New' command.

  (The configuration saved is stored — in a subfolder — in the folder `C:\Users\<user>\CtrlSysConfigs`.)

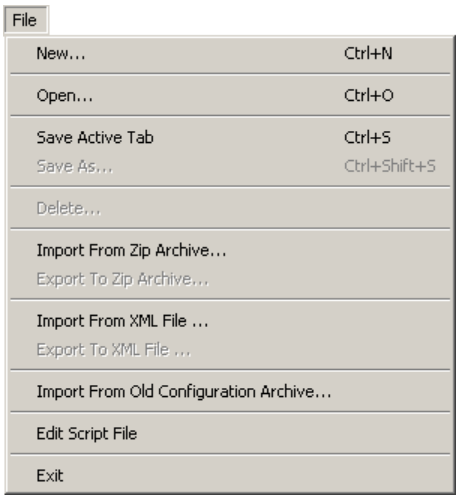
- 'Delete . . .'

  The 'Delete . . .' command deletes the configuration you are editing. When you click 'Delete . . .', NV9000-SE Utilities presents a confirmation dialog:



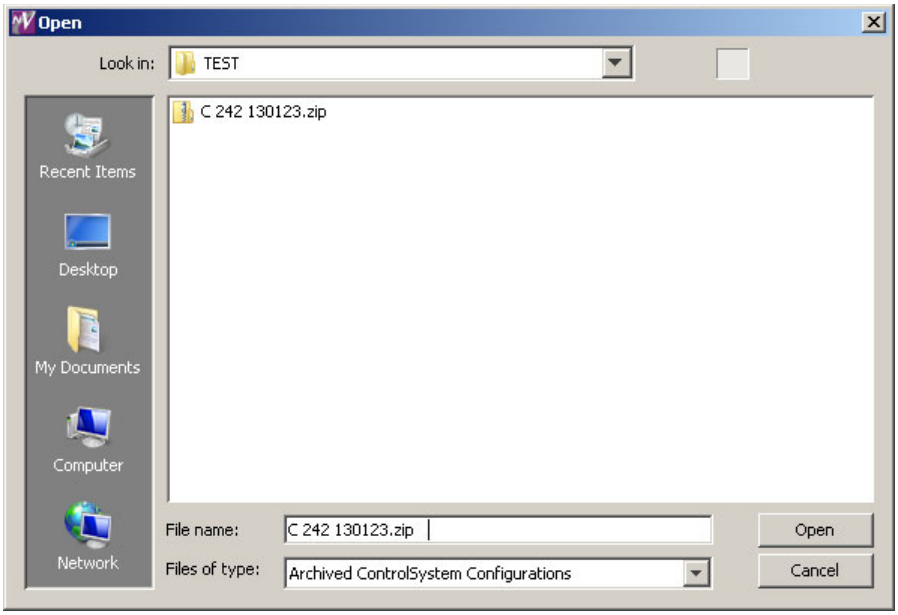
  Click 'Yes' to delete the configuration or 'No' to cancel the deletion.

After you delete the configuration, NV9000-SE Utilities has no configuration open. and the 'File' menu has a reduced set of commands:



- 'Import from Zip Archive . . .'

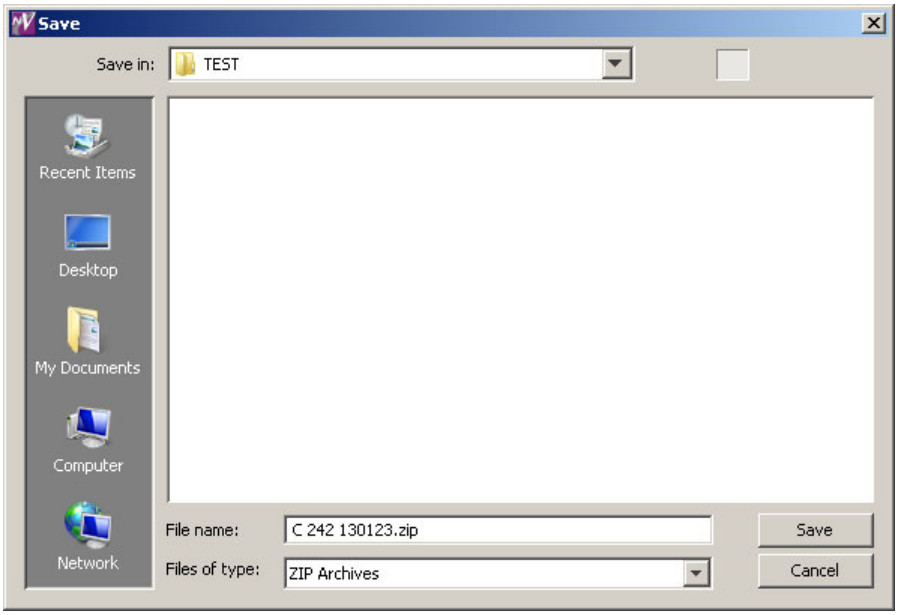
  The 'Import from Zip Archive . . .' command opens a configuration that was previously exported as a .zip file, perhaps remotely. When you click 'Import from Zip Archive . . .', NV9000-SE Utilities presents an 'Open' dialog:



  Browse to locate the .zip file in which you are interested. Select the file and click 'Open' to open the .zip file or click 'Cancel' to stop the operation.

- 'Export to Zip Archive . . .'

  The 'Export to Zip Archive . . .' command saves your configuration in a .zip file. The .zip file can be opened later, perhaps at another workstation. When you click 'Export to Zip Archive . . .', NV9000-SE Utilities presents a 'Save' dialog:

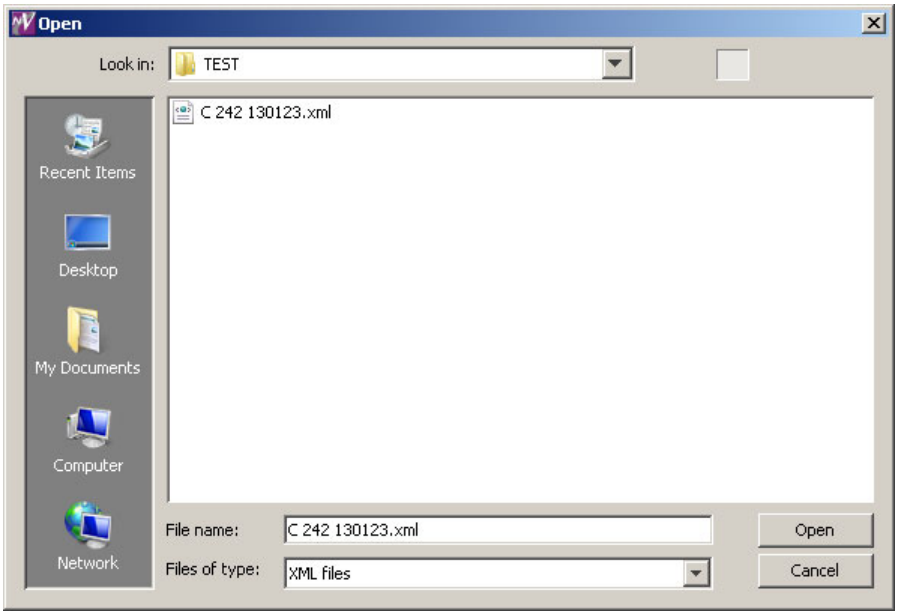


  Browse to locate the folder in which to save the .zip file. The default name for the file is the configuration name (followed by .zip). You may enter any name you like. Click 'Save' to save the .zip file or click 'Cancel' to stop the operation.

  The .zip file you create this way may be opened with the 'Import from Zip Archive . . .' command in any instance of NV9000-SE Utilities anywhere (as long as the instance is at a recent revision).

- 'Import from XML File. . .'

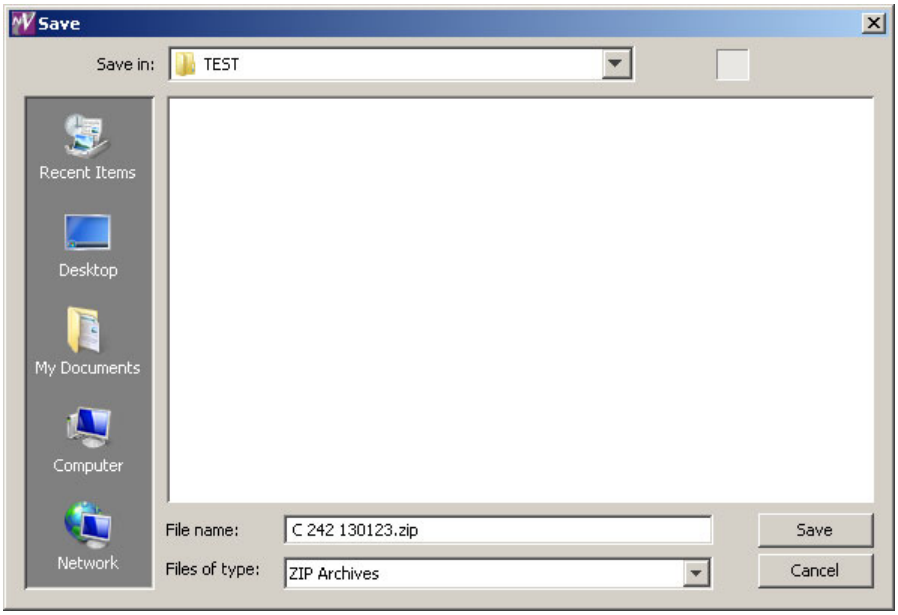
  The 'Import from XML File . . .' command opens a configuration that was previously exported as an XML file, perhaps remotely. When you click 'Import from XML File . . .', NV9000-SE Utilities presents an 'Open' dialog:



  Browse to locate the .xml file in which you are interested. Select the file and click 'Open' to open the .xml file or click 'Cancel' to stop the operation.

- 'Export to XML File. . .'

  The 'Export to XML File . . .' command saves your configuration in a .xml file. The .xml file can be opened later, perhaps at another workstation. When you click 'Export to XML File . . .', NV9000-SE Utilities presents a 'Save' dialog:

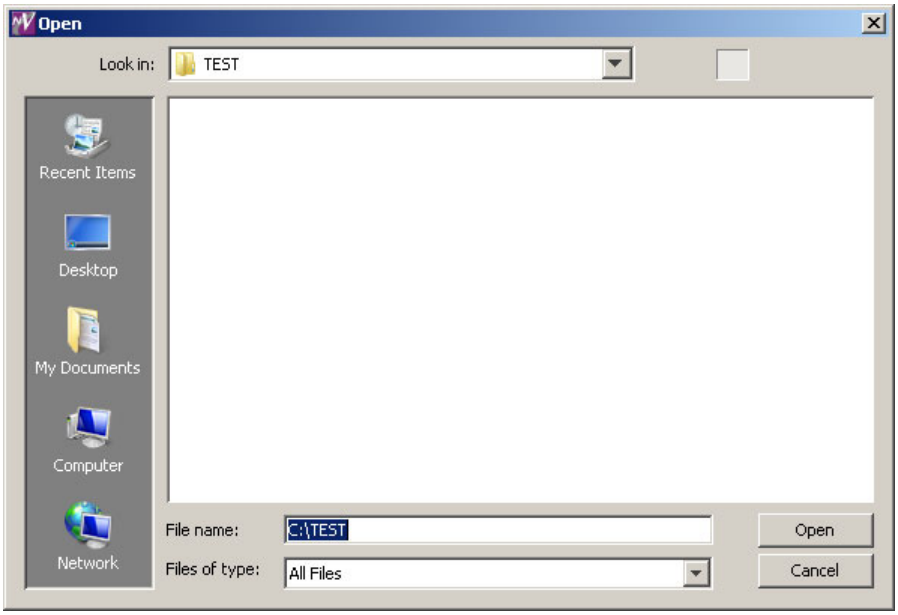


Browse to locate the folder in which to save the .xml file. The default name for the file is the configuration name (followed by .xml). You may enter any name you like. Click 'Save' to save the .xml file or click 'Cancel' to stop the operation.

The .xml file you create this way may be opened with the 'Import from XML File . . .' command in any instance of NV9000-SE Utilities anywhere (as long as the instance is at a recent revision).

- 'Import from Old Configuration Archive . . .'

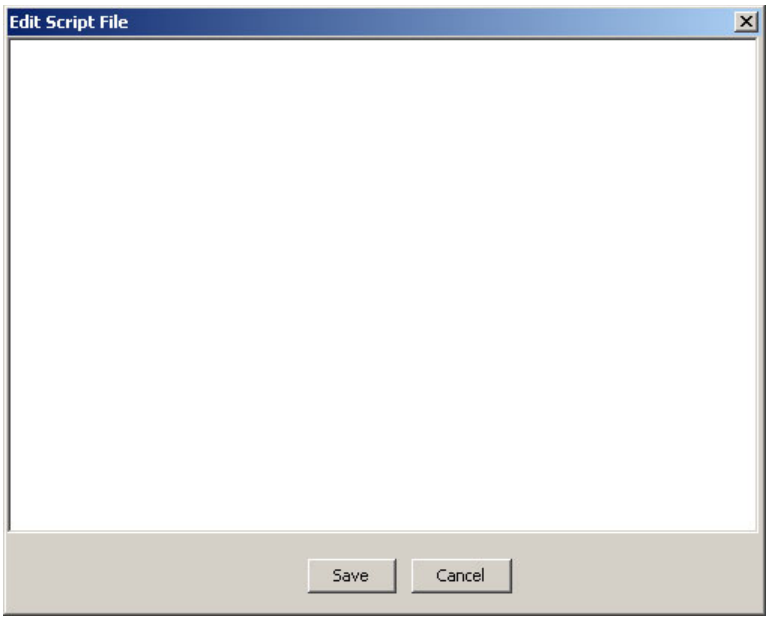
  The 'Import from Old Configuration Archive . . .' command opens a configuration that was previously exported in a very old configuration (prior to NV9000-SE Utilities v4.0). When you click 'Import from Old Configuration Archive . . .', NV9000-SE Utilities presents an 'Open' dialog:



Browse to locate the archive in which you are interested. Select the file and click 'Open' to open the archive or click 'Cancel' to stop the operation.

- Edit Script File

  This command is *only for Grass Valley service technicians.* (If you click the command, a window appears in which you can edit a script.)



  If you are not a Grass Valley service technician, you may ignore this command (and its window).

- Exit

  To leave and close NV9000-SE Utilities, click 'Exit'.

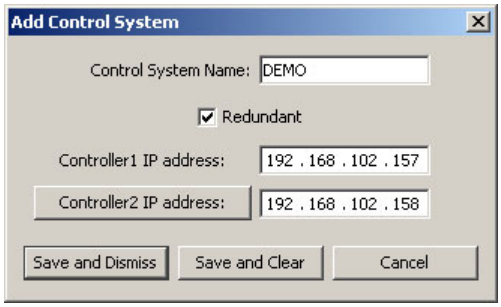
System Menu

The 'System' menu has one command: 'Add Control System':

When you click 'Add Control System', NV9000-SE Utilities presents a dialog in which to identify the control system.

▲ Here, by "control system" is meant an NV9000 system controller, i.e, an NV960, NV920 or a redundant pair of NV60s or NV920s.

This is the dialog:



Place a check in the 'Redundant' check box if your control system is a pair of system controllers. Enter the name of the control system in the 'Control System name' field.

Enter the IP address of the first system controller in the first IP address field. If the control system is redundant, also enter the IP address of the second system controller in the second field.

Click 'Save and Dismiss' to create an entry in the 'System Management' page and close the dialog.

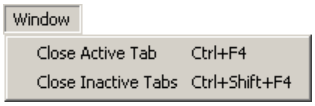
Click 'Save and Clear' to create an entry in the 'System Management' page and keep the dialog open so that you can create another control system.

Click 'Cancel' to close the dialog without creating another control system entry in the 'System Management' page.

The control system entries you create appear as icons in the left side of the 'System Management' page. The icons appear green when the actual control system is healthy, yellow when the control system is partially healthy (and communication with the control system can be established) and red when communication cannot be established.

Window Menu

The 'Window' menu has two commands that refer to the visible configuration pages (or tabs):



These are the commands:

- Close Active Tab

  When you click 'Close Active Tab' — or Ctrl-F4 — NV9000-SE Utilities closes the active configuration page. The active page is the one that is in the foreground among the configuration pages that are displayed.
- Close Inactive Tabs

  When you click 'Close Inactive Tabs' — or Ctrl-Shift-F4 — NV9000-SE Utilities closes all the inactive configuration pages. The active page is the one that is in the foreground among the configuration pages that are displayed. Inactive pages are all the other pages.

Help Menu

The 'Help' menu has two commands:

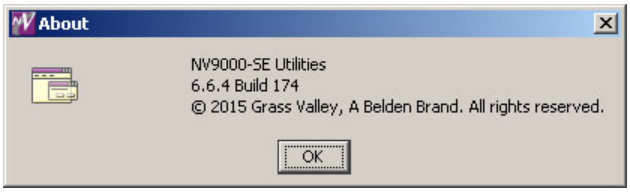
These are the commands:

- 'Help Index . . .'

  When you click 'Help Index . . .', NV9000-SE Utilities opens the on-line help system.

- About

  When you click 'About', NV9000-SE Utilities displays information about NV9000-SE Utilities and its revision:



3 Installation

Chapter 3 provides installation instructions.

NV9000-SE Utilities normally ships to you on a Grass Valley software and documentation CD (part number SB0033-17). Use the CD's autoplay menus to navigate to, and click the installation button for, NV9000-SE Utilities.

If you have received the NV9000-SE Utilities installation program by some other means, simply locate and double-click the installer file.

The installation process will then begin. It is simple and quick.

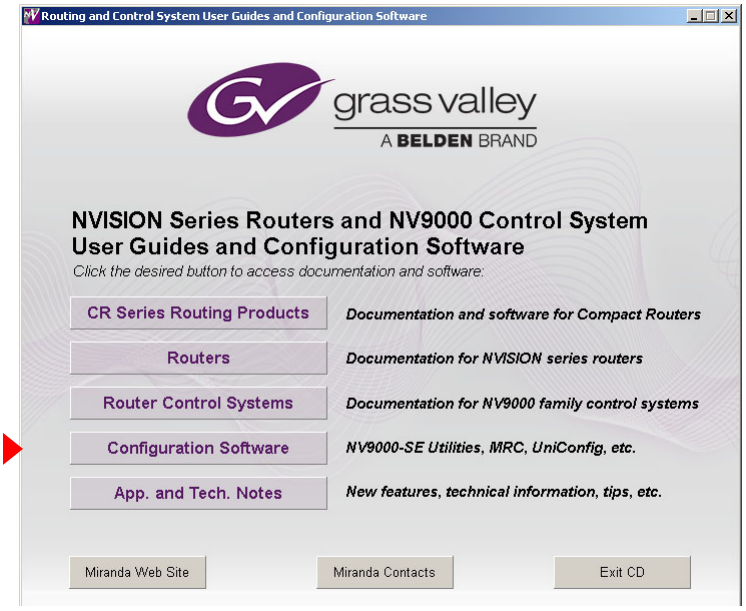
You may install NV9000-SE Utilities on as many PCs as you like.

- NV9000-SE Utilities runs under Windows XP, Windows Vista, or Windows 7.

Take the following steps to install NV9000-SE Utilities.

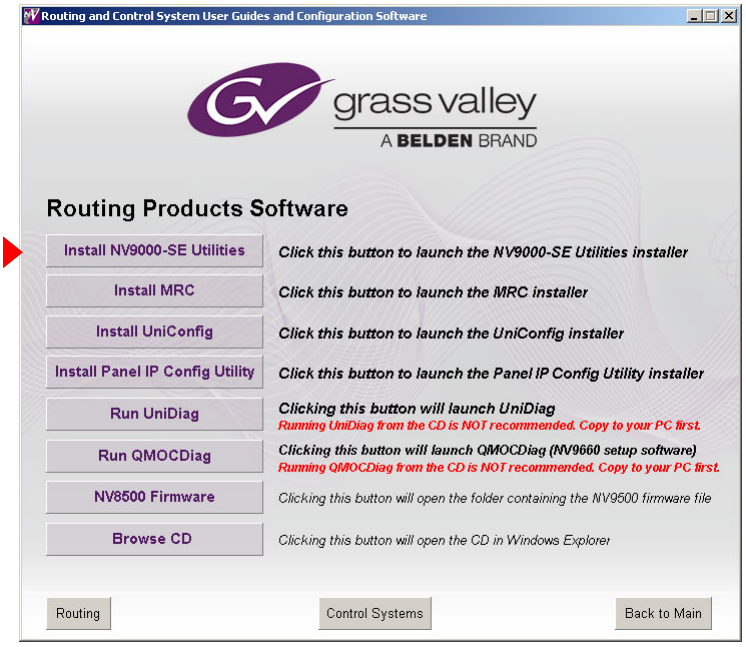
From the CD

1. Place the SB0033-17 CD provided in the CD ROM drive of your PC. The CD should automatically display its initial menu after a few seconds:



Click 'Configuration Software'.

2 In the window that appears next, click 'Install NV9000-SE Utilities':



The installer will launch and present several simple dialogs regarding your preferences for the installation.

If the autoplay menu fails to appear (as it might on systems having strong security), open the CD and navigate to `<cd drive>:\Software` and double-click the NV9000-SE Utilities installer. It will be named `SEUtilitiesV6.3.3 Installer.exe` or similar, depending on its software revision.

3 Proceed to step 1, following, to complete the installation.

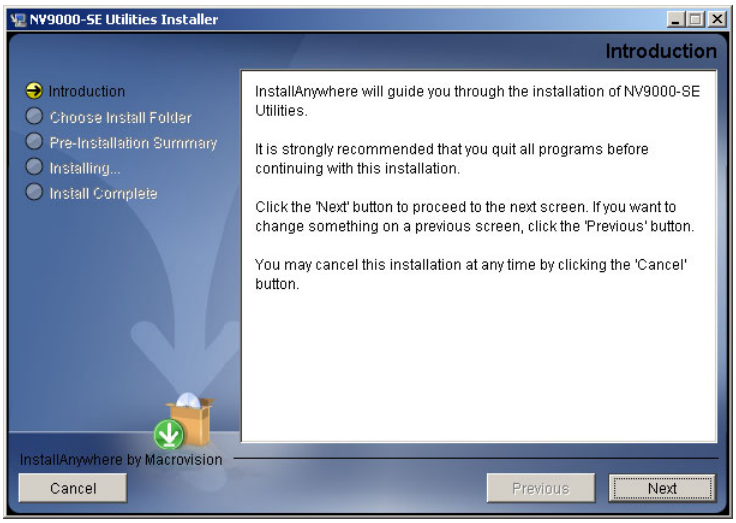
Without the CD

1 If you have received the NV9000-SE Utilities installation program from a Grass Valley service technician, perhaps on a USB device, locate and double-click the installer file. This file will be named `SEUtilitiesV6.3.3 Installer.exe` or similar, depending on its software revision. The installation process will begin.

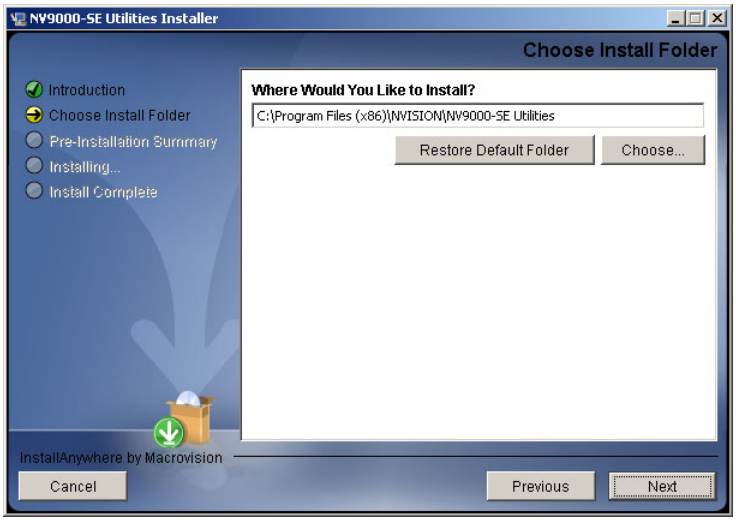
2 Proceed to step 1, following, to complete the installation.

In Either Case

1 A few moments after you launch the installer, its first window appears:



2 Read the introductory information and click **Next** to proceed. The 'Choose Install Folder' screen appears:

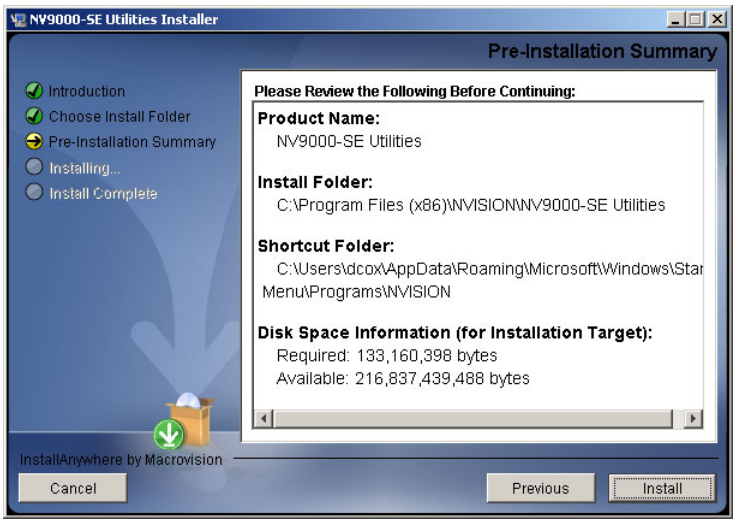


3 Click **Choose** to browse to the folder you want.

At any time, you can click **Restore Default Folder** to choose the installer's default folder. By default, NV9000-SE Utilities is installed at: `C:\Program Files\Miranda\NV9000-SE Utilities\.`

Finally, click **Next**.

4 Verify that the information on the 'Pre-Installation Summary' screen is correct, as shown:



To update the information that displays, click **Previous** to return to a previous screen, updating information as needed. When you are done, click **Next** on each screen until the 'Pre-Installation Summary' screen appears.

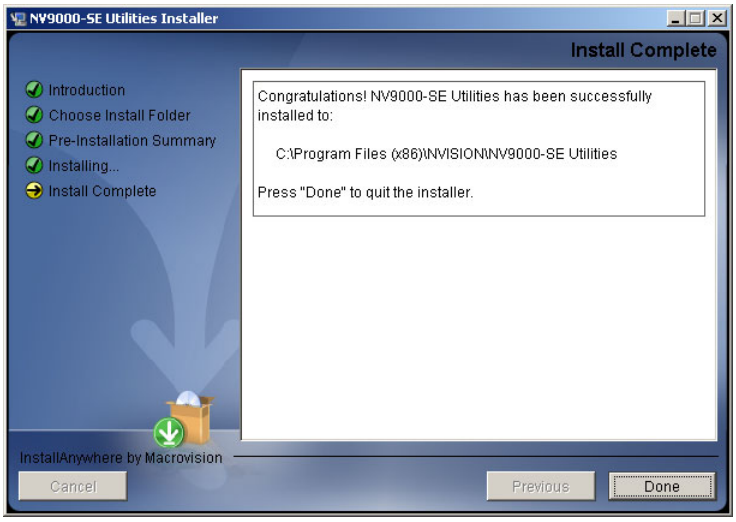
Finally, click **Install**.

5 The 'Installing . . .' screen appears, showing installation progress:

Installation proceeds automatically.

Click **Cancel** if you want to cancel the installation.

6 When the installation is complete, the 'Installation Complete' screen appears:



Click the radio button to restart your computer either now or at a later time. Then click **Done**. It is recommended that you restart your computer at this time. The installation window closes.

When your computer restarts, NV9000-SE Utilities will be installed. Until you restart, NV9000-SE Utilities will not function correctly.

4 Routers

Chapter 4 describes the 'Routers' configuration page.

Summary

Introduction to NVISION Series Routers *35*
Router Configuration in NV9000-SE Utilities *38*
'Routers' page *39*
'Add Router' page *40*
Router Details Page *44*
'Routers' table *49*
'Router Controls' table *50*
Control Points table *54*
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'Find Routers' page *57*
Virtual Crosspoints *59*
NVISION Profiles *62*

Introduction to NVISION Series Routers

An NVISION series router is a device that has a certain number of inputs and outputs and internally connects inputs to (one or more) outputs, allowing signals to flow from the input to the output. Inputs and outputs are connected to ports of video and audio devices of various kinds. When an input is connected to an output, we say it is *routed* to the output. (We also say it is *taken* to the output).

With the exception of machine control routers, all NVISION series routers are called "X-Y" routers or *standard* routers. These routers have *M* inputs and *N* outputs that can be depicted as an X-Y grid with inputs on one axis and outputs on the other. They employ one or more crosspoint switches to perform the routing. The X-Y routers are non-blocking: any input can be routed to any or all outputs.

In contrast, machine control routers use a point-to-point architecture, with exceptions. Ports are bidirectional. One machine control port can be connected, as an input, to one other port, as an output. The exceptions are when a machine control router is used as a "data router" in which case it is considered an X-Y router and when the machine control router is in broadcast mode.

Large-Format Routers

Grass Valley's NVISION series routers include:

NV8500 Series	Includes the NV8140, NV8144, NV8280, NV8576, and NV8576-Plus. These routers vary in size up to 1152×1152 (video) and 18,432×18,432 (audio). The NV8500 series supports 3Gig, HD, and SD, AES, MADI, and IP.
NV8256-Plus	The NV8256-Plus is a 22RU video router that supports 3Gig, HD, and SD, up to 512×512.
NV8288, NV8288-Plus	The NV8288 is a 10RU video router (about 12" deep) that supports HD and SD, up to 288×576. The NV8288-Plus, in two frames, supports a 576×576 matrix.
NV7512, NV7512-Plus	The NV7512 is a 14RU audio router that supports analog audio, AES and MADI. The NV7512 has a 512×512 matrix. The NV7512-Plus is expandable to 2048 × 2048 (4096×4096 mono).
NV5256, NV5256-Plus	The NV5256 is an 8RU machine control router connecting up to 256 machine control ports. The NV5256-Plus, in two frames, supports 512 ports. The NV526 and NV5256-Plus can be used as data (X-Y) routers also.
NV5128-MFR	The NV5128-MFR is a multi-format router (hence, MFR). It switches video (analog or digital), audio (analog or AES) and machine control signals. It is highly configurable and has a 128×128 crosspoint matrix. The NV5128-MFR also supports (now discontinued) master control modules and their functions.

There are other router models. Most of them are no longer in production.

The NV8500 family *hybrid* routers are configured in MRC. All other routers, including NV8500 family *standard* routers, are configured in UniConfig.

The inputs and outputs handled by routers are configurable in NV9000-SE Utilities, and the definition of I/O devices is properly a control system subject, not a router subject.

Compact Routers

Grass Valley also has an extensive series of compact routers, ranging in size from 8×2 to 32×32, and compact control panels. The CR series, as these routers are called, support analog and digital video (including 3Gig, HD, and SD), analog and digital audio, and machine control. Included in the CR series is a set of "clean and quiet" routers — the CQX routers — that can perform video and audio fades during transitions.

All compact routers are configured in CRSC (Compact Router System Configurator).

Compact control panels, when configured, are usually configured in NV9000-SE Utilities.

Definitions

A router *input* or a router *output* is a single connector or a group of terminals that functions as a single connector. (Inputs and outputs are collectively called *ports*.)

The devices connected to router *inputs* are called *source devices.* A source device (in NV9000-SE Utilities) is a set of inputs (on one or more routers).

The devices connected to router *outputs* are called *destination devices.* A destination device (in NV9000-SE Utilities) is a set of outputs (on one or more routers).

Some devices (such as VTRs) have both inputs and outputs. Thus, in NV9000-SE Utilities, a device can be both a source and a destination (i.e, it comprises a set of input ports and output ports.)

Partitions

The crosspoint matrix of a router can be partitioned. Partitions can exist for several reasons. For instance, some routers support more than one signal type. Thus partitioning is a way to allow different signal types to coexist in one router.

A partition is usually called a *physical level.* This is in distinction from a *virtual level* which is another NV9000-SE Utilities concept.

Principles of Partitions

1. A partition has a defined size and includes both inputs and outputs. It also has a defined partition type. (See Partition Types, following.) The size is configured as a starting port number and ending port number for inputs and the same for outputs.
2. Signals can be switched only within a partition, never directly from one partition to another.
3. A router crosspoint matrix must be configured as having at least one partition. It can be the entire matrix.
   - ▲ If the entire matrix is a single partition, the matrix is not actually partitioned (i.e., divided into parts). However, the configuration data base requires you to define at least one partition.
4. Partitions may overlap. For example, if an NV8500 standard router has AES cards interspersed with video cards, it is acceptable to define two partitions that overlap completely — one video and one AES — and that occupy the entire crosspoint matrix space.
5. Not every port in a partition need be used.
6. The NV8500 hybrid routers have two distinct matrices: one for video and one for audio. The matrix for audio is not a crosspoint matrix; it is a TDM "matrix" that for convenience is treated as a crosspoint matrix. It is generally necessary to define one partition for the video and another for the audio.
7. As is evident with the NV8500 hybrid routers, not every port in a partition is available. Each disembedder card, for instance, has 16 unused or unusable audio ports. These ports are numbered in the partition, but do not have any corresponding circuitry.
8. It is possible to overlay router partitions to implement both a stereo model for switching audio and a "mono" model.
9. Partitions are defined in MRC or UniConfig, which configure routers. The same partitions must also be defined — identically — in the router definitions in NV9000-SE Utilities.

Most NVISION series routers allow up to 4 partitions. The NV5128-MFR allows 8 partitions because it supports many signal types.

Partition Types

These are the supported partition types, for NV8500 series routers:

Video	Audio
Digital Video	Asynchronous AES
	Synchronous Audio
	Synchronous Stereo Audio

For the NV8500 series, the term "synchronous audio" means audio that is switched according to the timing of a video signal and a video reference. The term "asynchronous AES" refers to AES signals that are independent of any video.

These are the supported partition types, for all other routers:

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

Some partition types include more than one signal type. Some signal types are represented by more than one partition type. The partition types do not necessarily mean the same for all routers.

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

The 4 machine control partition types have different purposes and therefore behave differently.

Artificial Partition Types

UniConfig allows two additional *artificial* partition types:

- Monitor
- Output Follow

MRC also allows a monitor partition type.

We say they are *artificial* because these types do not define a portion of the router's crosspoint matrix, but use UniConfig's partition table as a convenient way to define router functions. (Control panel operators can use these levels, even though they are not part of the crosspoint matrix.)

Router Configuration in NV9000-SE Utilities

An NV9000-SE Utilities configuration includes one or more router descriptions. You can create or modify router configurations in several places within NV9000-SE Utilities:

- The 'Routers' page under the 'Configuration' pane.
- The 'Add Router' page, under the 'Tasks' pane.
- The 'Routers' table, under the 'Views' pane.
- The 'Router Controls' table, under the 'Views' pane.

These pages all give you different views of the same data.

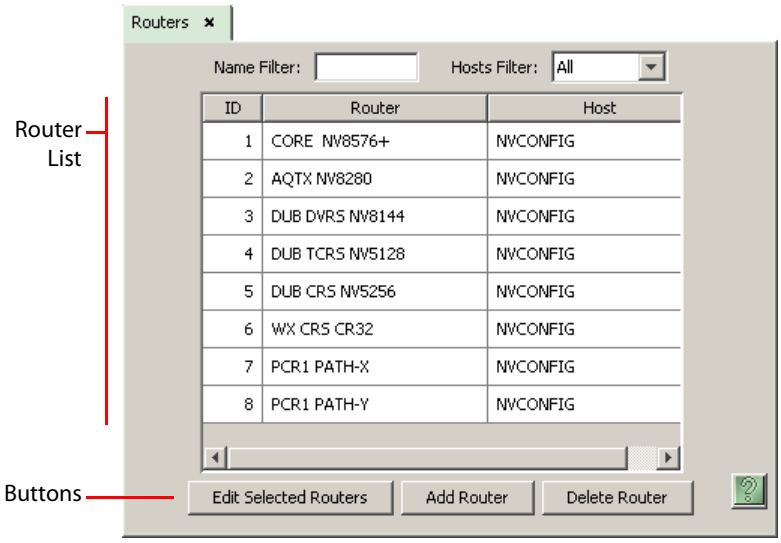
You can also view and modify router crosspoints in the 'System Management' pane. (The crosspoints are live data. Changing crosspoint data is not configuration.)

You can also produce lists of router ports in varying detail using the 'View Router Ports' page, under the 'Tasks' pane.

The Control Points table, under the 'Views' pane, can useful or even necessary to perform some router configuration tasks.

'Routers' Page

Click 'Routers' in the 'Configuration' pane to show the 'Routers' configuration page:



This page provides a simple list of the routers defined in the configuration.

At the bottom of the page are 3 buttons that let you add, delete, or change router definitions:

- 'Edit Selected Routers' Button
- 'Add Router' Button
- 'Delete Router' Button

Router List

The router list, initially empty for new configurations, becomes populated when you define routers using the 'Add Router' configuration page. See 'Add Router' page, on page 40.

Each entry in the router list has 3 fields:

- ID. The first is the data base ID for the router. These numbers are generated automatically and you cannot change them, but they might help you distinguish identically named routers.
- Router. The second field is the router name.
- Host. The third field is the host name — the name of the primary system controller. Usually the host name is "NVCONFIG" unless you change the name in the system controller.

  All routers should reference the same primary system controller.

You can use standard click, shift-click, and control-click techniques to select one or more routers in the list.

‘Edit Selected Routers’ Button

This button opens a router details page for each of the routers you have selected in the list. It is in the router details page that you specify (1) a router’s physical levels and (2) a router’s functional details.

See Router Details Page, on page 44.

‘Add Router’ Button

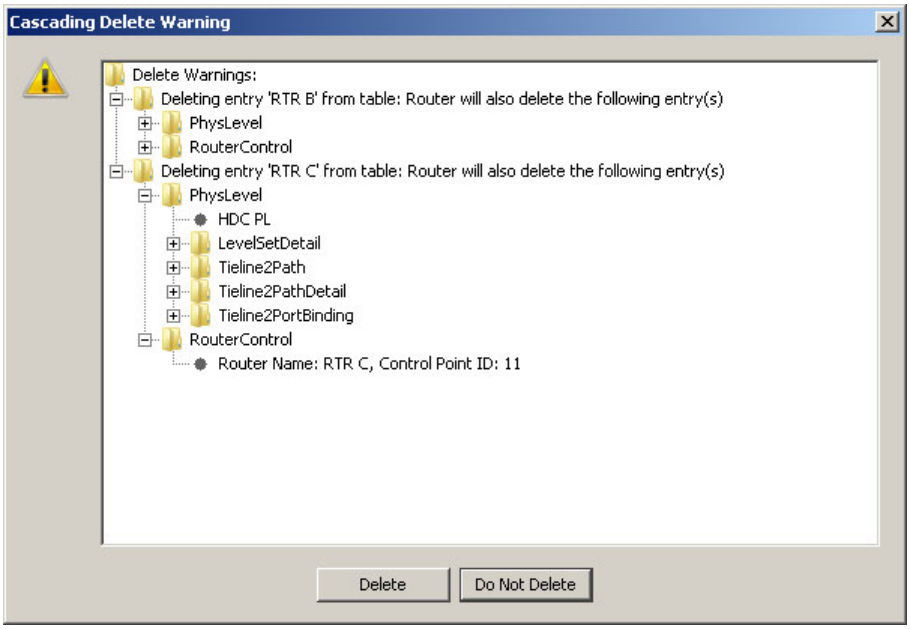
This button causes NV9000-SE Utilities to display the ‘Add Router’ page. The ‘Add Router’ page starts a router definition.

See ‘Add Router’ page, on page 40.

‘Delete Router’ Button

This button deletes all the routers you have selected in the router list.

NV9000-SE Utilities presents a warning dialog before it deletes the routers:



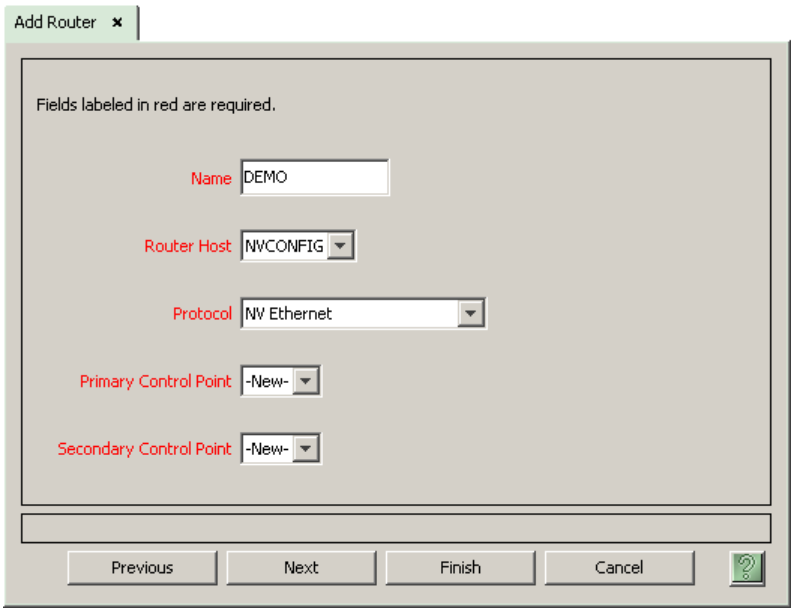
There is no undo: after the routers are deleted, you cannot retrieve them.

‘Add Router’ Page

The ‘Add Router’ page starts a sequence of steps, in multiple pages, in which you create a new router definition. There are two ways to get the ‘Add Router’ page:

- Click the ‘Add Router’ button at the bottom of the ‘Routers’ page (of the ‘Configuration’ pane).
- Click ‘Add Router’ in the ‘Tasks’ pane.

This is the 'Add Router' page:



This page, as the start of a sequence, provides several fields that identify the basic properties of a router:

- Name
- Router Host
- Protocol
- Primary Control Point
- Secondary Control Point (not present for serial protocols and some others)

At the bottom of the page are buttons that allow you to move through the sequence of steps in router definition:

- Previous
- Next
- Finish
- Cancel

The buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

Name

Enter the name for the router in this field. The name of the router helps distinguish one router from another within NV9000-SE Utilities. Router names do not mean very much otherwise.

Router Host

The 'Host' drop-down list provides a list of the hosts defined in your configuration.

A router's host is the system controller in an NV9000 system that controls the router. (There are potentially many controllers in the system.)

Choose the host you prefer from the drop-down menu. The default, and most frequently encountered, host is NVCONFIG.

To define hosts, use the Hosts Table of the 'Views' pane.

Protocol

The 'Protocol' drop-down list provides a list of the router communication protocols from which you can choose. A protocol is the medium or "language" in which the system controller (the host) interacts with the router.

These are the protocols included in the list:

DHD Serial Router	Datatek D-2815 Serial	Encore Router
GVGF Horizon TCI	ISIS Serial	Jupiter Bridge Router
Jupiter ESbus	Klotz Serial Router	Lawo Serial Router
NV Compact Router Ethernet	NV Control System Ethernet	NV Ethernet
NV Master Control Ethernet	NV Serial-Private	NV Serial-Public
Pesa	Probel Router	Sierra Video
Sony CART+ Serial	Stagetec Nexus Router	Trinix Ethernet Router
Utah RCP-1	Virtual Router	

Some of the protocols exist for the benefit of one customer; other protocols are for obsolete products or for products of companies that are no longer in business.

The default protocol is 'NV Ethernet'.

Choose the protocol, from the drop-down list, that applies to your router. For NVISION series routers, you should usually choose 'NV Ethernet' or 'NV Serial-Public'. The protocol you choose might require some level of support from Grass Valley technical personnel.

- The 'Virtual Router' protocol allows you to define a router without actually having a router present in the system.

Control Points

A control point is a coded description of the connection between the system controller (the host) and the router. There are two types of connections and therefore two types of control points: Ethernet and serial.

There are often two control point fields — drop-down lists — in the page. But depending on the router protocol you choose, the secondary control point might be absent. A secondary control point is not present for serial protocols and for some other protocols.

The default choice in the drop-down list is '-New-'. This particular choice means that you intend to define the control point in the router details page, which is the next page in the router definition sequence. Sometimes '-New-' is the only choice in the list.

- If you want to review the existing control points in your configuration, go to the 'Control Points' table under the 'Views' pane.

Serial control points are expressed as a text string beginning with S and containing several fields, separated by commas. Simple Ethernet control points are expressed as a text string beginning with E, followed by a comma, followed by an IP address. This is a sampling:

Parameters	Description
S,5,38400,N81	COM5 P0 NVCONFIG
S,6,38400,N81	COM6 P1 NVCONFIG
S,7,38400,N81	COM7 P2 NVCONFIG
S,8,38400,N81	COM8 P3 NVCONFIG
S,9,38400,N81	COM9 P4 NVCONFIG
S,10,38400,N81	COM10 P5 NVCONFIG
S,11,38400,N81	COM11 P6 NVCONFIG
S,12,38400,N81	COM12 P7 NVCONFIG
E,192.168.1.25	Enet Addr 192.168.1.25 DEFAULT DESC
E,192.168.104.172	Enet Addr 192.168.104.172 DEFAULT DESC
E,192.168.104.246	Enet Addr 192.168.104.246 DEFAULT DESC
E,192.168.1.16	Enet Addr 192.168.1.16 DEFAULT DESC

These are the parts of the serial encoding, from left to right:

- The COM port number.
- The Baud rate.
- The communication parameters.

  This is a 3-character term. The first character is the number of parity bits. "N" means no parity bit. The second character is the number of data bits. Normally this is 8. The third character is the number of stop bits. Normally this is 1.

  The default for most serial ports is "N81."

For simple Ethernet encoding, only an IP address is required. Some routers require additional fields for which both syntax and meaning depend on the actual hardware supported through the control point.

'Previous' Button

Click the 'Previous' button if you want to go to the previous page in the router definition sequence.

'Next' Button

Click 'Next' to go to the router details page. In this page, you can enter control point data, specify the router's physical levels, and set of number of other parameters regarding the router.

'Finish' Button

Click 'Finish' to accept the router thus far defined in the 'Add Router' page.

The router definition, as defined in the 'Add Router' page is incomplete. You must later go to the router details page to complete the definition.

This button allows you to create a number of router definitions rapidly and complete them later.

After you click 'Finish', the 'Add Router' page remains and is re-initialized for additional entries.

'Cancel' Button

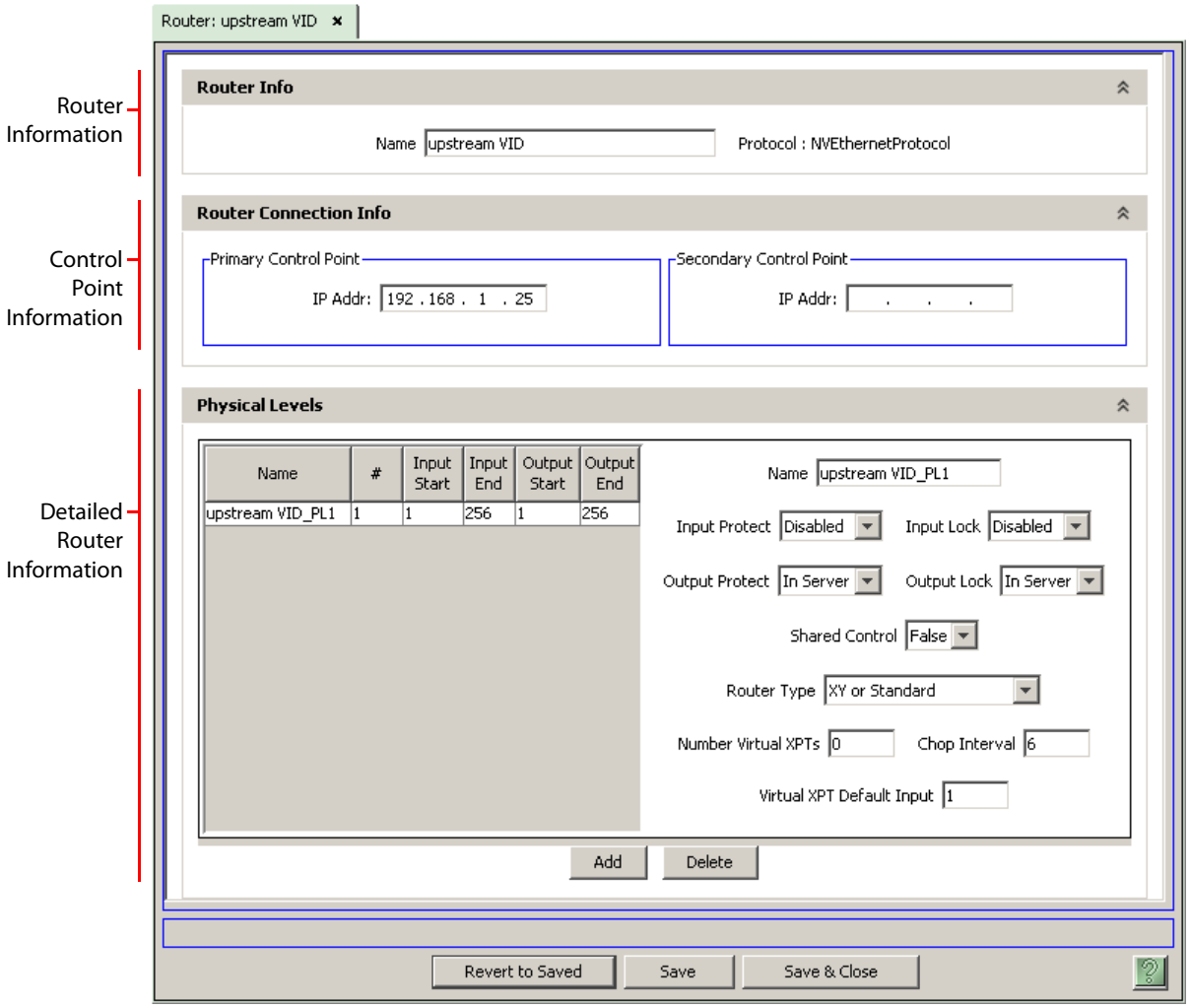
Click 'Cancel' if you want to terminate the router definition you started.

When you click 'Cancel', the 'Add Router' page re-initializes for another entry.

Router Details Page

The router details page is not called "router details" in NV9000-SE Utilities. A router details page appears either when you select a router for editing in the 'Routers' page, when you click 'Next' in the 'Add Router' page, or when you click 'Edit' in the 'Routers Table' page.

This is a typical router details page:



The router details page has 3 main collapsible sections:

- Router information
- Control point information
- Detailed router information

The sections are identified by a gray bar across the page. At the right end of each gray bar is a chevron. Click the chevron to collapse or expand the section. The chevron points up or down in context, depending on whether the section is collapsed or not:

At the bottom of the page are 3 simple buttons:

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the router definition, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

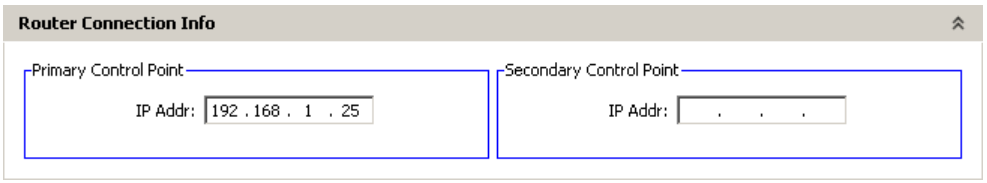
Router Information

This section presents the name and protocol of the router:

You can edit the router's name here but you cannot change the protocol in this section. For that you must use the 'Routers' table under the 'Views' pane.

Control Point Information

This section presents the router's control point(s):



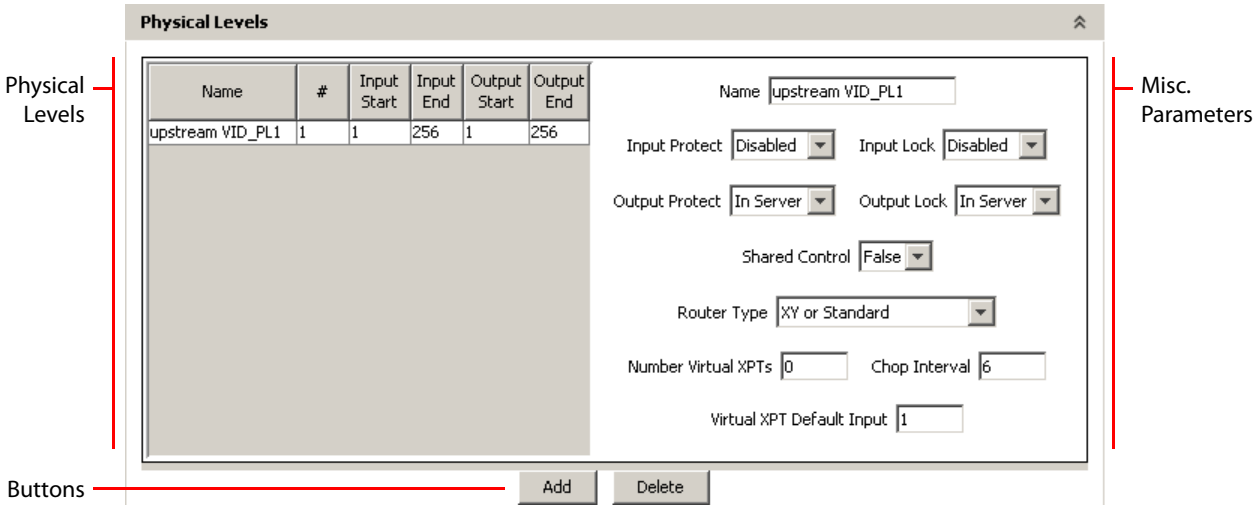
it is here that you define the router's control points.

A NVISION series router can always have two control cards for redundancy, but two control cards are not required. Each control card requires a defined control point. The control point is the IP address given to the control card. If your router has one control card, leave the secondary control point field blank.

A router definition assigned a serial protocol such as 'NV Serial-Public' has only one control point. Some other protocols have only one control point. If your router uses such a protocol, the section will have only the primary control point field.

Detailed Router Information

This section presents (1) the router's physical levels and (2) miscellaneous, but important, parameters affecting the router's functioning:



When you create a new router definition, the physical level list is initially empty. The two buttons at the bottom of this section let you add and delete physical levels. (You might have to scroll to see the buttons.)

▲ The physical levels you specify here must match the physical levels (partitions) you defined in MRC or in UniConfig.

Physical Levels

The router's physical levels (as configured in MRC or UniConfig) specify the actual signal types used by the router.

The table in this section enumerates the physical levels, but disregards the levels' actual signal type. The number of levels is limited in MRC and UniConfig. The physical levels listed here must match the router's levels in number, input range, and output range.

The table has 6 columns:

- Name

  When you add a level to the table (using the 'Add' button), NV9000-SE Utilities inserts a suggested name in the name field. You can use the suggested name or a name of your choosing.

  Drag the boundaries between the column headers to enlarge a column for easier editing.

- '#'

  This column is the level *number*. This number must match the level number you specified (for the level) in MRC or UniConfig.

- Input Start, Input End

  The numbers in these two columns specify the range of input ports for the level.

- Output Start, Output End

  The numbers in these two columns specify the range of output ports for the level.

The 'End' value must be greater than or equal to the 'Start' value.

The physical ranges entered here must match the "controller" ranges you specified in MRC or UniConfig.

Use the 'Delete' button if you have defined too many levels or if you find it easier to start over from an empty list. Otherwise, you can simply retype the entry in any of the fields of the table to change the table.

▲ Remember to click 'Save' after making changes to any of the router details. Otherwise your changes could be lost when you leave the page.

Misc. Parameters

The miscellaneous parameter fields in this section define important parameters for the physical levels of the router.

Important: the parameters that are displayed (which you can change) apply to the currently selected physical level. To select a physical level, click in any field for that level in the level table. The first field of the miscellaneous parameters is, in fact, the name of the selected level. This is to remind you which level you selected.

These are the parameters:

- Name

  The 'Name' field is a convenience — duplicating the name in the list of levels — that helps you remember that the parameters apply to the selected level. You can change the name of the level in this field or in the table at any time.

- Input Protect, Input Lock

  Each of these fields defines how inputs will be locked or protected.

  The choices for these fields are 'In Server' and 'Disabled'. 'In Server' means that inputs are locked or protected within the NV9000 control system software. Otherwise, input locks or protects are disabled.

  See LPR Controls, on page 79.

- Output Protect, Output Lock

  Each of these fields defines how outputs will be locked or protected.

  The choices for these fields are 'In Server', 'In Router', and 'Disabled'. 'In Server' means that outputs are locked or protected within the NV9000 control system software. 'In Router' means that outputs are locked or protected within the router itself. Otherwise, output locks or protects are disabled.

  See LPR Controls, on page 79.

- Shared Control

  The choices for this parameter are 'False' and 'True'.

  This option informs the system controller whether another control system is connected to this physical level. That is to say, another control system is connected to the router control card and that it can initiate crosspoint changes.

From the drop-down list, select 'True' to confirm that this is so. The NV9000 software will allow the externally initiated changes and update its tables accordingly. (The NV9000 software will not log unexpected changes as errors.).

If you select 'False', the NV9000 software retains exclusive access to this physical level and does not permit crosspoint changes that it does not initiate.

- Router Type

  This is probably the most critical field in the set of parameters: The choices for this field are

  - XY or standard

    Most routers are X-Y routers, used for video and audio routing. They are called "X-Y" routers because they incorporate a 2D switching matrix.

    X-Y routers stand in contrast to machine control routers because they have a crosspoint matrix and routes are not bi-directional or point-to-point.

  - NVISION machine control

    This router type is the exception in the NVISION series. Machine control routers are treated differently from standard routers and must be identified.

    Machine control routers transmit control signals from a "source" machine (such as a VTR) to a "destination" machine and return status signals from the destination to the source. Machine control routes are bi-directional and point-to-point.

  - NVISION profile

    This is a special feature available for artificial or "virtual" routers created for the purpose manipulating router levels that could not be otherwise controlled without the artificial router. (You can get into such a situation if you try to use alien equipment that does not play well with NV9000 concepts or NVISION series routers.)

    NVISION profiles are also useful in supporting Kaleido multi-viewers.

    See the NVISION Profiles, on page 62.

- 'Number Virtual XPTs'

  If you router is to have virtual crosspoints, specify the number of such crosspoints here. Otherwise, leave the field value at 0.

  See Virtual Crosspoints, on page 59.

- Chop Interval

  Some routers perform test function known colloquially as "chop." Not all NVISION series routers support "chop." A chop rapidly switches the selected destination between its current source and the preset source.

  If your router can perform chop (and at least one control panel is configured to initiate a chop), then specify an interval in this field. The interval is expressed as a number of video frames. The default value is 6 frames.

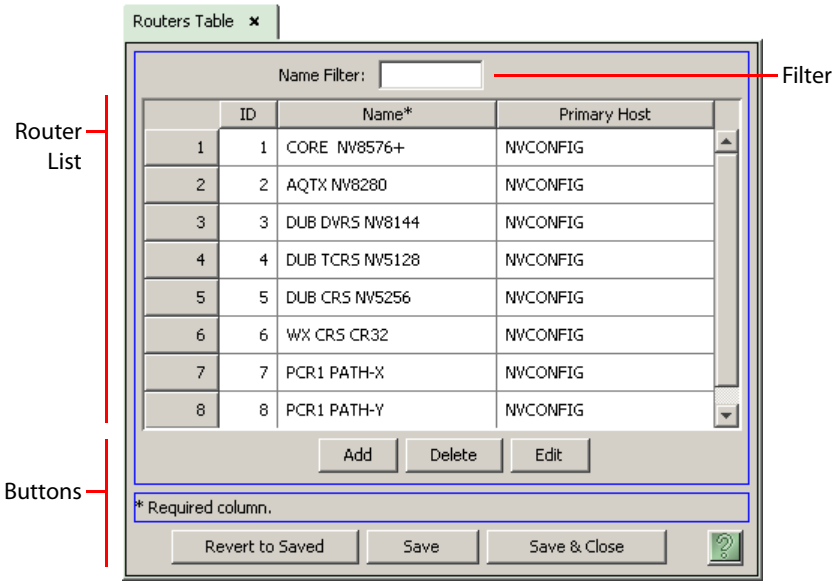
- 'Virtual XPT Default Input'

  If you router is to have virtual crosspoints, specify the default input here. Otherwise, the value in the field does not matter.

  See Virtual Crosspoints, on page 59.

'Routers' Table

Click 'Routers' in the 'Views' pane to show the 'Routers' table:



This page provides a simple list of the routers defined in the configuration, quite similar to the 'Routers' page under the 'Configuration' pane.

At the top of the page is a name filter. If you enter text in this field, the list of routers is restricted to those routers whose name fields contain the text you entered.

The router list identifies the primary host, i.e., the primary system controller. There is an entry for each router. This field is the name of your primary system controller. Usually this is NVCONFIG. All routers should reference the same primary system controller.

At the bottom of the page are 6 buttons:

- Add

  Click 'Add' to add a router to the table. NV9000-SE Utilities creates a new row at the bottom of the router list in which you can enter a name for the router and choose a host.

  (The ID is generated by NV9000-SE Utilities.)

  Although we do not recommend it, you can have duplicate router names because it is the database ID that distinguishes one router from another.

- Delete

  Select one or more rows in the 'Routers' table and click 'Delete' to remove those routers from the table.

  NV9000-SE Utilities deletes the router entries immediately without any warning dialog.

- Edit

  Select one or more rows in the 'Routers' table and click 'Edit' to open a router details page for each of the selected routers.

  See Router Details Page, on page 44 for details.

- Save

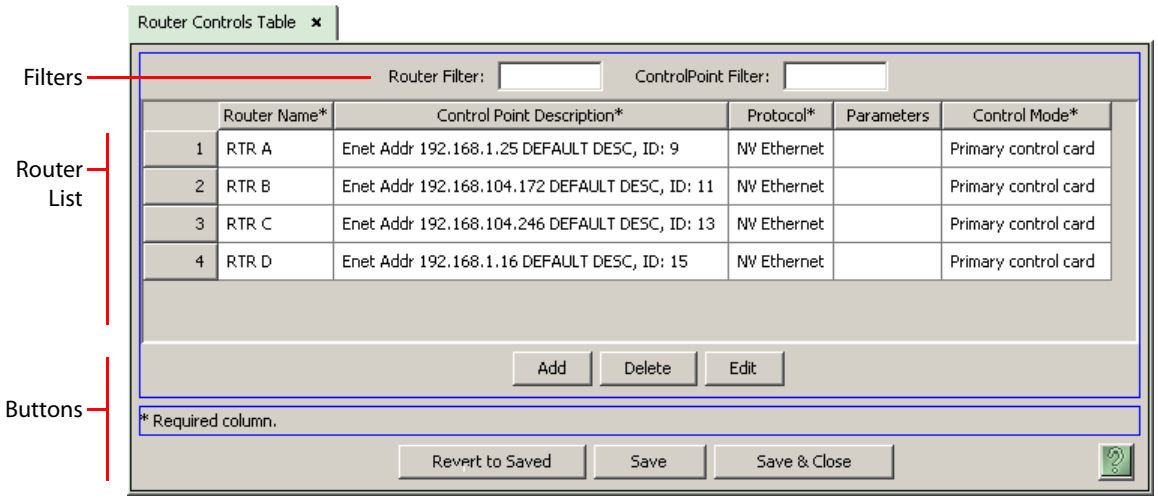
  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the router definition, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

'Router Controls' Table

Click 'Router Controls' in the 'Views' pane to show the 'Router Controls' table:



The page lists router control points and provides the details of those control points.

The page lets you choose the protocol or control card for router control points that have been defined. You can modify the parameters field for those routers. You can add and delete routers in this page. For any router control point, you can choose a control point description, but you cannot change the description only in the 'Control Points' table.

The page has 3 sections:

- Filters
- The router list
- Buttons

Filters

At the top of the page are two filters:

- Router Filter.

  If you enter text in this field, the list of routers is restricted to those routers whose name fields contain the text you entered.
- Control Point Filter.

  If you enter text in this field, the list of routers is restricted to those routers whose control point description fields contain the text you entered.

Both filters can be applied at any time.

Router List

This section lists the routers and, for each router, presents the following:

- The router's name
- The control point description.
- The communication protocol.
- Communication parameters.
- The control card to which the control point applies. (NVISION series routers usually have two control cards designated "primary" and "secondary" in NV9000-SE Utilities.)

The numbers at the left of the rows of the list are database IDs. NV9000-SE Utilities shows the list in order of database ID by default. (You can change the ordering by clicking a column header.)

See Modifying the Table Data, on page 52.

Buttons

The buttons are the same as in some other router pages:

- Add

  Click 'Add' to add a router to the table. NV9000-SE Utilities creates a new row at the bottom of the router list in which you can enter a name for the router and choose a host.

  The ID is generated by NV9000-SE Utilities.

  Although we do not recommend it, you can have duplicate router names because it is the database ID that distinguishes one router from another.

- Delete

  Select one or more rows in the routers table and click 'Delete' to remove those routers from the table.

  NV9000-SE Utilities deletes the router entries immediately without any dialog.

- Edit

  Select one or more rows in the routers table and click 'Edit' to open a router details page for each of the selected routers.

  See Router Details Page, on page 44 for details.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the router definition, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Modifying the Table Data

You can change any of the data in the router controls table.

- Router name.

  This field is a drop-down list. Choose a router name from the list.

- The control point data.

  This field is a drop-down list. Its contents are the description fields from the 'Control Points' table.

  Choose a description from the list.

  If you need to change the description, do so in the 'Control Points' table.

- The communication protocol.

  This field is a drop-down list. Choose a protocol from the list.

- Communication parameters.

  This field is a simple text field. Often this field is left blank because no parameters are required.

  What you enter in the parameter field is entirely dependent on the router and the system in which the router is used. It is not possible to give complete instructions for this field. [And no one knows all the different parameter types or values].

  We present one example for routers that use DHP (dynamic hybrid pathfinding). See DHP Data in the Router Tables, following.

- The control card to which the control point applies. (NVISION series routers usually have two control cards designated "primary" and "secondary" in NV9000-SE Utilities and whose connectors are labeled "Pri" and "Sec" on the router.)

  This field is a drop-down list. Choose either 'Primary Control Card' or 'Secondary Control Card' from the list.

  ▲ There is no such thing as a "primary" or "secondary" control card. The terms are used merely to distinguish the two control cards which are side-by-side in the router frame. You should maintain consistency between your labeling in NV9000-SE Utilities and the labeling on the router frame, but it is not strictly necessary.

The numbers at the left of the rows of the list are database IDs. NV9000-SE Utilities shows the list in order of database ID by default. (You can change the ordering by clicking any column header. The new ordering will be ascending or descending according the data in that column. Repeatedly clicking the column header switches between ascending and descending order.)

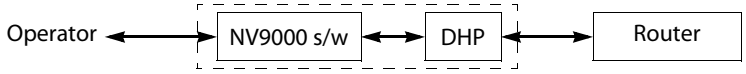
DHP Data in the Router Tables

NV8500 routers have a DHP option. DHP stands for dynamic hybrid pathfinding.

A portion of the router is reserved as the "DHP core." Using the core, and appropriate configuration of ports in NV9000-SE Utilities, a broadcast facility can mix standard and hybrid I/O cards, routing input from standard inputs to hybrid outputs and vice verse. (Suffice it to say that DHP is required to make this happen.)

DHP is software and that software resides in the system controller.

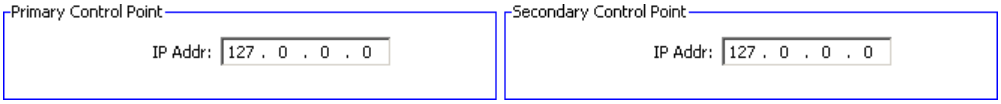
When the DHP option is enabled, the NV9000 software in the system controller addresses the DHP software as if it were the router itself. DHP then communicates with the NV8500 router.



DHP makes decisions about routing paths through the DHP core and sends appropriate take commands to the router.

To set up DHP processing means "playing games" with the IP addresses involved. Thus . . .

1 In the router details page, define both control points for the NV8500 router as (Ethernet) 127.0.0.0:



2 In the control points table, create those two control points:

9	NVCONFIG	E,127.0.0.0,HR:9476	DHP prim 10.110.202.11
10	NVCONFIG	E,127.0.0.0,HR:9477	DHP sec 10.110.202.12

The host is the system controller in which DHP is to be active (i.e., the system controller controlling the NV8500 router to which DHP applies). The default host name for most system controllers is "NVCONFIG."

NV9000-SE Utilities will have partially filled in the 'Parameters' field as "E" followed by a comma, followed by the 127.0.0.0 IP address. For DHP, you must add a comma, "HR", and a 4-digit port number. (Illustrated above are two suitable port numbers. Refer to the DHP User's Guide for a list of acceptable port numbers and to understand why you need these port numbers.). The syntax of the 'Parameter' field must be exact.

Enter anything in the description field that is useful to you.

3 Go to the router controls table. It will list the two control points you created:

NV8576	DHP prim 10.110.202.11, ID: 9	NV Ethernet		Primary control card
NV8576	DHP sec 10.110.202.12, ID: 10	NV Ethernet		Secondary control card

The 'Parameters' field will be empty. It is necessary to specify in that field (1) the actual IP addresses of the router control cards and (2) the DHP free source.

In step 2, we noted the actual IP addresses of the router control cards in the control point description. Also we choose a DHP free source (in our example here, that is 8).

This is the result in our example:

NV8576	DHP prim 10.110.202.11, ID: 9	NV Ethernet	E,10.110.202.11,FS:8	Primary control card
NV8576	DHP sec 10.110.202.12, ID: 10	NV Ethernet	E,10.110.202.12,FS:8	Secondary control card

The syntax for the free source is comma, "FS", colon, ‹source number›.

Refer to the *DHP User's Guide* to learn what a DHP free source is and how to use one.

Notes

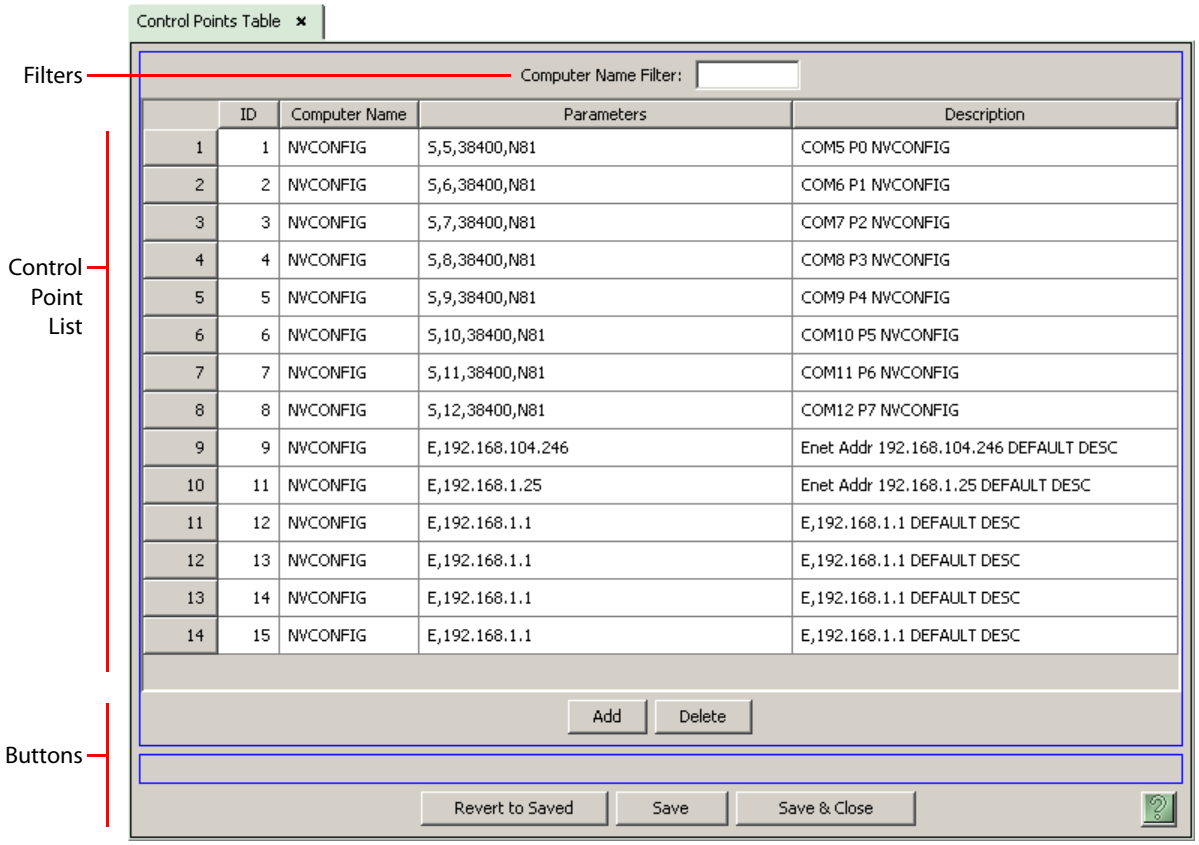
1 DHP requires two configuration files for the NV8500 router to be installed in the system controller's file system. (An expanded NV856-Plus, having two frames, requires 2 configuration files for each frame.)

2 A system controller can provide support for at most one NV8500 router using DHP.

3 If your system includes an NV8500 hybrid router that uses DHP and also has MADI inputs or outputs, when you configure an audio level in the physical level list of the router details page, you must add 40,000 to the ranges' end values. Thus, if your audio level's normal range is 1–9216 and 1–18432, then the ranges specified must be 1 to 49,216 and 1 to 58,432.

Control Points Table

Click 'Control Points' in the 'Views' pane to show the 'Control Points' table:



	ID	Computer Name	Parameters	Description
1	1	NVCONFIG	S,5,38400,N81	COM5 P0 NVCONFIG
2	2	NVCONFIG	S,6,38400,N81	COM6 P1 NVCONFIG
3	3	NVCONFIG	S,7,38400,N81	COM7 P2 NVCONFIG
4	4	NVCONFIG	S,8,38400,N81	COM8 P3 NVCONFIG
5	5	NVCONFIG	S,9,38400,N81	COM9 P4 NVCONFIG
6	6	NVCONFIG	S,10,38400,N81	COM10 P5 NVCONFIG
7	7	NVCONFIG	S,11,38400,N81	COM11 P6 NVCONFIG
8	8	NVCONFIG	S,12,38400,N81	COM12 P7 NVCONFIG
9	9	NVCONFIG	E,192.168.104.246	Enet Addr 192.168.104.246 DEFAULT DESC
10	11	NVCONFIG	E,192.168.1.25	Enet Addr 192.168.1.25 DEFAULT DESC
11	12	NVCONFIG	E,192.168.1.1	E,192.168.1.1 DEFAULT DESC
12	13	NVCONFIG	E,192.168.1.1	E,192.168.1.1 DEFAULT DESC
13	14	NVCONFIG	E,192.168.1.1	E,192.168.1.1 DEFAULT DESC
14	15	NVCONFIG	E,192.168.1.1	E,192.168.1.1 DEFAULT DESC

The page lists control points. A control point is a serial port (in the system controller) or an IP address (accessible through an Ethernet port in the system controller). A control point usually connects the system controller to a router.

The page has 3 sections:

- Filters
- Control point list
- Buttons

Filters

At the top of the page is a 'Computer Name' filter. If you enter text in this field, the list of control points is restricted to those control points whose 'Computer Name' field contains the text you entered.

Control Point List

This section lists the control points and has 4 columns:

- ID. The first is the data base ID for the router. These numbers are generated automatically and you cannot change them, but they might help you distinguish identically named routers.
- Computer name. The name given to the system controller in which the control point exists. Usually this name is "NVCONFIG."
- Parameters. The control point information in a compact coded form.

  Serial control points are expressed as a text string beginning with S and containing several fields, separated by commas. Simple Ethernet control points are expressed as a text string beginning with E, followed by a comma, followed by an IP address. This is a sampling:

Parameters	Description
S,5,38400,N81	COM5 P0 NVCONFIG
S,6,38400,N81	COM6 P1 NVCONFIG
S,7,38400,N81	COM7 P2 NVCONFIG
S,8,38400,N81	COM8 P3 NVCONFIG
S,9,38400,N81	COM9 P4 NVCONFIG
S,10,38400,N81	COM10 P5 NVCONFIG
S,11,38400,N81	COM11 P6 NVCONFIG
S,12,38400,N81	COM12 P7 NVCONFIG
E,192.168.1.25	Enet Addr 192.168.1.25 DEFAULT DESC
E,192.168.104.172	Enet Addr 192.168.104.172 DEFAULT DESC
E,192.168.104.246	Enet Addr 192.168.104.246 DEFAULT DESC
E,192.168.1.16	Enet Addr 192.168.1.16 DEFAULT DESC

  These are the parts of the serial encoding, from left to right:

  - The COM port number.
  - The Baud rate.
  - The coded communication characteristics.

    The coded value is a 3-character term. The first character is the number of parity bits. "N" means no parity bit. The second character is the number of data bits. Normally this is 8. The third character is the number of stop bits. Normally this is 1. The default for most serial ports is "N81."

  For simple Ethernet encoding, only an IP address is required. Some routers require additional fields for which both syntax and meaning depend on the actual hardware supported through the control point.

  ▲ If you see "!COHERENT" in this field, what it means is that the router is set up to handle "coherent switching" better than normal. That is, the 4 sources of a coherent

switch should switch at approximately the same moment. The only effect this parameter modifier really has is to cause hex commands (50hex) to be replaced with 55hex commands (transmit all within the same vertical interval).

You can always enter this value (!COHERENT) to cause the router to switch coherent sources better.

- Description. These fields are free-format and allow you to add commentary to your control points.

Buttons

The buttons are the same as in some other router pages:

- Add

  Click 'Add' to add a control point to the table. NV9000-SE Utilities creates a new row at the bottom of the router list in which you can enter control point data.

  The ID is generated by NV9000-SE Utilities.

- Delete

  Select one or more rows in the table and click 'Delete' to remove those rows from the table.

  NV9000-SE Utilities deletes the control point entries immediately without any dialog.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the control point table, discarding any changes you have made (since the last save).

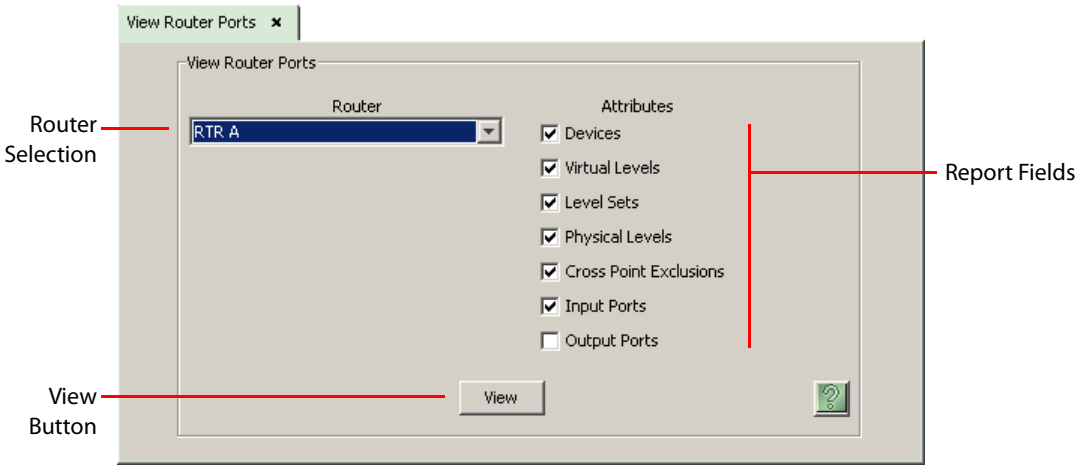
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

'View Router Ports' Page

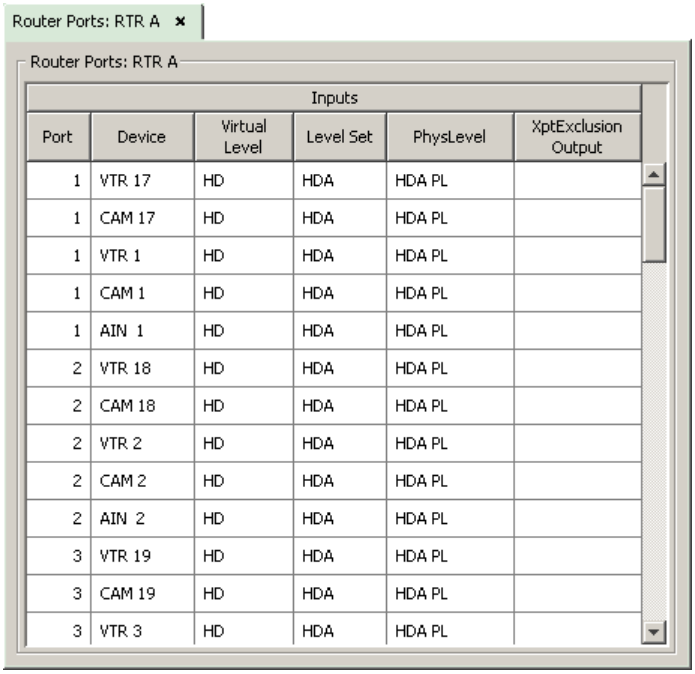
The 'View Router Ports' page is available in the 'Tasks' pane. It is not an essential tool, but can be a convenience if you want to create a list of router ports that you can view.

This is the page:



To create a list of port information, choose a router, select the fields that you want to appear as columns in the list, and click 'View'.

NV9000-SE Utilities creates a new tabbed page that contains the list of ports. This is an example generated from the settings illustrated above:



Router Ports: RTR A

Router Ports: RTR A

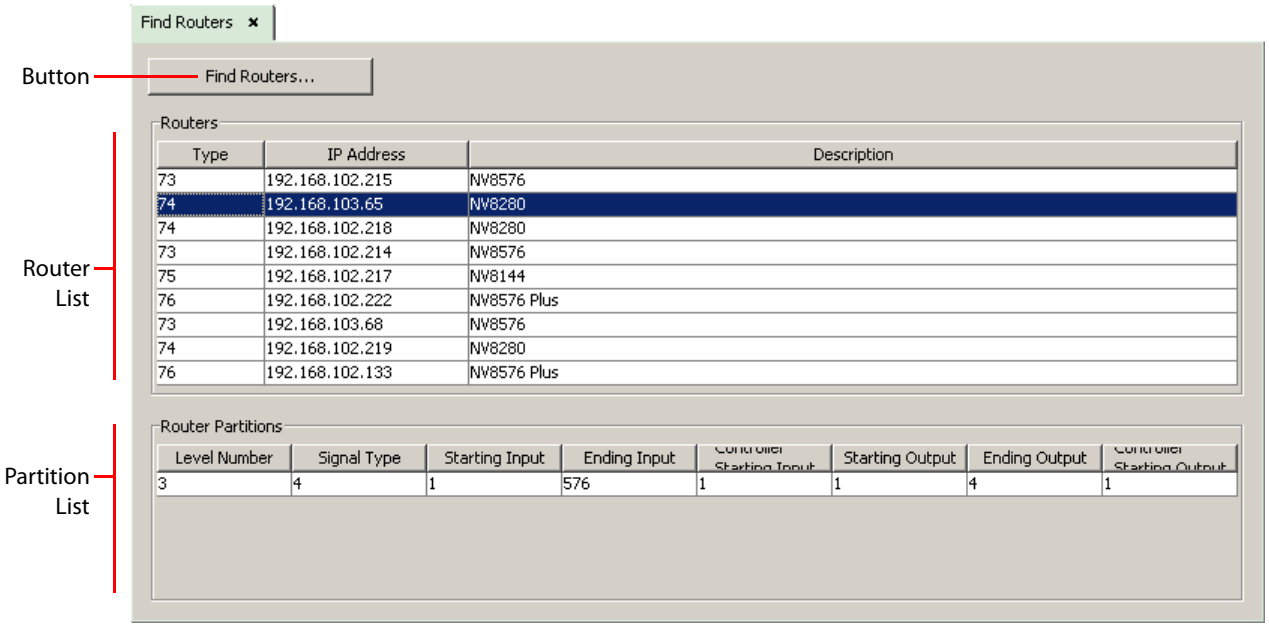
Inputs					
Port	Device	Virtual Level	Level Set	PhysLevel	XptExclusion Output
1	VTR 17	HD	HDA	HDA PL	
1	CAM 17	HD	HDA	HDA PL	
1	VTR 1	HD	HDA	HDA PL	
1	CAM 1	HD	HDA	HDA PL	
1	AIN 1	HD	HDA	HDA PL	
2	VTR 18	HD	HDA	HDA PL	
2	CAM 18	HD	HDA	HDA PL	
2	VTR 2	HD	HDA	HDA PL	
2	CAM 2	HD	HDA	HDA PL	
2	AIN 2	HD	HDA	HDA PL	
3	VTR 19	HD	HDA	HDA PL	
3	CAM 19	HD	HDA	HDA PL	
3	VTR 3	HD	HDA	HDA PL	

'Find Routers' Page

The 'Find Routers' page is available in the 'Tasks' pane. It is not an essential tool, but can be a convenience if you want to view a list of accessible routers.

- You can think of this page as NV9000-SE Utilities' "ping" for routers.

This is the page:



There are 3 parts to the page:

- 'Find Routers' button
- Router list
- Partition list

Click the 'Find Router' button to generate a list of routers (actually router control cards) that are detectable by your PC.

The router list, in the 'Routers' section, has 3 columns:

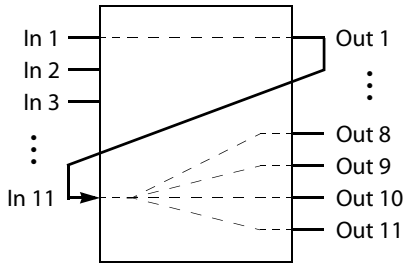
- Type. Each router control card has, within its non-volatile storage, a router type ID. This field shows the router's type ID.
- IP address. This is the IP address of the router's control card. (Most NVISION series routers have two control cards.)
- Description. This is a brief description of the router.

If you click a row in the router list, the page will list data for one of the router's partitions. None of the fields in the page are editable. The page is a report only.

Virtual Crosspoints

Virtual crosspoints are a concept developed at NVISION (now Grass Valley) that allows *re-entry* without consuming any physical ports (either input or output).

Formerly, physical re-entry was possible with cabling:



With re-entry, the output at port 1 in this illustration can be taken to any or all other outputs. This is in itself insignificant because without any other factors, output 1 is simply a copy of one of the inputs. Input 1 could have been taken to outputs 8, 9, 10, and 11.

One significant fact of re-entry is that, with initial setup, any input can now be routed to outputs 8, 9, 10, and 11 ***in a single take*** (to output 1). Further, a panel operator need not know about the existence of output ports 8–11.

Another significant fact is that if the output undergoes any internal processing (such as breakaway or signal conditioning) it is ***not*** an identical copy of an input and the re-entry is required of the output is to be distributed to other outputs.

Virtual crosspoints provide *virtual re-entry* and without cabling, without using any ports, and without the frame delays inherent in physical re-entry.

Virtual re-entry allows:

- Indirection, and in fact, multiple levels of indirection.
- Routing to multiple outputs (in a single take).
- Often, the multiple outputs include a monitor.
- Controlling the device name that appears on the operators' control panels.
- Hiding implementation details from the operator(s).

Principles

1 Virtual crosspoints are implemented in tables in the NV9000 software in the system controller (and not in the router). There is no direct cost associated with them.

(The virtual crosspoints are simulated crosspoints, but they appear to be real crosspoints to the operator. The result of their use, of course, are real routes.)

2 Virtual crosspoints are assigned to individual physical levels in individual routers. (Your switching requirements might require that you define virtual crosspoints on several levels, perhaps in several routers.)

3 If you want a physical level to have virtual crosspoints, you must specify the number of virtual crosspoints. There is no limit to the number of virtual crosspoints you can define for a physical level. The number you actually require will generally be less than or equal to the number of outputs in the physical level. (See 'Number Virtual XPTs', on page 48.)

4 Let *V* represent the number of virtual crosspoints. Then
   a (a) The physical level will have *V* virtual inputs and *V* virtual outputs.
   b (b) If your physical level has *M* real inputs, the total number of inputs that your configuration can use is *M* + *V*.
   c (c) If your physical level has *N* real outputs, the total number of outputs that your configuration can use is *N* + *V*.

      Example: If your physical level has inputs 1–288 inputs, and outputs 1–576, with 64 virtual crosspoints, the size of the available matrix becomes (288+64, 576+64) or (352, 640).
   d (d) Any virtual output *v* is coupled to virtual input v, where 1 ≤ *v* ≤ V.

      Using the same example: virtual input 6 is coupled to virtual output 6. In the 352×640 matrix, that virtual input port is 288 + 6 = 294 and the associated virtual output port is 576 + 6 = 582.

   NV9000-SE Utilities does not let you specify a port beyond the conbined range of real ports and virtual ports.

   Operators can select sources and destinations that use ports in the combined range of real ports and virtual ports. Operators normally cannot distinguish virtual ports from real ports.
5 NV9000-SE Utilities requires that you define a “default input” for virtual crosspoints.

   (See ‘Virtual XPT Default Input’, on page 48.)

   The term “default input” is a misnomer. It is not a default for anything. It really should be called an “initial” or “temporary” input.

   In NV9000-SE Utilities, no output can be without an input and this includes virtual outputs. Therefore, assign any of the real inputs as the initial input. When a system controller starts, that input is taken to all the virtual outputs you have defined.

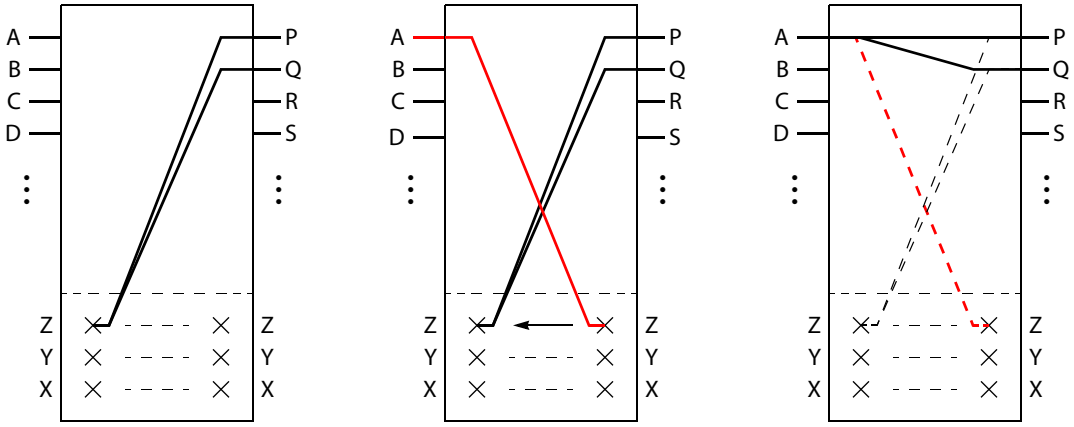
   When an operator performs routes using virtual crosspoints, those routes override the initial (and temporary) input.
6 The use of virtual crosspoints pre-supposes some setup salvos that put the NV9000 system in a pre-defined state against which panel operators can perform takes to virtual outputs.

   There can be many such pre-defined states.

   See Salvos, on page 481 for additional information.

Scenario 1

In this scenario, the physical level is set up so that any input routed to output Z will be taken to both P and Q:



Setup | Operator "takes" A to Z | Result Operator still sees A as taken to Z

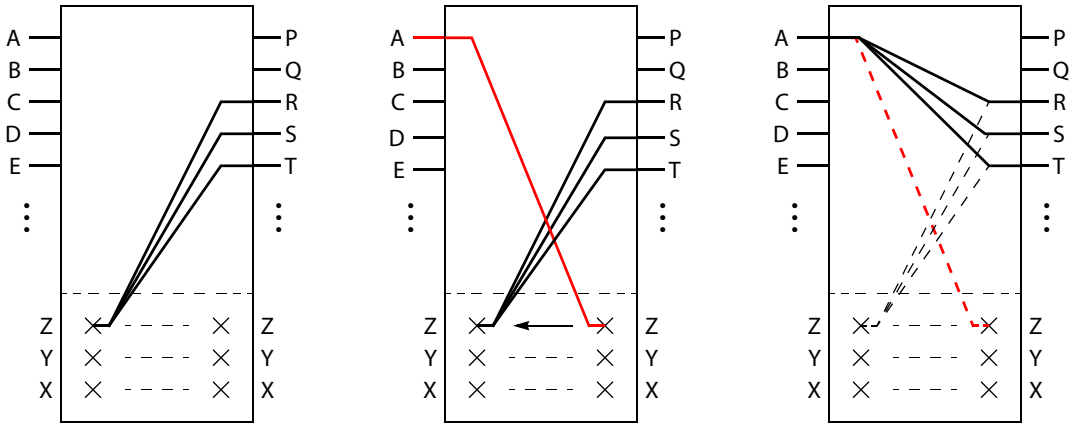
If the operator takes A to Z, the NV9000 software "discovers" that input Z is virtually routed to P and Q. Therefore, it routes A to P and Q as real routes.

Here, an input was taken to multiple outputs, P and Q, and that fact was concealed from the operator. The operator's control panel reports that A was taken to Z. The operator executed a single take.

Other inputs can be taken to Z with a similar result: that input will be taken to P and Q.

Scenario 2

In this scenario, the setup is similar to that of scenario 1, but takes to Z are no longer for outputs P and Q, but for R, S, and T:



Setup | Operator "takes" A to Z | Result Operator still sees A as taken to Z

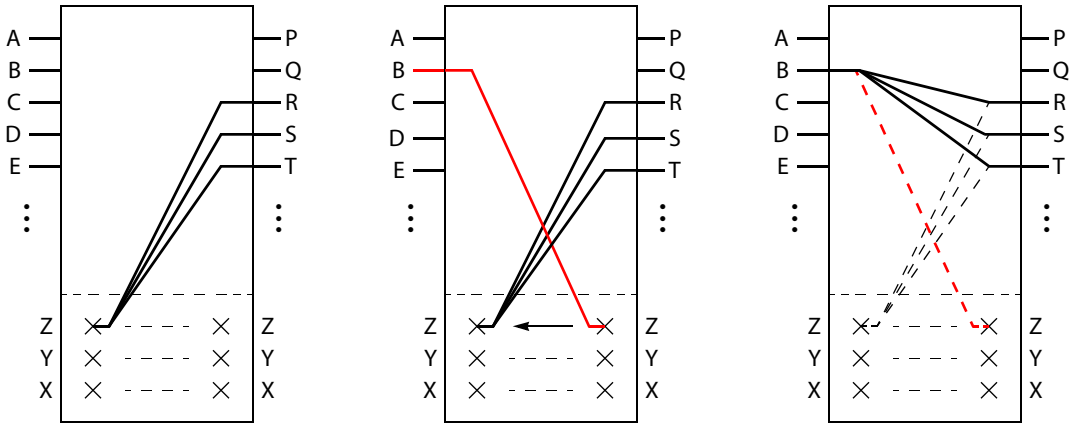
If the operator takes A to Z, the NV9000 software "discovers" that input Z is virtually routed to R, S, and T. Therefore, it routes A to R, S, and T as real routes.

Here, again, an input was taken to multiple outputs, and that fact was concealed from the operator. The operator's control panel reports that A was taken to Z. The operator executed a single take.

Other inputs can be taken to Z with a similar result: that input will be taken to R, S, and T.

Scenario 3

In this scenario, the setup is the same as for scenario 2:



Setup | Operator "takes" B to Z | Result Operator still sees B as taken to Z

If the operator now takes B to Z, the NV9000 software again "discovers" that input Z is virtually routed to R, S, and T. Therefore, it routes B to R, S, and T as real routes.

The operator's control panel reports that B was taken to Z. The operator executed a single take.

This scenario illustrates that any time an operator takes an input to *virtual output V*, the router actually takes the input to the real outputs "connected" to *virtual input V*.

NVISION Profiles

Profiles are a concept developed to support external systems that must communicate with NVISION routers over NVISION Ethernet protocol (NVEP) and do not have access to device information, principally their port numbers.

> *Kaleido multi-viewers — at one time — could not properly issue takes in an NV9000 system and required profiles to function with the NV9000. That probably has changed by now.*

Using a profile, an external system can cause the NV9000 control system to perform an all-level take by referring only to the profile.

To provide a profile, you create a virtual router (one that has no real existence) with a single physical level and a virtual level to match the physical level. You include the virtual level in all the devices you want to be able to switch from the external system.

> *You must also convey the physical level ID and the port numbers of the relevant devices to the external system.*

The way it works is that when the NV9000 software receives an 0x00003001 command through NVEP and "sees" that it is about to perform a switch on the profile's level, it instead performs the switch on ***all*** the levels of the (destination) device.

We presume there is no ambiguity involved — that the profile's output port specified in the take command belongs to one and only one NV9000 device. If not, the NV9000 will probably use the first device it detects that includes that profile port.

Creating a "Profile"

Follow these guidelines. (The order of the steps is not critical. For instance, you can perform step 2 at any time. If you are starting with an NV9000 configuration that already has devices defined, you can modify the existing devices easily.)

1 Define a virtual router that has type 'NVISION Profile'. It must have one physical level.

Give this level a matrix large enough to accommodate all the devices you want to switch using the external system.

2 Define a set of actual routers (with physical levels as needed).

3 Create a virtual level that represents the physical level of the "profile." Use the 'Virtual Levels' table to do so.

4 Define a set of input and output devices that use one or more virtual levels corresponding to actual routers and that also include the virtual level (and port numbers) of the "profile."

The external system will issue "3000" or "3001" take commands, specifying the input port, output port, and the physical level of the "profile." (The external system must of course, know the applicable port numbers and physical level ID.)

Example

This example uses a very simplified router configuration.

1 Define routers:

ID	Router	Host
1	RTR A	NVCONFIG
2	RTR B	NVCONFIG
3	PROFILE	NVCONFIG
4	RTR C	NVCONFIG

The profile must use virtual router protocol and be of type 'NVISION Profile'.

It must have enough ports to cover the devices you want to switch externally.

(Using the 'Virtual Levels' table, define a virtual level for the physical level of the profile:

	ID	Mnemonic*
1	1	HD
2	2	SD
3	3	AUDIO
4	4	PF

2 Define level sets:

Level Set Detail

Display Index	Virtual Level	Physical Level
1	HD	RTR A_PL1
2	AUDIO	RTR C_PL1
3	PF	PROFILE_PL1

Level Set Detail

Display Index	Virtual Level	Physical Level
1	SD	RTR B_PL1
2	AUDIO	RTR C_PL1
3	PF	PROFILE_PL1

Here we have defined two level sets, HD and SD, and 3 routers, A, B, and C that switch HD, SD, and audio respectively.

A fourth router is the profile. Here are the physical levels of the routers:

ID	Router*	Name	Input Start*	Input End*	Output Start*	Output End*	Signal Type*
1	RTR A	RTR A_PL1	1	144	1	144	XY or Standard
2	RTR B	RTR B_PL1	1	288	1	288	XY or Standard
3	PROFILE	PROFILE_PL1	1	72	1	72	NVISION Profile
4	RTR C	RTR C_PL1	1	1152	1	1152	XY or Standard

Note that the database ID for the physical level of the profile is 3. You'll use this in the commands from your external system.

3 Define devices that can be switched by the external system:

Device ID	Device	In				Out			
		HD	SD	AUDIO	PF	HD	SD	AUDIO	PF
9	BIN 1		5	5	1				
10	BIN 2		6	6	2				
11	BIN 3		7	7	3				
12	BIN 4		8	8	4				
13	BOUT 1						5	5	1
14	BOUT 2						6	6	2
15	BOUT 3						7	7	3
16	BOUT 4						8	8	4

These devices all include a port on the virtual level that represents the physical level of the profile. Here, it is "PF."

4 Save and write the configuration to the NV9000 system controller.

5 Later, from your external system, issue 0x0000 3001 take commands. Each such command identifies an input port and an output port on the physical level of the profile. Recall that the phys level ID in this example is 3.

Example: the external system takes input 1 to output 4 on physical level "3".

What happens? SD and AUDIO are taken from routers B and C (port 5 of both) to ports 5 of routers B and C, respectively.

5 System Management

Chapter 5 describes the status and management pages of the 'System Management' pane.

Summary

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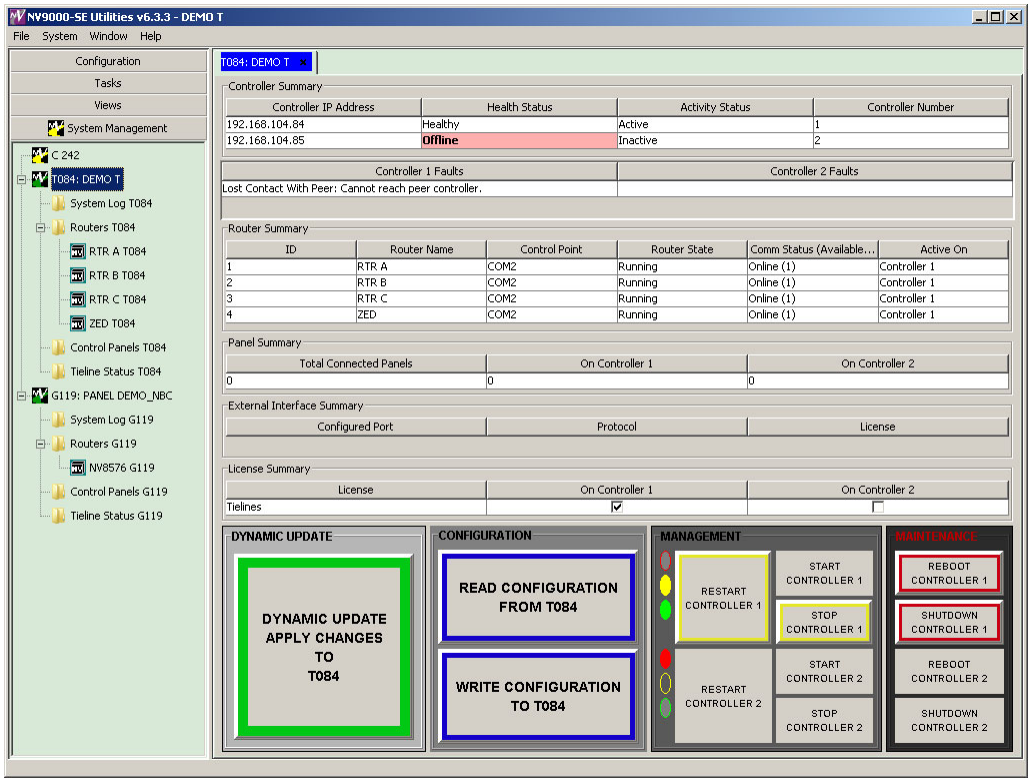
Summary

When you click the 'System Management' navigation pane, the pane opens revealing a list of control systems on the left and a page of tables and tools on the right:



If you have selected a control system on the left, the tables show general system information and the buttons allow you to read and write configurations and to start and stop the system controllers.

The system management pane does not provide access to configuration data, but lists the control systems in your NV9000 system that you have identified:

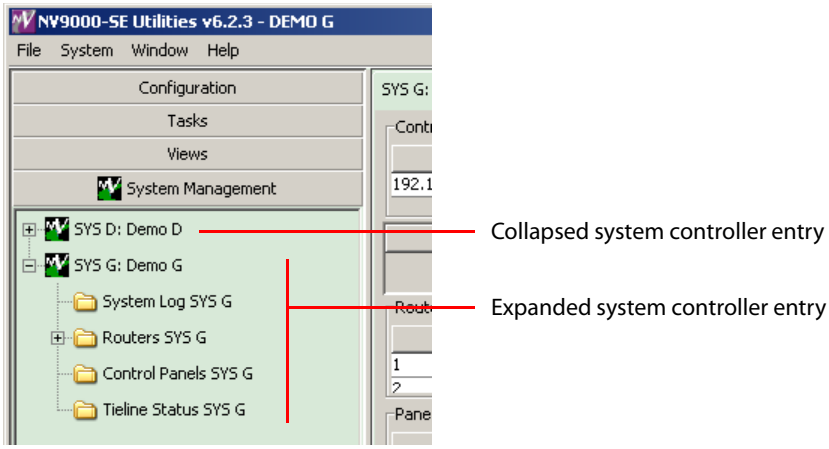


Fig. 5-1: Identified System Controllers

You can select any system controller in this pane to review its status, to start or stop the system controller, or to perform maintenance tasks.

Figure 5-1 shows two system controllers 'SYS D' and 'SYS G'. Next to the name of each system controller, separated by a colon (:), is the name of the configuration it uses.

Figure 5-1 shows SYS G expanded, revealing several folder icons: 'System Log', 'Routers', 'Control Panels', and 'Tieline Status'. Figure 5-1 shows that SYS D is not expanded. To expand the view of a system controller, click the "+" next to the system controller's icon. To collapse the view of a system controller, click the "–" next its icon.

The color of a system controller's icon gives a rough indication of its state:

Green: the controller is connected (to your PC) and healthy.

Yellow: the controller is connected (to your PC) but is not healthy. Nevertheless, it is capable of responding to NV9000-SE Utilities on your PC).

Red: the controller is not connected to your PC or is not functioning.

Clicking any entry in the system management pane causes a status and control page to appear in the work area:

- Click a system controller to view a page in which you can *start, stop, or restart* a system controller.
- Clicking a 'System Log' folder causes the *system log page* for the applicable system controller to appear.
- Clicking a 'Control Panels' folder causes a *control panels page* for the applicable system controller to appear.
- Clicking a 'Tieline Status' folder causes a *tieline status page* for the applicable system controller to appear. This is a graphical representation of tielines defined in your

configuration. The diagram indicates the number of tielines between router (partitions) and the number of tielines actually in use. A table of tieline usage data accompanies the diagram.

The 'Routers' entry is slightly different: it is an expandable icon. Click the "+" to expand the entry or click the "–" to collapse the entry. When it is expanded, the entry lists the routers named in the system controller's configuration. See Figure 5-2, following.

Click any router sub-entry to view the router page for that router:

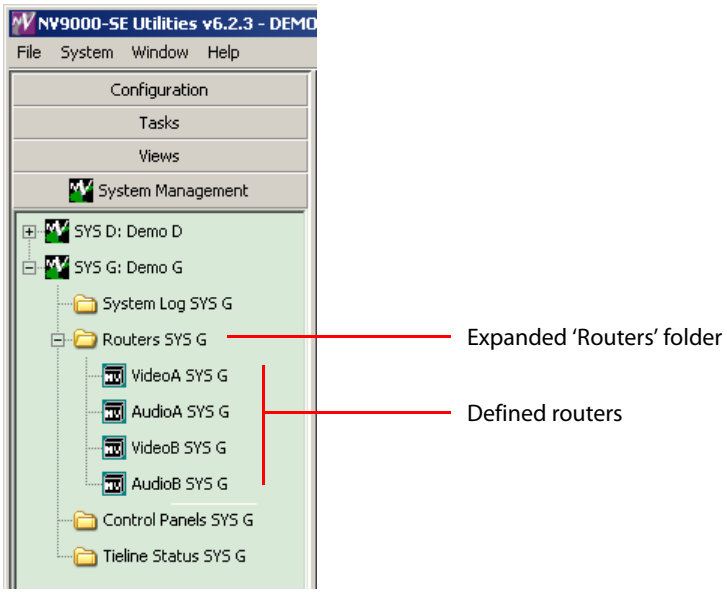
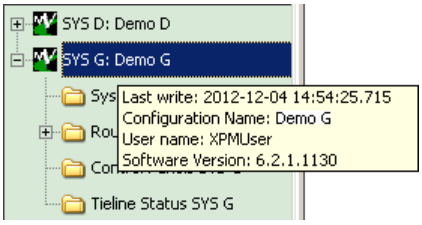


Fig. 5-2: Expanded Router Section

Hovering

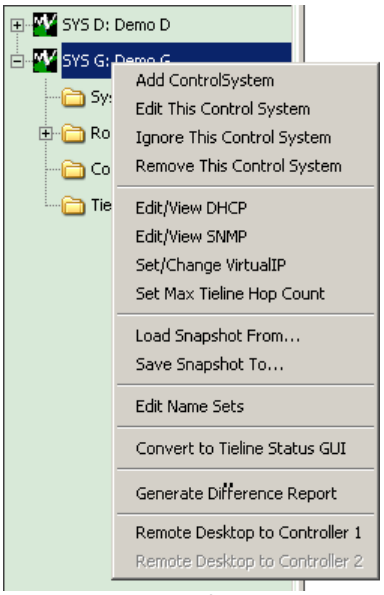
If you hover your cursor over a system controller in the system management pane, an information message pops up briefly:



This message tells you the name of the system controller's configuration, the date on which it was configured, and the software version of the system controller.

Context Menu

If you right-click any system controller in the system management pane, a context menu appears allowing you to configure additional aspects of the system controller:



The commands of the context menu are discussed under Navigation Pane, on page 86.

Managing Control Systems

The 'System Management' pages (and navigation pane) allow you to manipulate system controllers — without regard to the configuration content.

In the 'System Management' page, a *control system* is an NV9000 *system controller* (i.e, an NV960 or NV920 or a redundant pair of NV960s or NV920s). A system controller is also called a *controller*. The two controllers in a redundant pair are called *controller 1* and *controller 2*.

An NV9000 *configuration* is a database, comprising a set of router definitions, level definitions, device definitions, control panel configurations, connectivity information, and some other kinds of information.

An NV9000 configuration resides in the file system of your PC while you are developing the configuration. At any point, using the 'System Management' page, you can transfer the configuration to the file system of a system controller and the system controller is then considered "configured." You can also transfer a configuration from a system controller to your PC. You might want to do this to modify the configuration or simply to examine the configuration.

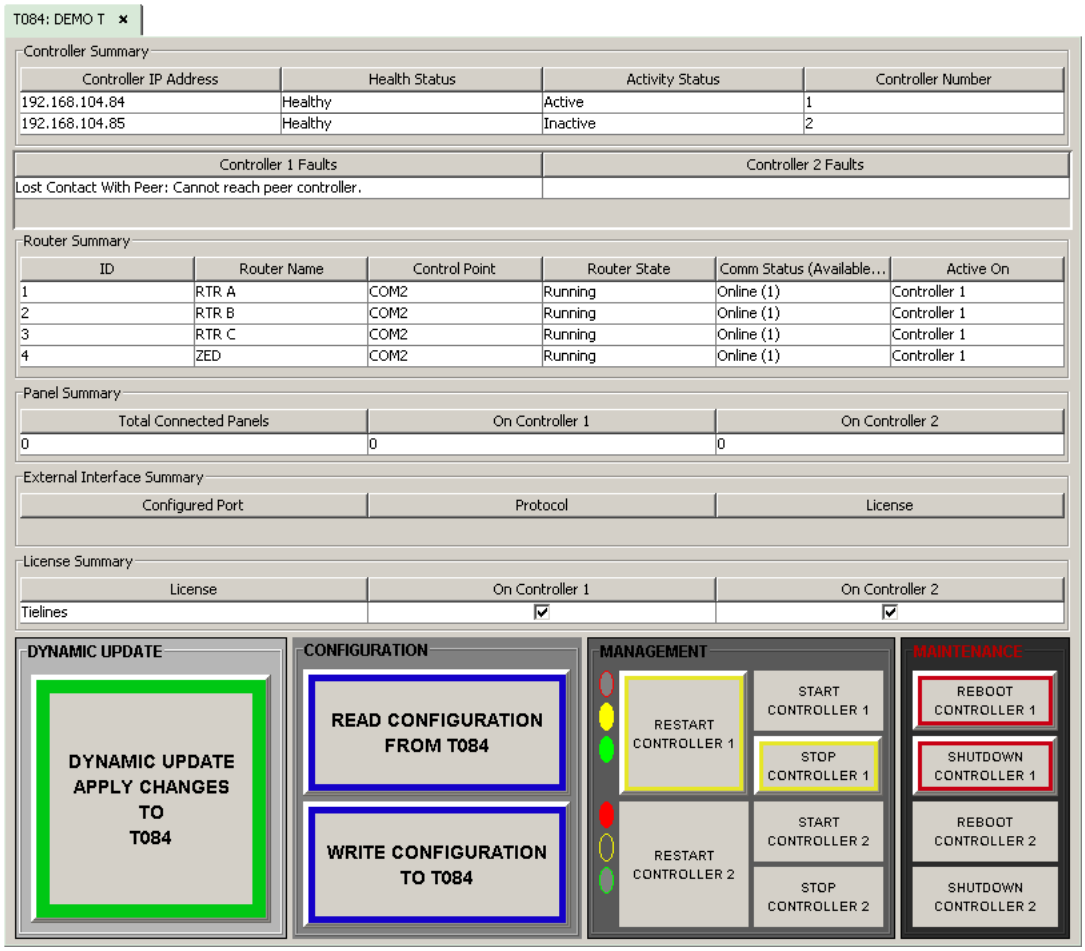
When a system controller is started or restarted, the NV9000 software in the system controller loads it "active" configuration from the configuration stored in its file system.

You can use the 'System Management' page to add or remove control systems. (There is a short delay after you add a control system before the control system appears fully in the navigation pane.) You can also use the 'Add Control system' command of the 'System' menu to add a control system.

You can use the 'File' menu to open, save, close, and delete NV9000 *configurations*. You can also use the 'File' menu to import or export NV9000 *configurations*.

Main System Page

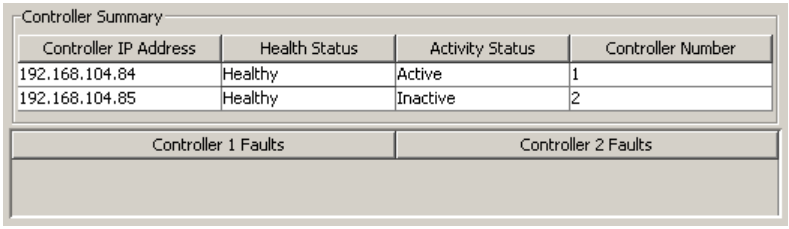
The main system page presents tables of general system information and buttons with which to read and write configurations and to start and stop the selected system controller(s). This is a sample:



The tables and the buttons are discussed in the following sections.

Controller Summary

The 'Controller Summary' lists the system controllers belonging to the selected control system:



In a redundant system, there are two controllers. These are identified by '1' and '2' in the 'Controller Number' column. In a non-redundant system, there is one controller (numbered 1).

(There is never any more than 2 controllers in this list.)

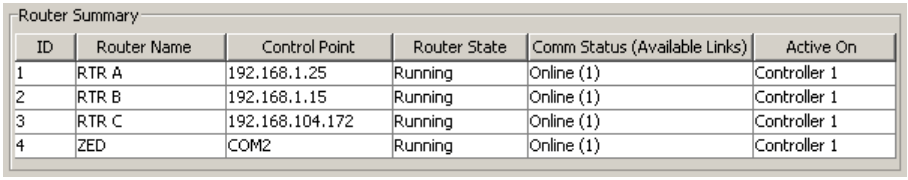
The controllers are identified by their IP addresses.

The controllers' status can be either 'Healthy' or 'Unhealthy'. In a redundant system, one controller is 'Active' and the other is 'Inactive'. In a non-redundant system, the single controller is 'Active'.

- It is possible for NV9000-SE Utilities to show both controllers as 'Inactive'. This might when both controllers are either unhealthy or off-line.

Router Summary

The 'Router Summary' lists the routers defined in the selected control system:



The ID field gives the database ID of the routers. The routers are typically identified by name, but if your configuration has duplicate router names, the IDs are can be the distinguishing factor.

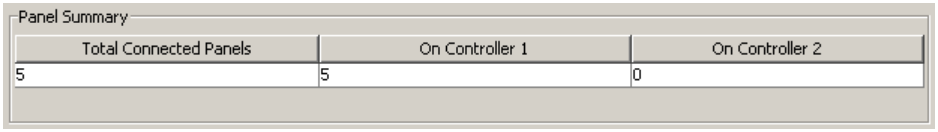
The other columns present router status.

A router is "active" through the active system controller. In the illustration here, that is controller 1. If controller 2 were active, this column would read "controller 2."

The router's control points are either serial ports or IP addresses. If the router is controlled through a serial port, the control point field shows the COM port. If the router is controlled through an Ethernet port, the field shows the port's IP address.

Panel Summary

The panel summary tells you the number of control panels in use:


Panel Summary

Total Connected Panels	On Controller 1	On Controller 2
5	5	0

You can view more details about panels in the 'Control Panels' status page, described under Control Panels Page, on page 82.

The control panels counted are those that (1) were defined in the configuration of the selected control system and (2) are presently connected. The panels reported will be active either on controller 1 or on controller 2. That is, the panel count will be 0 for one of the controllers.

(If controller 2 does not exist, there is no field for it.)

External Interface Summary

To connect third-party devices to the NV9000 system, it is necessary to define ports for the connections. These are called "external interfaces."

Typically, the ports are serial ports (i.e, COM ports) and use the NVISION serial protocol (NVSP) for communication. Some external interfaces support connections that require licenses.

The external interface summary lists the ports in use and identifies their protocols and gives information about any licenses that are required.

External Interface Summary

Configured Port	Protocol	License
COM3	Probel External protocol	**Missing**
COM6	ES-BUS protocol	Valid
COM7	NVISION serial protocol	Valid
COM8	NVISION serial protocol	Valid
COM9	NVISION serial protocol	Valid

License Summary

The license summary lists NV9000 features that your facility has licensed:

License Summary

License	On Controller 1	On Controller 2
ES-BUS external interfaces	☑	☑
ES-BUS routers	☑	☑
Hybrid Pathfinding	☑	☑
Probel external interfaces	☑	☑
Tielines	☑	☑

In this illustration, DHP (dynamic hybrid pathfinding) and tielines have been licensed. Interfaces to third-party systems are also licensed items. *All* these features should be active on both controllers if your system is redundant.

Buttons

The fairly large buttons at the bottom of the page do two things: (1) transfer configuration data to or from the system controller(s) and (2) control the operation of the system controller(s):

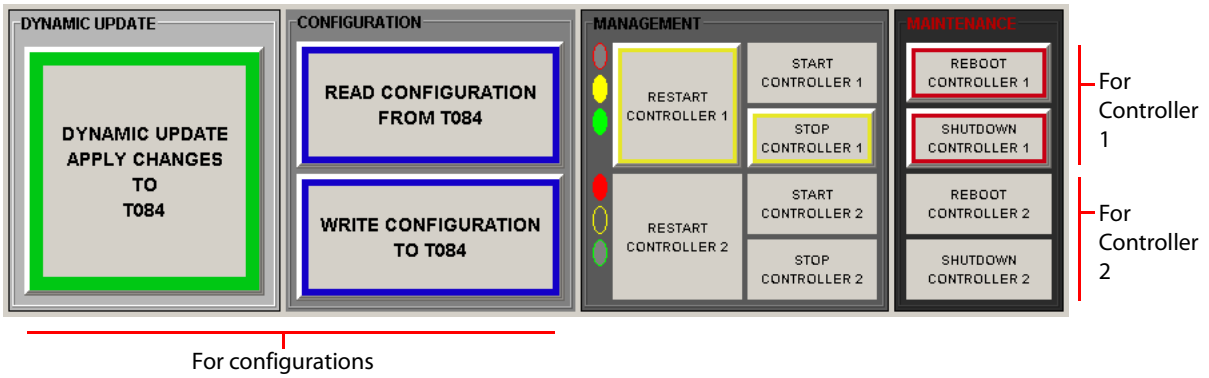


Fig. 5-3: System Management Buttons

There a 5 buttons and 3 indicators for controller 1 and the same for controller 2.

- It is important to note that the 'Dynamic Update' button, 'Read Configuration' button, and the 'Write Configuration' button apply to the active controller, whereas the other buttons apply specifically to controller 1 or controller 2.
- If your system is not redundant, controller 2 does not exist. Nevertheless buttons exist for it. If controller 2 is absent, the buttons for controller 2 are all gray, with no yellow or red highlighting.

The 3 indicators are ellipses that resemble (North American) traffic lights. There are 3 indicators for each controller.

This is what the colors mean:

- A solid red indicator means that the controller is stopped (or not present).
- A solid yellow indicator means that the controller is active.
- A solid green indicator means that the controller is healthy.

When the indicators are grey (with a colored outline) they do not apply. Figure 5-3 shows that controller 1 is active and healthy and that controller 2 is non-existent.

The buttons for the controllers are highlighted when they can be applied. For example, a running controller can be restarted or stopped; it cannot be started. Therefore the 'Start' button would not be highlighted, as shown in Figure 5-3.

The Buttons

These are the functions of the buttons:

- Dynamic Update

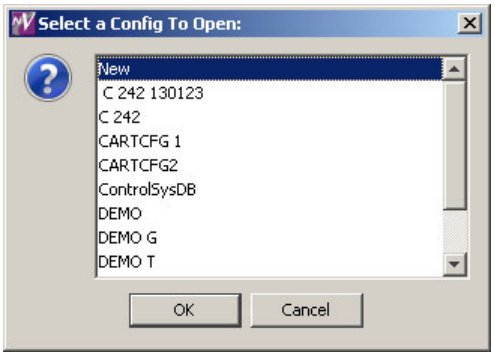
  The 'Dynamic Update' button is intended to transfer certain kinds of changes to the *active* system controller's configuration (from your PC) without requiring a restart.

  The button specifies to which control system it applies. You are to infer from the state of the controller buttons to which controller it applies.

- ▲ The 'Dynamic Update' button is unreliable and it is not possible to give information about when it is designed to work and when it is not. Therefore, avoid it.

- Read Configuration

  The 'Read Configuration' button transfers configuration data from the active system controller to a configuration in your PC. When you click the 'Read' button, NV9000-SE Utilities presents a dialog in which you can choose a configuration:



  The first entry in the list is 'New'. Choose this entry to create a new configuration. NV9000-SE Utilities will present an additional dialog in which to enter the configuration name.

  If you choose an existing configuration, NV9000-SE Utilities will present a confirmation message asking you whether it may overwrite the existing configuration.

  The button legend specifies from which control system the software will read. You will have to infer from the state of the controller buttons from which controller it will read (if you have a redundant pair).

- Write Configuration

  The 'Write Configuration' button transfers configuration data from your PC to the active system controller.

  The button legend specifies to which control system the software will write. You are to infer from the state of the controller buttons to which controller it will write (if you have a redundant pair).

  It is important to write the same configuration to both controllers of a redundant system. Therefore it is important to know to which controller you are writing. See Method of Restarting Both Controllers, on page 74.

- Restart Controller 1, Restart Controller 2

  There are two restart buttons, one for each controller.

  A restart button causes the NV9000 software running in a controller to restart. A software restart is generally required so that the NV9000 can load its new configuration data.

  Therefore, every time you write a configuration to the controller, you should restart it.

  If your system is redundant and you restart the active controller, the system will fail over to the inactive controller. That is, the inactive controller will become active.

- Start Controller 1, Start Controller 2

  There are two start buttons, one for each controller.

  If you have stopped the NV9000 software in a controller for any reason, the way to start it again is to click the start button for that controller. (The start button will be disabled if the software is already running.)

  If your system is redundant and you start the NV9000 software in a controller, the other controller will remain active if its software is running. If the other controller is stopped, the controller you are starting becomes active.
- Stop Controller 1, Stop Controller 2

  There are two stop buttons, one for each controller.

  Click a stop button to stop the NV9000 software in a controller.

  If you stop the software in an active controller, the system fails over to the inactive controller which then becomes active.
- Reboot Controller 1, Reboot Controller 2

  There are two reboot buttons, one for each controller.

  Click a reboot button to reboot a controller. This causes a hardware restart of the entire controller. (The NV9000 software will also start up in the process.)
- Shutdown Controller 1, Shutdown Controller 2

  There are two shutdown buttons, one for each controller.

  Click a shutdown button to power down a controller.

Method of Restarting a Standalone Controller

You must write the configuration to the controller and restart the controller. Follow these steps to do so:

1. Click the 'Write Configuration to ‹controller›' button to write the configuration to the controller. The process can take some time, perhaps a minute or more. NV9000-SE Utilities shows progress bars during the write.
2. Click 'Restart Controller 1' to restart the controller. A restart takes several seconds.

You will see the controller's indicators (ellipses) change color as the restart progresses.

Method of Restarting Both Controllers

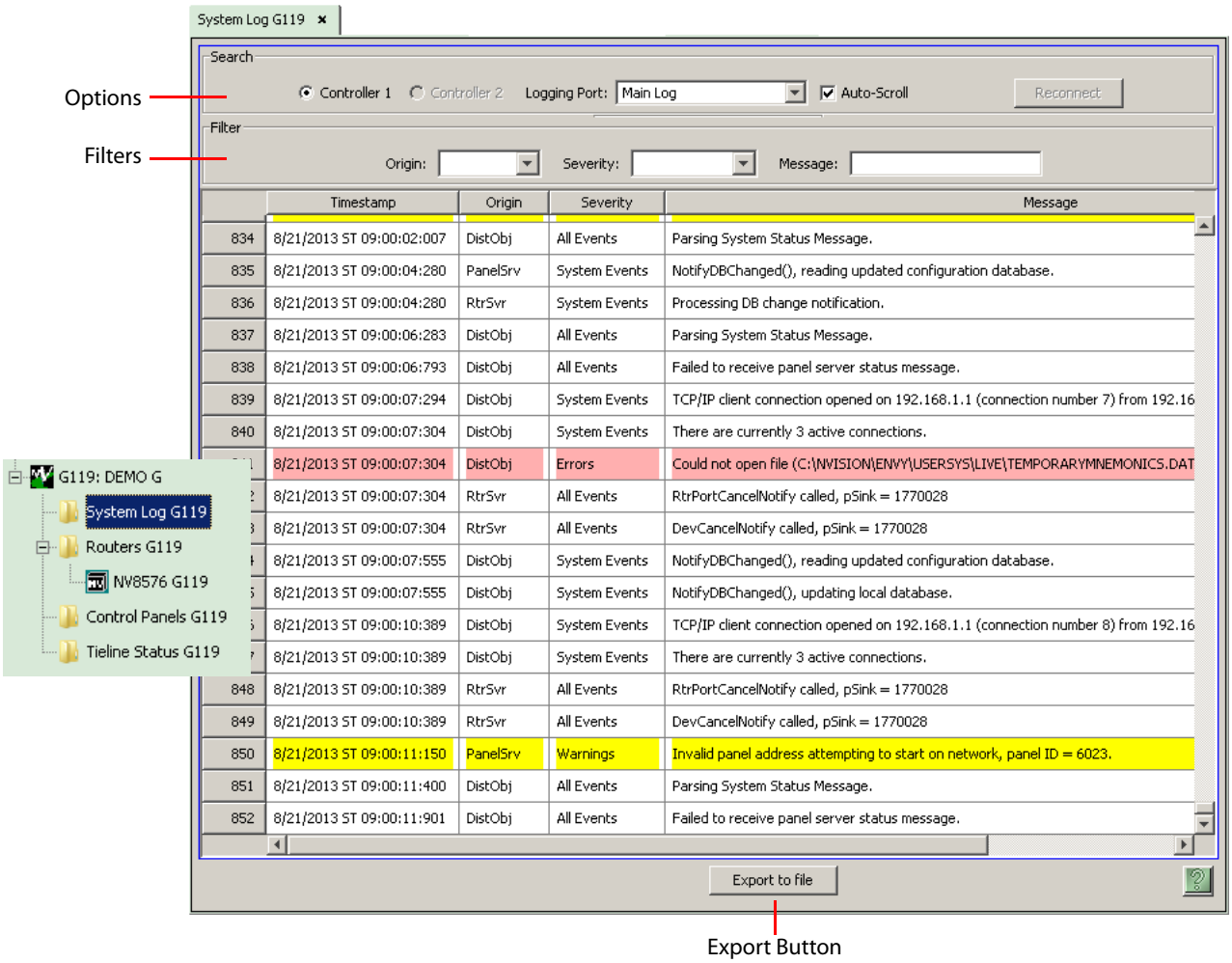
If you are configuring a redundant system, you must write the configuration to each controller and restart each controller. Follow these steps to do so:

1. Write the configuration to the active controller.
2. Restart the active controller. As a result, the system fails over to the inactive controller which now becomes active.
3. Write the configuration to the (formerly inactive) controller.
4. Restart the (formerly inactive) controller. The system fails over once again and the formerly active controller is now active once again.

You will see the controllers' indicators (ellipses) change color as the restarts progress.

System Log Page

When you click the 'System Log' entry in an expanded control system entry in the navigation pane, the 'System Log' page appears:



At the top of the page are two sections: one for display options and another for list filters. The options section also includes a 'Reconnect' button.

At the bottom of the page is an 'Export to File' button.

Errors or otherwise serious events in the log are highlighted in pink. *Warnings* or mildly serious events are highlighted in yellow.

Options

The options section includes two radio buttons, a filter, a check box, and a 'Reconnect' button:

The radio buttons let you choose whether to view the log for controller 1 or for controller 2.

If the 'Auto-Scroll' check box is checked, the displayed event list scrolls automatically as new events are added to the list. The new events are displayed as they occur.

If the 'Auto-Scroll' check box is not checked, the displayed event list remains stationary unless you scroll manually.

The 'Logging Port' option is a drop-down list in which you can choose the source for the log messages that are displayed. The choices are:

Main Log	Transaction Log	Tieline Monitor Log
Virtual XPT Log	NvAgent Log	TCP/IP Log (NP0017)
NVSP Log (NV0025)	NP Interface Log	SNMP Router Agent Log
Sony Bridge Log	SMS NC SVC Log	SNMP Master Agent Log
DHP Log		SNMP Master Control Agent Log

Reconnect Button

Click the 'Reconnect' button to re-establish the logging communication link with the NV9000 software if it ever fails. If the link is functioning, you should see the message "Connected to telnet log port XXXX."

Filters

The filters section includes 2 drop-down lists and a text field:

Entries in these field reduce the number of list entries that are displayed.

The entries in 'Origin' drop-down list vary with the logging port you chose above.

The entries in the 'Severity' drop-down list are a subset of the 8 possible entries. The entries are those severity levels that can be found in the existing log.

Origin

The 'Origin' drop-down list has entries that restrict the list entries to the specified source. Some of the choices in the list for the main log might be:

CPt_9	Debug	DistObj	NvDB
NVMaster	PanelSrv	RTRID_1	RtrSrv

The actual entries in the 'Origin' drop-down list vary with the logging port that you chose.

The control panels used in your system are logging sources and can have entries in 'Origin' drop-down list (subject to the chosen logging port).

Severity

The 'Severity' drop-down list has entries that restrict the list entries to the specified severity level. There are 7 severity levels, roughly in order of the amount of data logged:

Errors	Only critical system errors are logged (e.g., loss of a server).
Warnings	Only warnings and errors are logged (e.g., loss of a backup control card).

System events	This level of logging includes the two previous levels, plus system events (e.g., a panel or a router dropping off line).
Transactions	This level includes the three previous levels, plus a record of all messages between all system components (e.g., each time a panel sends a request).
All events	All system activity is written to the logs.
Debug	Extensive information about errors. (Use this option only under Grass Valley's direction.)
Verbose debug	Use caution: this level quickly fills the system controller's hard drive with data. (Use this option only under Grass Valley's direction.)

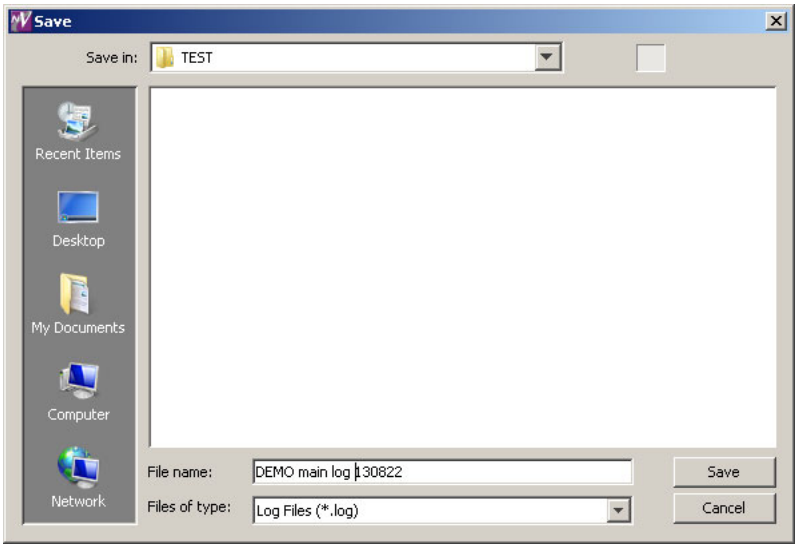
No logging at all is also a choice.

Message

The 'Message' field is a text field. If you type anything in this field, the logging list is restricted to entries whose 'Message' fields contain the text you typed.

Export to File

Click the 'Export to File' button to save a copy of the log file. When you click the button, NV9000-SE Utilities presents a 'Save' dialog in which you can specify the location of the saved log:

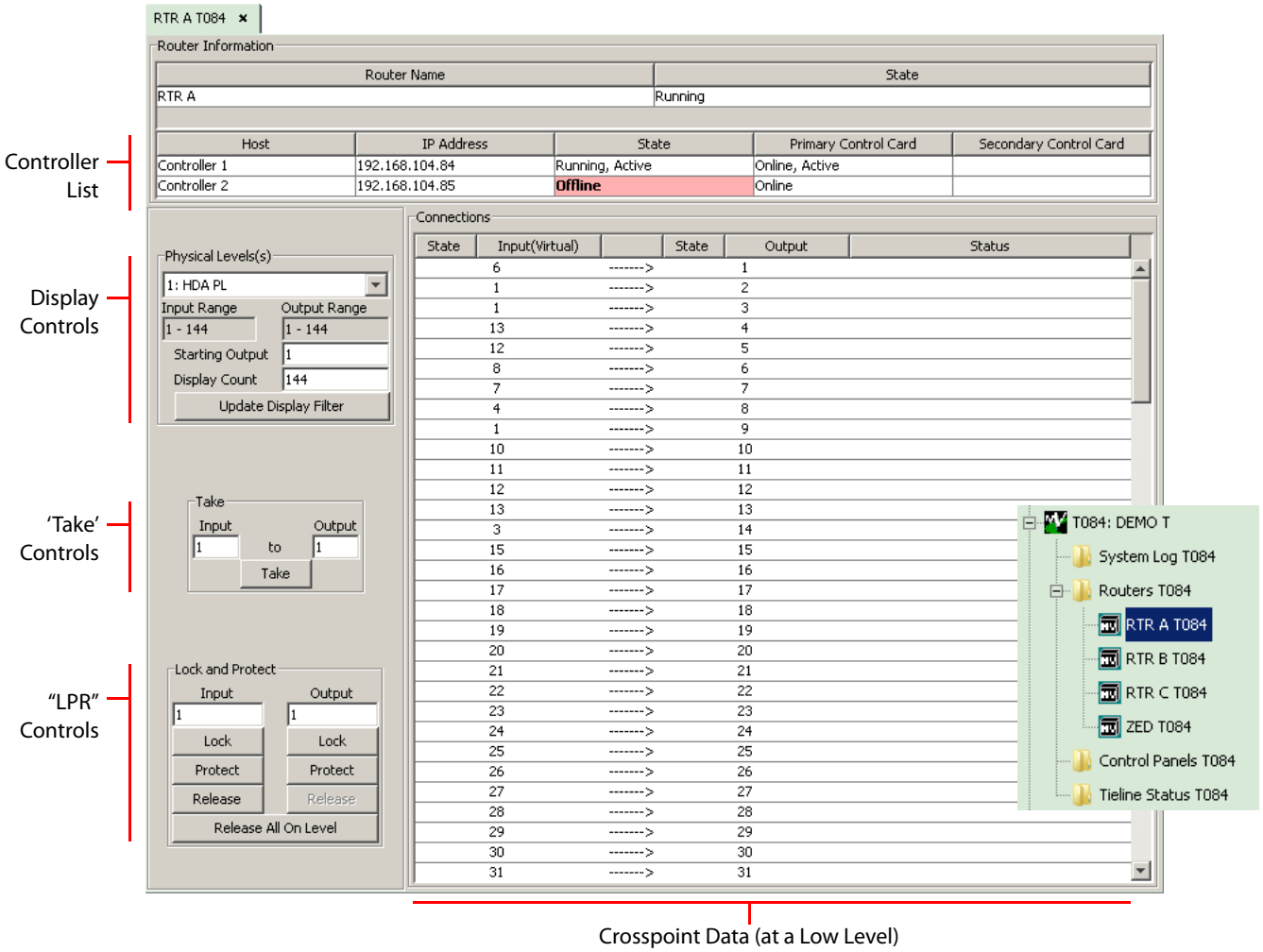


Browse to the folder in which to save the file. Then choose or enter a file name. Click 'Save'.

The saved log file is not affected by any display filter in effect.

Routers Page

Click one of the routers listed in the navigation page to view a page detailing the router:



The router page has several sections as show in this illustration.

The controller list identifies the system controllers in the system and shows their status. (In the illustration, the status for controller 2 is 'offline' and its status field is therefore highlighted in pink.)

The display controls section lets you select the physical level (within the selected router) to display and to specify a sub-range of crosspoint data to display.

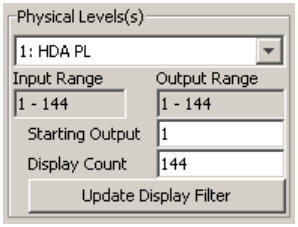
The take controls let you perform simple takes.

The "LPR" controls let you lock or protect inputs or outputs and to release those locks or protects.

- Some configurations do not support input locks or protects or output locks or protects. In controllers with such configurations, the inputs (or outputs) cannot be locked or protected in this page.

Display Controls

The display controls section lets you select one of the routers physical levels (or partitions) for display and specify the set of outputs to display:



To select a physical level, choose one from the drop-down list. Often there is only one level in a router.

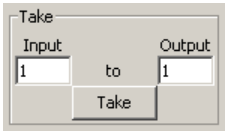
To select a range of outputs, specify a starting point and a count. The range cannot exceed the size of the partition (1–144 in the illustration above). The full range of outputs depends, of course, on the partition you select.

The physical level and the range you specify appear in the crosspoint display.

The 'Update Display Filter' button is not needed, but it does not hurt to click it.

Take Control

The take controls section lets you perform single, simple takes (within the selected partition):



To perform a take, enter an input and an output. Then press the 'Take' button.

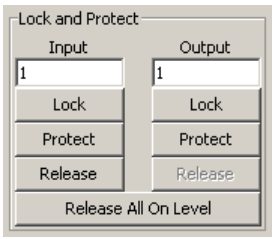
The take appears in the crosspoint display. (You might have to scroll the display to view the affected output.)

(The take cannot occur if the input is locked or the output is locked.)

LPR Controls

"LPR" is an abbreviation for "Lock/Protect/Release."

The LPR controls section lets you lock or protect inputs and outputs and also lets you release locks or protects:



There are two columns: one for inputs and one for outputs. The columns are independent.

The LPR state of inputs and outputs is indicated in the 'State' columns of the crosspoint display.

Definitions

Inputs and outputs can be locked or protected. The person who issues a lock or protect is called the *owner*.

When an input or an output is *locked*, no one at all may change its state. That is, no one may use it in a route and no one may "protect" it. No one may release the lock except the owner.

When an input or an output is *protected*, no one except the owner may change its state. That is, no one except the owner may use it in a route and no one may "lock" it. No one may release the lock except the owner.

To *release* a lock is to free the input or output to be used in any way and by anyone.

A force release is an override of a lock or protect without regard to ownership. Some control panels can be configured to allow forced release.

Locks

To lock an input, enter the input port number in the 'Input' field and click 'Lock' in the input column. To lock an output, enter the output port number in the 'Output' field and click 'Lock' in the output column.

An "L" appears in the state field of the input or output in the crosspoint display.

Protects

To protect an input, enter the input port number in the 'Input' field and click 'Protect' in the input column. To protect an output, enter the output port number in the 'Output' field and click 'Protect' in the output column.

A "P" appears in the state field of the input or output in the crosspoint display.

Release

To release an input, enter the input port number in the 'Input' field and click 'Release' in the input column. To release an output, enter the output port number in the 'Output' field and click 'Release' in the output column.

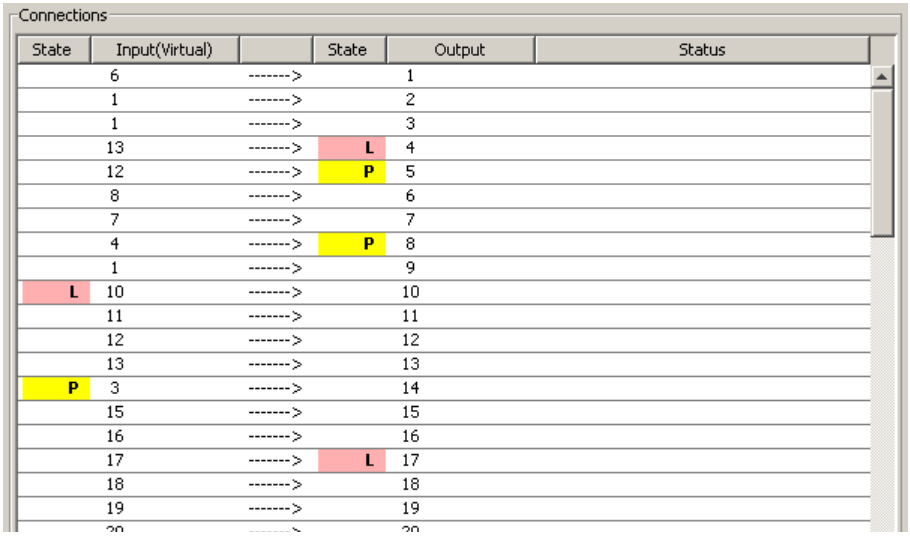
The "L" or "P" disappears from the state field of the input or output in the crosspoint display.

Release All on Level

Click the 'Release All on Level' button to release all inputs and outputs of the selected physical level. The change is indicated in the state fields of the crosspoint display.

Crosspoint Display

NV9000-SE Utilities presents the physical level you select in the display controls section in the crosspoint display (which is labeled 'Connections'):


Connections

State	Input(Virtual)		State	Output	Status
	6	------->		1	
	1	------->		2	
	1	------->		3	
	13	------->	L	4	
	12	------->	P	5	
	8	------->		6	
	7	------->		7	
	4	------->	P	8	
	1	------->		9	
L	10	------->		10	
	11	------->		11	
	12	------->		12	
	13	------->		13	
P	3	------->		14	
	15	------->		15	
	16	------->		16	
	17	------->	L	17	
	18	------->		18	
	19	------->		19	

The display has 5 significant columns. (The column that contains "------->" is just decoration. It serves to remind you that inputs are taken to outputs.)

The display is normally ordered by its outputs in ascending order, but by clicking on any column header, you can cause the display to be ordered according to the data in that column. Click the column header once to produce an ascending order; click the column header again to produce a descending order.

The crosspoint display is restricted to the range of outputs you specify in the display controls section.

The state field of any locked input or output is highlighted in pink and contains an "L". The state field of any protected input or output is highlighted in yellow and contains a "P".

Input

The first two columns apply to inputs. The 'State' column of this pair provides the LPR state of the input and the 'Input (Virtual)' column lists input ports. An input in this column is the one routed (taken) to the output in the same row.

Output

The fourth and fifth columns apply to outputs. The 'State' column of this pair provides the LPR state of the output and the 'Input (Virtual)' column lists input ports.

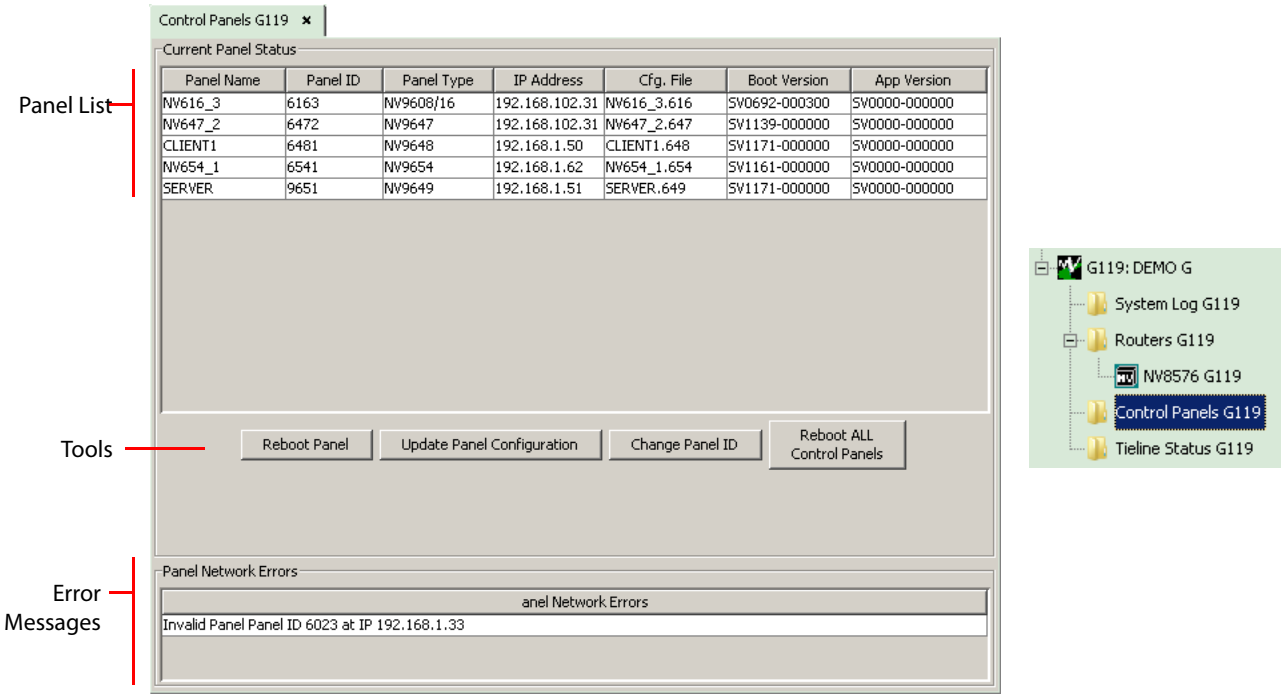
Status

Any field in the 'Status' column provides remarks about the output port in the same row.

The remarks vary according to the router type. In particular, the 'Status' fields provide important information about the ports of an NV5256 machine control router.

Control Panels Page

When you click the 'Control Panels' entry in an expanded control system entry in the navigation pane, the 'Control Panels' page appears:



The page has 3 sections.

The first lists all the NV96*xx* control panels defined in the configuration of the control system (for which you clicked 'Control Panels'). You can select a panel in this list if you intend to work on it.

The second section is a set of buttons that perform panel operations.

The third section reports network errors that occur for control panels.

Note that a panel is "defined" when you create a panel configuration for it using the 'Control Panels' page of NV9000-SE Utilities's Configuration pane. In doing so, you will have assigned the panel a panel ID and a panel name.

Panel List

The panel list has seven columns:

- Panel Name

  When you defined the panel configuration, you gave the panel a name. The fields in this column list those names.

- Panel ID

  When you defined the panel configuration, you gave the panel an ID (which is a number). The fields in this column list those IDs.

  Note that in any running system controller, all panel IDs must be unique. Therefore, the panel IDs in your configuration must be all be unique.

- Panel Type

  When you defined the panel configuration, you chose a panel type (such as NV9649). The fields in this column list the types of the panels in use.

  If you want to review the available panel types, refer to Control Panels, on page 183.
- IP Address

  When the NV9000 software starts up, it assigns IP addresses to all defined panels (through DHCP). This column provides the panels' IP addresses.
- 'Cfg. File'

  When a panel configuration is created, it is stored in a file. This column displays the file names. (You will have specified the file name during configuration. The file extension is determined by the panel type.)
- 'Boot Version'

  The boot version and the app version are those of the software in the panel (whether it is a software panel or hardware panel).
- 'App Version'

  The boot version and the app version are those of the software in the panel (whether it is a software panel or hardware panel).

Buttons

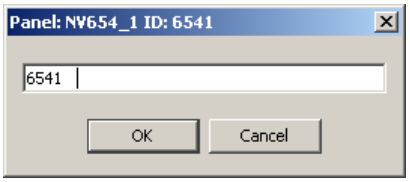
There are 4 buttons in the button section:

- Reboot Panel

  Select a panel in the panel list and then click this button to restart the panel (hardware and software, if the panel is a hardware panel).
- Update Panel Configuration

  Select a panel in the panel list and then click this button to reload the panel configuration (of the panel is a hardware panel). Software panels (including virtual panels) do not require this.
- Change Panel ID

  Select a panel in the panel list and then click this button to change the panel's ID. A dialog appears in which to enter the new ID:

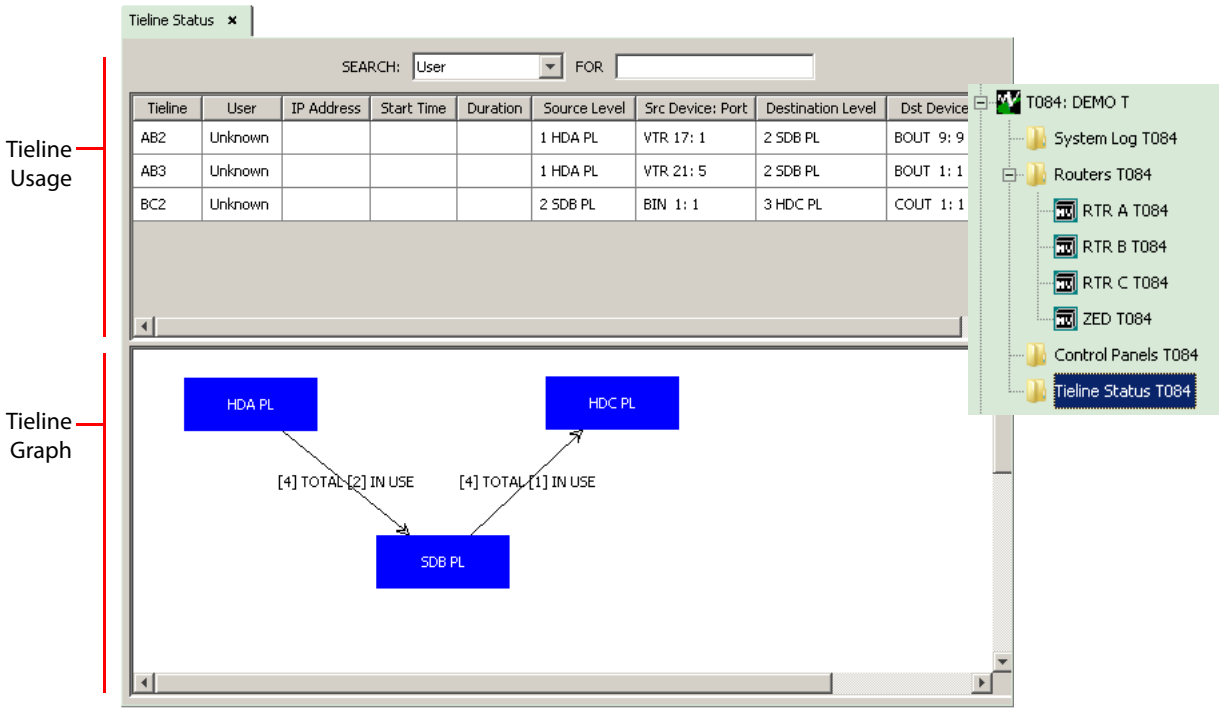
  

  Remember that all panel IDs must be unique.
- Reboot ALL Control Panels

  Click this button to restart all panels. It is not necessary to select a panel for this operation.

Tieline Status Page

When you click the 'Tieline Status' entry in an expanded control system entry in the navigation pane, the 'Tieline Status' page appears:



The page has two sections: tieline usage and a tieline graph.

Tieline Usage

The table in this section shows tielines that are currently in use, that is the tielines on which a route has been made.

The table lists simple tielines. Multi-hop tielines, if they exist, comprise two or more of the simple tielines.

The table has 9 columns:

- Tieline

  The names assigned to the (simple) tieline defined in the configuration of the selected control system.

- User

  The user who made the tieline route. If the user cannot be identified, the field reports "Uknown."

- IP address

  The panel at which the tieline route was made. If the panel cannot be identified, the field is blank.

- Start time

  The time at which the tieline was put into use by a route. If the start time cannot be determined, the field is blank.

- Duration

  The length of time that the tieline has been in use by a route. If this value cannot be determined, the field is blank.

- Source level

  A field in this column identify the physical level of the source (or upstream) device of the tieline.

- 'Src device:port'

  A field in this column actually has two data: (1) the name of the source device and the port in physical level identified in the 'Source Level' field.

- Destination level

  A field in this column identify the physical level of the destination (or downstream) device of the tieline.

- 'Dst device:port'

  A field in this column actually has two data: (1) the name of the destination device and the port in physical level identified in the 'Destination Level' field.

Filtering

You can use a filter to restrict the number of entries in the table using the 'Search' drop-down menu and the 'For' field. The drop-down menu has 4 entries that correspond to 4 columns in the table: 'User', 'Tieline', 'Source Device', and 'Destination Device'.

To filter the table, choose one of the entries in the 'Search' drop-down list and type search text in the 'For' field. Only those table entries in which the specified field contains the search text will be displayed. To display all table entries, clear the 'For' field.

Tieline Graph

The graph shows the topology of the tielines defined in the configuration of the control system. (Tielines are defined in the 'Tielines' page of the Configuration pane.)

The graph represents physical levels by blue rectangles and identifies the specific physical level as the title of the rectangle.

The lines between the rectangles represent sets of tielines.

The label associated with a line has two parts:

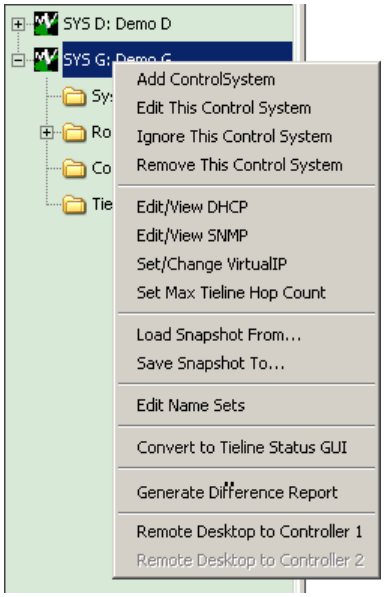
[xxx] TOTAL and [yyy] IN USE

The number "xxx" is the number of tielines in the set. The number "yyy" is the number of tielines in use in that set. It is possible for "yyy" to be 0.

The numbers of tielines in use, as shown in the graph, corresponds to the data in the tieline usage section.

Navigation Pane

If you right-click any system controller in the system management pane, a context menu appears allowing you to configure additional aspects of the system controller:



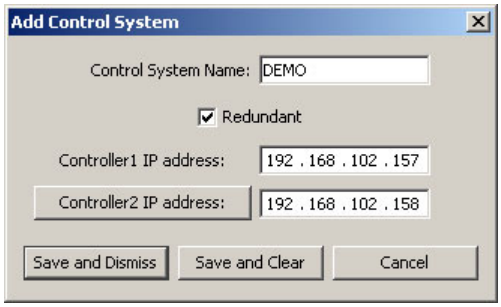
The context menu has 14 commands:

- Add Control System
- Edit This Control System
- Ignore This Control System
- Remove This Control System
- Edit/View DHCP
- Edit/View SNMP
- Set/Change Virtual IP
- Set Max Tieline Hop Count
- Load Snapshot from . . .
- Save Snapshot to . . .
- Edit Name Sets
- Convert to Tieline Status GUI
- Generate Difference Report
- Remote Desktop to Controller (1 or 2)

Add Control System

▲ This command performs the same function as the 'Add Control System' command of the 'System' menu.

When you click 'Add Control System', NV9000-SE Utilities presents a dialog in which to identify the control system:



The command adds a control system entry to the 'System Management' pane.

Place a check in the 'Redundant' check box if your control system is a pair of system controllers. Enter the name of the control system in the 'Control System name' field.

Enter the IP address of the first system controller in the first IP address field. If the control system is redundant, also enter the IP address of the second system controller in the second field.

Click 'Save and Dismiss' to create an entry in the 'System Management' page and close the dialog.

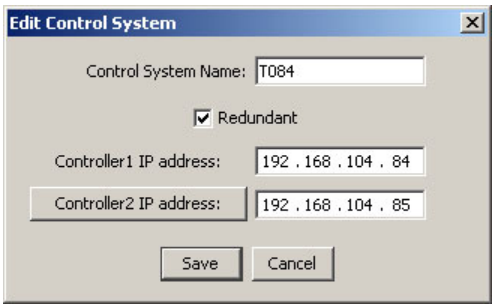
Click 'Save and Clear' to create an entry in the 'System Management' page and keep the dialog open so that you can create another control system.

Click 'Cancel' to close the dialog without creating another control system entry in the 'System Management' page.

The control system entries you create appear as icons in the left side of the 'System Management' page. The icons appear green when the actual control system is healthy, yellow when the control system is partially healthy (and communication with the control system can be established) and red when communication cannot be established.

Edit This Control System

When you click 'Edit This Control System', NV9000-SE Utilities presents a dialog in which to re-enter the control system's identity:



The dialog is virtually the same as the dialog for 'Add Control System' — except that to get the dialog you will have right-clicked a control system that is already present in the 'System Management' navigation pane.

Place a check in the 'Redundant' check box if your control system is a pair of system controllers. Enter the name of the control system in the 'Control System name' field. Remove the check mark if it is not redundant.

Re-enter the IP address of the first system controller in the first IP address field. If the control system is redundant, also re-enter the IP address of the second system controller in the second field.

Click 'Save and Dismiss' to create an entry in the 'System Management' page and close the dialog.

Click 'Save and Clear' to create an entry in the 'System Management' page and keep the dialog open so that you can create another control system.

Click 'Cancel' to close the dialog without creating another control system entry in the 'System Management' page.

The icon (that you right-clicked) appear green when the control system is healthy, yellow when the control system is partially healthy (and communication with the control system can be established) and red when communication cannot be established.

Ignore This Control System

The 'Ignore This Control system' is to be used in emergencies and very carefully.

- It is not obvious how to execute the command.

The 'Ignore This Control System' command causes NV9000-SE Utilities to stop polling the control system (that you right-clicked) for status. This is useful when that control system is offline. When a control system is off-line, NV9000-SE Utilities spends nearly all its time attempting to get status from that system while all its other functions come to a near halt.

Use this command in such a case.

- Be very careful because it is not obvious how to execute the command. There is no feedback.

Follow these steps to cause a control system to be ignored:

1. Right-click the control system icon in the 'System Management' pane.
2. Choose 'Ignore This Control System' from the context menu that appears.
3. Close the 'System Management' page that is displayed. Click the "X" in the page tab to do so.

   This is the critical part: without closing the page, NV9000-SE Utilities continues to poll the control system.

To revert the system, i.e., to turn polling back on: right-click the control system's icon in the 'System Management' pane. Doing so causes the control system's main page to reappear and NV9000-SE Utilities will start polling the system again.

Remove This Control System

The 'Remove This Control System' command deletes a control system entry from the 'System Management' pane.

Be very careful about this command: it removes the control system entry without a confirmation dialog. If you accidentally click this command, NV9000-SE Utilities removes the control system without warning. It can be a nuisance to restore an accidentally deleted control system entry.

Edit/View DHCP

The 'Edit/View DHCP' command presents a view of the DHCP mappings for the system selected controller's networks:

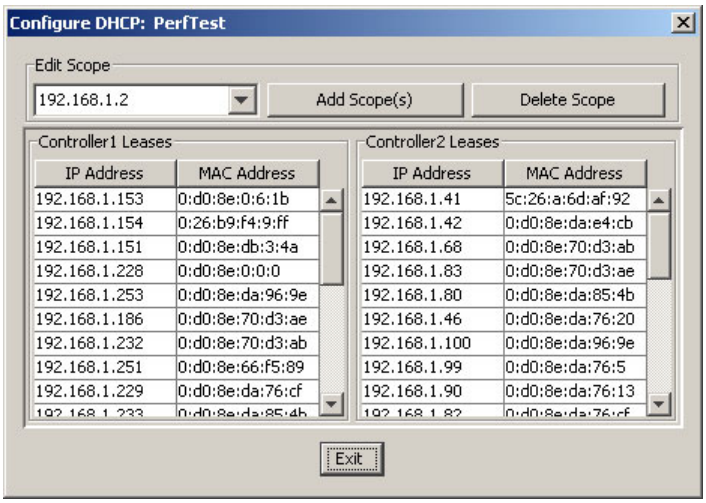


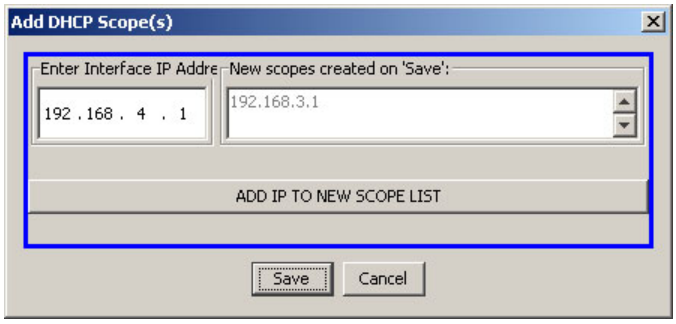
Fig. 5-4: Configure DHCP Dialog

Each of the networks of a system controller supports DHCP. In the dialog of this command, the networks are called *scopes*. Because the typical system controller has 2 "router and panel" networks, there are typically two scopes listed in the drop-down menu of this dialog.

You can choose any scope available in the drop-down menu. The DHCP assignments for that scope appear in the lists labeled 'Controller 1' and 'Controller 2'.

Add Scope(s)

You can create additional scopes by clicking the 'Add Scope(s)' button. A dialog such as the following appears:



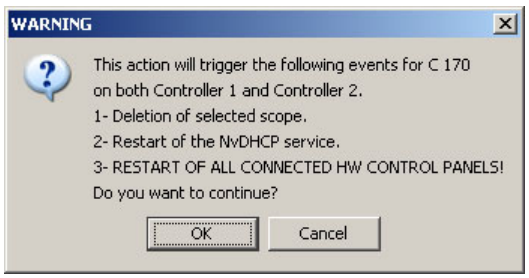
To add a scope (i.e., a system controller network), enter its IP address in the field at the left and then click 'Add IP to New Scope List'. The new IP address will appear in the list of scopes at the right. When you have finished adding scopes, click 'Save'. Or click 'Cancel' if you make a mistake.

The new scopes appear in the drop-down menu of the 'Configure DHCP' dialog (shown in Figure 5-4).

▲ A reboot of the system controller(s) is required before the new scopes take effect.

Delete Scope

If you want to delete a scope, click 'Delete Scope' in the 'Configure DHCP' dialog. A warning appears:



Click 'OK' if accept these conditions. Click 'Cancel' if you do not.

▲ Be careful. This command should be issued rarely if ever and then only during the early development of your system. If you delete the scope, any panels on that scope will fail in their attempt to restart.

Edit/View SNMP

The 'Edit/View SNMP' command presents an 'SNMP Configuration' dialog:

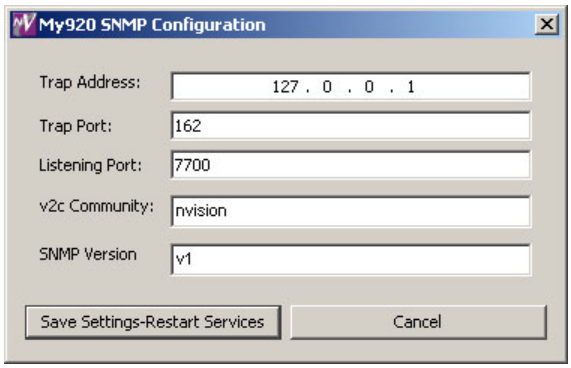


Fig. 5-5: SNMP Configuration Dialog

The dialog has five parameter fields:

- Trap address
- Trap port
- Listening port
- 'v2c Community'
- SNMP version

The dialog has two buttons:

- 'Save Settings-Restart Services'

  Click this button to save your changes to the SNMP settings and restart the SNMP service. (A restart is required.)

  ▲ You should make the same changes to both system controllers if your system is a redundant control system.

- Cancel

  Click 'Cancel' to discard any changes you have entered in the parameter fields.

Note:

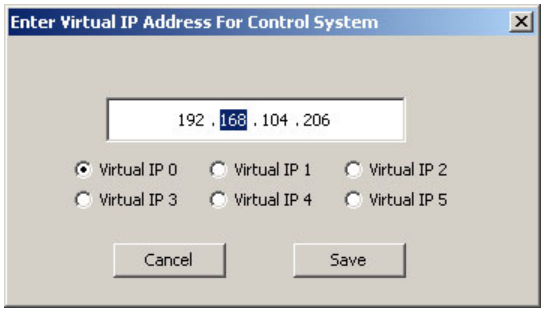
Unless a system controller has SNMP installed (for which you need a license), the command is disabled.

NV9000-SE Utilities will not let you access the SNMP configuration dialog unless both controllers (if you have a redundant system) are running properly.

Set/Change Virtual IP

A virtual IP address is an artificial IP address that allows your PC and other systems to address either system controller of a redundant pair using a single IP address.

When you click 'Set/Change Virtual IP', the following dialog appears:



The system controller might have up to 6 Ethernet ports, depending in the controller. An NV960 has up to 6; an NV920 has 3.

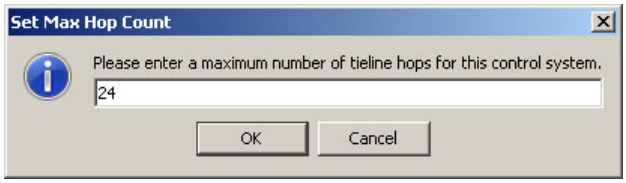
You can assign a virtual IP address to any of the six possible ports by selecting one of the radio buttons identified by number and entering an IP address.

Further work must be done within the system controller itself to make the subnet of the actual port match the subnet of the virtual IP address. That is outside the scope of this manual.

▲ After specifying a virtual IP address, you must reboot (not restart) both system controllers of the redundant pair before the virtual IP address can take effect.

Set Max Tieline Hop Count

The max tieline hop count is the limit beyond which an NV9000 system will not create a tieline. The option is relatively simple, as shown here:



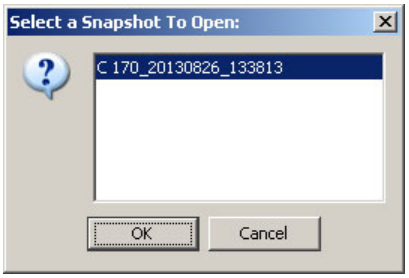
Load Snapshot from . . .

Snapshots are primarily a diagnostic tool for use by Grass Valley technical support.

Snapshots are a way of packaging a configuration and the state of the routers at a specific point in time. When a snapshot is loaded, the system controller restarts with the configuration from the snapshot and then sets the router crosspoints to the state specified in the snapshot.

The routers defined in the snapshot should *match* the routers present in the actual system being controlled when you do the load. A "match" means that router names are identical and with partition names and sizes being identical.

When you click 'Load Snapshot from . . .', the following dialog appears:



In this dialog are listed the snapshot files from which you may choose. Pick one and click 'OK' to load a snapshot. Otherwise click 'Cancel'.

The list identifies snapshots that you have either made from NV9000-SE Utilities or that you have received from another site and have copied into NV9000-SE Utilities's snapshot folder. Under Windows XP, the pathname of the snapshot folder is

C:\Documents and Settings\Administrator\CtrlSysSnapshots

or, under Windows 7,

C:\Users\‹user›\CtrlSysSnapshots

- If the folder is empty, the command simply does nothing, because it has nothing to load.
- Both of the controllers of a redundant system must be online. Otherwise you cannot load a snapshot. You get this message:

- Loading a snapshot causes a restart of the controller (or of both controllers).

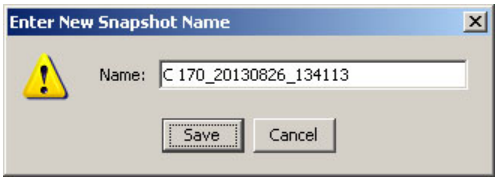
Save Snapshot to . . .

Snapshots are primarily a diagnostic tool for use by Grass Valley tech support.

Snapshots are a way of packaging a configuration and the state of the routers at a specific point in time. When a snapshot is loaded, the system controller restarts with the

configuration of the snapshot and then sets the router crosspoints to the state specified in the snapshot.

When you click 'Save Snapshot to . . .', the following dialog appears:



This dialog presents the default name of the snapshot you are making. It is composed of the control system name, the date, and the time. You can specify whatever file name you wish, overriding the default. Click 'Save' to save the snapshot. Otherwise, click 'Cancel'.

NV9000-SE Utilities saves snapshots in a designated snapshot folder. Under Windows XP, the pathname of the snapshot folder is

C:\Documents and Settings\Administrator\CtrlSysSnapshots

or, under Windows 7,

C:\Users\‹user›\CtrlSysSnapshots

If you intend to send a snapshot file to someone, copy it from the designated snapshot folder.

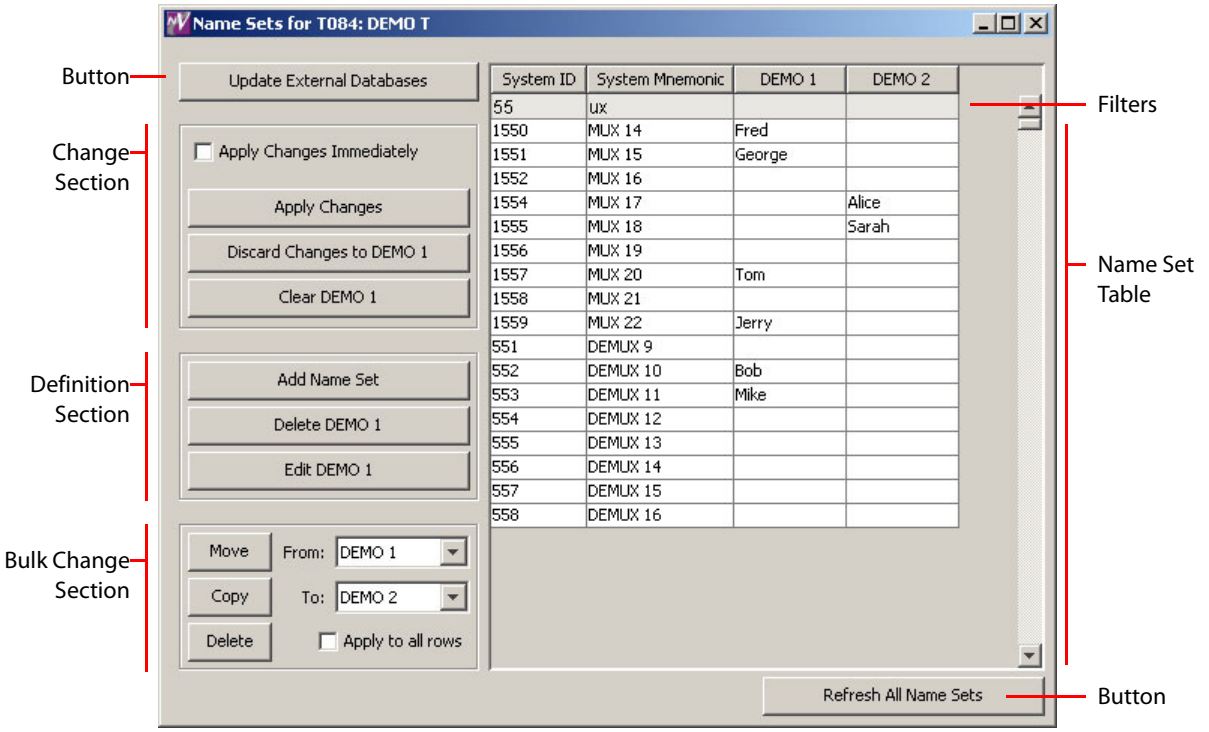
Edit Name Sets

A *name set* is an alternate naming space for the devices defined in your configuration. (Some facilities prefer to have one or more alternate name sets.)

You can define any number of name sets. A system name space (or default name space) always exists. It is in the default name space that you define devices in the configuration pages of NV9000-SE Utilities.

If your configuration has name sets (other than the default), certain control panel configurations can allow panel operators to switch between the system name space and the alternate name set.

When you click 'Edit Name Sets', a dialog appears, similar to the following:



This dialog lets you view all name sets at once and to modify any of them at any time. (You might have to scroll to view different name sets if you have many.)

A name set — defined by a column in the table — can have blank or undefined entries. Where there are blanks, a control panel using the name set will display the system name instead of a blank.

The name set dialog has several sections:

- Change Section — apply or remove changes.
- Definition Section — create or delete name sets.
- Bulk Change Section — move or copy data from one name set to another or delete name set data.
- Name Set Table — the table displays the name sets and it is in the table that you enter the alternate names of the name sets.

  The top row of the name set table is a set of filters with which to trim the number of entries that appear in the table. If you enter any text in a filter field, the table is restricted to the items that contain the text you entered. The restrictions are compounded if you enter text in more than one field.

  In the illustration above, the text '55' in the 'System ID' column and the text 'ux' in the 'System Mnemonic' column restrict the table to show only those names whose system ID contains "55" and whose system mnemonic contains "ux."

  You can sort the name set table by clicking any column header. The sort will be ascending in the values of that column. If you click the column again, the sort will be descending.

The name set dialog also has two buttons:

- Update External Databases

  Clicking this button causes the system controller to send a notification message (to third-party control systems, iControl, and Kaleido subsystems) that a name set change has occurred.

- Refresh All Name Sets

  Clicking this button causes NV9000-SE Utilities to retrieve the currently defined name sets from the active system controller (the one you have chosen in the system management pane) and update its name set tables.

  To complete the update, you must click 'Apply Changes'. Otherwise, changes to the name sets will not be retained.

Name Set Table

The name set table displays the system mnemonics for all source and destination devices defined in the configuration and displays the alternate names in each name set for those devices.

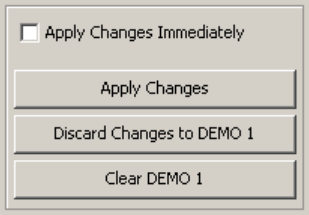
Initially, the table might not have any name sets defined. However the system names are always defined (as long as there are devices defined) and the 'System Mnemonics' column is always present and fully populated.

(To create a name set or an additional name set, click 'Add Name Set' in the definition section.)

If a name set exists, you can click in an entry in the name set column and type an alternate name. In this way, you can populate a name set.

Change Section

The change section has 3 buttons and a check box:



Check the check box if you want your changes to take effect immediately (in the configuration). If you leave the check box unchecked, you must click 'Apply Changes' to save your changes.

When you click 'Apply Changes', changes made to all name sets are saved.

To undo recent changes,

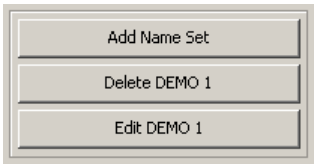
1 Click in the column of the name set you want to undo.
2 Click 'Discard Changes to ‹*name set*›'. if you do not wish to save your changes.

To erase all entries in a name set

3 Click in the column of the name set you want to erase.
4 Click 'Clear ‹*name set*›'.

Definition Section

The change section has 3 buttons:



Add Name Set

Click 'Add Name Set' to create a new name set. A dialog appears:

Enter a name for the name set and click 'OK' to create the name set. Otherwise, click 'Cancel'.

When you create the name set, an new empty column appears in the name set table, at the right. The column header is the name you gave the name set.

Delete ‹*name set*›

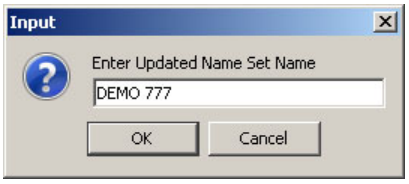
To delete a name set:

1 Click anywhere in the column belonging to the name set you want to delete. The title of the delete button changes to reflect the name set you chose.

2 Click the 'Delete ‹*name set*›' button.

Edit ‹*name set*›

To change the name of a name set, click 'Edit ‹*name set*›'. A dialog appears:

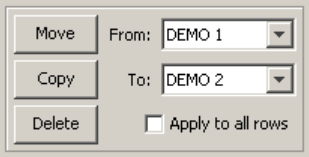


Enter a new name for the name set and click 'OK' to rename the name set. Otherwise, click 'Cancel'.

Bulk Change Section

The bulk change section lets you move or copy multiple names from one name set to another and to delete multiple names.

The bulk change section has 3 buttons, 2 drop-down lists and a check box:



From

The 'From' drop-down list lets you select the name set (column) from which to move or copy names or from which to delete names.

To

The 'To' drop-down list lets you select the name set (column) to which to move or copy names.

Apply to All Rows

When this check box is checked, the operation (move, copy, or delete) applies to all rows of the name set or name sets involved. If you leave this check box unchecked, the operation applies only to the rows you select.

- Note that although NV9000-SE Utilities lets you select multiple columns, the operation you perform applies only to the names in the left-most selected column.
- Note that selecting any name actually selects the row in which the name is found. The columns you choose in the 'From' and 'To' drop-down lists are those that are affected by a move, copy, or delete. The column in which is you perform the (row) selection is not necessarily affected.

Move

Clicking the 'Move' button transfers data from the 'From' column to the 'To' column and removes those data from the 'From' column.

To move selected names of a name set:

1. Use click, shift-click, or ctrl-click to select one or more rows of the name set table.
2. Select the 'From' name set and select the 'To' name set.
3. Be sure 'Apply to All Rows' is unchecked and click 'Move'.

To move *all* names of a name set:

1. Check 'Apply to All Rows'.
2. Select the 'From' name set and select the 'To' name set.
3. Click 'Move'.

Copy

Clicking the 'Copy' button transfers data from the 'From' column to the 'To' column and leaves those data where they are in the 'From' column.

To copy selected names of a name set:

1 Use click, shift-click, or ctrl-click to select one or more rows of the name set table.
2 Select the 'From' name set and select the 'To' name set.
3 Be sure 'Apply to All Rows' is unchecked and click 'Copy'.

To copy *all* names of a name set:

1 Check 'Apply to All Rows'.
2 Select the 'From' name set and select the 'To' name set.
3 Click 'Copy'.

Delete

Clicking the 'Delete' button removes data from the 'From' column (i.e, name set).

To delete selected names of a name set:

1 Use click, shift-click, or ctrl-click to select one or more rows of the name set table.
2 Select the 'From' name set.
3 Be sure 'Apply to All Rows' is unchecked and click 'Delete'.

To delete *all* names of a name set:

1 Check 'Apply to All Rows'.
2 Select the 'From' name set.
3 Click 'Delete'.

Update External Databases

Clicking this button causes the system controller to send a notification message (to third-party control systems, iControl, and Kaleido subsystems) that a name set change has occurred.

Refresh All Name Sets

Clicking this button causes NV9000-SE Utilities to retrieve the currently defined name sets from the active system controller (the one you have chosen in the system management pane) and update its name set tables.

To complete the update, you must click 'Apply Changes'. Otherwise, changes to the name sets will not be retained.

Convert to Tieline Status GUI

WARNING
Avoid this command unless you want to change your copy of NV9000-SE Utilities to a tieline status GUI. You cannot recover NV9000-SE Utilities except by reinstalling it.

Clicking this command first gives you a warning:

This command removes all features of NV9000-SE Utilities except the tieline status GUI and features that support the tieline status GUI.

(Customers might wish, instead, to use the NV9000 Web Suite, which provides tieline status, among other things.)

Generate Difference Report

A difference report compares a physical level in the configuration you have loaded in NV9000-SE Utilities against a physical level (presumably the same physical level) in the configuration of the selected control system. The difference report tells you whether any changes were made.

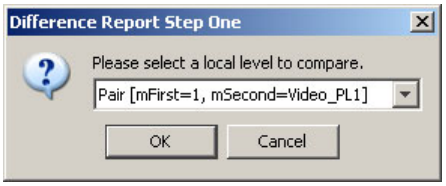
After NV9000-SE Utilities generates a difference report, which it displays, you can use the buttons at the bottom of the report page (1) to save selected differences in the report as an "ignore" list or (2) to save the entire report as a .csv file.

To generate a difference report:

1 Right-click a system controller in the 'System Management' pane.

- ▲ Unless your situation is very unusual, be sure that the configuration in NV9000-SE Utilities has the same name as the configuration in the system controller in which you are interested.

In the context menu that appears, choose 'Generate Difference Report' The first of several dialogs appears:



In this dialog, you select the physical level of the configuration loaded in NV9000-SE Utilities. In the language of the dialog, this is the *local* level.

After you select the level, click 'OK'. Click 'Cancel' if you want to discontinue the difference report.

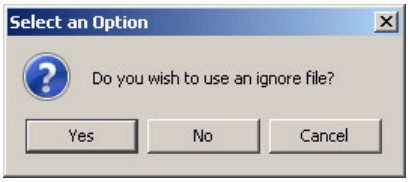
2 The second dialog appears:

In this dialog, select a *remote level,* that is, a physical level in the configuration of the system controller.

- Unless your situation is very unusual, be sure that the *remote* level is the same level as the *local* level.

After you select the level, click 'OK'. Click 'Cancel' if you want to discontinue the difference report.

3 The third dialog appears:

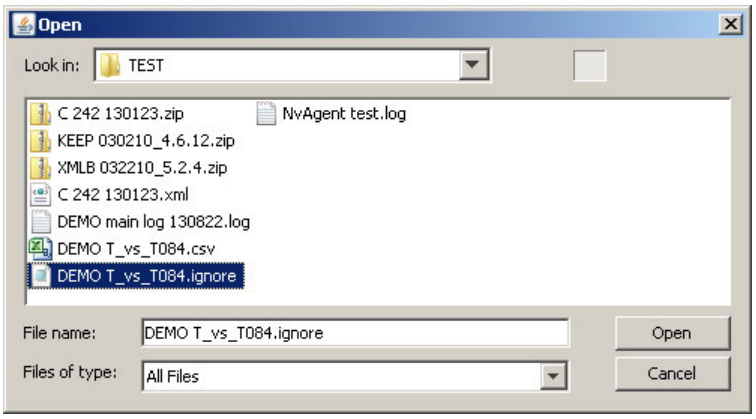


NV9000-SE Utilities asks whether you want to use an "ignore" file.

If you have any ignore files, either they were generated by a previous difference report or you acquired an ignore file from someone at another location.

Every time you run a difference report, you can generate an "ignore" file. An ignore file lets you ignore previously reported differences in the report you are about to generate.

Click 'Yes' if you want to use an ignore file. NV9000-SE Utilities presents a dialog in which you can browse to locate a specific ignore file:



The file extension for "ignore" files is `.ignore`.

Click 'No' or 'Cancel' if you do not want to use an "ignore" file. ('Cancel' has the same result as 'No'.)

4 NV9000-SE Utilities displays the difference report:

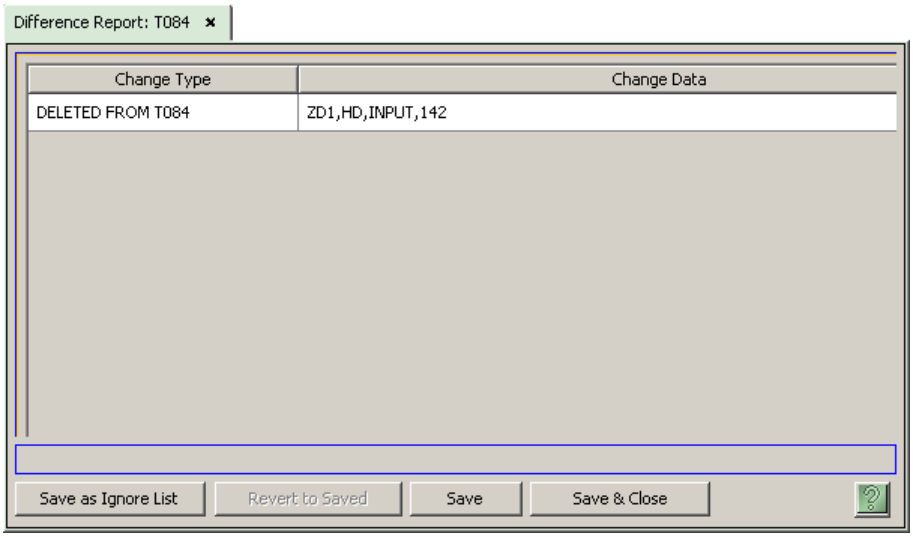


Fig. 5-6: Difference Report (Sample)

Every difference listed in the report comprises a change type and shows the change data.

The difference report focuses on the system controller. The page tab identifying the report shows the controller name.

Items present in the configuration in NV9000-SE Utilities but absent from the system controller are reported as *deleted from* the named controller.

Items absent from the configuration in NV9000-SE Utilities but present in the system controller are reported as *added to* the named controller.

- The report is deficient in two ways:

  (1) It does not tell you to which physical level it applies. You will have to remember the physical level. If you are saving difference reports or ignore files (using the buttons at the bottom of the report window) be sure to identify in the file name to which level the report applies.

  (2) The change data are incomplete. As an example, the change shown in Figure 5-6 involved two ports: input port 142 and output port 142, both belonging to device ZD1. The output port is missing from the difference report.

5 After NV9000-SE Utilities displays the report, you can use the buttons at the bottom of the report to save the report as an "ignore list" or as a .csv file. These are the buttons:

Save as Ignore File	This button generates an ignore file to be used by subsequent difference reports involving the same physical level. Before you click this button. select any or all of the changes listed in the difference report that you want included in the ignore file. If the ignore file is used in future reports, the changes you select are the ones that are ignored. (If you select nothing, the ignore file is empty.)
Revert to Saved	This button is always disabled (grayed out).

Save	This button generates a .csv file that contains the data in the entire difference report.
Save & Close	This button generates a .csv file that contains the data in the entire difference report and then closes the report page.

Remote Desktop to Controller (1 or 2)

There are two of these commands in the system page's context menu, one for system controller 1 and the other for system controller 2. The commands are alike.

When you click one of these commands, NV9000-SE Utilities causes your computer to login (remotely) on the desktop of the system controller. (You must enter the user name and password required by that system controller.)

If the system controller is not connected to your PC, you will get an error message.

Other Topics

Analyze Configuration

Under the 'Configuration' pane, there is an 'Analyze' page. This page can give you a diagnostic report concerning any of your configurations. See Analyze Page, on page 585 for more information.

System Controllers

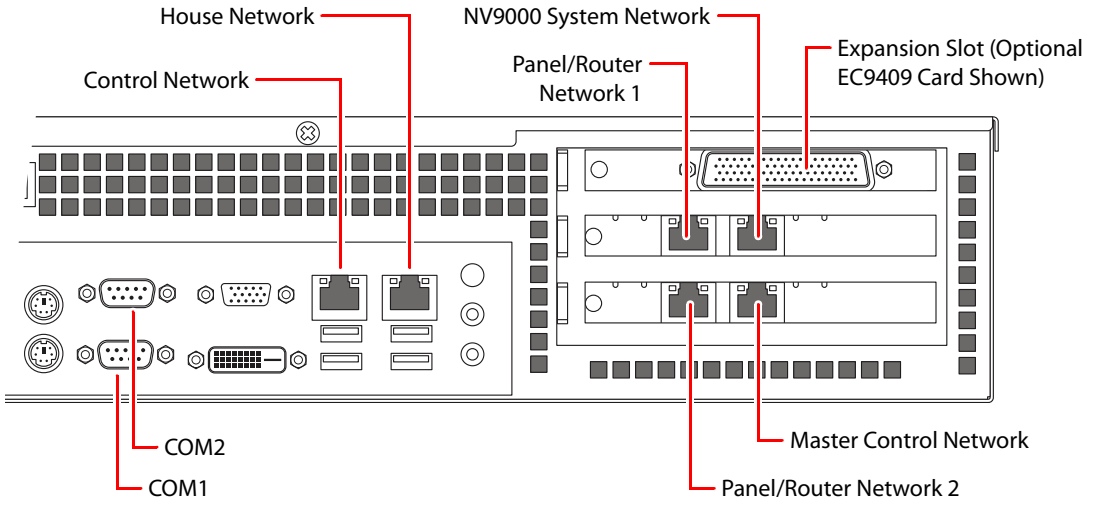
There are 2 system controller models: the NV960 and NV920. The NV960 costs more but offers more.

NV960

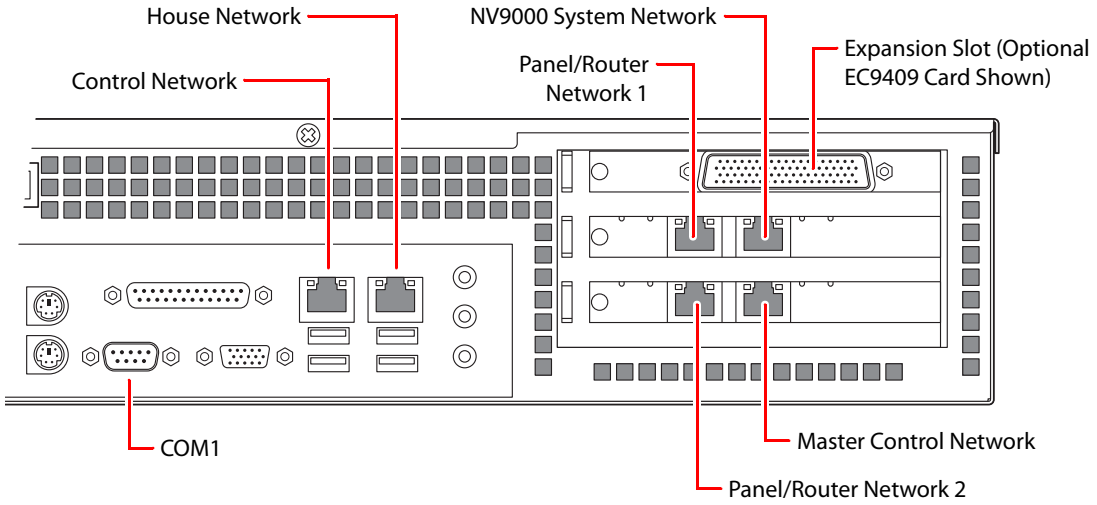
The NV960 is a 2RU system controller, supporting several port options.

There are several models. The NV960 is a stand-alone unit. The NV965 comprises two controllers that are paired to make a redundant system. (The NV967 is the same as the NV965 but adds an NV9700 "remote diagnostics and changeover" panel and an EC9420 serial card.)

Located at the rear of the system controller are (typically) six Ethernet ports and two serial ports (COM1 and COM2):



The ports of the older model of the NV960 are organized slightly differently. There is only one serial port (COM1):



These are the networks available at the ports:

- Control Net

  Provides communication between two system controllers being used as a redundant pair.

  ▲ This a private network not to be used for any other purpose.

- House Net

  Allows the system controller to communicate with your facility's computer network and with PCs running NV9000-SE Utilities, GUIs, and other software.

- Panel and Router Nets 1 and 2

  Connect to routers and control panels. Any command initiated by an operator through a control panel is sent to the system controller, which interprets the command, and then sends appropriate instructions (such as "take") to the appropriate router(s).

- NV9000 System Net

Connects to other NV9000 systems.

- Master Control Net

  Allows the system controller to communicate with a master control subsystem.

PCI Slots

The controller frame has 3 PCI expansion slots. Expansion options include:

EC9412	A 10/100baseT PCI card that adds one Ethernet port.
EC9414	A 10/100/1000baseT PCI card that adds two Ethernet ports.
EC9420	An 8-port RS-232/422/485 PCI card with DE9 breakout box.
EC9421	An external 1RU Ethernet-to-serial converter that has 16 RS-232/422/485 ports.
EC9422	A serial "Y" cable for use with an EC9420 card in a redundant NV9000 system. One cable is required for each serial port.
EC9423	An external 1RU Ethernet-to-serial converter that has 32 RS-232/422/485 ports.
EC9424	A serial "Y" cable for use with an EC9421 or EC9423 converter in a redundant NV9000 system. One cable is required for each serial port.

NV920

Each NV920 is 1RU and houses two system controllers. Each system controller has 2 disk drives, 3 Ethernet ports, and no expansion slots. However each NV920 does have an RS-485 port that supports one serial device.

Several models of the NV920 are available:

- NV920D. NV920 frame with dual controllers.
- NV920S. NV920 frame with a single controller.
- NV920-PRI. A primary NV920 system controller.
- NV920-SEC. A secondary NV920 system controller.
- NV920-FME. An NV920 frame only.
- NV920-FRU. A "field replacement unit," that is, a spare system controller.

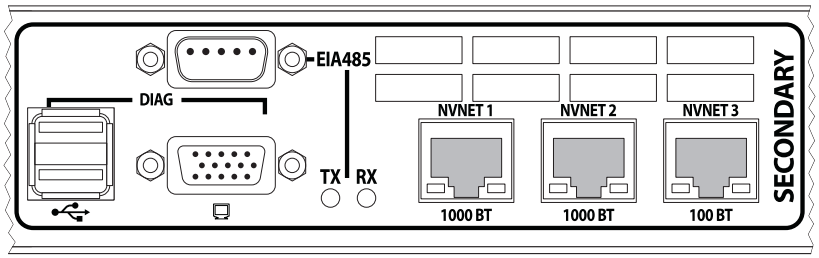
The Frame

The NV920 frame is a 1RU frame which contains a power supply having two removable power supply modules, and one or two removable NV920 system controllers. One controller is labeled 'Primary' and the other 'Secondary'. These terms distinguish one from the other, but otherwise have no specific meaning.

The NV920 frame has two power supply modules for redundancy. In normal operation, both supplies operate in tandem, sharing the load. If one power supply module fails, the other immediately absorbs the full load.

The System Controller

At the rear of the NV920 frame are two identical sets of connectors, one for each system controller. These are the connections for one system controller:



Among these are 3 Ethernet (RJ-45) connectors. Two support 1G Ethernet. The third supports 100M Ethernet. The Ethernet ports are otherwise identical. At least one must be used for a panel and router network. One must be connected to your "house network" for configuration and monitoring.

IP Addresses

The default subnet mask is 255.255.255.0 with a device range of 1–254. Your subnet masks need not be 255.255.255.0. If a subnet mask differs, the device address range will be something other than 1–254.

The different system controller models have different default IP addresses.

- NV960

  The NV960 has at least two Ethernet ports, built into the frame, called the "house net" and the "control net." It typically has 4 additional Ethernet ports. The actual number of ports depends on the number and type of PCI cards installed in the NV960 frame. These are the usual port assignments:

Port	Single Controller	Redundant Controller 1	Redundant Controller 2
Control net	172.16.1.1	172.16.1.1	172.16.1.2
Panel and router net 1	192.168.1.1	192.168.1.1	192.168.1.2
Panel and router net 2	192.168.2.1	192.168.2.1	192.168.2.2
House net	192.168.20.1	192.168.20.1	192.168.20.2
Master control net	192.168.7.201	192.168.7.201	192.168.7.202
NV9000 system net	192.168.3.1	192.168.3.1	192.168.3.2

  You can change these IP addresses. You should connect your PC to the house net. It must be on the same subnet as the house net.

  It is possible to re-purpose all of these networks. Unless there is a very compelling reason, avoid doing so. (The control net is a private network shared only by the two controllers in a redundant pair.)

- NV920

The NV920 has 3 Ethernet ports, named “NVNET1,” “NVNET2,” and “NVNET3.” By default, these ports are:

Port	Single Controller	Redundant Controller 1	Redundant Controller 2
NVNET1	192.168.1.1	192.168.1.1	192.168.1.2
NVNET2	192.168.2.1	192.168.2.1	192.168.2.2
NVNET3	192.168.3.1	192.168.3.1	192.168.3.2

You can change these IP addresses. You may connect your PC to any of the 3 ports. It must be on the same subnet as the port to which you connect.

The other two ports can be assigned to panels, routes, and master control as you require.

IP Addresses for Routers

A certain range of addresses is allocated for router control cards. IP addresses for router control cards range from 192.168.1.5 to 192.168.1.40 or from 5 to 40 on whatever network they are assigned.

This is the default range which is designed to avoid conflict with the default DHCP ranges of IP addresses. Your system can use other ranges.

IP Addresses for Control Panels

The system controller uses DHCP to determine the IP addresses of control panels. No other devices should be assigned IP addresses in the range used for DHCP.

IP addresses for control panels are divided into two pools:

- Primary pool — 192.168.1.41 through 192.168.1.150 or from 41 to 150 on whatever network they are assigned.
- Secondary or redundant pool — 192.168.1.151 through 192.168.1.254 from 151 to 254 on whatever network they are assigned.

The primary pool is used by the primary controller of a redundant pair and the secondary pool is used by the secondary controller.

Licenses

Licensed options (such as DHP) must be “activated” to be used. Customers must purchase a license “key” to activate an option.

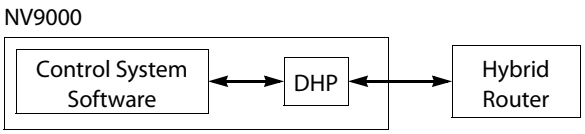
NV9000-SE Utilities lists licenses for an installed system controller in the ‘System Management’ page.

DHP

DHP (dynamic hybrid pathfinding) is an NV9000 option that allows NV8500 family hybrid routers to perform hybrid routing with relatively few hybrid cards. With DHP, the router passes standard inputs through an internal pool of hybrid disembedder cards and embedder cards after which the audio from the standard inputs can be recombined and re-embedded on output.

The point of DHP is that it allows you to populate the router with many relatively inexpensive standard I/O cards and a few hybrid cards and still have the benefits of hybrid routing (that is, to allow audio from standard inputs to be disembedded and re-embedded for standard outputs, all within the router).

DHP is a service that resides in the NV9000. The NV9000 control software treats the DHP service as if it were a hybrid router.



The DHP service then communicates with the router directly. All takes to a hybrid router go through the DHP service, transparently. All status from the router also goes through the DHP service.

DHP is licensed software (EC9540) that ships with the NV9000. The purchase of the license allows you to activate the DHP service in the NV9000.

- If you have an older version of the NV9000 software that does not include DHP, you will need to obtain an updated version of the NV9000 software.

See the *DHP User's Guide* for further detail.

SNMP

In the Grass Valley SNMP option, there are 4 agents:

- Grass Valley master agent
- NV9000 sub-agent
- Grass Valley router sub-agent
- Grass Valley master control sub-agent

The Grass Valley SNMP agent runs under Microsoft Windows without conflict with the Windows agent. The NV9000 agent provides system traps, router traps, and control panel traps.

See Grass Valley application note AN0012-03 for more information.

Tielines

Tielines are a licensed option. If your control system supports tielines, the main 'System Management' page will list tielines in its 'Licenses' section.

See Tieline Status Page, on page 84.

See Tielines, on page 501 for information about tielines and their configuration.

Database Repository

The repository of configuration data bases on your PC is a folder:

`C:\Documents and Settings\<user>\CtrlSysConfigs` [under Windows XP]

or

`C:\Users\<user>\CtrlSysConfigs` [under Windows 7]

Each configuration you define is a folder within this folder.

You can freely copy and move these folders from place to place on your PC or on your computer network including backup drives.

Do not modify a folder's contents directly. Use NV9000-SE Utilities to make changes. Otherwise you will corrupt the configuration.

Hosts

A host is the Windows system under which the NV9000 software runs. The term "host" is another word for a system controller.

NV9000-SE Utilities' 'Hosts' table (under the 'Views' pane) lists the hosts defined in your configuration. You can add, update, or delete hosts. By default there is only one host, named NVCONFIG.

In a redundant system, the second controller resides in a second host whose name, by default, is NVCONFIG2.

That there is a host table at all is an anomaly. It is not necessary or even helpful to define hosts other than NVCONFIG and NVCONFIG2.

Host names are also present in the 'Routers' page and the 'Routers' table. These entries are the name of the primary system controller, which should be NVCONFIG.

Panel IDs

In an NV9000 system, control panels are identified by "panel IDs" and their IP addresses are assigned by DHCP. "Virtual" panels — those that execute as software on your PC — like physical panels, require panel IDs. The EC9700 and EC9710 are software panels that are not considered virtual panels inasmuch as they do not emulate any physical panel. The EC9700 and EC9710 probably do not have panel IDs. For all software panels, it is the IP address of the PC on which they execute that is used by the NV9000 software for communication.

Control panel configurations are defined within an NV9000 configuration and may be added or removed through manipulation of the NV9000's control panel tables.

▲ The EC9700 and EC9710 are obsolete now, but are still supported.

Master Control

NV9000 systems can include master control subsystems.

In NV9000-SE Utilities, a master control system is treated as if it were a router.

When you are using master control configuration software to develop master control configurations, the master control system can reference sources and destinations controlled by the NV9000 control system. The master control system, during operation, issues requests for takes to the NV9000 system. When the NV9000 system performs those takes, it notifies the master control that it has done so.

See Master Control, on page 465.

Kaleido

NV9000 systems can include Kaleido multi-viewers. The Kaleido multi-viewers can be linked to routers in the system.

Nothing special need be done in NV9000-SE Utilities to support Kaleido multi-viewers, except to configure the router destinations that feed the multi-viewer(s).

NV9700

The NV9700 is a slim 1RU device that allows an NV9000 operator these capabilities:

- See at a glance which NV9000 system controller is active.
- See at a glance whether an NV9000 system controller has an abnormal condition.
- Force a switch from one system controller to the other at any time.
- Hear an alert signal when an alarm condition occurs.

In addition, the NV9700 has a set of relay (GPO) outputs at the rear that can control fairly heavy-duty external circuitry. The relays reflect the status conditions that are indicated at the front of the panel.

This is the front of the NV9700 panel:

There are two large push-button switches and 3 status LEDs for each of the two redundant system controllers. Pressing the button forces the system active. The 3 LEDs indicate:

- Left, green LED — system controller is "healthy."
- Middle, amber LED — the system controller is active. Normally, one controller is active.
- Right, red LED — the system controller has an alarm condition.

NV9000 Web Suite

The NV9000 Web Suite is a browser application — a status tool — that presents views of NV9000 control system data. The NV9000 Web Suite (or, the web suite, for short) has one or more tabbed pages that show:

- DHP data (for systems including NV8500 hybrid routers).
- Tieline data.
- Crosspoint data — arranged to show destinations' primary levels.
- Crosspoint data — arranged to show multiple levels for each destination.
- Crosspoint data — arranged to show the crosspoint matrix, with breakaway and level mapping, and locks and protects. The page also allows users to perform takes (with breakaway and level mapping), and locks and protects.

As a Web Suite user, you can customize your views of the NV9000 data. The web suite runs on your PC desktop as a *service, not an application*. It can be accessed through browsers that support HTML 5.0.

See the *NV9000 Web Suite User's Guide* for further information.

6 Virtual Levels and Level Sets

Chapter 6 provides information about virtual levels, level sets, and the configuration pages and tables related to virtual levels and level sets.

Summary

Introduction *111*
'Level Sets' Page *116*
'Add Level Set' Page *117*
Level Set Details Page *119*
'Level Sets' Table *125*
'Level Set Details' Table *126*
'Virtual Levels' Table *128*
'Virtual Level Groups' Table *130*
'Virtual Level Signal Binding' Table *132*
'Signal Type' Table *134*

Introduction

The video, audio, and other signal types composing a device's output are generally considered *levels* in the broadcast industry. We say that devices send and receive signals on several *levels.*

In NV9000-SE Utilities, we call these *virtual* levels to contrast them with the *physical* levels that partition routers.

Another way to think of levels is to imagine the two-dimensional X-Y router matrices switching different signals being stacked into layers. The layers can be considered levels.

In NV9000-SE Utilities, *virtual levels* are abstractions that apply universally to (1) devices and (2) routers in your system. *Physical levels* are concrete, not abstract, and apply only to one router matrix or one section of a router matrix. Physical levels, as stated, are also called *partitions.*

The names of virtual levels are important and widely used. Control panel operators can see and select virtual levels — by name. The names of physical levels are known only to the few persons who configure the NV9000 system.

In NV9000-SE Utilities, a *virtual level type* is a named entity that represents one or more signal types. As an example, the virtual level type "HD" might correspond to the following signal types:

1080i / 59.94	720p / 29.97	1080p / 23.98
1080i / 50	720p / 50[1]	

These are the signal types that would be allowed to be switched in the physical level that corresponds to any virtual level named "HD." (More than one virtual level can be named "HD.")

Virtual level *types* are applied when you create actual virtual levels in the process of defining level sets.

Signals on a virtual level are switched by only one physical level. If your system has multiple virtual levels of the same name, they are switched by different physical levels.

Conversely, several virtual levels can share a physical level. For example, virtual levels AES 1/2, AES 3/4, AES 5/6, and AES 7/8 could all be switched by an AES physical level.

- The virtual levels you define are largely for the benefit of control panel operators.
- Virtual level *types* can be organized into named virtual level groups. The groups are also considered virtual level types, but types without any particular signal binding. Operators of certain control panels can choose whether to view levels as a group or as individual levels.

Level Sets

A *level set* is a set of virtual levels. A level set associates signal types that are normally switched together (i.e., at the same time).

- Levels are usually defined in the process of creating a level set.

Some systems do not need "level sets." However, NV9000-SE Utilities requires at least one level set to be defined. In such a system, that one level set would includes all virtual levels.

In a level set, each virtual level is coupled with a physical level. Signals on that virtual level are switched by the associated physical level. These couplings also serve to associate the level set with the particular routers that switch the virtual levels.

The virtual levels in the level set are also ordered. Each level is given a *display index* in the ordering. Virtual levels are displayed on control panels according to the ordering of the current device's level set, the lowest display index first.

If your system has a single level set, that level set identifies all the virtual levels and references all the routers used in your system. If there is a physical level (of a router) not included in that single level set, it cannot be used.

If your system has multiple level sets, together they identify all the virtual levels and reference all the routers used in your system. If there is a physical level (of a router) not included in those level sets, the physical level cannot be used.

The name of any virtual level type may be used in multiple level sets, but those names will represent different virtual levels.

A signal in one level set cannot be routed to a device having the same signal type in another level set if the physical levels are different, as they would be, for instance, if the physical levels were in different routers. (A tieline would be required to perform such a route even though the signal types are otherwise compatible.)

1. These are default signal types. They are identified in the 'Signal Type' table, but are not further defined in NV9000-SE Utilities. You can modify the 'Signal Type' table to suit your system's requirements.

Virtual Level Groups

Virtual level types can be organized into *virtual level groups,* which are also virtual level types.

A group is defined in the 'Virtual Level Groups' table. The group's name is a special entry in the 'Virtual Levels' table. Virtual level groups are intended to appear to the panel operator as if they were levels.

Groups must be flat in structure, not hierarchical. That is, a group cannot consist of sub-groups.

- NV9000-SE Utilities will let you define hierarchical groups. Avoid doing that!

The panel operator can (if a panel is so enabled) collapse or expand the display of virtual level groups. A collapsed group is displayed as the group name. An expanded group is displayed as a list of level names. In all cases, the operator views the display as a level or as levels.

Groups are useful when a level set contains a large number of virtual levels and the display on a control panel becomes unwieldy. For example, if a level set has 2 video levels and 14 audio levels, by placing the video levels in one group and all the audio in another group, the operator can (by collapsing the levels) view just two "levels"—video and audio.

- Only some control panels permit the expansion or contraction of virtual level groups: NV9601, NV9640, NV9641, and NV9642.

"Takes" can be performed between two virtual level groups if the levels within the groups are identical.

Creating Virtual Level Groups

Virtual level are created using the 'Virtual Level Groups' table and the 'Virtual Levels' table, both accessed through the 'Views' pane.

The 'Virtual Levels Group' table allows you to create "parent-child" relationships between virtual level types. For a group having *M* members, you must create *M* parent-child relations in the 'Virtual Level Groups' table. The parent is a virtual level type bearing the name for the group. The child is a virtual level type that is to be a member of the group.

Before you create the parent-child relations, you must have created a new virtual level type (in the 'Virtual Levels' table) that will bear the group name. This virtual level must ***not*** ever be used as a normal virtual level. This virtual level type must not have an entry in the 'Virtual Level Signal Bindings' table.

Levels at Control Panels

Control panel operators see only virtual levels, never physical levels. (At certain panels, operators can collapse grouped levels so that the panel displays only the group name or expand the group to view all the level names.

Virtual levels (in a level set) displayed on a control panel appear in the order of their *display indexes* which are sequence numbers. A virtual level's display index is defined when you define the virtual level.

The lowest number in the sequence is called the *primary level.* By widespread convention, a video level is placed at the beginning (or top) of the list of virtual levels. NV9000-SE Utilities

supports the illusion that such a level is a "primary" level. In actuality, there is no such thing as a primary level. All levels are treated uniformly.

However, some control panels can display only one level for a device. In those instances, it is the first level that is displayed — the level having the lowest display index. It is for that reason that NV9000-SE Utilities calls the first virtual level the "primary" level. When configuring levels, you should consider what level is displayed on control panels that display only one level.

Notes

1. There is a difference between a virtual level *type* and the virtual level itself: a virtual level *type* is used to name a virtual *level*. That type (or name) can represent several virtual levels in different level sets. It is the virtual level's name that appears on control panels, regardless of the level set.
2. "Takes" can occur between devices within a level set or between the same virtual levels of devices in different level sets.
3. *Tielines* allow routing between different physical levels. Without tieline(s), signals cannot be routed between different physical levels. For more information, see Tielines, on page 501.

Example

Consider an NV9000 system that has two level sets:

- Level set *A* that supports HD only (through router *A*).
- Level set *B*, that supports HD plus AES1/2, AES3/4, AES5/6, and AES7/8. In this case, router *B* handles the HD video and router *C* handles the audio.

With three routers, three physical levels are defined:

- HDA, for router A
- HDB, for router B
- AES, for router C

(without regard to the partition sizes).

Then, level set A includes 1 virtual level:

- HD, supported by physical level HDA (in router *A*).

And level set B includes 5 virtual levels:

- HD, supported by physical level HDB (in router *B*)
- AES1/2, supported by physical level AES (in router *C*)
- AES3/4, supported by physical level AES (in router *C*)
- AES5/6, supported by physical level AES (in router *C*)
- AES7/8, supported by physical level AES (in router *C*)

Observe that virtual levels named HD occur in both level sets. They are distinct levels but have the same name. Operators will see "HD" as a displayed level name.

Also note that the 4 different AES virtual levels all use the same physical level.

Pages and Tables

All configuration pages and tables for level sets reference the same data. Data entered or updated in one page are simultaneously available in other pages.

In general, level sets are added using the 'Add Level Set' page. You can access that page through the 'Add Level Set' button of the 'Level Sets' page of the 'Configuration' pane or directly through the 'Tasks' pane.

The 'Level Sets' page (under the 'Configuration' pane) lists all level sets. You can add, delete, or edit level sets in this page.

Under the 'Views' pane are the following tables:

- The 'Virtual Levels' table lists all virtual level types. You can add and delete virtual level types here.
- The 'Virtual Level Groups' table lists all parent-child relationships in all virtual level groups. You can add and delete group relationships here.
- The 'Virtual Level Signal Binding' table lists the signal types that are can be represented by the virtual level types. Each entry is an inclusion relationship. Each virtual level type includes one or more signal types. You can add and delete inclusion relationships here.
- The 'Level Sets' table lists all level sets. You can add and delete virtual levels here.
- The 'Level Set Details' table lists all virtual levels in all level sets. You can add and delete virtual levels here and redefine them here. (You ***cannot*** create a new level set here.)
- The 'Signal Types' table lists all defined signal types. You can add and delete signal types here. The signal types are referenced by the 'Virtual Level Signal Binding' table.

The default list of virtual level types (in the 'Virtual Levels' table) includes all the virtual levels ever defined for NVISION series routers. Your system probably does not use all these virtual level types. You can remove the virtual levels your system does not use from this table. (Doing so will reduce the size of the list of virtual level types in the 'Level Set Details' page to only those that you need for your configuration. If you have more than one configuration, each configuration can be different in this regard.

You can create one or more new virtual level types, using the 'Virtual Levels' table, the 'Signal Type' table, and the 'Virtual Level Signal Binding' table. A virtual level type (other than one that is a group name) must have at least one entry in the signal binding table. First create the virtual level type in the 'Virtual Levels' table, giving the level type a name. Then create one or more entries in the 'Virtual Level Signal Binding' table, choosing the name you created in the 'Name' column and assigning the level a signal type from the drop-down menu in the 'Signal Type' column. Signals types are defined in the 'Signal Type' table.

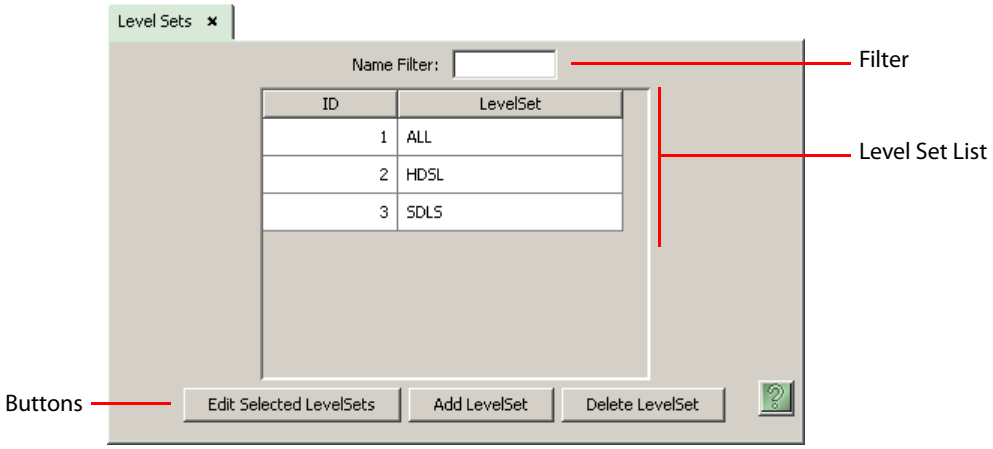
NV9000-SE Utilities ships with a default set of signal types:

1080i / 50	1080i / 59.94	1080p / 23.98
625i / 50	525i / 59.94	
720p / 50	720p / 29.97	
AES/EBU	AES Mono	Analog Audio
Dolby E	LtRt	NTSC
PAL	RS232 DCE	RS232 DTE
RS422 Forward	RS422 Reverse	Timecode

‘Level Sets’ Page

The ‘Level Sets’ page (under the ‘Configuration’ pane) lists all level sets. You can add, delete, or edit level sets using this page.

This is a typical ‘Level Sets’ page:



There are 3 sections in the page:

- Filter
- Level Set List
- Buttons

Filter

At the top of the page is a name filter. If you enter text in this field, the list of level sets is restricted to those level sets whose names contain the text you entered.

Level Set List

The level set list has two columns:

- ID. These are the database IDs of the different level sets.
- ‘Level Set’. These are the names of the level sets.

You can use click, shift-click, and control-click techniques to select any of the level sets in the list.

Buttons

‘Edit Selected Level Sets’ Button

This button opens a level set details page for each of the level sets you have selected in the list. It is in the level set details page that you specify virtual levels and the physical levels that switch them.

See Level Set Details Page, on page 119.

'Add Level Set' Button

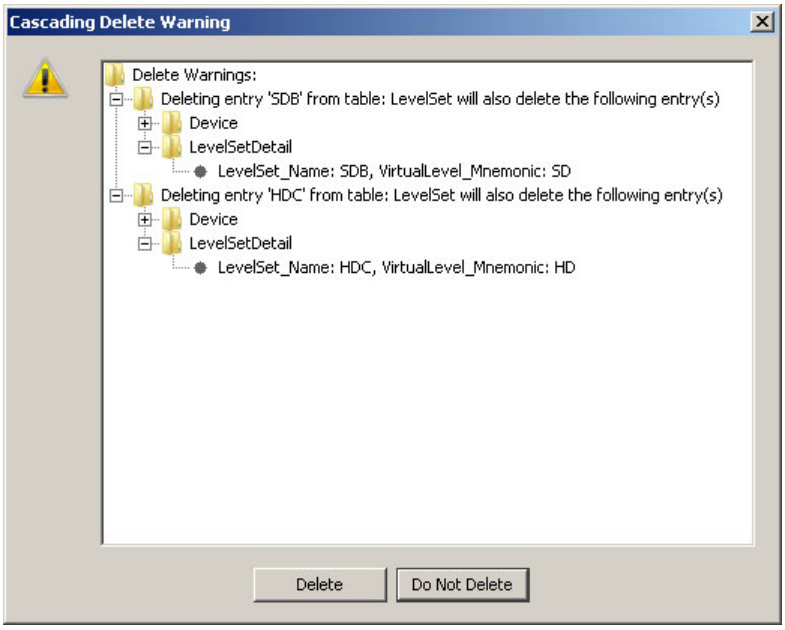
This button causes NV9000-SE Utilities to display the 'Add Level Set' page. The 'Add Level Set' page starts a level set definition.

See 'Add Level Set' Page, following.

'Delete Level Set' Button

This button deletes all the level sets you have selected in the list.

NV9000-SE Utilities presents a warning dialog before it deletes the level sets:



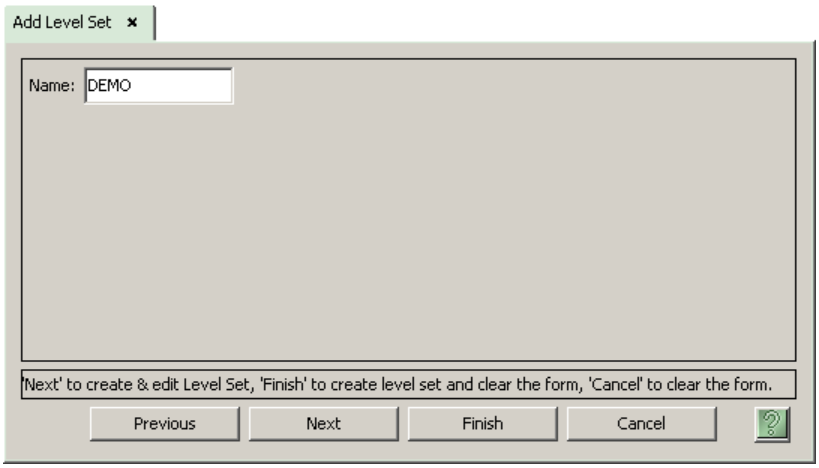
There is no undo: after the level sets are deleted, you cannot retrieve them.

'Add Level Set' Page

The 'Add Level Set' page starts a sequence of steps, in multiple pages, in which you create a new level set. There are two ways to get the 'Add Level Set' page:

- Click the 'Add Level Set' button at the bottom of the 'Level Sets' page (of the 'Configuration' pane).
- Click 'Add Level Set' in the 'Tasks' pane.

This is the 'Add Level Set' page:



This page, as the start of a sequence, provides a name field — all that is required to start the level set definition.

At the bottom of the page are buttons that allow you to move through the sequence of steps in level set definition:

- Previous
- Next
- Finish
- Cancel

The buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

'Previous' Button

Click the 'Previous' button if you want to go to the previous page in the level set definition sequence.

'Next' Button

Click 'Next' to go to the level set details page. In this page, you can associate virtual levels with physical levels, and specify a number of other parameters regarding the level set.

'Finish' Button

Click 'Finish' to accept the level set thus far defined in the 'Add Level Set' page.

The level set definition, as defined in the 'Add Level Set' page is incomplete. You must later go to the level set details page to complete the definition.

This button allows you to create a number of level set definitions rapidly and complete them later.

After you click 'Finish', the 'Add Level Set' page remains and is re-initialized for additional entries.

'Cancel' Button

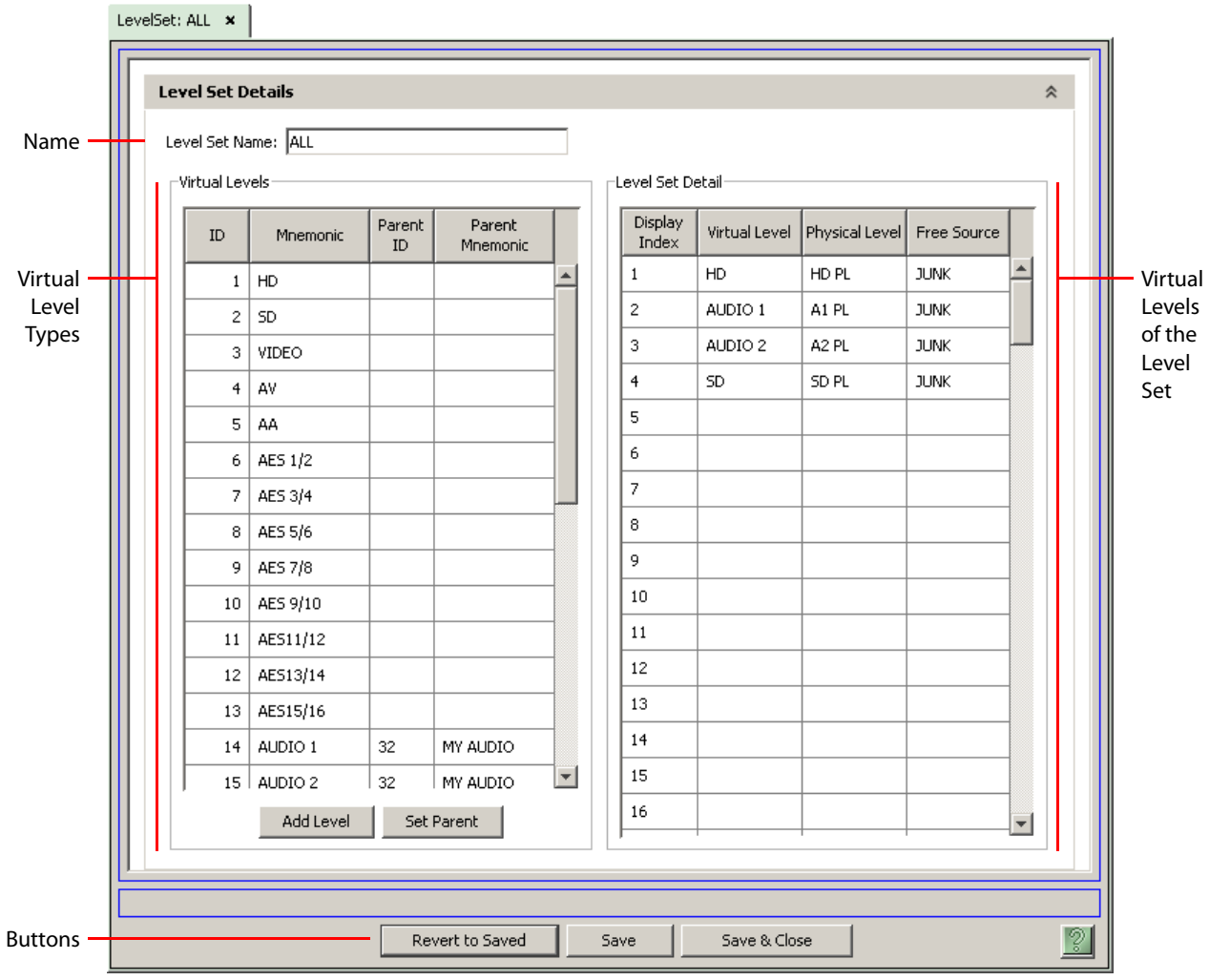
Click 'Cancel' if you want to terminate the level set definition you started.

When you click 'Cancel', the 'Add Level Set' page re-initializes for another entry.

Level Set Details Page

You can access the 'Level Set Details' page by clicking the 'Next' button of the 'Add Level Set' page or by clicking 'Edit' in the 'Level Sets' table (under the 'Views' pane).

This is a sample 'Level Set Details' page:



The page has 4 sections:

- Name
- Level Set Detail
- Virtual Level Types
- Buttons

Name

The 'Name' field displays the level set's name. It is basically a reminder of which level set you are viewing, but you can also change the name of the level set here.

Buttons

At the bottom of the page are 3 simple buttons:

- Save

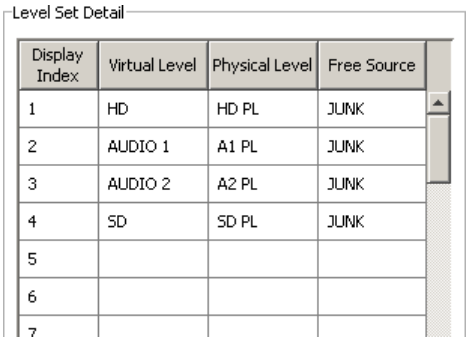
  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the level set definition, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Level Set Detail

The 'Level Set Details' section is the principal part of the page. This is a sample:



The rows of this table have 4 fields:

- Display Index

  The display indexes for the level set determine the order in which the levels are displayed on a control panel. The level having the lowest index is displayed first or at the top of the panel's display. (Some panels that have re-legendable LCD buttons display level names on buttons.)
- Virtual Level

  One of the defined virtual levels.
- Physical Level

  One of the defined physical levels. This is the partition in which signals of the virtual level are switched.
- Free Source

  Entries in this field are optional. A free source is one of the source devices you have defined in your configuration. If you have defined no source devices yet, you will have to enter values in these fields later if you want to define free sources.

A free source is one that, for example, can be assigned to a tieline destination or a machine control destination to release that destination from use. It is not necessary to define a free source. You can use any source. Typically, a free source is black/silence.

The drop-down list includes all source devices assigned to the level set you are editing.

This table has several functions:

1 It defines virtual levels. Every virtual level you add in this table is a new virtual level.

2 Together, the virtual levels define the level set.

3 The entries in the 'Display Index' column defined the order in which virtual levels are presented on control panels. (NV9000-SE Utilities calls the virtual level having the lowest display index the "primary" level.)

4 The table can identify the "free source" for each virtual level. In most cases, you can leave this field blank.

- A free source is one of the devices defined in your configuration. Typically devices are defined after level sets are created. Therefore when you are defining the level set, there might be no source devices, assigned to this level set, from which to choose a free source. In that case, wait until you have created source devices and return to the level set table to specify the free source.

Defining a Level Set

To define the level set is to add entries to the 'Level Set Details' table. Keep in mind that the virtual levels you add will appear in the order given by their display indexes.

To define a level set, repeat these steps for each virtual level you want to include in the level set:

1 Click a 'Virtual Level' field of the table. Choose a virtual level from the drop-down list that appears.

The virtual levels from which you can choose are pre-defined, either by default or because you have actively defined virtual levels for your system. See 'Virtual Levels' Table, on page 128.

2 Click the 'Physical Level' field next to the virtual level field. Choose a physical level from the drop-down list that appears. The physical level you choose is the one that will switch signals on the virtual level in the associated 'Virtual Level' field. (Your configuration defined that physical level in one of its router definitions.)

3 Optionally click the 'Free Source' field in the row for the virtual level you chose in step 1.

Generally a free source is not necessary, but in certain cases you might want a free source, such as for a machine control level, or when your system has tielines.

Choose a free source from the drop-down list of source devices that appears when you click the field. (If the list is empty, you must return to the level set details table later, after you have defined source devices.)

Virtual Level Types

The list of virtual level names at the left side of the page serves as a reminder of the virtual level types available. It also shows where a virtual level name is a member of a virtual level group.

This section is superfluous — it is not needed to define a level set. However, it is intended as a convenience. Besides letting you view the virtual level names (or virtual level types), you can, using the buttons at the bottom of the list, create a new virtual level type or add a level to a group, without jumping to another page.

These are the fields of the list of available virtual level types:

- ID

  The database ID assigned to the virtual level type (or virtual level name).

- Mnemonic

  The name assigned to the virtual level type. It is this name that operators see at their control panels.

  These are either the default names provided with NV9000-SE Utilities or names that you have created in the 'Virtual Levels' table.

- Parent ID

  If the virtual level type belongs to a virtual level group, this field shows the database ID of the "parent" level. (The virtual level type is considered the "child" in its relationship to the "parent.")

- Parent Mnemonic

  If the virtual level type belongs to a virtual level group, this field shows the name of the "parent" level. (The virtual level type is considered the "child" in its relationship to the "parent.")

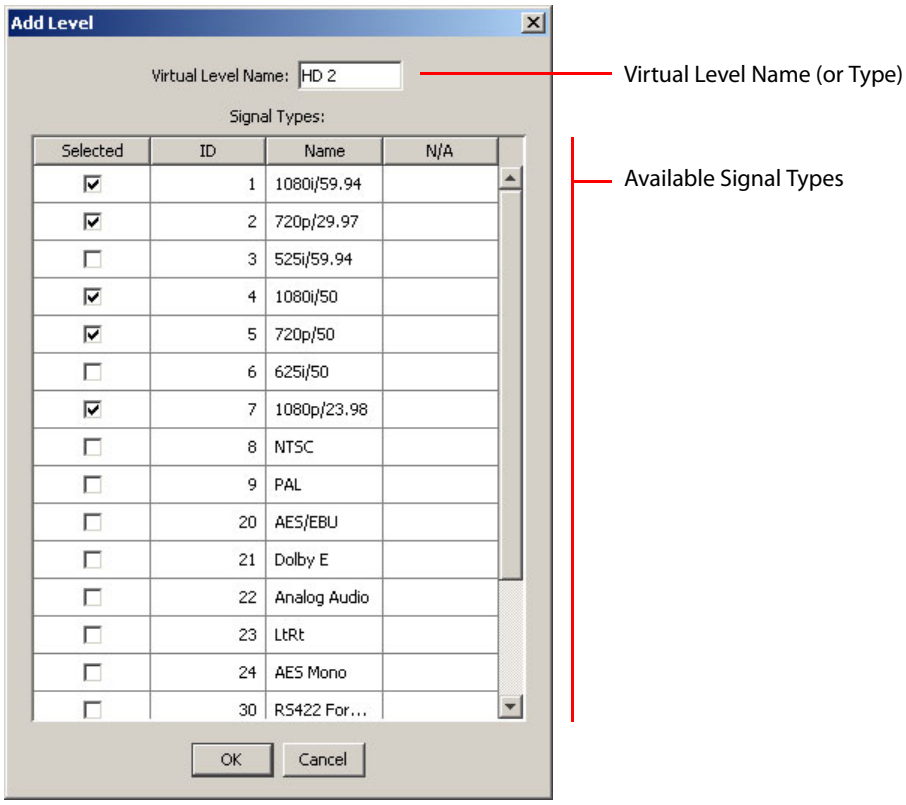
Buttons

At the bottom of the list of virtual level types are two buttons that, as a convenience, let you edit the list of virtual level types without jumping to another page:

- Add Level.
- Set Parent.

Add Level

When you click the 'Add Level' button, a dialog appears:



In this dialog, you can create a virtual level type and specify its associated signal binding. The new virtual level you create here will appear in the 'Virtual Levels' table and the 'Virtual Level Signal Binding' table.

First, enter a name for the virtual level type.

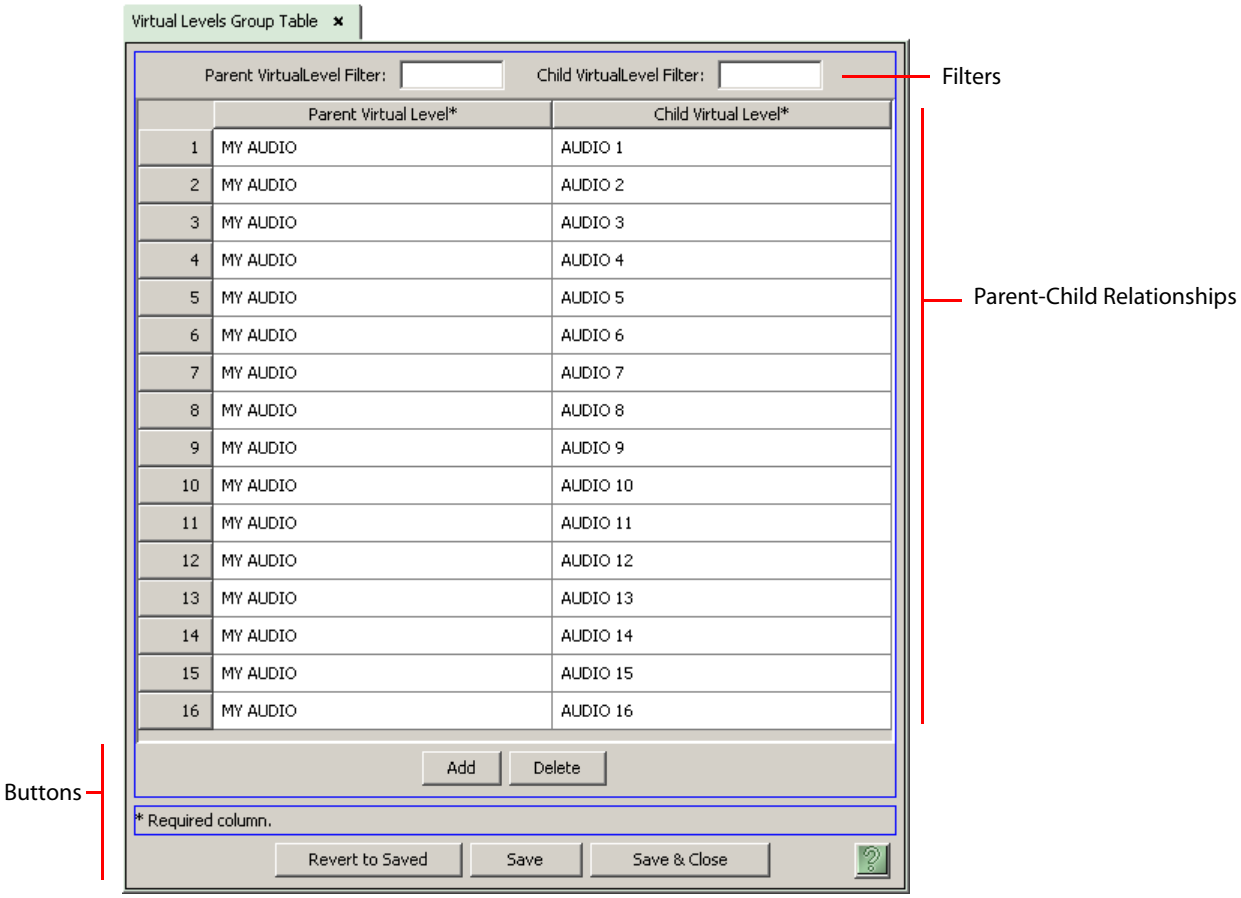
Then place check marks in all the signal types that this virtual level will represent. Then click 'OK'.

(Or click 'Cancel' if you change your mind.)

- We recommend that you use the 'Virtual Levels' table and the 'Virtual Level Signal Binding' table to create virtual levels, rather than this shortcut.
- You might need to use the 'Signal Type' table to define additional signal types.

Set Parent

When you click the 'Set Parent' button, the 'Virtual Level Groups' table appears:



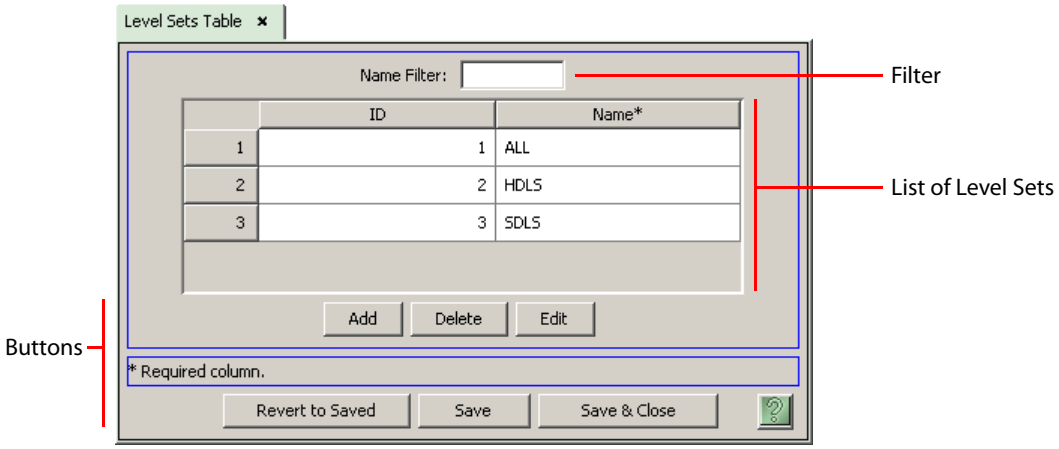
It is in this table that you can create (or delete) parent-child relationships. A set of parent-child relationships defines a virtual level group. (In the illustration above, the 16 entries show that AUDIO1–AUDIO16 belong to the virtual level group 'MY AUDIO'.)

See 'Virtual Level Groups' Table, on page 130 for information.

- Do not create nested groups (or subgroups).
- Do not create cycles among the parent-child relationships. A child must not include its parent directly or indirectly.

'Level Sets' Table

The 'Level Sets' table can be found in the 'Views' pane. It lists all level sets:



You can add, delete, or edit level sets here.

Filter

At the top of the page is a name filter. If you enter text in this field, the list of level sets is restricted to those level sets whose name fields contain the text you entered.

Buttons

At the bottom of the page are 6 buttons:

- Add

  Click 'Add' to add a level set to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can enter a name for the level set. (Adding a level set does not define its content. You must edit the level set to define its contents.)

  (The ID is generated by NV9000-SE Utilities.)

- Delete

  Select one or more rows in the 'level Set' table and click 'Delete' to remove those level sets from the table.

  NV9000-SE Utilities deletes the entries immediately without any warning dialog.

- Edit

  Select one or more rows in the 'Level Sets' table and click 'Edit' to open a level set details page for each of the selected level sets.

  See Level Set Details Page, on page 119 for details.

- Save

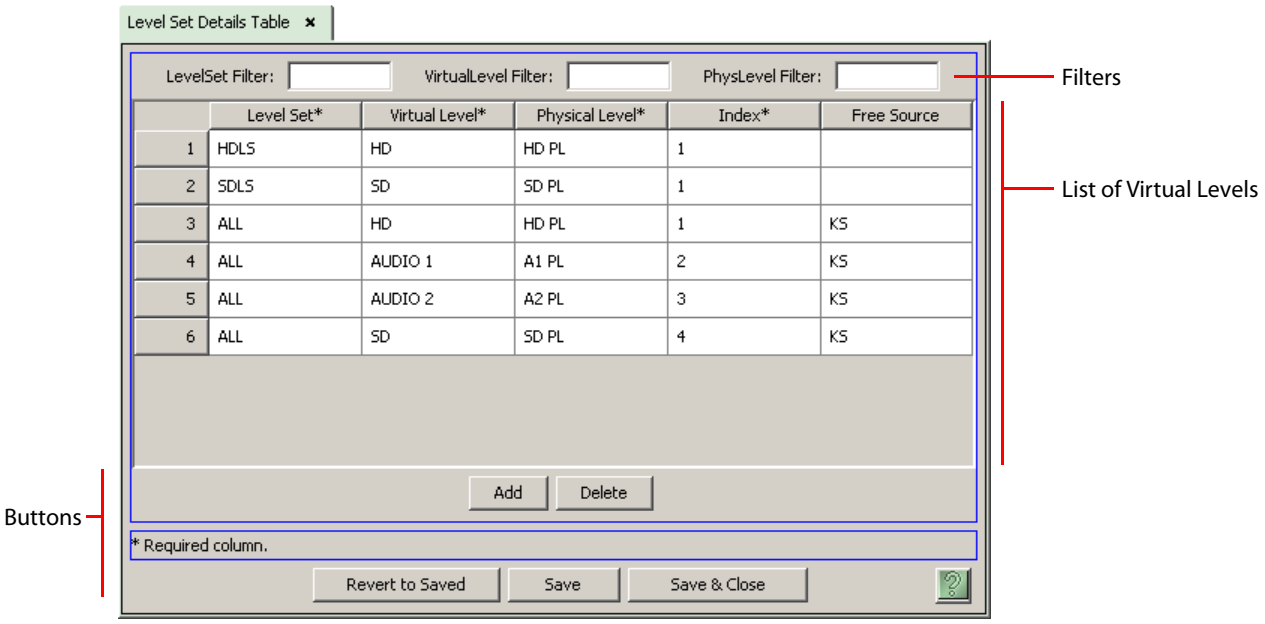
  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

  Click 'Revert to Saved' to restore the saved list of level sets, discarding any changes you have made (since the last save).

‘Level Set Details’ Table

The ‘Level Set Details’ table can be found in the ‘Views’ pane. It lists all virtual levels in all level sets (subject to filtering).



You can add and delete virtual levels here and redefine them here. (You ***cannot*** create a new level set here.)

To edit any field, click the field. Most of the fields are drop-down lists; choose an element from the drop-down list. The ‘Index’ fields are numeric fields.

List of Virtual Levels

The list presents the data for all virtual levels, in all level sets (subject to filtering). These are the fields of the ‘Level Set Detail’ table:

- Level Set

  The level set to which the virtual level belongs. These fields are drop-down lists.
- Virtual Level

  The name of the virtual level. These fields are drop-down lists.
- Physical Level

  The physical level to which the virtual level maps. This is the router partition in which signals of the virtual level are switched. These fields are drop-down lists.
- Index

  The display index of the virtual level within its level set.
- Free Source

  A free source is one that can be assigned, for example, to a tieline destination or a machine control destination to release that destination from use.

  These fields are drop-down lists of source devices in the level set of the virtual level.

Filters

At the top of the page are 3 filters:

- 'Level Set' filter. If you enter text in this field, the list of virtual levels is restricted to those whose 'Level Set' fields contain the text you entered.
- 'Virtual Level' filter. If you enter text in this field, the list of virtual levels is restricted to those whose 'Virtual Level' fields contain the text you entered.
- 'Physical Level' filter. If you enter text in this field, the list of virtual levels is restricted to those whose 'Physical Level' fields contain the text you entered.

Buttons

At the bottom of the page are 5 buttons:

- Add

  Click 'Add' to add a virtual level to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can enter data for the new virtual level. (All fields except the free source are required.)
- Delete

  Select one or more rows in the 'Level Set Details' table and click 'Delete' to remove those virtual levels from the table.

  NV9000-SE Utilities deletes the entries immediately without any warning dialog.
- Save

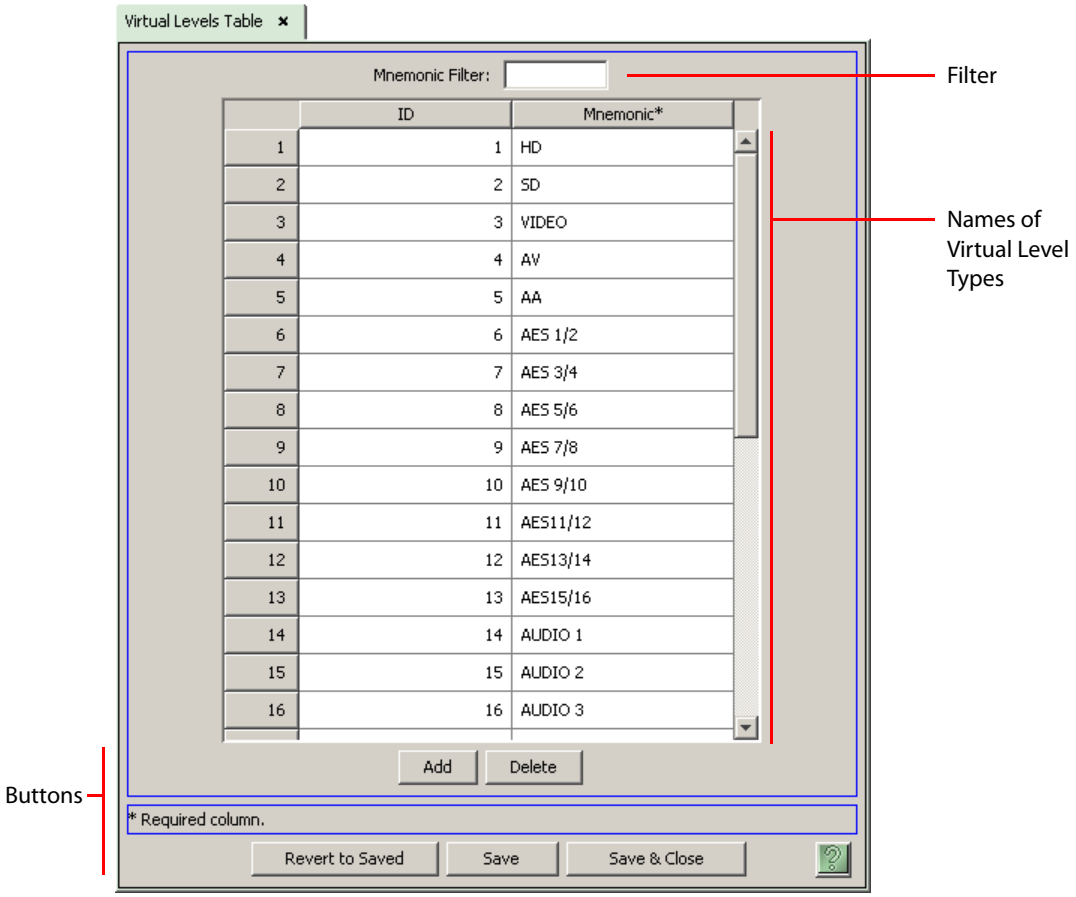
  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved list of virtual levels, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

'Virtual Levels' Table

The 'Virtual Levels' table can be found in the 'Views' pane. It lists all virtual levels *types*:



You can add and delete virtual level types in this table.

- Note that these are *virtual level types*, not the virtual levels themselves. (Virtual levels are defined, using these types, in the level set details page.)
- Note also that NV9000-SE Utilities ships with a default set of virtual level types that might or might correspond to the virtual levels that you have (or that you need) in your system. (Some of those types are illustrated above.) You can, however, re-define the virtual level types to suit your system.

Filter

At the top of the page is a 'Mnemonic' filter. If you enter text in this field, the list of virtual level types is restricted to those entries whose 'Mnemonic' (i.e., name) fields contain the text you entered.

Buttons

At the bottom of the page are 5 buttons:

- Add

  Click 'Add' to add a virtual level type to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can enter the name for the new virtual level type.

  (The ID is generated by NV9000-SE Utilities.)

- Delete

  Select one or more rows in the table and click 'Delete' to remove those virtual level types from the table.

  NV9000-SE Utilities deletes the entries immediately without any warning dialog.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

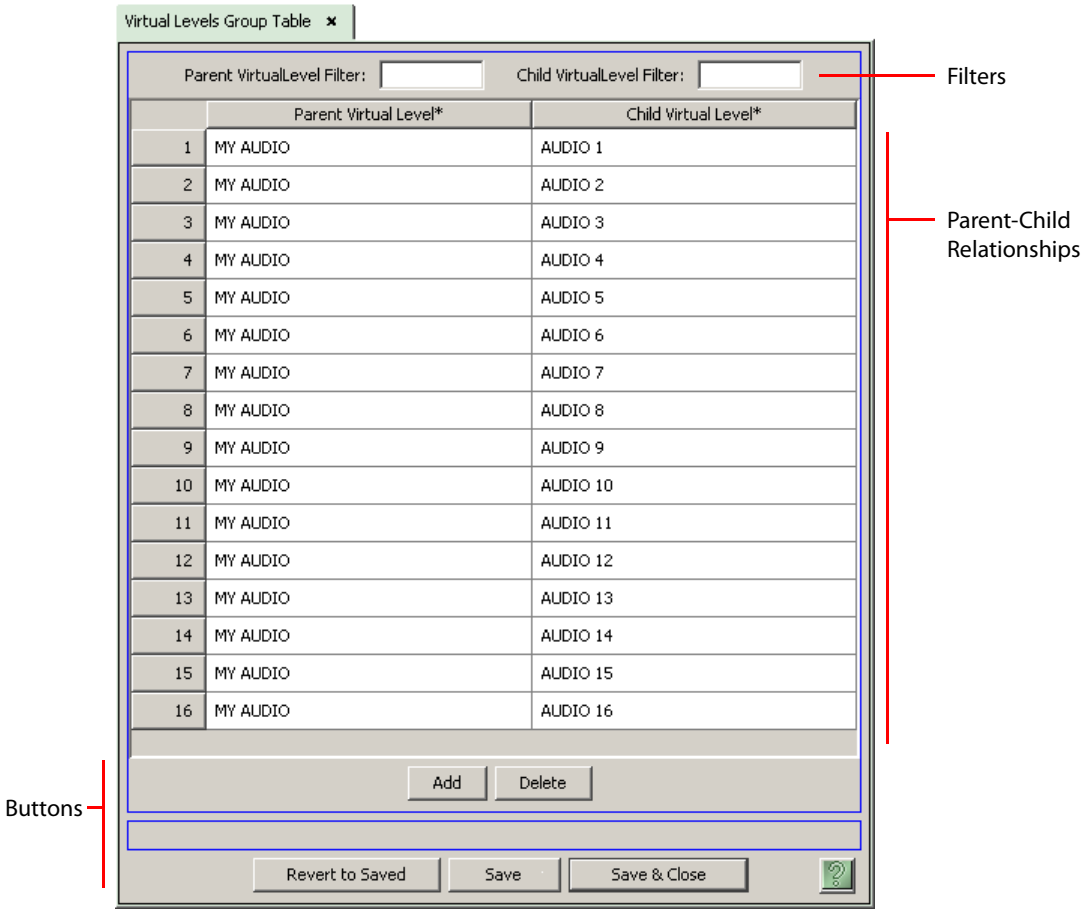
  Click 'Revert to Saved' to restore the saved list of virtual level types, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

‘Virtual Level Groups’ Table

The ‘Virtual Level Groups’ table can be found in the ‘Views’ pane. It lists all parent-child relationships (or group relationships) for all virtual level groups (subject to filtering):



You can add and delete group relationships here.

- Do not create nested groups (or subgroups).
- Do not create cycles among the parent-child relationships. A child must not include its parent directly or indirectly.

Filters

At the top of the page are two filters:

- ‘Parent Virtual Level’ filter. If you enter text in this field, the list of group relationships is restricted to those entries whose ‘Parent Virtual Level’ fields contain the text you entered.
- ‘Child Virtual Level’ filter. If you enter text in this field, the list of group relationships is restricted to those entries whose ‘Child Virtual Level’ fields contain the text you entered.

Buttons

At the bottom of the page are 5 buttons:

- Add

  Click 'Add' to add a group relationship to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can select the names for the parent level type and for the child level type. These virtual level type names must have already been defined in the 'Virtual Levels' table.

  (The group relationships are defined for virtual level *types*.)

- Delete

  Select one or more rows in the table and click 'Delete' to remove those group relationships from the table.

  NV9000-SE Utilities deletes the entries immediately without any warning dialog.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

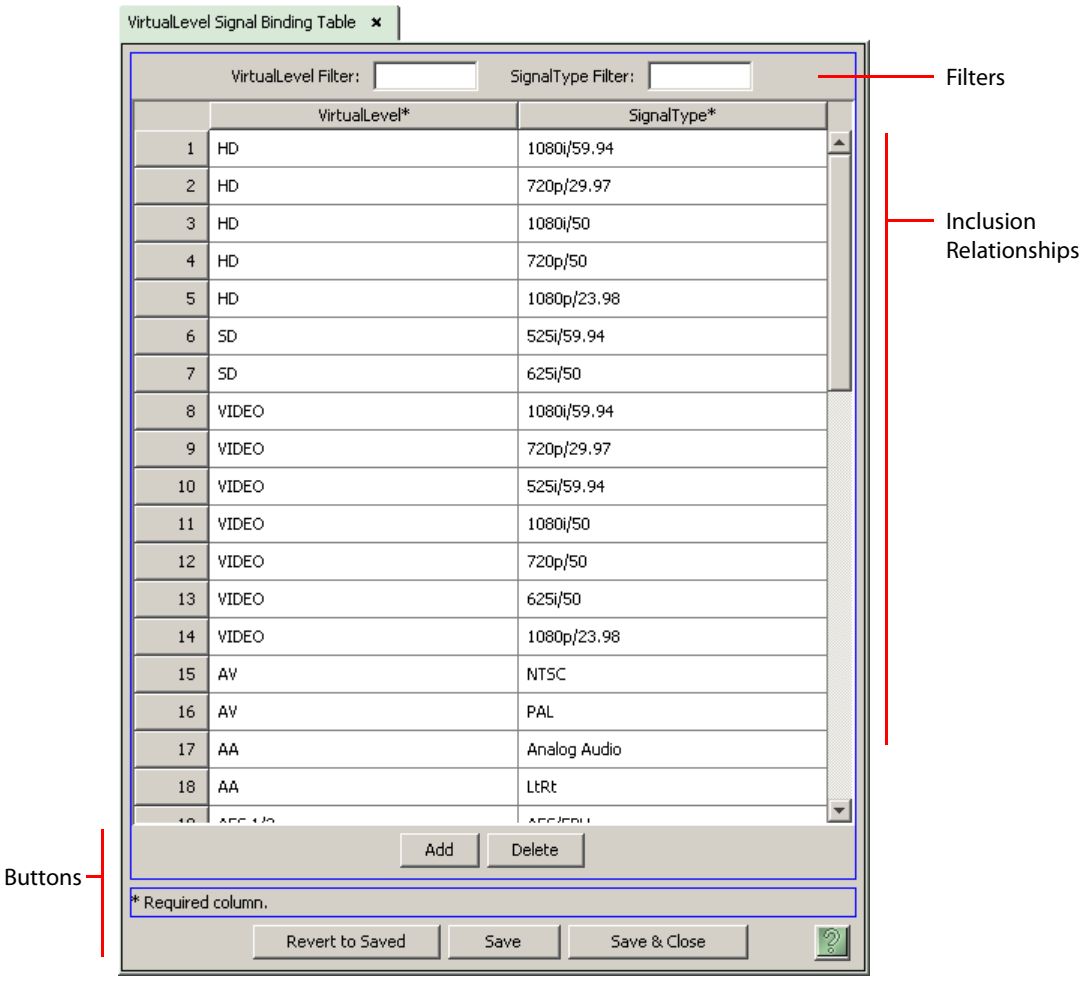
  Click 'Revert to Saved' to restore the saved list of group relationships, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

'Virtual Level Signal Binding' Table

The 'Virtual Level Signal Binding' table can be found in the 'Views' pane. It lists the signal types that are represented by the virtual level types.



Each entry is an inclusion relationship: each virtual level type includes one or more signal types. You can add and delete inclusion relationships here.

What this table means is that the NV9000 software will (attempt to) route an input of a given virtual level type if the output of the route is defined as having one of the signal types matching the virtual level type.

(The inclusion relationships are defined for virtual level *types*, not for actual virtual levels. Thus, the inclusion relationship applies to all actual virtual levels created in your configuration.)

- NV9000-SE Utilities provides a default set of virtual level types, a default set of signal types, and a default signal binding table. You might need to re-define some of these tables for your system.
- The signal binding relationships are completely arbitrary. You can use any signal binding relationships that are suitable in your system.

Filters

At the top of the page are two filters:

- 'Virtual Level' filter. If you enter text in this field, the list of inclusion relationships is restricted to those entries whose 'Virtual Level' (i.e., virtual level type name) fields contain the text you entered.
- 'Signal Type' filter. If you enter text in this field, the list of inclusion relationships is restricted to those entries whose 'Signal Type' fields contain the text you entered.

Buttons

At the bottom of the page are 5 buttons:

- Add

  Click 'Add' to add an inclusion relationship to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can select a virtual level type and a signal type.
- Delete

  Select one or more rows in the table and click 'Delete' to remove those inclusion relationships from the table.

  NV9000-SE Utilities deletes the entries immediately without any warning dialog.
- Save

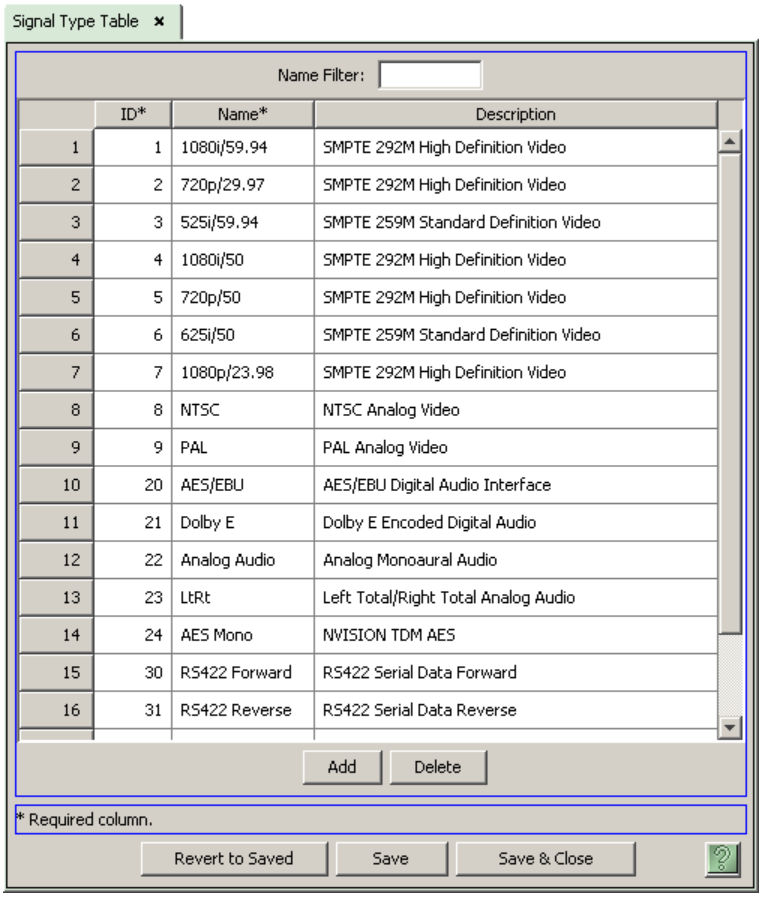
  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved list of inclusion relationships, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

‘Signal Type’ Table

The ‘Signal Types’ table can be found in the ‘Views’ pane. It lists all defined signal types:



You can add and delete signal types here. These signal types are referenced, by name, in the ‘Virtual Level Signal Binding’ table.

The ‘Description’ fields are simply notes for your own use.

- NV9000-SE Utilities provides a default set of virtual level types, a default set of signal types, and a default signal binding table. You might need to re-define some of these tables for your system.
- The names of the signal types are completely arbitrary. You can use any names that are suitable in your system.

Filter

At the top of the page is a ‘Name’ filter. If you enter text in this field, the list of signal types is restricted to those entries whose names contain the text you entered.

Buttons

At the bottom of the page are 5 buttons:

- Add

  Click 'Add' to add a signal type to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can enter the name for the new signal type and a description.

  (The ID is generated by NV9000-SE Utilities.)

- Delete

  Select one or more rows in the table and click 'Delete' to remove those signal types from the table.

  NV9000-SE Utilities deletes the entries immediately without any warning dialog.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

  Click 'Revert to Saved' to restore the saved list of signal types, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Notes on Creating a Level Set

Before you can complete the creation of a level set, all the physical levels used by that level set must have been defined.

Also, before you can complete the creation of a level set, all the virtual level *types* you will be using must have been created. There is a default set of virtual level types, but these might or might not be applicable to your system.

A virtual level cannot be defined unless there is a physical level (a router partition) in which to switch the signals represented by the level.

To add several level sets rapidly, enter the name of a level set in the 'Add Level Set' page and then press the 'Finish' button. Repeat that for other level sets. Then edit the level sets individually, defining virtual levels.

7 Devices and Device Categories

Chapter 7 provides information regarding devices and device categories and the configuration pages and tables related to devices and device categories.

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Introduction

Under NV9000-SE Utilities, a *device* is any unit of equipment — except a router — that generates, receives, or sends signals (typically video and audio) in a router control system. Although routers can be considered devices *per se*, we exclude them because want to differentiate between I/O devices and routers.

In NV9000-SE Utilities, a physical device is connected to one or more routers and the router(s) switch its incoming signals to their destinations.

Thus, a device can be a source of signals for one or more routers; a device can be the destination of signals from the router. A device that is a source of signals is called a *source device*, or just a *source*. A device that is a destination of signals is called a *destination device*, or just a *destination*. Devices can be both sources and destinations.

Further, in configuring and controlling routers, we often ignore the physical devices themselves and think of the router ports as being the devices themselves instead of remembering that the ports are connected to actual devices.

The configuration pages of NV9000-SE Utilities all treat devices as if they were sets of input ports and output ports. We abbreviate input port to *input*, and output port to *output*.

Examples of devices, in the NV9000-SE Utilities sense, are cameras, microphones, VTRs, DVRs, monitors, satellite feeds., storage systems, etc.

Categories

Device categories provide a way to (1) organize devices and (2) provide an orderly and meaningful naming system to control panel operators.

Device categories provide a way around NV9000-SE Utilities' restrictive 8-character device mnemonics.

Simply said, a category is a base name for a set of devices to which control panel operators can append one or more suffixes (or indexes) to specify a complete device name.

Suffixes are alphanumeric strings of up to 4 characters. An operator can append up to 8 suffixes to a device's base name to fully specify the device name.

An index is a number that, converted to text, completes a device name. Indexes are generally not used at control panels, but are used by NVISION series master control subsystems.

At control panels, operators enter indexes as suffixes consisting of single digits.

Multiple devices can be defined in NV9000-SE Utilities and named according to a base name and one or more suffixes. Consider for example,

CAM A 10

This base name for this device is "CAM." The device name has 3 suffixes: "A", "1," and "0." To select this device, an operator would press a button on a control panel that selects "CAM" for cameras, and then press in succession, "A," "1," and "0." This might, for instance, mean camera 10 in room A. Hundreds or thousands of cameras names could be created using this technique.

Most NVISION series control panels have buttons that can be devoted to category/suffix device selection. These are usually called *category buttons*. In pressing those buttons, the operator has asked for a device whose name in the configuration database might not have any resemblance to "CAM A 10." That is, the names by which panel operators can select devices using category selection are most likely different from the names used in the configuration database.

Device categories in NV9000-SE Utilities are called simply "categories."

- The use of categories and suffixes presumes the existence of at least one control panel in your system that has matching category (and suffix) buttons. See Control Panels, on page 183.

Level Sets

Devices belong to level sets and send and receive signals on different signal *levels*. Those levels are called virtual levels in NV9000-SE Utilities and the virtual levels for a device are defined in its level set.

(See Virtual Levels and Level Sets, on page 111 for information.)

When we say that a device belongs to a level set, we mean that a device is assigned a level set when it is created. The device sends and receives signals on one or more of the virtual levels of that level set.)

▲ Some systems do not really need level sets. However, NV9000-SE Utilities requires at least one level set. In those systems, a single level set will contain all virtual levels and is therefore equivalent to no level set.)

Configuration Pages and Tables

These are the pages under the 'Configuration' pane for devices and categories:

- Devices
- Device Details
- Categories
- Input Phys Conns
- Output Phys Conns

These are the pages under the 'Tasks' pane:

- Add Device
- Add Multiple Devices
- Add Category

These are the tables under the 'Views' pane:

- Devices
- Categories
- Suffixes
- 'PhysConns'
- Category Details

These are the queries under the 'Views' pane:

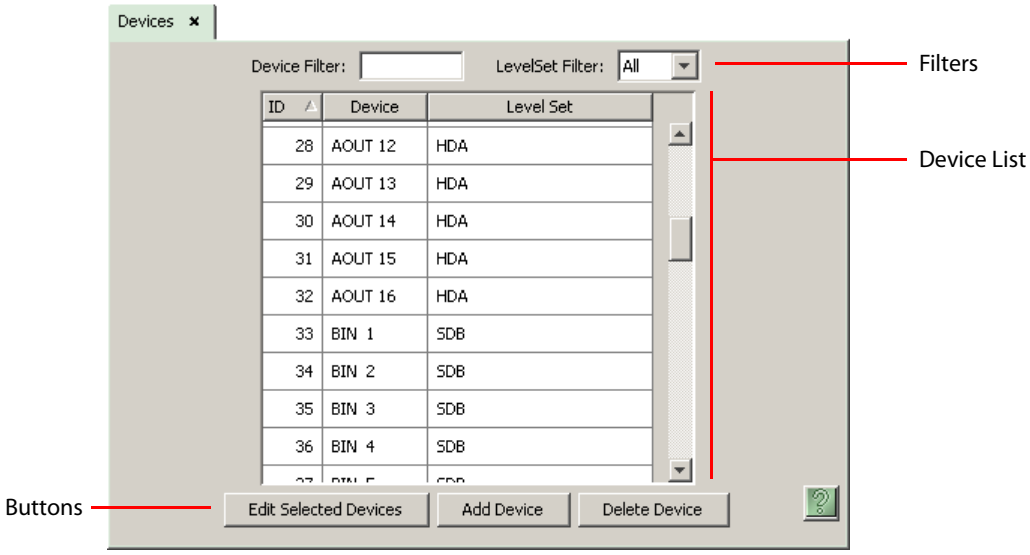
- Physical Connections
- Orphaned Physical Connections

These pages and tables are described in the following sections.

Devices Page

The 'Devices' page (under the 'Configuration' pane) lists all devices and the level set to which each device belongs. You can add, delete, or edit devices using this page.

This is a typical 'Devices' page:



There are 3 sections in the page:

- Filters
- Device List
- Buttons

Filters

At the top of the page are 2 filters:

- Device Filter. If you enter text in this field, the list of devices is restricted to those devices whose names contain the text you entered.
- Level Set Filter. If you select a level set in the drop-down list of this field, the list of devices is restricted to those devices that belong to the level set selected.

  (If you choose 'All'—assuming that is not the name of a level set you defined—the category list is not restricted.)

Device List

The device list has 3 columns:

- ID. These are the database IDs of the different devices.
- Device. These are the names of the devices.
- 'Level Set'. A field in this column identifies the level set to which the corresponding device belongs.

You can use click, shift-click, and control-click techniques to select any of the devices in the list.

Buttons

'Edit Selected Devices' Button

This button opens a device details page for each of the devices you have selected in the list. It is in the device details page that you specify the I/O ports of the device.

See Device Details Page, on page 141.

'Add Device' Button

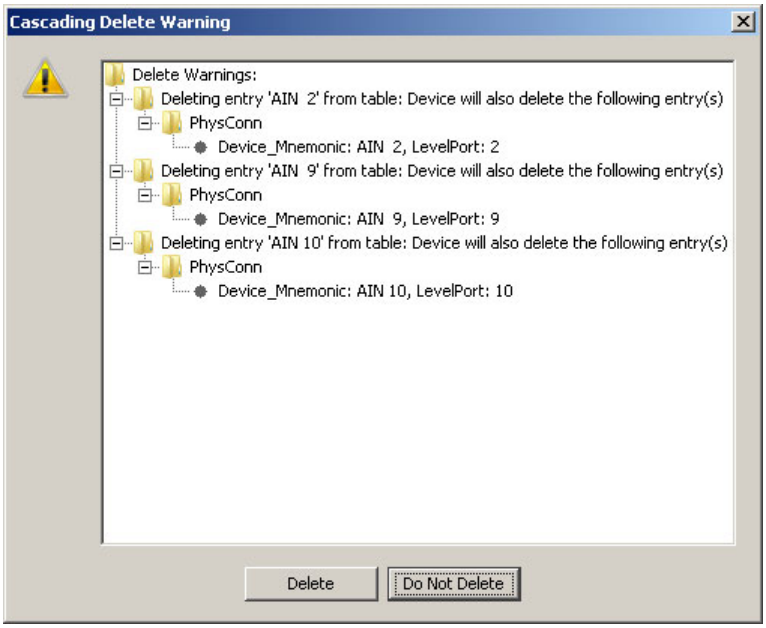
This button causes NV9000-SE Utilities to display the 'Add Device' page. The 'Add Device' page starts a device definition.

See 'Add Device' Page, on page 157.

'Delete Device' Button

This button deletes all the devices you have selected in the list.

NV9000-SE Utilities presents a warning dialog before it deletes the devices:

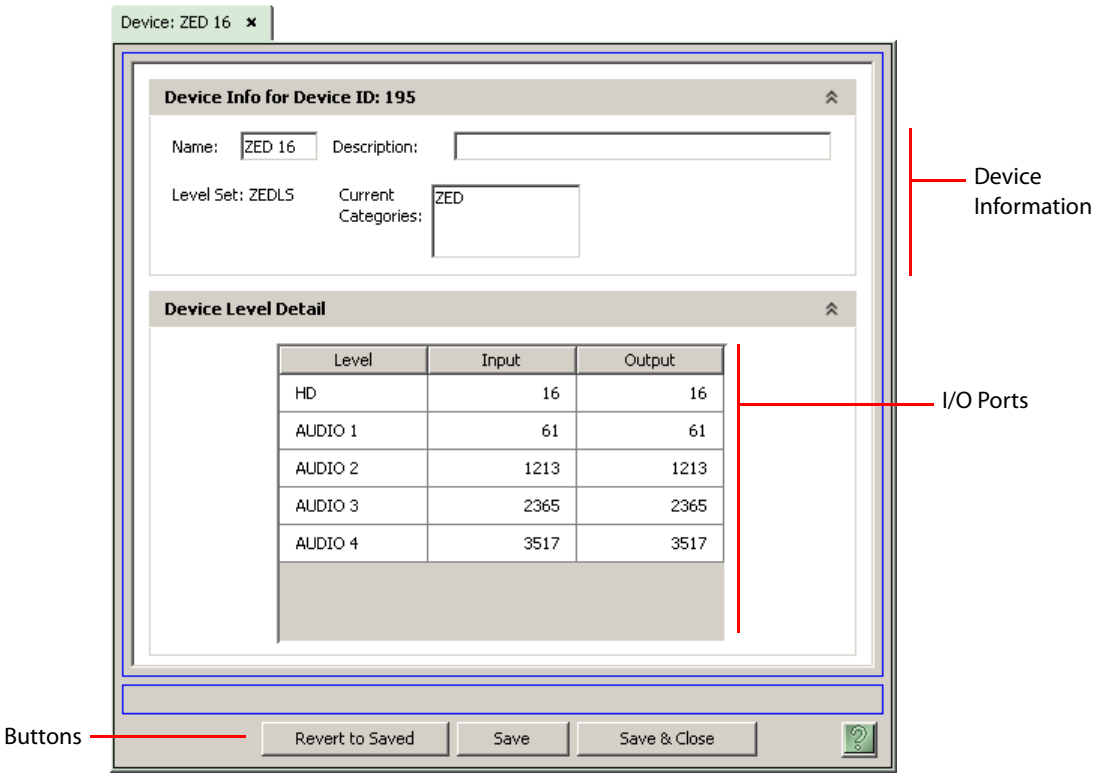


There is no undo: after the devices are deleted, you cannot retrieve them.

Device Details Page

You can access the 'Device Details' page by (1) clicking the 'Edit Selected Device' button of the 'Devices' page, (2) clicking the 'Next' button of the 'Add Device' page, or (3) clicking 'Edit' in the 'Devices' table (under the 'Views' pane).

This is a sample 'Device Details' page:



The page has 3 main sections:

- Device Information
- Buttons
- Device Detail — I/O Ports

Device Information

The 'Name' field displays the device's name. It is basically a reminder of which device you are viewing, but you can also change the name of the device here.

The 'Description' field can contain any description of the device that you find useful. It is not necessary to enter any information in this field.

The 'Level Set' field tells you to which level set this device has been assigned. (You cannot modify this field here.) (See Virtual Levels and Level Sets, on page 111 and 'Level Sets' Page, on page 116 for information.)

The 'Current Categories' block lists the categories to which this device has been assigned. (See Categories, on page 138 and Categories Page, on page 144 for information.)

Buttons

At the bottom of the page are 3 simple buttons:

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the device definition, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Device Detail — I/O Ports

The 'Device Details' section is the principal part of the page. This is a sample:

Level	Input	Output
HD	16	16
AUDIO 1	61	61
AUDIO 2	1213	1213
AUDIO 3	2365	2365
AUDIO 4	3517	3517

It is in this table that you assign router ports to the device. (You can assign router ports to devices in other configuration pages too.)

The rows of this table have 3 fields:

- Level

  The entries in this column of the table are the virtual levels available to the device as defined in the level set to which the device was assigned when it was created.)
- Input

  This table column lists *router input ports*. Note that the router's input ports connect to the device's *output* ports.

  For each level on which your device is an input to a router, enter that router's input port to which the device connects. In the illustration above, the device has input connections on all of its levels.

  If the device sends no signal on that level, leave the input field blank.
- Output

  This table column lists *router output ports*. Note that the router's output ports connect to the device's *input* ports.

  For each level on which your device receives a signal from a router, enter that router's output port to which the device connects. In the illustration above, the device has output connections on all of its levels.

  If the device receives no signal on that level, leave the output field blank.

Level-to-Port Relationships

You can determine fairly easily which ports you may assign to a device. There is a firm relationship between the virtual levels of the device (and its level set) to the router ports.

The virtual levels of the device are those of its level set. In the level set, each virtual level is associated with a physical level. That physical level was defined for a specific router. The physical level has a specific range of input ports and output ports.

Thus, for any virtual level, you can determine its router and, for that router, the range of ports for the level.

Display Index	Virtual Level	Physical Level	Free Source
1	HD	ZED_HD	ZD1

(Level Set Details)

(Router Physical Levels)

Name	#	Input Start	Input End	Output Start	Output End
ZED_HD	1	1	144	1	144
ZED_A1	2	1	1152	1	1152
ZED_A2	3	1153	2304	1153	2304
ZED_A3	4	2305	3456	2305	3456
ZED_A4	5	3457	4608	3457	4608

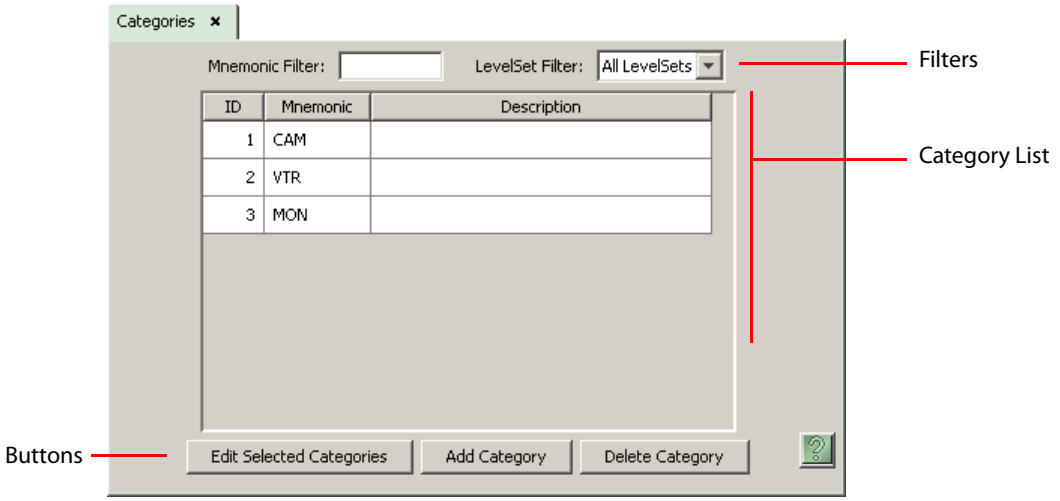
In this example, input ports 1–144 and output ports 1–144 are available for virtual level HD in this level set.

▲ You should remember, or keep an account of, the ports that you have already used.

Categories Page

The 'Categories' page (under the 'Configuration' pane) lists all categories. You can add, delete, or edit categories using this page.

This is a typical 'Categories' page:



There are 3 sections in the page:

- Filters
- Category List
- Buttons

Filters

At the top of the page are 2 filters:

- Mnemonic Filter. If you enter text in this field, the list of categories is restricted to those categories whose names contain the text you entered.
- Level Set Filter. If you select a level set in this field, the list of categories is restricted to those categories that include the level set selected.

  (If you choose 'All LevelSets' — assuming that is not the name of a level set you defined — the category list is not restricted.)

Category List

The device list has 3 columns:

- ID. These are the database IDs of the different categories.
- Mnemonic. These are the names of the categories.
- Description. These are optional descriptions of the categories.

You can use click, shift-click, and control-click techniques to select any of the categories in the list.

Buttons

'Edit Selected Categories' Button

This button opens a category details page for each of the categories you have selected in the list. It is in the category details page that you specify the suffixes for devices in the category.

See Category Details Page, on page 146.

'Add Category' Button

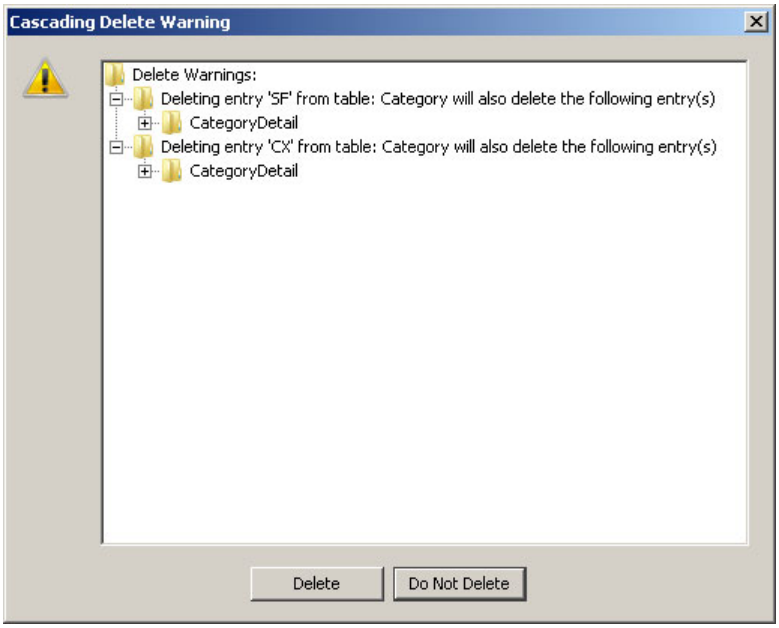
This button causes NV9000-SE Utilities to display the 'Add Category' page. The 'Add Category' page starts a category definition.

See 'Add Category' Page, on page 165.

'Delete Category' Button

This button deletes all the categories you have selected in the list.

NV9000-SE Utilities presents a warning dialog before it deletes the categories:

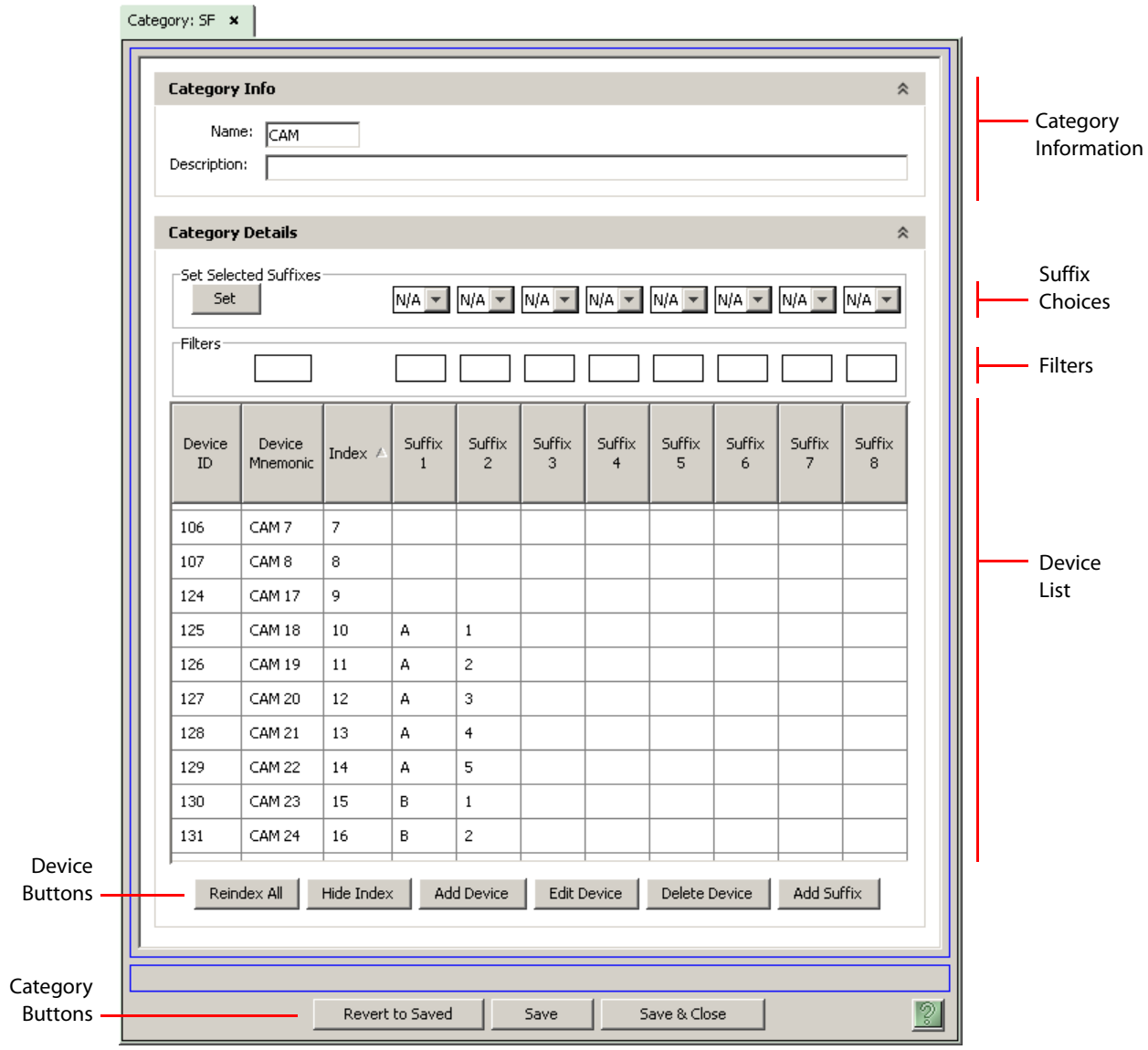


There is no undo: after the categories are deleted, you cannot retrieve them.

Category Details Page

You can access the category details page by (1) clicking the 'Edit Selected Categories' button in the "Categories' page, (2) clicking the 'Next' button in the 'Add Category' page sequence or (3) clicking 'Edit' in the 'Categories' table (under the 'Views' pane).

This is a sample 'Category Details' page:



The page has 6 main sections:

- Category Information
- Suffix Choices
- Filters
- Device List
- Device Buttons
- Category Buttons

Category Information

The 'Name' field displays the category's name. It is basically a reminder of which category you are editing, but you can also change the name of the category here.

▲ Remember that the category name is the "base name" of device names that are selected at a control panel.

The 'Description' field can contain any description of the category that you find useful. It is not necessary to enter any information in this field.

Category Buttons

At the bottom of the page are 3 simple buttons that pertain to the category itself:

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the category definition, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Device List

The devices list is the principal part of the page. Many of the other sections of the page refer to this section, especially the filter section. This is a sample:

Device ID	Device Mnemonic	Index	Suffix 1	Suffix 2	Suffix 3	Suffix 4	Suffix 5	Suffix 6	Suffix 7	Suffix 8
106	CAM 7	7								
107	CAM 8	8								
124	CAM 17	9								
125	CAM 18	10	A	1						
126	CAM 19	11	A	2						
127	CAM 20	12	A	3						
128	CAM 21	13	A	4						
129	CAM 22	14	A	5						
130	CAM 23	15	B	1						
131	CAM 24	16	B	2						

It is in this table that you assign suffixes to devices in the category.

▲ Remember that panel operators who use category device selection methods do so by pressing suffix buttons, appending suffix text to the device name formed of its base name and previously appended suffix text.

The table lists the devices assigned to the category. The rows of this table have 11 fields, of which 8 are suffix fields, These are the fields:

- Device ID

  The database ID of the device definition.

- Device mnemonic

  The name of the device.

- Index

  NVISION master control systems require that router source selection be performed using a category base name and a single index. The index column gives the indexes of the devices in the list for master control.

  (The 'Index' column has other purposes too. Principally, it governs, where new devices are added to the device list.)

  Device selection at NV96xx control panels does ***not*** use indexes, but uses suffixes. The suffixes for selection might resemble indexes if they are digits.

  The indexes are automatically generated when the category is created. In addition, the first several suffix fields are coded automatically so that they match the index of the device. You can change the index of any device in the category.

  The 'Reindex All' button generates a new index sequence for the device list.

  The 'Hide Index' button causes NV9000-SE Utilities not to display the index column.

  Note that device indexes often bear no particular relationship to any numbers that appear in device mnemonics, although you can create a relationship using the 'Auto-Fill Suffixes' button at the bottom of the page.

- 'Suffix 1' through 'Suffix 8'

  Every device, under category selection, may have up to 8 suffixes. Each suffix is a text string of up to 4 characters. Therefore, with a base name of up to 8 characters, the maximum device name would have 40 characters. However, panel operators do not type device names. They press category and suffix buttons. Therefore, operators will press no more than 9 buttons to select a device and usually far fewer than 9 buttons.

  The name of a device, under category selection, is spelled out as much as possible on the small displays of NV96xx control panels, with the most recent suffix displayed and the least recent suffix possibly scrolled off the display.

  Although NV9000-SE Utilities allows any text as a suffix, we recommend that you restrict your suffix text to alphanumeric characters.

The filters above the table can be used to reduce the number of entries displayed in the table in certain ways. See Filters, following.

The device buttons just below the table affect the devices in the table, the suffixes used in the table, and how the table is displayed. See Device Buttons, on page 150.

▲ If you define suffixes for one category, they become available globally, for all categories.

Filters

The device list has 9 filter fields.

The first filter, above the device mnemonic field, filters the device list on the basis of device mnemonics. If a mnemonic does not *begin with* the text you type in the filter field, it is *excluded* from the device list.

The other 8 filters apply to the 8 suffixes. If a suffix does not *begin with* the text you type in the filter field in that suffix column, it is *excluded* from the device list.

(The more filters you apply, the more devices are excluded from the list.)

Suffix Choices

The device list is associated with a set of 8 suffix drop-down lists, one for each suffix column in the device list:

This section lets you apply a set of suffixes to all selected devices in the category. It can save a considerable amount of time compared to entering suffixes for all devices individually.

To use this section,

1. Use click, shift-click, and control-click techniques to select one or more devices in the device list.
2. Choose a suffix from the drop-down menu in each of the columns for which the selected devices are to get suffixes.
3. Click the 'Set' button in the suffix section.

If a particular suffix is not available, you can create one by clicking the 'Add Suffix' button at the bottom of the device list.

Device Buttons

Below the device list are 6 buttons associated with the devices in the list:

The device buttons affect the devices in the table, the suffixes used in the table, and how the table is displayed.

- There is a bug in the category details page: if your window is too narrow, some of the device-related buttons do not appear.

Reindex All

This button produces a new set of indexes for the devices *that are displayed* in the device list. Devices that are not displayed are *not affected*. The indexes are consecutive integers in the order of the entries in the list.

You can impose a filter on the list reducing the number of displayed devices and you can reorder the list on the basis of the data in any column of the list by clicking on the column header. Click once to obtain an ascending order; click again to obtain a descending order.

Whatever devices are displayed, in whatever ordering, are then assigned consecutive indexes.

▲ It is possible — in fact, easy — to create duplicate indexes using this button. This might be undesirable.

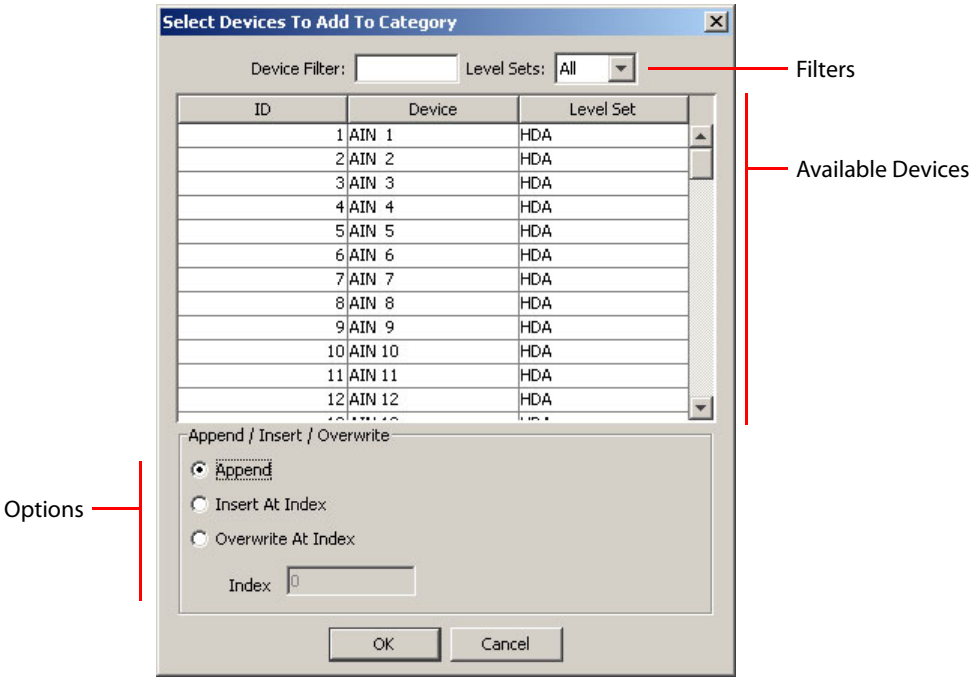
Hide Index

This button causes NV9000-SE Utilities to remove the 'Index' column from the device list.

If you are not be concerned with indexes, the column might be a distraction.

Add Device

This button adds devices to the device list. When you click 'Add Device', NV9000-SE Utilities presents a dialog in which you can select devices and choose a method by which to add the devices to the list:



This dialog has 3 sections (not including the buttons at the bottom):

- Filters

  There are two filters.

  The 'Device Filter' restricts the device list by device name. If a device name does not begin with the text you specify as this filter, it is excluded from the list.

  The 'Level Sets' filter is a drop-down list. It restricts the device list to those devices that belong to the level set you select from the drop-down list. (The first entry in the drop-down list is "All" which means all level sets. If you choose this entry, the device list is not restricted by level set.)

- Available devices

  This section presents all available devices (subject to the filters).

The ID column is the database ID of the device. The 'Level Set' column shows the level sets to which the devices belong.

Use click, shift-click, and control-click techniques to select one or more of the devices in the list of available devices.

- Options

  This section allows you to choose one of 3 methods by which to add the devices you have selected to the category's device list.

  ▲ In each of these cases, the devices are added to the category's device list according to the data in the 'Index' column of the category's device list. It would be prudent to have the 'Index' column visible when you add devices.

  These are the 3 methods:

  - Append

    NV9000-SE Utilities adds the selected devices to the device list, starting at an index equal to the highest existing index plus 1. For example, if you add 3 devices and the highest index is 441, the new indexes are 442, 443, and 444.

    Thus the new devices are *appended* with respect to the index ordering.

  - Insert at Index

    NV9000-SE Utilities adds the selected devices to the device list, starting at the index you specify and displacing existing entries, therefore preserving them.

    When you choose this option, the option section's 'Index' field becomes enabled and you must enter an index in this field. This is the index at which NV9000-SE Utilities starts adding the selected devices to the category's device list.

    All the indexes of devices in the category's device list at or above the index you specified are increased by the number of devices you added. This increase allows room for the new devices.

    Thus the new devices are *inserted at* the specified index and the other indexes are adjusted. For example, if you add two devices at index 5 and the category's device list has indexes

    1, 2, 3, 4, 5, 6, 7, 8, and 67,

    the list becomes

    1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 69,

    where 5 and 6 are the new entries.

  - Overwrite at Index

    NV9000-SE Utilities adds the selected devices to the device list, starting at the index you specify and overwriting existing entries.

    When you choose this option, the option section's 'Index' field becomes enabled and you must enter an index in this field. This is the index at which NV9000-SE Utilities adds the selected devices to the category's device list.

    The new devices overwrite existing devices, starting at the index you specify and continuing upward until all the new devices have been added to the list. Devices not overwritten retain their indexes.

Thus the new devices *overwrite existing device data, starting at* the specified index. For example, if you add two devices at index 5 and the category's device list has indexes

1, 2, 3, 4, 5, 6, 7, 8, and 67,

the list becomes

1, 2, 3, 4, 5, 6, 7, 8, and 67,

where 5 and 6 are the new entries and the indexes do not change.

Edit Device

This button causes NV9000-SE Utilities to display the device details page for each of the devices you select.

Use click, shift-click, and control-click techniques to select one or more devices in the device list.

See Device Details Page, on page 141.

Delete Device

This button removes all the devices you selected from the categories device list, immediately. (There is no warning dialog.)

Use click, shift-click, and control-click techniques to select one or more devices in the device list.

Add Suffix

This button causes NV9000-SE Utilities to display an 'Input' dialog in which you can specify a suffix:

You can enter any text string, up to 4 characters. We recommend that you restrict your text string to alphanumeric characters.

Click 'OK' to confirm that you want the new suffix. Otherwise, click 'Cancel'.

The suffix you define becomes available globally, for all categories.

(If you want to delete suffixes, go to the 'Suffixes' table under the 'Views' pane.)

Auto-Fill Suffixes

"Auto-fill" is where NV9000-SE Utilities fills the suffix fields of ***specific*** devices by parsing the device mnemonics to discover what suffixes they contains. If it discovers suffixes in the device mnemonic, it places those in consecutive suffix columns, starting at suffix 1.

The process overwrites the suffixes currently assigned to the devices.

The benefits of auto-fill are that (1) you can create suffixes that match your device mnemonics exactly and (2) the process is very quick compared to encoding all suffixes by hand.

For example, the mnemonic "CAM 185" has a base name of "CAM" and 3 suffixes, "1," "8," and "5," separated by a space character. The 3 suffixes will appear as suffix 1, suffix 2, and suffix 3 for that device.

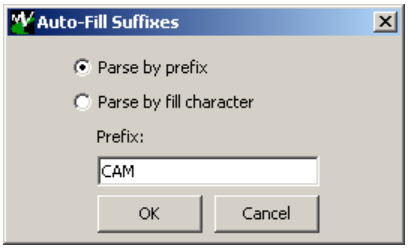
▲ "Auto-fill" might fail to parse certain device names if they are ill-conditioned. Names suitable for auto-fill start with a base name and end with a number. The number is typically separated from the base name by a character such as a space or an underbar (_).

Alphabetic suffixes are acceptable. For example, the device mnemonic 'CAM 7ABC' results in 4 suffixes.

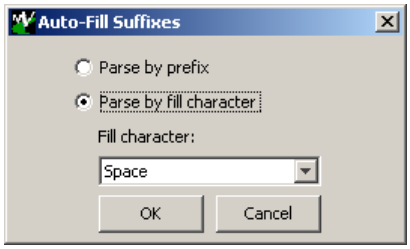
Names are ill-conditioned if they contains two or more separator characters such as space or underbar. The software stops generating suffixes when it encounters the duplicate separator.

The device names generated by NV9000-SE Utilities' 'Add Multiple Devices' page sequence are all well-conditioned, consisting of a base name, a separator character, and a sequence number.

When you click the 'Auto-Fill Suffixes' button, NV9000-SE Utilities displays a dialog in which you can specify how NV9000-SE Utilities should parse device names:



Parse by prefix



Parse by fill character

The dialog presents two methods:

- Parse by prefix

  When you choose this method, the dialog's data field is a 'Prefix' text box.

  The parser tests each device name against the prefix you specify in the dialog's data field. If the name matches, the parser extracts each non-separator character from the remainder of the device name and makes those characters the suffixes for the device.

  This method has the side effect of excluding devices having other prefixes. Excluded devices remain unchanged.

- Parse by fill character

  When you choose this method, the dialog's data field is a 'Fill Character' drop-down list.

  The parser searches each device name for the "fill character" you specify in the dialog's data field. (Fill character also means *separator character.*)

  If the name contains the specified separator character, the parser extracts each alphanumeric character from the remainder of the device name and makes those characters the suffixes for the device. However, if it finds another separator character (of any kind) it stops the extraction immediately.

The 'Fill Character' field — a drop-down list — allows you to choose one of the following fill characters:

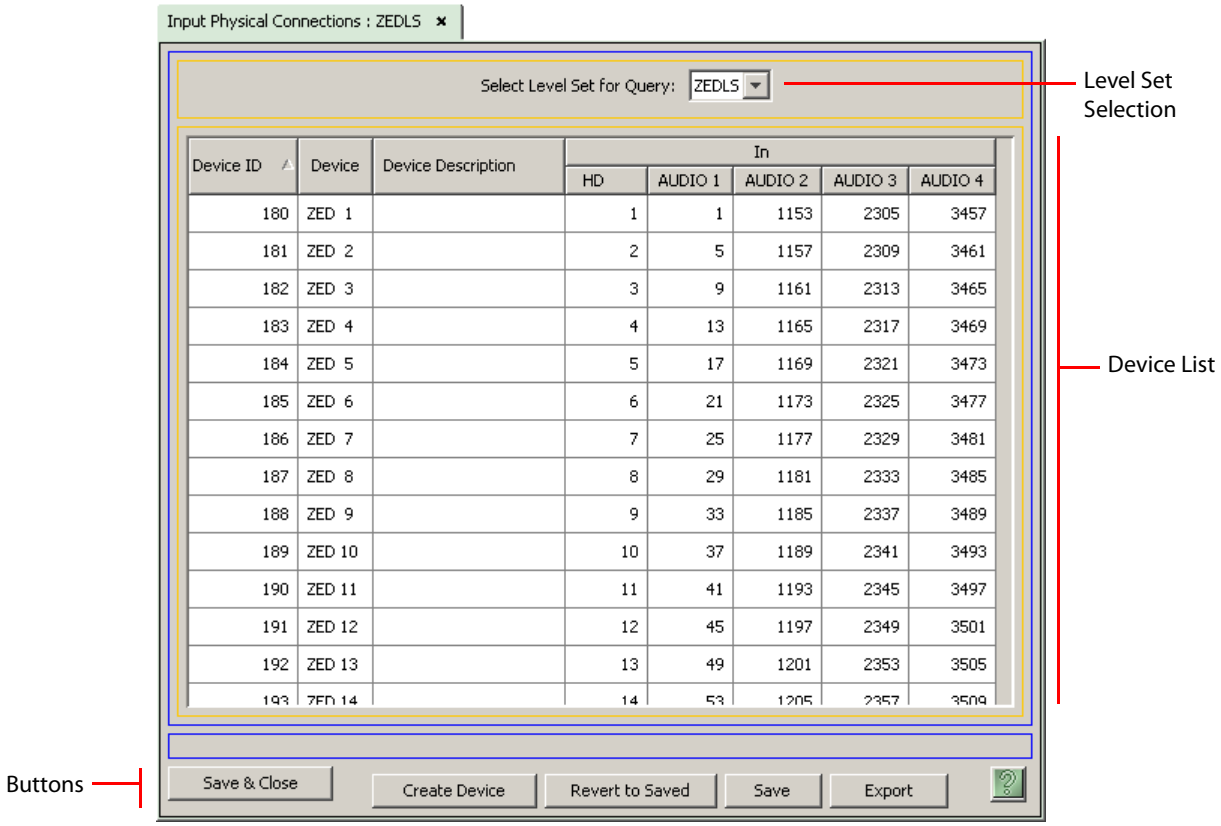
space 0 (zero) - (dash or hyphen) _ (underline or underbar) none

This method has no particular side effects. Only those devices that contain the specified separator character are affected. Other devices remain unchanged.

After you have specified a method, click 'OK' to execute the auto-fill. Otherwise, click 'Cancel'.

'Input Phys Conns' Page

The 'Input Phys Conns' page shows the input ports for devices in a selected level set. This is a sample of the page:



Device ID	Device	Device Description	In				
			HD	AUDIO 1	AUDIO 2	AUDIO 3	AUDIO 4
180	ZED 1		1	1	1153	2305	3457
181	ZED 2		2	5	1157	2309	3461
182	ZED 3		3	9	1161	2313	3465
183	ZED 4		4	13	1165	2317	3469
184	ZED 5		5	17	1169	2321	3473
185	ZED 6		6	21	1173	2325	3477
186	ZED 7		7	25	1177	2329	3481
187	ZED 8		8	29	1181	2333	3485
188	ZED 9		9	33	1185	2337	3489
189	ZED 10		10	37	1189	2341	3493
190	ZED 11		11	41	1193	2345	3497
191	ZED 12		12	45	1197	2349	3501
192	ZED 13		13	49	1201	2353	3505
193	ZED 14		14	53	1205	2357	3509

There are 3 sections in the page:

- Level Set Selection
- Device List
- Buttons

Level Set Selection

To view the input ports of devices in the device list, choose a level set in the drop-down list entitled 'Select Level Set for Query'.

(You can view devices for one level set at a time. There is no way to view input ports for all level sets.)

Device List

The device list includes a row for each device assigned to the level set you specified.

The table has 3 fixed columns and additional columns — one for each level in the selected level set.

These are the 3 fixed columns:

- ID

  These are the database IDs for the devices in list. You cannot change these IDs.

- Device

  These are the names of the devices in the list. You can change the device names. (The changes will appear in other pages that list the devices.)

- Description

  The device descriptions are optional and free-form. You can change the descriptions to anything suitable for your configuration.

The columns for the levels in the level set contain port numbers. You can edit any port number in the device list. (In most cases, the ports in the list were generated in the 'Add Multiple Devices' process. See 'Add Mutiple Devices' Page, on page 159.)

Buttons

At the bottom of the page are 5 buttons:

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the device list, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

- Create Device

  Click 'Create Device' to add a device to the list.

  When you do so, NV9000-SE Utilities adds a new row in the list. You can the enter the device name and its description, and specify input ports for each of the device's virtual levels.

  ▲ Note that there is no button for deleting devices in this page. You can delete devices using the 'Devices' configuration page or the 'Devices' table under the 'Views' pane.

- Export

  Click 'Export' to save the device list to a comma-separated (.csv) text file.

  A 'Save' dialog appears in which you can navigate to a folder in which to save the file. NV9000-SE Utilities suggests a name for the file, but you can change it. For example, NV9000-SE Utilities suggests

  ```
  ExportDevPhysConn
  ```

  You might want to choose a name more meaningful to your situation. The file actually saved is `<yourname>_Input.csv`.

  (NV9000-SE Utilities does not immediately show that the file type must be .csv. So remember that the save is to a .csv file.)

'Output Phys Conns' Page

The 'Output Phys Conns' page is just like the 'Input Phys Conns' page in every way except that it is for outputs. (Because it is for outputs, its export file, if any, is named for outputs too.)

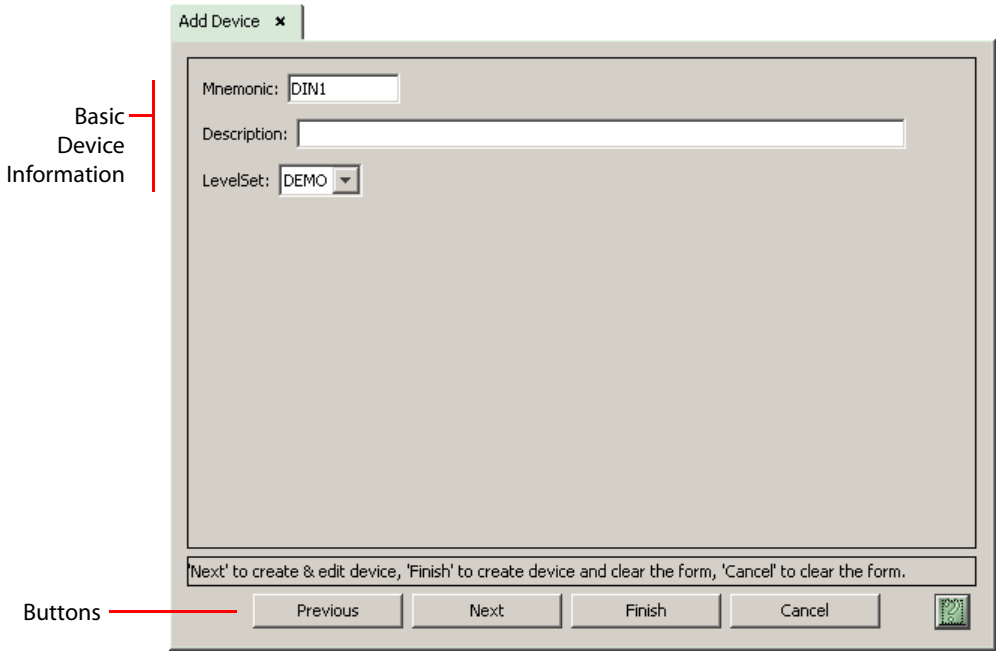
See 'Input Phys Conns' Page, on page 155.

'Add Device' Page

The 'Add Device' page starts a series of steps, in multiple pages, in which you create a new device. There are two ways to get the 'Add Device' page:

- Click the 'Add Device' button at the bottom of the 'Devices' page (of the 'Configuration' pane).
- Click 'Add Device' in the 'Tasks' pane.

This is a sample of the page:



This page, as the start of a series, provides 3 basic fields:

- Mnemonic. The new device's name.
- Description. This field is optional and free-form. Use it to suit the purposes of your system.
- Level Set. This field is required. All devices must belong to one and only one level set.

At the bottom of the page are buttons that allow you to move through the sequence of steps in device definition:

- Previous
- Next
- Finish
- Cancel

The buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

'Previous' Button

Click the 'Previous' button if you want to go to the previous page in the device definition sequence.

'Next' Button

Click 'Next' to go to the device details page. In this page, you specify the I/O ports for the device and set other parameters for the device.

'Finish' Button

Click 'Finish' to accept the device thus far defined in the 'Add Device' page.

The device definition, as defined in the 'Add Device' page is incomplete. You must later go to the device details page to complete the definition.

This button allows you to create a number of device definitions rapidly and complete them later.

After you click 'Finish', the 'Add Device' page remains and is re-initialized for additional entries.

'Cancel' Button

Click 'Cancel' if you want to terminate the device definition you started.

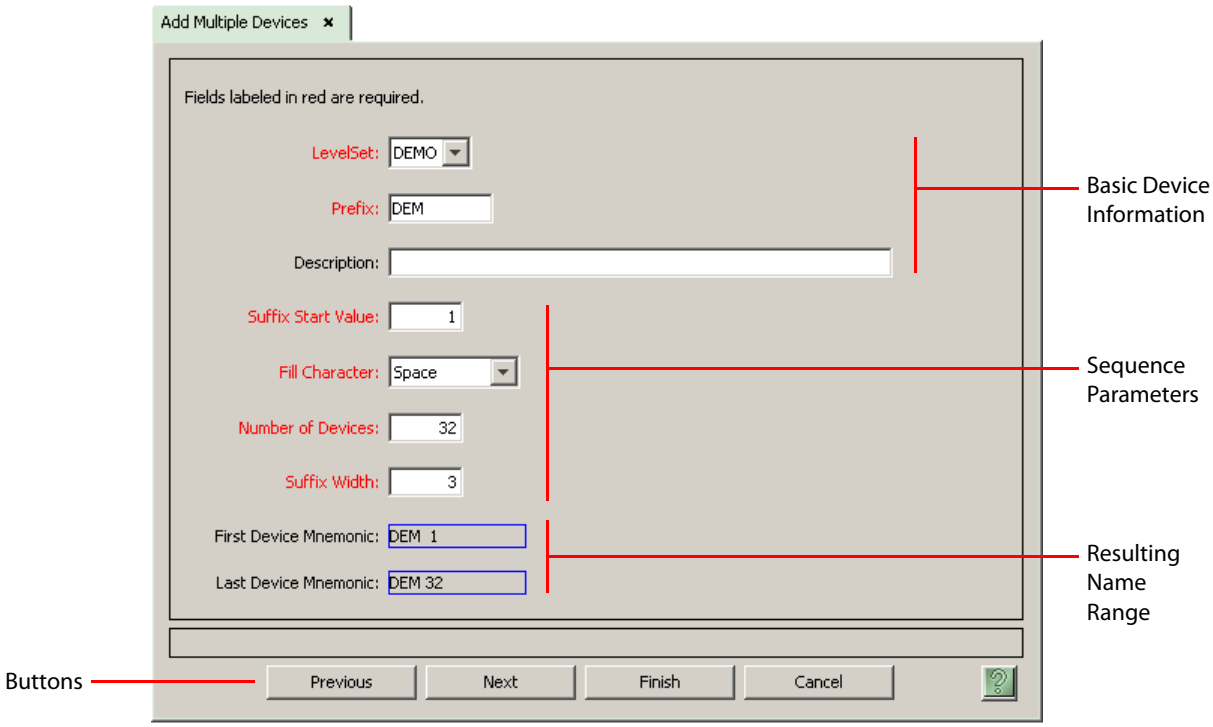
When you click 'Cancel', the 'Add Device' page re-initializes for another entry.

'Add Multiple Devices' Page

The 'Add Multiple Devices' page can be found in the 'Tasks' pane.

The 'Add Multiple Devices' page starts a series of steps, in multiple pages, in which you create a set of related devices.

This is a sample of the page:



The page has 4 sections:

- Basic Device Information
- Sequence Parameters
- Resulting Name Range
- Buttons

The series of devices created by this page have names that consist of a base name (or prefix) and a sequence number (or suffix). The prefix and the suffix can be separated by one or more "fill" characters.

(The term *suffix* as used here has a different meaning from the term *suffix* in relation to categories and device selection by category. Here, a suffix is just a sequence number.)

The series of devices also have I/O ports that are enumerated according to a starting number and an increment that you specify in the second page of the 'Add Multiple Devices' page series.

Basic Device Information

This section provides 3 basic fields:

- Level Set. This field is required. The device definitions about to be created must belong to one and only one level set.
- Prefix. This field is the base name upon which device names are built, by appending a number to the base name. (A separator character can be placed between the base and the number.)
- Description. This field is optional and free-form. Use it to suit the purposes of your system.

Sequence Parameters

This section provides 4 fields:

- Suffix start value

  A suffix is a number in a sequence of numbers defined in this page.

  Enter, in this field, the number at which the sequence starts.

- Fill character

  The fill character is the character that separates the sequence number from the base name.

  The 'Fill Character' field is a drop-down list that allows you to choose one of the following fill characters:

  space 0 (zero) - (hyphen) _ (underbar) none

  The choice 'none' of course means that there is no separator character. The default character is a space.

- Number of devices

  This field specifies the number of devices in the sequence.

- Suffix width

  This field specifies the number of characters devoted, in the new device names, to the suffix. Enter a value large enough to accommodate the numbers of the sequence and the separator character.

  For example, if your maximum number is 145 (3 digits), and the separator character is a space, the suffix width should be 3+1, or 4.

  The fill character fills all non-numeric positions in the suffix. For example, with a base name of Dx, a suffix width of 5 a fill character of '-', the device names are

  ```
  Dx----1, Dx----2,  Dx---10, Dx---11,  DX--100, DX--101,
  ```

  and so on. The exception is that when the fill character is 'none' there is no filling at all.

Resulting Name Range

After you have entered values in the other fields of the page, this section displays the first and last device names of the sequence that you are creating.

You can adjust the sequence parameters if the names are not properly formed.

Buttons

At the bottom of the page are buttons that allow you to move through the sequence of steps in device definition:

- Previous
- Next
- Finish
- Cancel

The buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

'Previous' Button

Click the 'Previous' button if you want to go to the previous page in the device definition sequence.

'Next' Button

Click 'Next' to go to the next page in the 'Add Multiple Devices' page sequence.

(There are two more pages in the sequence after the first.)

'Finish' Button

The 'Finish' button is disabled in the first 'Add Multiple Devices' page.

It is enabled in the second 'Add Multiple Devices' page and has the same effect as the 'Next' button.

It is enabled in the third 'Add Multiple Devices' page. In that page, it completes the multiple device definitions and returns you to the first 'Add Multiple Devices' page.

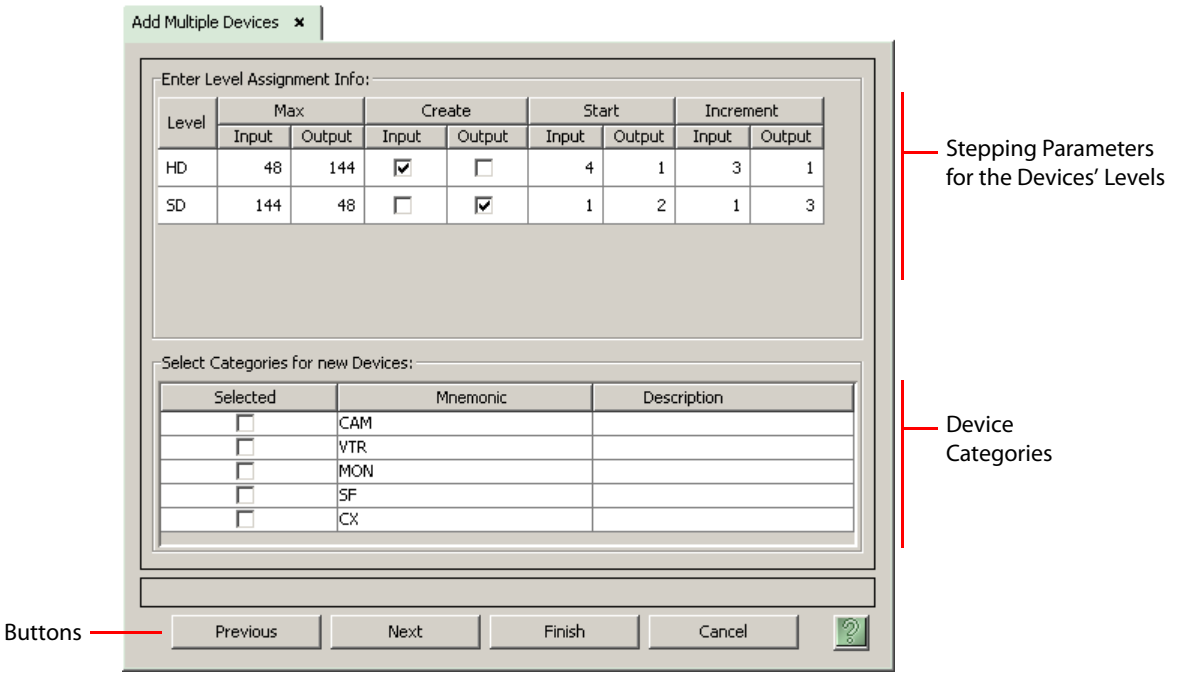
'Cancel' Button

Click 'Cancel' if you want to terminate the multiple device definition you started.

When you click 'Cancel', the first 'Add Multiple Devices' page re-initializes for another entry.

Second Multiple-Device Page

When you click 'Next' in the first 'Add Multiple Devices' page, the second page appears:



The second page has two sections, not including the buttons at the bottom which are the same as for the first and third pages.

Stepping Parameters

This section has a table that lets you specify how the I/O ports are sequenced for the multiple devices you are creating. This is a sample:

Level	Max		Create		Start		Increment	
	Input	Output	Input	Output	Input	Output	Input	Output
HD	48	144	☑	☐	4	1	3	1
SD	144	48	☐	☑	1	2	1	3

Fig. 7-1: Stepping Parameters (Sample)

Each row in this table is a virtual level in the level set of the new devices.

(Recall that a virtual level identifies a physical level which is a range of input and output ports of a specific router.)

For each virtual level (row) there 4 sets of values — one value for inputs and one for outputs. These are the parameters of the table:

- Maximum

  The values in the 'Maximum' fields are derived from (1) the size of the partition used by the virtual level and (2) the values entered in the 'Increment' fields.

  The values give the *maximum number of devices* that can be created with the current parameters. (You cannot enter values in these fields.)

In Figure 7-1, the partition size is 144 for both inputs and outputs. The increment for HD inputs (and for SD outputs) is 3. Therefore the maximum number of devices that can be created with the current parameters is `floor(144÷3)`, or 48.

If your intention is to create more than that number of devices, you will have to reconsider what you are attempting.

- Create

  The check boxes in the 'Create' fields enable inputs or outputs, or both, for each of the virtual levels. Leave the checkbox(es) blank where the virtual levels are to have no ports.

  If an input is disabled for a virtual level, the values in all the other input fields for that virtual level are ignored. Similarly, if an output for a virtual level is disabled, the values in all the other input fields for that virtual level are ignored.

- Start

  The values in the 'Start' fields are the starting port numbers for the multiple devices you are creating.

  Enter a value in the input field for a virtual level if its input check box is checked.

  Enter a value in the output field for a virtual level if its output check box is checked.

- Increment

  The values in the 'Increment' fields give the difference between the previous port and the current port in the sequence you are creating.

  For example, in Figure 7-1, the HD input ports start at 4 and increment by 3. Therefore the ports of the sequence will be 4, 7, 10, 13, 16, and so on.

  Enter a value in the input field for a virtual level if its input check box is checked.

  Enter a value in the output field for a virtual level if its output check box is checked.

▲ Be careful to distinguish input fields from output fields. It is easy to get confused in this table.

▲ Ensure that the starting port numbers and the increments are realistic. If the ending port number (which you will have to calculate) exceeds the partition for the virtual level, the devices you are creating are not realizable.

Device Categories

Every device can belong to a device category. This section lists the available categories.

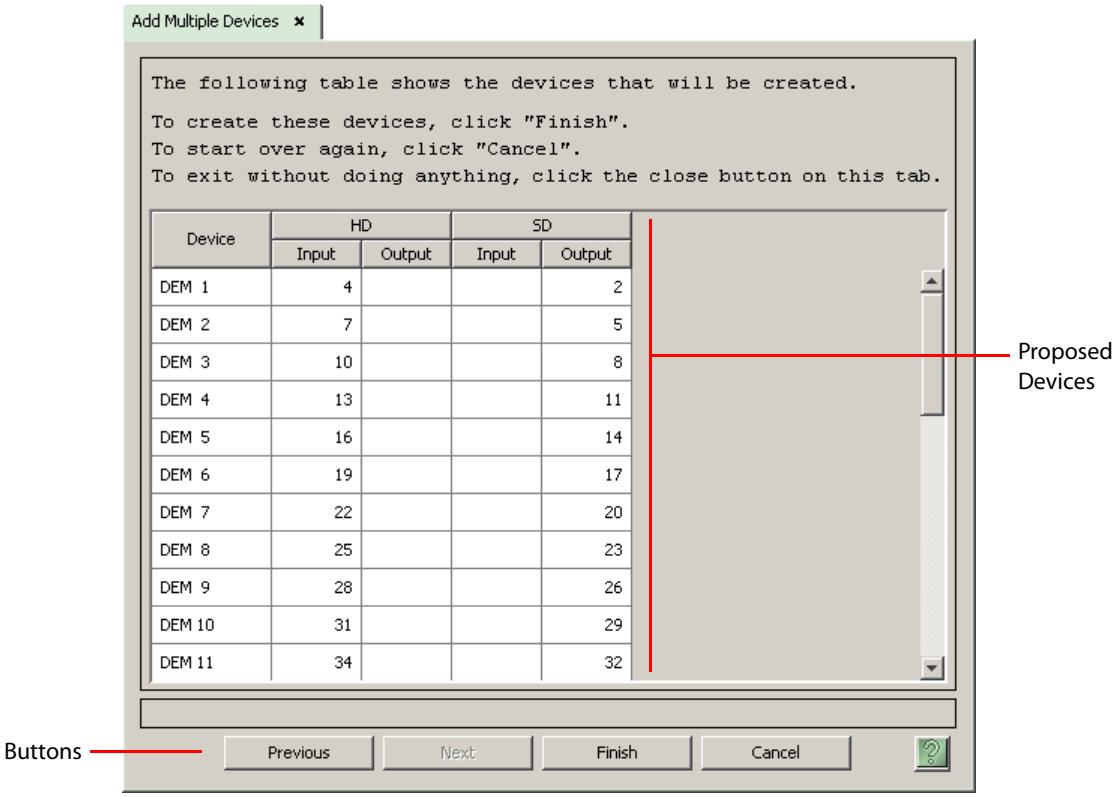
Place a check in the check box of each category to which you want these devices to belong. All the devices you are creating will be added to those categories.

It is not necessary for the devices to belong to a category.

(You cannot modify the category name or description fields.)

Third Multiple-Device Page

When you click either 'Next' or 'Finish' in the second 'Add Multiple Devices' page, the third page appears:



The third page has one section — proposed devices — not including the buttons at the bottom which are the same as for the first and second pages.

The list of proposed devices shows the I/O ports that were generated according to the parameters you specified in page 2 of the 'Add Multiple Devices' series. It also shows the devices names that were generated according to the parameters you specified in page 1.

Examine the list of devices carefully, scrolling as necessary.

If the proposed devices are satisfactory, click 'Finish' to complete the creation of the devices.

Click 'Cancel' if you want to discard the proposed devices.

Click 'Previous' if you want to revise any of the device parameters.

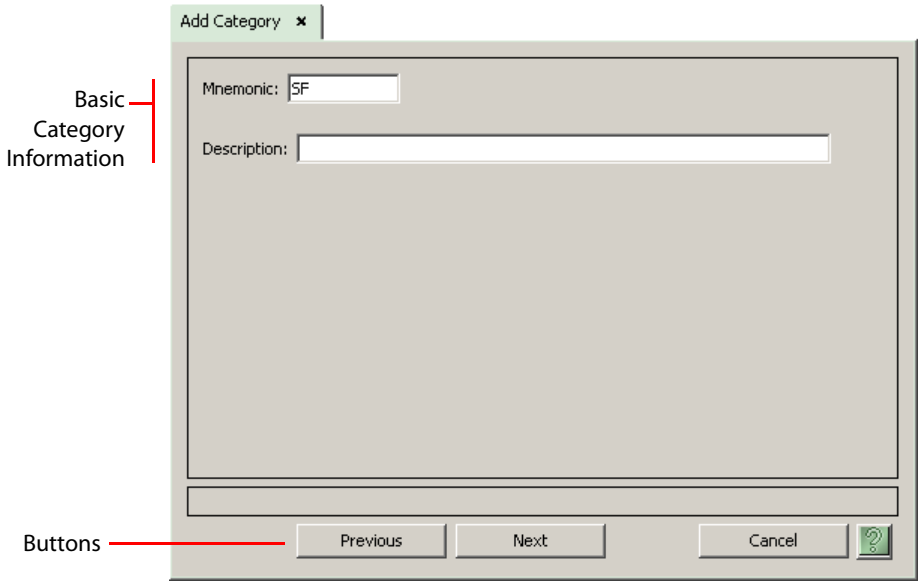
(The 'Next' button is disabled in the third page.)

'Add Category' Page

The 'Add Category' page starts a series of steps, in multiple pages, in which you create a new category. There are two ways to get the 'Add Category' page:

- Click the 'Add Category' button at the bottom of the 'Categories' page (of the 'Configuration' pane).
- Click 'Add Category' in the 'Tasks' pane.

This is a sample of the page:



This page, as the start of a series, provides 2 basic fields:

- Mnemonic. The new category's name.
- Description. This field is optional and free-form. Use it to suit the purposes of your system.

At the bottom of the page are buttons that allow you to move through the sequence of steps in device definition:

- Previous
- Next
- Cancel

Buttons

The buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

'Previous' Button

Click the 'Previous' button if you want to go to the previous page in the device definition sequence.

'Next' Button

Click 'Next' to go to the second page of the 'Add Category' page series. In this page, you select the devices for the category.

See Second 'Add Category' Page, following.

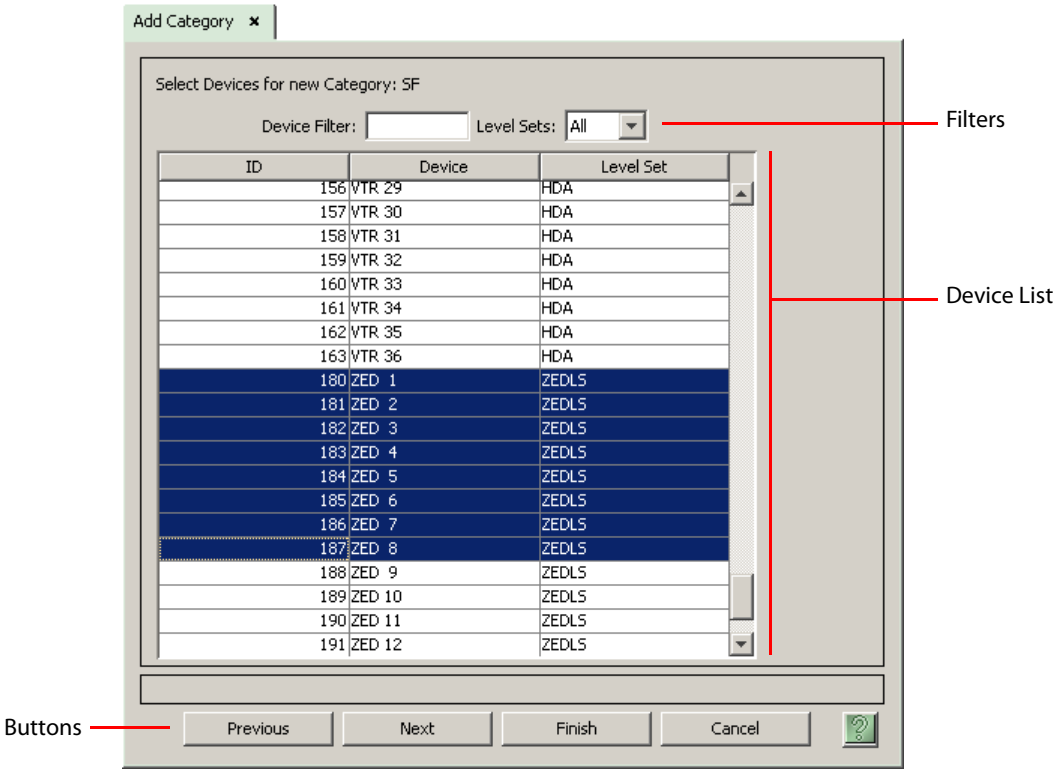
'Cancel' Button

Click 'Cancel' if you want to terminate the category definition you started.

When you click 'Cancel', the 'Add Category' page re-initializes for another entry.

Second 'Add Category' Page

When you click 'Next' in the first 'Add Category' page, the second page appears:



The second page has two sections, not including the buttons at the bottom which are the same as for the first and third pages, with the addition of the 'Finish' button.

Filters

At the top of the page are 2 filters:

- Device Filter. If you enter text in this field, the list of devices is restricted to those devices whose names contain the text you entered.
- Level Set Filter. If you select a level set in the drop-down list of this field, the list of devices is restricted to those devices that belong to the level set you selected.

Device List

The device list has 3 columns:

- ID. These are the database IDs of the different devices.
- Device. These are the names of the devices.
- 'Level Set'. These are the names of the level sets to which the devices belong.

Use click, shift-click, and control-click techniques to select any of the devices in the list.

The devices you select in this list are the devices added to the category when you click the 'Next' or 'Finish' button.

If a device is already present in the list of devices belonging to the category, it will not be duplicated.

Buttons

The buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

'Previous' Button

Click the 'Previous' button if you want to go to the previous page in the category definition sequence.

'Next' Button

Click 'Next' to complete the category definition and go to the third page of the 'Add Category' page series. (That page is merely a stub, serving no purpose.)

See Third 'Add Category' Page, on page 168.

'Finish' Button

The 'Finish' button has the same effect as the 'Next' button.

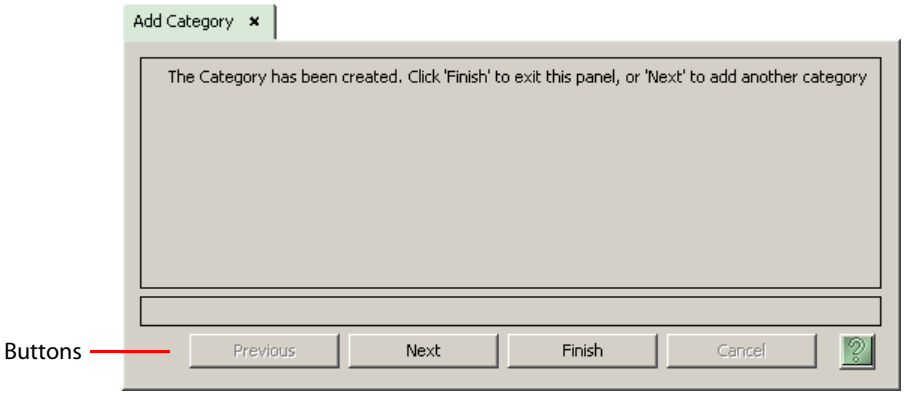
'Cancel' Button

Click 'Cancel' if you want to terminate the category definition you started.

When you click 'Cancel', the first 'Add Category' page re-initializes for another entry.

Third 'Add Category' Page

When you click either 'Next' or 'Finish' in the second 'Add Category' page, the third page appears:



The third page is a stub: it has no real content except the two enabled buttons:

(The 'Previous' and 'Cancel' buttons are disabled.)

'Next' Button

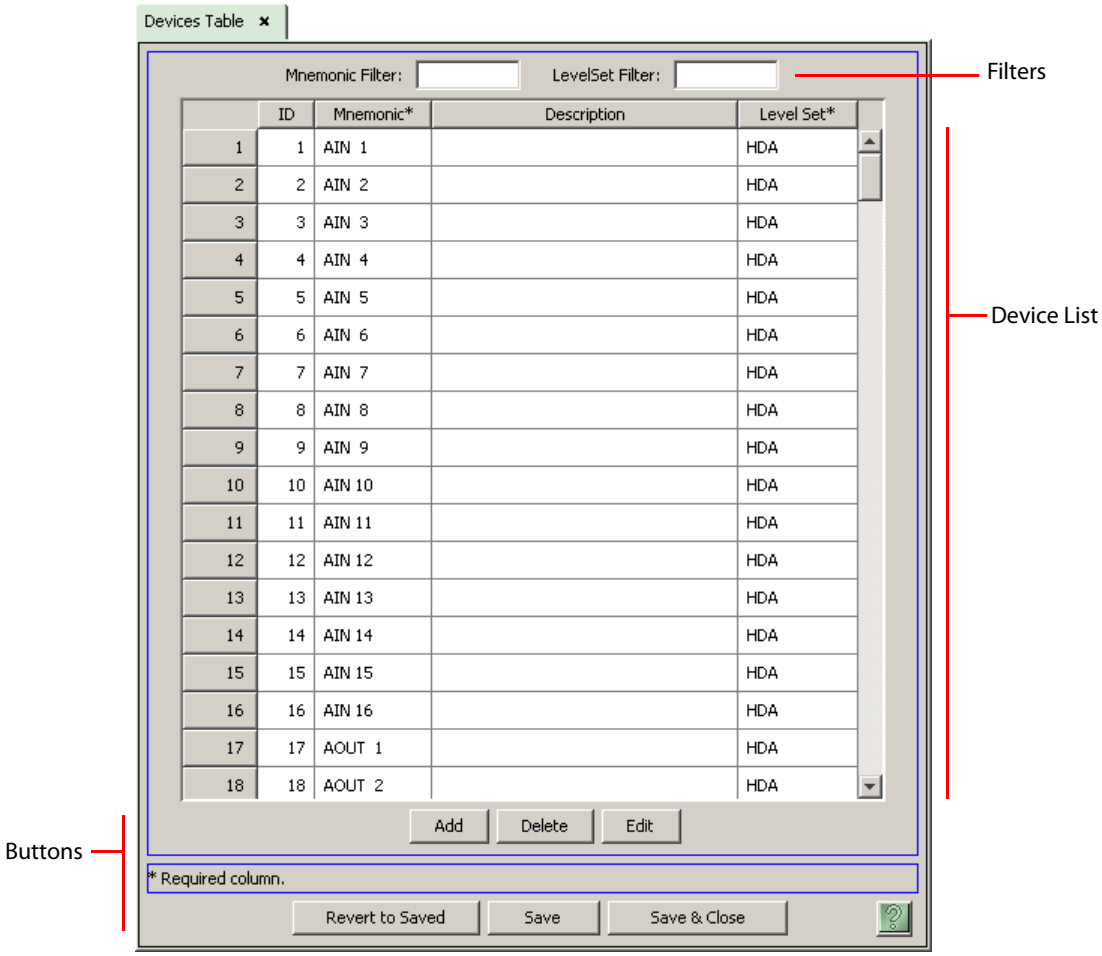
Click the 'Next' button to start another category definition.

'Finish' Button

Click 'Finish' to dismiss the 'Add Category' page.

Devices Table

The 'Devices' table is found under the 'Tables' portion of the 'Views' pane:



The 'Devices' table lists all devices defined in your configuration (subject to the filters).

Listed are the device names and the level sets to which they belong.

The descriptions are optional and free-form. Use them to suit the purposes of your system.

The IDs are the data base IDs of the devices.

Filters

At the top of the page are two filters:

- Mnemonic filter.

  If you enter text in this field, the list of devices is restricted to those devices whose name fields contain the text you entered.

- Level set filter.

  If you enter text in this field, the list of devices is restricted to those devices whose level set contains the text you entered.

Buttons

At the bottom of the page are 6 buttons:

- Add

  Click 'Add' to add a device to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can enter a name for the device and choose a level set for the device. (Adding a device does not define its content. You must edit the device to complete its definition.)

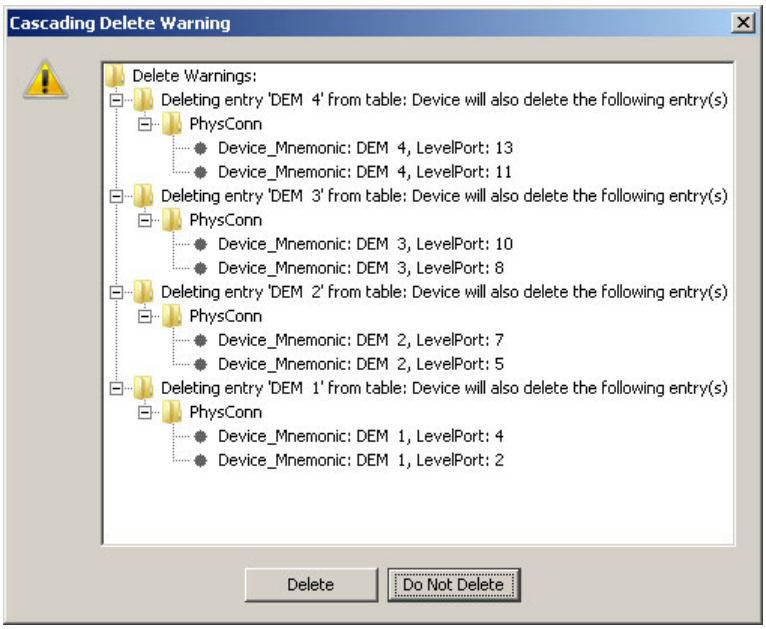
  (The ID is generated by NV9000-SE Utilities.)

- Delete

  Select one or more rows in the 'Devices' table and click 'Delete' to remove those devices from the table.

  NV9000-SE Utilities deletes a single entry immediately without any warning dialog.

  NV9000-SE Utilities removes multiple entries immediately from the displayed list, but does not actually delete the multiple entries until you save the table. It then presents a warning dialog:



- Edit

  Select one or more rows in the 'Devices' table and click 'Edit' to open a device details page for each of the selected devices.

  See Device Details Page, on page 141 for details.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

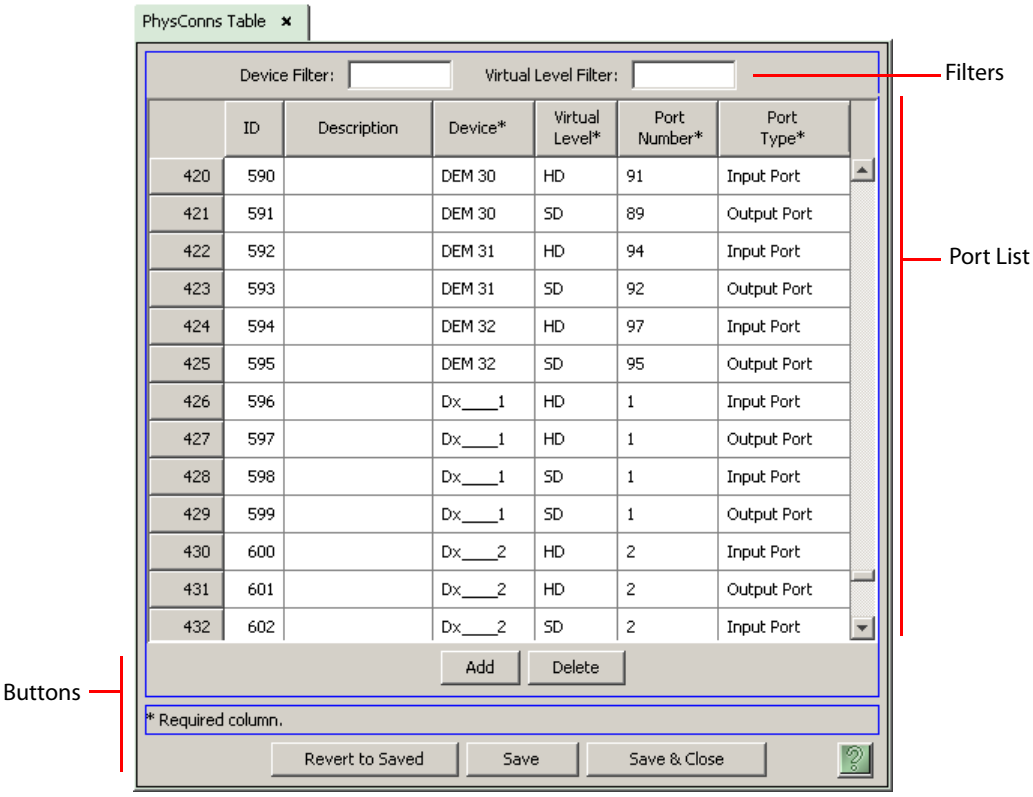
  Click 'Revert to Saved' to restore the saved list of devices, discarding any changes you have made (since the last save).

- Save & Close

Click 'Save & Close' to commit the changes you have made in the page and then close the page.

'PhysConns' Table

The 'Physconns' table is found under the 'Tables' portion of the 'Views' pane:



The 'PhysConns' table (i.e., physical connections table) lists all I/O ports defined in your configuration (subject to the filters).

The table includes, for each port,

- The name of the device to which the port belongs.
  - ▲ Any port can belong to more than one device definition in the configuration. Although a port cannot be *physically* connected to more than one device at a time, it is possible to create multiple device definitions that allow panel operators to use the same ports, but in different ways.
- The port type: input or output.
  - ▲ Remember that input ports are numbered independently of output ports.
- The virtual level of the port.
  - ▲ The 'PhysConns' table neglects to specify the level set to which the port and its device belong. Thus, the virtual level entries can be ambiguous because different level sets can have identically named virtual levels.

The description fields are optional and free-form and for your benefit. You can enter any text in the description field. The descriptions remain with the table as long as the port in that row exists. The descriptions are not used elsewhere.

The IDs are the data base IDs of the devices.

Buttons

At the bottom of the page are 5 buttons:

- Add

  Click 'Add' to add a port to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can enter the name of the device of which the port is part, choose a level set for the port, specify the port number and its type (input or output).

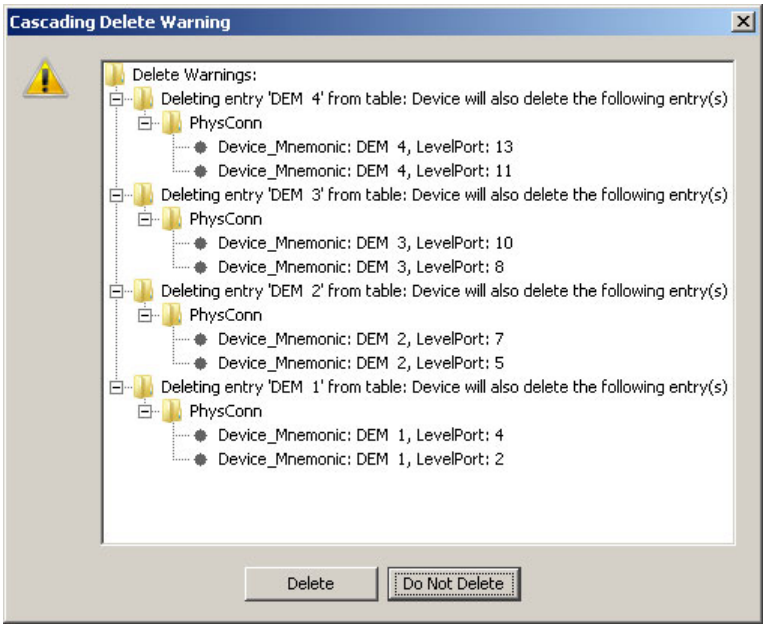
  (The ID is generated by NV9000-SE Utilities.)

- Delete

  Select one or more rows in the port list and click 'Delete' to remove those ports from the configuration.

  NV9000-SE Utilities deletes a single port immediately without any warning dialog.

  NV9000-SE Utilities removes multiple ports immediately from the displayed list, but does not actually delete the multiple ports until you save the table. It then presents a warning dialog:



- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

  Click 'Revert to Saved' to restore the saved list of devices, discarding any changes you have made (since the last save).

- Save & Close

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Filters

At the top of the page are two filters:

- Mnemonic filter.

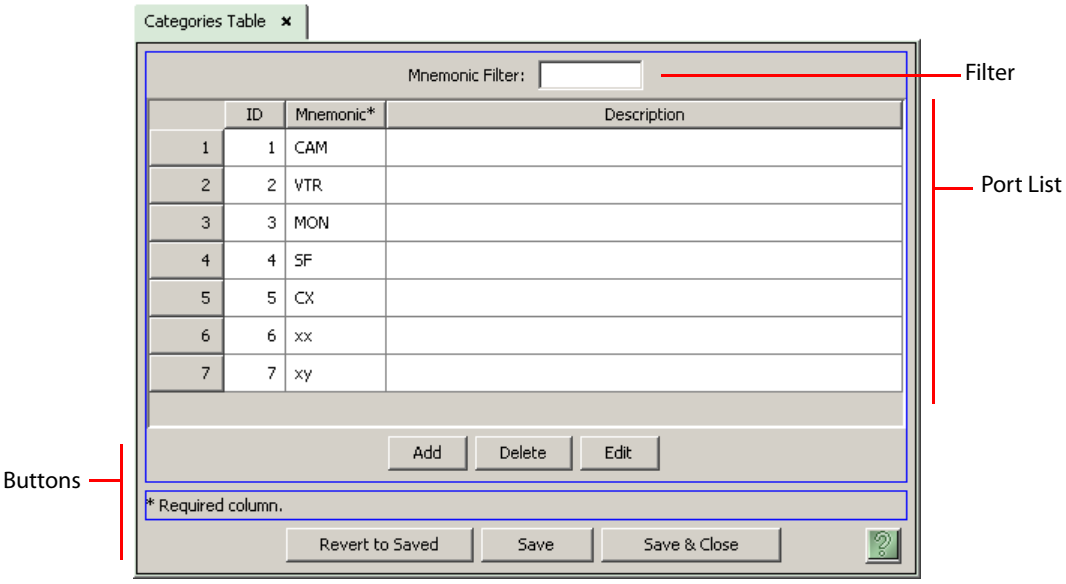
  If you enter text in this field, the list of devices is restricted to those devices whose name fields contain the text you entered.

- Level set filter.

  If you enter text in this field, the list of devices is restricted whose level set fields contain the text you entered.

Categories Table

The 'Categories' table is found under the 'Tables' portion of the 'Views' pane:



The 'Categories' table lists all categories defined in your configuration (subject to the filter). The table has 3 sections:

- Filters
- Category List
- Buttons

Filters

At the top of the page is a 'Mnemonic' filter: if you enter text in this field, the list of categories is restricted to those categories whose name fields contain the text you entered.

Category List

The category list simply shows category names.

You have the option of entering descriptions in the 'Description' fields. This field is free-format.

The IDs are the data base IDs of the categories.

Buttons

At the bottom of the page are 6 buttons:

- Add

  Click 'Add' to add a category to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can enter a name (and optional) description for the category. (Adding a category does not define its content. You must edit the category to complete its definition.)

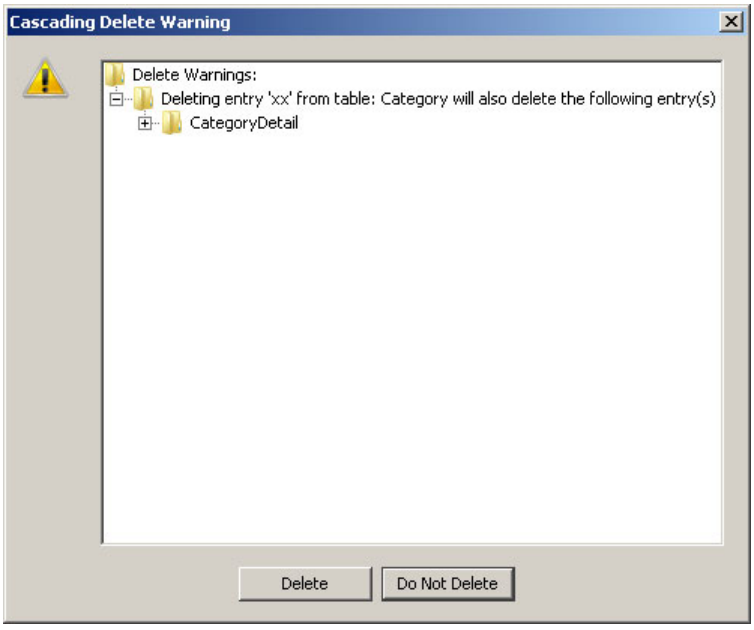
  (The ID is generated by NV9000-SE Utilities.)

- Delete

  Select one or more rows in the 'Categories' table and click 'Delete' to remove those categories from the table.

  NV9000-SE Utilities deletes a single entry immediately without any warning dialog.

  NV9000-SE Utilities removes multiple entries immediately from the displayed list, but does not actually delete the multiple entries until you save the table. It then presents a warning dialog:



- Edit

  Select one or more rows in the 'Categories' table and click 'Edit' to open a category details page for each of the selected devices.

  See Category Details Page, on page 146 for details.

- Save

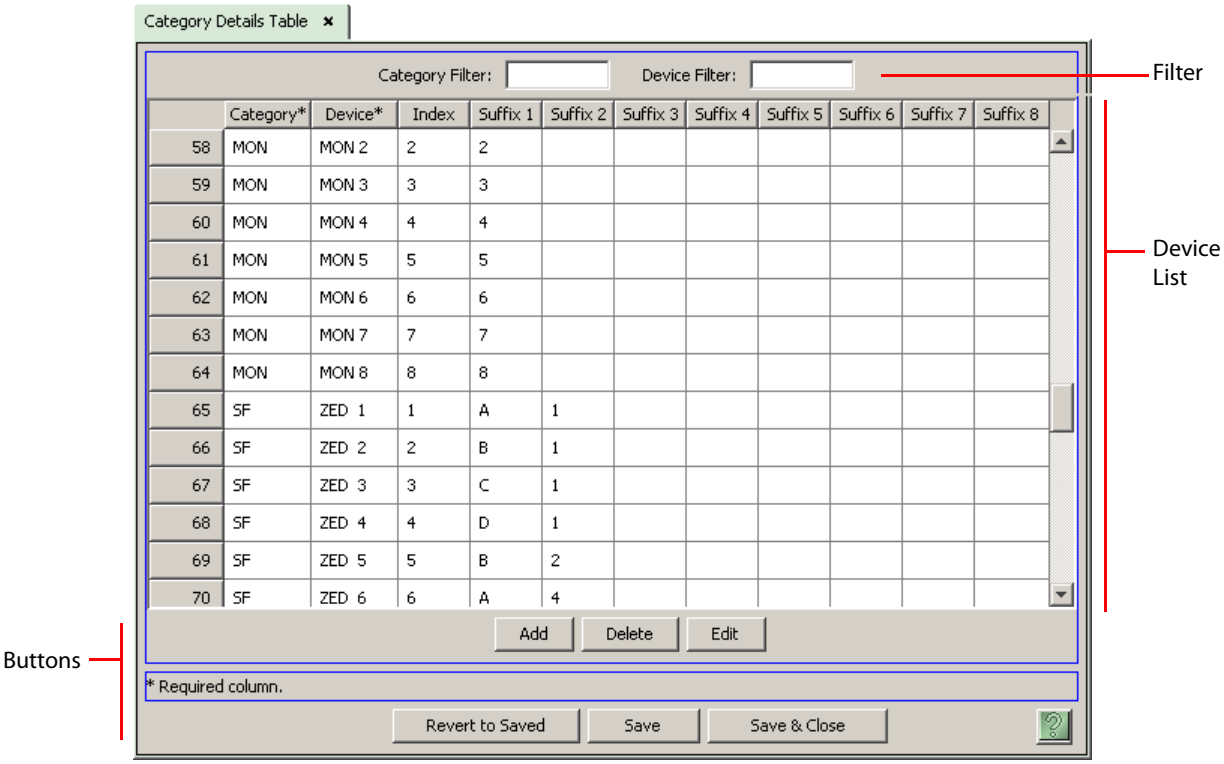
  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved list of categories, discarding any changes you have made (since the last save).
- Save & Close

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Category Details Table

The 'Category Details' table is found under the 'Tables' portion of the 'Views' pane:



The 'Categories' table lists all the devices that have been assigned to categories in your configuration (subject to the filters).

The table has 3 sections:

- Filters
- Device List
- Buttons

Filters

At the top of the page are 2 filters:

- Category Filter. If you enter text in this field, the list of devices is restricted to those devices whose category names contain the text you entered.
- Device Filter. If you enter text in this field, the list of devices is restricted to those devices whose names contain the text you entered.

Device List

The device list has 11 columns, 8 of which are for device suffixes. These are the first 3 columns:

- Category. Fields in this column show the categories to which the devices belong.
- Device. These are the names of the devices that belong to at least one of the displayed categories.
- Index. When a category is created, the devices assigned to the category are indexed. These are the indexes for the devices within a category.

The 8 suffix fields contain suffixes that have been assigned to the devices. (Suffixes are text strings of up to 4 characters.) Many of the suffix fields are blank, meaning that they are not used.

Use click, shift-click, and control-click techniques to select any set of the devices in the list.

Buttons

At the bottom of the page are 6 buttons:

- Add

  Click 'Add' to add a device to the device list. NV9000-SE Utilities creates a new row at the bottom of the list in which you can enter a device name, category name, and index and suffix field values for the new device.

  The 'Category', 'Device', and 'Suffix' fields all have drop-down lists from which to choose an entry. The 'Index' field has a numeric entry box.
- Delete

  Select one or more rows in the 'Category Details' table and click 'Delete' to remove those categories from the table.

  NV9000-SE Utilities deletes the selected rows immediately without any warning dialog.
- Edit

  Select one or more devices in the 'Category Details' table and click 'Edit' to open a device details page for each of the selected devices.

  See Device Details Page, on page 141 for details.
- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

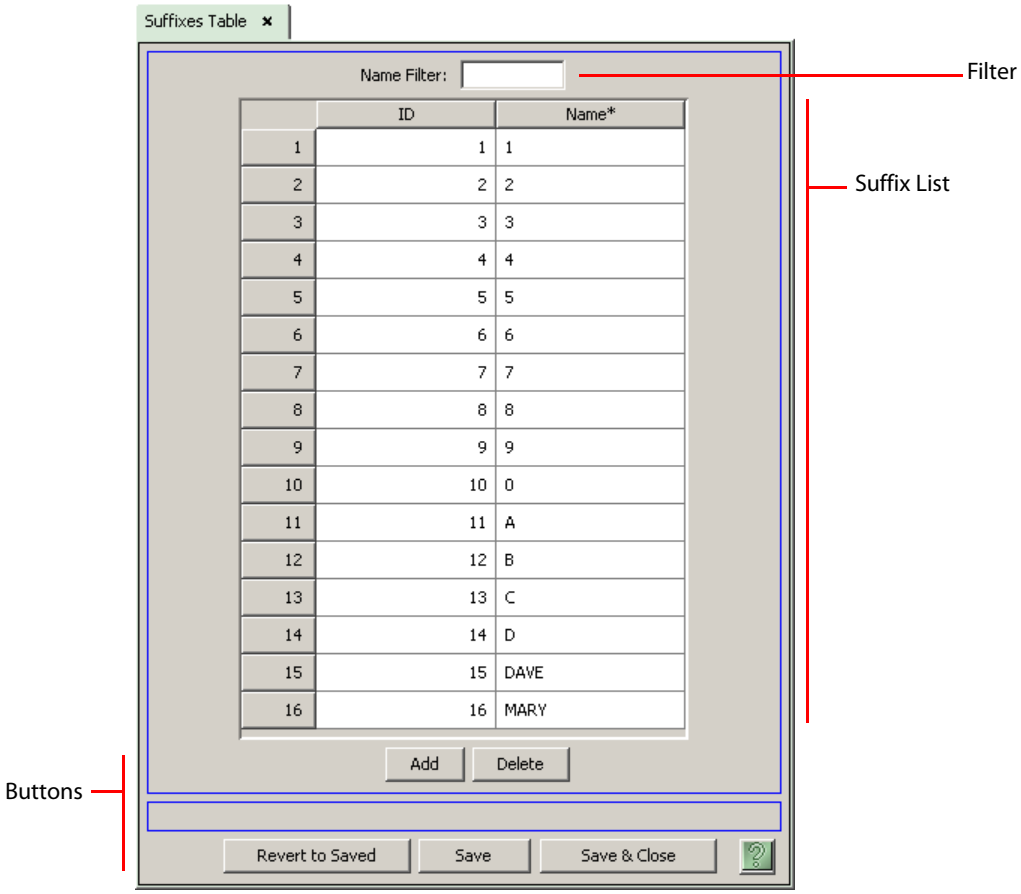
  Click 'Revert to Saved' to restore the saved list of categories, discarding any changes you have made (since the last save).

- Save & Close

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Suffixes Table

The 'Suffixes' table is found under the 'Tables' portion of the 'Views' pane:



The 'Suffix' table lists all suffixes defined in your configuration (subject to the filter). The table has 3 sections:

- Filters
- Suffix List
- Buttons

Filters

At the top of the page is a 'Name' filter: if you enter text in this field, the list of suffixes is restricted to those suffixes that contain the text you entered.

Suffix List

The suffix list simply shows suffix names. You can edit the suffixes in the table.

The IDs are the data base IDs of the categories.

Buttons

At the bottom of the page are 5 buttons:

- Add

  Click 'Add' to add a suffix to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can enter a suffix.

  (The ID is generated by NV9000-SE Utilities.)

- Delete

  Select one or more rows in the 'Suffixes' table and click 'Delete' to remove those suffixes from the table.

  NV9000-SE Utilities deletes the selected suffixes immediately without any warning dialog.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

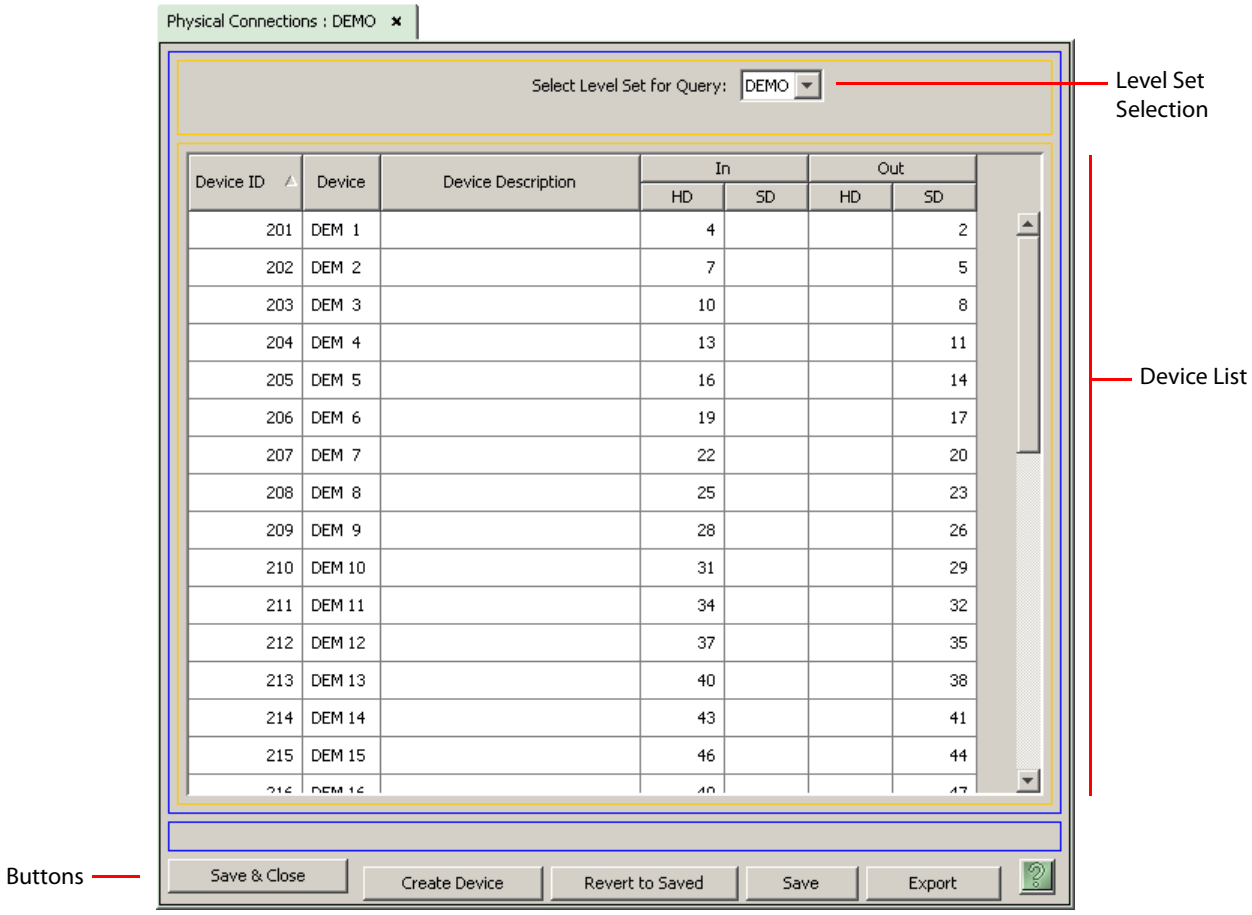
  Click 'Revert to Saved' to restore the saved list of suffixes, discarding any changes you have made (since the last save).

- Save & Close

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

'Physical Connections' Query

The 'Physical Connections' page is found under the 'Queries & Advanced Operations' portion of the 'Views' pane. The page shows the input and output ports for devices in a selected level set. This is a sample of the page:



This page is virtually the same as the 'Input Phys Conns' page and 'Output Phys Conns' page, but shows both inputs and outputs.

There are 3 sections in the page:

- Level Set Selection
- Device List
- Buttons

Level Set Selection

To view the ports of devices in the device list, choose a level set in the drop-down list entitled 'Select Level Set for Query'.

(You can view devices for one level set at a time. There is no way to view the ports for all level sets.)

Device List

The device list includes a row for each device assigned to the level set you specified.

The table has 3 fixed columns and additional columns — one for each level in the selected level set.

These are the 3 fixed columns:

- ID

  These are the database IDs for the devices in list. You cannot change these IDs.

- Device

  These are the names of the devices in the list. You can change the device names. (The changes will appear in other pages that list the devices.)

- Description

  The device descriptions are optional and free-form. You can change the descriptions to anything suitable for your configuration.

The columns for the levels in the level set contain port numbers, divided into 2 groups, one for inputs and one for outputs. You can edit any port number in the device list. (In many cases, the ports in the list were generated in the 'Add Multiple Devices' process. See 'Add Mutiple Devices' Page, on page 159.)

Buttons

At the bottom of the page are 5 buttons:

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the device list, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

- Create Device

  Click 'Create Device' to add a device to the list.

  When you do so, NV9000-SE Utilities adds a new row in the list. You can the enter the device name and its description, and specify the input and output ports for each of the device's virtual levels.

  ▲ Note that there is no button for deleting devices in this page. You can delete devices using the 'Devices' configuration page or the 'Devices' table under the 'Views' pane.

- Export

  Click 'Export' to save the device list to ***two*** comma-separated (.csv) text files, one for inputs and one for outputs.

  A 'Save' dialog appears in which you can navigate to a folder in which to save the files. NV9000-SE Utilities suggests a base name for the files, but you can change it.

For example, NV9000-SE Utilities suggests

`ExportDevPhysConn`

You might want to choose a name more meaningful to your situation. The files actually saved are

`<yourname>_Input.csv`. and
`<yourname>_Output.csv`.

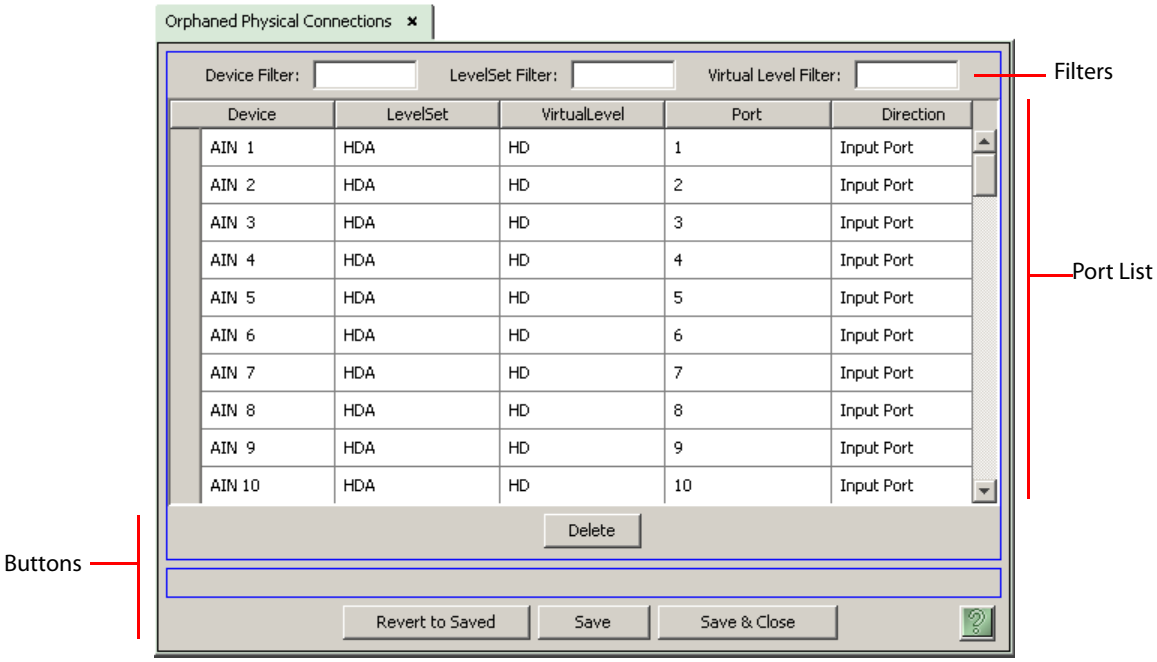
where NV9000-SE Utilities appends "_Input" and "_Output" to the name you choose.

(NV9000-SE Utilities does not immediately show that the file type must be .csv. So remember that the save is to a .csv file.)

- The default file names collide with the default file names you might have generated from the 'Input Phys Conns' page or the 'Output Phys Conns' page. Be careful not to overwrite a file you want to preserve.

'Orphaned Physical Connections' Query

The 'Orphaned Physical Connections' page is found under the 'Queries & Advanced Operations' portion of the 'Views' pane. This is a sample of the page:



This page lists the ports that remain after certain database items with which the port was associated were deleted or changed. Such items include routers and level sets.

Your final configuration should show no entries in this table. If this table has entries, you will probably want to delete the entries. However, you should review the entries carefully to understand why the "orphans" exist and what, if anything, you might want to do to restructure your configuration.

There are 3 sections in the page:

- Filters
- Port List
- Buttons

Filters

At the top of the page are 3 filters:

- Device Filter. If you enter text in this field, the list of ports is restricted to those devices whose names contain the text you entered.
- Level Set Filter. If you enter text in this field, the list of ports is restricted to those devices whose level set name contains the text you entered.
- Virtual Level Filter. If you enter text in this field, the list of ports is restricted to those virtual levels whose name contains the text you entered.

Port List

The port list has 5 columns:

- Device. These are the names of the devices to which the ports belong.
- 'Level Set'. These are the names of the level sets to which the devices belong.
- 'Virtual Level'. A field in this column is the name of the virtual level (within the level set of the same row). The virtual level maps to the router partition of which the port is part.
- Port. The port's number within the router partition mapped to the virtual level.
- Direction. Fields in this column specify whether the port is an input port or an output port.

You can use click, shift-click, and control-click techniques to select any of the devices in the list.

The only operation you can perform on orphaned physical connections in this table is deletion.

Buttons

At the bottom of the page are 4 buttons:

- Delete

  Click 'Delete' to delete the ports you selected in the port list.
- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the port list, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

8 Control Panels

Chapter 8 discusses hardware and software control panels and provides a description of the panels offered as part of an NV9000 router control system.

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Introduction

Many events in an NV9000 router control system are initiated at control panels.

NV9000-SE Utilities supports about 20 hardware control panel models. A few of the panel types supported in NV9000-SE Utilities are not actually control panels, but appear in the control panels selection list because it is convenient to configure these devices as if they were control panels.

Grass Valley also offers about a dozen "virtual panels." These are software emulations of hardware panels that reside and execute on users' PCs. NV9000-SE Utilities treats these as if they were hardware panels and does not distinguish them from hardware panels.

NV9000-SE Utilities also supports two software control panels. Like the virtual panels, these reside and execute on users' PCs. These do not emulate hardware panels.

The following is a list of the available hardware panels:

NV9601 NV9602 NV9603A NV9604 NV9605 NV9606 NV9607
NV9608 NV9609 NV9616 NV9640 NV9640A NV9641 NV9641A
NV9642 NV9646 NV9648 NV9649 NV9654

Virtual panels include:

NV9601V NV9602V NV9603AV NV9605V NV9606V NV9607V NC9609V
NV9616V NV9640V NV9641V NV9642V NC9647V[1] NV9648V NV9649V
NV9654V

Software panels include:

EC9700 EC9710

NV9000-SE Utilities also supports 2 CR series "remote panel" types:

RP16 RP32

and two special devices, handled as if they were panels, but that are not actually control panels for the router control system:

NV9575-VF NV9660

These panel types are all discussed later in this chapter.

Notes

Hardware and virtual panel configurations in NV9000-SE Utilities are identified by panel ID. The configuration with a given panel ID is used for communicating with the panel having that particular ID.

All panel IDs throughout your system must be distinct. If there is an ID collision, no harm will occur, but one or more panels will fail to operate.

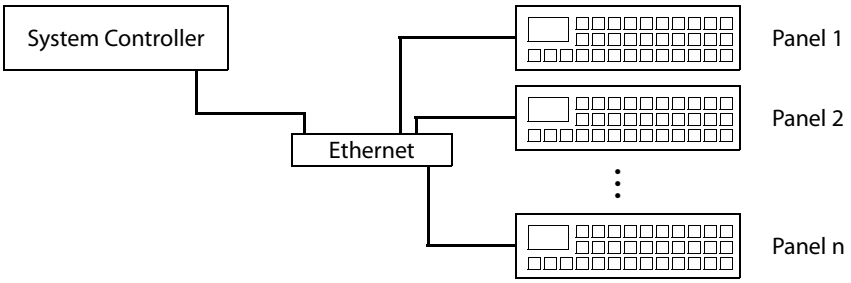
The software panels are a bit archaic, but they are free. Virtual panels are preferable but there is a cost for the license.

1. There is no physical NV9647 control panel.

Installation and Connections

Hardware Panels

Hardware panels use DHCP and require panel IDs. Hardware panels are connected, over Ethernet, on one (or more) of the router and panel networks of the NV960 or on an available network of the NV920:



The NV9000 software uses DHCP (dynamic host configuration protocol) at startup to create IP addresses for each of the hardware panels connected to the system controller.

To be recognizable to the system controller, each panel must be assigned a unique *panel ID*.

The instructions for assigning a panel ID to the panel vary according to the panel and can be found in the user's guide for the panel. The steps are not complicated. These are the general steps for most, but not all, panels:

1. Disconnect the panel from the Ethernet switch. Just remove the RJ-45 cable from the rear of the panel.
2. After a few seconds, the panel will enter "setup" mode, where one or more of its buttons illuminate and captions for the buttons (either on the buttons themselves or on a panel display) indicate which buttons to press to enter a panel ID.

   Some panels present a menu button for the process. Press the menu button and continue.

   Panels with older software revisions may require the power to be cycled for the panel to enter menu mode.
3. Press the required button sequence to reach a state where the panel will accept a new ID. A "numeric button" arrangement will be illuminated, where the buttons correspond to the 10 digits, 0–9. Press the buttons for the new panel ID.
4. Then press the buttons required to save the panel ID and exit. It is possible also to perform some panel diagnostics at this time.
5. Reconnect the Ethernet cable at the rear of the panel. Your panel will restart in a few seconds. If your panel ID is unique, the panel should soon indicate that it is connected.

   If there is an NV9000 configuration for the panel, the panel will start functioning as it was configured. If there is no configuration, the panel will remain idle but connected and a "No Config" message will be displayed.

You must create a panel ID for every hardware panel this way, but you need not do so more than once — when you add the panel to your control system.

Panel configurations in NV9000-SE Utilities are identified by panel ID. The configuration with a given panel ID is used for communicating with the panel having that particular ID.

Virtual Panels

Virtual panels reside on users' PCs and communicate with the NV9000 system through the PC's IP address. Except for the NV9647V, the various virtual panels emulate nearly completely the hardware panels after which they are named. (There is no physical NV9647.)

Because they are software, virtual panels do not provide the GPIO functions that some physical panels provide.

To obtain the virtual panel software (the installers actually) you must purchase a 5-seat license and the accompanying SB0217 Virtual Panels CD. Virtual panels are available for both Macintosh OS/X and Windows.

To install a virtual panel, locate and double click its installer on the CD. The installation takes only a few seconds.

Virtual panels require panel IDs as do physical panels.

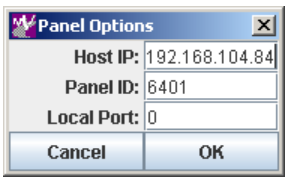
The instructions for assigning a panel ID to the virtual panel can be found in the virtual panel installer's guide that comes with the virtual panels. These are the general steps:

1 Launch the virtual panel. Usually you would double click the panel icon on your PC desktop.

2 Right-click anywhere in the black region of the virtual panel window. A context menu appears:

If the panel is connected to the NV9000, the 'Disconnect' button will be enabled and you should click 'Disconnect'.

3 Again right-click anywhere in the black region of the virtual panel window. The context menu appears. Click 'Set Parameters'. The 'Panel Options' dialog appears:



4 (If you have not done so) enter the IP address of the system controller with which your panel is to communicate.

5 Then enter the panel's ID in the 'Panel ID' field. Click 'OK'.

6 Once more, right-click anywhere in the black region of the virtual panel window. The context menu appears.

The 'Connect' button will be enabled and you should click 'Connect'.

If there is an NV9000 configuration for the panel, the panel will start functioning as it was configured. If there is no configuration, the panel will remain idle (dark) but connected.

The users in your facility must have a unique panel ID for every virtual panel they use, across all PCs. The panel IDs for virtual panels must not collide with the panel IDs for physical panels.

The implication is that users cannot just launch a virtual panel and expect it to work. A panel ID must be created in NV9000-SE Utilities for the virtual panel and the configuration for the system controller must be updated with the panel IDs assigned to the virtual panels throughout your system.

Software Panels

There are two software panels available:

- EC9700 — a "control" GUI. This GUI was designed to be functionally equivalent to the NV9601. In actuality, it lacks some of the features of the NV9601.
- EC9710 — a "status" GUI. This GUI shows the sources taken to selected destinations.

Software panels reside on users' PCs and communicate with the system controller through the PCs' IP addresses.

They are inconvenient to install but require no panel IDs and they cost nothing because they are bundled with the NV9000 software.

▲ There are no current EC9700 or EC9710 manuals.

First, obtain the software installer (currently, `SV0269-06.msi`) from Grass Valley customer support or copy the installer from the file system of your system controller.

Obtain the Installer

Follow these steps to get the software from the system controller:

1 Login to the system controller.

This will require are keyboard, monitor, and mouse (or pointing device) connected to the appropriate ports of your system controller.

▲ There are other ways to access the file system of the system controller, such as remote login. But this is the method that is most reliable and requires the least discussion.

2 Navigate the file system to this folder:
`C:\nvision\envy\install\client\`

3 Copy the file `SV0269-06.msi` from that folder to a USB device.

4 Properly eject and remove the USB device.

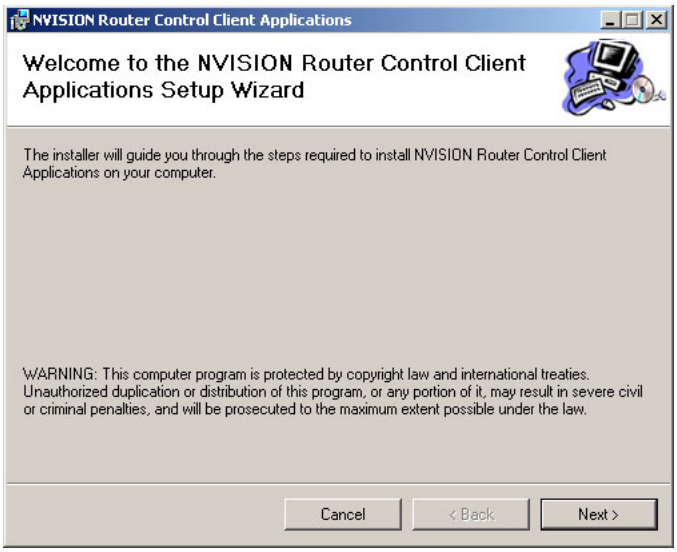
Install the GUIs

Follow these steps to install the software panels on a PC:

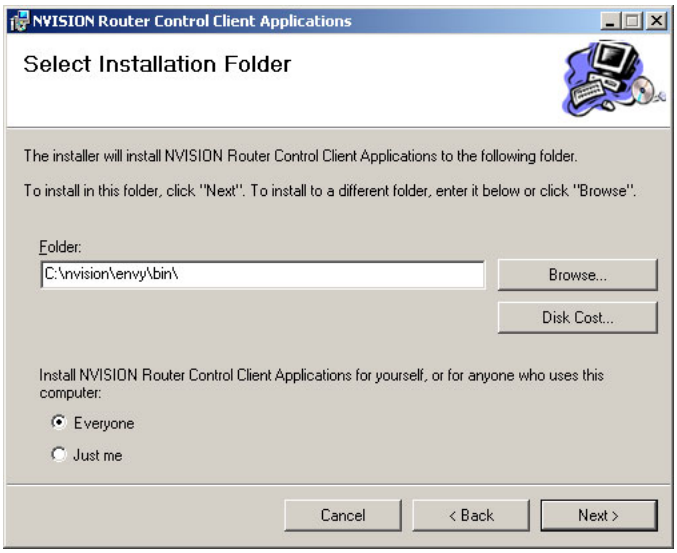
1 Know the IP address(es) of the system controller with which your software panels will communicate.

2 Insert the USB device with the installer in a USB slot of the PC. (Optionally copy the installer to the PC's file system.)

3 Double click the installer icon. The first screen of the installer appears:

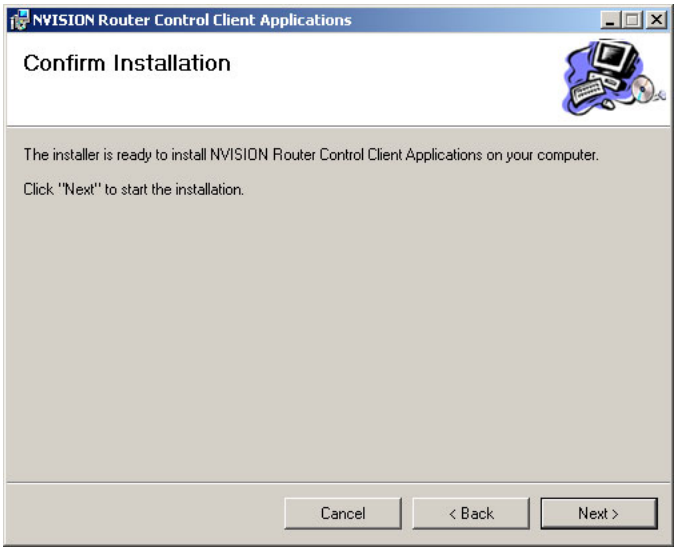


4 Click 'Next' to continue. The next screen appears:



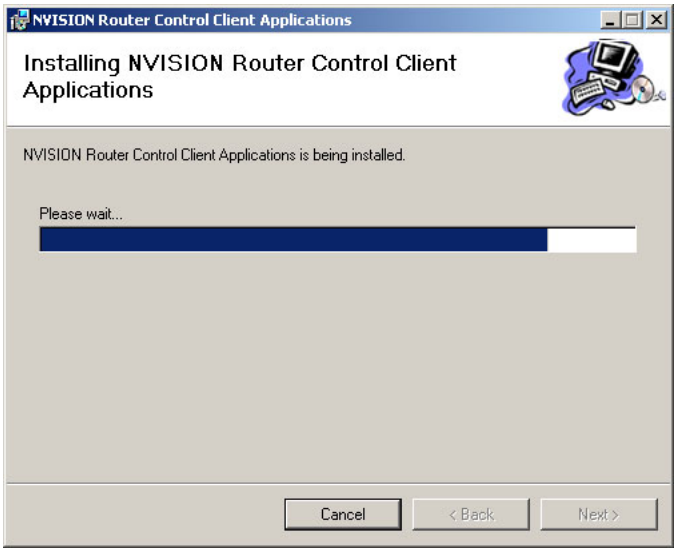
Change the pathname of the installation folder if necessary. Select the 'Everyone' radio button. Then, click 'Next' to continue.

5 The next screen appears:



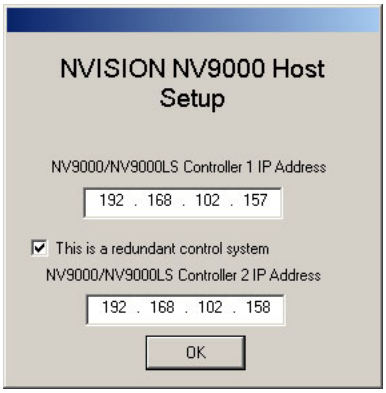
Click 'Next' to confirm that you want the installation to begin.

6 The next screen appears:



This screen displays a progress indicator. You will also see queries about your installation.

The first asks for the IP address(es) of your system controller:

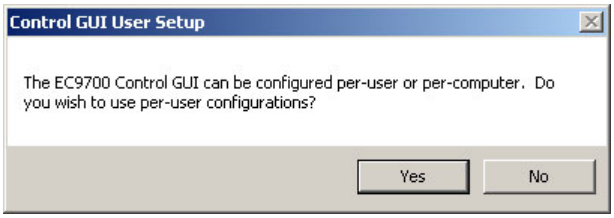


If your system is redundant, check the check box and enter the IP address of the second system controller.

The second asks whether you want to restrict the EC9700 to one running instance:

Respond as you wish, yes or no. (Without this restriction, the user at this PC can run multiple instances of the EC9700 GUI.)

The third asks whether you want to configure the EC9700 “per-user” or “per-computer”:



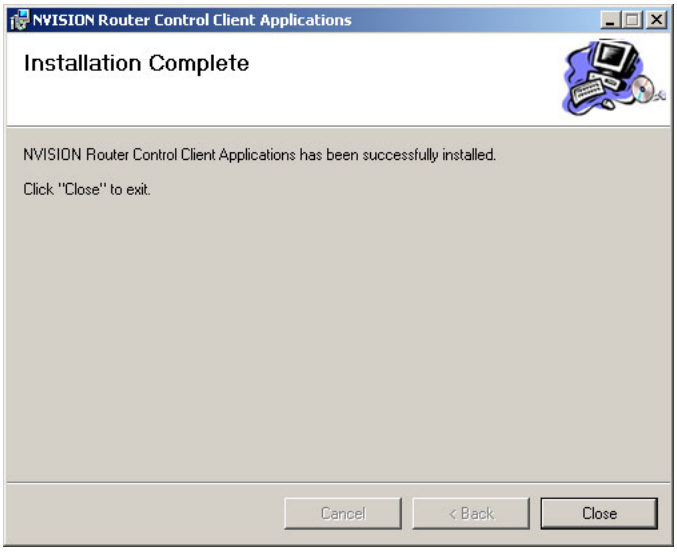
When you configure the GUI(s) in NV9000-SE Utilities, you must provide either (1) the computer name of the PC on which the GUI will run or (2) a Windows user name for the person who will operate the GUI.

If you choose “per-user” in this dialog, you must configure the GUI with a valid Windows user name in NV9000-SE Utilities.

If you choose “per-computer” in this dialog, you must configure the GUI with the PC’s computer name.

This requirement will be the case on every PC on which you install the GUIs.

7 The completion screen appears:



Click 'Close' to dismiss the installer.

The installer places shortcuts for the software under 'Programs' in the Windows 'Start' menu, in an NVISION folder. The entries are

'EC9700 Router Control'
'EC9710 Router Status'.

You might wish to copy these shortcuts to the PC's desktop.

Add the GUIs to Your NV9000 Configuration

Finally, add the GUI(s) you installed to the NV9000 configuration:

1 If you have installed the GUIs "per-computer," get the PC's computer name. Either

Right-click the computer icon on the PC's desktop and choose 'Properties' from the context menu that appears.

or,

Go to the 'System' control panel.

Read the computer name from the display:

2 If you have installed the GUIs "per-user," get the user's Windows user name.

3 Go to the 'Add SW Panels' page.

You may add the EC9700, the EC9710, or both.

4 (If desired) add the EC9700 for this user's PC.

   Choose EC9700 as the panel type, and fill in the other entries, including the computer name from step 1 or the user name from step 2.

   Click 'Finish' to complete the addition of the GUI to the configuration without displaying the GUI's configuration page. (You must later configure the EC9700 details.)

5 (If desired) Add the EC9710 for this user's PC.

   Choose EC9710 as the panel type, and fill in the other entries, including the computer name from step 1 or the user name from step 2.

   Click 'Finish' to complete the addition of the GUI to the configuration without displaying the GUI's configuration page. (You must later configure the EC9710 details.)

6 Repeat these steps for GUIs you installed on other PCs.

Panels under the System Management Pane

The panels in use are displayed under the 'System Management' pane. See Control Panels Page, on page 82 for more information.

Panel Features

All NV9000 control panels, including software panels, share some common features. Following is a description of some of those features.

Buttons

Some panels have backlit buttons. Generally those are 0.5" square, and appear in two or three colors, green, amber and sometimes red. These buttons can be bright (high-tally), dim (low-tally) or off.

The backlit buttons have clear plastic caps under which you can insert a plastic button legend.

Generally, green represents a source or a source function and amber represents a destination or a destination function. However, amber and green can represent other functions too.

Some panels, in particular the newer panels such as the NV9640, have LCD buttons. These are larger buttons with LCDs built into their face. Because the LCDs are 64x32 pixel matrices, the buttons are dynamically re-legendable and show up to 3 lines of 8 characters. The LCD buttons can appear in 7 colors, red, green, blue, purple, amber, yellow, or grey, and in 3 levels: high-tally, low-tally, and off.

The buttons of virtual panels emulate the buttons of the matching hardware panels. These buttons all use color and have dynamic legends.

Displays

Some hardware panels have alphanumeric displays — some larger, some small. Some panels have no display.

The larger displays have 8 lines of 42 characters. The smaller displays have 4 lines of text. Some other panels have limited display capability: from one to four 8-character LED readouts. Still other panels emulate a display on their LCD buttons.

This is a summary:

Panel	Display	Buttons
NV9601	8×42 VFD	Backlit (0.5 in)
NV9602	2 LED readouts	Backlit (0.5 in)
NV9603A	3 LED readouts	Backlit (0.5 in)
NV9604	none	Backlit (0.5 in)
NV9605	3 LED readouts	Backlit (0.5 in)
NV9606	none	Backlit (0.3 in)
NV9607	8×42 or 4×42 VFD	Backlit (0.3 in)
NV9608	emulated	Mixed LCD and backlit buttons
NV9609	4 LED readouts	Backlit (0.5 in)
NV9616	emulated	Mixed LCD and backlit buttons
NV9640	8×42 VFD	LCD
NV9640A	8×42 VFD	LCD
NV9641	none	LCD
NV9641A	none	LCD
NV9642	4×22 VFD	LCD
NV9646	emulated	LCD
NV9647V	4×22 virtual	virtual
NV9648	3 LED readouts	LCD
NV9649	4 LED readouts	LCD
NV9654	emulated	LCD

Virtual Level Groups

Certain panels support the use of level groups. See 'Virtual Level Groups' Table, on page 130.

Those panels are

NV9601	NV9608	NV9616	NV9640	NV9640A
NV9641	NV9641A	NV9642	NV9647V	

The software panels do not support virtual level groups.

Name Sets

Some panels support name sets. These are the panels that do:

NV9601	NV9602	NV9603	NV9605	NV9607
NV9608	NV9609	NV9616	NV9640	NV9640A
NV9641	NV9641A	NV9642	NV9646	NV9647V
NV9648	NV9649	NV9654		

Notes:

The NV9648 allows a name set in 2 behavioral models, but has no 'Name Set Toggle' button.

The NV9649 allows a name set and has a 'Name Set Toggle' button in 2 behavioral models.

For these panels, the display fields can show either names from a name set or system mnemonics for devices depending on (1) the state of the 'Name Set Toggle' button (if the panel has one), (2) the default name set, and (3) the existence of name sets in the NV9000 configuration. (An "alias" is a name defined in a name set.)

An NV9000 can have many name sets. See Edit Name Sets, on page 93.

The software panels do not support name sets.

Modes and Behavioral Models

Most panels can operate in different modes. Usually, the mode can be selected by the operator. Some panels can be configured according to certain "behavioral models" and these behavioral models are quite distinct. For these panels, the operator cannot choose a behavioral model.

In addition, some panels have several secondary modes, such as salvo mode or menu mode, that can be used on occasion.

Most panels enter *setup mode* when their Ethernet port is disconnected. It is in setup mode that you can set panel IDs and perform certain diagnostics. Not all panels have a setup mode. Please refer to the specific control panel's user guide for information about setup mode.

Principle Modes

There are 3 principle modes:

- X-Y mode — individual control of all router *levels*. Operators choose a destination, optionally choose desired breakaway levels, choose a source, and press 'Take' to complete a desired route.

  Some panels have a "limited X-Y mode."
- Multi-destination mode — lets you route to multiple destinations. Typically, operators select a destination, choose a source, and repeat for all desired routes, then press 'Take'. Takes are "all level," and breakaways cannot be performed.

  ▲ A 'Hold' button, if available, allows you to select many MD destinations at once.
- Single-destination mode.

  The NV9602 and NV9607 provide "single destination" mode, wherein the panel's destination is configured as the default destination and there are no destination buttons. Takes are performed on all levels.

  These panels also support a "single-destination with breakaway" mode. See the user's guide for more information.

  For other panels, "single-destination" mode is not a distinct mode, but it can be simulated on the panel. It can be combined with the other two modes.

Secondary Modes

Not all panels provide these modes. The secondary modes of panel operation are:

- Setup mode — where the panel is freshly powered up, but disconnected from the network. In this mode, you can preset the panel's panel ID and perform a few diagnostic tasks.
- Salvo mode — the operator presses a Salvo button to enter salvo mode where the display lists both system salvos and local salvos. The operator may select a salvo and then the 'Take' button to execute a salvo.
- Menu mode — pressing a Menu button places the panel in "menu" mode. In menu mode, the display, or alternatively, the LCD button array becomes a menu. (The menu provides a small set of diagnostic and other functions.)
- Hold 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 destinations. If hold is still on when you press 'Take', the selected destinations remain selected.

  Without hold enabled, the MD desinations become unselected after an MD take.

  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.
- 'Save Preset' mode — whatever is on preset is retained on preset after a take. Otherwise, whatever is on preset is discarded after a take.
- Information mode — pressing an 'Information' button (when there is information to display) places the panel in "information" mode. In information mode, the display reports information such as level mappings.
- (For the NV9601 and some other panels) scroll mode — when the operator presses a 'Scroll' button, scroll mode becomes active and the operator may scroll through lists of devices for a category (during category device selection).
- Level mode (which exists only for the NV9609 and the NV9649 when it is in NV9609 mode.)

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

  When the panel is ***not*** in level mode, takes occur on either all levels or selected levels of the current destination.

  If the panel has multiple 'Level' buttons, operators can perform multiple-level breakaway.
- (For the NV9654 only) 'All Buttons' mode vs 'Display and Buttons' mode. When the panel is in 'Display and Buttons' mode, the leftmost 15 buttons (a 5×3 array) function as a display. When the panel is in 'All Buttons' mode, they do not.

Behavioral Models

The NV9641 has two behavioral models:

- LCD XY/MD. Under this model, the panel has a tree-structured button layout.

- Paging. In this model, the panel supports a *list* of button pages through which the operator can scroll.

The NV9649 provides 3 behavioral models:

- 'Panel Server'

  Under the "server" model, the panel operates in conjunction with a number of NV9648s. The NV9649 is the "server" and the NV9648s are the "clients."

- 'NV9609 Panel'

  When the panel is in "NV9609" mode, it functions exactly like an NV9609 (but with LCD buttons). In this mode, the panel operates standalone, without regard to any NV9648s.

- 'LCD XY/MD'

  Under the LCD XY/MD model, the panel operates standalone, without regard to any NV9648s, and has a moderately richer function set than under the other two models.

The NV9648 also provides 3 behavioral models:

- 'Panel Client'

  Under the "client" model, the panel operates in conjunction with an NV9649 and other NV9648s. The NV9649 is the "server" and the NV9648s are the "clients."

- 'Panel Standalone' Mode

  Under the "standalone" model, the panel functions much the way it does under the "client" model, but it does not require the presence of an NV9649 and has a few added button function types, in particular a destination section button.

- 'LCD XY/MD'

  Under the LCD XY/MD model, the panel also operates standalone, not requiring the presence of an NV9649, and has a moderately richer function set.

Menus

Most panels have menus that are become active when the operator presses a 'Menu' button.

Menu functions typically include:

- Viewing the panel's software versions
- Viewing the user ID
- Setting the panel ID
- Changing button illumination

Machine Control

Most, if not all, panels support machine control. Support for machine control routing includes:

- 'Source is Master' button and 'Source is Master default' panel option.

  For certain machine control routes, either the source is the master and the destination is the slave or the source is the slave and the destination is the master. The button toggles the state; the panel option allows the panel to start up in the appropriate state.

- Broadcast button (and broadcast mode)

  In broadcast mode, machine control signals are sent to multiple receiving devices.

- "Data routing" modes

  ("Data routing" means machine control routing in the language of NV9000-SE Utilities.)

  There are 3 data routing modes:

  - Automatic. If a machine control 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.
  - Semi-automatic (recommended). If the control port is in use for the source or destination device, the system takes all selected levels *except machine control* and allows the operator to perform the machine control level route by pressing 'Take' a second time.

    ▲ Semi-automatic mode is not an option in multi-destination mode.
  - Manual. If the control port is in use for the source or destination device, the system takes all selected levels except machine control. It does not perform the machine control level route.

This is a summary of support for machine control:

Panel	B'Cast Button	Src is Master	Data Routing Modes
NV9601	Y	Y	Y
NV9602	Y	Y	Y
NV9603A	Y	Y	Y
NV9604	N	N	N
NV9605	Y	Y	Y
NV9606	N	N	N
NV9607	Y	Y	Y
NV9608	Y	Y	Y
NV9609	Y	Y	Y
NV9616	Y	Y	Y
NV9640, NV9640A	Y	Y	Y
NV9641, NV9641A	Y	Y	Y
(XY/MD)	Y	Y	Y
(paging)	N	option yes, button no	N
NV9642	Y	Y	Y
NV9647V	Y	Y	Y
NV9648			
(XY/MD)	N	N	Y
(client)	N	N	N
(standalone)	N	N	N
NV9649			
(XY/MD)	Y	Y	Y
(server)	Y [2]	option yes, button no	N
(NV9609)	Y	Y	N

2. This is a bug.

NV9654	Y	Y	Y
EC9700	Y	Y	Y

GPIO

Some panels have a tally interface, a.k.a. a GPIO interface.

At the rear of those panels 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 panel behavior that depends on the tally inputs.

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

The tally interface, also called a GPIO interface, is labeled a "GPI interface." on the rear of the panel.

The NV9575-VF (not an actual panel) has only GPIO connectors. Although not a control panel, it is configured as if it were. It has 64 relay outputs and 32 optically isolated inputs.

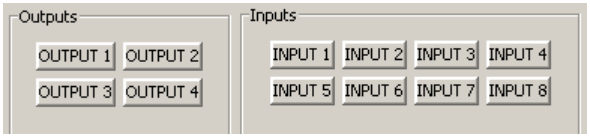
The actual control panels that support GPIO have 4 relay outputs and 8 optically isolated inputs. These are the panels:

NV9605 NV9606 NV9607 NV9609 NV9646

NV9649 (under NV9609 model)

The GPIO Section of the Panel Configuration Page

The panel configuration page provides a GPIO section, below the tree window:

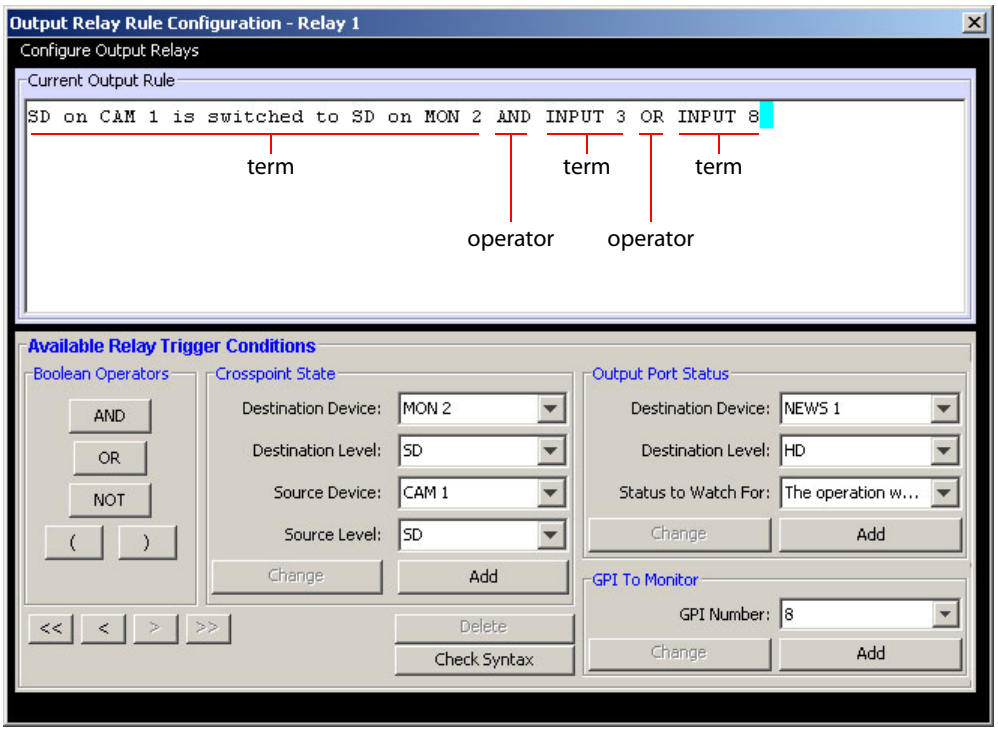


Click on a button under 'Outputs' to configure one of the 4 tally outputs or click on a button under 'Inputs' to configure one of the 8 tally inputs.

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

Configuring Outputs

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

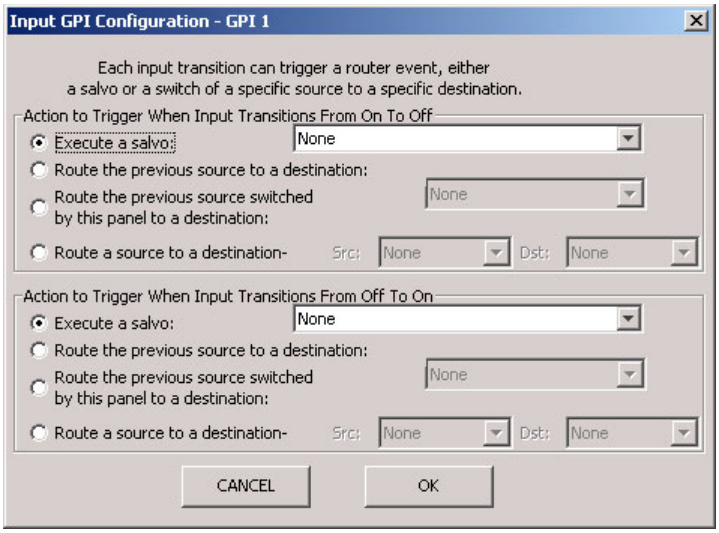


In this dialog, you create a Boolean expression involving sources destinations, port status, and GPI (input) status. When the conditions of the Boolean expression are met (i.e., the expression is "true") the relay closes. When the conditions are not met, the relay opens. The illustration shows one such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

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

Configuring Inputs

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



[The dialog is different for the NV9575-VF.)

An event is signalled when a transition occurs on the input from on to off or from off to on. You can configure the panel 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.
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.
3 Route the "previous source" switched by ***this*** panel to a destination, even if it is the same as the current source.
4 Route a source to a destination.

GPIO Summary

The NV9609 has 4 relays that can switch on or off your external devices, based on (1) the panel's 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 panel can respond with one of 4 actions, such as executing a salvo. (It is the control system that actually executes the salvo.)

Salvos

A *salvo* is a predefined and stored sequence of router control system commands.

Most panels support system salvos. System salvos are defined in NV9000-SE Utilities as part of a configuration.

A few panels also support local salvos. Local salvos are defined by a panel operator, at a panel, by recording panel operations.

In an NV9000 configuration, you can also create salvo lists. Some panels require the operator to select a salvo from a designated salvo list.

Some panels execute a salvo immediately and directly when the operator presses a salvo button. Some panels enter salvo mode when operators press a salvo button. In salvo mode, the operator can browse for salvos, and record local salvos.

Those panels that use a salvo list allow the user to scroll through the salvo list to find the desired salvo. A salvo list does not include local salvos, only system salvos.

See Salvos, on page 481 for more information on salvos.

This is a summary of the panels with respect to salvos:

Panel	Method	Local Salvos	Uses Salvo List
NV9601	Salvo mode	Yes	
NV9602	Direct		
NV9603A	Salvo list		Yes
NV9604	Direct		
NV9605	Direct		
NV9606	Direct		
NV9607	Direct		
NV9608	Salvo mode	Yes	
NV9609	Salvo list		Yes
NV9616	Salvo mode	Yes	
NV9640, NV9640A	Direct		
NV9641, NV9641A			
(XY/MD)	Direct		
(paging)	Direct		
NV9642	Direct		
NV9646	Direct		
NV9647V	Direct		
NV9648			
(XY/MD)	Direct		
(client)	No salvos		
(standalone)	Direct		
NV9649			
(XY/MD)	Direct		
(server)	Salvo list		
(NV9609)	Salvo list		
NV9654	Direct		
EC9700	Salvo mode	Yes	

Tree-Structured Button Layouts

Some panels have tree-structured button layouts. These are the panels that do:

NV9640	NV9640A	NV9641	NV9641A
NV9642	NV9646	NV9647	NV9654
NV9648 (under the XY/MD model)		NV9649 (under the XY/MD model)	

These are panels that have LCD buttons, which are re-legendable.

"Tree-structured" means that the configurer can define a number of linked "button pages." When the operator presses certain buttons (such as a 'Navigate' button), the panel software causes the functions of the linked button page to appear on the buttons. Because pages and links can be nested, arbitrarily large sets of linked button pages can be defined. (The graph of the structure of pages is called a "tree.")

Button Layout Templates

For these panels, you can also define suffix and global navigate *templates*.

A suffix template is a "page" of buttons — intended to contain a matrix of suffix buttons — that can be referenced as a page in one or more panel configurations.

A global navigation template is also a "page" of buttons — not very different from any normal button page — that can be referenced as a page in one or more panel configurations.

▲ Configurers please note that if you change a suffix template or global navigation template, you must actively force the changes to propagate back to the panel configurations that use them. Refer to the individual user's guides for details.

Selection Buttons

Some panels have "selection" buttons. These are the panels that do:

NV9601	NV9640	NV9640A	NV9641
NV9641A	NV9642	NV9646	NV9647V
NV9648 (under the XY/MD model)		NV9649 (under the XY/MD model)	
NV9654			

The NV9601 is unique among these panels. Its selection buttons are fixed in number and position, backlit and not re-legendable, and function differently from selection buttons on the other panels listed above (all of which have re-legendable buttons).

NV9601 Selection Buttons

Beneath the display are 8 backlit selection buttons. The 8 buttons correspond to the 8 lines of the display. Each button selects the item on the corresponding line.

The NV9601's selection buttons are dedicated buttons; they are not configurable.

Selection buttons support *level selection* in XY mode and *MD device selection* in multi-destination mode. Operators can scroll through multiple pages of levels in X-Y mode and through multiple pages of devices in MD mode. The operator makes selections from — and add to selections — whatever appears on the display at any given time.

Selection buttons also allow operators to select menus when the panel is in menu mode (or in setup mode) and to select salvos when the panel is in salvo mode.

LCD Selection Buttons

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

The LCD selection buttons (of the NV640, etc.) do not necessarily correspond to any displayed information.

When the panel is in XY mode, a set of selection buttons presents a set of virtual levels for the selected destination device. If there are more levels than selection buttons, the 'Page Up' and 'Page Down' buttons activate and the operator can scroll through the level list.

When the panel is in MD mode, a set of selection buttons presents a set of MD devices. If there are more destinations than selection buttons, the 'Page Up' and 'Page Down' buttons activate and the operator can scroll through the destinations.

MD Destinations

Note that MD destinations are defined in panel configurations, not in the general configuration. The setup of MD destinations is applicable on an individual panels basis.

Further, each MD destination has two options:

- 'User Definable'

  When an MD destination is "user definable, the operator may choose a different destination using the panel buttons.
- 'User Selectable'

  When an MD destination is "user selectable," the operator may select it and take sources to it. Otherwise, the operator can see it but cannot use it.

  You can also just to leave a destination out of the MD list if you do not want the operator to use it.

Configuration Pages and Tables

These are the pages under the 'Configuration' pane for devices and categories:

- Control Panels Page
- EC9700/EC9710 Page

These are the pages under the 'Tasks' pane:

- 'Add Control Panel' Page
- 'Add SW Panel' Page

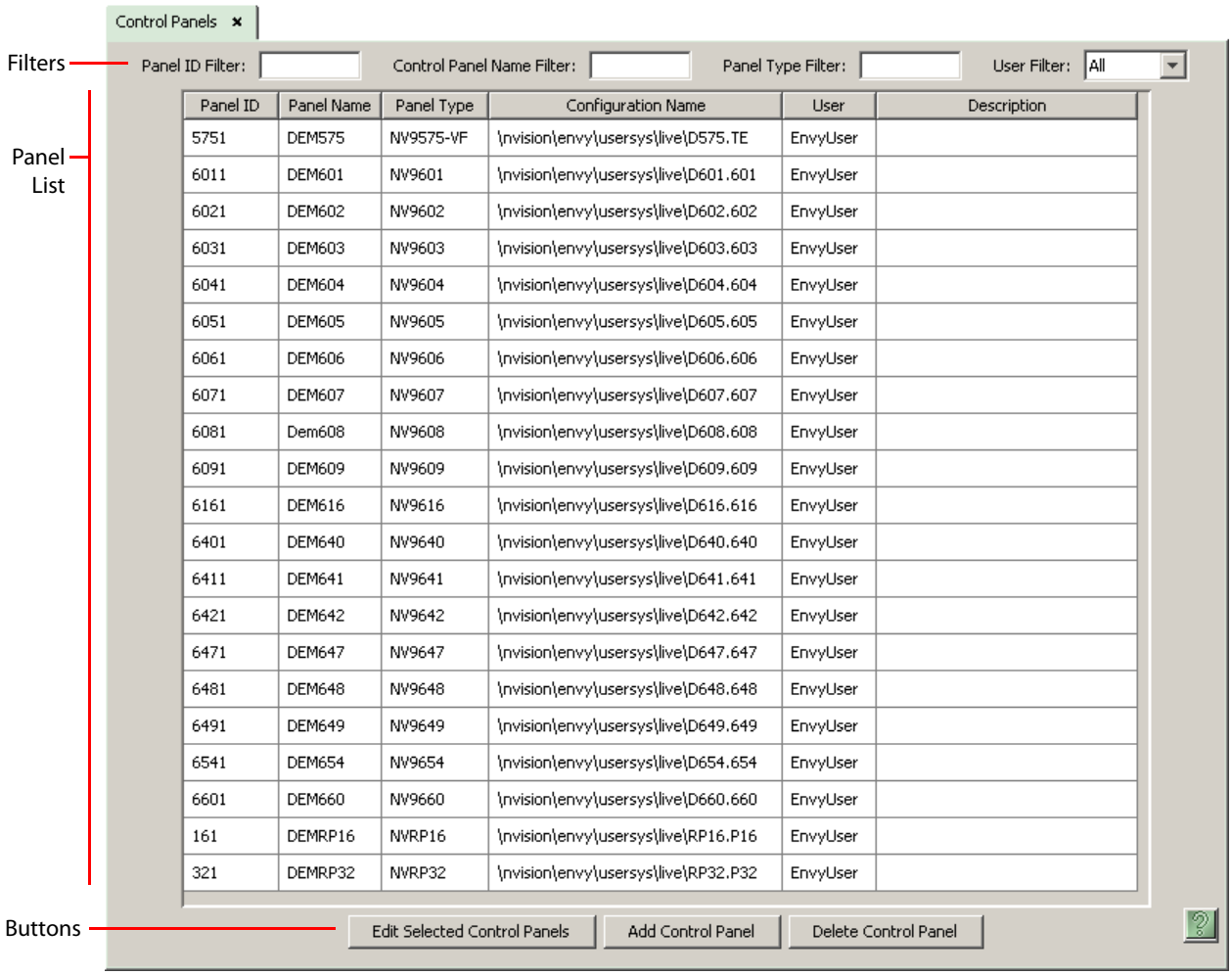
These are the tables under the 'Views' pane:

- Panels Table
- GUIs Table

These pages and tables are described in the following sections.

Control Panels Page

The 'Control Panels' page (under the 'Configuration' pane) lists all hardware (and virtual) control panels you have defined in your configuration. This is a typical 'Control Panels' page:



Panel ID	Panel Name	Panel Type	Configuration Name	User	Description
5751	DEM575	NV9575-VF	\nvision\envy\usersys\live\D575.TE	EnvyUser	
6011	DEM601	NV9601	\nvision\envy\usersys\live\D601.601	EnvyUser	
6021	DEM602	NV9602	\nvision\envy\usersys\live\D602.602	EnvyUser	
6031	DEM603	NV9603	\nvision\envy\usersys\live\D603.603	EnvyUser	
6041	DEM604	NV9604	\nvision\envy\usersys\live\D604.604	EnvyUser	
6051	DEM605	NV9605	\nvision\envy\usersys\live\D605.605	EnvyUser	
6061	DEM606	NV9606	\nvision\envy\usersys\live\D606.606	EnvyUser	
6071	DEM607	NV9607	\nvision\envy\usersys\live\D607.607	EnvyUser	
6081	Dem608	NV9608	\nvision\envy\usersys\live\D608.608	EnvyUser	
6091	DEM609	NV9609	\nvision\envy\usersys\live\D609.609	EnvyUser	
6161	DEM616	NV9616	\nvision\envy\usersys\live\D616.616	EnvyUser	
6401	DEM640	NV9640	\nvision\envy\usersys\live\D640.640	EnvyUser	
6411	DEM641	NV9641	\nvision\envy\usersys\live\D641.641	EnvyUser	
6421	DEM642	NV9642	\nvision\envy\usersys\live\D642.642	EnvyUser	
6471	DEM647	NV9647	\nvision\envy\usersys\live\D647.647	EnvyUser	
6481	DEM648	NV9648	\nvision\envy\usersys\live\D648.648	EnvyUser	
6491	DEM649	NV9649	\nvision\envy\usersys\live\D649.649	EnvyUser	
6541	DEM654	NV9654	\nvision\envy\usersys\live\D654.654	EnvyUser	
6601	DEM660	NV9660	\nvision\envy\usersys\live\D660.660	EnvyUser	
161	DEMRP16	NVRP16	\nvision\envy\usersys\live\RP16.P16	EnvyUser	
321	DEMRP32	NVRP32	\nvision\envy\usersys\live\RP32.P32	EnvyUser	

There are 3 sections in the page:

- Filters
- Panel List
- Buttons

Filters

At the top of the page are 4 filters:

- Panel ID Filter. If you enter text in this field, the list of panels is restricted to those panels whose panel IDs contain the text you entered. (Panel IDs are numbers.)
- Control Panel Name Filter. If you enter text in this field, the list of panels is restricted to those panels whose names contain the text you entered.

- Panel Type Filter. If you enter text in this field, the list of panels is restricted to those panels whose type fields contain the text you entered.
- User Filter. If you select a user name in the drop-down list of this field, the list of panels is restricted to those panels that are assigned to the user name selected.

Panel List

The panel list has 6 columns:

- Panel ID. These are the panel IDs that are assigned to each panel during configuration. Every panel in your system — hardware or virtual — must have a unique panel ID. (The software panels do not have panel IDs.)
- Panel Name. These are the names that are assigned to each panel during configuration.
- Panel Type. These are the types, chosen at configuration, of the panels in the list.
- Configuration Name. These fields give the pathnames of the panel configuration files in the NV9000 system controller's file system.
- User. These are the user names that are assigned to the panels in the list.
- Description. The description fields are free-form and their content is optional.

You can use click, shift-click, and control-click techniques to select any of the panels in the list.

Buttons

'Edit Selected Control Panels' Button

This button opens one or more control panel pages — one for each of the panels you have selected in the panel list. It is in a control panel page that you specify the details of a control panel.

Please refer to the various hardware panels described later in this chapter for information about the panels.

'Add Control Panel' Button

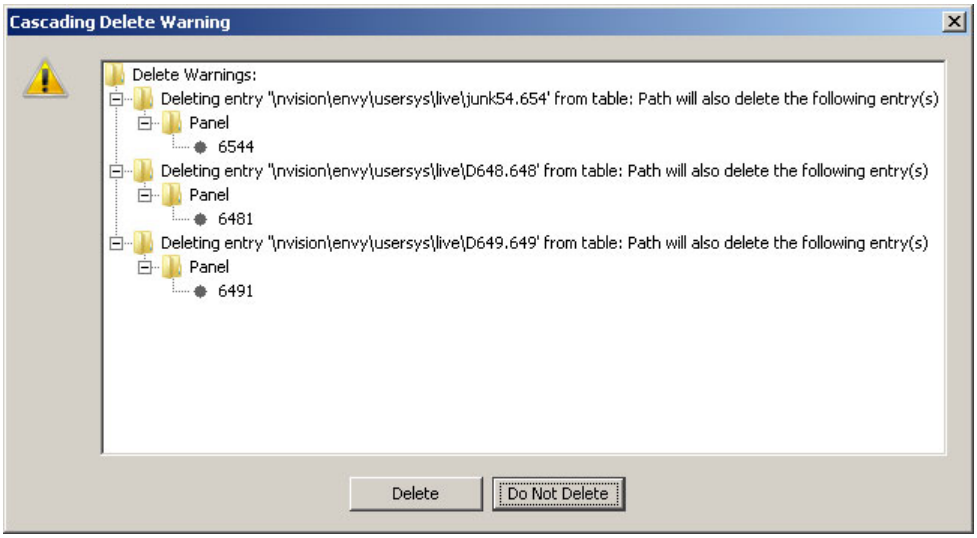
This button causes NV9000-SE Utilities to display the 'Add Control Panel' page. The 'Add Control Panel' page starts a control panel definition.

See 'Add Control Panel' Page, on page 206.

'Delete Control Panel' Button

This button deletes all the control panels you have selected in the panel list.

NV9000-SE Utilities presents a warning dialog before it deletes the panels:



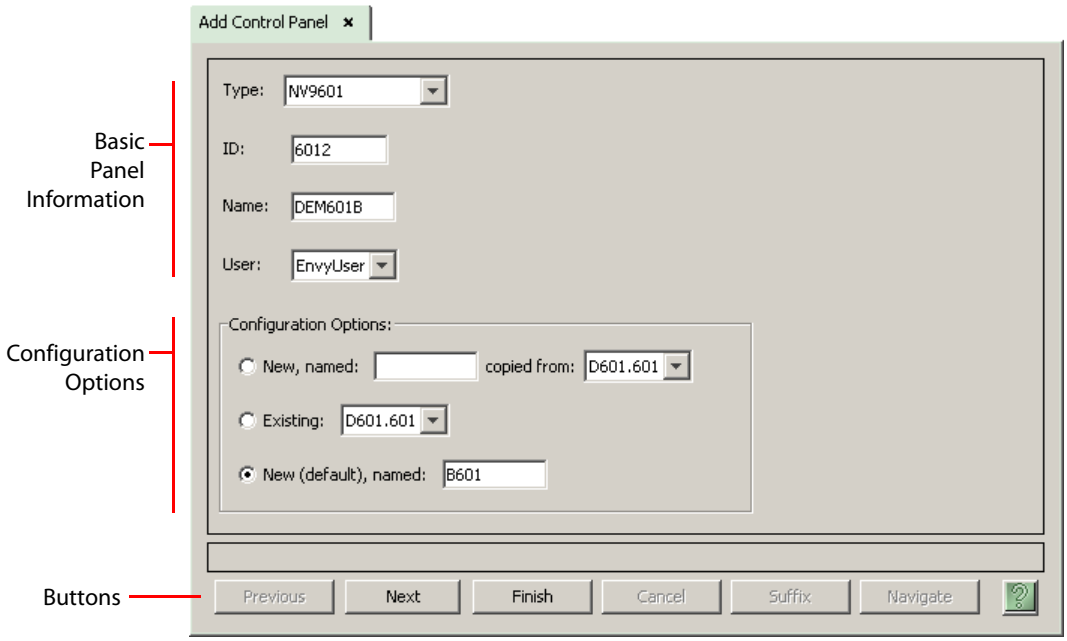
There is no undo: after the panels are deleted, you cannot retrieve them.

'Add Control Panel' Page

The 'Add Control Panel' page starts a series of steps, in multiple pages, in which you create a new hardware (or virtual) panel configuration. There are two ways to get the 'Add Control Panel' page:

- Click the 'Add Control Panel' button at the bottom of the 'Control Panels' page (of the 'Configuration' pane).
- Click 'Add Control Panel' in the 'Tasks' pane.

This is a sample of the page:



This page, as the start of a series, has 2 main sections, in addition to the buttons at the bottom:

- Basic Information. In this sections, you select the type of panel and provide a unique panel ID for the configuration you are about to define.
- Configuration Options. In this section, you specify whether the configuration you are creating is new or a copy of an existing configuration.

Buttons

At the bottom of the page are 6 buttons. Four of them allow you to move through the sequence of steps in panel definition:

- Previous
- Next
- Finish
- Cancel

The buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

The 'Suffix' and 'Navigate' buttons (at the right) allow you to create a suffix page or a "global navigation" page instead of a panel configuration. These buttons (and corresponding pages) are enabled only for certain panel types (e.g., the NV9640).

'Previous' Button

Click the 'Previous' button if you want to go to the previous page in the panel definition sequence.

'Next' Button

Click 'Next' to go to the panel's configuration page. In this page, you specify the details of the panel configuration.

'Finish' Button

Click 'Finish' to accept the panel thus far defined in the 'Add Control Panel' page.

The panel definition, as specified in the 'Add Control Panel' page is incomplete. You must later go to the panel configuration page to complete the definition.

This button allows you to create a number of panel definitions rapidly and complete them later.

After you click 'Finish', the 'Add Control Panel' page remains and is re-initialized for additional entries.

'Cancel' Button

Click 'Cancel' if you want to terminate the panel definition you started.

When you click 'Cancel', the 'Add Control Panel' page re-initializes for another entry.

‘Suffix’ and ‘Navigate’ Buttons

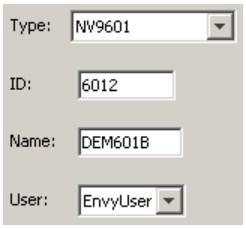
For certain hardware (or virtual) panels, you may create “suffix pages” and “global navigation” pages. Those panels are the NV9640, NV9641, NV9642, NV9647, and the NV9654. (These are the panels that have hierarchical button layouts — button “pages” — as well as LCD buttons.)

See Tree-Structured Button Layouts, on page 202

If you select one of those panel types in the ‘Add Control Panel’ page, you can create a “suffix page” or a “global navigation” page to be included in one or more panel configurations of that panel type.

Basic Information

There are 4 fields in the basic information section:



These are the basic information fields:

- Type

  Select a panel type in the drop-down list of the ‘Type’ field.

  (If you select NV9640, NV9641, NV9642, NV9647, or NV9654 as the panel type, you have the option of creating a suffix page or a global navigation page instead of a panel configuration. Use the ‘Suffix’ or ‘Navigate’ button at the bottom of the page.)

- ID

  In the ID field, enter a number for the panel’s ID.

  (You must enter a panel ID even if you are creating a suffix page or a global navigation page.)

  ▲ All panel IDs in an NV9000 configuration must be unique integers. If there are duplicate panel IDs, one or more of your panels that have that ID will not work. Exercise care when you are creating panels to keep all their IDs distinct.

- Name

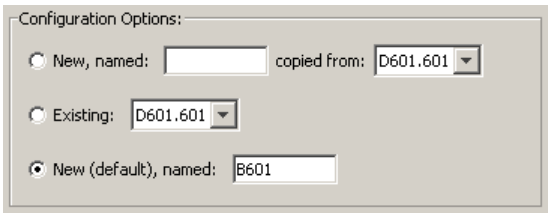
  Enter a name for the panel in the name field. The name appears only NV9000-SE Utilities and helps you distinguish one panel configuration from another. Otherwise, the name is not critical.

- User

  Choose a user name from the drop-down list of this field. (It is this user name that is reported when the panel’s operator locks or protects sources or destinations.)

Configuration Options

There are 3 configuration options:



Choose an option by clicking the radio button of the option. These are the options:

- New, named ‹*xxxx*› copied from ‹*xxxx*›.

  This option creates a configuration that is a copy of an existing configuration. A new configuration file is created.

  Enter a configuration file name in the text box. Choose an existing configuration file name in the drop-down list.

- Existing

  This option creates a configuration that is a copy of an existing configuration. No new configuration file is created. The existing configuration file is used by the original panel configuration and the new configuration.

  Choose an existing configuration file name in the drop-down list.

- New (default) named ‹*xxxx*›

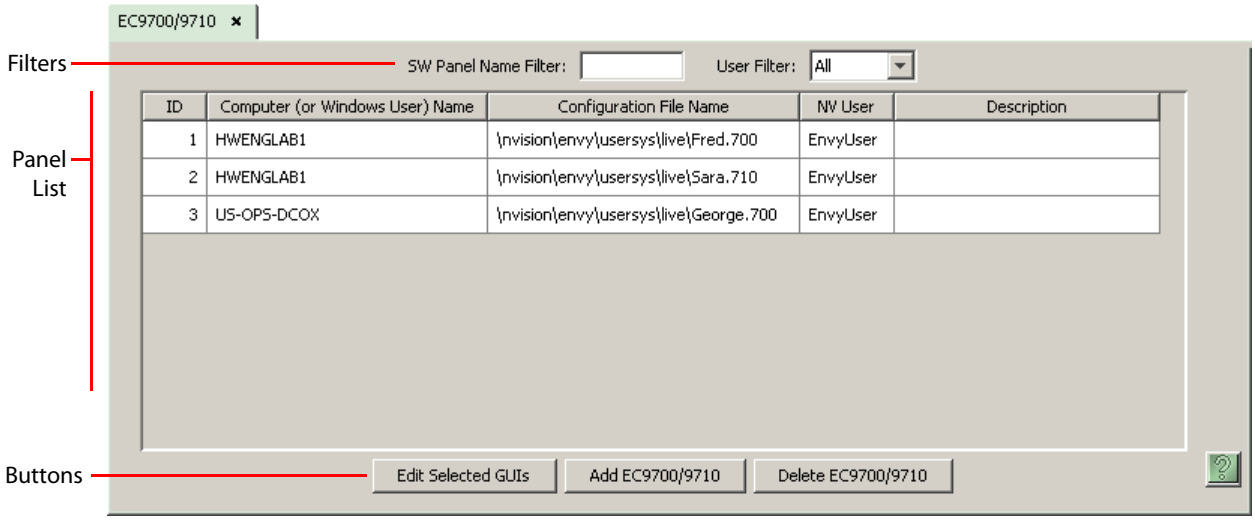
  This option creates a completely new (and empty) configuration.

  Enter a name for the panel in the name field.

The file name created as a result of your choice in this section has an extension that is based on the panel type. For example, the file extension for an NV9601 panel is `.601`.

EC9700/EC9710 Page

The 'EC9700/EC9710' page (under the 'Configuration' pane) lists all software control panels you have defined in your configuration. This is a sample 'EC9700/EC9710' page:



There are 3 sections in the page:

- Filters
- Panel List
- Buttons

Filters

At the top of the page are 2 filters:

- SW Panel Name Filter. If you enter text in this field, the list of panels is restricted to those panels whose names contain the text you entered
- User Filter. If you select a user name in the drop-down list of this field, the list of panels is restricted to those panels that are assigned to the NV9000 user name selected.

Panel List

The panel list has 5 columns:

- ID. These are the database IDs of the panels.
- Computer (or Windows User) Name.

  Represents either the computer name of the PC on which the GUI will run or the Windows user name of the user who will be operating the GUI.

  ▲ When the corresponding panel is installed, its installation option "per-user or per-computer" must match the setting you choose in this configuration.
- Configuration File Name. These fields give the pathnames of the panel configuration files in the NV9000 system controller's file system.
- NV User. These are the NV9000 user names that are assigned to the panels in the list.
- Description. The description fields are free-form and their content is optional.

You can use click, shift-click, and control-click techniques to select any of the panels in the list.

Buttons

'Edit Selected GUIs' Button

This button opens one or more SW panel pages — one for each of the panels you have selected in the panel list. It is in the SW panel page that you specify the details of the panel.

Please refer to the software panel descriptions later in this chapter for information about the panels.

'Add EC9700/EC9710' Button

This button causes NV9000-SE Utilities to display the 'Add SW Panel' page. The 'Add SW Panel' page starts a control panel definition.

See 'Add SW Panel' Page, on page 211.

'Delete EC9700/EC9710' Button

This button deletes all the panels you have selected in the list.

NV9000-SE Utilities presents a warning dialog before it deletes the panels:

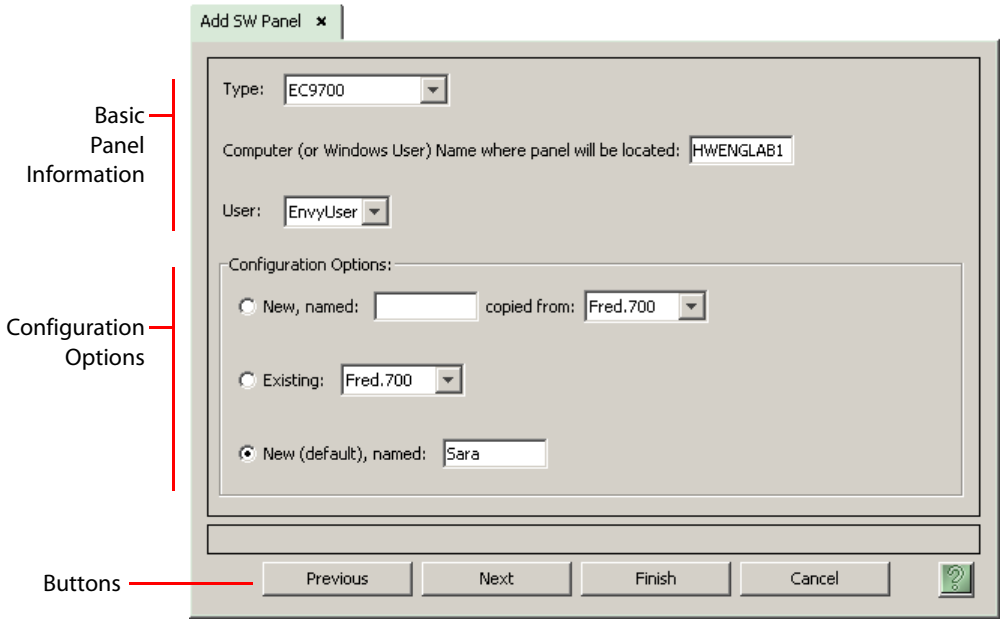
There is no undo: after the panels are deleted, you cannot retrieve them.

'Add SW Panel' Page

The 'Add SW Panel' page starts a series of steps, in multiple pages, in which you create a new software panel (i.e., GUI) configuration. There are two ways to get the 'Add SW Panel' page:

- Click the 'Add EC9700/EC9710' button at the bottom of the 'EC9700/EC9710' page (of the 'Configuration' pane).
- Click 'Add SW Panel' in the 'Tasks' pane.

This is a sample of the page:



This page, as the start of a series, has 2 sections:

- Basic Information. In this section, you select the type of panel and provide either a computer name or a Windows user name for the configuration you are about to define.
- Configuration Options. In this section, you specify how whether the configuration you are creating is new or a copy of an existing configuration.

Buttons

At the bottom of the page are 4 buttons that allow you to move through the sequence of steps in panel definition:

- Previous
- Next
- Finish
- Cancel

The buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

'Previous' Button

Click the 'Previous' button if you want to go to the previous page in the panel definition sequence.

'Next' Button

Click 'Next' to go to the panel configuration page. In this page, you specify the details of the software panel.

'Finish' Button

Click 'Finish' to accept the panel thus far defined in the 'Add SW Panel' page.

The panel definition, as specified in the 'Add SW Panel' page is incomplete. You must later go to the panel configuration page to complete the definition.

This button allows you to create a number of panel configurations rapidly and complete them later.

After you click 'Finish', the 'Add SW Panel' page remains and is re-initialized for additional entries.

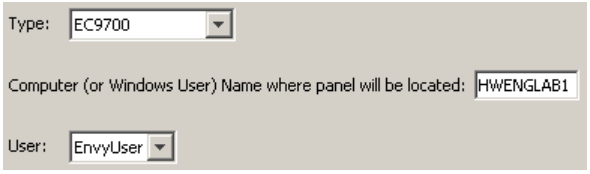
'Cancel' Button

Click 'Cancel' if you want to terminate the panel definition you started.

When you click 'Cancel', the 'Add SW Panel' page re-initializes for another entry.

Basic Information

There are 3 fields in the basic information section:



These are the basic information fields:

- Type

  Select a software panel type in the drop-down list of the 'Type' field.

- Computer (or Windows User) Name where panel will be located

  Examine system parameters of the Windows system of the PC on which the GUI that uses this configuration resides. Either obtain the system name or the Windows user name of the user that will use the panel. Enter either name in the text field.

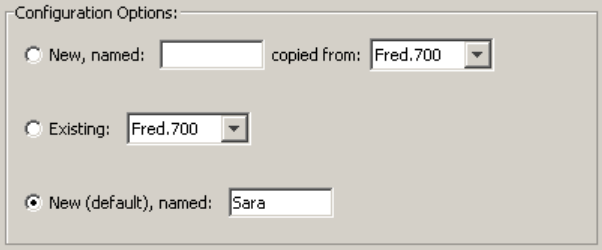
  ▲ When the corresponding panel is installed, its installation option "per-user or per-computer" must match the entry you choose in this configuration.

- User

  Choose a user name from the drop-down list of this field. (It is this user name that is reported when the panel's operator locks or protects sources or destinations.)

Configuration Options

There are 3 configuration options:



Choose an option by clicking the radio button of the option. These are the options:

- New, named ‹*xxxx*› copied from ‹*xxxx*›.

  This option creates a configuration that is a copy of an existing configuration. There is a new configuration file.

  Enter a configuration file name in the text box. Choose an existing configuration file name in the drop-down list.

- Existing

  This option creates a configuration that is a copy of an existing configuration. The configuration file is used by the original panel configuration and the copy.

  Choose an existing configuration file name in the drop-down list.

- New (default) named

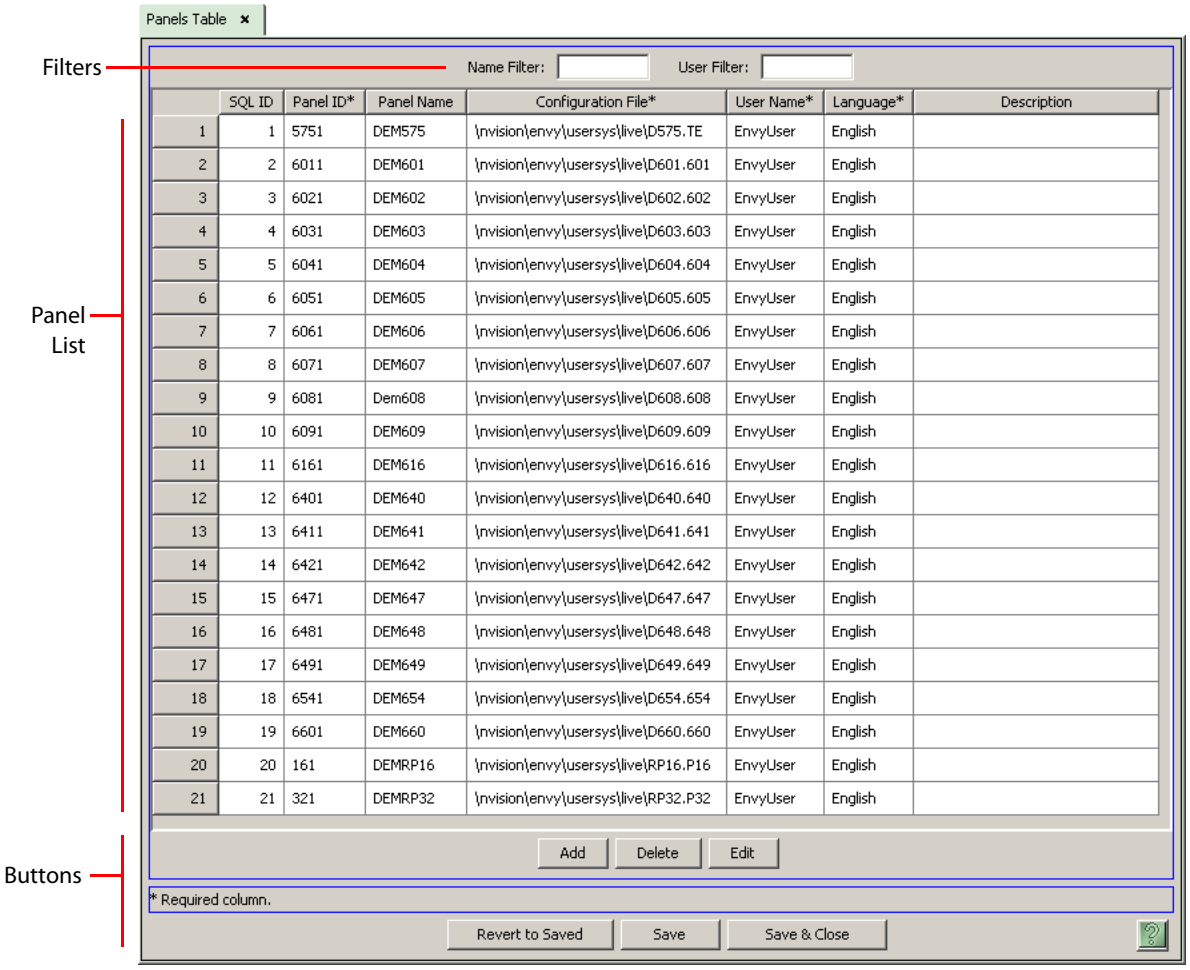
  This option creates a completely new (and empty) configuration.

  Enter a name for the panel in the name field.

The file name created as a result of your choice in this section has an extension that is based on the panel type. For example, the file extension for an EC9700 GUI is `.700`.

Panels Table

The 'Panels Table' is found under the 'Tables' portion of the 'Views' pane:



	SQL ID	Panel ID*	Panel Name	Configuration File*	User Name*	Language*	Description
1	1	5751	DEM575	\nvision\envy\usersys\live\D575.TE	EnvyUser	English	
2	2	6011	DEM601	\nvision\envy\usersys\live\D601.601	EnvyUser	English	
3	3	6021	DEM602	\nvision\envy\usersys\live\D602.602	EnvyUser	English	
4	4	6031	DEM603	\nvision\envy\usersys\live\D603.603	EnvyUser	English	
5	5	6041	DEM604	\nvision\envy\usersys\live\D604.604	EnvyUser	English	
6	6	6051	DEM605	\nvision\envy\usersys\live\D605.605	EnvyUser	English	
7	7	6061	DEM606	\nvision\envy\usersys\live\D606.606	EnvyUser	English	
8	8	6071	DEM607	\nvision\envy\usersys\live\D607.607	EnvyUser	English	
9	9	6081	Dem608	\nvision\envy\usersys\live\D608.608	EnvyUser	English	
10	10	6091	DEM609	\nvision\envy\usersys\live\D609.609	EnvyUser	English	
11	11	6161	DEM616	\nvision\envy\usersys\live\D616.616	EnvyUser	English	
12	12	6401	DEM640	\nvision\envy\usersys\live\D640.640	EnvyUser	English	
13	13	6411	DEM641	\nvision\envy\usersys\live\D641.641	EnvyUser	English	
14	14	6421	DEM642	\nvision\envy\usersys\live\D642.642	EnvyUser	English	
15	15	6471	DEM647	\nvision\envy\usersys\live\D647.647	EnvyUser	English	
16	16	6481	DEM648	\nvision\envy\usersys\live\D648.648	EnvyUser	English	
17	17	6491	DEM649	\nvision\envy\usersys\live\D649.649	EnvyUser	English	
18	18	6541	DEM654	\nvision\envy\usersys\live\D654.654	EnvyUser	English	
19	19	6601	DEM660	\nvision\envy\usersys\live\D660.660	EnvyUser	English	
20	20	161	DEMRP16	\nvision\envy\usersys\live\RP16.P16	EnvyUser	English	
21	21	321	DEMRP32	\nvision\envy\usersys\live\RP32.P32	EnvyUser	English	

The 'Panels Table' lists all hardware (and virtual) panels defined in your configuration (subject to the filters).

Filters

At the top of the page are two filters:

- Name filter.

  If you enter text in this field, the list of panels is restricted to those panels whose names contain the text you entered.

- User filter.

  If you enter text in this field, the list of panels is restricted to those panels assigned to users whose names contain the text you entered.

Buttons

At the bottom of the page are 6 buttons:

- Add

  Click 'Add' to add a panel to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can enter a name for the panel and other data.

  When you add a panel in this page, its configuration file must be a copy of an existing configuration file.

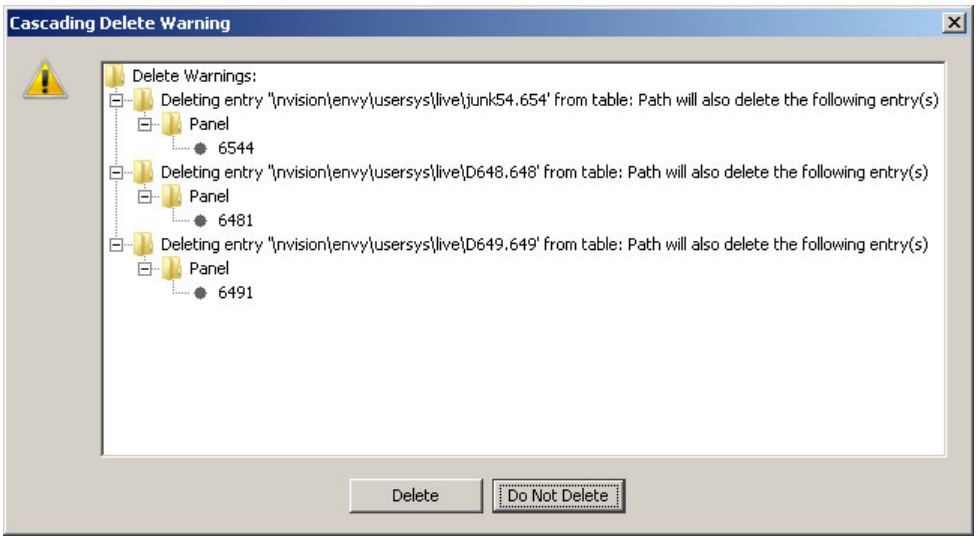
  (The ID is generated by NV9000-SE Utilities.)

- Delete

  Select one or more rows in the 'Devices' table and click 'Delete' to remove those panels from the table.

  NV9000-SE Utilities deletes a single entry immediately without any warning dialog.

  NV9000-SE Utilities removes multiple entries immediately from the displayed list, but does not actually delete the multiple entries until you save the table. It then presents a warning dialog:



- Edit

  Select one or more rows in the panels table and click 'Edit' to open a panel configuration page for each of the selected panels.

  Please refer to the descriptions of panel configuration pages later in this chapter for more information.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

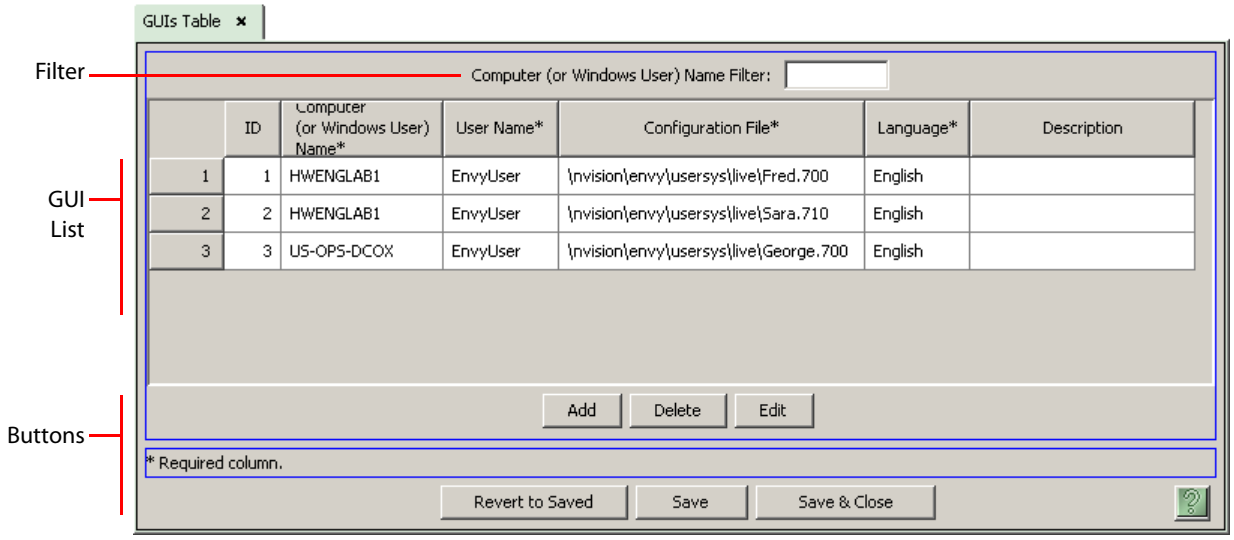
  Click 'Revert to Saved' to restore the saved list of panels, discarding any changes you have made (since the last save).

- Save & Close

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

GUIs Table

The 'GUIs Table' is found under the 'Tables' portion of the 'Views' pane:



The term "GUI" here means software panel.

The 'GUIs Table' lists all software panels defined in your configuration (subject to the filter).

The IDs are the data base IDs of the GUIs.

Filter

At the top of the page is one filter: 'Computer (or WIndows User) Name Filter'. If you enter text in this field, the list of panels is restricted to those GUIs whose 'Computer (or Windows User) Name' fields contain the text you entered.

Buttons

At the bottom of the page are 6 buttons:

- Add

  Click 'Add' to add a GUI to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can enter a name for the panel and other data.

  When you add a GUI in this page, its configuration file must be a copy of an existing configuration file.

  (The ID is generated by NV9000-SE Utilities.)

- Delete

  Select one or more rows in the 'Devices' table and click 'Delete' to remove those panels from the table.

  NV9000-SE Utilities deletes the entries immediately without any warning dialog.

- Edit

  Select one or more rows in the GUIs list and click 'Edit' to open a software panel configuration page for each of the selected GUIs.

See the description of the software panel configuration pages in this chapter for more information.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

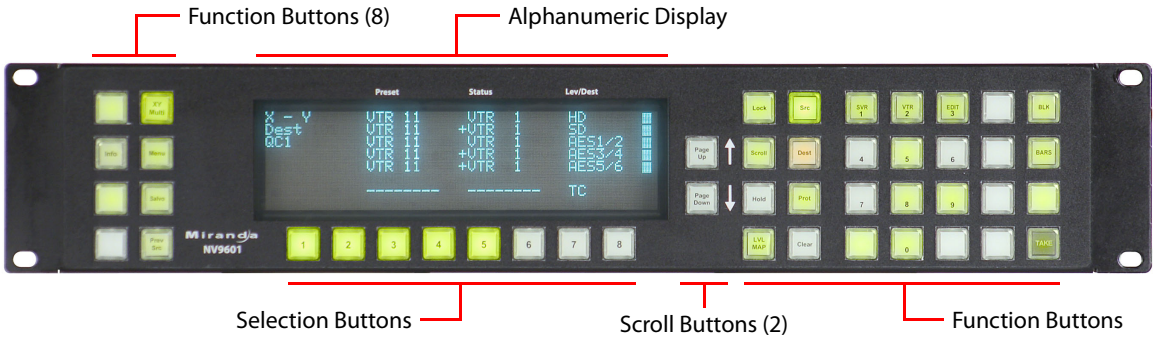
  Click 'Revert to Saved' to restore the saved list of GUIs, discarding any changes you have made (since the last save).
- Save & Close

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

NV9601

NV9601 Panel Description

The NV9601 is a 2RU control panel that has a large alphanumeric display, 36 function buttons, 8 selection buttons, and 2 scrolling buttons. The alphanumeric display has 8 lines of 42 characters. The 8 selection buttons correspond to the 8 lines of the display, the leftmost selection button corresponding to the top line and the rightmost button corresponding to the bottom line. Operators select what is displayed on the particular line with the matching button:



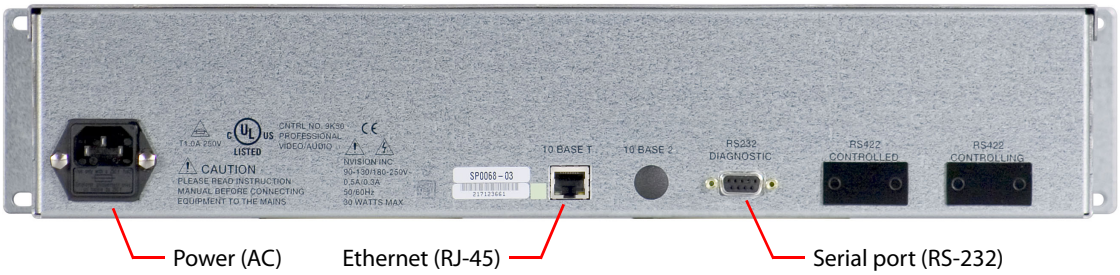
An equivalent virtual panel — the NV9601V — is available.

The panels can operate in one of 2 modes:

- X-Y mode.
- Multi-destination (MD) mode.

The panels can be configured so that either mode is selectable by the operator.

At the rear are power, serial, and network connectors:



Function Buttons

The NV9601 has 8 function buttons on the left and 28 function buttons on the right.

Function buttons either select sources and destinations or perform certain other functions such as locking a destination or switching to the menu.

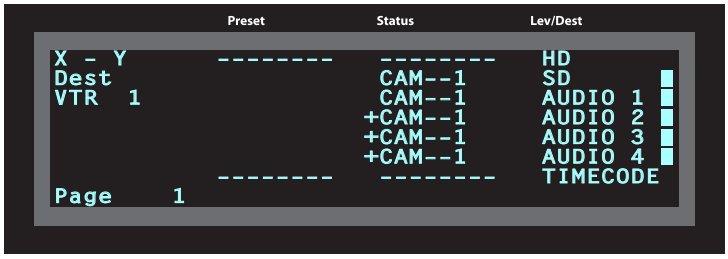
Each button has 3 illumination levels: high and low tally (green or amber), and off. (The button material is actually white or light gray.)

The function buttons each have clear plastic keycaps under which you may place plastic inserts for button legends. Buttons of the NV9601V (virtual panel), however, have automatically generated button legends.

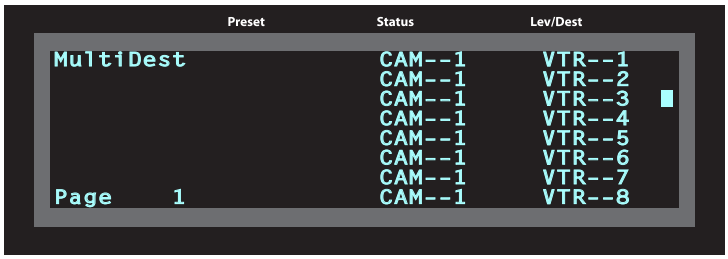
The 2 dedicated scroll buttons scroll the display up and down.

Alphanumeric Display

The 8×42 alphanumeric display provides real-time feedback for the operators as they press buttons to execute takes and other operations. The display changes according to the mode, X-Y or multi-destination:



X-Y mode



Multi-destination mode

Operators might need to scroll the display to see additional information.

Display Fields

The display has 4 columns:

- Information (not labeled).

  The first entry in this column is "X - Y" or 'MultiDest" unless you have entered salvo mode, menu mode, or setup mode.

  The bottom-most entry in this column is always the page number of the display.

  The column identifies the current destination in X-Y mode and does nothing in particular in MD mode.

- Preset.

  The preset column indicates what source will be routed to a destination when the operator presses the 'Take' button.

  In X-Y mode, the preset column represents the levels of a source or the levels of multiple sources under breakaway.

  In MD mode, the preset column indicates the sources that will be routed to selected destinations in the 'Level/Dest' column.

- Status.

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

  In X-Y mode, the status column represents either the levels of a source or the levels of multiple sources under breakaway.

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

- Lev/Dest.

  In X-Y mode, this column identifies the levels of the currently selected destination.

  In MD mode, the 'Level/Dest' column presents all the MD destinations defined in the NV9601 configuration.

The display fields can show either names from a name set or the system mnemonics.

Selection Buttons

Beneath the display are 8 selection buttons. The buttons correspond to the lines of the display. Each button selects the item on the corresponding line.

Modes of Operation

The panel operates in either X-Y mode or multi-destination (MD) mode:

- X-Y mode — individual control of all router *levels* with breakaway being possible.
- Multi-destination (MD) mode — lets you control multiple destinations at one time. Takes are "all level," and breakaways cannot be performed.

Secondary modes of panel operation are:

- Setup mode — where the NV9601 is disconnected from the panel network. In this mode, you can set the NV9601's panel ID and perform a few diagnostic tasks.
- Salvo mode — the operator presses a Salvo button to enter salvo mode where the display lists both system salvos and local salvos. The operator may select and execute a salvo.

- Menu mode — pressing a Menu button places the NV9601 in "menu" mode. In menu mode, the display shows a menu. Operators may change certain panel features.
- Information mode — pressing an 'Information' button places the NV9601 in "information" mode, where the display reports information such as level mappings.

Other modes of operation are:

- Hold mode — when the operator presses a 'Hold' button, hold mode becomes active.
- Save preset mode — when the operator presses a 'Save Preset' button, 'Save Preset' mode becomes active.
- Scroll mode — when the operator presses a 'Scroll' button, scroll mode becomes active. Note that scroll mode does ***not*** cause the *display* to scroll.

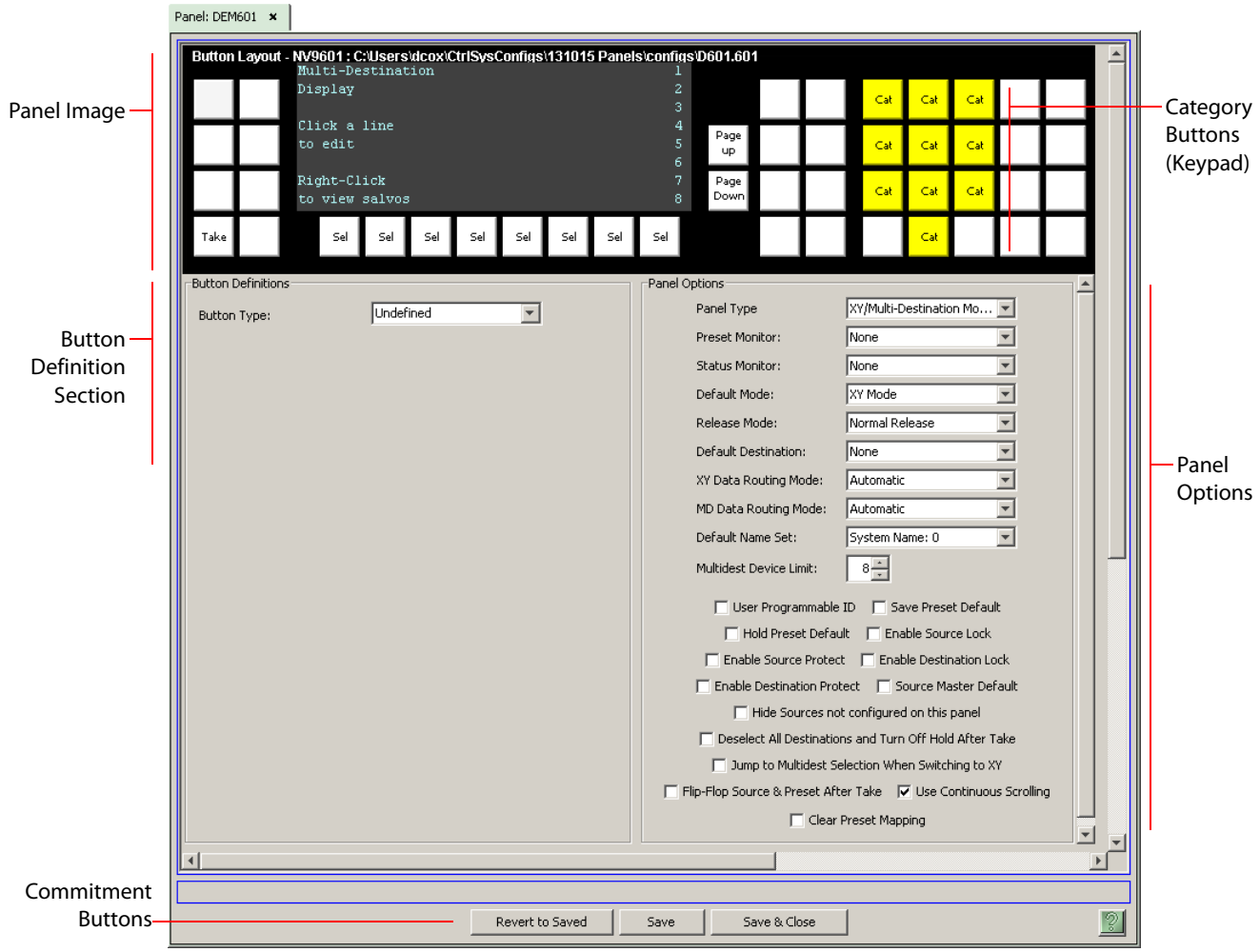
Other NV9601 Functions

The NV9601 provides the following additional features:

- Gang or dub switching in multi-destination mode.
- Broadcast data routing in X-Y mode.
- Level mapping.

NV9601 Configuration Page

This is the default NV9601 panel configuration page:



After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

The page has 3 main regions:

- A graphic representation of the NV9601 panel.

  Click on any of the button "proxies" to assign a function to that button. Specify the button characteristics in the button definition section of the page.

  In the middle of the graphic is a representation of the panel's display. Click the display to edit the multi-destination device list. Right-click the display to edit the panel's salvo

list. When you are editing the salvo list, you can add or remove (1) system salvos and (2) local salvos.

(System salvos are defined elsewhere in NV9000-SE Utilities. Local salvos are defined by panel operators while the router control system is running. Therefore, when you add salvos to or remove salvos from the list, you are adding or removing placeholders pointing to salvos defined elsewhere.)

Among the function buttons at the far right of the graphic are 10 buttons colored yellow. These are category buttons. (These buttons are also used under setup and menu modes.) They can be configured only as category buttons.

The buttons under the display (which are selection buttons) cannot be configured.

- Button definition section.

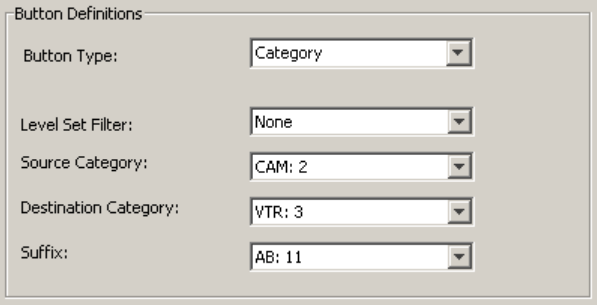
  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definition Section, following.

- Panel options.

  In this section, configurers specify the behavioral characteristics of the panel. See the *NV9601 User's Guide* for detailed information.

Button Definition Section

The button definitions section has several controls:



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. You will frequently see these options:

Button Type	A drop-down menu where you may select a button type.
Level Set Filter	A drop-down menu listing level sets. Choosing a level set here restricts the list of categories or devices to those belonging to that level set.

These are the button types available for NV9601 configurations:

Broadcast	Category	Chop	Clear Preset
Default State	Destination	Destination Lock	Destination Mode
Destination Protect	Free Source	Hold	Information
Level Map	Lock	Menu	Name Set Toggle
Panel Lock	Preset Release	Previous Source	ProtectSalvo
Save Preset	Scroll	Source	Source Master
Source/Mode	Src/Dst Mode	Take	XY/MD Mode
Virtual Level Contract	Virtual Level Expander		

▲ Note that other panels might have button types with the same names but that perform different functions.

NV9601 Button Types

These are the button types available for the NV9601:

Type	Description
Broadcast	On the data (control) level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button is useful in dubbing applications or when a backup (redundant) device is in use.
Category	Displays a category's device list. When you assign a category button, 4 additional drop-down menus appear: 'Level Set Filter', 'Source Category', 'Destination Category', and 'Suffix'. The level set filter allows you to restrict the list of categories according to the level set to which the categories' devices belong. Choose one of the level set names in the drop-down list. Each category button can represent a source category, a destination category, and a suffix. When the panel is in source mode, the category button will select its source category. When the panel is in destination mode, the category button will select its destination category. After a category has been selected, the suffixes on the category buttons come into play. All of the panel's category buttons that provide suffixes activate when a category has been selected. To configure the button, choose a source category and a destination category. You can choose 'None' for either. Finally, and optionally, choose a suffix from the drop-down list for suffixes. Generally, suffixes are the numerals 0–9, but they can also be alphanumeric and up to 4 characters in length. (You can review the available suffixes in the 'Suffixes' table under 'Views' in NV9000-SE Utilities.)
Chop	When a chop function is supported by the router, the button is a toggle that enables and disables rapid switching of the selected destination device between the current source and the preset source. This chop function is used to test system timing.
Clear Preset	Erases preset entries, while leaving the panel in the same mode. We recommend you use this button because it is a "safety" feature. The clear preset button has the side effect of switching off 'Save Preset' mode.
Default State	Returns the panel to its most recent power-up state. That is called the *default state*.
Destination	Selects a destination. When you assign a destination button, a drop-down menu appears: 'Destination Device'. Choose a device from the list. The 'None' entry is merely a placeholder. Do not choose 'None'.

Type	Description
Destination Lock	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. In MD mode, an “L” appears next to the destination in the display when it is locked. In X-Y mode, an “L” appears next to selected levels in the display when they are locked.
Destination Mode	Places the panel in destination mode. In destination mode, category buttons that do not represent destinations become momentarily disabled (dark) and the remaining enabled category buttons select destinations. Note that the function of ‘Lock’ and ‘Protect’ buttons depend on whether the panel is in destination mode or source mode.
Destination Protect	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. **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. In MD mode, a “P” appears next to the destination in the display when it is protected. In X-Y mode, a “P” appears next to selected levels in the display when they are protected.
Free Source	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 *Level Set Details* page of NV9000-SE Utilities.
Hold	Toggles the panel in and out of “hold” mode. In multi-destination mode, hold mode retains destination selections after a take. In X-Y mode, hold mode retains breakaway levels after a take. (There are other effects.)
Information	The information button displays auxiliary information about level mapping and perhaps other matters. The operator presses the information button once to see the information and again to hide the information.
Level Map	Cross-connects levels (in the same physical router). The function is typically used to shuffle audio channels, for example, to connect AES1/2 to AES3/4. The Level Map mode is cancelled when the next normal take is performed involving the selected destinations.
Lock	The button locks (or unlocks) a source when the panel is in source mode and locks (or unlocks) a destination when the panel is in destination mode.
Menu	This button puts the NV9601 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. 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.

Type	Description
Name Set Toggle	The button toggles the panel between its default name set and the "system name" set. One or the other becomes the active name set. The button definition has no fields to configure. 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'. The status, preset, or destination displays use the active name set — either the default name set or the system name set. However, that when the panel is displaying name sets, and a device does not have a name in the name set, the panel displays the system name.
Panel Lock	Prevents accidental changes to the panel settings, especially router crosspoints. When the panel is locked, the button array becomes blank except for the Panel Lock button which becomes amber. Pressing the 'Panel Lock' button again reverts the panel to its previous mode.
Preset Release	Removes locks and protects from preset source devices. This button is not needed if source locks and protects are not used in your system.
Previous Source	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. 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.
Protect	The button protects (or unprotects) a source when the panel is in source mode and protects (or unprotects) a destination when the panel is in destination mode.
Quick Source	A quick source button selects a source and performs an immediate take. When you assign a quick source button, a drop-down menu appears in which you choose a source device. The 'None' entry is merely a placeholder. Do not choose 'None'.
Salvo	The button puts the panel in salvo mode where the operator can choose a salvo (local or system) to execute, review the contents of any salvo, and execute a salvo (by pressing 'Take').
Save Preset	When this function is enabled (its button is high tally), whatever is on preset is retained (on preset) after a take. When the function is disabled (its button is low tally), preset is cleared after a take.
Scroll	A scroll button places the panel in scroll mode, where the operator can scroll (using the 'Page Up' and 'Page Down' buttons, through devices belonging to a category during category device selection. If the panel is in scroll mode, the operator cannot specify a category's device by suffix. Note also that the button does ***not*** cause the display to scroll.
Source	A source button selects a source. (Note that a quick source button selects a source and also performs an immediate take.) 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'.

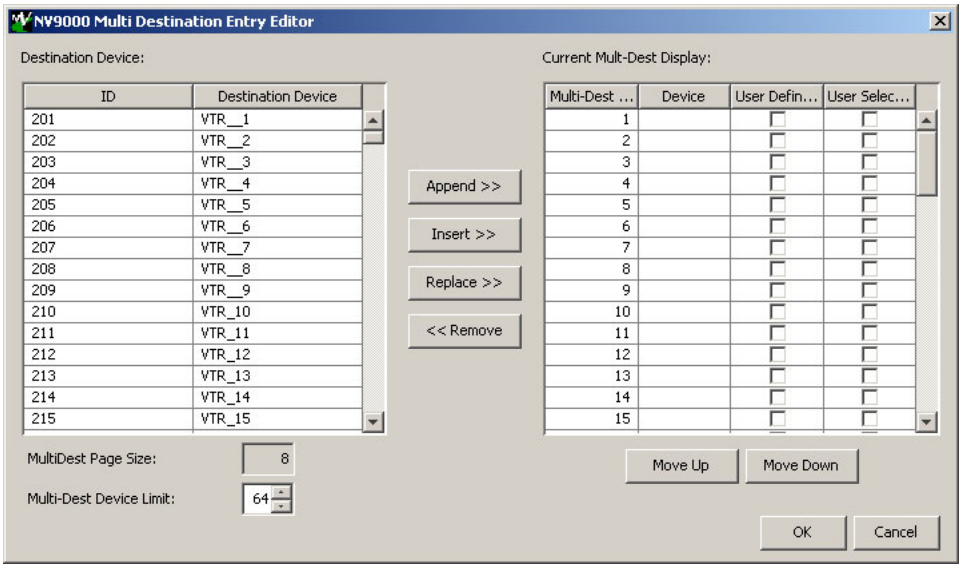
Type	Description
Source Master	Means “source is the master” and makes the source device the master. Otherwise, the destination is the master. The button is a toggle: Press it once to make the source the master (it goes high-tally); press it again to make the destination the master (the button is low-tally). 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. The ‘Source is Master’ button is also used to initiate “broadcast” control routes.
Source/ Mode	Places the panel in source mode. In source mode, category buttons that do not represent source become momentarily disabled (dark) and the remaining enabled category buttons select source. Note that the function of ‘Lock’ and ‘Protect’ buttons depend on whether the panel is in destination mode or source mode.
Src/Dst Mode	Toggles the panel between source mode and destination mode. Note that the function of ‘Lock’ and ‘Protect’ buttons depend on whether the panel is in destination mode or source mode.
Take	In X-Y mode, a take button switches the preset source device to the selected destination device on selected levels. In MD mode, a take button switches the preset source device(s) to the selected destination device(s) on all levels. In most cases, configurers should provide the operator a ‘Take’ button.
Undefined	Makes the button undefined and inactive. On the actual panel, it will remain unlit (dark).
Virtual Level Contract	In X-Y mode, this button causes the alphanumeric display to show virtual levels at the *highest* level of grouping (with the least detail). The button affects only virtual levels that have been grouped. The button has no effect in multi-destination mode. This button has no configuration options.
Virtual Level Expander	In X-Y mode, this button causes the alphanumeric display to show virtual levels at the *lowest* level of grouping (with the most detail). The button affects only virtual levels that have been grouped. The button has no effect in multi-destination mode. This button has no configuration options.
XY/MD Mode	Switches the panel between X-Y mode and multi-destination mode. The button is always green for XY mode and amber for multi-destination mode.

See the *NV9601 User’s Guide* for more detail.

Multi-Destination Configuration

Follow these guidelines.

Click the display portion of the panel graphic. The multi-destination entry editor appears:



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

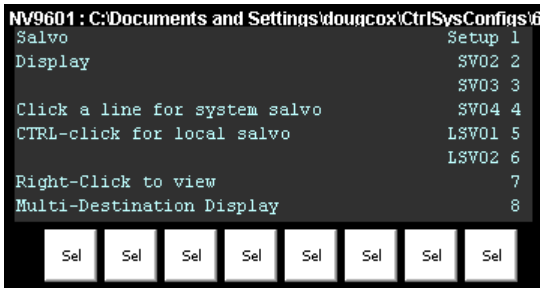
To define an MD destination, select a destination on the left and copy it, using either the 'Append' button, the 'Insert' button, or the 'Replace' button, to the right.

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

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.

Salvo Configuration

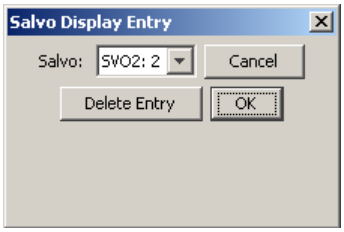
To configure salvos, right-click the display region of the panel graphic in the NV9601 configuration page to switch it to salvo configuration. The salvo configuration image appears:



To add or remove system salvos, click either a blank line or an existing system salvo. To add, remove, or rename a local salvo, control-click either a blank line or an existing local salvo.

- Clicking a local salvo has no effect. Control-clicking a system salvo likewise has no effect.

When you click a system salvo, the following dialog appears:



Select a system salvo from the drop-down menu. If the salvo was already in the salvo list, you can delete it from the list.

When you click a local salvo, the following dialog appears:

To create a local salvo, enter or re-enter the name of a local salvo in the text box. If the local salvo exists already, you can delete it from the NV9601's salvo list.

After you create a local salvo, it is empty. It contains no commands. It is the task of the panel operator to create or erase the contents of a local salvo by recording actions at the panel. (Local salvo definition is a function available when the panel is in menu mode.)

NV9602

NV9602 Panel Description

The NV9602 is a 1RU panel. It has 2 sets of backlit function buttons and a small display. The display has 2 distinct LED readouts each having 8 characters:

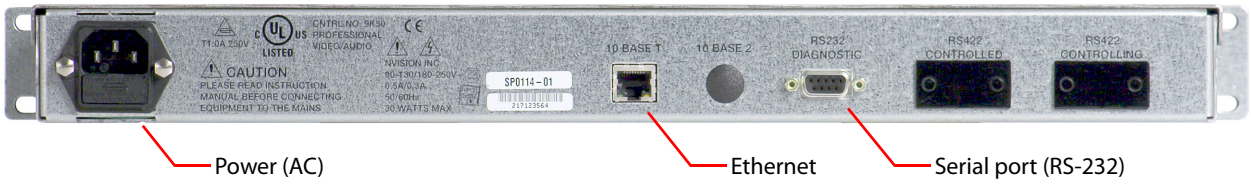
The NV9602 can operate in one of 4 modes. See Modes of Operation, following.

An equivalent virtual panel — the NV9602V — is available.

The function buttons select sources or destinations, or they execute functions.

The up and down arrows at the far right apply only when the panel is in menu mode.

At the rear are power, serial, and network connectors:



Function Buttons

The NV9602 has an array of 32 function buttons on the left and 6 function buttons on the right. The 10 buttons at the top left are labeled with numerals (0–9). These are for menu operations such as entering the panel ID.

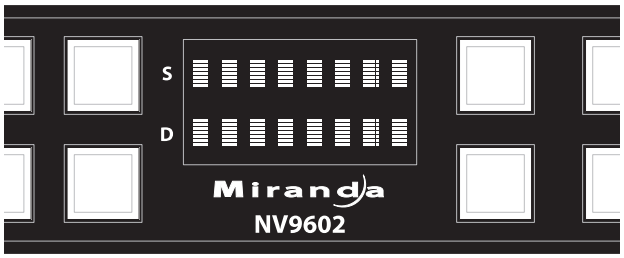
Physical source buttons represent one of two "pages" of sources. Physical destination buttons (if present) represent one of two pages of destinations. The panel can be configured with a 'Source Shift' button that toggles between the two source pages and a 'Destination Shift' button that toggles between the two Destination pages.

Each button has *three* operational levels: high and low tally (green or amber), and off. (The button material is actually white or light gray.)

The function buttons each have clear plastic keycaps under which you may place plastic inserts for button legends. Buttons of the NV9602V (virtual panel) have automatically generated button legends.

Alphanumeric Display

The display has 2 fields of 8 characters:



- Status, labeled "S" on the panel.

  The 'Status' field always shows the source that was routed to the currently selected destination, which is identified in the 'Destination' field.
- Destination, labeled "D" on the panel.

  The 'Destination' field shows the current destination.

The two fields can show either names from a name set or the system mnemonics.

Modes of Operation

The NV9602 operates in one of 4 modes:

- Single-Destination Mode.
- Single-Destination Mode with Breakaway.
- Limited X-Y Mode.
- Multi-Destination Mode.

The panel's set of button functions varies with the mode.

The modes (or behavioral models) are determined at configuration. The operator cannot switch between different modes.

▲ The NV9604 control panel can operate as an extension of the NV9602. See NV9604, on page 246.

Single-Destination Mode

In single destination mode, the panel's destination is configured as the default destination and there are no destination buttons. Takes occur as soon as a source button is pressed. (There is no 'Take' button function.)

Takes are performed on all levels.

Single-Destination Mode with Breakaway

This mode is an extension of single-destination mode that includes level buttons on the panel.

Again, the single destination is configured as the default destination. There are no destination buttons and there is no 'Take' button.

Limited X-Y Mode

In limited X-Y mode, takes occur from a single source to a single selectable destination.

Takes are all level. Pressing a source button completes the take. There is no 'Take' button.

Multi-Destination Mode

In this mode, source buttons are configured with destinations as well as sources. Thus, each source button completes a route to an individual destination.

There is no 'Take' button. Takes are all-level.

Secondary Modes

Additional but secondary modes of panel operation are:

- Setup mode — where the NV9602 is freshly powered up, but disconnected from the network. In this mode, you can set the panel ID and perform a few diagnostic tasks.
- Menu mode — pressing a menu button places the NV9602 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.
- Source mode — (in limited X-Y mode only) allows 'Source/Destination' buttons to select sources.
- Destination mode — (in limited X-Y mode only) allows 'Source/Destination' buttons to select destinations.

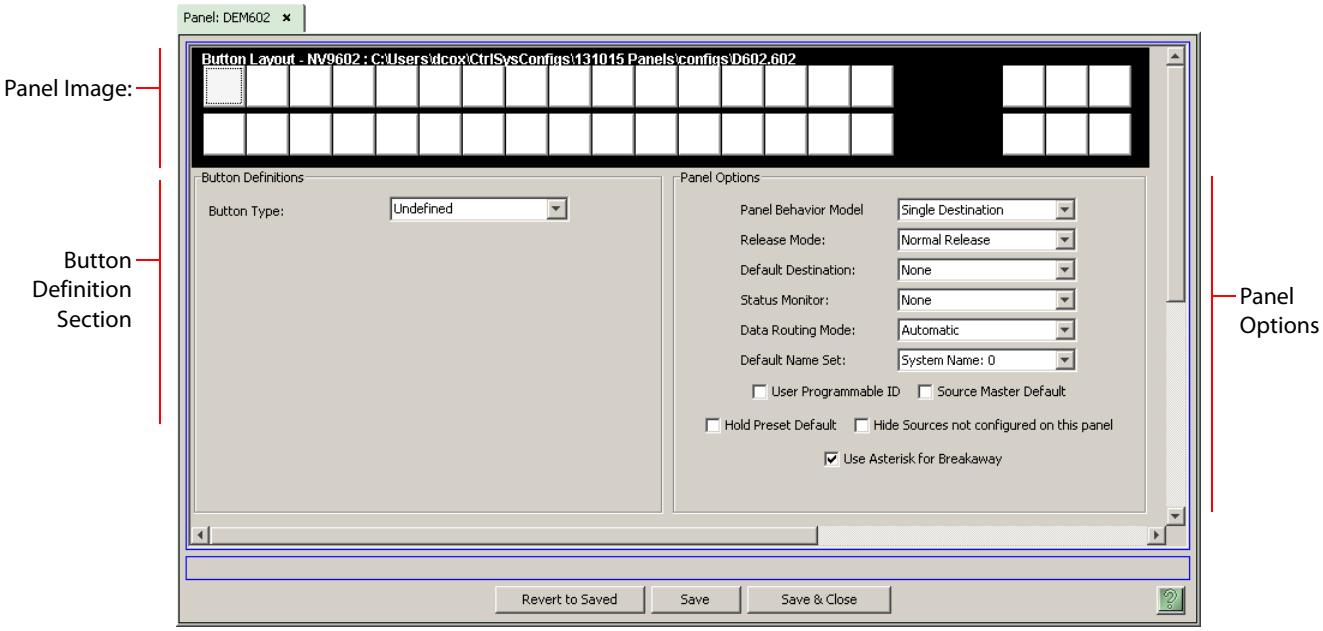
Other NV9602 Functions

The NV9602 can perform the following additional functions:

- System salvos.
- Broadcast data routing.

NV9602 Configuration Page

This is the default NV9602 panel configuration page:



After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

There are 3 main regions:

- A graphic representation of the NV9602 panel.

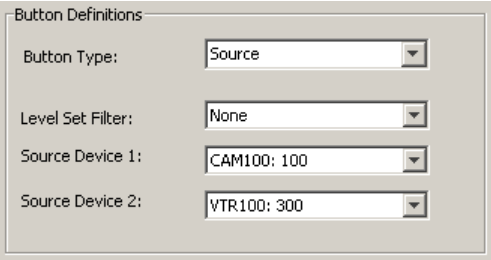
  Configurers must click a button "proxy" to select the button for configuration.
- Button definitions.

  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definition Section, following.
- Panel options.

  In this section, configurers may specify the behavioral characteristics of the panel. See the *NV9602 User's Guide* for detailed information.

Button Definition Section

The button definition section configures the button you have selected in the image of the NV9602:



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.

These are the button types available for NV9602 configurations:

Broadcast	Chop	Default state	Destination
Destination Lock	Destination Protect	Destination Shift	Free Source
Hold	Level	Menu	Name Set Toggle
None/All	Panel Lock	Previous Source	Salvo
Source	Source Master	Source/Destination	Source/Dest Toggle
Source Shift			

Not all of these button types are available in all operating modes.

▲ Note that other panels might have button types with the same names but that perform different functions.

NV9602 Button Types

These are the button types available for the NV9602. These codes represent the modes:

S — single-destination mode

B — single-destination mode with breakaway

X — limited X-Y mode

M — multi-destination mode

All — all modes

Type	Modes	Description
Broadcast	M, X	On the data (control) level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button definition has no fields to configure. A broadcast button is useful in dubbing applications or when a backup (redundant) device is in use. See also the Source Master button, following. The button is available in single-destination mode, with or without breakaway, but is incompatible with the mode.
Chop	All	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. The button definition has no fields to configure.
Default state	All	The button returns the panel to its most recent power-up state. That is called the *default state*. The button definition has no fields to configure.
Destination	X	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. When you assign a destination button, two drop-down menus appear: 'Destination Device 1' and 'Destination Device 2'. These correspond to the two destination pages. If there is a 'Destination Shift' button on the panel, the operator can switch between the two pages. When the first page is selected, pressing the button selects device 1. When the second page is selected, pressing the button selects device 2.
Destination Lock	S, B, X	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. The button definition has no fields to configure. The NV9602 provides no explicit indication, during operation, whether a destination is locked or unlocked.
Destination Protect	S, B, X	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. **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. The button definition has no fields to configure. The NV9602 provides no explicit indication, during operation, whether a destination is locked or unlocked.
Destination Shift	X	The button toggles between the first and second destination sets. The button definition has no fields to configure. This button toggles between the two destinations assigned to a 'Destination' button. See the Destination button, above.

Type	Modes	Description
Free Source	S, B, X	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 *Level Set Details* page of NV9000-SE Utilities. The button definition has no fields to configure.
Hold	B, X	In single-destination mode with breakaway, this button retains breakaway levels after a take. In limited X-Y mode, this button allows the operator to perform a gang (or "dub") route. In hold mode, destination selections are cumulative, and not mutually exclusive. The hold button is a toggle; press it once to place the panel in "hold mode." Press it again to cancel "hold mode." In the panel options, you can specify whether the panel powers up in hold mode. The button definition has no fields to configure.
Level	B	The button selects a level. The button definition has one field to configure: the level. (Do not choose 'None' for the level.) Your panel — configured for single-destination mode with breakaway — will have multiple level buttons, one for each level you want the operator to control. The operator selects multiple levels for a breakaway and then presses a source to complete the take. When all level buttons are *deselected*, or when all level buttons are *selected,* a take is "all-level." When one or more level buttons are selected, a take occurs on just those levels. The operator must select levels before selecting the source The color of the level buttons reflect the levels of the current destination in a limited way. See also the None/All button, following.
Menu	All	This button puts the NV9602 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. 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. The button definition has no fields to configure.

Type	Modes	Description
Name Set Toggle	All	The button toggles the panel between its default name set and the "system name" set. One or the other becomes the active name set. The button definition has no fields to configure. 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'. 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.
None/All	B	The button toggles the panel between all levels (of the current destination) being selected and none of the levels being selected. The button definition has no fields to configure.
Panel Lock	All	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. The button definition has no fields to configure.
Previous Source	S, B, X	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. The button definition has no fields to configure. 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.
Salvo	All	The salvo button executes a system salvo immediately. During configuration, when you assign a salvo button, a drop-down menu appears: 'Salvo'. Choose a salvo from the list. The 'None' entry is merely a placeholder. Do not choose 'None'.

Type	Modes	Description
Source	All	The button selects a source. The source name appears in the 'Status' display. ***Pressing a source button completes a take.*** The nature of source buttons differs in the 4 operating modes: Single-destination, single-destination with breakaway, and limited X-Y modes When you assign a source button, two drop-down menus appear: 'Source Device 1' and 'Source Device 2'. These correspond to the two source pages. If there is a 'Source Shift' button on the panel, the operator can switch between the two pages. When the first page is selected, pressing the button selects device 1. When the second page is selected, pressing the button selects device 2. Multi-destination mode When you assign a source button, *three* drop-down menus appear: 'Source Device 1', 'Source Device 2', and 'Destination Device'. The first two correspond to the two source pages. If there is a 'Source Shift' button on the panel, the operator can switch between the two pages. When the first page is selected, pressing the button selects device 1. When the second page is selected, pressing the button selects device 2. The 'Destination Device' field allows you to configure a destination for every source button. Typically, you will assign one destination device to one set of sources, another destination to another set of sources, and so on. At the limit, you can configure up to 38 destinations. The destination assigned to the button does not change when the source page changes.
Source Master	All	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 definition has no fields to configure. 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). 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. The 'Source is Master' button is also used to initiate "broadcast" machine control routes.
Source/ Destination	X	The button selects either a source or a destination depending on whether the panel is in source mode or destination mode. It is the 'Source/Dest Toggle' button that places the panel in source mode or destination mode. During configuration, when you assign a 'Source/Destination' button, you will see two drop-down menus: 'Source Device' and 'Destination Device'. The source device is selected when the operator presses the button in source mode. The destination device is selected when the operator presses the button in destination mode.

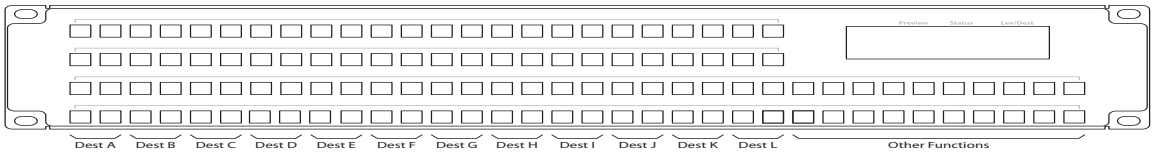
Type	Modes	Description
Source/ Dest Toggle	X	The button toggles between source and destination modes. The button definition has no fields to configure. 'Source/Destination' buttons are affected by the toggle. In source mode, a 'Source/Destination' button selects a source; in destination mode, a 'Source/Destination' button selects a destination.
Source Shift	All	The button toggles between the first and second source sets. The button definition has no fields to configure. The button affects the operation of any source button (in any mode). Source buttons represent two sources. One belongs to one source set and the other belongs to the other source set.
Undefined	All	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).

See the *NV9602 User's Guide* for more detail.

Multi-Destination Configuration

A panel configured in multi-destination mode has buttons that represent 2 sources and a destination. Pressing a button selects one of the sources and the destination and performs an immediate take — to the destination assigned to the button. (A "shift" button switches between the two sources of the button.)

A typical multi-destination might, for example, provides 8 destinations with up to 8 sources available for each one, with 6 buttons assigned to other functions:



NV9603A

NV9603A Panel Description

▲ The NV9603A is a revision of the NV9603. The NV9603 has been obsolete for several years. NV9000-SE Utilities means the NV9603A wherever it says NV9603.

The NV9603A is a 1RU panel. It has 2 sets of backlit function buttons and a small display. The display has 3 distinct LED readouts each having 8 characters:

The NV9603A operates in X-Y mode only.

An equivalent virtual panel — the NV9603AV — is available.

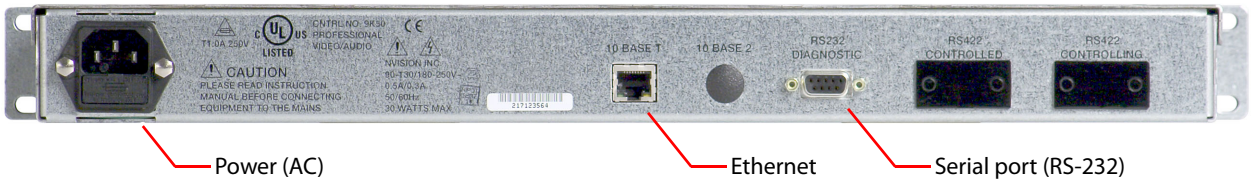
The function buttons select sources or destinations, or perform some task such as locking a destination. The 10 buttons at the lower left are category buttons, by convention.

The two buttons immediately to the left of the display are scroll buttons by default. Using the scroll buttons, the operator can sequence through devices within a category.

The operator can select one of two sets of sources using a configured 'Source Shift' button. Thus, every source button potentially represents 8 sources, depending on the page in use and the state of the 'Source Shift' button. There is a similar 'Destination Shift' function.

The scroll buttons are also used when the panel is in menu mode (to change the illumination of the buttons).

At the rear are power, serial, and network connectors:



Function Buttons

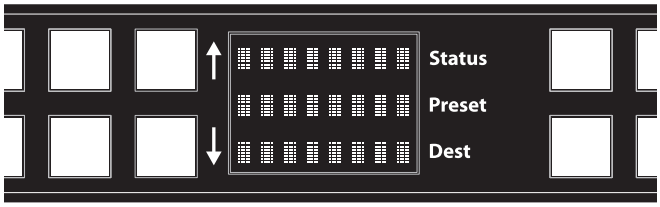
The NV9603A has an array of 30 function buttons on the left and 4 function buttons on the right.

Each button has *three* operational levels: high and low tally (green or amber), and off. (The button material is actually white or gray.)

The function buttons each have clear plastic keycaps under which you may place plastic inserts for button legends. Buttons of the NV9603AV (virtual panel) have automatically generated button legends.

Alphanumeric Display

The display has 3 fields of 8 characters:



- Status.

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

  The 'Preset' field shows the source that is pending a take. After the take, this source becomes the current source and appears in the 'Status' field.
- Destination.

  The 'Dest' field shows the current destination.

The three fields can show either names belonging to a name set or the system mnemonics.

Modes of Operation

The NV9603A operates in X-Y mode.

Additional but secondary modes of panel operation are:

- Salvo mode — pressing a salvo button places the NV9603A in salvo mode where the operator may select and execute a salvo from a salvo list.
- Setup mode — where the NV9603A is freshly powered up, but disconnected from the network. In this mode, you can set the panel ID and perform diagnostic tasks.
- Menu mode — pressing a menu button places the NV9603A in "menu" mode where the buttons lose their normal functions and become part of a menu that changes as needed during menu operation.

Other NV9603A Functions

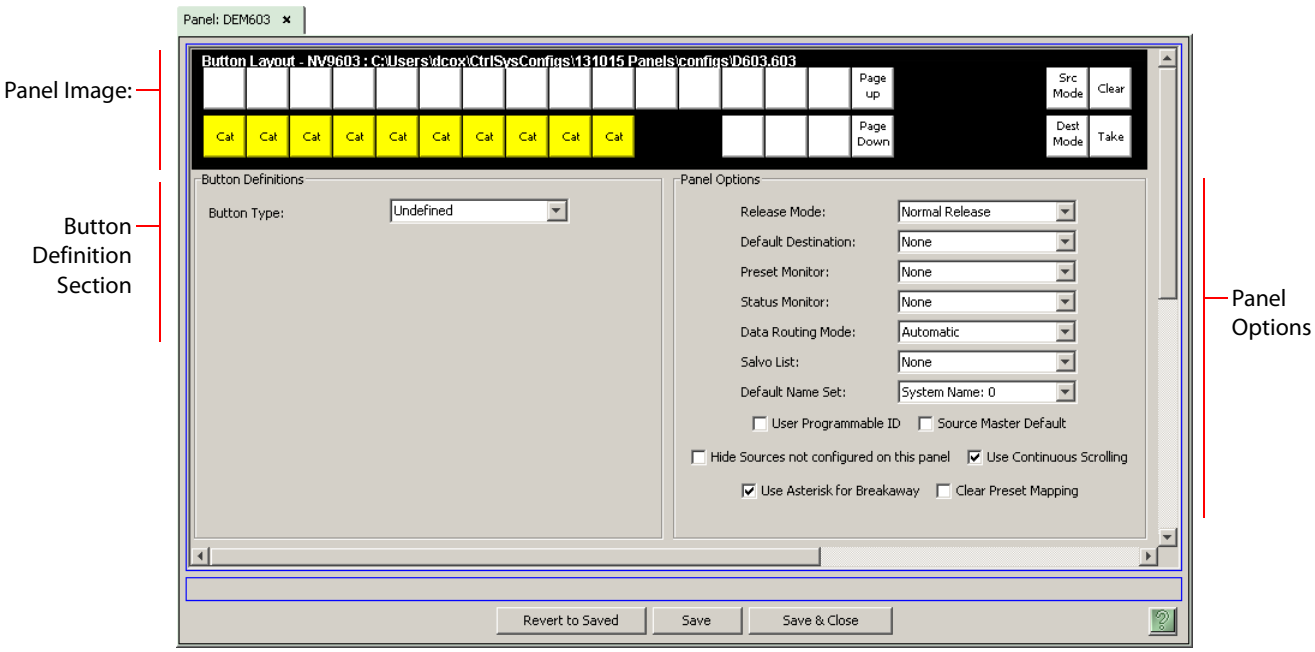
The NV9603A can be configured to perform the following additional functions:

- System salvos.
- Broadcast data routing.

NV9603A Configuration Page

▲ NV9000-SE Utilities calls this panel the NV9603.

This is the default NV9603A panel configuration page:



After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

There are 3 main regions:

- A graphic representation of the NV9603A.

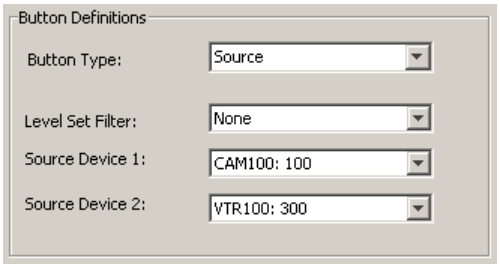
  Configurers must click a button "proxy" to select the button for configuration.
- Button definitions.

  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definition Section, following.
- Panel options.

  In this section, configurers may specify the behavioral characteristics of the panel. See the *NV9603 User's Guide* for detailed information.

Button Definition Section

The button definition section configures the button you have selected in the image of the NV9603A:



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.

These are the button types available for NV9603A configurations:

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

▲ Note that other panels might have button types with the same names but that perform different functions.

NV9603A Button Types

These are the button types available for the NV9603A:

Type	Description
Broadcast	On the data (machine control) level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button definition has no fields to configure. A broadcast button is useful in dubbing applications or when a backup (redundant) device is in use. See also the Source Master button, following.
Category	A category button has 3 functions: Select a source category and initiate device selection for that category. Select a destination category and initiate device selection for that category. During the process of device selection, append a suffix to the pending device name. A category button can provide any or all of these functions. When you assign a category button, 3 additional drop-down menus appear: 'Source Category', 'Destination Category', and 'Suffix'. A category button can represent a suffix. Once a category is selected, operators press suffix buttons to select a device within the category. Not all category buttons necessarily select categories and not all category buttons represent suffixes. If your category button does not represent a suffix, select 'None' in the 'Suffix' field. If your category button does not represent a source category, select 'None' in the source field. If your category button does not represent a destination category, select 'None' in the destination field. Category buttons are affected by source mode and destination mode. Only source categories are available in source mode; only destination categories are available in destination mode.
Chop	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. The button definition has no fields to configure.
Clear	The button reverts to the most recent preset. You may think of this as a "backspace key." During category device selection, it erases the suffixes you entered under category select in reverse order.
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. When you assign a destination button, two drop-down menus appear: 'Level Set Filter' and 'Destination Device'. Select the device for this button from the list that appears in the 'Destination Device' field. The button is not available in multi-destination mode.

Type	Description
Destination Lock	The button sets or removes a "lock" on the current destination device. The lock can be removed only by the user (at this panel or at another) that originally set the lock, or by a panel that has "Force Release" enabled. The button definition has no fields to configure. The NV9603A provides no explicit indication, during operation, whether a destination is locked or unlocked. This button is available, but does not operate, in multi-destination mode. It is present on the configuration page as a future feature.
Destination Protect	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. **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. The button definition has no fields to configure. The NV9603A provides no explicit indication, during operation, whether a destination is locked or unlocked. This button is available, but does not operate, in multi-destination mode. It is present on the configuration page as a future feature.
Destination Mode	The button places the panel in destination mode, in which category selection buttons select destination categories. If the panel is not in destination mode, it is in source mode.
Destination Shift	The button toggles between the first and second sets of destinations. The button definition has no fields to configure. The button affects the operation of any destination button. Destination buttons represent two destinations. One belongs to one destination set and the other belongs to the other destination set.
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 free source is defined in the *Level Set Details* page of NV9000-SE Utilities. The button definition has no fields to configure. The free source button must be used in conjunction with machine control router(s). Otherwise, it fails with an 'Inv Src' message briefly appearing in the 'Status' field of the display. This button is available, but does not operate, in multi-destination mode. It is present on the configuration page as a future feature.

Type	Description
Level	The button selects a level. The button definition has one field to configure: the level. (Do not choose 'None' for the level.) Your panel can have multiple level buttons, one for each level you want the operator to control. The operator selects multiple levels for a breakaway and then presses a source to complete the take. When all levels are deselected, or when all levels are selected, a take is "all-level." When one or more level buttons are selected, a take occurs on just those levels. The level buttons for selected levels are high-tally. When the operator first selects a destination, *all* levels for that destination are automatically selected. If the operator presses any level button when all levels are selected, the result is that all *other* levels become deselected and that level remains selected. If your panel does not have level buttons that represent all levels of a destination, it is impossible to reselect all levels after deselecting some levels. The remedy is to reselect the destination. Doing so causes the pending take to become all-level once again.
Menu	This button puts the NV9603A panel in menu mode and displays a menu that provides access to certain panel functions. Without the button, the operator has no access to the menu functions. By pressing certain buttons, the operator makes menu selections and may enter data (such as panel ID) or change button brightness values. When the panel is in menu mode, the menu button cycles through the functions of the menu. The button definition has no fields to configure. Configurers should ***not*** locate the menu button on any of the buttons used to change the illumination or to change the panel ID.
Name Set Toggle	The button toggles the panel between its default name set and the "system name" set. One or the other becomes the active name set. The button definition has no fields to configure. 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'. 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.

Type	Description
Page Down	The button scrolls *down* through the device list of the currently selected category. The device selected appears in the 'Preset' field of the display. The term "page" does not have any meaning here. '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. Whether the list wraps around at the beginning or end is governed by the 'Use Continuous Scrolling' panel option. The button definition has no fields to configure.
Page Up	The button scrolls *up* through the device list of the currently selected category. The device selected appears in the 'Preset' field of the display. The term "page" does not have any meaning here. 'Page Up' moves to the next *higher* device in the category's device list. (Example: if the current device is CAM_3, the next higher device would probably be CAM_4, 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. The button definition has no fields to configure.
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. Pressing the panel lock button again reverts the panel to its previous state. The button definition has no fields to configure.
Previous Source	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. The button definition has no fields to configure. 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. This button type can be used in either mode.
Salvo	The salvo button places the panel in *salvo mode* where the operator can scroll through the salvo list assigned to the panel (as a panel option). When the operator finds the salvo of interest, he or she presses the 'Take' button to execute the salvo. After the salvo executes, the panel returns to its normal mode. The salvo name appears in the 'Preset' field of the display. The button definition has no fields to configure. Pressing the salvo button again while the panel is in salvo mode resets the salvo selection to nothing. Pressing any other button while the panel is in salvo mode returns the panel to its normal mode.

Type	Description
Source	The button selects a source. The source name appears in the 'Preset' display. When you assign a source button, two drop-down menus appear: 'Source Device 1' and 'Source Device 2'. These correspond to two sets of sources. If there is a 'Source Shift' button on the panel, the operator can switch between the two sets. When the first set is selected, pressing the button selects device 1. When the second set is selected, pressing the button selects device 2.
Source 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 definition has no fields to configure. 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). 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.
Source Mode	The button places the panel in source mode, in which category selection buttons select source categories. If the panel is not in source mode, it is in destination mode.
Source Shift	The button toggles between the first and second sets of sources. The button definition has no fields to configure. The button affects the operation of any source button (in either limited X-Y mode or multi-destination mode). Source buttons represent two sources. One belongs to one source set and the other belongs to the other source set. This button type can be used in either mode.
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. A single 'Src/Dst Mode' button does the work of a pair of 'Source Mode' and a 'Destination Mode' buttons.
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 is possible for the operator to execute a take. Configurers should provide the operator a 'Take' button. The button definition has no fields to configure.
Undefined	This button type is a placeholder: during configuration, it makes the button undefined and inactive. On the actual panel, the undefined button remains unlit (dark).

See the *NV9603 User's Guide* for more detail.

Single-Destination Configuration

It is possible to configure the panel for single-destination operation. The panel's default destination (a panel option) is the single destination.

NV9604

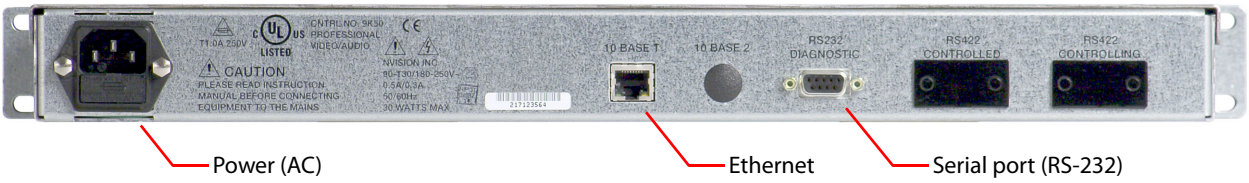
NV9604 Panel Description

The NV9604 is a 1RU control panel. It has 32 backlit function buttons and no display.

The NV9604 can operate either by itself as a stand-alone panel or as a extension of an NV9602 control panel. By itself, it can operate in one of two modes. As an extension to an NV9602, it can operate in any of the 4 modes configured for that particular NV9602. See Modes of Operation, following:

When the panel is stand-alone, the function buttons either select sources or select destinations. When the panel is used as an NV9602 extension, the buttons can execute a small set of additional functions.

At the rear are power, serial, and network connectors:



There is no virtual panel matching the NV9604.

Function Buttons

The NV9604 has an array of 32 function buttons. There is a limited set of button functions when the panel is stand-alone. When it is an NV9602 extension, the buttons' functions are slightly different in each of the 4 operating modes of the NV9602. (See Modes of Operation, following.)

When the panel is an NV9602 extension, source buttons represent one of two sets of sources. and destination buttons (if present) represent one of two sets of destinations. When the panel is stand-alone, each source button represents a single source and each destination button represents a single destination.

Each button has *three* operational levels: high and low tally (green or amber), and off. (The button material is actually white or gray.)

Modes of Operation

By itself, the NV9604 operates in one of 2 modes:

- Single-Destination Mode.
- Limited X-Y Mode.

An NV9604 can operate in one of 4 modes:

- Single-Destination Mode.
- Single-Destination Mode with Breakaway.
- Limited X-Y Mode.
- Multi-Destination Mode.

As a NV9602 extension, the NV9604 can operate in any mode configured for the NV9602. The NV9604 has only limited use when the NV9602 is in multi-destination mode.

The modes (or behavioral models) are determined at configuration for both the NV9604 and the NV9602. The operator cannot switch between different modes.

Single-Destination Mode

In single destination mode, the panel's destination is the configured default destination and there are no destination buttons. Takes are performed on all levels.

Takes occur immediately when a source button is pressed.

Under NV9602 control, the single destination is the one configured for the NV9602. The default destination for the NV9604 is ignored.

Single-Destination Mode with Breakaway

This mode is an extension of single-destination mode that includes level buttons on the NV9602 panel. This mode is not available when the NV9604 is stand-alone.

Here too, the single destination is configured as the default destination *for the NV9602*. The default destination for the NV9604 is ignored. There are no destination buttons.

The NV9602's level buttons select the levels on which the take is to occur. Takes occur on all levels when either no levels are selected or when all levels are selected.

Levels selected on the NV9602 affect sources selected on either the NV9602 or NV9604.

Limited X-Y Mode

In limited X-Y mode, takes occur from a single source to a single destination. Destinations are selectable. Takes are all level. Pressing a source button completes a take.

Under NV9602 control, both sources and destinations can be selected on the NV9604.

Multi-Destination Mode

This mode is not available when the NV9604 is stand-alone. In this mode, source buttons of the NV9602 are configured with destinations as well as sources.

Each NV9602 source button completes a route to an individual destination.

The NV9604's source buttons do not support multi-destination operations. The NV9604 can be used only for salvo buttons when it is under control of a NV9602 configured in MD mode.

Takes are all-level.

Secondary Modes

The NV9604 of itself has no secondary modes.

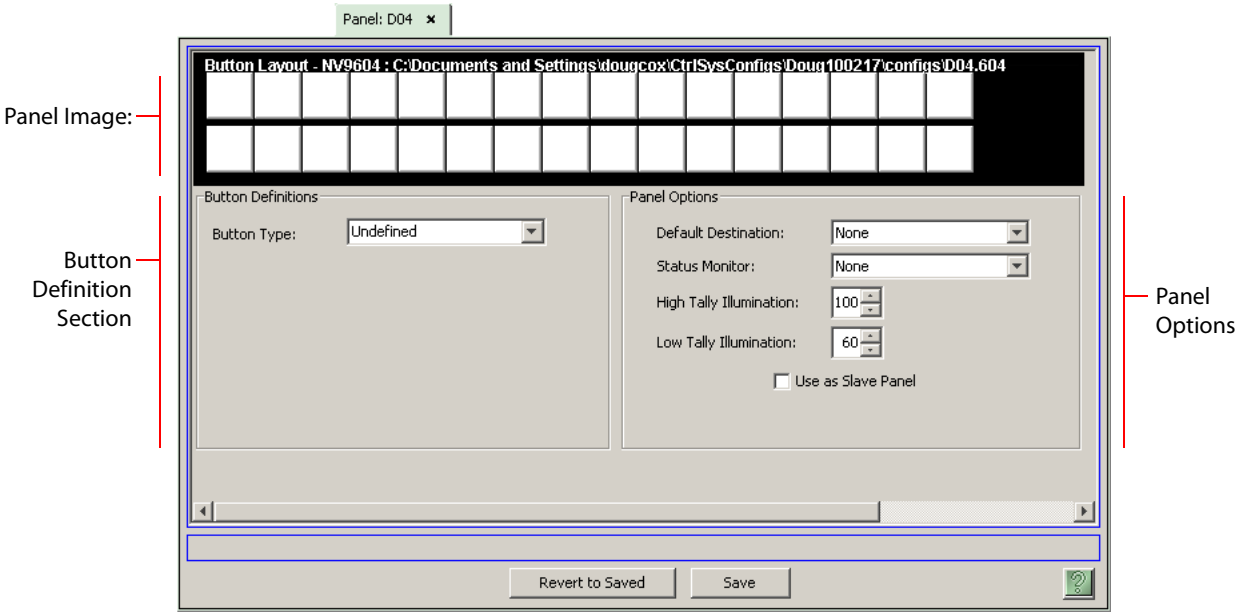
The NV9604 has a limited self-test capability, but no setup mode in which to change its panel ID. To change the panel ID, you must use NV9000-SE Utilities.

Other NV9604 Functions

The NV9604 can also be configured to perform system salvos.

NV9604 Configuration Page

This is the default NV9604 panel configuration page:



After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

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

- A graphic representation of the NV9604 panel.

  Configurers must click a button "proxy" to select the button for configuration.
- Button definitions.

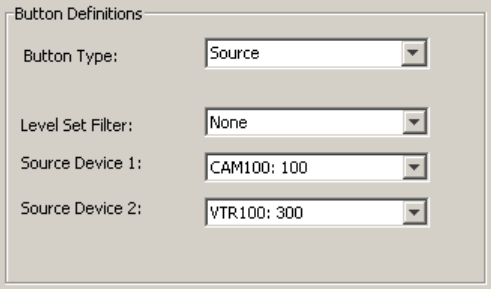
  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definition Section, following.

- Panel options.

  In this section, configurers may specify the behavioral characteristics of the panel. See the *NV9604 User's Guide* for detailed information.

Button Definition Section

The button definition section configures the button you have selected in the image of the NV9604:



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.

When the NV9604 is used as an NV9602 extension, the use of the buttons depends on the mode in which the NV9602 is configured.

When the NV9604 is used by itself, the NV9604 has no modes, but can operate either as single-destination panel (using the default destination) or as an X-Y panel.

These are the button types available for NV9604 configurations:

Destination Previous Source Salvo Source

'Previous Source' and 'Salvo' buttons are available only when the panel is an NV9602 extension.

▲ Note that other panels might have button types with the same names but that perform different functions.

NV9604 Button Types

When the NV9604 is used as an NV9602 extension, the use of the buttons depends on the mode in which the NV9602 is configured. These letter codes identify, below, in the table, the NV9602 modes in which a button can operate:

S — single-destination mode

B — single-destination mode with breakaway

X — limited X-Y mode

M — multi-destination mode

Any — any mode

When the NV9604 is used by itself, the NV9604 has no modes, but can operate either as single-destination panel (using the default destination) or as an X-Y panel. These are the button types available for the NV9604:

Type	Modes	Description
Destination	X	The button selects a destination. When the panel is an NV9602 extension, the destination name appears in the 'Destination' display of the NV9602. The destination is the target of a pending take, which will route a source to that destination. The nature of destination buttons differs according to your configuration: Stand-alone panel. When you assign a source button, one drop-down menus appear: 'Destination Device'. NV9602 extension (you have checked 'Use as Slave Panel'). When you assign a destination button, two drop-down menus appear: 'Destination Device 1' and 'Destination Device 2'. These correspond to the two destination sets. If there is a 'Destination Shift' button on the NV9602 panel, the operator can switch between the two sets. When the first set is selected, pressing the button selects device 1. When the second set is selected, pressing the button selects device 2. Note that when an NV9602 is in multi-destination mode, the only operable buttons on the NV9604 are salvo buttons.
Previous Source	S, B, X	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. The button definition has no fields to configure. 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. The button type is not available unless you have checked 'Use as Slave Panel'.
Salvo	Any	The salvo button executes a system salvo immediately. During configuration, when you assign a salvo button, a drop-down menu appears: 'Salvo'. Choose a salvo from the list. The 'None' entry is merely a placeholder. Do not choose 'None'. The button type is not available unless you have checked 'Use as Slave Panel'.

Type	Modes	Description
Source	Any	The button selects a source. The source name appears in the 'Status' display. ***Pressing a source button completes a take.*** When the panel is an NV9602 extension, the source name appears in the 'Status' display of the NV9602. The nature of source buttons differs according to your configuration: Stand-alone panel. When you assign a source button, one drop-down menus appear: 'Source Device'. NV9602 extension (you have checked 'Use as Slave Panel'). When you assign a source button, two drop-down menus appear: 'Source Device 1' and 'Source Device 2'. These correspond to the two source sets. If there is a 'Source Shift' button on the panel, the operator can switch between the two sets. When the first set is selected, pressing the button selects device 1. When the second set is selected, pressing the button selects device 2. Note that when an NV9602 is in multi-destination mode, the only operable buttons on the NV9604 are salvo buttons.
Undefined	Any	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).

See the *NV9604 User's Guide* for more detail.

NV9605

NV9605 Panel Description

The NV9605 is a 1RU panel. It has 2 sets of backlit function buttons and a small display. The display has 3 distinct LED readouts each having 8 characters:

The NV9605 can operate in one of 2 modes. See Modes of Operation, following.

An equivalent virtual panel — the NV9605V — is available.

The function buttons select sources or destinations, or perform some task such as locking a destination. The function buttons are configurable.

The scroll buttons are not configurable buttons. Using the scroll buttons, the operator can scroll through 4 "pages" of sources and destinations. The scroll buttons are also used when the panel is in menu mode (to change the illumination of the buttons).

After selecting any one of the pages, the operator can further select one of two sets of sources using a configured 'Source Shift' button. Thus, every source button potentially

represents 8 sources, depending on the page in use and the state of the 'Source Shift' button.

There is no corresponding 'Destination Shift' function. There is only one set of destinations for each page.

At the rear of the panel are power, serial control, Ethernet, and GPIO connectors:

You connect the NV9605 to the NV9000 system using the Ethernet connector.

The serial port is for local diagnostics, as it is for all control panels.

The NV9605 uses external PS0001 power supplies.

The GPIO connector supports the panel's GPIO functions: 4 outputs and 8 inputs. See GPIO, on page 198.

Function Buttons

The NV9605 has an array of 32 function buttons on the left. Four of the 6 buttons on the right are function buttons. The other 2 buttons on the right are scroll buttons. The buttons' functions are only slightly different in each of the 2 operating modes. (See Modes of Operation, next.)

The 10 buttons at the top left are labeled with numerals (0–9). These are for menu operations such as entering the panel ID.

Each button has *three* operational levels: high and low tally (green or amber), and off. (The button material is actually white or gray.)

The function buttons each have clear plastic keycaps under which you may place plastic inserts for button legends. Buttons of the NV9605V (virtual panel), however, have automatically generated button legends.

Differences between the Left and Right Function Buttons

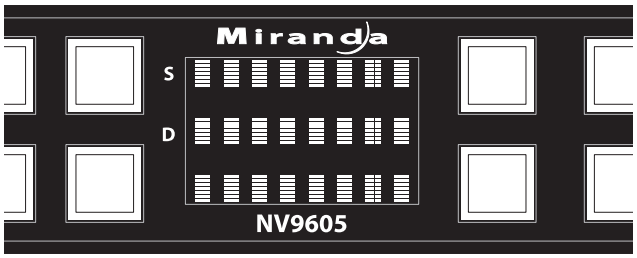
All 32 buttons to the left of the display scroll whenever you press a scroll button. The buttons on the pages are independent.

The 4 function buttons on the right behave differently when you scroll:

- Source buttons remain source buttons on all pages, although they can represent different sources on different pages. Destination buttons are destination buttons on all pages, although they can represent different destinations on different pages.
- Other functions (such as 'Hold' or 'Menu') are fixed and remain the same for all pages.

Alphanumeric Display

The display has 3 fields of 8 characters:



- Status, labeled "S" on the panel.

  The 'Status' field always shows the source that was routed to the currently selected destination, which is identified in the 'Destination' field.
- Destination, labeled "D" on the panel.

  The 'Destination' field shows the current destination.

  In multi-destination mode, the destination field shows the most recently selected destination and the status field changes to reflect the source most recently routed to that destination.
- Page, unlabeled.

  The 'Page' field shows the current page (of four).

The 'Status' and 'Destination' fields can show either names belonging to a name set or the system mnemonics.

Modes of Operation

The NV9605 operates in one of 2 modes:

- Limited X-Y Mode.
- Multi-Destination Mode.

The panel's set of button functions varies *slightly* with the mode.

The modes (or behavioral models) are determined at configuration. The operator cannot switch between different modes.

Limited X-Y Mode

In limited X-Y mode, takes occur from a single selectable source to a single selectable destination.

If the panel has any level buttons, operators may perform breakaway — routing sources on fewer than all levels.

Pressing a source button completes the take. There is no 'Take' button.

Multi-Destination Mode

In this mode, source buttons are configured with destinations as well as sources. Thus, each source button completes a route to an individual destination.

There is no 'Take' button. Takes are all-level.

Secondary Modes

Additional but secondary modes of panel operation are:

- Setup mode — where the NV9605 is freshly powered up, but disconnected from the network. In this mode, you can set the panel ID and perform a few diagnostic tasks.
- Menu mode — pressing a menu button places the NV9605 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.

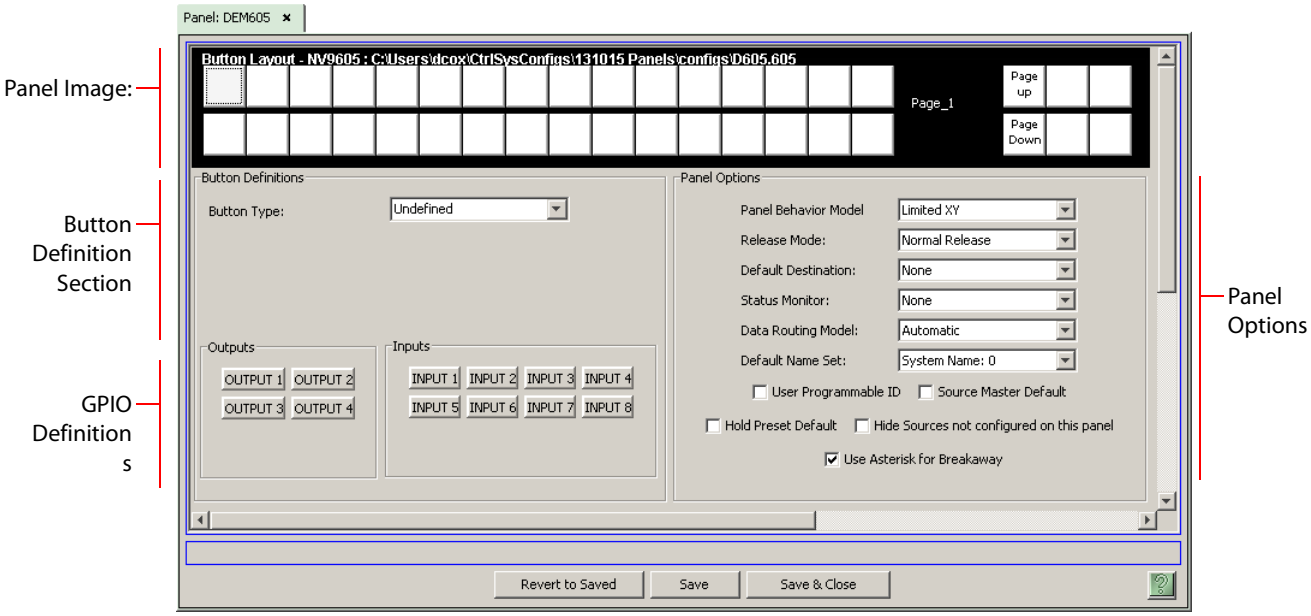
Other NV9605 Functions

The NV9605 can be configured to perform the following additional functions:

- System salvos.
- Broadcast data routing.

NV9605 Configuration Page

This is the default NV9605 panel configuration page:



After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

There are 4 main regions:

- A graphic representation of the NV9605 panel.

  Configurers must click a button "proxy" to select the button for configuration.
- Button definitions.

  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definition Section, following.
- Panel options.

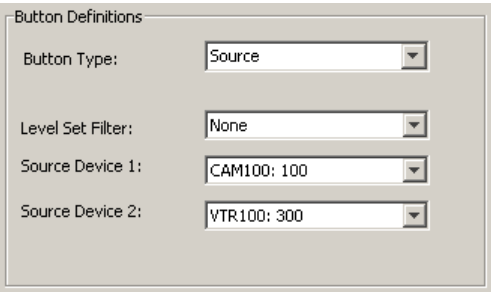
  In this section, configurers may specify the behavioral characteristics of the panel. See the *NV9605 User's Guide* for detailed information.
- GPIO definitions.

  In this section, configurers may define GPIO logic. The control panel has a rear connector that provides 4 relay outputs and 8 optically isolated inputs. See GPIO, on page 198.

  (Note that the graphical buttons represent *connectors* and not actual buttons.)

Button Definition Section

The button definition section configures the button you have selected in the image of the NV9605:



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.

These are the button types available for NV9605 configurations:

Broadcast	Chop	Default state	Destination
Destination Lock	Destination Protect	Free Source	Hold
Level	Menu	Name Set Toggle	None/All
Panel Lock	Previous Source	Salvo	Source
Source Master	Source Shift		

Not all button types are available in all modes. Only a few button types are available for the 32 buttons to the left of the display.

▲ Note that other panels might have button types with the same names but that perform different functions.

NV9605 Button Types

These are the button types available for the NV9605. These letter codes represent its modes:

X — limited X-Y mode

M — multi-destination mode

Only a few button types are available for the 32 buttons to the left of the display. These are designated with the letter code "L."

Type	Code	Description
Broadcast	M, X	On the data (machine control) level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button definition has no fields to configure. A broadcast button is useful in dubbing applications or when a backup (redundant) device is in use. See also the Source Master button, following.
Chop	M, X	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. The button definition has no fields to configure.
Default state	X	The button returns the panel to its most recent power-up state. That is called the *default state*. The button definition has no fields to configure.
Destination	L, X	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. When you assign a destination button, two drop-down menus appear: 'Level Set Filter' and 'Destination Device'. Select the device for this button from the list that appears in the 'Destination Device' field. The button is not available in multi-destination mode.
Destination Lock	M, X	The button sets or removes a "lock" on the current destination device. The lock can be removed only by the user (at this panel or at another) that originally set the lock, or by a panel that has "Force Release" enabled. The button definition has no fields to configure. The NV9605 provides no explicit indication, during operation, whether a destination is locked or unlocked. This button is available, but does not operate, in multi-destination mode. It is present on the configuration page as a future feature.

Type	Code	Description
Destination Protect	M, X	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. **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. The button definition has no fields to configure. The NV9605 provides no explicit indication, during operation, whether a destination is locked or unlocked. This button is available, but does not operate, in multi-destination mode. It is present on the configuration page as a future feature.
Free Source	M, X	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 *Level Set Details* page of NV9000-SE Utilities. The button definition has no fields to configure. The free source button must be used in conjunction with machine control router(s). Otherwise, it fails with an 'Inv Src' message briefly appearing in the 'Status' field of the display. This button is available, but does not operate, in multi-destination mode. It is present on the configuration page as a future feature.
Hold	X	In limited X-Y mode, this button allows the operator to perform a gang (or "dub") route. In hold mode, destination selections are cumulative, and not mutually exclusive. Hold mode also allows breakaway levels to be retained after a take. The hold button is a toggle; press it once to place the panel in "hold mode." Press it again to cancel "hold mode." In the Panel Options, you can specify whether the panel powers up in hold mode. The button definition has no fields to configure.
Level	L, X	The button selects a level. (The button is not available in multi-destination mode.) The button definition has one field to configure: the level. (Do not choose 'None' for the level.) This button type applies only in limited X-Y mode. Your panel can have multiple level buttons, one for each level you want the operator to control. The operator selects multiple levels for a breakaway and then presses a source to complete the take. When all level buttons are *deselected*, or when all level buttons are *selected,* a take is "all-level." When one or more level buttons are selected, a take occurs on just those levels. The operator must select levels before selecting the source. The color of the level buttons reflect the selected levels of the current destination in a limited way. See also the None/All button, following.

Type	Code	Description
Menu	M, X	This button puts the NV9605 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. 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. The button definition has no fields to configure.
Name Set Toggle	L, M, X	The button toggles the panel between its default name set and the "system name" set. One or the other becomes the active name set. The button definition has no fields to configure. 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'. 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.
None/All	X	The button toggles the panel between all levels (of the current destination) being selected and none of the levels being selected. The button definition has no fields to configure.
Panel Lock	L, M, X	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. The button definition has no fields to configure.
Previous Source	M, X	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. The button definition has no fields to configure. 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. This button type can be used in either mode.
Salvo	L, M, X	The salvo button executes a system salvo immediately. During configuration, when you assign a salvo button, a drop-down menu appears: 'Salvo'. Choose a salvo from the list. The 'None' entry is merely a placeholder. Do not choose 'None'. This button type can be used in either mode.

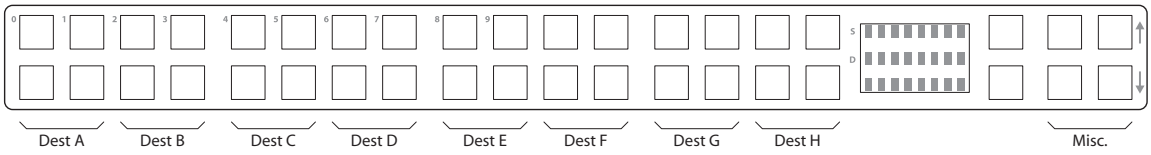
Type	Code	Description
Source	L, M, X	The button selects a source. The source name appears in the 'Status' display. ***Pressing a source button completes a take.*** The nature of source buttons differs in the operating modes: Limited X-Y mode When you assign a source button, two drop-down menus appear: 'Source Device 1' and 'Source Device 2'. These correspond to two sets of sources. If there is a 'Source Shift' button on the panel, the operator can switch between the two sets. When the first set is selected, pressing the button selects device 1. When the second set is selected, pressing the button selects device 2. Multi-destination mode When you assign a source button, *three* drop-down menus appear: 'Source Device 1', 'Source Device 2', and 'Destination Device'. The first two correspond to the two sets of sources. If there is a 'Source Shift' button on the panel, the operator can switch between the two sets. When the first set is selected, pressing the button selects device 1. When the second is selected, pressing the button selects device 2. The 'Destination Device' field allows you to configure a destination for every source button. Typically, you will assign one destination device to one group of sources, another destination to another group of sources, and so on. At the limit, you can configure up to 36 destinations in each of the 4 pages. The destination assigned to the button does not change when the operator presses the 'Source Shift' button.
Source Master	M, X	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 definition has no fields to configure. 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). 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.
Source Shift	M, X	The button toggles between the first and second sets of sources. The button definition has no fields to configure. The button affects the operation of any source button (in either limited X-Y mode or multi-destination mode). Source buttons represent two sources. One belongs to one source set and the other belongs to the other source set. This button type can be used in either mode.
Undefined	—	This button type is a placeholder: during configuration, it makes the button undefined and inactive. On the actual panel, the undefined button remains unlit (dark).

See the *NV9605 user's Guide* for more detail.

Multi-Destination Configuration

A panel configured in multi-destination mode has buttons that represent 2 sources and a destination. Pressing a button selects one of the sources and the destination and performs an immediate take — to the destination assigned to the button. (A "shift" button switches between the two sources of the source buttons.)

A typical multi-destination configuration might, for example, provides 8 destinations with up to 8 sources available for each one, with the 4 buttons on the right assigned to other functions:



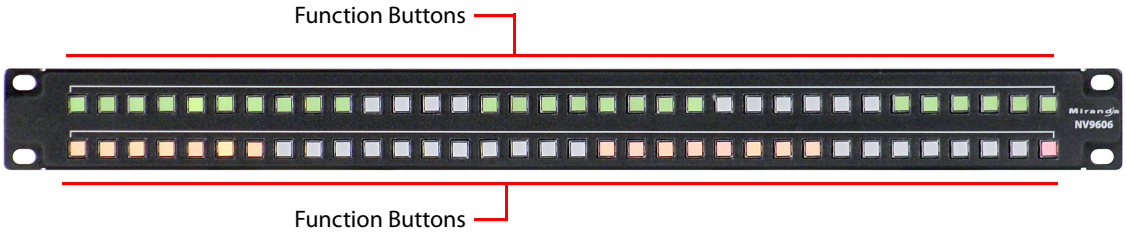
Single-Destination Configuration

It is possible to configure the panel for single-destination operation, in either limited X-Y mode or multi-destination mode.

NV9606

NV9606 Panel Description

The NV9606 is a 1RU control panel. It has 68 backlit function buttons:



The NV9606 can operate either by itself as a stand-alone panel or as a extension of an NV9607 control panel.

An equivalent virtual panel — the NV9606V — is available.

When the panel is stand-alone, the function buttons are limited: an operator can select sources and destinations or execute salvos. When the panel is used as an NV9607 extension, the set of functions is approximately that of the NV9607. As an extension to an NV9607, it can operate in any of the 4 modes configured for that particular NV9607. See Modes of Operation, following.

The sets of functions differ in the different operating modes.

At the rear of the panel are power, serial control, Ethernet, and GPIO connectors:

You connect the NV9606 to the NV9000 system using the Ethernet connector.

The serial port is for local diagnostics, as it is for all control panels.

The NV9606 uses external PS0001 power supplies. One will suffice. Two provide redundancy.

The GPIO connector supports the panel's GPIO functions: 4 outputs and 8 inputs. See GPIO, on page 198.

Function Buttons

The NV9606 has 2 rows of 34 function buttons. The total is 68 function buttons. The set of buttons differ in each of the 4 operating modes. (See Modes of Operation, following.)

Physical source buttons represent one of two sets of sources. Physical destination buttons (if present) represent one of two sets of destinations. The panel can be configured with a 'Source Shift' button that toggles between the two source pages and a 'Destination Shift' button that toggles between the two destination pages.

Each button has *three* operational levels: high and low tally (green or amber), and off. (Their material is actually white or light gray.)

The function buttons each have clear plastic keycaps under which you may place plastic inserts for button legends. Buttons of the NV9606V (virtual panel) have automatically generated button legends.

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.

See GPIO, on page 198.

Modes of Operation

By itself, the NV9606 operates in a very limited X-Y mode.

As an NV9607 extension, the NV9606 can operate in any of the modes configured for the NV9607.

- Limited X-Y Mode.
- Single-Destination Mode.
- Single-Destination Mode with Breakaway.
- Multi-Destination Mode.

The panel's set of button functions varies with the mode.

The modes (or behavioral models) are determined at configuration for both the NV9606 and the NV9607. The operator cannot switch between different modes.

Limited X-Y Mode

In limited X-Y mode, takes occur from a single source to a single destination (selectable).

Pressing a source button completes a take unless the corresponding NV9607 has a 'Source Preview' button and it is active (high-tally).

Breakaway is possible in this mode if the panel has level buttons. Level buttons selected the levels on which the take is to occur. Takes occur on all levels when either no levels are selected or when all levels are selected.

Single-Destination Mode

In single destination mode, the panel's destination is configured as the default destination and there are no destination buttons.

Pressing a source button completes a take unless the corresponding NV9607 has a 'Source Preview' button and it is active (high-tally).

Takes are all-level.

Single-Destination Mode with Breakaway

In this mode too, the single destination is configured as the default destination. There are no destination buttons.

Pressing a source button completes a take unless the corresponding NV9607 has a 'Source Preview' button and it is active (high-tally).

Breakaway is possible in this mode if the panel has level buttons. Level buttons selected the levels on which the take is to occur. Takes occur on all levels when either no levels are selected or when all levels are selected.

Multi-Destination Mode

In this mode, source buttons are configured with destinations as well as sources. Thus, each source button completes a route to an individual destination.

Pressing a source button completes a take unless the corresponding NV9607 has a 'Source Preview' button and it is active (high-tally).

Takes are all-level.

Secondary Modes

The NV9606 of itself has no secondary modes.

The NV9606 has a limited self-test capability, but no setup mode in which to change its panel ID. To change the panel ID, you must use NV9000-SE Utilities.

Other NV9606 Functions

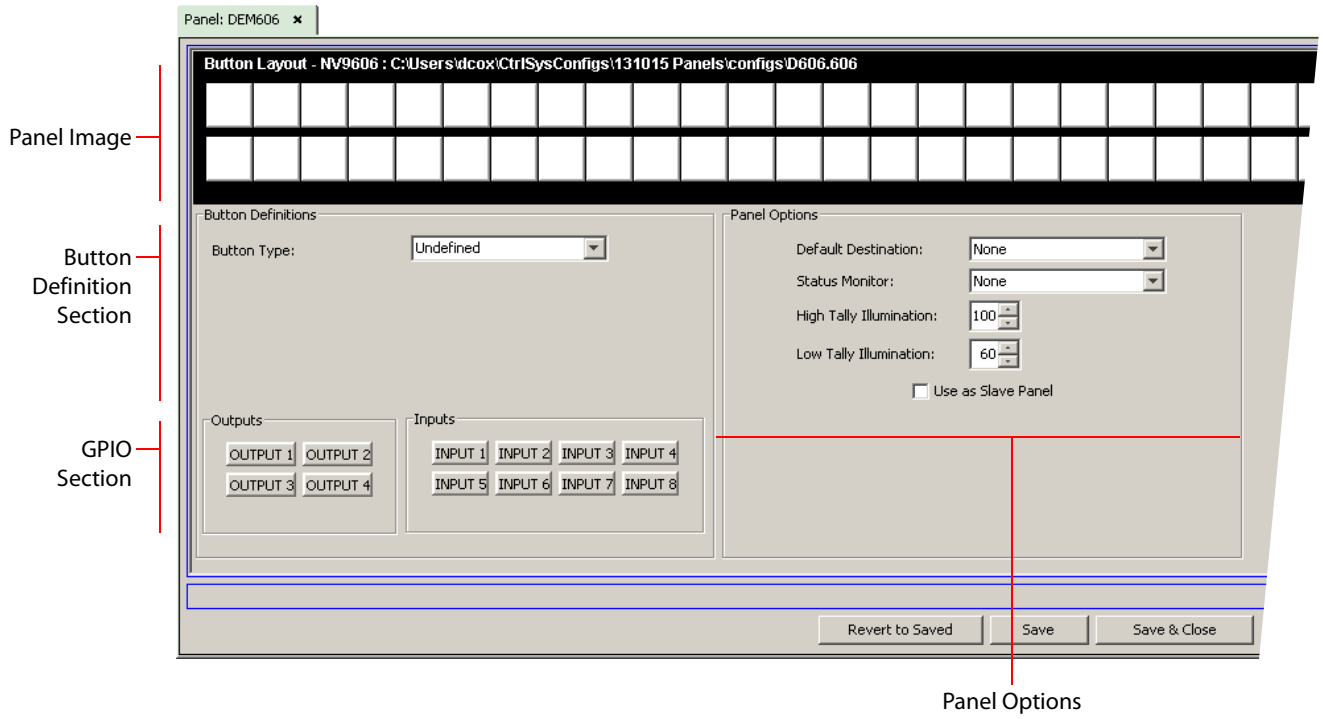
By itself, the NV9606 can also be configured to perform system salvos.

As an NV9607 extension, the NV9606 can be configured to perform the following additional functions:

- System salvos.
- Broadcast data routing.

NV9606 Configuration Page

This is the default NV9606 panel configuration page:



After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

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

- A graphic representation of the NV9606 panel.

  Configurers must click a button "proxy" to select the button for configuration.
- Button definitions.

  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definition Section, following.

- GPIO definitions.

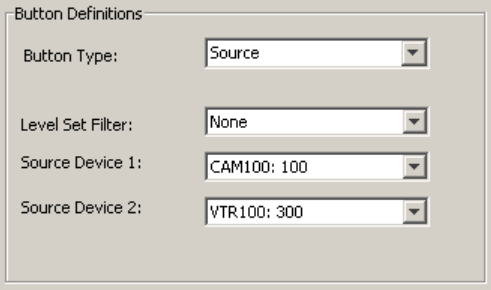
  In this section, configurers may define GPIO logic. The control panel has a rear connector that provides 4 relay outputs and 8 optically isolated inputs. See GPIO, on page 198. (Note that the graphical buttons represent *connector terminals* and not actual buttons.)

- Panel options.

  In this section, configurers may specify the behavioral characteristics of the panel. See the *NV9606 User's Guide* for detailed information.

Button Definition Section

The button definition section configures the button you have selected in the image of the NV9606:



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.

When the NV9606 operates stand-alone, it has only a few button functions:

Source Previous Source Salvo Destination Panel Lock

When the NV9606 is an NV9607 extension, these are the button types available:

Broadcast	Chop	Default state	Destination
Destination Lock	Destination Protect	Destination Shift	Free Source
Hold	Information	Level	Menu
None/All	Page Down	Page Up	Panel Lock
Previous Source	Salvo	Source	Source Master
Source Shift			

Not all button types are available in all of the modes.

▲ Note that other panels might have button types with the same names but that perform different functions.

NV9606 Button Types

These are the button types available for the NV9606. These codes, present in the table that follows, represent its modes:

S — single-destination mode

B — single-destination mode with breakaway

X — limited X-Y mode

M — multi-destination mode

All — all modes

The letter 'L' denotes stand-alone operation.

Type	Modes	Description
Broadcast	X	With respect to the machine control level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button definition has no fields to configure. A broadcast button is useful in dubbing applications or when a backup (redundant) device is in use. See the *NV9607 User's Guide* for more information. See also the Source Master button, following.
Chop	All	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. The button definition has no fields to configure.
Default state	S, B, X	The button returns the panel to its most recent power-up state. That is called the *default state*. The button definition has no fields to configure.
Destination	X, L	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. When you assign a destination button, two drop-down menus appear: 'Destination Device 1' and 'Destination Device 2'. These correspond to the two destination pages. If there is a 'Destination Shift' button on the panel, the operator can switch between the two pages. When the first page is selected, pressing the button selects device 1. When the second page is selected, pressing the button selects device 2.
Destination Lock	S, B, X	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. The button definition has no fields to configure. The NV9606 provides no explicit indication, during operation, whether a destination is locked or unlocked.
Destination Protect	S, B, X	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. **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. The button definition has no fields to configure. The NV9606 provides no explicit indication, during operation, whether a destination is locked or unlocked.

Type	Modes	Description
Destination Shift	X	The button toggles between the first and second destination sets. The button definition has no fields to configure. This button toggles between the two destinations assigned to a 'Destination' button. See the Destination button, above.
Free Source	S, B, X	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 *Level Set Details* page of NV9000-SE Utilities. The button definition has no fields to configure.
Hold	B, X	In single-destination mode with breakaway, this button retains breakaway levels after a take. In limited X-Y mode, this button allows the operator to perform a gang (or "dub") route. In hold mode, destination selections are cumulative, and not mutually exclusive. The hold button is a toggle; press it once to place the panel in "hold mode." Press it again to cancel "hold mode." In the panel options, you can specify whether the panel powers up in hold mode. The button definition has no fields to configure.
Information	All	The information button displays auxiliary information about level mapping, breakaway, and perhaps other matters. The operator presses the information button once to see the information and again to hide the information.
Level	B, X	The button selects a level. The button definition has one field to configure: the level. (Do not choose 'None' for the level.) Your panel — configured for single-destination mode with breakaway — will have multiple level buttons, one for each level you want the operator to control. The operator selects multiple levels for a breakaway and then presses a source to complete the take. When all level buttons are *deselected*, or when all level buttons are *selected,* a take is "all-level." When one or more level buttons are selected, a take occurs on just those levels. The operator must select levels before selecting the source The color of the level buttons reflect the levels of the current destination in a limited way. See also the None/All button, following.
Menu	All	This button puts the ***NV9607*** 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. 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 the *NV9607 User's Guide* for more information. The button definition has no fields to configure.

Type	Modes	Description
None/All	B	The button toggles the panel between all levels (of the current destination) being selected and none of the levels being selected. The button definition has no fields to configure.
Page Down	All	The button scrolls the display down one page (either 3 lines or 7 lines according to the panel's display configuration). The button definition has no fields to configure.
Page Up	All	The button scrolls the display up one page (either 3 lines or 7 lines according to the panel's display configuration). The button definition has no fields to configure.
Panel Lock	All, L	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 red. Pressing the panel lock button again reverts the panel to its previous state. (When the panel is in its normal state, the button is low-tally red.) The button definition has no fields to configure.
Previous Source	S, B, X, L	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. The button definition has no fields to configure. 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.
Salvo	All, L	The salvo button executes a system salvo immediately. During configuration, when you assign a salvo button, a drop-down menu appears: 'Salvo'. Choose a salvo from the list. The 'None' entry is merely a placeholder. Do not choose 'None'.

Type	Modes	Description
Source	All, L	The button selects a source. The source name appears in the 'Status' display. ***Pressing a source button completes a take unless source preview mode is in effect.*** In that case, pressing a take button is required for the completion of the take. The nature of source buttons differs in the 4 operating modes of the NV9607: Single-destination, single-destination with breakaway, and limited X-Y modes When you assign a source button, two drop-down menus appear: 'Source Device 1' and 'Source Device 2'. These correspond to the two source pages. If there is a 'Source Shift' button on the panel, the operator can switch between the two pages. When the first page is selected, pressing the button selects device 1. When the second page is selected, pressing the button selects device 2. Multi-destination mode When you assign a source button, *three* drop-down menus appear: 'Source Device 1', 'Source Device 2', and 'Destination Device'. The first two correspond to the two source pages. If there is a 'Source Shift' button on the panel, the operator can switch between the two pages. When the first page is selected, pressing the button selects device 1. When the second page is selected, pressing the button selects device 2. The 'Destination Device' field allows you to configure a destination for every source button. Typically, you will assign one destination device to one set of sources, another destination to another set of sources, and so on. At the limit, you could configure up to 184 destinations. (68 in the NV9606 and 116 in the NV9607). The destination assigned to the button does not change when the source page changes. See the *NV9607 User's Guide* for more information.
Source Master	All	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 definition has no fields to configure. 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). 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. The 'Source is Master' button is also used to initiate "broadcast" machine control routes. See the *NV9607 User's Guide* for more information.

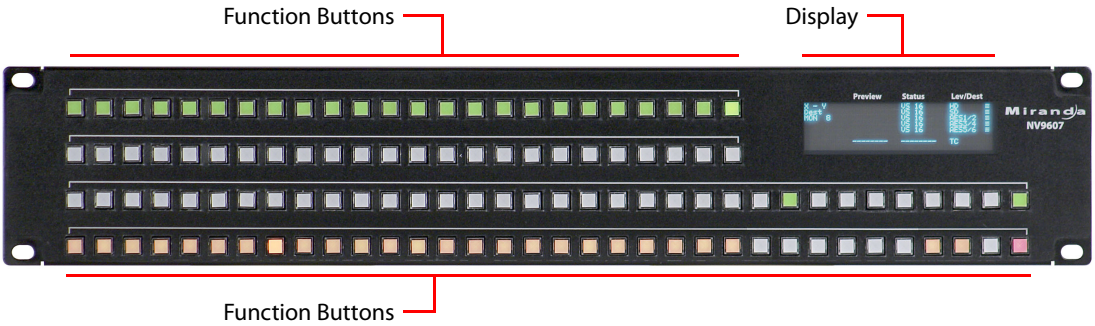
Type	Modes	Description
Source Shift	All	The button toggles between the first and second source sets. The button definition has no fields to configure. The button affects the operation of any source button (in any mode). Source buttons represent two sources. One belongs to one source set and the other belongs to the other source set.
Undefined	All, L	This button type is a placeholder: during configuration, it makes the button undefined and inactive. On the actual panel, the undefined button remains inactive and unlit (dark).

See the *NV9606 User's Guide* for more detail.

NV9607

NV9607 Panel Description

The NV9607 is a 2RU control pane. It has 116 backlit function buttons and a small display. The display has either 4 or 8 lines of 42 characters, depending on its configuration:



An NV9606 control panel can operate as an extension of the NV9607. That is, an NV9607 and an NV9606 together form a larger panel with more buttons.

An equivalent virtual panel — the NV9607V — is available.

The NV9607 can operate in one of 4 modes:

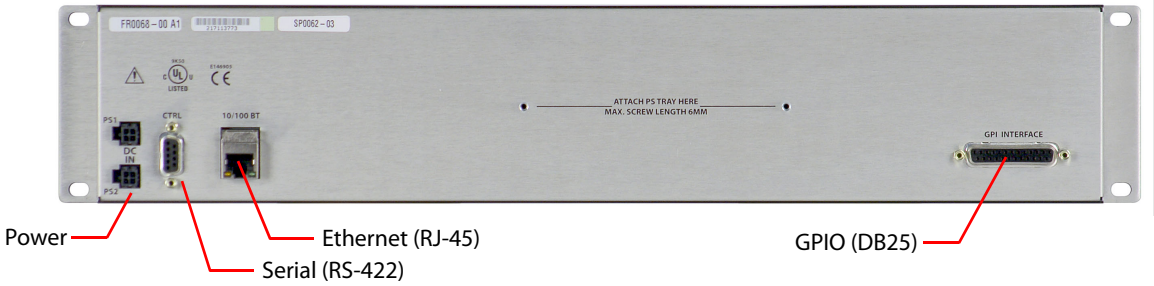
- Limited X-Y mode.
- Single-destination (SD) mode.
- Single-destination mode with breakaway.
- Multi-destination (MD) mode.

See Modes of Operation, following.

The function buttons are configurable. They select sources or destinations, or they execute functions. Physical source selection buttons represent one of two sets of sources. Physical destination selection buttons (if present) represent one of two sets of destinations. An operator can toggle between the two sets.

The sets of functions differ in the different operating modes.

At the rear of the panel are power, serial control, Ethernet, and GPIO connectors:



You connect the NV9607 to the NV9000 system using the Ethernet connector.

The serial port is for local diagnostics, as it is for all control panels.

The NV9607 uses external PS0001 power supplies. One will suffice. Two provide redundancy.

The GPIO connector supports the panel's GPIO functions: 4 outputs and 8 inputs. See GPIO, on page 198.

Function Buttons

The NV9607 has 4 rows of function buttons. The upper two rows have 24 buttons. The lower two rows have 34 buttons. The total is 116 function buttons. The set of button functions differ in each of the 4 operating modes. (See Modes of Operation, following.)

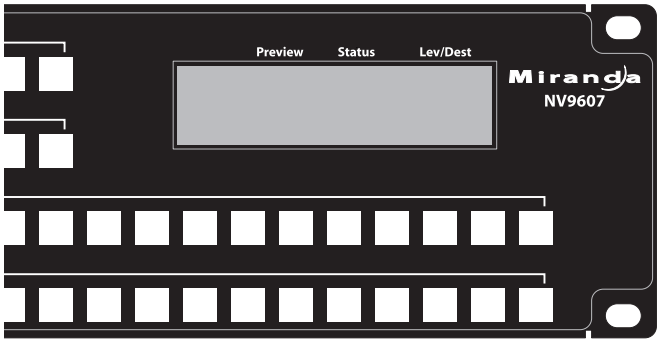
Physical source buttons represent one of two sets of sources. Physical destination buttons (if present) represent one of two sets of destinations. The panel can be configured with a 'Source Shift' button that toggles between the two source pages and a 'Destination Shift' button that toggles between the two destination pages.

Each button has *three* operational levels: high and low tally (green, amber, and sometimes red), and off. (The button material is actually white or gray.)

The function buttons each have clear plastic keycaps under which you may place plastic inserts for button legends. Buttons of the NV9607V (virtual panel), however, have automatically generated button legends.

Alphanumeric Display

The panel has an alphanumeric display (a VFD) at the top right:



The display has either 4 or 8 lines of 42 characters, depending on configuration. The characters are tall (4×14) when the display is configured for 4 lines.

When the panel is in multi-destination mode, the contents of the display differ greatly from the contents in the other modes.

The main difference between XY mode, SD mode, and SD mode with breakaway is the title in the first line.

'Page Up' and 'Page Down' button functions are available for scrolling the display.

The display has 4 columns:

- Information (the left-most column, not labeled).

  The first entry in this column is 'X - Y', 'Single', '1Dst/wBrk', or 'MultiDest" depending on the mode in which the panel is configured, unless the operator has entered menu mode, or setup mode or has pressed an 'Information' button.

  The bottom-most entry in this column is always the page number of the display.

  In MD mode, there are no entries in this column other than "MultiDest" and the page number. In the other modes, the third entry identifies the current destination.

- Preview.

  The preview column indicates what source will be routed to a destination when the operator presses a 'Take' button.

  ▲ This column is used only when the panel is in source preview mode. When the panel is not in source preview mode, takes occur when the operator selects a source.

  In MD mode, the preview column indicates the source(s) that will be routed to selected destination(s) in the 'Level/Dest' column. After the take, they disappear from the preview column and re-appear in the status column.

  In the other modes, the preview column represents either the levels of a source or the levels of multiple sources under breakaway. After the take, they disappear from the preview column and re-appear in the status column. (If the take was unsuccessful, the preview column remains unchanged.)

- Status.

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

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

  In the other modes, the status column represents either the levels of a source or the levels of multiple sources under breakaway.

- Level/Dest.

  In MD mode, the 'Level/Dest' column presents all the MD destinations defined in the NV9607 configuration. (The actual destinations are defined in the NV9000 configuration.)

  In the other modes, this column identifies the levels of the currently selected destination. That destination is identified in the information column.

The display fields can show either names in a name set or the system mnemonics.

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.

See GPIO, on page 198.

Modes of Operation

The NV9607 operates in one of 4 modes:

- Limited X-Y Mode.
- Single-Destination Mode.
- Single-Destination Mode with Breakaway.
- Multi-Destination Mode.

The panel's set of button functions varies with the mode.

The modes (or behavioral models) are determined at configuration. The operator cannot switch between different modes.

▲ The NV9606 control panel can operate as an extension of the NV9607.

Limited X-Y Mode

In limited X-Y mode, takes occur from a single source to a single destination (selectable).

Pressing a source button completes a take unless a panel has a 'Source Preview' button and it is active (high-tally).

Breakaway is possible in this mode if the panel has level buttons. Level buttons select the levels on which the take is to occur. Takes occur on all levels when either no levels are selected or when all levels are selected.

Single-Destination Mode

In single destination mode, the panel's destination is configured as the default destination and there are no destination buttons.

Pressing a source button completes a take unless a panel has a 'Source Preview' button and it is active (high-tally).

Takes are all-level.

Single-Destination Mode with Breakaway

Again the single destination is configured as the default destination. There are no destination buttons.
Pressing a source button completes a take unless a panel has a 'Source Preview' button and it is active (high-tally).

Breakaway is possible in this mode if the panel has level buttons. Level buttons selected the levels on which the take is to occur. Takes occur on all levels when either no levels are selected or when all levels are selected.

Multi-Destination Mode

In this mode, source buttons are configured with destinations as well as sources. Thus, each source button completes a route to an individual destination.

Pressing a source button completes a take unless a panel has a 'Source Preview' button and it is active (high-tally).

Takes are all-level.

Secondary Modes

Additional but secondary modes of panel operation are:

- Setup mode — where the NV9607 is powered up, but disconnected from the network. In this mode, you can set the panel ID and perform a few diagnostic tasks.
- Menu mode — pressing a menu button places the NV9607 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.
- Source preview mode — (in any of the operating modes) allows source selection to act as a preview selection, requiring the operator to press a 'Take' button to complete a take.

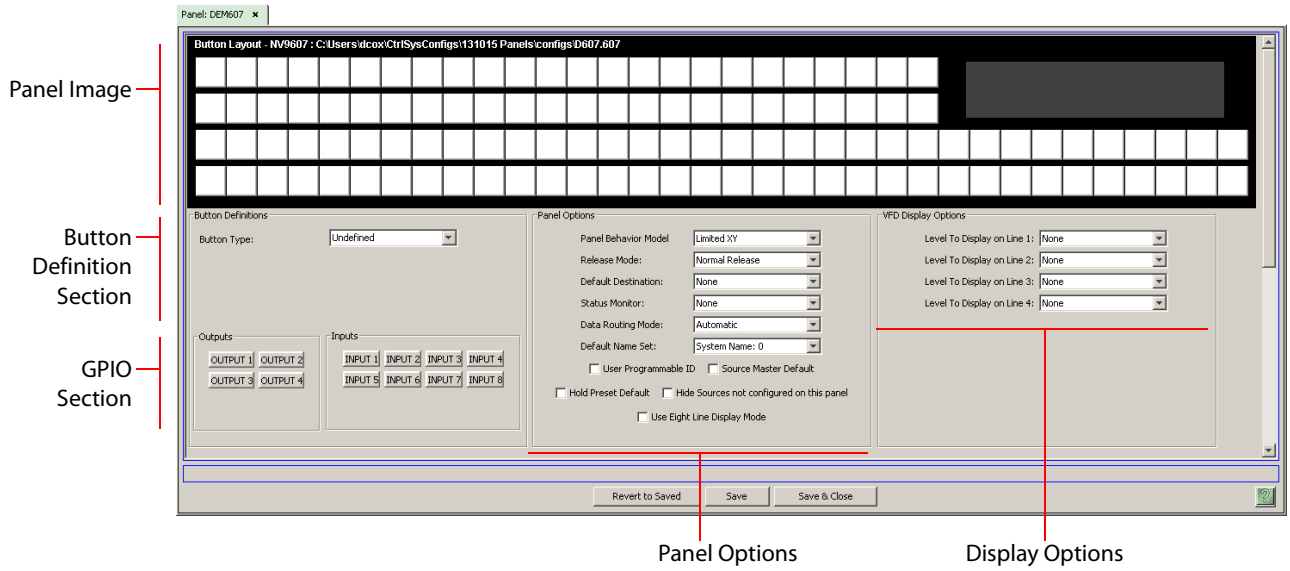
Other NV9607 Functions

The NV9607 can be configured to perform the following additional functions:

- System salvos.
- Broadcast data routing.

NV9607 Configuration Page

This is the default NV9607 panel configuration page:



After you have configured the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

There are 5 main regions:

- A graphic representation of the NV9607 panel.

  Configurers must click a button "proxy" to select the button for configuration.
- Button definitions.

  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definitions, following.
- GPIO definitions.

  In this section, configurers may define GPIO logic. The control panel has a rear connector that provides 4 relay outputs and 8 optically isolated inputs. See GPIO, on page 198. (Note that the graphical buttons represent *connectors* and not actual buttons.)
- Panel options.

  In this section, configurers may specify the behavioral characteristics of the panel. See the *NV9607 User's Guide* for detailed information.
- Display options.

  In this section, configurers may *partially* specify the ordering of levels when the panel is in X-Y mode, single-destination mode, or single-destination mode with breakaway.

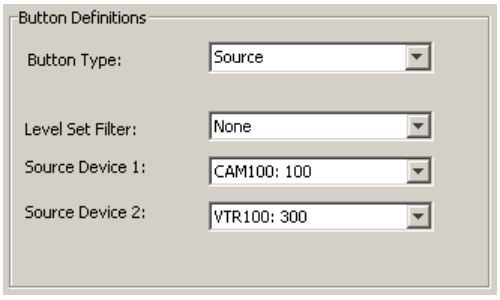
  In these modes, the display shows level information, up to 4 lines or 8 lines, as the display is configured. The display options let you specify explicitly which levels appear on those 4 (or 8) lines. The specification applies, however, *only to the first page* of the level display.

  You may leave any of the fields in this section blank. If you leave all of the fields blank, the display will present levels *in their default order*.

  If you leave some fields blank, those display lines will appear blank, while the lines for which you specified a level will show that level.

Button Definitions

The button definition section configures the button you have selected in the image of the NV9607:



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.

These are the button types available for NV9607 configurations:

Broadcast	Chop	Default state	Destination
Destination Lock	Destination Protect	Destination Shift	Free Source
Hold	Information	Level	Menu
Name Set Toggle	None/All	Page Down	Page Up
Panel Lock	Previous Source	Salvo	Source
Source Master	Source/Destination	Source Preview	Source Shift
Take			

Not all button types are available in all modes.

▲ Note that other panels might have button types with the same names but that perform different functions.

NV9607 Button Types

The following table shows the button types for the NV9607. These codes, present in the table that follows, represent its modes:

S — single-destination mode

B — single-destination mode with breakaway

X — limited X-Y mode

M — multi-destination mode

All — all modes

Type	Modes	Description
Broadcast	X	With respect to the machine control level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button definition has no fields to configure. A broadcast button is useful in dubbing applications or when a backup (redundant) device is in use. See also the Source Master button, following.
Chop	All	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. The button definition has no fields to configure.
Default state	S, B, X	The button returns the panel to its most recent power-up state. That is called the *default state*. The button definition has no fields to configure.

Type	Modes	Description
Destination	X	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. When you assign a destination button, two drop-down menus appear: 'Destination Device 1' and 'Destination Device 2'. These correspond to the two destination pages. If there is a 'Destination Shift' button on the panel, the operator can switch between the two pages. When the first page is selected, pressing the button selects device 1. When the second page is selected, pressing the button selects device 2.
Destination Lock	S, B, X	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. The button definition has no fields to configure. The NV9607 provides no explicit indication, during operation, whether a destination is locked or unlocked.
Destination Protect	S, B, X	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. **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. The button definition has no fields to configure. The NV9607 provides no explicit indication, during operation, whether a destination is locked or unlocked.
Destination Shift	X	The button toggles between the first and second destination sets. The button definition has no fields to configure. This button toggles between the two destinations assigned to a 'Destination' button. See the Destination button, above.
Free Source	S, B, X	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 *Level Set Details* page of NV9000-SE Utilities. The button definition has no fields to configure.
Hold	B, X	In single-destination mode with breakaway, this button retains breakaway levels after a take. In limited X-Y mode, this button allows the operator to perform a gang (or "dub") route. In hold mode, destination selections are cumulative, and not mutually exclusive. The hold button is a toggle; press it once to place the panel in "hold mode." Press it again to cancel "hold mode." In the panel options, you can specify whether the panel powers up in hold mode. The button definition has no fields to configure.
Information	All	The information button displays auxiliary information about level mapping, breakaway, and perhaps other matters. The operator presses the information button once to see the information and again to hide the information.

Type	Modes	Description
Level	B, X	The button selects a level. The button definition has one field to configure: the level. (Do not choose 'None' for the level.) Your panel — configured for limited X-Y mode or single-destination mode with breakaway — will have multiple level buttons, one for each level you want the operator to control. The operator selects multiple levels for a breakaway and then presses a source to complete the take. When all level buttons are *deselected*, or when all level buttons are *selected,* a take is "all-level." When one or more level buttons are selected, a take occurs on just those levels. The operator must select levels before selecting the source The color of the level buttons reflect the levels of the current destination in a limited way. See also the None/All button, following.
Menu	All	This button puts the NV9607 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. 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. The button definition has no fields to configure.
Name Set Toggle	All	The button toggles the panel between its default name set and the "system name" set. One or the other becomes the active name set. The button definition has no fields to configure. 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'. 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.
None/All	B	The button toggles the panel between all levels (of the current destination) being selected and none of the levels being selected. The button definition has no fields to configure.
Page Down	All	The button scrolls the display down one page (either 3 lines or 7 lines according to the panel's display configuration). The button definition has no fields to configure.
Page Up	All	The button scrolls the display up one page (either 3 lines or 7 lines according to the panel's display configuration). The button definition has no fields to configure.

Type	Modes	Description
Panel Lock	All	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 red. Pressing the panel lock button again reverts the panel to its previous state. (When the panel is in its normal state, the button is low-tally red.) The button definition has no fields to configure.
Previous Source	S, B, X	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. The button definition has no fields to configure. 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.
Salvo	All	The salvo button executes a system salvo immediately. During configuration, when you assign a salvo button, a drop-down menu appears: 'Salvo'. Choose a salvo from the list. The 'None' entry is merely a placeholder. Do not choose 'None'.
Source	All	The button selects a source. The source name appears in the 'Status' display. ***Pressing a source button completes a take unless source preview mode is in effect.*** In that case, pressing a take button is required for the completion of the take. The nature of source buttons differs in the 4 operating modes: Single-destination, single-destination with breakaway, and limited X-Y modes When you assign a source button, two drop-down menus appear: 'Source Device 1' and 'Source Device 2'. These correspond to the two source pages. If there is a 'Source Shift' button on the panel, the operator can switch between the two pages. When the first page is selected, pressing the button selects device 1. When the second page is selected, pressing the button selects device 2. Multi-destination mode When you assign a source button, *three* drop-down menus appear: 'Source Device 1', 'Source Device 2', and 'Destination Device'. The first two correspond to the two source pages. If there is a 'Source Shift' button on the panel, the operator can switch between the two pages. When the first page is selected, pressing the button selects device 1. When the second page is selected, pressing the button selects device 2. The 'Destination Device' field allows you to configure a destination for every source button. Typically, you will assign one destination device to one set of sources, another destination to another set of sources, and so on. At the limit, you could configure up to 116 destinations. (When the NV9607 has an NV9606 extension, you could configure up to 68 additional destinations.) The destination assigned to the button does not change when the source page changes.

Type	Modes	Description
Source Master	All	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 definition has no fields to configure. 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). 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. The 'Source is Master' button is also used to initiate "broadcast" machine control routes.
Source/ Destination	X	The button selects both a source and a destination and performs an immediate take. Source/dest buttons are not subject to source preview mode. In fact they become inactive in source preview mode. Source/dest buttons are not subject to source shift or destination shift.
Source Preview	All	The button toggles 'source preview' mode. When source preview mode is off, pressing a source button results in an immediate take. When source preview mode is on, pressing a source button does not cause an immediate take, but places source information in the 'Preview' column of the display. Pressing a take button is required to complete the take. This mode allows operators to preview a source before actually executing the take. In source preview mode, all buttons except source buttons, source-related buttons, the 'Source Preview' button and the 'Take' button are disabled.
Source Shift	All	The button toggles between the first and second source sets. The button definition has no fields to configure. The button affects the operation of any source button (in any mode). Source buttons represent two sources. One belongs to one source set and the other belongs to the other source set.
Take	All	This button performs a take when a panel is in source preview mode (i.e., it has a 'Source Preview' button and it is high-tally). When the panel is not in source preview mode, any take button is disabled and dark. When the panel is in source preview mode, the take button is dark until you select a source. Then the take button turns low-tally red. After you press the take button, the button goes dark again.
Undefined	All	This button type is a placeholder: during configuration, it makes the button undefined and inactive. On the actual panel, the undefined button remains inactive and unlit (dark).

See the *NV9607 User's Guide* for more detail.

Multi-Destination Configuration

Pressing a source button selects the source and the destination. If the panel is not in *source preview mode,* the button performs an immediate take — to the destination assigned to the source button.

A typical multi-destination configuration might, for example, provides 12 destinations with up to 16 sources available for each one, with 20 buttons assigned to other functions:

NV9608 and NV9616

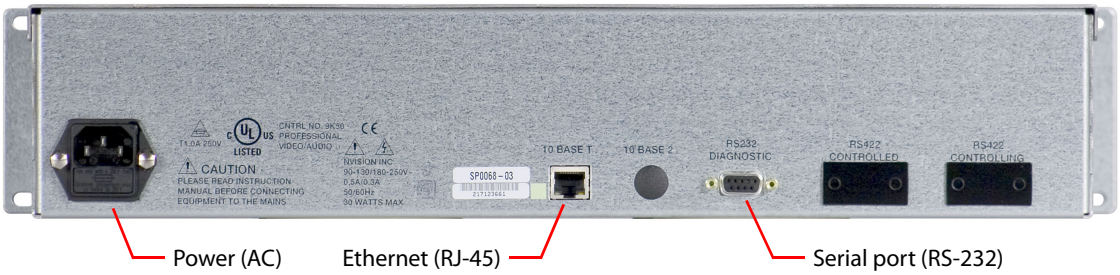
NV9608 and NV9616 Panel Descriptions

The NV9616 and NV9608 are 2RU control panels. The NV9616 has 16 LCD buttons whereas the NV9608 has 8 LCD buttons (and is less expensive). Otherwise, they are functionally identical:

NV9616

NV9608

At the rear are power, serial, and network connectors:



An equivalent NV9616V — a "virtual panel" — is available. It emulates the NV9616. There is no NV9608V.

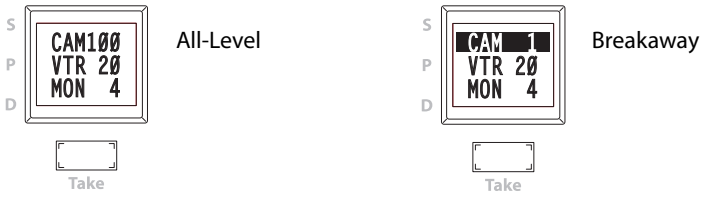
The panels can operate in one of 2 modes:

- X-Y mode.
- Multi-destination (MD) mode.

The panels can be configured so that either mode is selectable by the operator. The panels can also operate in several secondary modes, including salvo mode and menu mode.

LCD Button Array

The NV9616 has 16 LCD button units. The NV9608 has 8. Each unit comprises a large LCD button and a small 'Take' button below the LCD button. The LCD buttons each have 3 lines of text. The lines of the button are labeled "S," "P," and "D":



In multi-destination mode, the 3 lines of text display status (S), preset (P), and destination (D), respectively. If breakaway applies to that destination, the status appears in reverse text. A button can display other messages in other contexts.

Under each LCD button is a smaller white 'Take' button. Pressing the take button executes a take.

The LCD button array represents:

- Destinations (in multi-destination mode). These panels support up to 512 MD destinations. You can view different "pages" of destinations using the scroll buttons.
- Levels (in X-Y mode). The button at the top left represents the selected destination. The remaining 15 buttons (or 7 buttons on the NV9608) buttons represent the levels of the selected destination.
- Menu functions (in menu mode). Some of the LCD buttons execute menu functions.
- Salvos (in salvo mode). The panels provide support for system salvos and local salvos on multiple pages of salvo buttons. You can select a "page" of salvos using the scroll buttons.

The LCD buttons can be green (for sources), amber (for destinations), yellow, or red. Each button provides three levels of tally: off, low, and high.

All buttons of the NV9616V (virtual panel) have automatically generated button legends.

Scroll Buttons

There are 2 scroll buttons (called 'Page Up' and 'Page Down' in NV9000-SE Utilities).

These buttons scroll either through pages of MD destinations or through pages of salvos. The scroll buttons page through levels if you have more than 15 (or 7) levels defined.

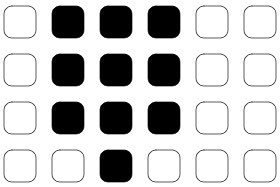
Shortcut

In MD mode, the panel's category buttons allow you to enter a page number for multi-destination devices, instead of scrolling. This is a convenience — a shortcut that lets you avoid 'Page Down' or 'Page Up' button presses when you know the number of the page you want.

Function Buttons

The panel's 24 function buttons and two scroll buttons are backlit buttons. The buttons can be green or amber. Each button provides three levels of tally: off, low, and high.

Ten of the buttons, arranged like a telephone keypad, have fixed functions. These 10 buttons are "category" buttons, representing category mnemonics or category suffixes or both:



The other 14 function buttons can be assigned any available function.

The function buttons each have clear plastic keycaps under which you may place plastic inserts for button legends. *All* buttons of the NV9616V (virtual panel) have automatically generated button legends.

See Devices and Device Categories, on page 137 for information on categories and suffixes.

Modes of Operation

The panels can operate in one of 2 modes:

- X-Y mode.
- Multi-destination (MD) mode.

The panels can be configured so that either mode is selectable by the operator.

Multi-Destination Mode

The panel supports up to 512 MD destinations. The NV9616 displays 16 at a time on the LCD buttons. The NV9608 displays 8 at a time.

In MD mode, the LCD buttons are generally green — and high-tally when selected. They become yellow when you have selected a source and red when you have locked or protected a destination.

Breakaway is not directly possible in MD mode, but when the operator performs breakaway in X-Y mode and then switches to MD mode, the destination(s) for which breakaway occurred show the device name in reverse text.

X-Y Mode

The LCD buttons represent a single selected destination and the levels for that destination.

The destination appears on the top left LCD button. This button is generally *amber*. The button is red when the destination is locked.

The remaining LCD buttons show the destination's levels. The level buttons are generally *green*. Level buttons turn yellow when you have selected a source on those levels. If there are more levels than available buttons, the operator can scroll through the pages of levels using the scroll buttons. The destination button remains in its fixed position regardless of the page.

Breakaway is possible in X-Y mode. Operators select the levels for which the take is to occur by pressing the individual LCD buttons that represent the levels. (Scrolling might be necessary to view all the levels.)

Operators perform a take by selecting a destination, (optionally) selecting levels, selecting a source, and pressing the take button under any of the selected LCD buttons.

Secondary Modes

Additional but secondary modes of panel operation are:

- Setup mode — where the panel is freshly powered up, but disconnected from the network. In this mode, you can set the panel ID and perform a few diagnostic tasks.
- Salvo mode — pressing a salvo button places the panel in salvo mode, where it is expected that the operator will choose a salvo on an LCD button, possibly scrolling to find the salvo.
- Menu mode — pressing a menu button places the panel 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.
- Source mode — pressing a source mode button places the panel temporarily in source mode, where the operator can use category and suffix buttons to select a *source*.
- Destination mode — pressing a destination mode button places the panel temporarily in destination mode, where the operator can use category and suffix buttons to select a *destination*.
- Hold mode — when hold mode is active in X-Y mode, a breakaway level selection remains in effect until the operator turns hold mode off. In MD mode, when hold mode is active, the operator may select multiple destinations.
- Save preset mode and load preset mode — pressing a 'Save Preset' button places the panel in a temporary mode in which you can name and save a preset selection. Pressing a 'Load Preset' button places the panel in a temporary mode in which you can select a saved preset selection.

Other Panel Functions

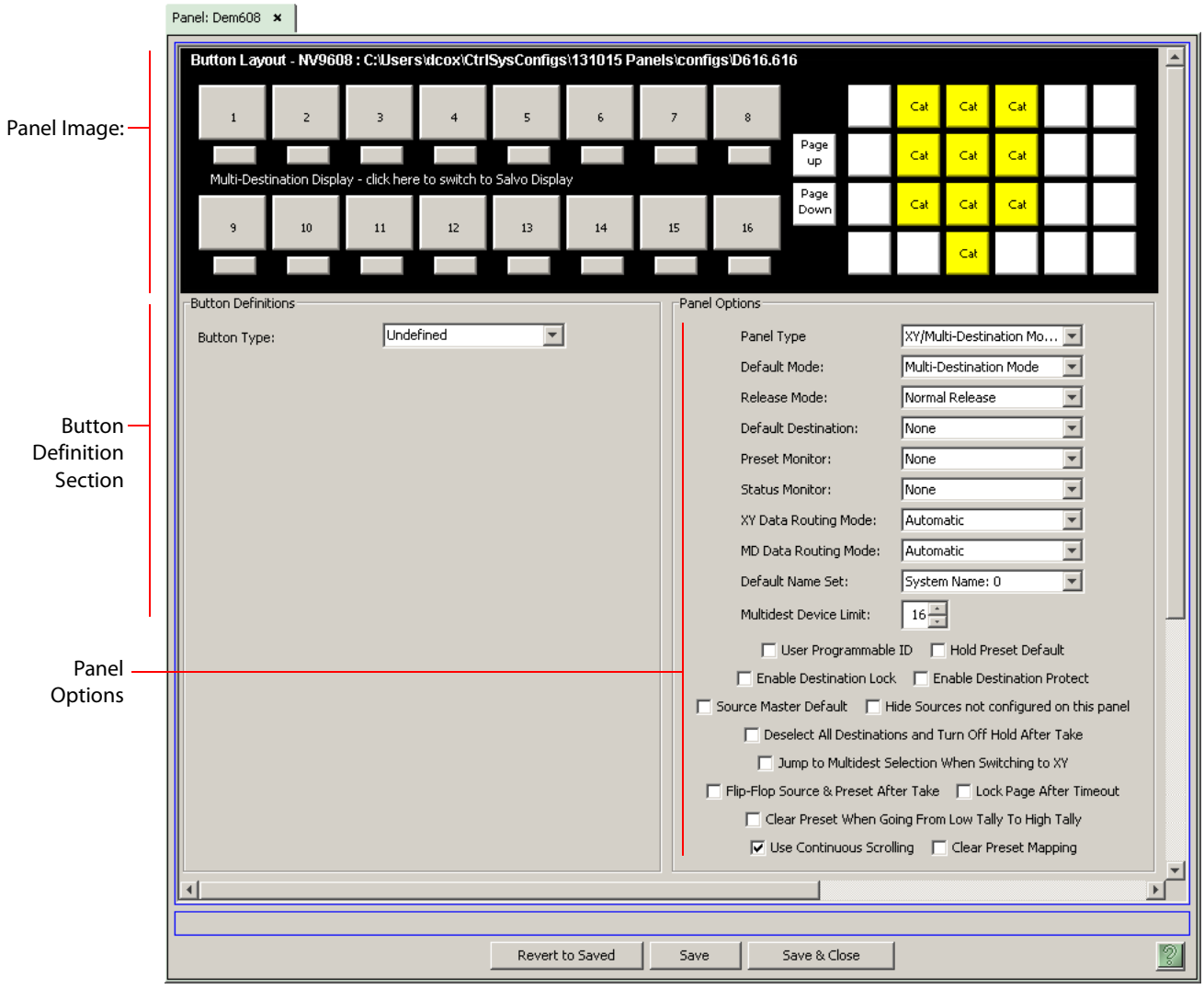
The NV9616 and NV9608 can be configured to perform the following additional functions:

- System salvos and local salvos.
- Broadcast data routing.
- "Gang" takes.

  The panel supports gang switching in multi-destination mode. The operator may route single or multiple sources to multiple destinations in a single operation.

NV9608 and NV9616 Configuration Pages

This is the default NV9616 panel configuration page:



The NV9608 configuration page is functionally identical, but instead of showing 16 LCD button proxies, it shows only 8.

After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

There are 3 main regions:

- A graphic representation of the panel (NV9616 or NV9608).

  At the left are the 16 (or 8) LCD button proxies. These represent either MD destinations or salvos. You can click the line of text in the middle of this section to toggle between MD destination entry and salvo entry. The text changes accordingly:

  Multi-Destination Display - click here to switch to Salvo Display

  Salvo Display - click here to switch to Multi-Destination Display

  At the right are the 24 function buttons. The 10 yellow buttons are fixed category buttons. The other 14 function buttons are completely configurable.

- Button definitions.

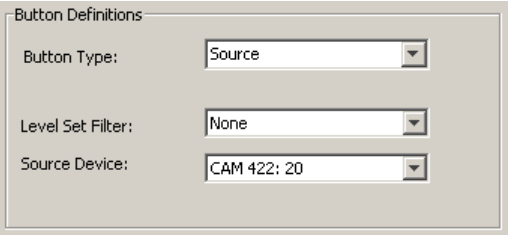
  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definitions, following.

- Panel options.

  In this section, configurers may specify the behavioral characteristics of the panel. See the *NV9608/NV9616 User's Guide* for detailed information.

Button Definitions

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



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.

These are the button types available for NV9616 and NV9608 configurations:

Broadcast	Category	Chop	Clear
Clear preset	Default state	Destination Lock	Destination Mode
Destination Protect	Free Source	Gang Take	Hold
Information	Level Map	Load Preset	Menu
Name Set Toggle	Panel Lock	Preset Release	Previous Source
Salvo	Save Preset	Source	Source Master
Source Mode	Src/Dst Mode	XY/MD Mode	

▲ Note that other panels might have button types with the same names but that perform different functions.

NV9616 and NV9608 Button Types

These are the button types available for the NV9616 and NV9608:

Type	Description
Broadcast	On the data level (i.e., machine control level), the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button definition has no fields to configure. A broadcast button is useful in dubbing applications or when a backup (redundant) device is in use. See also the Source Master button, following.
Category	The button selects a device category. When the panel is in source mode, a category button (partially) selects a source. When the panel is in destination mode, a category button (partially) selects a destination. During operation, a sequence of category button presses is required to select a source or a destination. The first press selects the actual category (e.g., CAM, VTR, MON) and subsequent presses select either alphanumeric suffixes or digits in a numerical suffix. 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. Thus, when the panel is in source mode, category buttons that are not configured with a source category become disabled. When the panel is in destination mode, category buttons that are not configured with a destination category become disabled. Category buttons configured with both source and destination categories are not disabled in either mode. Category buttons that have only a suffix configured are disabled until a category becomes selected. After a category button has been pressed, the operator must then press number or suffix buttons to perform a device selection within the category. Only those suffixes or digits that can apply to the present selection remain enabled. The 24 function buttons include 10 fixed category buttons. You cannot configure these as any other button type. You can create additional category buttons however. 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.) NV9000-SE Utilities allows configurers to designate a separator character which is inserted between the parts of the device name. Category buttons also allow you to enter a page number for multi-destination devices as an alternative to scrolling. This is a convenience, but it is available only when no category device selection (in MD mode) is pending. The convenience is not available for salvos.
Chop	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. The button definition has no fields to configure.

Type	Description
Clear	The button reverts to the most recent action. You may also think of this as a "backspace key." It erases the suffixes entered under category selection in reverse order. If the operator continues to press the 'Clear' button during category selection, it will erase the entire selection, including the category mnemonic. (If the operator has placed the panel in salvo mode, 'Clear' brings the panel back to normal mode, without executing a salvo.)
Clear preset	The button removes the preset source from a pending take. The button definition has no fields to configure.
Default state	The button returns the panel to its most recent power-up state. That is called the *default state*. The button definition has no fields to configure.
Destination Lock	The button sets or removes a "lock" on the currently selected destination device(s). The lock can be removed only by the user that originally set the lock, or by a panel that has "Force Release" enabled. The button definition has no fields to configure. In X-Y mode, the panel turns the destination button (the top left LCD button) red when the destination is locked. In MD mode, the panel turns the buttons for locked destinations red. It also displays "Locked by ‹user›" on the buttons of locked destinations (where ‹user› is one of the user names defined in the NV9000 system).
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. Categories that include both source and destinations remain enabled in both source mode and destination mode. The button definition has no fields to configure.
Destination Protect	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. **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. The button definition has no fields to configure. In X-Y mode, the panel provides no explicit indication, during operation, whether a destination is protected or unprotected. In MD mode, the panel turns the buttons for protected destinations red. It also displays "Protect by ‹user›" on the buttons of protected destinations (where ‹user› is one of the user names defined in the NV9000 system).
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 free source is defined in the *Level Set Details* page of NV9000-SE Utilities. The button definition has no fields to configure.

Type	Description
Gang Take	When the panel is in MD mode, the gang take button allows operators to select and preset multiple MD destinations and execute a take for all of them simultaneously. When the panel is in X-Y mode, the gang take button acts like an ordinary take button. The button definition has no fields to configure.
Hold	In multi-destination mode, Hold retains destination selections after a take. In X-Y mode, Hold retains breakaway levels after a take. The button definition has no fields to configure.
Information	Although an information button is present in the drop-down menu for button types, you should not configure an information button on the panel, because an information button does nothing.
Level Map	Cross-connects levels (in the same physical router). The function is typically used to shuffle audio channels, for example, to connect AES1/2 to AES3/4. The level map mode is cancelled when the next normal take is performed involving the selected destinations. The button definition has no fields to configure.
Load Preset	The 'Load Preset' button creates a preset for MD destinations using one of the presets the operator saved with a 'Save Preset' operation. The button does not operate in X-Y mode. The button definition has no fields to configure. The 'Load Preset' button and 'Save Preset' button are not supported in an NV915. They are fully functional in an NV920 or NV960.
Menu	This button puts the NV9616 panel in menu mode and displays a menu on the LCD buttons that provides access to a variety of panel functions. Without the button, the operator has no access to the menu functions. Using the menu, the operator can change the panel ID (if the configuration permist it) or change button brightness values. Administrators could use the menu to determine the panel's software revision, IP address, user ID, or configuration name. The button definition has no fields to configure.
Name Set Toggle	The button toggles the panel between its *default name set* and the "system name" set. One or the other becomes the active name set. The button definition has no fields to configure. 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'. 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.
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. Pressing the panel lock button again reverts the panel to its previous state. The button definition has no fields to configure.

Type	Description
Preset Release	The button removes locks and protects from preset source devices. This button is not needed if source locks and protects are not used in your system. The button definition has no fields to configure.
Previous Source	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. The button definition has no fields to configure. 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.
Salvo	The salvo button places the panel in *salvo mode* where the operator can scroll through pages of system salvos and local salvos. Salvo names appear on the panel's LCD buttons. The operator might need to scroll to find the salvo of interest. When the operator finds the salvo of interest, he or she presses the button for the salvo to select the salvo and presses the take button under the salvo button to execute the salvo. After the salvo executes, the panel returns to its normal mode. The operator must press the salvo button again (while the panel is still in salvo mode) to return to normal mode. Local salvos are not supported in an NV915. They are fully functional in an NV920 or NV960.
Save Preset	The 'Save Preset' button becomes enabled, in MD mode only, when you have selected a preset for a destination (or multiple presets for multiple destinations). When the operator presses 'Save Preset' the panel enters a "save preset" mode where the operator may enter an name under which the preset will be saved and which can be used later if the operator presses a 'Load Preset' button. The button does not operate in X-Y mode. The button definition has no fields to configure. The 'Save preset' button and 'Load Preset' button are not supported in an NV915. They are fully functional in an NV920 or NV960.
Source	The button selects a pre-defined 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'.
Source Master	Means "the source is the master" and makes the source device the master. Otherwise, the destination device is the master. This button (and these concepts) apply only to machine control routes only. The button definition has no fields to configure. 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). 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. The 'Source is Master' button is also used to initiate "broadcast" machine control routes.

Type	Description
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. The button definition has no fields to configure.
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. If you place this button on a panel, the panel does not need a 'Source Mode' button or a 'Destination Mode' button. The button definition has no fields to configure.
XY/MD Mode	The button toggles the panel between X-Y mode and multi-destination mode. The button definition has no fields to configure.
Undefined	This button type is a placeholder: during configuration, it makes the button undefined and inactive. On the actual panel, the undefined button remains unlit (dark).

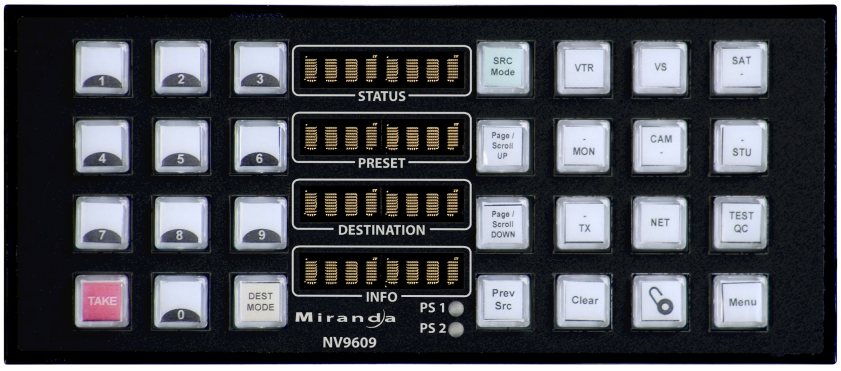
See the *NV9608/NV9616 User's Guide* for more detail.

NV9609

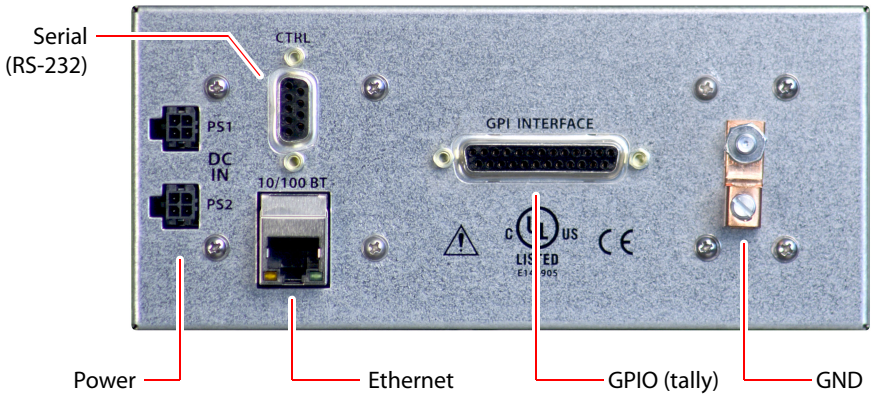
NV9609 Panel Description

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

The NV9609 is a limited X-Y control panel featuring 2 sets of backlit function buttons and a small display. The display has 4 distinct readouts each having 8 characters:



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



The NV9609 uses external PS0001 power supplies.

An equivalent NV9609V — a "virtual panel"— is available. It emulates the NV9609.

The NV9609 has some features that many other NV96*xx* control panels do not. One such feature is *level mode*. (The NV9649 also has a level mode.)

Function Buttons

The NV9609 has an array of 12 function buttons on the left and 16 function buttons on the right. There is no restriction on how they may be configured. Configurers will probably also want to create a numeric pad, using the buttons, for operators to enter category suffixes.

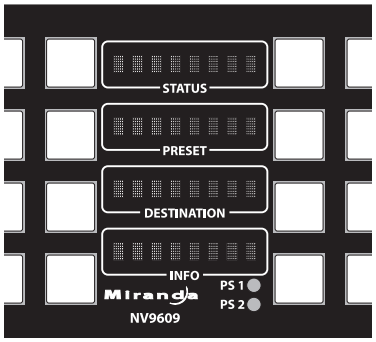
Each button has *three* operational levels: high and low tally (green or amber), and off. (The button material is actually white or gray.)

The function buttons each have clear plastic keycaps under which you may place plastic inserts for button legends. Buttons of the NV9609V (virtual panel), however, have automatically generated button legends.

Scrolling is necessary in level mode and salvo mode. It is optional when the panel operator is choosing a device in a category. The NV9609 scrolls using 'Page Up' and 'Page Down' buttons.

Alphanumeric Display

The display has 4 separate display fields.



- Status.

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

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

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

- Preset.

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

- Destination.

  The 'Destination' field shows the current destination.

- 'Info'.

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

The 'Status', 'Preset', and 'Destination' fields can show either the names of a name set or the system mnemonics.

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.

See GPIO, on page 198.

Modes of Operation

The NV9609 operates as an X-Y panel only.

Level Mode

Operators can switch the panel in and out of *level mode* (if the panel has a 'Level Mode' button). In level mode, an operator can 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. When the panel has multiple 'Level' buttons, operators can perform multiple-level breakaway.

Secondary Modes

Additional but secondary modes of panel operation are:

- Setup mode — where the NV9609 is freshly powered up, but disconnected from the network. In this mode, you can set the panel ID and perform a few diagnostic tasks.
- Salvo mode — pressing a salvo button places the NV9609 in salvo mode, where it is expected that the operator will choose a salvo and then the 'Take' button to executes a salvo.

- Menu mode — pressing a menu button places the NV9609 in "menu" mode. In menu mode, the buttons lose their normal functions and become part of a menu that changes as needed during menu operation.

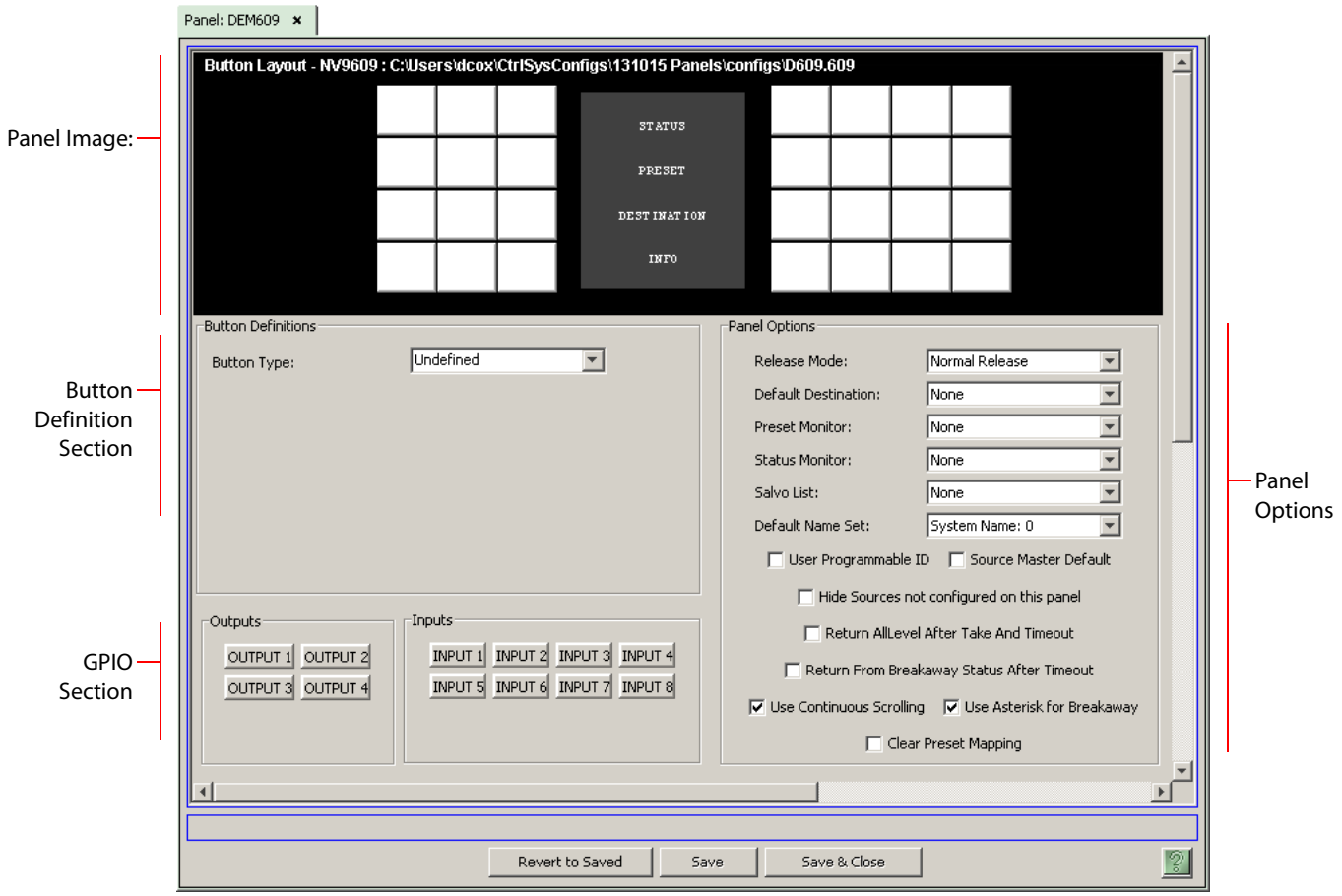
Other NV9609 Functions

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

- System salvos.
- Broadcast data routing.

NV9609 Configuration Page

This is the default NV9609 panel configuration page:



After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

There are 4 main regions:

- A graphic representation of the NV9609 panel.

  Configurers must click a button "proxy" to select the button for configuration.
- Button definitions.

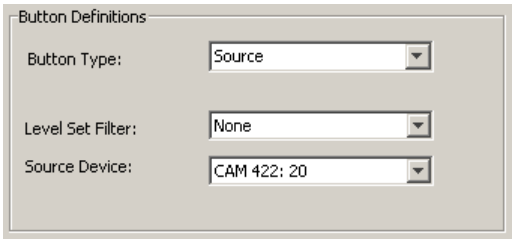
  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definitions, following.
- GPIO definitions.

  In this section, configurers may define GPIO logic. The control panel has a rear connector that provides 4 relay outputs and 8 optically isolated inputs. See GPIO, on page 198. (Note that the graphical buttons represent *connector terminals* and not actual buttons.)
- Panel options.

  In this section, configurers may specify the behavioral characteristics of the panel. See the *NV9609 User's Guide* for detailed information.

Button Definitions

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



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.

These are the button types available for NV9609 configurations:

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	Salvo	Source	Source Master
Source Mode	Src/Dst Mode	Take	

▲ Note that other panels might have button types with the same names but that perform different functions.

NV9609 Button Types

These are the button types available for the NV9609:

Type	Description
Broadcast	On the data (machine control) level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button definition has no fields to configure. A broadcast button is useful in dubbing applications or when a backup (redundant) device is in use. See also the Source Master button, following.
Category	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.) 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. Thus, when the panel is in source mode, category buttons that are not configured with a source category become disabled. When the panel is in destination mode, category buttons that are not configured with a destination category become disabled. Category buttons configured with both source and destination categories are not disabled in either mode. Category buttons that have only a suffix configured are disabled until a category becomes selected. After a category button has been pressed, the operator must then press number or suffix buttons to perform a device selection within the category. The operator may also use scroll buttons ('Page Up' and 'Page Down') to select device indexes within the category if the panel has scroll buttons. 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. 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. If you intend to have a keypad, you must use category buttons to implement the keypad. Any particular category button can represent 3 items: a source category, a destination category, and a suffix (which might be numeric). 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.) NV9000-SE Utilities allows configurers to designate a separator character which is inserted between the parts of the device name.
Chop	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. The button definition has no fields to configure.

Type	Description
Clear	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. (If the operator is in level mode, or in salvo mode, 'Clear' brings the panel 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. When you assign a destination button, a drop-down menu appears: 'Destination Device'. Choose a device from the list. The 'None' entry is merely a placeholder. Do not choose 'None'. 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	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. The button definition has no fields to configure. The NV9609 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. Categories that include both source and destinations appear in both source mode and destination mode. The button definition has no fields to configure.
Destination Protect	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. **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. The button definition has no fields to configure. The NV9609 provides no explicit indication, during operation, whether a destination is locked or unlocked.
Free Source	The button selects a pre-defined phantom device that can be used to release or "free" devices on the data (machine control) level. A free source is also used with tielines to free the tieline for others to use. The free source is defined in the *Level Set Details* page of NV9000-SE Utilities. The button definition has no fields to configure.

Type	Description
Level	The button selects a level. The button definition has one field to configure: the level. 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 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.) You must select levels before selecting the source, otherwise multi-level takes do not work. They are all level. (Multi-level takes — and level buttons — are not available in *level mode*.) 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. 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.
Level Mode	The button toggles the panel in and out of level mode. "All Level" appears in the 'Info' display when level mode is 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 some other button types, are disabled in level mode. The only means to select a source are source category buttons. 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. The button definition has no fields to configure.
Menu	This button puts the NV9609 panel in menu mode and displays a menu on the buttons that provides access to a variety of panel functions. Without the button, the operator has no access to the menu functions. 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. The button definition has no fields to configure.
Name Set Toggle	The button toggles the panel between its default name set and the "system name" set. One or the other becomes the active name set. The button definition has no fields to configure. 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'. 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.

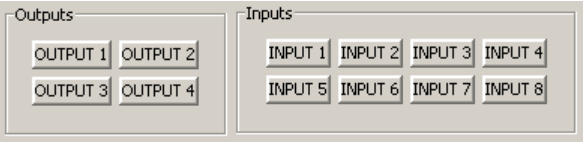
Type	Description
Page Down	The button scrolls *down*. Scrolling devices within a category: 'Page Down' moves to the next *lower* device in the category's device list. (Example: if the current device is CAM_4, the next lower device would probably be CAM_3, subject to the device definitions in the NV9000 configuration.) Scrolling devices is possibly only when a category selection is in progress. Whether the list wraps around at the beginning or end is governed by the 'Use Continuous Scrolling' panel option. Scrolling salvos in salvo mode: 'Page Down' moves to the salvo with the next *lower* index in the salvo list. A valid salvo list must have been specified in the panel options. 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, an operator can cycle through all the levels (including "All Levels") indefinitely. The button definition has no fields to configure.
Page Up	The button scrolls *up*. 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. Whether the list wraps around at the beginning or end is governed by the 'Use Continuous Scrolling' panel option. Scrolling salvos in salvo mode: 'Page Up' moves to the salvo with the next *higher* index in the salvo list. A valid salvo list must have been specified in the panel options. Scrolling levels in level mode: 'Page Up' moves first to "All levels" and then to the last level and then to *previous* levels defined for the destination. Using the 'Page Up' button, an operator can cycle through all the levels (including "All Levels") indefinitely. The button definition has no fields to configure.
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. Pressing the panel lock button again reverts the panel to its previous state. The button definition has no fields to configure.
Previous Source	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. The button definition has no fields to configure. 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.
Quick Source	A quick source button selects a source and performs an immediate take. When you assign a quick source button, a drop-down menu appears in which you choose a source device. The 'None' entry is merely a placeholder. Do not choose 'None'.

Type	Description
Salvo	The salvo button places the panel in *salvo mode* where the operator can scroll through the salvo list assigned to the panel (as a panel option). When the operator finds the salvo of interest, he or she presses the 'Take' button to execute the salvo. After the salvo executes, the panel returns to its normal mode. The button definition has no fields to configure. Pressing the salvo button again while the panel is in salvo mode resets the salvo selection to nothing. Pressing any other button while the panel is in salvo mode returns the panel to its normal mode.
Source	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'.
Source 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 definition has no fields to configure. 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). 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. The 'Source is Master' button is also used to initiate "broadcast" machine control routes.
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. The button definition has no fields to configure.
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 is possible for the operator to execute a take. Configurers should provide the operator a 'Take' button. The button definition has no fields to configure.
Undefined	This button type is a placeholder: during configuration, it makes the button undefined and inactive. On the actual panel, the undefined button remains unlit (dark).

See the *NV9609 User's Guide* for more detail.

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 that input or output. (These buttons represent the DB25 *connector* at the rear.)

See GPIO, on page 198.

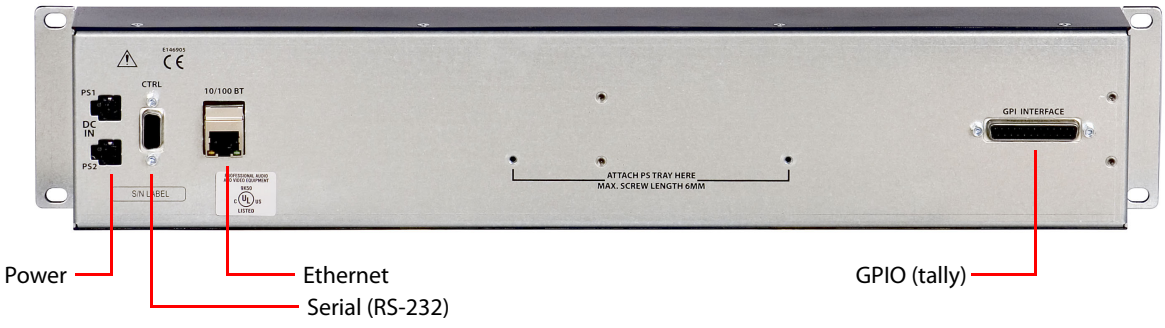
NV9640 (and NV9640A)

Panel Description

▲ The NV9640A is a revision of the NV9640 that uses slightly different LCD buttons. Otherwise, the NV9640A is the same as the NV9640. NV9000-SE Utilities does not list an NV9640A. For an NV9640A, choose an NV9640 configuration.

The NV9640(A) is a control panel (2RU) featuring 30 LCD function buttons (illuminated in various colors and having 1 to 3 lines of text) and a small vacuum fluorescent display having 8 lines of 42 characters. It can operate in X-Y mode or in multi-destination (MD) mode. Operators can switch between modes at any time:

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



An equivalent NV9640V — a "virtual panel"— is available. It emulates the NV9640 (and the NV9640A).

The NV9640(A) provides a *tree-structured* (or hierarchical) button layout. Configurers can define a "tree" of button pages in such a way that each of the 30 LCD buttons can either (1) execute a function or (2) select a subtree (i.e., present an entirely new set of functions at a different level in the tree). The tree, with its subtrees, is not limited in size.

We use the term "button page" or "page" to mean the set of 30 button functions at any particular place in the tree.

(Configurers use 'Navigate' buttons to create new button pages (subtrees). During operation, NV9640(A) users press such buttons to access different subtrees.)

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

Function Buttons

The NV9640(A) has an array of 30 LCD buttons. Each has 3 lines of text. The buttons can display one of seven colors dynamically: nominally red, green, blue, purple, amber, yellow, or grey.

Each LCD button has *three* operational levels: high tally, low tally, and off.

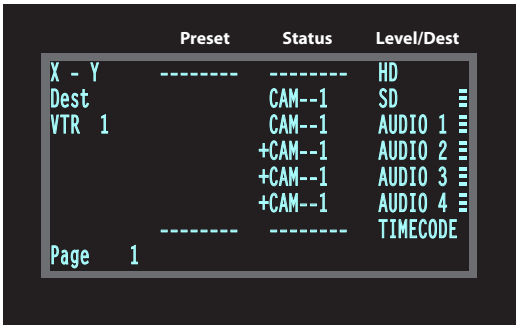
Some buttons functions are assigned by the system. For example, the panel software adds a "forward" button and a "back" button if there are more sources than buttons on a category page.

The LCD buttons display a menu if the operator presses a menu button.

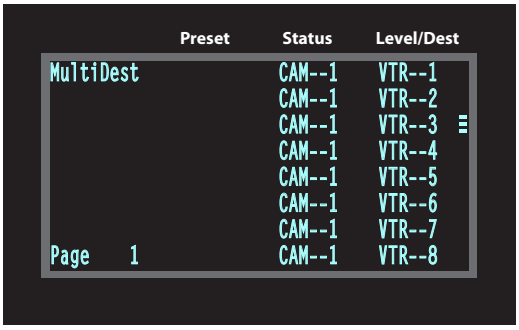
Configurers can define 'Selection' buttons that select a level during a breakaway setup. (They *must* do so if the operator is to make such selections.)

Alphanumeric Display

The alphanumeric display provides feedback for the operators as they press buttons to execute takes and other operations. The panel functions in either X-Y or multi-destination (MD) mode:



X-Y mode



Multi-destination mode

In either case, the display has 8 lines. Operators might need to scroll.

The display has 4 columns:

- Level/Dest.

  In X-Y mode, this column identifies the levels of the currently selected destination. That destination is identified in the information column.

In MD mode, the 'Level/Dest' column presents all the MD destinations (but only 8 at a time) defined in the NV9640(A) configuration. Operators might need to scroll to see or select a destination.

- Status.

  In X-Y mode, the status column represents either the levels of a source or the levels of multiple sources under breakaway.

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

- Preset.

  The preset column indicates what source will be routed to a destination when the operator presses the 'Take' button.

  In X-Y mode, the preset column represents either the levels of a source or the levels of multiple sources under breakaway. After the take, they disappear from the preset column and re-appear in the status column.

  In MD mode, the preset column indicates the sources that will be routed to selected destinations in the 'Level/Dest' column. After the take, they disappear from the preset column and re-appear in the status column.

- Information (not labeled).

  In X-Y mode, the third entry identifies the current destination. In MD mode, there are no entries in this column other than "MultiDest" and the page number.

  The bottom-most entry in this column is always the page number of the display.

The display fields can show either names from a name set or the system mnemonics.

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.

See GPIO, on page 198.

Modes of Operation

The primary modes of operation are:

- X-Y mode — individual control of all router *levels*. Choose a destination, optionally choose desired breakaway levels, choose a source, and press 'Take' to complete a desired route.
- Multi-destination mode — lets you control multiple destinations. Select a destination using selection buttons, choose a source, and repeat for all desired routes. Then press 'Take'. Takes are "all level," and breakaways cannot be performed.
- Single-destination mode.

  Single-destination" mode is not a distinct mode, but it is a mode on some other panels and can be simulated on the NV9640(A). It can be combined with the other two modes.

The secondary modes of panel operation are:

- Setup mode — where the NV9640A is freshly powered up, but disconnected from the network. In this mode, you can set the panel ID and perform a few diagnostic tasks.
- Salvo mode — pressing a Salvo button (and then the 'Take' button) executes a salvo.

- Menu mode — pressing a Menu button places the NV9640(A) in "menu" mode. In menu mode, the LCD button array becomes a menu that changes as needed during menu operation.

Other modes of operation are:

- Hold mode.
- Save preset mode.

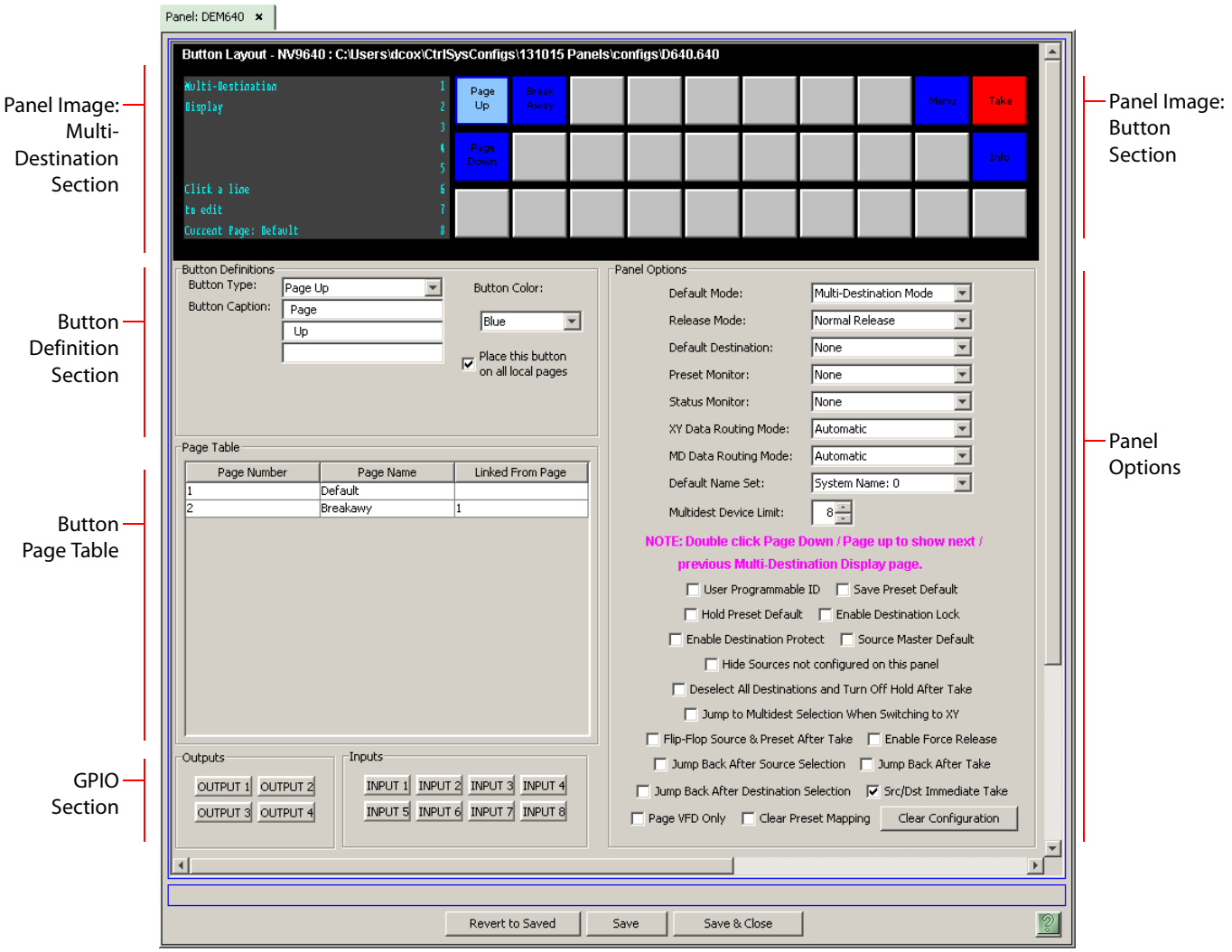
Other NV9640(A) Functions

The NV9640(A) can be configured to perform the following additional functions:

- System salvos.
- Gang or dub switching in multi-destination mode.
- Broadcast data routing in X-Y mode.
- Level mapping.
- (In NV9000-SE Utilities) button page "templates" — global navigation templates and suffix templates — for easier configuration.

NV9640 Configuration Page

This is the default NV9640 panel configuration page:



After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

There are 5 main regions:

- A graphic representation of the NV9640 panel.

  On the right are 30 LCD function button proxies. Click on a button proxy to assign a function to it. In some cases, you can click or double-click certain buttons to execute the button function. Double-clicking a 'Navigate' button, for instance, causes the

button's "subpage" to appear. Double-clicking a 'Page Up' or 'Page Down' button allows you to scroll through multi-destination pages that are represented in the image of the alphanumeric page.

Buttons can be illuminated in several colors: green, amber, yellow, red, blue, purple, and grey. There are 3 levels of illumination: high tally (bright), low tally (muted) and off.

- Button definitions.

  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definitions, following.

- Button page table.

  This section displays a list of the individual pages of the tree structure. The button page at the top of the list (i.e., root of the tree) is called "Default." See Button Page List, on page 313.

- GPIO definitions.

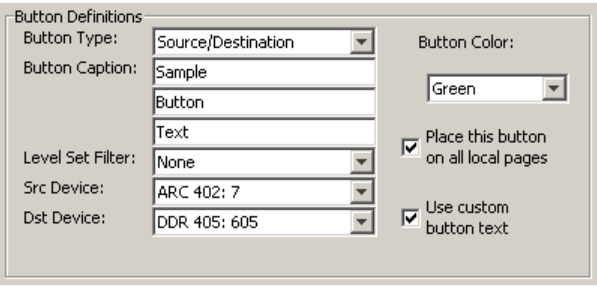
  In this section, configurers may define GPIO logic. The control panel has a rear connector that provides 4 relay outputs and 8 optically isolated inputs. See GPIO, on page 198. (Note that the graphical buttons represent *connector terminals* and not actual buttons.)

- Panel options.

  In this section, configurers may specify the behavioral characteristics of the panel. See the *NV9640 User's Guide* or the *NV9640A User's Guide* for detailed information.

Button Definitions

The button definitions section has several controls:



The controls vary according to the button type.

Button Type	A pull-down menu where you may select a button type.
Button Caption	Three text boxes in which you can enter three lines of button text up to 8 characters each.
Button Color	A pull-down menu where you can select a button color: amber, blue, green, grey, purple, red, or yellow.
Check box	"Place this button on all local 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.
Check box	"Use custom button text." Check this box if you want to override the button's default text. This checkbox is not present for all button types.

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 unique: during configuration, it initiates a dialog in which you create a button subtree. During operation, it switches the panel to the button page associated with the button. See 'Edit Navigation Button' Dialog, on page 312.

Some buttons are generated dynamically during operation.

There are different sets of button types for global suffix pages and for global navigation pages. See Global Navigation on page 314.

Button Types

Note that different subsets of these button types are available when you are defining a global suffix template or a global navigation template. See Global Navigation on page 314.

These are the button types available for NV9640 configurations:

Back	Broadcast	Category	Chop
Clear Preset	Default State	Destination	Destination Lock
Destination Protect	Free Source	[Forward]	Global Navigate
Hold	Information	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	VFD/SEL Toggle
Virtual Level Contract	Virtual Level Expand	XY/MD Mode	

▲ Note that other panels might have button types with the same names but that perform different functions.

NV9640 (and NV9640A) Button Types

These are the button types available for the NV9640 and NV9640A. (Note that different subsets of these button types are available when you are defining a global suffix template or a global navigation template.).

Type	Description
Back	The 'Back' function places the predecessor of the current button page on the panel. The panel software can introduce a "back" button if an automatically generated list has more entries than can fit on a page.
Broadcast	On the data (control) level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button is useful in dubbing applications or when a backup (redundant) device is in use. See also the Source Master button, following.

Type	Description
Category	Displays a category's device list. When you assign a category button, two additional drop-down menus appear: 'Src Category' and 'Dst Category'. Choose a category from one of the category lists. When you choose a source category, the destination categories become inaccessible and vice versa: a category button must be either a source category or a destination category. You must choose 'None' in either category list to switch to the other category list. When you choose either 'Src Category' or '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. 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 default button text will be the category name. You can override the default text.
Chop	When a chop function is supported by the router, the button is a toggle that enables and disables rapid switching of the selected destination device between the current source and the preset source. This chop function is used to test system timing.
Clear Preset	Erases preset entries, while leaving the panel in the same mode. We recommend you use this button because it is a "safety" feature. The clear preset button has the side effect of switching off 'Save Preset' mode.
Default State	Returns the panel to its most recent power-up state. That is called the *default state*.
Destination	Selects a destination. When you assign a destination button, a drop-down menu appears: 'Destination Device'. Choose a device from the list. The 'None' entry is merely a placeholder. Do not choose 'None'.
Destination Lock	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. In MD mode, an "L" appears next to the destination in the display when it is locked. In X-Y mode, an "L" appears next to selected levels in the display when they are locked.
Destination Protect	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. **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. In MD mode, a "P" appears next to the destination in the display when it is protected. In X-Y mode, a "P" appears next to selected levels in the display when they are protected.
Free Source	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 *Level Set Details* page of NV9000-SE Utilities.

Type	Description
[Forward]	The panel software can introduce a “forward” button if an automatically generated list has more entries than can fit on a page. A ‘Forward’ displays and activates the next button page in an automatically generated sequence. There is no explicit ‘Forward’ button type; configurers cannot create forward buttons explicitly.
Global Navigate	A global navigation button is very much like a navigation button to the operator. However, during configuration, it selects a previously defined “global navigation” template. The template itself may have structure that ordinary button pages have. It can include any button type except additional global navigate buttons.
Hold	Toggles the panel in and out of “hold” mode. In multi-destination mode, hold mode retains destination selections after a take. In X-Y mode, hold mode retains breakaway levels after a take. (There are other effects.)
Information	The information button displays auxiliary information about level mapping and perhaps other matters. The operator presses the information button once to see the information and again to hide the information.
Level Map	Cross-connects levels (in the same physical router). The function is typically used to shuffle audio channels, for example, to connect AES1/2 to AES3/4. The Level Map mode is cancelled when the next normal take is performed involving the selected destinations.
Menu	This button puts the NV9640 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. 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.
Name Set Toggle	The button toggles the panel between its default name set and the “system name” set. One or the other becomes the active name set. The button definition has no fields to configure. 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’. 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.
Navigate	During operation, a navigate button selects and displays a “target” button page. During configuration, a navigate button presents a dialog in which you can enter details of the target page. After you do so, NV9000-SE Utilities 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. (You’ll use the navigate function to create new button pages.) 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.

Type	Description
Page Down	Scrolls a list *down*. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the list. "Page Down' also scrolls through multi-destination devices in multi-destination mode and through levels in X-Y mode.
Page Up	Scrolls a list *up*. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the the list. "Page Up' also scrolls through multi-destination devices in multi-destination mode and through levels in X-Y mode. When the operator is displaying a list of devices from a category, the 'Page Up' button will return the operator to the page containing the category button.
Panel Lock	Prevents accidental changes to the panel settings, especially router crosspoints. When the panel is locked, the button array becomes blank except for the Panel Lock button which becomes high tally red. Pressing the Panel Lock button again reverts the panel to its previous mode.
Preset Release	Removes locks and protects from preset source devices. This button is not needed if source locks and protects are not used in your system.
Previous Source	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. 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.
Quick Source	A quick source button selects a source and performs an immediate take. When you assign a quick source button, a drop-down menu appears in which you choose a source device. The 'None' entry is merely a placeholder. Do not choose 'None'.
Salvo	Executes a salvo. When you assign a Salvo button, a drop-down list appears in which you select a system salvo. The 'None' entry is merely a placeholder. Do not choose 'None'. (You can generate salvo buttons automatically in the 'Edit Navigation Button' dialog when you create a navigation button.)
Save Preset	When this function is enabled (its button is high tally), whatever is on preset is retained (on preset) after a take. When the function is disabled (its button is low tally), preset is cleared after a take.

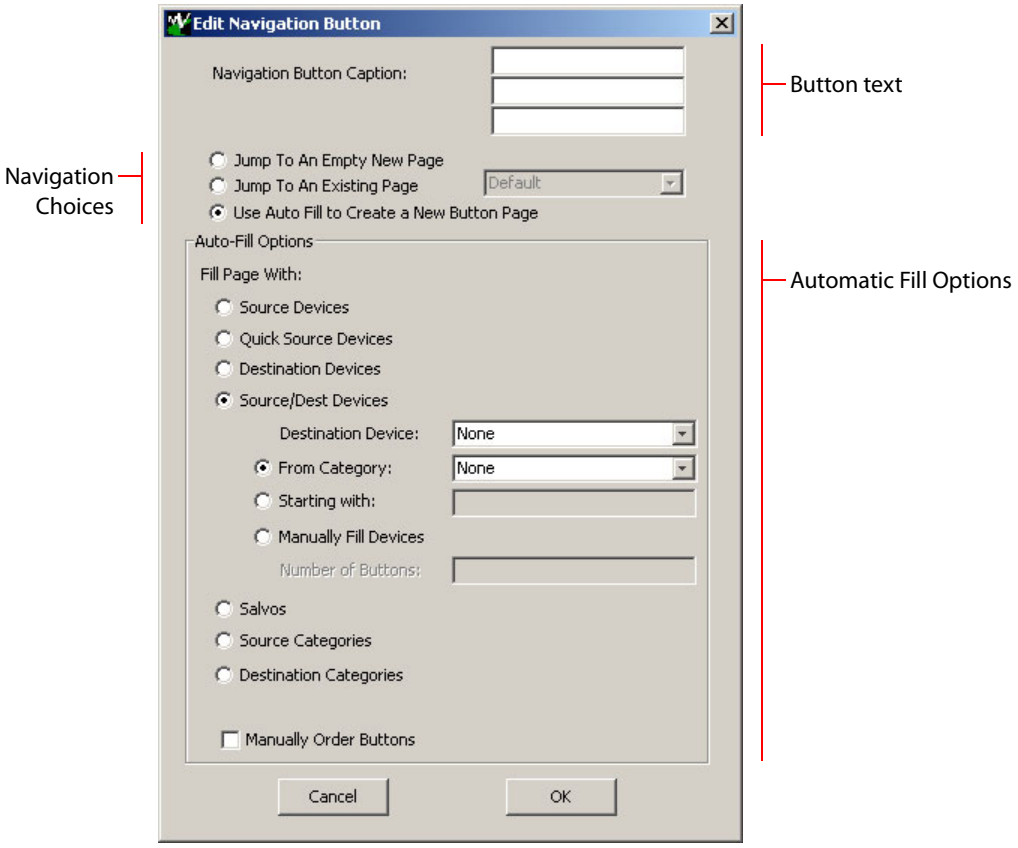
Type	Description
Selection	Selection buttons have many functions, not the least of which is to give feedback (e.g., source and destination mnemonics) when the operator is performing takes. You should configure exactly 8 selection buttons (on any button page) if you want to support level selection in XY mode and MD device selection in MD mode. When the panel is in XY mode, a set of selection buttons presents a set of virtual levels for the selected destination device. If there are more levels than selection buttons, the 'Page Up' and 'Page Down' buttons activate and the operator can scroll through the level list. When the panel is in MD mode, a set of selection buttons presents a set of MD devices. If there are more destinations than selection buttons, the 'Page Up' and 'Page Down' buttons activate and the operator can scroll through the destinations. During configuration, when you assign a selection button, two additional drop-down menus appear: 'Display Index' and 'Multidst Device'. The drop-down menu for the button's *display index* has as many entries as the current page has selection buttons. Choose a virtual level's display index for the selection button for when the button is used in X-Y mode. Normally, your set of display indexes would be sequential from left to right. The drop-down menu for the *multi-destination device* allows you to specify the MD destination for the button. Do this for all the devices that you want to be selectable in MD mode. On the configuration page, when there are more MD devices than selection buttons, the up and down buttons become active and you can scroll through the set of MD devices to assign them to select buttons. (You can have up to 128 MD devices, in multiples of 8. See the 'Multidest Device Limit' box under panel options.) You do not have to commit every MD device to a button. MD buttons that are uncommitted are no-ops.
Source	A source button selects a source. (Note that a quick source button selects a source and also performs an immediate take.) 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'.
Source Master	Means "source is the master" and makes the source device the master. Otherwise, the destination is the master. 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). 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. The 'Source is Master' button is also used to initiate "broadcast" control routes.
Source/ Destination	A source/destination button selects both a source and a destination at one time. Source/destination buttons can be configured to perform immediate takes. (It is a NV9640 panel option.) If they are not so configured, the operator must also press a 'Take' button to effect a take.

Type	Description
Take	In X-Y mode, a take button switches the preset source device to the selected destination device on selected levels. In MD mode, a take button switches the preset source device(s) to the selected destination device(s) on all levels. In most cases, configurers should provide the operator a 'Take' button.
Undefined	Makes the button undefined and inactive. On the actual panel, it will remain unlit (dark).
VFD/SEL Toggle	The button is toggle. In one state, it makes the display (VFD) scroll when the operator presses 'Page Up' or 'Page Down'. In the other state, it makes the items on selection buttons scroll. The selection buttons represent levels when the panel is in X-Y mode and represents destinations in MD mode. Thus, there are 3 scrolling options: Scroll the VFD only. The VFD scrolls 8 lines at a time. The selection buttons do not scroll. The panel option 'Page VFD Only' is checked and there is no 'VFD/SEL Toggle' button. Toggle between scrolling the VFD only and the selection buttons only. The VFD scrolls 8 lines at a time. The selection buttons scroll modulo the number of selection buttons. Scroll the VFD and selection buttons at the same time. Both the VFD and the selection buttons scroll 8 items at a time. The panel option is unchecked and there is no 'VFD/SEL Toggle' button. This button has no configuration options. The button legend is fixed. Depending on which state the button is in, it will read "Paging VFD" or "Paging Sel Buttons."
Virtual Level Contract	In X-Y mode, this button causes the alphanumeric display to show virtual levels at the *highest* level of grouping (with the least detail). The button affects only virtual levels that have been grouped. The button has no effect in multi-destination mode. This button has no configuration options.
Virtual Level Expand	In X-Y mode, this button causes the alphanumeric display to show virtual levels at the *lowest* level of grouping (with the most detail). The button affects only virtual levels that have been grouped. The button has no effect in multi-destination mode. This button has no configuration options.
XY/MD Mode	Switches the panel between X-Y mode and multi-destination mode. 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.

See the *NV9640* (or *NV9640A*) *User's Guide* for more detail.

‘Edit Navigation Button’ Dialog

During configuration, when you choose ‘Navigate’ as the type for a selected button, NV9000-SE Utilities displays a dialog in which you specify navigation button details:



At the top, this dialog presents 3 lines on which you can enter text for the button caption.

The dialog has 3 navigation choices:

- Jump to an empty new page.

  This option creates a new page in the button tree. 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. Operators will use the navigation button you are creating to display the page you select in the associated drop-down menu.

- 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 suboptions:

Source buttons	Salvo buttons
Destination buttons	Source category buttons
Source/destination buttons	Destination category buttons

Button Page List

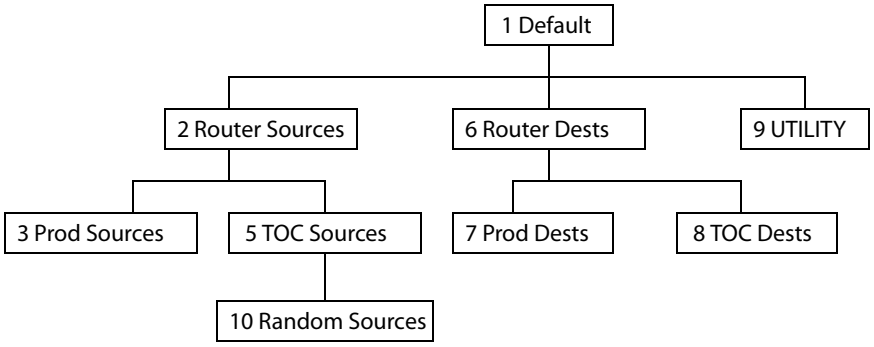
This section lists the pages of the button tree. It has 3 columns: Page Number, Page Name, and "Link to Page Num(s)."

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.

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:

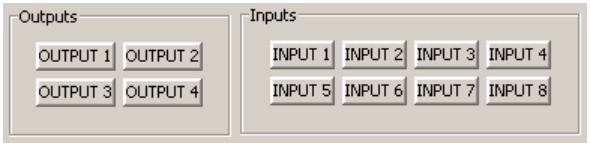


During configuration, you will use 'Navigate' buttons to create new pages. During configuration, you can double-click a 'Navigate' button to jump to its page.

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

Tally (GPIO) Section

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 that input or output. (These buttons represent the DB25 *connector* at the rear.)

See GPIO, on page 198.

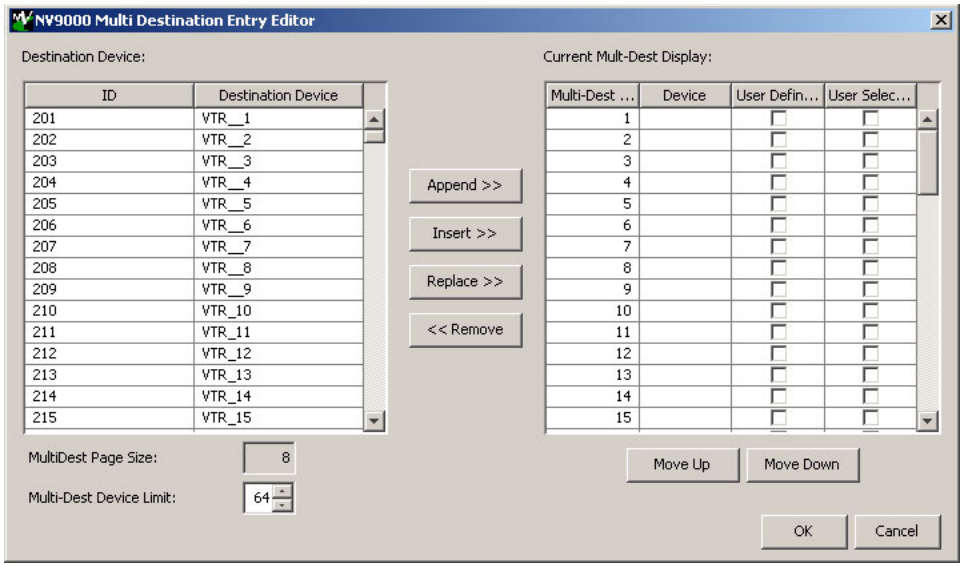
Single-Destination Mode

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

The simplest form presents a group of “quick source” buttons. If you configure a default destination in the panel options, all the quick sources could be taken to a (single) default destination with no need for destination selection.

Multi-Destination Configuration

Click the display portion of the panel graphic. The multi-destination entry editor appears:



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

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 ‘Remove’ button *removes* highlighted MD destinations from the right.

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.

Global Navigation

NV9000-SE Utilities supports what are known as “global navigation” pages for NV9640 control panels. Global navigation pages are templates — patterns — that may be used and reused in the creation of NV9640 configurations.

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 NV9640 configurations. Navigate templates allow all functions except ‘Global Navigate’.

Templates themselves are ***not*** NV9640 configurations.

NV9641 (and NV9641A)

NV9641 and NV9641A Panel Description

- The NV9641A is a panel model that replaces the NV9641. It uses slightly different LCD buttons, but otherwise, the NV9641A is identical to the NV9641. NV9000-SE Utilities does not list an NV9641A. For an NV9641A, choose an NV9641 configuration.

The NV9641 is a 1RU control panel featuring 16 LCD function buttons (illuminated in various colors and having 1 to 3 lines of text) and 2 up/down (scroll) buttons:

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

An equivalent NV9641V — a "virtual panel"— is available. It emulates the NV9641.

Behavioral Models

Configurers can place the NV9641 in one of two behavioral models: XY/MD and paging. The behavioral models are distinct. The operator cannot switch from one model to the other.

XY/MD Model

Under this model, the NV9641 provides a *tree-structured* (or hierarchical) button layout. You can define a "tree" of buttons in such a way that each of the 16 LCD buttons (illuminated in various colors and having 1 to 3 lines of text) can either (1) execute a function or (2) select a subtree (i.e., present an entirely new set of functions at a different level in the tree). The tree, with its subtrees, is not limited in size.

(We use the term "button page" or "page" to mean the set of 16 button functions at any particular place in the subtree.)

Configurers use 'Navigate' buttons to create new button pages (subtrees). During operation, NV9641 users press such buttons to access different subtrees.

The up/down buttons scroll through lists of devices, through levels in X-Y mode, and through pages of multi-destination devices.

Paging Model

Under this model, the NV9641 provides a set of button pages, through which the operator may scroll using the up/down buttons. In this case, the term "button page" means a set of buttons accessed by the up/down buttons. In this model, the button pages are ***not*** organized as a tree. There are no navigation buttons under paging mode.

Function Buttons

The NV9641 has an array of 16 LCD buttons. The buttons can display one of seven colors dynamically: nominally red, green, blue, purple, amber, yellow, or grey.

Each LCD button has *three* operational levels: high tally, low tally, and off.

Some buttons functions are assigned by the system. For example. the panel software adds a "forward" button and a "back" button if there are more sources than buttons in a category page.

The LCD buttons display a menu if the operator presses a menu button.

Configurers can define 'Selection' buttons that select a level during a breakaway setup or that select destinations in multi-destination (MD) mode. (You *must* do so if the operator is to make such selections.)

Up/Down Buttons

The two small backlit buttons (next to the printed arrows) illuminate when scrolling is possible. The up button illuminates when you can scroll up; the down button, when you can scroll down.

Scrolling is necessary when a list of items exceeds the number of buttons available for the items.

Operators use the up/down buttons to view different button pages when the panel is configured according to the paging model.

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.

See GPIO, on page 198.

Modes of Operation

Under the paging model, the panel operates in a limited X-Y mode only.

The primary modes of operation are:

- X-Y Mode — individual control of all router *levels*. Choose a destination, optionally choose desired breakaway levels, choose a source, and press 'Take' to complete a desired route.
- Single-Destination Mode.

  Single-destination" mode is not a distinct mode, but it is a mode on some other panels and can be simulated on the NV9641. It can be combined with the other two modes.
- Limited X-Y Mode.

When the panel is configured according to the paging model, we can say it is in limited X-Y mode. In limited X-Y mode, takes are all-level and apply to a single destination.

- Multi-Destination Mode — lets you control multiple destinations. The LCD buttons display destinations and sources. Select a destination, choose a source, and repeat for all desired routes. Then press 'Take'. Takes are "all level," and breakaways cannot be performed.

The secondary modes of panel operation are:

- Setup Mode — where the NV9641 is freshly powered up, but disconnected from the network. In this mode, you can set the panel ID and perform a few diagnostic tasks.
- Salvo Mode — pressing a Salvo button (and then the 'Take' button) executes a salvo. Salvo mode tends to be very brief.
- Menu Mode — pressing a Menu button places the NV9641 in "menu" mode. In menu mode, the LCD button array becomes a menu that changes as needed during menu operation.

Other modes of operation are:

- Hold mode.
- Save preset mode.

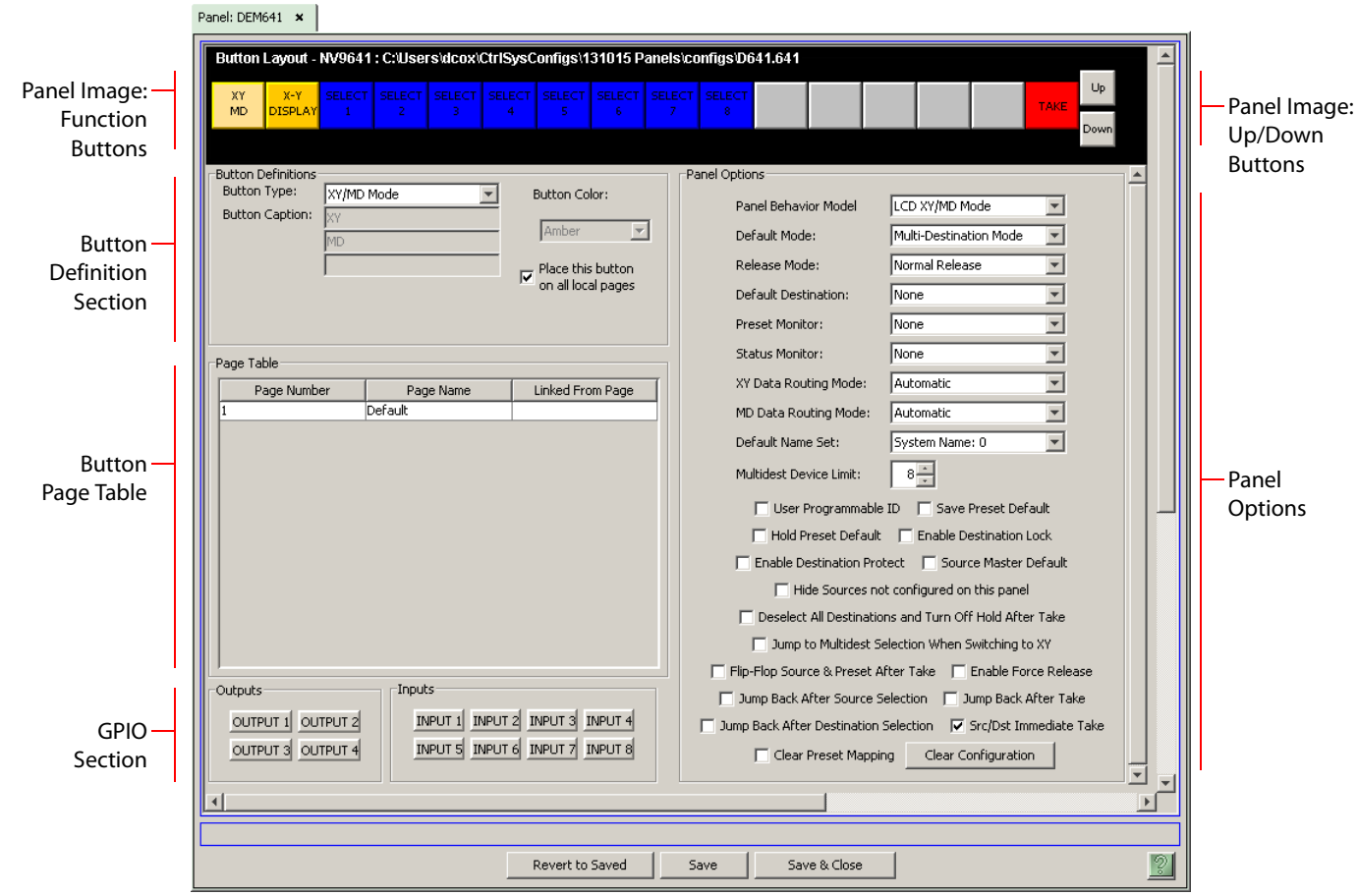
Other NV9641 Functions

The NV9641 can be configured to perform the following additional functions:

- System salvos.
- Gang or dub switching in multi-destination mode.
- Broadcast data routing in X-Y mode.
- Level mapping in X-Y mode.
- (In NV9000-SE Utilities) button page "templates"— global navigation templates and suffix templates — for easier configuration.

NV9641 Configuration Page

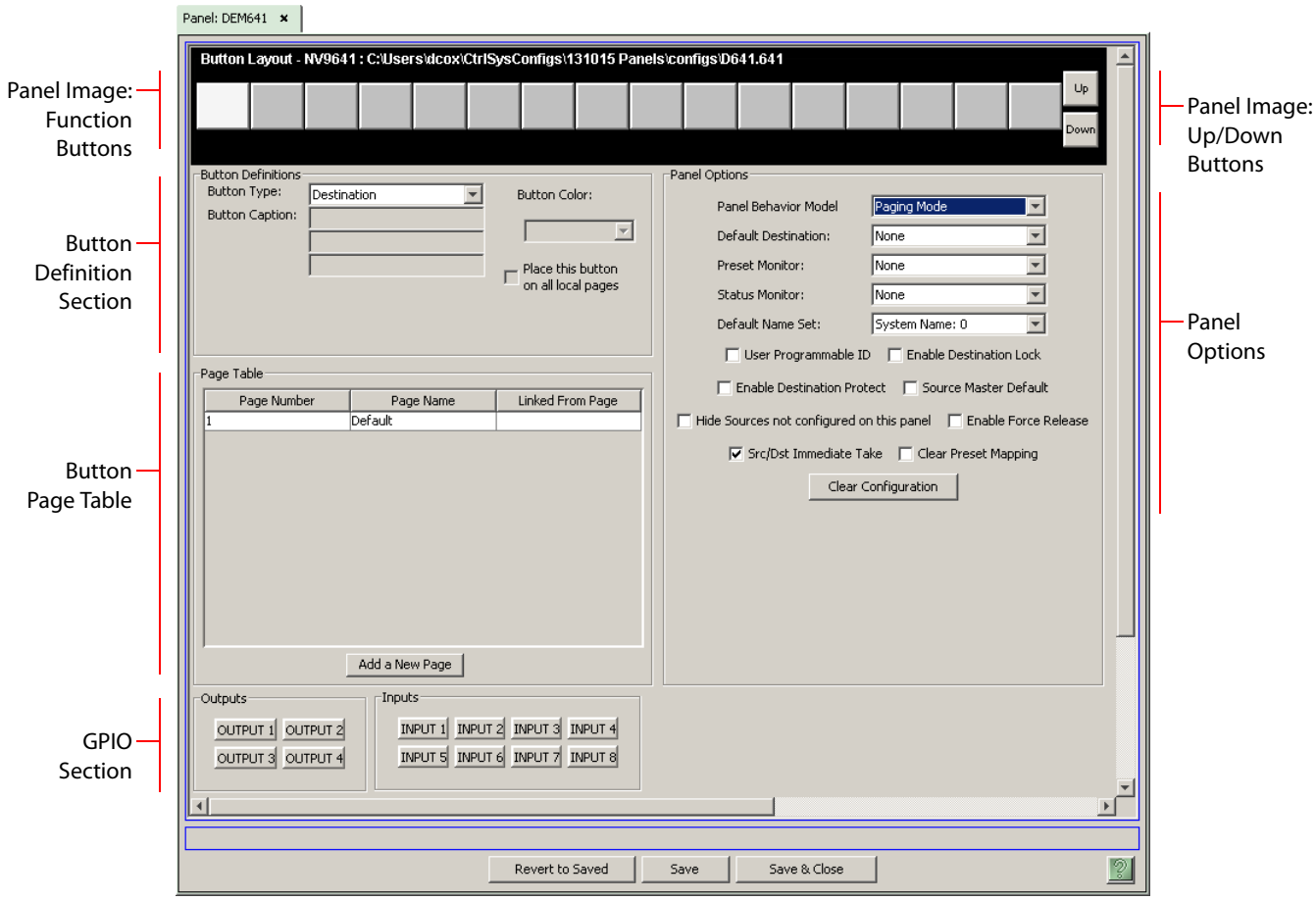
This is the default NV9641 panel configuration page, under the XY/MD model:



The first panel option selects the behavioral model of the panel: either *XY/MD* or *paging*. The configuration page reinitializes when you change the behavioral model (and unsaved changes you have made are lost). The default model is the XY/MD model; its page format is illustrated above.

The page format for the paging model is illustrated, following.

This is the default NV9641 panel configuration page, under the paging model:



In either case, after you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

There are 5 main regions:

- A graphic representation of the NV9641 panel.

  On the left are 16 LCD function button proxies. Click on a button proxy to assign a function to it. In some cases, you can click or double-click certain buttons to execute the button function. Clicking an up or down button allows you to scroll through selection button blocks for MD destination assignments. Unless you are configuring a suffix template or working on a "paging mode" panel configuration, you can double-click a 'Navigate' button to make the button's "subpage" appear.

When you are working on a paging mode configuration, the up and down buttons select the previous or next pages. (The down button also creates new pages if you happen to be at the end of the page list.)

Buttons can be illuminated in several colors: green, amber, yellow, red, blue, purple, and grey. There are 3 levels of illumination: high tally (bright), low tally (muted) and off.

On the right are the two scroll buttons. These are not configurable functions.

- Button definitions.

  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definition Section, following.

- Button page table.

  This section displays a list of the individual pages of the tree structure under the XY/MD model or the list structure under the paging model. The button page at the top of the table is called "Default." In the XY/MD model, it is the root of the tree. See Button Page List, following.

- GPIO definitions.

  In this section, configurers may define GPIO logic. The control panel has a rear connector that provides 4 relay outputs and 8 optically isolated inputs. See GPIO, on page 198. (Note that the graphical buttons represent *connector terminals* and not actual buttons.)

- Panel options.

  In this section, you may specify the behavioral characteristics of the panel. See the *NV9641 User's Guide* (or the *NV9641A User's Guide*) for detailed information.

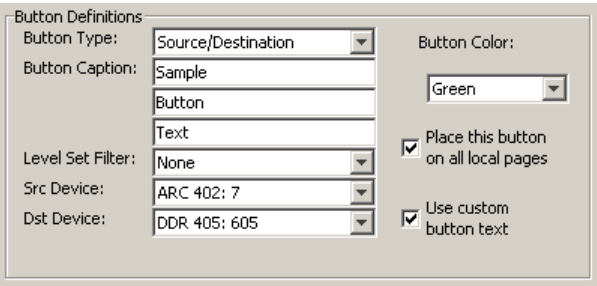
Panel Options

The first panel option selects the behavioral model of the panel: *XY/MD* or *paging*. The panel options differ between the two models. The default model is XY/MD mode.

The panel options under the paging model are a subset of the options under the XY/MD model.

Button Definitions

The button definitions section has several controls:



The controls vary according to the button type.

Button Type	A pull-down menu where you may select a button type.
Button Caption	Three text boxes in which you can enter three lines of button text up to 8 characters each.

Button Color	A pull-down menu where you can select a button color: amber, blue, green, grey, purple, red, or yellow.
Check box	"Place this button on all local 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.
Check box	"Use custom button text." Check this box if you want to override the button's default text. This checkbox is not present for all button types.

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 unique: during configuration, it initiates a dialog in which you create a button subtree. During operation, it switches the panel to the button page associated with the button. See 'Edit Navigation Button' Dialog, on page 326.

Some buttons are generated dynamically during operation.

There are different sets of button types for global suffix pages and for global navigation pages. See Global Navigation, on page 329.

Button Types — XY/MD Model

These are the button functions available under the XY/MD model:

[Back]	Broadcast	Category	Chop
Clear Preset	Default State	Destination	Destination Lock
Destination Protect	Free Source	[Forward]	Hold
Level Map	Menu	Name Set Toggle	Navigate
Panel Lock	Preset Release	Previous Source	Quick Source
Salvo	Save Preset	Selection	Source
Source Master	Source/Destination	Take	Virtual Level Contract
Virtual Level Expand	X-Y Display	XY/MD Mode	

▲ Note that other panels might have button types with the same names but that perform different functions.

Button Types — Paging Model

These are the button functions available under the paging model:

Broadcast	Destination	Destination Lock	Destination Protect
Free Source	Menu	Panel Lock	Previous Source
Quick Source	Salvo	Source	Source/Destination
Take	X-Y Display		

NV9641 (and NV9641A) Button Types

The buttons available under the paging model are a subset of those available under the XY/MD model. Following are all the button types. A "P" next to the button name indicates that is available under paging mode:

Type	Paging	Description
[Back]		The 'Back' function places the predecessor of the current button page on the panel. The panel software can introduce a "back" button if an automatically generated list has more entries than can fit on a page.
Broadcast	P	On the data (control) level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button is useful in dubbing applications or when a backup (redundant) device is in use. See also the Source Master button, following.
Category		Displays a category's device list. When you assign a category button, two additional drop-down menus appear: 'Src Category' and 'Dst Category'. Choose a category from one of the category lists. When you choose a source category, the destination categories become inaccessible and vice versa: a category button must be either a source category or a destination category. You must choose 'None' in either category list to switch to the other category list. 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 default button text will be the category name. Configurers can override the default text.
Chop		When a chop function is supported by the router, the button is a toggle that enables and disables rapid switching of the selected destination device between the current source and the preset source. This chop function is used to test system timing.
Clear Preset		Erases preset entries, while leaving the panel in the same mode. This button is recommended as a "safety" feature. The clear preset button has the side effect of switching off 'Save Preset' mode.
Default State		Returns the panel to its most recent power-up state. That is called the *default state*.
Destination	P	Selects a destination. When you assign a destination button, a drop-down menu appears: 'Destination Device'. Choose a device from the list. The 'None' entry is merely a placeholder. Do not choose 'None'. The button text in normally the destination mnemonic, but override the default text.

Type	Paging	Description
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. In MD mode, the button of a locked destination appears bright red and its button legend is 'Locked by ‹user›' and the 'X-Y Display' button turns dark red. In X-Y mode, the 'X-Y Display' button is low-tally red (not amber) when the preset destination is locked.
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. **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. In MD mode, the button of a protected destination appears bright red and its button legend is 'Protected by ‹user›' and the 'X-Y Display' button turns low-tally red. In X-Y mode, no changes are visible on the panel operated by the user who issued the protect. On other user's panels, of any type, the destination appear protected.
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 *Level Set Details* page of NV9000-SE Utilities.
[Forward]		The panel software can introduce a "forward" button if an automatically generated list has more entries than can fit on a page. Technically, a 'Forward' button is a navigate button with the label "FORWARD" and that points to the next button page in the automatically generated sequence. There is no explicit 'Forward' button type.
Hold		The button turns hold mode on or off. In multi-destination mode, hold mode allows multiple destination selections and also retains destination selections after a take. In X-Y mode, hold mode retains breakaway levels after a take. (There are other effects.
Level Map		Cross-connects levels (in the same physical router). The function is typically used to shuffle audio channels, for example, to connect AES1/2 to AES3/4. The Level Map mode is cancelled when the next normal take is performed involving the selected destinations.
Menu	P	This button puts the NV9641 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. 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.

Type	Paging	Description
Name Set Toggle		The button toggles the panel between its default name set and the "system name" set. One or the other becomes the active name set. The button definition has no fields to configure. 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'. 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.
Navigate		During operation, a navigate button selects and displays a "target" button page. During configuration, a navigate button presents a dialog in which you can enter details of the target page. After you do so, NV9000-SE Utilities 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. (You'll use the navigate function to create new button pages.) 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.
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.
Preset Release		Removes locks and protects from preset source devices. This button is not needed if source locks and protects are not used in your system.
Previous Source	P	Presets the previously routed source to the currently selected destination. The operator must next press take to restore the previous source. This function is useful when a user makes a route in error. 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.
Quick Source	P	A quick source button selects a source and performs an immediate take. When you assign a quick source button, a drop-down menu appears in which you choose a source device. The 'None' entry is merely a placeholder. Do not choose 'None'.
Salvo	P	Executes a salvo. When you assign a Salvo button, a drop-down list appears in which you select a system salvo. The 'None' entry is merely a placeholder. Do not choose 'None'. (You can generate salvo buttons automatically in the 'Edit Navigation Button' dialog when you create a navigation button.)
Save Preset		When this function is enabled (its button is high tally), whatever is on preset is retained (on preset) after a take. When the function is disabled (its button is low tally), preset is cleared after a take.

Type	Paging	Description
Selection		Selection buttons have many functions, not the least of which is to give feedback (e.g., source and destination mnemonics) when the operator is performing takes. You should configure exactly 8 selection buttons (on any button page) if you want to support level selection in X-Y mode and MD device selection in MD mode. When the panel is in XY mode, a set of selection buttons presents a set of virtual levels for the selected destination device. If there are more levels than selection buttons, the up/down buttons activate and the operator can scroll through the level list. When the panel is in MD mode, a set of selection buttons presents a set of MD devices. If there are more destinations than selection buttons, the up/down buttons activate and the operator can scroll through the destination list. During configuration, when you assign a selection button, two additional drop-down menus appear: 'Display Index' and 'Multidst Device'. The drop-down menu for the button's *display index* has as many entries as the current page has selection buttons. Choose a virtual level's display index for the selection button for when the button is used in X-Y mode. Normally, your set of display indexes would be sequential from left to right. The drop-down menu for the *multi-destination device* allows you to specify the MD destination for the button. Do this for all the devices that you want to be selectable in MD mode. On the configuration page, when there are more MD devices than selection buttons, the up and down buttons become active and you can scroll through the set of MD devices to assign them to select buttons. (You can have up to 128 MD devices, in multiples of 8.) You do not have to commit every MD device to a button. MD buttons that are uncommitted are no-ops.
Source	P	A source button selects a source. (Note that a quick source button selects a source and also performs an immediate take.) 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'.
Source Master		Means "source is the master" and makes the source device the master. Otherwise, the destination is the master. 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). 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. The 'Source is Master' button is also used to initiate "broadcast" control routes.

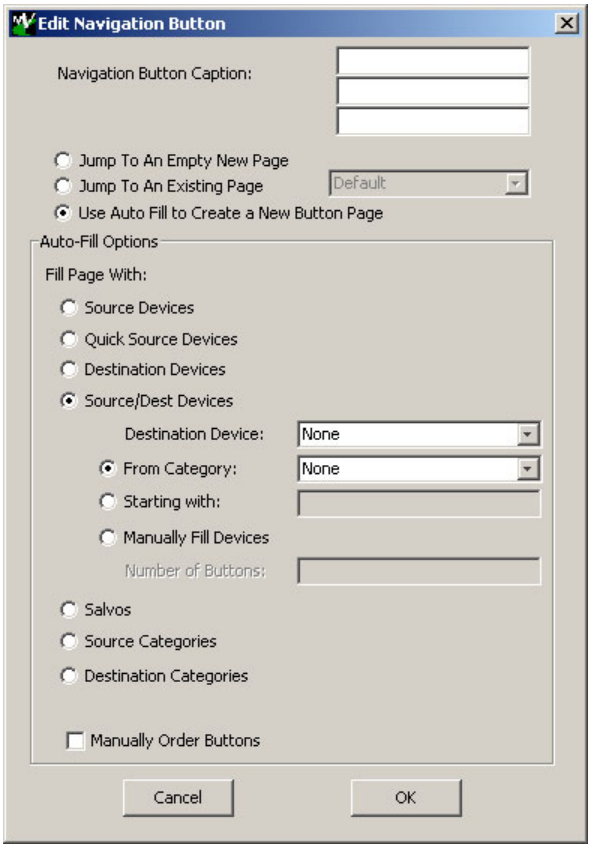
Type	Paging	Description
Source/Destination	P	A source/destination button selects both a source and a destination at one time. A source/destination button can be configured to perform an immediate take. If it is not, the operator must also press a 'Take' button to effect a take. When you assign a source/destination button, two drop-down menus appears: 'Source Device' and 'Destination Device'. Choose a device from each list. A 'None' entry is merely a placeholder. Do not choose 'None'.
Take	P	In X-Y mode, a take button switches the preset source device to the selected destination device on selected levels. In MD mode, a take button switches the preset source device(s) to the selected destination device(s) on all levels. Under the paging model, a take button switches the preset source device to the selected destination device on all levels. In most cases, configurers should provide the operator a 'Take' button.
Undefined	P	Makes the button undefined and inactive. On the actual panel, it will remain unlit (dark).
Virtual Level Contract		In X-Y mode, this button causes the alphanumeric display to show virtual levels at the *highest* level of grouping (with the least detail). The button affects only virtual levels that have been grouped. The button has no effect in multi-destination mode. This button has no configuration options.
Virtual Level Expand		In X-Y mode, this button causes the alphanumeric display to show virtual levels at the *lowest* level of grouping (with the most detail). The button affects only virtual levels that have been grouped. The button has no effect in multi-destination mode. This button has no configuration options.
X-Y Display	P	The 'X-Y Display' button displays current route status — in X-Y mode or multi-destination mode. Pressing this button has no effect. It also displays other messages in other circumstances, as required. 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.) After a take, the 'X-Y Display' button also displays the current source name. If there is no destination selected, the 'X-Y Display' button says so.
XY/MD Mode		Switches the panel between X-Y and multi-destination (MD) modes. 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.

See the *NV9641* (or *NV9641A*) *User's Guide* for more detail.

'Edit Navigation Button' Dialog

- Navigation buttons, and their corresponding target pages, are available only under the XY/MD model. The 'Edit Navigation Button' dialog is available only under the XY/MD model.

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



At the top, this dialog presents 3 lines on which you can enter text for the button caption.

The dialog has 3 options:

- Jump to an empty new page.

  This option creates a new page in the button tree. After the page is created, you can select it at any time and edit its buttons.

- Jump to an existing page.

  This options does ***not*** create a new page in the button tree. Operators will use the navigation button you are creating to display the page you select in the associated drop down menu.

- 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 suboptions:

Source buttons	Source category buttons
Destination buttons	Destination category buttons
Source/destination buttons	Salvo buttons

Button Page Table

The page table under the XY/MD models differs from the page table under the paging model.

Under XY/MD, the page table represents a hierarchical (tree) structure of button pages. Under the paging model, the page table represents a list structure of button pages.

Under the XY/MD Model

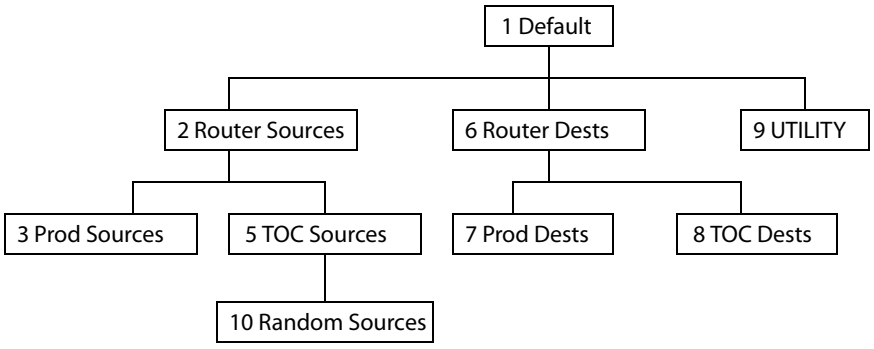
This page table lists the pages of the button page *tree*. It has 3 columns: 'Page Number', 'Page Name', and 'Link to Page Num(s)'.

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.

This is a sample of the page table under the XY/MD model:

Page Number	Page Name	Referrers
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:



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

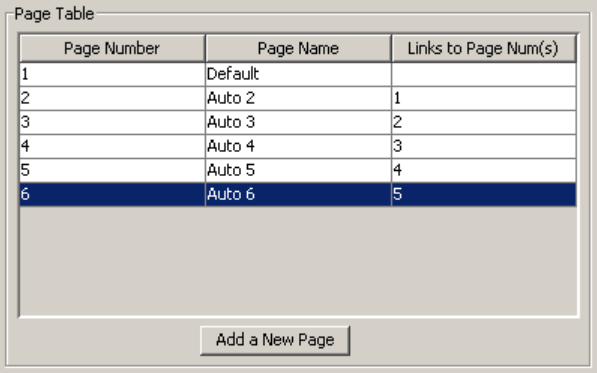
During operation, panel operators will press navigation buttons, global navigation buttons, or category buttons to jump to other pages.

Under the Paging Model

The page table lists the pages of the button page list. 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.

This is a sample of a page table under the paging model:

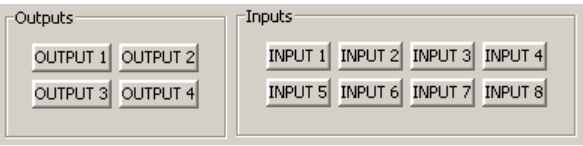


It represents a list structure. When the operator presses the 'Up' button, the preceding page appears, unless the operator is viewing the first page. When the operator presses the 'down' button, the following page appears unless the operator is viewing the last page.

To append a page to the list, either click the 'Add a New Page' button or click the 'Down' button when you are viewing the last page.

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 that input or output. (These buttons represent the DB25 *connector* at the rear.) See GPIO, on page 198.

Single-Destination Mode

Single-destination mode (a.k.a., "single-bus" or "button-per-source" mode) can be emulated in either X-Y mode or MD mode or when the panel is configured under the paging model.

Single-destination mode is ***not*** a distinct mode.

Global Navigation

NV9000-SE Utilities supports what are known as "global navigation" pages for NV9641 control panels. Global navigation pages are templates — patterns — that may be used and reused in the creation of NV9641 configurations.

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 NV9641 configurations. Navigate templates support all functions except 'Global Navigate'. That is because templates cannot be nested.

Templates themselves are ***not*** NV9641 configurations.

NV9642

NV9642 Panel Description

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

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

An equivalent NV9642V — a "virtual panel"— is available. It emulates the NV9642.

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

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

Configurers use 'Navigate' buttons to create new button pages (subtrees). During operation, NV9642 users press such buttons to access different subtrees.

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

Panel "Stacking"

The NV9642 can operate under one of two behavioral models:

- Standalone
- Stacking

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

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

If you have selected panel stacking as the behavioral model, NV9000-SE Utilities will ask you for the identities of up to 7 NV9646s. The configuration of those NV9646s is performed within the NV9642 configuration page. Although the NV9646s appear in the control panel list, with their panel IDs, they cannot be edited directly.

Function Buttons

The NV9642 has two rows of 17 LCD buttons — a total of 34 LCD buttons. Each has 3 lines of text. The buttons can display one of seven colors dynamically: nominally red, green, blue, purple, amber, yellow, or grey. If the button text occurs on only one or two lines, the button displays larger text, centered on the button.

Each LCD button has *three* operational levels: high tally, low tally, and off.

Some buttons functions are assigned by the system depending on the context. For example. the panel software adds a "forward" button and a "back" button if there are more sources than buttons on a category page.

The LCD buttons display a menu if the operator presses a menu button. When the operator make a menu selection, viewable data are displayed on the LCD buttons.

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

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

Alphanumeric Display

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

Because the display has 4 rows, operators might need to scroll the display frequently to see additional information. (The up and down buttons, right next to the display, are for scrolling the display.)

The display has 2 columns:

- Level/Dest.

  In X-Y mode, this column identifies the levels of the currently selected destination. That destination is identified as the first entry in the column.

  In MD mode, the 'Level/Dest' column presents all the MD destinations defined in the NV9642 configuration.
- Status.

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

  In X-Y mode, the status column represents either the levels of a source or the levels of multiple sources under breakaway.

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

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

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

The display fields can show the names of the name set or the system mnemonics.

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.

See GPIO, on page 198.

Modes of Operation

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

The primary modes of operation are:

- X-Y mode — individual control of all router *levels*. Choose a destination, optionally choose desired breakaway levels, choose a source, and press 'Take' to complete a desired route.
- Multi-destination mode — lets you control multiple destinations. The LCD buttons display destinations and sources. You can scroll through destination lists using the 'Page Up' and 'Page Down' buttons. Select a destination using selection buttons, choose a source, and repeat for all desired routes. Then press 'Take'. Takes are "all level," and breakaways cannot be performed.
- Single-destination mode.

  Single-destination" mode is not a distinct mode, but it is a mode on some other panels and can be simulated on the NV9642.

The secondary modes of panel operation are:

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

Other modes of operation are:

- Hold mode.
- Save preset mode.

Other NV9642 Functions

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

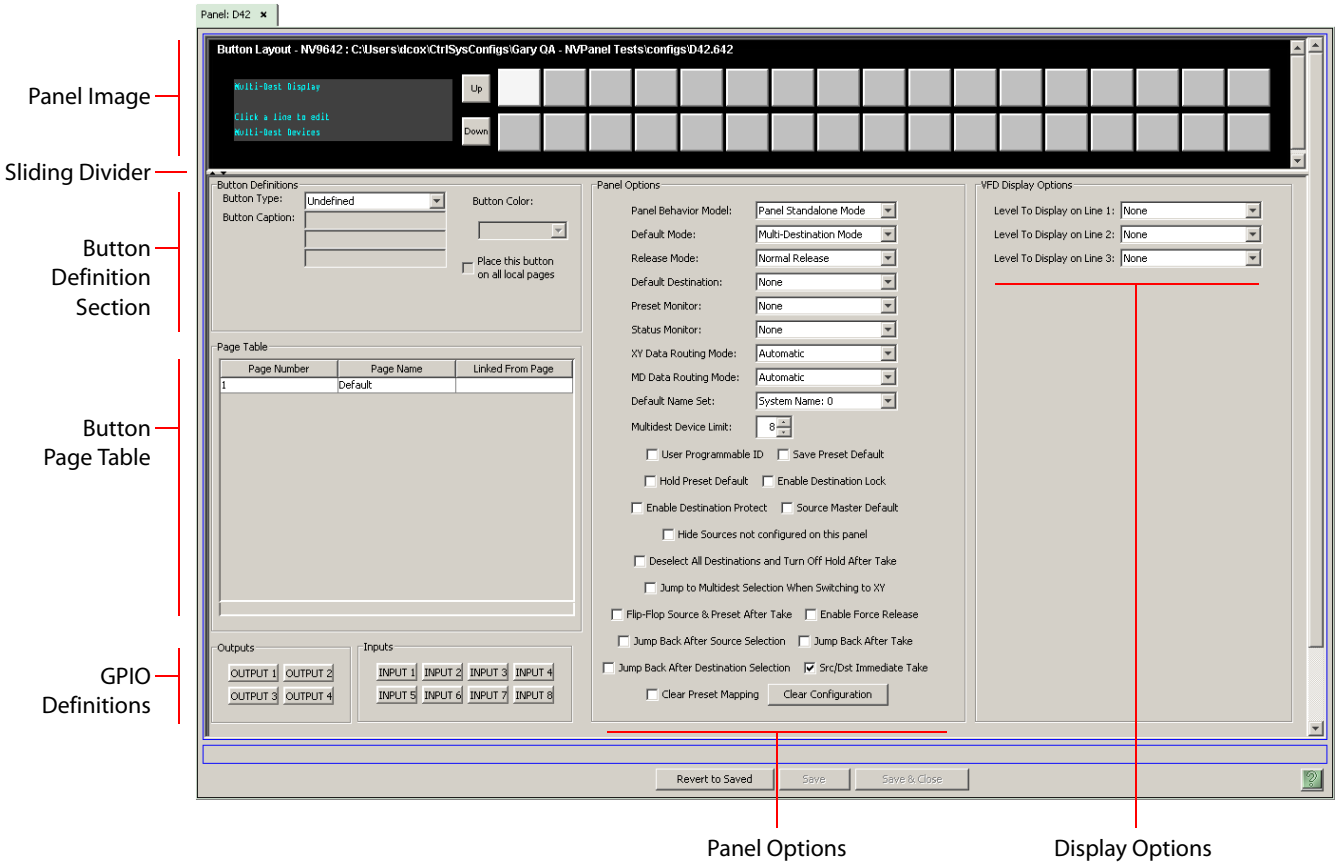
- System salvos.
- Gang or dub switching in multi-destination mode.
- Broadcast data routing in X-Y mode.
- Level mapping.

- (In NV9000-SE Utilities) button page "templates"—global navigation templates and suffix templates—for easier configuration.

The NV9642 has two behavioral models: standalone and stacking. The *standalone* model is provides "normal" operation. The *stacking* model allows the NV9642 to be used with from one to seven NV9646s to form a larger "panel" that has more buttons.

NV9642 Configuration Page

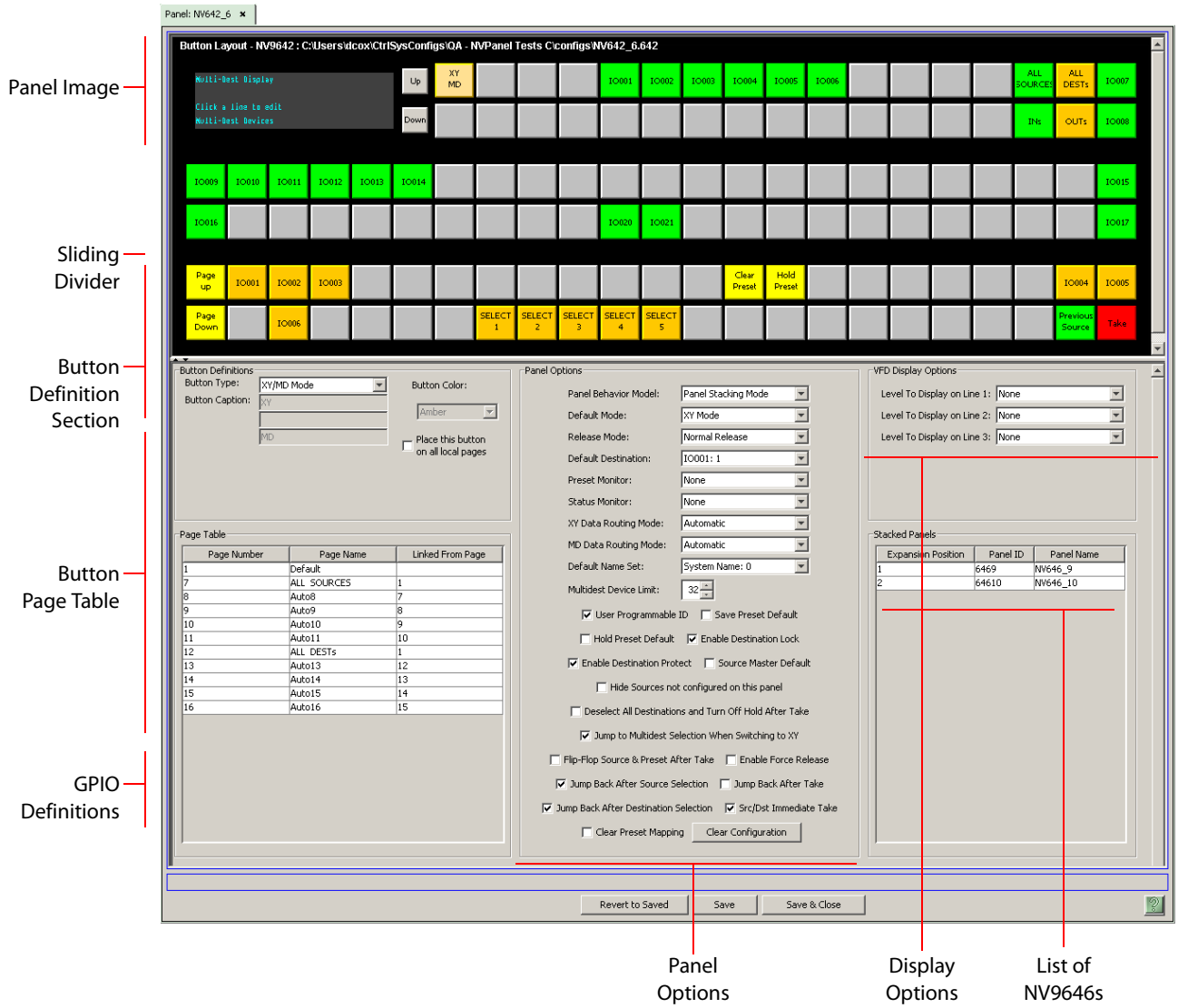
This is the default NV9642 panel configuration page (in *standalone* mode):



After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

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



Regions of the Configuration Page

There are 7 main regions (and a sliding divider at the bottom of the panel graphic):

- A graphic representation of the NV9642 panel.

  On the right are 34 function button images. Click on a button proxy to assign a function to it. In some cases, you can click or double-click certain buttons to execute the button function. Double-clicking a 'Navigate' button, for instance, causes the button's "subpage" to appear. Double-clicking a 'Page Up' or 'Page Down' button (not the same as a fixed up or down button) allows you to scroll through multi-destination pages that are represented in the image of the alphanumeric page.

  Click the display section of the panel image to open the multi-destination editor.

  Buttons can be illuminated in several colors: green, amber, yellow, red, blue, purple, and grey. There are 3 levels of illumination: high tally (bright), low tally (muted) and off.

Move the sliding divider at the bottom of the graphic downward (or upward if necessary) to reveal the NV9646 buttons when the panel is in stacking mode.

- Button definitions.

  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definition Section, following.

- Button page table.

  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." See Button Page List, on page 344.

- GPIO definitions.

  In this section, configurers may define GPIO logic. The control panel has a rear connector that provides 4 relay outputs and 8 optically isolated inputs. See GPIO, on page 198. (Note that the graphical buttons represent *connector terminals* and not actual buttons.)

- Panel options.

  In this section, configurers may specify the behavioral characteristics of the panel. See the *NV9642 User's Guide* for detailed information.

- Display options.

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

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

  You may leave any of the fields in this section blank. If you leave all 3 fields blank, the display will present levels *in their default order*.

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

  It is the first display option that controls whether the panel is in standalone mode or stacking mode.

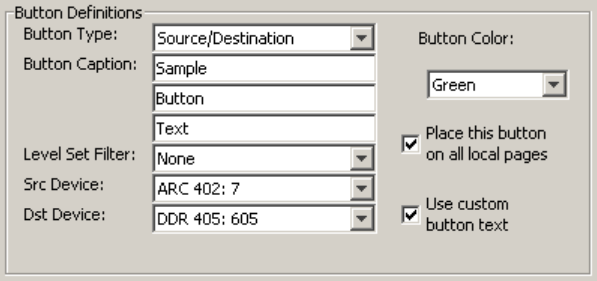
- List of NV9646s.

  This list presents the identities of the NV9646 extensions to the NV9000-SE Utilities. Each one is identified by a panel ID. The panel IDs of the NV9646s should be unique and not in use for any other purpose. You can assign any name to these NV9646 panels.

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

Button Definition Section

The button definitions section has several controls:



The controls vary according to the button type.

Button Type	A pull-down menu where you may select a button type.
Button Caption	Three text boxes in which you can enter three lines of button text up to 8 characters each.
Button Color	A pull-down menu where you can select a button color: amber, blue, green, grey, purple, red, or yellow.
Check box	"Place this button on all local 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.
Check box	"Use custom button text." Check this box if you want to override the button's default text. This checkbox is not present for all button types.

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 unique: during configuration, it initiates a dialog in which you create a subtree. During operation, it switches the panel to the button page associated with the button. See 'Edit Navigation Button' Dialog, on page 343.

Some buttons that are generated dynamically during operation.

There are different sets of button types for global suffix pages and for global navigation pages. See Global Navigation on page 314.

Button Types

These are the button types available for NV9642 configurations:

Back	Broadcast	Category
Chop	Clear Preset	Default State
Destination	Destination Lock	Destination Protect
Free Source	[Forward]	Global Navigate
Hold	Information	Level Map
Menu	Multi-Dest Paging Mode	Name Set Toggle
Navigate	Page Down	Page Up
Panel Lock	Preset Release	Previous Source

Quick Source Selection	Salvo	Save Preset
	Source	Source Master
Source/Destination	Take	Virtual Level Contract
Virtual Level Expand	XY Display	XY/MD Mode

▲ Note that other panels might have button types with the same names but that perform different functions.

NV9642 Button Types

These are the button types available for the NV9642. (Note that different subsets of these button types are available when you are defining a global suffix template or a global navigation template.)

Type	Description
Back	The 'Back' function places the predecessor of the current button page on the panel. The panel software can introduce a "back" button if an automatically generated list has more entries than can fit on a page.
Broadcast	On the data (control) level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button is useful in dubbing applications or when a backup (redundant) device is in use. See also the Source Master button, following.
Category	Displays a category's device list. When you assign a category button, two additional drop-down menus appear: 'Src Category' and 'Dst Category'. Choose a category from one of the category lists. When you choose a source category, the destination categories become inaccessible and vice versa: a category button must be either a source category or a destination category. You must choose 'None' in either category list to switch to the other category list. 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. 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 default button text will be the category name. You can override the default text.
Chop	When a chop function is supported by the router, the button is a toggle that enables and disables rapid switching of the selected destination device between the current source and the preset source. This chop function is used to test system timing.
Clear Preset	Erases preset entries, while leaving the panel in the same mode. This button is recommended as a "safety" feature. The clear preset button has the side effect of switching off 'Save Preset' mode.
Default State	Returns the panel to its most recent power-up state. That is called the *default state*.

Type	Description
Destination	Selects a destination. When you assign a destination button, a drop-down menu appears: 'Destination Device'. Choose a device from the list. The 'None' entry is merely a placeholder. Do not choose 'None'.
Destination Lock	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. In MD mode, an "L" appears next to the destination when it is locked. In X-Y mode, an "L" appears next to selected levels when they are locked.
Destination Protect	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. **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. In MD mode, a "P" appears next to the destination when it is protected. In X-Y mode, a "P" appears next to selected levels when they are protected.
Free Source	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 *Level Set Details* page of NV9000-SE Utilities.
[Forward]	The panel software can introduce a "forward" button if an automatically generated list has more entries than can fit on a page. A 'Forward' displays and activates the next button page in an automatically generated sequence. There is no explicit 'Forward' button type; configurers cannot create forward buttons explicitly.
Global Navigate	A global navigation button is very much like a navigation button to the operator. However, during configuration, it selects a previously defined "global navigation" template. The template itself may have structure that ordinary button pages have. It can include any button type except additional global navigate buttons.
Hold	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.)
Information	The information button displays auxiliary information about level mapping and perhaps other matters. The operator presses the information button once to see the information and again to hide the information.
Level Map	Cross-connects levels (in the same physical router). The function is typically used to shuffle audio channels, for example, to connect AES1/2 to AES3/4. The Level Map mode is cancelled when the next normal take is performed involving the selected destinations.
Menu	This button puts the NV9642 panel in menu mode and displays a menu on the LCD buttons that provides access to a variety of panel options. The button is required if you want the user to have access to the menu. 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.

Type	Description
Multi-Dest Paging Mode	This button allows panel operators to select a multi-destination "page" by entering the page number on a keypad. When a panel operator presses the 'Multi-Dest Paging Mode' button, the panel shows the suffix page assigned to the button. The operator enters the number of the desired multi-destination page, then presses 'Back'. The panel returns to the earlier page and switches the page's selection buttons to the multi-destination page selected. Note that it is the set of selection buttons on the page of the 'Multi-Dest Paging Mode' button that is affected by the page number the operator selects. Selection buttons on any other page are not affected.
Name Set Toggle	The button toggles the panel between its default name set and the "system name" set. One or the other becomes the active name set. The button definition has no fields to configure. 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'. 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.
Navigate	During operation, a navigate button selects and displays a "target" button page. During configuration, a navigate button presents a dialog in which you can enter details of the target page. After you do so, NV9000-SE Utilities 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. (You'll use the navigate function to create new button pages.) 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.
Page Down	(1) Scrolls the levels or MD destinations on the selection buttons *down* or (2) scrolls a list *down*. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the list.
Page Up	(1) Scrolls the levels or MD destinations on the selection buttons *up* or (2) scrolls a list *up*. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the list. When the panel is displaying the *first page* of a list of devices in a category, the 'Page Up' button returns the operator to the page containing the category button.
Panel Lock	Prevents accidental changes to the panel settings, especially router crosspoints. When the panel is locked, the button array becomes blank except for the Panel Lock button which becomes high tally red. Pressing the Panel Lock button again reverts the panel to its previous mode.
Preset Release	Removes locks and protects from preset source devices. This button is not needed if source locks and protects are not used in your system.

Type	Description
Previous Source	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. 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.
Quick Source	A quick source button selects a source and performs an immediate take. When you assign a quick source button, a drop-down menu appears in which you choose a source device. The 'None' entry is merely a placeholder. Do not choose 'None'.
Salvo	Executes a salvo. When you assign a Salvo button, a drop-down list appears in which you select a system salvo. The 'None' entry is merely a placeholder. Do not choose 'None'. (You can generate salvo buttons automatically in the 'Edit Navigation Button' dialog when you create a navigation button.)
Save Preset	When this function is enabled (its button is high tally), whatever is on preset is retained (on preset) after a take. When the function is disabled (its button is low tally), preset is cleared after a take.

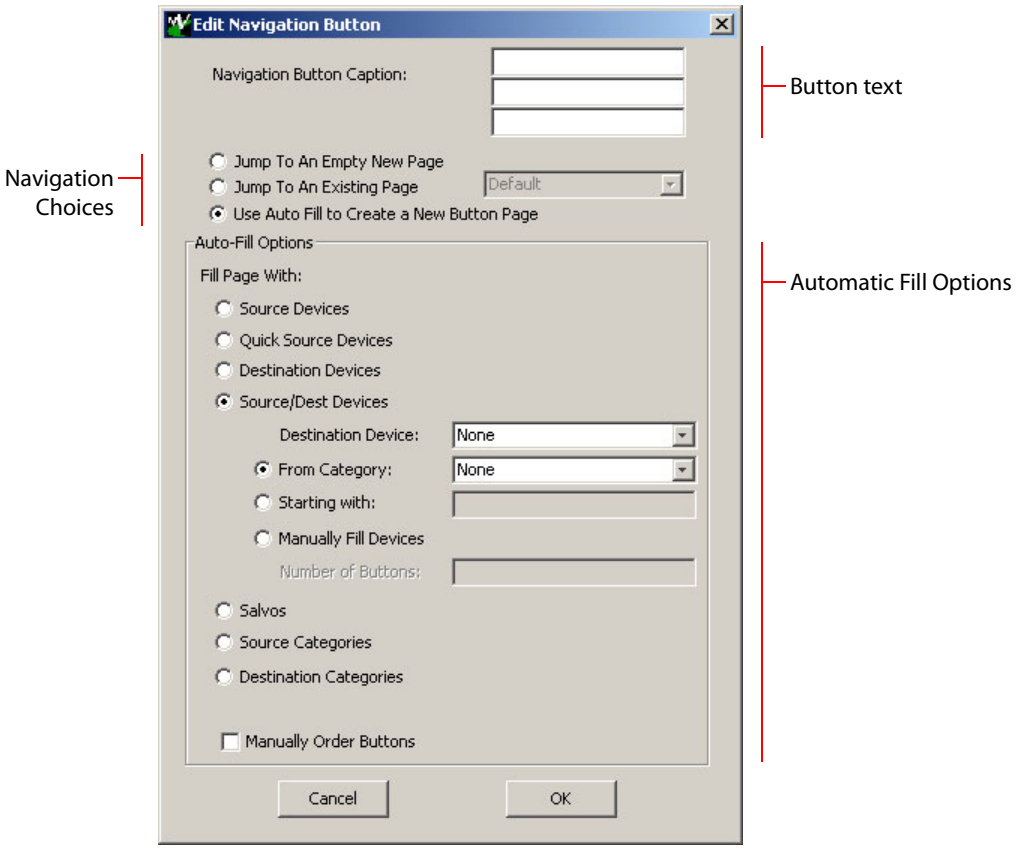
Type	Description
Selection	Selection buttons have many functions, not the least of which is to give feedback (e.g., source and destination mnemonics) when the operator is performing takes. When the panel is in XY mode, a set of selection buttons presents a set of virtual levels for the selected destination device. If there are more levels than selection buttons, the operator can use 'Page Up' or 'Page Down' buttons to scroll through the virtual level list. Note that the up/down buttons next to the display scroll the *display*, and do not scroll the level list represented on the selection buttons. Operators need 'Page Up' and 'Page Down' buttons to scroll the MD devices on the selection buttons. When the panel is in MD mode, a set of selection buttons presents a set of MD devices. If there are more destinations than selection buttons, the up/down buttons activate and the operator can scroll through the destination list — on the display. Here too, note that the up/down buttons next to the display scroll the *display*, and do not scroll the MD destination list represented on the selection buttons. During configuration, when you assign a selection button, two additional drop-down menus appear: 'Display Index' and 'Multidst Device'. The 'Multidst Device' field does not become enabled until you choose a display index. The drop-down menu for the button's *display index* has as many entries as the current page has selection buttons, but only up to a limit of 8. You must choose a display index for the selection button. Normally, your set of display indexes would be sequential from left to right. The drop-down menu for the *multi-destination device* allows you to specify the MD destination for the button. Do this for all the destination devices that you want to be selectable in MD mode. On the configuration page, when there are more MD devices than selection buttons, you can double-click a 'Page Up' or 'Page Down' button to scroll through the set of MD devices to assign them to selection buttons. (You can have up to 512 MD devices, in multiples of 8.) You do not have to commit every MD device to a button. MD buttons that are uncommitted are no-ops.
Source	A source button selects a source. (Note that a quick source button selects a source and also performs an immediate take.) 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'.
Source Master	Means "source is the master" and makes the source device the master. Otherwise, the destination is the master. It applies 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). 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. The 'Source is Master' button is also used to initiate "broadcast" control routes.
Source/ Destination	A source/destination button selects both a source and a destination at one time. 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.

Type	Description
Take	In X-Y mode, a take button switches the preset source device to the selected destination device on selected levels. In MD mode, a take button switches the preset source device(s) to the selected destination device(s) on all levels. In most cases, configurers should provide the operator a 'Take' button.
Undefined	Makes the button undefined and inactive. On the actual panel, it will remain unlit (dark).
Virtual Level Contract	In X-Y mode, this button causes the alphanumeric display to show virtual levels at the *highest* level of grouping (with the least detail). The button affects only virtual levels that have been grouped. The button has no effect in multi-destination mode. This button has no configuration options.
Virtual Level Expand	In X-Y mode, this button causes the alphanumeric display to show virtual levels at the *lowest* level of grouping (with the most detail). The button affects only virtual levels that have been grouped. The button has no effect in multi-destination mode. This button has no configuration options.
XY Display	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. 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.) After a take, the 'X-Y Display' button also displays the current source name. If there is no destination selected, the 'X-Y Display' button says so.
XY/MD Mode	Switches the panel between X-Y and multi-destination modes. 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.

See the *NV9642 User's Guide* for more detail.

'Edit Navigation Button' Dialog

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



At the top, this dialog presents 3 lines on which you can enter text for the button caption.

The dialog has 3 navigation choices:

- Jump to an empty new page.

  This option creates a new page in the button tree. 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. Operators will use the navigation button you are creating to display the button page you select in the associated drop down menu.

- 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 suboptions:

Source buttons	Salvo Source category buttons
Destination buttons	Destination category buttons
Source/destination buttons	Salvo buttons

Button Page List

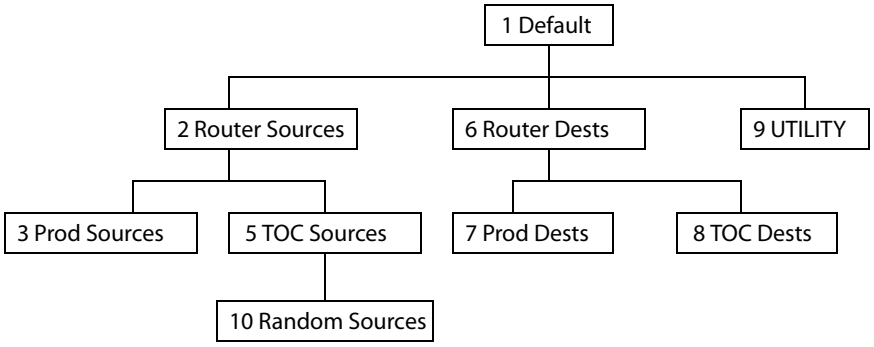
This section lists the pages of the button tree. It has 3 columns: Page Number, Page Name, and "Link to Page Num(s)."

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.

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:

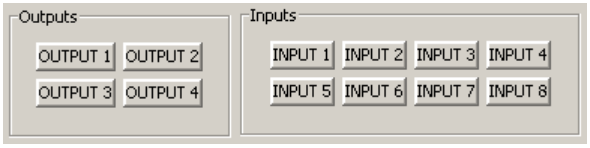


During configuration, you will use 'Navigate' buttons to create new pages. During configuration, you can double-click a 'Navigate' button to jump to its page.

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

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 that input or output. (These buttons represent the DB25 *connector* at the rear.)

See GPIO, on page 198.

Single-Destination Mode

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

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

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

Global Navigation

NV9000-SE Utilities supports what are known as "global navigation" pages for NV9642 control panels. Global navigation pages are templates — patterns — that may be used and reused in the creation of NV9640 configurations.

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 NV9642 configurations. Navigate templates support all functions except 'Global Navigate'. That is because templates cannot be nested.

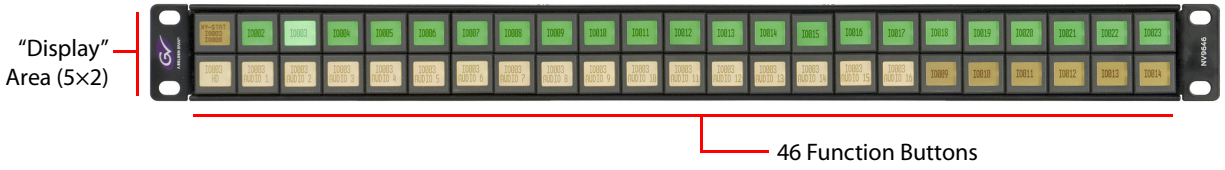
A global navigation page must be of the same "shape" as the NV9642 panel that references it. That is, if the NV9642 is in stacking mode and has, say, four NV9646 extensions, any global navigation page that it references must also be configured in stacking mode with four NV9646 extensions.

Templates themselves are ***not*** NV9642 configurations. They are *used by* NV9642 configurations.

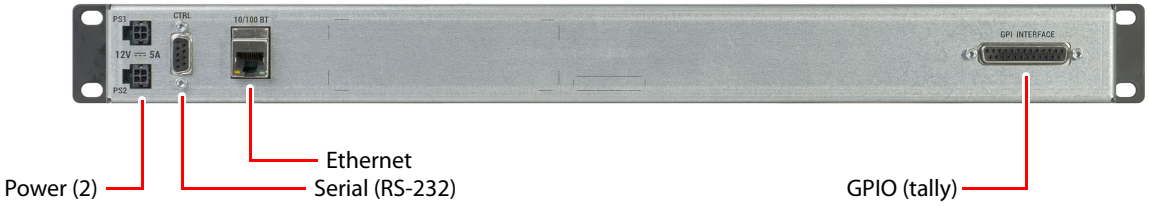
NV9646

NV9646 Panel Description

This 1RU panel is organized as shown in these figures:



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



The NV9000-SE Utilities is a compact unit, being 1RU and having an overall depth of about 2".

An equivalent NV9646V — a "virtual panel"— is available. It emulates the NV9646.

The panel can be configured in either of two behavioral modes:

- 'Display and Button' mode
- All-Button mode

Under 'Display and Button' mode, the left-most 15 buttons function as an alphanumeric display. These buttons display the same information as some other panels that have displays, such as the NV9640. Under this mode, the panel operator can turn the "display" on and off. When the display is off, the 15 buttons can have other configured functions. (It is with the 'Toggle Display' button that the operator hides or reveals the display.)

Under 'All-Button' mode, the panel provides no display. Note that under 'Display and Button' mode, the panel has 3 additional button functions that relate to the display.

The panel can operate in X-Y mode or in multi-destination (MD) mode. Operators can switch between modes at any time.

The NV9646 provides a *tree-structured* (or hierarchical) button layout. Configurers can define a "tree" of button pages in such a way that each of the 54 LCD buttons can either (1) execute a function or (2) select a subtree (i.e., present an entirely new set of functions at a different level in the tree). The tree, with its subtrees, is not limited in size.

We use the term "button page" or "page" to mean the set of 54 button functions at any particular place in the tree. A panel that is configured in 'Panel and Button' mode shows the "display" only on the top level page of the button "tree."

Configurers use 'Navigate' buttons to create new button pages (subtrees). During operation, NV9646 users press such buttons to access different subtrees.

The panel can also display predefined button pages. For instance, a "category" button, when pressed, can display one or more pages of sources or destinations through which the operator may browse. A "menu" button presents a page of (pre-defined) menu options.

Use as an NV9642 Extension

When an NV9642 is placed in stacking mode, it is coupled with from one to seven NV9646s that allows it to function as a larger panel with more buttons. The additional buttons allow a larger range of devices to be displayed, for example, when the operator is performing category device selection. Please refer to the NV9642 User's Guide for detail.

Function Buttons

The NV9646 has an array of 54 LCD buttons. Each button has 1, 2, or 3 lines of text. When there are one or two lines of text, the characters are large; when there are 3 lines of text, the characters are smaller. The buttons can display one of seven colors dynamically: nominally red, green, blue, purple, amber, yellow, or grey.

Each LCD button has *three* operational levels: high tally, low tally, and off.

Some buttons functions are assigned by the system. For example. the panel software adds a "forward" button and a "back" button if there are more sources than buttons on a category page.

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.

Configurers can define 'Selection' buttons that select a level or an MD device. (They *must* do so if the operator is to make such selections.)

Scrolling is necessary when a list of items — for instance, levels or MD devices — exceeds the number of buttons available for the items. Panels that use multi-destination mode will probably require 'Page Up' and 'Page Down' buttons.

Alphanumeric Display

When the panel is in 'Display and Button' mode, the left-most 10 buttons (a 5×2 array) form an alphanumeric display. (These buttons therefore provide a 40×9 matrix of characters.) The panel operator has the option of turning the display on or off. When the display is off, the 10 buttons can have other functions.

The alphanumeric display provides feedback for the operators as they make selections to execute takes and other operations. The panel functions either in: X-Y mode or multi-destination mode. The display changes according to those modes.

In either case, the display has 5 lines (1 header and 5 lines of information) and its buttons are white. The display has 5 columns:

- Information (the left-most column, which has no heading).

  In X-Y mode, the third entry identifies the destination currently selected.

  In MD mode, there are no entries in this column other than the word "MultiDes" and the page number.

  The bottom-most entry in this column is always the page number of the display, which can scroll.

- Preset.

  The preset column indicates what source *will* be routed to a destination when the operator presses the 'Take' button.

  In X-Y mode, the preset column represents either the levels of a source or the levels of multiple sources under breakaway. After the take, they disappear from the preset column and re-appear in the status column.

  In MD mode, the preset column indicates the sources that will be routed to selected destinations in the 'Level/Dest' column. After the take, they disappear from the preset column and re-appear in the status column.

- Status.

  The status column indicates what source(s) have been routed to the currently selected destination.

  In X-Y mode, the status column represents either the levels of a source or the levels of multiple sources under breakaway.

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

- LVL/DST.

  (This stands for "level/destination.")

  In X/Y mode, this column identifies the *levels* of the currently selected destination. That destination is identified in first column, the information column.

In MD mode, the 'Level/Dest' column presents all the MD devices defined in the NV9654 configuration.

- S-I-L-B (Attributes).

  This column represents 4 attributes of the levels or destinations present in the 'LVL/DST' column:

  "S" stands for *selected*. An asterisk (*) in the "S" column means that the associated level (or destination) is selected. In X-Y mode, an "*" indicates that a *level* is selected. In MD mode, an "*" indicates that an MD device is selected.

  "I" stands for *information*. An asterisk in the "I" column means that the additional information regarding the associated level or destination is available. Press an 'Info' button to view the information.

  "L" is the heading for *locks and protects*. An "L" in the "L" column means that the associated level (or destination) is locked. A "P" in the "L" column means that the associated level (or destination) is protected.

  "B" stands for *breakaway*. In X-Y mode, an asterisk in the "B" column means that the associated level is a breakaway level. In MD mode, an asterisk indicates a breakaway on the associated destination.

The display fields can show either names from a name set or the system mnemonics.

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.

See GPIO, on page 198.

Modes of Operation

The primary modes of operation are:

- X-Y mode — control of individual router *levels*. Choose a destination, optionally choose desired breakaway levels, choosing source(s), and press 'Take' to complete a desired route.
- Multi-destination mode — lets you control multiple destinations. The LCD buttons display destinations and sources. You can scroll through destination lists using the 'Page Up' and 'Page Down' buttons. Select a destination using selection buttons, choose a source, and repeat for all desired routes. Then press 'Take'. Takes in MD mode are "all level," and breakaways cannot be performed.
- Single-destination mode.

  Single-destination" mode is not a distinct mode, but it is a mode on some other panels and can be simulated on the NV9646.

The secondary modes of panel operation are:

- Setup mode — where the NV9646 is freshly powered up, but disconnected from the network. In this mode, you can set the panel ID and perform a few diagnostic tasks.
- Salvo mode — pressing a Salvo button (and then the 'Take' button) executes a salvo. (The duration of a salvo is indeterminate.)

- Menu mode — pressing a Menu button places the NV9646 in "menu" mode. In menu mode, the panel's button array becomes a menu that changes as needed during menu operation.

Other modes of operation are:

- Hold mode.
- Save preset mode.

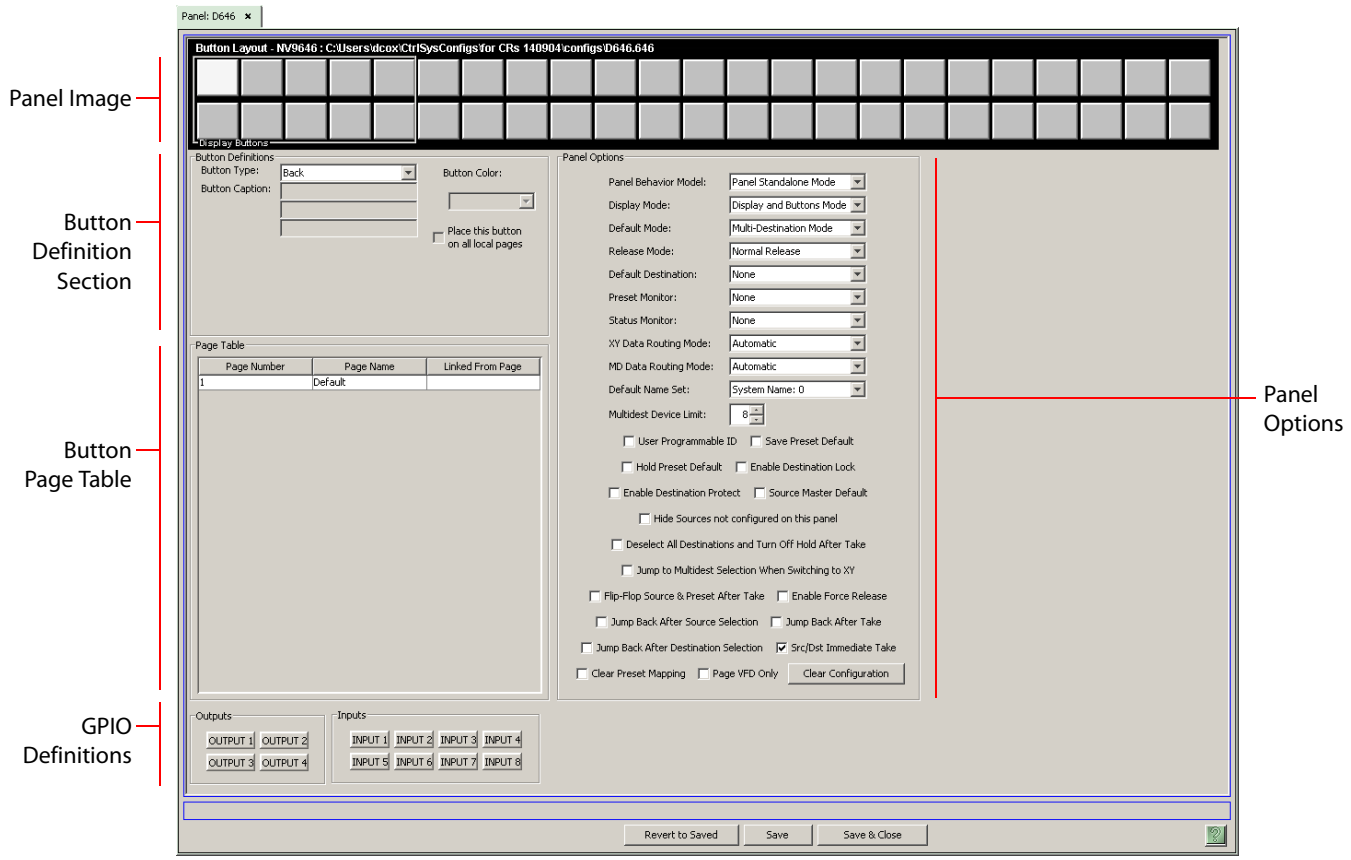
Other NV9646 Functions

The NV9646 can be configured to perform the following additional functions:

- System salvos.
- Gang or dub switching in multi-destination mode.
- Broadcast data routing in X-Y mode.
- Level mapping.
- (In NV9000-SE Utilities) button page "templates" — global navigation templates and suffix templates — for easier configuration.

NV9646 Configuration Page

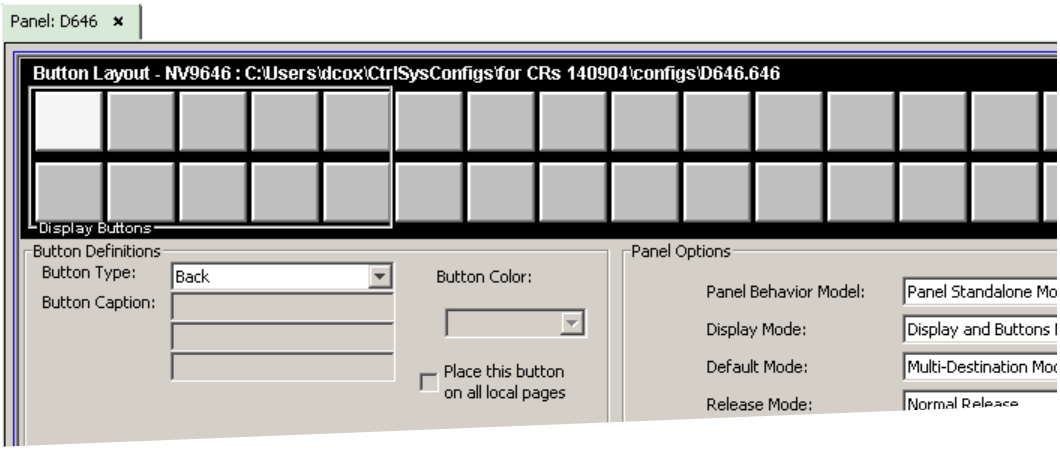
This is the default NV9646 panel configuration page:



After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

The previous illustration showed the configuration page set up for 'All Buttons' mode. The panel can also be configured in 'Display and Buttons' mode, in which case the "display" section of the panel graphic is delineated by a white line on the configuration page:



The display section is the 5×3 array of buttons at the left.

Regions of the Configuration Page

There are 5 main regions:

- The NV9646 panel image.

  The NV9646 has 54 LCD buttons in an 18×3 array. Click on a button to assign a function to it. In some cases, you can click or double-click a button to execute the button function. Double-clicking a 'Navigate' button, for instance, causes the button's "subpage" to appear.

  ▲ Double-clicking a category in the configuration window does not cause its associated device page(s) to appear in the configuration window.

  Buttons can be illuminated in several colors: green, amber, yellow, red, blue, purple, and grey. There are 3 levels of illumination: high tally (bright), low tally (muted) and off.

  Buttons in the 5×3 display section are always white (if the display is enabled). Operators can turn the display on and off. Configurers may assign button functions to the buttons of the display section for those occasions when the operator has turned the display off.

- Button definition section.

  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definitions, following.

- Button page table.

  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." See Button Page List, on page 435.

- GPIO definitions.

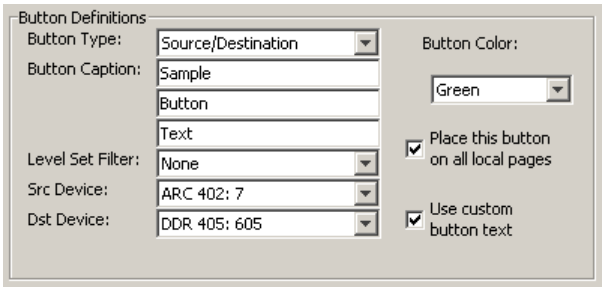
  In this section, configurers may define GPIO logic. The control panel has a rear connector that provides 4 relay outputs and 8 optically isolated inputs. See GPIO, on page 198. (Note that the graphical buttons represent *connector terminals* and not actual buttons.)

- Panel options.

  In this section, configurers may specify the behavioral characteristics of the panel. See the *NV9646 User's Guide* for detailed information.

Button Definitions

The button definitions section has several controls:



The controls vary according to the button type.

Button Type	A pull-down menu where you may select a button type.
Button Caption	Three text boxes in which you can enter three lines of button text up to 8 characters each. 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.
Check box	"Place this button on all local 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.
Check box	"Use custom button text." Check this box if you want to override the button's default text. This checkbox is not present for all button types.

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 unique: during configuration, it initiates a dialog in which you create a button subtree. During operation, it switches the panel to the button page associated with the button. See 'Edit Navigation Button' Dialog, on page 434.

Some buttons are generated dynamically during operation.

There are different sets of button types for global suffix pages and for global navigation pages. See Global Navigation, on page 437.

Button Types

These are the button types:

Back	Broadcast	Category	Chop
Clear Preset	Default State	Destination	Destination Lock
Destination Protect	Free Source	[Forward]	Global Navigate
Hold	Information	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	Toggle Display
VFD/SEL Toggle	X-Y Display	XY/MD Mode	

NV9646 Button Types

These are the button types available for the NV9646. (Note that different subsets of these button types are available when you are defining a global suffix template or a global navigation template.).

Type	Description
Back	The 'Back' function places the predecessor of the current button page on the panel. The panel software can introduce a "back" button if an automatically generated list has more entries than can fit on a page.
Broadcast	On the machine control level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button is useful in dubbing applications or when a backup (redundant) device is in use.
Category	Displays a category's device list. When you assign a category button, two additional drop-down menus appear: 'Src Category' and 'Dst Category'. Choose a category from one of the category lists. When you choose a source category, the destination categories become inaccessible and vice versa: a category button must be either a source category or a destination category. You must choose 'None' in either category list to switch to the other category list. When you choose either 'Src Category' or '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. 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 default button text will be the category name. You can override the default text.

Type	Description
Chop	When a chop function is supported by the router, the button is a toggle that enables and disables rapid switching of the selected destination device between the current source and the preset source. This chop function is used to test system timing.
Clear Preset	Erases preset entries, while leaving the panel in the same mode. We recommend you use this button because it is a "safety" feature. The clear preset button has the side effect of switching off 'Save Preset' mode.
Default State	Returns the panel to its most recent power-up state. That is called the *default state*.
Destination	Selects a destination. When you assign a destination button, a drop-down menu appears: 'Destination Device'. Choose a device from the list. The 'None' entry is merely a placeholder. Do not choose 'None'.
Destination Lock	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. When the panel has its display area enabled, an "L" appears, in MD mode, under the "L" column (of the "S I L B" buttons) on the rows representing locked *destinations*. In X-Y mode, an "L" appears under the "L" column on the rows representing locked *levels*.
Destination Protect	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. **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. When the panel has its display area enabled, a "P" appears, in MD mode, under the "L" column (of the "S I L B" buttons) on the representing locked *destinations*. In X-Y mode, a "P" appears under the "L" column on the rows representing locked *levels*.
Free Source	Defines a phantom device that can be used to release or "free" devices on the machine 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 *Level Set Details* page of NV9000-SE Utilities.
[Forward]	The panel software can introduce a "forward" button if an automatically generated list has more entries than can fit on a page. A 'Forward' button displays and activates the next button page in an automatically generated sequence. There is no explicit 'Forward' button type; configurers cannot create forward buttons explicitly.

Type	Description
Global Navigate	A global navigation button is very much like a navigation button to the operator. However, during configuration, it selects a previously defined "global navigation" template. The template itself may have structure that ordinary button pages have. It can include any button type except additional global navigate buttons.
Hold	Toggles the panel in and out of "hold" mode. In multi-destination mode, hold mode retains destination selections after a take. In X-Y mode, hold mode retains breakaway levels after a take. (There are other effects.
Information	The information button displays auxiliary information about level mapping and perhaps other matters. The operator presses the information button once to see the information and again to hide the information. An information button remains disabled (dark) until there is information to display. When there is information to display, an asterisk appears in the "I" column of the panel's display (when it is turned on). The "I" column is found on the "S I L B" buttons of the display.
Level Map	Cross-connects levels (in the same physical router). The function is typically used to shuffle audio channels, for example, to connect AES1/2 to AES3/4. The Level Map mode is cancelled when the next normal take is performed involving the selected destination.
Menu	This button puts the NV9646 panel in menu mode and displays a menu on the LCD buttons that provides access to a variety of panel options. Place the button on the panel only if you want the user to have access to the menu. By pressing certain buttons, the user makes menu selections and may enter data (such as panel ID) or change LCD brightness values.
Name Set Toggle	The button toggles the panel between its default name set and the "system name" set. One or the other becomes the active name set. The button definition has no fields to configure. 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'. 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.
Navigate	During operation, a navigate button selects and displays a "target" button page. During configuration, a navigate button presents a dialog in which you can enter details of the target page. After you do so, SE displays the target page's buttons on the panel image and adds the subtree to the tree window in the lower left corner if it is not there. (You'll use the navigate function to create new button pages.) 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 to operators.

Type	Description
Page Down	Scrolls a list *down*. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the list. 'Page Down' also scrolls through multi-destination devices in multi-destination mode and through levels in X-Y mode.
Page Up	Scrolls a list *up*. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the the list. 'Page Up' also scrolls through multi-destination devices in multi-destination mode and through levels in X-Y mode. When the operator is displaying a list of devices from a category, the 'Page Up' button will return the operator to the page containing the category button.
Panel Lock	Prevents accidental changes to the panel settings, especially router crosspoints. When the panel is locked, the button array becomes blank except for the Panel Lock button which becomes high tally red. Pressing the Panel Lock button again reverts the panel to its previous mode.
Preset Release	Removes locks and protects from preset source devices. This button is not needed if source locks and protects are not used in your system.
Previous Source	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. 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.
Quick Source	A quick source button selects a source and performs an immediate take. When you assign a quick source button, a drop-down menu appears in which you choose a source device. (The 'None' entry is merely a placeholder. Do not choose 'None'.)
Salvo	Executes a salvo. When you assign a Salvo button, a drop-down list appears in which you select a system salvo (previously defined in NV9000-SE Utilities). The 'None' entry is merely a placeholder. Do not choose 'None'. (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.)
Save Preset	When this function is enabled (its button is high tally), whatever is on preset is retained (on preset) after a take. When the function is disabled (its button is low tally), preset is cleared after a take.

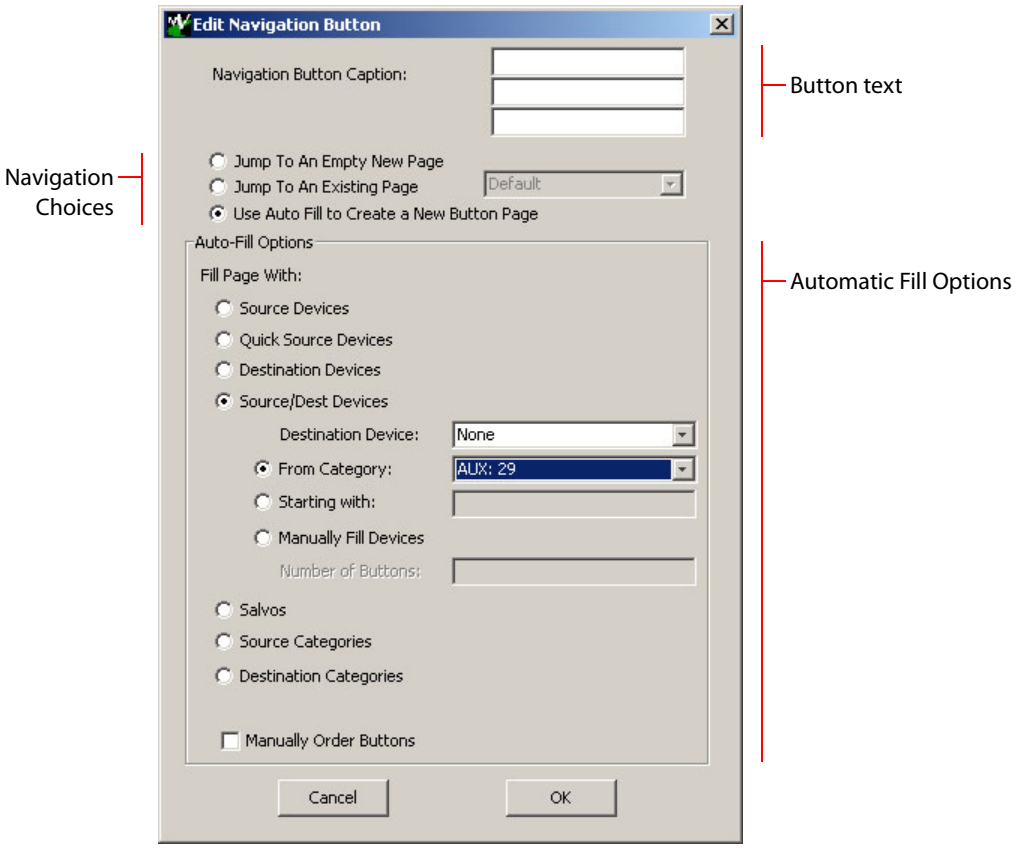
Type	Description
Selection	Typically, at least one button page should provide a set of selection buttons. Operators press selection buttons to select levels (when the panel is in XY mode) or to select MD device (in MD mode). Each selection button represents one level or one MD device. You may configure any number of selection buttons (on any button page). The selection buttons can be arranged anywhere on the button page. The selection buttons on any button page are unrelated to the selection buttons on any other page. Only the selection buttons on the currently visible page are active at a given time. 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. Scrolling is affected by two factors — the presence or absence of a 'VFD/Sel Paging Toggle' button and whether the 'Page VFD only' option is in effect. Thus, If your panel does ***not*** have a 'VFD/Sel Paging Toggle' button, 1 When the 'Page VFD Only' option is ***not*** in effect, selection buttons scroll (always in increments of 8) when the panel's display scrolls. We say that the selection buttons "follow" the display. 2 When the 'Page VFD Only' option ***is*** in effect, only the panel's display scrolls and the selection buttons, if any, do not scroll. If your panel ***does*** have a 'VFD/Sel Paging Toggle' button, 1 When the 'VFD/Sel Paging Toggle' button reads 'Paging LCD Display', the panel's display scrolls (and selection buttons do not). 2 When the 'VFD/Sel Paging Toggle' button reads 'Paging Select Buttons', the selection buttons scroll by an increment equal to the number of buttons on the page (and the display does not scroll). Under the 'All Buttons' model, there is no such effect. ▲ If the panel is configured so that both the display and the selection buttons scroll, the number of selection buttons on a page should be exactly 8. During configuration, when you assign a selection button, an additional drop-down menus appears in the button definition area: 'Display Index'. An 'Edit Multi-Dest Devices' button also appears. The drop-down menu for the button's *display index* has as many entries as the panel's 'MultiDest Device Limit' option. The number of selection buttons would usually be much smaller than the MD device limit. We recommend that you choose consecutive display indexes from 1 to the number of selection buttons on the page. Use the 'Edit Multi-Dest Devices' button to define MD devices. They are assigned to selection buttons in the order in which you define them.

Type	Description
Source	A source button selects a source. (Note that a quick source button selects a source and also performs an immediate take.) 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'.)
Source Master	Means "source is the master" and makes the source device the master during machine control operations. Otherwise, the destination is the master. 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). 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. The 'Source is Master' button is also used to initiate "broadcast" machine control routes.
Source/ Destination	A source/destination button selects both a source and a destination at one time. Source/destination buttons can be configured to perform immediate takes. (It is a NV9646 panel option.) If they are not so configured, the operator must also press a 'Take' button to effect a take.
Take	In X-Y mode, a take button switches the preset source device to the selected destination device on selected levels. In MD mode, a take button switches the preset source device(s) to the selected destination device(s) on all levels. In most cases, configurers should provide the operator a 'Take' button.
Undefined	Makes the button undefined and inactive. On the actual panel, it will remain unlit (dark).
VFD/SEL Toggle	The button is a toggle and is available only when the display is in 'Display and Buttons' mode. In one state, it makes the display (here called a VFD) scroll when the operator presses 'Page Up' or 'Page Down'. In the other state, it makes the items on selection buttons scroll. This button has no configuration options. The button legend is fixed. Depending on which state the button is in, it will read "Paging LCD Display" [sic] or "Paging Select Buttons." The presence or absence of this button affects how selection buttons scroll.

Type	Description
X-Y Display	This button displays the current source and current destination. It is usable in both X/Y mode and MD mode. It is very useful when the panel has no display. It might be appropriate to define an 'X-Y Display' button in the display area. When the display is turned off, the button would become visible.
XY/MD Mode	Switches the panel between X-Y mode and multi-destination mode. 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.

'Edit Navigation Button' Dialog

During configuration, when you choose 'Navigate' for a selected button, NV9000-SE Utilities displays a 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.

The dialog has 3 navigation choices:

- Jump to an empty new page.

  This option creates a new page in the button tree. 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. Operators will use the navigation button you are creating to display the page you select in the associated drop-down menu.
- 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 suboptions:

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

Button Page List

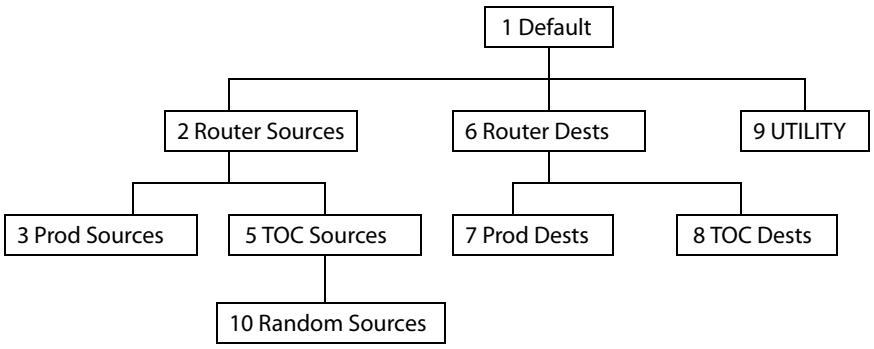
This section lists the pages of the button tree. It has 3 columns: Page Number, Page Name, and "Link to Page Num(s)."

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.

This is a sample of a button page list:

Page Number	Page Name	Referrers
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:

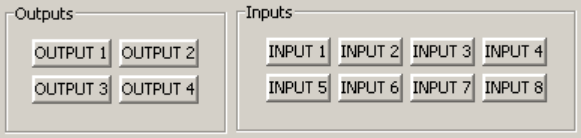


During configuration, you will use 'Navigate' buttons to create new pages. During configuration, you can double-click a 'Navigate' button to jump to its page.

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

Tally (GPIO) Section

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 that input or output. (These buttons represent the DB25 *connector* at the rear.)

See GPIO, on page 198.

Single-Destination Mode

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

The simplest form presents a group of “quick source” buttons. If you configure a default destination in the panel options, all the quick sources could be taken to a (single) default destination with no need for destination selection.

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. The limit to the number of MD devices is a panel option.

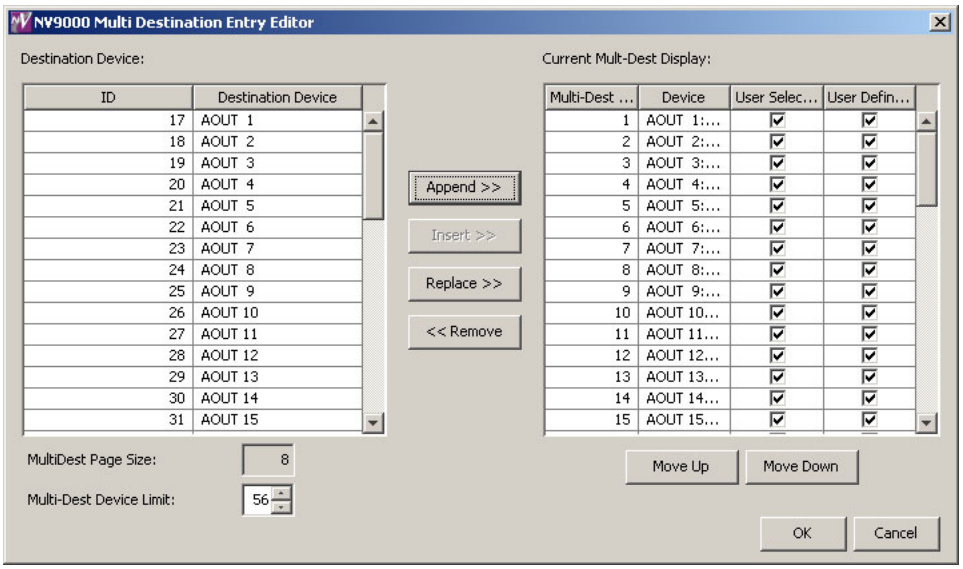
A configurer follows these guidelines to configure MD devices:

1 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.

  Use the ‘Display Index’ field to assign a unique number to the button. When the panel is in MD mode, the display index will represent one of the MD devices. Which MD device is subject to the panel operator’s scrolling the list of MD devices.

  (The display index for the button also represents a virtual level when the panel is in X-Y mode.)

2 Click 'Edit Multi-Dest Devices' to define or re-define MD 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.

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

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.

Global Navigation

NV9000-SE Utilities supports what are known as "global navigation" pages for NV9646 control panels. Global navigation pages are templates — patterns — that may be used and reused in the creation of NV9646 tree-structured configurations.

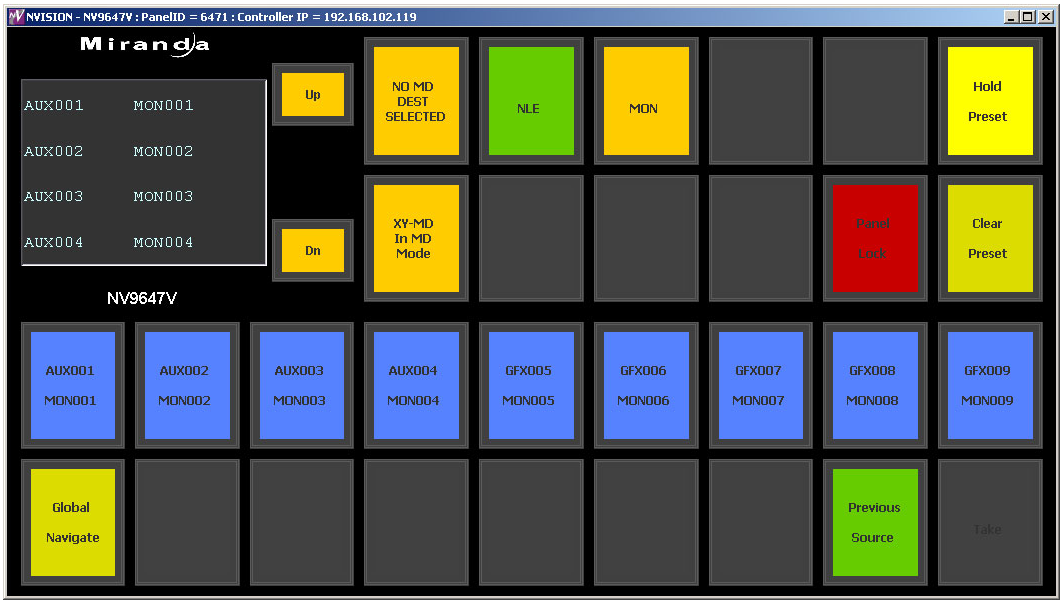
There are two types of global navigation pages: 'Suffix' and 'Navigate'. A 'Navigate' template can define a single button page or an entire subtree of pages. A 'Suffix' template is a single page only. The buttons allowed in a suffix template are a small subset of the buttons supported by NV9646 configurations. Navigate templates support all functions except 'Global Navigate'. That is because templates cannot be nested (i.e., recursively defined).

Templates themselves are ***not*** NV9646 configurations.

NV9647V (Virtual Only)

NV9647 Panel Description

There is no physical NV9647 — just the virtual panel. This is a sample:



The NV9647 is a virtual panel featuring 30 function buttons (illuminated in various colors and having 1 to 3 lines of text) and a small display having 4 lines of 22 characters. It can operate in X-Y mode or in multi-destination (MD) mode. Operators can switch between modes at any time. Up and down buttons allow you to scroll the display.

The NV9647V provides a *tree-structured* (or hierarchical) button layout. Configurers can define a "tree" of buttons in such a way that each of the 30 buttons can either (1) execute a function or (2) select a subtree (i.e., present an entirely new set of functions at a different level in the tree). The tree, with its subtrees, is not limited in size.

(We use the term "button page" or "page" to mean the set of 30 button functions at any particular level in the tree.)

Configurers use 'Navigate' buttons to create new button pages (subtrees). During operation, NV9647V users press such buttons to access different subtrees.

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

Function Buttons

The NV9647V has 4 rows of LCD buttons — a total of 30 buttons. The buttons can display one of seven colors dynamically: nominally red, green, blue, purple, amber, yellow, or grey.

Each LCD button has *three* operational levels: high tally, low tally, and off.

Some buttons functions are assigned by the system depending on the context. For example. the panel software adds a "forward" button and a "back" button if there are more sources than buttons on a category page.

The buttons display a menu if the operator presses a menu button. When the operator make a menu selection, viewable data are displayed on the buttons.

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

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

Alphanumeric Display

The alphanumeric display provides feedback for the operators as they press buttons to execute takes and other operations. The panel functions in either X-Y or multi-destination mode.

Because the display has 4 rows, operators might need to scroll the display frequently to see additional information. (The up and down buttons, right next to the display, are for scrolling the display.)

The display has 2 columns:

- Level/Dest.

  In X-Y mode, this column identifies the levels of the currently selected destination. That destination is identified as the first entry in the column.

  In MD mode, the 'Level/Dest' column presents all the MD destinations defined in the NV9647V configuration.

- Status.

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

  In X-Y mode, the status column represents either the levels of a source or the levels of multiple sources under breakaway.

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

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

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

The display fields can show either the names of a name set or the system mnemonics.

Modes of Operation

The primary modes of operation are:

- X-Y mode — individual control of all router *levels*. Choose a destination, optionally choose desired breakaway levels, choose a source, and press 'Take' to complete a desired route.
- Multi-destination mode — lets you control multiple destinations. The buttons display destinations and sources. Select a destination using selection buttons, choose a source,

and repeat for all desired routes. Then press 'Take'. Takes are "all level," and breakaways cannot be performed.

- Single-destination mode.

  Single-destination" mode is not a distinct mode, but it is a mode on some other panels and can be simulated on the NV9647V.

The secondary modes of panel operation are:

- Salvo mode — pressing a Salvo button (and then the 'Take' button) executes a salvo. (The duration of a salvo is indeterminate.)
- Menu mode — pressing a Menu button places the NV9647V in "menu" mode. In menu mode, the LCD button array becomes a menu that changes as needed during menu operation.

Other modes of operation are:

- Hold mode.
- Save preset mode.

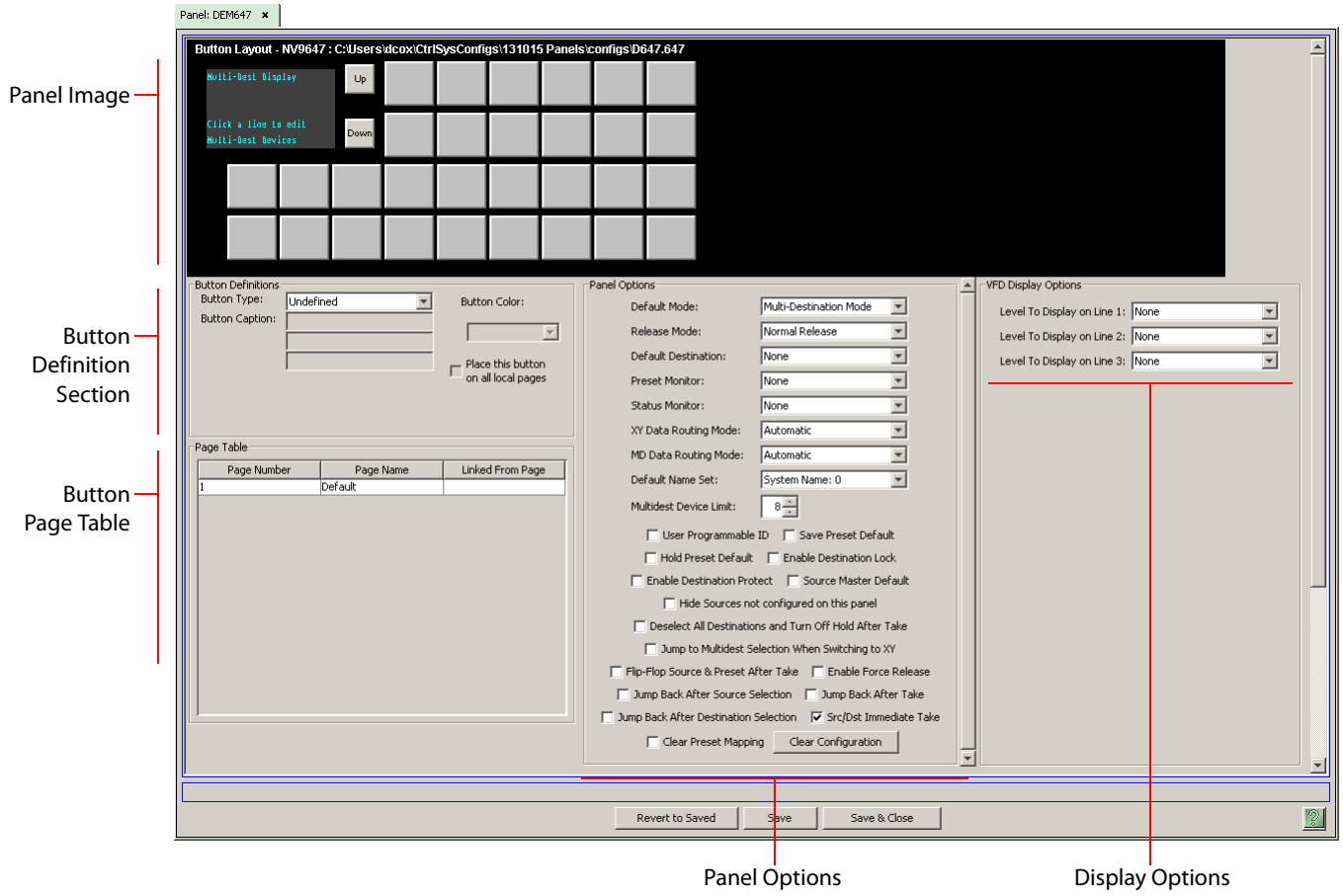
Other NV9647V Functions

The NV9647V can be configured to perform the following additional functions:

- System salvos.
- Gang or dub switching in multi-destination mode.
- Broadcast data routing in X-Y mode.
- Level mapping.
- (In NV9000-SE Utilities) button page "templates" — global navigation templates and suffix templates — for easier configuration.

NV9647V Configuration Page

This is the default NV9647V panel configuration page:



After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

There are 5 main regions:

- A graphic representation of the NV9647V panel.

  On the right are 30 function button images. Click on a button to assign a function to it. In some cases, you can click or double-click certain buttons to execute the button function. Double-clicking a 'Navigate' button, for instance, causes the button's "subpage" to appear. Double-clicking a 'Page Up' or 'Page Down' button (not the same as a fixed up or down button) allows you to scroll through multi-destination pages that are represented in the image of the alphanumeric page.

  Click the display section of the panel image to open the multi-destination editor.

Buttons can be illuminated in several colors: green, amber, yellow, red, blue, purple, and grey. There are 3 levels of illumination: high tally (bright), low tally (muted) and off.

- Button definitions.

  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definition Section, following.

- Button page table.

  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." See Button Page List, on page 344.

- Panel options.

  In this section, configurers may specify the behavioral characteristics of the panel.

  At present, there is no *NV9647 User's Guide*.

- Display options.

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

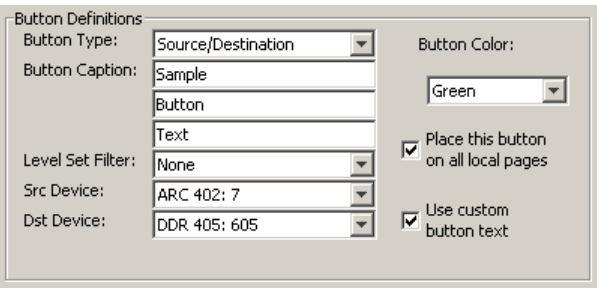
  In X-Y mode, the display shows 3 lines of level information. (The display also scrolls by 3 lines at a time.) The display options let you specify explicitly what levels appear on those 3 lines. The specification applies, however, only to the first page of the level display.

  You may leave any of the fields in this section blank. If you leave all 3 fields blank, the display will present levels *in their default order*.

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

Button Definition Section

The button definitions section has several controls:



The controls vary according to the button type.

Button Type	A pull-down menu where you may select a button type.
Button Caption	Three text boxes in which you can enter three lines of button text up to 8 characters each.
Button Color	A pull-down menu where you can select a button color: amber, blue, green, grey, purple, red, or yellow.
Check box	"Place this button on all local 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.

Check box	"Use custom button text." Check this box if you want to override the button's default text. This checkbox is not present for all button types.

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 unique: during configuration, it initiates a dialog in which you create a subtree. During operation, it switches the panel to the button page associated with the button. See 'Edit Navigation Button' Dialog, on page 343.

Some buttons that are generated dynamically during operation.

There are different sets of button types for global suffix pages and for global navigation pages. See Global Navigation on page 314.

Button Types

Note that different subsets of these button types are available when you are defining a global suffix template or a global navigation template. See Global Navigation on page 314.

These are the button types available for NV9647V configurations:

Back	Broadcast	Category	Chop
Clear Preset	Default State	Destination	Destination Lock
Destination Protect	Free Source	[Forward]	Global Navigate
Hold	Information	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	Virtual Level Contract
Virtual Level Expand	XY Display	XY/MD Mode	

▲ Note that other panels might have button types with the same names but that perform different functions.

NV9647 Button Types

These are the button types available for the NV9647. (Note that different subsets of these button types are available when you are defining a global suffix template or a global navigation template.)

Type	Description
Back	The 'Back' function places the predecessor of the current button page on the panel. The panel software can introduce a "back" button if an automatically generated list has more entries than can fit on a page.
Broadcast	On the data (control) level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button is useful in dubbing applications or when a backup (redundant) device is in use. See also the Source Master button, following.

Type	Description
Category	Displays a category's device list. When you assign a category button, two additional drop-down menus appear: 'Src Category' and 'Dst Category'. Choose a category from one of the category lists. When you choose a source category, the destination categories become inaccessible and vice versa: a category button must be either a source category or a destination category. You must choose 'None' in either category list to switch to the other category list. 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. 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 default button text will be the category name. You can override the default text.
Chop	When a chop function is supported by the router, the button is a toggle that enables and disables rapid switching of the selected destination device between the current source and the preset source. This chop function is used to test system timing.
Clear Preset	Erases preset entries, while leaving the panel in the same mode. This button is recommended as a "safety" feature. The clear preset button has the side effect of switching off 'Save Preset' mode.
Default State	Returns the panel to its most recent power-up state. That is called the *default state*.
Destination	Selects a destination. When you assign a destination button, a drop-down menu appears: 'Destination Device'. Choose a device from the list. The 'None' entry is merely a placeholder. Do not choose 'None'.
Destination Lock	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. In MD mode, an "L" appears next to the destination when it is locked. In X-Y mode, an "L" appears next to selected levels when they are locked.
Destination Protect	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. **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. In MD mode, a "P" appears next to the destination when it is protected. In X-Y mode, a "P" appears next to selected levels when they are protected.
Free Source	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 *Level Set Details* page of NV9000-SE Utilities.

Type	Description
[Forward]	The panel software can introduce a "forward" button if an automatically generated list has more entries than can fit on a page. A 'Forward' displays and activates the next button page in an automatically generated sequence. There is no explicit 'Forward' button type; configurers cannot create forward buttons explicitly.
Global Navigate	A global navigation button is very much like a navigation button to the operator. However, during configuration, it selects a previously defined "global navigation" template. The template itself may have structure that ordinary button pages have. It can include any button type except additional global navigate buttons.
Hold	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.)
Information	The information button displays auxiliary information about level mapping and perhaps other matters. The operator presses the information button once to see the information and again to hide the information.
Level Map	Cross-connects levels (in the same physical router). The function is typically used to shuffle audio channels, for example, to connect AES1/2 to AES3/4. The Level Map mode is cancelled when the next normal take is performed involving the selected destinations.
Menu	This button puts the NV9647 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. 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.
Name Set Toggle	The button toggles the panel between its default name set and the "system name" set. One or the other becomes the active name set. The button definition has no fields to configure. 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'. 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.
Navigate	During operation, a navigate button selects and displays a "target" button page. During configuration, a navigate button presents a dialog in which you can enter details of the target page. After you do so, NV9000-SE Utilities 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. (You'll use the navigate function to create new button pages.) 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.

Type	Description
Page Down	(1) Scrolls the levels or MD destinations on the selection buttons *down* or (2) scrolls a list *down*. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the list.
Page Up	(1) Scrolls the levels or MD destinations on the selection buttons *up* or (2) scrolls a list *up*. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the list. When the panel is displaying the *first page* of a list of devices in a category, the 'Page Up' button returns the operator to the page containing the category button.
Panel Lock	Prevents accidental changes to the panel settings, especially router crosspoints. When the panel is locked, the button array becomes blank except for the Panel Lock button which becomes high tally red. Pressing the Panel Lock button again reverts the panel to its previous mode.
Preset Release	Removes locks and protects from preset source devices. This button is not needed if source locks and protects are not used in your system.
Previous Source	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. 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.
Quick Source	A quick source button selects a source and performs an immediate take. When you assign a quick source button, a drop-down menu appears in which you choose a source device. The 'None' entry is merely a placeholder. Do not choose 'None'.
Salvo	Executes a salvo. When you assign a Salvo button, a drop-down list appears in which you select a system salvo. The 'None' entry is merely a placeholder. Do not choose 'None'. (You can generate salvo buttons automatically in the 'Edit Navigation Button' dialog when you create a navigation button.)
Save Preset	When this function is enabled (its button is high tally), whatever is on preset is retained (on preset) after a take. When the function is disabled (its button is low tally), preset is cleared after a take.

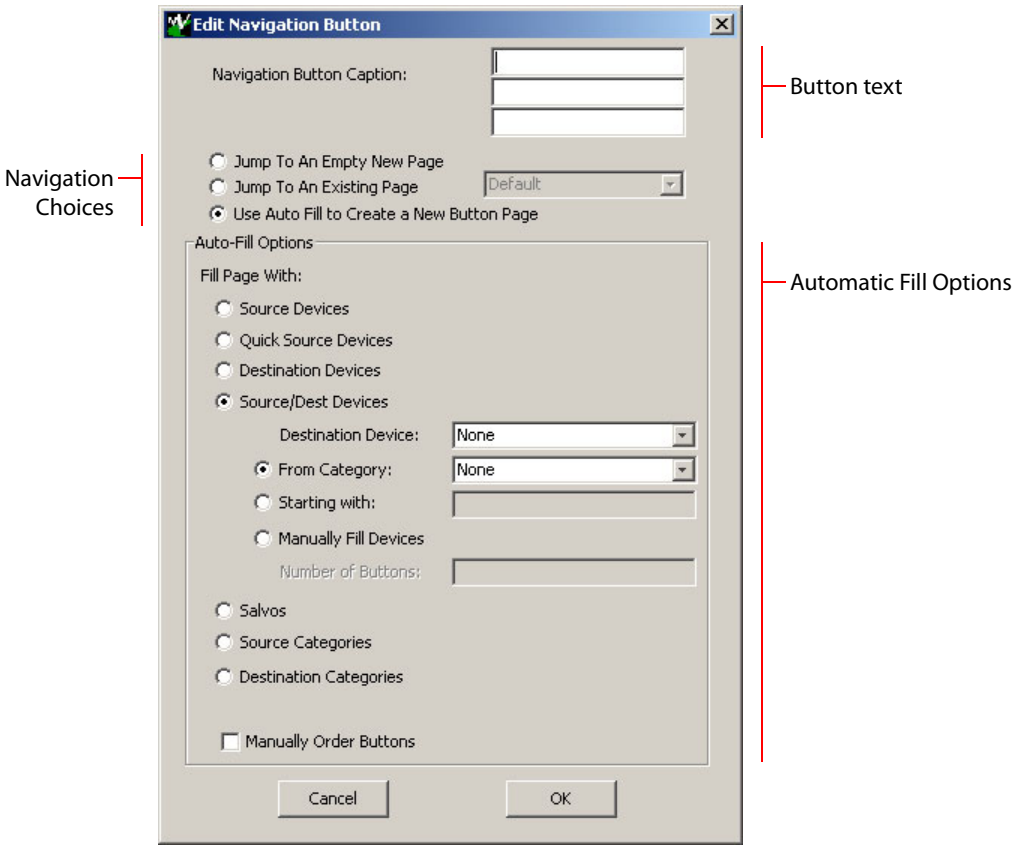
Type	Description
Selection	Selection buttons have many functions, not the least of which is to give feedback (e.g., source and destination mnemonics) when the operator is performing takes. When the panel is in XY mode, a set of selection buttons presents a set of virtual levels for the selected destination device. If there are more levels than selection buttons, the operator can use 'Page Up' or 'Page Down' buttons to scroll through the virtual level list. Note that the up/down buttons next to the display scroll the *display*, and do not scroll the level list represented on the selection buttons. Operators need 'Page Up' and 'Page Down' buttons to scroll the MD devices on the selection buttons. When the panel is in MD mode, a set of selection buttons presents a set of MD devices. If there are more destinations than selection buttons, the up/down buttons activate and the operator can scroll through the destination list — on the display. Here too, note that the up/down buttons next to the display scroll the *display*, and do not scroll the MD destination list represented on the selection buttons. During configuration, when you assign a selection button, two additional drop-down menus appear: 'Display Index' and 'Multidst Device'. The 'Multidst Device' field does not become enabled until you choose a display index. The drop-down menu for the button's *display index* has as many entries as the current page has selection buttons, but only up to a limit of 8. You must choose a display index for the selection button. Normally, your set of display indexes would be sequential from left to right. The drop-down menu for the *multi-destination device* allows you to specify the MD destination for the button. Do this for all the destination devices that you want to be selectable in MD mode. On the configuration page, when there are more MD devices than selection buttons, you can double-click a 'Page Up' or 'Page Down' button to scroll through the set of MD devices to assign them to selection buttons. (You can have up to 512 MD devices, in multiples of 8.) You do not have to commit every MD device to a button. MD buttons that are uncommitted are no-ops.
Source	A source button selects a source. (Note that a quick source button selects a source and also performs an immediate take.) 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'.
Source Master	Means "source is the master" and makes the source device the master. Otherwise, the destination is the master. It applies 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). 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. The 'Source is Master' button is also used to initiate "broadcast" control routes.
Source/ Destination	A source/destination button selects both a source and a destination at one time. 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.

Type	Description
Take	In X-Y mode, a take button switches the preset source device to the selected destination device on selected levels. In MD mode, a take button switches the preset source device(s) to the selected destination device(s) on all levels. In most cases, configurers should provide the operator a 'Take' button.
Undefined	Makes the button undefined and inactive. On the actual panel, it will remain unlit (dark).
Virtual Level Contract	In X-Y mode, this button causes the alphanumeric display to show virtual levels at the *highest* level of grouping (with the least detail). The button affects only virtual levels that have been grouped. The button has no effect in multi-destination mode. This button has no configuration options.
Virtual Level Expand	In X-Y mode, this button causes the alphanumeric display to show virtual levels at the *lowest* level of grouping (with the most detail). The button affects only virtual levels that have been grouped. The button has no effect in multi-destination mode. This button has no configuration options.
XY Display	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. 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.) After a take, the 'X-Y Display' button also displays the current source name. If there is no destination selected, the 'X-Y Display' button says so.
XY/MD Mode	Switches the panel between X-Y and multi-destination modes. 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.

(There is no *NV9647 User's Guide*. You may refer to the *NV9642 User's Guide* — the manual for the panel from which the NV9647 was modeled — for more detail.)

'Edit Navigation Button' Dialog

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



At the top, this dialog presents 3 lines on which you can enter text for the button caption.

The dialog has 3 navigation choices:

- Jump to an empty new page.

  This option creates a new page in the button tree. 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. Operators will use the navigation button you are creating to display the button page you select in the associated drop down menu.

- 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 suboptions:

Source buttons	Salvo Source category buttons
Destination buttons	Destination category buttons
Source/destination buttons	Salvo buttons

Button Page List

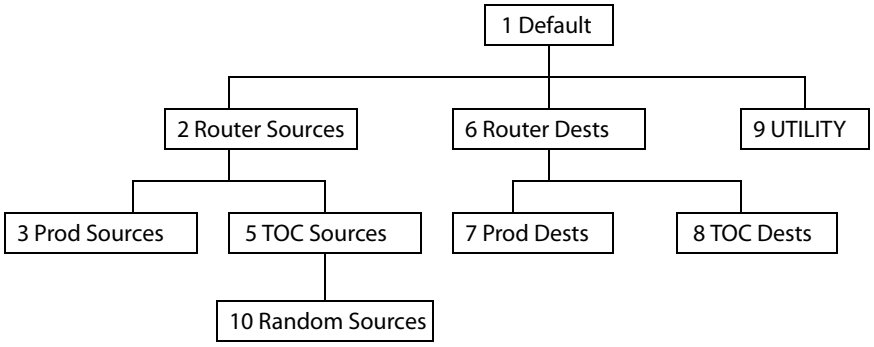
This section lists the pages of the button tree. It has 3 columns: Page Number, Page Name, and "Link to Page Num(s)."

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.

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:



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

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

Single-Destination Mode

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

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

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

Global Navigation

NV9000-SE Utilities supports what are known as "global navigation" pages for NV9647V control panels. Global navigation pages are templates — patterns — that may be used and reused in the creation of NV964V configurations.

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 NV9647 configurations. Navigate templates support all functions except 'Global Navigate'. That is because templates cannot be nested.

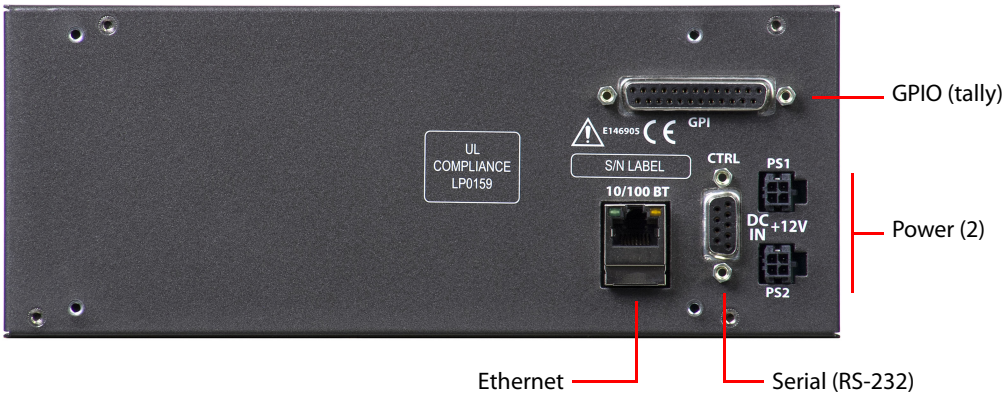
Templates themselves are ***not*** NV9647V configurations.

NV9648

NV9648 Panel Description

The NV9648 is a 2RU half-width panel. Two NV9648s can be mounted in a rack side-by-side with a rack mounting kit (part number NV9649-48-RMK). The panel has 3 identical sections, each having a display and 9 LCD buttons:

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



The NV9648 has no virtual panel equivalent.

Behavioral Models

The NV9648 has 3 very different operating modes (or behavioral models):

- 'Panel Client' mode. For brevity, we can call this "client" mode.

  When the panel is in "client" mode, it operates in conjunction with an NV9649 and other 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 panels. The NV9649, being the server, can control which sources and destinations the NV9648s can select.

- 'Panel Standalone' mode. For brevity, we can call this "standalone" mode.

  When the panel is in "standalone" mode, it functions much the way it does in "client" mode, but without the need for an NV9649 or other NV9648s. It has a few added button functions.

- 'LCD Min XY/MD' mode. For brevity, we can call this "LCD XY/MD" mode.

  In this mode, the panel also operates standalone, but has a richer function set. 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 (i.e., a new "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.

The panel's 27 buttons and 3 displays are used in very different ways in the 3 modes.

Function Buttons and Displays

At the front, the panel is divided into 3 sections. Each section has 1 display and 9 buttons. Each display is an 8-character alphanumeric display.

Each function button 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).

Source and destination buttons show the source or destination mnemonic. 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 the MD device, in MD mode.

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

In client mode and in standalone mode, each section functions as a complete and separate panel, unrelated to the other two sections. Each section displays the source or destination chosen for its section. (When the panel is in client mode, the NV9649 server panel can reassign the destination and sources to each section of each NV9648.)

In LCD XY/MD mode, all 3 sections are integrated. The 3 displays show, in MD mode, from left to right, (1) the current source, (2) the preset source, and (3) the selected destination. All 27 function buttons form a "button page" in a hierarchical structure of button pages.

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.

See GPIO, on page 198.

Additional Modes

Additional but secondary modes of panel operation are:

- Setup mode — where the NV9648 is freshly powered up, but disconnected from the network. In this mode, you can preset the NV9648's panel ID and perform a few diagnostic tasks.
- Menu mode — pressing a menu button places the NV9648 in "menu" mode. In menu mode, the buttons lose their normal functions and become part of a menu that changes as needed during menu operation.

There is one other mode of operation: 'Hold' mode. Hold mode is available when the panel is operating under the LCD XY/MD model.

Other NV9648 Functions

The NV9648 can be configured to perform system salvos (under the 'LCD Min XY/MD' behavioral model).

NV9648 Configuration Page(s)

The NV9648 panel can be configured to operate under 3 behavioral models:

- 'Panel Client' mode.
- 'Panel Standalone' mode.
- 'LCD Min XY/MD' mode.

The behavioral model is selected in the first entry among the panel options. The panel configuration pages differ greatly under the 3 models. The set of button functions differ and the panel options also differ.

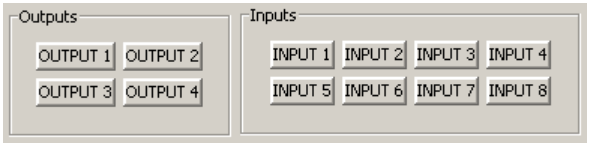
Common Configuration Page Features

Panel Graphic

At the top of the page is a graphic representation of the NV9648 panel. Configurers click a button "proxy" in the graphic to select a button for configuration.

Tally (GPIO) Section

This 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 that input or output. (These buttons represent the DB25 *connector* at the rear.)

See GPIO, on page 198.

Commitment Buttons

Three 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.
- Save & Close. Press this button to commit all your recent changes and dismiss the page.

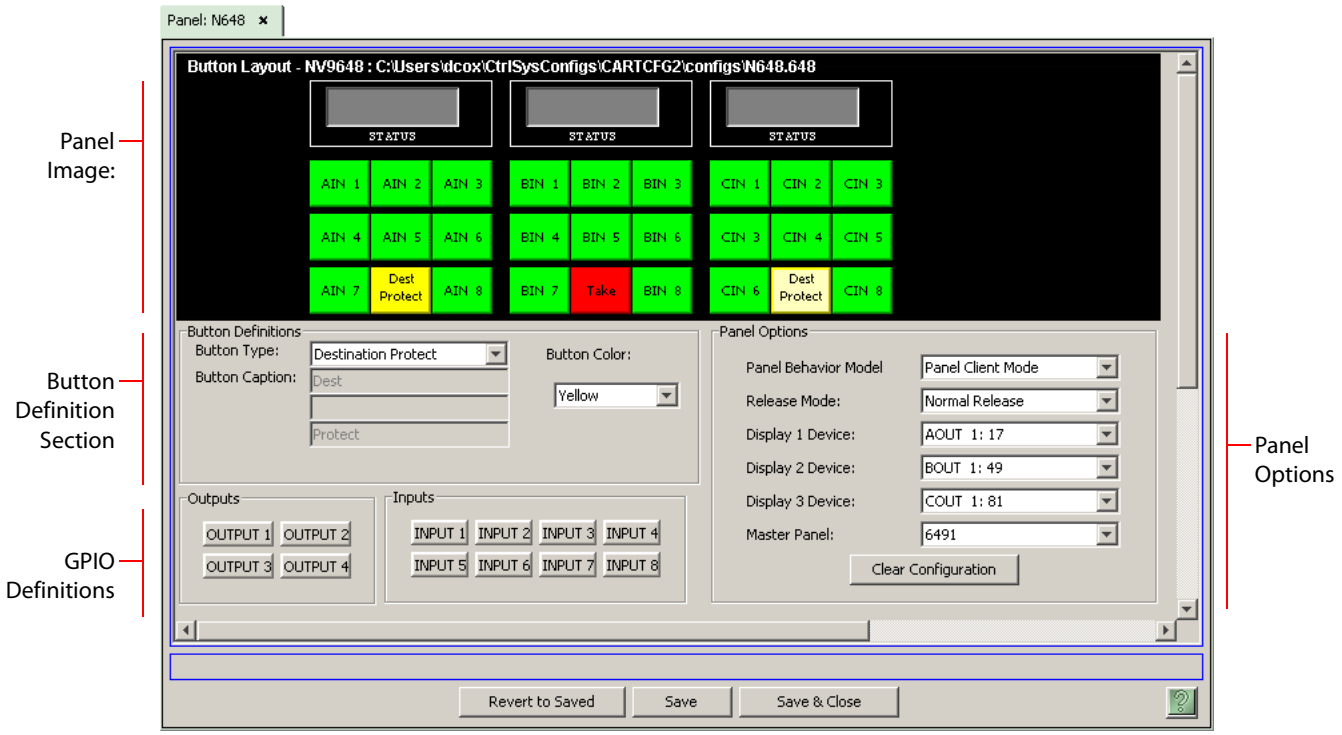
These actions are not reversible.

Clear Configuration Button

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

Configuration Page for Client Mode

This is a sample NV9648 panel configuration page for client mode:



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

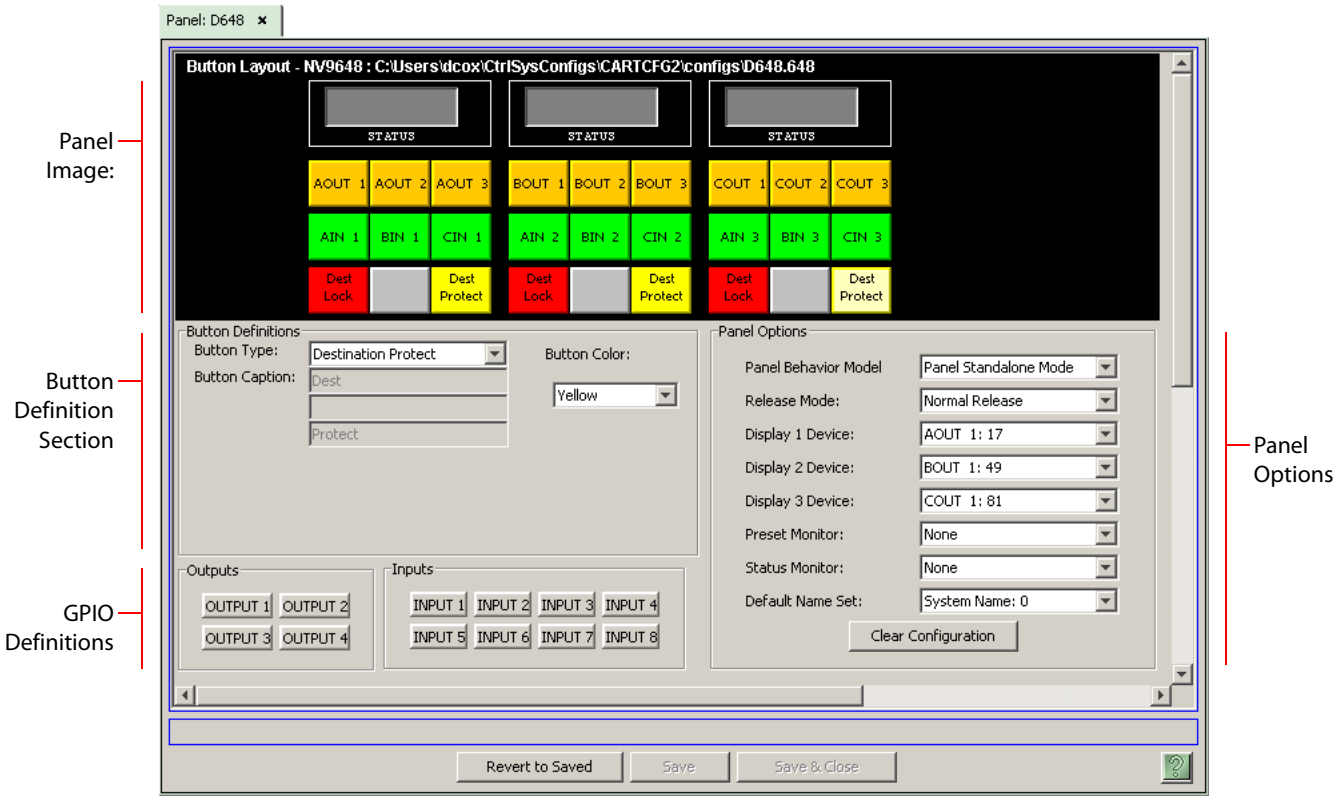
One or more NV9648s (clients) operate with an NV9649 (server). The NV9649 can assign a destination to any of an NV9648's sections and also assign sources to the source buttons of any of an NV9648's sections.

In client mode, clients 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.

▲ Before you can complete an NV9648 "client" configuration, you must have defined an NV9649 server configuration. The NV9648 references the NV9649 by its panel ID.

Configuration Page for Standalone Mode

This is a sample NV9648 panel configuration page for standalone mode:



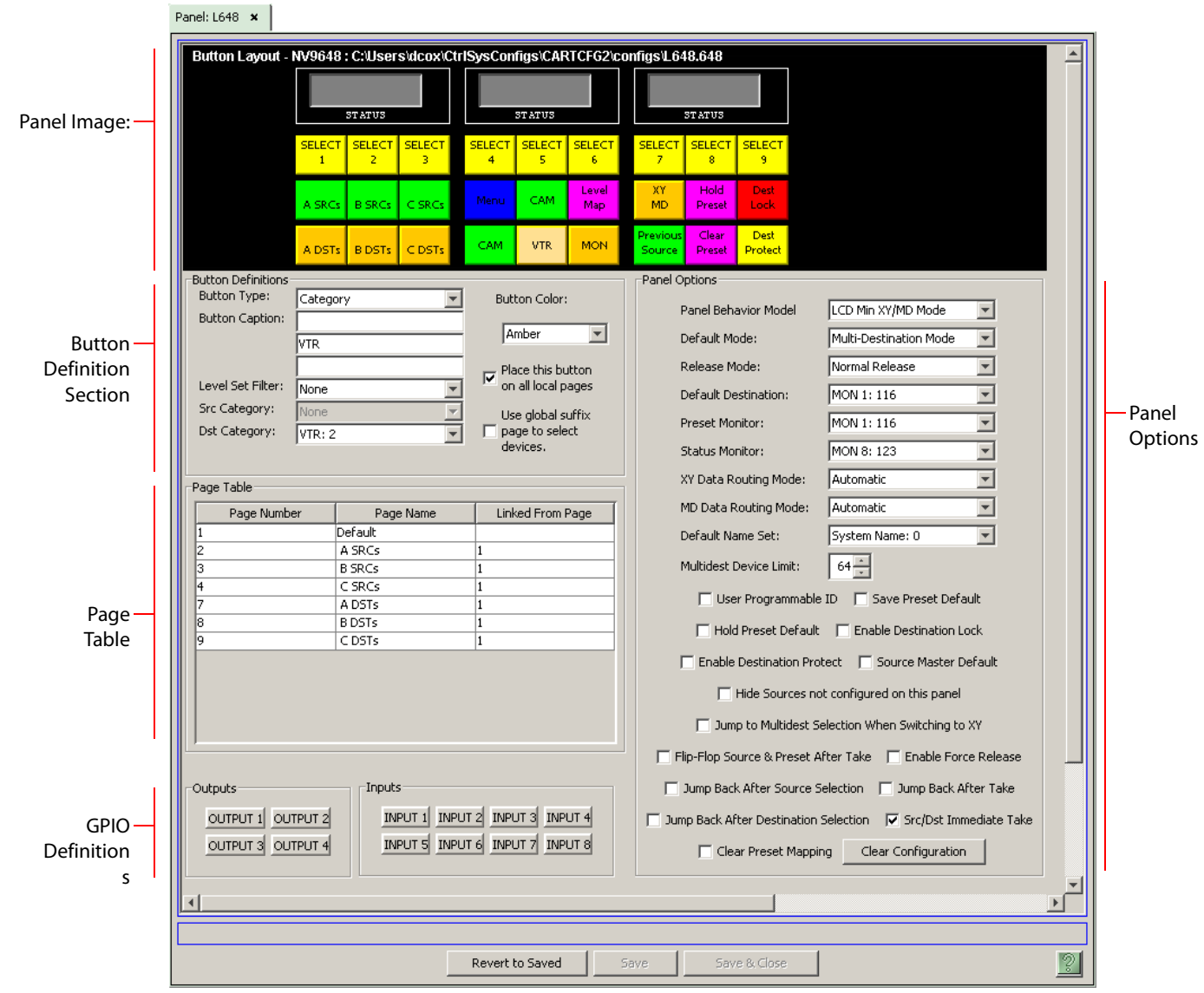
The panel in standalone mode functions much the same way it does in client mode, but (1) does not require the presence of an NV9649 and (2) provides 2 additional button functions.

As under client mode, the panel has 3 sections that are independent control units. Each unit corresponds to a destination that is selectable.

Each section's display shows its own destination. (The display reads "NO DEST" if no destination has been selected.

Configuration Page for LCD XY/MD Mode

This is a sample NV9648 panel configuration page for XY/MD mode:



The panel in LCD XY/MD mode has a more extensive function set than panels in client mode or standalone mode. In LCD XY/MD mode too, the panel does not require the presence of an NV9649.

The panel's 3 sections are ***not*** independent control units, but integrated into a single larger control unit. The 3 displays together show the current source, the preset source, and the current destination. All 27 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 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).

Button Page List

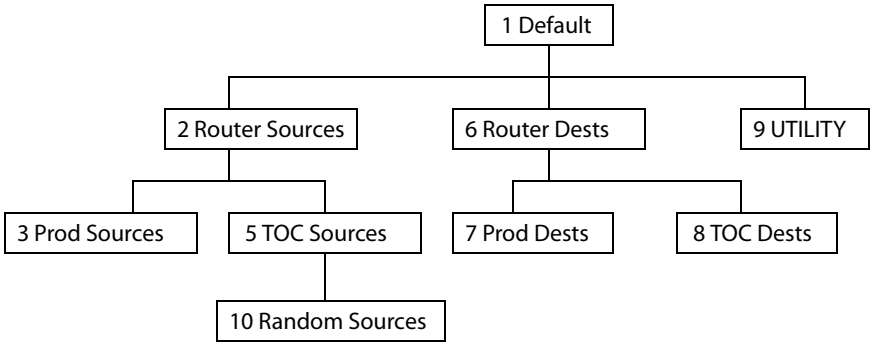
This section lists the pages of the button tree. It has 3 columns: Page Number, Page Name, and "Link to Page Num(s)."

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.

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:



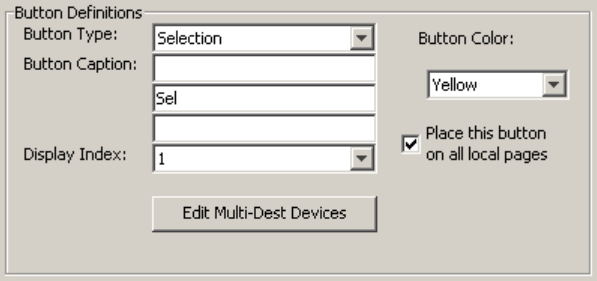
During configuration, you will use 'Navigate' buttons to create new pages. During configuration, you can double-click a 'Navigate' button to jump to its page.

During operation, panel operators will press navigation buttons or category 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.

Button Definitions

The button definitions section has several controls:



The controls vary according to the button type.

Button Type	A pull-down menu where you may select a button type.
Button Caption	Three text boxes in which you can enter three lines of button text up to 8 characters each.
Button Color	A pull-down menu where you can select a button color: amber, blue, green, grey, purple, red, or yellow.
Check box	"Place this button on all local 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.
Check box	"Use custom button text." Check this box if you want to override the button's default text. This checkbox is not present for all button types.

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 unique: during configuration, it initiates a dialog in which you create a subtree. During operation, it switches the panel to the button page associated with the button. See 'Edit Navigation Button' Dialog, on page 388.

Some buttons that are generated dynamically during operation.

Button Functions for Client Mode

These are the button types available for NV9648 configurations under the client model:

Destination Lock Destination Protect Quick Source Source Take

Button Functions for Standalone Mode

These are the button types available for NV9648 configurations under the standalone model:

Destination Destination Lock Destination Protect Quick Source
Salvo Source Take

Button Functions for LCD XY/MD Mode

These are the button types available for NV9648 configurations under the LCD XY/MD model:

Back	Category	Clear Preset	Destination
Destination Lock	Destination Protect	[Forward]	Hold
Level Map	Menu	Navigate	Page Down
Page Up	Panel Lock	Previous Source	Quick Source
Salvo	Selection	Source	Take
X-Y Display	XY/MD Mode		

NV9648 Button Functions (under the Client Model)

These are the button types available for NV9648 configurations under the client model:

Type	Description
Destination Lock	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.
Destination Protect	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. **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.
Quick Source	A quick source button selects a source and performs an immediate take. When you assign a quick source button, a drop-down menu appears in which you choose a source device. (The 'None' entry is merely a placeholder. Do not choose 'None'.)
Source	A source button selects a source. (Note that a quick source button selects a source and also performs an immediate take.) 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'.)
Take	A 'Take' button performs the route set up by a destination selection and a source selection.
Undefined	Makes the button undefined and inactive. On the actual panel, it will remain unlit (dark).

NV9648 Button Functions (under the Standalone Model)

These are the button types available for NV9648 configurations under the standalone model:

Type	Description
Destination	Selects a destination. When you assign a destination button, a drop-down menu appears: 'Destination Device'. Choose a device from the list. The 'None' entry is merely a placeholder. Do not choose 'None'.
Destination Lock	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.
Destination Protect	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. **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.
Quick Source	A quick source button selects a source and performs an immediate take. When you assign a quick source button, a drop-down menu appears in which you choose a source device. (The 'None' entry is merely a placeholder. Do not choose 'None'.)
Salvo	Executes a salvo. When you assign a Salvo button, a drop-down list appears in which you select a system salvo (previously defined in NV9000-SE Utilities). The 'None' entry is merely a placeholder. Do not choose 'None'. (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.)
Source	A source button selects a source. (Note that a quick source button selects a source and also performs an immediate take.) 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'.)
Take	A 'Take' button performs the route set up by a destination selection and a source selection.
Undefined	Makes the button undefined and inactive. On the actual panel, it will remain unlit (dark).

NV9648 Button Functions (under the LCD XY/MD Model)

These are the button types available for NV9648 configurations under the LCD XY/MD model:

Type	Description
Back	The 'Back' function places the predecessor of the current button page on the panel. The panel software can introduce a "back" button if an automatically generated list has more entries than can fit on a page.
Category	Displays a category's device list. When you assign a category button, two additional drop-down menus appear: 'Src Category' and 'Dst Category'. Choose a category from one of the category lists. When you choose a source category, the destination categories become inaccessible and vice versa: a category button must be either a source category or a destination category. You must choose 'None' in either category list to switch to the other category list. When the operator clicks the category button, a list of devices in the category appears. The default button text will be the category name. You can override the default text.
Clear Preset	Erases preset entries, while leaving the panel in the same mode. We recommend you use this button because it is a "safety" feature. The clear preset button has the side effect of switching off 'Save Preset' mode.
Destination	Selects a destination. When you assign a destination button, a drop-down menu appears: 'Destination Device'. Choose a device from the list. The 'None' entry is merely a placeholder. Do not choose 'None'.
Destination Lock	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.
Destination Protect	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. **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.
[Forward]	The panel software can introduce a "forward" button if an automatically generated list has more entries than can fit on a page. A 'Forward' button displays and activates the next button page in an automatically generated sequence. There is no explicit 'Forward' button type; configurers cannot create forward buttons explicitly.
Hold	Toggles the panel in and out of "hold" mode. In multi-destination mode, hold mode retains destination selections after a take. In X-Y mode, hold mode retains breakaway levels after a take. (There are other effects.)

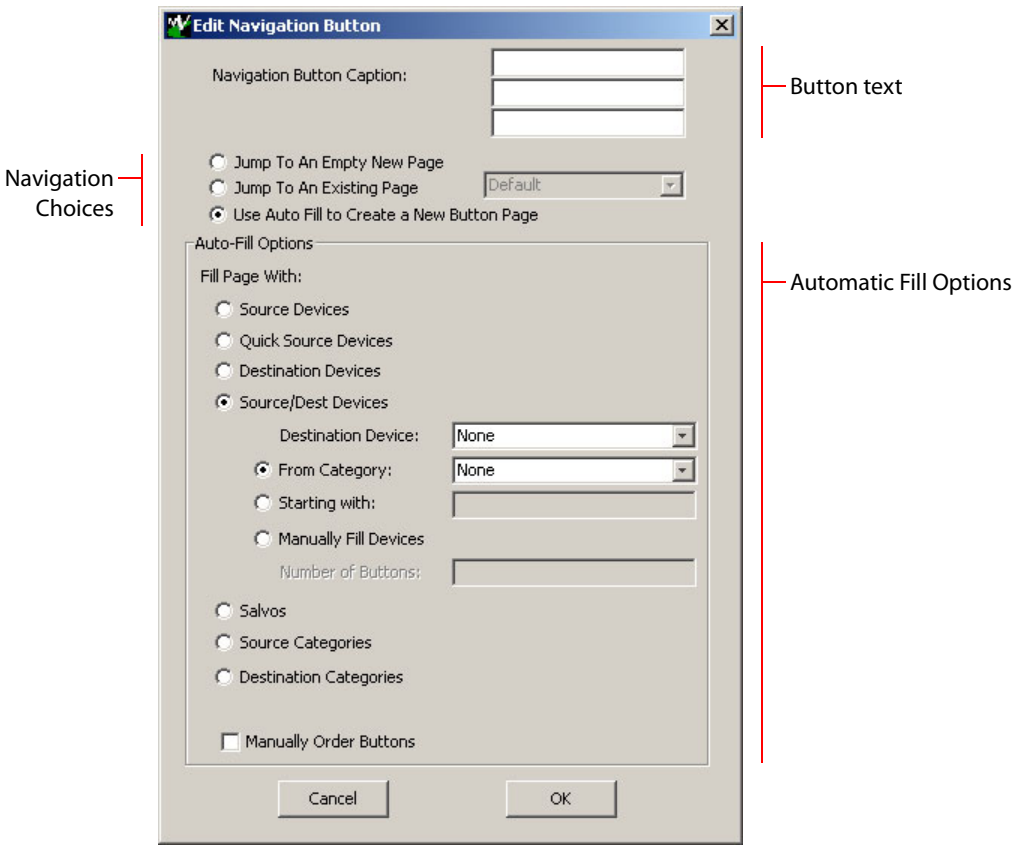
Type	Description
Level Map	Cross-connects levels (in the same physical router). The function is typically used to shuffle audio channels, for example, to connect AES1/2 to AES3/4. The Level Map mode is cancelled when the next normal take is performed involving the selected destination.
Menu	This button puts the NV9648 panel in menu mode and displays a menu on the LCD buttons that provides access to a variety of panel options. Place the button on the panel only if you want the user to have access to the menu. By pressing certain buttons, the user makes menu selections and may enter data (such as panel ID) or change LCD brightness values.
Navigate	During operation, a navigate button selects and displays a "target" button page. During configuration, a navigate button presents a dialog in which you can enter details of the target page. After you do so, NV9000-SE Utilities 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. (You'll use the navigate function to create new button pages.) 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 to operators.
Page Down	Scrolls a list *down*. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the list. 'Page Down' also scrolls through multi-destination devices in multi-destination mode and through levels in X-Y mode.
Page Up	Scrolls a list *up*. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the the list. 'Page Up' also scrolls through multi-destination devices in multi-destination mode and through levels in X-Y mode. When the operator is displaying a list of devices from a category, the '{age Up, button (which appears on the page automatically) returns the operator to the page containing the category button.
Panel Lock	Prevents accidental changes to the panel settings, especially router crosspoints. When the panel is locked, the button array becomes blank except for the Panel Lock button which becomes high tally red. Pressing the Panel Lock button again reverts the panel to its previous mode.
Previous Source	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. 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.
Quick Source	A quick source button selects a source and performs an immediate take. When you assign a quick source button, a drop-down menu appears in which you choose a source device. (The 'None' entry is merely a placeholder. Do not choose 'None'.)

Type	Description
Salvo	Executes a salvo. When you assign a Salvo button, a drop-down list appears in which you select a system salvo (previously defined in NV9000-SE Utilities). The 'None' entry is merely a placeholder. Do not choose 'None'. (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.)
Selection	Typically, at least one button page should provide a set of selection buttons. Operators press selection buttons to select levels (when the SE is in XY mode) or to select MD devices (in MD mode). Each selection button represents one level or one MD device. You may configure any number of selection buttons (on any button page). The selection buttons can be arranged anywhere on the button page. When there are more levels, or more MD devices, than buttons on a page, the SE enables scrolling. The operator presses 'Page Up' or 'Page Down' to scroll through the levels or MD devices to make selections. During configuration, when you assign a selection button, an additional drop-down menus appears in the button definition area: 'Display Index'. An 'Edit Multi-Dest Devices' button also appears. The drop-down menu for the button's *display index* 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. Use the 'Edit Multi-Dest Devices' button to define MD devices. They are assigned to selection buttons in the order in which you define them.
Source	A source button selects a source. (Note that a quick source button selects a source and also performs an immediate take.) 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'.)
Take	In X-Y mode, a take button switches the preset source device to the selected destination device on selected levels. In MD mode, a take button switches the preset source device(s) to the selected destination device(s) on all levels. In most cases, configurers should provide the operator a 'Take' button on one or more pages.
Undefined	Makes the button undefined and inactive. On the actual panel, it will remain unlit (dark).
X-Y Display	This button displays the current source and current destination. It is usable in both X/Y mode and MD mode.
XY/MD Mode	Switches the panel between X-Y mode and multi-destination mode (when the panel is operating under the LCD XY/MD behavioral model). 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.

See the *NV9648 User's Guide* for more detail.

'Edit Navigation Button' Dialog

During configuration, when you choose 'Navigate' for a selected button, NV9000-SE Utilities displays a 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.

The dialog has 3 navigation choices:

- Jump to an empty new page.

  This option creates a new page in the button tree. 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. Operators will use the navigation button you are creating to display the page you select in the associated drop-down menu.

- 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 suboptions:

Source buttons	Salvo buttons
Destination buttons	Source category buttons
Source/destination buttons	Destination category buttons

Single-Destination Mode

When the panel is in client mode, each of the 3 independent control units of the panel are single-destination control units. (The destination can be changed at the NV9649 server panel.)

When it is in standalone mode, the 3 sections of the panel can be configured as single-destination units. The units would have default destinations defined and no destination buttons.

It is also possible to configure a panel in LCD XY/MD mode as a single-destination panel. Again, the panel would have a default destination defined and no destination buttons.

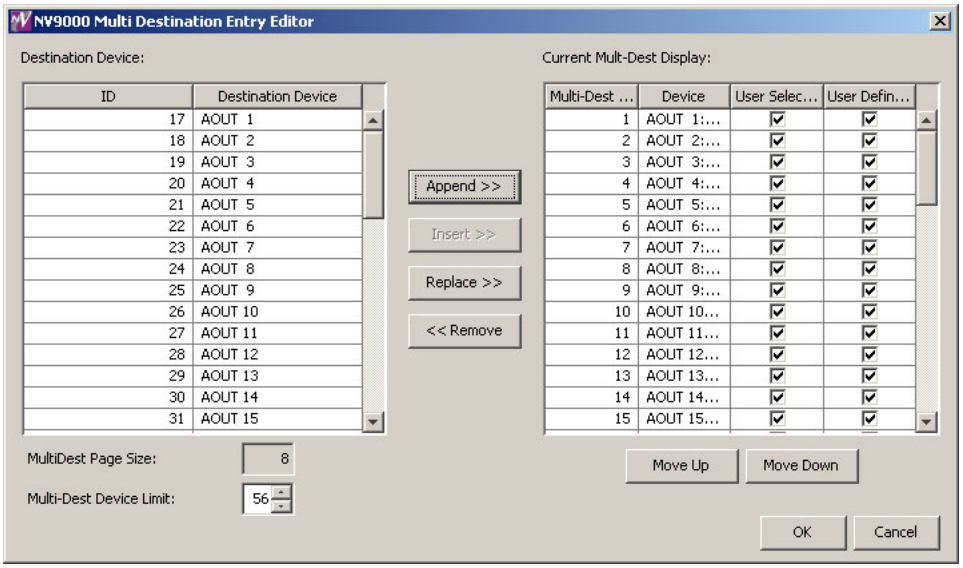
Multi-Destination Configuration

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. The limit to the number of MD devices is a panel option.

Follow these guidelines to Configure MD Devices.

1 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.

2 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.

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.

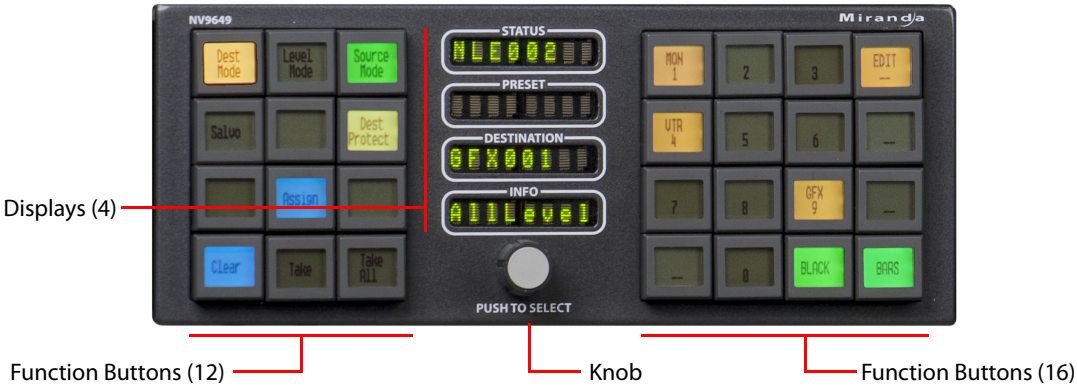
The 'Remove' button *removes* highlighted MD destinations from the right.

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.

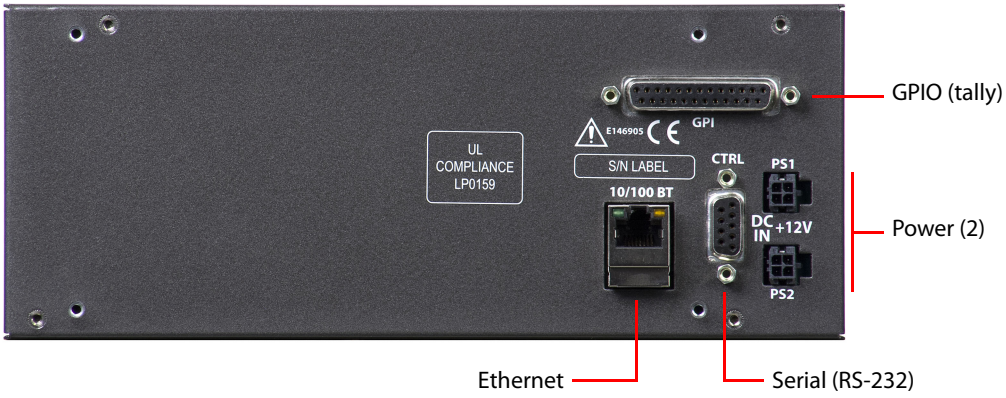
NV9649

NV9649 Panel Description

The NV9649 is a 2RU half-width control panel. Two NV9649s can be mounted in a rack side-by-side with a rack mounting kit (part number NV9649-48-RMK). The panel has two sets of function buttons and 4 displays:



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:



The NV9649 has no virtual panel equivalent.

Behavioral Models

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. The NV9000 system controller "remembers" the source and destination assignments and also allows operators to choose among different sets of such assignments.

- '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 simple backlit buttons.

  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.

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. 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 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 presents the button legend. Source and destination buttons, for example, show the source or destination mnemonic. 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.

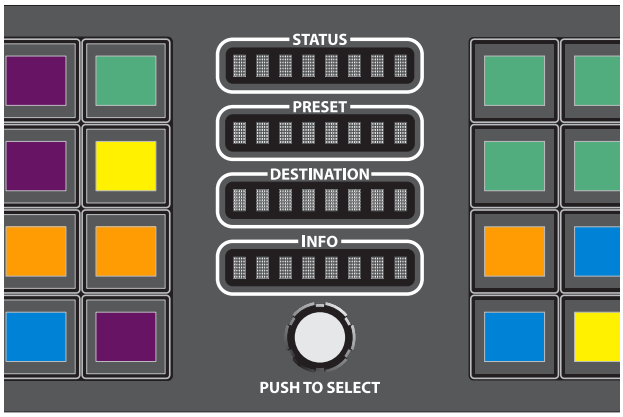
The buttons and displays are used differently in the 3 operating modes.

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

Under the 'Panel Server' model, the panel operator can perform device selection using a category list or category pages. When the panel is configured for category pages, the array of 16 buttons at the right side of the panel form a "page" of category buttons. Many such pages can be defined.

Display Fields

The display area has four separate 8-character display fields:



- 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.

- 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.

- Destination.

  The 'Destination' field shows the currently selected destination.

- 'Info'.

  Under normal operating conditions, the 'Info' 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 names from a name set or the system mnemonics.

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.

See GPIO, on page 198.

Additional Modes

When the panel is operating under the LCD XY/MD model, 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.

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 set the 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 the 'Take' button to executes a salvo. (The duration of a salvo is indeterminate, but usually short.)
- Menu mode — pressing a menu button places the 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. (The panel does not have a menu in server 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.

Other NV9649 Functions

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

- System salvos.
- Broadcast data routing.

NV9649 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 differ greatly under the 3 models. The set of button functions differ and the panel options also differ.

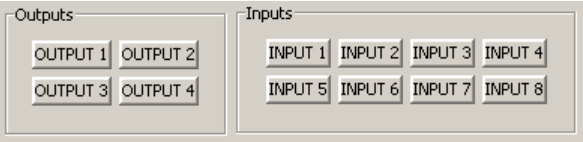
Common Page Features

Panel Graphic

At the top of the page is a graphic representation of the NV9649 panel. Configurers must click a button "proxy" in the graphic to select the button for configuration.

Tally (GPIO) Section

This 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 that input or output. (These buttons represent the DB25 *connector* at the rear.)

See GPIO, on page 198.

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.
- Save & Close. Press this button to commit all your recent changes and dismiss the page.

These actions are not reversible.

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.

Configuration Page for the Server Model

This is a sample NV9649 panel configuration page for server mode:

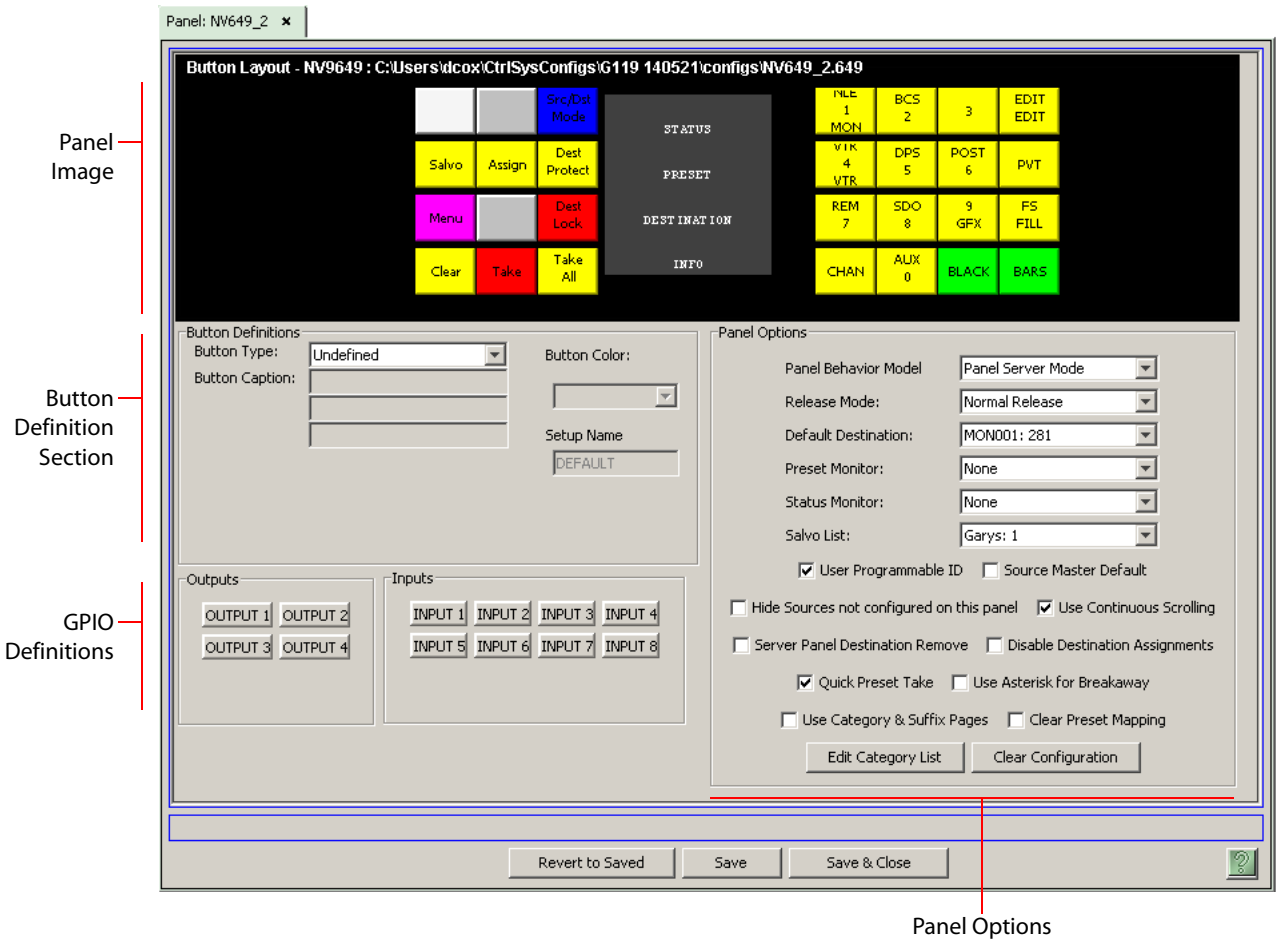


Fig. 8-1: NV9649 Configuration Page (for Server Mode, using Category Lists)

The panel can be configured to select devices by category list or using category pages. The choice is a panel option. Figure 8-1 shows the panel options where category lists are in effect.

Figure 8-2, following, shows the panel options where category pages are in effect.

This is the NV9649 configuration page for which category and suffix pages have been chosen:

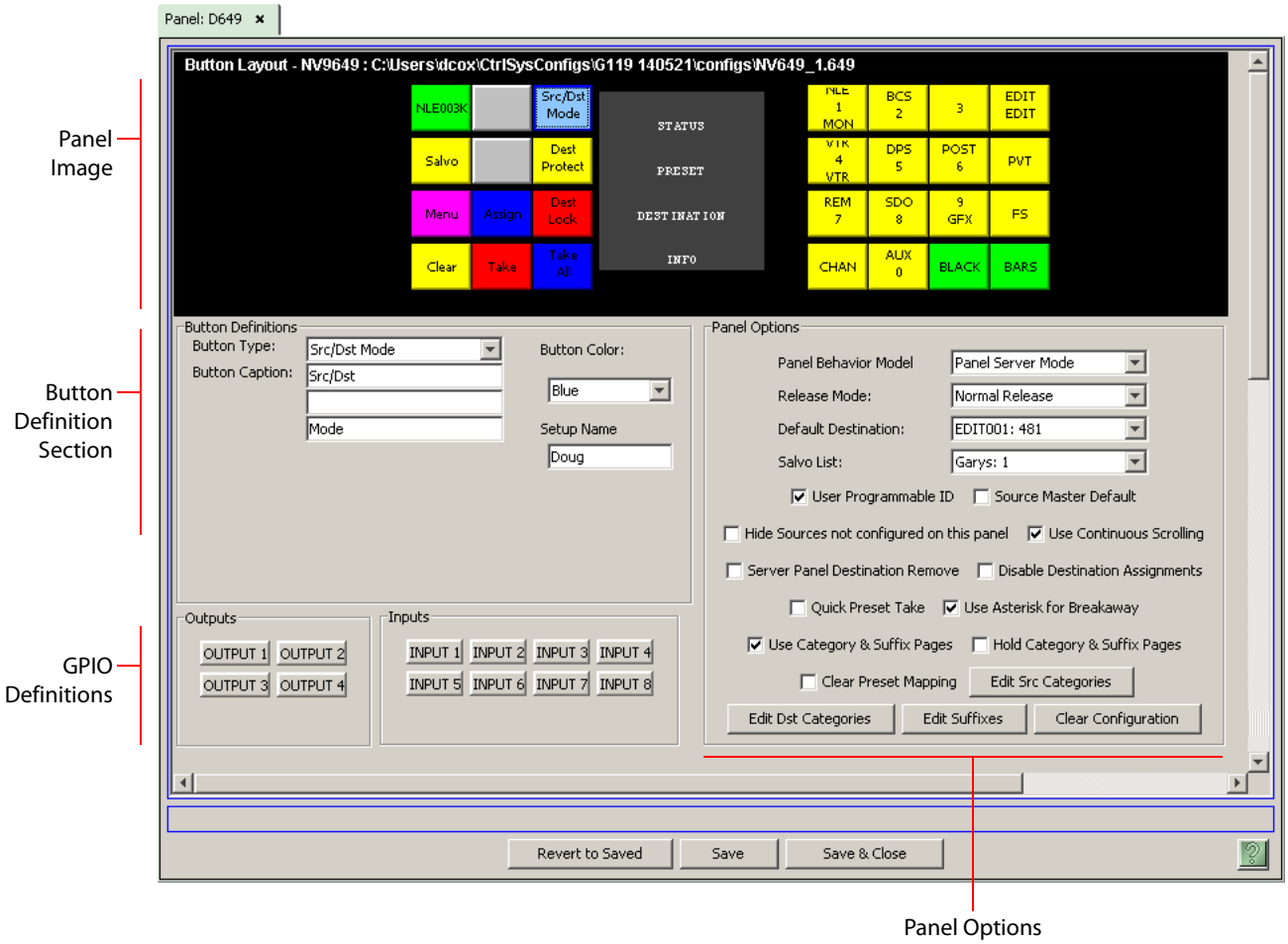


Fig. 8-2: NV9649 Configuration Page (for Server Mode, using Category and Suffix Pages)

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 three 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.

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

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.)

- Configuring the Category List

  Go to a server-mode NV9649 configuration page. *Uncheck* the panel option 'Use Category & Suffix Pages'.

  Click the 'Edit Category List' button. Use the editing dialog that appears.

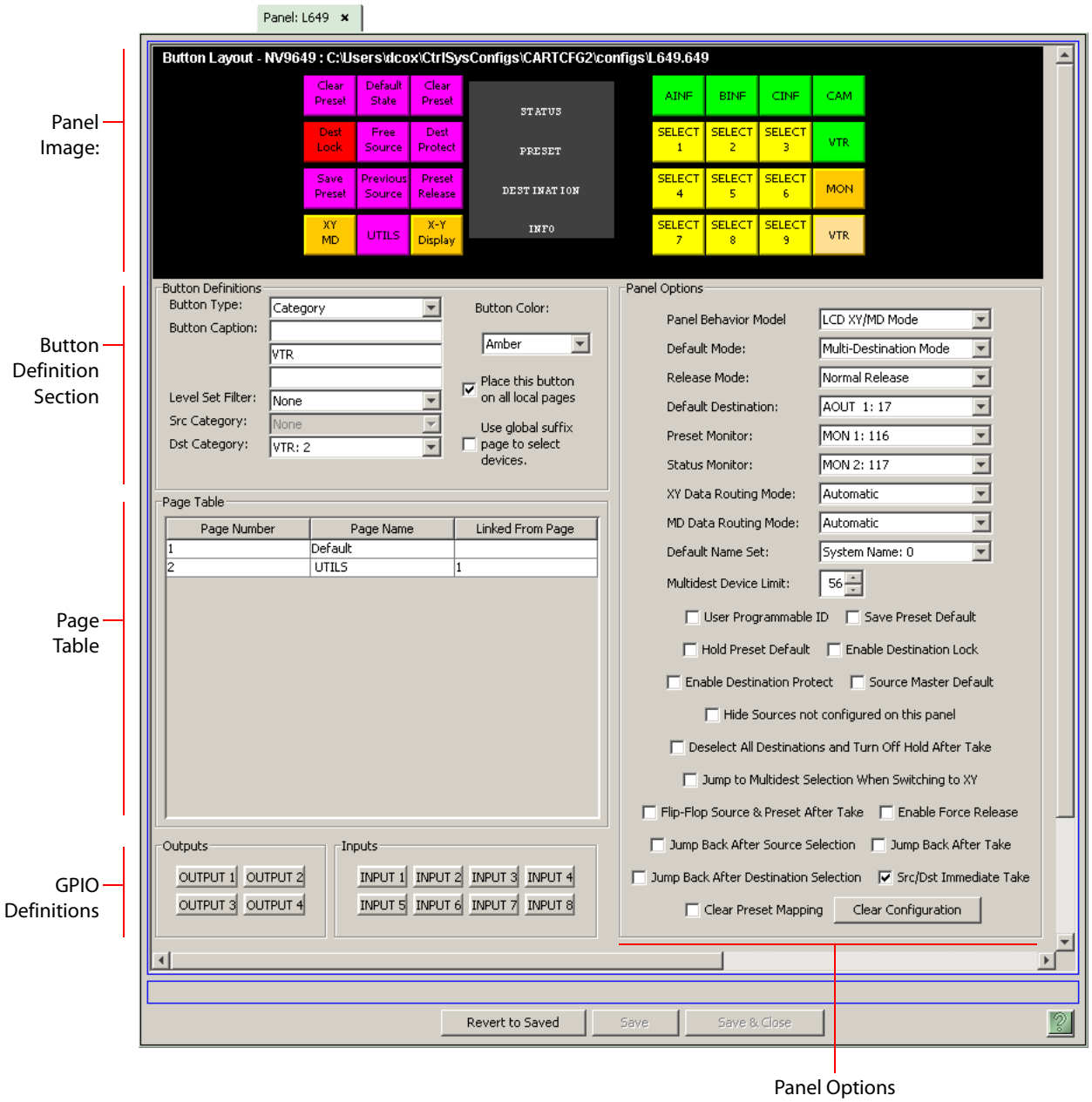
- Configuring Category and Suffix Pages

  Go to a server-mode NV9649 configuration page. *Check* the panel option 'Use Category & Suffix Pages'.

  Click the 'Edit Src Categories' button, the 'Edit Dst Categories' button, or the 'Edit Suffixes' button, depending on what you want to edit. Use the editing dialog(s) that appears.

Configuration Page for the LCD XY/MD Model

This is a sample NV9649 panel configuration page for 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).

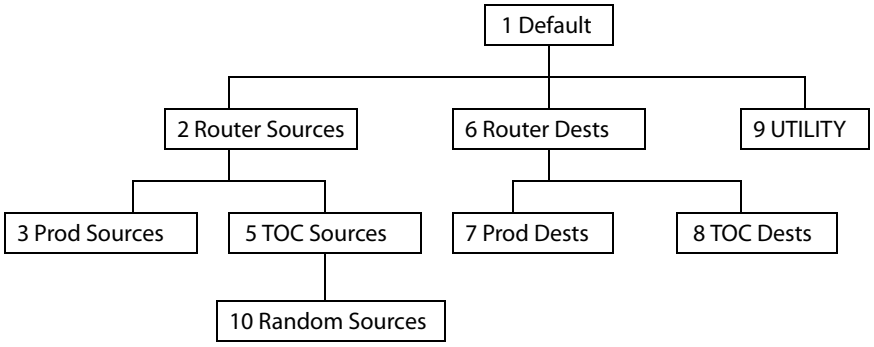
Button Page List

This section 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.

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:

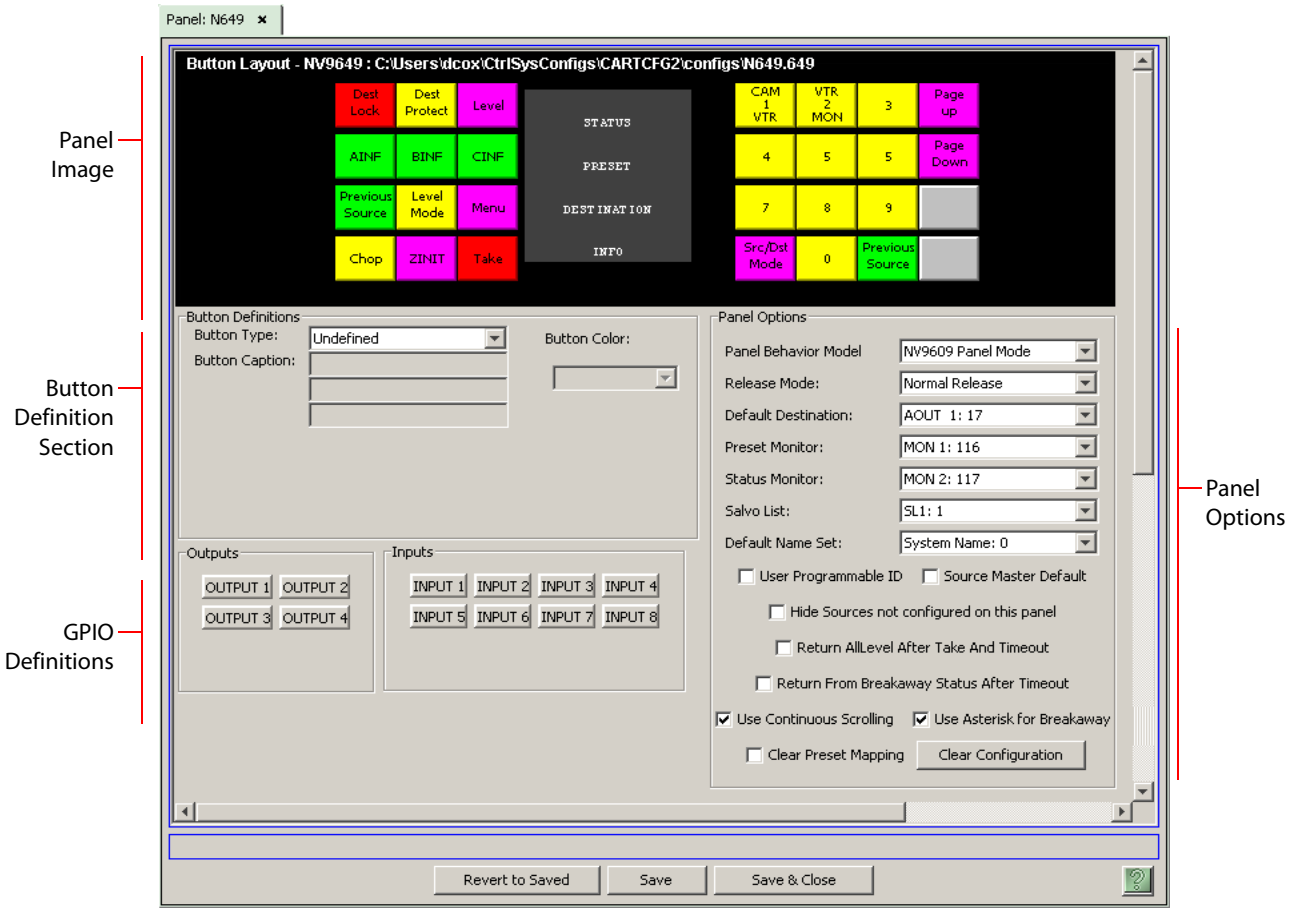


During configuration, you will use 'Navigate' buttons to create new pages. During configuration, you can double-click a 'Navigate' button to jump to its page.

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

Configuration Page for the NV9609 Model

This is the default NV9649 panel configuration page for 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 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.

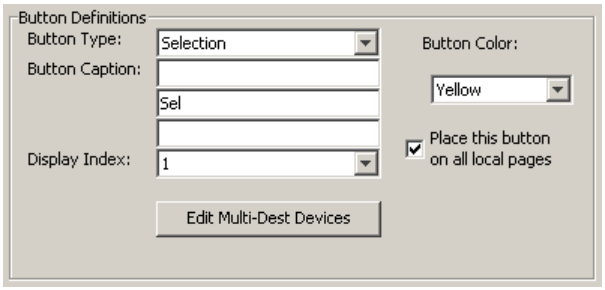
The NV9609, and thus the NV9649, is characterized by having a "level mode." (Refer also to the *NV9609 Users' Guide*.)

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

Button Definitions

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

The button definitions section has several controls:



The controls vary according to the button type.

Button Type	A pull-down menu where you may select a button type.
Button Caption	Three text boxes in which you can enter three lines of button text up to 8 characters each.
Button Color	A pull-down menu where you can select a button color: amber, blue, green, grey, purple, red, or yellow.
Check box	"Place this button on all local 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.
Check box	"Use custom button text." Check this box if you want to override the button's default text. This checkbox is not present for all button types.

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 unique: during configuration, it initiates a dialog in which you create a subtree. During operation, it switches the panel to the button page associated with the button. See 'Edit Navigation Button' Dialog, on page 413.

Some buttons that are generated dynamically during operation.

Button Functions for Server Mode

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

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			

NV9649 Button Functions (under the Server Model)

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

Type	Description (under Server Mode)
Assign	When the panel is in destination mode, the button is used to assign a selected destination to an NV9649 control unit. When the panel is in source mode, the button is used to assign a preset source to a source button of an NV9649 control unit. (Pressing a source button of the desired NV9649 control unit completes the assignment.) Changes made to the assignments made for all NV9649 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).
Broadcast	On the data (machine control) level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button definition has no fields to configure. A broadcast button is useful in dubbing applications or when a backup (redundant) device is in use.

Type	Description (under Server Mode)
Category	During operation, the button has 3 functions: Display a source category's device list when the panel is in source mode. Display a destination category's device list when the panel is in destination mode. Present a suffix (or a digit) to be appended to a device name during category selection. 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.) 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. 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. 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.) 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. Operators can also use the knob to scroll through sources or destinations after choosing a category. The default button text is the category name. You can override the default text. 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	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. The button definition has no fields to configure. Its legend is arbitrary.
Clear	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 The button definition has no fields to configure. Its legend is arbitrary.

Type	Description (under Server Mode)
Destination	Selects a destination. 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'. 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. The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.
Destination Lock	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. The button definition has no fields to configure. Its legend cannot be changed.
Destination Mode	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. Categories that include both source and destinations appear in both source mode and destination mode. The button definition has no fields to configure.
Destination Protect	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. **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. The button definition has no fields to configure. Its legend cannot be changed.
Menu	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. 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.
Quick Source	A quick source button selects a source and performs an immediate take to the current destination of the NV9000-SE Utilities unless 'the panel option 'Server Panel Destination Remove' is checked in the configuration. 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'.) 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. The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.
Salvo	A salvo button places the SE 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 SE then returns to normal operating mode. The button definition has no fields to configure.

Type	Description (under Server Mode)
Source	A source button selects a source. (Note that a quick source button selects a source and also performs an immediate take.) The source selected by a source button is preset to be take to the current destination of the NV9000-SE Utilities. (No takes can occur at the NV9000-SE Utilities if the panel option 'Server Panel Destination Remove' is checked in the configuration.) 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'.) 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. The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.
Source Mode	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. Categories that include both source and destination devices appear in both source mode and destination mode. The button definition has no fields to configure.
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. Categories that include both source and destination devices appear in both source mode and destination mode. The button definition has no fields to configure.
Take	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.) In salvo mode, a take button executes a selected salvo. A take button is disabled (and dark) until it is possible for the operator to execute a take. Configurers should provide the operator a 'Take' button. The button definition has no fields to configure.
Take All	The button takes the selected (i.e., preset) source to ***all*** NV9649 control units. The button definition has no fields to configure.
Undefined	Makes the button undefined and inactive. On the actual panel, it will remain unused (dark).

See the *NV9649 User's Guide* for more detail.

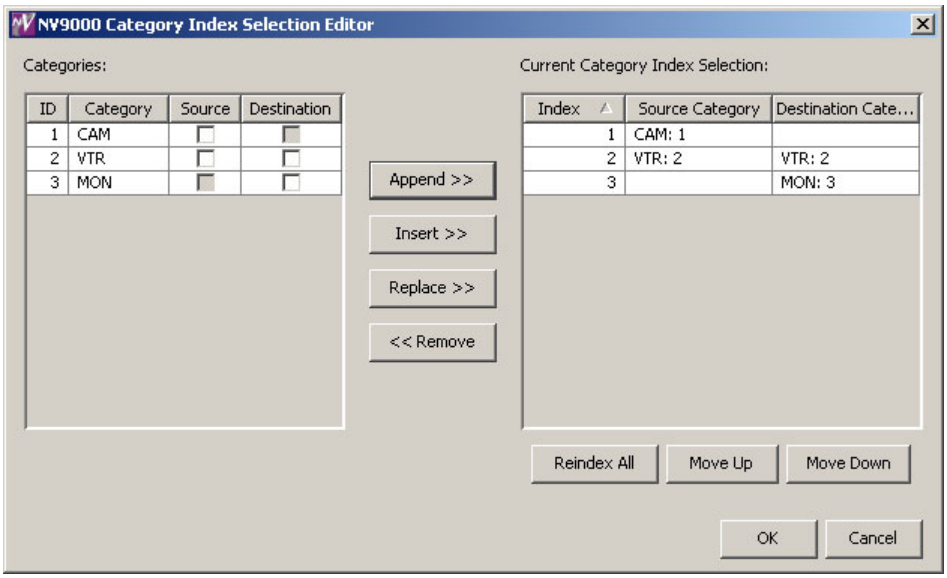
Category Lists

Under server mode, operators can use the NV9649's knob to select a device 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.

Follow these guidelines to create a category list.

1 Right-click the display area of the panel graphic in the panel's configuration page. 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.

2 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 '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.

Button Functions for LCD XY/MD mode

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

Back	Broadcast	Category	Chop
Clear Preset	Default State	Destination	Destination Lock
Destination Protect	Free Source	[Forward]	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	XY Display	XY/MD Mode

NV9649 Button Functions (under the LCD XY/MD Model)

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

Type	Description (under LCD XY/MD Mode)
Back	The 'Back' function places the predecessor of the current button page on the panel. The panel software can introduce a "back" button if an automatically generated list has more entries than can fit on a page. 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).
Broadcast	On the data (machine control) level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button definition has no fields to configure. Its legend is arbitrary. A broadcast button is useful in dubbing applications or when a backup (redundant) device is in use. See also the Source Master button, following.
Category	Pressing the button displays a category's device list. 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. 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. 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. 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. (The suffix page is intended to give the operator a keypad with which to enter device suffixes or indexes.) 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. The default button text is the category name. You can override the default text.
Chop	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. The button definition has no fields to configure. Its legend is arbitrary.
Clear Preset	Erases preset entries, while leaving the panel in the same mode. We recommend you use this button because it is a "safety" feature. The clear preset button has the side effect of switching off 'Save Preset' mode. The button definition has no fields to configure. Its legend is arbitrary.

Type	Description (under LCD XY/MD Mode)
Default State	Returns the panel to its most recent power-up state. That is called the *default state*. The button definition has no fields to configure. Its legend is arbitrary.
Destination	Selects a destination. 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'. 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. The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.
Destination Lock	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. The button definition has no fields to configure. Its legend cannot be changed.
Destination Protect	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. **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. The button definition has no fields to configure. Its legend cannot be changed.
Free Source	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 *Level Set Details* page of NV9000-SE Utilities. The button definition has no fields to configure. Its legend is arbitrary.
[Forward]	The panel software can introduce a "forward" button if an automatically generated list has more entries than can fit on a page. A 'Forward' displays and activates the next button page in an automatically generated sequence. There is no explicit 'Forward' button type; configurers cannot create forward buttons explicitly.
Global Navigate	To the operator, a global navigation button is very much like a navigation button. The difference arises primarily during configuration. During configuration, you must selects 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. The template itself may have structure that ordinary button pages have. It can include any button type except additional global navigate buttons. The button legend is arbitrary.
Hold	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.) The button definition has no fields to configure. Its legend is arbitrary.

Type	Description (under LCD XY/MD Mode)
Level Map	Cross-connects levels (in the same physical router). The function is typically used to shuffle audio channels, for example, to connect AES1/2 to AES3/4. The Level Map mode is cancelled when the next normal take is performed involving the selected destinations. The button definition has no fields to configure. Its legend is arbitrary.
Menu	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. 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. The button definition has no fields to configure. Its legend is arbitrary.
Name Set Toggle	The button toggles the panel between its default name set and the "system name" set. One or the other becomes the active name set. The button definition has no fields to configure. Its legend is arbitrary. 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'. 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.
Navigate	During operation, a navigate button selects and displays a "target" button page. During configuration, a navigate button presents a dialog in which you can enter details of the target page. After you do so, NV9000-SE Utilities 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. (You can use the navigate function to create new button pages.) 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.
Page Down	(1) Scrolls the levels or MD destinations on the selection buttons *down* or (2) scrolls a list *down*. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the list. The button definition has no fields to configure. Its legend is arbitrary.
Page Up	(1) Scrolls the levels or MD destinations on the selection buttons *up* or (2) scrolls a list *up*. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the list. When the panel is displaying the *first page* of a list of devices in a category, the 'Page Up' button returns the operator to the page containing the category button. The button definition has no fields to configure.

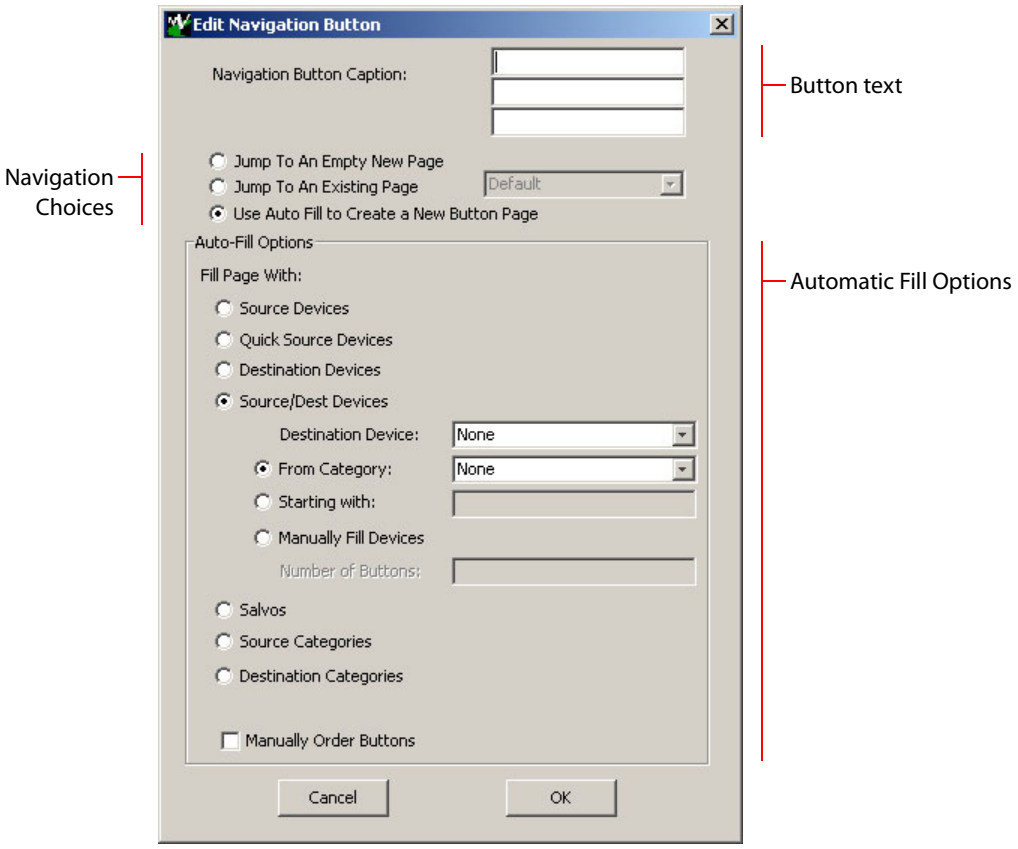
Type	Description (under LCD XY/MD Mode)
Panel Lock	Prevents accidental changes to the panel settings, especially router crosspoints. When the panel is locked, the button array becomes blank except for the Panel Lock button which becomes high tally red. Pressing the Panel Lock button again reverts the panel to its previous mode. The button definition has no fields to configure. Its legend cannot be changed.
Preset Release	Removes locks and protects from preset source devices. This button is not needed if source locks and protects are not used in your system. The button definition has no fields to configure.
Previous Source	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. 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. The button definition has no fields to configure.
Quick Source	A quick source button selects a source and performs an immediate take. When you assign a quick source button, a drop-down menu appears in which you choose a source device. (The 'None' entry is merely a placeholder. Do not choose 'None'.) 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. The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.
Salvo	The button presets a salvo. (Subsequently pressing the 'Take' button actually executes the salvo.) When you assign a Salvo button, a drop-down list appears in which you select a system salvo (previously defined in NV9000-SE Utilities). The 'None' entry is merely a placeholder. Do not choose 'None'. (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.)
Save Preset	When this function is enabled (its button is high tally), whatever is on preset is retained (on preset) after a take. When the function is disabled (its button is low tally), preset is cleared after a take. The button definition has no fields to configure. Its legend is arbitrary.

Type	Description (under LCD XY/MD Mode)
Selection	Typically, at least one button page should provide a set of selection buttons. Operators press selection buttons to select levels (when the SE is in XY mode) or to select MD devices (in MD mode). Each selection button represents one level or one MD device. You may configure any number of selection buttons (on any button page). The selection buttons can be arranged anywhere on the button page. When there are more levels, or more MD devices, than buttons on a page, the SE enables scrolling. The operator presses 'Page Up' or 'Page Down' to scroll through the levels or MD devices to make selections. 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. The drop-down menu for the button's *display index* 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. 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. You can also obtain the MD device editing window by right-clicking the display area of the panel graphic.
Source	A source button selects a source. (Note that a quick source button selects a source and also performs an immediate take.) 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'.) 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. The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.
Source Master	Means "source is the master" and makes the source device the master. Otherwise, the destination is the master. It applies 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). 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. The 'Source is Master' button is also used to initiate "broadcast" control routes. The button definition has no fields to configure. Its legend is arbitrary.

Type	Description (under LCD XY/MD Mode)
Source/ Destination	A source/destination button selects both a source and a destination at one time. 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. 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'.) 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. 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.
Take	In X-Y mode, a take button switches the preset source device(s) to the selected destination device on selected levels. In MD mode, a take button switches the preset source device(s) to the selected destination device(s) on all levels. In most cases, configurers should provide the operator a 'Take' button. The button definition has no fields to configure. Its legend is arbitrary.
Undefined	Makes the button undefined and inactive. On the actual panel, it will remain unlit (dark).
XY Display	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. 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.) After a take, the 'X-Y Display' button also displays the current source name. If there is no destination selected, the 'X-Y Display' button says so. The button definition has no fields to configure. Its legend is defined by the system and varies in context.
XY/MD Mode	Switches the panel between X-Y and multi-destination modes. 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. The button definition has no fields to configure. Its legend is defined by the system and varies in context.

'Edit Navigation Button' Dialog

During configuration, when you choose 'Navigate' for a selected button, NV9000-SE Utilities displays a 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.

The dialog has 3 navigation choices:

- Jump to an empty new page.

  This option creates a new page in the button tree. 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. Operators will use the navigation button you are creating to display the page you select in the associated drop-down menu.

- 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 suboptions:

Source buttons	Salvo buttons
Destination buttons	Source category buttons
Source/destination buttons	Destination category buttons

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.

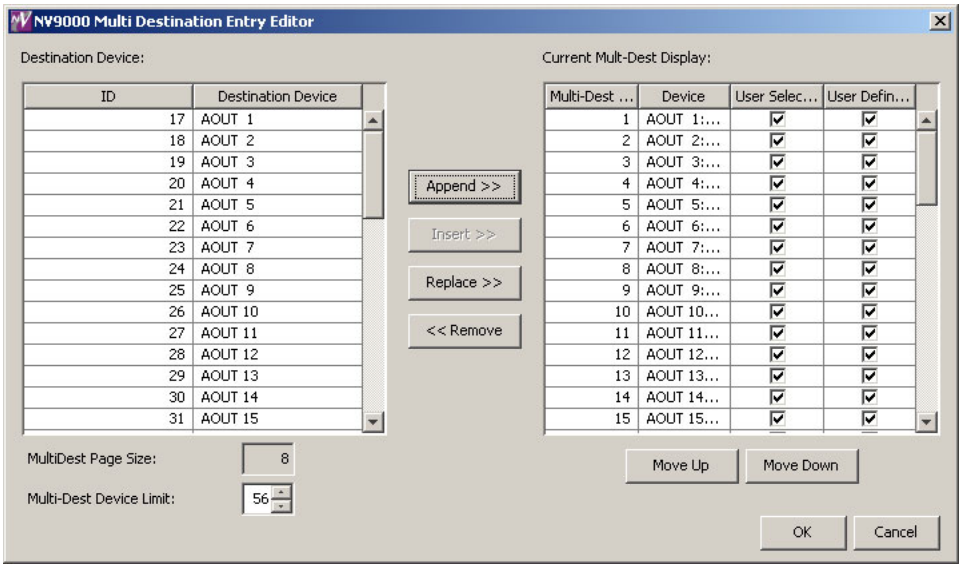
The panel, in either LCD XY/MD or NV9609 mode, can be configured as a single-destination panel by defining a default destination during configuration and providing no destination selection buttons.

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. The limit to the number of MD devices is a panel option.

Follow these guidelines to configure MD devices.

1. 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.
2. 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.

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

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.

Button Functions for NV9609 Mode

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

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

NV9649 Button Functions (under the NV9609 Model)

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

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

Type	Description (under NV9609 Mode)
Category	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.) 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. 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. 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. 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. 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. 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). 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.) NV9000-SE Utilities allows configurers to designate a separator character which is inserted between the parts of the device name. 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.
Chop	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. The button definition has no fields to configure. Its legend is arbitrary.
Clear	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. (If the operator is in level mode, or in salvo mode, 'Clear' brings the panel back to normal mode.) The button definition has no fields to configure. Its legend is arbitrary.

Type	Description (under NV9609 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. 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'. 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. The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.
Destination Lock	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. The button definition has no fields to configure. Its legend cannot be changed. 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. Categories that include both source and destinations appear in both source mode and destination mode. The button definition has no fields to configure. Its legend is arbitrary.
Destination Protect	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. **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. The button definition has no fields to configure. Its legend cannot be changed. 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 free source is defined in the *Level Set Details* page of NV9000-SE Utilities. The button definition has no fields to configure. Its legend is arbitrary.

Type	Description (under NV9609 Mode)
Level	The button selects a level. The button definition has one field to configure: the level. 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.) You must select levels before selecting the source, otherwise multi-level takes do not work. They are all level. (Multi-level takes — and level buttons — are not available in *level mode*.) 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.
Level Mode	The button toggles the panel in and out of level mode. "All Level" appears in the 'Info' display when level mode is 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 some other button types, are disabled in level mode. The only means to select a source are source category buttons. 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. The button definition has no fields to configure. Its legend is arbitrary.
Menu	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. 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. The button definition has no fields to configure. Its legend is arbitrary.
Name Set Toggle	The button toggles the panel between its default name set and the "system name" set. One or the other becomes the active name set. The button definition has no fields to configure. Its legend is arbitrary. 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'. 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.

Type	Description (under NV9609 Mode)
Page Down	The button scrolls *down*. 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. Whether the list wraps around at the beginning or end is governed by the 'Use Continuous Scrolling' panel option. Scrolling salvos in salvo mode: 'Page Down' moves to the salvo with the next *lower* index in the salvo list. A valid salvo list must have been specified in the panel options. 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, an operator can cycle through all the levels (including "All Levels") indefinitely. The button definition has no fields to configure. Its legend is arbitrary.
Page Up	The button scrolls *up*. 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. Whether the list wraps around at the beginning or end is governed by the 'Use Continuous Scrolling' panel option. Scrolling salvos in salvo mode: 'Page Up' moves to the salvo with the next *higher* index in the salvo list. A valid salvo list must have been specified in the panel options. Scrolling levels in level mode: 'Page Up' moves first to "All levels" and then to the last level and then to *previous* levels defined for the destination. Using the 'Page Up' button, an operator can cycle through all the levels (including "All Levels") indefinitely. The button definition has no fields to configure. Its legend is arbitrary.
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. Pressing the panel lock button again reverts the panel to its previous state. The button definition has no fields to configure. Its legend cannot be changed.
Previous Source	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. The button definition has no fields to configure. Its legend is arbitrary. 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.

Type	Description (under NV9609 Mode)
Quick Source	A quick source button selects a source and performs an immediate take. When you assign a quick source button, a drop-down menu appears in which you choose a source device. (The 'None' entry is merely a placeholder. Do not choose 'None'.) 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. The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.
Salvo	A salvo button places the SE 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 SE then returns to normal operating mode. The button definition has no fields to configure.
Source	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'. 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. The button legend is the source name, unless you check 'Use Custom Button Text' and assign the button your own text.
Source 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 definition has no fields to configure. Its legend is arbitrary. 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). 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. The 'Source is Master' button is also used to initiate "broadcast" machine control routes.
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. The button definition has no fields to configure. Its legend is arbitrary.
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. The button definition has no fields to configure. Its legend is arbitrary.

Type	Description (under NV9609 Mode)
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 is possible for the operator to execute a take. Configurers should provide the operator a 'Take' button. The button definition has no fields to configure. Its legend is arbitrary.
Undefined	This button type is a placeholder: during configuration, it makes the button undefined and inactive. On the actual panel, the undefined button remains unlit (dark).

See the *NV9649 User's Guide* for more detail.

Global Navigation

NV9000-SE Utilities supports what are known as "global navigation" pages for NV9640 control panels. Global navigation pages are templates — patterns — that may be used and reused in the creation of NV9640 configurations.

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 NV9640 configurations. Navigate templates allow all functions except 'Global Navigate'.

Templates themselves are ***not*** NV9640 configurations.

NV9654

NV9654 Panel Description

The NV9654 is a hierarchical control panel (2RU) featuring 54 LCD function buttons (illuminated in various colors and having 1 to 3 lines of text):

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

An equivalent NV9654V — a "virtual panel"— is available. It emulates the NV9654.

The panel can be configured in either of two behavioral modes:

- 'Display and Button' mode
- All-Button mode

Under 'Display and Button' mode, the left-most 15 buttons function as an alphanumeric display. These buttons display the same information as some other panels that have displays, such as the NV9640. Under this mode, the panel operator can turn the "display" on and off. When the display is off, the 15 buttons can have other configured functions. (It is with the 'Toggle Display' button that the operator hides or reveals the display.)

Under 'All-Button' mode, the panel provides no display. Note that under 'Display and Button' mode, the panel has 3 additional button functions that relate to the display.

The panel can operate in X-Y mode or in multi-destination (MD) mode. Operators can switch between modes at any time.

The NV9654 provides a *tree-structured* (or hierarchical) button layout. Configurers can define a "tree" of button pages in such a way that each of the 54 LCD buttons can either (1) execute a function or (2) select a subtree (i.e., present an entirely new set of functions at a different level in the tree). The tree, with its subtrees, is not limited in size.

We use the term "button page" or "page" to mean the set of 54 button functions at any particular place in the tree. A panel that is configured in 'Panel and Button' mode shows the "display" only on the top level page of the button "tree."

Configurers use 'Navigate' buttons to create new button pages (subtrees). During operation, NV9654 users press such buttons to access different subtrees.

The panel can also display predefined button pages. For instance, a "category" button, when pressed, can display one or more pages of sources or destinations through which the operator may browse. A "menu" button presents a page of (pre-defined) menu options.

Function Buttons

The NV9654 has an array of 54 LCD buttons. Each button has 1, 2, or 3 lines of text. When there are one or two lines of text, the characters are large; when there are 3 lines of text, the characters are smaller. The buttons can display one of seven colors dynamically: nominally red, green, blue, purple, amber, yellow, or grey.

Each LCD button has *three* operational levels: high tally, low tally, and off.

Some buttons functions are assigned by the system. For example. the panel software adds a "forward" button and a "back" button if there are more sources than buttons on a category page.

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.

Configurers can define 'Selection' buttons that select a level or an MD device. (They *must* do so if the operator is to make such selections.)

Scrolling is necessary when a list of items — for instance, levels or MD devices — exceeds the number of buttons available for the items. Panels that use multi-destination mode will probably require 'Page Up' and 'Page Down' buttons.

Alphanumeric Display

When the panel is in 'Display and Button' mode, the left-most 15 buttons (a 5×3 array) form an alphanumeric display. (These buttons therefore provide a 40×9 matrix of characters.) The panel operator has the option of turning the display on or off. When the display is off, the 15 buttons can have other functions.

The alphanumeric display provides feedback for the operators as they make selections to execute takes and other operations. The panel functions either in: X-Y mode or multi-destination mode. The display changes according to those modes.

In either case, the display has 9 lines (1 header and 8 lines of information) and its buttons are white. The display has 5 columns:

- Information (the left-most column, which has no heading).
- Preset.
- Status.
- LVL/DST.
- S-I-L-B (Attributes).

The display fields can show either names from a name set or the system mnemonics.

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.

See GPIO, on page 198.

Modes of Operation

The primary modes of operation are:

- X-Y mode — control of individual router *levels*. Choose a destination, optionally choose desired breakaway levels, choosing source(s), and press 'Take' to complete a desired route.
- Multi-destination mode — lets you control multiple destinations. The LCD buttons display destinations and sources. You can scroll through destination lists using the 'Page Up' and 'Page Down' buttons. Select a destination using selection buttons, choose a source, and repeat for all desired routes. Then press 'Take'. Takes in MD mode are "all level," and breakaways cannot be performed.

- Single-destination mode.

  Single-destination" mode is not a distinct mode, but it is a mode on some other panels and can be simulated on the NV9654.

The secondary modes of panel operation are:

- Setup mode — where the NV9654 is freshly powered up, but disconnected from the network. In this mode, you can set the panel ID and perform a few diagnostic tasks.
- Salvo mode — pressing a Salvo button (and then the 'Take' button) executes a salvo. (The duration of a salvo is indeterminate.)
- Menu mode — pressing a Menu button places the NV9654 in "menu" mode. In menu mode, the panel's button array becomes a menu that changes as needed during menu operation.

Other modes of operation are:

- Hold mode.
- Save preset mode.

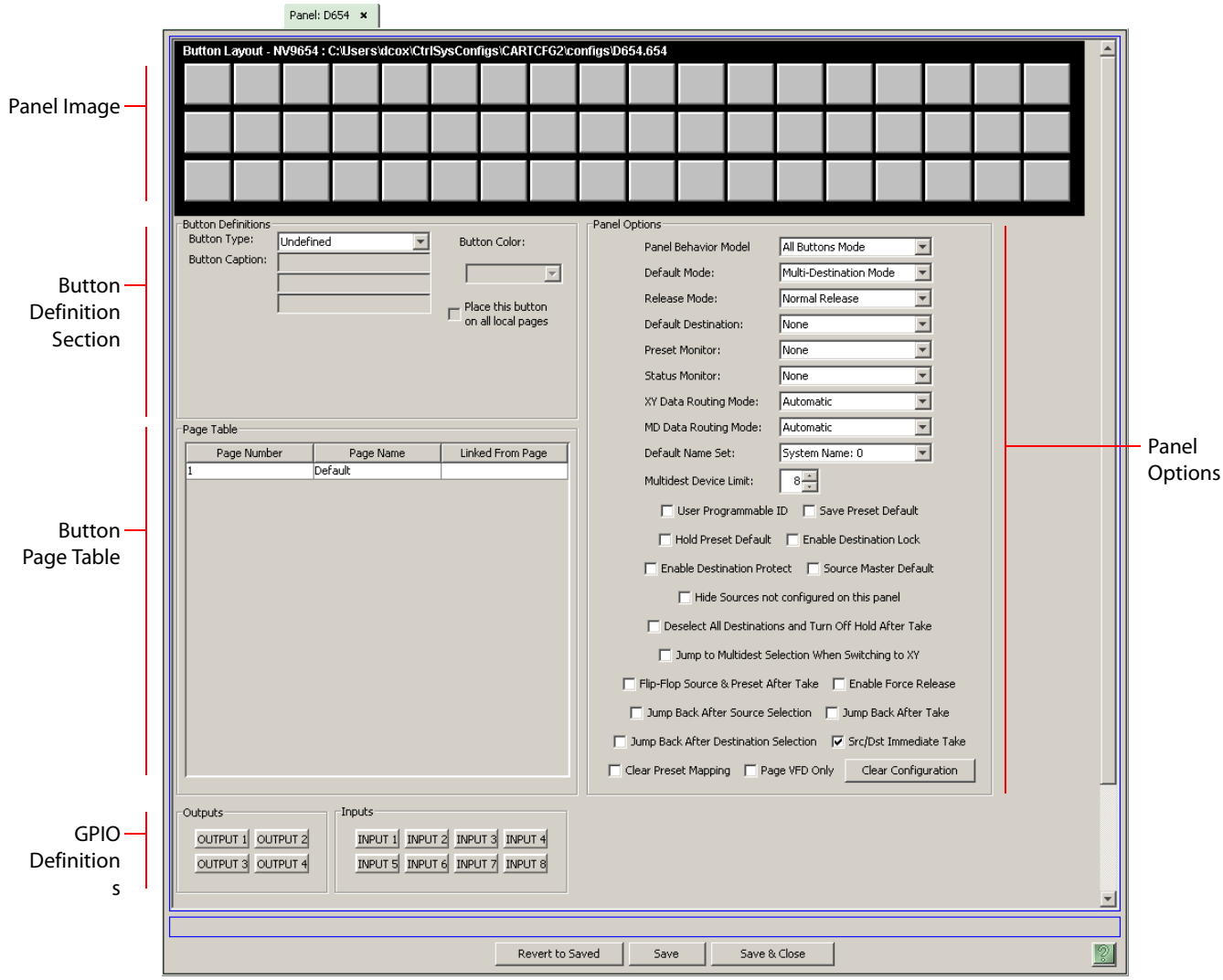
Other NV9654 Functions

The NV9654 can be configured to perform the following additional functions:

- System salvos.
- Gang or dub switching in multi-destination mode.
- Broadcast data routing in X-Y mode.
- Level mapping.
- (In NV9000-SE Utilities) button page "templates" — global navigation templates and suffix templates — for easier configuration.

NV9654 Configuration Page

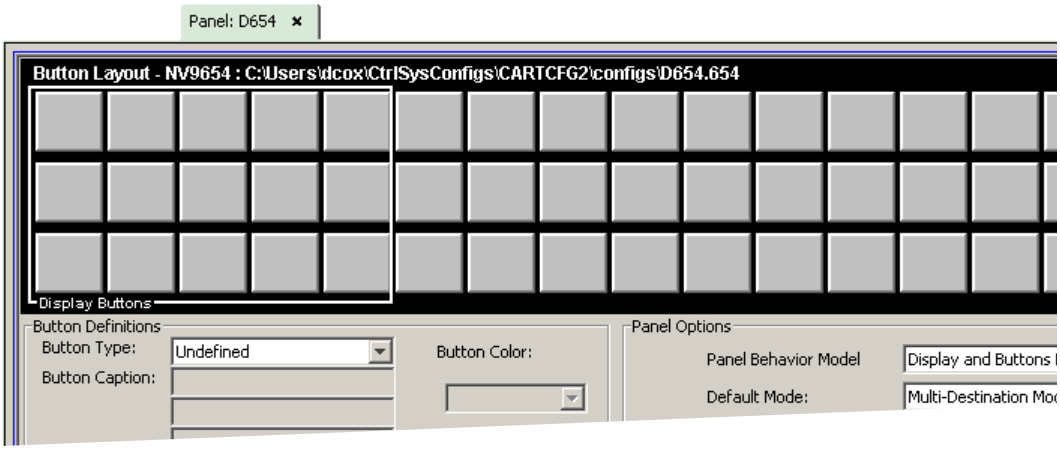
This is the default NV9654 panel configuration page:



After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

The previous illustration showed the configuration page set up for 'All Buttons' mode. The panel can also be configured in 'Display and Buttons' mode, in which case the "display" section of the panel graphic is delineated by a white line on the configuration page:



The display section is the 5×3 array of buttons at the left.

Regions of the Configuration Page

There are 5 main regions:

- The NV9654 panel image.

  The NV9654 has 54 LCD buttons in an 18×3 array. Click on a button to assign a function to it. In some cases, you can click or double-click a button to execute the button function. Double-clicking a 'Navigate' button, for instance, causes the button's "subpage" to appear.

  Buttons can be illuminated in several colors: green, amber, yellow, red, blue, purple, and grey. There are 3 levels of illumination: high tally (bright), low tally (muted) and off.

  Buttons in the 5×3 display section are always white (if the display is enabled). Operators can turn the display on and off. Configurers may assign button functions to the buttons of the display section for those occasions when the operator has turned the display off.

- Button definition section.

  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definitions, following.

- Button page table.

  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." See Button Page List, on page 435.

- GPIO definitions.

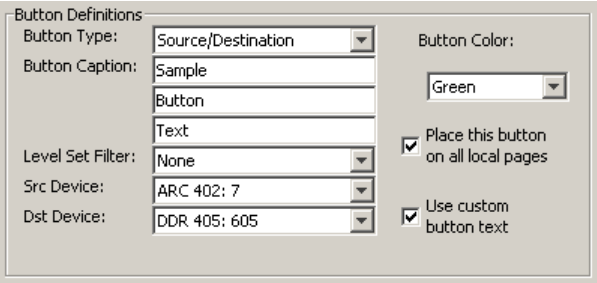
  In this section, configurers may define GPIO logic. The control panel has a rear connector that provides 4 relay outputs and 8 optically isolated inputs. See GPIO, on page 198. (Note that the graphical buttons represent *connector terminals* and not actual buttons.)

- Panel options.

  In this section, configurers may specify the behavioral characteristics of the panel. See the *NV9654 User's Guide* for detailed information.

Button Definitions

The button definitions section has several controls:



The controls vary according to the button type.

Button Type	A pull-down menu where you may select a button type.
Button Caption	Three text boxes in which you can enter three lines of button text up to 8 characters each.
Button Color	A pull-down menu where you can select a button color: amber, blue, green, grey, purple, red, or yellow.
Check box	"Place this button on all local 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.
Check box	"Use custom button text." Check this box if you want to override the button's default text. This checkbox is not present for all button types.

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 unique: during configuration, it initiates a dialog in which you create a button subtree. During operation, it switches the panel to the button page associated with the button. See 'Edit Navigation Button' Dialog, on page 434.

Some buttons are generated dynamically during operation.

There are different sets of button types for global suffix pages and for global navigation pages. See Global Navigation, on page 437.

Button Types

These are the button types:

Back	Broadcast	Category	Chop
Clear Preset	Default State	Destination	Destination Lock
Destination Protect	Free Source	[Forward]	Global Navigate
Hold	Information	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	Toggle Display
VFD/SEL Toggle	X-Y Display	XY/MD Mode	

NV9654 Button Types

These are the button types available for NV9654 configurations. (Note that different subsets of these button types are available when you are defining a global suffix template or a global navigation template.)

Type	Description
Back	The 'Back' function places the predecessor of the current button page on the panel. The panel software can introduce a "back" button if an automatically generated list has more entries than can fit on a page.
Broadcast	On the machine control level, the button enables a broadcast take to an *additional* controlled device, after a broadcast route has been initiated with a "source is master" control-level take to the *first* controlled device. The button is useful in dubbing applications or when a backup (redundant) device is in use. See also the Source Master button, following.
Category	Displays a category's device list. When you assign a category button, two additional drop-down menus appear: 'Src Category' and 'Dst Category'. Choose a category from one of the category lists. When you choose a source category, the destination categories become inaccessible and vice versa: a category button must be either a source category or a destination category. You must choose 'None' in either category list to switch to the other category list. When you choose either 'Src Category' or '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. 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 default button text will be the category name. You can override the default text.
Chop	When a chop function is supported by the router, the button is a toggle that enables and disables rapid switching of the selected destination device between the current source and the preset source. This chop function is used to test system timing.
Clear Preset	Erases preset entries, while leaving the panel in the same mode. We recommend you use this button because it is a "safety" feature. The clear preset button has the side effect of switching off 'Save Preset' mode.
Default State	Returns the panel to its most recent power-up state. That is called the *default state*.
Destination	Selects a destination. When you assign a destination button, a drop-down menu appears: 'Destination Device'. Choose a device from the list. The 'None' entry is merely a placeholder. Do not choose 'None'.

Type	Description
Destination Lock	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. When the panel has its display area enabled, an "L" appears, in MD mode, under the "L" column (of the "S I L B" buttons) on the rows representing locked *destinations*. In X-Y mode, an "L" appears under the "L" column on the rows representing locked *levels*.
Destination Protect	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. **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. When the panel has its display area enabled, a "P" appears, in MD mode, under the "L" column (of the "S I L B" buttons) on the representing locked *destinations*. In X-Y mode, a "P" appears under the "L" column on the rows representing locked *levels*.
Free Source	Defines a phantom device that can be used to release or "free" devices on the machine 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 *Level Set Details* page of NV9000-SE Utilities.
[Forward]	The panel software can introduce a "forward" button if an automatically generated list has more entries than can fit on a page. A 'Forward' button displays and activates the next button page in an automatically generated sequence. There is no explicit 'Forward' button type; configurers cannot create forward buttons explicitly.
Global Navigate	A global navigation button is very much like a navigation button to the operator. However, during configuration, it selects a previously defined "global navigation" template. The template itself may have structure that ordinary button pages have. It can include any button type except additional global navigate buttons.
Hold	Toggles the panel in and out of "hold" mode. In multi-destination mode, hold mode retains destination selections after a take. In X-Y mode, hold mode retains breakaway levels after a take. (There are other effects.)
Information	The information button displays auxiliary information about level mapping and perhaps other matters. The operator presses the information button once to see the information and again to hide the information. An information button remains disabled (dark) until there is information to display. When there is information to display, an asterisk appears in the "I" column of the panel's display (when it is turned on). The "I" column is found on the "S I L B" buttons of the display.
Level Map	Cross-connects levels (in the same physical router). The function is typically used to shuffle audio channels, for example, to connect AES1/2 to AES3/4. The Level Map mode is cancelled when the next normal take is performed involving the selected destination.

Type	Description
Menu	This button puts the NV9654 panel in menu mode and displays a menu on the LCD buttons that provides access to a variety of panel options. Place the button on the panel only if you want the user to have access to the menu. By pressing certain buttons, the user makes menu selections and may enter data (such as panel ID) or change LCD brightness values.
Name Set Toggle	The button toggles the panel between its default name set and the "system name" set. One or the other becomes the active name set. The button definition has no fields to configure. 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'. 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.
Navigate	During operation, a navigate button selects and displays a "target" button page. During configuration, a navigate button presents a dialog in which you can enter details of the target page. After you do so, NV9000-SE Utilities 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. (You'll use the navigate function to create new button pages.) 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 to operators.
Page Down	Scrolls a list *down*. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the list. 'Page Down' also scrolls through multi-destination devices in multi-destination mode and through levels in X-Y mode.
Page Up	Scrolls a list *up*. Lists include categories, source devices, and destination devices. Scrolling is necessary when the list exceeds the number of buttons available for the the list. 'Page Up' also scrolls through multi-destination devices in multi-destination mode and through levels in X-Y mode. When the operator is displaying a list of devices from a category, the 'Page Up' button will return the operator to the page containing the category button.
Panel Lock	Prevents accidental changes to the panel settings, especially router crosspoints. When the panel is locked, the button array becomes blank except for the Panel Lock button which becomes high tally red. Pressing the Panel Lock button again reverts the panel to its previous mode.
Preset Release	Removes locks and protects from preset source devices. This button is not needed if source locks and protects are not used in your system.

Type	Description
Previous Source	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. 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.
Quick Source	A quick source button selects a source and performs an immediate take. When you assign a quick source button, a drop-down menu appears in which you choose a source device. (The 'None' entry is merely a placeholder. Do not choose 'None'.)
Salvo	Executes a salvo. When you assign a Salvo button, a drop-down list appears in which you select a system salvo (previously defined in NV9000-SE Utilities). The 'None' entry is merely a placeholder. Do not choose 'None'. (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.)
Save Preset	When this function is enabled (its button is high tally), whatever is on preset is retained (on preset) after a take. When the function is disabled (its button is low tally), preset is cleared after a take.

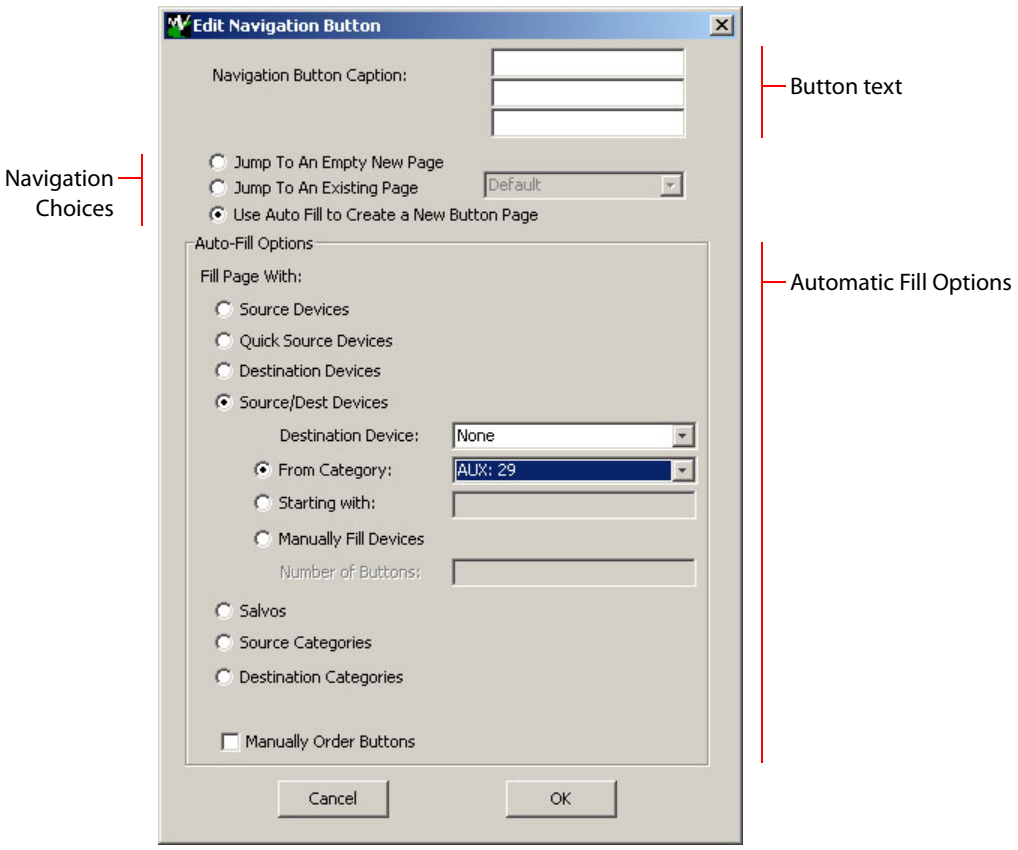
Type	Description
Selection	Typically, at least one button page should provide a set of selection buttons. Operators press selection buttons to select levels (when the SE is in XY mode) or to select MD device (in MD mode). Each selection button represents one level or one MD device. You may configure any number of selection buttons (on any button page). The selection buttons can be arranged anywhere on the button page. The selection buttons on any button page are unrelated to the selection buttons on any other page. Only the selection buttons on the currently visible page are active at a given time. When there are more levels, or more MD devices, than buttons on a page, the SE enables scrolling. The operator presses 'Page Up' or 'Page Down' to scroll through the levels or MD devices to make selections. Scrolling is affected by two factors — the presence or absence of a 'VFD/Sel Paging Toggle' button and whether the 'Page VFD only' option is in effect. Thus, If your panel does ***not*** have a 'VFD/Sel Paging Toggle' button, When the 'Page VFD Only' option is ***not*** in effect, selection buttons scroll (always in increments of 8) when the panel's display scrolls. We say that the selection buttons "follow" the display. When the 'Page VFD Only' option ***is*** in effect, only the panel's display scrolls and the selection buttons, if any, do not scroll. If your panel ***does*** have a 'VFD/Sel Paging Toggle' button, When the 'VFD/Sel Paging Toggle' button reads 'Paging LCD Display', the panel's display scrolls (and selection buttons do not). When the 'VFD/Sel Paging Toggle' button reads 'Paging Select Buttons', the selection buttons scroll by an increment equal to the number of buttons on the page (and the display does not scroll). Under the 'All Buttons' model, there is no such effect. If the panel is configured so that both the display and the selection buttons scroll, the number of selection buttons on a page should be exactly 8. During configuration, when you assign a selection button, an additional drop-down menus appears in the button definition area: 'Display Index'. An 'Edit Multi-Dest Devices' button also appears. The drop-down menu for the button's *display index* has as many entries as the panel's 'MultiDest Device Limit' option. The number of selection buttons would usually be much smaller than the MD device limit. We recommend that you choose consecutive display indexes from 1 to the number of selection buttons on the page. Use the 'Edit Multi-Dest Devices' button to define MD devices. They are assigned to selection buttons in the order in which you define them.
Source	A source button selects a source. (Note that a quick source button selects a source and also performs an immediate take.) 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'.)

Type	Description
Source Master	Means "source is the master" and makes the source device the master during machine control operations. Otherwise, the destination is the master. 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). 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. The 'Source is Master' button is also used to initiate "broadcast" machine control routes.
Source/ Destination	A source/destination button selects both a source and a destination at one time. Source/destination buttons can be configured to perform immediate takes. (It is a NV9654 panel option.) If they are not so configured, the operator must also press a 'Take' button to effect a take.
Take	In X-Y mode, a take button switches the preset source device to the selected destination device on selected levels. In MD mode, a take button switches the preset source device(s) to the selected destination device(s) on all levels. In most cases, configurers should provide the operator a 'Take' button.
Toggle Display	When the panel is operating under 'Display and Buttons' mode, this button turns the display portion of the button array on or off. When the "display" is off, the buttons used for the display perform other assigned functions, as configured in NV9000-SE Utilities.
Undefined	Makes the button undefined and inactive. On the actual panel, it will remain unlit (dark).
VFD/SEL Toggle	The button is a toggle. In one state, it makes the display (called a VFD) scroll when the operator presses 'Page Up' or 'Page Down'. In the other state, it makes the items on selection buttons scroll. This button has no configuration options. The button legend is fixed. Depending on which state the button is in, it will read "Paging LCD Display" [sic] or "Paging Select Buttons." The presence or absence of this button affects how selection buttons scroll.
X-Y Display	This button displays the current source and current destination. It is usable in both X/Y mode and MD mode. It is very useful when the panel has no display. It might be appropriate to define an 'X-Y Display' button in the display area. When the display is turned off, the button would become visible.
XY/MD Mode	Switches the panel between X-Y mode and multi-destination mode. 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.

See the *NV9654 User's Guide* for more detail.

‘Edit Navigation Button’ Dialog

During configuration, when you choose ‘Navigate’ for a selected button, NV9000-SE Utilities displays a 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.

The dialog has 3 navigation choices:

- Jump to an empty new page.

  This option creates a new page in the button tree. 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. Operators will use the navigation button you are creating to display the page you select in the associated drop-down menu.

- 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 suboptions:

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

Button Page List

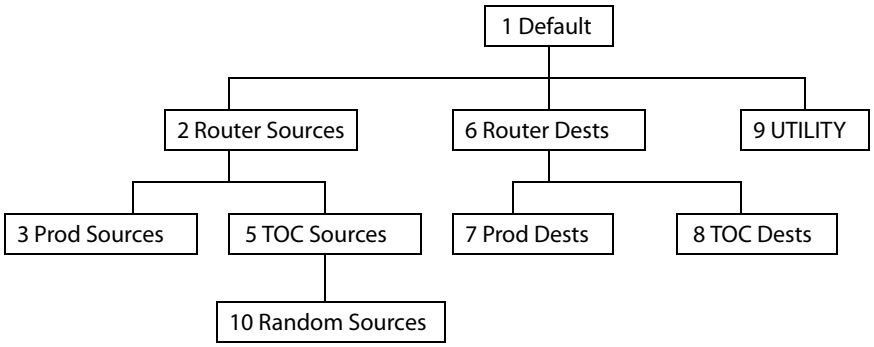
This section lists the pages of the button tree. It has 3 columns: Page Number, Page Name, and "Link to Page Num(s)."

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.

This is a sample of a button page list:

Page Number	Page Name	Referrers
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:

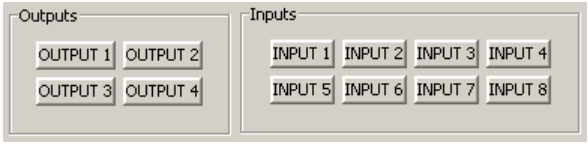


During configuration, you will use 'Navigate' buttons to create new pages. During configuration, you can double-click a 'Navigate' button to jump to its page.

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

Tally (GPIO) Section

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 that input or output. (These buttons represent the DB25 *connector* at the rear.)

See GPIO, on page 198.

Single-Destination Mode

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

The simplest form presents a group of “quick source” buttons. If you configure a default destination in the panel options, all the quick sources could be taken to a (single) default destination with no need for destination selection.

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. The limit to the number of MD devices is a panel option.

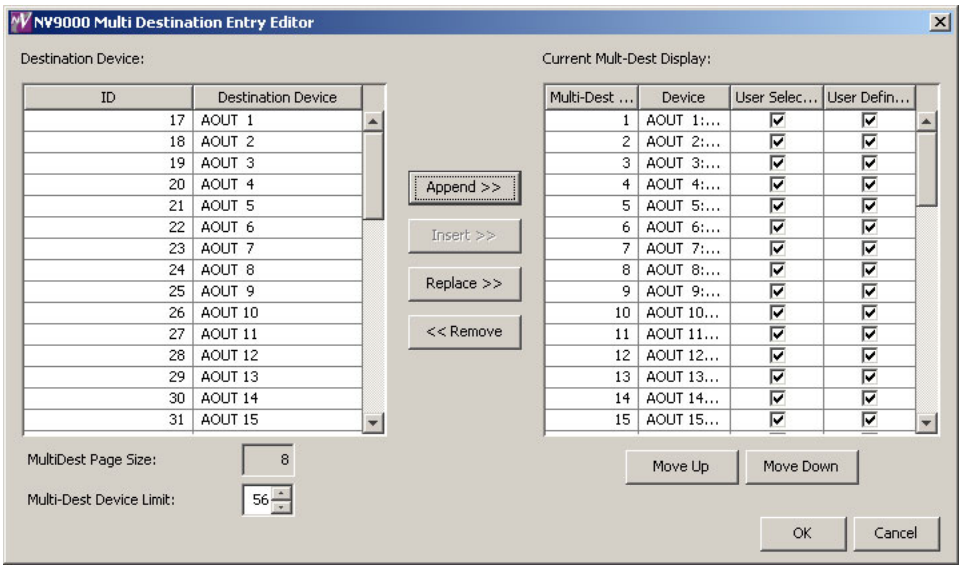
A configurer follows these guidelines to configure MD devices:

1 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.

Use the ‘Display Index’ field to assign a unique number to the button. When the panel is in MD mode, the display index will represent one of the MD devices. Which MD device is subject to the panel operator’s scrolling the list of MD devices.

(The display index for the button also represents a virtual level when the panel is in X-Y mode.)

2 Click ‘Edit Multi-Dest Devices’ to define or re-define MD 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.

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 ‘Remove’ button *removes* highlighted MD destinations from the right.

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.

Global Navigation

NV9000-SE Utilities supports what are known as "global navigation" pages for NV9654 control panels. Global navigation pages are templates — patterns — that may be used and reused in the creation of NV9654 tree-structured configurations.

There are two types of global navigation pages: 'Suffix' and 'Navigate'. A 'Navigate' template can 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 NV9654 configurations. Navigate templates support all functions except 'Global Navigate'. That is because templates cannot be nested (i.e., recursively defined).

Templates themselves are ***not*** NV9654 configurations.

NV9575-VF

Product Description

▲ The NV9575-VF is not a control panel. Its inclusion in NV9000-SE Utilities' control panel list and configuration pages is a matter of convenience. Please refer to the *NV9575-VF User's Guide* (UG0023-*xx*) for detail.

The NV9575-VF is a third-party tally interface:

This 1RU device (unlike router control panels) has no controls on its front panel. What it does have — at the rear — are 64 relay outputs and 32 optically isolated inputs, typically used for tally functions.

The NV9575-VF has 6 DB25 connectors on its rear panel that provide connections for the 64 relay outputs, 16 per connector, with 8 pins common. Two additional DB25s provide connections for the 32 inputs, also 16 per connector with 8 pins common.

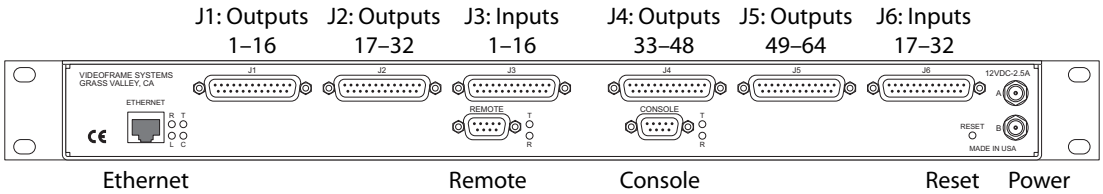
Each relay can be configured to switch on a number of conditions:

- One or more routes occurring on specific levels.
- Conditions involving output ports (destination, level).
- A transition on one or more of the NV9575-VF inputs.

Each input (also called a GPI) can be configured to trigger a salvo on a transition from off to on and to trigger another salvo on a transition from on to off.

Connections

This is the rear of the tally interface:



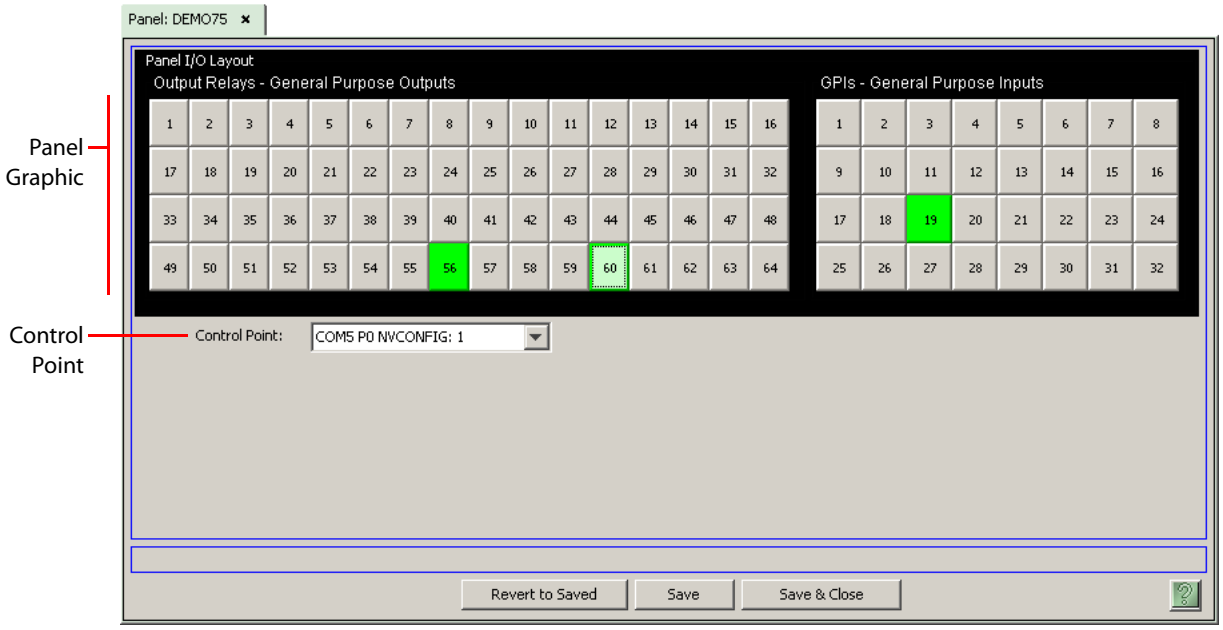
The 6 DB25 connectors on its rear panel — J1 through J6. J1, J2, J4, and J5 — provide connections for the 64 relay outputs, 16 per connector, with 8 pins common. J3 and J6 provide connections for the 32 inputs, also 16 per connector with 8 pins common.

It also has 2 power connectors, an RJ-45 Ethernet port, two DE9s (remote and console). The DE9s and the Ethernet port have LED activity indicators.

The 'remote' connector is not used. The console connector is used briefly to assign the NV9575-VF an IP address. The Ethernet connector is the port through which the NV9000 system communicates with the NV9575-VF after it is set up.

NV9575-VF Configuration Page

This is the NV9575-VF configuration page:



After you have configured the panel's connections, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

There are 2 main regions:

- A graphic representation of the NV9575-VF.

  On the left are 64 rectangular button-like icons representing the NV9575-VF's 64 relay output connections.

  On the right are 32 icons representing the NV9575-VF's optically-isolated inputs.

  Note: The "button" icons you see on the NV9575-VF page represent connections (on DB25s) at the rear of the panel. The NV9575-VF has no buttons.

  When you configure a connection, the icon turns green.

- Control point.

  In this drop-down list, choose one of the system controller's serial control points for the NV9575-VF.

For information about configuring the inputs and outputs of the NV9575-VF, see GPIO, on page 198.

▲ The NV9575-VF requires Initial setup using Videoframe configuration software. The NV9575-VF must also be set up as an external interface in NV9000-SE Utilities. See the *NV9575-VF User's Guide* for detailed information.

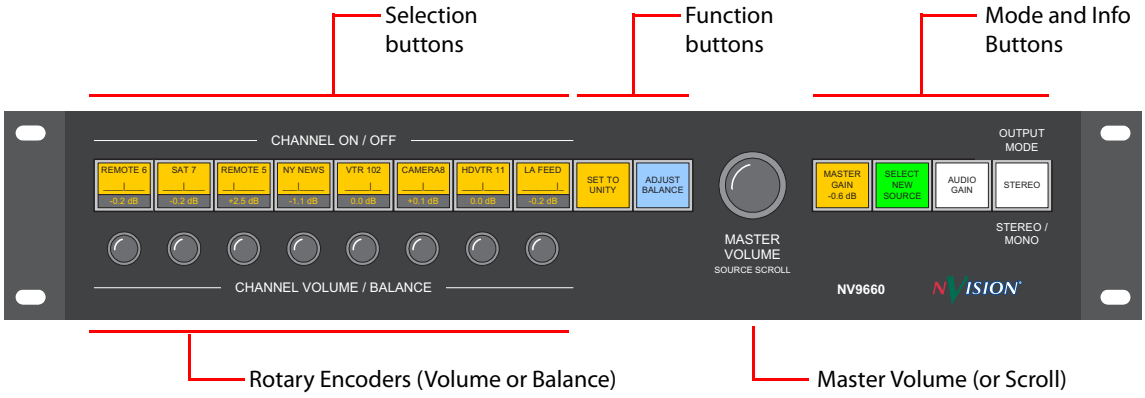
NV9660

Product Description

▲ The NV9660 is not an NV9000 control panel. Its inclusion in NV9000-SE Utilities' control panel list and configuration pages is a matter of convenience.

▲ This product is probably obsolete.

The NV9660 a hybrid panel, combining an audio mixer panel and a router control panel. The panel controls the input selection and mixing functions on the NVISION NV7512 "MIX OUT" Quad Mixer Output Module. One NV9660 is required per mixer output, thus four panels are needed to control all four mixers on the NV7512 MIX OUT.



Note the following:

- Each mixer has eight stereo inputs and a single AES output.
- Each input has adjustable gain and balance.
- The NV9660 panel can choose the NV7512 output (from its crosspoint matrix) that feeds each mixer input.

This panel operates in 3 principal modes:

- Source selection.
- Gain control.
- Balance control.

See Modes of Operation, on page 441.

Panel Organization

This 2RU panel is organized as shown in the illustration above. There are 14 LCD buttons, numbered from 1 to 14, left to right. The buttons are color coded and each displays 3 lines of text and graphics, typically the source device, a balance indicator, and gain.

1 Selection buttons

These 8 buttons are toggles that select channels in gain or balance mode.

These 8 buttons with the 2 function buttons (9 and 10) function as category/device selection buttons in source selection mode.

Category/device selection uses the large knob (labeled “master volume”) to scroll through categories and devices within a category.

2 Function buttons

These 2 buttons depend on the selected panel mode:

- In gain control mode, button 9 sets selected channels to unity gain. Button 10 switches the panel to balance control mode.
- In balance control mode, button 9 centers the balance of selected channels. Button 10 switches the panel to gain control mode.
- In source selection mode, both of these buttons support category selection.

3 Master volume knob

In gain and balance control modes, the master volume knob adjusts the total gain of the channel mix.

In source selection mode, the master volume knob scrolls through categories and device IDs.

4 Mode and information section

The four buttons in this section change depending on the panel mode. In gain and balance control modes:

- Button 11 shows the panel’s master gain value in dB.
- Button 14 lets you change the panel’s output from stereo to mono and vice versa.

In source selection mode:

- Button 11 lets you select a mixer input to which you want to assign a source.
- Button 14 has no assigned function. It remains off.

Button 12 lets you change mode. Button 13 shows the panel mode.

5 Rotary encoder knobs

The 8 rotary encoders depend on the panel mode. Each affects the channel directly above it.

- In gain mode, they adjust the gain of the stereo source.
- In balance mode, they adjust the source's left/right balance.

Important: A channel need not be selected for its associated encoder to adjust its gain or balance.

Modes of Operation

There are 3 primary modes of operation:

- In source selection mode, you assign sources to the mixer's input channels. Source categories and device names are pre-configured using the NV9000 Router Control System.

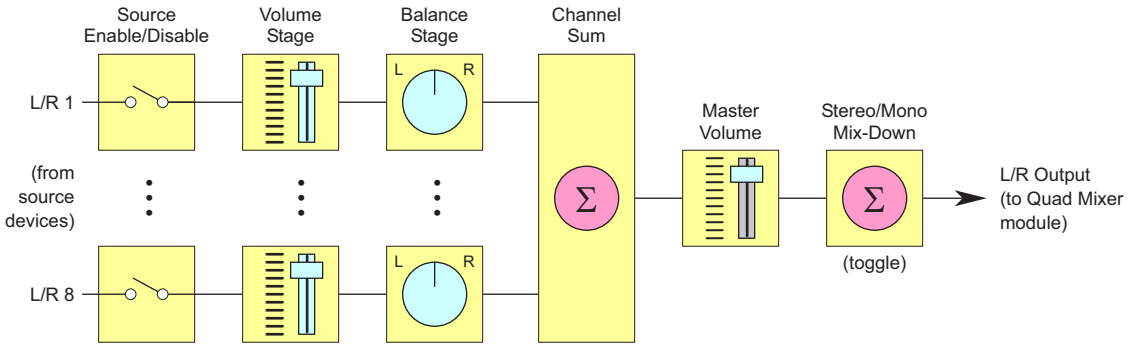
  In source selection mode, the selection buttons turn green.
- In gain control mode, you control the gain of individual input channels and the mixer's output gain. You can also set selected channels to unity.

  In gain control mode, the selection buttons turn amber.
- In balance control mode, you control the balance of individual channels and the mixer's output gain. You can also "center" the balance of selected channels.

  In balance selection mode, the selection buttons turn blue.

Basic Function

This functional diagram illustrates the basic function of the NV9660 mixer.



There are four identical mixer functions on a NV7512 Quad Mixer Output card, and the NV9660 panel controls one of these mixers. Please note:

- The NV9660 panel can select 8 stereo sources as mixer inputs.
- Each source uses gain and balance processing, and then all of the left channels are summed—and all of the right channels are summed.
- These summed signals are processed through a gain stage (Master Volume) and are then output.
- If the output mode is "mono mix-down," left and right are summed and divided by two—and this combined signal is copied onto output L and output R.

Additional Panel Features

The LCD buttons are number 1–14 from left to right. A selection button is always in one of the following states:

- Unselected — dimly lit. If a channel selection button is unselected, the input is not part of the mix.
- Selected — brightly lit. If a channel selection button is selected, the input is included in the mix, and functions can be performed on it (e.g., set to unity gain, center balance).
- Off — dark. If a channel selection button is off, the input is not assigned. If a function button or mode button is off, no function is available or no information is available.

To switch from stereo to mono mode and vice versa, press button 14 until it reads "Stereo" or "Mono."

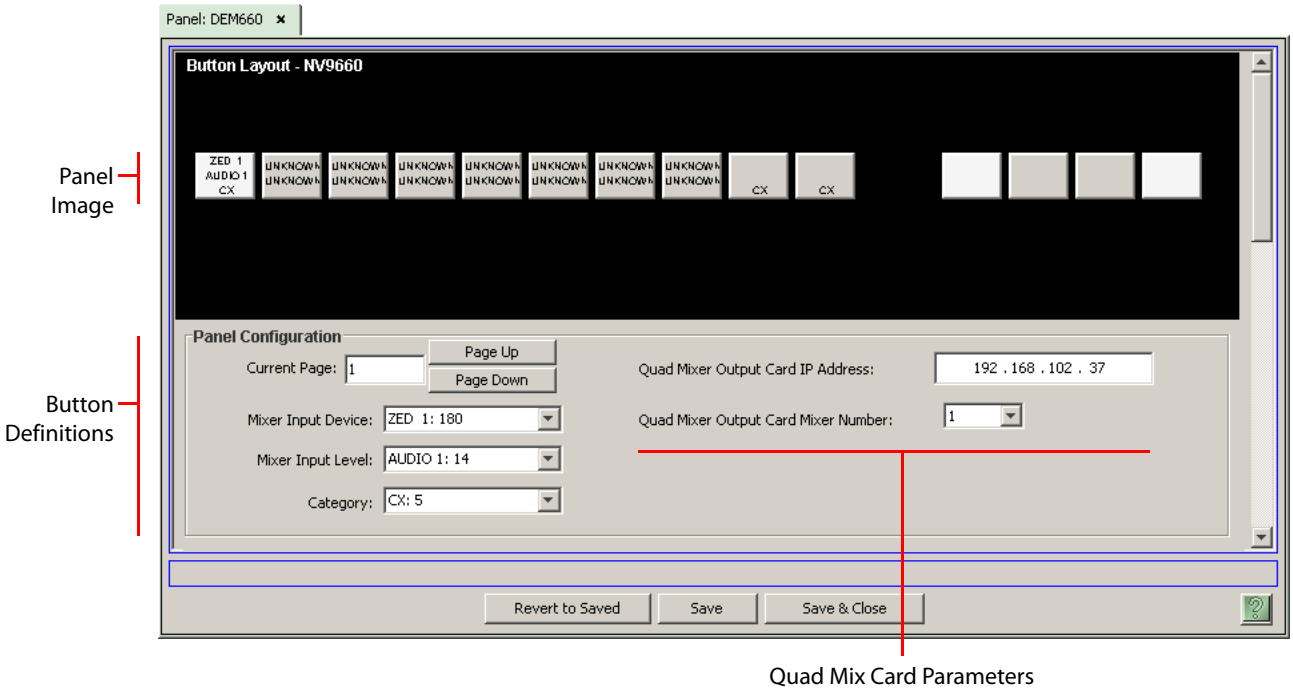
Button 12 lets you change mode. Button 13 shows the panel mode.

The LCD buttons are color coded:

Green	Source mode button
Amber	Gain mode button
Blue	Balance mode button
White	Info or mode identification
Red	Warning or error
Dark	Off, and not a function.

NV9660 Configuration Page

This is the NV9660 configuration page:



▲ Also required is the QMOCDiag software to configure a quad mixer card.

The page has 3 main sections:

- Panel image.

  The panel has 14 buttons. The left 10 are configurable in this page. The right 4 are not configurable.

- Button definition section

  There are several fields in this section of the page.

  When the panel is in source selection mode, the 10 leftmost buttons can be used to select categories. Thus, for each of the 10 buttons, you can choose a category mnemonic.

  When the panel is in gain or balance mode, the 8 leftmost buttons represent an NV7512 input (specified by a device and level) and buttons 9 and 10 are function buttons. The button's input assignment in NV9000-SE Utilities is a default value because the NV9660 operator can select different devices (I guess on the same level).

  The 8 buttons, as a group, represent the 8 channels that can be mixed on a single mixer of the quad mixer card.

  When the panel is in source selection mode, the 10 left buttons are used for category and device selection. If your system has more than 10 categories, you can place the additional categories on additional "pages" of category buttons. Use the 'Page Up' and 'Page Down' buttons to select a page for categories.

  When the operator wants to choose a category, he or she will use the large knob to scroll through the "pages" of categories. Following the selection of a category, the operator uses the large knob to scroll through devices.

- Quad mix card parameters

  In the IP address field, specify the IP address of the quad mixer card. It is with this card that the NV9660 communicates.

  The quad mixer card has 4 mixers. In the mixer field, you select the mixer that this NV9660 will control. Four NV9660s are required to control all 4 outputs of the QM card.

RP16

Hardware Description

The RP16 (which is called NVRP16 in NV9000-SE Utilities) is not an NV9000 control panel. The RP16 is a "remote panel module" in the compact router series. The combination of an RP16 and a CR series panel (such as a CP1616) normally functions as a "remote panel" in a CRSC compact router system. However, a remote panel can also be used as an NV9000 control panel.

▲ The RP16 is the configurable part of the pairing.

The RP16 has no I/O connectors and no video reference connectors. Otherwise, the RP16 is the same size as, and resembles, a 1RU compact router.

This is a front view of the RP16:

Fig. 8-3: RP16, Front View

This is a rear view:

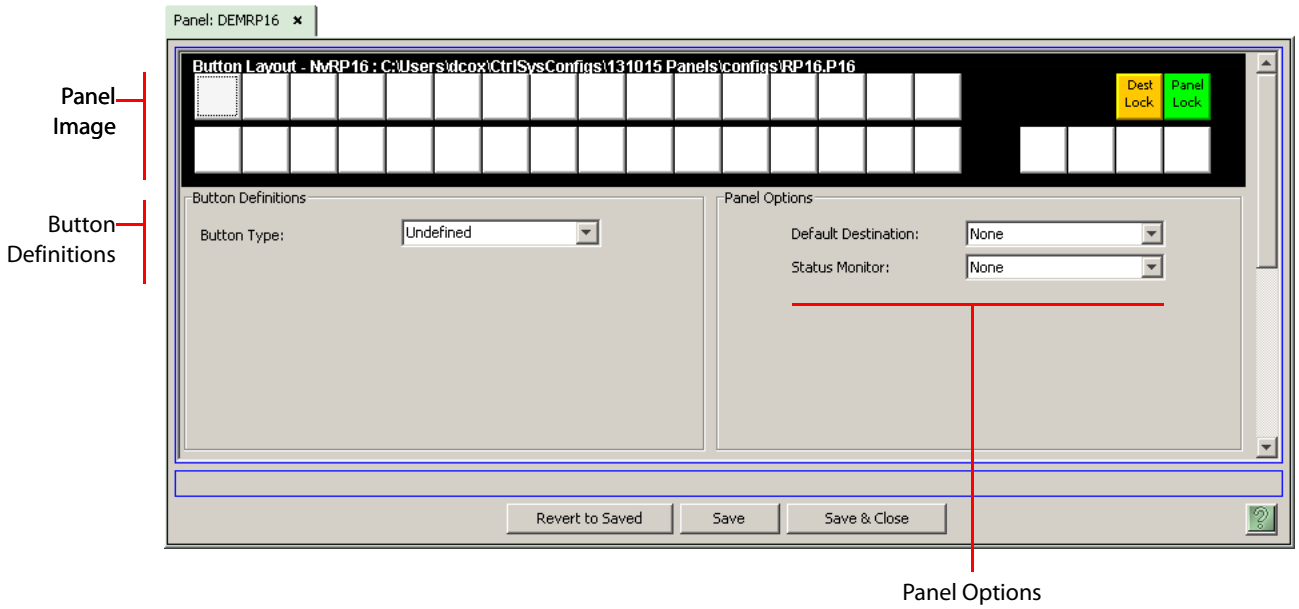
Fig. 8-4: RP16, Rear View

A remote panel module must have a CR series control panel attached to be usable. This is a view of the CP1616 (one of the control panels that can mount on the RP16):

RP16 Configuration Page

- Before you can configure the RP16 in NV9000-SE Utilities, you must use CRSC (the Compact Router System Configurator) to set it up for use in an NV9000 system. Use CRSC's 'Setup NV9000 Remote Panel' page to do so. See the *CRSC User's Guide for details*.

This is the "NVRP16" configuration page:



After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

There are 3 main regions:

- A graphic representation of the CP1616.

  On the left are 32 configurable buttons. On the right are 6 buttons, 2 of which have fixed assignment: 'Dest Lock' and 'Panel Lock'.

  Panel buttons are backlit buttons, not LCD buttons, and can be illuminated in green, amber, or red. There are 3 levels of illumination: high tally (bright), low tally (muted) and off.

- Button definitions.

  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definitions, following.

- Panel options.

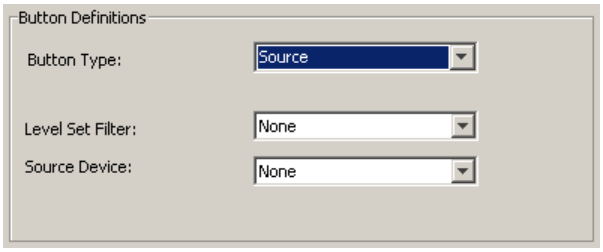
  In this section, configurers may specify the behavioral characteristics of the panel. There are two options:

  Default Destination: if you specify a default destination, the panel powers up with the default destination selected.

  Status monitor: the destination you select in this field is identified as that of the status monitor. (This is a monitor in the NV9000 system; it is not a feature of the RP16 itself.)

Button Definitions

The button definitions section has several controls that vary according to button type:



The controls vary according to the button type. There is one fixed field:

Button Type A pull-down menu where you may select a button type.

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

Button Types

These are the button types available for NVRP16 configurations:

Destination Level Salvo Source

▲ Note that other panels might have button types with the same names but that perform different functions.

RP32

Hardware Description

The RP32 (which is called NVRP32 in NV9000-SE Utilities) is not an NV9000 control panel. The RP32 is a "remote panel module" in the compact router series. The combination of an RP32 and a CR series panel (such as a CP3232) normally functions as a "remote panel" in a CRSC compact router system. However, a remote panel can also be used as an NV9000 control panel.

- The RP32 is the configurable part of the pairing.

The RP32 has no I/O connectors and no video reference connectors. Otherwise, the RP32 is the same size as, and resembles, a 2RU compact router.

These are illustrations of the RP32:

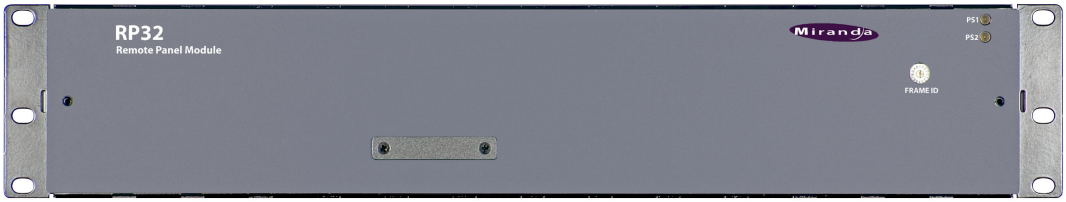


Fig. 8-5: RP32, Front View

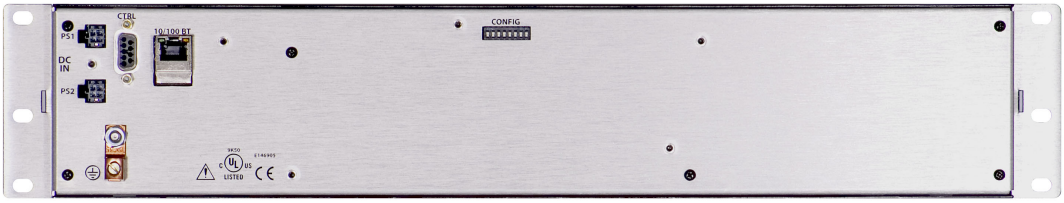


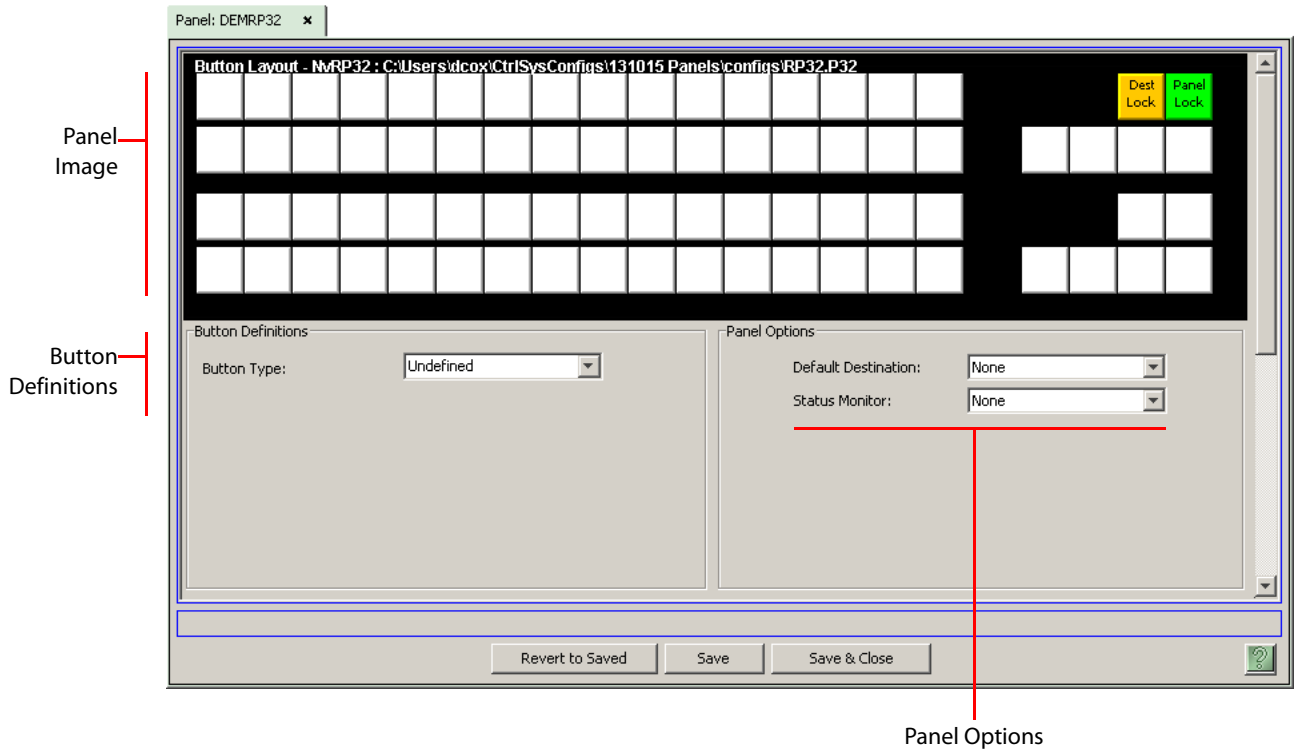
Fig. 8-6: RP32, Rear View

A remote panel module must have a CR series control panel attached to be usable. This is a view of the CP3232 (one of the control panels that can mount on the RP32):

RP32 Configuration Page

- Before you can configure the RP32 in NV9000-SE Utilities, you must use CRSC (the Compact Router System Configurator) to set it up for use in an NV9000 system. Use CRSC's 'Setup NV9000 Remote Panel' page to do so. See the *CRSC User's Guide for details*.

This is the "NVRP32" configuration page:



After you have configure the panel's buttons, and the panel options, the page will have changed, showing, in particular, the text of the buttons you have defined.

At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

Regions of the Configuration Page

There are 3 main regions:

- A graphic representation of the CP3232.

  On the left are 64 configurable buttons. On the right are 12 buttons, 2 of which have fixed assignment: 'Dest Lock' and 'Panel Lock'.

  Panel buttons are backlit buttons, not LCD buttons, and can be illuminated in green, amber, or red. There are 3 levels of illumination: high tally (bright), low tally (muted) and off.

- Button definitions.

  In this section, configurers make button assignments, using its pull-down menus and text fields. See Button Definitions, following.

- Panel options.

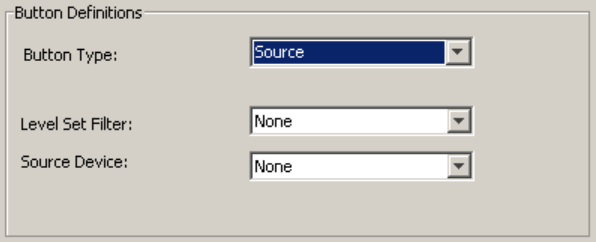
  In this section, configurers may specify the behavioral characteristics of the panel. There are two options:

  Default Destination: if you specify a default destination, the panel powers up with the default destination selected.

  Status monitor: the destination you select in this field is identified as that of the status monitor. (This is a monitor in the NV9000 system; it is not a feature of the RP32 itself.)

Button Definitions

The button definitions section has several controls that vary according to button type:



The controls vary according to the button type. One fixed field is button type:

Button TypeA pull-down menu where you may select a button type.

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

Button Types

These are the button types available for NVRP32 configurations:

Destination Level Salvo Source

▲ Note that other panels might have button types with the same names but that perform different functions.

EC9700

The EC9700 is a control GUI—a software application that emulates an NV9601 hardware panel and that runs on a PC. (It was designed to provide the same functions as the NV9601, even though it does not resemble the NV9601.)

Because it is software that runs on your PC, the EC9700 must be installed on your PC. (See Software Panels, on page 187 for installation instructions.) And because it runs on your PC, the NV9000 system must be able to communicate with your PC. Therefore, when you configure the EC9700 (and the EC9710) you must provide the computer name of the PC on which the software will run. (You can find the computer name of a PC by right-clicking the computer icon for the PC and choosing the 'Properties' command from the context menu that appears.)

You must create a separate EC9700 configuration for every PC that will run the EC9700 GUI.

The 'EC9700/EC9710' Page

The 'EC9700/EC9710' configuration page lists the software control panels defined in your configuration. At the bottom of this page are buttons that allow you to add and delete software control panels.

See EC9700/EC9710 Page, on page 209 for details.

The 'Add SW Panel' Page

The 'Add SW Panel' page is the page in which you start the addition of a software control panel. It is in this page that you specify the computer name of the PC on which the panel is to execute.

See 'Add SW Panel' Page, on page 211 for details.

The EC9700 GUI

The GUI has 5 possible tabbed pages (or views):

X-Y Multidest User Category Help Salvos

The tabbed pages have various "chevron" icons. Use these to navigate the lists that appear in the pages:

Go to the top of list (i.e., page or scroll up as far as it is possible to go).

Go to the bottom of list (i.e., page or scroll down as far as it is possible to go).

Page up (i.e., go up one "chunk" at a time).

Page down (i.e., go down one "chunk" at a time).

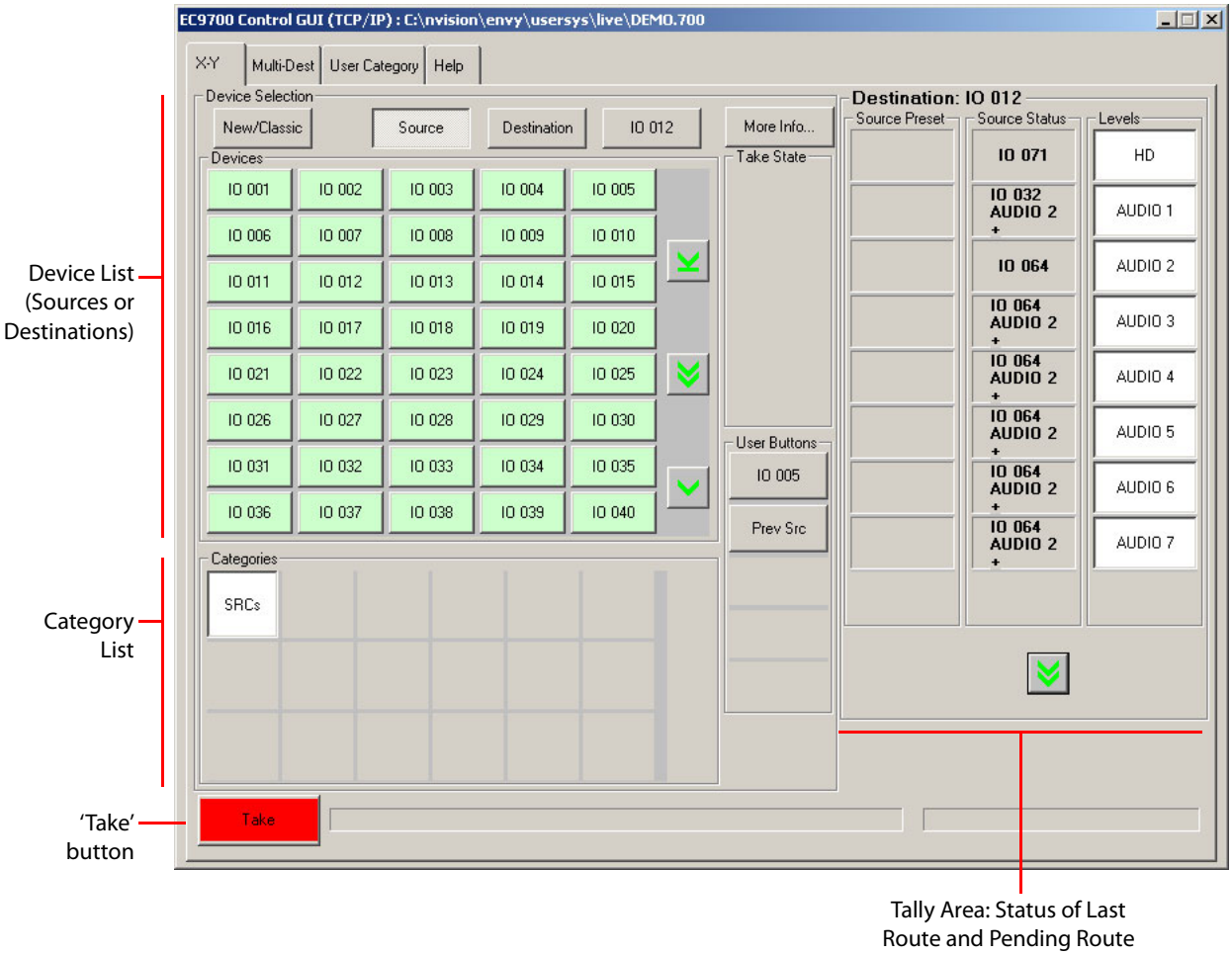
Scroll up (i.e., go up one line at a time).

Scroll down (i.e., go down one line at a time).

These icons appear when and where they can be used and disappear when there is no opportunity to use them. For instance, if you are viewing the entries at the very top of a list, the top-of-page, scroll up, and page up buttons will be hidden.

X-Y View

This is a typical X-Y view. This view is showing sources:



At the right side of the page is the tally area: 3 columns that give the status of the current route and any pending route.

The columns are called:

- Level

  This column identifies the levels of the currently selected destination.

- Source Status

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

  The status column represents either the levels of a source or the levels of multiple sources under breakaway.

- Source Preset

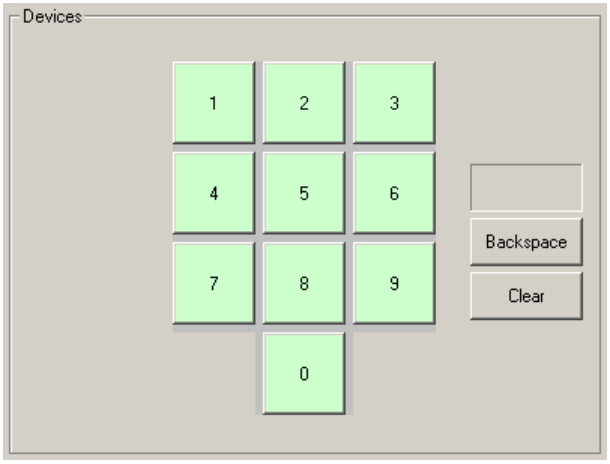
  The preset column indicates what source will be routed to a destination when the operator presses the 'Take' button.

  The preset column represents either the levels of a source or the levels of multiple sources under breakaway.

If necessary, use the available scroll button or buttons in this section to view status other levels.

In the device list section, click 'Source' to view a list of source devices or click 'Destination' to view a list of destinations.

Optionally, click the 'New/Classic' button to toggle between the list view (of devices) and the numeric keypad. This is the numeric keypad:



Use the keypad in conjunction with a selected category to perform category/index device selection.

Other Page Features

The 'More Info' button becomes enabled when the GUI gives an error message, a warning, or some other kind of message. Press 'More Info' to see the additional information.

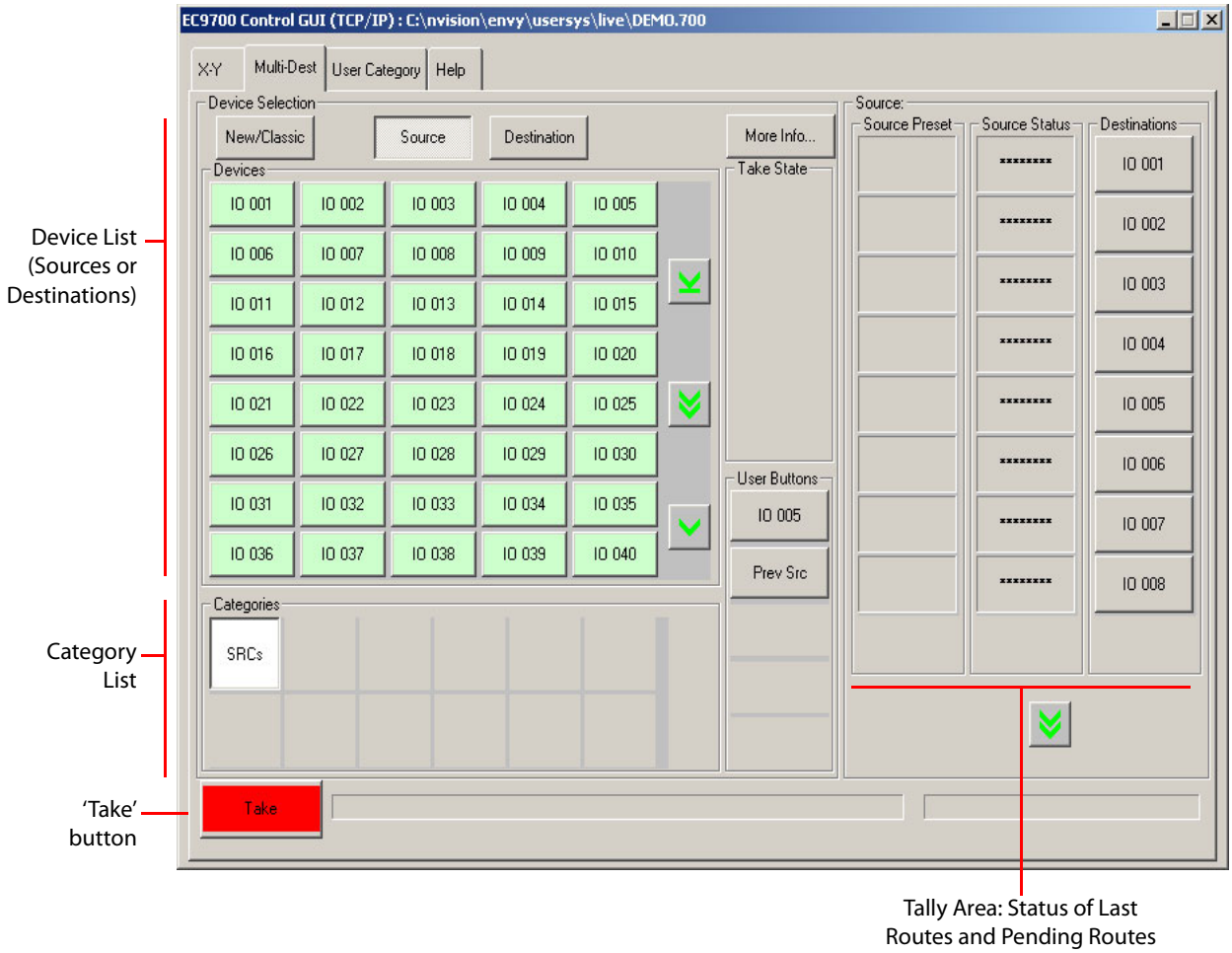
The 'Take State' section gives status messages that are issued when the operator performs takes. The messages are often failure messages. When a status message is displayed, the operator can press the 'More Info' button to see take status details.

All 5 'User' buttons are configurable. There is a small set of functions that can apply.

To perform a simple take, select a destination, select a source, and press the red 'Take' button.

'Multidest' View

This is a typical 'Multidest' view. This view is showing sources:



At the right side of the page is the tally area: 3 columns that give the status of the current routes and any pending routes. The columns are called:

- Destination

  The 'Destination' column presents all the MD destinations defined in the EC9700 configuration.

- Source Status

  The status column indicates what sources were routed to the destinations.

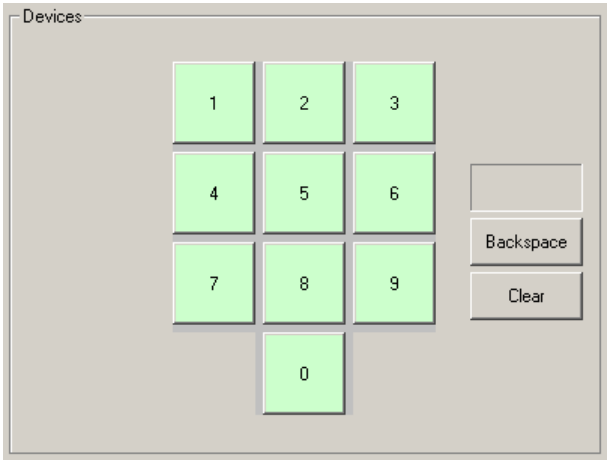
- Source Preset

  The preset column indicates what sources will be routed to selected destinations when the operator presses the 'Take' button.

If necessary, use the available scroll button or buttons in this section to view status other MD destinations.

In the device list section, click 'Source' to view a list of source devices or click 'Destination' to view a list of destinations.

Optionally, click the 'New/Classic' button to toggle between the list view (of devices) and the numeric keypad. This is the numeric keypad:



Use the keypad in conjunction with a selected category to perform category/index device selection.

Other Page Features

The 'More Info' button becomes enabled when the GUI gives an error message, a warning, or some other kind of message. Press 'More Info' to see the additional information.

The 'Take State' section gives status messages that are issued when the operator performs takes. The messages are often failure messages. When a status message is displayed, the operator can press the 'More Info' button to see take status details.

All 5 'User' buttons are configurable. There is a small set of functions that can apply.

‘User Category’ View

This is a typical ‘User Category’ view. This view is showing destinations:

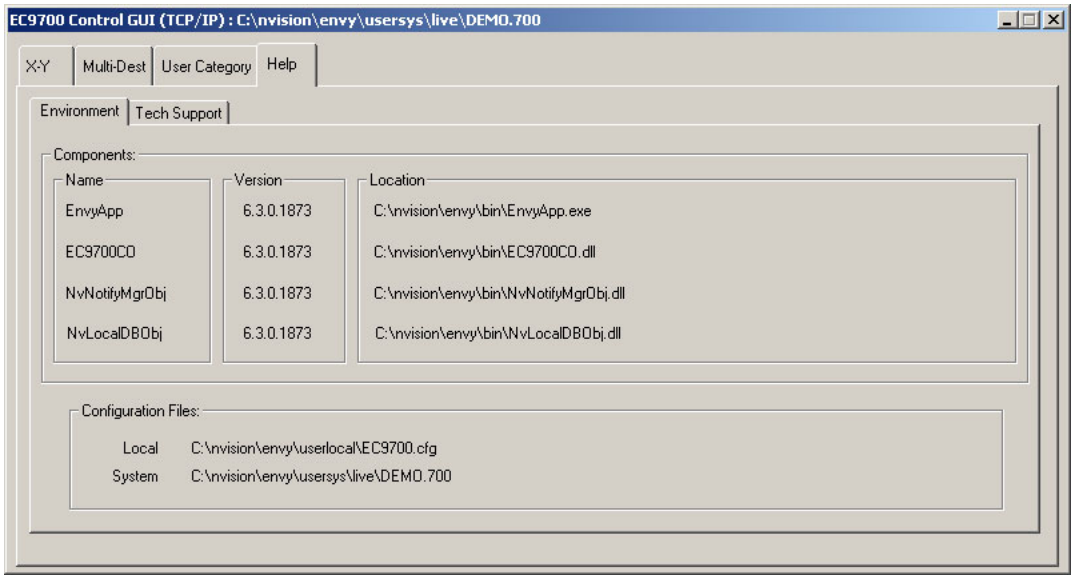
The ‘User Category’ view does not work, and never did.

‘Help’ View

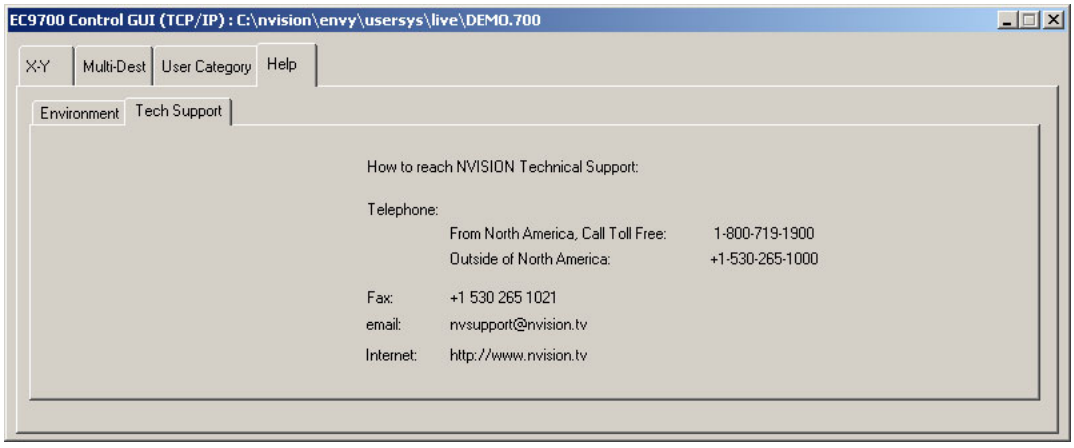
This is a typical ‘Help’ view. The ‘Help’ page has 2 sub-tabs:

- Environment
- Tech Support

This is the environment sub-tab:



This is the tech support sub-tab:

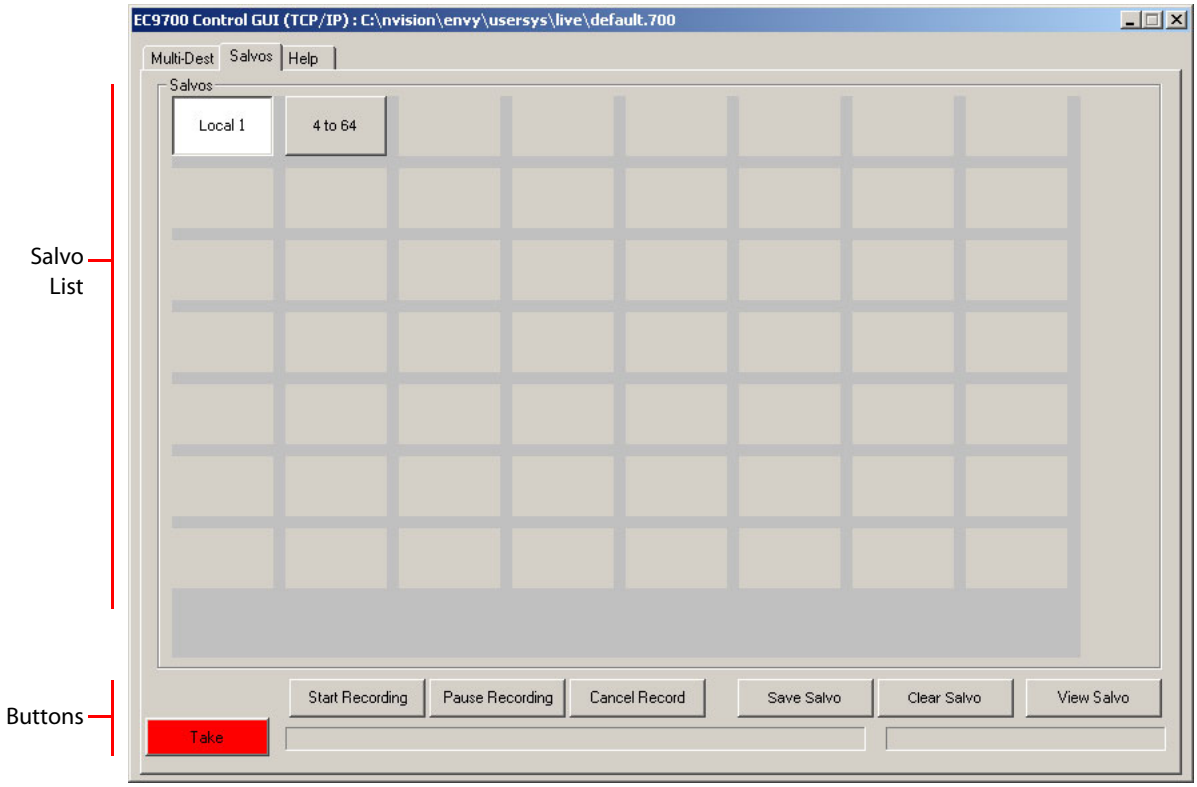


'Salvos' View

The 'Salvos' tab allows operators to select and execute salvos. and (2) to define (i.e., record) local salvos. There are two classes of salvos: system salvos, defined in the NV9000 configuration, and local salvos, defined at the panel.

For reference, see Salvos, on page 200.

This is the 'Salvos' tab:



The page lists all salvos (locally defined salvos and system salvos).

To execute a salvo, click the salvo in the display and then click the 'Take' button. The 'Take' button remains grayed out until you select a salvo.

There are 6 buttons in addition to the 'Take' button. Most of these support the creation of locally defined salvos (or "local salvos"):

- Start Recording

  Click this button to start recording a local salvo.

  ▲ But first click one of the local salvos listed on the page. It is this salvo to which you will record operations. The EC9700 configuration must have one or more local salvos defined for you to be able to record to a salvo.

  A local salvo is defined, by recording various panel operations, only for the panel at which it is recorded. After you click the 'Start Recording' button, you then begin performing source and destination selections, takes, and other operations in the sequence in which you want them to be performed in the salvo.

- Pause Recording

  Click this button to pause the recording of a local salvo.

  If you have paused a salvo recording, any operations you perform are not included in the salvo.

  If you press the 'Pause Recording' button, it becomes a 'Resume Recording' button.

- Cancel Record

  Click this button to cancel the recording of a local salvo.

- Save Salvo

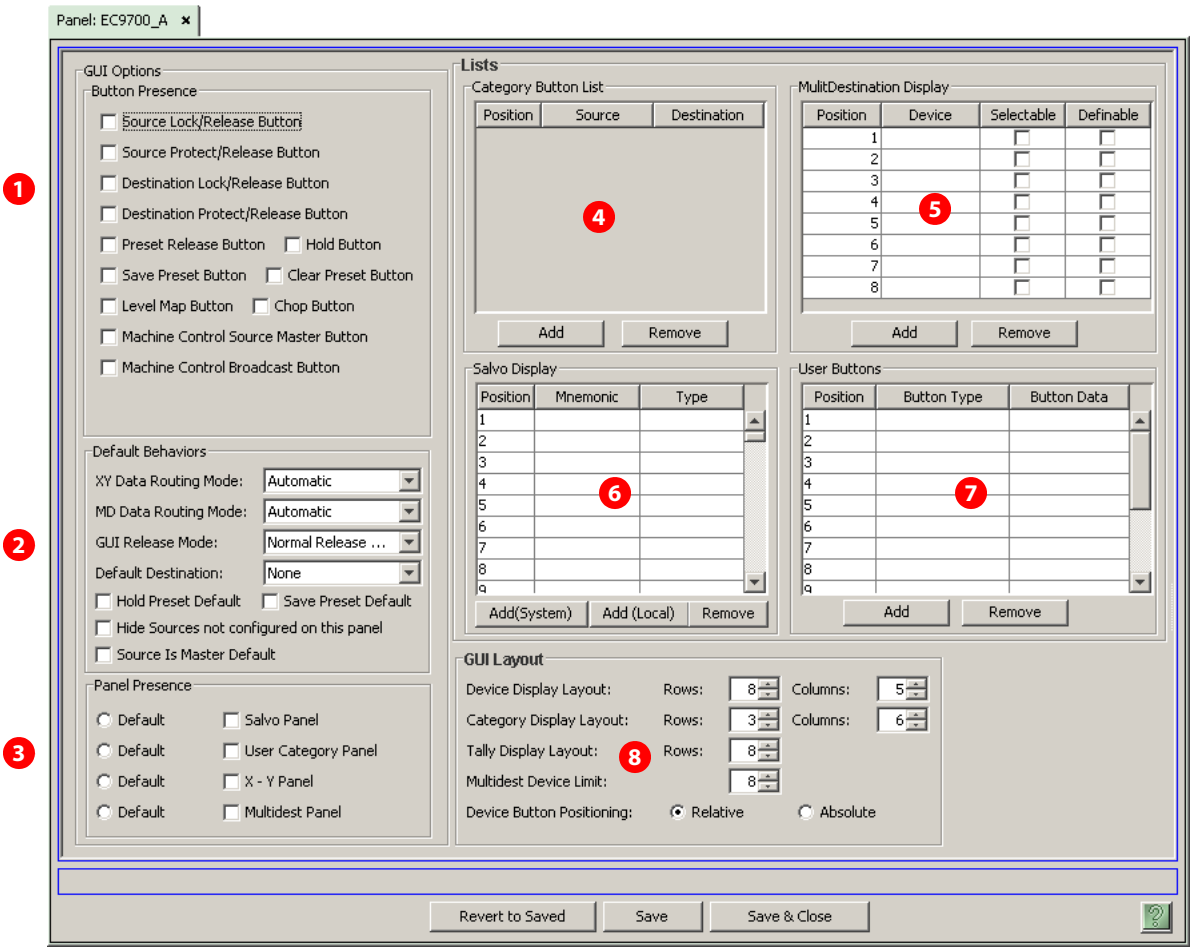
  Click this button to save the local salvo you have recorded.
- Clear Salvo

  Click this button to clear the salvo you have selected from the salvo list. Clearing a salvo is to remove all the commands from the salvo.
- View Salvo

  if you click this button, NV9000-SE Utilities displays the command sequence of the salvo you have selected from the salvo list.

EC9700 Configuration Page

This is the EC9700 configuration page:



At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

In addition to those buttons, the page has 8 main sections, identified by numbers above:

1 Button presence

The section lists 12 buttons that can be present in the GUI. Place checks in the check boxes for all the buttons you want to appear in the GUI.

A bug exists: The checkbox options do not persist past saving the GUI config.

2 Default behaviors

The options in this section are like the panel options in many of the hardware panel configuration pages. There is no *EC9700 User's Guide*. Therefore refer to the *NV9601 User's Guide* for information about these panel options.

3 Panel presence

There are 4 tabbed pages (called "panels") that can be present in the GUI, in addition to a 'Help' page:

Salvo User Category X-Y Multidest

Place a check in the checkbox of those "panels" you want to appear in the GUI.

Also choose which "panel" you want to be the default, that is, the "panel" that is foremost when the GUI starts.

4 Category button list

This section lists the category buttons that appear in the GUI.

5 Multi-destination display

In this table, you can specify which destination devices are included in the multi-destination device list.

See MD Destinations, on page 203, for information about the 'Selectable' and 'Definable' fields.

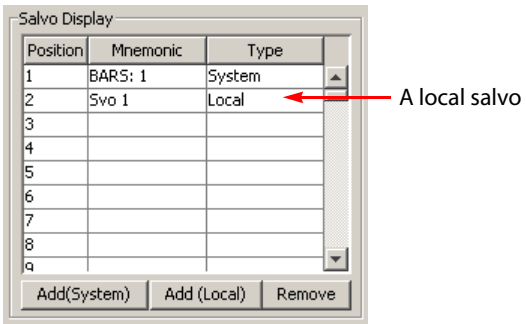
You must also specify the multi-destination device limit in the 'GUI layout' section.

6 Salvo display

This section lists salvos that the operator can execute.

The EC9700 can execute system salvos or local salvos. Salvos are defined in the NV9000 configuration. Local salvos are defined by operators who record sequences of operations while using the GUI.

For an operator to be able to define a local salvo, the EC9700 configuration must include one or more local salvos in this section. You can click the 'Add (Local)' button to do that:



See Salvos, on page 200.

7 User buttons

You can add function buttons to the GUI. There is a small set of buttons from which to choose.

Click in a 'Button Type' field to add a button. The 'Button Data' field might or might not contain data depending on the button type.

8 GUI layout

Here you specify the size of the various GUI elements. For instance, you can specify the number of rows and columns of the button matrix that represents source or destination devices.

If your GUI will have a set of multi-destination devices, you must specify the "multi-dest limit" in this section. The multi-dest limit is the number of multi-destination device entries that will appear in your GUI. Some or all of these entries can be blank. Operators, if allowed, can define, or redefine, certain entries.

EC9710

Because it is software that runs on your PC, the EC9700 must be installed on your PC. (See Software Panels, on page 187 for installation instructions.) And because it runs on your PC, the NV9000 system must be able to communicate with your PC. Therefore, when you configure the EC9700 (and the EC9710) you must provide the computer name of the PC on which the software will run. (You can find the computer name of a PC by right-clicking the computer icon for the PC and choosing the 'Properties' command from the context menu that appears.)

You must create a separate EC9710 configuration for every PC that will run the EC9710 GUI.

The 'EC9700/EC9710' Page

The 'EC9700/EC9710' configuration page lists the software control panels defined in your configuration. At the bottom of this page are buttons that allow you to add and delete software control panels.

See EC9700/EC9710 Page, on page 209 for details.

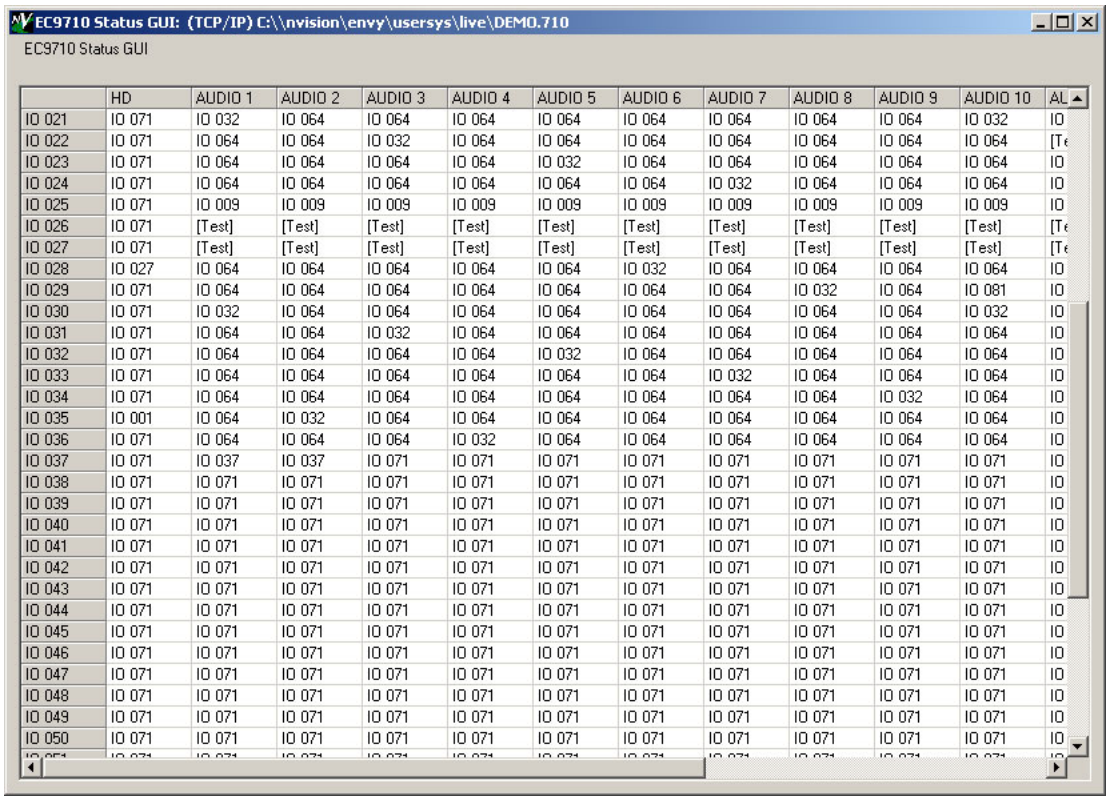
The 'Add SW Panel' Page

The 'Add SW Panel' page is the page in which you start the addition of a software control panel. It is in this page that you specify the computer name of the PC on which the panel is to execute.

See 'Add SW Panel' Page, on page 211 for details.

The EC9710 GUI

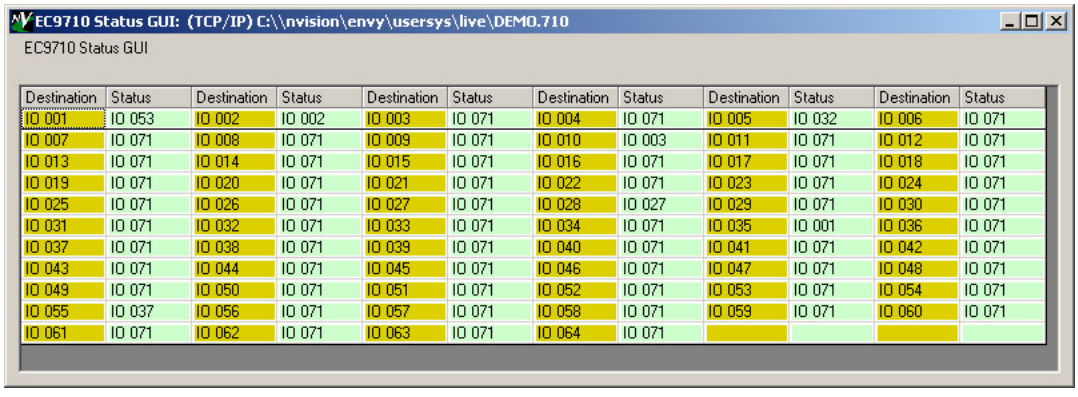
The EC9710 is a very simple status GUI. It has two configurable forms. The first form is a list of devices (which are specified in the GUI's configuration):



	HD	AUDIO 1	AUDIO 2	AUDIO 3	AUDIO 4	AUDIO 5	AUDIO 6	AUDIO 7	AUDIO 8	AUDIO 9	AUDIO 10	AL
IO 021	IO 071	IO 032	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 032	IO
IO 022	IO 071	IO 064	IO 064	IO 032	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	[Te
IO 023	IO 071	IO 064	IO 064	IO 064	IO 064	IO 032	IO 064	IO 064	IO 064	IO 064	IO 064	IO
IO 024	IO 071	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 032	IO 064	IO 064	IO 064	IO
IO 025	IO 071	IO 009	IO 009	IO 009	IO 009	IO 009	IO 009	IO 009	IO 009	IO 009	IO 009	IO
IO 026	IO 071	[Test]	[Test]	[Test]	[Test]	[Test]	[Test]	[Test]	[Test]	[Test]	[Test]	[Te
IO 027	IO 071	[Test]	[Test]	[Test]	[Test]	[Test]	[Test]	[Test]	[Test]	[Test]	[Test]	[Te
IO 028	IO 027	IO 064	IO 064	IO 064	IO 064	IO 064	IO 032	IO 064	IO 064	IO 064	IO 064	IO
IO 029	IO 071	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 032	IO 064	IO 081	IO
IO 030	IO 071	IO 032	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 032	IO
IO 031	IO 071	IO 064	IO 064	IO 032	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO
IO 032	IO 071	IO 064	IO 064	IO 064	IO 064	IO 032	IO 064	IO 064	IO 064	IO 064	IO 064	IO
IO 033	IO 071	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 032	IO 064	IO 064	IO 064	IO
IO 034	IO 071	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 032	IO 064	IO
IO 035	IO 001	IO 064	IO 032	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO
IO 036	IO 071	IO 064	IO 064	IO 064	IO 032	IO 064	IO 064	IO 064	IO 064	IO 064	IO 064	IO
IO 037	IO 071	IO 037	IO 037	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO
IO 038	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO
IO 039	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO
IO 040	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO
IO 041	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO
IO 042	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO
IO 043	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO
IO 044	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO
IO 045	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO
IO 046	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO
IO 047	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO
IO 048	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO
IO 049	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO
IO 050	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO 071	IO

The rows of the table are the destinations specified in the GUI's configuration. The columns in the table are the levels specified in the GUI's configuration.

The second form is also a list of devices, but shows just the source at the primary level for each destination:



Destination	Status	Destination	Status	Destination	Status	Destination	Status	Destination	Status	Destination	Status
IO 001	IO 053	IO 002	IO 002	IO 003	IO 071	IO 004	IO 071	IO 005	IO 032	IO 006	IO 071
IO 007	IO 071	IO 008	IO 071	IO 009	IO 071	IO 010	IO 003	IO 011	IO 071	IO 012	IO 071
IO 013	IO 071	IO 014	IO 071	IO 015	IO 071	IO 016	IO 071	IO 017	IO 071	IO 018	IO 071
IO 019	IO 071	IO 020	IO 071	IO 021	IO 071	IO 022	IO 071	IO 023	IO 071	IO 024	IO 071
IO 025	IO 071	IO 026	IO 071	IO 027	IO 071	IO 028	IO 027	IO 029	IO 071	IO 030	IO 071
IO 031	IO 071	IO 032	IO 071	IO 033	IO 071	IO 034	IO 071	IO 035	IO 001	IO 036	IO 071
IO 037	IO 071	IO 038	IO 071	IO 039	IO 071	IO 040	IO 071	IO 041	IO 071	IO 042	IO 071
IO 043	IO 071	IO 044	IO 071	IO 045	IO 071	IO 046	IO 071	IO 047	IO 071	IO 048	IO 071
IO 049	IO 071	IO 050	IO 071	IO 051	IO 071	IO 052	IO 071	IO 053	IO 071	IO 054	IO 071
IO 055	IO 037	IO 056	IO 071	IO 057	IO 071	IO 058	IO 071	IO 059	IO 071	IO 060	IO 071
IO 061	IO 071	IO 062	IO 071	IO 063	IO 071	IO 064	IO 071				

All the entries are pairs. The destination field is yellow; the source field is green.

The number of column pairs is a configuration parameter.

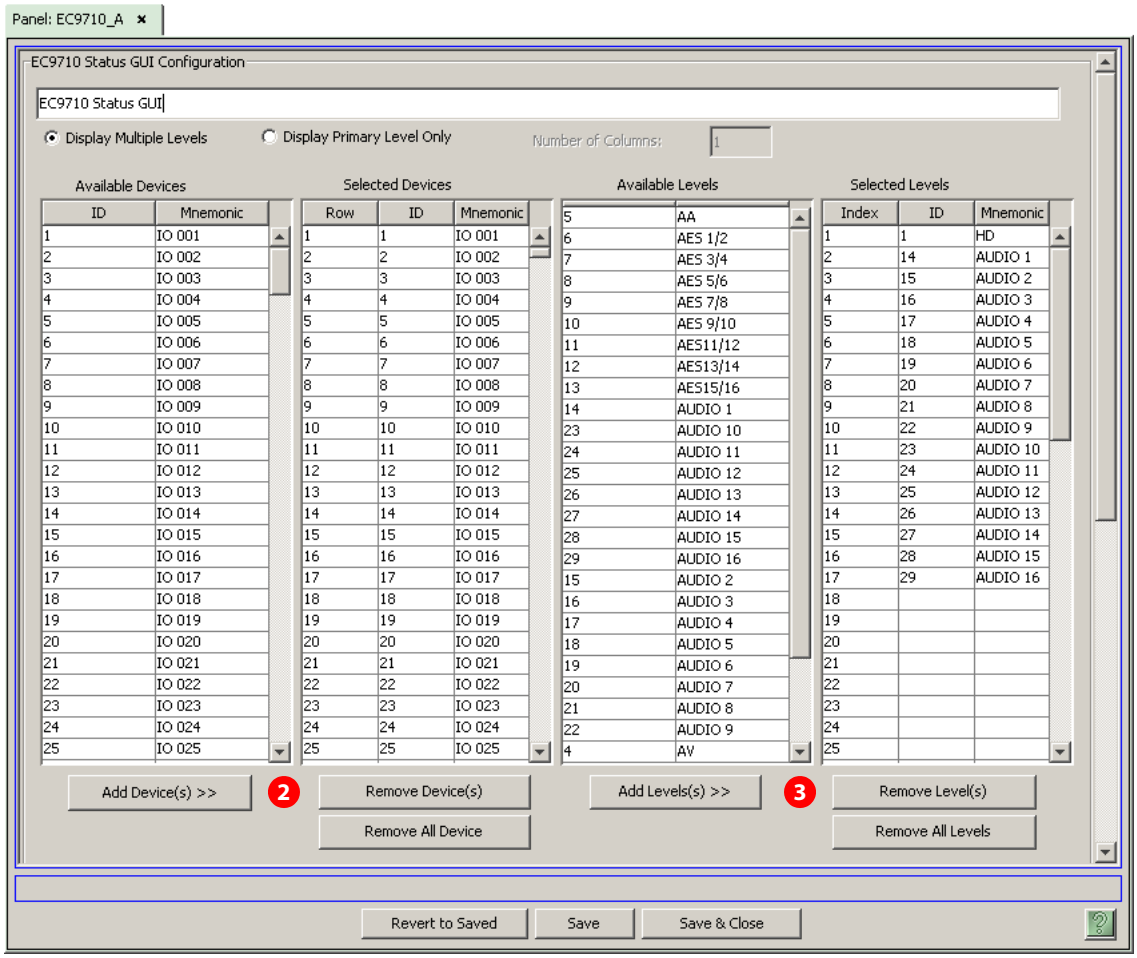
(The primary level is the first level in the level set to which a device belongs.)

EC9710 Configuration Page

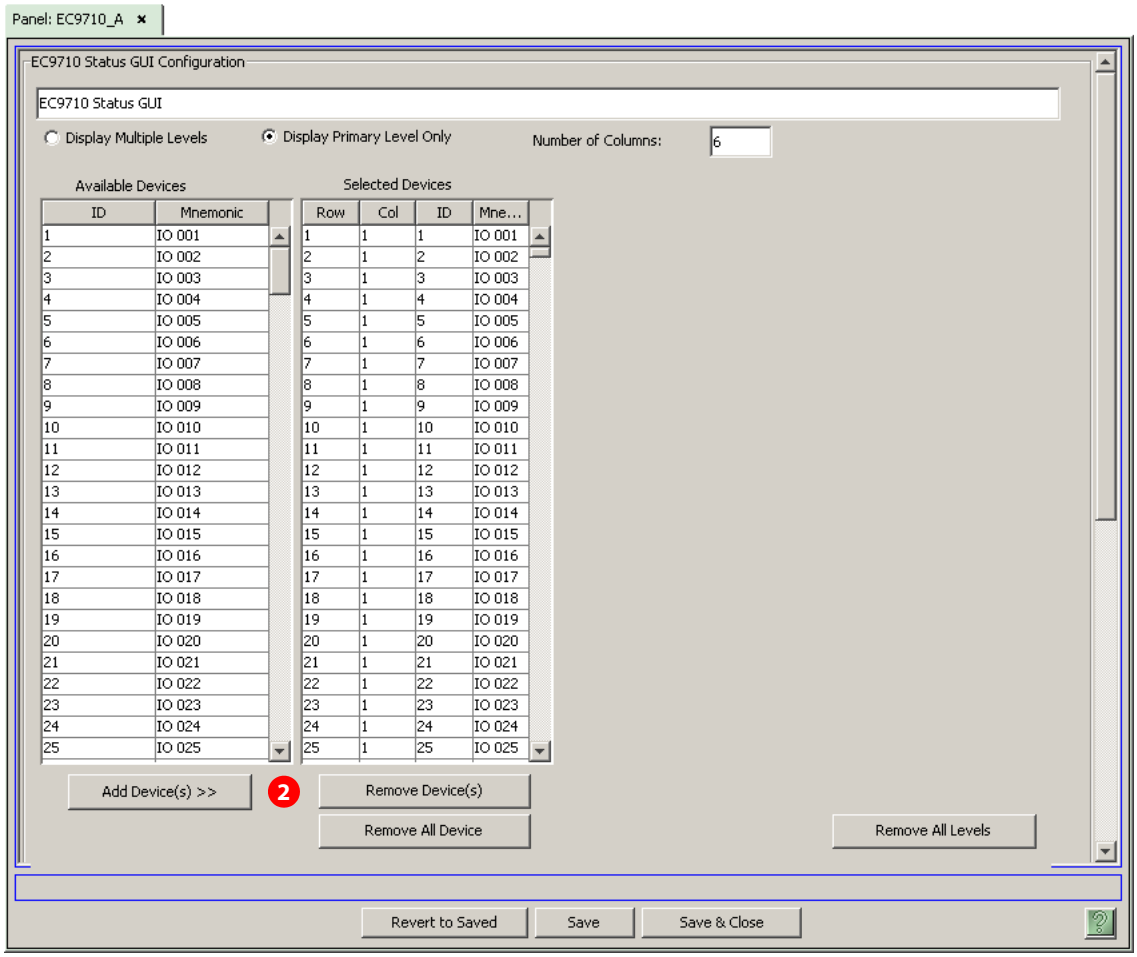
The EC9710 can be configured in two ways:

- As a multi-level display, where each row of the display is one (destination) device and the columns show the sources routed to the levels configured for the GUI.
- As a primary-level display, where each destination is paired with the source that is routed on its primary level. You can specify the number of pairs in each row.

This is the EC9710 configuration page, as it appears for the configuration of a multi-level display:



This is the EC9710 configuration page, as it appears for the configuration of a primary-level display:



At the bottom of the page are 3 important buttons: 'Revert to Saved', 'Save', and "Save & Close'. The 'Save' button commits modifications you have just made. The 'Revert to Saved' button restores the last saved version of the panel configuration, canceling any changes you just made. 'Save & Close' saves the panel configuration and dismisses the page.

In addition to those buttons, the page has 3 main sections, identified by numbers above:

1 GUI options

This is the section in which you choose the display type: multi-level or primary level. If you choose a primary level display, the 'Number of Columns' field becomes enabled. In this field, specify the number of destination-source pairs that will be displayed in a row of the display.

2 Device lists

The section has two lists and 3 buttons.

The list on the left shows available devices. The list on the right ('Selected Devices') shows the devices that the GUI will show when it is running.

Initially, the 'Selected Devices' list is empty. You can add devices to this list and remove devices from this list with the buttons of the section.

To add devices, select one or more devices in the list of available devices and click 'Add Device(s)'. To remove devices, select one or more devices in the 'Selected Devices' list and click 'Remove Device(s)'. To empty the list, click 'Remove All Devices'.

This section is present for both multi-level and primary-level displays.

- A software bug causes the 'Remove All Levels' button to remain for primary level displays. You can ignore it.

3 Level lists

This section governs the levels that are displayed when the GUI is multi-level. This section is absent from the configuration page when you have chosen a primary level display.

When it is present, the section has two lists and 3 buttons.

The list on the left shows available levels. The list on the right ('Selected Levels') shows the levels that the GUI will show when it is running. The columns of the display are ordered according to the ordering of the list you create.

Initially, the 'Selected Levels' list is empty. You can add levels to this list and remove levels from this list with the buttons of the section.

To add levels, select one or more levels in the list of available levels and click 'Add Level(s)'. To remove levels, select one or more levels in the 'Selected Levels' list and click 'Remove Level(s)'. To empty the list, click 'Remove All Levels'.

9 Master Control

Chapter 9 provides information about the 'Add Nvision Master Control' page available through the 'Tasks' pane.

Summary

Introduction *465*
'Add Nvision Master Control' Page *468*

Introduction

Integrating an NV5100 master control switcher with an NV9000 control system allows the NV9000 and associated systems (tally, automation, etc.) to monitor the state of the various buses and effects within the NV5100 switcher.

- NVISION NV5100MC and NV5128-MC master control systems are obsolete. Although these systems are no longer manufactured, there is limited support for them in the field.

An NV5100 master control switcher is a MCPM or an MCE, and is not the NV5100 frame containing MPCMs or MCEs.

Nevertheless, a master control switcher identified by your NV9000 configuration is treated as a router and included among the routers listed in the 'Routers' page and the 'Routers' table.

The NV9000 polls the NV5100 MCPM or MCE as it does a router, but the data returned is more extensive than simple crosspoint state. The MCPM or MCE is modeled as a 128-output router, with the following configuration parameters:

Level number = 1
Level size = up to 65535 inputs and up to 128 outputs (defaults to 128 inputs and 4 outputs)
Shared control = TRUE

These parameters are to be defined in the 'PhysLevels' table.

The outputs of the master control level are defined as follows:

Output	Description
1	Program video
2	Program audio — the input of AES channel 1 (input is the AES input number not the mono input number)
3	Preset video
4	Preset audio — the input of AES channel 1 (input is the AES input number not the mono input number)

Output	Description
5	Preview A video
6	Preview A audio — the input of AES channel 1 (input is the AES input number not the mono input number)
7	Preview B video
8	Preview B audio — the input of AES channel 1 (input is the AES input number not the mono input number)
9	Aux 1 video
11	Output 11 = Aux 2 Video
12–20	unassigned
21	PGM keyer 1 selected
22	PGM keyer 1 selection
23	PGM keyer 2 selected
24	PGM keyer 2 selection
25	PGM keyer 3 selected
26	PGM keyer 3 selection
27-30	unassigned
31	PST keyer 1 selected
32	PST keyer 1 selection
33	PST keyer 2 selected
34	PST keyer 2 selection
35	PST keyer 3 selected
36	PST keyer 3 selection
37–40	unassigned
41	PVW keyer 1 selected
42	PVW keyer 1 selection
43	PVW keyer 2 selected
44	PVW keyer 2 selection
45	PVW keyer 3 selected
46	PVW keyer 3 selection
47-50	unassigned
51	PGM logo A selected
52	PGM logo A selection
53	PGM logo B selected
54	PGM logo B selection
55-60	unassigned
61	PST logo A selected

Output	Description
62	PST logo A selection
63	PST logo B selected
64	PST logo B selection
65-70	unassigned
71	PVW logo A selected
72	PVW logo A selection
73	PVW logo B selected
74	PVW logo B selection
75-80	unassigned
81	PGM DVE selected
82	PGM DVE selection
83	PST DVE selected
84	PST DVE selection
85	PVW DVE selected
86	PVW DVE selection
87-90	unassigned
91	PGM over
92	PST over
93	PVW over
94-100	unassigned
101	PGM video status
102	PGM audio status
103	PST video status
104	PST audio status
105	PVW video status
106	PVW audio status
107-110	unassigned
111	Program video main source number
112	Program audio main source number
113	Preset video main source number
114	Preset audio main source number
115	Preview A video main source number
116	Preview A audio main source number
117	Preview B video main source number
118	Preview B audio main source number

Output	Description
119	Aux 1 video main source number
120	unassigned
121	Aux 2 video main source number

Note:

All crosspoints are reported as router inputs, not master control inputs.)

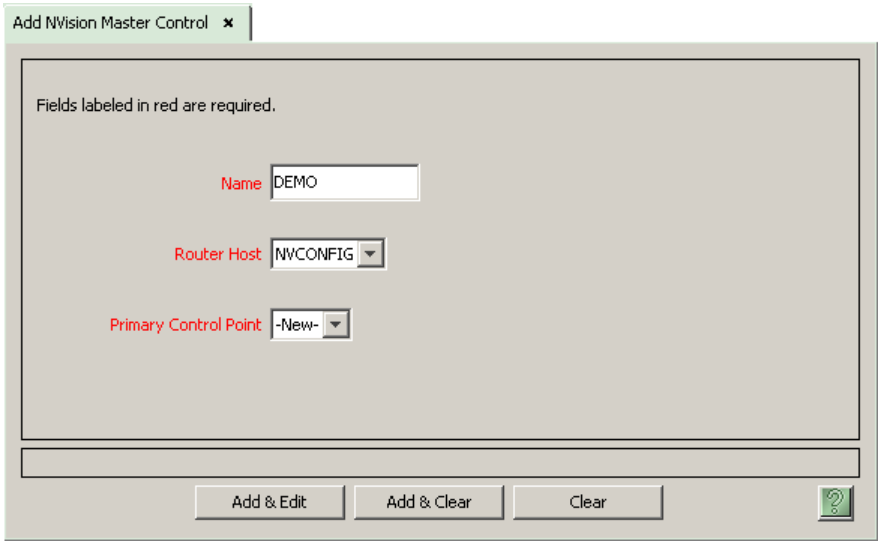
With reference to outputs 91–93, audio over status is reported as follows:

Value	Meaning
Input = 0	The over was not selected
Input > 0	The over selection number

Audio status and video status are reported using the same values as audio status and video status in NP0019-00.

'Add Nvision Master Control' Page

The 'Add Nvision Master Control' page adds the master control subsystem you name as a new router definition:



This page, as the start of a sequence, provides several fields that identify the basic properties of a master control subsystem, i.e., an MCPM or MCE:

- Name
- Router Host
- Primary Control Point

At the bottom of the page are buttons that help you add master control subsystems:

- Add & Edit
- Add & Clear
- Clear

The buttons are grayed out (disabled) until you provide a name for the master control subsystsem.

Name

Enter the name for the master control subsystsem (MCPM or MCE) in this field. The name of the router helps distinguish the master control subsystsem from routers within NV9000-SE Utilities. Router names and the name of the master control system do not mean very much otherwise.

Router Host

The 'Host' drop-down list provides a list of the hosts defined in your configuration.

A router's host is the system controller in an NV9000 system that controls the router. (There are potentially many controllers in the system.)

Choose the host you prefer from the drop-down menu. The default, and most frequently encountered, host is NVCONFIG.

To define hosts, use the 'Hosts' table of the 'Views' pane. See Hosts Table, on page 593.

Primary Control Point

A control point is a coded description of the connection between the system controller (the host) and the master control subsystsem.

The 'Primary Control Point' field is a drop-down list. The only choice in the drop-down list is '-New-'.

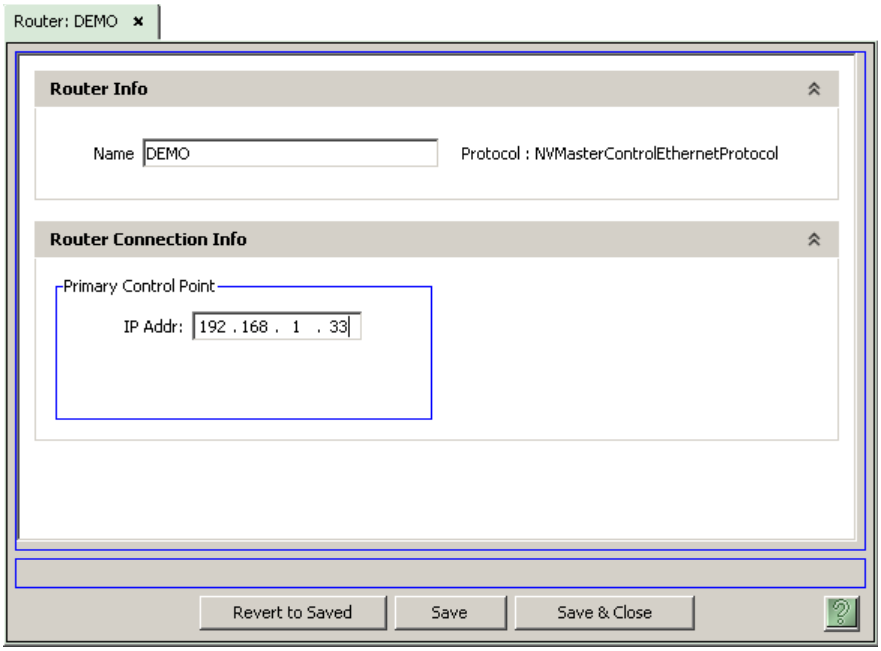
- If you want to review the existing control points in your configuration, go to the 'Control Points' table under the 'Views' pane.

The MCPM or MCE's control point is an Ethernet port, but you cannot specify the control point until you click 'Add & Edit' and the master control details page appears.

Buttons

‘Add & Edit’ Button

Click ‘Add & Edit’ button to go to the master control details page. In this page, you can specify the IP address of the MCPM or MCE. (The IP address is its control point):



(The master control system’s protocol is always ‘NVMasterControlEthernetProtocol’.

There are no fields in which to enter level or “crosspoint” information.

‘Add & Clear’ Button

Click ‘Add & Clear’ to accept the master control system and clear the ‘Add Nvision Master Control’ page.

The master control system definition, as defined in the ‘Add Nvision Master Control’ page is incomplete. You must later go to the ‘PhysLevels’ table to specify the number of inputs and outputs and to enable shared control.

This button allows you to create a number of master control definitions rapidly and complete them later.

‘Clear’ Button

Click ‘Clear’ if you want to terminate the master control system definition you started.

When you click ‘Clear’, the ‘Add Nvision Master Control’ page re-initializes for another entry.

10 External Interfaces

Chapter 10 provides information about NV9000-SE Utilities's external interface pages.

Summary

Introduction *471*
'External Interfaces' page *471*
'Add External Interface' page *473*
External Interface Details Page *477*
Apps Table *479*

Introduction

External interfaces are licensed NV9000 software components that can be purchased and added to your NV9000 system controller.

An external interface provides a link between the NV9000 system controller and a third-party control system. The system controller can control the third-party system or the third-party system can control the NV9000. In some cases, the control can flow in both directions.

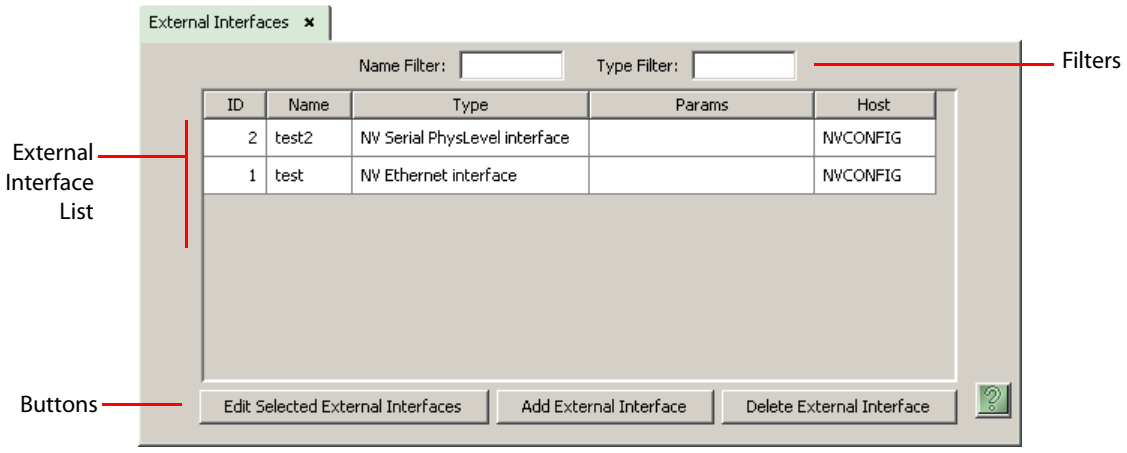
There are three pages in NV9000-SE Utilities that concern external interfaces:

- 'External Interfaces' page, accessed through the 'Configuration' pane.
- 'Add External Interface' page, accessed through the 'Tasks' pane.
- 'Apps' table, accessed through the 'Views' pane.

'External Interfaces' page

The 'External Interfaces' page (under the 'Configuration' pane) lists all external interface definitions identified in your system. You can add, delete, or edit external interfaces using this page.

This is a typical 'External Interfaces' page:



There are 3 sections in the page:

- Filter
- External Interface List
- Butt ns

Filter

At the top of the page are two filters:

- Name filter:

  If you enter text in this field, the list of interfaces is restricted to those interfaces whose names contain the text you entered.
- Type filter:

  If you enter text in this field, the list of interfaces is restricted to those interfaces whose type fields contain the text you entered.

External Interface List

The interface list has 5 columns:

- ID. These are the database IDs of the different external interface definitions.
- Name. These are the names of the external interface definitions.
- Type. These are the types of the external interface definitions.

  When you create an external interface definition, you may select one of 8 protocols. The interface type is identified by its protocol. See 'Add External Interface' page, on page 473 for information regarding the protocols.
- Params. These are the parameters of the external interface definitions.

  Some external interfaces require parameters.
- Host. These identify the host of the external interface definition.

You can use click, shift-click, and control-click techniques to select any of the external interfaces in the list.

Buttons

'Edit Selected External Interfaces' Button

This button opens an external interface details page for each of the external interfaces you have selected in the list. It is in the external interface details page that you can configure the communication port (either serial or Ethernet) of the interface.

See External Interface Details Page, on page 477.

'Add External Interface' Button

This button causes NV9000-SE Utilities to display the 'Add External Interface' page. The 'Add External Interface' page starts an external interface definition.

See 'Add External Interface' page, following.

'Delete External Interface' Button

This button deletes all the external interfaces you have selected in the list.

NV9000-SE Utilities presents a warning dialog before it deletes the external interfaces:

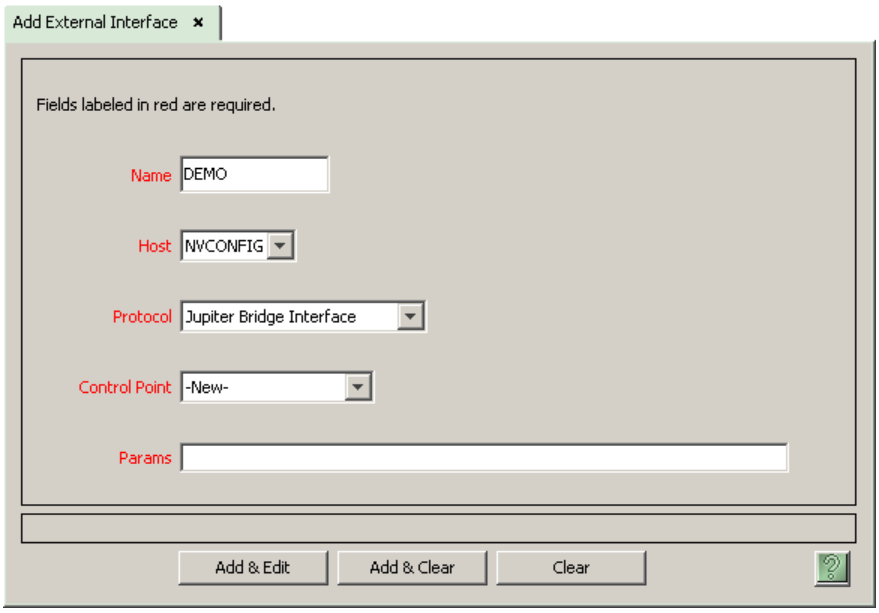
There is no undo: after the external interfaces are deleted, you cannot retrieve them.

'Add External Interface' page

The 'Add External Interface' page starts a sequence of steps, in multiple pages, in which you create a new external interface definition. There are two ways to get the 'Add External Interface' page:

- Click the 'Add External Interface' button at the bottom of the 'External Interfaces' page (of the 'Configuration' pane).
- Click 'Add External Interface' in the 'Tasks' pane.

This is the 'Add External Interface' page:



This page, as the start of a sequence, provides several fields that identify the basic properties of an external interface:

- Name
- Host
- Protocol
- Control Point
- Params

At the bottom of the page are buttons that allow you to move through the sequence of steps in external interface definition:

- Previous
- Next
- Finish
- Cancel

The buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

Name

Enter the name for the external interface definition in this field. The name of the external interface definition helps distinguish one external interface definition from another within NV9000-SE Utilities. External interface names do not mean very much otherwise.

Host

The 'Host' drop-down list provides a list of the hosts defined in your configuration.

An external interface's host is the system controller in which the external interface runs. (There are potentially many controllers in the system.)

Choose the host you prefer from the drop-down menu. The default, and most frequently encountered, host is NVCONFIG.

To define hosts, use the 'Hosts' table of the 'Views' pane. See Hosts Table, on page 593.

Protocol

The 'Protocol' drop-down list provides a list of the external interface protocols from which you can choose. A protocol is the medium or "language" in which the system controller (the host) interacts with the other system.

There are 8 protocols included in the list:

ESbus PhysLevel interface	Jupiter Bridge interface
Marshall IMD interface	NV Ethernet interface
NV Serial PhysLevel interface	NV9000 Panel server
NV9000 Tieline server	Probel PhysLevel interface

Some of the these entries are not useful. There are also external interfaces (e.g. the SMS7000 interface which is implemented as a service) that are not in the list.

Choose the protocol, from the drop-down list, that applies to the third-party system. The protocol you choose might require some level of support from Grass Valley technical personnel.

- The NV9000 Panel server and the NV Tieline server are services and are not external interface protocols. It is harmless, but not useful, to select one of these as a protocol.

The default interface protocol is 'NV Ethernet'.

Control Point

A control point is a coded description of the connection between the system controller (the host) and the router. There are two types of connections and therefore two types of control points: Ethernet and serial.

The interface type depends on the protocol you selected.

There is one control point field — a drop-down list — in the page. The drop-down list might include a small list of control point values, either serial or Ethernet.

The default choice in the drop-down list is '-New-'. This particular choice means that you intend to define the control point in the external interface details page, which is the next page in the external interface definition sequence. Sometimes '-New-' is the only choice in the list.

- If you want to review the existing control points in your configuration, go to the 'Control Points' table under the 'Views' pane.

Serial control points are expressed as a text string beginning with S and containing several fields, separated by commas. Simple Ethernet control points are expressed as a text string beginning with E, followed by a comma, followed by an IP address. This is a sampling:

Parameters	Description
S,5,38400,N81	COM5 P0 NVCONFIG
S,6,38400,N81	COM6 P1 NVCONFIG
S,7,38400,N81	COM7 P2 NVCONFIG
S,8,38400,N81	COM8 P3 NVCONFIG
S,9,38400,N81	COM9 P4 NVCONFIG
S,10,38400,N81	COM10 P5 NVCONFIG
S,11,38400,N81	COM11 P6 NVCONFIG
S,12,38400,N81	COM12 P7 NVCONFIG
E,192.168.1.25	Enet Addr 192.168.1.25 DEFAULT DESC
E,192.168.104.172	Enet Addr 192.168.104.172 DEFAULT DESC
E,192.168.104.246	Enet Addr 192.168.104.246 DEFAULT DESC
E,192.168.1.16	Enet Addr 192.168.1.16 DEFAULT DESC

These are the parts of the serial encoding, from left to right:

- The COM port number.
- The Baud rate.
- The communication parameters.

  This is a 3-character term. The first character is the number of parity bits. “N” means no parity bit. The second character is the number of data bits. Normally this is 8. The third character is the number of stop bits. Normally this is 1.

  The default for most serial ports is “N81.”

For simple Ethernet encoding, only an IP address is required. Some routers require additional fields (“control point modifiers”) for which both syntax and meaning depend on the actual hardware supported through the control point.

Params

The control point for certain kinds of interfaces can accept parameters. You can express the parameters for an interface in this field if you know the parameter or parameters.

‘Previous’ Button

Click the ‘Previous’ button if you want to go to the previous page in the external interface definition sequence.

‘Next’ Button

Click ‘Next’ to go to the external interface details page. In this page, you can enter control point data.

'Finish' Button

Click 'Finish' to accept the external interface thus far defined in the 'Add External Interface' page.

The external interface definition, as defined in the 'Add External Interface' page is incomplete. You must later go to the External Interface Details Page to complete the definition.

This button allows you to create a number of external interface definitions rapidly and complete them later.

After you click 'Finish', the 'Add External Interface' page remains and is re-initialized for additional entries.

'Cancel' Button

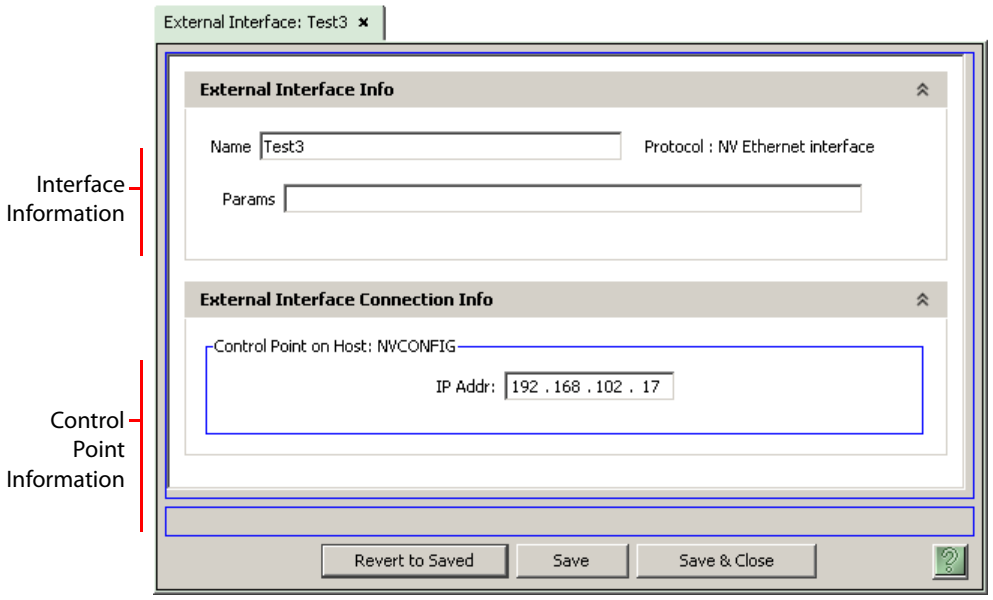
Click 'Cancel' if you want to terminate the external interface definition you started.

When you click 'Cancel', the 'Add External Interface' page re-initializes for another entry.

External Interface Details Page

The external interface details page is not called "external interface details" in NV9000-SE Utilities. An external interface details page appears either when you select an external interface for editing in the 'External Interface' page, when you click 'Next' in the 'Add External Interface' page, or when you click 'Edit' in the 'Apps Table' page.

This is a typical external interface details page:



The external interface details page has 2 main collapsible sections:

- Interface information
- Control point information

The sections are identified by a gray bar across the page. At the right end of each gray bar is a chevron. Click the chevron to collapse or expand the section. The chevron points up or down in context, depending on whether the section is collapsed or not:

At the bottom of the page are 3 simple buttons:

- Save

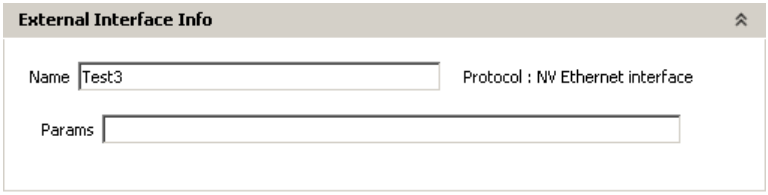
  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the external interface definition, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Interface Information

This section presents the name and protocol of the external interface definition:

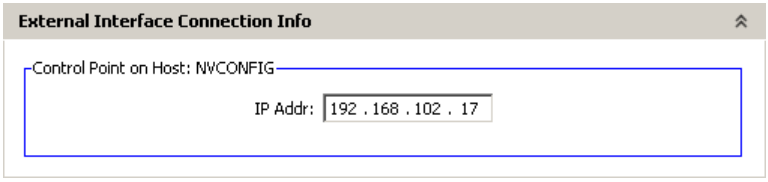


You can edit the external interface definition's name here but you cannot change the protocol in this section. For that you must use the 'Apps' table under the 'Views' pane.

You can also edit any parameters that apply to the interface.

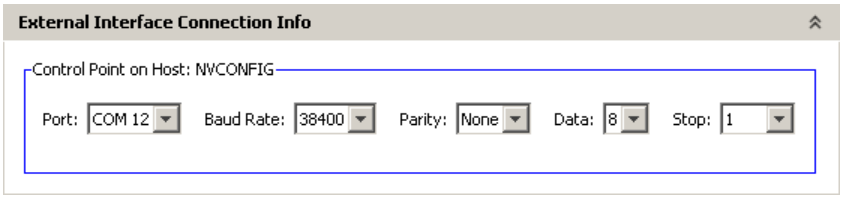
Control Point Information

This section presents the external interface definition's control point:



it is here that you define the external interface's control point.

Two kinds of control points exist: serial and Ethernet. For an Ethernet control point, the Ethernet address, as shown above, is the only entry in the section. For serial control points, there are more options:



The serial port is a port of the system controller. The NV960 allows many serial ports, depending on its hardware options. The NV920 does not provide serial ports.

These are the parts of the serial encoding, from left to right:

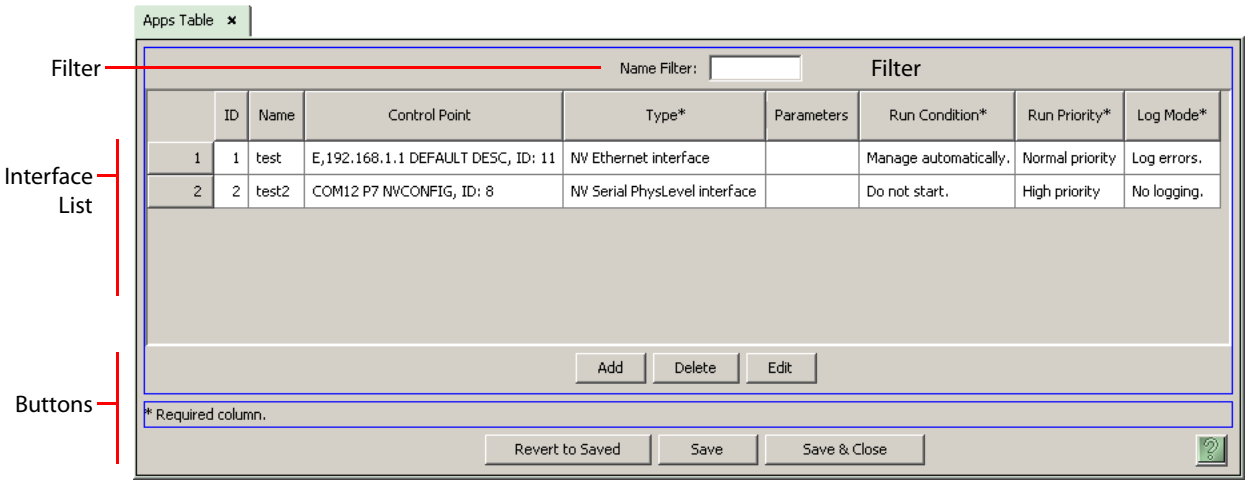
- The COM port.
- The Baud rate.
- The communication parameters.

  These include the number of parity bits, data bits, and stop bits. The default for most serial ports is "N81"—no parity, 8 data bits, and 1 stop bit.

For simple Ethernet encoding, only an IP address is required. Some routers require additional fields ("control point modifiers") for which both syntax and meaning depend on the actual hardware supported through the control point.

Apps Table

Click 'Apps' in the 'Tables' portion of the 'Views' pane to show the 'Apps' table:



This page provides a list of the external interfaces defined in your NV9000 configuration, quite similar to the 'External Interfaces' page under the 'Configuration' pane.

At the top of the page is a name filter. If you enter text in this field, the list of interfaces is restricted to those interfaces whose name fields contain the text you entered.

At the bottom of the page are 6 buttons:

- Add

  Click 'Add' to add an external interface to the table. NV9000-SE Utilities creates a new row at the bottom of the router list in which you can enter a name for the interface and provide other pertinent data.

  (The ID is generated by NV9000-SE Utilities.)

  Although we do not recommend it, you can have duplicate interface names because it is the database ID that distinguishes one interface from another.

- Delete

  Select one or more rows in the 'Apps' table and click 'Delete' to remove those interfaces from the table.

  NV9000-SE Utilities deletes the interface entries immediately without any warning dialog.

- Edit

  Select one or more rows in the 'Apps' table and click 'Edit' to open an external interface details page for each of the selected interfaces.

  See External Interface Details Page, on page 477 for details.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

  Click 'Revert to Saved' to restore the saved list of interface definitions, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

11 Salvos

Chapter 11 provides information about salvos, salvo construction, and the pages of NV9000-SE Utilities that support salvos.

Summary

Introduction *481*
Salvos Page *482*
'Add Salvos' Page *483*
Salvo Editing Page *486*
Salvos Table *497*
Salvo Lists Table *498*
Salvo List Details Table *499*

Introduction

A salvo is a sequence of NV9000 commands that can be stored and then executed at any time.

When a panel operator presses a salvo button, the sequence of commands of the salvo executes rapidly. The duration of a salvo is indeterminate, but typically very short.

Salvos are useful if you want to encapsulate frequently repeated command sequences. They are essential if you want to be able to change the state of your router control system rapidly and with some degree of automation.

There are two types of salvos:

- System salvos — System salvos are defined in NV9000-SE Utilities using salvo configuration pages. They are available to all control panels and all users.
- Local salvos — Local salvos are ***not*** defined in NV9000-SE Utilities, but are programmed by a panel operator and are available only to that specific control panel. The operator programs a local salvo by recording operations performed at the panel.

NV9000-SE Utilities supports the concept of salvo lists. Some control panels (NV9603A, NV9609) allow operators to select salvos only from a salvo list. Salvo lists exist to present panel operators with a subset of the salvos present in the configuration — presumably to make the selection of salvos easier. Any number of salvo lists can be defined in NV9000-SE Utilities. However, a panel configuration can use only one of the defined lists (without being reconfigured).

The configuration of local salvos depends on the control panel that supports local salvos. These are the NV9601, NV9608, and NV9616. Please refer to the panels' user guide for details.

The rest of this chapter discusses only system salvos.

Configuration Pages and Tables

There is one page under the 'Configuration' pane for salvos:

- Salvos Page

There is one page under the 'Tasks' pane:

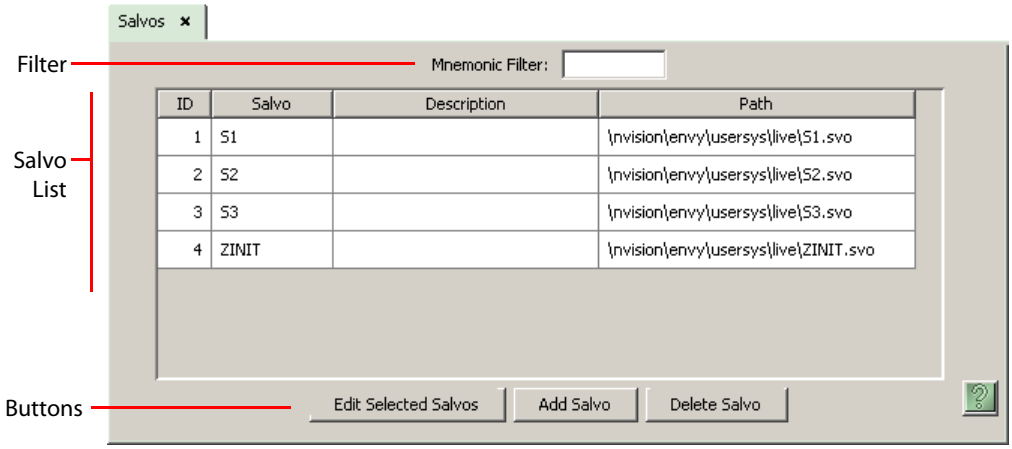
- 'Add Salvos' Page

These are the tables under the 'Views' pane:

- Salvos Table
- Salvo Lists Table
- Salvo List Details Table

Salvos Page

The 'Salvos' page (under the 'Configuration' pane) lists all system salvos you have defined in your configuration. This is a typical 'Salvos' page:



There are 3 sections in the page:

- *Filter*
- *Salvo List*
- *Buttons*

Filter

At the top of the page is a 'Mnemonic' filter: if you enter text in this field, the list of salvos is restricted to those salvos whose names contain the text you entered.

Salvo List

The salvo list has 4 columns:

- ID. These are the database IDs of the salvos.
- Salvo. These are the names of the salvos.
- Description. Descriptions of the salvos are optional and free-format.
- Path. These are the pathnames of the salvo files in the NV9000 system controller's file system.

You can use click, shift-click, and control-click techniques to select any of the salvos in the list.

Buttons

'Edit Selected Salvos' Button

This button opens one or more salvo editing pages — one for each of the salvos you have selected in the salvo list. It is in a salvo editing page that you specify the sequence of commands in a salvo.

See Salvo Editing Page, on page 486.

'Add Salvo' Button

This button causes NV9000-SE Utilities to display the 'Add Salvo' page. The 'Add Salvo' page starts a salvo definition.

See 'Add Salvos' Page, on page 483.

'Delete Salvo' Button

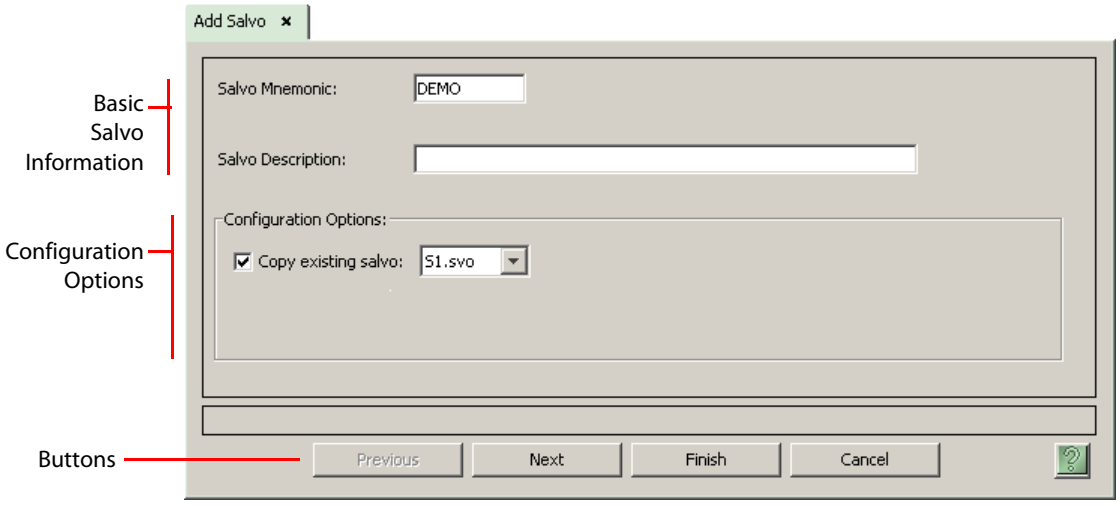
This button deletes all the salvos you have selected in the salvo list without warning. There is no undo: after the salvos are deleted, you cannot retrieve them.

'Add Salvos' Page

The 'Add Salvo' page starts a series of steps, in multiple pages, in which you create a new salvo. There are two ways to get the 'Add Salvo' page:

- Click the 'Add Salvo' button at the bottom of the 'Salvos' page (of the 'Configuration' pane).
- Click 'Add Salvo' in the 'Tasks' pane.

This is a sample of the page:



This page, as the start of a series, has 2 main sections, in addition to the buttons at the bottom:

- Basic Information. In this sections, you name the salvo and optionally provide a description.
- Configuration Options. In this section, you specify whether the salvo you are creating is new or a copy of an existing salvo.

Buttons

At the bottom of the page are 4 buttons that allow you to move through the sequence of steps in salvo definition:

- Previous
- Next
- Finish
- Cancel

The buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

'Previous' Button

Click the 'Previous' button if you want to go to the previous page in the salvo definition sequence.

'Next' Button

Click 'Next' to go to the salvo editing page. In this page, you specify the sequence of commands in the salvo.

'Finish' Button

Click 'Finish' to accept the salvo thus far defined in the 'Add Salvo' page.

The salvo definition, as specified in the 'Add Salvo' page is incomplete. You must later go to the salvo editing page to edit the salvo.

This button allows you to create a number of salvo definitions rapidly and complete them later.

After you click 'Finish', the 'Add Salvo' page remains and is re-initialized for additional entries.

'Cancel' Button

Click 'Cancel' if you want to terminate the salvo definition you started.

When you click 'Cancel', the 'Add Salvo' page re-initializes for another entry.

Basic Information

There are 2 fields in the basic information section:

These are the basic information fields:

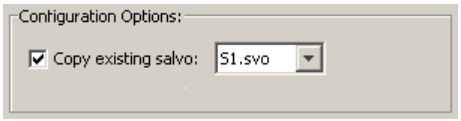
- Mnemonic

  Enter a name for the salvo in the 'Mnemonic' field. The name appears to operators on their panels when they are selecting a salvo for execution.
- Description

  Enter any description that is useful to your configuration.

Configuration Options

There is one configuration option:



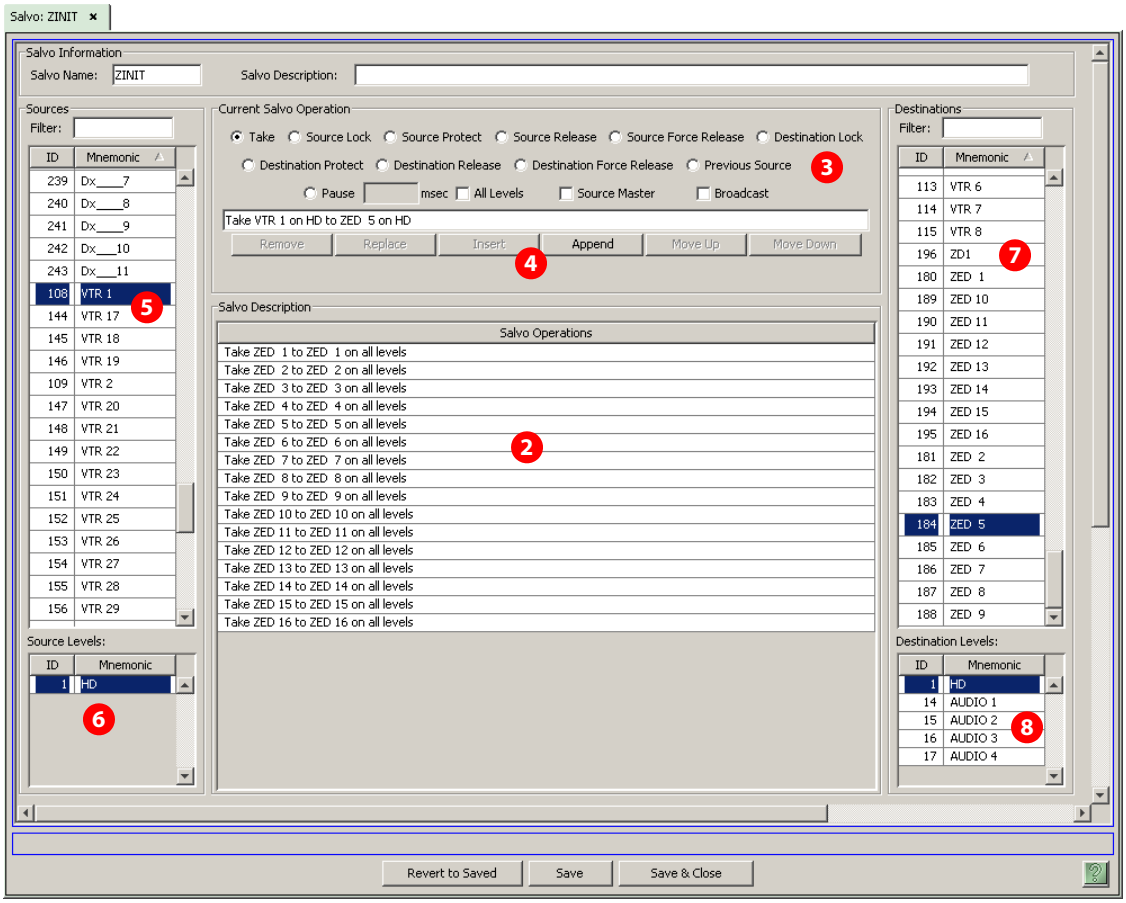
If you leave this option unchecked, you will create an entirely new (empty) salvo.

If you check the option. your new salvo will be a copy of the existing salvo you select in the drop-down list associated with the check box. The initial command sequence of the new salvo will be the same as the command sequence of the existing salvo.

The file extension for all salvos is `.svo`.

Salvo Editing Page

The salvo editing page is where you define a salvo. This is a typical page:



The page is not labeled a “salvo editing page” in NV9000-SE Utilities. Individual salvo editing pages are titled (in their tabs) with their salvo names.

The page has 8 sections, numbered in the preceding illustration:

1 Salvo Information
2 Salvo Operations
3 Salvo Operations
4 Salvo Composition Buttons
5 Source List
6 Source Levels
7 Destination List
8 Destination Levels

Salvo Information

The salvo information section has two basic fields:

- Salvo Name

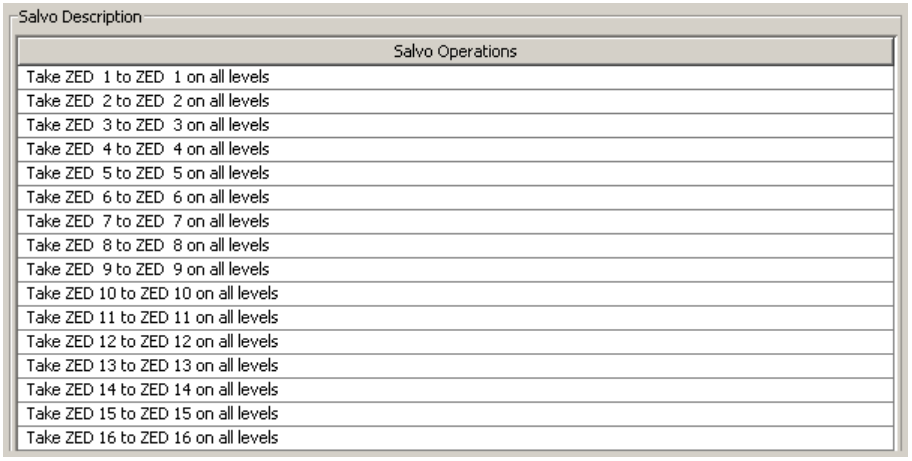
  You can edit the salvo name here.

- Salvo Description

  A salvo description is optional and free-format. We recommend that you enter a meaningful description. Someone working on this configuration after you might not understand what you intended.

Salvo Operations

The salvo operations section is the salvo. It is the most critical part of the page:



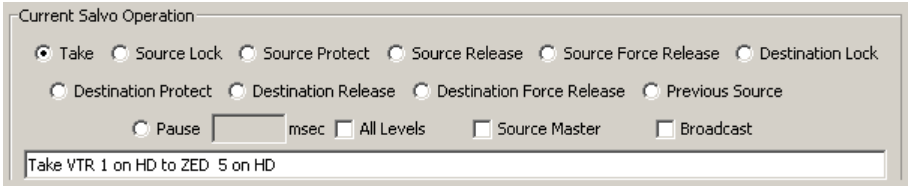
Each line in this list is an NV9000 command.

You can compose commands using commands selected in the salvo command section. If the command involves sources or destinations, those sources are specified in the source and destination sections.

Generally you add a command you have composed by pressing the 'Append' button in the salvo composition section. You can also delete commands from the salvo and reorder commands in the salvo using the buttons in the salvo composition section.

Salvo Command Selection

The salvo command section has 11 command choices and 3 options:



These are the commands:

Take	Previous Source	Pause
Source Lock	Source Protect	Source Release
Source Force Release	Destination Lock	Destination Protect
Destination Release	Destination Force Release	

The commands are associated with radio buttons. You can select only one command at a time. These are the options:

All Levels Source Master Broadcast

They are checkbox options.

(The 'msec' text box becomes enabled if you select the 'Pause' command.)

Command Syntax

The command section has a field that functions as a command preview so you can see the command before you add it to the salvo.

Each of the 11 commands has its own syntax. When you choose a command, a prototype of the command appears in the preview field. The word "null" appears one or more times in the command prototype. The word null is a "token" that represents some value you must supply from the source and destination lists or possibly from another source.

The individual command descriptions that follow explain the command syntax.

The syntax of some commands is affected by the options you choose, particularly the 'All Levels' option. See Options, on page 492.

▲ When you are constructing a command, avoid clicking in the 'Salvo Description' section. Doing so resets the command section and the command you were constructing is replaced with a default command prototype.

Commands

To build a salvo, you construct commands in the command section, using its preview field, and then add the command to the salvo. There are 3 composition buttons that can do that:

- Replace
- Insert
- Append

In all cases, after you have constructed a command, click one of these composition buttons to add the command to the salvo. See Salvo Composition Buttons, on page 493.

Take

When you have checked the 'All Levels' option, the prototype for the 'Take' command is:

Take null to null on all levels

When you have *unchecked* the 'All Levels' option, the prototype for the 'Take' command is:

Take null on null to null on null

The syntax for the 'Take' command is

Take ‹*source*› **on** ‹*src-level*› **to** ‹*destination*› **on** ‹*dest-level*›

or

Take ‹*source*› **to** ‹*destination*› **on all levels**

Thus, you must choose a source device from the source list and a destination from the destination list to construct the command. If you have not chosen 'All Levels', you must also choose a source level and a destination level.

When you choose all the items required for the command, all the "null" words will have been replaced and the composition buttons become enabled. You can now add the command to the salvo.

Previous Source

When you have checked the 'All Levels' option, the prototype for the 'Take' command is:

Take the previous source to null on all levels

When you have *unchecked* the 'All Levels' option, the prototype for the 'Take' command is:

Take the previous source to null on null

The syntax for the 'Previous Source' command is

Take the previous source to ‹*destination*› **on** ‹*dest-level*›

or

Take the previous source to ‹*destination*› **on all levels**

You must choose a destination from the destination list to construct the command. If you have not chosen 'All Levels', you must also choose a destination level.

Pause

When you have chosen the 'Pause' command, all the command options become disabled.

The prototype for the 'Pause' command is:

Pause for ‹*nnn*› milliseconds

where *nnn* is the value you entered in the 'msec' field. If you entered no value in the 'msec' field, the prototype is

Pause for milliseconds

Note: after you enter a value in the 'msec' field, click the 'Pause' command again. Otherwise, the salvo editor will not accept your millisecond value.

Source Lock

When you have checked the 'All Levels' option, the prototype for the 'Source Lock' command is:

Source Lock null on all levels

When you have *unchecked* the 'All Levels' option, the prototype for the 'Source Lock' command is:

Source Lock null on null

The syntax for the 'Source Lock' command is

Source Lock ‹*source*› **on** ‹*src-level*›

or

Source Lock ‹*source*› **on all levels**

You must choose a source device from the source list to construct the command. If you have not chosen 'All Levels', you must also choose a source level.

Source Protect

When you have checked the 'All Levels' option, the prototype for the 'Source Protect' command is:

Source Protect null on all levels

When you have *unchecked* the 'All Levels' option, the prototype for the 'Source Protect' command is:

Source Protect null on null

The syntax for the 'Source Protect' command is

Source Protect ‹*source*› **on** ‹*src-level*›

or

Source Protect ‹*source*› **on all levels**

You must choose a source device from the source list to construct the command. If you have not chosen 'All Levels', you must also choose a source level.

Source Release

When you have checked the 'All Levels' option, the prototype for the 'Source Release' command is:

Release null on all levels

When you have *unchecked* the 'All Levels' option, the prototype for the 'Source Release' command is:

Release null on null

The syntax for the 'Source Release' command is

Release ‹*source*› **on** ‹*src-level*›

or

Release ‹*source*› **on all levels**

You must choose a source device from the source list to construct the command. If you have not chosen 'All Levels', you must also choose a source level.

▲ Note that this command has the same syntax as 'Destination Release'. It might not be possible to distinguish a source release from a destination release in the salvo.

Source Force Release

When you have checked the 'All Levels' option, the prototype for the 'Source Force Release' command is:

Force Release null on all levels

When you have *unchecked* the 'All Levels' option, the prototype for the 'Source Release' command is:

Force Release null on null

The syntax for the 'Source Force Release' command is

Force Release ‹*source*› **on** ‹*src-level*›

or

Force Release ‹*source*› **on all levels**

You must choose a source device from the source list to construct the command. If you have not chosen 'All Levels', you must also choose a source level.

▲ Note that this command has the same syntax as 'Destination Force Release'. It might not be possible to distinguish a source force release from a destination force release in the salvo.

Destination Lock

When you have checked the 'All Levels' option, the prototype for the 'Destination Lock' command is:

Destination Lock null on all levels

When you have *unchecked* the 'All Levels' option, the prototype for the 'Destination Lock' command is:

Destination Lock null on null

The syntax for the 'Destination Lock' command is

Destination Lock ‹*source*› **on** ‹*src-level*›

or

Destination Lock ‹*source*› **on all levels**

You must choose a destination device from the source list to construct the command. If you have not chosen 'All Levels', you must also choose a destination level.

Destination Protect

When you have checked the 'All Levels' option, the prototype for the 'Destination Protect' command is:

Destination Protect null on all levels

When you have *unchecked* the 'All Levels' option, the prototype for the 'Destination Protect' command is:

Destination Protect null on null

The syntax for the 'Destination Protect' command is

Destination Protect ‹*source*› **on** ‹*src-level*›

or

Destination Protect ‹*source*› **on all levels**

You must choose a destination device from the source list to construct the command. If you have not chosen 'All Levels', you must also choose a destination level.

Destination Release

When you have checked the 'All Levels' option, the prototype for the 'Destination Release' command is:

Release null on all levels

When you have *unchecked* the 'All Levels' option, the prototype for the 'Destination Release' command is:

Release null on null

The syntax for the 'Destination Release' command is

Release ‹*source*› **on** ‹*src-level*›

or

Release ‹*source*› **on all levels**

You must choose a destination device from the source list to construct the command. If you have not chosen 'All Levels', you must also choose a destination level.

- Note that this command has the same syntax as 'Source Release'. It might not be possible to distinguish a source release from a destination release in the salvo.

Destination Force Release

When you have checked the 'All Levels' option, the prototype for the 'Destination Force Release' command is:

Force Release null on all levels

When you have *unchecked* the 'All Levels' option, the prototype for the 'Destination Release' command is:

Force Release null on null

The syntax for the 'Destination Force Release' command is

Force Release ‹*source*› **on** ‹*src-level*›

or

Force Release ‹*source*› **on all levels**

You must choose a source destination from the source list to construct the command. If you have not chosen 'All Levels', you must also choose a destination level.

- Note that this command has the same syntax as 'Source Force Release'. It might not be possible to distinguish a source force release from a destination force release in the salvo.

Options

The 3 command options are not enabled for all commands.

All Levels

The 'All Levels' option affects all commands except 'Pause'.

Checking the 'All Levels' option means that the command affects all levels of the destination, the source, or both.

Unchecking the 'All Levels' option means that the command occurs on a single source level, on a single destination level, or both.

Source Master

The 'Source Master' option is enabled only for the 'Take' command and then only when the 'All Levels' option is *unchecked*.

The 'Source Master' option applies only for takes on a machine control level.

Checking the 'Source Master' option means that the source device is the master in the machine control connection and that the destination is not the master. Leaving the option unchecked means that the destination is the master.

When you select the 'Source Master' option, the salvo editor appends "using Source Master Mode" to the 'Take' command:

Take AIN 12 on HD to AOUT 5 on HD using Source Master Mode

▲ If you have also checked the 'Broadcast' option, the 'Source Master' option is a no-pop. The 'Broadcast' option overrides the 'Source Master' option.

Broadcast

The 'Broadcast' option is enabled only for the 'Take' command and then only when the 'All Levels' option is *unchecked*.

The 'Broadcast' option applies only for takes on a machine control level.

Checking the 'Broadcast' option means that the route is part of a broadcast route. Leaving the option unchecked means that the router is a simple route.

When you select the 'Broadcast' option, the salvo editor appends "using Broadcast Master Mode" to the 'Take' command:

Take AIN 12 on HD to AOUT 5 on HD using Broadcast Master Mode

▲ If you have also checked the 'Broadcast' option, the 'Source Master' option is a no-pop. The 'Broadcast' option overrides the 'Source Master' option.

Salvo Composition Buttons

There are 6 salvo composition buttons:

Some of these buttons refer to a selection of command lines in the salvo operations section. Use standard click, shift-click, and control-click methods to make a selection of command lines.

These are the buttons:

- Remove

  Click the 'Remove' button to delete selected command lines.
- Replace

  Click the 'Replace' button to replace the (single) command you have selected with the command you have composed.

If you have more than one command selected in the salvo, the command section is disabled (grayed out) and the 'Replace' button is also disabled.

- Insert

  Click the 'Insert' button to insert the command you have composed just above the (single) command you have selected.

  If you have more than one command selected in the salvo, the command section is disabled (grayed out) and the 'Insert' button is also disabled.

- Append

  Click the 'Append' button to add the command you have composed just after the last command in the salvo.

  If you have more than one command selected in the salvo, the command section is disabled (grayed out) and the 'Append' button is also disabled.

- Move up

  Click the 'Move Up' button to move the selected command line up one position, that is it will be placed just above the command that preceded it.

  If you have a multiple disjoint command selection, all selected commands become contiguous, and are placed just above the command that preceded the first command in the disjoint selection.

  If you have a multiple contiguous command selection, the commands are placed as a unit just above the command that preceded the first command in the contiguous selection.

- Move down

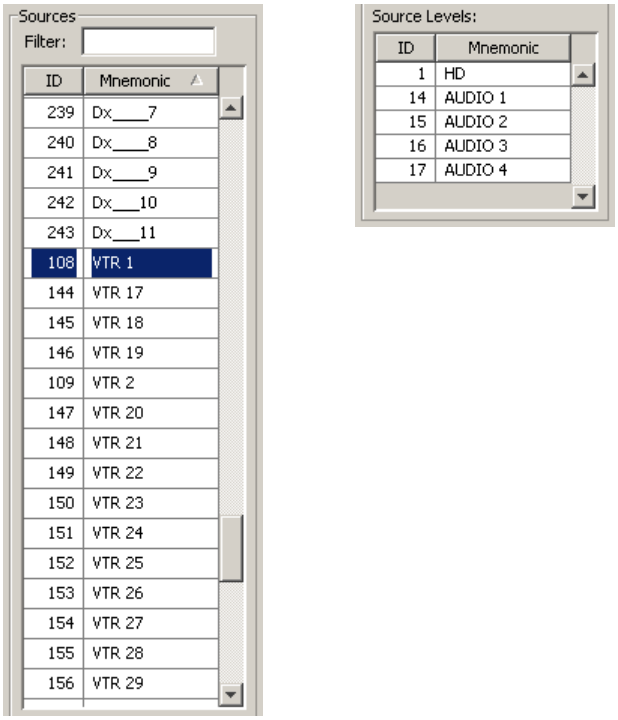
  Click the 'Move Down' button to move the selected command line down one position, that is it will be placed just below the command that followed it.

  If you have a multiple disjoint command selection, all selected commands become contiguous, and are placed just below the command that followed the first command in the disjoint selection.

  If you have a multiple contiguous command selection, the commands are placed as a unit just below the command that followed the first command in the contiguous selection.

Source List

The source list and source level list are at the left side of the page:



The source list includes a mnemonic filter: the list is restricted to the sources whose names contain the text you type in the filter field.

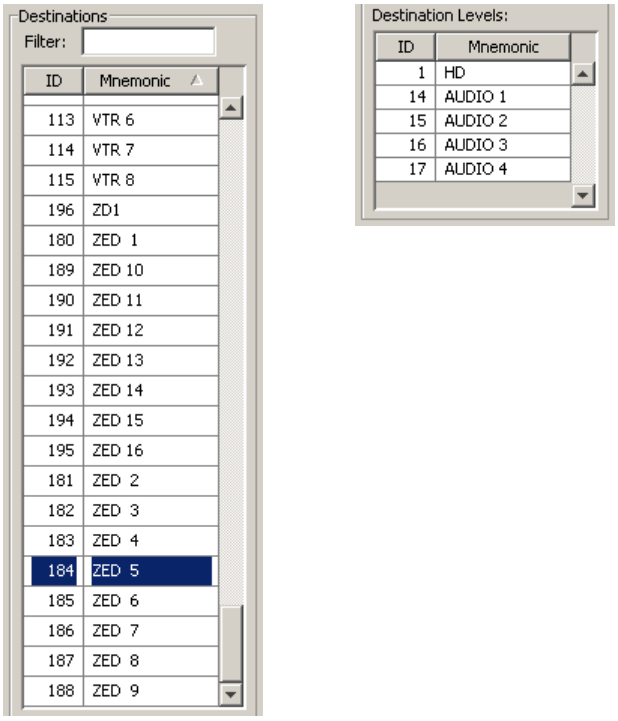
Some commands (such as 'Take') require that you select a source device. It is in this list that you do so.

Source Levels

Unless your command uses the 'All Levels' option, it might also require that you specify a level for the selected source. It is in the source levels list that you make that selection.

Destination List

The destination list and destination level list are at the right side of the page:



The destination list includes a mnemonic filter: the list is restricted to the destinations whose names contain the text you type in the filter field.

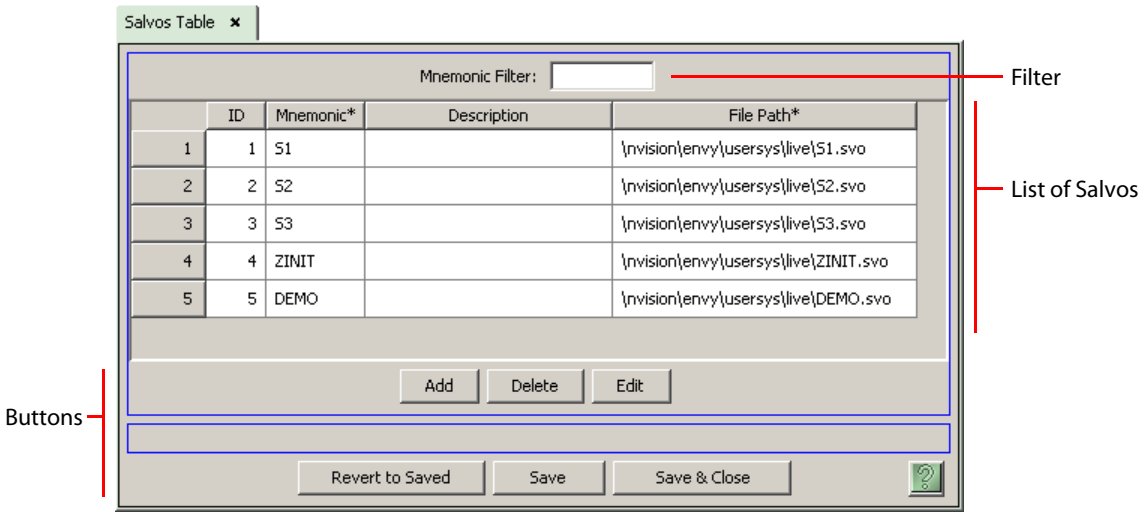
Some commands (such as 'Take') require that you select a destination device. It is in this list that you do so.

Destination Levels

Unless your command uses the 'All Levels' option, it might also require that you specify a level for the selected destination. It is in the destination levels list that you make that selection.

Salvos Table

The 'Salvos' table can be found in 'Tables' portion of the 'Views' pane. It lists all system salvos defined in your configuration:



You can add, delete, or edit system salvos here.

Filter

At the top of the page is a 'Mnemonic' filter. If you enter text in this field, the list of salvos is restricted to those salvos whose names contain the text you entered.

Buttons

At the bottom of the page are 6 buttons:

- Add

  Click 'Add' to add a salvo to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can enter a name for the salvo. (Adding a salvo does not define its content. You must edit the salvo to define its contents.)

  (The ID is generated by NV9000-SE Utilities.)

- Delete

  Select one or more rows in the salvo list and click 'Delete' to remove those salvos from the list. NV9000-SE Utilities deletes the entries immediately without any warning dialog.

- Edit

  Select one or more rows in the salvo list and click 'Edit' to open a salvo editing page for each of the selected salvos.

  See Salvo Editing Page, on page 486 for details.

- Save

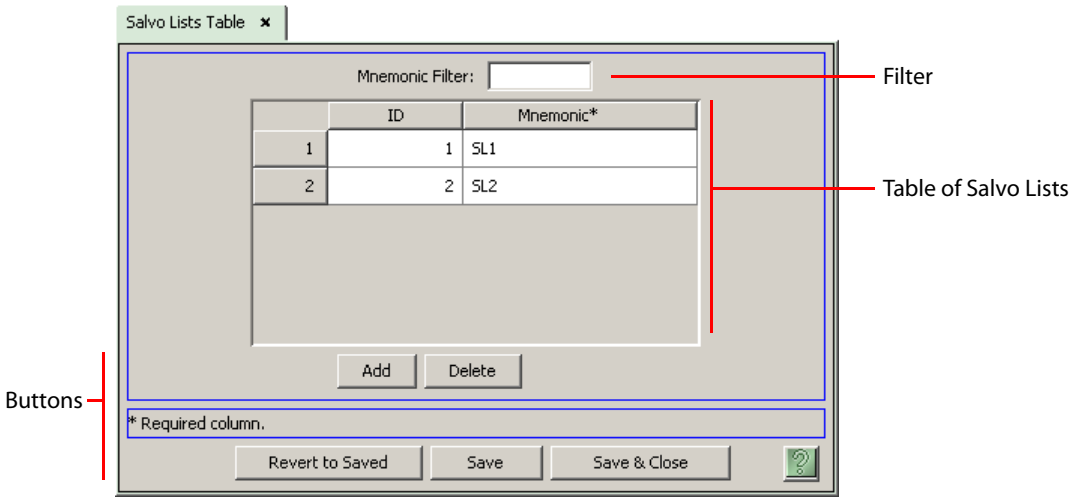
  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

  Click 'Revert to Saved' to restore the saved list of salvos, discarding any changes you have made (since the last save).

Salvo Lists Table

The 'Salvo Lists' table can be found in 'Tables' portion of the 'Views' pane. It presents all system salvo *lists* defined in your configuration:



You can add, delete, or edit system salvo lists here.

A salvo list is a set of salvos — a subset of all system salvos that is useful to panel operators. Some control panels require a salvo list to operate. Those panels are the NV9603A and the NV9609.

Other panels do not require salvo lists. If your configuration does not include panels that require salvo lists, you may ignore the concept of a salvo list.

To view, or edit, the contents of a salvo list, use the Salvo List Details Table.

Filter

At the top of the page is a 'Mnemonic' filter. If you enter text in this field, the table of salvo lists is restricted to those salvo lists whose names contain the text you entered.

Buttons

At the bottom of the page are 5 buttons:

Add

Click 'Add' to add a salvo list to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can enter a name for the salvo list. (Adding a salvo list does not define its content. Initially, the list will be empty. You must use the Salvo List Details Table to define the salvo list.)

(The ID is generated by NV9000-SE Utilities.)

- Delete

  Select one or more rows in the table and click 'Delete' to remove those salvo lists from the table. NV9000-SE Utilities deletes the entries immediately without any warning dialog.

- Save

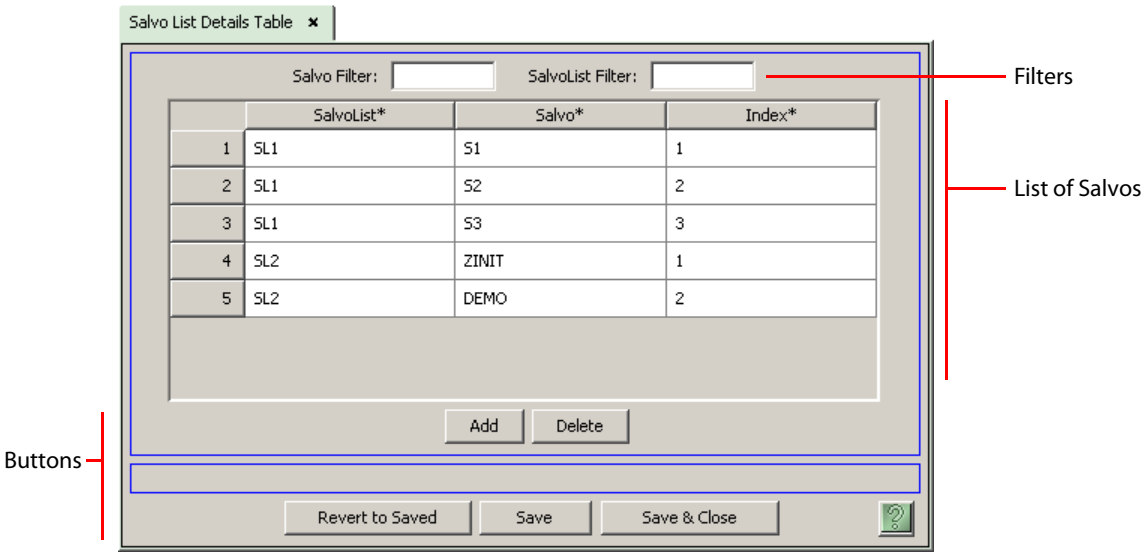
  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

  Click 'Revert to Saved' to restore the saved table of salvo lists, discarding any changes you have made (since the last save).

Salvo List Details Table

The 'Salvo List Details' table can be found in the 'Views' pane. It lists all salvos, in all salvo lists (subject to filtering).



It is in this table that you specify which salvos belong to which salvo lists, and the order of the salvos within the list. The index fields of the table specify the ordering.

You can add and delete salvos here and redefine them here. (You ***cannot*** create a new salvo list here nor can you edit a salvo. Any salvo present in this table will already have been created.)

To edit any field, click the field. The 'Salvo List' fields are drop-down lists; the 'Salvo' fields are also drop-down lists. The 'Index' fields are numeric fields. The index values give the ordering of the salvos within the salvo list.

The page has 3 sections:

- Filters
- List of Salvos
- Buttons

Filters

At the top of the page are 2 filters:

- 'Salvo' filter. If you enter text in this field, the list of salvos is restricted to those whose salvo (name) fields contain the text you entered.
- 'Salvo List' filter. If you enter text in this field, the list of salvos is restricted to those whose 'Salvo List' fields contain the text you entered.

List of Salvos

The list presents all salvos, in all salvo lists (subject to filtering). These are the fields of the table:

- Salvo List

  The salvo list entry identifies the list to which the salvo in the same row belongs. These entries are drop-down lists. You can change the salvo list in a row by choosing a list from the drop-down list.
- Salvo

  The name of the salvo. These fields are drop-down lists. You can change the salvo in a row by choosing a salvo from the drop-down list.
- Index

  The index values give the ordering of the salvos within the salvo list. You can change the index by typing a new value in the field.

Buttons

At the bottom of the page are 5 buttons:

- Add

  Click 'Add' to add a salvo to the table. NV9000-SE Utilities creates a new row at the bottom of the list in which you can choose a salvo from a drop-down list and also choose the salvo list (from its drop-down list) to which the salvo will belong. You should also enter an index value for the new salvo. All the index values for a particular salvo list define the order the salvos within the salvo list.
- Delete

  Select one or more rows in the table and click 'Delete' to remove those salvos from the table. NV9000-SE Utilities deletes the rows immediately without any warning dialog.
- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved salvo details table discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

12 Tielines

Chapter 12 provides information regarding tielines and the pages in NV9000-SE Utilities that support tielines.

Summary

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'Add Tieline Group' Page *511*
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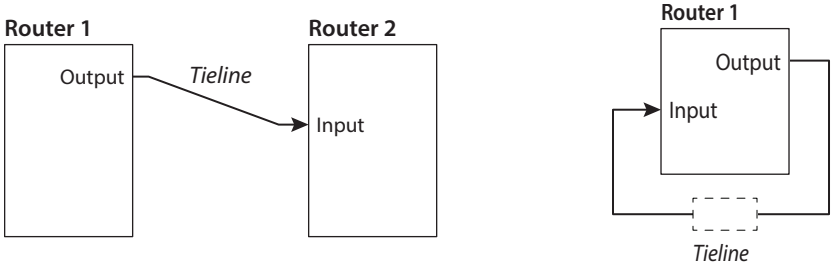
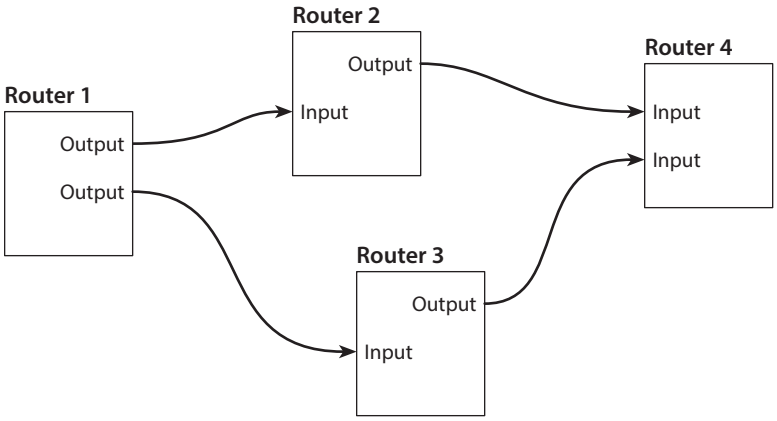
Introduction

Simply stated, a tieline connects two routers. More precisely, a tieline connects an output of an "upstream" router partition (*physical level)* to an input of a "downstream" router partition. The upstream and downstream router partitions can be the same.



A multi-hop tieline is a set of simple tielines between multiple routers, perhaps at remote geographical locations.



Multiple tielines can be defined between routers. The NV9000 system uses tielines as a pool of resources. When the NV9000 needs to use a tieline to perform a route, it determines all the tielines necessary to make the route. If the pool of tielines is depleted, of course, it cannot make the route.

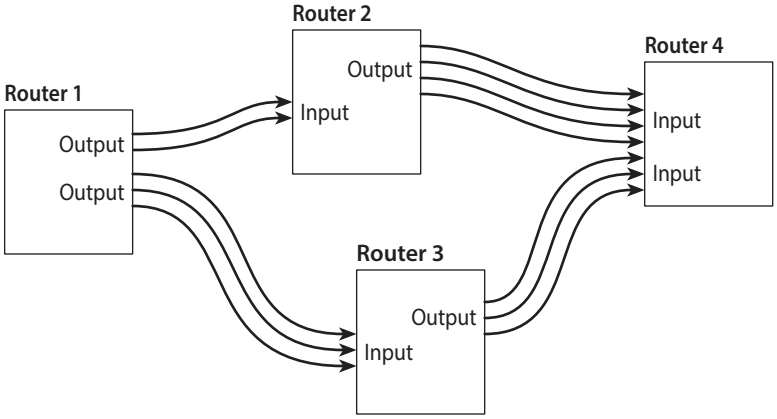


Fig. 12-1: Pooled Tielines

For example, in Figure 12-1, there are no tieline paths from router 2 to router 3. If the NV9000 system cannot find a tieline path for a route, as in this case, it cannot make the route.

Free Source

Control panel operators can release a tieline by routing a local source, specifically the "free source," to the destination of the tieline route.

There is also a "system parameter" that, when set, automatically routes the free source to the input of a tieline when that tieline is no longer in use. See AUTO_FREESRC, on page 593.

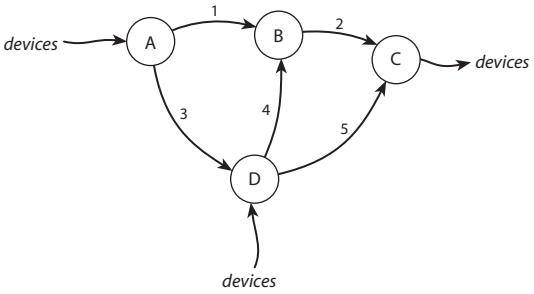
Tieline Groups

A *tieline group* couples tielines that must be used together.

The several tieline group pages and tables in NV9000-SE Utilities allow you to define and manipulate tieline groups.

Multi-Hop Tieline Routes

Multi-hop tieline routes are those that comprise more than one simple tieline:



What "multi-hop" implies is that you can route a source from a router (point A) to a router not directly connected to A (such as point C) in a single take. There are several paths from A to C: the NV9000 control software chooses the best path (usually the shortest and of the least cost).

No special configuration need be performed to create multi-hop tielines. It is sufficient to configure just the individual port connections.

After you have defined all the simple tielines, NV9000-SE Utilities calculates all the multi-hop (or segmented) tieline paths in the entire network of simple tielines. (These paths can be viewed in the Tieline2 Path Table (page 527) and the Tieline2 Path Detail Table (page 530)

A take that requires tieline(s) will follow the shortest or lowest cost path from its source device to its destination device. (You can assign a relative cost value to each simple tieline.)

Multi-Site Tielines

When tielines are defined on more than one NV9000 system controller in a router control system, we say that the tielines are multi-site tielines. That is, tielines routes created in one NV9000 system controller can use tielines defined in another NV9000 system controller. The different NV9000s might or might not be in different cities. The tieline definitions in each NV9000 must include definitions for the tielines in (all) the other NV9000s.

- This requirement warranted the addition of the Control Systems Table (page 537) where the different NV9000s can be enumerated.
- Certain fields in the tieline tables exist because of the possibility of multi-site tielines. Generally, customers who do not have multi-site telines can ignore those fields.

If, for instance, a system has two system controllers, A and B, and 3 shared tielines, the following table data might exist:

- The 'Control System' table (in system controller A):

ID	Name	IP Address	Description
1	Local	127.0.0.1	Local control system (A)
2	System B	192.168.102.1	Remote control system (B)

- The 'Tieline2' table (in system controller A):

ID	Control System	Control System's Tieline2 ID	Cost	Name	Description
1	Local	1	1	A tieline 1	
2	System B	1	1	B tieline 1	
3	Local	3	1	A tieline 2	

- The control system table (in system controller B):

ID	Name	IP Address	Description
1	Local	127.0.0.1	Local control system (B)
2	System A	192.168.101.1	Remote control system (A)

- The 'Tieline2' table (in system controller B):

ID	Control System	Control System's Tieline2 ID	Cost	Name	Description
1	Local	1	1	B tieline 1	
2	System A	1	1	A tieline 1	

(Just ignore the "2" in "Tieline2.")

Tieline Exclusions

If, for any reason, you want to prevent an input port or output port from being routed using a tieline, you can enter the port and the tieline in a table of "tieline exclusions."

The ports named in tieline exclusion table must not be in the set of ports used by tielines.

See Tieline2 Exclusions Table, on page 522.

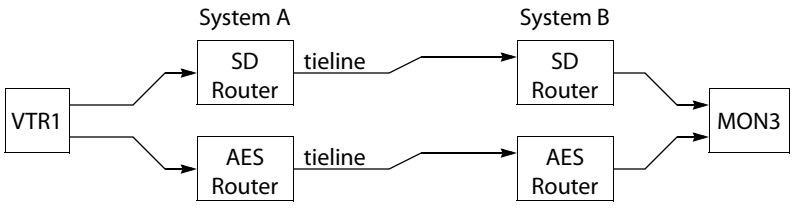
Usage

A tieline *route* is one taken from a source on an upstream router to a destination on a downstream router.

The following examples show some uses of tielines.

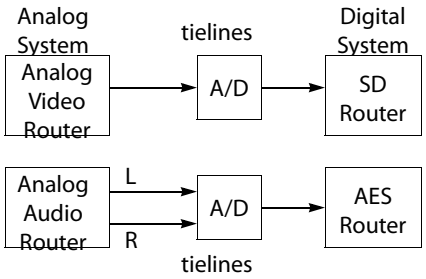
- Case A: connecting two routers.

  In this case, tielines connect two different router systems. Here, VTR 1 is connected (only) to routers in System A. With tielines, you can take VTR 1 to MON 3.



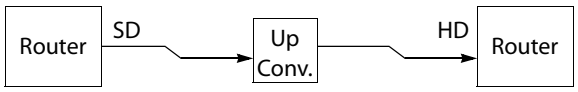
- Case B: format conversions.

In this case, tielines use intermediate devices to connect router matrices of different types. Here, analog signals are converted to digital signals along tielines:



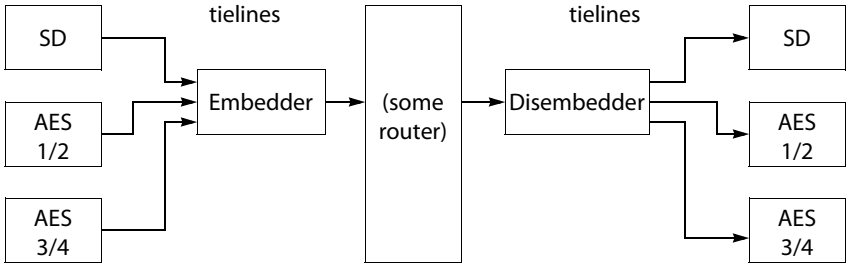
With tielines, it is possible to take an analog source to a digital output (in one take on a single control panel).

- Case C: up- or down-conversion:



- Case D: embedding or disembedding.

  In this example, a tieline connects multiple ports at one end and a single port at the other end:



Discussion

These are the main reasons for tielines:

- Switch a source on one router to a destination on another router.
- Connect routers in separate locations.
- Expand smaller routers.
- (Commonly) to perform signal conversions.
- (Commonly) to perform audio embedding or disembedding.
- Create signal delays (for audio).

These are the specific benefits of defining tielines:

- Only a single press of a take button is required.
- Tielines for a take are obtained from a pool of tielines defined in the NV9000 configuration. Ports are not committed to particular tielines. Takes using tielines (as needed) are transparent to the operator as long as the system controller does not run out of tieline ports.

Configuration Pages and Tables

These are the pages under the 'Configuration' pane for tielines:

- Tielines Page
- Tieline Groups Page

These are the pages under the 'Tasks' pane:

- 'Add Tieline' Page
- 'Add Tieline Group' Page

These are the tables under the 'Views' pane:

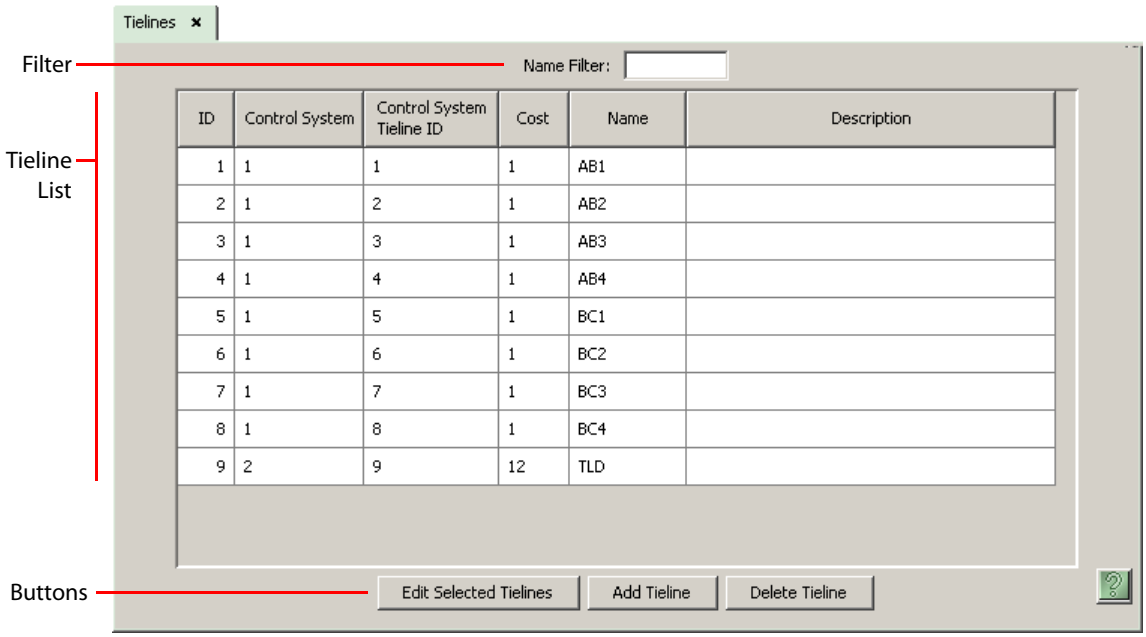
- Tieline2 Table
- Tieline2 Exclusions Table
- Tieline2 Group Table
- Tieline2 Group Binding Table
- Tieline2 Path Table
- Tieline2 Path Detail Table
- Tieline2 Port Binding Table
- Tieline2 Signal Binding Table
- Control Systems Table

These pages and tables are described in the following sections.

(Just ignore the "2" in "Tieline2." it means nothing.)

Tielines Page

The 'Tielines' page (under the 'Configuration' pane) lists all *simple* tielines you have defined in your configuration. This is a typical 'Tielines' page:



There are 3 sections in the page:

- Filter
- Tieline List
- Buttons

Filter

At the top of the page is a 'Mnemonic' filter: if you enter text in this field, the list of tielines is restricted to those tielines whose names contain the text you entered.

Tieline List

The tieline list has 6 columns:

- ID. These are the database IDs of the tielines.
- Control System. This field is the database ID of the control system to which a tieline is assigned.
- Control System Tieline ID. This field is the database ID of the tieline with respect to the control system in which it is defined.
- Cost. This field is a cost value for the tieline. You can assign an arbitrary value to this field. The NV9000 software uses cost as a factor in determining the best tieline path for a route.
- Name. This field is the name assigned to the tieline when it was created.
- Description. Descriptions of the tielines are optional and free-format. However, it is prudent to create meaningful descriptions. Other configurers might need to know what you intended.

You can use click, shift-click, and control-click techniques to select any of the tielines in the list.

Buttons

'Edit Selected Tielines' Button

This button opens one or more tieline editing pages—one for each of the tielines you have selected in the tieline list. It is in a tieline editing page that you specify, graphically, the port connections of a simple tieline.

See Tieline Configuration Page, on page 513.

'Add Tieline' Button

This button causes NV9000-SE Utilities to display the 'Add Tieline' page. The 'Add Tieline' page starts a tieline definition.

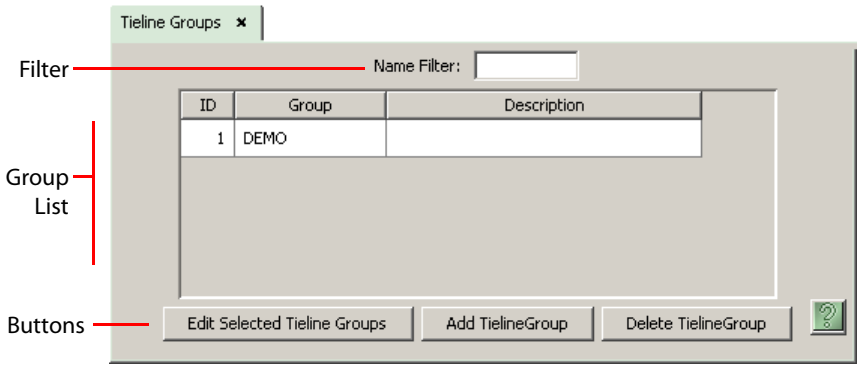
See 'Add Tieline' Page, on page 509.

'Delete Tieline' Button

This button deletes all the tielines you have selected in the tieline list, without warning. There is no undo: after the tielines are deleted, you cannot retrieve them.

Tieline Groups Page

The 'Tieline Groups' page (under the 'Configuration' pane) lists all the tieline groups you have defined in your configuration. This is a sample 'Tieline Groups' page:



There are 3 sections in the page:

- Filter
- Group List
- Buttons

Filter

At the top of the page is a 'Name' filter: if you enter text in this field, the list of tieline groups is restricted to those groups whose names contain the text you entered.

Group List

The group list has 3 columns:

- ID. These are the database IDs of the groups.
- Group. These fields are the names of the groups.
- Description. Descriptions of the tieline groups are optional and free-format. However, it is prudent to create meaningful descriptions. Other configurers might need to know what you intended.

You can use click, shift-click, and control-click techniques to select any of the tieline groups in the list.

Buttons

'Edit Selected Tieline Groups' Button

This button opens one or more tieline group configuration pages—one for each of the groups you have selected in the group list. It is in a tieline group configuration page that you specify the tielines in the group.

See Tieline Group Configuration Page, on page 518.

'Add Tieline Group' Button

This button causes NV9000-SE Utilities to display the 'Add Tieline Group' page. The 'Add Tieline Group' page starts a tieline group definition.

See 'Add Tieline Group' Page, on page 511.

'Delete Tieline Group' Button

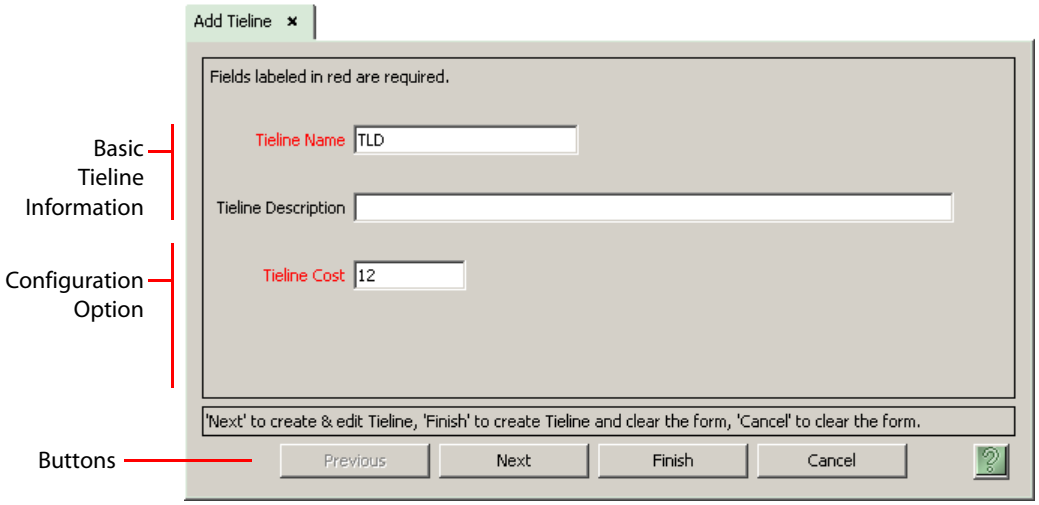
This button deletes all the tieline groups you have selected in the group list, without warning. There is no undo: after the tieline groups are deleted, you cannot retrieve them.

'Add Tieline' Page

The 'Add Tieline' page starts a series of steps, in multiple pages, in which you create a new tieline. There are two ways to get the 'Add Tieline' page:

- Click the 'Add Tieline' button at the bottom of the 'Tielines' page (of the 'Configuration' pane).
- Click 'Add Tieline' in the 'Tasks' pane.

This is a sample of the page:



This page, as the start of a series, has 2 main sections, in addition to the buttons at the bottom:

- Basic Information. In this sections, you name the tieline and optionally provide a description.
- Configuration Options. In this section, you specify the cost for the tieline. (You can change that value at any time.)

Buttons

At the bottom of the page are 4 buttons that allow you to move through the sequence of steps in tieline definition:

- Previous
- Next
- Finish
- Cancel

The buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

'Previous' Button

Click the 'Previous' button if you want to go to the previous page in the tieline definition sequence.

'Next' Button

Click 'Next' to go to the tieline editing page. In this page, you specify the connections of the tieline.

'Finish' Button

Click 'Finish' to accept the tieline thus far defined in the 'Add Tieline' page.

The tieline definition, as specified in the 'Add Tieline' page is incomplete. You must later go to the Tieline Configuration Page to edit the tieline.

This button allows you to create a number of tieline definitions rapidly and complete them later.

After you click 'Finish', the 'Add Tieline' page remains and is re-initialized for additional entries.

'Cancel' Button

Click 'Cancel' if you want to terminate the tieline definition you started.

When you click 'Cancel', the 'Add Tieline' page re-initializes for another entry.

Basic Information

There are 2 fields in the basic information section:

These are the basic information fields:

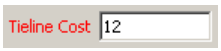
- Tieline Name

  Enter a name for the tieline in the 'Tieline Name' field. Panel operators rarely see tieline names. The Web Suite, and perhaps other software, identifies tielines by the names you give them. Users of the Web Suite can see tieline operations as they occur.
- Tieline Description

  Enter any description that is useful to your configuration.

Configuration Options

There is one configuration option. That is tieline cost:



Enter an integer value that you think represents the cost of using this simple tieline.

The cost, obviously, is not in units of currency. The cost is a value relative to the costs of other tielines and represents, effectively, the energy required to send a signal on that tieline.

The maximum value is 999,999,999.

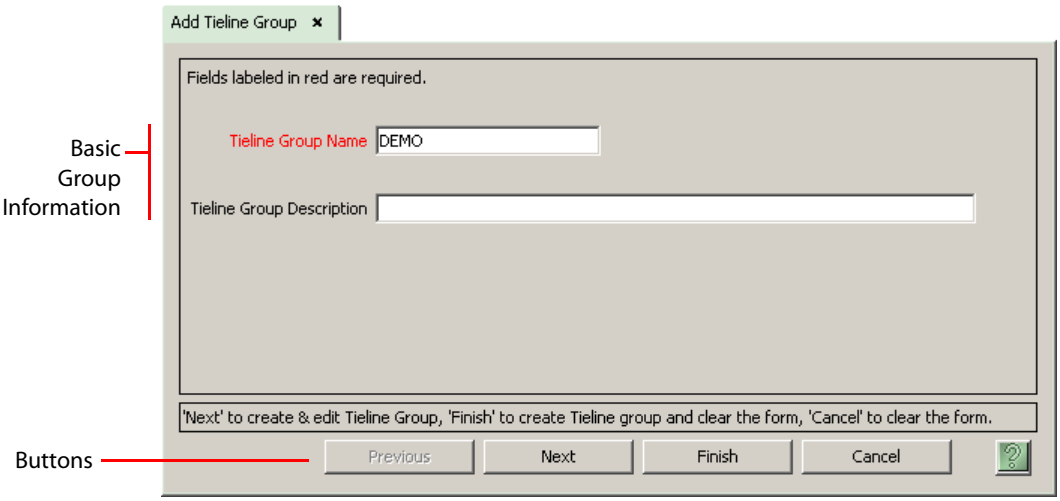
The cost of any multi-hop route is the sum of the costs of its individual simple tielines (or "hops").

'Add Tieline Group' Page

The 'Add Tieline Group' page starts a series of steps, in multiple pages, in which you create a new tieline group. There are two ways to get the 'Add Tieline Group' page:

- Click the 'Add Tieline Group' button at the bottom of the 'Tieline Groups' page (of the 'Configuration' pane).
- Click 'Add Tieline Group' in the 'Tasks' pane.

This is a sample of the page:



This page, as the start of a series, has 1 main section, in addition to the buttons at the bottom: basic group information.

Buttons

At the bottom of the page are 4 buttons that allow you to move through the sequence of steps in tieline group definition:

- Previous
- Next

- Finish
- Cancel

The buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

'Previous' Button

Click the 'Previous' button if you want to go to the previous page in the group definition sequence.

'Next' Button

Click 'Next' to go to the tieline group configuration page. In this page, you specify the tielines that will belong to the group.

'Finish' Button

Click 'Finish' to accept the tieline thus far defined in the 'Add Tieline Group' page.

The tieline group definition, as specified in the 'Add Tieline Group' page is incomplete. You must later go to the Tieline Group Configuration Page to edit the group.

This button allows you to create a number of tieline group definitions rapidly and complete them later.

After you click 'Finish', the 'Add Tieline Group' page remains and is re-initialized for additional entries.

'Cancel' Button

Click 'Cancel' if you want to terminate the tieline group definition you started.

When you click 'Cancel', the 'Add Tieline Group' page re-initializes for another entry.

Basic Information

There are 2 fields in the basic information section:

These are the basic information fields:

- Tieline Group Name

  Enter a name for the tieline group in the 'Tieline Group Name' field. Group names are usually known only to the configurer. Panel operators do not use them.
- Tieline Group Description

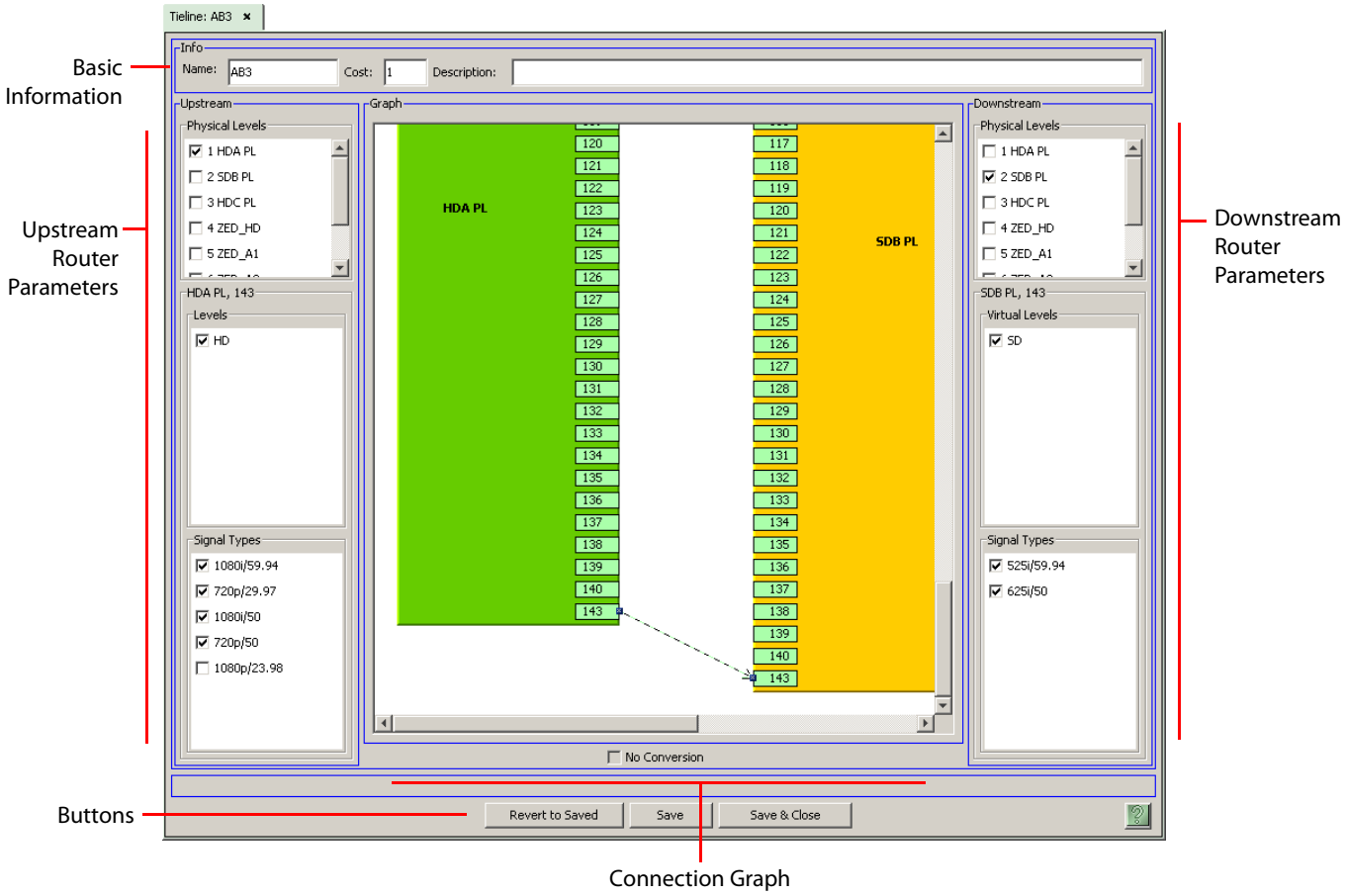
  Enter any description that is useful to your configuration.

Tieline Configuration Page

You can access the tieline configuration page (1) by clicking 'Edit Selected Tielines' in the 'Tielines' page, (2) by clicking the 'Next' button of the 'Add Tieline' page (under the 'Tasks' pane), or (3) by clicking 'Edit' in the 'Tieline2' table (under the 'Views' pane).

The tieline configuration page is not called that in NV9000-SE Utilities. It is identified by the tieline name in the page's tab.

This is a sample tieline configuration page:



In this page, you define a *simple tieline* — one between physical levels of two routers. The page has 5 sections:

- Basic Information
- Upstream Router Parameters
- Downstream Router Parameters
- Connection Graph
- Buttons

Using this page requires you to follow a certain order in performing the configuration steps. See Method, on page 517.

Basic Information

The basic information section has 3 fields.

The 'Name' field displays the tieline's name. It is basically a reminder of which tieline you are viewing, but you can also change the name of the tieline here.

The 'Cost' field displays the tieline's relative cost. You can edit this field here. The cost is a value relative to the costs of other tielines and represents, effectively, the energy required to send a signal on that tieline.

The 'Description' field is a place where you can write comments about the tieline. The field is free-format.

Up- and Downstream Router Parameters

The 'Upstream' section. at the left side of the page, has 3 subsections and the 'Downstream' section, at the right side of the page. have 3 subsections:

- Physical Levels
- Virtual Levels
- Signal Types

The 3 sections on the left function the same way as the 3 sections on the right.

Physical Levels

The 'Physical Levels' sections list the names of all router partitions (i.e., physical levels) defined in your configuration. For each partition, there is a check box.

When you check any box on the upstream side, a large *green* rectangle appears in the 'Graph' section of the page. The green rectangle is labeled by the name of the partition you checked and has at its *right* side a series of numbers, which are the output port numbers of that partition.

When you check any box on the downstream side, a large *yellow* rectangle appears in the 'Graph' section of the page. The yellow rectangle is labeled by the name of the partition you checked and has at its *left* side a series of numbers, which are the input port numbers of that partition.

(Tielines connect an output of an upstream partition to an input of a downstream partition.)

You will create tielines by drawing a line from a port of a green rectangle to a port of a yellow rectangle. You can draw multiple lines in many cases. You cannot draw a line unless you have selected at least one upstream partition and at least one downstream partition in the 'Physical Levels' sections. That is, there must be at least one green rectangle and at least one yellow rectangle.

▲ The rectangles tend to be extremely tall and do not fit well in the 'Graph' window. You will have to scroll to find the ports you need. You can also drag the rectangles to reposition them more optimally.

Virtual Levels

Until you have drawn a line in the 'Graph' section and until one line is selected, the 'Virtual Levels' sections (upstream and downstream) remain empty. So also do the 'Signal Types' sections.

After you select a line representing a tieline (which you can do by clicking the line), the 'Virtual Levels' sections become enabled. The upstream virtual levels section contain the virtual level represented by the upstream partition of the tieline you selected. The downstream virtual levels section contain the virtual level represented by the downstream partition of the tieline you selected. You should check the check box next to the virtual level in both sections. (Alternatively, you can check one or more of the entries in the 'Signal Types' sections.)

Checking the check box enables all the signal types assigned to that virtual level to become selected (checked) in the 'Signal Types' section.

Signal Types

In these sections (both upstream and downstream) you can select the specific signal types that the tieline will carry. The tieline will not be used for signal types not selected.

(Checking the virtual level check box in a 'Virtual Level' section enables all of the entries in the corresponding 'Signal Types' section.)

Connection Graph

The 'Graph' section of the page is where you define the tieline's cable connections.

When you have chosen an upstream physical level, the graph region shows a green rectangle with numbered ports. The graph section will show more than one green rectangle if you have selected more than one upstream partition.

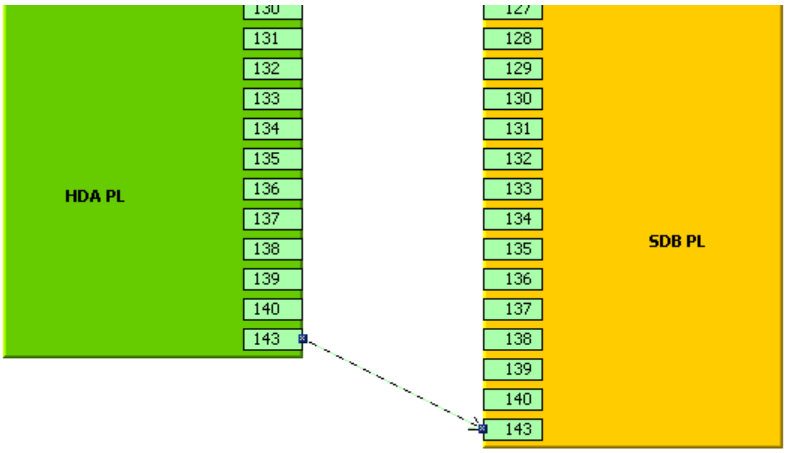
When you have chosen a downstream physical level, the graph region shows a yellow rectangle with numbered ports. The graph section will show more than one green rectangle if you have selected more than one upstream partition.

The upstream partition may be the same as the downstream partition. Nevertheless, there will be two rectangles.

(You might have to scroll to see the rectangles. You can move a rectangle with the graph region by dragging.)

To create a tieline, draw a line from a port of a green rectangle to a port of a yellow rectangle by dragging your cursor from one port to the other. A line with an arrowhead

appears. The line will remain selected so that you can assign signal types to the line using the check boxes in the two 'Signal Types' sections of the page:



(A selected line is green-and-black striped. Sometimes it is thin and sometimes it is thick, because of artifacts in the rendering engine.)

- Ports already consumed by tielines are not displayed.
- Ports used by NV9000 devices should not be used for tielines, but there is no representation of those ports in the 'Graph' section.

It is not sufficient just to draw the line. To each line, you must assign a set of signal types.

You can do this, when a line is selected, by checking the check boxes of the signal types in the upstream and downstream 'Signal Types' sections of the page. You can also check the 'Virtual Level' check boxes to enable all the signal types associated with the upstream virtual level and with the downstream virtual level.

When you have finished drawing lines between ports and assigning signal types to the lines, do not forget to click 'Save' at the bottom of the page. Otherwise

Multiple Lines

In many cases, you can draw multiple lines in the 'Graph' section.

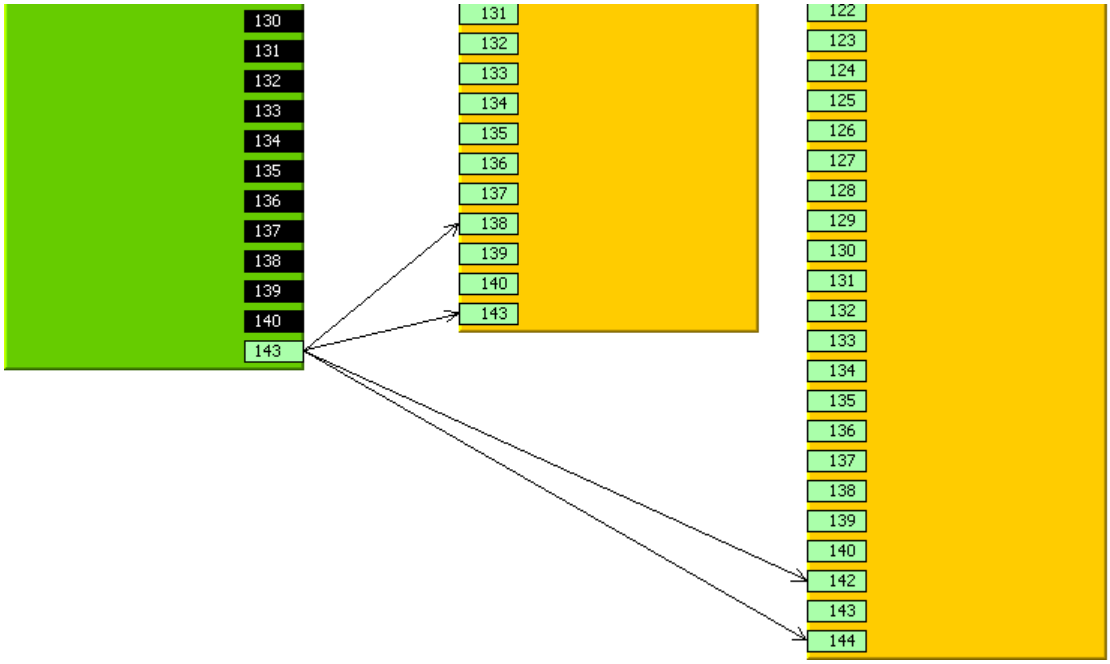
Keep in mind that the tieline configuration page represents *exactly one simple tieline.* The several lines that you draw belong to one simple tieline and represent connections of different signal types.

Exactly what the cabling for the tieline is and what signal conversion devices you might have in the tieline are not represented in the graph.

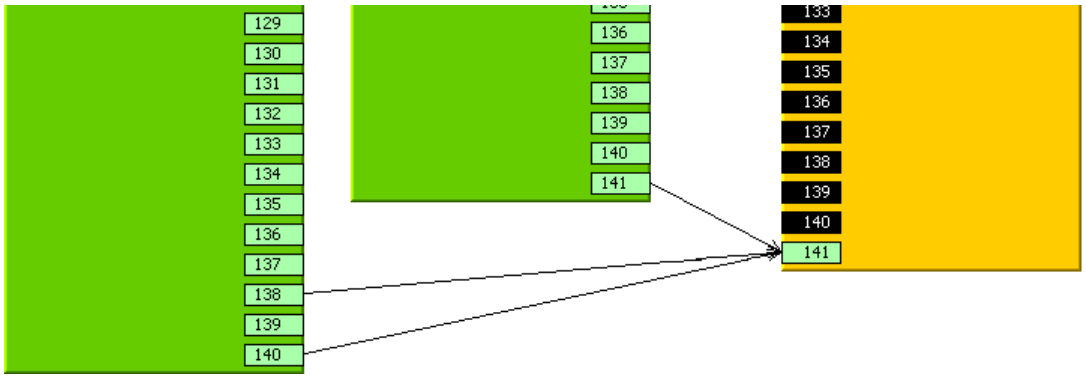
Fanout (1:N) and fanin (N:1) are permissible, but N:N — arcs from multiple upstream ports to multiple downstream ports — is not permissible.

The multiple arcs describe a single simple tieline. When the tieline is used for a route, ***all*** its arcs are live and conduct signals. And when the tieline is released, ***all*** its arcs are released.

Here is an example of "fanout":



Here is an example of "fanin":



Note that you cannot draw lines from (or to) ports rendered in black.

- The 'No Conversion' check box option below the graph seems always to be disabled. It is not known why it is present on the page.

Method

You must perform the steps of tieline creation in a certain order:

1. Select upstream and downstream partitions in the 'Physical Levels' sections of the page.
2. Draw one or more lines (arcs) from an upstream port to a downstream port.
3. Select an arc.
4. Assign signal types to the arc using the check boxes of the 'Virtual level' and 'Signal Types' sections of the page.
5. Repeat steps 3 and 4 for all arcs.
6. Click 'Save'. (Or click 'Revert to Saved' if you want to discard your work.)

Buttons

At the bottom of the page are 3 simple buttons:

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

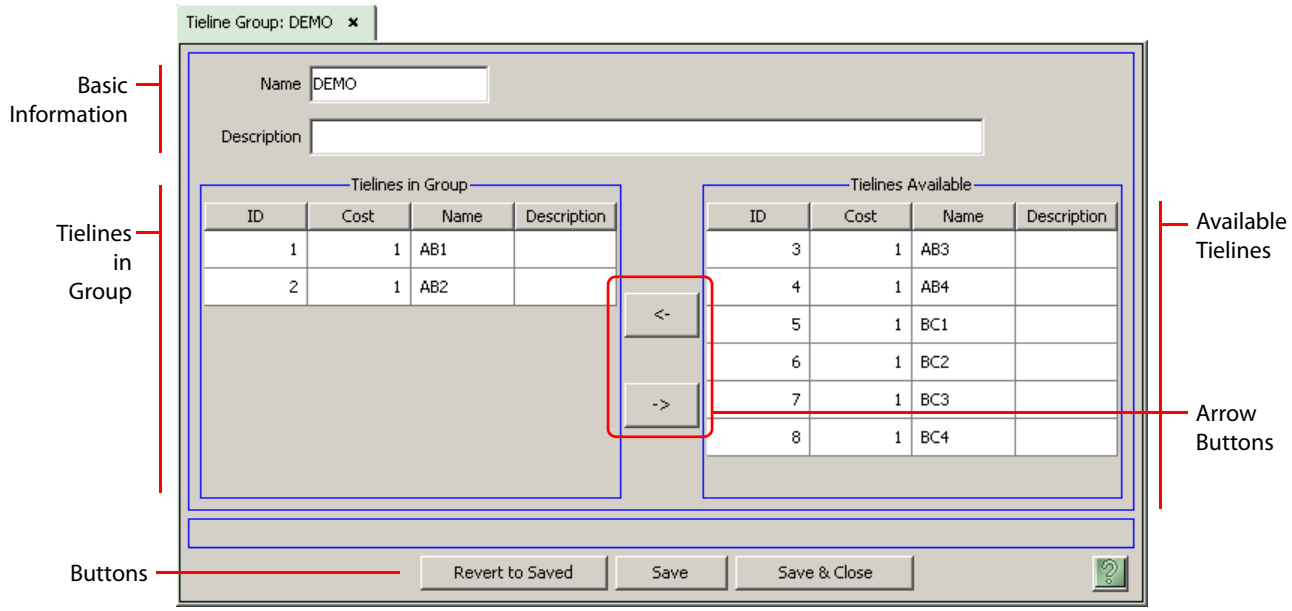
  Click 'Revert to Saved' to restore the saved version of the tieline, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Tieline Group Configuration Page

You can access the tieline group configuration page by clicking the 'Edit Selected Tieline Groups' button of the 'Tieline Groups' page, the 'Next' button of the 'Add Tieline Group' page or by clicking 'Edit' in the 'Tieline2 Group' table (under the 'Views' pane).

This is a sample tieline group configuration page:



In this page, you define a tieline group by adding available tielines to, or removing them from, the list of tielines in the group. There are 4 sections in the page:

- Basic Information
- Tielines in Group
- Available Tielines
- Buttons

Basic Information

The basic information section has 2 fields.

The 'Name' field displays the group's name. It is basically a reminder of which group you are viewing, but you can also change the name of the group here.

The 'Description' field is a place where you can write comments about the group. The field is free-format.

Tielines in Group

This table on the left lists the tielines that belong to the group. The table on the right lists available tielines.

To add a tieline to the group, select one or more tielines among the available tielines at the right. Then click the left arrow button (<-).

To remove one or more tielines from the group, select those tielines in the table at the left. Then click the right arrow button (->). Those tielines are returned to the list of available tielines.

Available Tielines

The table on the right lists available tielines. The tielines of the group may be drawn from this list.

Buttons

At the bottom of the page are 3 simple buttons:

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

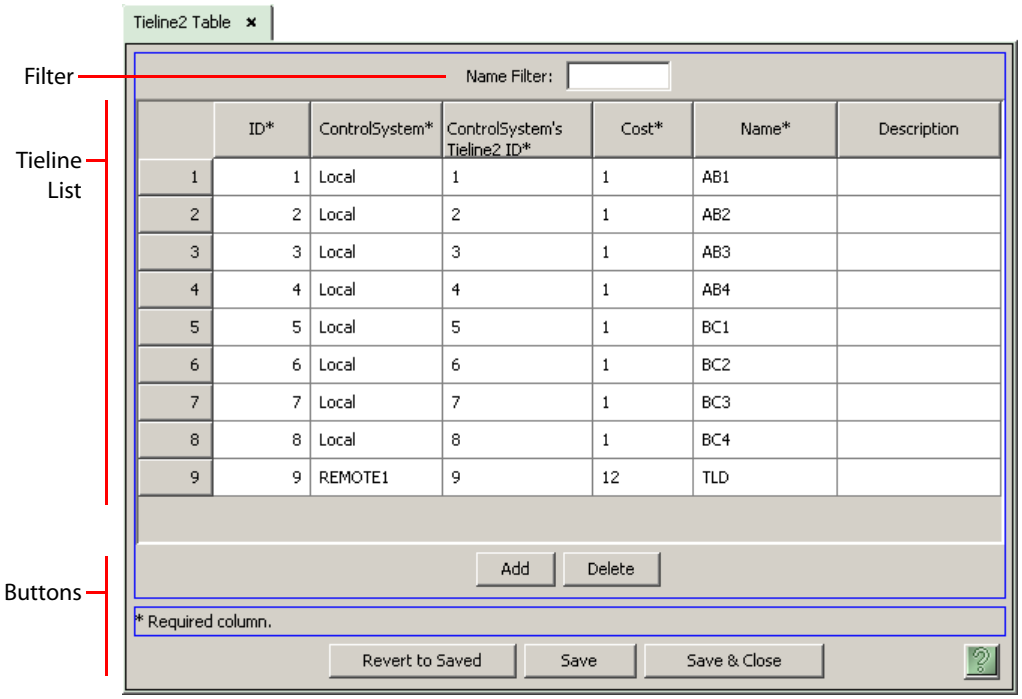
  Click 'Revert to Saved' to restore the saved version of the tieline group, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Tieline2 Table

▲ The "2" in "Tieline2" means nothing. It is just an artifact of the database software.

The 'Tieline2' table (under the 'Views' pane) lists all simple tielines you have defined in your configuration. This is a sample 'Tieline2' page:



There are 3 sections in the page:

- Filter
- Tieline List
- Buttons

Filter

At the top of the page is a 'Name' filter: if you enter text in this field, the list of tielines is restricted to those tielines whose names contain the text you entered.

Tieline List

The tieline list has 6 columns:

- ID

  The ID is the data base ID of the tieline. It is generated automatically and you cannot modify these fields.

- Control System

  The control system in which the tieline is defined. The fields in this column are drop-down lists from which you can choose a control system.

  (Control systems are defined in the Control Systems Table (page 537).

- Control System's Tieline2 ID

  This is the database ID of the tieline with respect to the control system to which is assigned (and in which the tieline is actually defined).

  For multi-site tielines to function properly, these IDs must be listed accurately. For local tielines, this field is the same as the ID field.
- Cost

  This the relative cost of the tieline. The cost is a value you can assign to a tieline based on factors known to you. There is no general formula that you can apply.
- Name

  This is the name of the tieline, usually assigned in the 'Tielines' page or the 'Add Tieline' page. You can modify the name in this table.
- Description

  This is the description of the tieline, usually assigned in the tieline configuration page. You can revise the description in this table. The description is free-format.

Buttons

At the bottom of the page are 5 simple buttons:

- Add

  Click 'Add' to add a tieline to the table. A new row appears at the bottom of the table in which you can enter data.
- Delete

  Select one or more rows of the table and click 'Delete' to delete those rows from the table. The rows are deleted immediately.
- Save

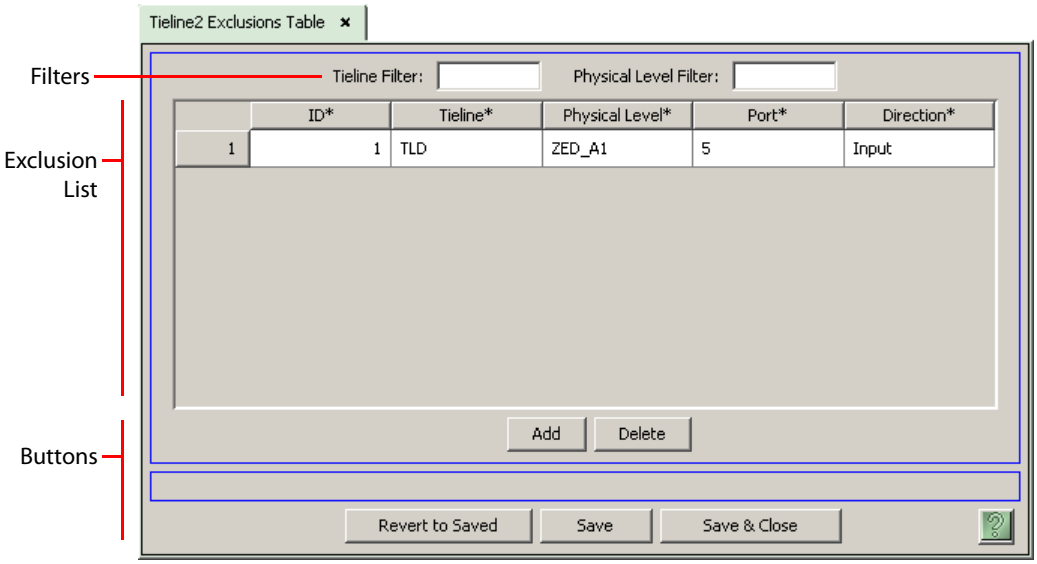
  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the 'Tieline2' table, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Tieline2 Exclusions Table

The 'Tieline2 Exclusion' table (under the 'Views' pane) lists all tieline exclusions you have defined in your configuration, with details of each. This is a sample 'Tieline2 Exclusions' page:



Note that the "2" in "Tieline2" means nothing. It is just an artifact of the database software.

If, for any reason, you want to prevent an input port or output port from being routed using a tieline, you can enter the port and the tieline in this table.

The ports named in this table must not be in the set of ports used by tielines.

There are 3 sections in the page:

- Filter
- Exclusion List
- Buttons

Filter

At the top of the page are two filters:

- Tieline filter: if you enter text in this field, the list of tieline exclusions is restricted to those exclusions whose tieline names contain the text you entered.
- Physical level filter: if you enter text in this field, the list of tieline exclusions is restricted to those exclusions whose physical level fields contain the text you entered.

Exclusion List

The exclusion list has 5 columns:

- ID

  The data base ID of the exclusion. It is generated automatically. You cannot modify it.
- Tieline

  The name of a tieline. The entries in this columns have drop-down lists that let you select one of the existing tielines.

- Physical Level

  The name of a physical level (a router partition). The entries in this columns have drop-down lists that let you select a physical level.

- Port

  A port with respect to the physical level selected for the exclusion.

  This is the port to be excluded from the tieline specified in the table row.

  The software performs no range-checking. Be sure to enter a port number valid for the physical level.

- Direction

  The direction of the port. Entries in this column have a drop-down list. Choices are either 'Input' or 'Output'.

Buttons

At the bottom of the page are 5 simple buttons:

- Add

  Click 'Add' to add a tieline to the table. A new row appears at the bottom of the table in which you can enter data.

- Delete

  Select one or more rows of the table and click 'Delete' to delete those rows from the table. The rows are deleted immediately.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

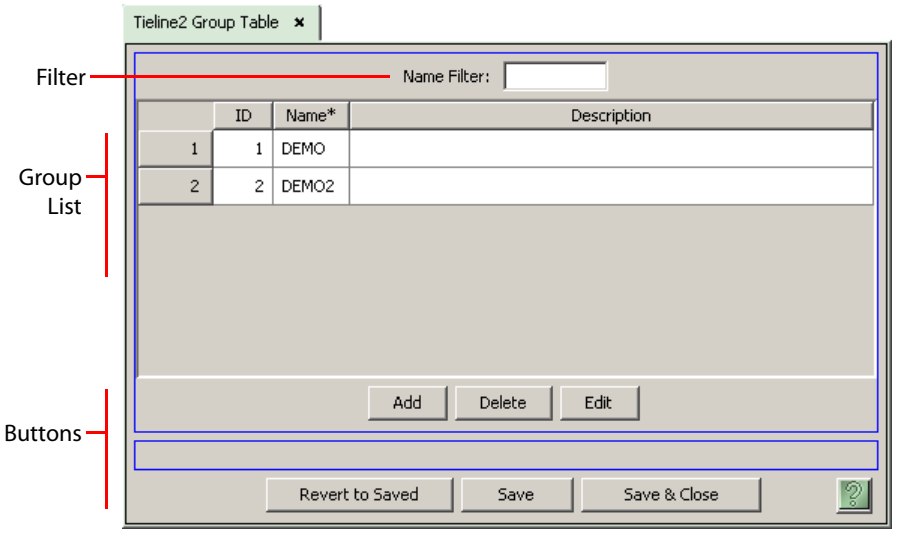
  Click 'Revert to Saved' to restore the saved version of the tieline exclusion table, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Tieline2 Group Table

The 'Tieline2 Group' table (under the 'Views' pane) lists all the tieline groups you have defined in your configuration. This is a typical 'Tieline2 Group' page:



There are 3 sections in the page:

- Filter
- Group List
- Buttons

Filter

At the top of the page is a 'Name' filter: if you enter text in this field, the list of tieline groups is restricted to those groups whose names contain the text you entered.

Group List

The group list has 3 columns:

- ID. These are the database IDs of the groups.
- Group. These fields are the names of the groups.
- Description. Descriptions of the tieline groups are optional and free-format. However, it is prudent to create meaningful descriptions. Other configurers might need to know what you intended.

You can use click, shift-click, and control-click techniques to select any of the tieline groups in the list.

Buttons

At the bottom of the page are 6 simple buttons:

- Add

  Click 'Add' to add a group to the table. A new row appears at the bottom of the table in which you can enter data.

- Delete

  Select one or more rows of the table and click 'Delete' to delete those rows from the table. The rows are deleted immediately.

- Edit

  If you select one or more rows of the table and click 'Edit', a tieline group configuration page appears for each of the selected rows.

  See Tieline Group Configuration Page, on page 518.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

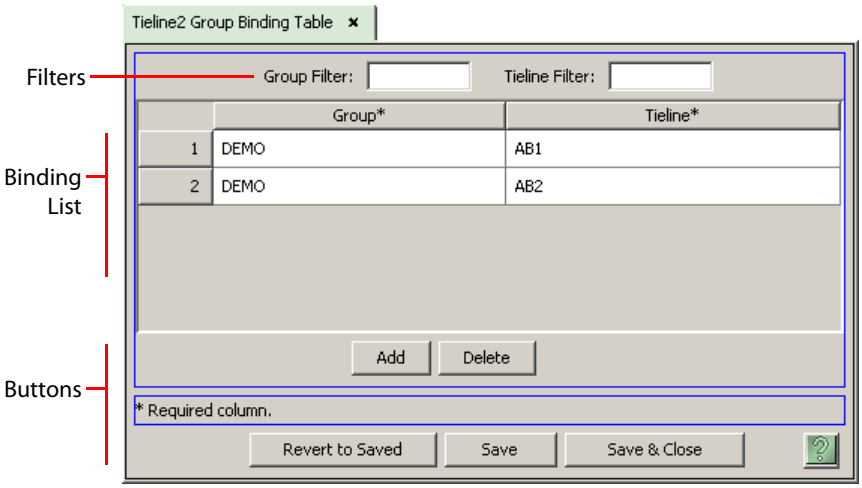
  Click 'Revert to Saved' to restore the saved version of the tieline group table, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Tieline2 Group Binding Table

The 'Tieline2 Group Binding' table (under the 'Views' pane) lists all the tieline groups you have defined in your configuration and shows the tielines that belong to each group. This is a sample 'Tieline2 Group' page:



There are 3 sections in the page:

- Filter
- Binding List
- Buttons

Filter

At the top of the page are two filters:

- Group filter: if you enter text in this field, the binding list is restricted to those entries whose group names contain the text you entered.

- Tieline filter: if you enter text in this field, the binding list is restricted to those entries whose tieline names contain the text you entered.

Binding List

The binding list has 2 columns:

- Group. This field is the name of the group to which the tieline of the same row belongs.
- Tieline. This field contains the name of a tieline that belong to the group named in that row.

You can use click, shift-click, and control-click techniques to select any of the entries in the list.

Buttons

At the bottom of the page are 5 simple buttons:

- Add

  Click 'Add' to add a binding entry to the table. A new row appears at the bottom of the table in which you can enter data.
- Delete

  Select one or more rows of the table and click 'Delete' to delete those rows from the table. The rows are deleted immediately.
- Save

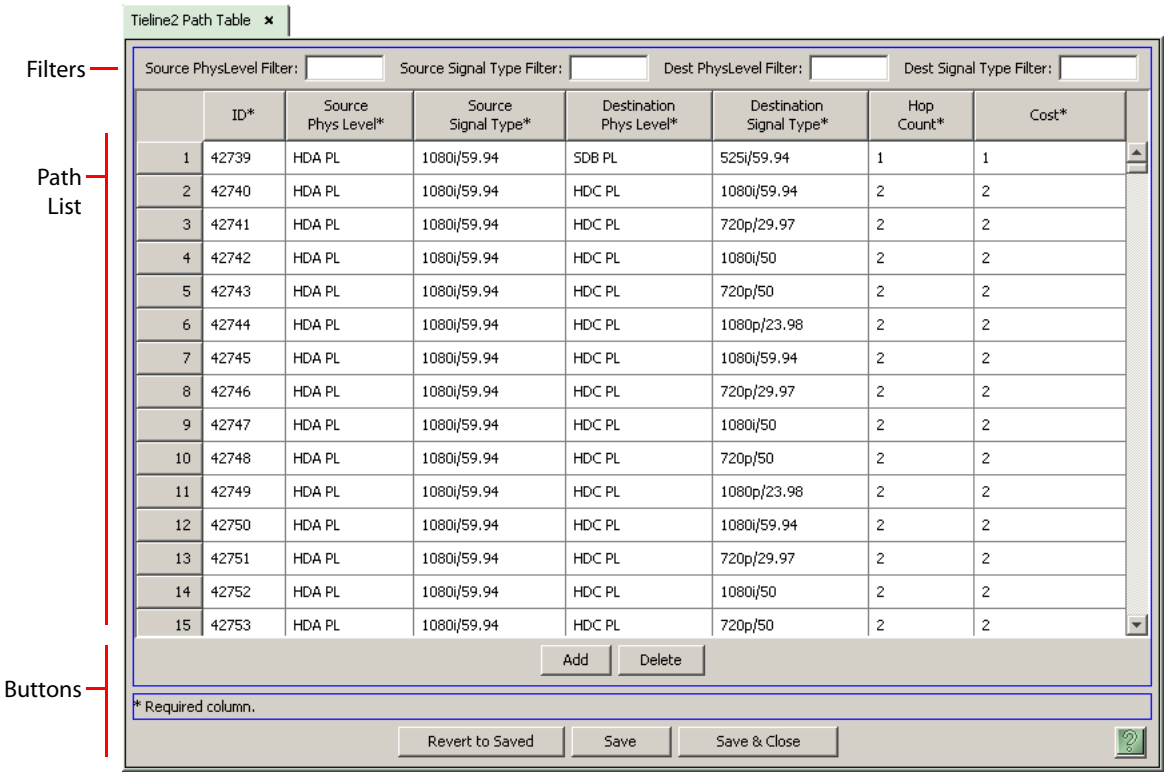
  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the tieline group binding table, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Tieline2 Path Table

The 'Tieline2 Path' table (under the 'Views' pane) lists all the tieline paths of your configuration. This is a sample 'Tieline2 Path' page:



The tieline paths are all the possible paths that signals can traverse through the network of tielines available.

The tieline paths are generated (only) when you write your configuration to the system controller. If you have added tielines since the last write to the system controller, the tieline paths table remains incomplete (or even empty) until you execute the write.

A tieline path represents a single signal type. For instance, if a single cable connects an HD router (with 5 different signal types) and an SD router (with 2 signal types), that cable represents 10 paths. The number of tieline paths in the 'Tieline2 Path' table increases explosively with the number of cables, the number of signal types, and the number of hops possible in your network of tielines. The table lists all 1-hop paths, 2-hop paths, and so on to the maximum number of hops in your system.

Fortunately, you will rarely have to analyze the tieline paths (in this table) in any great detail. If you want to review the formulas for calculating the number of tieline paths, please refer to Number of Tieline Paths, on page 541.

The table lists all tieline paths and shows the hop count and cost for each. There are 3 sections in the page:

- Filters
- Path List
- Buttons

Filters

At the top of the page are 4 filters, corresponding to the 4 main columns of the table:

- 'Source PhysLevel' filter: if you enter text in this field, the path list is restricted to those entries whose 'Source Phys Level' fields contain the text you entered.
- 'Source Signal Type' filter: if you enter text in this field, the path list is restricted to those entries whose 'Source Signal Type' fields contain the text you entered.
- 'Dest PhysLevel' filter: if you enter text in this field, the path list is restricted to those entries whose 'Destination Phys Level' fields contain the text you entered.
- 'Dest Signal Type' filter: if you enter text in this field, the path list is restricted to those entries whose 'Destination Signal Type' fields contain the text you entered.

Path List

The path list has 7 columns:

- ID.

  These are the database IDs of the tieline paths.
- Source Phys Level.

  These fields are drop-down lists where you can choose a physical level for sources that might use the path.
- Source Signal Type.

  These fields are drop-down lists where you can choose a signal type for sources that might use the path.
- Destination Phys Level.

  These fields are drop-down lists where you can choose a physical level for destinations that might use the path.
- Destination Signal Type.

  These fields are drop-down lists where you can choose a signal type for destinations that might use the path.
- Hop Count.

  The number of hops (or simple tielines) in the tieline path.
- Cost.

  The total cost of the path. The total cost is the sum of the relative costs of each hop in the path. The total cost is also relative.

You can use click, shift-click, and control-click techniques to select any of the tieline groups in the list.

▲ It is advisable not to modify the tieline path list. These data were calculated by NV9000-SE Utilities. To modify the data on your own can be disastrous.

Please refer to the Tieline2 Path Detail Table, next, for additional information.

Buttons

At the bottom of the page are 5 simple buttons:

- Add

  Click 'Add' to add a path entry to the table. A new row appears at the bottom of the table in which you can enter data.

- Delete

  Select one or more rows of the table and click 'Delete' to delete those rows from the table. The rows are deleted immediately.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

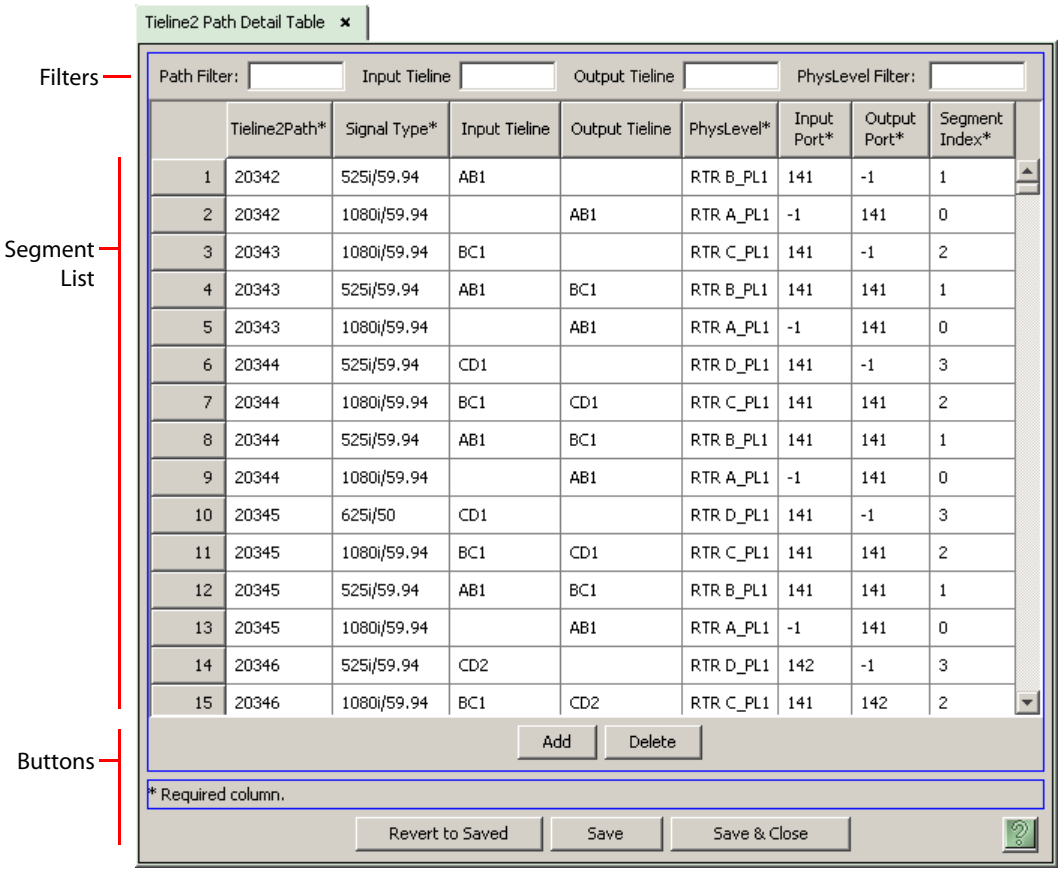
  Click 'Revert to Saved' to restore the saved version of the tieline path table, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Tieline2 Path Detail Table

The 'Tieline2 Path Detail' table (under the 'Views' pane) shows all the tieline paths of your configuration — in detail. This is a sample 'Tieline2 Path Detail' page:



	Tieline2Path*	Signal Type*	Input Tieline	Output Tieline	PhysLevel*	Input Port*	Output Port*	Segment Index*
1	20342	525i/59.94	AB1		RTR B_PL1	141	-1	1
2	20342	1080i/59.94		AB1	RTR A_PL1	-1	141	0
3	20343	1080i/59.94	BC1		RTR C_PL1	141	-1	2
4	20343	525i/59.94	AB1	BC1	RTR B_PL1	141	141	1
5	20343	1080i/59.94		AB1	RTR A_PL1	-1	141	0
6	20344	525i/59.94	CD1		RTR D_PL1	141	-1	3
7	20344	1080i/59.94	BC1	CD1	RTR C_PL1	141	141	2
8	20344	525i/59.94	AB1	BC1	RTR B_PL1	141	141	1
9	20344	1080i/59.94		AB1	RTR A_PL1	-1	141	0
10	20345	625i/50	CD1		RTR D_PL1	141	-1	3
11	20345	1080i/59.94	BC1	CD1	RTR C_PL1	141	141	2
12	20345	525i/59.94	AB1	BC1	RTR B_PL1	141	141	1
13	20345	1080i/59.94		AB1	RTR A_PL1	-1	141	0
14	20346	525i/59.94	CD2		RTR D_PL1	142	-1	3
15	20346	1080i/59.94	BC1	CD2	RTR C_PL1	141	142	2

The tieline paths are those all the theoretical paths that signals can traverse through the network of tielines available.

The details presented in this table, separate from the 'Tieline2 Path' table, are the ports that define the "hops" of each path. (These data are presented separately because the presentation is somewhat tidier.)

Each tieline path has as many entries in this table as are required to represent all the "hops" of the path. Thus, for any *N*-hop tieline path, there are N+1 entries in this table. Each entry is called a "segment."

Each tieline path has a head end; that is segment 0. Each tieline path has a tail end; for an *N*-hop tieline, that is segment *N*. (A segment, then, is equivalent to one of the router partitions along the tieline path.)

At the head end, the input port is undefined because a tieline path originates at an output. At the tail end, the output port is undefined because a tieline path terminates at an input. We indicate that a port is undefined by a –1 in the port field.

The first 3 paths (IDs 20342, 20343, and 20344) in the illustration above show a 1-hop, 2-hop, and a 3-hop tieline respectively.

There are 3 sections in the page:

- Filters
- Segment List
- Buttons

Filters

At the top of the page are 4 filters, corresponding to the 4 main columns of the table:

- 'Path' filter: if you enter text in this field, the path list is restricted to those entries whose 'Tieline2Path' fields contain the text you entered.
- 'Input Tieline' filter: if you enter text in this field, the path list is restricted to those entries whose 'Input Tieline' fields contain the text you entered.
- 'Output Tieline' filter: if you enter text in this field, the path list is restricted to those entries whose 'Output Tieline' fields contain the text you entered.
- 'PhysLevel' filter: if you enter text in this field, the path list is restricted to those entries whose 'PhysLevel' fields contain the text you entered.

(The filters can all be applied; their effects are combined.)

Segment List

The segment list has 8 columns:

- 'Tieline2Path'. These are the database IDs of the tieline paths (which can also be referenced in the Tieline2 Path Table (page 527).

  Note that the database IDs are the only way to identify tieline paths. They have no names.
- Signal type.

  Each path can support one or more signal types, on specific ports. This field identifies one of the signal types supported by the segment (i.e., by the partition at that point in the tieline path).
- Input Tieline.

  This field is the name of the tieline at an input. If the segment index is 0, that is the partition is the head end of the path, the field will be blank and the 'Input Port' field will be –1.
- Output Tieline.

  This field is the name of the tieline at an output. If the partition is the tail end of the path, the field will be blank and the 'Output Port' field will be –1.
- 'PhysLevel'.

  A 'Physlevel' entry specifies in what partition the input or output port exists. The input and output port numbers are given with respect to that partition.
- Input port.

  This field is an input port of this segment (partition) of the tieline path. If there is no input port, the field will be –1 and the 'Input Tieline' field will be blank.
- Output port.

  This field is an output port of this segment (partition) of the tieline path. If there is no output port, the field will be –1 and the 'Output Tieline' field will be blank.

- Segment index.

  The segment index identifies a particular partition of a single-hop or multi-hop path.

  Segment 0 is the head end of a path. For an *N*-hop tieline, segment *N* is the tail end of the path.

You can use click, shift-click, and control-click techniques to select any of the entries in the list.

▲ It is advisable not to modify the tieline path list or the details list. These data were calculated by NV9000-SE Utilities. To modify the data on your own can be disastrous.

Buttons

At the bottom of the page are 5 simple buttons:

- Add

  Click 'Add' to add a path entry to the table. A new row appears at the bottom of the table in which you can enter data.

- Delete

  Select one or more rows of the table and click 'Delete' to delete those rows from the table. The rows are deleted immediately.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

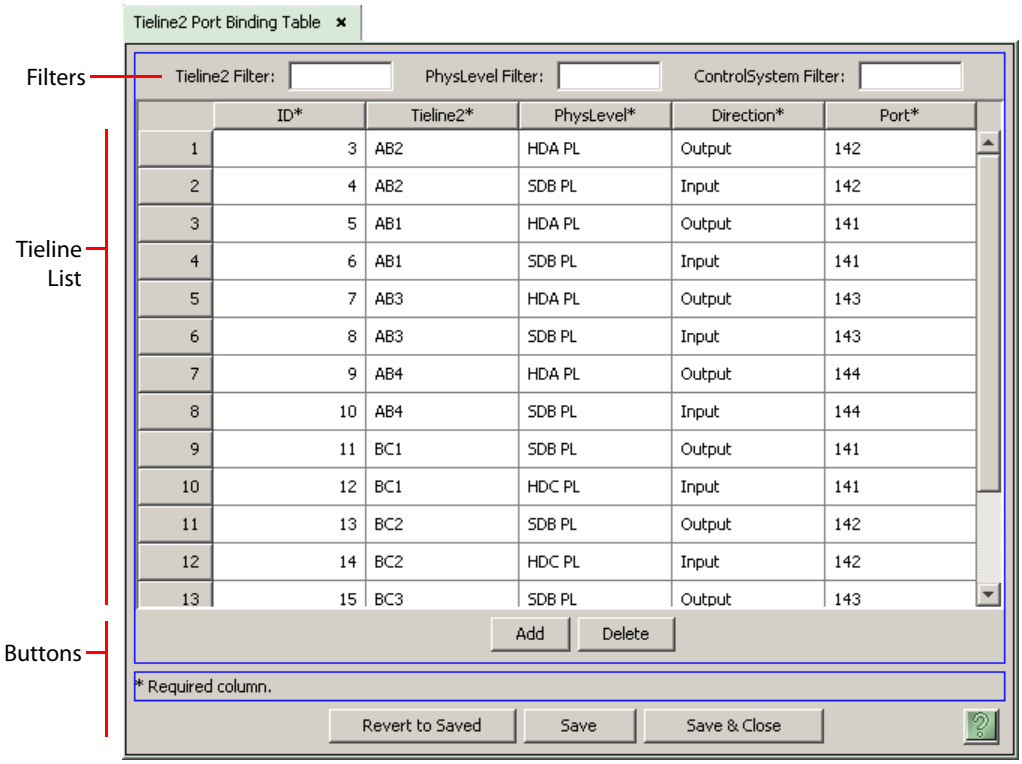
  Click 'Revert to Saved' to restore the saved version of the tieline path detail table, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Tieline2 Port Binding Table

The 'Tieline2 Port Binding' table (under the 'Views' pane) shows all the ports used for tielines in your configuration. This is a sample 'Tieline2 Port Binding' page:



Every simple tieline connects two ports. The ports are usually in different physical levels (partitions). This table lists the ports for all the simple tielines in your configuration.

There are 3 sections in the page:

- Filters
- Tieline List
- Buttons

Filters

At the top of the page are 3 filters, corresponding to the 4 main columns of the table:

- 'Tieline2' filter: if you enter text in this field, the tieline list is restricted to those tielines whose names contain the text you entered.
- 'PhysLevel' filter: if you enter text in this field, the tieline list is restricted to those entries whose 'PhysLevel' fields contain the text you entered.
- 'ControlSystem' filter: this filter is a no-op. It has no effect on the tieline list. (There is no 'Control System' column in the table.)

Tieline List

The tieline list has 5 columns:

- ID. These are the database IDs of the tieline-to-port relationships (of which there are two for every tieline).
- 'Tieline2'. These are the names given to the tielines when they were created. You can edit the names in this table.
- 'PhysLevel'.

  A 'Physlevel' entry specifies in what partition the input or output port exists.
- Direction.

  These fields are drop-down lists. Your choices are 'Input' or 'Output'. This field specifies the port type.
- Port.

  The port number (input or output) with respect to the physical level (partition) specified.

You can use click, shift-click, and control-click techniques to select any of the entries in the list.

Buttons

At the bottom of the page are 5 simple buttons:

- Add

  Click 'Add' to add a path entry to the table. A new row appears at the bottom of the table in which you can enter data.
- Delete

  Select one or more rows of the table and click 'Delete' to delete those rows from the table. The rows are deleted immediately.
- Save

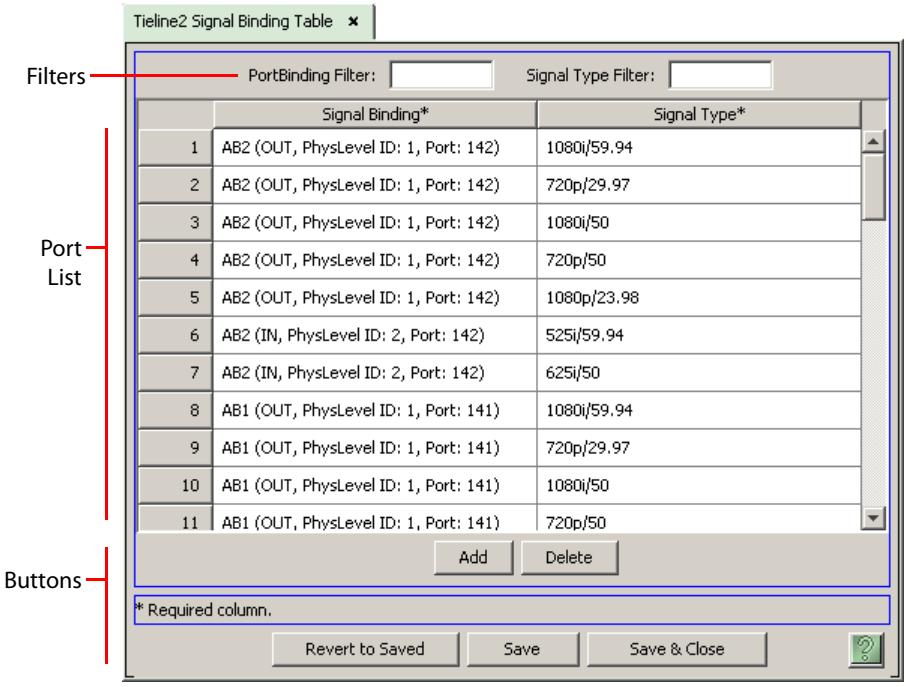
  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the tieline port binding table, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Tieline2 Signal Binding Table

The 'Tieline2 Signal Binding' table (under the 'Views' pane) shows all the signal types supported by the tieline ports in your configuration. This is a sample 'Tieline2 Signal Binding' page:



Every tieline port supports a number of (related) signal types. For instance, in the illustration above, output port 142 of the physical level whose ID is 1 supports 5 HD formats: 1080i/59.94, 720p/29.97, 1080i/50, 720p/50, and 1080p/23.98.

There are 3 sections in the page:

- Filters
- Port List
- Buttons

Filters

At the top of the page are 2 filters:

- 'PortBinding' filter: if you enter text in this field, the port list is restricted to those entries whose 'Signal Binding' fields contain the text you entered.

  ▲ There is a bug here: the column should probably be labeled 'Port Binding'.

- 'Signal Type' filter: if you enter text in this field, the port list is restricted to those entries whose 'Signal Type' fields contain the text you entered.

Port List

The tieline list has 2 columns:

- 'Signal Binding'. Entries in this column are compounded of two items: the name of a simple tieline, and a port (which is specified by a port type, physical level ID, and a port number). These two items form a *tieline port binding*, which is really just a port.

  ▲ There is a bug here: the column should be labeled 'Port Binding'.

- 'Signal Type'. Entries in this column enumerate the signal types for each of the ports in the list.

You can use click, shift-click, and control-click techniques to select any of the entries in the list.

Buttons

At the bottom of the page are 5 simple buttons:

- Add

  Click 'Add' to add a path entry to the table. A new row appears at the bottom of the table in which you can enter data.

- Delete

  Select one or more rows of the table and click 'Delete' to delete those rows from the table. The rows are deleted immediately.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

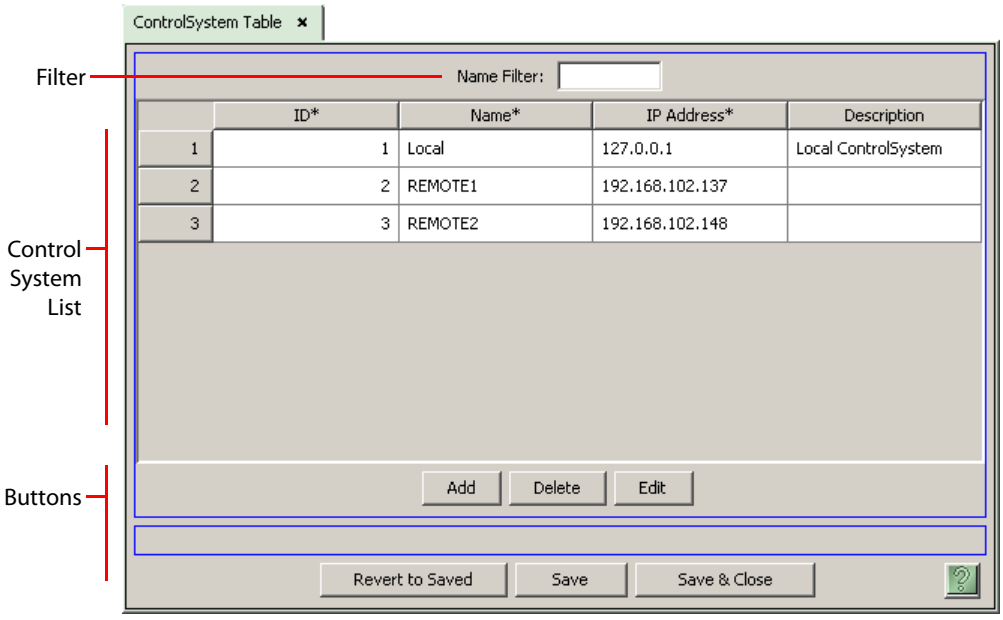
  Click 'Revert to Saved' to restore the saved version of the tieline signal binding table, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Control Systems Table

The 'Control Systems' table (under the 'Views' pane) lists all the control systems defined in your configuration. This is a sample 'Control Systems' page:



This table exists to support tielines. There are 3 sections in the page:

- Filter
- Control System List
- Buttons

Filter

At the top of the page is a 'Name' filter: if you enter text in this field, the control system list is restricted to those systems whose names contain the text you entered.

Control System List

The control system list has 4 columns:

- ID. These are database IDs assigned to the control systems. You cannot change these fields.
- Name. These are the names of the control systems. You can edit the names in this table.
- IP address. These are the IP addresses of the control systems. You can edit the IP addresses in this table.
- The description field is free-format. Use it to comment on your control system.

You can use click, shift-click, and control-click techniques to select any of the entries in the list.

Buttons

At the bottom of the page are 6 simple buttons:

- Add

  Click 'Add' to add a path entry to the table. A new row appears at the bottom of the table in which you can enter data.

- Delete

  Select one or more rows of the table and click 'Delete' to delete those rows from the table. The rows are deleted immediately.

- Edit

  ▲ There is a bug here: the 'Edit' button does nothing.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

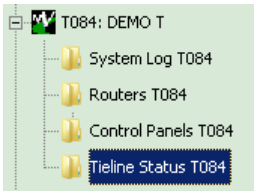
  Click 'Revert to Saved' to restore the saved version of the tieline signal binding table, discarding any changes you have made (since the last save).

- 'Save & Close'

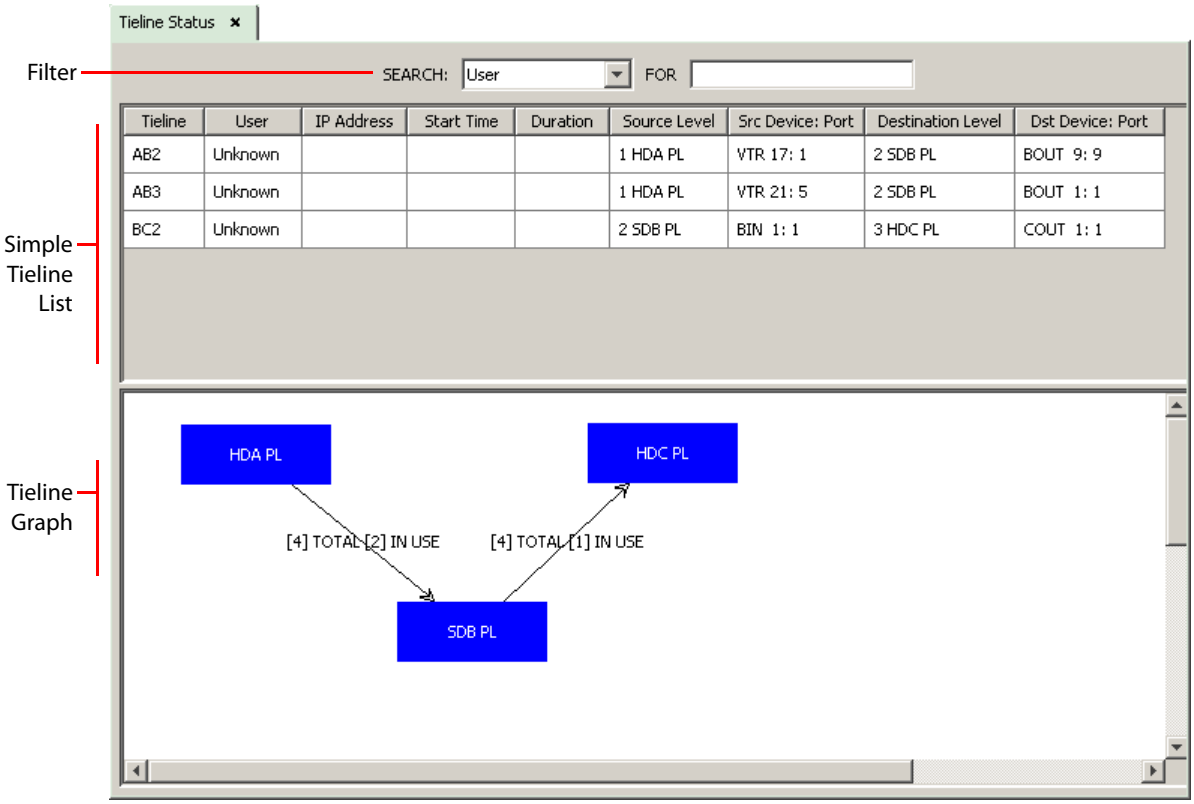
  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Tieline Status Page

The 'Tieline Status' page is available through the 'System Management' pane. To access the 'Tieline Status' page, click the 'Tieline Status' "folder" under the system controller you want to inspect:



This a sample 'Tieline Status' page;



The 'Tieline Status' page shows the simple tielines that are in use. By careful inspection, you can determine the multi-hop tielines (if any) that comprise simple tielines.

- If your system has a large number of tielines, this page might be difficult or impossible to decipher.
- You might want to use the NV9000 Web Suite to observe tieline status.

There are 3 sections in the page:

- Filters
- List of Simple Tielines
- Tieline Graph

Filters

At the top of the page is one filter. The drop-down list at the left lets you choose the column of the tieline list that will form the basis of the filter. The text box at the right lets you specify text with which to filter the list.

If you enter text in the text box, the tieline list is restricted to those entries that contain your text in the column you specified.

The columns you can choose for the filter are:

User Tieline Source Device Destination Device

List of Simple Tielines

The table in this section shows simple tielines that are currently in use, that is the tielines on which a route has been made. Multi-hop tielines, if they exist, comprise two or more of the simple tielines.

The table has 9 columns:

- Tieline

  The names assigned to the (simple) tieline defined in the configuration of the selected control system.
- User

  The user who made the tieline route. If the user cannot be identified, the field reports "Unknown."
- IP address

  The panel at which the tieline route was made. If the panel cannot be identified, the field is blank.
- Start time

  The time at which the tieline was put into use by a route. If the start time cannot be determined, the field is blank.
- Duration

  The length of time that the tieline has been in use by a route. If this value cannot be determined, the field is blank.
- Source level

  A field in this column identify the physical level of the source (or upstream) device of the tieline.
- 'Src device:port'

  A field in this column actually has two data: (1) the name of the source device and the port in the physical level identified in the 'Source Level' field.
- Destination level

  A field in this column identify the physical level of the destination (or downstream) device of the tieline.
- 'Dst device:port'

  A field in this column actually has two data: (1) the name of the destination device and the port in the physical level identified in the 'Destination Level' field.

Tieline Graph

The graph shows the topology of the tielines defined in the configuration of the control system. (Tielines are defined in the 'Tielines' page of the Configuration pane.)

The graph represents physical levels by blue rectangles and identifies the specific physical level as the title of the rectangle.

The lines between the rectangles represent sets of tielines.

The label associated with a line has two parts:

[*xxx*] TOTAL and [*yyy*] IN USE

The number "*xxx*" is the number of tielines in the set. The number "*yyy*" is the number of tielines in use in that set. It is possible for "*yyy*" to be 0.

The numbers of tielines in use, as shown in the graph, corresponds to the data in the tieline usage section.

Note that you can drag the partition rectangles around in the graphic window to make a clearer picture.

Number of Tieline Paths

Definitions & Notation

Let two router partitions be labeled *J* and *K*. Then we say *JK* is the number of tieline paths from *J* to *K*. (Tielines are unidirectional.)

Call the number of signal types supported by tielines of a router partition the "degree" of the partition. (For example, an SD partition might support the signal types 525i/59.94 and 625i/50. The degree of that partition would be 2.)

A simple tieline need not support all the signal types of the partitions it connects. But for the sake of simplicity in the calculations, we assume that all tielines support all the signal types of the partitions they connect.

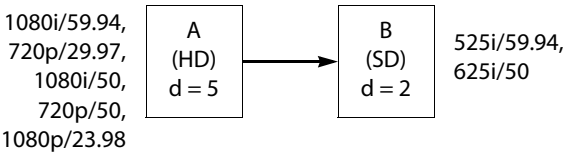
Simple Tielines

(Simple tielines are 1-hop tielines, directly connecting two partitions.)

For partitions A and B, where A has degree d_A and B has degree d_B, and the number of connections between A and B is N, the path count is

$$AB = d_A \times d_B \times N$$

Example:



A supports 1080i/59.94, 720p/29.97, 1080i/50, 720p/50, 1080p/23.98.

B supports 525i/59.94 and 625i/50.

There are 4 tielines defined between A and B.

The path count, AB is $5 \times 2 \times 4 = 40$.

Multi-Hop Tielines

For the sake of path calculations, a multi-hop tieline consists of a starting partition, A, and an ending partition, Z, and one or more intervening partitions (B, C, D, . . . X, Y) through which signals are routed from A to Z.)

Each partition, A, B, C, and so on to Z, has degree d_A, d_B, d_C, d_D, . . . d_X, d_Y, d_Z.

Let N_{AB}, N_{BC}, N_{CD}, . . . N_{YZ} be the number of connections between adjacent partitions.

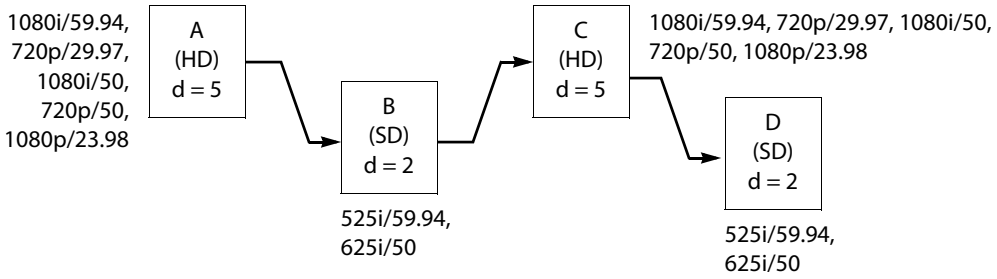
The path count for the multi-hop tieline is

$AZ = [AB \times BC \times CD \times \ldots \times YZ] / (d_B \times d_C \times d_D \times \ldots d_Y)$

that is, the product of path count for all simple tielines in the route divided by the product of degrees of all intermediate partitions.

(The result is a maximum; if you have declined to use certain signal types for certain tielines, the result will be less. The calculations for that situation are extremely complex and not at all useful.)

Example:



A supports 1080i/59.94, 720p/29.97, 1080i/50, 720p/50, 1080p/23.98. The degree of A is 5.

B supports 525i/59.94 and 625i/50. The degree of B is 2.

C supports 1080i/59.94, 720p/29.97, 1080i/50, 720p/50, 1080p/23.98. The degree of C is 5.

D supports 525i/59.94 and 625i/50. The degree of D is 2.

There are 3 tielines defined between A and B, and also between B and C and between C and D.

The path count is

$AD = [(AB)(BC)(CD)] / (d_B \times d_C)$

Where

$AB = d_A \times d_B \times 3 = 5 \times 2 \times 3 = 30$

$BC = d_B \times d_C \times 3 = 2 \times 5 \times 3 = 30$

$CD = d_C \times d_D \times 3 = 5 \times 2 \times 3 = 30$

Then

$AD = [(30)(30)(30)] / (2 \times 5)$

$AD = 27,000 / 10 = 2700.$

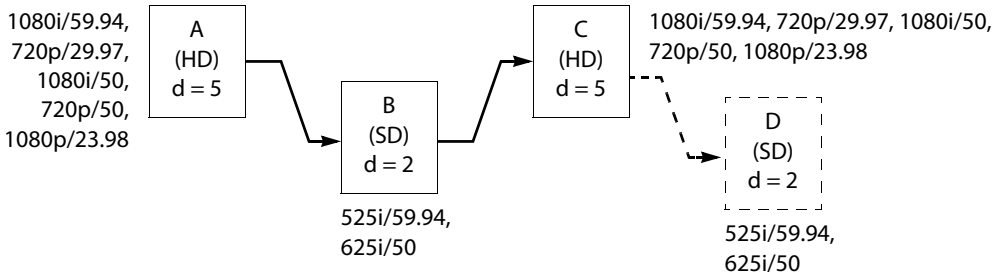
Comparison

The number of paths in the 'Tieline2' table increases greatly as the number of tielines increases, as the number of router partitions increases, and as the degree of the partitions increases.)

The examples given here of course do not represent your system. They are meant to convey the complexity of the path table.

Variation with the Number of Routers

Consider a small system with 3 router (partitions), A, B, C where a fourth partition D is added:



There is one tieline between A and B, B and C, and when added, between C and D.

When the system has 3 partitions, the path count is

(1-hop)
AB = 5 x 2 = 10
BC = 2 x 5 = 10

(2-hop)
AC = (5) x 2 x (5) = 50
= 10 x 10 / 2 = 50

All Paths
10 + 10 + 50 = 70.

(That is for 3 cables.)

Adding the D partition, the patch count increases.

(1-hop)
AB = 5 x 2 = 10
BC = 2 x 5 = 10
CD = 5 x 2 = 10

(2-hop)
AC = (5) x 2 x (5) = 50
= 10 x 10 / 2 = 50
BD = (2) x 5 x (2) = 20
= 10 x 10 / 5 = 20

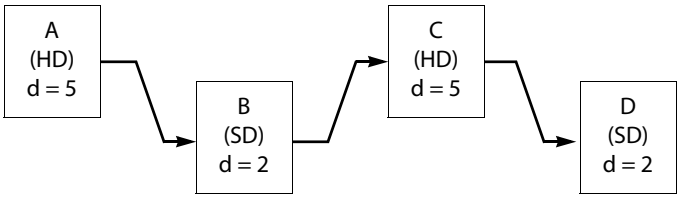
(3-hop)
AD = 10 x 10 x 10 / (2 x 5) = 100

All Paths
10 + 10 + 10 + 50 + 20 + 100 = 200.

(That is for 4 cables. Adding one cable more than doubled the tieline path count.)

Variation with the Number of Connections

Consider the 4-partition system from above. There are 4 partitions, A, B, C, and D. We vary the number of connections between partitions from 1 to 4 and $N = N_{AB} = N_{BC} = N_{CD}$ (because it is easy):



One Connection

(1-hop)
AB = 5 x 2 x 1 = 10
BC = 2 x 5 x 1 = 10
CD = 5 x 2 x 1 = 10

(2-hop)
AC = 10 x 10 / 2 = 50
BD = 10 x 10 / 5 = 20

(3-hop)
AD = 10 x 10 x 10 / (d_B x d_C) = 100
= 10 x 10 x 10 / (2 x 5) = 100

All Paths
10 + 10 + 10 + 50 + 20 + 100 = 200. [This result was seen earlier]

Two Connections

(1-hop)
AB = (5 x 2) x 2 = 20
BC = (2 x 5) x 2 = 20
CD = (5 x 2) x 2 = 20

(2-hop)
AC = 20 x 20 / 2 = 400 / 2 = 200
BD = 20 x 20 / 5 = 400 / 5 = 80

(3-hop)
AD = 20 x 20 x 20 / (2 x 5) = 8000 / 10 = 800

All Paths
20 + 20 + 20 + 200 + 80 + 800 = 1140.

Three Connections

(1-hop)
AB = (5 x 2) x 3 = 30
BC = (2 x 5) x 3 = 30
CD = (5 x 2) x 3 = 30

(2-hop)
AC = 30 x 30 / 2 = 900 / 2 = 450

BD = 30 x 30 / 5 = 900 / 5 = 180

(3-hop)
AD = 30 x 30 x 30 / (2 x 5) = 27,000 / 10 = 2700

All Paths
30 + 30 + 30 + 450 + 180 + 2700 = 3420.

Four Connections

(1-hop)
AB = (5 x 2) x 4 = 40
BC = (2 x 5) x 4 = 40
CD = (5 x 2) x 4 = 40

(2-hop)
AC = 40 x 40 / 2 = 1600 / 2 = 800
BD = 40 x 40 / 5 = 1600 / 5 = 320

(3-hop)
AD = 40 x 40 x 40 / (2 x 5) = 64,000 / 10 = 6400

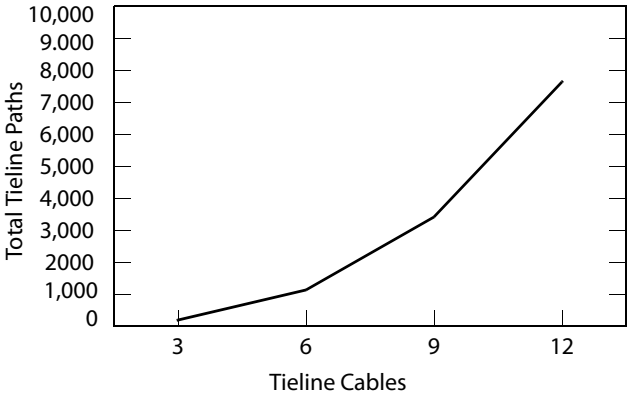
All Paths
40 + 40 + 40 + 800 + 320 + 6400 = 7640.

Comparison

These are the data:

Connections	1-Hop Paths	2-Hop Paths	3-Hop Paths	Total
1 x 3 = 3	30	70	100	200
2 x 3 = 6	60	280	800	1140
3 x 3 = 9	90	630	2700	3420
4 x 3 = 12	120	1120	6400	7640

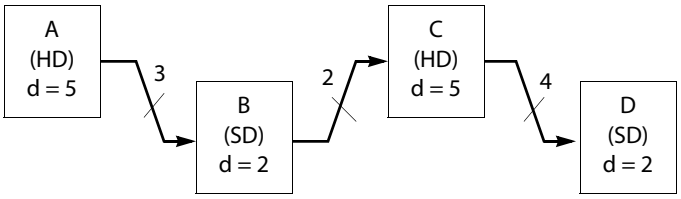
This is the chart for the example, showing the totals for the 4 cases:



Variation in Tieline Count

Thye previous examples used a uniform number of tielines between partitions because it made the examples easier to understand. When the number of tielines is not uniform, the calculations are not more difficult.

Consider the 4-partition system again. This time, $N_{AB} = 3$, $N_{BC} = 2$, and $N_{CD} = 4$:



Then

(1-hop)
AB = (5 x 2) x 3 = 30
BC = (2 x 5) x 2 = 20
CD = (5 x 2) x 4 = 40

(2-hop)
AC = (AB)(AC) / 2 =
= 30 x 20 / 2 = 600 / 2 = 300

BD = (BC)(CD) / 5 =
= 20 x 40 / 5 = 800 / 5 = 160

(3-hop)
AD = (AB)(BC)(CD) / (d_B x d_C) =
= 30 x 20 x 40 / (2 x 5) = 24,000 / 10 = 2400

All Paths
30 + 20 + 40 + 300 + 160 + 2400 = 2950.

(Again, the figure is a maximum, because if you omit certain signal types from certain paths, the number of paths decreases. The calculations for that situation are not worth the trouble.)

Your tieline configuration will probably be more complex than the examples given here. Complex configurations can be decomposed into simpler parts and the two formulas (given under Simple Tielines and Multi-Hop Tielines, on page 541) can then be applied.

13 Importing and Exporting

Chapter 13 provides information about importing and exporting configuration data.

Summary

Introduction *547*
Theory *549*
Export to File *550*
Import Data File *555*

Introduction

NV9000-SE Utilities provides a mechanism to import and export certain data directly to (and from) configuration tables.

This limited capability is in addition to the several commands in the 'File' menu that allow you to import and export entire configurations to and from .zip files and .xml files, and to import old configurations.

These two commands are found in the 'Tasks' pane:

- Import Data File
- Export to File

▲ The 'Export to File' command can also be invoked from the 'Input Phys Conns' page and from the 'Output Phys Conns' page. See 'Input Phys Conns' Page, on page 155 and 'Output Phys Conns' Page, on page 157.

The files involved are .csv files which open directly in Microsoft Excel. The 'Import Data File' command expects a properly formatted .csv file. The 'Export to File' command generates a .csv file (or two in some cases).

The data that can be imported and exported using these commands are

- Devices
- Categories (and category details)
- Physical connections

There are several ways these data can be exported or imported.

Export to File

The 'Export to File' command has two options:

- Table

  If you select this option, you can select one of a few tables to export. For the selected table, you can specify which data fields (identified by column headers) to export and which to omit.

  Some data fields require you to specify whether to emit the database ID of the field or the mnemonic that appears in the field. There are reasons for either case.

- Devices and their Physical Connections

  With this option, you specify a level set and whether to emit input devices, output devices, or both. The export command then emits the devices (and the correspond port data) that belong to the specified level set.

Import Data File

The 'Import Data File' command has two similar options:

- Target Table

  If you select this option, you can select one of a few tables to which to import data. For the selected table, you can specify which data fields (identified by column headers) to import and which to omit.

  Some data fields require you to specify whether the data field contains a database ID or a mnemonic. (There are reasons for either case.)

- Devices and their Physical Connections

  With this option, you specify a level set and whether to import input devices or output devices. (You cannot import both at the same time.) The command then imports the device data (and the correspond port data) that belong to the specified level set.

A third option, 'Import Mapping File', exists. In the process of exporting and importing data, you might have created and saved "mappings." This command loads one of your saved mappings.

▲ Note: NV9000-SE Utilities wants to save and retrieve the mapping files in the configuration repository on your computer. That is `C:\user\<username>\CtrlSysConfigs` under Windows 7.

The mapping file contains no configuration data.

Points to Remember

1 The import and export commands affect one of 3 specific sets of data.

  Devices.
  Categories and category details.
  Physical connections.

  These data generally form the bulk of configuration data at any particular installation. Not included are salvos and tieline data among other data.

2 The 'Import Data File' command is perilous.

You can seriously damage your configuration by importing data the wrong way. And importing data the right way is extremely tricky. It is our hope that the guidelines in this chapter will help you avoid the pitfalls.

In fact, because of the perils, there is a 'Test' button in the last page of the import command sequence that lets you try out an import before performing an actual import.

▲ Make a backup copy of your configuration before using the 'Import Data File' command.

(There are no perils when you are exporting data, but while exporting, you should keep in mind the perils of importing that same data.)

Theory

There are 3 basic reasons to use the 'Export to File' command:

- To create an Excel file (or similar) in which to edit device data more easily. That data can then be imported to another configuration.

  It makes little sense to import the data back into the file from which it came. (But you can do it if you are careful.)
- To prepare a report of the device data in some publishing software, that is to make the data readable, digestible, or "pretty."
- To create an empty Excel file in the proper format — with the proper column headers. You can then load your configuration data into the Excel file more easily.

There are 2 basic reasons to use the 'Import Data File' command:

- To add data to device, category, or physical connection tables that already have data.

  The assumption here is that you are modifying an existing configuration.
- To add data to empty device, category, or physical connection tables.

  The assumption here is that you are creating a new configuration.

Guidelines for Importing

1 Almost always omit the principal database ID column (or make it blank) when importing.

If, for example, database IDs are present in the Excel file, and a matching database ID exists in the configuration, the import of that row of the file will fail and the existing item in the configuration will not be changed.

NV9000-SE Utilities creates database IDs whenever it needs them.

2 Unless you are adding new data to a table, clear the table (or the relevant portion of it) into which you are importing.

(If you delete devices, NV9000-SE Utilities deletes the related physical connections also.)

3 Generally, you cannot import data into a completely empty configuration.

Creating device entries requires there to be a containing level set. A level set requires a router partition. So at a minimum, the configuration you are creating (or modifying) should have a complete set of router definitions and level set definitions. Little else is required for imports.

4 If you are importing previously exported data, remember how you exported it. For example, if the data were exported using tabs as field delimiters instead of commas, the import should also use tabs. Also, if the export produced a row of column headers, the import should recognize the headers (and skip over them).

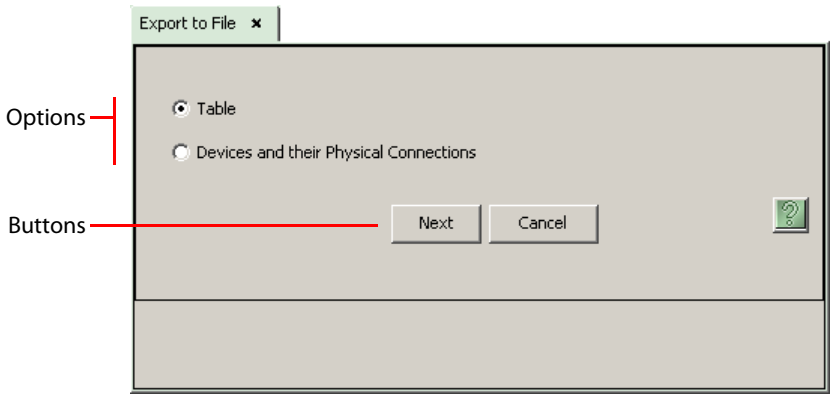
Export to File

The 'Export to File' page starts a series of steps, in multiple pages, in which you create a .csv file. There are two ways to get the 'Export to File' page:

- Click the 'Export' button at the bottom of the 'Input Phys Conns' page of the 'Output Phys Conns' page (of the 'Configuration' pane).
- Click 'Export to File' in the 'Tasks' pane.

Initial Page

This is a sample of the initial 'Export to File' page:



This page, as the start of a series, provides 2 basic fields:

- Table.

  Choose this option to export a selected table. (You specify the table, and other export options, in a subsequent page.)
- Devices and their Physical Connections.

  Choose this option to export the devices and their physical connections that belong to a specified level set. (You specify the level set in a subsequent page, and you can also specify whether to export inputs, outputs, or both.)

Buttons

At the bottom of the page (and other pages in the export equence) are buttons that allow you to move through the sequence of steps in device definition. This page has two buttons:

- Next
- Cancel
- (Previous which is not present in this particular page)

Generally, the buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

'Next' Button

Click 'Next' to go to the second page of the export sequence.

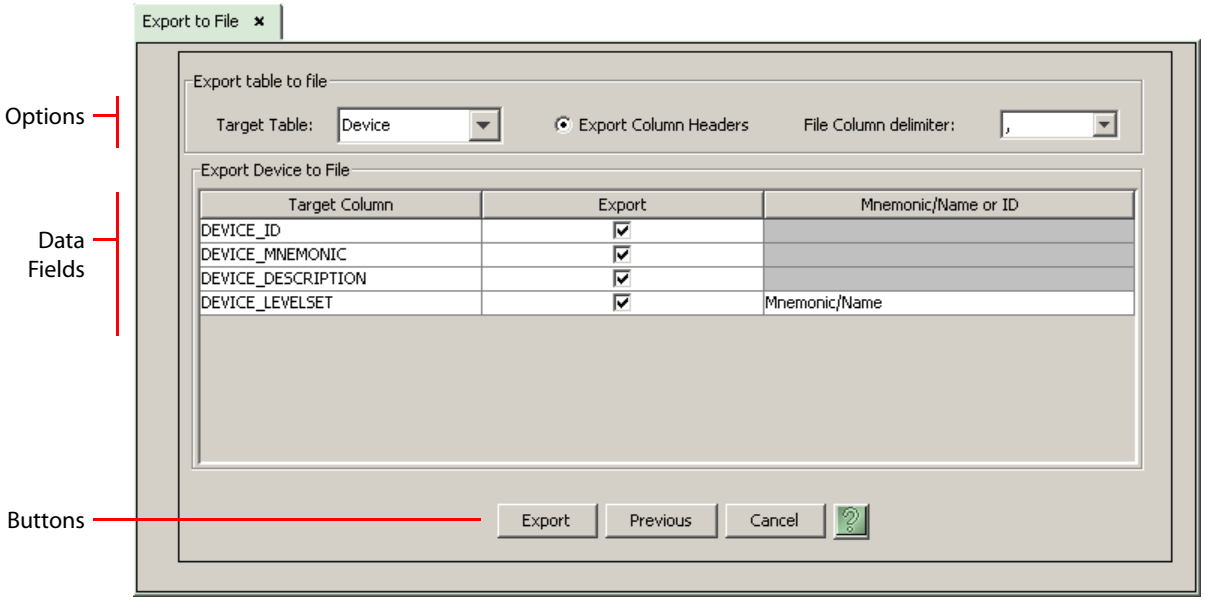
'Cancel' Button

Click 'Cancel' if you want to terminate the export you started.

When you click 'Cancel', NV9000-SE Utilities closes the page.

Second Page — Exporting a Table

This is a sample of the second 'Export to File' page when you have chosen the 'Table' option:



This page has 3 sections:

- Options
- Data Fields
- Buttons

Options

The first option is the table to export. Choose one of the following 4 tables:

Device Category CategoryDetail PhysConn

The second option is whether to export column headers. Click the circle to enable or disable column headers. Column headers are enabled when there is a black dot in the circle.

The third option is the character to use as a field separator (or a column separator as it is called here). Choose a comma, tab, or vertical bar (|) from the drop-down menu.

Data Fields

The table in this section lists the fields of the table that can be exported. The table has 3 columns:

- Target Column
- Export
- Mnemonic/Name or ID

'Target Column'

The 'Target Column' entries show what the column headers in the file will be (if you have enabled column headers). Otherwise, they just identify the fields that you can export.

▲ The text in these fields are concatenations of the table name and the field names of the table. For example, for the device table, the first entry is DEVICE_ID, which is a concatenation of "Device" and "ID." (There is no such thing as a device ID and there is no DEVICE_ID field anywhere in NV9000-SE Utilities.

'Export'

The 'Export' column contains check boxes. Place a check in the check box for table fields you want to export and clear the check boxes for fields that you do not want to export.

'Mnemonic/Name or ID'

Some entries in this column are disabled and the disabled entries are grayed out.

For any field that you wish to export and that has an enabled mnemonic/ID entry, you must specify whether to export that field as a mnemonic or as a (database) ID.

(If the data you export are imported, they must be imported with the flag set the same way.

Buttons

At the bottom of the page (and other pages in the export equence) are buttons that allow you to move through the sequence of steps in device definition. This page has two buttons:

- Export
- Previous
- Cancel

Generally, the buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

'Export' Button

Click 'Export' to go to the next step of the export sequence, which is a Windows 'Save' dialog in which you specify the file name, and the folder in which to save the exported file.

The default name for the file is a concatenation of

`Export` + *table name* + `csv`

For example, if you are exporting the device table, the file name is `ExportDevice.csv`.

When you click OK in the 'Save' dialog, NV9000-SE Utilities carries out the save and returns a message indicating success:

Failure messages can occur but they are rare and usually based on conditions in your computer's file system.

You can also click 'Cancel' to return to the export page.

'Next' Button

Click 'Previous' to go to the previous page of the export sequence.

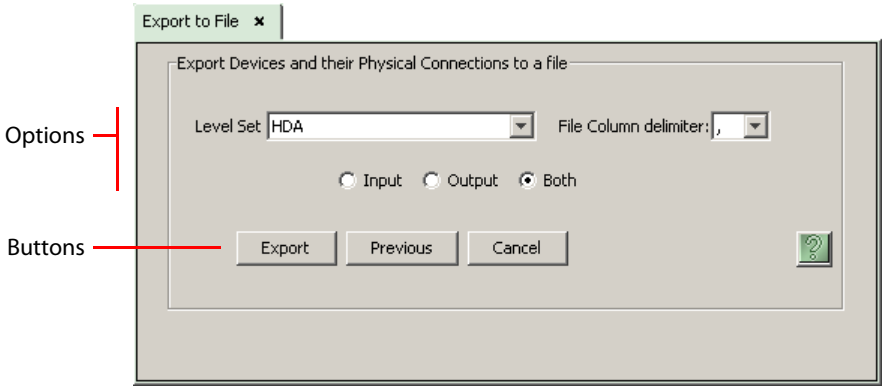
'Cancel' Button

Click 'Cancel' if you want to terminate the export you started.

When you click 'Cancel', NV9000-SE Utilities closes the page.

Second Page — Exporting Devices and Physical Connections

This is a sample of the second 'Export to File' page when you have chosen the 'Devices and their Physical Connections' option:



This page has 2 sections:

- Options.
- Buttons

Options

The first option is the name of a level set whose device data you want to export. Choose a level set from the drop-down menu. If your configuration has no level set, you cannot proceed with the export.

The second option is the character to use as a field separator (or a column separator as it is called here). Choose a comma, tab, or vertical bar (|) from the drop-down menu.

The third option is a choice of whether to export inputs, outputs, or both. Choose of the three radio buttons.

Buttons

At the bottom of the page (and other pages in the export sequence) are buttons that allow you to move through the sequence of steps in device definition. This page has two buttons:

- Export
- Previous
- Cancel

Generally, the buttons are grayed out (disabled) until they become applicable. For instance, you cannot use the 'Previous' button (to go to a previous page) until you have used the 'Next' button to go to one of the next pages.

'Export' Button

Click 'Export' to go to the next step of the export sequence, which is a Windows 'Save' dialog in which you specify a file name *prefix*, and the folder in which to save the exported file.

There is no default for the prefix.

If you are exporting inputs, the file name is the concatenation of

prefix + _Input + .csv

If you are exporting outputs, the file name is the concatenation of

prefix + _Output + .csv

If you are exporting both inputs and outputs, NV9000-SE Utilities creates both files.

When you click OK in the 'Save' dialog, NV9000-SE Utilities carries out the save and returns a message indicating success:

Failure messages can occur but they are rare and usually based on conditions in your computer's file system.

You can also click 'Cancel' to return to the export page.

'Previous' Button

Click 'Previous' to go to the previous page of the export sequence.

'Cancel' Button

Click 'Cancel' if you want to terminate the export you started.

When you click 'Cancel', NV9000-SE Utilities closes the page.

Import Data File

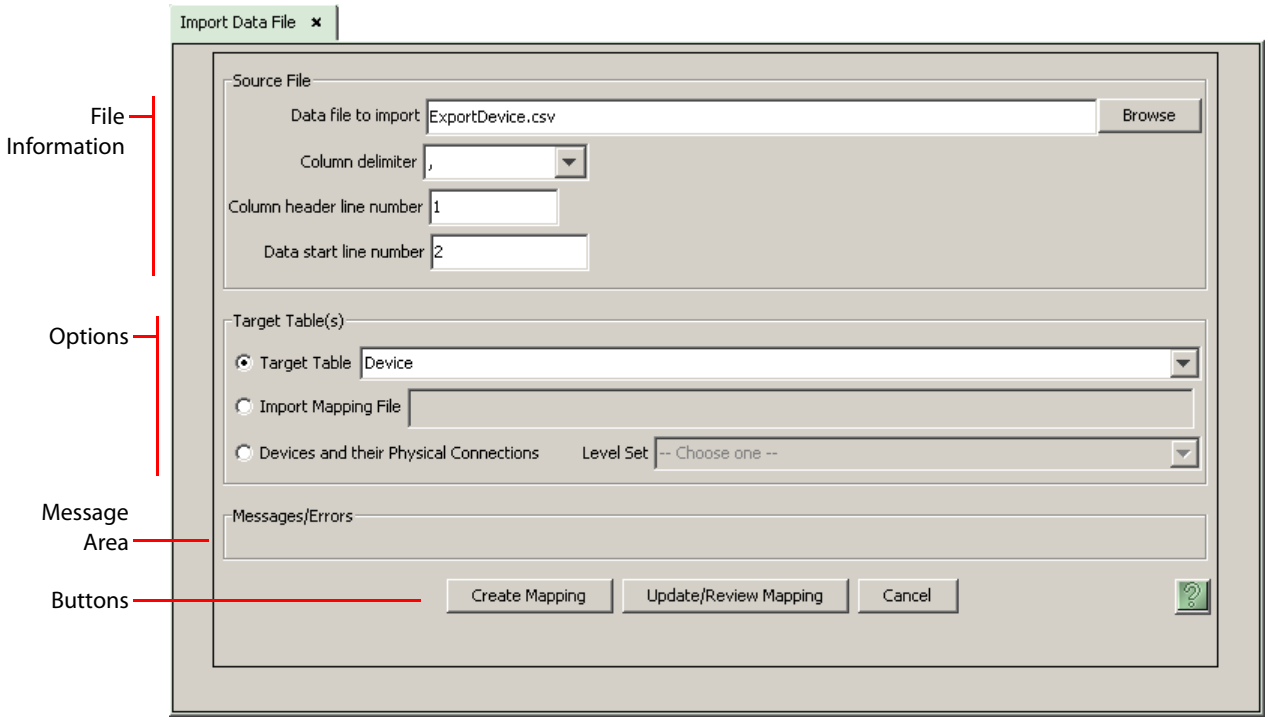
The 'Import Data File' page starts a series of steps, in multiple pages, in which you import data from a .csv file.

▲ Make a backup copy of your configuration before you import any data.

The 'Import Data File' command is found under the 'Tasks' pane.

Initial Page

This is a sample of the initial 'Import Data File' page:



This page, as the start of a series, has 4 sections:

- File Information
- Message Area
- Options
- Buttons

File Information

There are 4 fields in this section:

- Data file to import

  Click the 'Browse' button at the right to navigate to, and open, a .csv file containing the data you want to import. The name of the file appears in the white text box. (You can also type a pathname in this box.)

- Column delimiter

  Acceptable .csv files use either commas, tabs, or vertical bars (|) as field separators. Select the separator your file uses from the drop-down list for this option.

- Column header line number

  Your .csv file might have column headers, especially if it was created as a file exported from NV9000-SE Utilities. If your file has column headers, specify the line number in which the headers are to be read.

- Data start line number

  The data in your .csv file might start at a line other than 1. If your .csv file was created an export, the data probably start at line 2. You might have a reason for starting data in any other line. In any case, specify the line number at which your data start.

Message Area

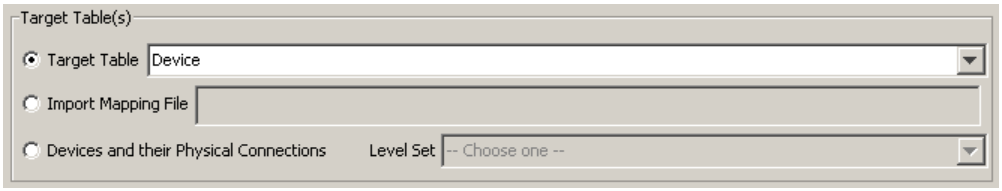
The message box presents status messages regarding your import.

Options

The options section has 3 choices:

- Target table.

  This option has a drop-down list from which you can select a table:



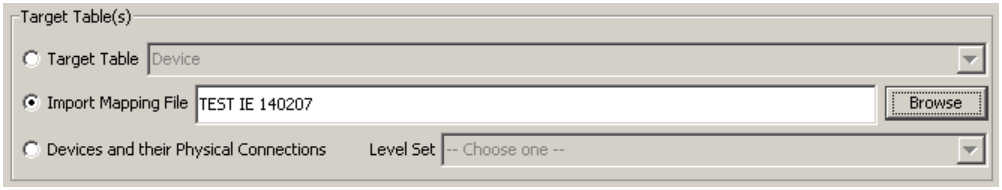
  Choose this option when you want to import data to a specific table. You can choose one of the following 4 tables:

  Device Category CategoryDetail PhysConn

  After you choose the table, click the 'Create Mapping' button to continue with the import.

- Import mapping file.

  Choose this option if you have saved a mapping file and want to retrieve it. When you choose this option, a 'Browse' button appears:



  Click the browse button to locate a mapping file that you have previously saved using the 'Save Mapping' button of the next page in the import sequence.

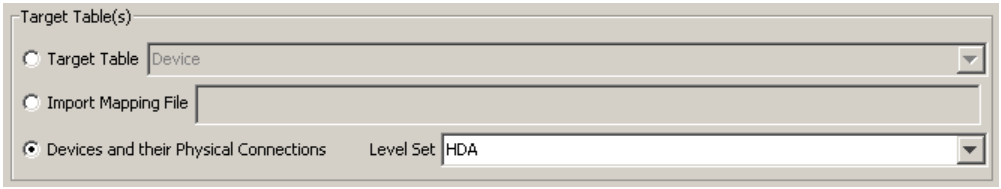
  Mapping files are always saved in NV9000-SE Utilities' database repository (`C:\Users\<user>\CtrlSysConfigs` under Windows 7) and have no file extension. Be careful to choose a mapping file that is appropriate for the data you want to import.

Two of the 3 buttons at the bottom of the page advance to the next page in the import sequence. These are 'Create Mapping' and 'Update/Preview Mapping'.

When you have chosen to import a mapping file, do ***not*** click 'Create Mapping,' but click 'Update/Preview Mapping' instead. Clicking the 'Create Mapping' button causes the software to ignore your mapping file and create an entirely new mapping in the next page of the import sequence.

- Devices and their Physical Connections.

  Choose this option when you want to import data for devices (and their physical connections) The option has a drop-down list in which you select a level set to which the imported devices will be assigned.



(The configuration must, of course, have the appropriate level set defined.)

After you choose the level set, click the 'Create Mapping' button to continue with the import.

Buttons

At the bottom of the page (and other pages in the export equence) are buttons that allow you to move through the sequence of steps in device definition. This page has two buttons:

- Create Mapping
- Update/Preview Mapping
- Cancel

The buttons are grayed out (disabled) until they become applicable.

'Create Mapping' Button

The 'Create Mapping' button takes you to the Mapping Page — for Tables in the import sequence. When that page is displayed, the software creates a new mapping.

'Update/Preview Mapping' Button

The 'Update/Preview Mapping' button also takes you to the Mapping Page — for Tables in the import sequence. When that page is displayed, the software does not create a new mapping, but uses the mapping you selected in the 'Import Mapping File' option.

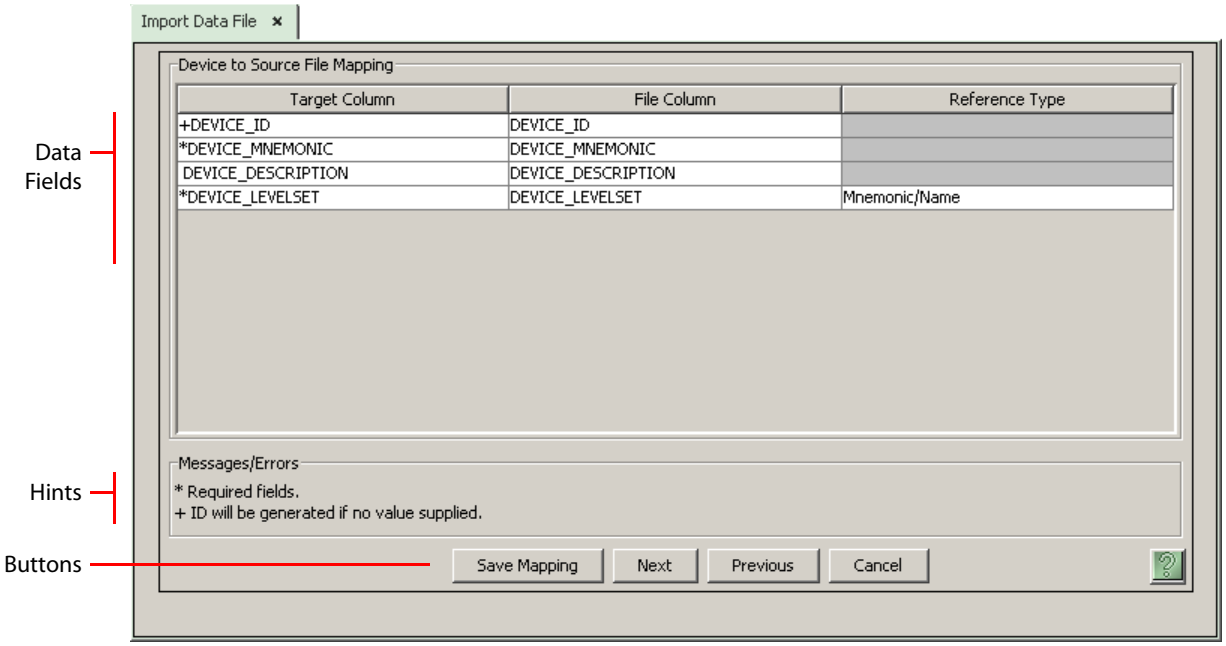
The 'Update/Preview Mapping' button is enabled only when you have selected a file under the 'Import Mapping File' option. It is not enabled for the 'Target Table' or 'Devices and Physical Connections' options.

'Cancel' Button

Click 'Cancel' if you want to terminate the import you started. When you click 'Cancel', NV9000-SE Utilities closes the page.

Mapping Page—for Tables

This is a sample of the 'Mapping' page of the import sequence:



This example shows the fields as they apply when importing to a 'Device' table.

This page has 3 sections:

- Data Fields
- Hints
- Buttons

Data Fields

This section of the page identifies the mapping of the fields of your .csv file to the fields of the table you selected in a previous step.

▲ Note: if the file you selected does not match the table data, it will be very obvious.

The first column in this section represents the data fields of your selected table. The names shown are concatenations of the table name and the field names of the table. In the illustration above, for example, which is for the device table, the first entry is DEVICE_ID, which is a concatenation of "DEVICE" and "ID" with an underbar in the middle. (There is no such thing as a device ID and there is no DEVICE_ID field anywhere in NV9000-SE Utilities.) The fields of a device table are ID, mnemonic, description, and level set.

The second column represents the column headers from your .csv file. It is possible for the column headers to contain any arbitrary text. It is also possible that the columns of the file are not in the same order as the columns of the targeted table.

A mapping is required. By choosing a column header in a drop-down list for each entry on this page you can map the correct columns to the data fields of the table.

You can also choose 'None' for the mapping. This means that the column in the .csv file is to be ignored.

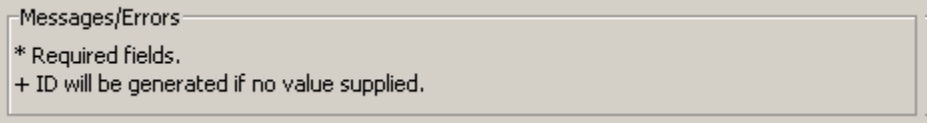
The third column in the section entitled 'Mnemonic/Name or ID' allows you to specify, for certain data fields, whether to import the data as a database ID or as a mnemonic. It is important that your choice matches the data in the .csv file.

(Generally if the .csv file has data base IDs in a field, the file was generated during an export from NV9000-SE Utilities.)

Not all data fields have this choices. Those that do not are grayed out.

Hints

The hints section tells you what the marks mean in the "Target Column' column":



Data fields marked by asterisks (*) are required.

Data fields marked by plus signs (+) will be generated if no value is supplied. This is particularly applicable to the ID field of the table. Generally you should not import IDs because NV9000-SE Utilities generates the IDs. Further, if you import an ID and a record bearing that ID exists, the import for that item will fail.

Buttons

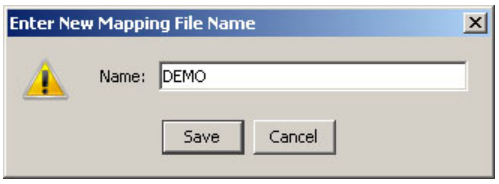
At the bottom of the page (and other pages in the export sequence) are buttons that allow you to move through the sequence of steps in device definition. This page has 4 buttons:

- Save Mapping
- Next
- Previous
- Cancel

The buttons are grayed out (disabled) until they become applicable.

'Save Mapping' Button

The 'Save Mapping' button presents a dialog in which you can specify the name of a file in which to save the mapping displayed in the page. This is the dialog:



Enter a name and click 'Save' to save the mapping.

Mapping files are always saved in NV9000-SE Utilities' database repository on your PC. Under Windows 7, this is usually C:\Users\‹*user*›\CtrlSysConfigs.

Mapping files have no file extension.

'Next' Button

Click 'Next' to go to the next page (the Run Page) of the import sequence.

'Previous' Button

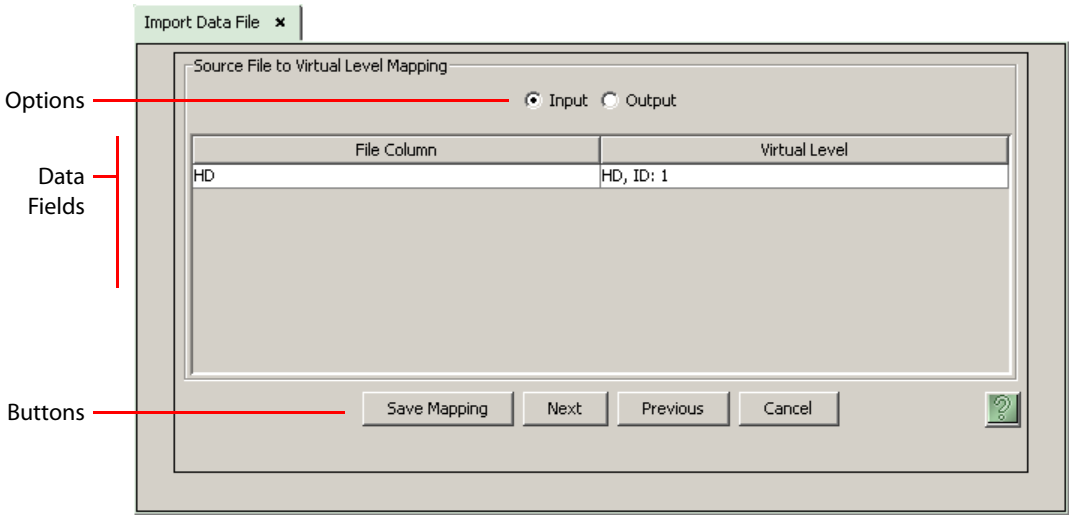
Click 'Previous' to go to the previous page (the Import Data File page) of the import sequence.

'Cancel' Button

Click 'Cancel' if you want to terminate the import you started. When you click 'Cancel', NV9000-SE Utilities closes the page.

Mapping Page — for Devices and their Physical Connections

This is a sample of the 'Mapping' page of the import sequence:



This example shows a mapping for an HD virtual level.

This page has 3 sections:

- Options
- Data Fields
- Buttons

Options

Use these two radio buttons to choose whether to import inputs or outputs.

Data Fields

This section of the page identifies the mapping of the fields of your .csv file to the virtual levels in the level set you chose, in a previous step.

▲ Note: if the file you selected does not match the virtual levels, it will be very obvious.

The table has two columns. The left-hand column represents the data fields (i.e., columns) of your .csv file.

The right-hand table column represents the virtual level to which the file data in the left-hand column will be assigned.

A mapping is required. By choosing a virtual level in a drop-down list for each entry on this page you can map correctly the columns of the file to virtual levels in your configuration.

▲ It is easy to choose the wrong virtual level, especially if you have many that are similarly named. Be careful!.

Buttons

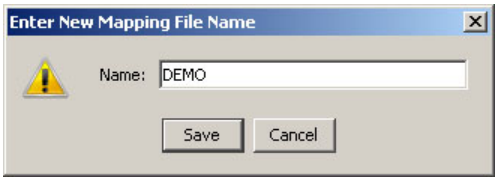
At the bottom of the page (and other pages in the export sequence) are buttons that allow you to move through the sequence of steps in device definition. This page has 4 buttons:

- Save Mapping
- Next
- Previous
- Cancel

The buttons are grayed out (disabled) until they become applicable.

'Save Mapping' Button

The 'Save Mapping' button presents a dialog in which you can specify the name of a file in which to save the mapping displayed in the page. This is the dialog:



Enter a name and click 'Save' to save the mapping.

Mapping files are always saved in NV9000-SE Utilities' database repository on your PC. Under Windows 7, this is usually C:\Users\‹*user*›\CtrlSysConfigs.

Mapping files have no file extension.

'Next' Button

Click 'Next' to go to the next page (the Run Page) of the import sequence.

'Previous' Button

Click 'Previous' to go to the previous page (the Import Data File page) of the import sequence.

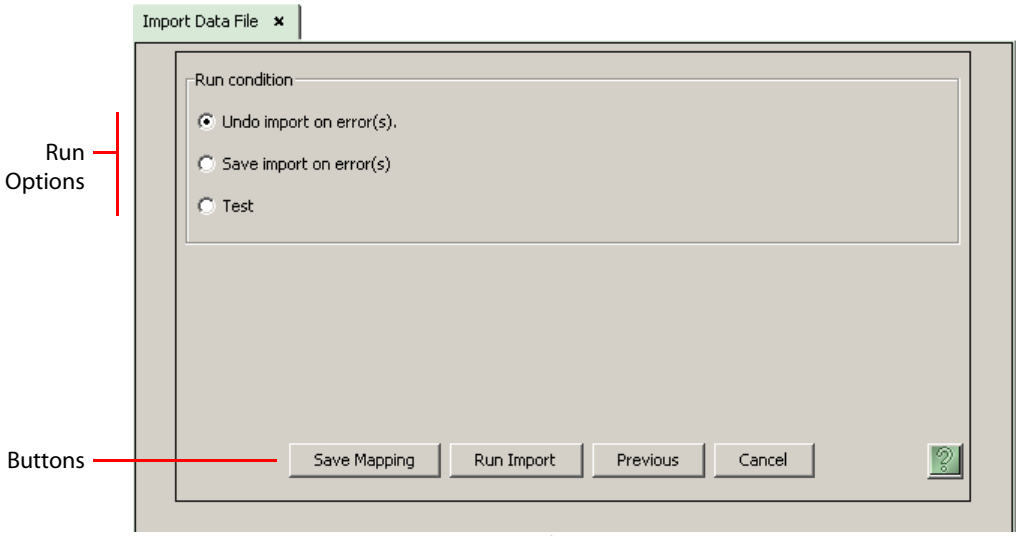
'Cancel' Button

Click 'Cancel' if you want to terminate the import you started. When you click 'Cancel', NV9000-SE Utilities closes the page.

Run Page

The 'Run' page is the same whether you are importing to a table or to a level set. However, the results and the resulting messages are different in the two cases.

This is a sample of the 'Mapping' page of the import sequence:



This example shows the 'Run' page for importing to a virtual level.

This page has 2 sections:

- Run Options
- Buttons

Run Options

There are 3 choices for running an import:

- Undo import on error(s).

  This choice executes the import, but will "undo" the entire import if any error occurs.
- Save import on errors(s).

  This choice executes the import, and does not "undo" any part of the import if any error occurs. The configuration is modified and retains the errors if any errors occurred.
- Test

  This choice processes the import is if it were executing, but does not apply any changes to the configuration. It reports any errors that might occur.

  Using this run option is a way to test whether the import will succeed before you actually import any data.

Buttons

At the bottom of the page (and other pages in the export sequence) are buttons that allow you to move through the sequence of steps in device definition. This page has 4 buttons:

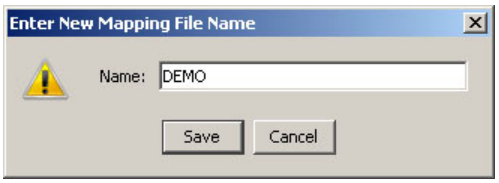
- Save Mapping
- Run Import
- Previous

- Cancel

The buttons are grayed out (disabled) until they become applicable.

'Save Mapping' Button

The 'Save Mapping' button presents a dialog in which you can specify the name of a file in which to save the mapping displayed in the page. This is the dialog:



Enter a name and click 'Save' to save the mapping.

Mapping files are always saved in NV9000-SE Utilities' database repository on your PC. Under Windows 7, this is usually C:\Users\‹*user*›\CtrlSysConfigs.

Mapping files have no file extension.

'Run Import' Button

Click 'Run Import' to execute the import according to the run option you chose in the 'Run Options' section.

(There are no further pages in the import sequence after this page.)

'Previous' Button

Click 'Previous' to go to the previous page of the import sequence.

'Cancel' Button

Click 'Cancel' if you want to terminate the import you started. When you click 'Cancel', NV9000-SE Utilities closes the page.

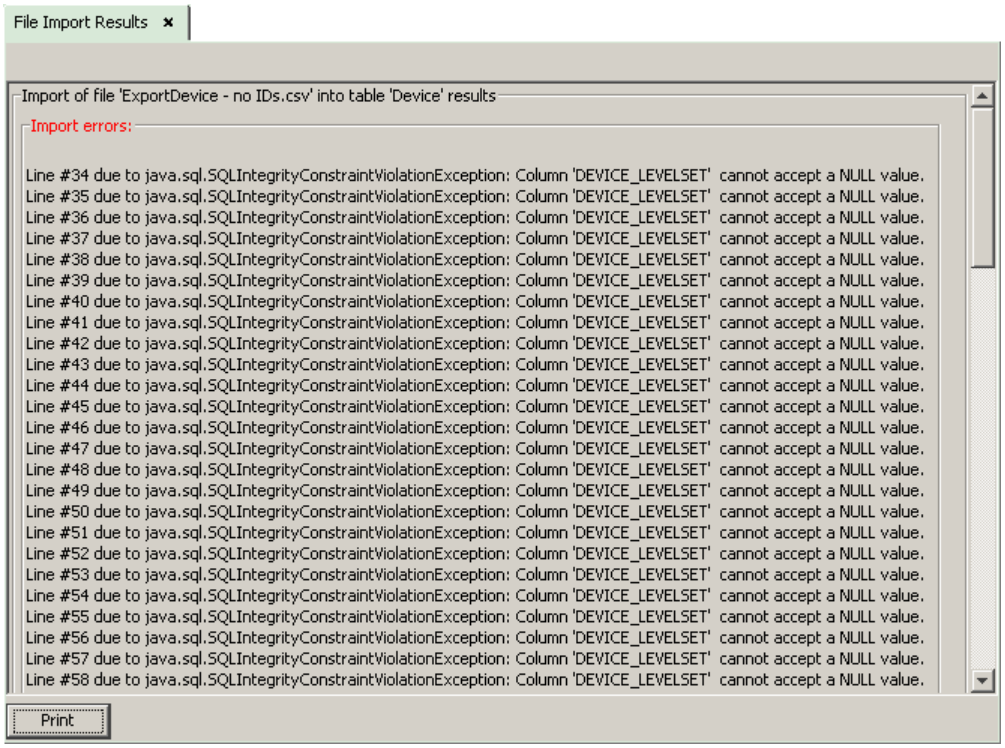
Import Results

The results and the resulting messages are different if you are importing to a table or to a level set.

Import to a Table

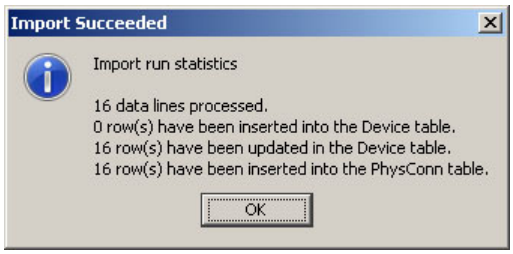
If the import succeeded, you will see a message like this one:

If the import (to a table) failed, you will see a list of error messages:

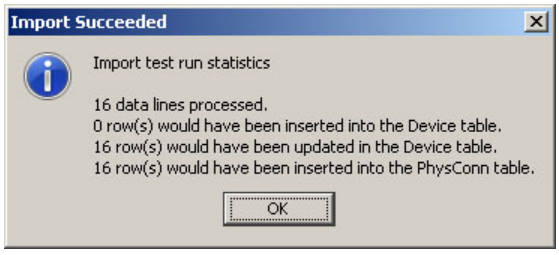


Import to a Level Set

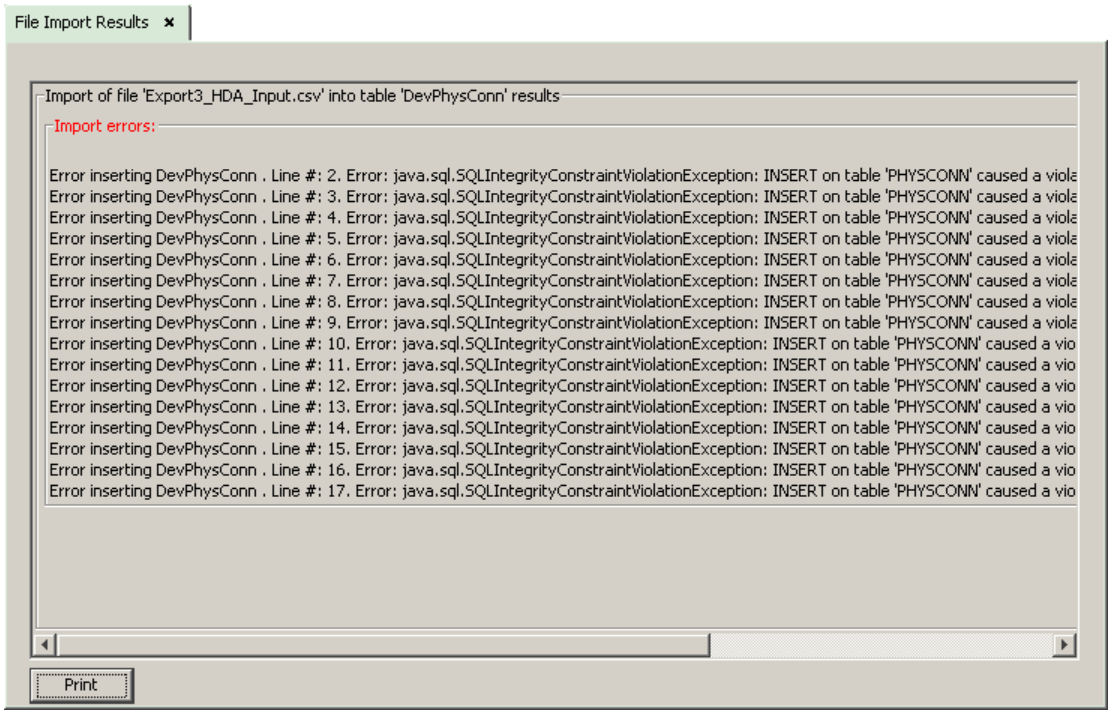
If the import succeeded, you will see a message like this one:



If you were testing the import, and it succeeded, you will see a message like this one:



If the import failed, you will see a list of error messages:



14 Name Sets

Chapter 14 provides information about name sets and discusses how they are configured and how they are used.

Summary

Summary *567*
Configuration of Name Sets *567*
Panel Operation *572*

Summary

Name sets allow you to define alternate names for I/O devices. You can create multiple name sets. The reasons for creating name sets are many and varied. The actual name sets used are entirely at the discretion of configurers at each installation.

Although you can create multiple name sets, any individual control panel can be configured to use exactly one. Panel operators may then toggle between the name set assigned to the panel and the "system names."

A control panel need not have an assigned name set. That panel will use only system names.

Different panels can use different name sets.

System names are the names assigned to devices at the time the devices are defined. A name set, and the alternate names it contains, are defined under the 'System Management' pane — after I/O devices have been defined.

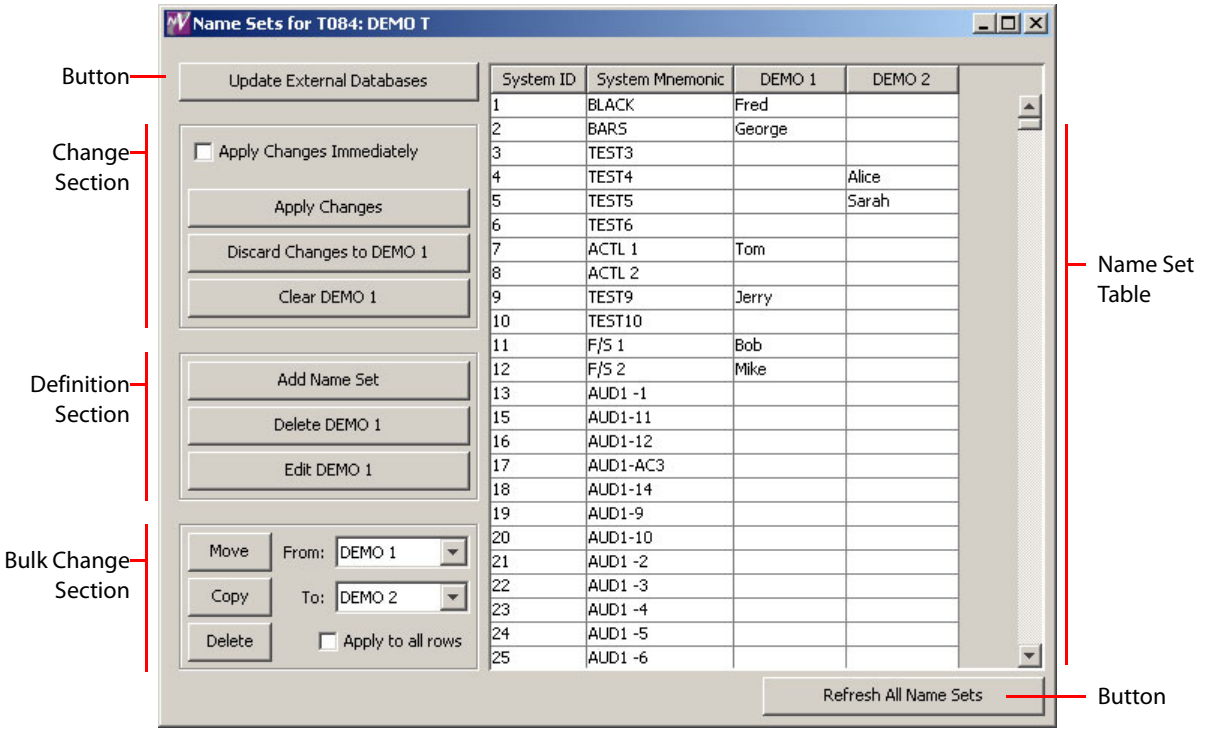
Configuration of Name Sets

Configuration of name sets occurs through the 'System Management' pane.

To open the name set dialog window, right click the name of a control system in the 'System Management' pane. In the context menu that appears, choose 'Edit Name Set'. The name set dialog appears.

- ***Note:*** the window for the name set dialog might immediately "jump" behind other open windows. You can bring it to the foreground again by clicking the 'Name Sets for ...' entry in your Windows task bar.

The following is a sample of the name set dialog:



This dialog lets you view all name sets at once and to modify any of them at any time. (You might have to scroll to view different name sets if you have many.)

A name set — defined by a column in the table — can have blank or undefined entries. Where there are blanks, a control panel using the name set will display the system name instead of a blank.

The name set dialog has several sections:

- Change Section — apply or remove changes.
- Definition Section — create or delete name sets.
- Bulk Change Section — move or copy data from one name set to another or delete name set data.
- Name Set Table — the table displays the name sets and it is in the table that you enter the alternate names of the name sets.

The name set dialog also has two buttons:

- Update External Databases

  Clicking this button causes the system controller to send a notification message (to third-party control systems, iControl, and Kaleido subsystems) that a name set change has occurred.

- Refresh All Name Sets

  Clicking this button causes NV9000-SE Utilities to retrieve the currently defined name sets from the active system controller (the one you have chosen in the system management pane) and update its name set tables.

  To complete the update, you must click 'Apply Changes'. Otherwise, changes to the name sets will not be retained.

Name Set Table

The name set table displays the system mnemonics for all source and destination devices defined in the configuration and displays the alternate names in each name set for those devices.

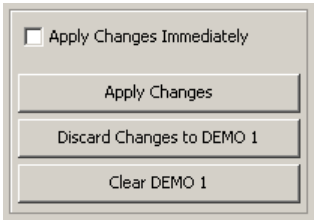
Initially, the table might not have any name sets defined. However the system names are always defined (as long as there are devices defined) and the 'System Mnemonics' column is always present and fully populated.

(To create a name set or an additional name set, click 'Add Name Set' in the definition section.)

If a name set exists, you can click in an entry in the name set column and type an alternate name. In this way, you can populate a name set.

Change Section

The change section has 3 buttons and a check box:



Check the check box if you want your changes to take effect immediately (in the configuration). If you leave the check box unchecked, you must click 'Apply Changes' to save your changes.

When you click 'Apply Changes', changes made to all name sets are saved.

To undo recent changes,

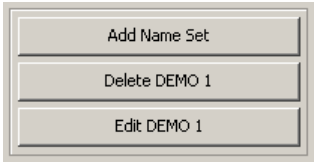
1 Click in the column of the name set you want to undo.
2 Click 'Discard Changes to ‹*name set*›'. if you do not wish to save your changes.

To erase all entries in a name set

1 Click in the column of the name set you want to erase.
2 Click 'Clear ‹*name set*›'.

Definition Section

The change section has 3 buttons:



Add Name Set

Click 'Add Name Set' to create a new name set. A dialog appears:

Enter a name for the name set and click 'OK' to create the name set. Otherwise, click 'Cancel'.

When you create the name set, an new empty column appears in the name set table, at the right. The column header is the name you gave the name set.

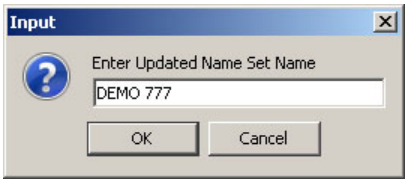
Delete ‹*name set*›

To delete a name set:

1. Click anywhere in the column belonging to the name set you want to delete. The title of the delete button changes to reflect the name set you chose.
2. Click the 'Delete ‹*name set*›' button.

Edit ‹*name set*›

To change the name of a name set, click 'Edit ‹*name set*›'. A dialog appears:

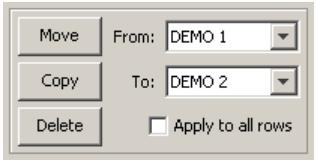


Enter a new name for the name set and click 'OK' to rename the name set. Otherwise, click 'Cancel'.

Bulk Change Section

The bulk change section lets you move or copy multiple names from one name set to another and to delete multiple names.

The bulk change section has 3 buttons, 2 drop-down lists and a check box:



From

The 'From' drop-down list lets you select the name set (column) from which to move or copy names or from which to delete names.

To

The 'To' list lets you select the name set (column) to which to move or copy names.

Apply to All Rows

When this check box is checked, the operation (move, copy, or delete) applies to all rows of the name set or name sets involved. If you leave this check box unchecked, the operation applies only to the rows you select.

- Note that although NV9000-SE Utilities lets you select multiple columns, the operation you perform applies only to the names in the left-most selected column.
- Note that selecting any name actually selects the row in which the name is found. The columns you choose in the 'From' and 'To' drop-down lists are those that are affected by a move, copy, or delete. The column in which is you perform the (row) selection is not necessarily affected.

Move

Clicking the 'Move' button transfers data from the 'From' column to the 'To' column and removes those data from the 'From' column.

To move selected names of a name set:

1. Use click, shift-click, or ctrl-click to select one or more rows of the name set table.
2. Select the 'From' name set and select the 'To' name set.
3. Be sure 'Apply to All Rows' is unchecked and click 'Move'.

To move *all* names of a name set:

1. Check 'Apply to All Rows'.
2. Select the 'From' name set and select the 'To' name set.
3. Click 'Move'.

Copy

Clicking the 'Copy' button transfers data from the 'From' column to the 'To' column and leaves those data where they are in the 'From' column.

To copy selected names of a name set:

1. Use click, shift-click, or ctrl-click to select one or more rows of the name set table.
2. Select the 'From' name set and select the 'To' name set.
3. Be sure 'Apply to All Rows' is unchecked and click 'Copy'.

To copy *all* names of a name set:

1. Check 'Apply to All Rows'.
2. Select the 'From' name set and select the 'To' name set.
3. Click 'Copy'.

Delete

Clicking the 'Delete' button removes data from the 'From' column (i.e, name set).

To delete selected names of a name set:

1. Use click, shift-click, or ctrl-click to select one or more rows of the name set table.
2. Select the 'From' name set.

3 Be sure 'Apply to All Rows' is unchecked and click 'Delete'.

To delete *all* names of a name set:

1 Check 'Apply to All Rows'.
2 Select the 'From' name set.
3 Click 'Delete'.

Configuring Panels

All NV96xx control panels support name sets.

There are two parts to configuring a panel with a name set:

- Designate the "default name set" in the panel options of the panel's configuration page.

  (Choose one of your defined name sets. Do not choose 'System Name:0'.
- Optionally, assign the 'Name Set Toggle' function to one or more buttons. Whether the panel operator can switch between the chosen name set and system names is at your discretion.

Panel Operation

Certain panels, such as the NV9640, can be configured to use one of the name sets defined in the NV9000 configuration. If such a panel has a 'Name Set Toggle' button, then the operator may switch between using the assigned name set and using system names.

When a panel is using its assigned name set, the names in the name set appear in applicable device selection fields or on device selection buttons of the control panel.

When a panel is using the system name set, system names appear in applicable device selection fields or on device selection buttons of the control panel.

▲ A name set has one entry for every I/O device defined in the configuration. A defined name set need not contain a name for every device. Fields for devices that have no alternate name are blank. When a device has no alternate name, the panel operator will see the system name instead. That is, if an alternate name exists, it will be displayed instead of the system name.

'Name Set Toggle' Buttons

A 'Name Set Toggle' button toggles the panel between its default name set and the "system name" set. Whichever name set an operator selects 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 operators switch to the system name set prior to category/suffix device selection and return to the preferred preferred name set afterward.

15 Aliases

Chapter 15 provides information regarding aliases and the 'Aliases' table.

Summary

Summary *573*
Aliases Table *574*

Summary

Aliases are names that you can assign to individual input ports. (Aliases do not apply to output ports.) Generally, individual ports do not have names because they belong to devices which do have names. The device names appear on control panels and are used to identify the ports on various (virtual) levels of the devices.

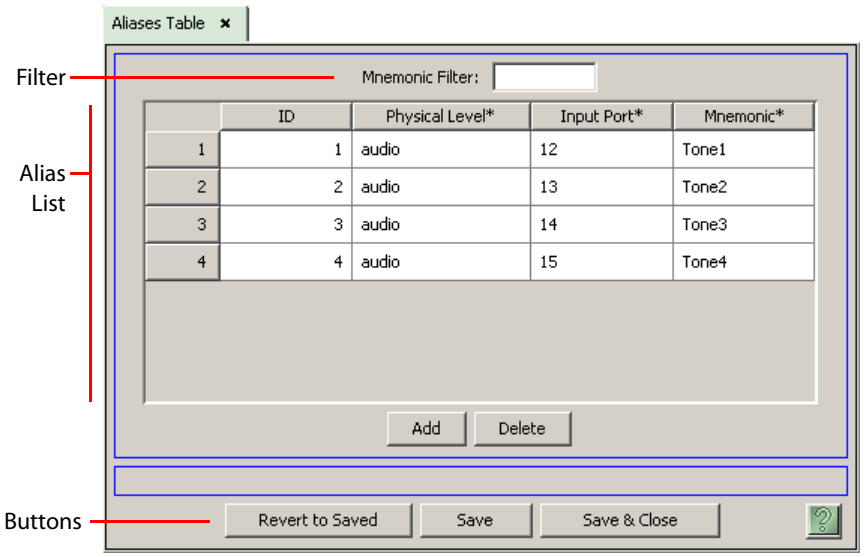
The reasons for creating aliases are many and varied. For example, one reason is to present a different name for the audio ports and video port of a "bars and tone" signal.

Note:

1. With aliases, it is individual ports that are named. Aliases are not global in any way.
2. It is only on control panels that aliases are used. A panel displays an alias where it displays a port, such as when the operator is performing level selection.
3. An alias overrides the name of the device to which the port belongs, but for that port only. Other ports that are not given aliases still use the device name.
4. The same alias can be applied to any or all ports you choose.

Aliases Table

There is one table in which to configure aliases. It is found under the “Views’ pane:



There are 3 sections in the page:

- Filter
- Alias List
- Buttons

Filter

At the top of the page is a ‘Mnemonic’ filter: if you enter text in this field, the list of aliases is restricted to those aliases that contain the text you entered.

Alias List

The alias list has 4 columns:

- ID. These are the database IDs of the groups.
- Physical level. Choose a physical level from the drop-down menu that appears when you click an entry in this column.
- Input port. Enter a port number in fields of this column.

  A port in the router control system is uniquely identified by a (physical level, port) pair.
- Mnemonic. An entry in this column is the alias for the port specified by (physical level, inputport).

  This mnemonic appears in place of the device mnemonic wherever the port is used.

  ▲ External interfaces do not report aliases.

You can use click, shift-click, and control-click techniques to select any of the aliases in the list.

Buttons

At the bottom of the page are 5 simple buttons:

- Add

  Click 'Add' to add a new row at the end of the user list in which you can specify a new alias.

- Delete

  Click 'Delete' to remove all selected rows from the table. The rows are deleted without any warning message.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the alias list, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

16 Users

Chapter 16 provides information regarding users and the 'Users' table.

Summary

Summary *577*
Users Table *578*

Summary

Every control panel in an NV9000 configuration can have a name associated with it. We call this name the "user name" although it is really a panel name.

A panel operator can lock or protect sources and destinations. When a source or destination is locked or protected, we say it is locked or protected by that user (citing the name). We say that the user "owns" the lock or protect.

Usually only that "user" may release a lock or protect. In actuality, the NV9000 software releases a lock or protect at the request of an operator using a panel that associated with the specific user name.

The reasons for creating user names are many and varied. It is not strictly necessary to create user names, but you might find them to be of some benefit.

It is in the 'Panels' table that you can associate a user name with a panel:

Panels Table

Name Filter: User Filter:

	SQL ID	Panel ID*	Panel Name	Configuration File*	User Name*	Language*	Description
1	1	6401	6401	\nvision\envy\usersys\live\6401.640	user 0	English	
2	2	6411	6411	\nvision\envy\usersys\live\6411.641	user 1	English	
3	3	6011	6011	\nvision\envy\usersys\live\6011.601	EnvyUser	English	
4	4	9616	16rp	\nvision\envy\usersys\live\16rp.P16	EnvyUser	English	

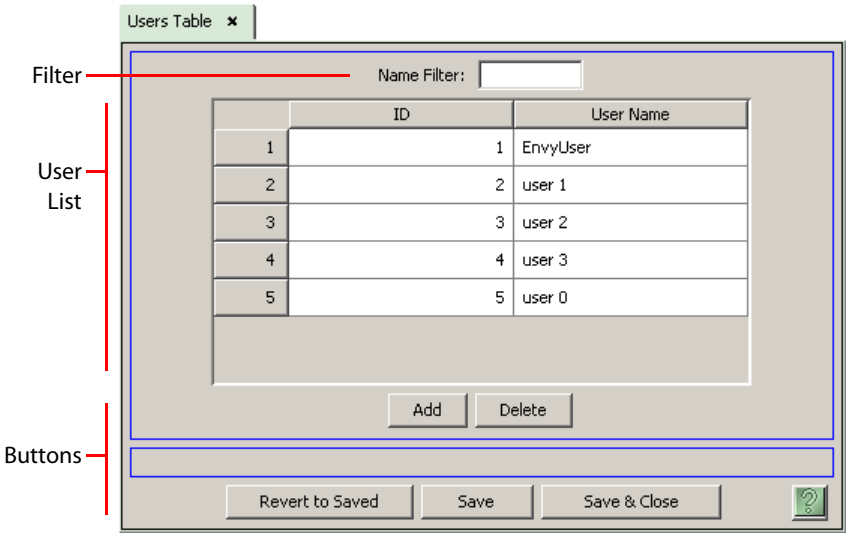
Note:

1 The default user name is 'envyuser'.

2 The same user name can be assigned to any or all panels.

Users Table

There is one table in which to configure user names. It is found under the “Views’ pane:



There are 3 sections in the page:

- Filter
- User List
- Buttons

Filter

At the top of the page is a ‘Name’ filter: if you enter text in this field, the list of user names is restricted to those names that contain the text you entered.

User List

The user list has 2 columns:

- ID. These are the database IDs of the groups.
- User name. An entry in this column is a user name.

You can use click, shift-click, and control-click techniques to select any of the users in the list.

Buttons

At the bottom of the page are 5 simple buttons:

- Add

  Click ‘Add’ to add a new row at the end of the user list in which you can specify a new user name.
- Delete

  Click ‘Delete’ to remove all selected rows from the table. The entries will not be deleted until you click ‘Save’ or ‘Save & Close’.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

  If you have deleted user name entries, NV9000-SE Utilities will present a warning dialog. To complete the deletion, click 'Delete' in this dialog.

- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the alias list, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

  If you have deleted user name entries, NV9000-SE Utilities will present a warning dialog. To complete the deletion, click 'Delete' in this dialog.

17 Router Protocols

Chapter 17 provides information about router protocols.

Summary

Introduction 581
Supported Protocols 582

Introduction

A router protocol is the way the system controller communicates with a router under its control. The protocol includes a command "language" (a set of commands that follow rules of syntax) and hand-shaking methods.

NVISION are designed to operate under an NV9000 router control system, using 'NV Ethernet' protocol (or NVEP). NVISION routers can also use 'NV Serial' protocol (or NVSP).

NVISION series routers can also communicate according to certain third-party protocols and be used in third-party systems. Third-party protocols for routers are licensed software components that can be purchased and added to the control card of your NVISION router. Usually the router is shipped with the purchased third-party protocol already installed.

It is in the router configuration pages (and tables) that router protocols are selected. These pages are:

- 'Add Router' page, (page 40) through the 'Configuration' pane or the 'Tasks' pane.
- 'Router Controls' table, (page 50) through the 'Views' pane.

These configuration pages are already discussed. Following is a list of the supported router protocols.

Supported Protocols

The following is a list of currently available protocols. This list is subject to change without notice. If you have any questions regarding the use or availability of protocols, contact Grass Valley.

Protocol	Description	Cable
NV Serial Protocol, Private	Communication with Grass Valley routers over an RS-422 serial connection.	DE9, wired straight through. Port configuration is in the router table.
NV Serial Protocol, Public	Supports third-party communication with Grass Valley routers (or routers that have implemented the Grass Valley protocol in their control cards). The connection is RS-422.	DE9, wired straight through. Port configuration is in the router table.
NV Ethernet	Ethernet connectivity between the NV9000 system controller and all current Grass Valley routers at 100 MB/s.	CAT5E patch cord. (Do not use a crossover cable.)
NV Master Control Ethernet	Ethernet connection from the NV9000 system controller to a Grass Valley master control subsystem (NV5128-MC or NV5100MC) at 100 MB/s.	CAT5E patch cord. (Do not use a crossover cable.)
NV Compact Router Ethernet	Ethernet connection from the NV9000 system controller to all Grass Valley compact routers (such as the CR1616-HD and CR3232-AES) at 100 MB/s. (This protocol is UDP.)	CAT5E patch cord. (Do not use a crossover cable.)
Virtual Router	Use this protocol to emulate a router using Grass Valley's NV Ethernet protocol. This protocol is useful for developing a configuration without an actual router. (Status is lost every time the NV9000 is restarted.)	(None required.)
Utah RCP-1	An NVISION router can operate under a Utah control system using this protocol. A properly configured Utah AVS2, SC1, SC2 or PL320 controller is required.	Cabling depends on the Utah controller model.
Jupiter ESBus	An NVISION router can operate under a Jupiter control system using this protocol. A properly configured VM3000 controller is required. Operation using a serial port on an SI-3000 is not recommended if the total controlled matrix space exceeds 256 × 256.	DE9 crossover (or null modem) cable required.

Protocol	Description	Cable
GVG Horizon TCI	An NVISION router can operate under a GVG Horizon control system using this protocol. An HX-GPI external controller running TCI protocol is required. Please note the NV9000's control point settings for Horizon: S, ‹COM port›, 9600 baud, no parity, 8 data bits, 1 stop bit.	DE9 cable with non-standard pinout.
Probel Router	An NVISION router can operate under a Probel control system using this protocol.	Varies by application. Consult the Probel documentation.
Pesa	An NVISION router can operate under a Pesa control system using this protocol. A properly configured Pesa controller is required. This connection is RS-232 using one of the ports on the Pesa controller that is normally reserved for the Pesa configuration PC. Pesa does not support an RS-422 interface.	DE9, with RS-232 pins Tx, Rx, and ground (typically pins 2, 3 and 5). The Pesa end must be wired for RS-232 loopback. Connect RTS to CTS and DTR to DSR.
ISIS Serial	An NVISION router can operate under an ISIS control system using this protocol.	DE9 wired straight through.
DataTek D-2815 Serial	An NVISION router can operate under a Datatek control system using this protocol.	Please consult the DataTek documentation. Grass Valley router's port pinout: TX+ 3 RX+ 7 TX– 8 RX– 2
Sony CART+ Serial	An NVISION router can operate under a Sony control system using this protocol.	Please consult the Sony documentation.

18 Misc. Configuration Pages

Chapter 18 provides information about configuration pages and tables that are not including in the topics discussed in preceding chapters.

Summary

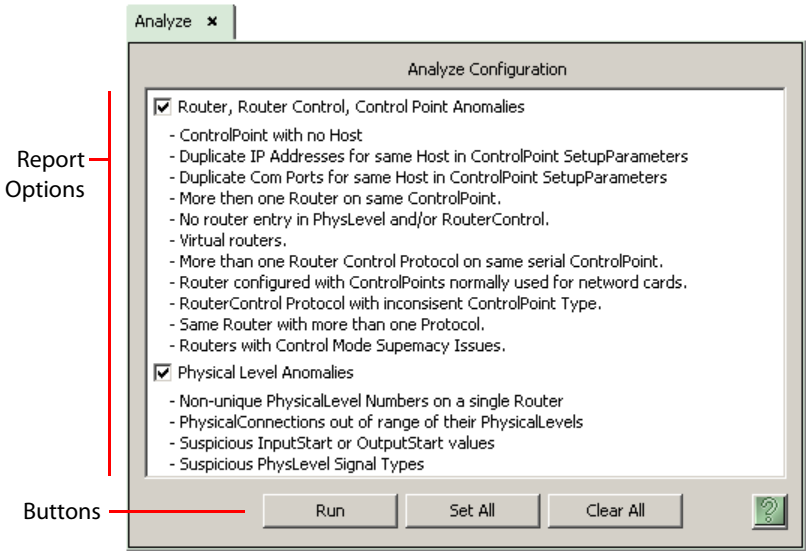
Introduction *585*
Analyze Page *585*
Paths Table *588*
'SysParams' Table *590*
Hosts Table *593*
'PhysLevels' Table *595*
'XptExclusions' Table *598*

Introduction

There are several configuration pages and tables that are unclassifiable. They are described in this section.

Analyze Page

The 'Analyze' page (under the 'Configuration' pane) produces a report of problems and potential problems in your configuration — conditions about which you, the configurer, might not be aware. This is a typical 'Analyze' page, showing the first of several report options:



There are 2 sections in the page:

- Report Options
- Buttons

Report Options

There are several dozen report options, organized in groups. The groups can be enabled or disabled when you check or uncheck the check box by the group title.

There are 7 groups. They are listed here without additional explanation:

1. Router, Router Control, Control Point Anomalies.
2. Physical level anomalies
3. Port router anomalies
4. PhysLevel port assignments to devices
5. DHCP anomalies
6. Duplicate values
7. Miscellaneous

Buttons

There are 3 buttons at the bottom of the page:

- Run

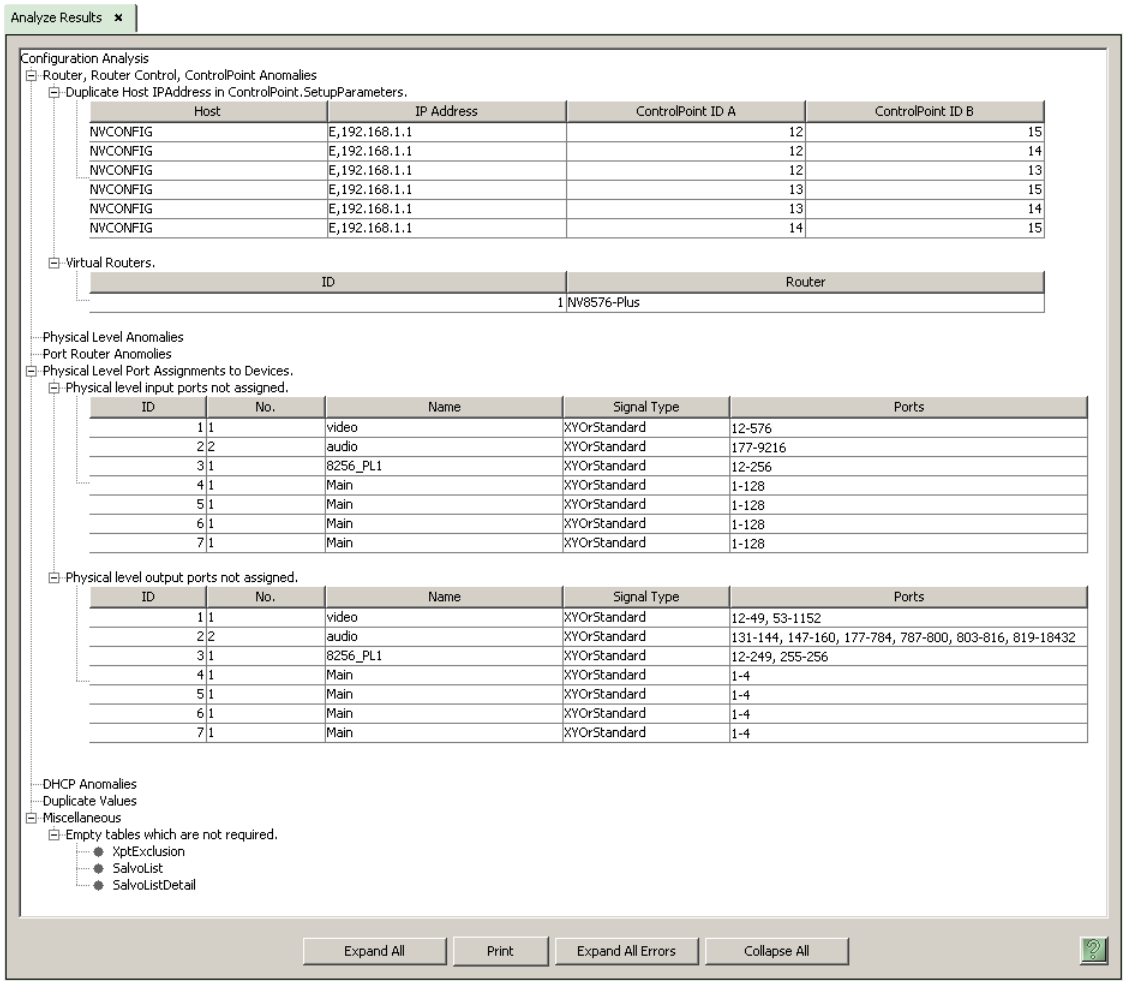
  Click this button to generate the analysis. See Report, on page 587, following.
- Set All

  Click this button to select all report options. Doing so places a check in each check box.
- Clear All

  Click this button to deselect all report options. Doing so removes the check from each check box.

Report

This is a sample 'Analyze' report:



Analyze Results

Configuration Analysis

- Router, Router Control, ControlPoint Anomalies
  - Duplicate Host IPAddress in ControlPoint.SetupParameters.

Host	IP Address	ControlPoint ID A	ControlPoint ID B
NVCONFIG	E,192.168.1.1	12	15
NVCONFIG	E,192.168.1.1	12	14
NVCONFIG	E,192.168.1.1	12	13
NVCONFIG	E,192.168.1.1	13	15
NVCONFIG	E,192.168.1.1	13	14
NVCONFIG	E,192.168.1.1	14	15

  - Virtual Routers.

ID	Router
1	NV8576-Plus

- Physical Level Anomalies
- Port Router Anomolies
- Physical Level Port Assignments to Devices.
  - Physical level input ports not assigned.

ID	No.	Name	Signal Type	Ports
1	1	video	XYOrStandard	12-576
2	2	audio	XYOrStandard	177-9216
3	1	8256_PL1	XYOrStandard	12-256
4	1	Main	XYOrStandard	1-128
5	1	Main	XYOrStandard	1-128
6	1	Main	XYOrStandard	1-128
7	1	Main	XYOrStandard	1-128

  - Physical level output ports not assigned.

ID	No.	Name	Signal Type	Ports
1	1	video	XYOrStandard	12-49, 53-1152
2	2	audio	XYOrStandard	131-144, 147-160, 177-784, 787-800, 803-816, 819-18432
3	1	8256_PL1	XYOrStandard	12-249, 255-256
4	1	Main	XYOrStandard	1-4
5	1	Main	XYOrStandard	1-4
6	1	Main	XYOrStandard	1-4
7	1	Main	XYOrStandard	1-4

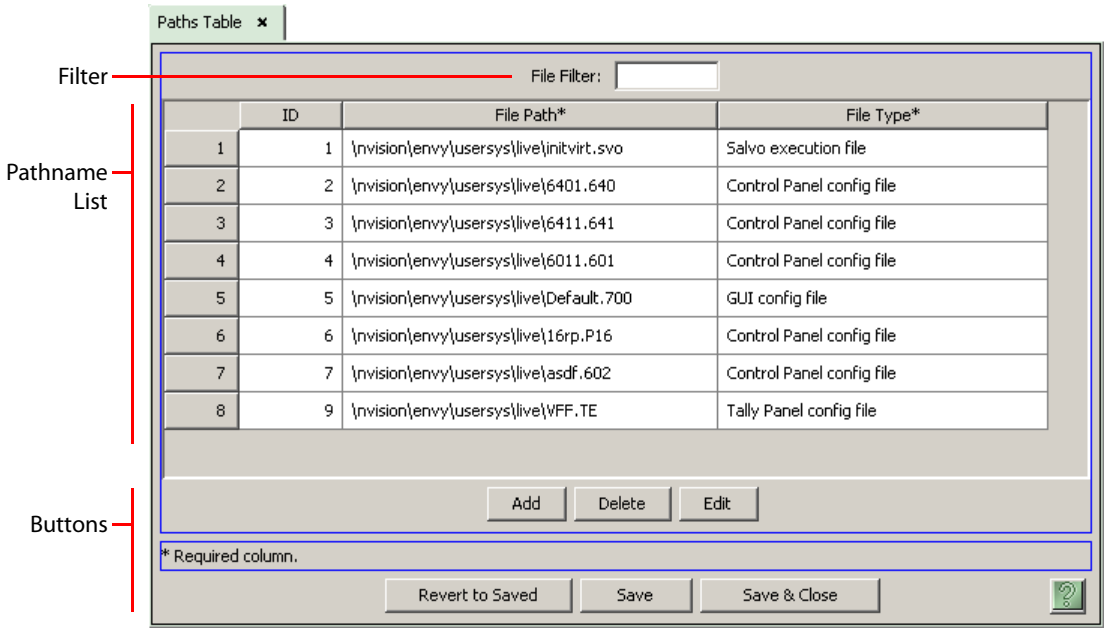
- DHCP Anomalies
- Duplicate Values
- Miscellaneous
  - Empty tables which are not required.
    - XptExclusion
    - SalvoList
    - SalvoListDetail

Expand All | Print | Expand All Errors | Collapse All

The report includes the items you selected in the report options. The contents of the 'Analyze' report vary greatly, and depend on the nature of the configuration.

Paths Table

The 'Paths' table (under the 'Views' pane) lists the pathnames, within the system controller, of the salvos, tally panel configurations, control panel configurations, and GUI configurations in your NV9000 configuration. This is a typical 'Paths' table:



NV9000-SE Utilities maintains the table automatically as you create and delete salvos and panel configurations.

▲ Be very careful if you edit this table. Usually there is no need to edit the table. Your configuration might fail in unpredictable ways if you make a mistake in this table.

There are 3 sections in the page:

- Filter
- Pathname List
- Buttons

Filter

At the top of the page is a 'File' filter. If you enter text in this field, the list of pathnames is restricted to those pathnames that contain the text you entered.

Pathname List

Each row in the list represents a file. The list has 3 fields:

- ID. The data base ID for the pathname. These numbers are generated automatically and you cannot change them.
- File path. These are the pathnames of one of the salvo files and panel configuration files in your configuration.
- File type. These are the types of the files. There are 4 types:

  Salvo (The file extension is .svo).

Tally panel configuration. (A tally panel is an NV9575-VF. The file extension is .TE.)

Hardware panel configuration. (File extensions vary according to the panel type. For example, the extension for an NV9602 is .602.)

GUI configuration. (File extensions are either .700 or .710.)

Buttons

At the bottom of the page are 6 buttons:

- Add

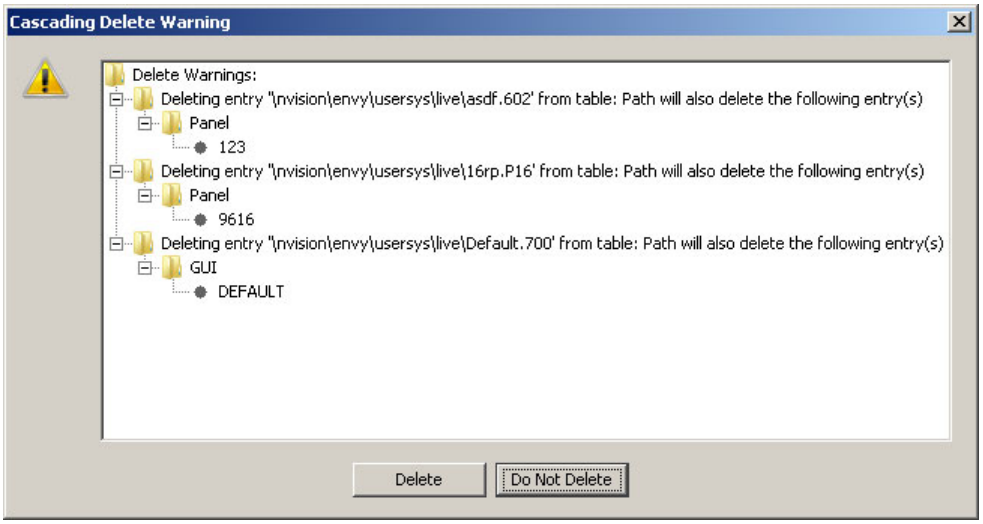
  Click 'Add' to add a pathname to the table. NV9000-SE Utilities creates a new row at the bottom of the router list in which you can enter a pathname and choose a type.

  (The ID is generated by NV9000-SE Utilities.)

- Delete

  Select one or more rows in the 'Paths' table and click 'Delete' to remove those pathnames from the table.

  NV9000-SE Utilities deletes the pathnames immediately. If you have deleted more than one pathname, NV9000-SE Utilities will present a deletion warning when you click 'Save' or 'Save & Close' if you have deleted any pathnames:



  Click 'Delete' to commit to the deletion you performed or 'Do Not Delete' if you want to cancel the deletion before saving.

- Edit

  Select one or more rows in the 'Paths' table and click 'Edit' to open a details page for each of the selected paths.

  The appropriate details page opens for the selected file types. The salvo details page opens for salvos and a specific panel editing page opens for any panel.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the pathname table, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

'SysParams' Table

The 'SysParams' table (under the 'Views' pane) lists "system parameters." This is a typical 'SysParams' table:

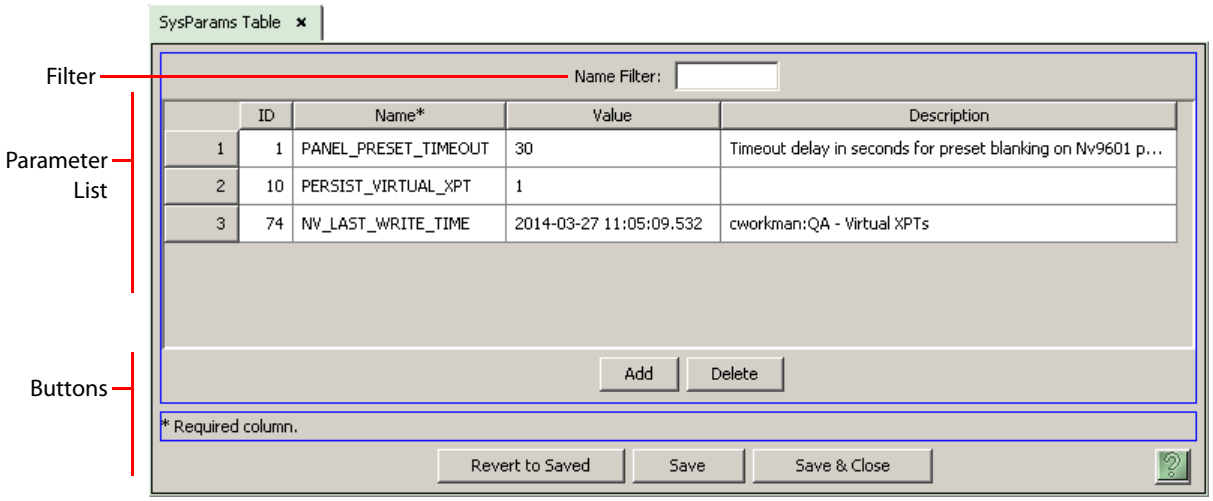


Fig. 18-1: 'SysParams' Table (Sample)

The "system parameters" are miscellaneous special-purpose data. Not every configuration will use every system parameter. Some configurations will use none.

- ▲ Although you can add parameters of arbitrary names to this list, NV9000-SE Utilities can process only the parameters whose names it recognizes.
- ▲ The use of a particular parameter is specific to the parameter and its value might depend on specific characteristics at an installation.

There are 3 sections in the page:

- Filter
- Parameter List
- Buttons

Filter

At the top of the page is a 'Name' filter. If you enter text in this field, the list of parameters is restricted to those parameters whose names contain the text you entered.

Parameter List

Each row in the list represents a parameter. The list has 4 fields:

- ID. The data base ID for the parameter. These numbers are generated automatically and you cannot change them.

- Name. This is the parameter's name. NV9000-SE Utilities processes a small number of parameters. You must enter the parameter name exactly.
- Value. This is the parameter's value. The range of values for a parameter depends entirely on the parameter. See Parameters, on page 592.
- Description. This field is free-form and arbitrary. It is a good idea to enter commentary in this field.

Buttons

At the bottom of the page are 5 buttons:

- Add

  Click 'Add' to add a parameter to the table. NV9000-SE Utilities creates a new row at the bottom of the router list in which you can enter parameter data.

  Remember that NV9000-SE Utilities processes only parameters whose names it recognizes. Type parameter names exactly. (It is assumed you will know a parameter name and its range of values because you have communicated with a Grass Valley service technician.)

  (The ID is generated by NV9000-SE Utilities.)
- Delete

  Select one or more rows in the 'SysParams' table and click 'Delete' to remove those parameters from the table.

  NV9000-SE Utilities deletes the parameters immediately and without warning.
- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the system parameters table, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Parameters

These are the parameters that are documented:

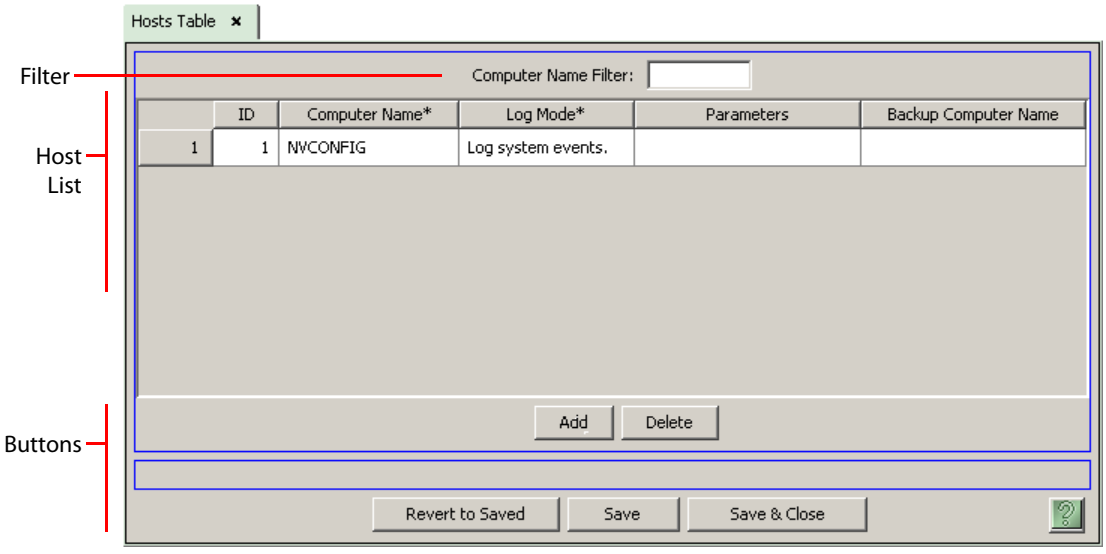
PANEL_PRESET_TIMEOUT	Delay, in seconds, before an idle control panel blanks out its preset source name. Typical values are 30 seconds.
SALVO_BTN_DEBOUNCE and SALVO_BTN_TIMEOUT	These two values are used together to define salvo button behavior on an NV9602. Ordinarily, salvo buttons on an NV9602 cause the immediate execution of a salvo. If that behavior is not desired, the above values can be set to make salvo execution a two-press operation. When a salvo button is pressed the first time, it will light. The "SALVO_BTN_DEBOUNCE" value is the time, in *milliseconds,* that must elapse between the first and second button press. This prevents an accidental 'double-tap" firing the salvo. The "SALVO_BTN_TIMEOUT" value is the amount of time, in *half seconds,* that the user has after the first press to press the button again. Once this time elapsed, the salvo button will dim. Currently these two values do ***not*** appear in the 'SysParams' table. However, there is a default value of 30 (ms, and sec., respectively) for these two values, which means two presses are needed. To override these values, place them both in the 'SysParams' table with a value of 0. You can also change the values if you like.
PERSIST_VIRTUAL_XPT	This means "persistent virtual crosspoints." If this value is set to 1, the NV9000 will retain the state of virtual crosspoints through a restart, reboot, or power-cycle of the control system. On redundant systems, the virtual crosspoint information is not shared between the system controllers, so the system controller on which a router having virtual crosspoints is active at startup will be the system controller that sets persistent virtual crosspoint information.
FAILOVER_SALVO_1_TO_2 and FAILOVER_SALVO_2_TO_1	The NV9000 software can execute a salvo when a failover occurs from one system controller to another. The FAILOVER_SALVO_1_TO_2 value must be the database ID of the salvo that will execute on controller 2 when it goes active. Similarly, the FAILOVER_SALVO_2_TO_1 value must be the database ID of the salvo that will execute on controller 1 when it goes active.

LEVEL_DO_SIMPLE_TAKE	This parameter allows the NV9000 software to interpret a physical level as if it were a virtual representation of the routing system. It will always switch devices configured on that physical level using an all-level take. This feature allows NV9000 clients a greatly simplified interface into a complex routing system. The value in the 'SysPArams' table for this parameter is a comma-delimited list of database IDs for physical levels that should be switched as all-level.
AUTO_FREESRC	If this parameter's value is set to 1, the NV9000 software automatically routes the configured free source to the input of a tieline when that tieline is no longer in use. Other values for this parameter are no-ops, causing no special behavior. The free source is that configured for the level set of the destination of the tieline route.
NV_LAST_WRITE_TIME	The last time (and date) the configuration was written to a system controller.

There might be other system parameters — that have not been documented. If an undocumented system parameter applies to your system, a Grass Valley service technician will communicate this to you.

Hosts Table

The 'Hosts' table (under the 'Views' pane) lists the "hosts" defined in your configuration. This is a typical 'Hosts' table:



A host is the NV9000 system controller on which your NV9000 software runs. A name is given to the system controller (internally).

The name is usually NVCONFIG. A second is usually NVCONFIG2 when you have a redundant pair of system controllers.

There are 3 sections in the page:

- Filter
- Host List
- Buttons

Filter

At the top of the page is a 'Computer Name' filter. If you enter text in this field, the list of hosts is restricted to those whose 'Computer Name' fields contain the text you entered.

Host List

Each row in the list represents a host. The list has 5 fields:

- ID. The data base ID for the host. These numbers are generated automatically and you cannot change them.
- Computer name. This is the name given to the system controller internally. The names are set to NVCONFIG and NVCONFIG2 at the factory. If you change the name in the system controller, also change the name in this table.
- Log mode. This field is a drop-down list in which you can select one of 8 logging modes. They are listed here, in order of the amount of information recorded:

  No logging
  Log errors
  Log warnings
  Log system events
  Log transactions
  Log all events
  Log debugging info
  Log verbose debugging info (this consumes a great amount of disk space)

- Parameters.

  You may ignore this field. It was created in an earlier version of NV9000-SE Utilities and is no longer needed.

  However, the field does accept one parameter: "`kr = off`" where "kr" means "kill rogues."

  "Rogues" are system components that are not responding to external stimuli. To "kill a rogue" is to turn the software component off.

  If the parameter field is "kr = off" exactly, the host does not kill rogues. If the parameter is anything else, the host does kill rogues.

  This parameter value might or might not have an effect on your system.

- Backup computer name.

  You may ignore this field. It was created in an earlier version of NV9000-SE Utilities and is no longer needed.

Buttons

At the bottom of the page are 5 buttons:

- Add

  Click 'Add' to add a host to the table. NV9000-SE Utilities creates a new row at the bottom of the router list in which you can enter host data.

  (The ID is generated by NV9000-SE Utilities.)

- Delete

  Select one or more rows in the 'Hosts' table and click 'Delete' to remove those hosts from the table.

  NV9000-SE Utilities deletes the hosts immediately and without warning.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

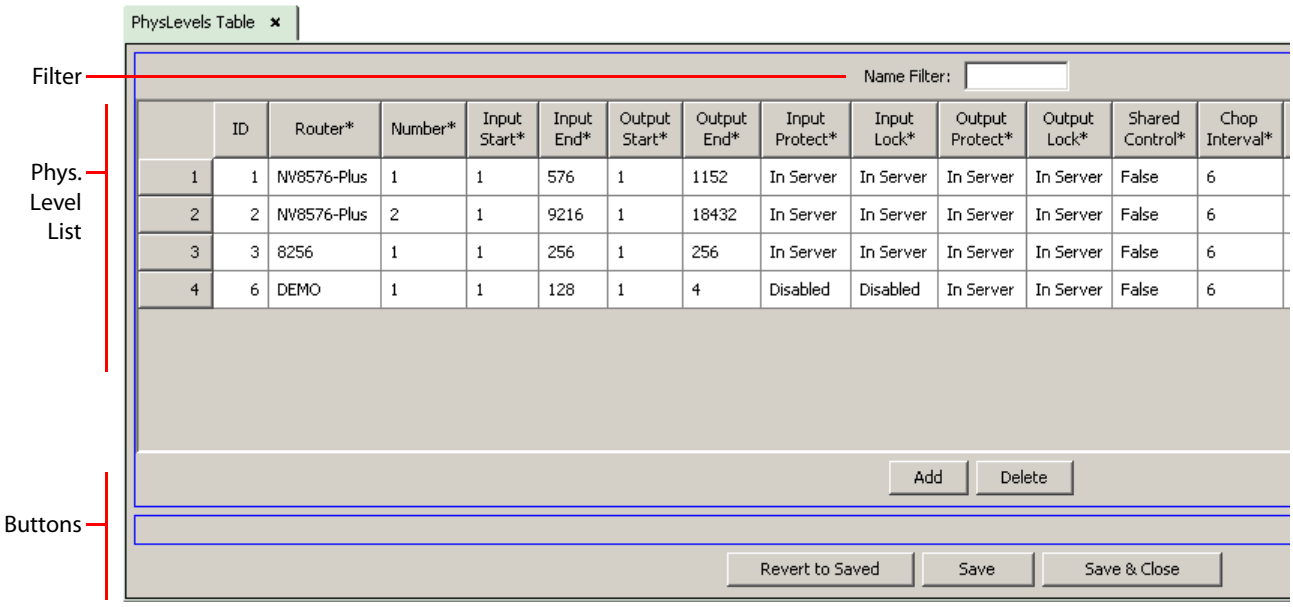
  Click 'Revert to Saved' to restore the saved version of the hosts table, discarding any changes you have made (since the last save).

- 'Save & Close'

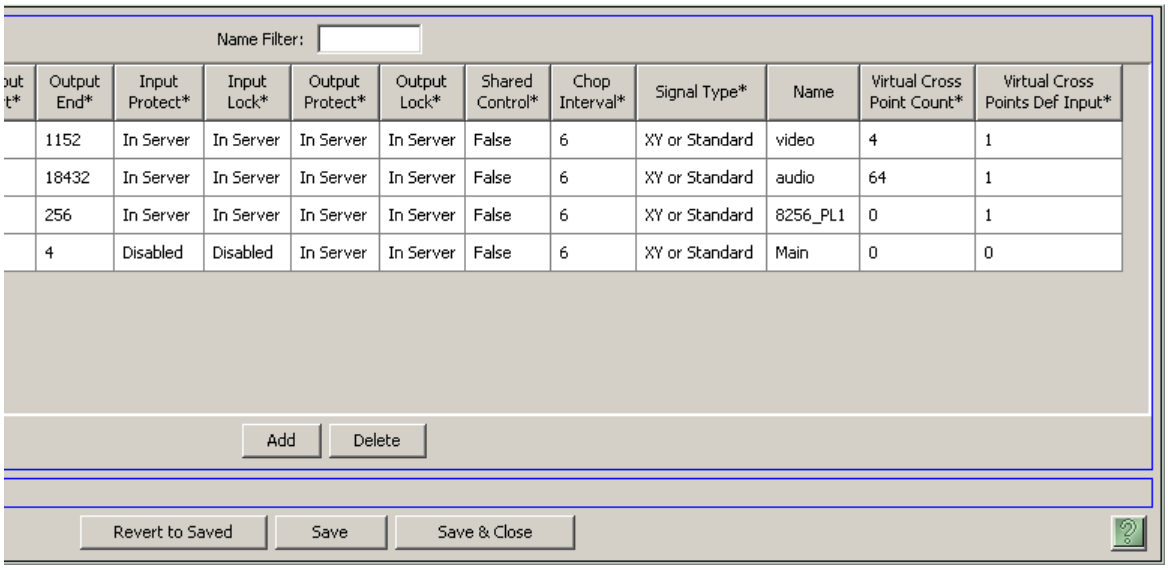
  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

'PhysLevels' Table

The 'PhysLevels' table (under the 'Views' pane) lists all the physical levels defined in your configuration. This is the left side of a sample 'PhysLevels' table:



This is the right side:



There are 3 sections in the page:

- Filter
- Physical Level List
- Buttons

Filter

At the top of the page is a 'Name' filter. If you enter text in this field, the list of levels is restricted to those levels whose names contain the text you entered.

Note that, by default, the 'Name' column of the table is at the right end of the table. You might have to scroll the window to see the level names. (You can also drag the column to the left side of the table.)

Physical Level List

Each row in the list represents a physical level. The list has 17 columns:

- ID. The data base ID for the level. These numbers are generated automatically and you cannot change them.
- Router. This is the router in which the physical level is defined.
- Number. This is the level number that was assigned to the physical level in the router details configuration page. See Router Details Page, on page 44.
- Input Start. This is the starting input port number for the level, also defined in the router details configuration page.
- Input End. This is the ending input port number for the level, also defined in the router details configuration page.
- Output Start. This is the starting output port number for the level, also defined in the router details configuration page.
- Output End. This is the ending output port number for the level, also defined in the router details configuration page.

- Input Protect. This field has a drop-down menu. Its choices are:

  In Server — Operators may protect sources (comprising input ports) and the protection is executed in the NV9000 system controller. (Here "server" means system controller.)

  Disabled. Operators may not protect inputs.
- Input Lock. This field has a drop-down menu. Its choices are:

  In Server — Operators may lock sources (comprising input ports) and the lock is executed in the NV9000 system controller. (Here "server" means system controller.)

  Disabled. Operators may not lock inputs.
- Output Protect. This field has a drop-down menu. Its choices are:

  In Server — Operators may protect destinations (comprising output ports) and the protection is executed in the NV9000 system controller. (Here "server" means system controller.)

  In Router — Operators may protect destinations (comprising output ports) and the protection is executed in the router.

  Disabled. Operators may not protect outputs.
- Output Lock. This field has a drop-down menu. Its choices are:

  In Server — Operators may lock destinations (comprising output ports) and the lock is executed in the NV9000 system controller. (Here "server" means system controller.)

  In Router — Operators may lock destinations (comprising output ports) and the lock is executed in the router.

  Disabled. Operators may not lock outputs.
- Shared Control. The field has a drop-down menu. Its choices are

  True. Control of this physical level is shared by more than one system controller. This option informs the system controller that another control system is connected to this physical level. That is to say, another control system is connected to the router control card and that it can initiate crosspoint changes. (The NV9000 software will not log unexpected changes as errors.).

  False. Control of this physical level is restricted to the system controller using this configuration. If you select 'False', the NV9000 software retains exclusive access to this physical level and does not permit crosspoint changes that it does not initiate.
- Chop Interval. Certain routers support "chop" which is test function where the current source and the preset source are rapidly alternated at the destination. The chop interval is the rate of chop in switches per second. The default value is 6.
- Signal Type. This field has a drop-down menu. Its choices are:

  'XY or standard'. Choose this for most video and audio routers.

  'NVISION Machine Control'. Choose this for NVISION series machine control routers.

  'NVISION Profile'. This is an artificial signal type that allows a virtual router (a router that uses virtual protocol) to represent an external system that, for one reason or another, cannot execute takes using the ports configured for routers in the NV9000 system.
- Name. This is the physical level's name.
- Virtual Crosspoint Count. This field contains the number of virtual crosspoints defined for the physical level in the router details configuration page.
- 'Virtual Crosspoints Def Input'. This field contains the default input for virtual crosspoints defined for the physical level in the router details configuration page.

▲ Although you can edit the entries in the physical levels table, it is unwise to do so unless you know what you are doing.

Buttons

At the bottom of the page are 5 buttons:

- Add

  Click 'Add' to add a physical level to the table. NV9000-SE Utilities creates a new row at the bottom of the router list in which you can enter physical level data.

  (The ID is generated by NV9000-SE Utilities.)

- Delete

  Select one or more rows in the 'PhysLevels' table and click 'Delete' to remove those levels from the table.

  NV9000-SE Utilities deletes the levels immediately and without warning.

- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.

- Revert to Saved

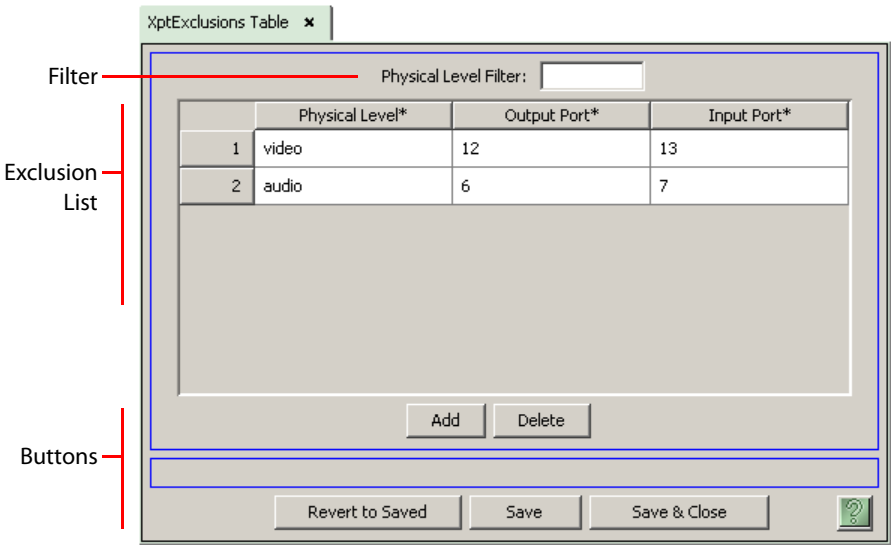
  Click 'Revert to Saved' to restore the saved version of the physical levels table, discarding any changes you have made (since the last save).

- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

'XptExclusions' Table

The 'XptExclusions' table (under the 'Views' pane) lists crosspoint ("XPT") exclusions. This is a typical 'XptExclusions' table:



A crosspoint exclusion is a route that is prevented from occurring (within a single physical level).

Thus, each crosspoint exclusion in the list specifies a physical level, an input port relative to the physical level, and an output port relative to the physical level. If an operator attempts to perform a take involving these ports, the route will not occur for these ports. It might be carried out for other ports in the take.

There are 3 sections in the page:

- Filter
- Exclusion List
- Buttons

Filter

At the top of the page is a 'Physical Level' filter. If you enter text in this field, the list of exclusions is restricted to those levels whose names contain the text you entered.

Exclusion List

Each row in the list represents a crosspoint exclusion. The list has 3 columns:

- ID. The data base ID for the level. These numbers are generated automatically and you cannot change them.
- Output port. This is the output end of the route that must not occur.
- Input port. This is the input end of the route that must not occur.

Buttons

At the bottom of the page are 5 buttons:

- Add

  Click 'Add' to add a crosspoint exclusion to the table. NV9000-SE Utilities creates a new row at the bottom of the exclusion list in which you can enter its data.

  (The ID is generated by NV9000-SE Utilities.)
- Delete

  Select one or more rows in the 'XptExclusions' table and click 'Delete' to remove those levels from the table.

  NV9000-SE Utilities deletes the rows immediately and without warning.
- Save

  Click 'Save' to commit (make permanent) the changes you have made in the page.
- Revert to Saved

  Click 'Revert to Saved' to restore the saved version of the crosspoint exclusions table, discarding any changes you have made (since the last save).
- 'Save & Close'

  Click 'Save & Close' to commit the changes you have made in the page and then close the page.

Glossary

Breakaway	Routing multiple sources, on different levels, to a destination.
Chop	"Chop" switches a destination between its current source and the preset source rapidly. The default chop rate is 6 times per second.
Control point	A port (Ethernet or serial) on the system controller.
Control system	The software that runs on the system controller.
Current configuration	The configuration you are editing.
Dst, DST	Destination
Free Source	A source, often "black/silence," that can be routed to a destination to free the source previously routed to that destination.
GPI	General Purpose Interface. (The term is occasionally used to mean GPI input.)
GPIO	General Purpose Input and Output.
GUI	Graphic User Interface
HD	High Definition (HD-SDI). Video signal rates: SMPTE 259M at 1.483 and 1.485 Gb/s.
Host	The computer on which the control system runs.
I/O	Input / Output
LED	Light Emitting Diode
LPR	Lock / Protect / Release.
Machine Control	The control of playback devices (typically tapes) that require cueing, rewinding, stopping, and starting, and some other kinds of operations. Machine control routers are port-to-port routers where ports are bidirectional.
MC	Master Control.
MD, Multidest	Multiple-destination. A panel operation mode in which multiple destinations can be switched with a single button press (after a certain amount of setup).
MRC	Software used to configure NV8500 family hybrid routers for use.
Page	(1) Several control panels have displays. A display can show a fixed number of entries from potentially large lists. A page is a displayable segment of a list. Lists can be salvos, destinations, levels, etc. (2) Some control panel s have several sets of button functions. For example, the NV9605 have 4 sets of button functions. Each set is called a page. (3) NV9000-SE Utilities has many configuration windows. These are generally called pages.
PGSE	Panel, GUI, and Salvo Editor. This is archaic and now obsolete software.
PIN	Personal Identification Number. This is an obsolete concept, never actually implemented in NV9000-SE Utilities.

RCS	Router Control System (the software running in a system controller)
RU	Rack Units. A standard measure for router frames and other rack-mountable device enclosures A rack unit is 1.75 inches (44.45 mm).
SD	Standard Definition. Video signal rates: SMPTE 259M at 143, 177, 270 and 360 Mb/s and SMPTE 344 M at 540 Mb/s.
Src, SRC	Source
SysMgr	System Manager.
System Controller	The hardware on which the router control system application runs.
UniConfig	Software used to configure routers other than NV8500 family hybrid routers for use.
UI	(1) User Interface (2) Unit Interval
User	A term meaning the name of a control panel. Such names are used in the control system to indicate who (i.e., which panel) “owns” a lock or protect.
VFD	A vacuum fluorescent display.

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Grass Valley Technical Support

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Corporate Head Office

Grass Valley
3499 Douglas-B.-Floreani
St-Laurent, Quebec H4S 2C6
Canada
Telephone: +1 514 333 1772
Fax: +1 514 333 9828
www.grassvalley.com