USER GUIDE

Cheetah

PERC3000

SYSTEM CONTROLLER
INSTALLATION AND OPERATION

Publication: 81-9059-0716-0, Rev. E
August 2014

www.pesa.com
Phone: 256.726.9200

Thank You!! for purchasing your new System Controller hardware and software application from PESA. We appreciate your confidence in our products. PESA produces quality, state-of-the-art equipment designed to deliver our users the highest degree of performance, dependability and versatility available anywhere. We want you to know that if you ever have a concern or problem with a PESA product, we have a team of engineers, technicians and customer service professionals available 24/7 every day of the year to help resolve the issue.

If you have any comments or suggestions concerning your PESA equipment, please contact our Customer Service Department.

Again thank you for choosing PESA and we look forward to a long-term partnership with you and your facility.

SERVICE AND ORDERING ASSISTANCE
PESA
103 Quality Circle, Suite 210
Huntsville AL 35806 USA
www.PESA.com

MAIN OFFICE
Tel: 256.726.9200
Fax: 256.726.9271

SERVICE DEPARTMENT
Tel: 256.726.9222 (24/7)
Toll Free: 800.323.7372
Fax: 256.726.9268
Email: service@PESA.com

Printed in the United States of America.

August 2014

May 2014

December 2013

August 2013

June 2013

TABLE OF CONTENTS

TABLE OF CONTENTS (CONT.)

TABLE OF CONTENTS (CONT.)

LIST OF FIGURES

LIST OF FIGURES (CONT.)

LIST OF TABLES

Chapter 1 - About This User Guide

1.1 Documentation and Safety Overview

This User Guide provides instructions for installation and operation of the PERC3000 System Controller hardware designed and produced by PESA, and applicable functions of PESA's Cattrax software application for the Microsoft Windows® operating system.

It is the responsibility of all personnel involved in the installation, operation, and maintenance of the equipment to know all the applicable safety regulations for the areas in which they will be working. ***Under no circumstances should any person perform any procedure or sequence in this manual if the procedural sequence will directly conflict with local Safety Practices. Local Safety Practices shall remain as the sole determining factor for performing any procedure or sequence outlined in this document.***

1.2 Cautions, and Notes

Cautions and Notes are addendum statements used in this guide that supply necessary information pertaining to the text or topic they address. Caution statements typically notify you of steps or procedures that could impede installation or operation; and/or cause damage to the equipment. Notes are additional statements that typically provide added information that can simplify and/or enhance the use or operating characteristics of the equipment. Examples of the graphic symbol used to identify each type of statement and the nature of the statement content are shown below:

1.2.1 Caution

	**Caution statements identify conditions or practices that can result in personal injury and/or damage to equipment if the instructions contained in the statement are not complied with.**

1.2.2 Note

	**Notes are for information purposes only. However, they may contain information important to the correct installation, operation, and/or maintenance of the equipment.**

Chapter 2 – Introduction

2.1 PRODUCT DESCRIPTION

PESA's server-based Ethernet Router Control, PERC3000, is a high-speed, high-capacity system controller for PESA routing installations. As with any PESA system controller, the function of the PERC3000 is to coordinate and control operation of router components contained in the signal transport infrastructure. Collectively, a PERC3000 System Controller consists of a hardware server platform running the PERC3000 software application and the PESA Cattrax control software application installed on a host computer running the Microsoft Windows XP Professional or Windows 7 operating system.

The hardware portion of the PERC3000 system, Figure 2-1, interfaces with router system components, such as network compatible Cheetah Matrix Frame Controllers, PERC1000 Frame Controllers or a host computer running Cattrax, over an Ethernet connection. In many installations, all of the router system components may communicate over the Ethernet. However, some PESA installations may have components or routers that communicate with the system controller over the proprietary PESA Router Control, or PRC, serial bus protocol. For these applications a serial bus interface peripheral device is available from PESA that allows the PERC3000 controller to communicate with and control PRC bus components. Refer to Paragraph 2.3.2.

The PERC3000 controller also interfaces with and configures a wide variety of PESA remote control panels used to operate router frames within the system. Depending on the panel type, remote control panels communicate with the system controller either through an Ethernet port or the proprietary PESA Remote Control Panel (RCP) bus. Cheetah RCP protocol panels communicate with the PERC3000 controller through an optionally available PESA RCP Panel Server peripheral interface device. Refer to Paragraph 2.3.3

Configuration and operation of the PERC3000 System Controller and peripheral devices is performed using PESA's Cattrax, a multi-purpose software control application.

Figure 2-1 PERC3000 System Controller

In order for the system controller to operate, it must be programmed by downloading a *controller configuration file* to it using the host PC and the Cattrax control software application. Configuration files are written by the user to tailor all operational aspects of the router system. Files may be named and saved for easy retrieval. Multiple configuration files may be written, stored and loaded as needed to allow quick access of different operational setups for the routing system. Procedures for creating, editing and working with controller configuration files are presented in Chapter 5 of this User Guide. PESA highly recommends that you become familiar with the structure and purpose of the controller configuration file before attempting installation or operation of the system controller or any peripheral devices.

2.2 CONTROLLER SYSTEM COMMUNICATION PROTOCOLS

In PESA router family architecture the core control system components are the system controller hardware/software, individual frame controllers contained in each router frame and a host PC to run the control software; plus remote control panels, or a third party controller interface as needed for an individual installation. Installations incorporating the PERC3000 controller may also require use of PESA's multi-port serial bus interface device for PRC bus interface and/or a PESA panel server device for RCP remote control panel bus compatibility.

Cheetah video router frames are equipped with a frame controller circuit card called the Matrix Frame Controller that communicates with the PERC3000 system controller over an Ethernet port. When a DRS audio router is included in the routing system, the PERC1000 Frame Controller used in each DRS DXE frame also communicates via Ethernet with the PERC3000 controller. Ethernet connectivity allows command and control functions over a facility network, reduces cabling requirements and allows efficient communications between all system components.

NOTE	**When the Matrix Frame Controller is used with the PERC3000 controller over an Ethernet link, *do not* connect the frame controller serial port to a PC running PESA's ViewPort utility software application. Use only the Cattrax application for frame controller monitoring and status queries.**

Many PESA router products such as the Jaguar, Ocelot and Cougar communicate with the system controller through a PESA proprietary serial bus protocol called the PESA Routing Control Bus, or simply the PRC bus. Previous generation Cheetah matrix frame controllers used the PRC bus protocol for communication with system controllers such as the 3500PRO and PERC2000. Third party control and automation devices also communicate with the system controller through serial buses. It is possible to control PRC bus and other serial bus devices with the PERC3000 system controller using the optionally available PERC3000 serial bus interface peripheral.

Typical PESA routing installations include a variety of remote control panels that allow users control access to the switch matrix. In PESA system architecture, remote control panels communicate with the system controller through either an Ethernet port or a proprietary serial bus protocol called the PESA Remote Control Panel, or simply the RCP bus. Remote control panels using the RCP bus, such as Cheetah RCP panels, can communicate with the PERC3000 controller using the optionally available RCP Panel Server peripheral. Ethernet panels such as the Touch 72 or Smart 32 can communicate directly with the PERC3000 controller.

Regardless of size or number of system components, or number of frame controllers, PESA router installations typically function under a single system controller to coordinate and oversee operation of the entire system. The PERC3000 system controller is capable of supervising multiple frame controllers allowing control of the entire system by a common set of control devices. Figure 2-2 illustrates a typical PERC3000 controller installation using a mix of PRC-based devices, Ethernet control devices and remote control panels using the PESA RCP control bus. This example system also includes both the optional multi-port serial bus interface and the panel server peripherals.

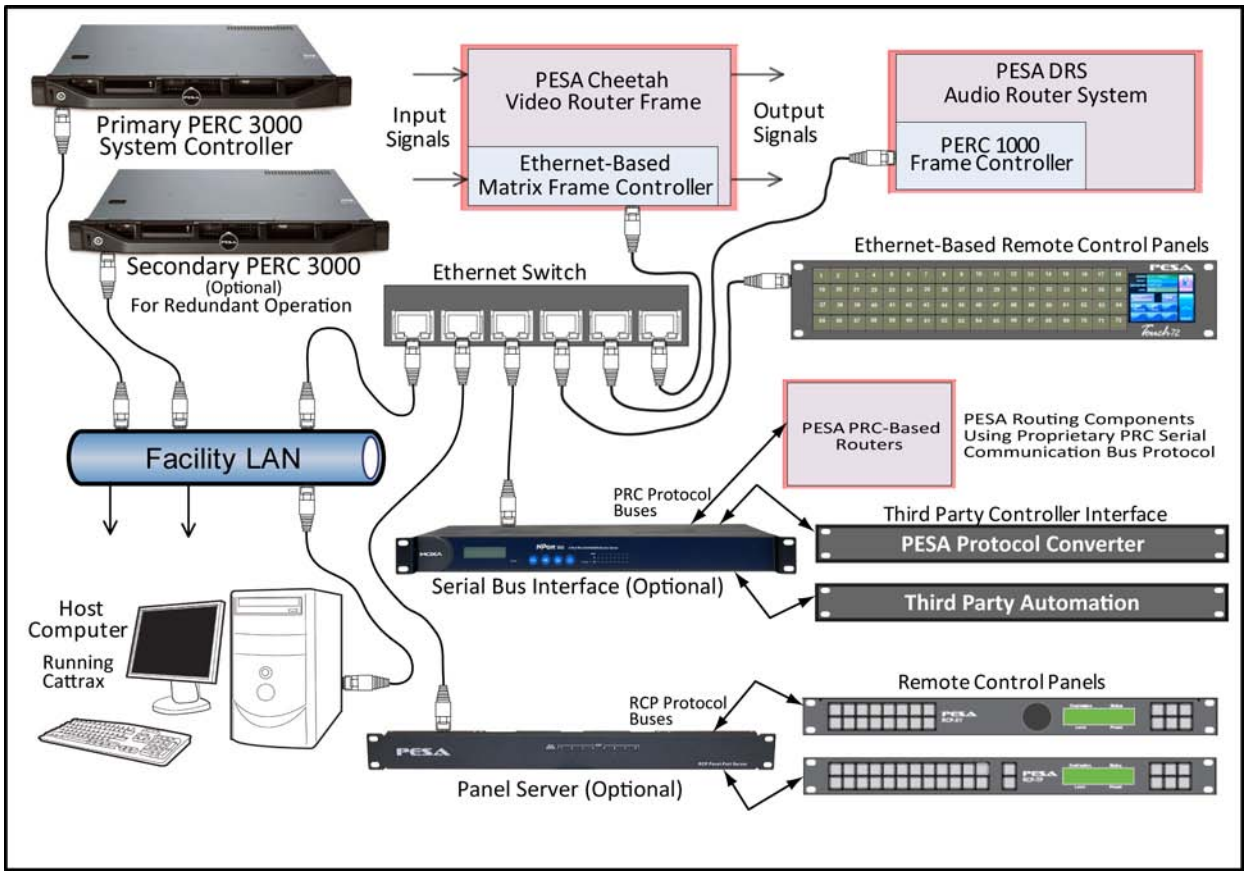


Figure 2-2 Typical PERC3000 System Controller Installation

2.3 PERC 3000 SYSTEM COMPONENTS

2.3.1 PERC 3000 SYSTEM CONTROLLER

The PERC3000 system controller is housed in a 1RU chassis with an internal power supply. It is built around a commercial, off-the-shelf Dell server platform, customized with PESA proprietary software pre-installed on the internal storage drive. For the highest reliability possible, the PERC3000 server device incorporates a solid state hard drive for internal storage.

When power is applied to the server, it initiates a boot-up procedure, upon completion of which it automatically launches the PERC3000 application. The PERC3000 communicates with the host control computer and other router system components through an Ethernet port.

When used as the controller for a router installation including a mix of Ethernet, PESA PRC bus routers and/or Cheetah control panels using the PESA RCP bus, the optional interface peripherals discussed in Paragraphs 2.3.2 and 2.3.3 must be used in conjunction with the PERC3000 controller.

Figure 2-3 illustrates the front and rear panel of the PERC3000 System Controller.

Figure 2-3 PERC3000 System Controller

2.3.2 PERC 3000 MULTI-PORT SERIAL BUS INTERFACE (OPTIONAL)

The PERC3000 Serial Bus Interface peripheral device communicates with the system controller over an Ethernet connection and provides 8 serial data ports, each of which may be individually configured through Cattrax control software. It is built around a commercial, off-the-shelf interface device, the MOXA NPort 5650-8 Serial Device Server, custom configured such that all operating commands and configuration procedures may be implemented through the Cattrax control software application.

A serial bus interface device must be used in conjunction with the PERC3000 controller if your routing installation incorporates any PESA routers that communicate with the system controller over the PESA router control (PRC) bus, or other control devices that communicate over a serial data bus or one of the PESA proprietary serial protocols. Refer to Paragraph 4.7 of this User Guide.

Figure 2-4 illustrates the front and rear panel of the serial bus interface peripheral.

Figure 2-4 PERC3000 Serial Bus Interface

2.3.3 PERC 3000 RCP PANEL SERVER (OPTIONAL)

The PERC3000 RCP Panel Server is a PESA built peripheral that communicates with the system controller over an Ethernet connection and provides up to 8 serial data ports supporting the PESA Remote Control Panel (RCP) communication protocol. Each panel server can support up to 32 individual remote control panels.

A panel server device must be used in conjunction with the PERC3000 controller if your routing installation incorporates any PESA remote control panels that communicate with the system controller over the RCP bus. This would include virtually all of the remote control panels found in currently installed Cheetah routing systems. Refer to Paragraph 4.9 of this User Guide.

Figure 2-5 illustrates the front and rear panel of the panel server peripheral.

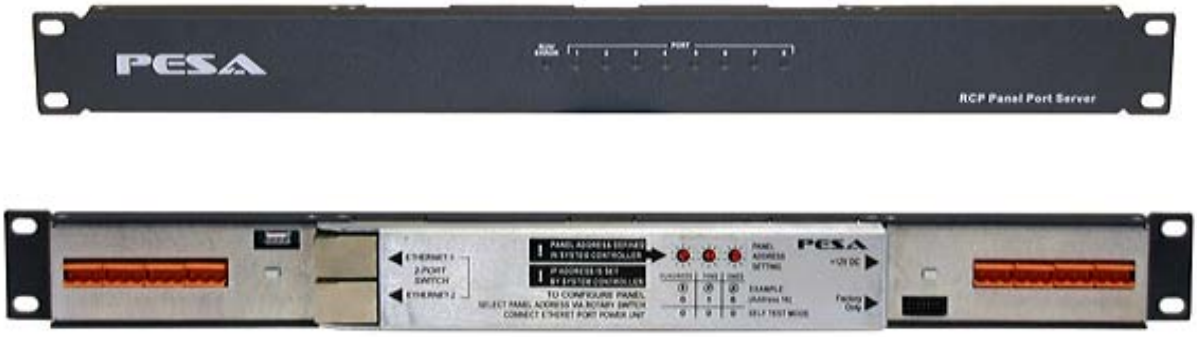


Figure 2-5 PERC3000 Panel Server

2.4 FEATURES

- Full featured server-based controller hardware
- Full Ethernet connectivity and support
- Full redundancy control option
- RS232/422 interface for many third-party control systems (with Serial Interface Peripheral)
- Up to 17 switching levels
- Allows up to 256 tieline interconnects
- Up to 256 salvos
- Up to 4800 source and destination names
- Intuitive Cattrax GUI control interface
- Off-line configuration capabilities
- Virtual matrix mapping
- Software re-entry
- Matrix breakup/segmentation

2.5 SPECIFICATIONS

2.5.1 PERC3000 SYSTEM CONTROLLER

Mechanical

Form Factor ..... 1 RU

Dimensions ..... 1.67in (H) X 15.5in (D) X 17.1in (W)
42.4mm (H) X 393.7mm (D) X 434mm (W)

Weight ..... 18 lb

Power Requirements

Power Input ..... 100 – 240 VAC, 50/60/Hz

Power Consumption ..... 250 W (Max.)

Environmental

Operating Temperature ..... 10°C - 35°C

NOTE: For altitudes above 2950 feet, the maximum operating temperature is derated 1 ºF/550 ft

Storage Temperature ..... -40°C - 65°C

Operating Humidity ..... 20% - 80% Non-Condensing

Storage Humidity ..... 5% - 95% Non-Condensing

2.5.2 PERC3000 SERIAL INTERFACE PERIPHERAL

LAN

Ethernet ..... 10/100 Mbps, RJ45

Serial Interface

Interface RS-232/RS-422/RS-485

Number of Ports 8

Port Connector Type RJ45 8-pin

Signals

RS-232: ..... TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

RS-422: ..... Tx+, Tx-, Rx+, Rx-, GND

RS-485 (2-wire): ..... Data+, Data-, GND

RS-422 (4-wire): ..... Tx+, Tx-, Rx+, Rx-, GND

Serial Line Protection ..... 15 KV ESD for all signals

Mechanical

Form Factor ..... 1 RU

Dimensions ..... 1.75in (H) X 7.48in (D) X 18.8in (W)
44.5mm (H) X 190mm (D) X 478mm (W)

Power Requirements

Power Input ..... 100 – 240 VAC, 47/63/Hz

Power Consumption ..... 20 W

Environmental

Operating Temperature ..... 0°C - 55°C

Storage Temperature ..... -40°C - 75°C

Operating Humidity ..... 5% - 95% Non-Condensing

Storage Humidity ..... 5% - 95% Non-Condensing

2.5.3 PERC3000 PANEL SERVER PERIPHERAL

Mechanical

Form Factor ..... 1 RU

Dimensions ..... 1.75in (H) X 1.25in (D) X 19in (W)
44.5mm (H) X 31.75mm (D) X 482.6mm (W)

Power Requirements

Power Input ..... 100 – 240 VAC, 47/63/Hz

Power Consumption ..... 2 W

Environmental

Operating Temperature ..... 0°C - 40°C

Operating Humidity ..... 90% Non-Condensing

Chapter 3 – PERC3000 System Description

3.1 PERC3000 System Controller

During normal operation there is no user interaction required with the PERC3000 controller. The PERC3000 platform is a Dell server with the PERC3000 system controller application pre-installed on the internal, solid-state storage drive.

The only connections required to the server during normal operation in the PERC3000 function are power and an Ethernet port connection.

It is not necessary to install a keyboard, mouse or monitor to the server as all commands for the system controller are issued and implemented through the Cattrax control software application running on a host computer.

On initial power-up, the Dell server performs its boot-up routine. Upon completion of boot-up, the Linux operating system automatically launches the PERC3000 application which in turn communicates with all router components to verify proper operation of the various frame controllers and peripheral devices. If PESA system errors are detected, these are flagged to the operator through Cattrax

3.2 IP Addresses and Network Configuration

NOTE	**When planning your PERC3000 controller installation, you should always allocate a group of at least three *sequential* network IP addresses dedicated to system controller components – even if you are only installing a single PERC3000 controller with no serial interface.**

The first address in the sequence is designated as the ***base IP address*** for the PERC3000 system and is always assigned to the PERC3000 designated as the ***primary*** controller, or in non-redundant installations, the single system controller. If a second system controller server is installed for redundancy, the ***secondary*** controller is assigned the IP address of base IP address +1.

When a PERC3000 serial interface device (MOXA NPort) is used, the third IP address in sequence (base IP address +2) is **always** assigned to this device and entered directly through the control panel located on the front of the device.

NOTE	**The third address in sequence is assigned to the serial interface device even if a secondary controller is not used. In this instance, the second IP address is reserved for future use if a secondary system controller server should ever be added.**

A unique IP address must be allocated for each panel server peripheral or network-based PESA remote control panel used in the system installation. It is not necessary that addresses designated for panel devices be sequential with one another or with the block of sequential addresses allocated for the PERC3000 system controller components.

In many facilities, a network administrator will assign the IP addresses allocated for router system components. In some instances it may be necessary to change the factory default IP address or other network parameter values set by PESA during product manufacture and testing.

IP addresses for the PERC3000 controller may be changed through a Cattrax control menu. IP addresses for network-based panel devices are entered by the user when the panel is configured into the system through Cattrax as part of creating the controller configuration file. When a new configuration file is loaded, or the current file is updated, and run by the system controller, a command is issued to each panel device which sets its IP address to the value specified in the controller configuration file.

Cattrax control software communicates with the PERC3000 system controller hardware through the host PC over Ethernet using the IP address of the host PC. When Cattrax is started, it immediately begins searching the network for all PESA products intended to communicate with it that might be connected to the network – including the PERC3000 system controller server.

3.3 FACTORY DEFAULT IP ADDRESS AND NETWORK PARAMETERS

In order for the host PC and PERC3000 controller hardware to communicate, the network parameters set for the system controller must allow Cattrax to "discover" it on the network. In some instances this may require changing the factory default IP address or other network parameters of the system controller. Consult your facility network administrator before adding devices to the network in order to determine if the factory default settings will cause a conflict on the network or possibly not allow the host PC running Cattrax to discover the controller. Static factory default IP address and network parameter values for PERC3000 system devices are identified in the following paragraphs:

3.3.1 SINGLE OR PRIMARY PERC3000 CONTROLLER

The PERC3000 system controller used in a single controller system installation, or the controller designated as ***primary*** when used in a redundant controller system, is programmed at the PESA factory with the following default network parameters:

Static IP:	192.168.1.222
Subnet Mask:	255.255.255.0
Gateway:	192.168.1.1

3.3.2 SECONDARY PERC3000 CONTROLLER

If two PERC3000 controllers are installed in a router system for control redundancy, the second system controller is designated the ***secondary*** server and is always assigned the IP address determined by adding 1 to the fourth octet of the IP address assigned to the primary controller (primary controller IP address + 1). A controller designated as the secondary in a redundant system is programmed at the PESA factory with the following default network parameters:

Static IP:	192.168.1.223
Subnet Mask:	255.255.255.0
Gateway:	192.168.1.1

3.3.3 SERIAL INTERFACE PERIPHERAL DEVICE

When included in a PERC3000 routing system, the MOXA serial interface device is always assigned the IP address determined by adding 2 to the fourth octet of the IP address assigned to the primary controller (primary controller IP address + 2). Serial interface device peripherals are programmed at the PESA factory with the following default network parameters:

Static IP: 192.168.1.224
Subnet Mask: 255.255.255.0
Gateway: 192.168.1.1

3.3.4 PANEL SERVER DEVICES AND NETWORK-BASED REMOTE CONTROL PANELS

Panel server devices and PESA network-based control panels, such as the Touch 72 or Smart 32, are all programmed at the PESA factory with the following default network parameters and IP address:

Static IP: 192.168.1.205
Subnet Mask: 255.255.255.0
Gateway: 192.168.1.1

On initial system start-up, the PERC3000 system controller identifies and communicates individually with each device using the unique panel ID assigned through the rotary switches on each panel. On system initialization, the PERC3000 controller changes the default IP address of each panel device to the unique address entered by the user during the panel configuration process.

3.4 CHANGING DEFAULT NETWORK PARAMETERS

In most installations, the default IP address setting from the factory may be used for initial "discovery" of the PERC3000 system controller by Cattrax. After the controller and the host PC are communicating, the IP address or other network parameters of system devices may be changed as required to fit a particular network plan using Cattrax control software menus.

Very rarely, the system controller factory default network parameters may cause a network conflict or not allow communication with the host PC. In such instances, it will be necessary to create a direct Ethernet connection between the PERC3000 system controller and the Cattrax control application running on a host PC that has been isolated from the facility network. Through the Windows operating system, configure the isolated PC to a static IP address and subnet that allows it to communicate with the system controller using the factory default IP address. Change the IP address of the controller with Cattrax. Refer to Paragraph 5.7 of this User Guide to configure network settings through Cattrax.

The IP address of a PERC3000 controller used as the single system controller in a router installation with non-redundant control, or installed as the *primary* controller in a redundant control system with dual system controllers, must be set to the ***Base IP Address*** – the numerically first address value of the three sequential addresses allocated on your network for controller system components.

If a second PERC3000 is installed as the secondary controller to configure a redundant control system installation, the IP address of the second controller is set automatically during the pairing procedure to a value of ***Base IP Address + 1,*** which is the numerically second address value of the three sequential addresses. It is not necessary that the second controller be set to a specific IP address prior to pairing with the primary controller; but in order for Cattrax to "discover" the second controller and make it available for pairing, it is necessary that the second controller be set to communicate on the same subnet with the same gateway and mask parameters as the primary controller.

If your system incorporates a MOXA serial interface, use the front panel controls on the device to change the IP address to a value of ***Base IP Address + 2*** – the numerically third address value of the three sequential addresses. Refer to manufacturer's documentation supplied with the serial interface device for information on how to change the IP address.

3.5 DUAL (REDUNDANT) PERC3000 SYSTEM CONTROLLERS

When a router system is equipped with dual PERC3000 controllers, one is always functioning as the active controller and the other is the standby controller. Installation designation as primary or secondary controller is not an indicator of which is the active controller. During operation, the standby controller monitors the health of the active controller and will automatically become active and take over control of the system if it detects a problem. A standby controller can become active for any of the following reasons:

- User requests the standby PERC3000 become active by a command from the control software.
- Active PERC3000 controller sends a request to the standby controller to initiate takeover.
- Active PERC3000 controller is removed from the network.

Chapter 4 – Installation

4.1 INTRODUCTION

Configuring a PERC3000 control system requires you to install and set up the hardware, install the Cattrax control software on a host PC and then establish Ethernet communication over the facility network between the controller hardware, any PERC3000 peripheral devices required for the system, the host PC and your PESA routing equipment.

Before the system controller can perform any useful function in the router system, a controller configuration file must be created and downloaded to it. The configuration file dictates every aspect of PERC3000 operation and may be created or modified and downloaded to the PERC3000 controller through menus of the Cattrax control application. Refer to Paragraph 5.12 of this User Guide.

Specific installation steps for each PERC3000 system component are presented in the following paragraphs.

4.2 SHIPPING DAMAGE INSPECTION

Immediately upon receipt, all shipping containers should be inspected for damage caused in transit. If any damage is noted, save all packing material and contact both PESA and the carrier as soon as possible.

4.3 UNPACKING

	**This equipment contains static sensitive devices.**

Carefully unpack the equipment and compare the parts received against the packing list. If any parts appear to be missing, please contact PESA immediately.

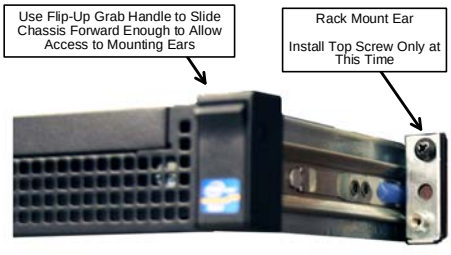
4.4 INSTALL PERC3000 SYSTEM CONTROLLER

The PERC3000 system controller chassis is designed for installation in a standard 19-inch equipment rack. Sufficient space must be provided to the rear and around all sides of the rack mount chassis to ensure adequate air flow. Do not block or restrict cooling air at any point on the server chassis.

Chassis slides on the sides of the unit allow for easy access and installation.

Install the equipment into the rack as follows:

1. Lift the chassis slide grab handle cover on both sides of the chassis and, using the plastic handle tabs, slide the front of the server out far enough to allow access to the rack mounting ears, as shown here.



2. Have someone assist you in placing the chassis into the equipment rack.
3. Support the bottom of the server assembly and install the top rack mounting screws on both sides of the chassis. The bottom screws are installed in a later step.
4. Slide the front of the server back into the chassis.
5. Lift the chassis grab handle cover on one side and install the bottom rack mount screw through the chassis cover and into the rack mounting ear. The bottom screws serve to secure the chassis and slide.
6. Repeat Step 5 on the remaining side of the chassis.

The main power switch is located behind a removable and lockable plastic front cover. To remove the cover, unlock the latch, if needed, and slide the latch up while pulling the cover toward you and remove the front cover. Do not apply power to the PERC3000 controller until all connections have been completed.

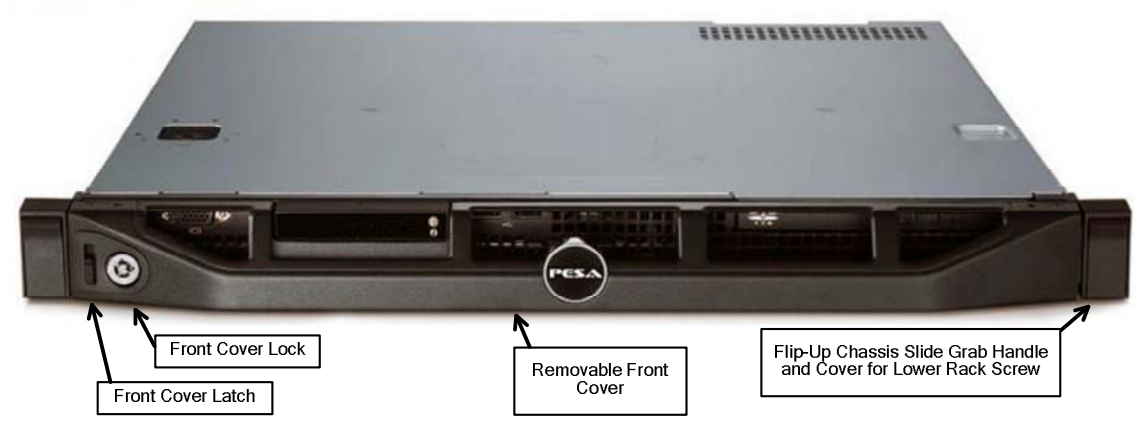


Figure 4-1 PERC3000 System Controller - Front Cover in Place

7. Connect an Ethernet cable between the RJ45 network connector labeled “1”, Figure 4-2, and a convenient facility Ethernet switch or hub port.
8. Connect the power cord to the rear panel AC connector and a source of primary power.

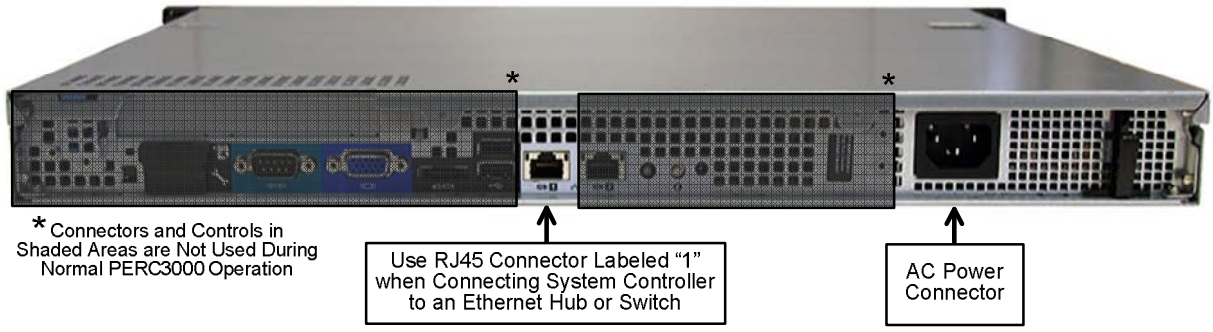


Figure 4-2 PERC3000 System Controller – Rear View

9. Apply power to the PERC3000 system controller by removing the front cover and pressing the main power switch as shown in Figure 4-3.
10. Replace the front cover and secure the latch lock, if desired.

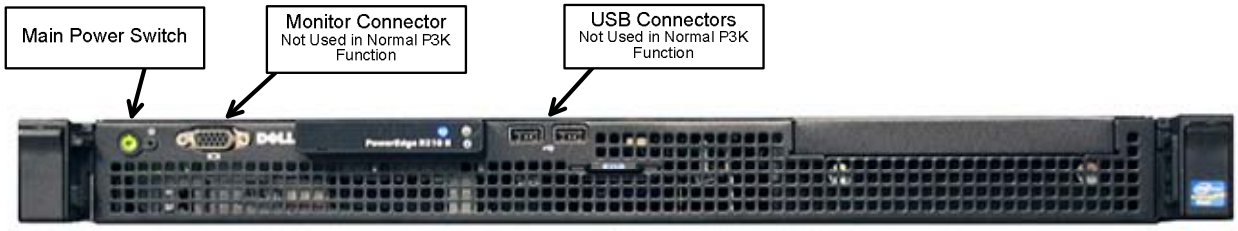


Figure 4-3 PERC3000 System Controller - Front Cover Removed

4.5 REDUNDANT SYSTEM CONTROLLERS

When installing a second PERC3000 system controller for redundant operation, follow the steps above to mount the controller in a convenient location. All data exchange and handshaking between the two controllers is performed over the Ethernet.

Controllers installed for redundant operation, must be configured and "introduced" to one another through a procedure called *Pairing*. This is done through an operator page of Cattrax, refer to Paragraph 5.11.

After the controllers are paired, redundant operation is completely transparent to the user. The controllers will automatically sync configuration and matrix status data, and will perform a "health" check on one another. By default, changeover in the event of failure of the active controller is automatic. If desired, the changeover mode may be set to manual through a selection in Cattrax. Also, an operator may at any time initiate a controller changeover. Refer to Paragraph 5.10.5.

Until the controllers have been paired, they will not function as a redundant system and will not perform any controller-to-controller sync or handshaking activity. If your PERC3000 system was ordered from the factory with two controllers in a redundant configuration, the pairing procedure will have been completed and should not need to be repeated during installation.

4.6 CONNECT CHEEATH MATRIX FRAME CONTROLLER TO ETHERNET

PESA's Cheetah Series Video Router frames provide internal chassis slots for up to two Matrix Frame Controller cards. Ethernet communication with each Matrix Frame Controller is made through a dedicated, card slot-specific RJ45 connector located on the rear panel of the video router frame. One or two (for frame control redundancy) matrix frame controllers can be installed in any of the Cheetah Series video routers. Power for the frame controller is derived through the router power distribution system.

Frame controller card locations vary depending on the Cheetah router frame type. Refer to the User Guide or Technical Addendum supplied with your router for proper installation location. If only one controller card is installed, it may be installed in either slot (A or B) – but remember that the rear panel *Frame Control* connectors for Ethernet connection are card-slot specific.

In Figure 4-4, the connector panel found on the Cheetah 864XR video frame is used as an example; the layout of the system connector panel on your frame may be different than the example shown here. Not all connectors shown in this example are present on all system connector panels; however, the information presented here applies to all connectors of like-nomenclature on any system connector panel, regardless of physical layout.

Install an Ethernet cable between the Frame Control connector on the video frame chassis rear panel corresponding to the internal card slot in which the matrix frame controller card is installed. Each rear panel RJ45 connector is hard wired to its respective card slot. If a card is present in both slots, connect each rear panel connector to an Ethernet port using a separate Ethernet cable.

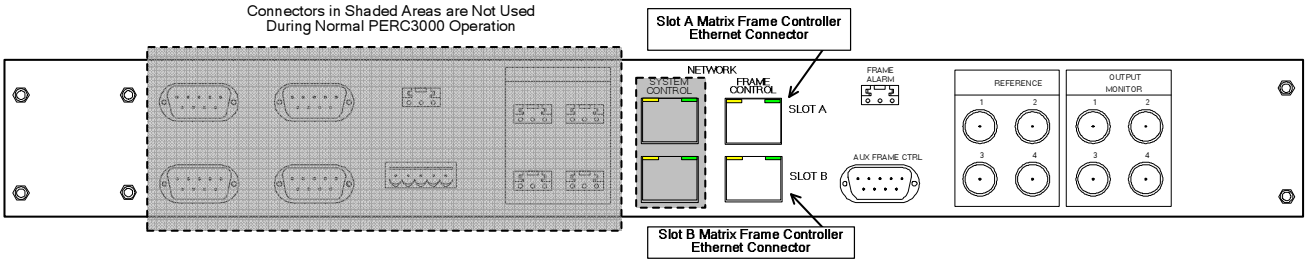


Figure 4-4 Typical Cheetah Video Frame Connector Panel

NOTE	**When the Matrix Frame Controller is used with the PERC3000 controller over an Ethernet link, *do not* connect the frame controller serial port to a PC running PESA's ViewPort utility software application. Use only the Cattrax application for frame controller monitoring and status queries.**

4.7 INSTALLING THE MOXA SERIAL INTERFACE PERIPHERAL

The PERC3000 Serial Interface peripheral (MOXA NPort 5650) may be installed in a standard 19-inch equipment rack. Sufficient space must be provided to the rear and around all sides of the rack mount chassis to ensure adequate air flow.

Prior to integration into the PERC3000 system, the IP address and other network parameters for the serial interface device must be set. With PERC3000 installations, the IP address of the serial device is always the third address of the three sequential addresses dedicated to the system controller(s). Network operating parameters for the MOXA device are entered directly on the front panel of the device using the local control buttons and display, refer to the User Guide for the device for additional information. For easy reference as to the actual values and settings that should be entered during setup, the IP address and network parameter data for the serial device is displayed in a status box labeled *Serial Interface IP* on the System Parameters page of Cattrax, refer to Paragraph 5.14.1.

There are eight serial ports available on the rear panel of the interface device, as shown by Figure 4-5. Each port connection is made through a female RJ45 connector, and the operational parameters of each port may be configured through Cattrax, refer to Paragraph 5.14.1.

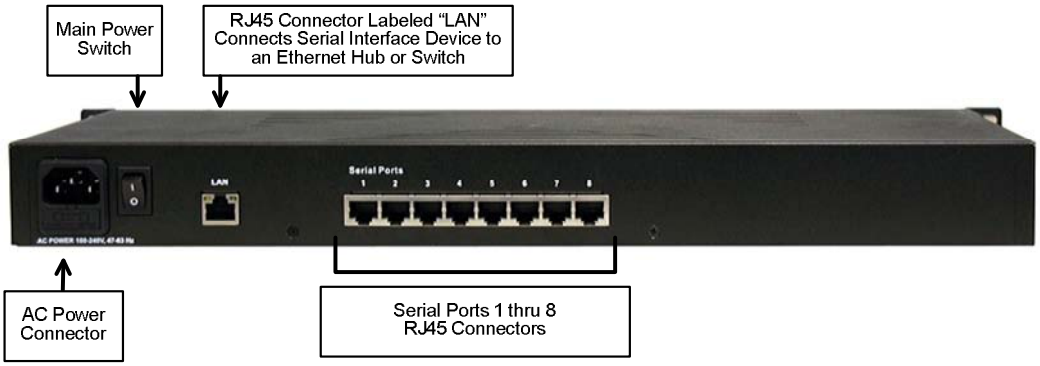


Figure 4-5 Typical Cheetah Video Frame Connector Panel

PESA system controllers prior to the PERC3000 used male DB9 connectors for serial port connection with external devices. When replacing an existing 3500PRO or PERC2000 system controller, PESA highly recommends that for each serial port you configure on the interface peripheral, you install a commercially available RJ45 to male DB9 adapter using a short network cable jumper to connect the adapter and the MOXA interface device, as shown by Figure 4-6. By using adapters in this manner, existing cabling fitted with a female DB9 connector for connection to the system controller may easily be adapted for connection to the interface device.

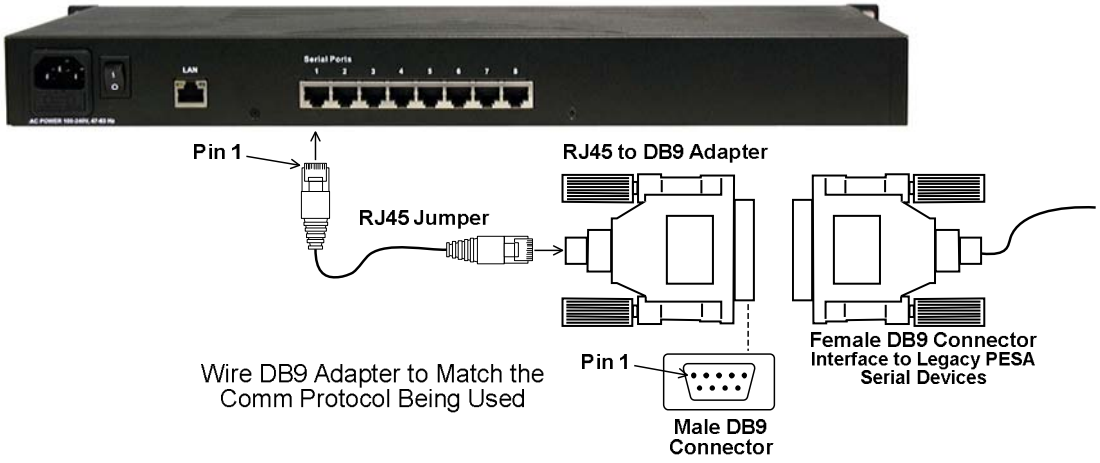


Figure 4-6 Typical RJ45 to DB9 Adapter Installation

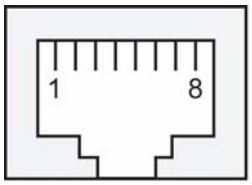
Typically, DB9 to RJ45 adapters are purchased as an assembly without the wiring pins inserted into the DB9 connector. This allows the user to configure the adapter pin-outs as needed for the protocol used by each individual serial communication port. PESA communication protocols, with the exception of the PRC protocol, allow the user to choose either RS232 or RS422 standards for data exchange. PESA PRC devices always use the RS422 standard. Adapter pin-outs for both protocols are provided in the following paragraphs.

Install the serial interface device as follows:

1. Mount the device in an equipment rack and secure with rack screws.
2. Connect an Ethernet cable between the RJ45 network connector labeled “LAN”, Figure 4-5, and a convenient facility Ethernet switch or hub port.
3. Connect the power cord to the rear panel AC connector and a source of primary power, turn the main power switch to the “on” position and allow the device time to complete its start-up procedure.
4. Refer to the User Guide for the MOXA device and enter the IP address designated for the device and other network parameter data for the device using the front panel controls. Cattrax provides the proper data entries for the serial interface on the PERC3000 System Parameters page, refer to Paragraph 5.14.1.
5. Using network cable jumpers and RJ45 to DB9 adapters, connect the serial ports to router system components as shown by Figure 4-6.
6. Use the charts and diagrams below to wire the adapters for the communication protocol and connector type used for each serial data bus.

Serial Port Pin-Outs for NPort 5650 Device

Rear Panel RJ45 Pin	RS-232 Pin Function	RS-422 Pin Function
1	DSR	----
2	RTS	TxD+
3	GND	GND
4	TxD	TxD-
5	RxD	RxD+
6	DCD	RxD-
7	CTS	----
8	DTR	----



Serial Port RJ45 Pin-Out

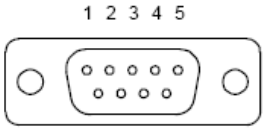
4.7.1 PIN-OUT ASSIGNMENT FOR DB9 MALE - RS-232 SERIAL PORT CONNECTION

Connect RJ45 to DB9 male adapter to match connections shown below

This wiring matches serial port wiring on other PESA system controllers.

RJ45 Pin Number	RS-232 Pin Name	Signal Direction	DB9 Male Adapter Pin Number	DB9 Male Adapter Function
1	DSR	<	6	DSR Input
2	RTS	>	7	RTS Output
3	GND	< >	5	Ground
4	TXD	>	3	TXD Output
5	RXD	<	2	RXD Input
6	DCD	<	1	CD Input
7	CTS	<	8	CTS Input
8	DTR	>	4	DTR Output

Pin	Signal	In/Out
1	CD	Input
2	RX	Input
3	TX	Output
4	DTR	Output
5	Ground	---
6	DSR	Input
7	RTS	Output
8	CTS	Input
9	RI	No Connect

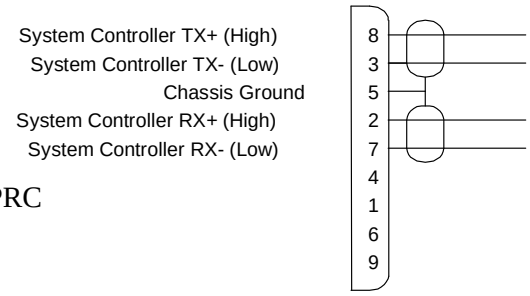


Contact locations when viewed from rear of chassis.

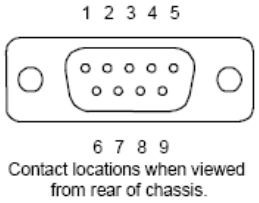
4.7.2 PIN-OUT ASSIGNMENT FOR DB9 MALE - RS-422 SERIAL PORT CONNECTION AND PRC CONNECTION

Connect RJ45 to DB9 male adapter to match connections shown below

This wiring matches serial port wiring on other PESA system controllers for the PRC Serial Control Port. This will allow the PERC3000 System Controller to control PESA Serial RS422 PRC Devices.



RJ45 Pin Number	RS-422 Pin Name	Signal Direction	DB9 Male Adapter Pin Number	DB9 Male Adapter Function
1	Not Used			
2	TxD +	>	8	TX Data + Output
3	GND	< >	5	Ground
4	TxD -	>	3	TX Data - Output
5	RxD +	<	2	RX Data + Input
6	RxD -	<	7	RX Data - Input
7	Not Used			
8	Not Used			



4.7.3 PESA CPU LINK SERIAL PROTOCOLS

Any of the eight serial ports of the MOXA device may be configured to interface the PERC3000 with external devices through a user-selectable choice of PESA serial bus protocols, at a selectable baud rate of either 9600 or 38400. Each port may also be assigned as RS-232 or RS-422 compatible through the System Parameters configuration page, refer to Paragraph 5.14.1. These protocols allow the PESA router to be controlled by external devices.

PERC3000 supports four serial interface protocols, as listed in Table 4-1. Two of these, P1E and USP, are PESA proprietary protocols. Description, command set and syntax for these protocols are presented in the PESA documents identified by Table 4-1. These documents are contained on the product documentation CD supplied with your controller or router. You may also contact PESA Customer Service to obtain these documents.

The PESA Router Control (PRC) protocol is also proprietary, and interfaces non-Ethernet based PESA router products to the system controller.

Autopatch is the fourth available serial protocol and is proprietary to Autopatch controller devices. This protocol would only be used to allow an Autopatch controller to operate a PESA router.

Table 4-1 PESA CPU Link Protocols

Protocol	Document No.
CPU Link Protocol No. 1 with Extensions (P1E)	81-9062-0408-0
Unsolicited Status Protocol (USP)	81-9062-0409-0
PESA Router Control (PRC) Bus	
AutoPatch	

If you choose to interface the PERC3000 to an external device using an RS-232 compliant serial data bus, connect the two devices using a null modem cable. RS-232 bus cable runs can be up to 50 feet in length. Using the RS-422 serial bus configuration allows for longer cable runs, up to 4000 feet in length.

4.7.4 PESA ROUTER CONTROL (PRC) SERIAL BUS

PESA's Router Control serial bus is a PESA proprietary system control communications protocol that links non-Ethernet control PESA routing switchers within the facility to a common system controller using an RS-422 control cable. Any of the eight serial ports of the MOXA device may be configured through Cattrax as a PRC port to link compatible routers to the PERC3000 system controller.

When any MOXA port is configured for PRC protocol, all port configuration options assume the PRC default value and cannot be changed, refer to Paragraph 5.14.1. Default operation in the PRC protocol is always selected as RS422 at a baud rate of 38400.

When a serial port is assigned for PRC operation, install an RJ45 to male DB9 adapter using a short network cable jumper to the MOXA interface device. An RS422 cable is connected between the male DB9 end of the adapter and the PRC connector on the rear panel of the PESA router to be controlled. Each PRC bus may be interconnected between system frames in a daisy-chain fashion, as shown by Figure 4-7.

The PRC port on Cheetah router frames is unique in that it has a 5-pin connector wired in parallel with the DB9. Both connectors are active and you may use whichever connector type is most convenient for frame-to-frame interface communications. Note that the 5-pin connector scheme is a legacy from previous PESA controller systems and will be found in many existing router installations.

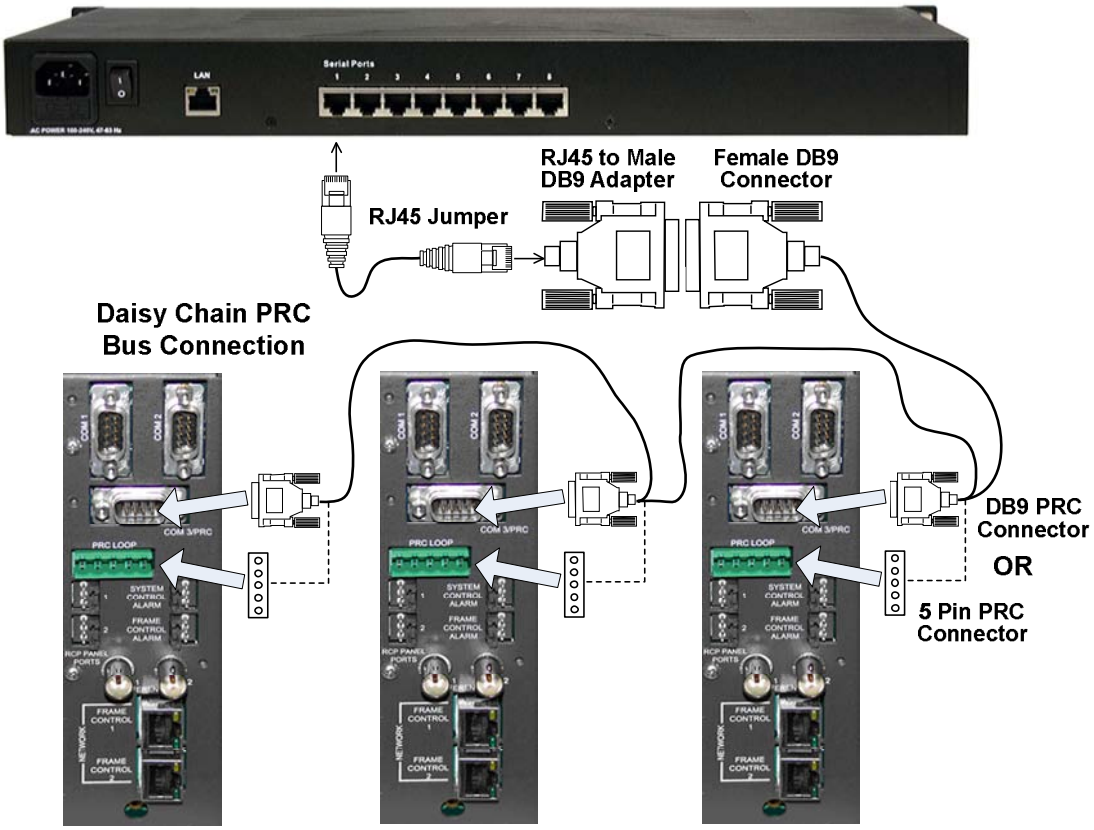


Figure 4-7 Typical PRC Bus Installation

When connecting the PRC RS-422 serial bus, you may obtain cables from PESA or fabricate your own using the connector pin locator and pin-out diagrams provided by Figures 4-8 thru 4-10.

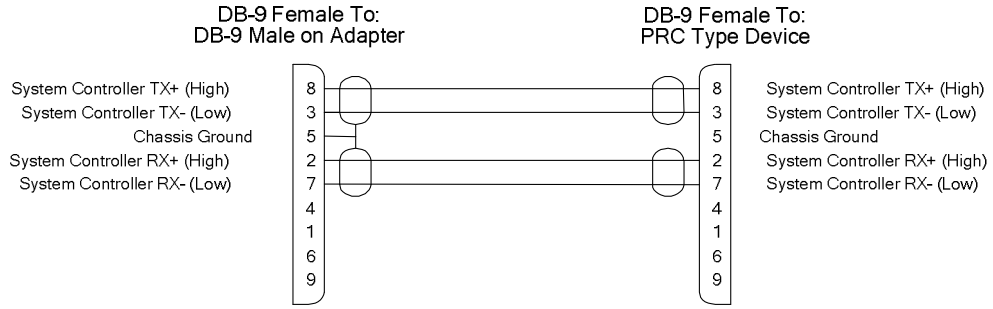


Figure 4-8 RS-422 Serial Cable for PRC Bus

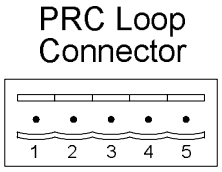


Figure 4-9 5-Pin Connector Pin-Out

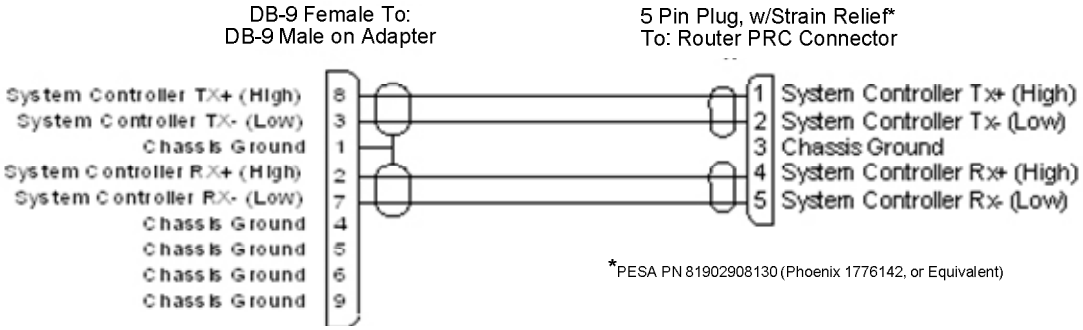


Figure 4-10 RS-422 System Expansion Cable

4.8 INSTALLING PESA NETWORK-BASED REMOTE CONTROL PANELS

Network-based PESA remote control panels, such as the Touch 72 or Smart 32 "Smart" panels, communicate via Ethernet with the PERC3000 controller. A typical network-based control panel is shown by Figure 4-11.

Figure 4-11 Typical Network-Based Remote Control Panel, Front and Rear View

Before they can be recognized by the PERC3000 and control the router, all network-based remote control panels must be configured through Cattrax into the system controller configuration file. A unique panel ID number is set by rotary switches on each panel, and that ID number is entered as part of the configuration file to uniquely identify the panel to the system controller. Also, as part of configuring each panel through Cattrax, a unique IP address is entered for the panel. As part of system initialization, the system controller sets the IP address of each panel to the address entered during configuration.

When configuring a Touch 72 or Smart 32 panel with dynamically reprogrammable pushbutton keys, the button labels and graphics that appear on each key may be specified as a part of the panel configuration procedure through Cattrax. Refer to Paragraph 5.15.8. Backlight color for each key may be modified from the factory default settings, if desired. Refer to Paragraph 5.15.9.

Install a network-based remote control panel as follows:

1. Mount the device in an equipment rack and secure with rack screws. In many installations it is easier to complete steps 2 thru 7 before securing the panel in a rack.
2. Using a small screwdriver, set desired Panel ID address on the three rotary switches on the rear panel as shown by Figure 4-12. Every network-based remote control panel in the router system must be assigned a unique panel ID address. You may use any series of numbers in the range 001 – 999. Panel ID is a required parameter for control panel configuration as discussed in Paragraph 5.15 of this User Guide

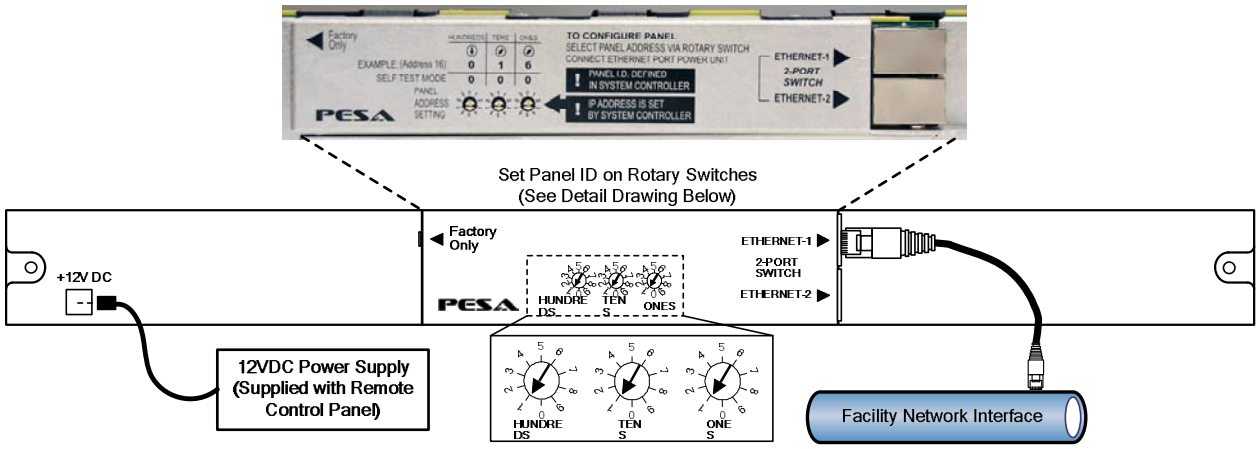


Figure 4-12 Network-Based Remote Control Panel Connections

3. The connector labeled Factory Only is not used for system installation and should be left open.
4. Install a network cable between either rear panel Ethernet Port (1 or 2) and an Ethernet hub or switch, or directly to any available facility Ethernet interface drop.

5. Every network-based panel has a 2 port Ethernet switch built-in. You may use the open connector as a connection point for another device. Often, this feature is used to daisy-chain Ethernet devices. Be aware, however, that if the directly connected panel is removed or loses power, the downstream device will also lose connection to the Ethernet.

	**When the 2 port Ethernet switch function of a network-based remote control panel is used to daisy-chain network devices, be aware that if the directly connected panel is removed or loses power, the downstream device will also lose connection to the Ethernet.**

6. Connect the output connector of the supplied 12VDC power supply to its mating plug, labeled *+12V DC*, on rear panel.
7. Apply power to the panel by plugging the power supply into a convenient source of AC power.
8. Add remote control panels to the system configuration file in accordance with Paragraph 5.15 of this User Guide. A remote control panel will not communicate with the system controller or operate the router until it is added to the system controller configuration file. When a network-based panel is added to the controller configuration file, an IP address designated for the panel must be entered. The IP address of the panel server device is changed by the system controller to the address specified in the configuration file during system initialization.

	**If you are changing the IP address of a network-based panel already on the network, you MUST restart the remote control panel after the modified configuration file is downloaded to the controller.**

4.9 INSTALLING THE PESA PANEL SERVER PERIPHERAL AND PESA RCP PANELS

Most PESA router remote control panels communicate with the system controller over a proprietary bus protocol called the PESA Remote Control Panel bus, or simply the RCP bus. RCP is a non-Ethernet protocol and the RCP panel server peripheral, Figure 4-13, must be used to interface RCP compatible remote panels to the PERC3000 controller. The panel server communicates via Ethernet with the PERC3000 controller. RCP compatible remote panels are connected to the panel server over an RS485 serial data bus through one of the eight available RCP port connectors on the server rear panel.

The following PESA Remote Control Panels are compatible with the PERC3000 RCP Panel Server

RCP-128X	**RCP-EXP128**	**RCP-MLDT2**	**RCP-STAT1**
RCP-241	**RCP-GPI**	**RCP-MLTP**	**RCP-STAT2**
RCP-48X	**RCP-JS**	**RCP-MLTP2**	**RCP-TP**
RCP-64X	**RCP-LCXY**	**RCP-MP32**	**RCP-XY**
RCP-CSD	**RCP-MB2**	**RCP-MP32D**	
RCP-EXP64	**RCP-MLDT**	**RCP-PVPG**	

Table 4-2 PESA Remote Control Panels Compatible with RCP Panel Server

In order to operate, both the panel server and all remote control panels connected to it must be configured through Cattrax into the system controller router configuration file. A unique panel ID number is set by switches on each server and panel, and that ID number is entered as part of the configuration file to identify the devices to the system controller. Also during configuration, a unique IP address is entered for each panel server device. As part of system initialization, the system controller sets the IP address of each panel server.

Figure 4-13 RCP Panel Server, Front and Rear View

Install the panel server device as follows:

1. Mount the device in an equipment rack and secure with rack screws. In many installations it is easier to complete steps 2 thru 9 before securing the panel in a rack.
2. Using a small screwdriver, set desired Panel ID address on the three rotary switches on the rear panel as shown by Figure 4-14. Every panel server and remote control panel in the router system must be assigned a unique panel ID address. You may use any series of numbers in the range 001 – 999. Panel ID is a required parameter for control panel configuration as discussed in Paragraph 5.15.7 of this User Guide
3. The connector labeled Factory Only is not used for system installation and should be left open.
4. Install a network cable between either rear panel Ethernet Port (1 or 2) and an Ethernet hub or switch, or directly to any available facility Ethernet interface drop.

5. Every panel server has a 2 port Ethernet switch built-in. You may use the open connector as a connection point for another device. Often, this feature is used to daisy-chain Ethernet devices. Be aware, however, that if the directly connected panel is removed or loses power, the downstream device will also lose connection to the Ethernet.

CAUTION	**When the 2 port Ethernet switch function of a panel server is used to daisy-chain network devices, be aware that if the directly connected panel is removed or loses power, the downstream device will also lose connection to the Ethernet.**

6. Connect the output connector of the supplied 12VDC power supply to its mating plug, labeled *+12V DC*, on rear panel.
7. Do not connect the power supply to a source of AC power until the remote panel connections are completed and verified.

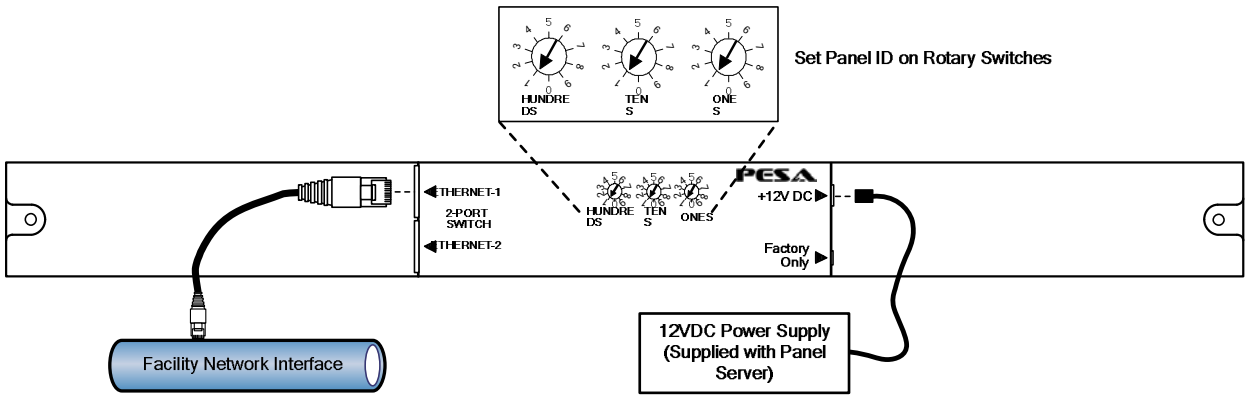


Figure 4-14 RCP Panel Server Connections

8. Use any of the eight available RCP ports to originate RCP buses. You may connect multiple RCP protocol compatible PESA remote control panels in a daisy-chain configuration, as shown by Figure 4-15. Each bus can support any number of panels, up to the maximum panel server capacity of 32.
9. Apply power to the panel server by plugging the power supply into a convenient source of AC power.
10. Add panel server devices and system remote control panels to the system configuration file in accordance with Paragraph 5.15 of this User Guide. Remote panels will not communicate with the system controller or operate the router until both the server and the panels are added to the system controller configuration file. When a panel server is added to the router configuration file, an IP address designated for the panel server must be entered. The IP address of the panel server device is changed by the system controller to the address specified in the configuration file during system initialization.

NOTE	**If you are changing the IP address of a panel server already on the network, you MUST restart the panel server after the modified configuration file is downloaded to the controller.**

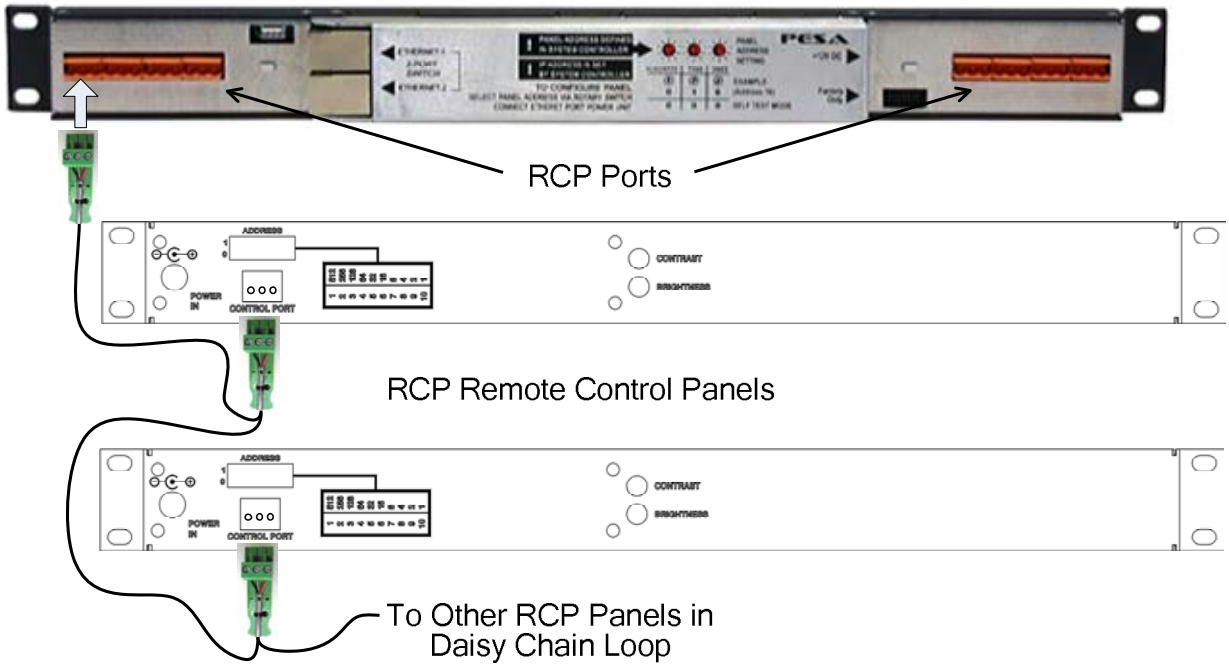


Figure 4-15 Typical RCP Connector Panel

Any of the rear panel RCP port connectors may be used to originate an RCP bus. Mating connectors used with both the server port connectors and the remote control panel port connectors are the same. Pin-out detail for the connector is shown by Figure 4-16.

When you construct a serial control cable use shielded, twisted-pair audio cable (PESA Part No. 81-9028-0043-2, Belden 8451, or equivalent). It is permissible to connect RCP protocol compatible PESA remote control panels with daisy-chained cables. Wire each remote panel connector as shown by Figure 4-17. The connector body has an integral strain relief, which requires the use of a nylon cable tie included with the connector. If this cable tie is not available, PESA Part No. 81-9021-0028-8, or equivalent, may be used.

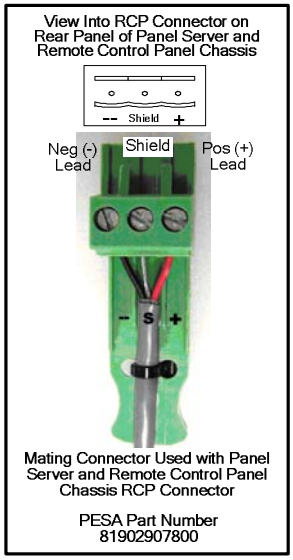


Figure 4-16 Preferred RCP Connector Pin-Out Diagram

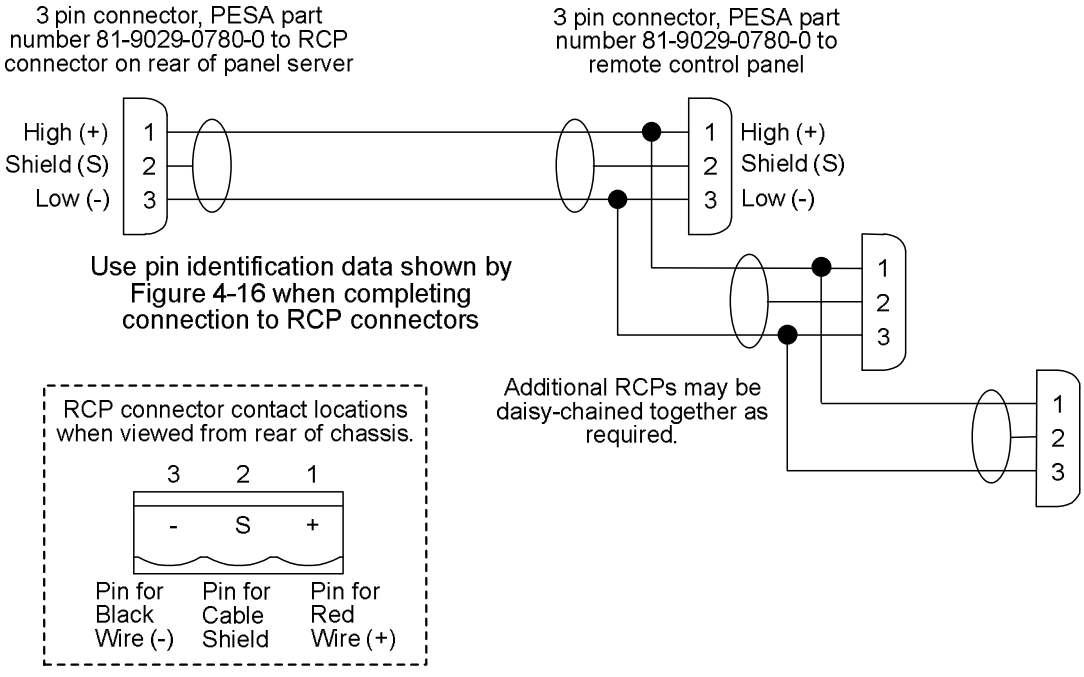


Figure 4-17 RS-485 Serial Cable Wiring for RCP Bus

Chapter 5 – PERC3000 Configuration and Operation Using Cattrax Control Software

5.1 INTRODUCTION

Designing and configuring a routing switcher system requires a thorough working knowledge of the hardware components and the operational modes and functions available to the user. This discussion of the Cattrax control application assumes the user has the knowledge of switching functions and terminologies required to configure a system using the various commands and pages introduced in the following paragraphs.

Through Cattrax you can view real-time status of virtually every aspect of router operation, modify many system operating parameters, issue manual switches on individual or multiple destinations, create new, or modify existing, router configuration files for the system controller, plus many other control and system monitoring functions.

The configuration file loaded into the PERC3000 system controller is where the actual signal switching functions for the entire router system, such as signal input/output assignments, signal names and aliases, switching levels, components and other special router functions are defined for the system. Through Cattrax you can create application-specific files that define and dictate all operational aspects for the router. Once created, a configuration file can be stored, edited or downloaded to the system controller device to become the active operating configuration.

Be aware that system changes you can make through the commands and pages discussed in the following paragraphs configure virtually all operational aspects of the router system.

Mistakes or erroneous entries made in many of the following configuration steps can result in serious problems with your router. Only knowledgeable users should attempt to make changes to the system configuration.

5.2 CATTRAX CONTROL SOFTWARE

Cattrax is a multi-system application that communicates with, and controls, many different types of PESA equipment; it incorporates data files into the software structure that contain equipment-specific interface pages, configuration parameters and control functions. In order for Cattrax to "discover" and communicate with a PERC3000 system controller, or any other piece of PESA equipment, the proper data file must be present in the version of Cattrax used.

Cattrax automatically searches for PESA equipment on the network and when detected, the application establishes communication with the equipment and lists it as an active device in the Devices View window.

If Cattrax is not already installed on the host PC, refer to the Cattrax User Guide and follow the procedure to install and set up the control software.

During installation of Cattrax, an icon is placed on the PC desktop. You may start the application by clicking on the desktop icon or by navigating to the folder containing the Cattrax program files and clicking on the ***Cattrax.exe*** file. When Cattrax is first started, an application interface similar to the one shown in Figure 5-1 is displayed on the host PC monitor and Cattrax begins searching the network for PESA equipment with which it can communicate. As the search process continues, a listing of PESA devices it locates is displayed in the Devices View window.

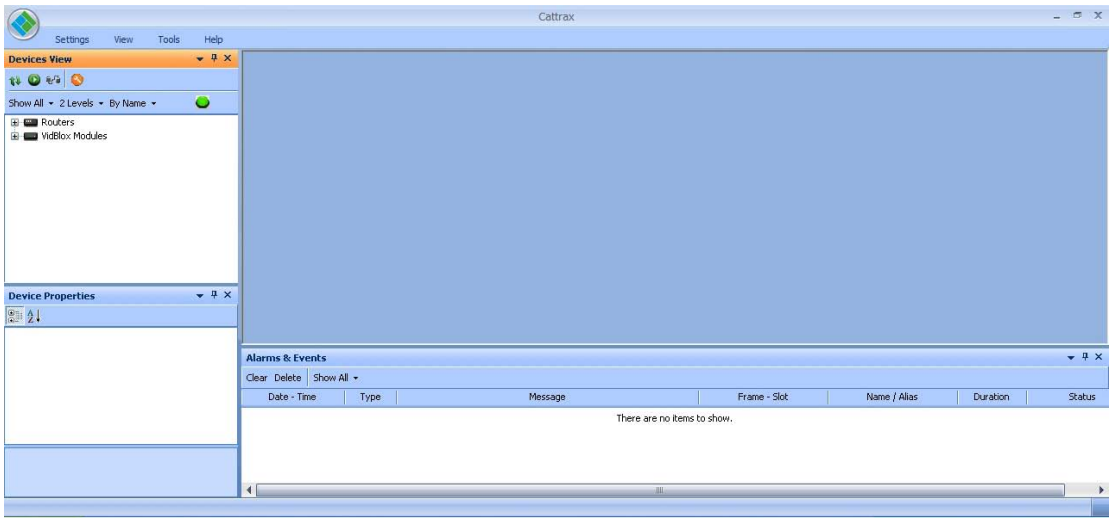


Figure 5-1 Cattrax Main Display Page

5.3 NAVIGATING CATTRAX

Only the features and pages of Cattrax that are pertinent to PERC3000 operation are discussed in this User Guide. For complete information on the Cattrax software control application, refer to the Cattrax User Guide, PESA Document Number 81905906770. As shown in Figure 5-2, the Cattrax display page is divided into five major functional areas: Menu Bar, Devices View Window, Device Properties Window, Main Display Window and Alarm and Events Window.

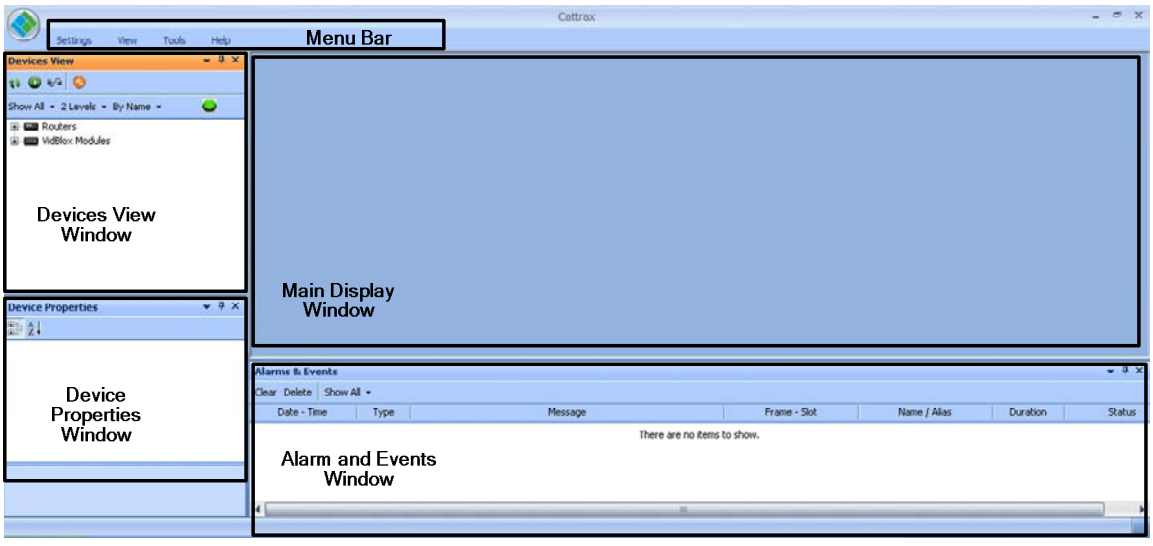


Figure 5-2 Cattrax Functional Areas

5.3.1 MENU BAR

The Menu Bar functions in a similar manner to other Microsoft Windows® based programs. Application specific commands are discussed in detail throughout this User Guide where appropriate.

5.3.2 DEVICES VIEW WINDOW

Cattrax' Devices View window, Figure 5-3, identifies PESA devices on the network. Depending on the view mode selected, Cattrax can display devices that have previously been connected to the network, even if they are currently not active. Devices are displayed in groups by device type, as shown. Per this example, notice that the heading *Routers* appears in the menu tree with a branch to a DRS Audio router. When a PESA device is connected to the network, and communication is established, the device ID is displayed as a branch of the menu tree in bold letters. If the *Show Active* mode is selected, only active devices are listed. When the *Show All* view mode is selected, the name of devices that have been "discovered" previously but are not currently under active control appear in the menu tree in gray letters. These entries continue to appear in the menu trees until they are manually removed. You may obtain more information on viewing modes and other operational features and functions of Cattrax by referring to the User Guide for the software application.

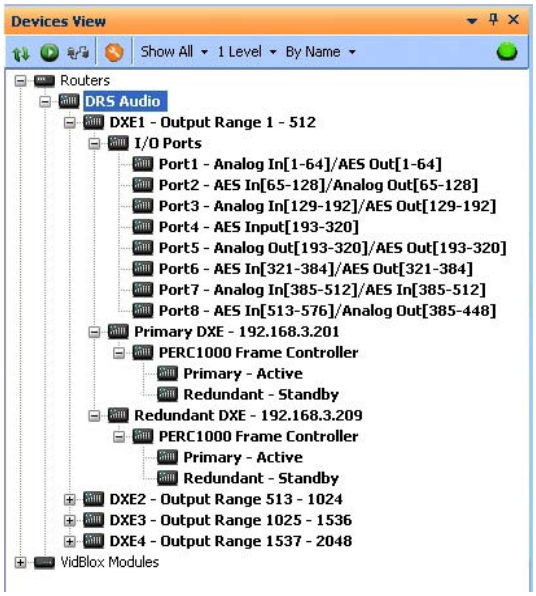


Figure 5-3 Example Devices View Window

5.3.3 DEVICE PROPERTIES WINDOW

Operational characteristics for the device selected in the Devices View window such as the base IP address, identifying name of the device and other data related to selected device are displayed in this panel. Base IP address and the name of the system controller can be modified through this window when the top level device entry is selected from the Devices View listing.

5.3.4 MAIN DISPLAY WINDOW

Operational characteristics, configuration, or controls for the menu item selected in the Menu Tree listing are displayed in the Main Display window. Control and display functions used in this panel follow standard Microsoft Windows® operating system protocol.

5.3.5 ALARMS AND EVENTS WINDOW

The Alarms and Events Window, Figure 5-4, displays flags when a defined alarm condition occurs or when a defined event occurs within the system. Notice from the example page that when Cattrax establishes connection with a device, it is flagged as an event, as is disconnecting a device from the network. When a device is discovered and flagged as connected, its identity appears in the Devices View window in bold letters.

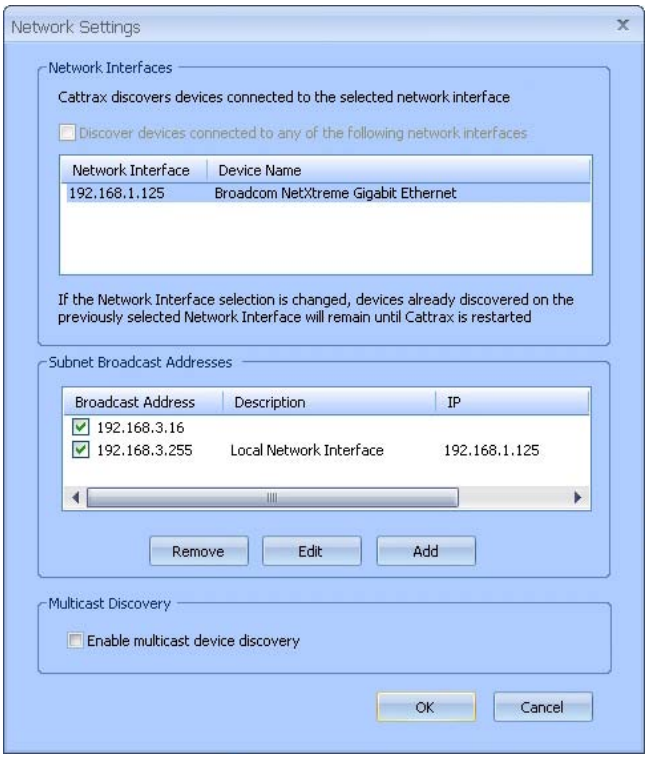
Figure 5-4 Example Alarms and Events Window

5.4 NETWORK CONFIGURATION WITH CATTRAX

In order for Cattrax to communicate with PESA equipment, the network interface device used by Cattrax must be actively connected to the subnet, or multiple subnets, containing equipment you wish to control. When communicating on a subnet containing PESA network controllable devices, Cattrax should immediately begin the search and discovery process for all devices configured for the same subnet. In some installations, PESA devices may reside on subnets different from one another within the network. Cattrax allows you to easily select both the network interface device it uses and the subnets on which it communicates.

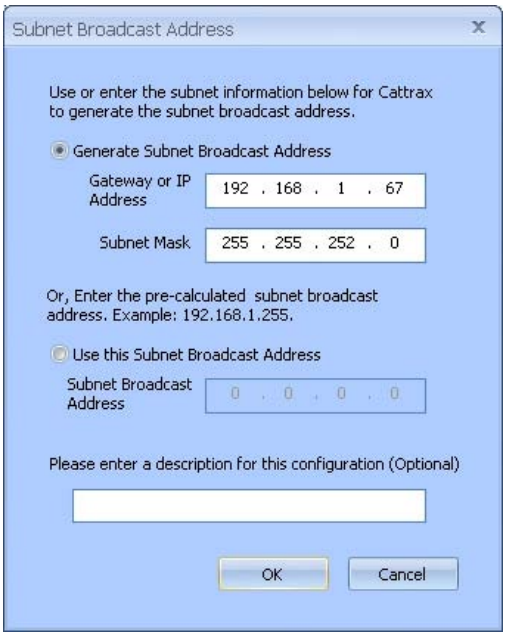
To view or modify current network communication parameters for Cattrax, click the *Network Settings* icon under the ***Setting*** menu in the Cattrax menu bar to open the Network Settings configuration menu as shown by the illustration at right.

The upper area displays the network interface devices available to Cattrax by IP address and name. In many installations there will be only one entry in the window and by default this would be the device used by Cattrax. If there are multiple entries, as would be the case, for example, if the host PC contains both an Ethernet NIC and a wireless adapter, the device Cattrax is currently communicating through is shown highlighted. You may select the network interface device you wish Cattrax to use by double-clicking the entry in the listing.



If you would like Cattrax to communicate over all of the listed network interface devices, place a checkmark in the box above the list. This option is only active if more than one device is listed. Be sure that the network interface device you select is communicating over the subnet(s) containing all PESA devices you wish to control.

Subnets currently available to Cattrax are listed in the middle area of the page under the Subnet Broadcast Address column. A check in the box beside an entry indicates that Cattrax is actively communicating over that subnet and will automatically discover PESA devices on it. If you wish to prevent Cattrax from communicating over a specific subnet, click the checkbox to remove the check. If you need to add additional subnets or modify address parameters of currently available subnets use the buttons in the display window as follows:



- **Add** – allows you to add subnets to the list of those available. Clicking the *Add* button opens the pop-up box shown here.

  Enter the IP and Subnet Mask data for the subnet address you wish to add. You may use the text box at the bottom of the pop-up to enter a description of the subnet. Click *OK* to enter the parameters. The new entry is added to the listing and a check is placed in the checkbox to activate the new subnet.

- **Edit** – allows you to modify address parameters of any entry in the listing. Highlight the entry you wish to modify and click the *Edit* button. The Subnet menu is displayed with current parameters for the entry listed. Make any changes you wish and click *OK* to commit the changes.

- **Remove** – allows you to remove any subnet from the listing. Highlight the entry you wish to delete and click the *Remove* button. The entry is immediately removed from the listing.

The lower area of the Network Settings configuration menu contains a checkbox that allows you to disable the Multicast device discovery function that allows Cattrax to automatically locate PESA devices in multiple subnets. Default selection for this function is ***Enabled*** as indicated by a check in the box. This option should not be disabled under normal use. If it is ever necessary to disable Multicast capability, click the checkbox to remove the checkmark.

When you have the network parameters properly configured, click the *OK* button to select the new configuration and exit the dialog box, or click *Cancel* to exit the box without making changes.

5.5 PERC3000 DEVICES VIEW ENTRIES

When a PERC3000 system controller is discovered on the network, it is added under the Routers parent header in the Devices View window. When the entry is selected, a listing of control and status menus available for the component is displayed in the Menu Tree window, as shown by Figure 5-5 using the name PERC 3000 192.168.3.16 as an example menu entry.

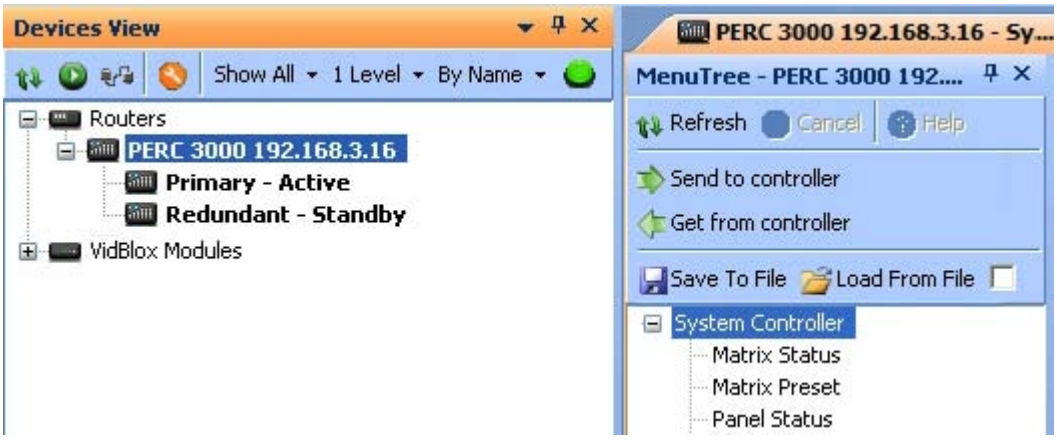


Figure 5-5 Example Devices View Display

5.6 PERC3000 DEVICE PROPERTIES DISPLAY

With the top-level PERC3000 entry selected in the Devices View window, the Device Properties window, Figure 5-6, displays the name, component data and currently active network communication parameters for the controller.

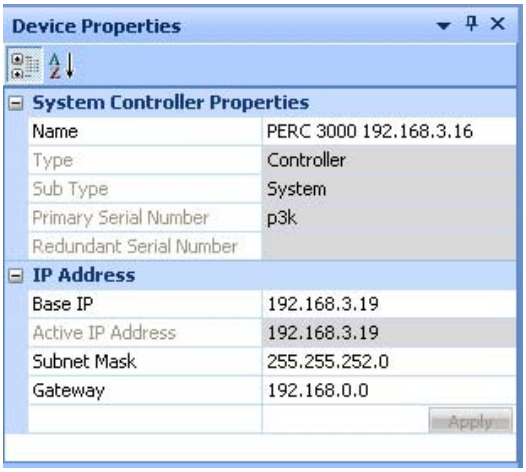


Figure 5-6 Example System Controller Device Properties Display

The top entry in the upper area of the window, labeled System Controller Properties, displays the user-selected name assigned to identify the PERC3000 system controller in the Devices View listing. You may change the name at any time by clicking in the cell displaying the name. You may edit the current name or delete the current entry and type a new name. Click the *Apply* button at the bottom of the display to enter the name change data.

The remainder of the upper area of the window is shown with shaded fields and displays component information of the system controller. Entries in the shaded fields cannot be modified.

5.7 CHANGING NETWORK PARAMETERS AND BASE IP ADDRESS OF PERC3000 SYSTEM CONTROLLER

The lower area of the Device Properties Display, labeled IP Address, displays current network parameters and the base IP address of each PERC3000 system controller in the system. The system controller does not support DHCP protocol and configured parameters are static until changed. From this display area you may enter new network parameters, including a new ***Base IP Address*** for the system controller device(s) by entering the new parameters in the active display fields.

Parameter values displayed initially are those currently loaded into system controller memory. Unless specified otherwise at time of shipment, **factory default values** for these settings are:

- IP Address: 192.168.1.222
- Subnet Mask: 255.255.255.0
- Gateway: 192.168.1.1

To change the base IP address: highlight the top level PERC3000 entry in the Devices View list, click in the *Base IP* block of the Device Properties pane, remove the currently listed IP address and enter the "new" address values you have selected as the base IP address for the system controller(s). Remember that the numbers 0 (zero) and 255 are not valid for the fourth octet of the IP address. If, based on your network requirements, you also need to assign a "new" subnet mask or default gateway setting, enter the desired values in the Subnet Mask and Gateway boxes.

Click **Apply** to write the new network parameter data to the system controller(s). After the new address is assigned, allow a few seconds for the system controller to reboot and verify that the displayed base IP address listed reflects the desired change. You may have to change the IP address of the host computer and restart Cattrax if it is necessary to change the Subnet of the controller.

When you expand the PERC3000 entry in the Devices View tree, a listing appears that identifies the active or standby status of the Primary and Redundant controller devices, as shown by Figure 5-5. If a redundant controller is present, the current active or standby status of each device is indicated. If a secondary controller device is not installed in the system, the redundant entry is shaded and the status is shown as ***None***. When you select either of the device entries, operational parameters particular to the highlighted device are shown in the Device Properties display area, as shown by Figure 5-7.

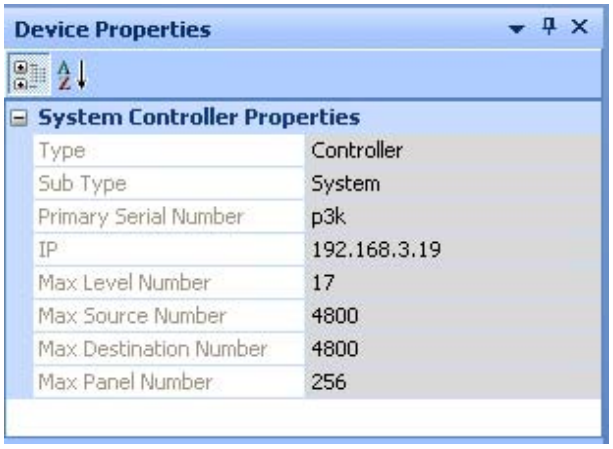


Figure 5-7 System Controller Device Properties

5.8 SYSTEM CONTROLLER MENUS

Commands and pages contained under the System Controller header in the Menu Tree Window, Figure 5-8, allow you to check status and monitor functions of the PERC3000 system controller module, as well as create, modify or save controller configuration files for the system controller.

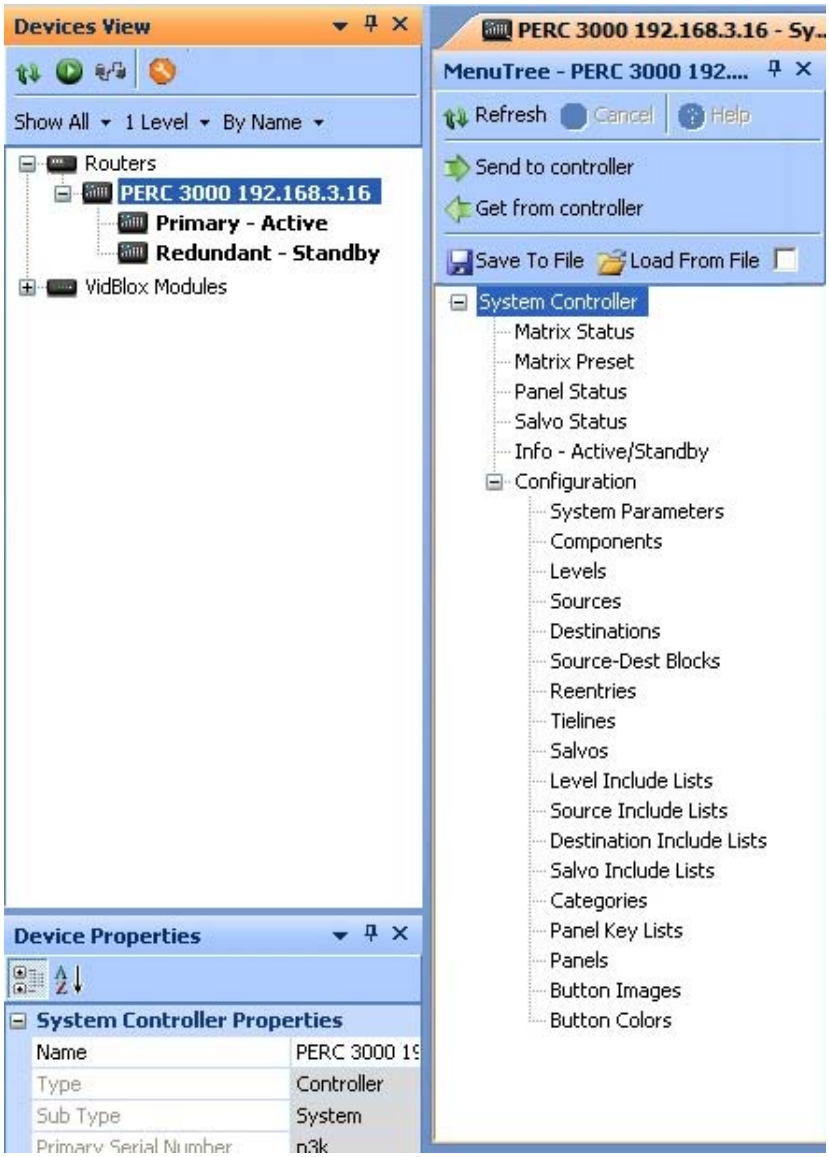


Figure 5-8 System Controller Menu Tree Commands

5.9 SYSTEM CONTROLLER FILE COMMANDS

Any time the PERC3000 menu entry from the Devices View window is opened in the Main Display window, a shaded box containing commands that are specific to the controller configuration file is displayed as the top item of the Menu Tree, as shown by Figure 5-9.

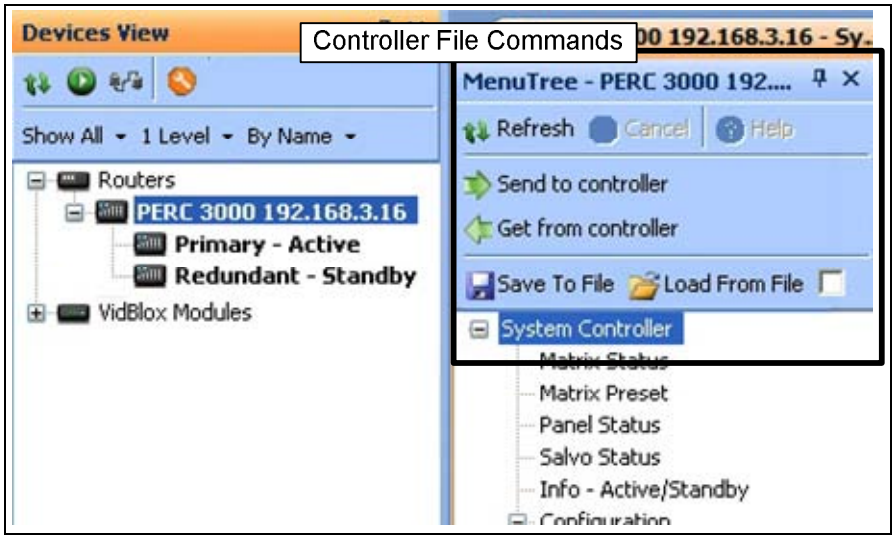


Figure 5-9 Controller File Commands

- **Refresh** – Refreshes currently displayed menu.
- **Cancel** – Cancels a requested action.
- **Help** – Access help files.
- **Send to Controller** – Downloads the configuration currently open in Cattrax to the system controller(s). Currently active controller configuration will be deleted from controller memory and replaced with the downloaded file.
- **Get from Controller** – Reads and opens the configuration file currently stored in system controller memory.
- **Save To File** - Saves the configuration file currently open in Cattrax under a filename of your choosing.
- **Load From File** – Allows you to load a saved configuration file from media such as a hard drive or thumb drive for review, modification or download to the system controller. Any time a saved file is loaded as the configuration file currently open in Cattrax, a check mark appears in the small box beside the Load from File command entry as a visual indication that the file currently displayed by Cattrax is not the currently active configuration file resident in system controller memory.

5.10 PERC3000 SYSTEM CONTROLLER MENU

Commands and pages contained under the **System Controller** parent header in the Menu Tree allow you to monitor status and issue direct control commands to certain functions of the system controller – including configuration for redundant operation of dual controllers. When any menu entry under the System Controller header is selected, Cattrax reads current status of the system controller and displays pertinent data for each entry in the menu page.

5.10.1 MATRIX STATUS

The Matrix Status page, Figure 5-10, is presented in a spreadsheet format of rows and columns and allows you to monitor current status of the entire switching matrix and initiate on-the-fly switches to any selected destination(s) ,. For each listed destination the spreadsheet columns provide the following information:

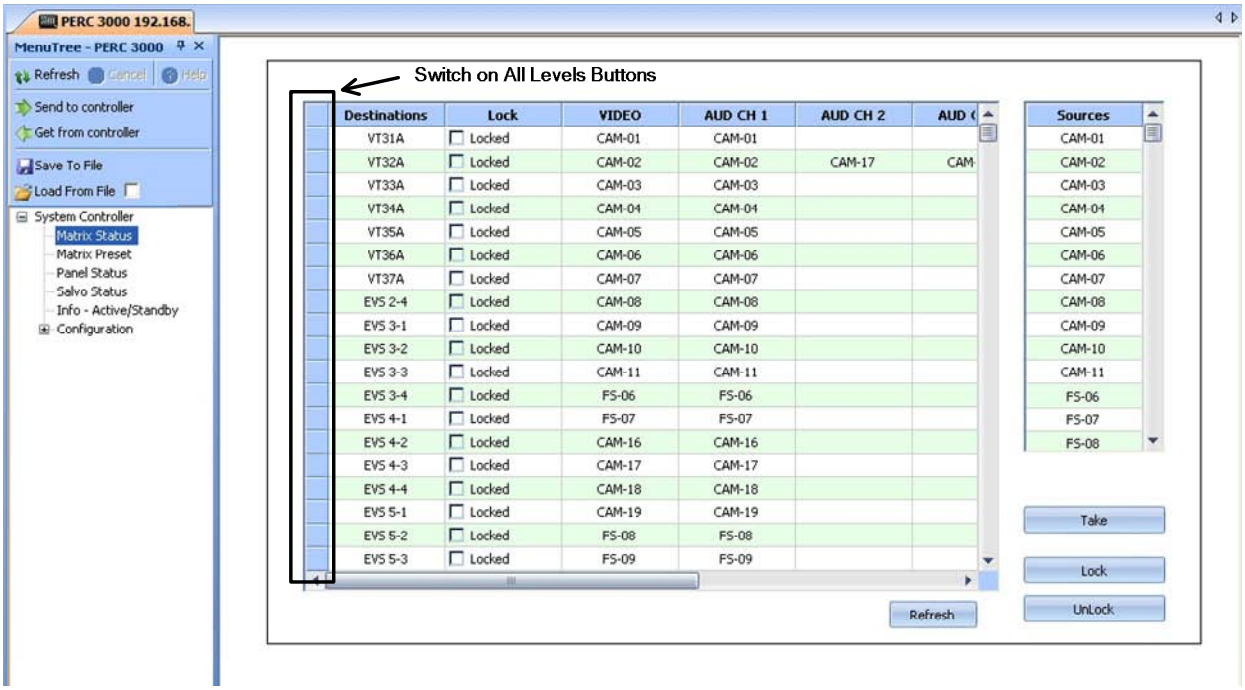


Figure 5-10 Matrix Status Display

- **Switch on All Levels** – Clicking this button on any row of the spreadsheet selects the destination and all switching levels on the row.
- **Destinations** – This column is a listing, by name, of every destination in the system as assigned through the Destinations Configuration page. If you hover the mouse cursor over any cell in the *Destinations* column, a pop-up box displays the physical input or output number associated with the respective router component(s) assigned to each active switching level for the destination.

  By default, the destinations are listed in numerical sequence by the destination number. You may sort the list alphabetically by the destination name by double-clicking in the column header cell. Continuing to double-click the column header cell will toggle the sort order between ascending and descending. Right-click any column header cell and choose *Unsort* from the pop-up menu to return the Destinations column to numerical listing order.
- **Lock** – If a check mark appears in the box, the destination is locked. Destinations can be locked from system remote control panels or from this status page.

- **Switching Levels** – There is a column for each switching level as assigned through the Levels Configuration page.

  For each destination, the lock status is displayed and the source switched to each switching level of the destination is identified in the switching level columns. For example, looking at Figure 5-10, the destination named VT31A is currently in an unlocked status and the source named CAM-01 is switched to VT31A on the VIDEO level. If any cell in a switching level column is blank, there is no active source for the indicated level in the source group.

  - **On-the-Fly Switching** – A scroll box on the right-hand side of the page contains a list of all **Sources** by name as configured through the Sources Configuration page, Paragraph 5.14.4. Three buttons labeled *Take***,** *Lock* and *Unlock* are located beneath the scroll box. Using the source list and buttons you can make on-the-fly changes to the switch matrix status. For example, if while monitoring the matrix status page you need to change the source of destination VT31A from CAM-01 to CAM-02 on the VIDEO level:

    - Click the cursor in the cell on row VT31A under the VIDEO column to highlight the cell.
    - Locate CAM-02 in the Sources scroll list and click to highlight the cell and select the source.

  A switch may be taken in one of two ways: you may double click on the source entry or click the *Take* button. After the switch is taken, the destination status cell for VT31A updates to reflect the new source selection.

  In addition to initiating a switch on a single level, as in the example above, the Matrix Status page also allows you to take switches on multiple levels and multiple destinations directly from the page by any of the following methods:

  - **Switch on All Levels** – Select the destination you wish to switch by left-clicking the *Switch on All Levels* button, see Figure 5-10, beside the row. All switching levels for the destination will be highlighted and you may initiate the switch by either method indicated in the previous paragraph. You may also use the Windows Control (Ctrl) and Shift function to select multiple destination rows for all-level switching.
  - **Mass Switching** – If you wish to select every destination and every switching level for a switch, left-click the *Switch on All Levels* button in the extreme upper left corner of the spreadsheet - beside the column header labeled *Destinations*.
  - **Single or Multiple Level Switching** – If you wish to switch every destination on a single switching level, left-click the column header cell for the level you wish to switch to select the entire column. You may select multiple switching level columns by using the standard Windows Control (Ctrl) and Shift functions.

  Lock and *Unlock* buttons allow you to lock or unlock a destination. Move the cursor to the cell under the Lock column of the destination you wish to lock or unlock. If the destination is currently unlocked, it may be locked by clicking the *Lock* button; if the destination is currently locked, it may be unlocked by clicking the *Unlock* button.

  Clicking the *Refresh* button updates the displayed real-time status of the switch matrix.

- **Column Lock Feature –** Column Lock allows you to lock sequential columns of the spreadsheet from left-right scrolling. To apply a column lock, right-click in the column header of the last column in left to right sequence you wish to prevent from scrolling when the horizontal spreadsheet scroll bar is moved. Select the *Lock Columns* command from the pop-up menu. The selected column and all columns to the left of the selected column will now remain in position regardless of where you position the horizontal scroll bar. You may remove the column lock by right-clicking in any column header and selecting the *Unlock Columns* command from the pop-up menu.

5.10.2 MATRIX PRESET

The Matrix Preset page, Figure 5-11, allows you to preset switches for any valid destination and source pairing in the system. Preset switches can be taken simultaneously, or selectively, directly from this menu page.

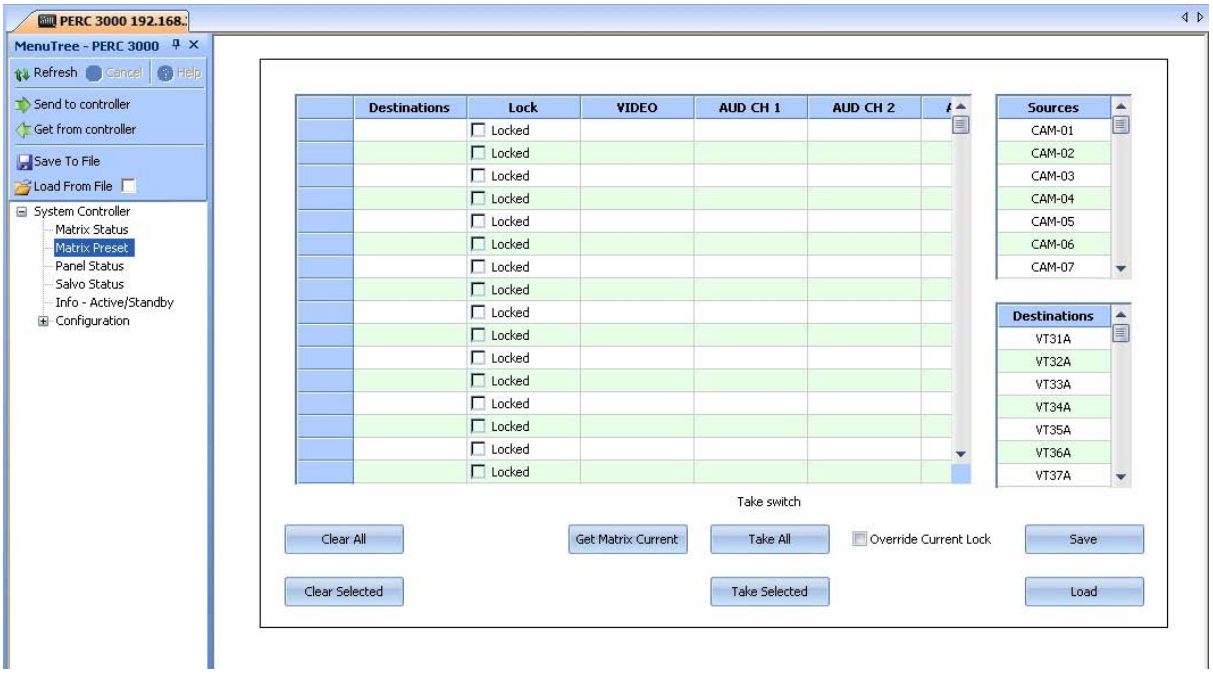


Figure 5-11 Matrix Preset Page

- **To Preset a Switch:**
  1. Move the cursor to a clear cell under the **Destinations** column and click to highlight the cell. Locate the desired destination for the switch in the destinations scroll box and double click the entry. Selected destination name displays in the cell.
  2. If you wish to lock the destination after the switch is made, click the box in the Lock column.
  3. Move the cursor to the cell under the column of the switching level on which you wish the switch to occur and click to highlight the cell. Locate the desired Source for the switch in the **Sources** scroll box and double click the entry to paste the selection in the cell. Repeat this procedure for all switching levels on which you wish the switch to occur.

4. Repeat the previous steps to define other destinations, sources and levels on which you wish to take a switch.
5. Pressing the *Take All* button causes all the preset switches to occur simultaneously.
6. Switches can be selectively chosen by highlighting one or more destination cells and pressing the *Take Selected* button.

- **Clear All** - Clears all preset entries from the page.
- **Clear Selected** - Clears only highlighted presets from the list.
- **Get Matrix Current** - Polls the system controller device and displays current status of the switch matrix.
- **Override Current Lock** – If you have preset a switch combination that will modify a currently locked switch, checking this box temporarily overrides the lock, allows the preset switch and re-locks the path.
- **Take All** – Clicking this button executes all switches entered on the matrix preset page.
- **Take Selected** – Clicking this button executes only switches that are highlighted on the matrix preset page.
- **Save** – Saves the current matrix preset page for future use.
- **Load** – Loads a saved matrix preset file.

5.10.3 PANEL STATUS

The Panel Status page, Figure 5-12, displays the current status of panel server devices and remote control panels in the router system that are under control of PERC3000. Each entry in the spreadsheet is described below:

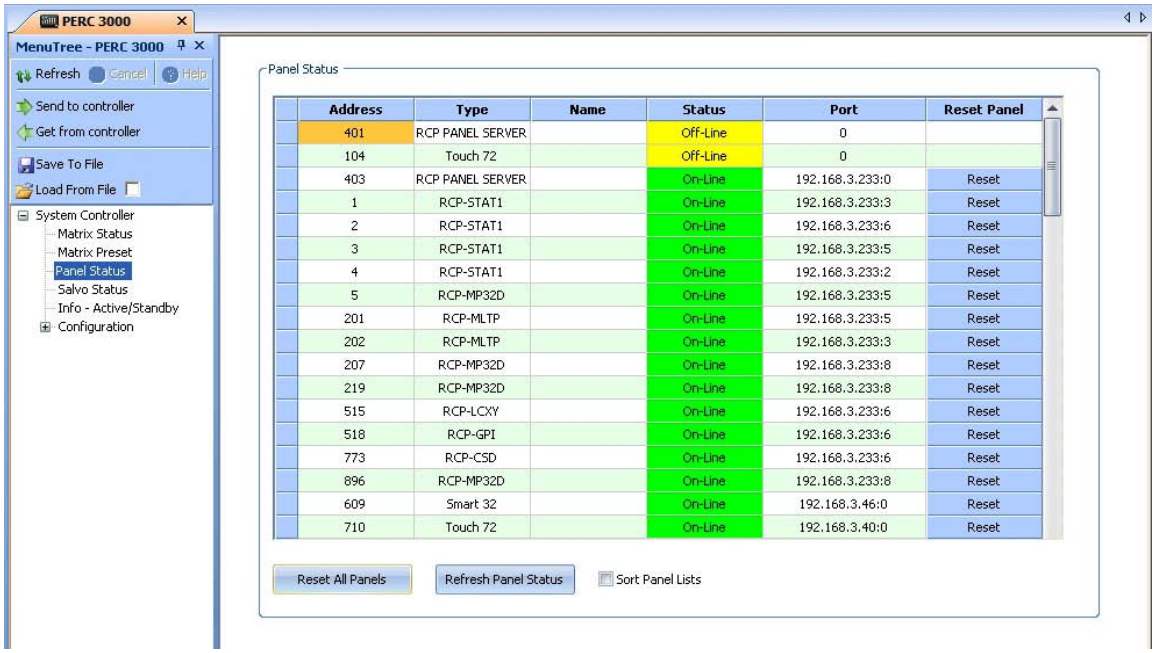


Figure 5-12 Panel Status Display

- **Address** – Displays the active hardware address (Panel ID) setting of the panel.
- **Type** – Indicates the panel type
- **Name** – Displays the name assigned to the panel during panel configuration.
- **Status** – Indicates whether the panel is currently online and communicating with the system controller or offline.
- **Port** – Displays the IP address of network-based remote control panels and panel server devices in the system. With non-network RCP-based panels the display indicates the IP address of the panel server device, and to which port link of the device each remote control panel under control of the server is attached.
- **Reset Panel** – Clicking this button performs a hardware reset on the indicated panel.
- **Reset All Panels** – Clicking this button issues a hardware reset command to all panels in the router system.
- **Refresh Panel Status** – Clicking this button causes Cattrax to re-poll the status of all remote control panels.
- **Sort Panel Lists** – This check box determines the display order of scrolling list items - such as sources, destinations, and levels - displayed on remote control panels with list access and display capability. When this box is *unchecked*, list items are scrolled in ascending numerical order by the number placed in the number column on the list configuration pane. If this box is *checked*, list items are displayed in alphabetical order by the panel name entered for the list entry.

5.10.4 SALVO STATUS

The Salvo Status page, Figure 5-13, displays the current status of all salvo groups in the router system.

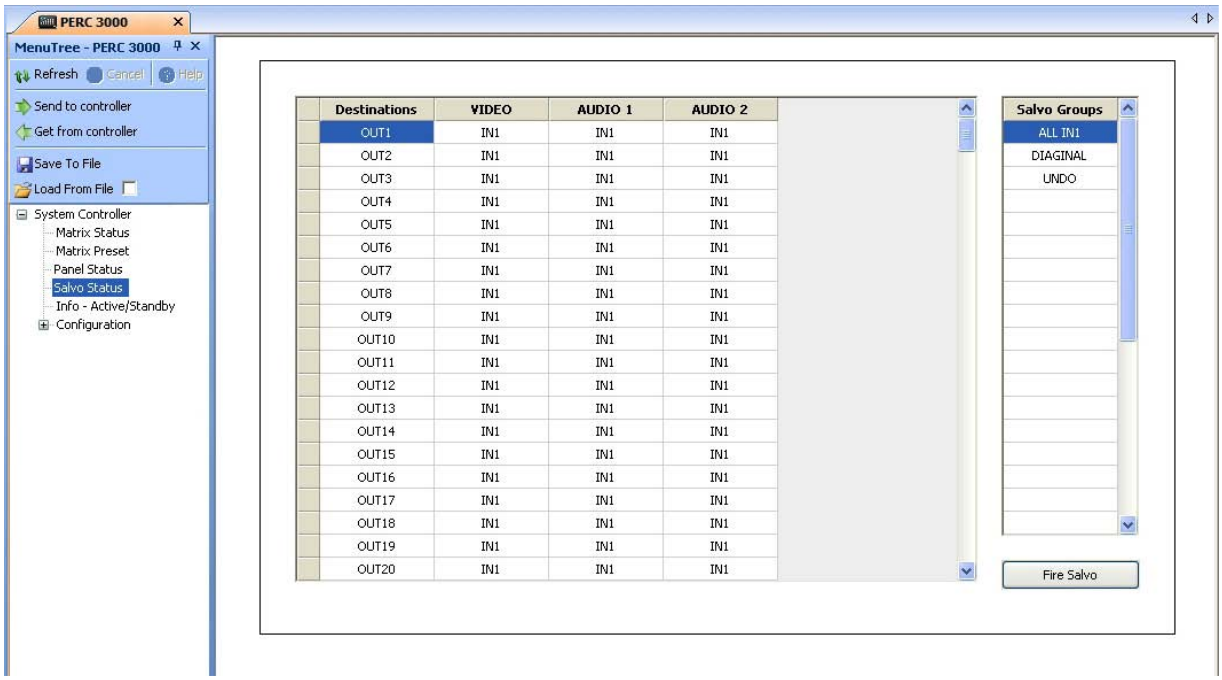


Figure 5-13 Salvo Status Display

Selecting an entry in the Salvo Groups listing displays the destinations and sources, by switching level, contained in the salvo group. You may immediately "take" the salvo group switches directly from this page by clicking the *Fire Salvo* button.

5.10.5 INFO - ACTIVE/STANDBY

For both the Primary and Redundant PERC3000 system controller, the Info - Active/Standby page, Figure 5-14, displays real-time status information, IP address and current operating mode. If the router is not equipped with a redundant system controller, the IP address of the primary controller is displayed and the mode box indicates that the device is the *single* controller for the router.

It is also through controls of this page that you perform the pairing operation to configure dual system controllers for automatic redundant operation. Refer to Paragraph 5.11

Each area of the page is introduced below:

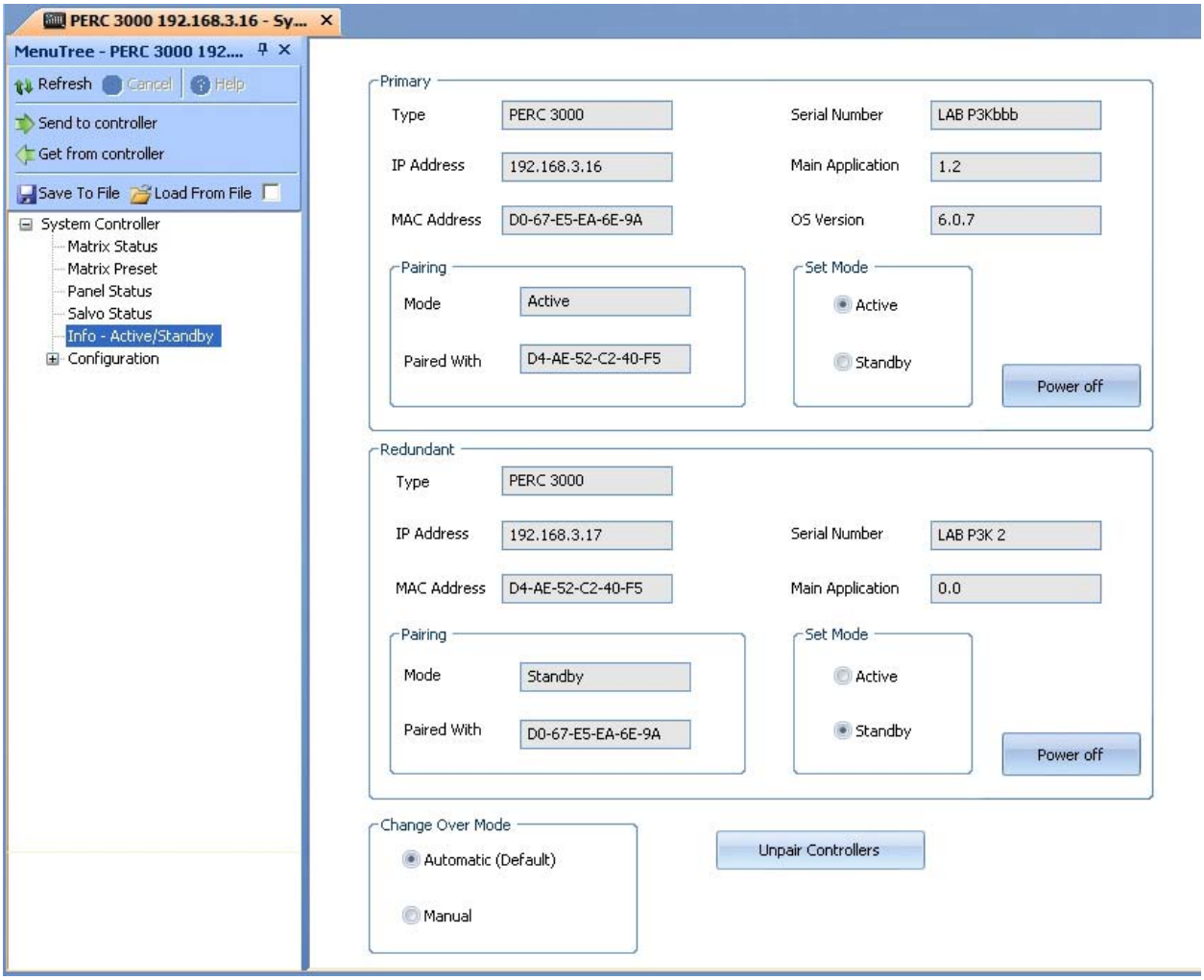


Figure 5-14 Info - Active/Standby Page

- **Type** – Identifies the controller as a PERC3000 controller device.
- **IP Address** – Displays the IP address assigned to the indicated controller device. The Primary controller assumes its assigned base IP address and the Redundant controller, if present, assumes the IP address of base IP + 1.
- **Serial Number** – Displays the serial number of the controller device installed in the indicated position.
- **MAC Address** – Identifies assigned MAC address for controller.
- **Main Application and OS Version** – Indicates revision level of program firmware loaded into system controller hardware.
- **Pairing**
  - **Mode** - If a second controller is present in the system and paired for redundant operation, this entry identifies whether the indicated controller device is currently functioning as the active or standby device for the system. *Single* indicates that there is only one controller in the router system.
  - **Paired With** - If a second controller is installed, this entry identifies, by MAC address, the controller hardware with which the displayed controller is paired. Note that this field is a static display indicating the paired device; it is not an entry field to designate the secondary controller. Refer to Paragraph 5.11.
- **Set Mode** – If the router contains dual system controllers that have been paired for redundant operation, the currently operating *active* or *standby* status of each module is displayed along with a pair of radio buttons that allow you to swap the active controller. You may use the Set Mode buttons in either the Primary or Redundant controller display areas to initiate the status toggle. A pop-up prompts you to verify the action before the status toggle is implemented.
- **Power Off** – Sends a command to the PERC3000 hardware to power down.
- **Change Over Mode** – In redundant control systems with paired dual controllers, the Automatic and Manual radio buttons allow you to set the desired mode of changeover operation in the event the standby controller detects a failure status in the active controller. Automatic changeover is the default selection.
- **Add Redundant or Unpair Controllers Button –** This button is used during the controller pairing process. Refer to Paragraph 5.11.

5.11 PAIRING AND UNPAIRING REDUNDANT SYSTEM CONTROLLERS

Two PERC3000 system controllers may be configured for redundant system control operation through a process called *pairing*. After they are paired, the active controller syncs with the standby controller to keep all configuration and status data current in the event that the standby controller has to take over operation of the router system. Pairing is performed through menu selections of the System Controller *Info - Active/Standby* page in Cattrax. If you ordered two controllers as a redundant set, the pairing procedure will have been performed at the factory and does not need to be repeated.

Prior to pairing, the Info display page shows a single controller as illustrated by Figure 5-15. The IP address of the currently active single controller is always set to the base IP address assigned to the router system, refer to Paragraph 3.2 of this User Guide.

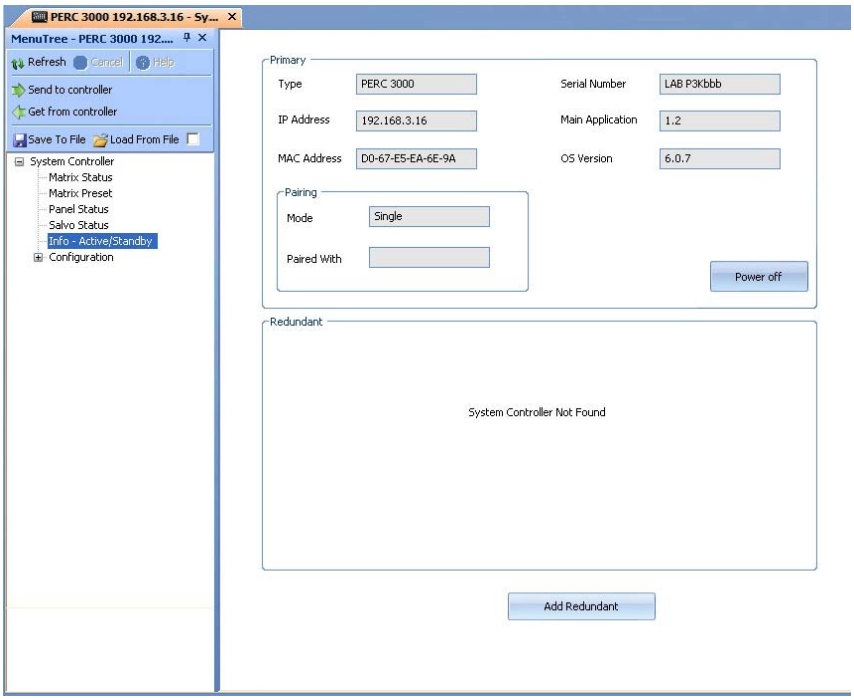
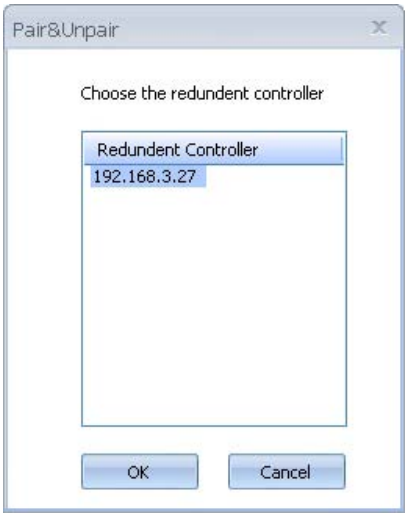


Figure 5-15 Single Controller Info-Active/Standby Display

To pair a second controller with the current active controller, the second controller must be installed on the facility Ethernet and powered up. Once paired, the primary controller will retain the base IP address and the newly installed secondary, or redundant, controller is assigned the IP address of base IP address + 1 by the active primary controller. It is not necessary that the IP address of the second controller be set prior to pairing. It is necessary that the currently set network parameters of the second controller, including its current IP address, allow it to be discovered by Cattrax on the facility Ethernet.

Pair a second controller for redundant operation as follows:

1. Click the *Add Redundant* button at the bottom of the Info – Active/Standby page, Figure 5-15.
2. The Pair&Unpair pop-up box is displayed as shown at right.
3. The box will contain a listing by IP address of all PERC3000 controllers available for pairing on the network. In most cases there will only be one entry in this box. Note that the IP address displayed in the box is the address currently set for the second controller. It is not necessarily the operating address of base IP address + 1 that will automatically be set for the controller during the pairing operation.



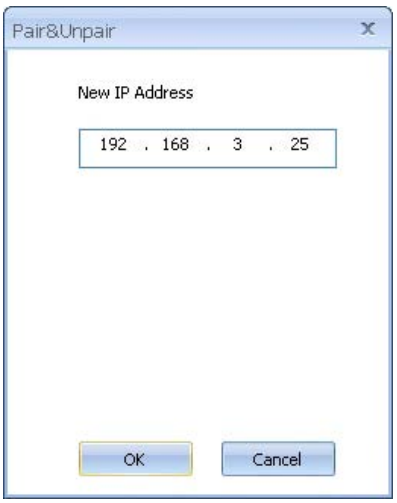
4. Select the controller from the list that you wish to pair with the primary controller for redundant operation and click *OK*.
5. Cattrax will automatically initiate the pairing process through the primary controller. Pairing may take several minutes to complete.
6. When the page updates to show the paired controllers, the Change Over Mode and Set Mode radio buttons are displayed on the page.

After pairing is completed, the second controller is shown as the Redundant device on the Info - Active/Standby page and the displayed IP address will be set as system base IP address + 1.

If it should ever be necessary to do so, paired controllers may be unpaired using control options on this page. As part of the unpairing process you will be asked to enter an IP address that you wish to be set for the now unpaired second controller. The reason for the address change is that the ONLY device in the system that can operate with the address of base IP address + 1 is the redundant device of two paired controllers. If you are unpairing the controllers temporarily or you do not plan to exchange the second controller hardware with another PERC3000 device, it is permissible to keep the current address set for the controller device.

Unpair the Redundant controller as follows:

1. Click the *Unpair Controllers* button at the bottom of the Info – Active/Standby page, as shown by Figure 5-14.
2. The Pair&Unpair pop-up box is displayed as shown at right.
3. The box will contain a blank field prompting you to enter the New IP Address you wish to set for the redundant controller after the unpairing process is complete. Enter the IP address and click *OK*.
4. Cattrax will automatically initiate the unpairing process through the primary controller. Unpairing may take several minutes to complete.
5. The page updates to show the unpairing process is complete, and the display fields show a single controller as illustrated by Figure 5-15.



5.12 SYSTEM CONTROLLER CONFIGURATION

Commands and pages contained under the System Controller → Configuration parent header in the Menu Tree Window allow you to view configuration status and edit or create a controller configuration file that can be saved or downloaded to the PERC3000 System Controller. Figure 5-16 lists the command headers contained under the Configuration parent. Each command is discussed in the following paragraphs.

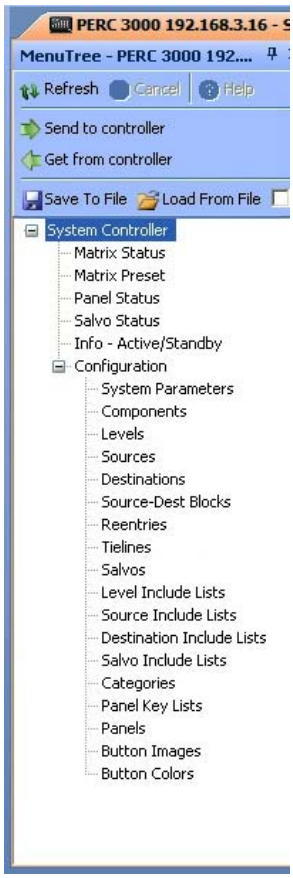


Figure 5-16 Controller Configuration Commands

When any system controller configuration command or configuration page is first accessed, there is no controller configuration file data loaded into the Cattrax control software. You have two options from which to select the type of configuration operation you wish to perform; either option allows you to view or modify an existing configuration file:

- Load an existing configuration file from a previously saved and stored file.
- Upload the currently active configuration file resident in system controller memory. This action requires that the host PC and the PERC3000 system controller be communicating via an Ethernet interface.

In order to view or modify the currently active configuration file loaded into the system controller, you must upload the configuration file from the active system controller by one of two methods:

- Select the *Get from Controller* command from the System Controller File commands menu.
- Select any command from the Configuration menu trees and you will be prompted with a decision box giving you the option to upload the current configuration file from the system controller memory.

Until you have performed one of these two actions, there is no “working” file data loaded into Cattrax.

As most configuration data is entered or modified through Cattrax menu commands, it is stored on the host PC – and only on the host PC. Changes entered do not get saved to a file, written to the system controller, or become active until the operator issues a command through Cattrax to either save or download the "new" controller configuration file. After a configuration file is created or modified, use the *Send to Controller* command in the File Commands menu to immediately download the file to the system controller hardware and activate the configuration changes.

In order to download a configuration, upload the current configuration file from the controller or to perform any status monitoring or maintenance/diagnostics procedures, the host PC and system controller must both be active on the network.

Each unique configuration file satisfies a specific system application. However, the following are some basic steps that are common to creating each router configuration file.

- Assign System Operating Parameters.
- Set up switching levels and routing components for the router system.
- Define and assign Sources and Destinations for each switching level that correspond to external equipment connected to the switching matrix components.
- Define special application functions such as Source-to-Destination Blocks (Paragraph 5.14.6), Reentries (Paragraph 5.14.7), Tielines (Paragraph 5.14.9) and Salvo Groups (Paragraph 5.14.14).
- Configure panel server devices and remote control panels, and define specific application functions to configurable control panel keys.

5.13 SYSTEM CONTROLLER CONFIGURATION PAGES – RIGHT MOUSE CLICK FUNCTIONS

As with most other applications based on the Microsoft Windows® operating system, Cattrax contains several application-specific functions for various configuration commands or data entry operations that are accessed by clicking the right mouse button and selecting the desired operation. Functions and commands presented on the right-click menu vary greatly between pages and data entry cells or fields. The example shown by Figure 5-17 illustrates a typical menu for data entry editing and short-cut functions. Not all commands shown below appear on every right-click menu.

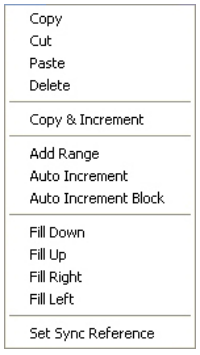


Figure 5-17 Typical Right-Click Mouse Commands

5.13.1 COPY, CUT, PASTE, DELETE

Copy, Cut, Paste and Delete Commands in Cattrax function exactly as the standard Microsoft Windows® functions.

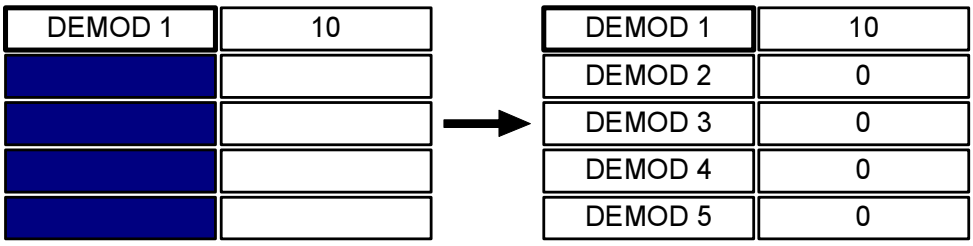
5.13.2 QUICK DATA ENTRY TOOLS

For many data entry operations, such as source and destination spreadsheets, that require you to enter repetitive information, such as Inputs, Outputs, etc., there are additional commands available from the right mouse click menu. Commands vary depending on the system page and grid column you are working with:

- **Copy & Increment**

Copy & Increment allows you to quickly fill fields of a configuration grid by duplicating the text and incrementing the numerical value of a starting entry into fields selected by a user-defined data block. Copy & Increment always fills in all valid fields of the data grid lines within the selected block, but it behaves differently depending on where from the grid you select the starting values fields.

If you choose a starting field from any of the name columns of the grid and do not include any of the numerical entry fields in the switching level columns when defining the size of the fill block, as shown by the diagram below, the text entry of the name will be duplicated in each field of the defined block and the numerical value associated with the name fields only will be incremented by one in each successive field of the fill block. All of the numerical values in the switching level columns will be filled with zeros, as shown.

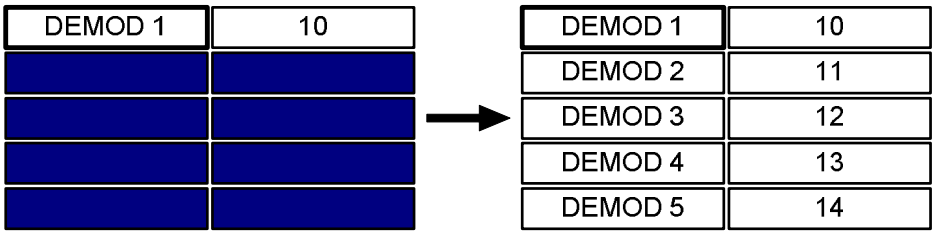


COPY & INCREMENT EXAMPLE 1

If you choose a starting field from the name columns of the grid, and you do include numerical entry fields under the switching level columns when defining the fill block, as shown below, the text entry of the name will be duplicated in each field of the defined block and the numerical value associated with the name will be incremented by one in each successive field of the fill block. All of the numerical values in the switching level columns included in the data block will be incremented by one in each successive field, as shown. Numerical fields NOT included in the defined data block will be filled with zeros.

There are a couple of rules you need to be aware of when using the Copy & Increment function:

- The fill block you define with the mouse must include at least one of the name columns and the name entry in the starting field must end in a numerical value, such as DEMOD1, DEMOD2, etc.
- Numerical values under any of the switching level columns will be incremented by one up to the maximum number of physical inputs or outputs defined for the level. If the fill block contains additional lines after any level column reaches the maximum number, any successive fields in that column will be filled with a zero.

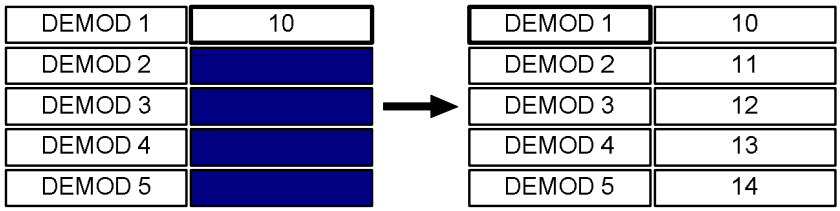


COPY & INCREMENT EXAMPLE 2

- **Auto Increment**

The Auto Increment function increments the numerical value of a starting entry into the fields of a user-defined fill block located below and in the same column as the starting entry. You must choose a starting field from a numerical entry field in any of the switching level columns when defining the fill block, as shown by the diagram below. Numerical values in the selected column will be incremented by one in each successive field, as shown. Auto Increment only adds numerical values if every line of the fill block already has a name, such as assigned to a source or destination, associated with the level.

Numerical values under the selected switching level column will be incremented by one up to the maximum number of physical inputs or outputs defined for the level. If the fill block contains additional lines after any switching level column reaches the maximum number, any successive fields in that column will be filled with a zero.

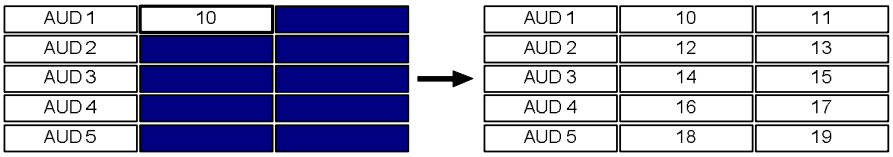


AUTO INCREMENT FUNCTION

- **Auto Increment Block**

Auto Increment Block is very similar to the Auto Increment function, the difference being that it allows the fill block to consist of multiple switching level columns, as shown by the diagram. Auto Increment Block always uses the field in the upper left corner of the fill block as the starting value entry, and fills successive fields with numerical values, incremented by a value of one, from left to right and top to bottom. Auto Increment Block only adds numerical values if every line of the fill block already has a name, such as assigned to a source or destination, associated with the level.

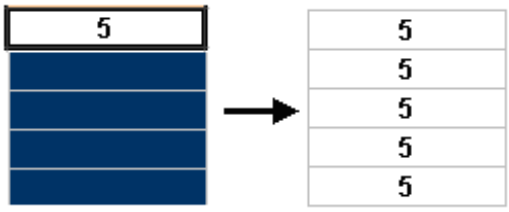
Numerical values filled in the switching level columns will be incremented by one up to the maximum number of physical inputs or outputs defined for the level in the starting entry field. If the fill block contains additional fields after any field in the block reaches the maximum number, any successive fields in the remainder of the fill block will be filled with zeros.



AUTO INCREMENT BLOCK FUNCTION

- **Fill-Down**

Fill-Down fills in the fields below a selected field with the selected number. First, select the field with the number you want to duplicate and then, select the fields below it. Right-click and select Fill-Down to fill in the fields with the selected number, as shown.



FILL-DOWN COMMAND

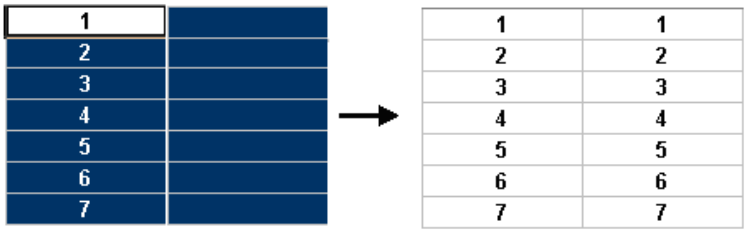
- **Fill-Up**

Fill-Up fills in fields above a selected field with the same information. First, select the field with the number you want to duplicate and then, select the fields above it. Right-click and select Fill-Up to fill in the fields with the selected information, as shown by the diagram.

FILL-UP COMMAND

- **Fill-Right**

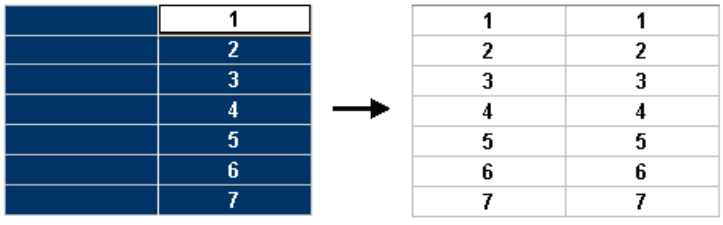
Fill-Right fills in the fields to the right of a selected field with the selected number(s). First, select the fields with the numbers you want to duplicate and then, select the fields to the right. Right-click and select Fill-Right to fill in the fields with the selected numbers. You can select either one field or several fields with this function, as shown.



FILL-RIGHT COMMAND

- **Fill-Left**

Fill-Left fills in the fields to the left of a selected field with the selected number(s). First, select the fields with the numbers you want to duplicate and then, select the fields to the left. Right-click and select Fill-Left to fill in the fields with the selected numbers. You can select either one field or several fields with this function, as shown by the diagram



FILL-LEFT COMMAND

5.14 CONFIGURATION COMMANDS

Each command contained under the Configuration parent header in the Menu Tree window is discussed in the following paragraphs.

5.14.1 SYSTEM PARAMETERS

The System Parameters page is the top level configuration page and identifies the currently loaded controller configuration file by name and initial operating parameters as shown by Figure 5-18.

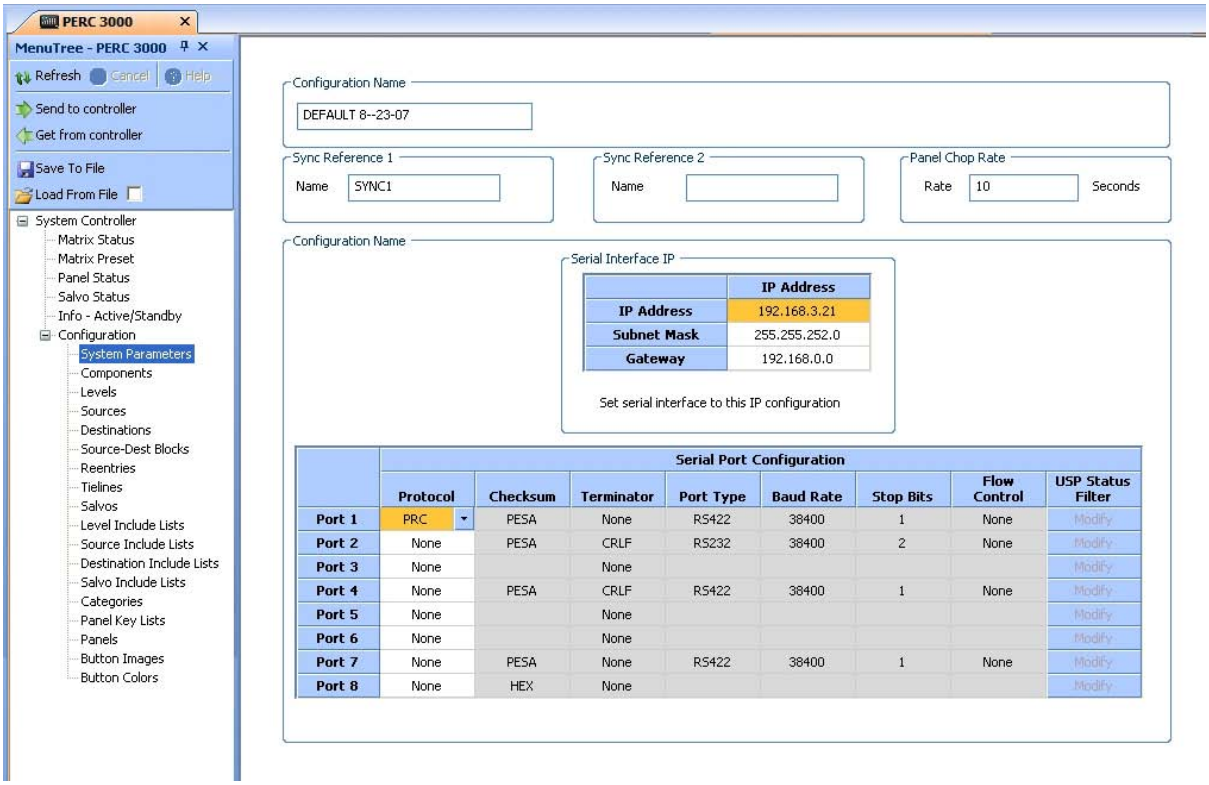


Figure 5-18 System Parameters Page

- **Configuration Name -** This field allows you to name the configuration file. Type the desired name in the Configuration Name box. Configuration names may have up to 32 alphanumeric characters.
- **Panel Chop Rate -** Chop Rate indicates the frame rate of switches used by the Chop mode of operation. To change the Chop Rate, enter the desired value in the Chop Rate box. Any desired Chop Rate between 1 and 255 frames is supported. Default value of this parameter is 10 frames.
- **Sync Reference Definition –** PERC3000 assigns up to two sources of external Sync Reference signals for synchronizing switching times and destination output signals. Cells in this field allow you to define sync sources.
  - **Name –** Enter an alphanumeric string in each cell to assign a name to the sync source.

- **Serial Interface IP –** This field is a static display-only area that provides a listing of the network operating parameters that must be entered into the MOXA serial interface device for proper operation and integration into the system. Actual data entry into the serial device is made through the keys and display on the front panel of the device.

- **Serial Port Configuration**

  PERC3000 systems that include PESA routers or other devices which communicate with the system controller through a serial port require use of the serial interface peripheral device. All port configuration options, for all serial protocols with the exception of PRC, are selected and configured through the Serial Port Configuration area of the System Parameters page. When PRC is the selected protocol for any port, the PRC default values are inserted for each port parameter field and can not be modified.

  The entry in the left-most column of the configuration table identifies the physical serial port (1 thru 8) on the interface device defined by the entries in the associated row.

  The following data fields are used for port configuration:

  - **Protocol -** This entry identifies the protocol, defining the format used when sending data through the serial ports of the serial interface device. Enter the desired data protocol from the pull-down menu associated with the table cell. There are currently four protocols available for use:

    - CPU Link Protocol 1 with Extensions (P1E) (81-9062-0407-0)
    - Unsolicited Status Protocol (USP) (81-9062-0409-0)
    - PESA Routing Control (PRC) (81-9062-0316-0)
    - AutoPatch (81-9059-0695-0)

  Number in parenthesis identifies the PESA document that describes the data protocol or interface.

  When any protocol other than PRC is selected, the following port configuration options may be selected:

  - **Checksum -** A checksum determines how the validity of transmitted data is confirmed. There are three available Checksum types:

    - **NONE -** No validity checking.
    - **PESA -** Data validity is checked using PESA's standard method. (See Protocol documentation.)
    - **HEX -** Data validity is checked using a standard HEX-ASCII Checksum.

  - **Terminator -** Terminator identifies the character(s) used to denote the end of a data packet or command string. Three terminators are available:

    - **CR -** A carriage return.
    - **LF -** A line feed.
    - **CRLF -** A carriage return followed by a line feed.

- **Port Type -** This pull down menu allows you to assign either the RS-422 or RS-232 operational protocol to the bus being configured.
- **Baud Rate -** Baud Rate is the data transfer rate through the serial port measured in Baud (bits per second). A Baud Rate of either 9600 or 38400 may be assigned to any of the serial buses.
- **Stop Bits -** In asynchronous communications, a Stop Bit indicates that a byte of data has just been transmitted. Every byte of data is preceded by a start bit and followed by a stop bit.

  Either 1 or 2 stop bits may be selected for each of the serial ports.
- **Flow Control -** Flow Control is a serial data stream parameter that specifies a control method for data transmission. Flow Control options available through a pull-down menu include RTS/CTS, XON/XOFF or NONE.
- **USP Status Filter -** The USP Status Filter determines which events are reported when a port is defined as a USP Port. Figure 5-19 illustrates the Status Filter Selection pop-up box and identifies the events that may be selected for reporting. To activate an event, click in the box beside the desired entry. A check in the box indicates the item is selected.

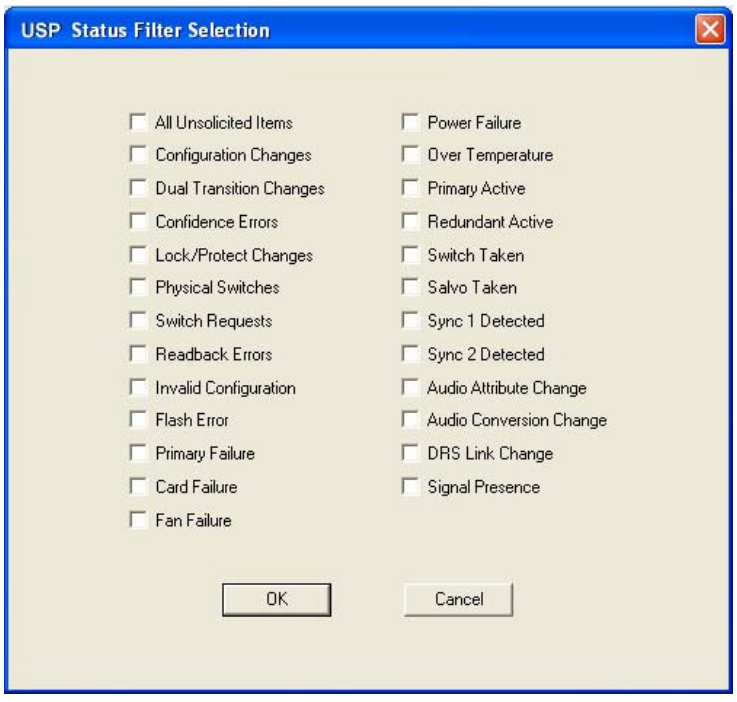


Figure 5-19 Status Filter Selection

5.14.2 COMPONENTS CONFIGURATION

In PESA's switching architecture, a ***component*** defines a physical switch matrix, or matrix segment, that routes a specific group of signals. When the **Components** menu entry is selected, the Components Configuration page, Figure 5-20, is displayed. From this page you can assign and enter operational parameters for various system components.

The box labeled *Components* on the left side of the display window contains a listing of all assigned components, by nickname; and the box labeled *Information* on the right side contains the data entry cells used to create new or modify existing components.

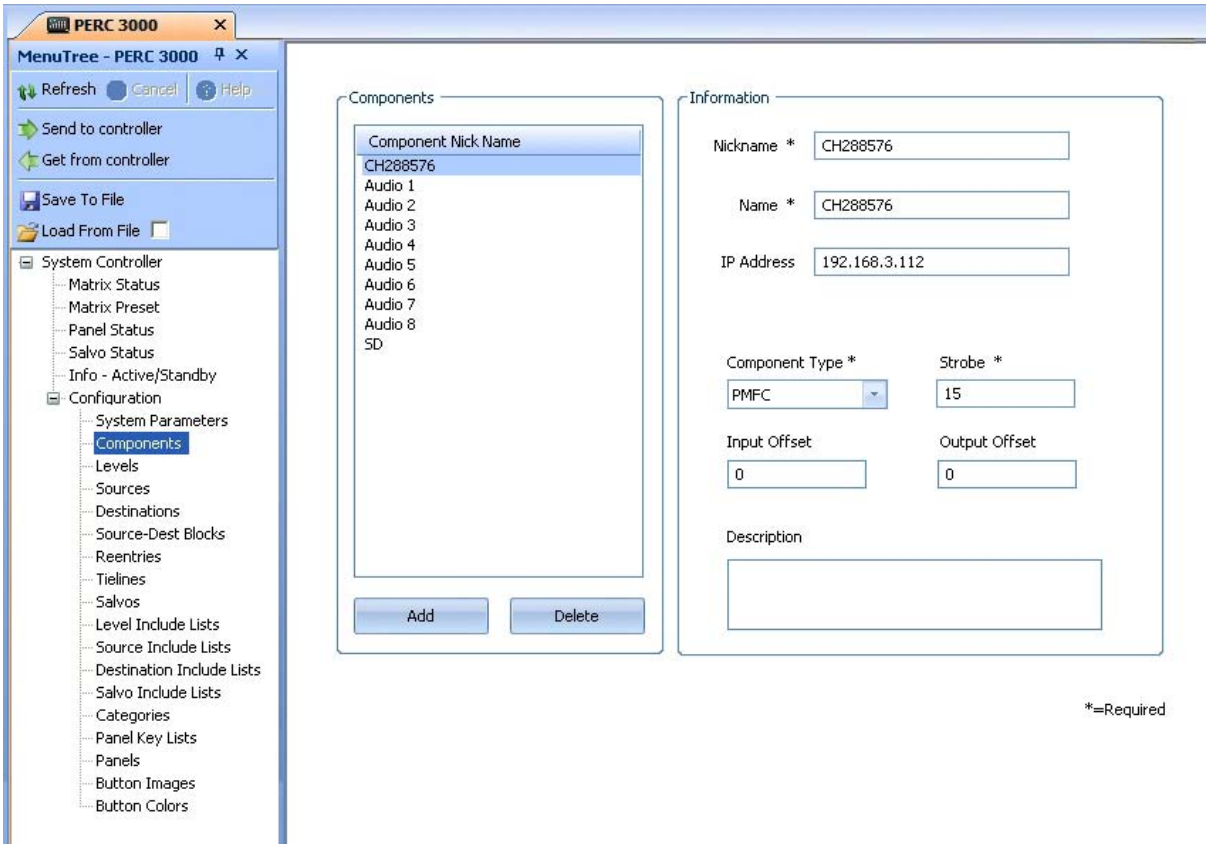


Figure 5-20 Components Configuration Page

- **Adding a Component** – PERC3000 allows a maximum of 64 components. To add a component, click the *Add* button at the bottom of the Components box to open a blank setup pane in the Information box.
- **Deleting a Component -** To delete a component, locate the nickname of the component you wish to delete in the Components box and click on the name to select it. Click *Delete* at the bottom of the box.

- **Nickname** – Nickname is a label (up to 8 characters) associated with the component and is the character string displayed in the Component Nick Name listing area. In order to assign the component a nickname, click the cursor in the Nickname field and enter the nickname label text.

  After Nickname text is assigned to a component, the Nickname character string is displayed as a sub-entry in the Components box. Any time you wish to return to the setup page for a particular component, click on the Nickname sub-entry under the Components Nick Name header.

- **Name** - The Name field is where a longer, more descriptive name is defined for the component. Generally, when assigning names and nicknames, the NAME field is a more precise description of the defined component and the NICKNAME field is a shortened acronym or mnemonic.

- **IP Address -** Enter the IP address, if applicable, of the router frame that switches the component signals, or the IP address of the Matrix Frame Controller module(s) if the component is switched by a Cheetah router frame. If the router switching the component does not communicate with the system controller over the Ethernet network (i.e. a PRC bus router), leave this entry blank.

- **Component Type -** Component Type is a pull-down menu list containing the types of hardware devices controlled by the PERC3000 controller from the following options:

  - PRC – Any PESA switching product using the PESA Routing Control (PRC) bus for control interface.
  - TGR – Describes the legacy PESA Tiger Series of switching products.
  - XTN – An External Control Bus to interface with non-PESA equipment.
  - DRS – Describes the standard PESA DRS Series of audio routing products.
  - PMFC - Cheetah video router Matrix Frame Controller when communicating with the PERC3000 over an Ethernet network.
  - DRS64 and DRS 128 – Describe the Stand-Alone DRS audio routers with a single DXE frame (64) or dual DXE frames (128).
  - DRS1536 – Describes the Enterprise DXE DRS audio router.

  Highlight and select the proper hardware designator corresponding to the type of hardware routing the component you are configuring.

- **Strobe - Strobe is a numerical entry that identifies the physical hardware (hardware ID) which routes the signals associated with the component entry.**

- **Input and Output Offset -** Offset defines the numerical difference between the physical input or output number and the level input or output number for a given source or destination.

- **Description -** Description is a free text field where you can enter a full description of the switching component or add notes or information as desired. This field is solely for discretionary use and has no effect on the defined component characteristics.

5.14.3 LEVELS CONFIGURATION

In PESA's switching architecture, a ***Level,*** or Switching Level, maps a grouping of signals to the ***component*** or multiple components which define the physical switch matrix that routes the actual input and output signals. When the **Levels** menu entry is selected, the Levels Configuration page, Figure 5-21, is displayed. From this page you can assign and enter operational parameters for up to 17 system switching levels.

The box labeled *Levels* on the left side of the display window contains a listing of all the assigned switching levels in the router, by Nickname; and the box labeled *Information* on the right side contains the data entry cells used to create new or modify existing switching levels.

In order to configure a switching level:

- Click the *Add* button and name the level,
- Define the I/O size of the level and level properties,
- Select the component or components that map the desired physical hardware and I/O signals to the switching level.

Remember that each switching level must have at least one mapped component. From a configuration process, this means that the component must be created before you can define the switching level.

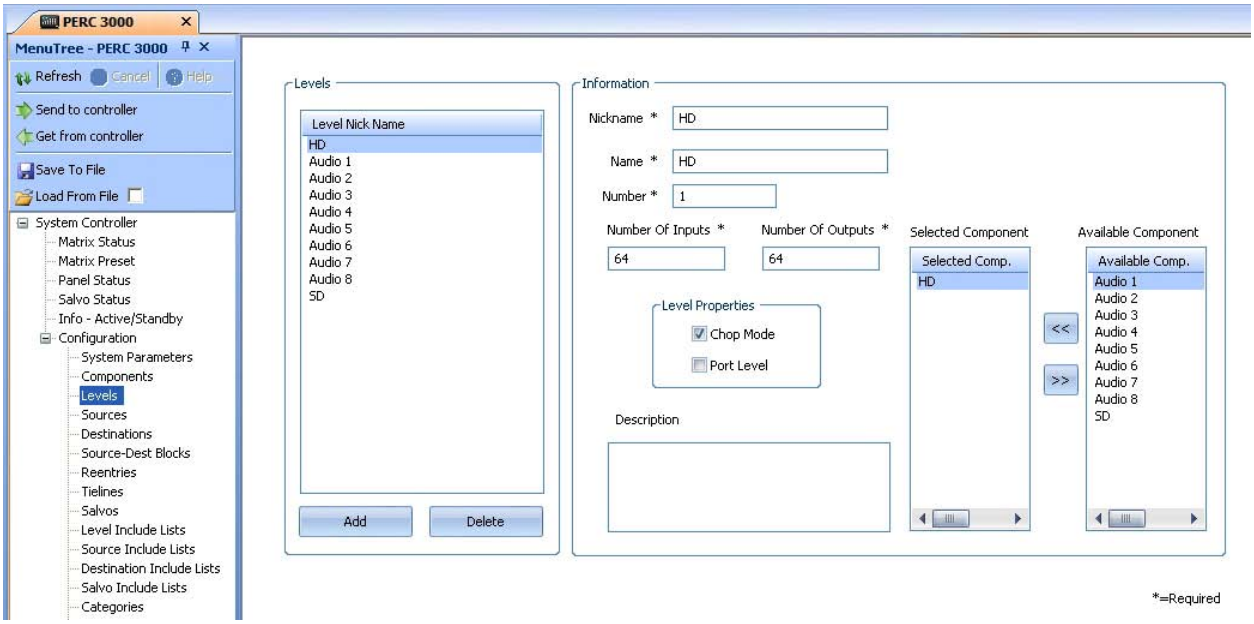


Figure 5-21 Levels Configuration Page

- **Adding a Level** – PERC3000 allows a maximum of 17 switching levels. To add a level, click the *Add* button at the bottom of the Levels box to open a blank setup pane in the Information box.
- **Deleting a Level -** To delete a level, locate the nickname of the level you wish to delete in the Levels box and click on the name to select it. Click *Delete* at the bottom of the box.

- **Nickname** – Nickname is a label (up to 8 characters) associated with the level and is the character string displayed on status display pages for the defined switching level. In order to assign the level a nickname, click the cursor in the Nickname field and enter the nickname label text.

  After Nickname text is assigned to a level, the Nickname character string is displayed as a sub-entry in the Levels box. Any time you wish to return to the setup page for a particular level, simply click on the Nickname sub-entry under the Level Nick Name header.

- **Name** - The Name field allows a longer and more descriptive name for the level. This field is often used to assign a name to the level that more accurately identifies its function.

  Generally, when assigning names and nicknames, the NAME field is a longer more precise description of the defined level and the NICKNAME field is a shortened acronym or mnemonic used to identify the level on display devices or pages.

- **Number** - The sequence number entered in the Number field determines the display order of levels on the configuration page if switching levels are sorted by number.

  While the number in no way determines priority or importance of one level over another, it is a convenient way to order and identify the levels. Numbers assigned to levels determine the sequence in which the levels are displayed in include lists and the entry display order when scrolling through levels on remote control panels. The number also determines the left-to-right order in which the switching level columns are displayed on the sources and destinations configuration pages of Cattrax, with switching level number one (1) appearing as the first displayed (left-most) column. Additionally, the sequence number identifies switching levels to external automation system equipment, when used.

  Each switching level may be assigned a sequence number with the caveat that each entry must be numeric, greater that zero and must be unique among other level entries.

- **Number of Inputs** – Enter the number of input sources associated with the defined level.

- **Number of Outputs** – Enter the number of output signals associated with the defined level.

- **Chop Mod**e - When this box is checked it indicates the level is “chop enabled” and may be included in a chop function.

- **Port Level** – This function not used in current version of Cattrax.

- **Description -** Description is a free text field where you can enter a full description of the switching level or add notes or information as desired. This field is solely for discretionary use and has no effect on the defined level characteristics.

- **Selected Component** – Components you wish to switch through the switching level you are configuring are listed in this column.

- **Available Component** – This column contains a listing of all available components which may be assigned to the switching level. To assign a component to a switching level, locate the desired component in the Available Component list and highlight the name.

Initially, all components are listed in the Available Component list box. Listed components are moved between the two list boxes using the two arrows between the boxes. In order to move a component from Available to Selected, highlight the component you want to add to the level and click the arrow pointing from the Available list to the Selected list. You may assign up to 32 components to each switching level. In order to remove a component, highlight and move the name from the Selected list to the available list using the arrow pointing to the Available list.

5.14.4 SOURCES

Click the **Sources** entry under the Configuration Menu Tree to access the Source Configuration page, Figure 5-22. This page allows you to define source groups in the router configuration. Note the Sources Configuration pane is in the form of a database spreadsheet with data entries for each source group made on individual rows from left to right. Each source group is assigned a name, and the physical inputs to the router system you wish to associate with the source group are assigned by switching level. In router terminology, this page maps each physical source (input) to the router to a logical input by switching level and source group nomenclature. Individual physical inputs to router system hardware components may be assigned to multiple source groups. PERC3000 allows up to 4800 source names.

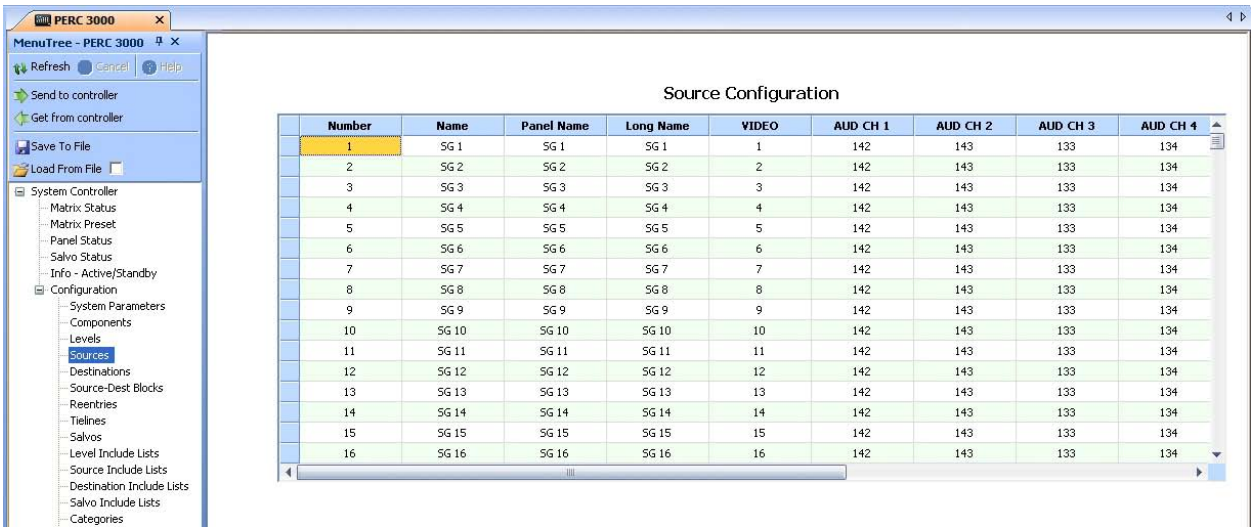


Figure 5-22 Sources Configuration Page

- **Number -** The left-most column labeled **Number** allows you to assign a number to each entry in the spreadsheet. The number you enter in this column determines the display order if you sort the list entries by number and also determines the entry display order when scrolling through lists on remote control panels.

  Flexible number assignment provides a simple method by which you can control display grouping by signal name or type, or add source entries to existing display groupings and maintain continuity to the grouping by signal type or name sequence.

You may assign a number to a row entry with the caveats that each entry must be numeric, greater than zero and it must be unique among others of its type. Gaps in numbering sequence are allowed, but can effect third party interface equipment.

- **Name, Panel Name and Long Name -** The next three columns allow you to assign identifying names and/or acronyms to each source group according to the following formats:
  - **Name –** Any combination of up to 8 alphanumeric characters may be used to identify the source group.
  - **Panel Name -** Any combination of up to 8 alphanumeric characters may be used to identify the group. The entry made in this column is the text string displayed in the switching level columns on the Matrix Status display page.
  - **Long Name –** This column is a free text space where you may enter a name up to 32 characters in length for the source. This name is only displayed on this configuration page and may be used to more clearly identify an external device or system.
- **Switching Levels -** To the right side of the three name columns, there are columns corresponding to each system switching level. The numeric entry in the columns on each row designates the physical input to the component selected for the source group on each switching level.

  For example, look at entry number 2 in Figure 5-22 labeled SG 2. Notice that the numeric entry for SG 2 in the VIDEO column is a 2. This entry tells the system controller that the video signal switched by the source group (logical input) identified as SG 2 on the switching level named VIDEO is present at physical input number 2 on the video router hardware component configured for the VIDEO switching level.

  Numeric entries for source group SG 2 in the columns corresponding to switching levels AUD CH 1 and AUD CH 2, for example, are 142 and 143, respectively. In this case, the numeric entries indicate that the audio signal switched by the source group identified as SG 2 on the switching level named AUD CH 1 is present at physical input number 142 on the router hardware component configured for the AUD CH1 switching level, and the signal specified for switching level AUD CH 2 is physically present at input 143 of the hardware component configured for AUD CH2.

  When you select source group SG 2 as the source for a router destination, the physical inputs for all switching levels associated with the source group are switched simultaneously to the physical outputs for all switching levels associated with the destination group.

  Only one physical input number entry per switching level is allowed. If the switching level controls more than one component, the numerical entry selects the physical input switched by all hardware components controlled by the level. Numerical physical input entries for a switching level may be used in multiple source groups.

  An entry of 0 (zero) in any switching level cell indicates no switch occurs to a physical input of the hardware component(s) under control of the switching level when the indicated source group is switched. By default a shaded zero (0) is present in every cell of each switching level column before a numerical value is entered. Any switching level may be undefined for a source group entry by leaving the shaded zero in the cell, or by entering a zero to overwrite an existing numerical entry.

- **Navigating the Sources Spreadsheet -** From the Sources Configuration page, you may view all assigned source groups, add a single source group or a range of groups to the configuration, delete a source or modify parameters of an existing source group.

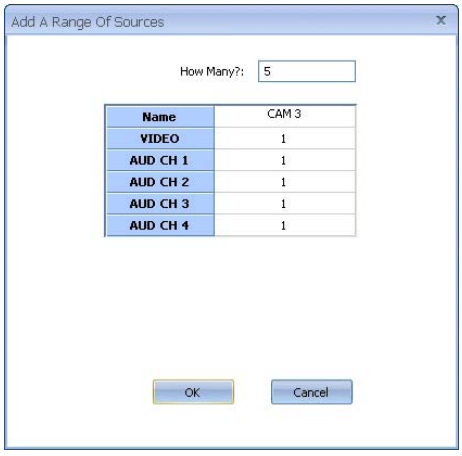
  - **Add Source** – If you wish to add a single source group entry, use the scroll bar and move the display to the empty row beneath the last source entry in the spreadsheet. Click the cursor in the Number cell on the empty row and enter the sort order number you wish to assign to the source entry. Click in the Name cell and begin typing the name of the source group you wish to add. Press Enter to add the source, and the name you entered is copied in all three of the name entry cells.

    If you wish to change any of the name entries, such as panel name or long name, click the cursor in the cell you wish to modify and enter the changes, followed by Enter. After the new source is entered, you may click the cursor in a switching level cell and enter the physical router input you wish to assign to the source for that level. You may continue adding single sources in this manner up to the maximum number of allowable sources for the controller.

  - **Delete Source** – If you wish to remove a source group entry from the configuration spreadsheet, move the cursor to the number column of the source row you wish to delete and right-click. Select delete from the right-click menu. You will be prompted to verify the action before the source is removed.

  - **Spreadsheet Right Mouse Click Functions -** Right-click any cell in the Source Configuration Spreadsheet to display a pop-up menu that provides command options for the cell, as shown below. Command items appearing in the pop-up menu vary depending on which commands are pertinent for data entered in the selected cell. Paragraph 5-13 discusses the function of common commands available from the pop-up menu. Remember that all commands listed and discussed below may not appear in the pop-up menu for a specific cell.

  - **Add Range** – Adds a range of sources using a category index type of naming scheme, as shown by the diagram below. You define the base name, such as “CAM,” the starting index - such as 3 and the number of sources to create – such as 5. This example would create sources “CAM 3:” to “CAM 7” on the five listed switching levels. If you do not want a switch to occur with the new source group on one or more of the switching levels, enter a zero (0) in the cell for that level.



- **Set Tieline Source**

  A Tieline is a special purpose routing function that dedicates a physical source input and a physical destination output on different switching levels as a direct connected path through an external physical connection. By allowing a source signal defined for one switching level to be selected as the source signal for a destination on another switching level, tielines offer a great deal of flexibility for many routing applications, such as seamlessly inserting format conversion equipment in signal paths.

  Each source signal that you wish to route from the tieline source switching level over the physical tieline to the tieline destination switching level must be configured as a *Tieline Source* through the **Set Tieline Source** function of the Sources configuration process. If you are not familiar with the function and purpose of a tieline in a router system, refer to Paragraph 5.14.9 thru 5.14.13 of this User Guide.

  Before you can configure any source on a switching level as a tieline source, there must be at least one tieline path defined between the switching level from which you wish to derive the source signal and the destination switching level. This is done through the Tieline Configuration page, refer to Paragraph 5.14.10.

  For this example, we illustrate the Source Configuration pane from Figure 5-22 with a switching level named Analog added, as shown here; and assume this level is tied to a matrix component that receives its source signals from analog devices such as cameras, tape machines, etc.

Source Configuration

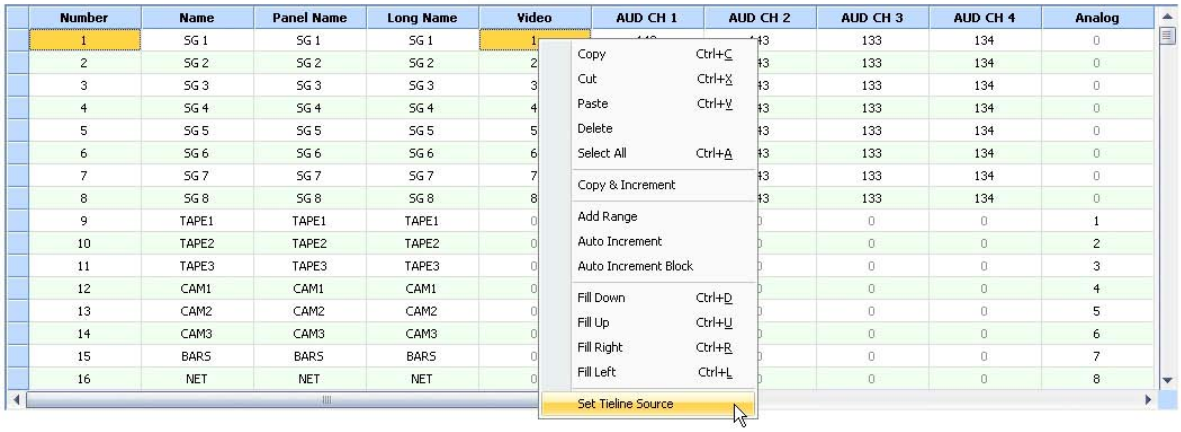
Number	Name	Panel Name	Long Name	VIDEO	AUD CH 1	AUD CH 2	AUD CH 3	AUD CH 4	Analog
1	SG 1	SG 1	SG 1	1	142	143	133	134	0
2	SG 2	SG 2	SG 2	2	142	143	133	134	0
3	SG 3	SG 3	SG 3	3	142	143	133	134	0
4	SG 4	SG 4	SG 4	4	142	143	133	134	0
5	SG 5	SG 5	SG 5	5	142	143	133	134	0
6	SG 6	SG 6	SG 6	6	142	143	133	134	0
7	SG 7	SG 7	SG 7	7	142	143	133	134	0
8	SG 8	SG 8	SG 8	8	142	143	133	134	0
9	TAPE1	TAPE1	TAPE1	0	0	0	0	0	1
10	TAPE2	TAPE2	TAPE2	0	0	0	0	0	2
11	TAPE3	TAPE3	TAPE3	0	0	0	0	0	3
12	CAM1	CAM1	CAM1	0	0	0	0	0	4
13	CAM2	CAM2	CAM2	0	0	0	0	0	5
14	CAM3	CAM3	CAM3	0	0	0	0	0	6
15	BARS	BARS	BARS	0	0	0	0	0	7
16	NET	NET	NET	0	0	0	0	0	8

Assuming a physical tieline has been defined with a physical output from switching level Analog defined as the tieline source and a physical input to switching level Video as the tieline destination, we would now like to route the signal from analog device CAM1, over the physical tieline, as the source for the destination on switching level Video when the source group SG1 is selected as the source for the destination. To do this we will configure CAM1 as a *Tieline Source*, on level Video as follows:

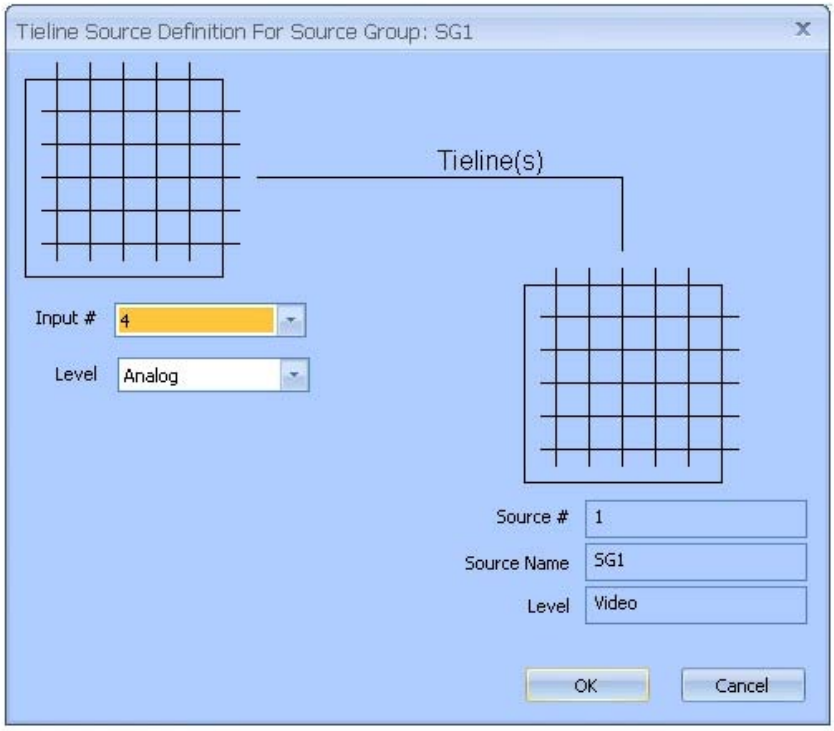
Right click the cursor in the data entry cell for source group SG1 on the Video switching level and select the "*Set Tieline Source*" option from the menu, as shown below.

Note that the Set Tieline Source option will not be displayed in the pull-down menu unless at least one tieline is defined between the Analog and Video switching levels through Tieline Configuration.

Source Configuration



In the example shown, by selecting "*Set Tieline Source*" in the cell for SG1 on the Video level, a graphic, as shown here, appears and displays the source number, source group name and switching level for which you are defining a tieline source on the right side. On the left side of the graphic you select the physical input and the switching level that you wish to define as the tieline source for that source group using the pull-down menu boxes.



By selecting Input #4 and Level Analog from the pull-down lists, we have now established a tieline source such that anytime source group SG1 is selected for a destination on the Video switching level, the system controller will route the signal on physical input #4 on the Analog matrix component through an external, physical cable to the defined tieline input on the Video matrix component and select that signal as the output for the destination.

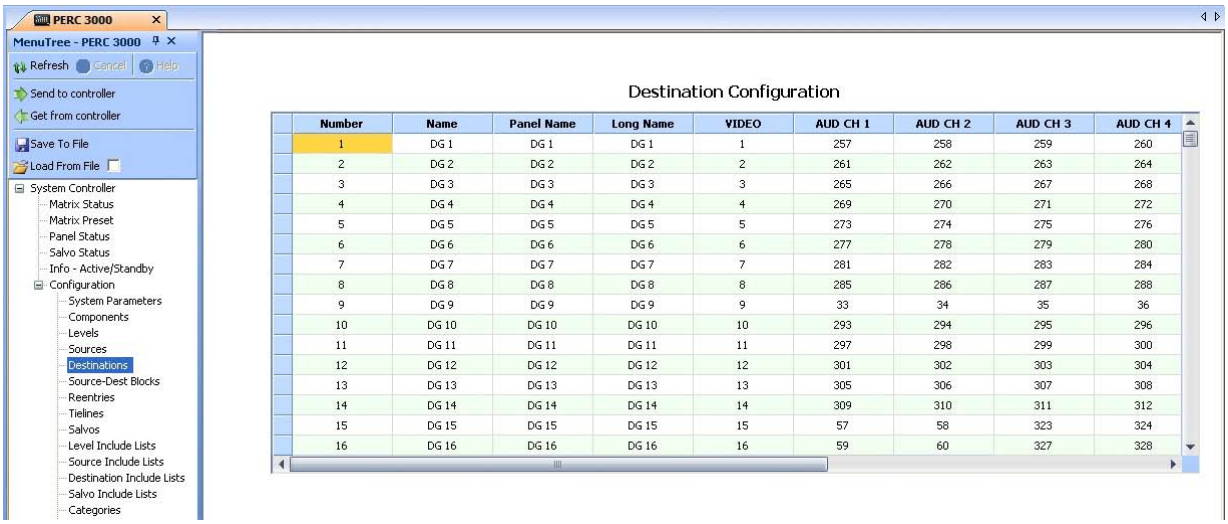
On the source spreadsheet the text entry "*4 on Analog*" is automatically written in the cell for SG1 on the Video level, as shown below. This display entry indicates that when SG1 is selected as a source, the source signal routed on the Video switching level will be actually the signal on physical input 4 of the Analog level routed through an external tieline.

Source Configuration

Number	Name	Panel Name	Long Name	VIDEO	AUD CH 1	AUD CH 2	AUD CH 3	AUD CH 4	Analog
1	SG 1	SG 1	SG 1	4 On Analog	142	143	133	134	0
2	SG 2	SG 2	SG 2	2	142	143	133	134	0
3	SG 3	SG 3	SG 3	3	142	143	133	134	0
4	SG 4	SG 4	SG 4	4	142	143	133	134	0
5	SG 5	SG 5	SG 5	5	142	143	133	134	0
6	SG 6	SG 6	SG 6	6	142	143	133	134	0
7	SG 7	SG 7	SG 7	7	142	143	133	134	0
8	SG 8	SG 8	SG 8	8	142	143	133	134	0
9	TAPE1	TAPE1	TAPE1	0	0	0	0	0	1
10	TAPE2	TAPE2	TAPE2	0	0	0	0	0	2
11	TAPE3	TAPE3	TAPE3	0	0	0	0	0	3
12	CAM1	CAM1	CAM1	0	0	0	0	0	4
13	CAM2	CAM2	CAM2	0	0	0	0	0	5
14	CAM3	CAM3	CAM3	0	0	0	0	0	6
15	BARS	BARS	BARS	0	0	0	0	0	7
16	NET	NET	NET	0	0	0	0	0	8

5.14.5 DESTINATIONS

Click the **Destinations** entry under the Configuration Menu Tree to access the Destination Configuration page, Figure 5-23. This page allows you to define destination groups in the router configuration. Note the Destinations Configuration pane is in the form of a database spreadsheet with data entries for each destination group made on individual rows from left to right. Each destination group is assigned a name, and the physical outputs from the router you wish to associate with the destination group are assigned by switching level. In router terminology, this page maps each physical destination (output) from the router to its logical output by switching level and destination group nomenclature. PERC3000 allows up to 4800 destination names.



Number	Name	Panel Name	Long Name	VIDEO	AUD CH 1	AUD CH 2	AUD CH 3	AUD CH 4
1	DG 1	DG 1	DG 1	1	257	258	259	260
2	DG 2	DG 2	DG 2	2	261	262	263	264
3	DG 3	DG 3	DG 3	3	265	266	267	268
4	DG 4	DG 4	DG 4	4	269	270	271	272
5	DG 5	DG 5	DG 5	5	273	274	275	276
6	DG 6	DG 6	DG 6	6	277	278	279	280
7	DG 7	DG 7	DG 7	7	281	282	283	284
8	DG 8	DG 8	DG 8	8	285	286	287	288
9	DG 9	DG 9	DG 9	9	33	34	35	36
10	DG 10	DG 10	DG 10	10	293	294	295	296
11	DG 11	DG 11	DG 11	11	297	298	299	300
12	DG 12	DG 12	DG 12	12	301	302	303	304
13	DG 13	DG 13	DG 13	13	305	306	307	308
14	DG 14	DG 14	DG 14	14	309	310	311	312
15	DG 15	DG 15	DG 15	15	57	58	323	324
16	DG 16	DG 16	DG 16	16	59	60	327	328

Figure 5-23 Destinations Configuration Page

- **Number** - The left-most column labeled **NUMBER** allows you to assign a number to each entry in the spreadsheet. The number you enter in this column determines the display order if you sort the list entries by number and also determines the entry display order when scrolling through lists on remote control panels.

  Flexible number assignment provides a simple method by which you can control display grouping by signal name or type, or add destination entries to existing display groupings and maintain continuity to the grouping by signal type or name sequence.

- You may assign a number to a row entry with the caveats that each entry must be numeric, greater than zero and it must be unique among others of its type. Gaps in numbering sequence are allowed.

- **Name, Panel Name and Long Name** - The next three columns allow you to assign identifying names and/or acronyms to each destination according to the following formats:

  - **Name** – Any combination of alphanumeric characters may be used to identify the destination.

  - **Panel Name** - Any combination of up to 8 alphanumeric characters may be used to identify the destination. The entry made in this column is the text string displayed in the switching level columns on the Matrix Status display page.

  - **Long Name** – This column is a free text space where you may enter a name up to 32 characters in length for the destination. This name is only displayed on this configuration page and may be used to more clearly identify an external device or system.

- **Switching Levels** - To the right side of the three name columns, there are columns corresponding to each system switching level. The numeric entry in the columns on each row designates the physical output from the component selected for the destination group on each switching level.

  For example, look at entry number 2 in Figure 5-23 labeled DG 2. Notice that the numeric entry for DG 2 in the VIDEO column is a 2. This entry tells the system controller that the output signal from the router specified by the destination group identified as DG 2 on the switching level named VIDEO is present at physical output number 2 on the video router hardware component configured to the VIDEO switching level.

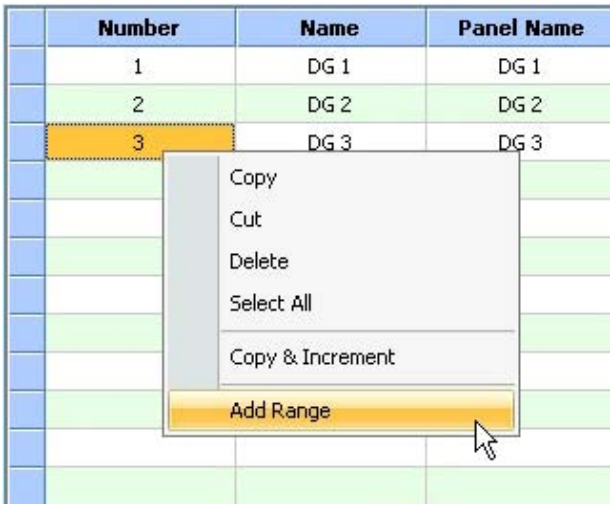
  Numeric entries for destination group DG 2 in the columns corresponding to switching level AUD CH 1 and AUD CH 2, for example, are 261 and 262, respectively. In this case, the numeric entries indicate that the router output signal specified by destination group DG 2 on the switching level named AUD CH 1 is the signal present at physical output number 261 from the router hardware component configured on the AUD CH1 switching level, and the output signal specified for switching level AUD CH 2 is physically present at output 262 of the hardware component configured to AUD CH2.

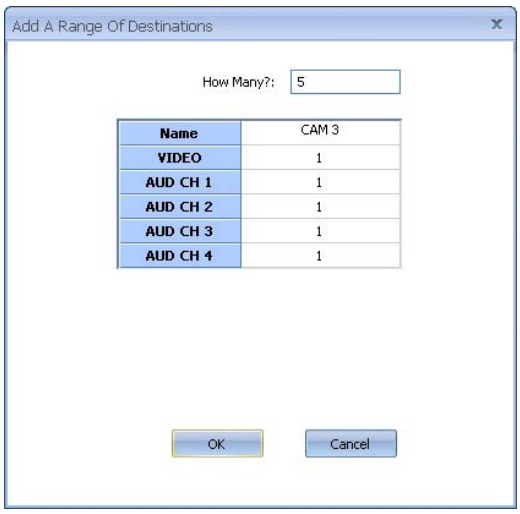
  When you select destination group DG 2 as the output for a selected source group, the physical inputs for all switching levels associated with the source group are switched simultaneously to the physical outputs for all switching levels associated with the destination group.

  Only one destination entry per switching level is allowed. If the switching level controls more than one component, the numerical entry designates the physical output that will be switched by all hardware components controlled by the level. Numerical destination entries may be shared between different destination groups.

An entry of 0 (zero) in any switching level cell indicates no switch occurs on a physical output from the hardware component(s) under control of the switching level when the indicated destination group is switched. By default a shaded zero (0) is present in every cell of each switching level column before a numerical value is entered. Any switching level may be undefined for a destination group entry by leaving the shaded zero in the cell, or by entering a zero to overwrite an existing numerical entry.

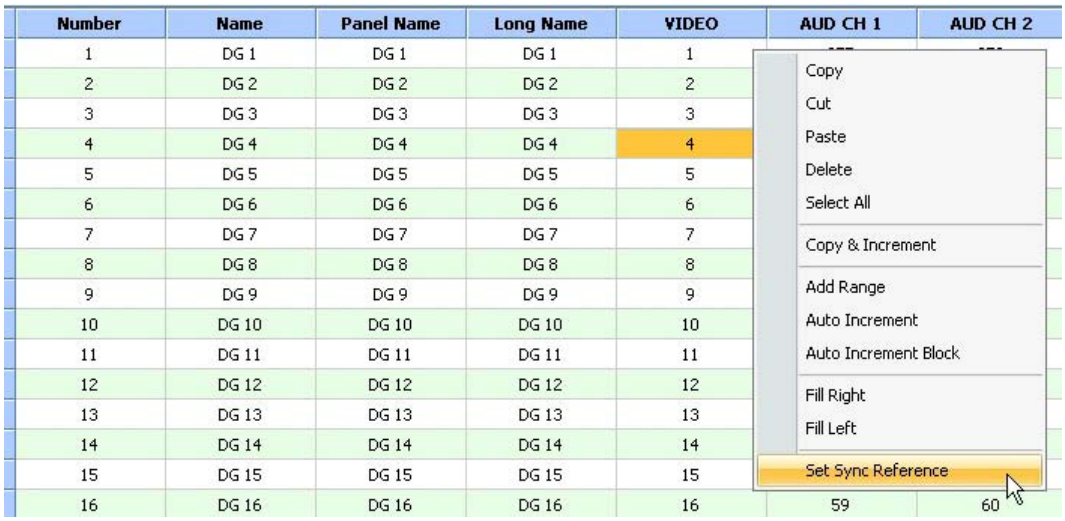
- **Navigating the Destinations Spreadsheet -** From the configuration page, you may view all assigned destination groups, add a single destination group or a range of destinations to the configuration, delete a destination or modify parameters of an existing destination group.
  - **Add Destination** – If you wish to add a single destination entry, use the scroll bar and move the display to the empty row beneath the last destination entry in the spreadsheet. Click the cursor in the Number cell on the empty row and enter the sort order number you wish to assign to the destination entry. Click in the Name cell and begin typing the name of the destination group you wish to add. Press Enter to add the destination, and the name you entered is copied in all three of the name entry cells. If you wish to change any of the name entries, such as panel name or long name, click the cursor in the cell you wish to modify and enter the changes, followed by Enter. After the new destination name is entered, you may click the cursor in a switching level cell and enter the physical router output you wish to assign as the destination for that level. You may continue adding single destinations in this manner up to the maximum number allowable for the controller.
  - **Delete Destination –** If you wish to remove a destination group entry from the configuration spreadsheet, move the cursor to the number column of the destination row you wish to delete and right-click. Select Delete from the right-click menu. You will be prompted to verify the action before the destination is removed.
  - **Spreadsheet Right Mouse Click Functions** - When you right-click on any cell in the Destination Configuration Spreadsheet, a pop-up menu appears providing command options for the cell, as shown here. Command items appearing in the pop-up menu vary depending on which commands are pertinent for data entered in the selected cell. Paragraph 5.13 discusses the function of common commands available from the pop-up menu. Remember that all commands listed and discussed below may not appear in the pop-up menu for a specific cell.





- **Add Range** – Adds a range of destinations using a category index type of naming scheme, as shown here. You define the base name, such as "CAM," the starting index - such as 3 and the number of sources to create – such as 5. This example would create sources "CAM 3:" to "CAM 7."
- **Set Sync Reference –** Most PESA routers accept up to two sources of external Sync Reference signals for synchronizing switching times and destination output signals. PERC3000 allows you to assign either of the sync signals to any single destination or multiple destinations simultaneously.

Destinations are mapped to sync signals using the **Set Sync Reference** command from the right-click command box, as shown below.



Click the cursor in a single cell corresponding to the destination and level, or to selected multiple destination cells you wish to map to a sync reference. Right-click and select the "Set Sync Reference" option from the menu. A pop-up box, as shown here, identifies the level and current destination you are configuring at the top. In the middle of the window you assign a sync source to the destination using the pull-down menu boxes.

Three radio buttons allow you to assign the sync source to only the Current Destination, All Destinations or Selected Destinations. Choose the Selected Destinations option when multiple cells have been highlighted.

In the example shown, by selecting "Set Sync Reference" in the spreadsheet cell for DG4 on the Video level, the pop-up box appears and shows DG 4 on the VIDEO level as the current destination. By selecting SYNC1 from the pull-down we have assigned the physical output named DG 4 on the VIDEO level to synchronize to the reference input named SYNC1 for the current destination only. Sync sources must be configured on the System Parameters page before they will appear in this pull-down listing.

5.14.6 SOURCE-DESTINATION (DEST) BLOCKS CONFIGURATION PAGE

When the Source-Dest Blocks menu entry is selected, the configuration page, as shown by Figure 5-24, is displayed. From this page you can selectively block any source group from being switched to a designated destination group. The box labeled *Blocks* on the left side of the display window contains a listing of destinations with at least one source block assignment, and the box labeled *Information* on the right side contains the data entry cells used to create new or modify existing source block assignments. Note the Information block has three areas:

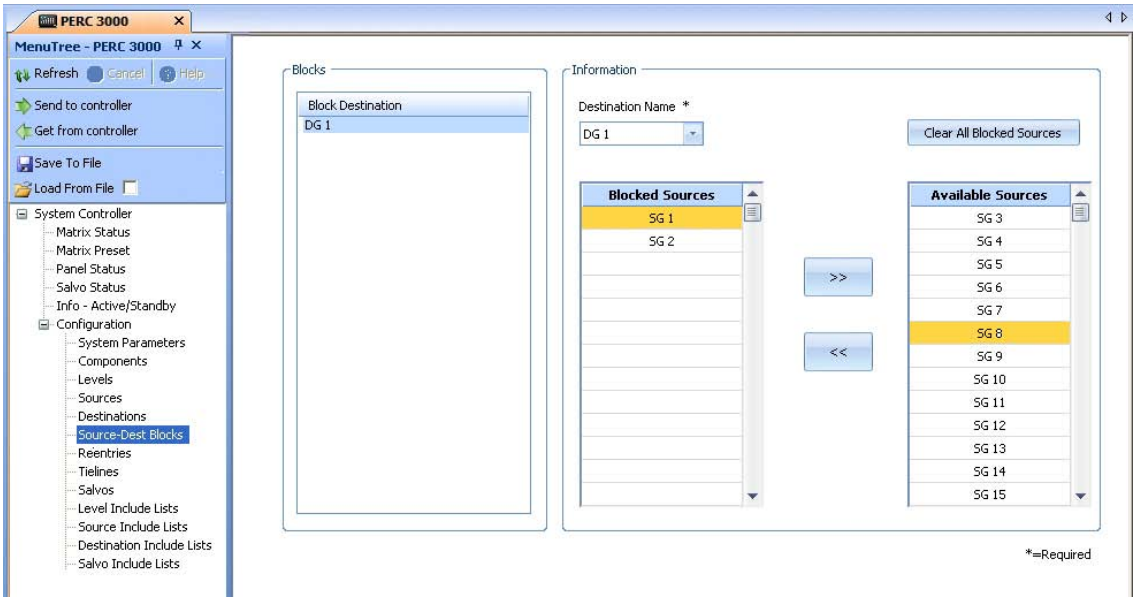
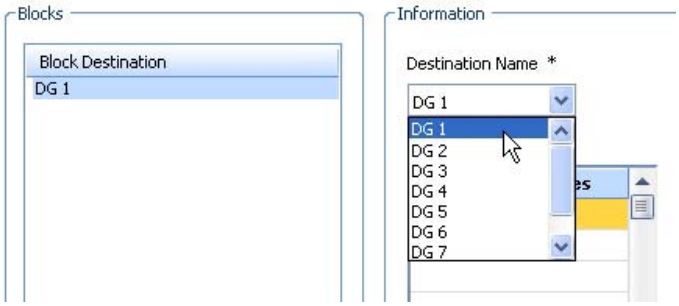


Figure 5-24 Source-Destination Block Configuration Page

- **Destination Name** – This is a pull-down listing of all destinations in the configuration, identified by Name, as shown in this illustration. To select a destination to which you wish to apply a source block, open the listing with the arrow icon, and select the destination name from the list.



- **Blocked Sources** – Sources you wish to block from access by the named destination are listed in this column.
- **Available Sources** – This column contains a listing of all the sources which may be switched to the named destination.

  In order to assign a source block to a specific destination, locate the desired destination in the Destination Name pull down list and highlight the name.

  Initially, all sources are listed in the Available Sources list box. Listed sources are moved between the two list boxes using the two arrows between the boxes. In order to move a source from Available to Blocked, highlight the source you want to block from access by the destination and click the arrow pointing from the Available list to the Blocked list. You may list any number of sources you wish to block. In order to unblock a source, highlight and move the source name from the Blocked list to the available list using the arrow pointing to the Available list.

  The Block Destination field contains a listing of all destinations, by Name, with at least one blocked source. If you wish to access source block configuration for a specific destination, click on the Destination name in the listing. From the configuration page you may move sources from Blocked to Available using the arrow keys, or you may clear all source blocks for the destination by clicking the Clear All Blocked Sources key. If all source blocks are removed, the destination name is removed from the Block Destination listing.

5.14.7 REENTRY FUNCTION DEFINED

A Reentry is a virtual switching function that allows dynamic routing of a single source to multiple destinations with a single switch.

An example use of the reentry function would be to simultaneously connect multiple displays or other devices to the same source such as in a deployment of monitors across multiple areas which need to display the same source material. All monitors in the display group could derive their video input signal from switcher destinations which have a reentry selected as their source. Anytime the user changes the source connected to the selected reentry destination, all monitors with that reentry as their source immediately display the new source selected on the reentry destination.

Reentry emulates an actual physical connection from a physical output of a switching level to a physical input of that same switching level as depicted in Figure 5-25. Virtual implementation of the reentry function eliminates the need for an actual physical input and output of the switching matrix for each reentry connection required.

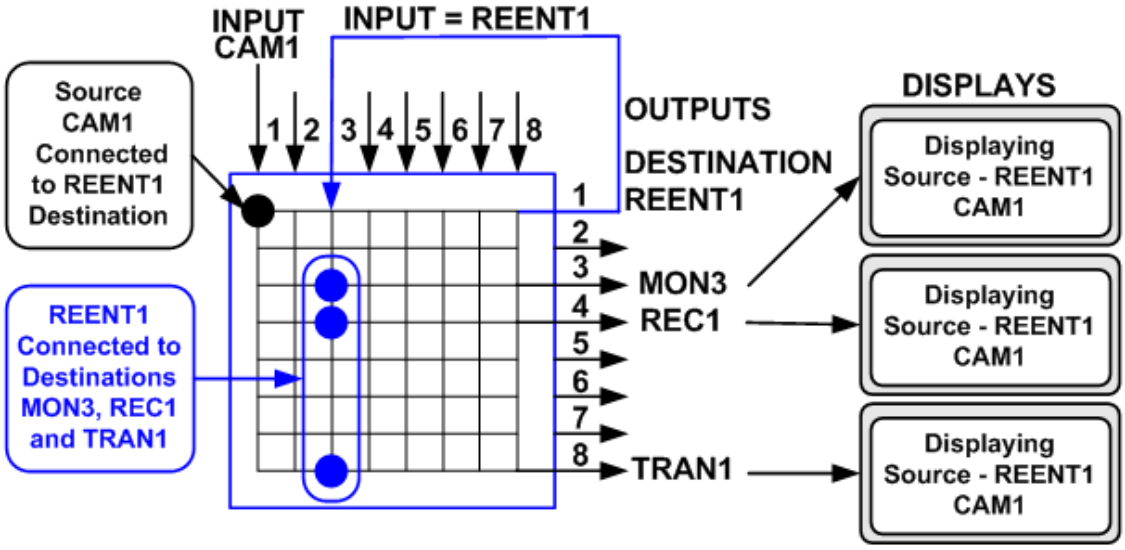


Figure 5-25 Crosspoint Connections for a Reentry Function

As shown by the illustration below, a Reentry is a virtual connection path that is both a virtual source (emulates an actual physical source) and a virtual destination (emulates an actual physical destination). In this example, the name REENT1 is assigned to the virtual reentry path.

Figure 5-26 illustrates an example reentry path with the configuration name of REENT1. For this example, we illustrate a switching matrix with 8 physical inputs and 8 physical outputs. We have defined source names for all 8 inputs (with source ID numbers assigned for system tracking) and destination names for all 8 outputs (with destination ID numbers assigned for system tracking).

This configuration allows us to define the name REENT1 with a source ID of 9 or higher and a destination ID of 9 or higher without creating any conflict with physical source and destination name ID numbers. A reentry source ID number can be any number which is ***not*** used for an existing source ID number defined for actual physical matrix inputs. Similarly, a reentry destination ID number can be any number which is not used for an existing destination ID number defined for actual physical matrix outputs. For our example, we have used REENT1 as the name for the reentry path, but we could identify the reentry path by any name which meets the definition for a valid name in the system.

Once REENT1 is defined in the configuration as a name with a Source Number ID of 9 and a Destination Number ID of 9, we can use the name REENT1 to define how the system will operate when REENT1 is used in normal system operation. REENT1 can be selected as a source, just as any other source, by any destination that is not a reentry path destination. In the example, we see that destination MON1 is switched to virtual source REENT1 as its source. However, the physical source which actually gets connected to destination MON1 is whatever source is currently selected for the REENT1 destination - in this example, physical source TAPE3.

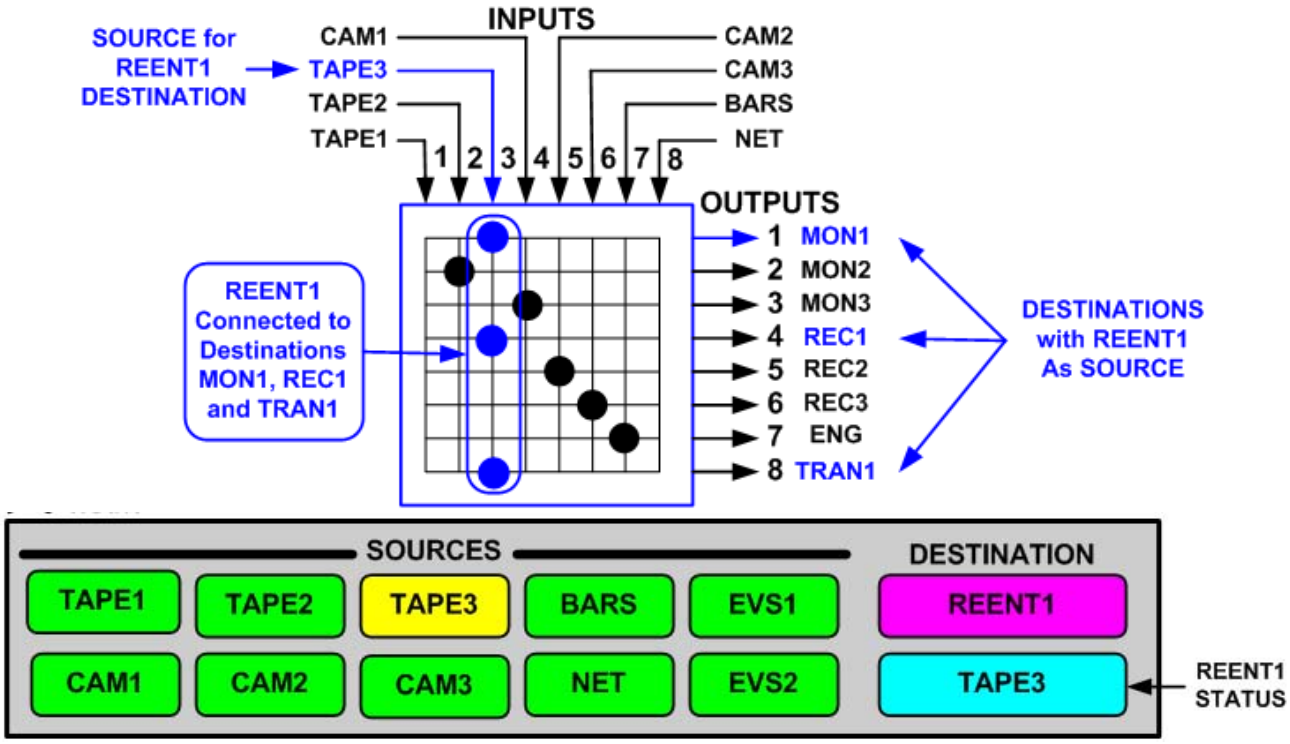


Figure 5-26 Crosspoint Connections for REENT1 Example and Panel Status

In Figure 5-26, we see that destinations REC1 and TRAN1 also select virtual source REENT1 as their source. Whatever physical source is currently selected for the REENT1 destination is also connected to destinations REC1 and TRAN1.

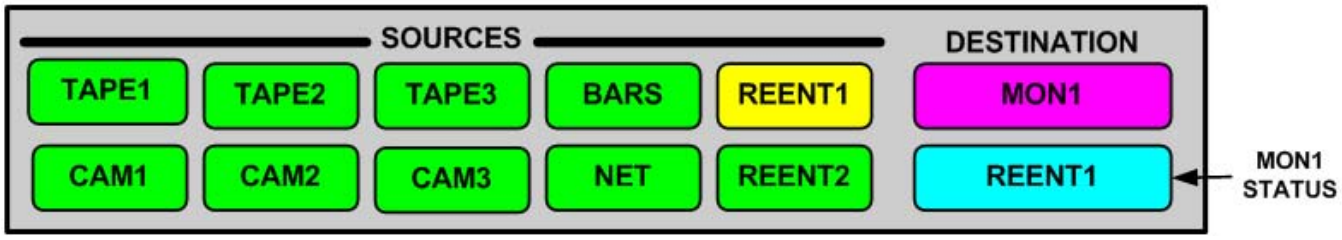
As part of this example, let's say a pushbutton panel has REENT1 assigned as the panel's destination as depicted by the panel illustration in Figure 5-26. All of the pushbuttons on the panel represent standard (non-reentry) sources. When a user presses a source pushbutton on the panel, the selected source will be connected to all three destinations; MON1, REC1 and TRAN1.

Every time a different source is selected on the pushbutton panel, all three destinations, MON1, REC1 and TRAN1, will track and have that source connected to their respective destinations automatically by the software. In fact, all destinations in the system which have REENT1 selected as a source will be connected to the source selected on the pushbutton panel with REENT1 as the destination.

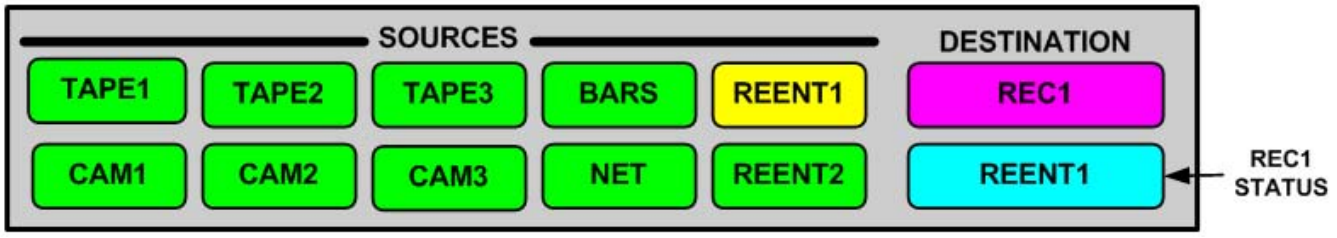
Figure 5-26 illustrates crosspoint connections and panel status for the REENT1 example. Output 1 - MON1, is connected to Input 3 - TAPE3; Output 4 - REC1, is connected to Input 3 - TAPE3; and Output 8 - TRAN1, is connected to Input 3 - TAPE3, based on each of those outputs having the virtual input, REENT1 selected as their source name. Other crosspoint connections for outputs 2,3,5,6 and 7 are also depicted in the figure, but those outputs are not affected by the reentry function.

As long as destinations MON1, REC1 and TRAN1 have REENT1 selected as their source, each time a different source pushbutton is selected on a panel with virtual destination REENT1 as its selected destination, the physical destinations, MON1, REC1 and TRAN1 will switch to the new physical source selected on the REENT1 destination panel. This allows multiple displays to be changed simultaneously using a single switch selection. By using a number of different virtual reentry path definitions, multiple groups of displays can be changed quickly and efficiently, but often more importantly, ***always assure the group of displays are all showing the same content.***

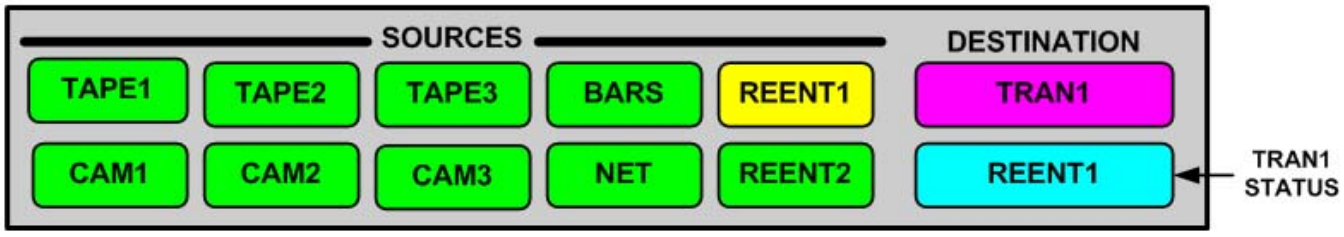
The following illustrations depict remote control panel status display for the example destinations deriving their source from reentry functions REENT1.



This panel illustration depicts destination MON1 with REENT1 as the source.



This panel illustration depicts destination REC1 with REENT1 as the source.



This panel illustration depicts destination TRAN1 with REENT1 as the source.

5.14.8 REENTRIES CONFIGURATION PAGE

A Reentry is a switching function that allows routing a single source to multiple destinations with a single switch. Refer to Paragraph 5.14.7. While similar in operation to a salvo function, the major difference is that a salvo must be setup as part of a configuration file. After a Reentry function is assigned it can be selected as needed just as any other source or destination from system remote control panels. The maximum number of reentries is 256.

Reentry functions are assigned using the Reentry Configuration page, Figure 5-27. The box labeled *Reentries* on the left side of the display window contains a listing of reentry paths, by Engineering Name, that have been created, and the box labeled *Information* on the right side contains the data entry cells used to create new or modify existing Reentry functions.

Source and destination ID numbers assigned to reentries are simply ID numbers for the software to use for internal tracking purposes. Standard source names and destination names also have source ID and destination ID numbers, respectively. A reentry source ID number can be any number which is ***not*** used for an existing source ID number defined for actual physical matrix inputs. Similarly, a reentry destination ID number can be any number which is ***not*** used for an existing destination ID number defined for actual physical matrix outputs. The maximum number of virtual reentry paths allowed by the PERC3000 is 256.

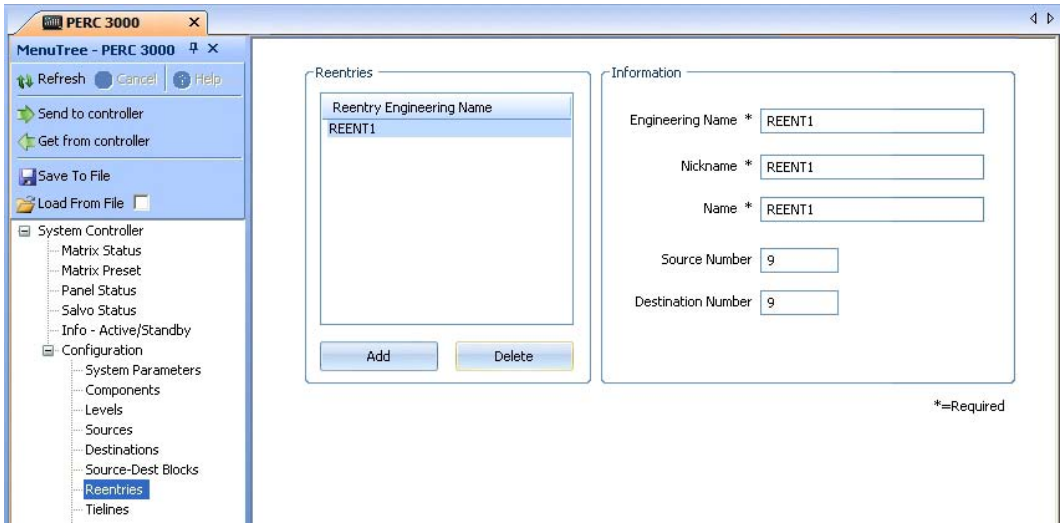


Figure 5-27 Reentry Configuration Page

- **Adding or Deleting a Reentry**
  - **Add Reentry** – To add a reentry path, click the *Add* button at the bottom of the Reentries box. A place-holder name is added and a setup pane with the name entry fields pre-filled is displayed in the Information box. The next sequentially available Source Number and Destination Number are automatically entered for you. You may change the name field entries to the descriptive name you would like to use for the reentry.
  - **Delete Reentry** – To delete a reentry path, locate the nickname of the reentry you wish to delete in the Reentries box and click on the name to select it. Click *Delete* at the bottom of the box.
- **Engineering Name, Nickname and Name**

These fields allow an identifying name to be assigned to the reentry path. In operation, this is the name used to signify both the source and destination when using a reentry path. Each of the name fields is discussed below:

- **Engineering Name –** Any combination of up to 8 alphanumeric characters may be used to assign the Engineering Name to the reentry.
- **Nickname -** Any combination of up to 8 alphanumeric characters may be used to assign the Nickname to the reentry.

- **Name –** This field is a free text space where you may enter a name up to 32 characters in length for the reentry path. This name is only displayed on this configuration page and may be used to more clearly comment the reentry function.

- **Defining a Reentry**

Remember that a reentry is a *virtual* signal path used as both a source and destination, with no physical input or output to or from the router. In order to configure a reentry it is necessary to enter a Source Number and Destination Number as follows:

- **Source Number** – The next sequentially available source number is automatically entered for the reentry. If you wish to assign the reentry function a different source number, click the cursor in the Source Number field and enter the Source Identification Number you wish to assign to the reentry function. This may be any number **NOT** used to identify an actual physical source. Using the numbers of our example reentry function from Paragraph 5.14.7, Source Number 9 would automatically be entered for the newly created reentry path named **REENT1**. In that example, 8 is the last source number assigned to a physical source. Therefore 9 is a valid and convenient number to assign to the reentry source.
- **Destination Number** – The next sequentially available destination number is automatically entered for the reentry. If you wish to assign the reentry function a different destination number, click the cursor in the Destination Number field and enter the Destination Identification Number you wish to assign to the reentry function. This may be any number **NOT** used to identify an actual physical destination. Using the numbers of our example reentry function from Paragraph 5.14.7, Destination Number 9 would automatically be entered for the newly created reentry path named **REENT1**. In that example, 8 is the last number assigned to a physical destination. Therefore 9 is a valid and convenient number to assign to the reentry destination.

5.14.9 TIELINE FUNCTION DEFINED

A Tieline is a special purpose routing function that dedicates a physical destination output and a physical source input on different switching levels as a direct connected path through an external, hardwired, physical connection.

A typical use for a tieline might be a switching application where an analog video source needs to be available as an analog output, and also converted by external equipment to a digital signal and be available from a digital video level in addition to the analog output.

In order to implement such an arrangement we would need to have a dedicated output from the switching level for analog signals (the source level), and a dedicated input to the switching level for digital signals (the destination level). Video conversion equipment is physically inserted between a router output connector from the analog switching level, and a router input connector for the digital video switching level.

Figure 5-28 illustrates this example with an external, hardwire tieline used to route an analog video signal from a camera source, CAM1, through an analog matrix (Level-1). The analog signal is connected to a digital video matrix (Level-2) through an external analog-to-digital converter, and then to a digital SDI transmission output, TRAN1. In the example of Figure 5-28, we have defined a tieline named NTSCSDI1, with physical output number 2 from switching Level 1 – Analog Video as the source for the physical tieline and physical input number 3 on switching Level 2 - Digital SDI Video, as the destination for NTSCSDI1.

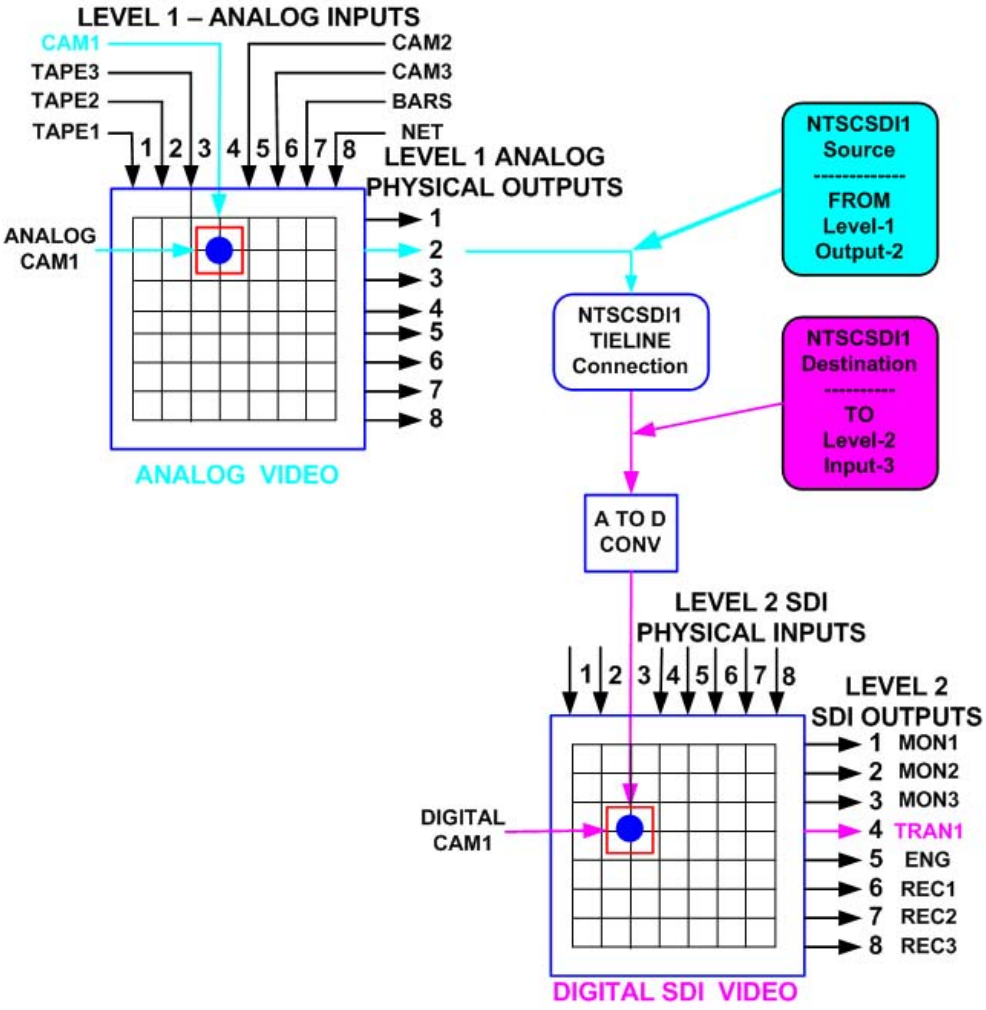


Figure 5-28 Tieline Example – NTSCSDI1

When we select an analog source from switching level Analog Video, that has been defined as a Tieline Source for switching level Digital SDI Video, as the desired output to one or more of the SDI destinations, the controller transparently switches the analog source to the dedicated tieline output from level Analog Video, through the conversion equipment and applies the converted digital signal to the dedicated tieline input of level Digital SDI Video, where that input is routed through switching level SDI to the selected destination output. This actual hardwired connection through the A/D conversion equipment between the two switching levels is the physical portion of a tieline.

Once a tieline routing function has been configured as described in the example shown in Figure 5-28, it may then be used by a destination on level 2 to connect to a source on level 1. Other destinations on level 2 can also connect to the same source on the same tieline. If a different destination on level 2 wants to connect to a different tieline source on level 1, another physical tieline must be defined in the system and available to make the interconnection. Tielines can also be used between switching matrices defined as different levels located in different physical locations.

There are two different and distinct system configuration processes which must be completed in order to utilize a tieline in normal operation.

The first of these is configuration within the router control system of the individual, physical tielines. This is where the user defines which dedicated output connector on the source switching level is connected to a physical, hardwire tieline, and which dedicated input connector on the destination switching level is connected to the signal output end of the hardwire tieline. Note that the router control system only allows configuration of a tieline to connect a physical output of one switching matrix level to a physical input on a different switching matrix level. Configuration of individual tielines, is described in Paragraph 5.14.10, *Tieline Configuration Page*.

The second mandatory process is to define and configure individual signal sources on the source switching level as Tieline Sources. Using Figure 5-28 as an example, in order for a destination on the SDI switching level 2 to select a source signal from the Analog switching level 1, a source group must be created, through the Sources Configuration page, identifying a source physically connected to level 1 as a tieline source that is available for routing to a destination on switching level 2. The tieline source definition also tells the controller that when this source is selected by a destination on level 2 the input signal must be routed through a physical tieline. Tieline Source Definition is described by Paragraph 5.14.12, *Tieline Source Configuration Page*.

5.14.10 TIELINE CONFIGURATION PAGE

Before a tieline routing function can be used, at least one physical tieline must be defined in the system controller configuration between the switching levels you wish to link. This is accomplished through the Tieline Configuration page. An example page is shown by Figure 5-29. Creating a tieline through this page assigns an identifying name to a tieline routing function and identifies the physical input and output connections on the switching levels associated with that function name to the system controller. You must install an external hardwire cable to the assigned router connectors between the switching levels in order for the tieline to move signal between the levels.

The box labeled *Tielines* on the left side of the display window contains a list, by Engineering Name, of existing tielines that have been created in the configuration, and the box labeled *Information* on the right side contains the data entry cells used to create new or modify existing tieline functions.

- **Adding or Deleting a Tieline**
  - **Add Tieline** – To add a tieline path, click the *Add* button at the bottom of the Tielines box to open a blank setup pane in the Information box.
  - **Delete Tieline** – To delete a tieline path, locate the nickname of the tieline you wish to delete in the Tielines box and click on the name to select it. Click *Delete* at the bottom of the box.

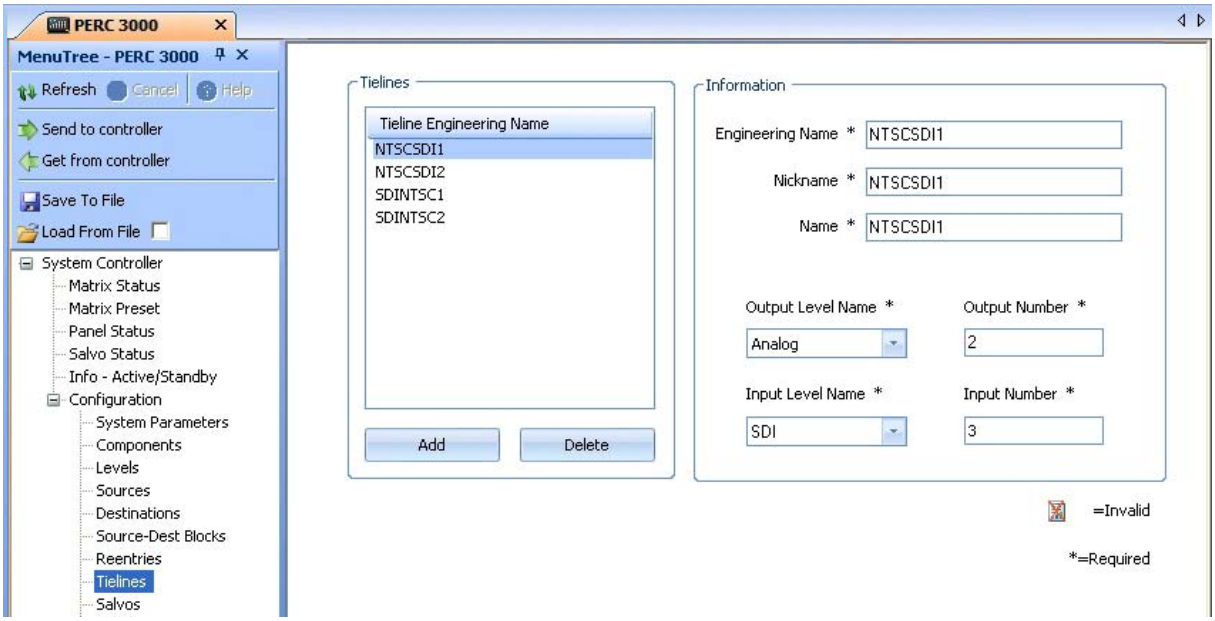


Figure 5-29 Tieline Configuration Page

- **Engineering Name, Nickname and Name**

In the case of the tieline, PESA recommends that you choose a name that is descriptive of the function of the tieline. The name you assign is not used on other status pages and is not used or seen by an operator. In the example page shown by Figure 5-29 notice that there are four tielines configured for this system. NTSCSDI1 is chosen to signify the first of two tieline connections dedicated between an output (destination) of analog video from a switching level named Video and an input (source) of digital SDI compliant video to a switching level named SDI. In similar manner, the name SDINTSC2 signifies the second of two tieline connections dedicated between an output (destination) from level SDI and an input (source) to level Video. Each of the name fields is discussed below:

- **Engineering Name –** Any combination of up to 8 alphanumeric characters may be used to assign the Engineering Name to the tieline.
- **Nickname -** Any combination of up to 8 alphanumeric characters may be used to assign the Nickname to the tieline.
- **Name –** This field is a free text space where you may enter a name up to 32 characters in length for the source. This name is only displayed on this configuration page and may be used to more clearly comment the tieline function.

- **Defining a Tieline**

Remember that a tieline is a hard-wired external connection between a dedicated output (destination) connector associated to a particular switching level and a dedicated input (source) connector to another level. It is important to clearly understand that a tieline is a *physical* connection made external to the router using cable attached to physical connectors on the rear panel of the router. In order to configure a tieline it is necessary to program the destination and source as follows:

- **Output Level Name** – This entry field opens a pull-down menu containing all the switching levels defined in the configuration. Highlight the switching level from which you wish to derive the signal routed to the tieline.
- **Output Number** – Enter the number of the physical output connection from the switching level entered above from which you wish to derive the signal routed to the tieline.
- **Input Level Name** – This entry field opens a pull-down menu containing all the switching levels defined in the configuration. Highlight the switching level you wish to receive the signal from the tieline.
- **Input Number** – Enter the number of the physical input connection of the switching level entered above you wish to receive the signal from the tieline.

Tielines will not be available for use until the system controller configuration file has been updated with the tieline parameters.

- **Tieline Allocation / De-allocation**

Tielines which have been defined and configured in the *Adding a Tieline section* above are allocated by the system controller for use by tieline sources on a first come, first served, basis. For example, the first destination on the Level 2, SDI video matrix to select a tieline source from the Level 1, analog video matrix will cause the system to allocate the first available physical tieline for that requested connection. If a second destination on the Level 2 SDI video matrix selects a tieline source from the Level 1 analog video matrix, a second Tieline from the Tieline definition table will be allocated, assuming a second physical tieline is defined and not currently in use by another destination.

If a destination on the Level 2 SDI video matrix subsequently switches from a tieline source and selects a source found locally on the Level 2, SDI video matrix, AND no other destination on the Level 2, SDI video matrix is using the same tieline path, the physical tieline that was allocated by the controller to complete the routing path will be de-allocated and made available for use by other destinations on the Level 2, SDI video matrix.

The system automatically makes both crosspoint switches necessary to connect the source from the Level 1 analog video matrix to the destination Level 2 SDI video matrix using an available Tieline.

5.14.11 TIELINE SOURCE DEFINITION

Before any source signal can be accessed by a destination on another switching level through a tieline, the source must be defined as a *tieline source* through a configuration command available on the Sources Configuration page.

A brief description of the Sources Configuration page is included here for reference. For a full description of source configuration, refer to Paragraph 5.14.4.

Using Figure 5-28 as an example, in order for a destination on the SDI switching level 2 to select a source from the Analog switching level 1, a source group must be created, through the Sources Configuration page, that identifies the source physically connected to level 1 as a tieline source that is available for routing to a destination on switching level 2. The tieline source definition also tells the controller that when this source is selected by a destination on level 2 the input signal must be routed through a physical tieline. Tieline Source Definition is described by Paragraph 5.14.10, *Tieline Configuration Page*.

The Sources Configuration page in Cattrax allows you to define source groups in the router configuration. An example source configuration pane is shown by Figure 5-30. Note the data entry grid is in the form of a database spreadsheet with data entries for each source group made on individual rows from left to right. Each source group is assigned a name, and the physical inputs to the router system you wish to associate with the source group are assigned by switching level. In router terminology, this page maps each physical source (input) to the router to its logical input by switching level and source group nomenclature. Individual physical inputs to router system hardware components may be assigned to multiple source groups. PERC3000 allows up to 4800 source names. Each column of the configuration grid is briefly introduced below:

- **Number** allows you to assign a number to each entry in the spreadsheet. The number you enter in this column determines the display order if you sort the list entries by number and also determines the entry display order when scrolling through lists on remote control panels.
- **Name,** allows you to assign an identifying name and/or acronyms to each source.
- **Switching Levels -** To the right side of the name columns, there are columns corresponding to each system switching level. The numeric entry in the columns on each row designates the physical input to the component (or components) selected for the source group on each switching level.

For this example we have illustrated a source configuration page for the source groups that would be created for the matrix in Figure 5-28.

Look at entry number 2 in Figure 5-30 labeled INPUT 2. Notice the numeric entry for INPUT 2 in the SDI column is a 2. This entry tells the system controller that the video signal switched by the source group identified as INPUT 2 on the switching level named SDI is present at physical input number 2 on the video router hardware component configured for the SDI switching level. Similarly, the numbers under each of the other Level names define the physical inputs on each of those levels that would be switched when the user selects INPUT 2 as the source group. For this example, the zeros in all the other level columns on the INPUT 2 row indicate that switching level SDI is the only level with an associated physical input signal in the INPUT 2 source group.

Source Configuration

Number	Name	Panel Name	Long Name	SDI	Audio L	Audio R	Analog
1	INPUT 1	INPUT 1	INPUT 1	1	0	0	0
2	INPUT 2	INPUT 2	INPUT 2	2	0	0	0
3	DigCam1	DigCam1	DigCam1	4 On Analog	0	0	0
4	INPUT 4	INPUT 4	INPUT 4	4	0	0	0
5	INPUT 5	INPUT 5	INPUT 5	5	0	0	0
6	INPUT 6	INPUT 6	INPUT 6	6	0	0	0
7	INPUT 7	INPUT 7	INPUT 7	7	0	0	0
8	INPUT 8	INPUT 8	INPUT 8	8	0	0	0
9	TAPE1	TAPE1	TAPE1	0	0	0	1
10	TAPE2	TAPE2	TAPE2	0	0	0	2
11	TAPE3	TAPE3	TAPE3	0	0	0	3
12	CAM1	CAM1	CAM1	0	0	0	4
13	CAM2	CAM2	CAM2	0	0	0	5
14	CAM3	CAM3	CAM3	0	0	0	6
15	BARS	BARS	BARS	0	0	0	7
16	NET	NET	NET	0	0	0	8

Figure 5-30 Source Configuration Page

Now look at entry number 12 in Figure 5-30 labeled CAM 1. Notice the numeric entry for CAM 1 in the Analog column is a 4. This entry tells the system controller that the analog video signal switched by the source group identified as CAM 1 on the switching level named Analog is present at physical input number 4 on the video router hardware component configured for the Analog switching level. Zeros in the remaining columns on the CAM 1 row indicate that switching level Analog is the only level with an associated physical input signal in the CAM 1 source group.

As shown in Figure 5-28, our goal is to seamlessly make the signal from analog source CAM 1, using external conversion equipment, available as a digital source signal on the SDI level. In order to access the source on the SDI level, we must create a source group for the SDI level that somehow identifies the digital signal and tells the system controller which physical input to the analog component we wish to use as the source. We do this through the Tieline Source Configuration pane.

Look at entry number 3 in Figure 5-30 labeled DigCam 1. DigCam 1 is the name of the *tieline source* we have chosen to use for the source group that on the SDI switching level selects the converted analog signal from CAM 1 on the Analog switching level. Notice the unusual entry, *4 on Analog*, in the data entry cell for DigCam 1 on the SDI level. This entry indicates that the video signal switched by the source group identified as DigCam 1 on the SDI switching level is present at physical input number 4 on the switching component for the Analog level and routed through an external physical tieline to the switching matrix component for the SDI level. The procedure for defining a tieline source is presented in Paragraph 5.14.12.

5.14.12 TIELINE SOURCE CONFIGURATION PANE

Sources are linked to tielines through the Sources Configuration page, using the Set Tieline Source command from the right-click command box. Right click the cursor on the Source Configuration page in the cell corresponding to the source group and level to which you wish to assign a tieline source. Looking at Figure 5-30, in order to assign a tieline source we would right click in the cell on the row for DigCam 1 in the SDI switching level column and select the **Set Tieline Source** option from the pop-up pane, rather than entering the number of a physical input to the switching level matrix.

The **Set Tieline Source** option only appears in the pop-up menu listing for a data entry cell if at least one physical tieline is defined between the switching levels you wish to link through Tieline Configuration. In other words, had we not previously configured tieline NTSCSDI1 in accordance with Paragraph 5.14.10 and illustrated by Figure 5-29, defining physical input 3 of switching level SDI as the input for NTSCSDI1, the Set Tieline Source option would not be shown in the right click menu for the data entry cell.

When you select the Set Tieline Source option, a graphic illustration, as shown by Figure 5-31, displays the level you are assigning on the right side. On the left side of the graphic you define the source and level that you wish to tie to the source group on the level you are configuring using the pull-down menu boxes. In the example shown, by selecting “Set Tieline Source” in the spreadsheet cell for source group DigCam1 on the SDI level, the graphic below appears and allows you to define the physical input number and switching level for the tieline source on the left side of the image.

For this example, by selecting 4 as the physical *Input #* and *Analog* as the Level from the pull-downs we have created a link to route the source at physical input 4 on the Analog level through an external tieline to a defined physical tieline input on the SDI level, which the controller accesses when DigCam1 is selected as the source for any destination on the SDI level. The cell text entry "*4 On Analog*" is automatically written in the cell for DigCam1 on the SDI level, as shown in Figure 5-30.

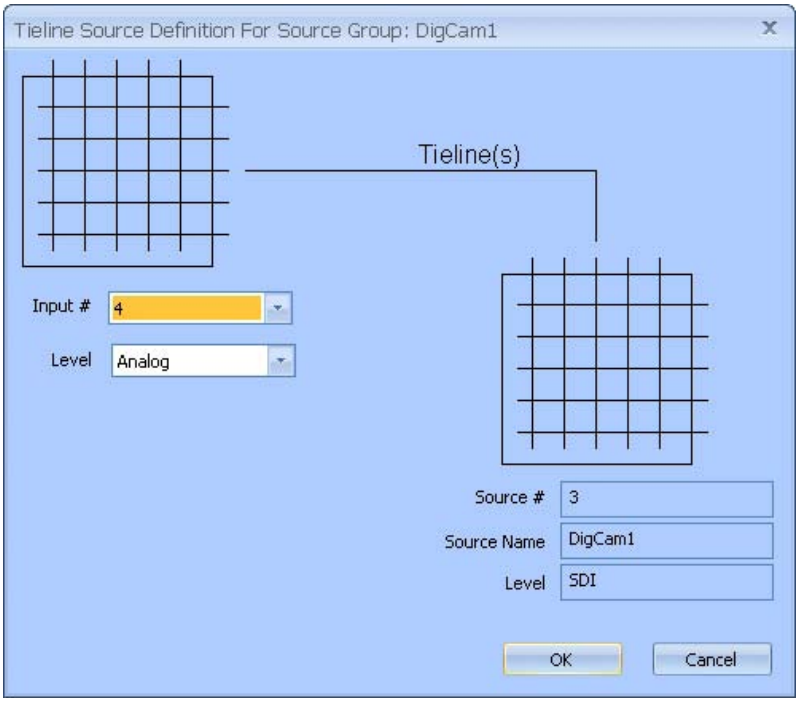


Figure 5-31 Tieline Source Configuration Pane

The Set Tieline Source does not define which physical tieline is used to complete the routing path, only that a Tieline definition must be present before the actual physical connection can be made. The system controller will assign, based on availability, which actual physical Tieline will be used to make a connection when any destination selects a source group which includes a Tieline Source defined on any level. The Tieline Source definition simply instructs the system controller that a source is not local to a particular level and must be connected from the alternate level assigned using the assigned physical input number on that alternate selected level as depicted in Figure 5-30.

5.14.13 TIELINE OPERATION SUMMARY

In summary, let's look at the entire sequence that occurs when a tieline source is selected for routing to a destination.

The system controller receives a command from a control panel to route source DigCam1 to a destination we will call AnaSDI1 on the SDI level.

The controller recognizes that DigCam1 is a tieline source on the SDI level and that the actual source for DigCam1 is physical input #4 on the Analog switching level router component.

The controller checks and verifies that at least one tieline is configured that defines a link between a physical output from the Analog level and a physical input to the SDI level. In this example, we know that tieline NTSCSDI1 is defined for that link.

The controller checks to see that at least one of the tie lines linking the two levels is open and available for use. It is possible that there are other tieline sources on the SDI level, that also derive their input from the analog level, already using the available tieline resources. For this example, we will assume that tieline NTSCSDI1 is available.

The controller completes a switch on switching level Analog from physical input #4 to physical output #2 (defined output from level Analog for tieline NTSCSDI1, see Figure 5-29).

It simultaneously completes another switch on switching level SDI from physical input #3 (defined input to level SDI for tieline NTSCSDI1, see Figure 5-29) to the physical output on the SDI level for destination group AnaSDI1. The external, hardware tieline physically connecting output #2 on the analog component to input #3 on the SDI component contains the A/D video conversion equipment.

As long as source DigCam on SDI is selected for any destination on SDI, tieline NTSCSDI1 is in use and not available for use by other tieline sources. If any panel attempts to make a switch using a tieline source, and all defined tielines between the switching levels are in use, the switch request is ignored and no change is made to the currently selected source for the destination.

5.14.14 SALVOS CONFIGURATION PAGE

When the **Salvos** menu entry is selected, the Salvo Configuration page, Figure 5-32, is displayed. From this page you can create and define salvo groups for the router configuration. The box labeled *Salvos* on the left side of the display window contains a listing of all the defined salvo groups in the router configuration, by name, and the box labeled *Information* on the right side contains the data entry cells used to create new or modify existing salvo groups.

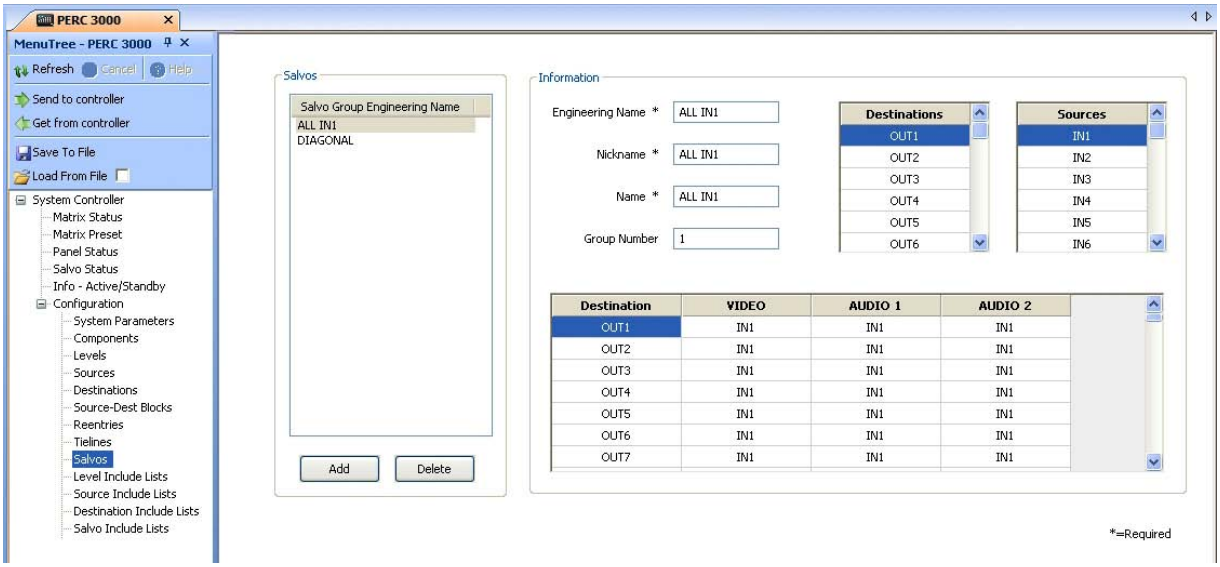


Figure 5-32 Salvos Configuration Page

Figure 5-32 illustrates a salvo group named ALL IN1 which, when "fired," switches the source group named IN1 to all defined destination groups. Salvo groups are "fired" from the Salvo Status page (refer to Paragraph 5.10.4) and when executed, all switches defined in the salvo group are simultaneously switched. All switches in a salvo are taken within the same vertical interval.

- **Adding a Salvo Group** – PERC3000 allows a maximum of 64 salvo groups. To add a salvo group, click the *Add* button at the bottom of the Salvos box. A place-holder name is added to the Salvo Engineering Group Name list box and a setup pane with the name entry fields pre-filled is displayed in the Information box. You may change the name field entries to the descriptive name you would like to use for the salvo group.
- **Deleting a Salvo Group -** To delete a salvo group, highlight the name of the group you wish to delete in the Salvo Group Engineering Name list box. Click *Delete* at the bottom of the box.
- **Engineering Name, Nickname, Name and Group Number -** Salvo group names may be from one to eight characters in length and constructed using uppercase letters, numbers, and spaces; however, the first character must be a letter. Three fields are provided for naming the salvo group. In the case of the salvo configuration, PESA recommends that you choose a name that is descriptive of the function of the salvo. In this example, the name ALL IN1 signifies a salvo that switches the input signals defined by source group IN1 to the physical outputs associated with every defined destination group. Each of the name fields is discussed below:
  - **Engineering Name** – Up to 8 alphanumeric characters are allowed when assigning the Engineering Name to the salvo group.
  - **Nickname** – Up to 8 alphanumeric characters are allowed when assigning the Nickname to the salvo group.
  - **Name** – This field is a free text space where you may enter a descriptive name, up to 32 characters in length, for the salvo group. This name is only displayed on this configuration page and may be used to more clearly comment the salvo function.
- **Group Number** – Group number is sequentially assigned by software and is not user definable.
- **Defining A Salvo Group -** Click the cursor in the top cell of the Destination column. Locate the first destination you wish to assign to the salvo group from the Destinations list at the top of the page and double-click the entry to copy the destination name into the cell. In like manner, move the cursor to the cells under the various switching level columns and, using the entries in the Source list, double-click the name of the source you wish to switch to the indicated level of the destination. If desired, you may enter additional destinations and assign sources to them.

5.15 PESA REMOTE CONTROL PANEL CONFIGURATION

Remote control panels are used extensively in router installations to allow operators throughout the facility access and control of all or specific portions of the switch matrix. PESA has many different types of remote control panels, each with specific functionality; but each and every panel must be configured into the system and included in the configuration file loaded into the system controller before it can be recognized by the system or operate the router.

Regardless of what type of remote panel you are configuring, the basic procedure steps are:

- Create level, resource and panel key lists for system remote control panels that identify and assign router access permissions to a panel. Once a list is created it may, in certain applications, be used with multiple panels. Therefore, list creation may not be required for each and every individual remote panel that you configure. The various types of lists used for panel configuration are introduced following these steps and discussed in detail by Paragraphs 5.15.1 through 5.15.6 of this User Guide.
- Select and define a unique Panel ID (hardware address) for the panel by setting ID select switches on the rear of the panel,
- With network-based panels or a Panel Server Device a unique IP address must be available for each panel,
- Open the Panels Configuration page and add the new panel. You will enter the Panel ID, IP address (if applicable), and specific panel operating parameters for the panel, as well as associate the various permissions and access lists to the panel. Refer to Paragraph 5.15.7.
- If you are configuring a PESA "Smart" panel such as the Touch 72 or Smart 32, you can also create text or graphic labels for each panel key. Refer to Paragraph 5.15.8.

Configuration requirements for each panel type are unique and not all lists or configuration parameters are applicable to every panel.

- **Level Lists:** Level lists are created through a Cattrax operator page and allow you to assign the switching levels that each remote control panel is allowed to control. Each is a named list that may contain any or all of the system switching levels. A level list is selected for each control panel through the Panels Configuration page.
- **Panel Key Lists:** Many PESA remote control panels have pushbutton switches, often referred to as *keys*, which are used for command entry. These keys may be used to, among other things, select sources and take switches on router destinations, select switching levels for a breakaway switch, select and take salvo switches for simultaneous switching of multiple sources and destinations. Many panels use the switches for other functions as well, such as soft key assignments, category indexing, control key functions, etc.

  Some key functions are fixed for a particular panel, but most keys can be assigned a function or value by associating a *Panel Key List* to the panel. These lists are created as part of the controller configuration file to designate the specific function of each key on a particular panel type and for a particular application. A unique Panel Key List must be created for each panel type, but the same list can be associated to any number of panels of the same type in order to clone the key functions to each panel. Panel Key Lists can be created for specific applications as a means of controlling access to the router by certain operators or operator station requirements.
- **Include Lists:** Many remote control panels offer a scrolling or indexing type access method. This method uses pushbuttons or a rotary control knob to allow you to rapidly scroll through a list of available router resources to locate the desired selection. This method is often used with Preset Select switching to set up the next switch.

There are three types of *Include Lists* that may be created to control resource access by each control panel that supports scrolling:

- *Source Include List* – A named list that may be assigned to a control panel and contains a listing of the source groups displayed in the scroll or index list of the panel. Only those sources contained in the list are available for the panel to control.
- *Destination Include List* – A named list that may be assigned to a control panel and contains a listing of the destination groups displayed in the scroll or index list of the panel. Only those destinations contained in the list are available to the panel.
- *Salvo Include List* – A named list that may be assigned to a control panel and contains a listing of the system salvos displayed in the scroll or index list of the panel. Only those salvo groups contained in the list are available for the panel to initiate.

5.15.1 LEVEL INCLUDE LISTS CONFIGURATION PAGE

The Level Include Lists Configuration page, Figure 5-33, allows you to selectively build a named list of switching levels which, when assigned to a specific remote control panel, designates the levels that panel is authorized to control. Multiple panels may share a Level Include List. Click the Level Include Lists parent entry in the Configuration menu tree to display the configuration page.

The box labeled *Level Include Lists* on the left side of the display window contains, by Nickname, the level include lists that have been created for the router, and the box labeled *Information* on the right side contains the data entry cells used to create new or modify existing level include lists.

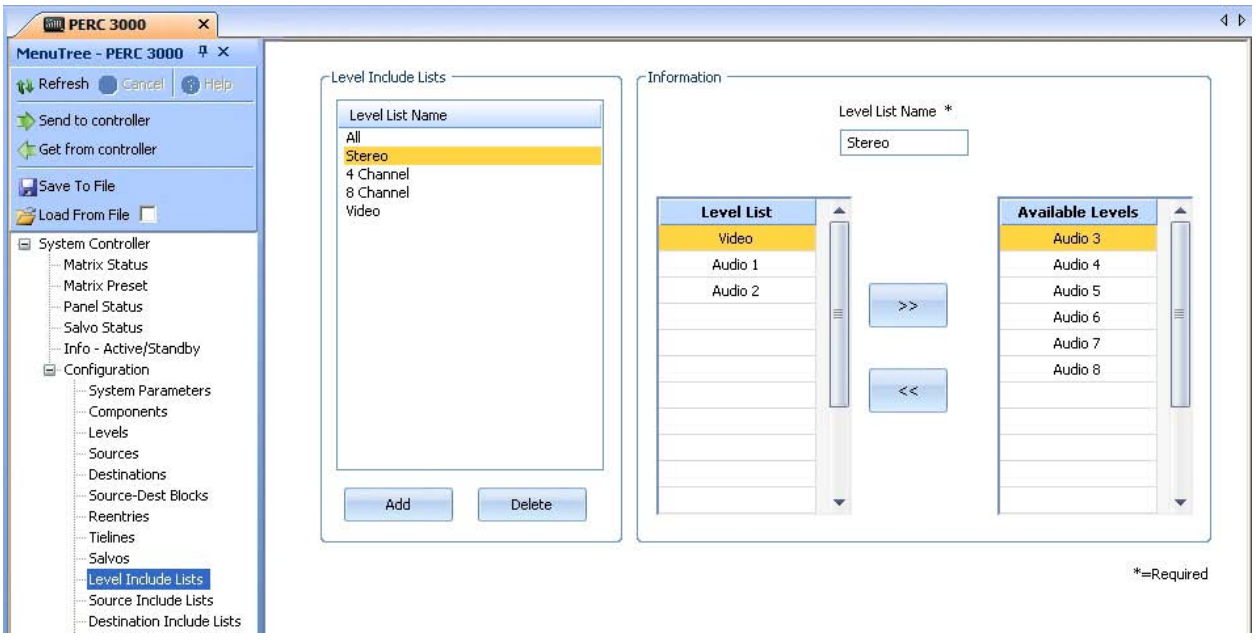


Figure 5-33 Level Include Lists Configuration Page

- **Adding a Level Include List** –To add a level include list, click the *Add* button at the bottom of the Level Include Lists box. A place-holder name is added to the Level List Name list box and a setup pane with the Level List Name entry field pre-filled is displayed in the Information box. You may change the name field entry to the descriptive name you would like to use for the level include list.
- **Deleting a Level Include List -** To delete a level include list, highlight the name of the list you wish to delete in the Level Include Lists box. Click *Delete* at the bottom of the box.
- **Level List Name** – This field is where you assign a name to the Level Include List. Names can be from one to eight characters in length and are constructed using uppercase letters, numbers, and spaces; however, the first character must be a letter. PESA highly recommends that you choose a name which is somewhat descriptive of the function of the level include list.
- **Level List** – Levels listed in this column are accessible by remote control panels functioning under the named level include list.
- **Available Levels** – This column contains a listing of all levels which may be included in the level include list.

  Initially, all levels are listed in the Available Levels list box. Listed levels are moved between the two list boxes using the two arrows between the boxes, as shown by Figure 5-34. In order to move a level from the Available Levels list to the Level List, highlight the level you want to include in the list and click the arrow pointing from the Available list to the Level list. In order to disallow a level from the Level Include List, highlight and move the level name from the Level List to the Available Levels list using the arrow pointing to the Available list.

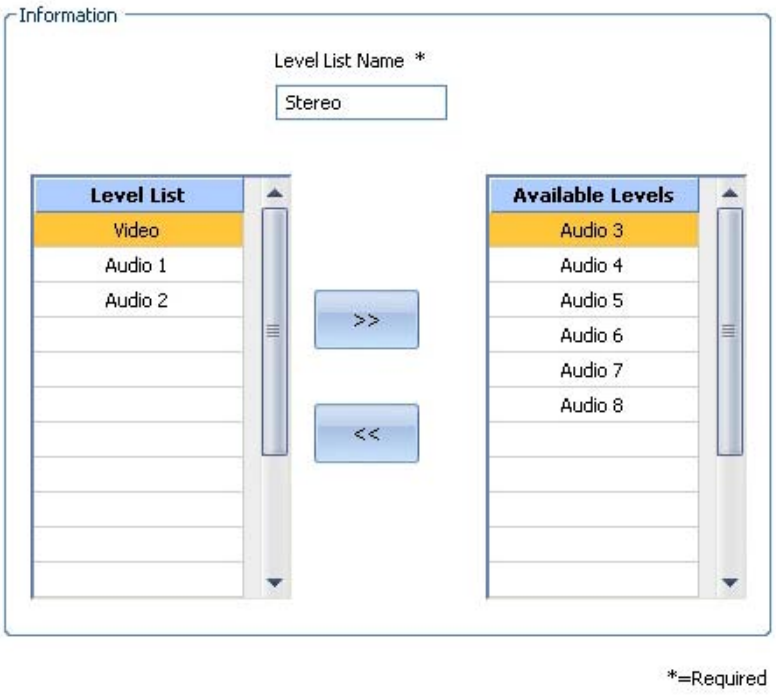


Figure 5-34 Level Include List Data Entry

5.15.2 SOURCE INCLUDE LISTS CONFIGURATION PAGE

The Source Include Lists Configuration page, Figure 5-35, allows you to selectively build a named list of sources which, when assigned to a remote control panel that supports scrolling resource selection capability, designates the sources that panel is authorized to access through scrolling. Note that this list only assigns source access permission for the scrolling function of the panel; it does not in any way affect resources assigned to panel keys through Panel Key Lists. Multiple panels may share a Source Include List. Click the Source Include Lists parent entry in the Configuration menu tree to display the configuration page.

The box labeled *Source Include Lists* on the left side of the display window contains, by Nickname, the source include lists that have been created for the router, and the box labeled *Information* on the right side contains the data entry cells used to create new or modify existing source include lists.

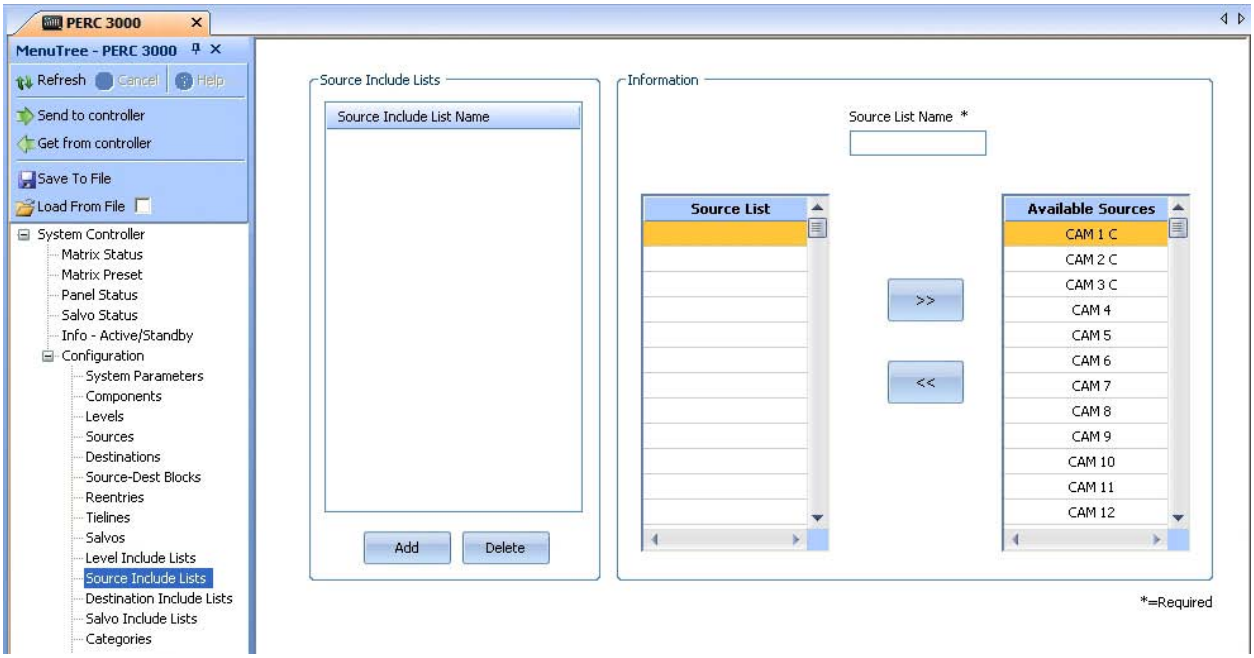


Figure 5-35 Source Include Lists Configuration Page

- **Adding a Source Include List** –To add a source include list, click the *Add* button at the bottom of the Source Include Lists box. A place-holder name is added to the Source Include List Name list box and a setup pane with the Source List Name entry field pre-filled is displayed in the Information box. You may change the name field entry to the descriptive name you would like to use for the source include list.
- **Deleting a Source Include List -** To delete a source include list, highlight the name of the list you wish to delete in the Source Include Lists box. Click *Delete* at the bottom of the box.

- **Source List Name** – This field is where you assign a name to the Source Include List. Source List names may be from one to eight characters in length and are constructed using uppercase letters, numbers, and spaces; however, the first character must be a letter. PESA highly recommends that you choose a name that is somewhat descriptive of the function of the source include list.
- **Source List** – Sources listed in this column are accessible by remote control panels functioning under the named source include list.
- **Available Sources** – This column contains a list of all sources which may be included in the source include list.

  Initially, all sources are listed in the Available Sources list box. Listed sources are moved between the two list boxes using the two arrows between the boxes, Figure 5-36. In order to move a source name from the available list to the source include list, highlight the source you want to include in the list and click the arrow pointing from the available list to the include list. In order to disallow a source from the include list, highlight and move the source name from the include list to the available list using the arrow pointing to the available list.

  Source Include Lists created for the configuration are listed in the Source Include List Name box. If you wish to access the configuration pane for a specific source include list, click on the name in the listing.

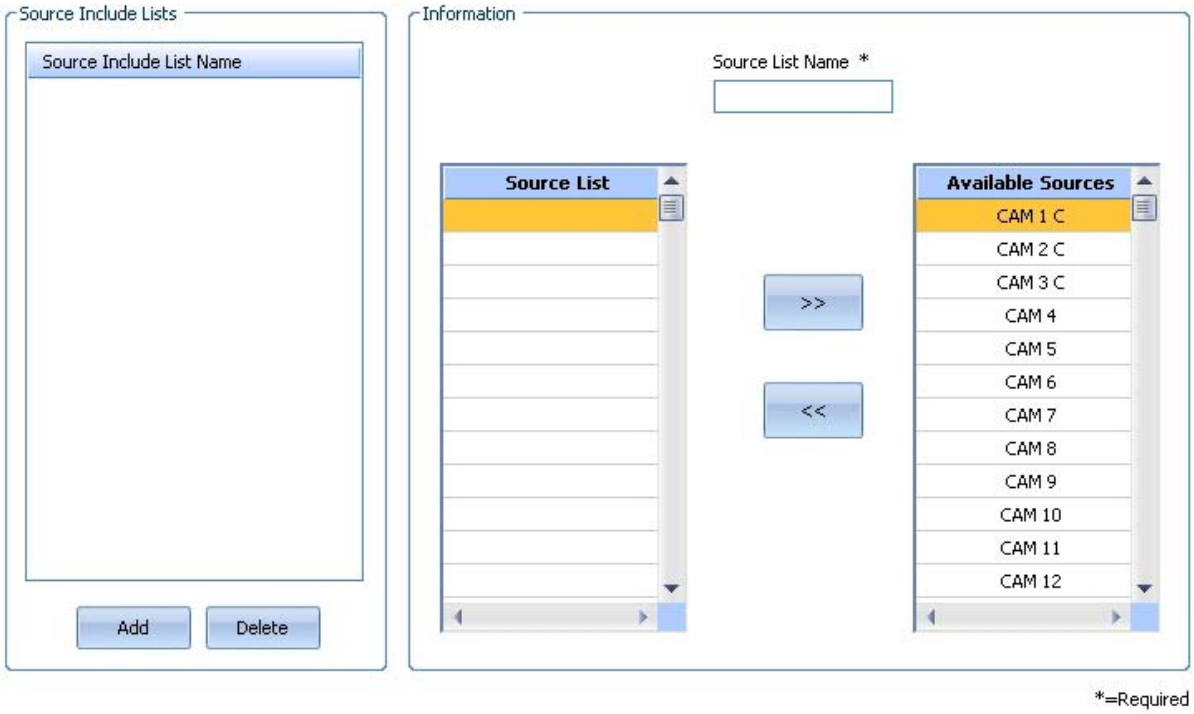


Figure 5-36 Source Include Lists Data Entry Fields

5.15.3 DESTINATION INCLUDE LISTS CONFIGURATION PAGE

The Destination Include Lists Configuration page, Figure 5-37, allows you to selectively build a named list of destinations which, when assigned to a remote control panel that supports scrolling resource selection capability, designates the destinations that panel is authorized to access through scrolling. Note that this list only assigns destination access permission for the scrolling function of the panel; it does not in any way affect resources assigned to panel keys through Panel Key Lists. Multiple panels may share a Destination Include List. Click the Destination Include Lists parent entry in the Configuration menu tree to display the configuration page.

The box labeled *Destination Include Lists* on the left side of the display window contains, by Nickname, the Destination Include Lists that have been created for the router, and the box labeled *Information* on the right side contains the data entry cells used to create new or modify existing source include lists.

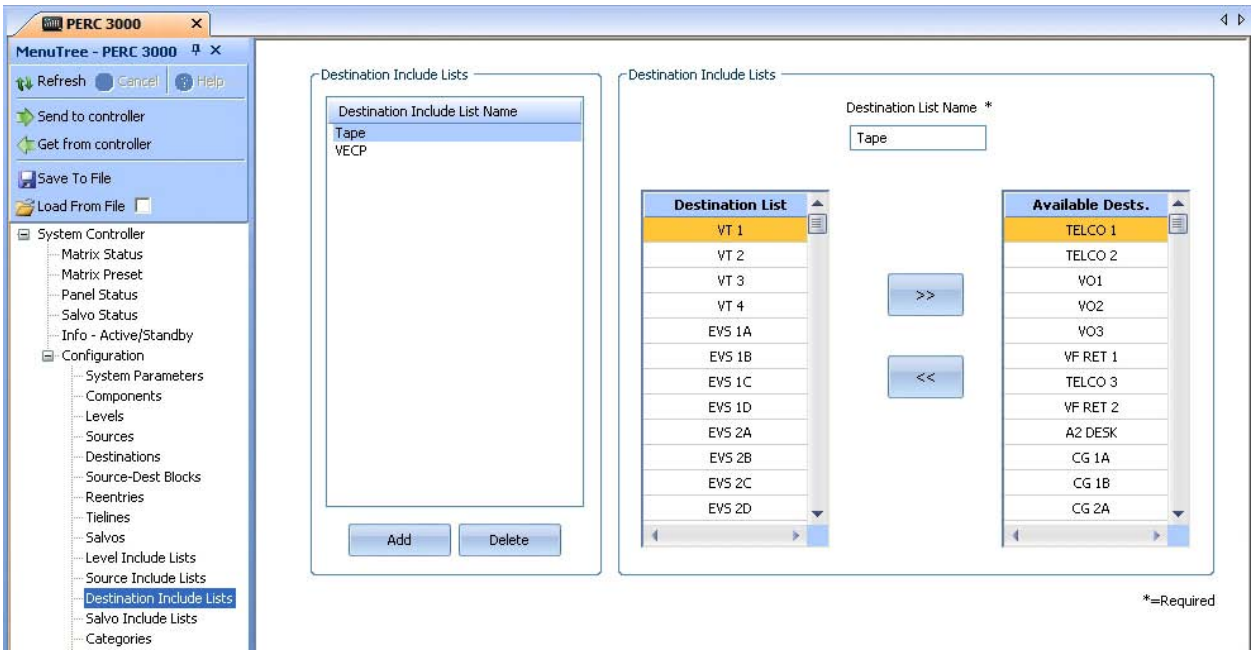


Figure 5-37 Destination Include Lists Configuration Page

- **Adding a Destination Include List** – To add a destination include list, click the *Add* button at the bottom of the Destination Include Lists box. A place-holder name is added to the Destination Include List Name list box and a setup pane with the Destination List Name entry field pre-filled is displayed in the Information box. You may change the name field entry to the descriptive name you would like to use for the destination include list.
- **Deleting a Destination Include List -** To delete a destination include list, highlight the name of the list you wish to delete in the Destination Include Lists box. Click *Delete* at the bottom of the box.

- **Destination List Name** – This field is where you assign a name to the Destination Include List. Destination List names may be from one to eight characters in length and are constructed using uppercase letters, numbers, and spaces; however, the first character must be a letter. PESA highly recommends that you choose a name which is somewhat descriptive of the function of the destination include list.
- **Destination List** – Destinations listed in this column are accessible by remote control panels functioning under the named destination include list.
- **Available Destinations** – This column contains a listing of all destinations which may be included in the destination include list.

  Initially, all destinations are listed in the Available Destinations list box. Listed destinations are moved between the two list boxes using the two arrows between the boxes, Figure 5-38. In order to move a destination name from the available list to the destination include list, highlight the destination you want to include in the list and click the arrow pointing from the available list to the include list. In order to disallow a destination from the include list, highlight and move the destination name from the include list to the available list using the arrow pointing to the available list.

  Destination Include Lists created for the configuration are listed in the Destination Include List Name box. If you wish to access the configuration pane for a specific destination include list, click on the name in the listing.

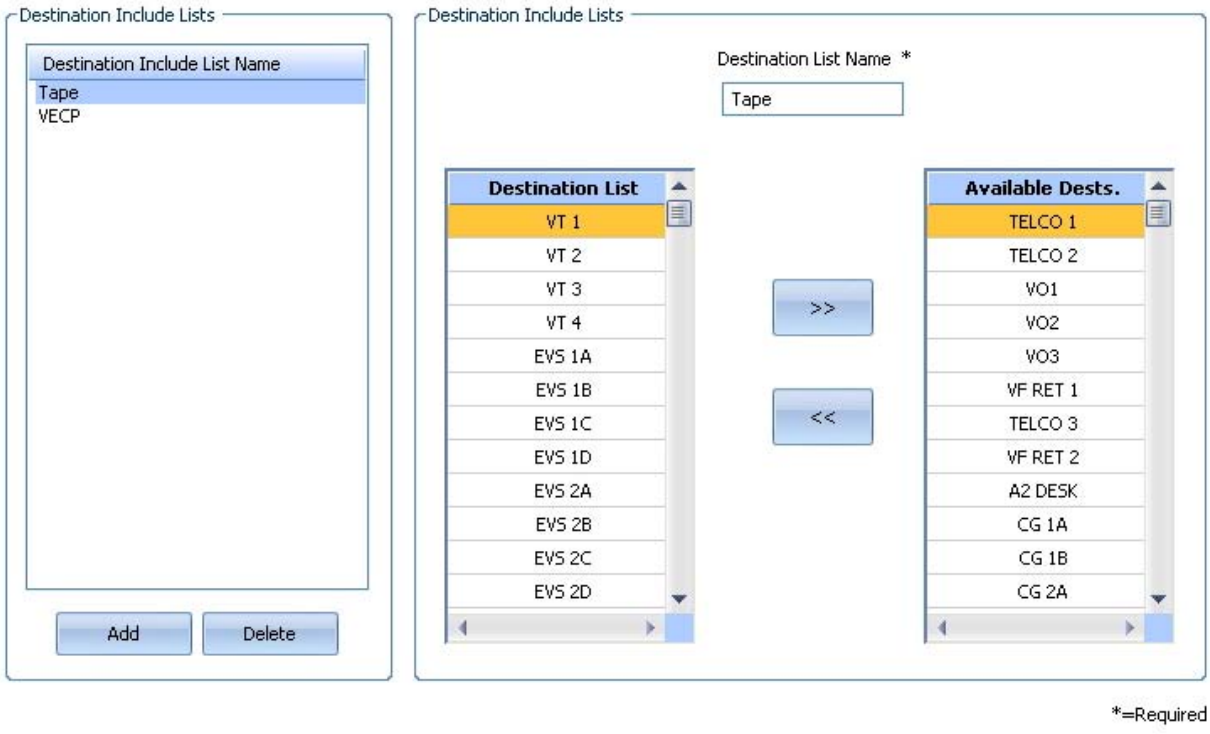


Figure 5-38 Destination Include Lists Data Entry Fields

5.15.4 SALVO INCLUDE LISTS CONFIGURATION PAGE

The Salvo Include Lists Configuration page, Figure 5-39, allows you to selectively build a named list of salvos which, when assigned to a remote control panel that supports scrolling resource selection capability, designates the salvos that panel is authorized to access through scrolling. Note that this list only assigns salvo access permission for the scrolling function of the panel; it does not in any way affect salvos assigned to panel keys through Panel Key Lists. Multiple panels may share a Salvo Include List. Click the Salvo Include Lists parent entry in the Configuration menu tree to display the configuration page.

The box labeled *Salvo Include Lists* on the left side of the display window contains, by Nickname, the salvo include lists that have been created for the router, and the box labeled *Information* on the right side contains the data entry cells used to create new or modify existing salvo include lists.

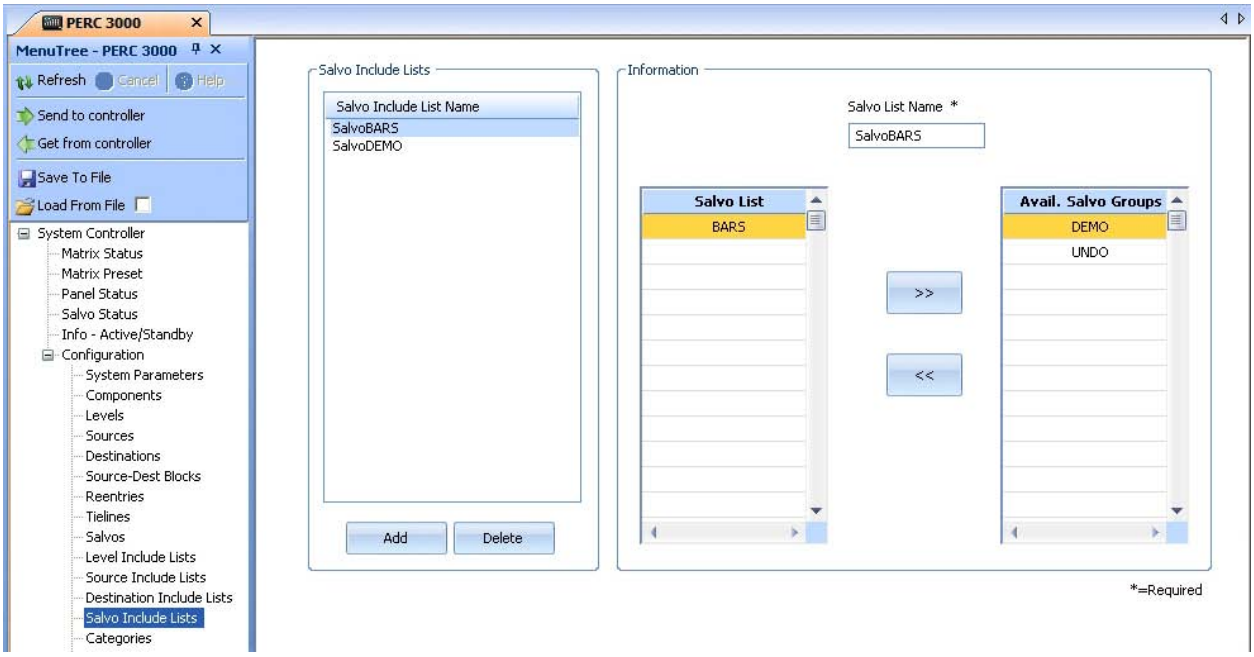


Figure 5-39 Salvo Include Lists Configuration Page

- **Adding a Salvo Include List** –To add a salvo include list, click the *Add* button at the bottom of the Salvo Include Lists box. A place-holder name is added to the Salvo List Name list box and a setup pane with the Salvo List Name entry field pre-filled is displayed in the Information box. You may change the name field entry to the descriptive name you would like to use for the salvo include list.
- **Deleting a Salvo Group** - To delete a salvo include list, highlight the name of the list you wish to delete in the Salvo Include Lists box. Click *Delete* at the bottom of the box.

- **Salvo List Name** – This field is where you assign a name to the Salvo Include List. PESA recommends that you choose a name that is somewhat descriptive of the function of the salvo include list. Salvo List Names may be from one to eight characters in length and are constructed using uppercase letters, numbers, and spaces; however, the first character must be a letter.
- **Salvo List** – Salvo groups listed in this column are accessible by remote control panels functioning under the named salvo include list.
- **Available Salvo Groups** – This column contains a list of all salvo groups which may be included in the salvo include list.

  Initially, all salvo groups are listed in the Available Salvo Groups list box. Listed salvo groups are moved between the two list boxes using the two arrows between the boxes. In order to move a salvo group name from the available list to the salvo include list, highlight the salvo group you want to include in the list and click the arrow pointing from the available list to the include list. In order to disallow a salvo group from the include list, highlight and move the salvo group name from the include list to the available list using the arrow pointing to the available list.

5.15.5 CATEGORIES

When the **Categories** menu entry is selected, the Categories Entry page, Figure 5-40, is displayed. From this page you can enter category labels. The box labeled *Category* contains a listing of all assigned categories, by label.

Categories are alphanumeric strings (up to 8 characters) used as labels when indexing sources and destinations from a remote control panel. Any combination of letters and numbers may be used as a category label. Generally, labels used as categories are elements of a name which can be paired to specify a certain source or destination. For example, Figure 5-40 lists the digits 0 thru 9 and the words IN and OUT as categories. To call the source named In 5 when indexing from a panel you would scroll through the categories to the word IN as the first character and then scroll to the digit 5 for the second character. Categories are entered from the Categories Configuration page. Up to 1024 categories are allowed in a configuration file.

- **Adding a Category**

  To add a category label, click a blank cell in the category list box, click in the cell and enter the character string for the category label you wish to enter.

- **Deleting or Editing a Category**

  To delete or edit a category label, move the cursor to the cell in the category list box containing the character string you wish to modify and double click. You may delete the entry with the delete key, or you may right-click to access the available editing options.

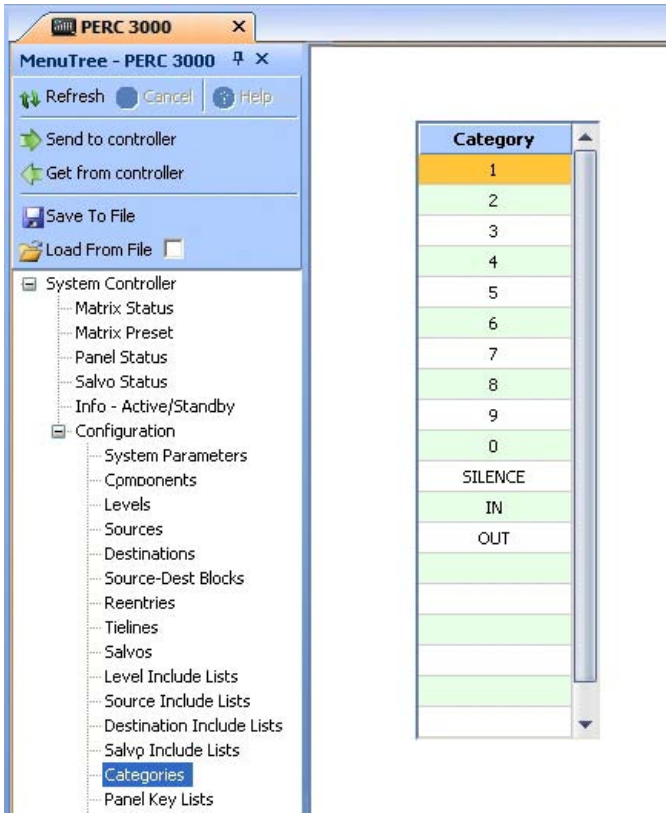
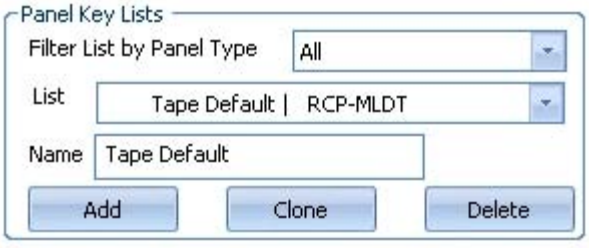


Figure 5-40 Categories Configuration Page

5.15.6 PANEL KEY LISTS CONFIGURATION PAGE

The Panel Key Lists Configuration page, Figure 5-41, allows you to generate one or more named lists that identify specific functions assigned to each configurable key on a system remote control panel. Multiple panels may share a panel key list as long as they are the same panel type. Click the Panel Key Lists parent entry in the Configuration menu tree to display the configuration page.

- **Panel Key Lists Pane** – The *Panel Key Lists* pane on the left side of the display window, just below the panel graphic image, contains cells and controls that allow you to access and modify currently created panel key lists, create new lists or delete panel key lists from the controller configuration.



- **List** – Expanding the pull-down box in the *List* cell opens a listing of all Panel Key Lists created for the configuration file. To access the configuration pane for a specific panel key list, click the list name. The selected Panel Key List is identified in the *List* cell by two entries: the list name and the type of panel for which it contains key assignments. These entries are separated by a vertical line.

- **Filter List by Panel Type** – Expanding the pull-down box in the *Filter List by Panel Type* cell opens a listing of all panel types for which panel key lists have been created. You may select any panel type entry to include only lists for that panel type in the *List* pull-down box. Selecting **All** from the panel type list includes all panel key lists that have been created for the controller configuration in the *List* pull-down box.

- **Name** – Enter a name you wish to use to identify the panel key list.

- **Add** – Clicking the Add button allows you to add a new panel key list.

- **Clone** – Clicking the Clone button simultaneously adds a new panel key list and assigns each key of the new list the identical function as the keys of the currently displayed list.

- **Delete** – Allows you to delete a panel key list.

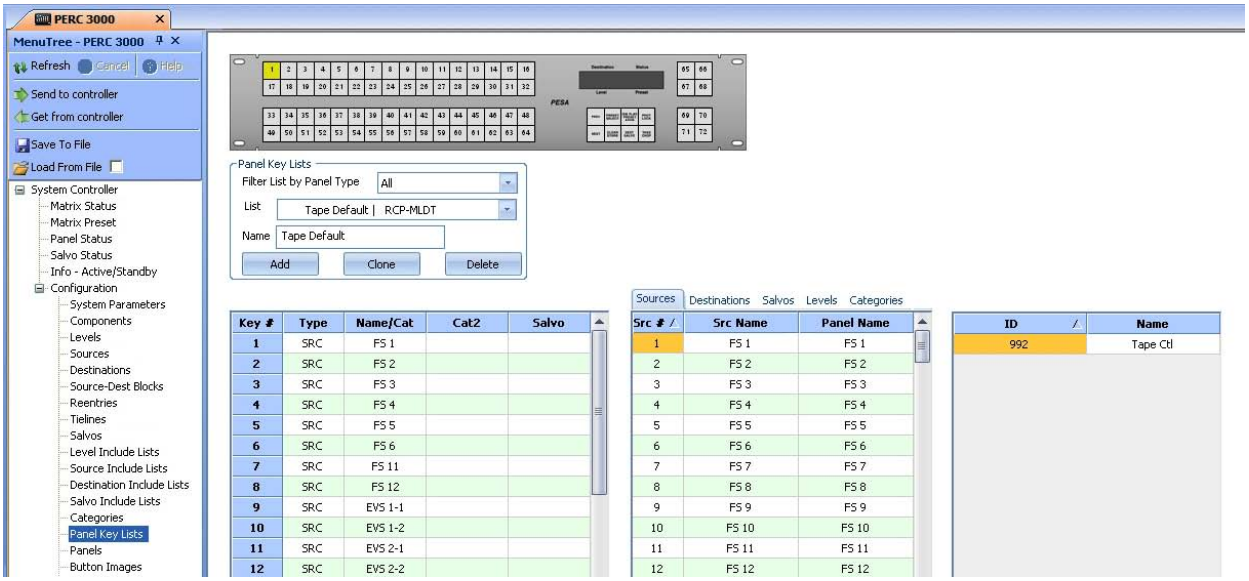
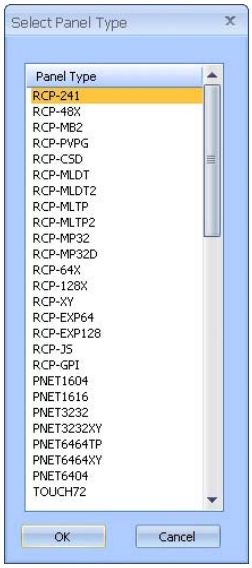


Figure 5-41 Panel Key Lists Configuration Page

- **Adding a Panel Key List** –To add a panel key list, click the *Add* button at the bottom of the Panel Key Lists box. A place-holder name is added to the *Name* cell and a pop-up box appears with a listing of the panel types you may set up through the system controller, as shown by the illustration at right. Select the panel type you are configuring.

  To make the programming task more straightforward, a visual image of the panel type you have selected is displayed at the top of the configuration page. There are a number of different remote control panels in the PESA product line, each is designed for a specific purpose, and each panel has a different key and display layout. Displaying a graphic image provides an easy guide for you to follow when configuring a specific type of panel. A place-holder list name is automatically inserted into the *Name* field below the graphic; however, you may change it to the name you would like to use for the panel key list.



- **Cloning a Panel Key List** – Clicking the *Clone* button at the bottom of the Panel Key Lists box simultaneously adds a new panel key list and assigns each key of the new list the identical function as the keys of the currently displayed list. A place-holder name for the new list is added to the *Name* cell. Cloning a list allows you to quickly make modifications or additions/deletions to an existing list and save the "new" list by another name without having to re-enter all the list data to an empty list pane.
- **Deleting a Panel Key List** - To delete a panel key list, expand the pull-down listing in the *List* cell and locate the name of the panel key list you wish to delete and select it. Click *Delete* at the bottom of the Panel Key Lists box.
- **Defining or Changing a Panel Key List Name -** Note the cell labeled *Name* in the Panel Key Lists box just below the panel graphic image, Figure 5- 42. This cell displays the name of the currently selected panel key list or the place-holder name assigned by Cattrax if the list is newly created. If desired, you may edit the displayed panel key list name directly from this cell. PESA recommends you assign a name that is somewhat descriptive of the function of the panel key list or the type of panel it controls. In this example we have used the List Name Tape Default to indicate the function of the panels using this panel key list. Panel Key List names may be structured using uppercase letters, numbers, and spaces; however, the first character must be a letter.
- **Assigning Data Functions to Configurable Panel Keys –** Below the Panel Key Lists box are spreadsheet type grids where the actual key function designations are made for each panel. The columns and data entry fields displayed by these grids will vary with each panel type being configured. Only those entry fields that are required for a particular panel are displayed when the panel type is selected.

  When a PESA "Smart" panel (Touch 72 or Smart 32) is selected for configuration, there are several additional data entry parameters required which are not applicable to any other panel. "Smart" panel specific configuration parameters are discussed at the end of this section.

  The grid on the left side of the page below the fields you just entered contains a column labeled Key #. Numbers in the Key # column correspond to the key number of each assignable key of the panel as depicted by the on-screen graphic.

  In the center of the page there is another pane with a series of page select tabs at the top labeled Sources, Destinations, Salvos, Levels and Categories. Clicking a tab displays a grid page that lists the router resources of the selected type that you may assign to keys of the remote control panel. Only those page tabs that are applicable for the selected panel type are displayed in the header. With most panels, you can assign any key on the panel any resource in any of the lists. After a control panel key is assigned, when the operator presses that key its label or function is recalled.

  Referring to the graphic image of the RCP-MLDT panel shown in Figure 5-42, there are two groups of 32 keys each (labeled 1 – 32 and 33 - 64) on the left side of the panel and two groups of four numbered keys (labeled 65 – 68 and 69 – 72) on the right side. Assume you would like to program the top group on the left to select sources, the bottom group to select destinations and the top cluster of four buttons to each select one of four levels in the system.

  Move the cursor to the column labeled Type on the row for Key #1. You can do this either by clicking in the cell or by mouse clicking on button number 1 on the graphic image.

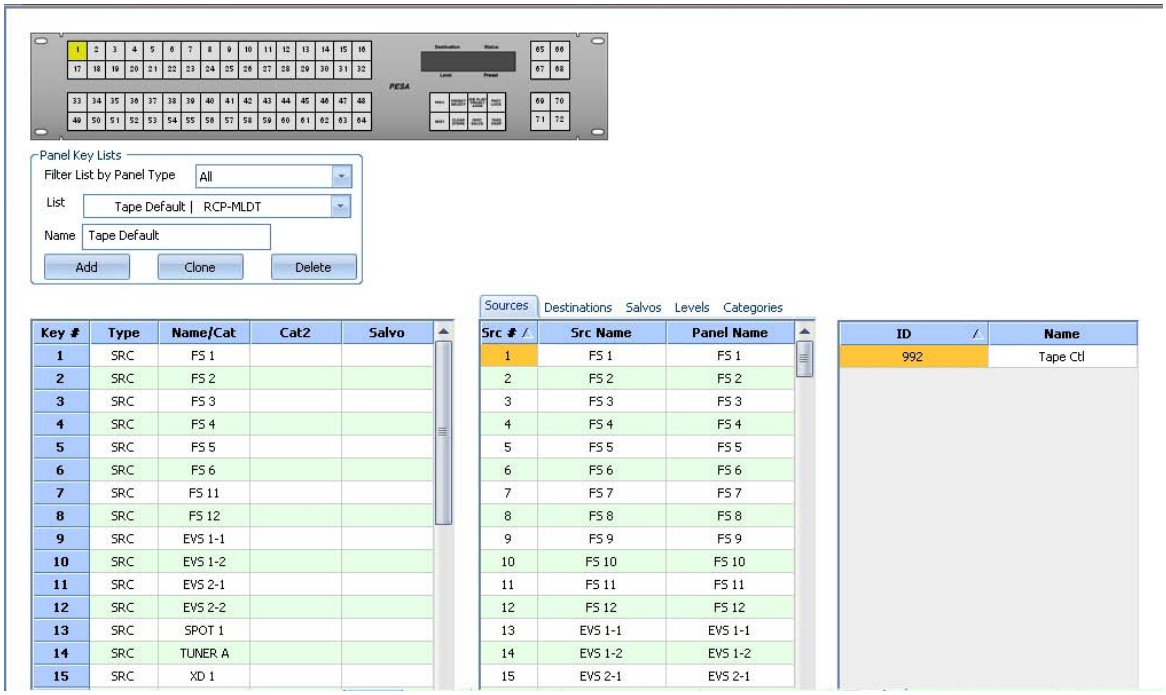


Figure 5-42 Panel Key Function Assignment

Select the Sources tab at the top of the resources display pane to open a listing of available sources that may be assigned to panel keys. Locate the Source you wish to assign to button number 1 in the sources listing and double-click. Refer to Figure 5-42 and note the Type (SRC for source) and the Name (FS 1) are automatically entered, and the cursor advances to the row for Key #2. Continue locating and clicking sources until the upper keys are assigned as desired. Any source from the list can only be assigned to one key on a page.

Use the scroll bar to move the Key# column to Key# 33. This cell is not shown in Figure 5-42. Since our example is to program the bottom row as destinations, we would move the cursor to the cell under the Type heading for key number 33. Select the Destinations tab above the grid to open a listing of available destinations in the display. Locate and double click the destinations you wish to assign to the panel keys. Any destination from the list can only be assigned to one key on a page.

Let's further assume we would like to assign the top cluster of four buttons on the right side to each represent one of the available switching levels defined for this system. Just as in the above steps, move the cursor to the key you wish to assign to the VIDEO layer, for this text we are using key number 65. Select the Levels tab to open the listing of available levels and double click the level name VIDEO. *Type* is identified as LEV and VIDEO is placed in the *Name* cell. When you wish to access the VIDEO level on a panel operating under this panel key list, press key 65.

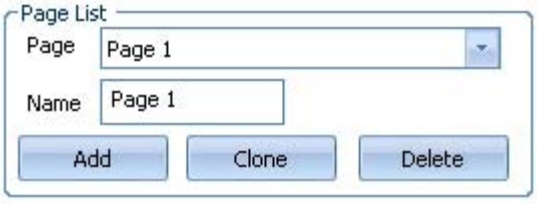
System salvo groups created through the Salvos configuration page, Paragraph 5.14.14, may be assigned to panel keys on panels that support the salvo function. If the Salvos tab is shown above the resources pane, you may assign system salvos by name from the listing to individual panel keys in exactly the same way as system resources just presented. When a system salvo is assigned to a panel key, the name of the salvo group is listed in the Salvo column of the key function grid on the row corresponding to the key assignment.

Categories and their use and purpose are discussed in Paragraph 5.15.5 of this User Guide. If you wish to assign a panel key to represent a specific category label on panels that support the category labels function, select the Categories tab to display a listing of available category labels. Move the cursor to the Name/Cat cell of the key row to assign and then locate and double-click the desired category label from the Categories scroll box. The column labeled Cat2 is used only when assigning a category label to a specific key. The entry in this column assigns the category label accessed when the panel key is selected after first selecting a Category Key.

The grid on the right side of the page contains a listing by Hardware ID number and Panel Name of all the remote control panels in the system to which the currently displayed panel key list is assigned. You may instantly access the Panels Configuration page for any panel in the listing by double-clicking the hardware ID entry for the desired panel. Double-clicking the ID header of the grid toggles the ascending/descending sort order of the hardware ID numbers.

- **Assigning Pages and Control Functions to PESA "Smart" Panel Keys –** PESA's Touch 72 and Smart 32 remote control panels are unique in that any of the front panel pushbutton keys may be assigned to any key function. PESA "Smart" panels support a pagination system that allows you to create up to 16 distinct pages of all front panel keys, for a total of 1152 assignable panel keys with the Touch 72 and 512 assignable keys with the Smart 32. In addition to the applicable router resource functions discussed above, the Panel Key Lists configuration page for PESA "Smart" panels adds the Page List pane where you set up panel key pages, and two additional tabs above the function select pane for router control functions (Control) and page select functions (Page), as shown in Figure 5-43 using the Touch 72 panel as an example.

  Page List Pane – From the page list pane you can add up to 16 unique pages of panel key functions. You can also give each page a name to more easily identify its function or application.



  - **Page** – displays the name of the panel key page that is currently displayed in the key assignment grid. The pull-down menu in this cell allows you to select the page you wish to display from a listing of all actively assigned pages.
  - **Name** – by default a new page is always assigned a sequential number as its name. You may change the text in this cell to change the name of the page.
  - **Add** – Clicking the Add button adds a new page for panel key assignments. By default the new page is named as the next page in numerical sequence. Change the name to a more descriptive name, if desired.
  - **Clone** – Clicking the Clone button simultaneously adds a new page and assigns each key of the new page the identical function as the keys of the currently displayed page.
  - **Delete** – Allows you to delete the page shown in the Page cell. If only one page is assigned this button is shown as inactive.

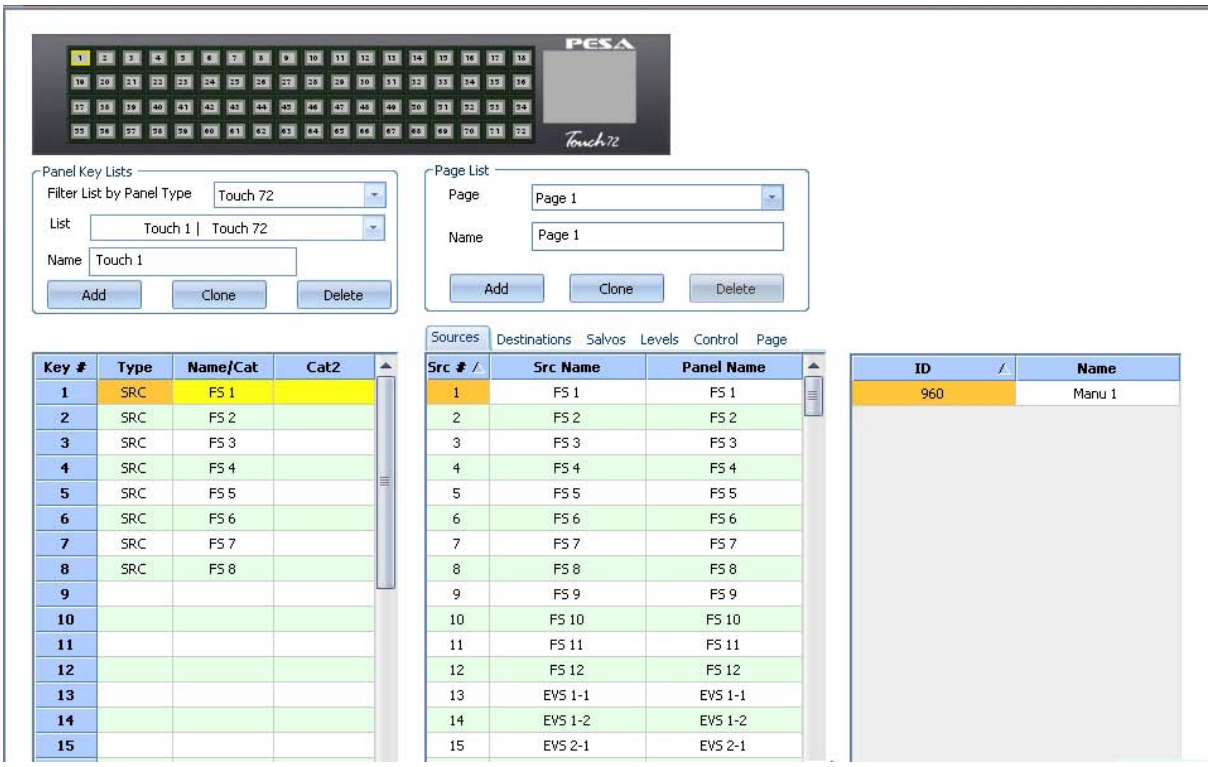


Figure 5-43 Typical PESA "Smart" Panel Key List Page

- **Control Tab** - Using resources under the Control tab, you may assign any panel key one of the following router control functions:
  - Take (Touch 72 only)
  - PRT/LK (Toggles between lock, protect, unlock)
  - Preset Mode (Touch 72 only)
  - Clear (Touch 72 only)
- **Page Tab** – Clicking the Page tab opens a listing of all assigned panel key pages, by name. You may assign a specific page to any router key so that when the key is selected, its page is selected for the panel keys.

Any key on a "Smart" panel may be assigned to a salvo group by selecting the salvo name from the resources listing under the Salvos tab. When you select a salvo group for a particular panel key, the salvo name is displayed in the Name/Cat column and the characters SVG are shown in the Type column on the panel key row.

5.15.7 PANELS CONFIGURATION PAGE

There are many different remote control panels in the PESA product family and each panel has a different control and display set. For this reason, text in this User Guide does not deal with operational procedures or displays of any specific panel type. Refer to the User Guide for the particular panel type for specific information.

PESA remote control panels are either network-based and communicate with the PERC3000 over an Ethernet port, such as the Touch 72, Smart 32 and PNet panels; or non-network based and communicate with the PERC3000 controller through an RCP Panel Server device. Regardless of type or communication method, all remote control panels in the system must be configured into the system controller through the Panels Configuration page of Cattrax.

When non-network remote control panels are included in a router system through the RCP Panel Server device, both the panel server and each remote control panel must be configured into the system through the Panels Configuration page.

The following PESA Remote Control Panels are compatible with the PERC3000 Panel Server

RCP-128X	**RCP-EXP128**	**RCP-MLDT2**	**RCP-STAT1**
RCP-241	**RCP-GPI**	**RCP-MLTP**	**RCP-STAT2**
RCP-48X	**RCP-JS**	**RCP-MLTP2**	**RCP-TP**
RCP-64X	**RCP-LCXY**	**RCP-MP32**	**RCP-XY**
RCP-CSD	**RCP-MB2**	**RCP-MP32D**	
RCP-EXP64	**RCP-MLDT**	**RCP-PVPG**	

When configuring remote control panels into a PERC3000 system, each network-based panel, each RCP panel server device and each individual non-network based remote control panel must be assigned a unique panel address - the hardware ID. On the network based panels and panel servers this is done by entering the desired hardware ID number using the three rotary switches on the rear panel of the server. With non-network remote control panels, the ID is entered by the setting of DIP switches on the rear of each remote control panel.

The Panels Configuration page, Figure 5-44, allows you to add RCP panel server devices and remote control panels to the system, program the functionality of each panel, and review the configuration of existing servers and panels. Click the Panels parent entry in the Configuration menu tree to display the configuration page.

The first three columns in the spreadsheet type grid pane display the Hardware ID, Panel Name and Panel Type of panel servers and remote control panels that have been configured for the router system. The remainder of the cells on each row display the configuration parameters for the indicated panel. Double-clicking the ID header of the pane toggles the ascending/descending sort order of the hardware ID numbers.

You may select any panel in the list by clicking in any cell on the row of the panel you wish to select. When a panel is selected, its display row within the grid will be highlighted. You may instantly access the Panel Key List configuration page assigned to the selected panel by double-clicking anywhere on the highlighted row.

Any time a panel entry in the grid pane is highlighted, a graphic image of the remote control panel is displayed at the top of the configuration page and the data entry panes at the bottom of the page display the current parameters of the selected panel. If you are adding a new panel to the listing, the graphic image of the panel is displayed after the new panel type is selected. Displaying a graphic image allows you to verify the panel type as well as provide a visual cue of the features and functions of the specific panel.

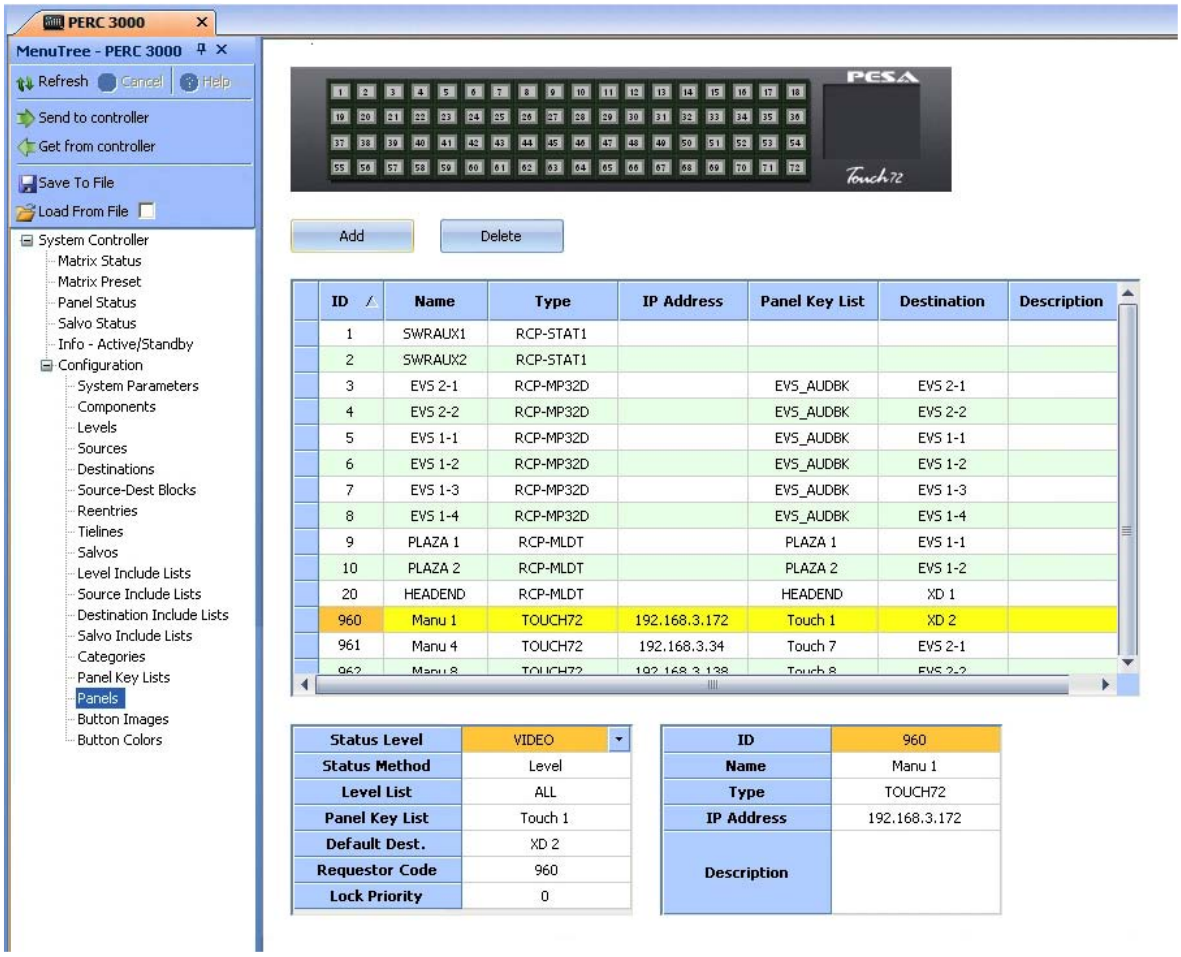
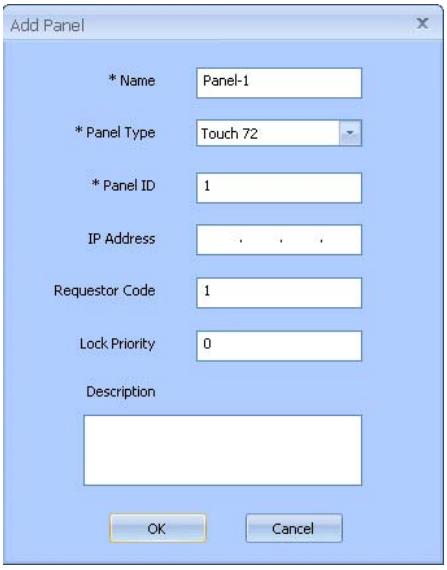


Figure 5-44 Panels Configuration Page

- **Adding a Control Panel** – To add a panel server or remote control panel to the system, click the *Add* button just beneath the panel graphic display. Choosing the Add function opens a pop-up box, as shown here:



  - The Name entry cell allows you to enter a unique name for the panel. Cattrax automatically inserts a place-holder name in the cell. You may enter a name now or use the place-holder name to set-up the panel and change it later if you wish.
  - The Panel Type cell contains a pull-down listing of available PESA control panel types. Locate and select the model (type) of panel you are adding to the system.
  - Enter the Panel (hardware) ID number of the server or panel that matches the ID number set on the rear panel switches of the server or panel hardware device.

- If you are adding a Panel Server or network-based “Smart” panel, enter the IP address you wish to assign to the panel on this set-up box.
- Cattrax automatically enters a default Requestor Code and Lock Priority value for this panel based on the assigned Panel ID number. If you wish to change the default values you may do some from this pop-up box.
- You may use the Description box to enter any notes or information you wish about the panel.
- When you have finished entering data for the panel, click *OK* to add the panel and exit the pop-up box.
- A graphic image of the panel type is displayed after the panel type is selected, and the panel is added to the display grid in the center of the page. The newly added panel is automatically selected and its row is highlighted.
- Enter configuration data and operating parameters for the new panel as outlined in the following steps.

Order of data entry is not particularly critical, but be aware that the graphic image does not update to the new panel until the panel type is entered in the Type cell. Figure 5-45 offers a closer look at the configuration page.

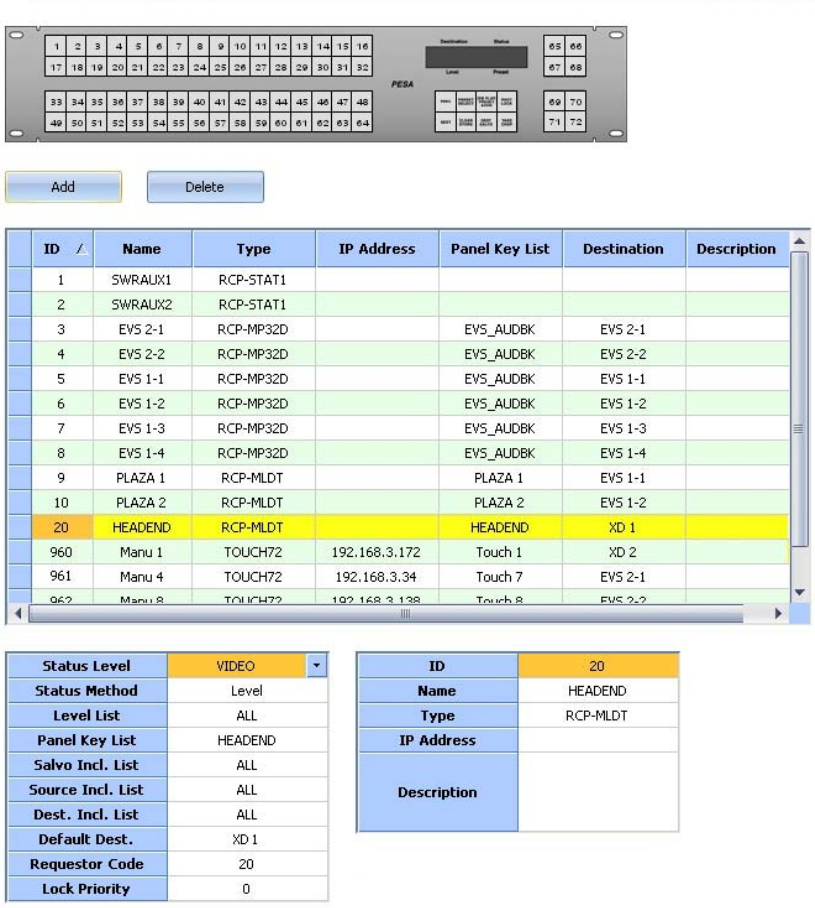


Figure 5-45 Adding a Panel Configuration

- **Defining or Editing a Panel Server or Remote Control Panel Configuration -** Highlighting an entry in the panel display grid selects the panel, displays a graphic image of the panel above the grid and displays the appropriate data entry fields for the panel below the grid. All data entry and editing for the panel configuration is done through the two data entry field columns.
- **Enter or Edit Panel Configuration Data -** Panel configuration data is entered in the cells displayed in the right-hand column. If you just added a panel, most of these entries will have been made from the panel add pop-up box. You may enter or edit any of the following parameters from these cells:
  - **ID** – The hardware ID number assigned to the server or panel is displayed in the ID column. This number MUST match the ID number set on the server or panel hardware.
  - **Name** – This entry allows you to assign a name to each panel. A panel name may be up to 8 characters in length and consist of a mix of alphanumeric characters. This is the text string displayed in other configuration and status pages to identify the panel. PESA recommends that you choose a panel name that helps identify the location or function of the panel within the router system
  - **Type** – This cell allows you to choose the model (type) of the panel server or remote panel using a pull-down menu of all PESA control panel model numbers. Click in the Type cell and open the pull-down menu. Select the model number of the panel you are installing and click the entry. The model number appears in the cell and a graphic image of the panel is displayed on the configuration page.
  - **IP Address** – If the panel you are installing communicates with the PERC3000 Controller over an Ethernet connection, such as a panel server or a PESA "Smart" panel, enter the IP Address you want assigned to the panel server or network panel according to your facility network plan. Each panel server or network panel must be assigned a unique IP address and also a unique panel identifier address. If the panel you are adding is not an Ethernet panel and uses the daisy-chain RCP control bus to connect to the panel server, leave this column blank.
  - **Description** – Description is a free text field where you can enter a description of the panel and its function or any other data you wish to enter concerning this panel.
- **Enter or Edit Panel Parameters -** After panel configuration data is entered, enter the specific operational parameters for the panel in the cells of the left-hand column, as shown in the illustration below. Each cell in this table uses a pull-down menu to display the options available. In order to enter or change any selection in the configuration, click in the cell containing the parameter that you want to change and click on the pull-down arrow. From the pull-down menu, click on the selection you want to enter for the panel configuration. Note that not all fields shown are pertinent to all panel types. If a panel does not support certain functions, data entry cells pertaining to that function are not displayed. This column may contain the following entries:

Status Level	VIDEO
Status Method	Level
Level List	ALL
Panel Key List	HEADEND
Salvo Incl. List	ALL
Source Incl. List	ALL
Dest. Incl. List	ALL
Default Dest.	XD 1
Requestor Code	20
Lock Priority	0

ID	20
Name	HEADEND
Type	RCP-MLDT
IP Address	
Description	

- **Status Level** – Status Level is the default switching level displayed or controlled by the panel. To assign or edit the Status Level, click in the cell and change the level selection from the pull-down menu.
- **Status Method** – The pull-down menu in this cell should always be set to *Level* in PERC3000 system applications.
- **Level List** – This entry determines the switching levels authorized for the panel by assigning a Level Include List to the panel. If the panel is authorized for all switching levels, select **ALL** from the pull-down menu.
- **Panel Key List** – This entry determines the function of the configurable panel keys by assigning a Panel Key List to the panel. The desired Panel key List is chosen from the pull-down menu associated with the cell. Only panel key lists which are valid for the panel type are included in the pull-down menu.
- **Salvo Include List** – This entry determines the salvo groups authorized for access by the panel by assigning a Salvo Include List to the panel. The desired Salvo Include List is chosen from the pull-down menu associated with the cell. If the panel is authorized access to all salvo groups, select **ALL** from the pull-down menu.
- **Source Include List** - This entry determines the sources authorized for access by the panel by assigning a Source Include List to the panel. The desired Source Include List is chosen from the pull-down menu associated with the cell. If the panel is authorized access to all sources, select **ALL** from the pull-down menu.
- **Destination Include List** - This entry determines the destinations authorized for access by the panel by assigning a Destination Include List to the panel. The desired Destination Include List is chosen from the pull-down menu associated with the cell. If the panel is authorized access to all destinations, select **ALL** from the pull-down menu.
- **Default Destination** – This entry assigns the default destination to the panel. In operation, the default destination determines which destination is displayed and controlled on initial panel power-up.

- **Destination Protect and Lock Functions -**
  - PERC3000 provides two similar methods, *Protect* and *Lock*, by which a user can prevent or control another user's ability to make switches on particular, defined destinations (output signals) by assigning codes and priorities to control panels and control ports in the system. Every remote control panel in the system is assigned a code number, called its Requestor Code, and is also assigned a numerical Lock Priority value as part of the Panels Configuration process.

    A Protect function may be applied to a destination through any remote control panel with Lock/Protect capability. After protect is applied, the protected destination can not be switched to a different source by any panel in the system, unless the panel attempting to switch the protected output meets one of these three criteria:

    1. Panel originating the protect function can switch the destination;
    2. Any panel configured with the same requestor code and an equal lock priority; or
    3. Any panel with a higher lock priority.

    A Lock function is very similar to Protect, and may be applied to a destination through a remote control panel with lock/protect capability. Once a Lock is applied, the locked destination can not be switched to a different source by any panel in the system until the Lock is cleared by a panel with the authority to clear it, by meeting one of these criteria:

    1. Panel originating the lock function can unlock the destination; or
    2. Any panel with a higher lock priority.

    The key difference between Protect and Lock is that when a destination is protected, any panel meeting the criteria to override the protect function operates totally impervious to the protect function and may make switches on the destination just as it would to any other unprotected destination. When a destination is locked, however, no panel may make a switch on the destination until the lock has been cleared from the destination.

  - **Requestor Code and Lock Priority Values**

    When panels are configured through Cattrax, each panel with Lock/Protect capability is assigned a requestor code value between 1 and 65535 and a lock priority value between 0 and 1023.

    Typically, and by default, the requestor code is assigned the same value as the panel ID address. However, there may be certain circumstances of an installation that require an exception to this numbering scheme. If you wish to allow two separate panels identical control over a protected destination, you may assign the same requestor code and lock priority to each panel.

    Lock priority is a numerical value that determines the rights of a panel to place or remove a lock or override a protect function on a destination. Panels with higher lock priority values have greater control over lock/protect functions. Any panel assigned a lock priority of zero (0) has the highest priority.

Let's look at an example. If you assign a panel a requestor code of 201 and a lock priority of 2, and assume we issue a protect function to a destination through this panel. Since it is the originating panel, it may continue to switch the destination, but other panels in the system may not switch that destination unless the panel attempting to make the switch also has a requestor code of 201 and lock priority of 2, or unless it has a lock priority of 1 or 0, regardless of its requestor code.

Now suppose this same panel issues a lock function to a destination. The lock could only be cleared by the originating panel or by a panel with a higher lock priority. A panel with a lock priority of zero (0) can override any protect function or clear any lock function.

- **Deleting a Panel Server or Remote Control Panel -** To delete a panel server or remote control panel, locate the name of the panel you wish to delete in the panel configuration grid and click to select it. Click *Delete* just below the graphic amige. You will ***NOT*** be asked to verify your choice to delete a panel – the action is immediate. Be absolutely sure you want to delete the panel configuration before you click on the delete command.

5.15.8 BUTTON IMAGES PAGE (FOR PESA "SMART" PANELS ONLY)

PESA's Touch 72 and Smart 32 panels support up to 16 pages of panel keys, each of which can display a dynamically programmable text label or graphic image to define the function of the key. Labels and graphics displayed by "Smart" panel keys are configured through the Button Images page, Figure 5-46.

A text label or graphic image is actually configured for each router resource and is displayed on any "Smart" panel key that is assigned to that resource.

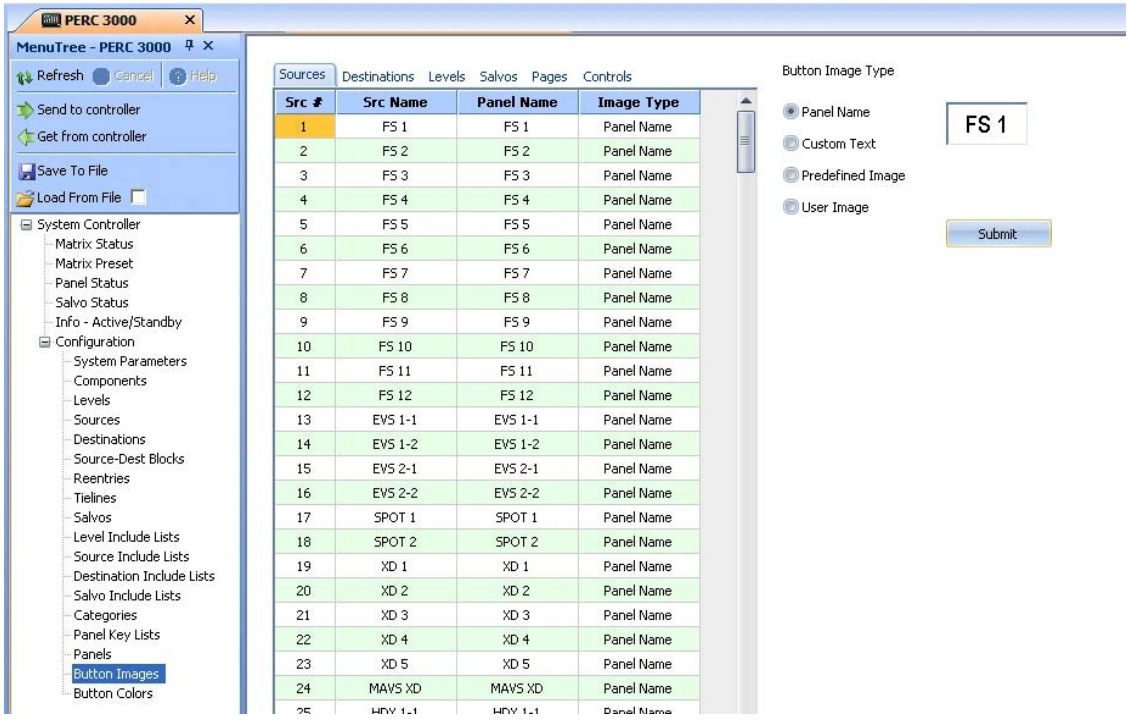


Figure 5-46 Button Images Page

Labels and graphics are assigned to each system resource through entries in the configuration pane. By default the name given to every system resource during configuration of the resource is the text label that is displayed by the "Smart" panel key. For example, refer to the pane in Figure 5-46 and look at the row for Source #1. The Panel Name is FS 1, and is the label entered during source group configuration for display on remote control panels. By default, this label would also be the text that would appear on any Touch 72 or Smart 32 panel assigned to Source #1, unless you change it in the Button Assignment grid.

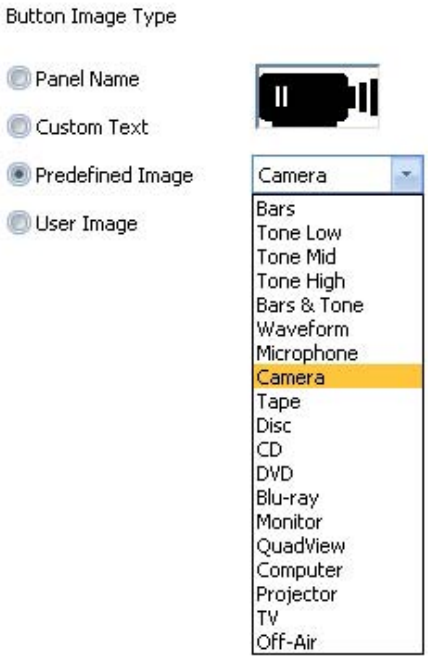
The tabs across the top of the Button Assignment grid select the type of system resource displayed in the listing. Highlight any row in the listing to select the resource for label editing.

Any changes you make to the button images configuration will not take effect and the button images will not be updated until the modified controller configuration file is downloaded to the system controller and the controller has updated the panel configuration.

For any system resource, you have the option of choosing any of the following label types for the "Smart" panel keys by clicking the radio buttons to the right of the grid:

- **Panel Name** – This is the default selection and uses the name assigned to the resource when it was configured for the key label.
- **Custom Text** – Allows you to enter a custom label that displays on a "Smart" panel key when the resource is assigned to it. You may enter characters on up to 3 lines. However, Cattrax automatically sizes the text to fit the available pixels of the key display device and the more text you enter, the smaller and less legible, each character becomes. Enter your custom text in the cell as shown here and click Submit to accept the entry.

- **Predefined Image** – This function allows you to insert an image display in place of a text label. Cattrax supports a library of common graphic images in a pull-down list as shown here using the Sources system resource tab for the example. Available graphic images vary depending on the type of system resource you are assigning to a key and the tab selected at the top of the grid. Table 5-1 lists the available images with each of the system resource tabs. You may preview each image in the window just above the pull-down listing. To assign a graphic image to a key, select the desired image from the list. Click Submit to accept the resource image.



Sources Tab	Destinations Tab	Salvos Tab	Controls Tab	Menu Tab
Bars	Waveform	Bars	Take (Touch 72 only)	Backlight
Tone Low	Headphones	Tone Low	Lock/Protect	Contrast
Tone Mid	Speaker	Tone Mid		Intensity
Tone High	Tape	Tone High		Arrow Up
Bars & Tone	Disc	Bars & Tone		Arrow Down
Waveform	CD	Monitor		Exit
Microphone	DVD			
Camera	Blu-ray			
Tape	Monitor			
Disc	Quadview			
CD	Computer			
DVD	Projector			
Blu-ray	TV			
Monitor	Off-Air			
Quadview				
Computer				
Projector				
TV				
Off-Air				

Table 5-1 Available Predefined Images by System Resource

- **User Image** – Cattrax allows you assign a custom graphic image to a resource, with the following constraints:
  - Must be a bitmap image (.bmp file)
  - Up to 64 pixels wide by 32 pixels high
  - 1 bit color depth.

When you select the User Image radio button, a dialog box opens that allows you to browse to the .bmp file you wish to upload. Select the file and click Open to load the image file. Click Submit to accept the resource image.

5.15.9 BUTTON COLORS PAGE (FOR PESA "SMART" PANELS ONLY)

PESA's "Smart" panels (Touch 72 and Smart 32) use a factory default, system-wide backlight color scheme for the front panel pushbutton keys that quickly identify the system resource type assigned to each key by the background color – regardless of which panel you are using. If desired, you may select the background color used for key type identification by system resource on a system-wide basis through the Button Colors configuration page. An example Button Colors page is shown by Figure 5-47, and the default color for each system resource type is illustrated.

Beneath the color preview box for each system resource type is a data entry cell with a pull-down list of available backlight colors that may be assigned to resource keys of that type. If you wish to change the factory default color for any resource type, open the pull-down box and select the desired color from the list. The color change will not take place until the modified controller configuration file is downloaded to the system controller and the controller updates the panels. If you wish to return to the factory default color settings, click the Reset button and download the modified configuration to the controller.

Any changes you make to the button colors configuration will not take effect and the background colors will not be changed until the modified controller configuration file is downloaded to the system controller and the controller has updated the panel configuration.

Backlight color displayed by pushbutton keys can not be selected on an individual key or single panel basis.

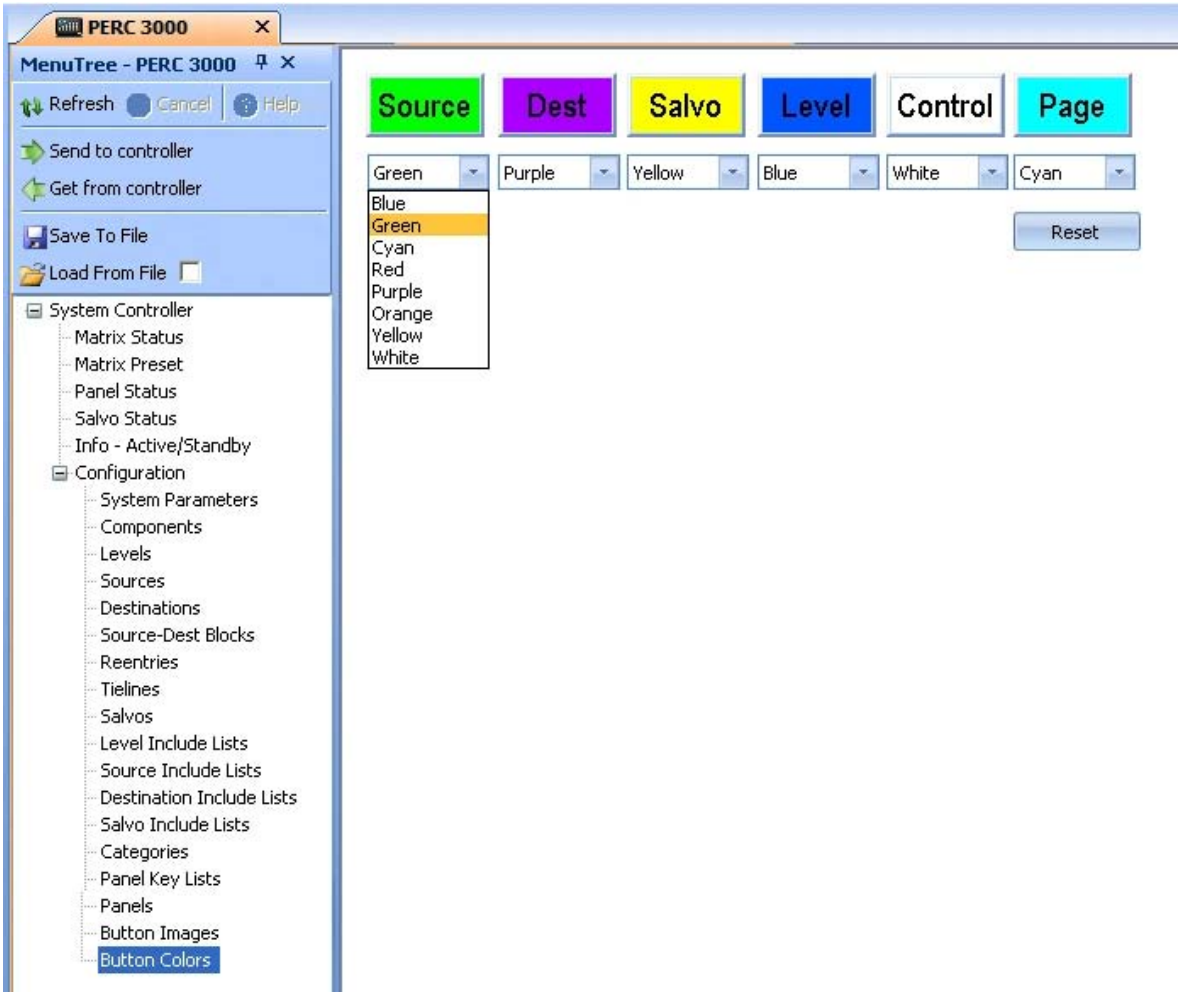


Figure 5-47 Button Colors Configuration Page

Chapter 6 – Maintenance and Repair

6.1 Customer Service

If you have any questions or problems with your PERC3000 system controller or a peripheral device, contact PESA's Customer Service Department:

By E-Mail – service@pesa.com

By Phone – 256-726-9222 (24/7)

6.2 Periodic Maintenance

No periodic maintenance is required.

6.3 PESA Service

If you are experiencing any difficulty with the PERC3000 system controller or a peripheral device, please contact PESA's Service Department. Skilled technicians are available to assist you 24 hours a day, every day of the year.

6.4 Repair

Before attempting to repair this equipment, please consult your warranty documents and PESA's Customer Service Department. Unauthorized repairs may void your warranty.

PC boards in this equipment contain Surface Mount Technology (SMT) components. Special tools and skills are required to replace these components without causing damage to adjacent areas.

Failure to consult with Customer Service before attempting to repair these boards may void your warranty.

6.5 Replacement Parts

Only parts of the highest quality are used in the design and manufacture of your PESA equipment. If the inherent stability and reliability are to be maintained, replacement parts must be of the same high quality. Please consult our Customer Service Department before installing any parts not purchased from PESA.

6.6 Factory Service

Before returning any equipment to PESA for service or repair, please contact our Customer Service Department for an RMA number.


PESA