9971-MVx-4K

• 9971-MV6-4K • 9971-MV18-4K

12G/6G/3G/HD/SD UHD Multiviewers

Product Manual

Cobalt Digital Inc.

2506 Galen Drive
Champaign, IL 61821
Voice 217.344.1243 • Fax 217.344.1245
www.cobaltdigital.com

9971-MVX-OM (V1.0B)

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Congratulations on choosing the Cobalt® 9971 12G/6G/3G/HD/SD UHD Multiviewers (9971-MV18-4K and 9971-MV6-4K). The 9971 is part of a full line of modular processing and conversion gear for broadcast TV environments. The Cobalt Digital Inc. line includes video decoders and encoders, audio embedders and de-embedders, distribution amplifiers, format converters, remote control systems and much more. Should you have questions pertaining to the installation or operation of your 9971, please contact us at the contact information on the front cover.

Manual No.:	9971-MVX-OM
Document Version:	V1.0B
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Applicable for Firmware Version (or greater):	v0.143 or newer
Description of product/manual changes:	- Manual version V1.0B has corrections that fix transposed HDMI OUT 1 and HDMI OUT 2 locations on rear module. Connector designations are now properly correlated to connector locations shown in illustrations.

Table of Contents

Chapter 1

Introduction

Overview

Note: This manual covers all 9971 models. Model **9971-MV6-4K** and **9971-MV18-4K** vary principally in the respective six and 18 inputs/PIPs supported. Unless noted otherwise, information herein applies to either model.

This manual provides installation and setup instructions for the 9971-MVx-4K 12G/6G/3G/HD/SD UHD Multiviewer card (also referred to herein collectively referred to as the 9971-MVx-4K).

This manual consists of the following chapters:

- **Chapter 1, "Introduction"** – Provides information about this manual and what is covered. Also provides general information regarding the 9971-MVx-4K.
- **Chapter 2, "Installation"** – Provides instructions for installing the 9971-MVx-4K in a frame, and connecting signal and control cabling to the 9971-MVx-4K.
- **Chapter 3, "Setup Instructions"** – Provides overviews of setup operating controls and instructions for setting up the 9971-MVx-4K to integrate within its signal flow environment.

This chapter contains the following information:

9971-MVx-4K Card Software Versions and this Manual

When applicable, Cobalt Digital Inc. provides for continual product enhancements through software updates. As such, functions described in this manual may pertain specifically to cards loaded with a particular software build.

The Software Version of your card can be checked by viewing the **Card Info** menu in DashBoard™. See Checking 9971-MVx-4K Card Information (p. 3-6) in Chapter 3, "Operating Instructions" for more information. You can then check our website for the latest software version currently released for the card as described below.

Note: Not all functionality described in this manual may appear on cards with initial software versions.

Check our website and proceed as follows if your card's software does not match the latest version:

Card Software **earlier** than latest version	Card is not loaded with the latest software. Not all functions and/or specified performance described in this manual may be available. You can update your card with new Update software by going to the **Support>Firmware Downloads** link at www.cobaltdigital.com. Download "Firmware Update Guide", which provides simple instructions for downloading the latest firmware for your card onto your computer, and then uploading it to your card through DashBoard™. **Software updates are field-installed without any need to remove the card from its frame.**
Card Software **newer** than version in manual	A new manual is expediently released whenever a card's software is updated **and specifications and/or functionality have changed** as compared to an earlier version (a new manual is not necessarily released if specifications and/or functionality have not changed). A manual earlier than a card's software version may not completely or accurately describe all functions available for your card. If your card shows features not described in this manual, you can check for the latest manual (if applicable) and download it by going to the card's web page on www.cobaltdigital.com.

Cobalt Reference Guides

From the Cobalt® web home page, go to **Support>Reference Documents** for easy to use guides covering network remote control, card firmware updates, example card processing UI setups and other topics.

Manual Conventions

In this manual, display messages and connectors are shown using the exact name shown on the 9971-MVx-4K itself. Examples are provided below.

- Card-edge display messages are shown like this:

  Ch01

- Connector names are shown like this: **SDI IN A**

In this manual, the terms below are applicable as follows:

- **9971-MVx-4K** refers to the 9971-MVx-4K 12G/6G/3G/HD/SD UHD Multiviewer card (9971-MV6-4K and/or 9971-MV18-4K).
- **Frame** refers to the HPF-9000, oGx, OG3-FR, 8321, or similar 20-slot frame that houses Cobalt® or other cards.
- **Device** and/or **Card** refers to a Cobalt® or other card.
- **System** and/or **Video System** refers to the mix of interconnected production and terminal equipment in which the 9971-MVx-4K and other cards operate.
- Functions and/or features that are available only as an option are denoted in this manual like this:

  Option

Warnings, Cautions, and Notes

Certain items in this manual are highlighted by special messages. The definitions are provided below.

Warnings

Warning messages indicate a possible hazard which, if not avoided, could result in personal injury or death.

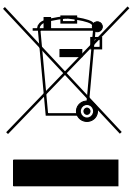
Cautions

Caution messages indicate a problem or incorrect practice which, if not avoided, could result in improper operation or damage to the product.

Notes

Notes provide supplemental information to the accompanying text. Notes typically precede the text to which they apply.

Labeling Symbol Definitions

	Important note regarding product usage. Failure to observe may result in unexpected or incorrect operation.
	Electronic device or assembly is susceptible to damage from an ESD event. Handle only using appropriate ESD prevention practices. If ESD wrist strap is not available, handle card only by edges and avoid contact with any connectors or components.
	Symbol (WEEE 2002/96/EC) For product disposal, ensure the following: • Do not dispose of this product as unsorted municipal waste. • Collect this product separately. • Use collection and return systems available to you.

Safety and Regulatory Summary

Warnings

! WARNING ! **To reduce risk of electric shock do not remove line voltage service barrier cover on frame equipment containing an AC power supply. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.**

Cautions

CAUTION **This device is intended for environmentally controlled use only in appropriate video terminal equipment operating environments.**

CAUTION **This product is intended to be a component product of an openGear® frame. Refer to the openGear® frame Owner's Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as its component products.**

CAUTION **Heat and power distribution requirements within a frame may dictate specific slot placement of cards. Cards with many heat-producing components should be arranged to avoid areas of excess heat build-up, particularly in frames using only convection cooling. The 9971-MVx-4K has a moderate power dissipation (>30 W). As such, avoiding placing the card adjacent to other cards with similar dissipation values if possible.**

CAUTION **If required, make certain Rear I/O Module(s) is installed before installing the 9971-MVx-4K into the frame slot. Damage to card and/or Rear I/O Module can occur if module installation is attempted with card already installed in slot.**

CAUTION **If card resists fully engaging in rear I/O module mating connector, check for alignment and proper insertion in slot tracks. Damage to card and/or rear I/O module may occur if improper card insertion is attempted.**

EMC Compliance Per Market

Market	Regulatory Standard or Code
United States of America	FCC "Code of Federal Regulations" Title 47 Part15, Subpart B, Class A
Canada	ICES-003
International	CISPR 24:2010 IEC 61000-4-2:2008 IEC 61000-4-3:2006 with A1:2007 and A2:2010 IEC 61000-4-4:2004 IEC 61000-4-6:2008 IEC 61000-6-3:2006 with A1:2010 CISPR 22:2008

9971-MVx-4K Functional Description

Figure 1-1 shows a functional block diagram of the 9971-MVx-4K. The 9971-MVx-4K includes input processing functions to accommodate SDI inputs, multi-split ARC/scaling functions, burn-in attributes and control of borders, UMD display text, audio meters, and other accessory displays. The output is available as a 2x DA 12G/6G3G/HD/SD-SDI output or HDMI/DVI. The output raster format and aspect ratio is user-configurable.

9971-MVx-4K Program Video Input/Output Formats

The 9971-MVx-4K provides the following inputs and outputs:

- **Inputs:**
  - **SDI IN 1** thru **SDI IN *n*** – coaxial video inputs per PiP (6 inputs on 9971-MV6-4K; 18 inputs on 9971-MV18-4K). On model 9971-MV18-4K, **SDI IN 1** thru **SDI IN 4** can be used as a single PiP input for media using quad-link SDQS/2SI.
- **Outputs:**
  - **12G/6G/3G/HD/SD-SDI OUT** – DA 12G/6G/3G/HD/SD-SDI multi-image video outputs.
  - **HDMI/DVI OUT** – Multi-image HDMI/DVI out (suitable for direct connection to monitor panels)

Option **(Option +DUAL)**. Option **+DUAL** offers an arrangement of multiple “Screens”, with each Screen being its own independent combining multiviewer. Each Screen can select from *n*-number of available SDI inputs, and in turn provide its output to be outputted on a selectable SDI or HDMI output. Option **+DUAL** provides independent MV processors **Screen 1** and **Screen 2**, which provides two unique, independent multiviewer views which can be fed to separate monitor screens. Each screen output can be set for different output formats as well.

Note: Total number of PiPs used for single-screen (non-option), Screen 1 and/or Screen 2 (combined or separate) cannot exceed card SDI input capacity.

- 9971-MV6-4K has a total capacity of six PiPs.
- 9971-MV18-4K has a total capacity of 18 PiPs.

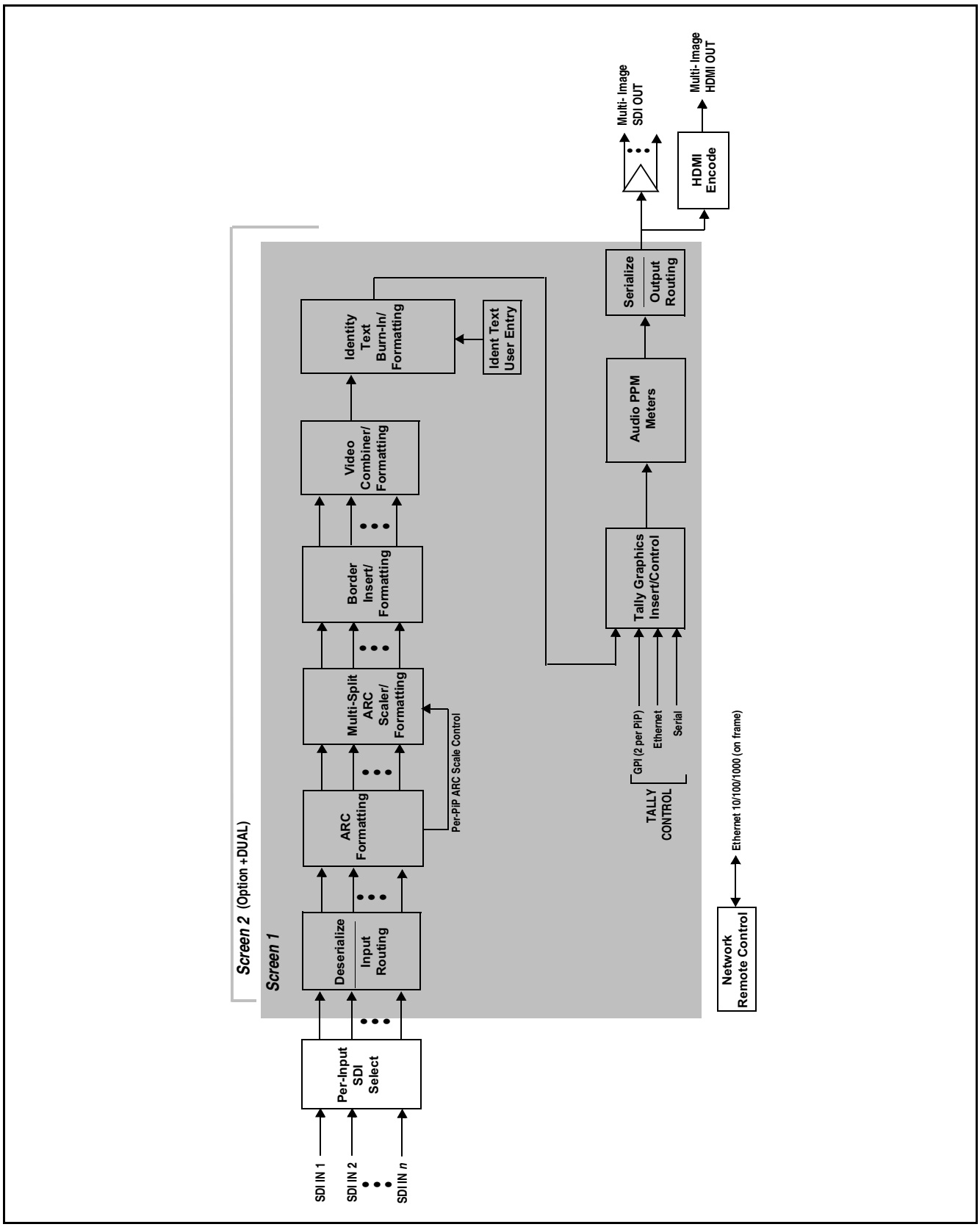


Figure 1-1 9971-MVx-4K Functional Block Diagram

Video Processing Description

The 9971-MVx-4K features input select and validity check functions, timing alignment, and PiP ARC/scaling functions as described below.

Input Video Select Function

Input video routing correlates the card inputs to PiP descriptors as desired. An Input Status display shows video format (e.g., “1920x1080i 59.94”) and duration of the valid signal presence. If invalid or no input signal is present for a given input, the status shows “Unlocked”.

Note: Model 9971-MV6-4H-4K has support for four HDMI inputs in addition to the base six SDI inputs (max).

ARC Processor/PIP Assignment

This function sets the layout/quantity of PiP images per screen, ranging from 0 (none) to *n* PiPs per screen (*n* being max supported PiPs by the card; *6* for model 9971-MV6-4K; *18* for model 9971-MV18-4K). In this manner, the base screen setup is provided where only the desired PiPs are displayed in the maximized available screen area.

Multi-Split ARC Scaler/Formatting Function

This function provides conversion of each PiP input to match a common user-selected format, resulting in images that are format-matched and suitable for combining into a single PiP image. When the PiP images are sized by this function, the borders and other accessory attributes are now integrated into each PiP image. In addition to full user control of PiP image H/V sizing, accessory attributes such as border size, weight, and color can be user configured.

Multiviewer Video Combiner/Formatting Function

This function combines the multiple video images into the user-configured positions within the overall image. At this point, all PiP images are of the same raster format and fully synchronous. User templates position the images as desired by the operator using the DashBoard controls.

Identity Text Burn-In/Formatting Function

This function provides user controls for entering UMD and user ident text that is burned into each PiP image. Controls allow full control of positioning, sizing, and color/background/opacity attributes. Burn-in text can be user entry text or external text sourced via IP from an automation system.

Tally Graphics Insert/Control

This function accommodates tally inputs (received as GPI, serial, or network commands) and allows configuring the commands to provide tally indications for each PiP image. All visual attributed are configurable, including “lamp” color, size, and positioning. Tally activation can also be controlled via IP from an automation system/router. UMD text can be inserted using local user text entry or integrated with router automation to receive text from the automation system.

Router Integration

Protocols (Router Integration) provides controls for integrating TSL router IP communication with 9971-MVx-4K to provide tally attribute control and TSL display address for the PiP images. Router functions such as UMD text sourcing from/using TSL protocol is also supported.

Background/Foreground Image Insertion

The 9971-MVx-4K provides full-screen raster insertion functions that provide a background template and also provide a foreground that can mask merged screen details not desired on the overall output, or provide fixed details (such as logo bugs) that are “burned into” the final image independent of PiP video content.

A Background image insertion resides behind the opaque PiPs (PiP video content and any borders, UMDs, Tallies, etc.) Background Image insertions can be full-size raster insertions, such as logo-based background template that remains fixed regardless of PiP positioning or sizing. A Foreground image resides on top of PiPs and background. The Foreground can serve as a mask where only certain PiPs or other details are visible in the final merged output view.

Per-PiP Audio PPM Meters

Each PiP image area has setup controls to provide audio meters in several formats (channel count) as desired. Each PiP image has an audio meter display that can display from 2-bar stereo up to all four embedded audio groups for the audio associated with a PiP input. User controls allow setting meter complement, position, size, and other graphic attributes.

Note: While per-PiP audio meters are supported, currently the 9971-MVx-4K models are not intended to provide pass-thru embedded audio content on either SDI or HDMI outputs. (It has been determined through user liaison that visual indication of audio presence/content type is significantly more practical than attempting aural assessment of multiviewer merged outputs and PiPs.)

User Control Interface

Figure 1-2 shows the user control interface options for the 9971-MVx-4K. These options are individually described below.

Note: All user control interfaces described here are cross-compatible and can operate together as desired. Where applicable, any control setting change made using a particular user interface is reflected on any other connected interface.

- **DashBoard™ User Interface** – Using DashBoard™, the 9971-MVx-4K and other cards installed in openGear®[1] frames can be controlled from a computer and monitor.

  DashBoard™ allows users to view all frames on a network with control and monitoring for all populated slots inside a frame. This simplifies the setup and use of numerous modules in a large installation and offers the ability to centralize monitoring. Cards define their controllable parameters to DashBoard™, so the control interface is always up to date.

  The DashBoard™ software can be downloaded from the Cobalt Digital Inc. website: www.cobaltdigital.com (enter “DashBoard” in the search window). The DashBoard™ user interface is described in Chapter 3,“Setup Instructions”.

- **Cobalt® OGCP-9000 and OGCP-9000/CC Remote Control Panels** – The OGCP-9000 and OGCP-9000/CC Remote Control Panels are not intended to be used for PiP sizing and other visual abstract configuration aspects. However, the control panel can be used as a convenient “one-button” control surface for launching non-abstract functions such as a user preset that invokes setups such as PiP splits and other presets.

1. openGear® is a registered trademark of Ross Video Limited. DashBoard™ is a trademark of Ross Video Limited.

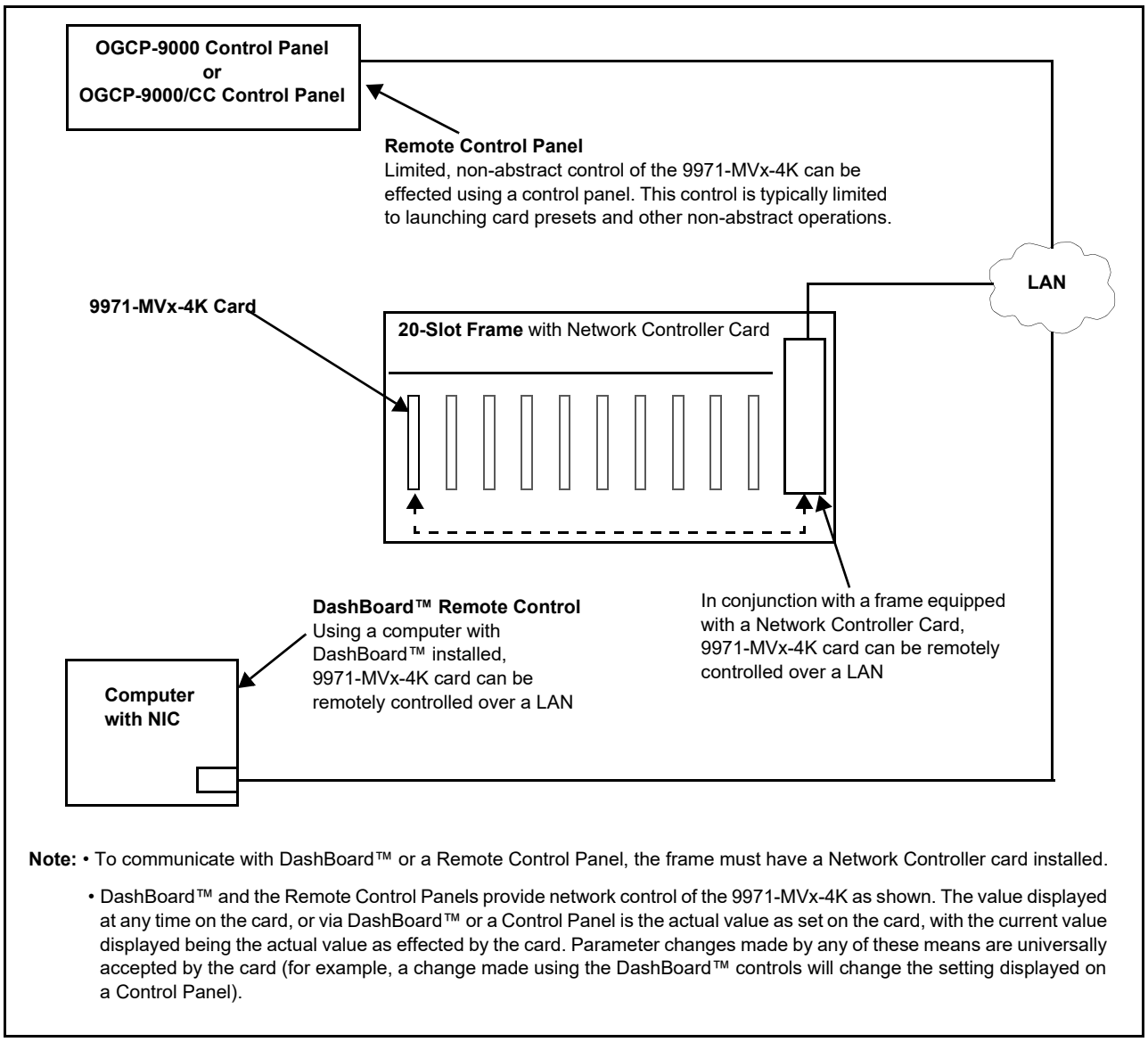


Figure 1-2 9971-MVx-4K User Control Interface

Note: If network remote control is to be used for the frame and the frame has not yet been set up for remote control, Cobalt® reference guide **Remote Control User Guide (PN 9000RCS-RM)** provides thorough information and step-by-step instructions for setting up network remote control of Cobalt® cards using DashBoard™. (Cobalt® OGCP-9000 and OGCP-9000/CC Remote Control Panel product manuals have complete instructions for setting up remote control using a Remote Control Panel.)

Download a copy of this guide by clicking on the **Support>Reference Documents** link at www.cobaltdigital.com and then select DashBoard Remote Control Setup Guide as a download, or contact Cobalt® as listed in Contact Cobalt Digital Inc. (p. 1-15).

9971-MVx-4K Rear I/O Modules

The 9971-MVx-4K physically interfaces to system video connections at the rear of its frame using a Rear I/O Module. All inputs and outputs shown in the 9971-MVx-4K Functional Block Diagram (Figure 1-1) enter and exit the card via the card edge backplane connector. The Rear I/O Module breaks out the 9971-MVx-4K card edge connections to BNC and other connectors that interface with other components and systems in the signal chain.

The full assortment of 9971-MVx-4K Rear I/O Modules is shown and described in 9971-MVx-4K Rear I/O Modules (p. 2-4) in Chapter 2, “Installation and Setup”.

Technical Specifications

Table 1-1 lists the technical specifications for the 9971-MVx-4K 12G/6G/3G/HD/SD UHD Multiviewer card

Table 1-1 Technical Specifications

Item	Characteristic
Part number, nomenclature	• 9971-MV6-4K 12G/6G/3G/HD/SD UHD Multiviewer with Six SDI Inputs • 9971-MV6-4H-4K 12G/6G/3G/HD/SD UHD Multiviewer with Six SDI Inputs and Four HDMI 2.0 Inputs • 9971-MV18-4K 12G/6G/3G/HD/SD 18-Input UHD Multiviewer
Installation/usage environment	Intended for installation and usage in frame meeting openGear™ modular system definition
Power consumption	< 35 Watts maximum
Installation Density	Up to 5 cards per 20-slot frame
Environmental: Operating temperature: Relative humidity (operating or storage):	 32° – 104° F (0° – 40° C) < 95%, non-condensing
Frame communication	10/100/1000 Mbps Ethernet with Auto-MDIX
Indicators	Card edge display and indicators as follows: • 4-character alphanumeric display • Status/Error LED indicator • Input Format LED indicator

Table 1-1 Technical Specifications — continued

Item	Characteristic
Program Video Input	(9971-MV6-4K) Video Inputs: (6) 75Ω inputs (max) (9971-MV18-4K) Video Inputs: (18) 75Ω inputs (max) SDI Formats Supported: SMPTE ST2082-1, ST2082-10, 424M, 292M, SMPTE 259M-C. All inputs/outputs 12G compliant and SDQS/2SI quad 3G compliant. Receive Cable Length: 60m Belden 1694A cable at 11.88 Gbps 120m Belden 1694A cable at 2.97 Gbps 240m Belden 1694A cable at 1.485 Gbps 400m Belden 1694A cable at 270 Mbps Return Loss: >15 dB up to 1.485 GHz >10 dB up to 2.970 GHz >7 dB up to 6 GHz >5 dB up to 12 GHz
Serial Digital PiP Video Output	Number of Outputs: (8) 75Ω inputs (max) Signal Level: 800 mV ± 10% DC Offset: 0 V ± 50 mV Jitter (12G/6G/3G/HD/SD): < 0.3/0.3/0.2/0.2 UI
HDMI PiP Video Output	(2, max) HDMI 2.0 Output; type A standard connector
HDMI Inputs (model 9971-MV6-4H-4K only)	(4) HDMI 2.0; type C-mini connector
GPIO (GPIO functionality currently reserved)	GPI and GPO; opto-isolated GPO Specifications: Max I: 120 mA Max V: 30 V Max P: 120 mW GPI Specifications: GPI LO @ Vin < 1.5 V GPI HI @ Vin > 2.3 V Max Vin: 9 V

Warranty and Service Information

Cobalt Digital Inc. Limited Warranty

This product is warranted to be free from defects in material and workmanship for a period of five (5) years from the date of shipment to the original purchaser, except that 4000, 5000, 6000, 8000 series power supplies, and Dolby® modules (where applicable) are warranted to be free from defects in material and workmanship for a period of one (1) year.

Cobalt Digital Inc.'s ("Cobalt") sole obligation under this warranty shall be limited to, at its option, (i) the repair or (ii) replacement of the product, and the determination of whether a defect is covered under this limited warranty shall be made at the sole discretion of Cobalt.

This limited warranty applies only to the original end-purchaser of the product, and is not assignable or transferrable therefrom. This warranty is limited to defects in material and workmanship, and shall not apply to acts of God, accidents, or negligence on behalf of the purchaser, and shall be voided upon the misuse, abuse, alteration, or modification of the product. Only Cobalt authorized factory representatives are authorized to make repairs to the product, and any unauthorized attempt to repair this product shall immediately void the warranty. Please contact Cobalt Technical Support for more information.

To facilitate the resolution of warranty related issues, Cobalt recommends registering the product by completing and returning a product registration form. In the event of a warrantable defect, the purchaser shall notify Cobalt with a description of the problem, and Cobalt shall provide the purchaser with a Return Material Authorization ("RMA"). For return, defective products should be double boxed, and sufficiently protected, in the original packaging, or equivalent, and shipped to the Cobalt Factory Service Center, postage prepaid and insured for the purchase price. The purchaser should include the RMA number, description of the problem encountered, date purchased, name of dealer purchased from, and serial number with the shipment.

Cobalt Digital Inc. Factory Service Center
2506 Galen Drive
Champaign, IL 61821 USA
www.cobaltdigital.com
Office: (217) 344-1243
Fax: (217) 344-1245
Email: info@cobaltdigital.com

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Contact Cobalt Digital Inc.

Feel free to contact our thorough and professional support representatives for any of the following:

- Name and address of your local dealer
- Product information and pricing
- Technical support
- Upcoming trade show information

Phone:	(217) 344-1243
Fax:	(217) 344-1245
Web:	www.cobaltdigital.com
General Information:	info@cobaltdigital.com
Technical Support:	support@cobaltdigital.com

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Chapter 2

Installation

Overview

This chapter contains the following information:

Installing the 9971-MVx-4K Into a Frame Slot

CAUTION

Heat and power distribution requirements within a frame may dictate specific slot placement of cards. Cards with many heat-producing components should be arranged to avoid areas of excess heat build-up, particularly in frames using only convection cooling. The 9971-MVx-4K has a moderate power dissipation (>30 W). As such, avoiding placing the card adjacent to other cards with similar dissipation values if possible.

CAUTION

	**This device contains semiconductor devices which are susceptible to serious damage from Electrostatic Discharge (ESD). ESD damage may not be immediately apparent and can affect the long-term reliability of the device.** **Avoid handling circuit boards in high static environments such as carpeted areas, and when wearing synthetic fiber clothing. Always use proper ESD handling precautions and equipment when working on circuit boards and related equipment.**

Note: **If installing the 9971-MVx-4K in a slot with no rear I/O module, a Rear I/O Module is required** before cabling can be connected. Refer to Installing a Rear I/O Module (p. 2-3) for rear I/O module installation procedure.

CAUTION

If required, make certain Rear I/O Module(s) is installed before installing the 9971-MVx-4K into the frame slot. Damage to card and/or Rear I/O Module can occur if module installation is attempted with card already installed in slot.

Note: Check the packaging in which the 9971-MVx-4K was shipped for any extra items such as a Rear I/O Module connection label. In some cases, this label is shipped with the card and to be installed on the Rear I/O connector bank corresponding to the slot location of the card.

Install the 9971-MVx-4K into a frame slot as follows:

1. Determine the slot in which the 9971-MVx-4K is to be installed.
2. Open the frame front access panel.
3. While holding the card by the card edges, align the card such that the plastic ejector tab is on the bottom.
4. Align the card with the top and bottom guides of the slot in which the card is being installed.
5. Gradually slide the card into the slot. When resistance is noticed, gently continue pushing the card until its rear printed circuit edge terminals engage fully into the rear I/O module mating connector.

CAUTION

If card resists fully engaging in rear I/O module mating connector, check for alignment and proper insertion in slot tracks. Damage to card and/or rear I/O module may occur if improper card insertion is attempted.

6. Verify that the card is fully engaged in rear I/O module mating connector.
7. Close the frame front access panel.
8. Connect the input and output cables as shown in 9971-MVx-4K Rear I/O Modules (p. 2-4).
9. Repeat steps 1 through 8 for other 9971-MVx-4K cards.

Note: The 9971-MVx-4K BNC inputs are internally 75-ohm terminated. It is not necessary to terminate unused BNC inputs or outputs.

Note: To remove a card, press down on the ejector tab to unseat the card from the rear I/O module mating connector. Evenly draw the card from its slot.

10. If network remote control is to be used for the frame and the frame has not yet been set up for remote control, perform setup in accordance with Setting Up 9971-MVx-4K Network Remote Control (p. 2-6).

Note: If installing a card in a frame already equipped for, and connected to DashBoard™, no network setup is required for the card. The card will be discovered by DashBoard™ and be ready for use.

Installing a Rear I/O Module

Note: This procedure is applicable **only if a Rear I/O Module is not currently installed** in the slot where the 9971-MVx-4K is to be installed.

If installing the 9971-MVx-4K in a slot already equipped with a suitable I/O module, omit this procedure.

Install a Rear I/O Module as follows:

1. On the frame, determine the slot in which the 9971-MVx-4K is to be installed.
2. In the mounting area corresponding to the slot location, install Rear I/O Module as shown in Figure 2-1.

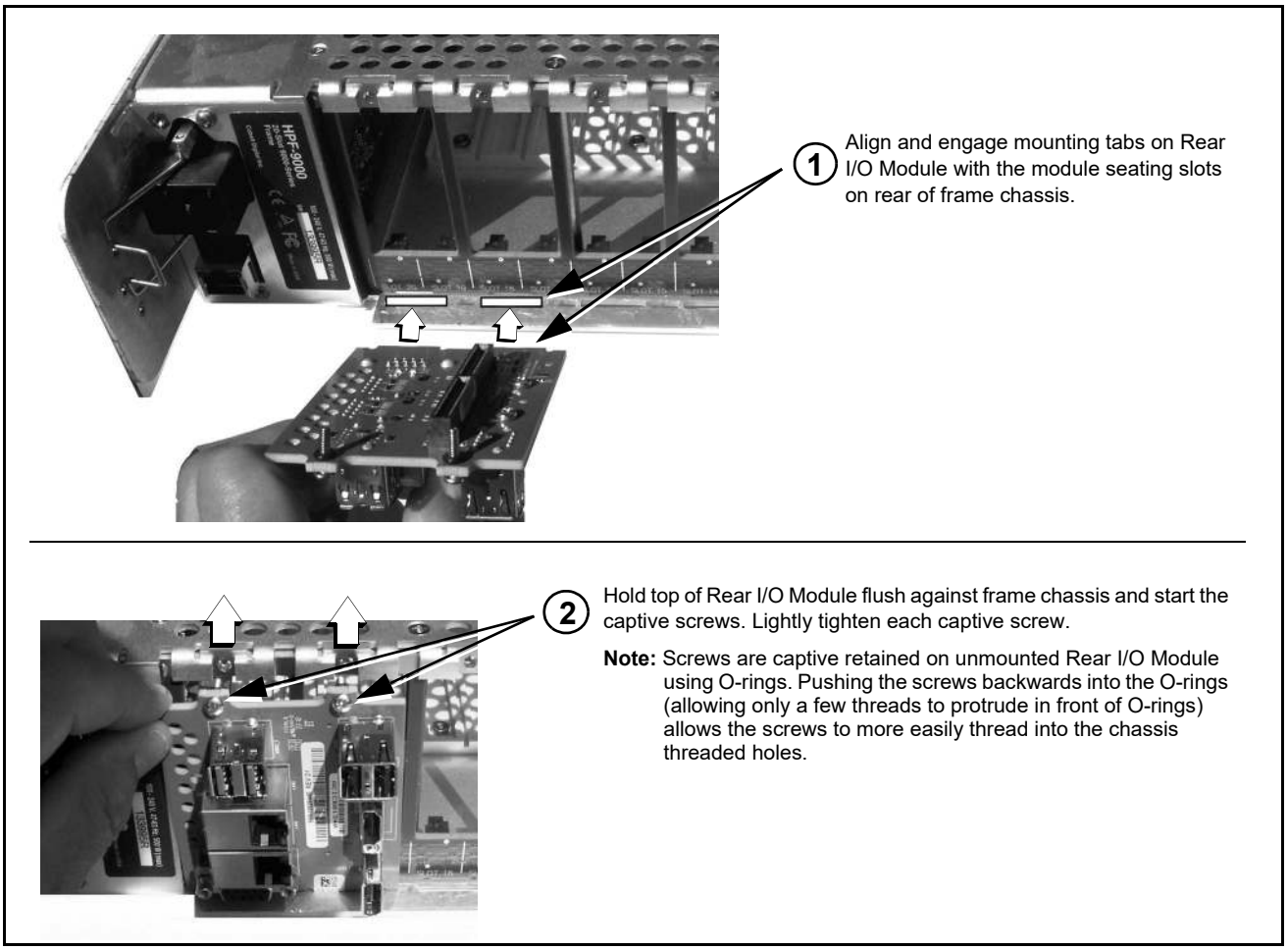


Figure 2-1 Rear I/O Module Installation

9971-MVx-4K Rear I/O Modules

Table 2-1 shows and describes the full assortment of Rear I/O Modules specifically for use with the 9971-MVx-4K.

Table 2-1 9971-MVx-4K Rear I/O Modules

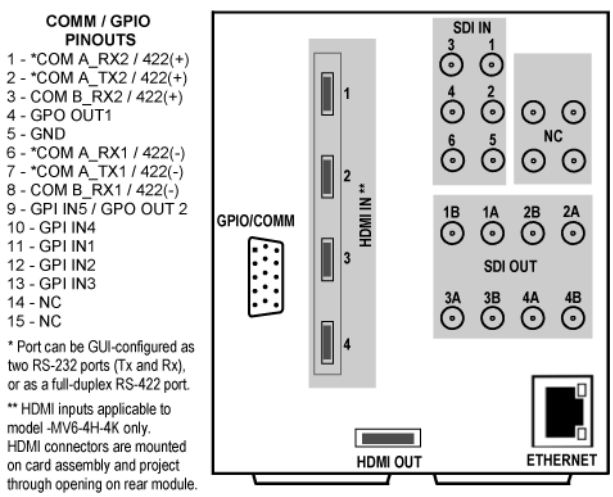
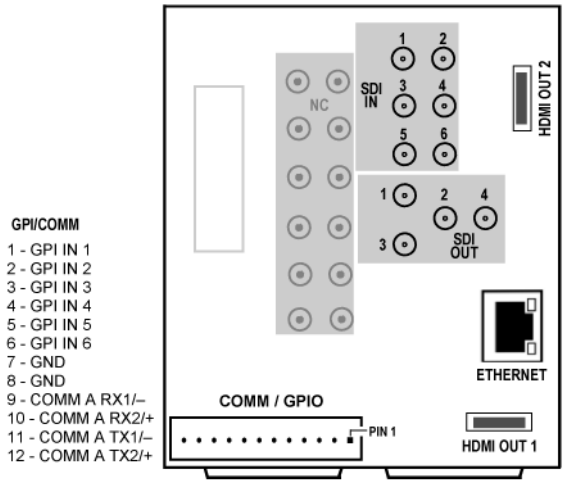
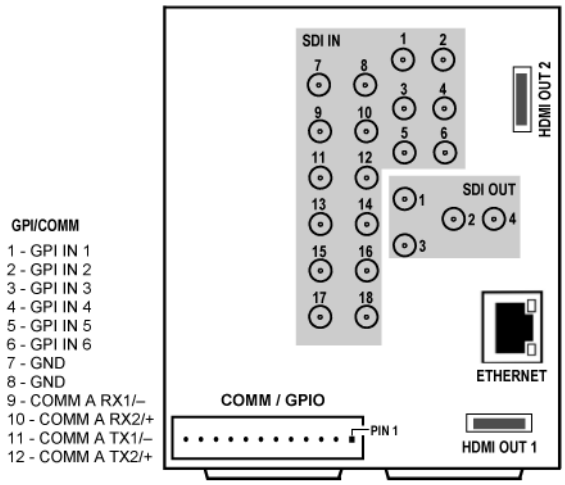
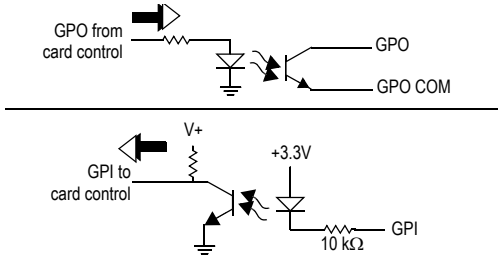
9971-MVx-4K Rear I/O Module	Description
Note: 6-input and 18-input Rear I/O Modules below are intended for use in 9971-MV6-4K or 9971-MV18-4K models, respectively. However, any Rear I/O Module can be used on either model noting the following: • 6-input Rear I/O Modules will not accommodate the maximum available PiP inputs on 9971-MV18-4K. • On 18-input Rear I/O Modules when used with 9971-MV6-4K, only **IN 1** thru **IN 6** of 18 available coaxial inputs on 18-input Rear I/O Modules can be used to pass to the actual card inputs. **Note:** All coaxial connections on Rear I/O Modules below are HD-BNC. **Note:** COMM/GPIO functionality is currently reserved.	
RM20-9971-B-HDBNC  	Provides the following connections: • SIx PiP SDI Video In (**SDI IN 1** thru **SDI IN 6**) • Eight SDI Out (4x2) (**SDI 1A/1B** thru **SDI 4A/4B**) • **HDMI IN 1** thru **HDMI IN 4** (Model 9971-MV6-4H-4K only.) These inputs (HDMI type C mini) reside on the card assembly and project through a cutout on the rear module. The connectors are not part of the rear module assembly. The connectors are shown here for reference. • **HDMI OUT** (type A standard connector) • **COMM/GPIO** (HD-15 connector) • **ETHERNET** 100/1000 Control Port **Note:** Ethernet connector is reserved for tally, UMD control, DashBoard Output Preview, and other functions. This port is independent of card/frame network remote control.

Table 2-1 9971-MVx-4K Rear I/O Modules — continued

9971-MVx-4K Rear I/O Module	Description
RM20-9971-C-HDBNC  	Provides the following connections: • SIx PiP SDI Video In (**SDI IN 1** thru **SDI IN 6**) • Four SDI Out (**SDI 1 OUT** thru **SDI 4 OUT**) • Two HDMI Out (**HDMI OUT 1** and **HDMI 2**; type A standard connectors) • **COMM/GPIO** (HD-15 connector) • **ETHERNET** 100/1000 Control Port **Note:** Ethernet connector is reserved for tally, UMD control, DashBoard Output Preview, and other functions. This port is independent of card/frame network remote control.
RM20-9971-D-HDBNC  	Provides the following connections: • 18 PiP SDI Video In (**SDI IN 1** thru **SDI IN 18**) • Four SDI Out (**SDI 1 OUT** thru **SDI 4 OUT**) • Two HDMI Out (**HDMI OUT 1** and **HDMI 2**; type A standard connectors) • **COMM/GPIO** (HD-15 connector) • **ETHERNET** 100/1000 Control Port **Note:** Ethernet connector is reserved for tally, UMD control, DashBoard Output Preview, and other functions. This port is independent of card/frame network remote control.
 	GPIO uses equivalent opto-isolated circuits shown below. **GPO Specifications:** Max I: 120 mA Max V: 30 V Max P: 120 mW Pullup R >500Ω resistor is recommended when using 5V control. **GPI Specifications:** GPI LO @ Vin < 1.5 V GPI HI @ Vin > 2.3 V Max Vin: 9 V

Setting Up 9971-MVx-4K Network Remote Control

Perform remote control setup in accordance with Cobalt® reference guide "Remote Control User Guide" (PN 9000RCS-RM).

Note: • If network remote control is to be used for the frame and the frame has not yet been set up for remote control, Cobalt® reference guide **Remote Control User Guide (PN 9000RCS-RM)** provides thorough information and step-by-step instructions for setting up network remote control of Cobalt® cards using DashBoard™. (Cobalt® OGCP-9000 and/or OGCP-9000/CC Remote Control Panels are not recommended for use with this product.)

Download a copy of this guide by clicking on the **Support > Reference Documents** link at www.cobaltdigital.com and then select DashBoard Remote Control Setup Guide as a download, or contact Cobalt® as listed in Contact Cobalt Digital Inc. (p. 1-15).

- If installing a card in a frame already equipped for, and connected to DashBoard™, no network setup is required for the card. The card will be discovered by DashBoard™ and be ready for use.
- Cards using current firmware versions typically require DashBoard™ version 6.0 or greater. This is due to the added user interface controls which can only be accommodated with DashBoard version 6.0 or greater. While cards with these firmware versions will appear in the frame Basic Tree View in earlier DashBoard versions, the card controls will not be accessible. For a free download of the latest DashBoard version, please go to **www.cobaltdigital.com**, and select **Products > Software Control > DashBoard™**, and then select the version applicable to your computer.

Chapter 3

Setup Instructions

Overview

If you are already familiar with using DashBoard to control Cobalt cards, please skip to Basic Setup Overview (p. 3-7).

This chapter contains the following information:

Control and Display Descriptions

This section describes the user interface controls, indicators, and displays for using the 9971-MVx-4K card.

Access to the 9971-MVx-4K functions (and the controls, indicators, and displays related to a particular function) follows a general arrangement of Function Menus under which related controls can be accessed (as described in Function Menu/Parameter Menu Overview below).

Note: When a setting is changed, settings displayed on DashBoard™ are the settings as effected by the card itself and reported back to the remote control; the value displayed at any time is the actual value as set on the card.

Function Menu/Parameter Menu Overview

The functions and related parameters available on the 9971-MVx-4K card are organized into function **menus**, which consist of parameter groups as shown below.

Figure 3-1 shows how the 9971-MVx-4K card and its menus are organized, and also provides an overview of how navigation is performed between cards, function menus, and parameters.

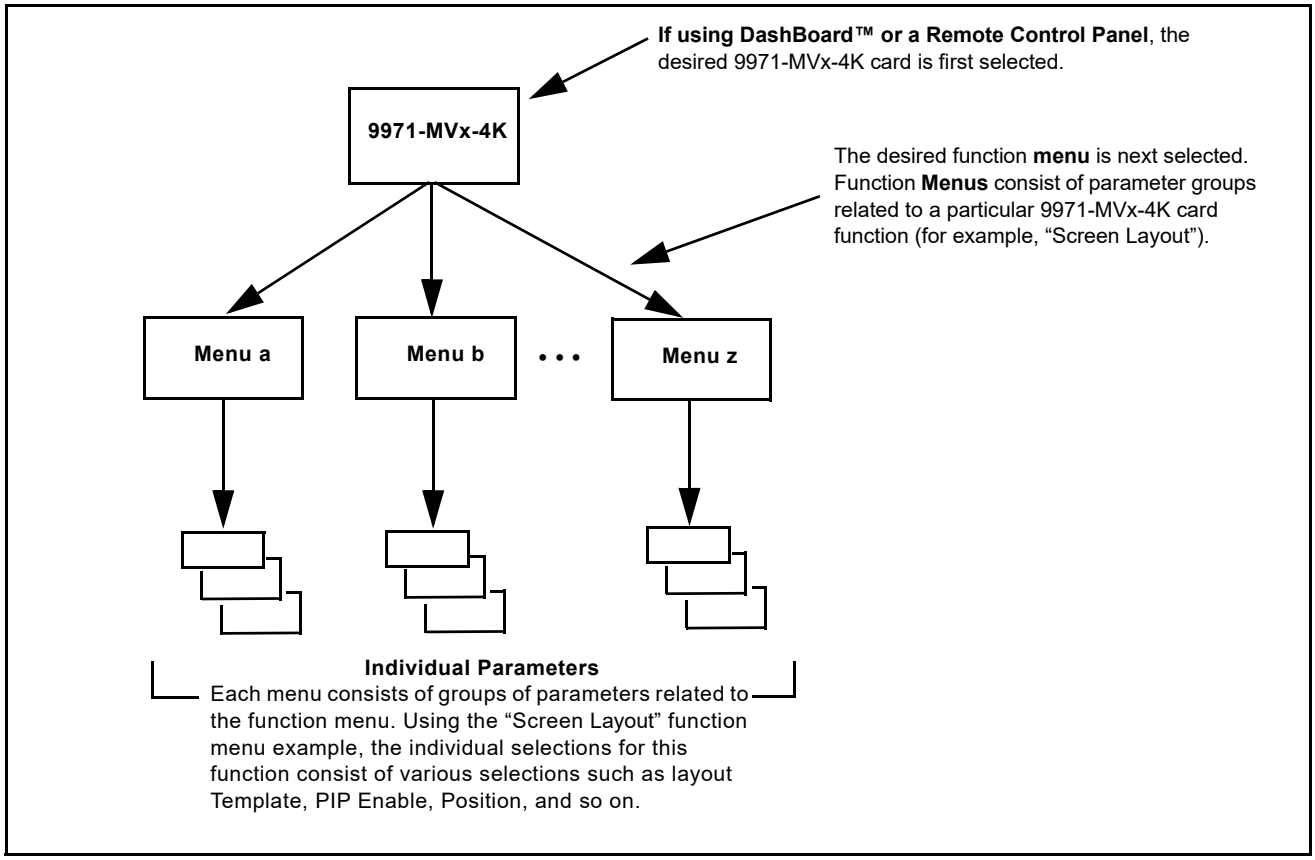


Figure 3-1 Function Menu/Parameter Menu Overview

DashBoard™ User Interface

(See Figure 3-2.) The card function menus are organized in DashBoard™ using tabs. When a tab is selected, each parametric control or selection list item associated with the function is displayed. Scalar (numeric) parametric values can then be adjusted as desired using the GUI slider controls. Items in a list can then be selected using GUI drop-down lists.

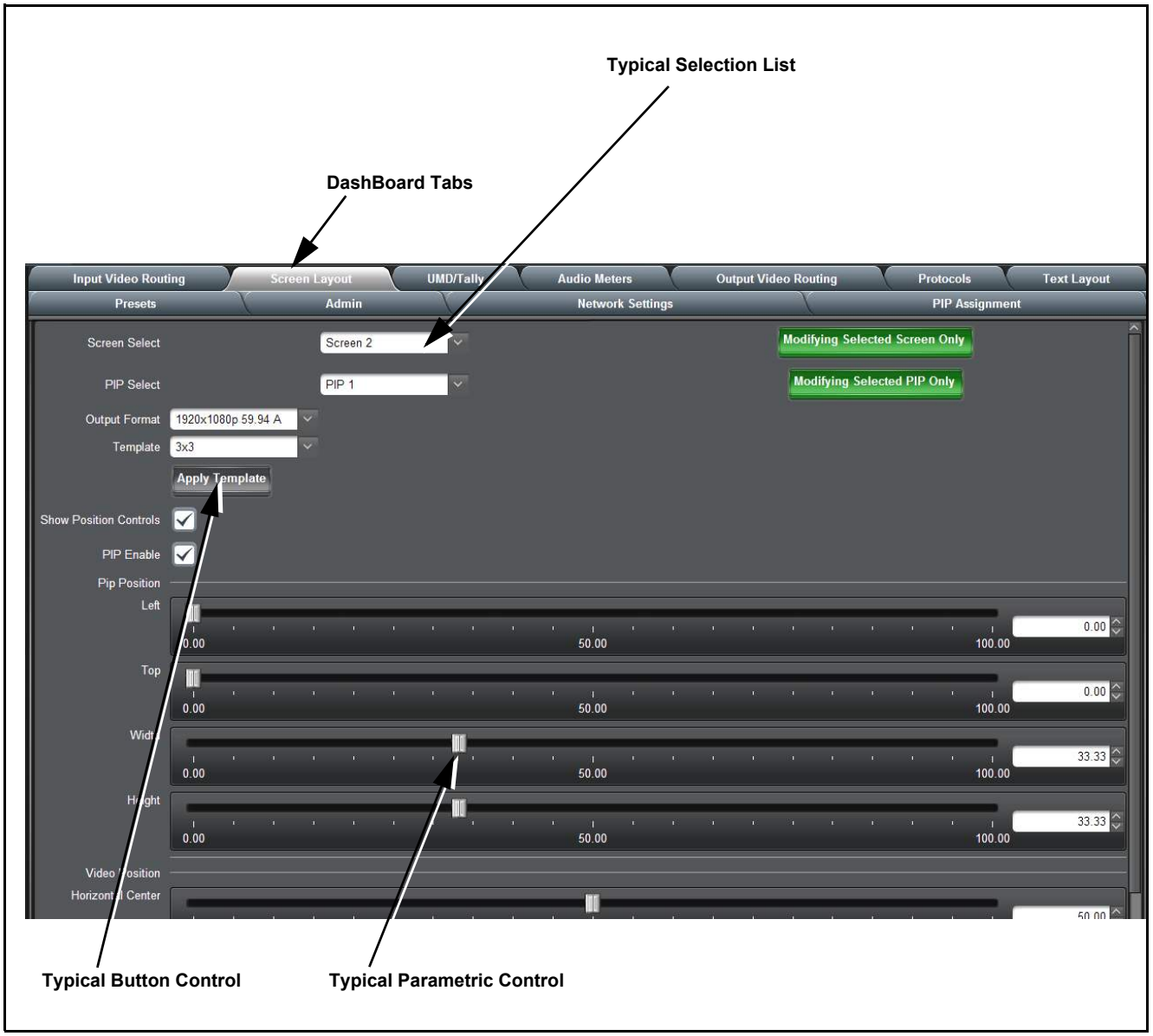


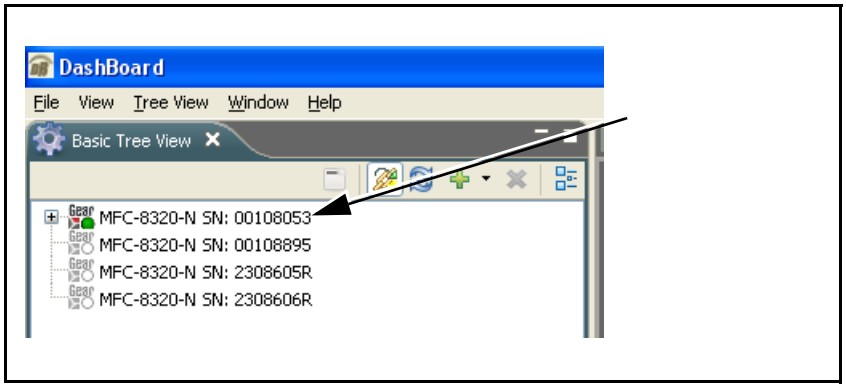
Figure 3-2 Typical DashBoard Tabs and Controls

Accessing the 9971-MVx-4K Card via Remote Control

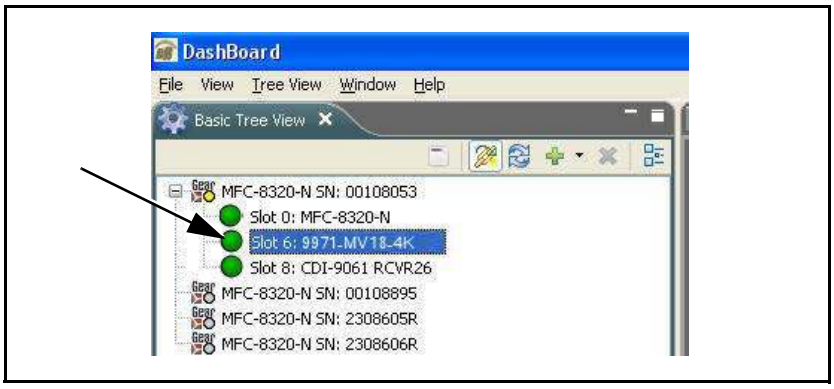
Access the 9971-MVx-4K card using DashBoard™ or Cobalt® Remote Control Panel as described below.

Accessing the 9971-MVx-4K Card Using DashBoard™

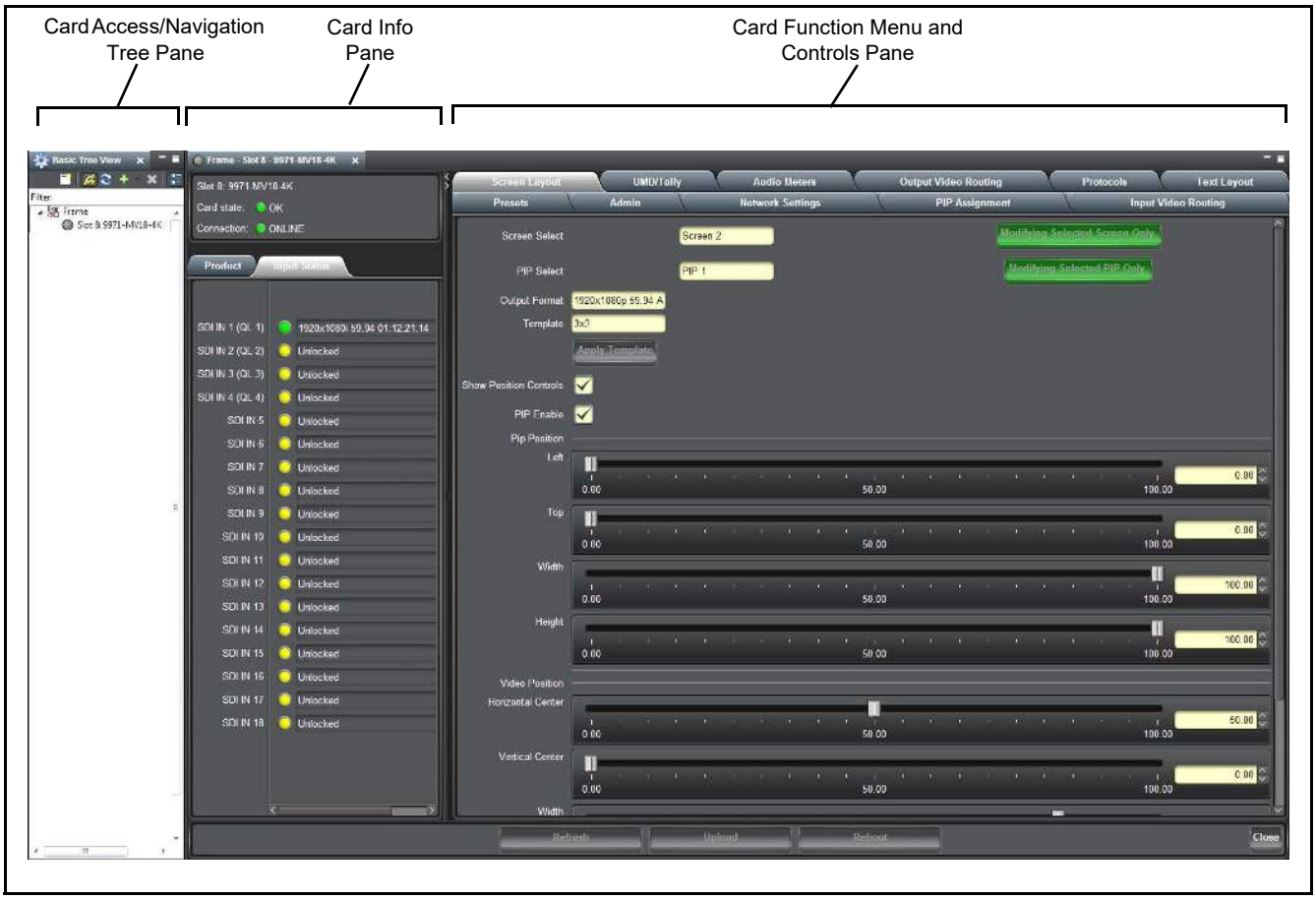
1. On the computer connected to the frame LAN, open DashBoard™.
2. As shown below, in the left side Basic View Tree locate the Network Controller Card associated with the frame containing the 9971-MVx-4K card to be accessed (in this example, “MFC-8320-N SN: 00108053”).



3. As shown below, expand the tree to access the cards within the frame. Click on the card to be accessed (in this example, “Slot 6: 9971-MV18-4K”).



As shown on the next page, when the card is accessed in DashBoard™ its function menu screen showing tabs for each function is displayed. (The particular menu screen displayed is the previously displayed screen from the last time the card was accessed by DashBoard™).


Card Access/Navigation Tree Pane
Card Info Pane
Card Function Menu and Controls Pane
Basic Tree View
Frame - Slot 8 - 9971-MV16-4K
Slot 8: 9971-MV16-4K
Card state: OK
Connection: ONLINE
Product
Input Status
SDI IN 1 (QL 1)
SDI IN 2 (QL 2)
SDI IN 3 (QL 3)
SDI IN 4 (QL 4)
SDI IN 5
SDI IN 6
SDI IN 7
SDI IN 8
SDI IN 9
SDI IN 10
SDI IN 11
SDI IN 12
SDI IN 13
SDI IN 14
SDI IN 15
SDI IN 16
SDI IN 17
SDI IN 18
Unlocked
Screen Layout
UMD/Tally
Audio Meters
Output Video Routing
Protocols
Text Layout
Presets
Admin
Network Settings
PIP Assignment
Input Video Routing
Screen Select
Screen 2
PIP Select
PIP 1
Output Format
Template
Apply Template
Show Position Controls
PIP Enable
Pip Position
Left
Top
Width
Height
Video Position
Horizontal Center
Vertical Center
Refresh
Upload
Reboot
Close

Checking 9971-MVx-4K Card Information

The operating status and software version the 9971-MVx-4K card can be checked using DashBoard™. Figure 3-3 shows and describes the 9971-MVx-4K card information screen using DashBoard™.

Note: Proper operating status in DashBoard™ is denoted by green icons for the status indicators shown in Figure 3-3. Yellow or red icons respectively indicate an alert or failure condition. Refer to Troubleshooting (p. 3-37) for corrective action.

The **Tree View** shows the cards seen by DashBoard™. In this example, Network Controller Card is hosting a 9971-MV18-4K card in slot 8.

Status Display
This displays shows the status and format of the signals being received by the 9971-MVx-4K, as well as card status.

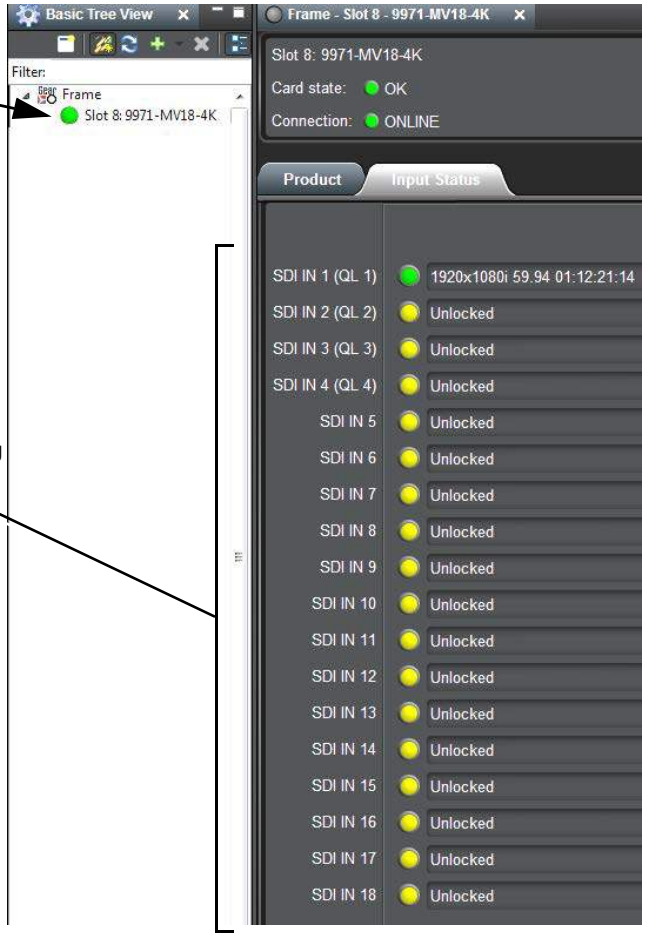


Figure 3-3 9971-MVx-4K Card Info/Status Utility

Basic Setup Overview

Figure 3-4 describes the primary steps in setting up the card to have a desired multiviewer layout, accommodate the number of input channels (PiPs) needed, and route the merged Screen output(s) to the physical card SDI and/or HDMI outputs. Basically, these steps set the card to accommodate the desired number of input channel PiPs, and then provide an output multiviewer matrix with the desired layout; these steps will produce the desired PiP layout on the card output.

When the input PiP and layout aspects are set as desired, then other attributes such as tallies and audio bars can be added to the PiPs as described in detailed section 9971-MVx-4K Function Menu List and Descriptions (p. 3-8).

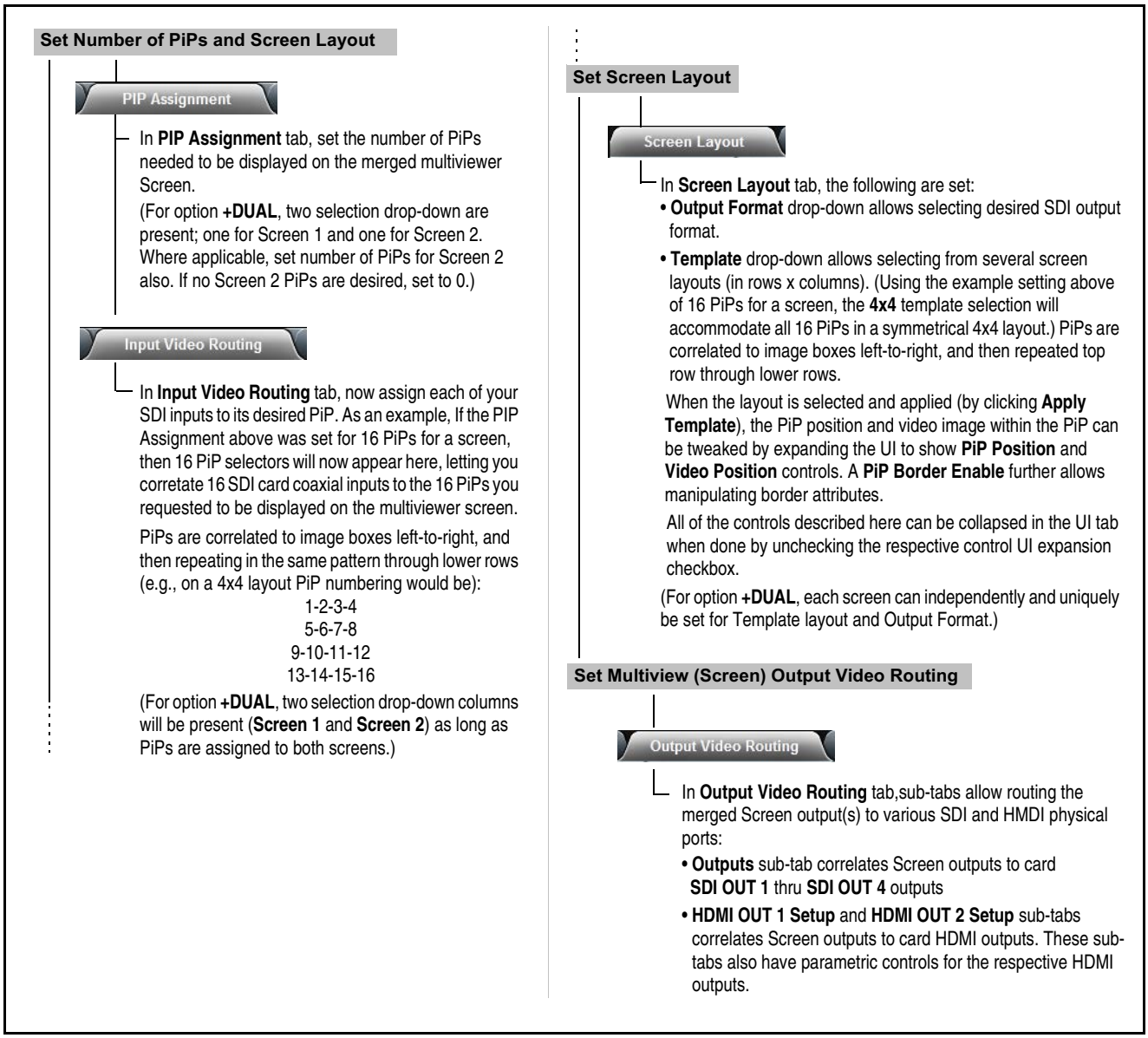


Figure 3-4 Basic Setup Overview

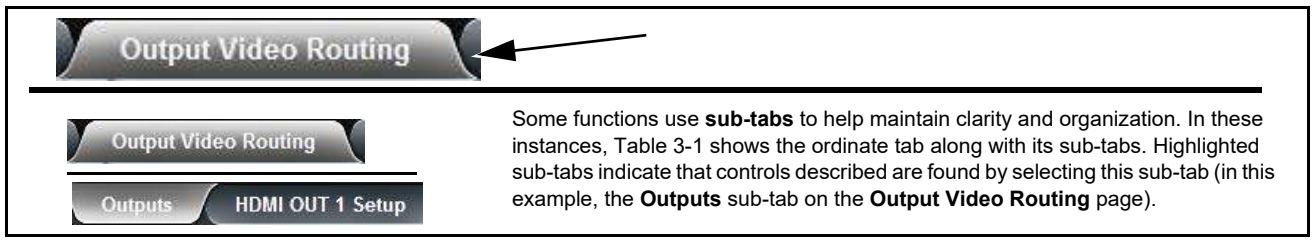
9971-MVx-4K Function Menu List and Descriptions

Table 3-1 individually lists and describes each 9971-MVx-4K function menu and its related list selections, controls, and parameters. Where helpful, examples showing usage of a function are also provided. Table 3-1 is primarily based upon using DashBoard™ to access each function and its corresponding menus and parameters.

Note: All numeric (scalar) parameters displayed on DashBoard™ can be changed using the slider controls, ⇕ arrows, or by numeric keypad entry in the corresponding numeric field. (When using numeric keypad entry, add a return after the entry to commit the entry.)

Note: Examples in this section use 9971-MV18-4K and may cite up to 18 available PiPs. The same controls appear on 9971-MV6-4K, but with support of a maximum of six PiPs on the card itself and related UI depictions. However, both models use the same tabs/pages as shown here.

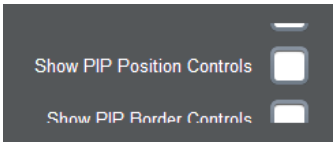
On DashBoard™ itself and in Table 3-1, the function menu items are organized using tabs as shown below.



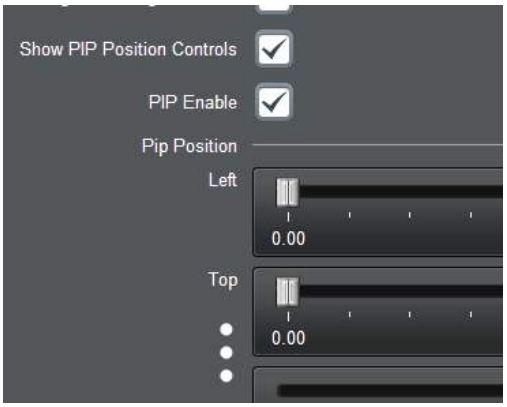
The table below provides a quick-reference to the page numbers where each function menu item can be found.

Table 3-1 9971-MVx-4K Function Menu List

Note: Numerous tabs/pages described below have **Show** checkboxes for various controls that allow hiding or exposing the controls as desired. This helps reduce visual clutter for controls that do not need manipulation. To expose the controls as described here, make certain the **Show** checkbox is checked.



In this example, with the **Show PIP Position Controls** unchecked, PiP position controls are hidden, and next UI next item directly appears next.



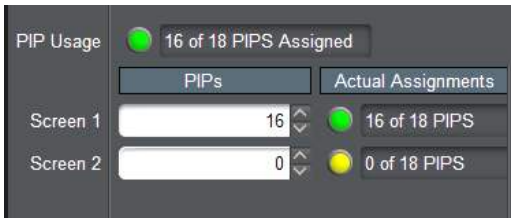
If now the **Show PIP Position Controls** box is checked, the full complement of PiP position controls are now shown and available.

Sets card for number of discrete PiPs to be displayed on the merged multiviewer Screen output(s).

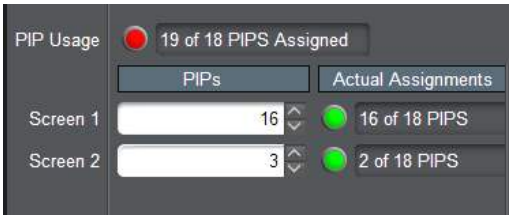
Option

Note: UI depictions below may show **Screen 1** and **Screen 2** controls. Screen 2 controls appear only when licensed with option **+DUAL**, which allows the card to support two independent screen outputs. If not optioned with +DUAL, the UI shows only Screen 1 controls.

• PiP Assign Select



Drop-down allows number of PiPs to be allotted to merged screen (in this example, 16 PiPs allotted to merged output screen).



If the allowable maximum allotment is exceeded, the card “trims” the allotment to allowable amount of last action (in this example, trimming 3 PiPs requested on Screen 2 to 2 PiPs, thereby keeping the total to 18 allowed PiPs).

Table 3-1 9971-MVx-4K Function Menu List — continued

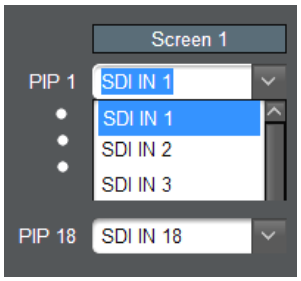
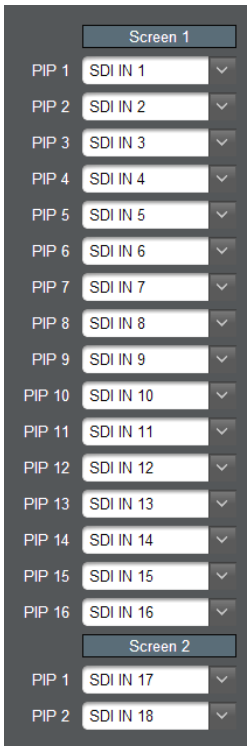
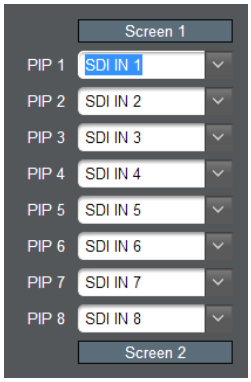
Input Video Routing	Selects and correlates card SDI inputs to display PiPs.
• **PiP-to-SDI Source Select**  	Drop-down selectors for each PiP allow correlating SDI inputs to each requested PiP. **Any** SDI IN can be assigned to **any** PiP. **Note:** Where quad-link SDI IN is used (SDI IN 1 thru SDI IN 4), the consecutive four SDI INs will be assigned to the desired PiP using **SDI IN 1** as the SDI IN – PiP designator for the PiP.
  	The number of PiPs displayed are dynamically tailored to the number of PiPs requested/assigned using the **PIP Assignment** tab (p. 3-9). In this example, the left example shows case where 16 PiPs are allotted to Screen 1 and 2 PiPs are allotted to Screen 2. The right example shows case where 8 PiPs are allotted to Screen 1, and none to Screen 2, thereby suppressing the Screen 2 column entirely.)

Table 3-1 9971-MVx-4K Function Menu List — continued

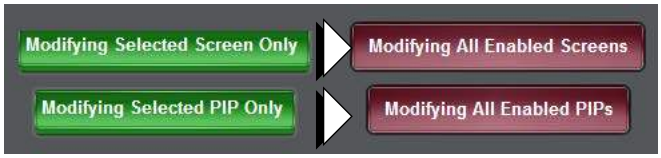
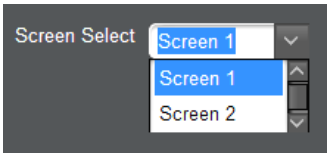
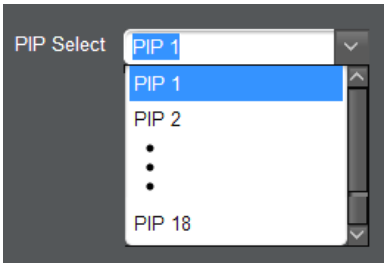
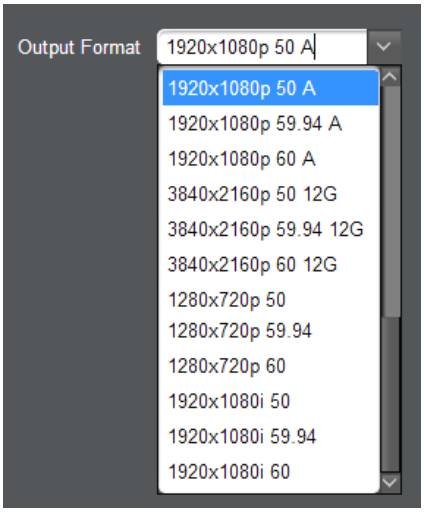
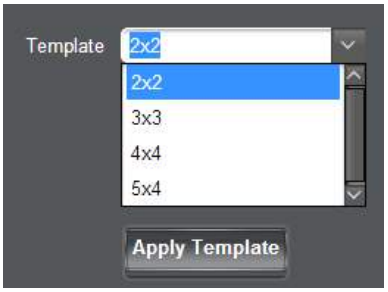
	Provides controls for selecting PiP layout presets templates and output format of the merged screen output(s). Also provides controls for per-PiP manipulation such as PiP sizing and positioning.
Screen/PiP Ganging Controls **Note:** In this tab and others where applicable, a ganging control and info message allows actions to be applied to **only** the selected screen (or PiP) or to **all** screens (or PiPs) as described below.  Clicking on the info message changes the action from **Only Screen** or **Only PIP** to ganged action of **All Enabled Screens** or **All Enabled PIPs**. This is convenient when attributes (such as tally setup or output format) is desired to be applied in a wholesale manner. In addition to changing the ganging rules, the info display also shows, at any time, whether changes are being applied on per-item or all items basis. If not carefully considered, **All** settings can apply attributes not desired for screens and/or PiPs. Make certain wholesale changes are desired before selecting All settings and applying changes.	
• **Screen Select** 	(Option **+DUAL** only) Selects the **Screen** to be set up using the controls on this tab. **Note:** This control can be set to gang both screens using the Screen/PiP Ganging Controls described above.
• **PiP Select** 	Selects the **PiP** to be set up using the controls on this tab. **Note:** This control can be set to gang all PiPs using the Screen/PiP Ganging Controls described above.

Table 3-1 9971-MVx-4K Function Menu List — continued

Screen Layout	(continued)
• **Output Format Select** 	Selects the output format (from choices shown) for the **Screen** to be set up using the controls on this tab. **Note:** (Option **+DUAL** only) This control can be set to gang both screens using the Screen/PiP Ganging Controls described above.
• **Template Preset Select** 	Selects from the preset symmetrical template grid choices shown to be applied to the screen(s). Click **Apply Template** when done. Shown below are example template layouts and example (default) PiP assignments. When the template is applied, PiP positioning, sizing, and video program image area within a PiP can be manipulated using controls described below. **Note:** • (Option **+DUAL** only) This control can be set to gang both screens using the Screen/PiP Ganging Controls (p. 3-11). • Make certain PiP settings performed in PIP Assignment (p. 3-9) assigns enough PiPs to fill template grid selected. • Although some layout choices exceed the number of program PiPs supported, these are reserved for support of clock and static graphic insertion support.

2 x 2

PIP 1	PIP 2
PIP 3	PIP 4

3 x 3

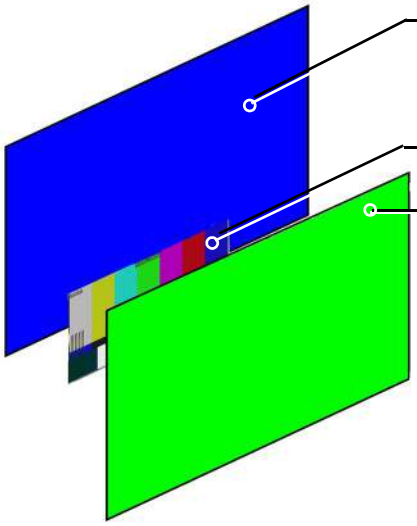
PIP 1	PIP 2	PIP 3
PIP 4	PIP 5	PIP 6
PIP 7	PIP 8	PIP 9

4 x 4

PIP 1	PIP 2	PIP 3	PIP 4
PIP 5	PIP 6	PIP 7	PIP 8
PIP 9	PIP 10	PIP 11	PIP 12
PIP 13	PIP 14	PIP 15	PIP 16

Table 3-1 9971-MVx-4K Function Menu List — continued

Screen Layout	(continued)
• **Background/Foreground Images and Controls**	**Background** and **Foreground** are full-screen raster insertion functions that provide a background template and also provide a foreground that can mask merged screen details not desired on the overall output, or provide fixed details (such as logo bugs) that are “burned into” the final image independent of PiP video content.



- **Background** Image resides behind the opaque PiPs (PiP video content and any borders, UMDs, Tallies, etc.) Background Image insertions can be full-size raster insertions, such as logo-based background template that remains fixed regardless of PiP positioning or sizing.
- **PiP Example**. PiP resides on top of background but behind foreground.
- **Foreground** Image resides on top of PiPs and background. The Foreground can serve as a mask where only certain PiPs or other details are visible in the final merged output view.

Both background and foreground digitally reside on the card as files stored in the card user-accessible SD Micro memory card.

A typical use of **Background** Image is a stylized template or background behind the PiPs. This background can be the production entity tradename or a backdrop that correlates the multiviewer instance to a production or precessing functional area.

A typical use of **Foreground** Image is an opaque overlay that has “cutouts” or “windows” in which desired PiPs can show through (the foreground file cutouts would correlate to the size and position of the intended PiP “windows”).

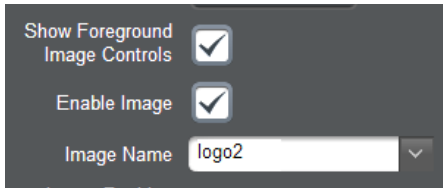
A Foreground image can also have fixed static graphic elements positioned in PiP image areas such as ID “bugs” as shown in this example.

Table 3-1 9971-MVx-4K Function Menu List — continued

Screen Layout	**(continued)**

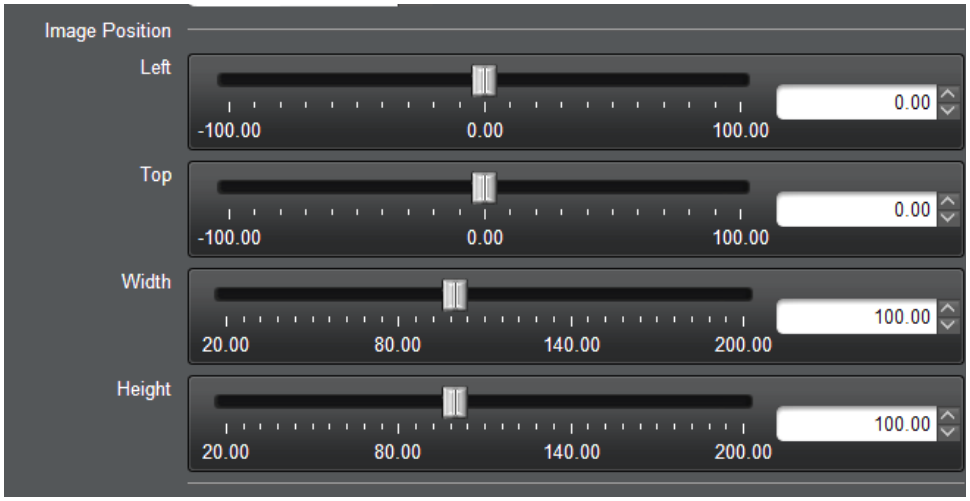
Note: Unless changes here are to be applied to all screens, make certain the desired screen is selected in Screen Select, and make certain Screen/PiP Ganging Controls is set to **Screen Only**. See Screen/PiP Ganging Controls (p. 3-11) for info on setting controls for screen/PiP only or wholesale ALL settings.

- **Foreground Select/Position/Enable Controls**



The **Show Foreground Image Controls** checkbox opens the Foreground Image Enable, Image Name, and Position adjustment controls.

- **Enable** and **Image Name** exposes controls and selects the desired image file stored on the card's Micro SD memory card.
- **Image Load Status** (not shown) shows if desired image file is accessible and loaded, or if image is not available because Micro-SD is not installed or cannot be read.
- **Width** and **Height** controls adjust the size of the imported image.
- **Left** and **Top** controls move the PiP from its default origin position.



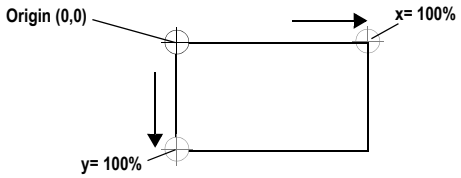
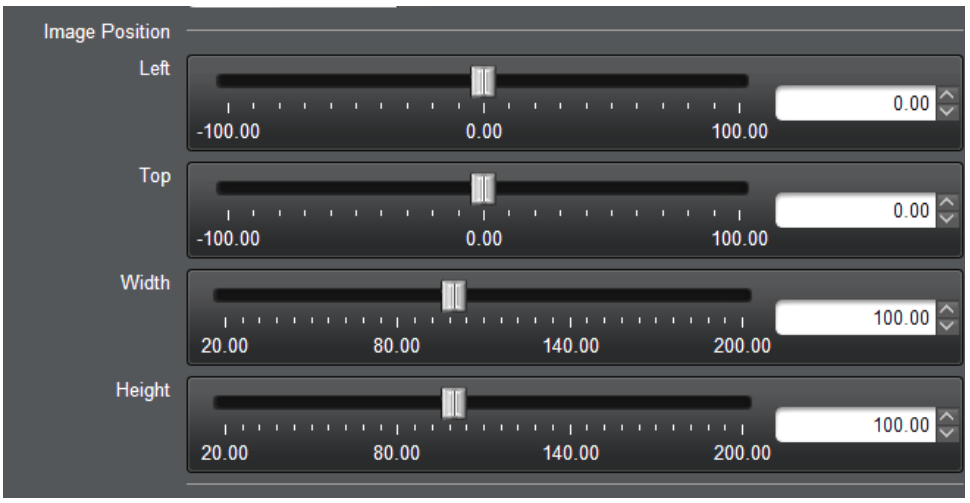


Table 3-1 9971-MVx-4K Function Menu List — continued

Screen Layout	(continued)
• **Background Select/Position/Enable Controls**	The **Show Background Image Controls** checkbox opens the Background Image Enable, Image Name, and Position adjustment controls. • **Enable** and **Image Name** exposes controls and selects the desired image file stored on the card's Micro SD memory card. • **Image Load Status** (not shown) shows if desired image file is accessible and loaded, or if image is not available because Micro-SD is not installed or cannot be read. • **Width** and **Height** controls adjust the size of the imported image. • **Left** and **Top** controls move the PiP from its default origin position.



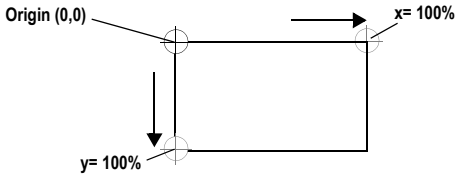
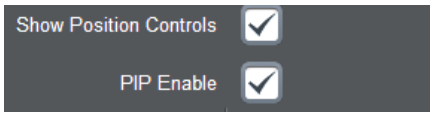


Table 3-1 9971-MVx-4K Function Menu List — continued

Screen Layout	(continued)

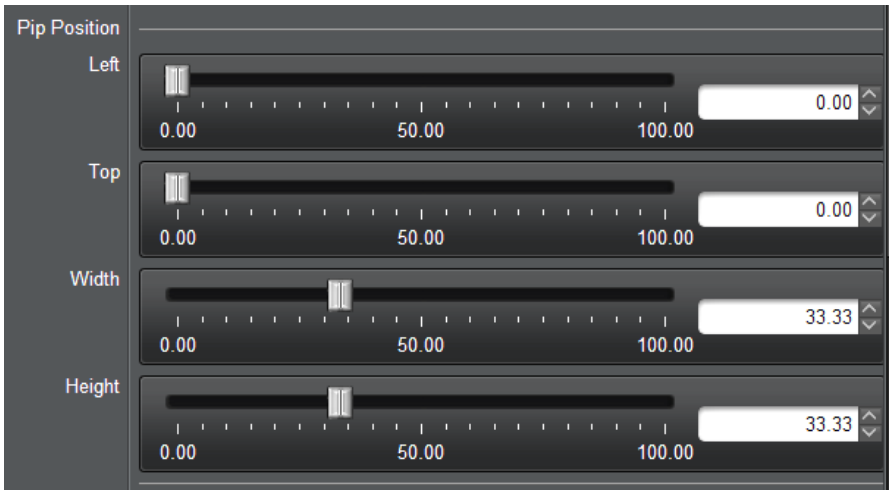
Note: Unless changes here are to be applied to all PiPs, make certain the desired PiP is selected in PIP Select, and make certain Screen/PiP Ganging Controls is set to **Only PiP**. See Screen/PiP Ganging Controls (p. 3-11) for info on setting controls for screen/PiP only or wholesale ALL settings.

• PiP Position/Enable Controls



The **Show Position Controls** checkbox opens the PiP Position and Video Position adjustment controls.

- **Left** and **Top** controls move the PiP from its default origin position.
- **Width** and **Height** controls adjust the size of the PiP from that prescribed in the template preset selection set earlier. (As an example, default W/H of 33% will correspond to the 1/3 split of each PiP for the 3x3 template layout.)



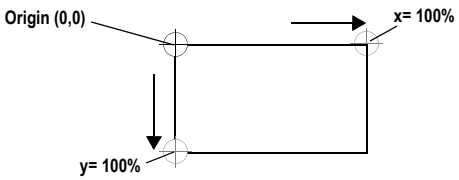
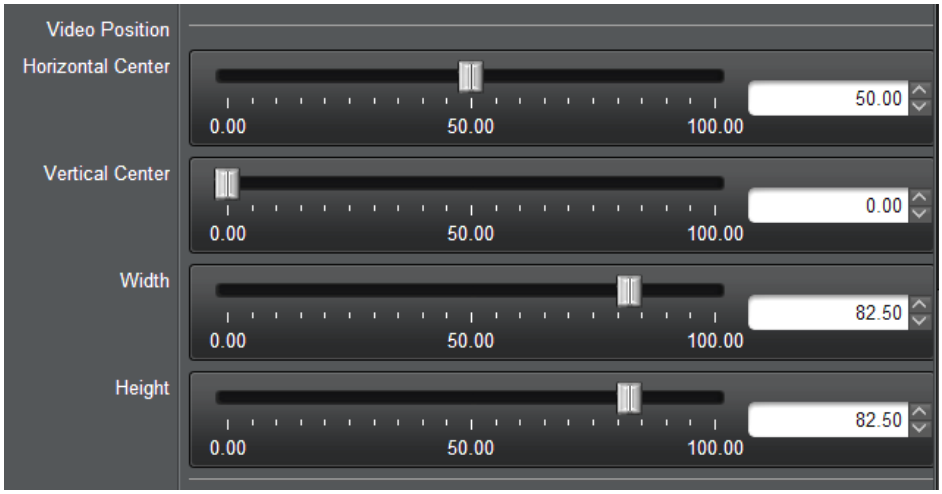


Table 3-1 9971-MVx-4K Function Menu List — continued

Screen Layout	(continued)
• **Video Position Controls**	• **Horizontal** and **Vertical Center** controls shift the content video image within the individual PiP area left/right or up/down. • **Width** and **Height** controls adjust the size of the content video image from its default size to a H/V size less than 100%. **Note:** Video position/size controls have no effect on the respective PiP size or position. Only the image within the selected PiP is modified.



• **Border Width/Enable Controls**	The **Show Border Controls** checkbox opens the Border width and other attributes controls. • **Border Width** sets the border width (in pixels).

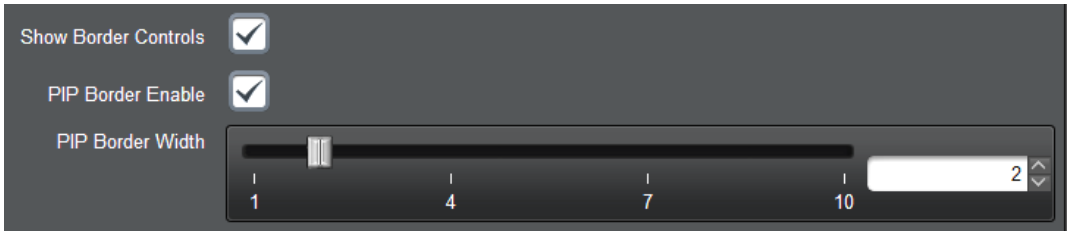


Table 3-1 9971-MVx-4K Function Menu List — continued

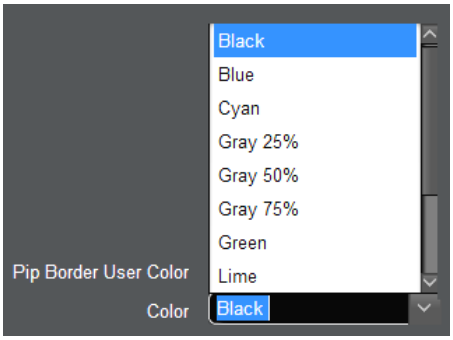
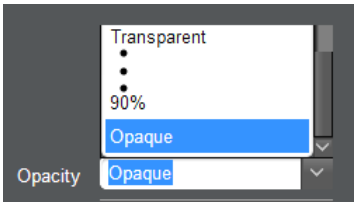
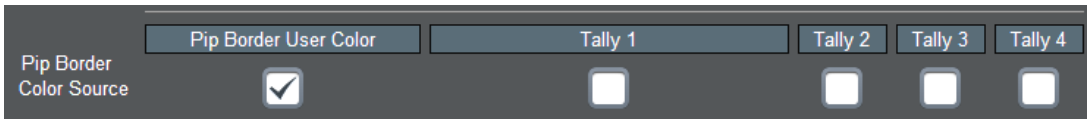
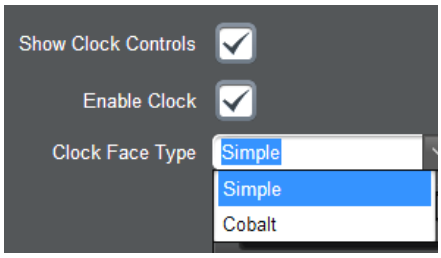
Screen Layout	(continued)
• **Border User Color/Opacity Select**  	• **User Color** select, when enabled, allows a border color to be asserted manually (versus asserted by tally automation). Color choices are shown here. • **Opacity** selects border opacity from full opaque to transparent in various gradients.
• **PiP Border Color Source Select** 	Selects the PiP board color from choices of User Color (as manually set up using Border User Color/Opacity Select controls above), or using Tally automated border color as directed by Tally 1 thru Tally 4 direction.

Table 3-1 9971-MVx-4K Function Menu List — continued

Screen Layout	**(continued)**

Note: Unless changes here are to be applied to all screens, make certain the desired screen is selected in Screen Select, and make certain Screen/PiP Ganging Controls is set to **Screen Only**. See Screen/PiP Ganging Controls (p. 3-11) for info on setting controls for screen/PiP only or wholesale ALL settings.

• Clock Enable/Position Controls



The **Show Clock Controls** checkbox opens the Clock Enable, Clock Face Type, and Position adjustment controls.

- **Enable** exposes controls and enables clock insertion on background.
- **Clock Face Type** selects from two clock face styles:
  - **Simple** shows an analog dial-type clock (with hour, minute, and seconds “hands”).
  - **Cobalt** shows a numeric (“digital”) clock (with hour, minute, and seconds digits.
- **Left** and **Top** controls move the PiP from its default origin position.

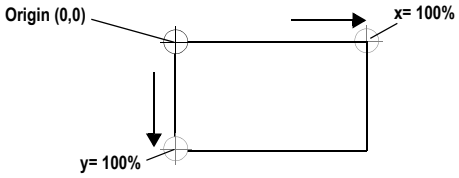


Table 3-1 9971-MVx-4K Function Menu List — continued

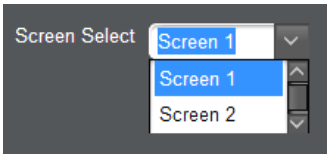
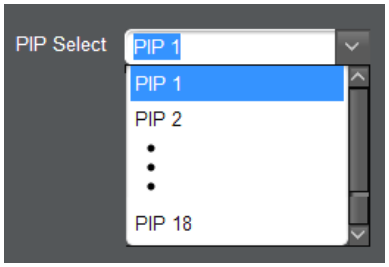
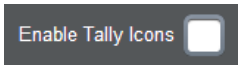
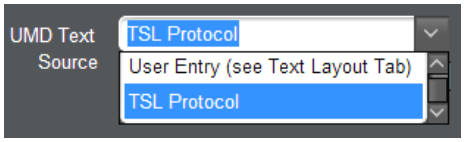
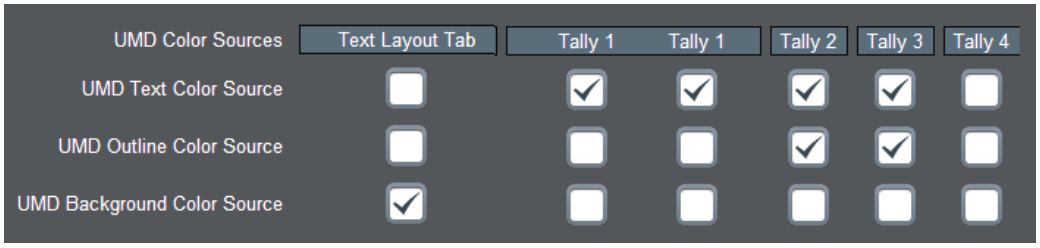
	Provides controls to set UMD text and color sources from TSL protocol/tally, or to obtain from User Entry (Text Layout page).
Note: Unless changes here are to be applied to all PiPs or screens, make certain the desired PiP is selected in PIP Select, and make certain Screen/PiP Ganging Controls is set to **desired screen/PiP**. See Screen/PiP Ganging Controls (p. 3-11) for info on setting controls for screen/PiP only or wholesale ALL settings.	
• **Screen Select** 	(Option **+DUAL** only) Selects the **Screen** to be set up using the controls on this tab. **Note:** This control can be set to gang both screens using the Screen/PiP Ganging Controls (p. 3-11).
• **PiP Select** 	Selects the **PiP** to be set up using the controls on this tab. **Note:** This control can be set to gang all PiPs using the Screen/PiP Ganging Controls (p. 3-11).
• **Enable Tally Icons** 	Enables insertion/use of standard tally “lamp” icon (rounded-corner square “lamp” icon). **Note:** Per TSL protocols, tally activation can be tied to color changes or other attributes. Enabling icons here is specifically tied to icon graphic insertion.
• **UMD Text Source Select** 	Selects UMD text source from TSL Protocol automation, or sets UMD to use static user-entered text in conjunction with Text Layout tab/page (p. 3-21).
• **UMD Color Source Select** 	For text, outlines, and background colors, individually allows color source to be selected from Tally sources, or use static user-entered color choices in conjunction with Text Layout tab/page (p. 3-21). The **Tally 1** thru **Tally 4** choices allow prioritization of TSL tally number items to assert over lower numbers (example: If Tally 1 is active over Tally 2, attributes/actions associated with Tally 1 are asserted).

Table 3-1 9971-MVx-4K Function Menu List — continued

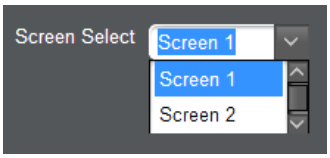
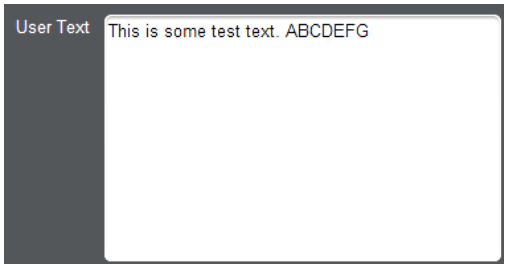
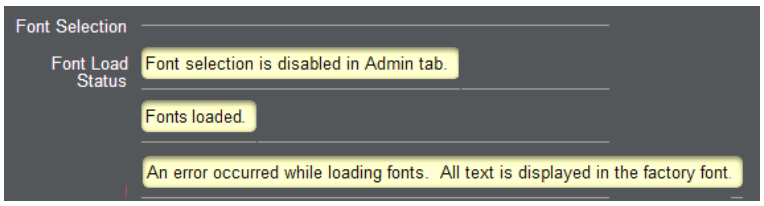
<table>
<tr><td> 
</td><td>Provides controls and dialog for screen text entry and positioning.</td></tr>
<tr><td colspan="2">Note: This tab has sub-tabs for Screen Text and PiP Text.
- Screen Text is user text which is “burned” across the entire multiviewer merged screen, with no regard for underlaying PiP.
- PiP Text is user text which is “burned” into specified PiP(s) and is entirely contained within a PiP.</td></tr>
<tr><td>• Screen Select
 
</td><td>(Option +DUAL only) Selects the Screen to be set up using the controls on this tab.
Note: This control can be set to gang both screens using the Screen/PiP Ganging Controls (p. 3-11).</td></tr>
<tr><td>• Screen Text Entry Field
 
</td><td>Dialog entry box that allows entry of desired ident text string.
Note: • All normal keyboard alphanumeric characters are supported. Not all ASCII special characters (Windows ALT+nnnn) are supported.
• Up to 126 characters can be entered.</td></tr>
<tr><td> 
</td><td>Depending on whether or not Load User Fonts is selected in the Admin tab, a corresponding message in Font Load Status is displayed.</td></tr>
</table>

Table 3-1 9971-MVx-4K Function Menu List — continued

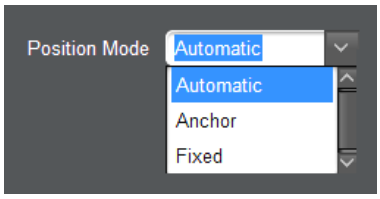
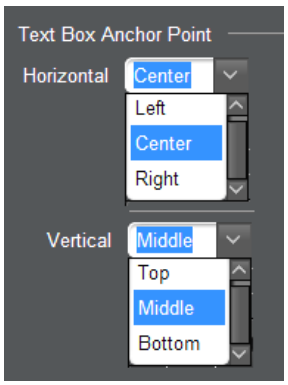
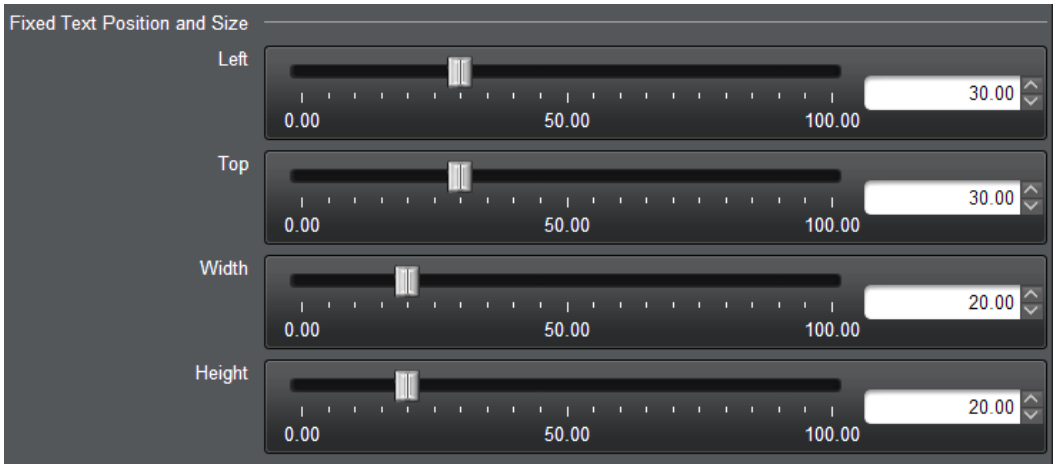
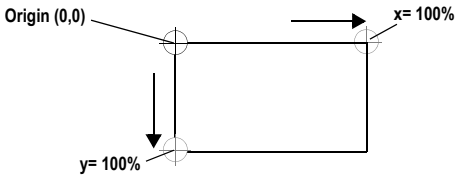
	**(continued)**
• **Position Mode Select**  	Sets the base location and anchoring of screen text insertions. • **Automatic** is default basic positioning. • **Fixed** allows full custom positioning using Fixed Text Position and Size controls (see below). • **Anchor** allows text positioning anchored to a starting position. The Text Box Anchor Point controls are exposed when Anchor is selected.

Table 3-1 9971-MVx-4K Function Menu List — continued

(continued)

• **Fixed Text Position/Size Controls**	When **Fixed** mode is selected above, these controls allow positioning and sizing as described. • **Left** and **Top** controls move the PiP from its default origin position. • **Width** and **Height** controls adjust the size of the overall text insertion.





• **Border Width/Enable Controls**	The **Show Border Controls** checkbox opens the Border width and other attributes controls. • **Outline Width** sets the border width (in pixels).

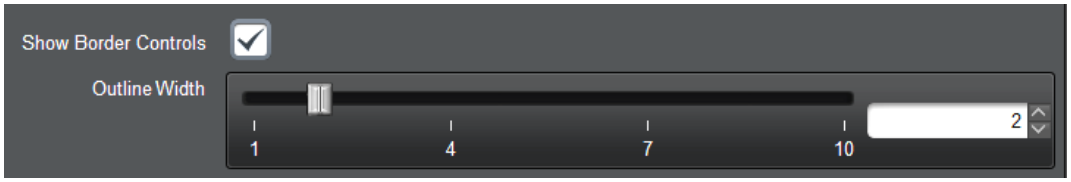


Table 3-1 9971-MVx-4K Function Menu List — continued

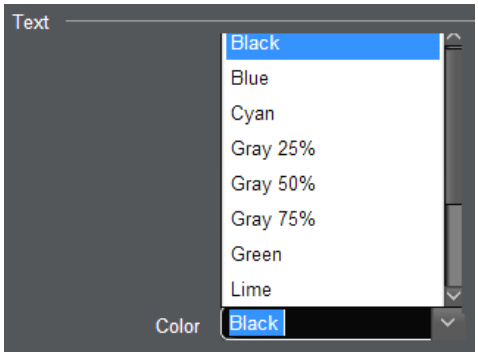
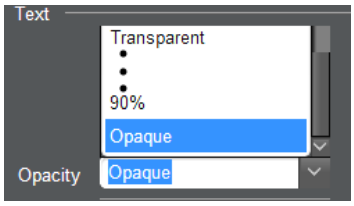
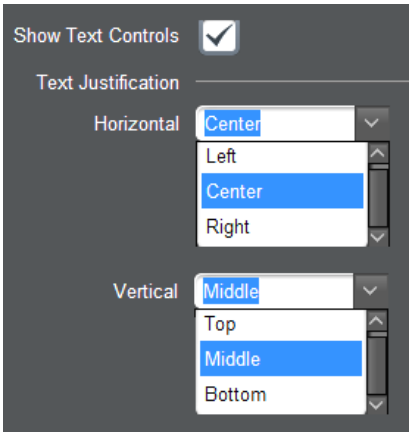
	**(continued)**
• **Border User Color/Opacity Select**  	Color/Opacity controls for **Text**, **Outline**, and **Background** are as follows: • **Color** select provides choices as shown here. • **Opacity** select provides opacity from full opaque to transparent in various gradients.
• **Text Justification/Alignment Select** 	The **Show Text Controls** checkbox opens the Text controls, which sets the positioning and justification of screen text as follows: • **Horizontal** choices **Left**, **Center**, and **Right** align the text either with left, center, or right margin and justification. • **Vertical** choices **Top**, **Middle**, and **Bottom** align the text either positioned near top, middle, or bottom of image area.

Table 3-1 9971-MVx-4K Function Menu List — continued

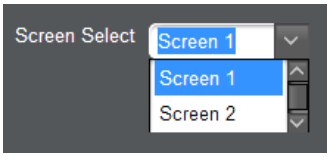
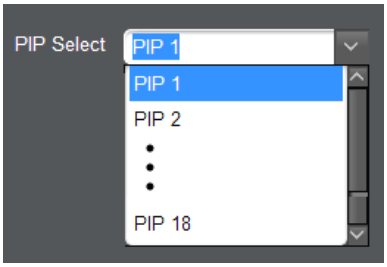
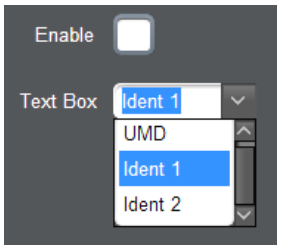
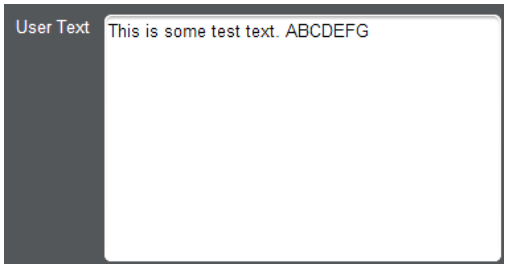
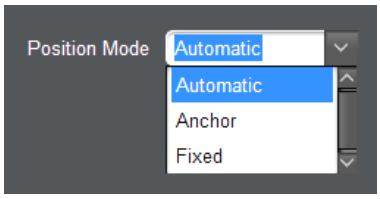
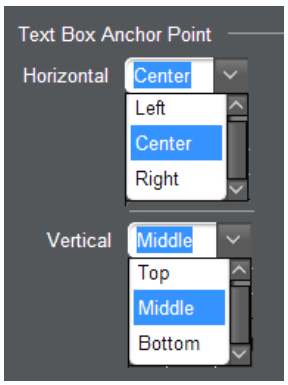
	Provides controls for selecting text source to be applied in selected PiPs and applying PiP text.
• Screen Select 	(Option **+DUAL** only) Selects the **Screen** to be set up using the controls on this tab. **Note:** This control can be set to gang both screens using the Screen/PiP Ganging Controls (p. 3-11).
• PiP Select 	Selects the **PiP** to be set up using the controls on this tab. **Note:** This control can be set to gang all PiPs using the Screen/PiP Ganging Controls (p. 3-11).
• PiP Text Box Enable/Select 	**Enable** opens PiP text tool dialog and controls. For selected PiP(s), **Text Box** sets PiP to use and display the selected text source from choices shown.
• PiP Text Entry Field 	Dialog entry box that allows entry of desired ident text string. **Note:** • All normal keyboard alphanumeric characters are supported. Not all ASCII special characters (Windows ALT+*nnnn*) are supported. • Up to 126 characters can be entered. • If **UMD Text Source** in UMD/Tally Color/Text Source Controls (p. 3-20) is set to **TSL Protocol**, Text Entry field is not available, and Text Source “See UMD/Tally Tab” message appears. To enter user text here, text source must be set to User Entry.

Table 3-1 9971-MVx-4K Function Menu List — continued

(continued)

- **Position Mode Select**





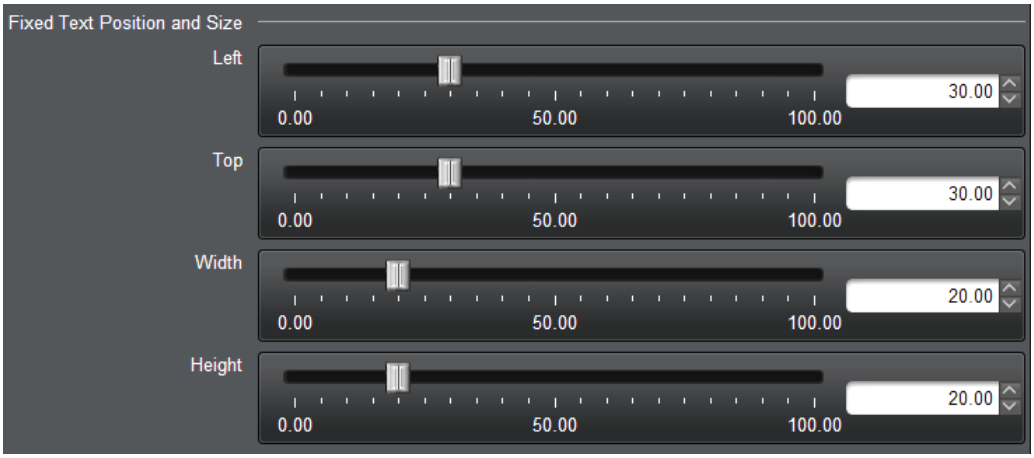
Sets the base location and anchoring of screen text insertions.

- **Automatic** is default basic positioning.
- **Fixed** allows full custom positioning using Fixed Text Position and Size controls (see below).
- **Anchor** allows text positioning anchored to a starting position. The Text Box Anchor Point controls are exposed when Anchor is selected.

- **Fixed Text Position/Size Controls**

When **Fixed** mode is selected above, these controls allow positioning and sizing as described.

- **Left** and **Top** controls move the PiP from its default origin position.
- **Width** and **Height** controls adjust the size of the overall text insertion.



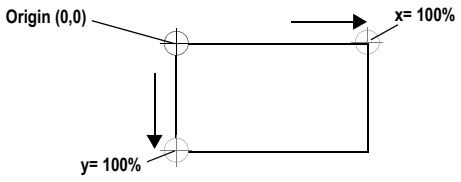
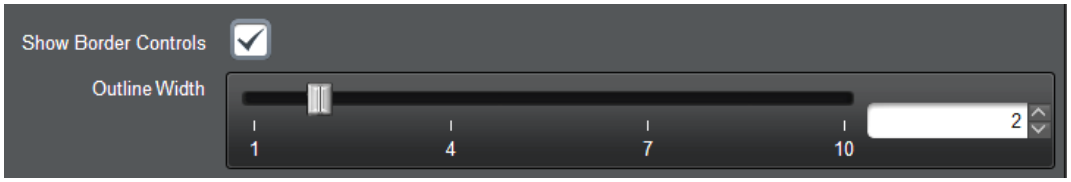
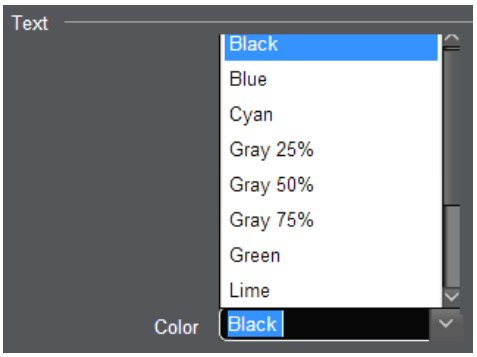
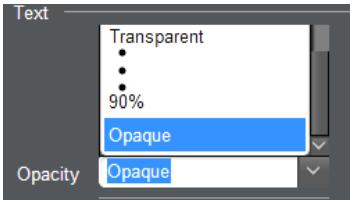


Table 3-1 9971-MVx-4K Function Menu List — continued

<table>
<tr><td> 
</td><td>(continued)</td></tr>
<tr><td>• Border Width/Enable Controls</td><td>The Show Border Controls checkbox opens the Border width and other attributes controls.
• Outline Width sets the border width (in pixels).</td></tr>
<tr><td colspan="2"> 
</td></tr>
<tr><td>• Border User Color/Opacity Select
 

 
</td><td>Color/Opacity controls for Text, Outline, and Background are as follows:
• Color select provides choices as shown here.

• Opacity select provides opacity from full opaque to transparent in various gradients.</td></tr>
</table>

Table 3-1 9971-MVx-4K Function Menu List — continued

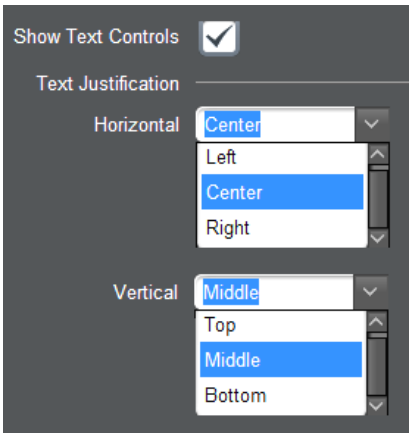
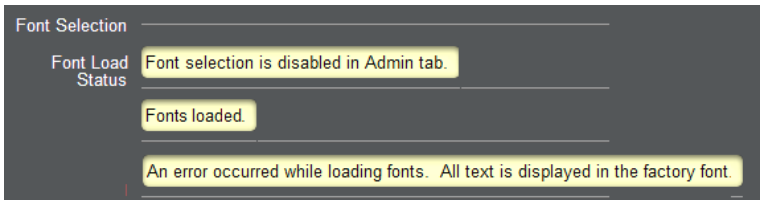
	**(continued)**
• **Text Justification/Alignment Select** 	The **Show Text Controls** checkbox opens the Text controls, which sets the positioning and justification of screen text as follows: • **Horizontal** choices **Left**, **Center**, and **Right** align the text either with left, center, or right margin and justification. • **Vertical** choices **Top**, **Middle**, and **Bottom** align the text either positioned near top, middle, or bottom of image area.
	Depending on whether or not **Load User Fonts** is selected in the **Admin** tab, a corresponding message in **Font Load Status** is displayed.

Table 3-1 9971-MVx-4K Function Menu List — continued

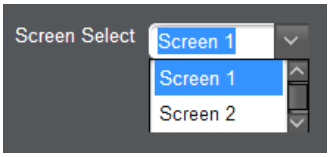
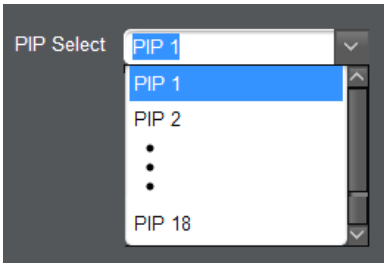
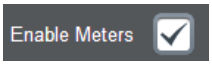
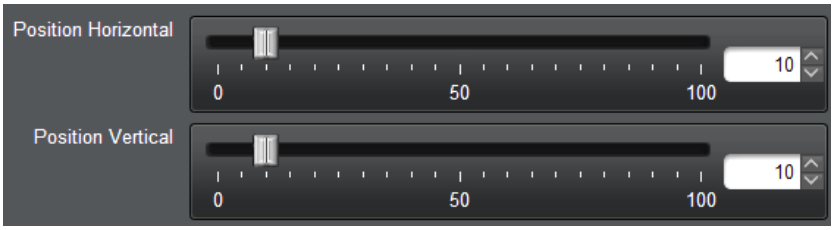
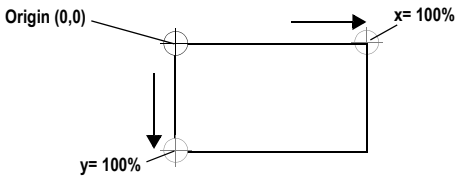
	Provides controls to insert PiP active-video area audio meters (bars), and set insertion rules and attributes such as layout, size and position.
Note: Audio meters are correlated with the embedded audio associated with the PiP input video. Each PiP can be set to display audio meters as desired.	
• **Screen Select** 	(Option **+DUAL** only) Selects the **Screen** to be set up using the controls on this tab. **Note:** This control can be set to gang both screens using the Screen/PiP Ganging Controls (p. 3-11).
• **PiP Select** 	Selects the **PiP** to be set up using the controls on this tab. **Note:** This control can be set to gang all PiPs using the Screen/PiP Ganging Controls (p. 3-11).
• **Meter Insertion Enable/Disable** 	Selects the rules for audio meters overlay insertion into the selected PiP area(s).
• **Base Layout Controls**	Sets the insertion location within the PiP where audio bars will be inserted.
 	

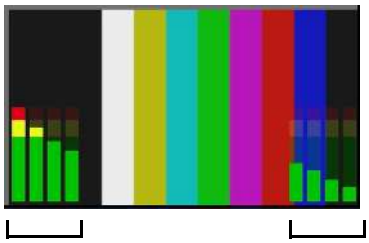
Table 3-1 9971-MVx-4K Function Menu List — continued

Audio Meters	**(continued)**

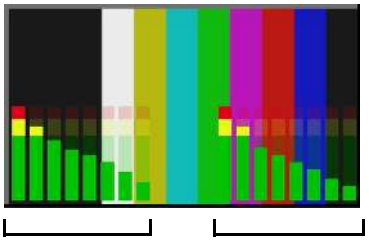
Example Meter Layouts

Stereo split

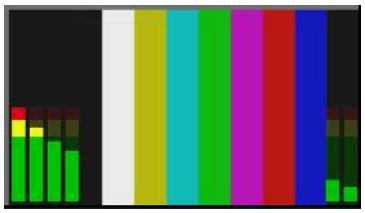
Groups 1-2



All Groups



Custom

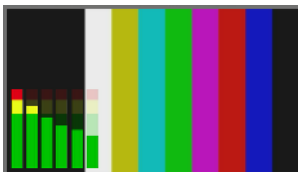


In this example, ch 1-4 on left, and ch 5-6 on right; 6 meters total

- **Number of Channels / Split Between Meters / Position**

Sets number of meter channels displayed, as well as a split between meters (if desired) which can be set between any pair.

Split Width controls sets the space between the space between the division set using the **Split Between Meters** control.



Split Width set at minimum (no split)

Split Width set at maximum (split pushes 2nd pair flush right)

Table 3-1 9971-MVx-4K Function Menu List — continued

	**(continued)**
• Meter Width Control 	Sets the relative width of the audio bars.  **Width** set at middle  **Width** set at less
• Meter Height Control 	Sets the relative height of the audio bars.  **Height** set at middle  **Height** set at less
• Meter Opacity Control 	Sets the relative opacity of the audio bars.  **Opacity** set at middle  **Opacity** set at less

Table 3-1 9971-MVx-4K Function Menu List — continued

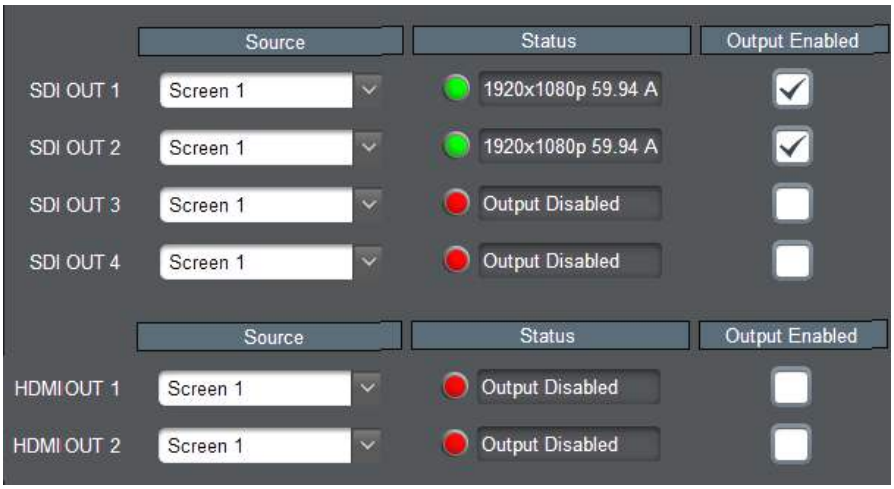
Provides controls to route multiviewer merged output(s) to SDI and HDMI output ports.

Outputs sub-tab routes multiviewer merged output(s) to the four SDI output ports and two HDMI ports as desired.

Option

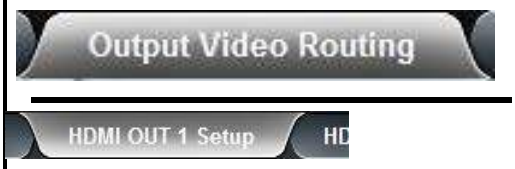
Note: UI depictions below may show **Screen 1** and **Screen 2** controls. Screen 2 controls appear only when licensed with option **+DUAL**, which allows the card to support two independent screen outputs. If not optioned with +DUAL, the UI shows only Screen 1 selections.

Screen Selection/Status Controls



- **Source** select routes the desired screen output to the desired physical SDI and HDMI ports.
- **Status** shows the output format selected (as set using the Screen Layout Controls; p 3-11).
- **Output Enabled** checkboxes enable or disable each SDI/HDMI output (with enable status also shown in Status column).

Table 3-1 9971-MVx-4K Function Menu List — continued



HDMI OUT 1 Setup and **HDMI OUT 2** sub-tabs independently route multiviewer merged output(s) and provide individual setup parameters to the two (max) HDMI output ports as desired.

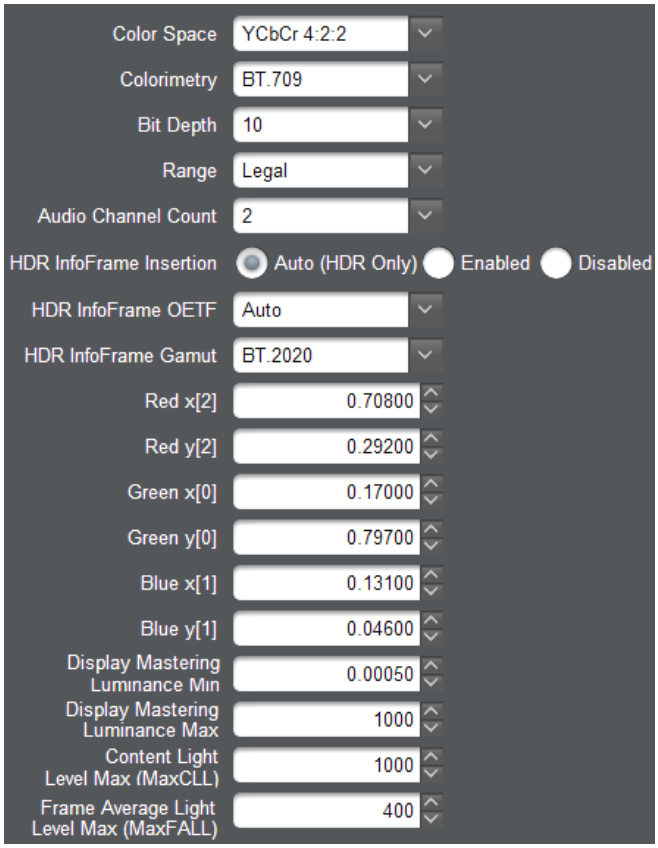
Note: **HDMI OUT** subtabs have identical independent controls for both HDMI OUT 1 and HDMI OUT 2 using the respective sub-tabs. Therefore, only the **HDMI OUT 1** controls are shown here.

HDMI Setup Controls

Basic HDMI package setup controls

HDR coding setup controls

Colorimetry/Luminanance setup controls



Note: Although Audio Channel Count select control may be present, this card is not specified for embedded audio processing/pass-thru. Control may not be functional.

Table 3-1 9971-MVx-4K Function Menu List — continued

Protocols	Provides controls for integrating TSL router IP communication with 9971-MVx-4K to provide tally attribute control and TSL display address for the PiP images.

Option

Note: UI depictions below may show **Screen 1** and **Screen 2** (Screen 1 and Screen 2) controls.. Screen 2 controls appear only when licensed with option **+DUAL**, which allows the card to support two independent screen outputs. If not optioned with +DUAL, the Screen 2 controls/selections are not ackowledged and therefore can be ignored.

Note:
- Router address must be accessible to network used for 9971-MVx-4K rear module Ethernet port (as set using the card Network Settings Controls (p. 3-36)).
- When router access (fetch) is enabled, control of certain burn-in aspects is asserted by router control, with user manual control locked out.

Tally Setup Controls

TSL setup controls.
Sets the card to communicate with TSL

Tally attribute setup controls.
Sets non-tally appearance and choices of color/ opacity when Tally-ON condition occurs.

Tally-to-PiP addressing setup.
Sets addressing for tally for each of the individual available PiPs.

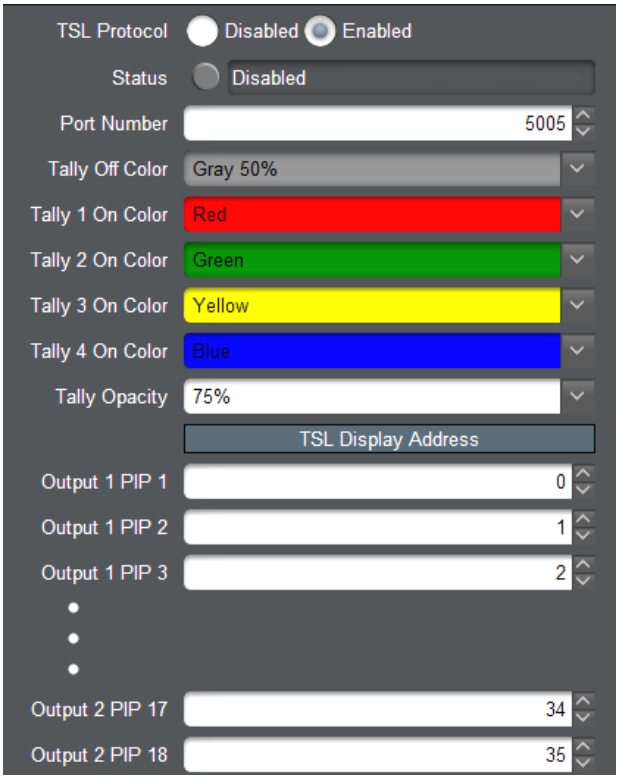
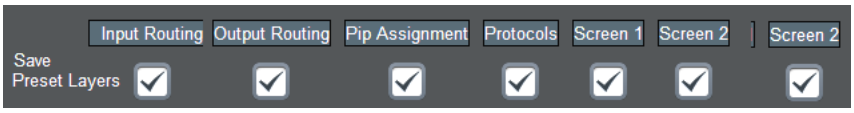


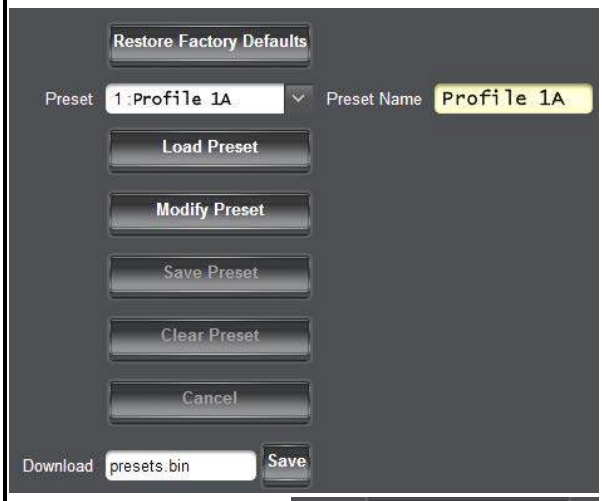
Table 3-1 9971-MVx-4K Function Menu List — continued

Allows user control settings to be saved in a one-button Preset and then loaded (recalled) as desired, and provides a one-button restore of factory default settings.

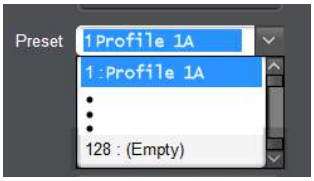
• Preset Save / Select / Load Controls



Preset Layers allows selecting a functional layer (or "area of concern") that the preset is concerned with. Limiting presets to a layer or area of concern allows for highly specific presets, and masks changing card settings in areas outside of the layer or area of concern.



- Pressing **Save Preset** opens field for entering user-defined **Preset Name** for the preset being saved (in this example, "Profile 1A"). Up to 128 individual presets can be saved.
- **Load Selected Preset** button allows loading (recalling) the selected preset. When this button is pressed, the changes called out in the preset are immediately applied.
- **Clear Preset** button deletes the currently selected preset.
- **Modify Preset** button allows currently-selected preset to take in current changed settings and nest the changes in the selected preset.
- **Restore Factory Defaults** button allows loading (recalling) the factory default preset. When this button is pressed, the changes called out in the preset are immediately applied.
- **Download** saves all individual presets to a .bin file to be downloaded to a connected computer.

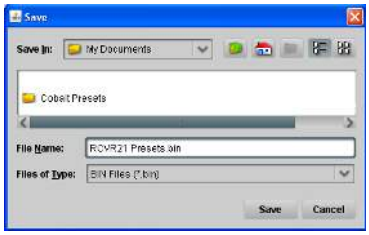


- **Preset:** drop-down allows a preset saved above to be selected to be loaded, modified or cleared. (In this example, custom preset "1: Profile 1A" can be selected and then loaded, modified, or cleared by pressing the respective button.)

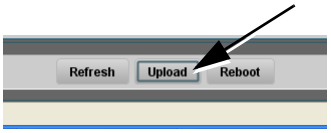
Download (save) card presets to a network computer by clicking **Download Presets – Save** at the bottom of the Presets page.

Browse to a desired save location (in this example, *My Documents\Cobalt Presets*).

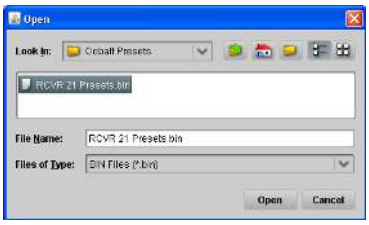
The file can then be renamed if desired (*RCVR21 Presets* in this example) before committing the save.



Upload (open) card presets from a network computer by clicking **Upload** at the bottom of DashBoard.



Browse to the location where the file was saved on the computer or drive (in this example, *My Documents\Cobalt Presets*). Select the desired file and click **Open** to load the file to the card.



Note: • Preset transfer between card download and file upload is on a **group** basis (i.e., individual presets cannot be downloaded or uploaded separately).

• After uploading a presets file, engagement of a desired preset is only assured by selecting and loading a desired preset as described above.

Table 3-1 9971-MVx-4K Function Menu List — continued

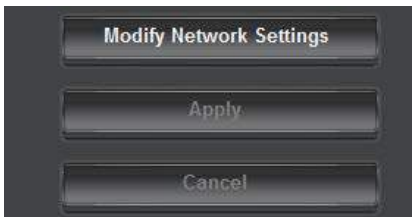
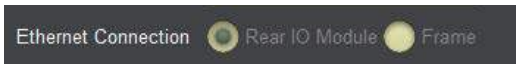
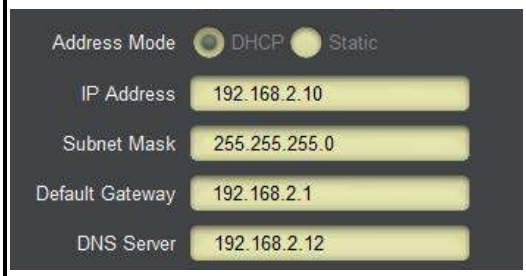
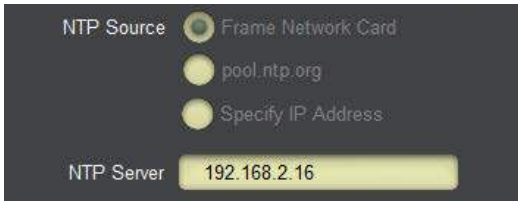
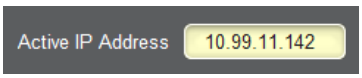
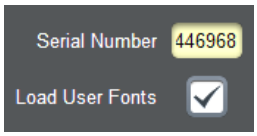
	The **Network Settings** tab provides a dedicated Ethernet connection to card control and monitoring via a rear module Ethernet port. (This IP interface is entirely independent and separate from the card's DashBoard frame-based remote control/monitoring interface.)
• **Opening Fields for Editing** 	• **Modify Network Settings** button opens dialog field for setting network parameters. • **Apply** button commits and applies the settings. • **Cancel** button exits dialog with no changes committed.
• **Card IP Physical Port Select Control** 	Allows card dedicated IP interface (as set below) to use frame communications or dedicated rear I/O module Ethernet RJ-45 port. **Note:** • Frame net connection allows cards with per-card Ethernet connection to connect with network via a shared frame Ethernet port instead of per-card dedicated Ethernet connectors on the card's rear module. Frame net connection is available only on certain frame models. • Card slot must be fitted with a rear I/O module equipped with an Ethernet connector in order to use **Rear I/O** selection.
• **Card IP Setup Controls** 	Provides controls for setting up card dedicated IP interface. • **Addressing Mode** selsects either DHCP or static. • Where **Static** is selected, standard IP fields allow entry of Address, Subnet Mask, and Default Gateway. • Where **DHCP** is selected, DNS Server address field is provided.
• **NTP Clock Setup** 	Allows device NTP clock IP source and localization. This is the clock/time device will use for logs and other recorded actions. • **NTP Source** buttons allow selecting the network source that will provide NTP time. • **NTP Server** sets the IP address where NTP is to be obtained when "Specify IP Address" is checked.
• **Card Active IP Address Display** 	Shows the connected (active) IP address the card is using (as set up using the controls described above).

Table 3-1 9971-MVx-4K Function Menu List — continued

	Shows card serial number and enables user font download.
• **Admin User Character (Font) Load** 	Load User Fonts allows the download of characters specifically tailored to a particular user language of the user's choice (this functionality is incrementally being introduced and may not be functional of earlier card firmware releases). **Note:** User characters (font), when loaded and enabled, **only** appear in user-accessible custom text such as user screen/PiP text, UMD text, and other user-entered text. The DashBoard UI labeling of controls uses the standard Latin-Roman character set as shown in this manual.

Troubleshooting

This section provides general troubleshooting information and specific symptom/corrective action for the 9971-MVx-4K card and its remote control interface. The 9971-MVx-4K card requires no periodic maintenance in its normal operation; if any error indication (as described in this section) occurs, use this section to correct the condition.

Error and Failure Indicator Overview

The 9971-MVx-4K card itself and its remote control systems all (to varying degrees) provide error and failure indications. Depending on how the 9971-MVx-4K card is being used (i.e, standalone or network controlled through DashBoard™ or a Remote Control Panel), check all available indications in the event of an error or failure condition.

The various 9971-MVx-4K card and remote control error and failure indicators are individually described below.

Note: The descriptions below provide general information for the various status and error indicators. For specific failures, also use the appropriate subsection listed below.

- Basic Troubleshooting Checks (p. 3-39)
- Troubleshooting Network/Remote Control Errors (p. 3-40)
- In Case of Problems (p. 3-40)

DashBoard™ Status/Error Indicators and Displays

Figure 3-5 shows and describes the DashBoard™ status indicators and displays. These indicator icons and displays show status and error conditions relating to the 9971-MVx-4K card itself and remote (network) communications.

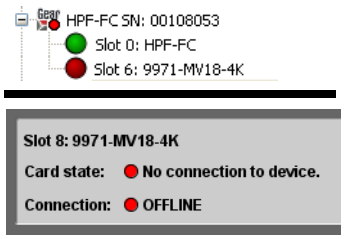
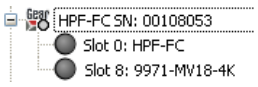
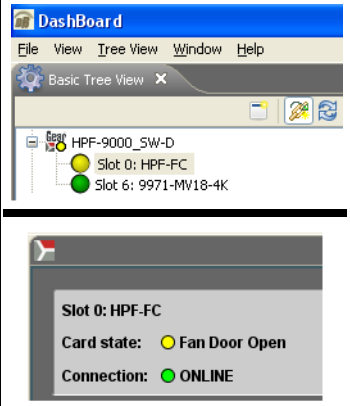
Indicator Icon or Display	Error Description
	Red indicator icon in Card Access/Navigation Tree pane shows card with Error condition (in this example, the Card Access/Navigation Tree pane shows a general error issued by the 9971-MVx-4K card in slot 6). Specific errors are displayed in the Card Info pane (in this example “No connection to device” indicating 9971-MVx-4K card is not connecting to frame/LAN).
	Gray indicator icon in Card Access/Navigation Tree pane shows card(s) are not being seen by DashBoard™ due to lack of connection to frame LAN (in this example, both a 9971-MVx-4K card in slot 8 and the HPF-FC Network Controller Card for its frame in slot 0 are not being seen).
	Yellow indicator icon in Card Access/Navigation Tree pane shows card with Alert condition (in this example, the Card Access/Navigation Tree pane shows a general alert issued by the HPF-FC Network Controller Card). Clicking the card slot position in the Card Access/Navigation Tree (in this example Network Controller Card “Slot 0: HPF-FC”) opens the Card Info pane for the selected card. In this example, a “Fan Door Open” specific error is displayed.
	Yellow indicator icon in 9971-MVx-4K Card Info pane shows error alert, along with cause for alert (in this example, the 9971-MVx-4K is not receiving an SDI input on SDI IN 1).

Figure 3-5 DashBoard™ Status Indicator Icons and Displays

Basic Troubleshooting Checks

Failures of a general nature (affecting many cards and/or functions simultaneously), or gross inoperability errors are best addressed first by performing basic checks before proceeding further. Table 3-2 provides basic system checks that typically locate the source of most general problems. If required and applicable, perform further troubleshooting in accordance with the other troubleshooting tables in this section.

Table 3-2 Basic Troubleshooting Checks

Item	Checks

Verify power presence and characteristics	• On both the frame Network Controller Card and the 9971-MVx-4K, in all cases when power is being properly supplied there is always at least one indicator illuminated. Any card showing no illuminated indicators should be cause for concern.
	• Check the Power Consumed indication for the 9971-MVx-4K card. This can be observed using the DashBoard™ Card Info pane.
	  • If display shows **no** power being consumed, either the frame power supply, connections, or the 9971-MVx-4K card itself is defective.
	  • If display shows **excessive** power being consumed (see Technical Specifications (p. 1-15) in Chapter 1, “Introduction”), the 9971-MVx-4K card may be defective.

Check Cable connection secureness and connecting points	Make certain all cable connections are fully secure (including coaxial cable attachment to cable ferrules on coaxial connectors). Also, make certain all connecting points are as intended. Make certain the selected connecting points correlate to the intended card inputs and/or outputs. Cabling mistakes are especially easy to make when working with large I/O modules.
Card seating within slots	Make certain all cards are properly seated within its frame slot. (It is best to assure proper seating by ejecting the card and reseating it again.)
Check status indicators and displays	On both DashBoard™ and the 9971-MVx-4K card edge indicators, red indications signify an error condition. If a status indicator signifies an error, proceed to the following tables in this section for further action.
Troubleshoot by substitution	All cards within the frame can be hot-swapped, replacing a suspect card or module with a known-good item.

Troubleshooting Network/Remote Control Errors

Refer to Cobalt® reference guide “Remote Control User Guide” (PN 9000RCS-RM) for network/remote control troubleshooting information.

In Case of Problems

Contact and Return Authorization

Should any problem arise with this product that was not solved by the information in this section, please contact the Cobalt Digital Inc. Technical Support Department.

If required, a Return Material Authorization number (RMA) will be issued to you, as well as specific shipping instructions. If required, a temporary replacement item will be made available at a nominal charge. Any shipping costs incurred are the customer’s responsibility. All products shipped to you from Cobalt Digital Inc. will be shipped collect.

The Cobalt Digital Inc. Technical Support Department will continue to provide advice on any product manufactured by Cobalt Digital Inc., beyond the warranty period without charge, for the life of the product.

See Contact Cobalt Digital Inc. (p. 1-21) in Chapter 1, “Introduction“ for contact information.

Cobalt Digital Inc.

2506 Galen Drive
Champaign, IL 61821
Voice 217.344.1243 • Fax 217.344.1245
www.cobaltdigital.com

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