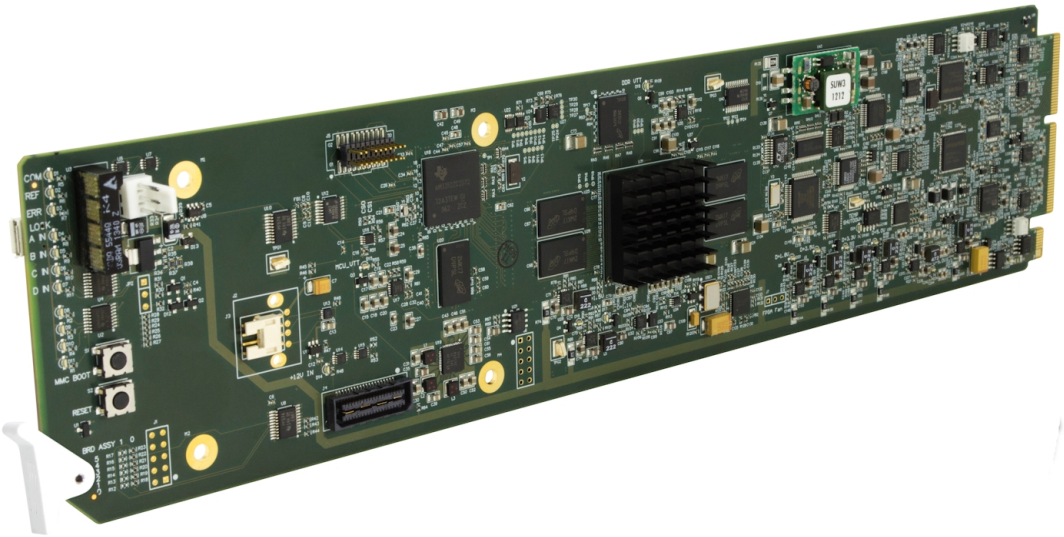
OG-5510-5S



3G/HD/SD-SDI/CVBS Expandable Multiviewer
with Advanced On-Screen Graphics

Instruction Manual

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OG-5510-5S-IM (V1.0)

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Chapter 1

Introduction

Overview

This manual provides installation and setup instructions for the OG-5510-5S 3G/HD/SD-SDI/CVBS Expandable Multiviewer with Advanced On-Screen Graphics card (also referred to herein as the OG-5510-5S).

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 OG-5510-5S.
- **Chapter 2, "Installation"** – Provides instructions for installing the OG-5510-5S in a frame, and connecting signal and control cabling to the OG-5510-5S.
- **Chapter 3, "Setup Instructions"** – Provides overviews of setup operating controls and instructions for setting up the OG-5510-5S to integrate within its signal flow environment.

This chapter contains the following information:

- **Manual Conventions (p. 1-1)**
- **Safety and Regulatory Summary (p. 1-3)**
- **OG-5510-5S Functional Description (p. 1-4)**
- **Technical Specifications (p. 1-12)**
- **Warranty and Service Information (p. 1-14)**
- **Contact Multidyne (p. 1-14)**

Manual Conventions

In this manual, display messages and connectors are shown using the exact name shown on the OG-5510-5S 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:

- **OG-5510-5S** refers to the OG-5510-5S 3G/HD/SD-SDI/CVBS Expandable Multiviewer with Advanced On-Screen Graphics card.
- **Frame** refers to the HPF-9000, OG3-FR, 8321, or similar 20-slot frame that houses openGear cards.
- **System** and/or **Video System** refers to the mix of interconnected production and terminal equipment in which the OG-5510-5S and other cards operate.

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 OG-5510-5S has a moderate power dissipation (<18 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 OG-5510-5S 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.**

CAUTION **The OG-5510-5S FPGA is designed for a normal-range operating temperature around 85° C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within device operating safe parameters, and can be allowed by setting this control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum card protection.**

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

OG-5510-5S Functional Description

Figure 1-1 shows a functional block diagram of the OG-5510-5S. The OG-5510-5S includes input processing functions to accommodate SDI and CVBS analog inputs, a validity check function to provide indication of input defects, timecode and audio data handling and routing control, multi-split ARC/scaling functions, a timing alignment function to synchronize the inputs to house reference, up to 5:1 Picture-in-Picture (PiP) video combining, and burn-in attributes and control of borders, UMD display text, audio meters, and other accessory displays. The output is available as a 2x DA 3G/HD/SD-SDI output or HDMI/DVI. The output raster format and aspect ratio is user-configurable.

OG-5510-5S Program Video Input/Output Formats

The OG-5510-5S provides the following inputs and outputs:

- **Inputs:**
  - **SDI/CVBS IN A** thru **SDI/CVBS IN E** – five coaxial video inputs (auto-detecting 3G/HD/SD-SDI or CVBS analog video)
- **Outputs:**
  - **3G/HD/SD-SDI OUT** – 2x DA 3G/HD/SD-SDI multi-image video outputs
  - **HDMI/DVI OUT** – Multi-image HDMI/DVI out with selectable audio embedding (suitable for direct connection to monitor panels)

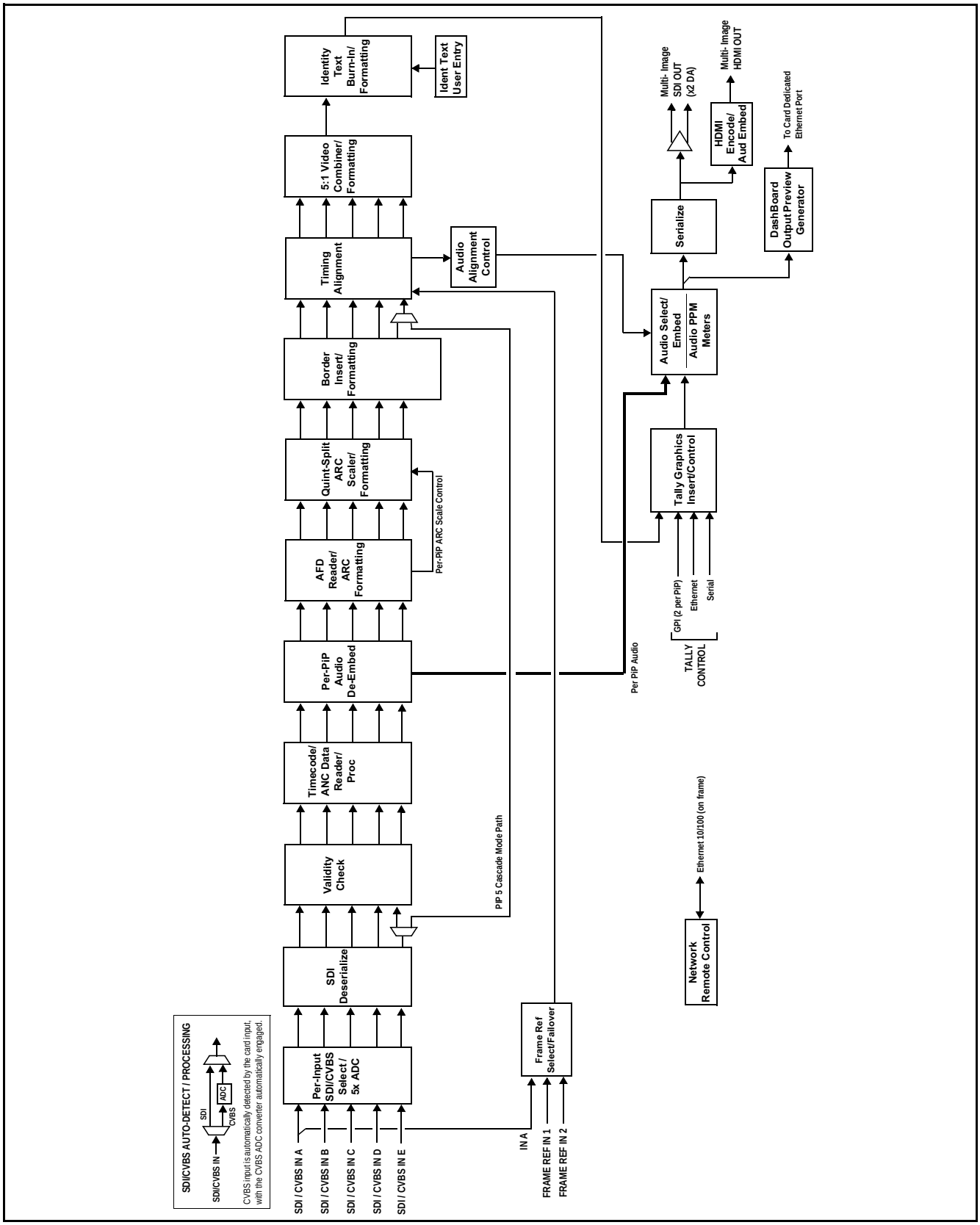


Figure 1-1 OG-5510-5S Functional Block Diagram

Video Processing Description

The OG-5510-5S features input select and validity check functions, timing alignment, and PiP ARC/scaling functions as described below.

Input Video Select Function

Auto-detect per PiP inputs independently set each of the card video inputs as 3G/HD/SD-SDI or CVBS SD analog video. Either mode preserves waveform and packet-based ancillary data for extraction and usage later in the card processing chain. A CVBS input is automatically detected by the card input, with the CVBS ADC converter automatically engaged in these cases.

Timecode Processor

This function provides for extraction of timecode data from any of the five per-PiP input video sources, and in turn allows timecode strings to be burned into the respective PiP images. The function can monitor any of the video inputs of the card for supported timecode formats such as HD ATC_LTC or ATC_VITC, and ATC_VITC or VITC waveform for SD SDI or CVBS inputs.

ARC Processor

This function provides separate ARC controls for each PiP input. The separate controls can re-aspect SD to match the aspecting used for HD inputs, and vice versa. Custom aspecting is also available for both HD and SD formats.

Quint-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.

Quint Timing Alignment Function

This function provides for frame alignment control of the five PiP inputs using either one of two external **FRAME REF IN (1,2)** reference signals distributed with the card frame, or a selected input video as a frame reference. As such, the card can accommodate asynchronous program video inputs.

This function also allows frame offset delay to be added between the output video and the frame sync reference. Frame sync can select from either of two card frame reference sources, input video, or free-run (internal) timing. Selectable failover allows alternate reference selection should the initial reference source become unavailable or invalid.

5:1 Video Combiner/Formatting Function

This function combines the five 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 positioning controls provide the H and V offsets that 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, video format of the corresponding PiP, wall-time clock, 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.

GPI/Event-Based Control

Up to five GPI inputs are available to control display attributes such as tally and border activation and color. GPI inputs can also be used to control insertion and attributes of user text insertion. Any combination of the GPI inputs can be set up to provide binary words of up to 16 combinations to define unique conditions tied to a specific word value (using “virtual” GPIs comprised of bit states for any of the discrete GPI inputs). Coding settings allow true conditions upon level or edge-triggered conditions.

Display attributes (such as border colors, ident text, and tally control) can also be controlled using internal intelligent event triggers, which provides attribute control based off of detected signal conditions.

Output Preview via Network Connection

A DashBoard Output Preview function provides the display of regularly-sampled screen captures in the card DashBoard remote control page. This provides remote-access program video content/presence and multiviewer layout confidence monitoring via the card’s DashBoard display without needing collocation with the card or its input or output video signals. When the card is acquiring frame captures (either 5-second periodic-updated continuous images or single frame (user selectable)), the area on the bottom of the DashBoard page displays the multiviewer image of the input video PiPs.

DashBoard acquires program video frame captures using an external network connection from a card rear module Ethernet port to the network/computer hosting the card's DashBoard connection. (DashBoard "learns" the card's IP address. When preview is requested, DashBoard queries the card address for the image, with the image transferred via the card rear module Ethernet connection).

Audio Processor Description

Audio Select/Embed

The audio processor operates as an internal audio router for selecting PiP-input embedded channels 1-16 as channels (as a four-group package) to be embedded into the combined PiP SDI and HDMI video outputs. The audio processor function operates with the timing alignment function to align audio with the selected reference.

Note:
- Output audio always corresponds to a single particular selectable PiP input. Various output embedded channels cannot be sourced from a mix of various PiP input embedded channels.
- To maintain conformance with CEA-861D HDMI audio channel line-up specifications and industry standard SDI convention, the HDMI output swaps between the C and LFE channels for the HDMI output.

Per-PiP Audio PPM Meters

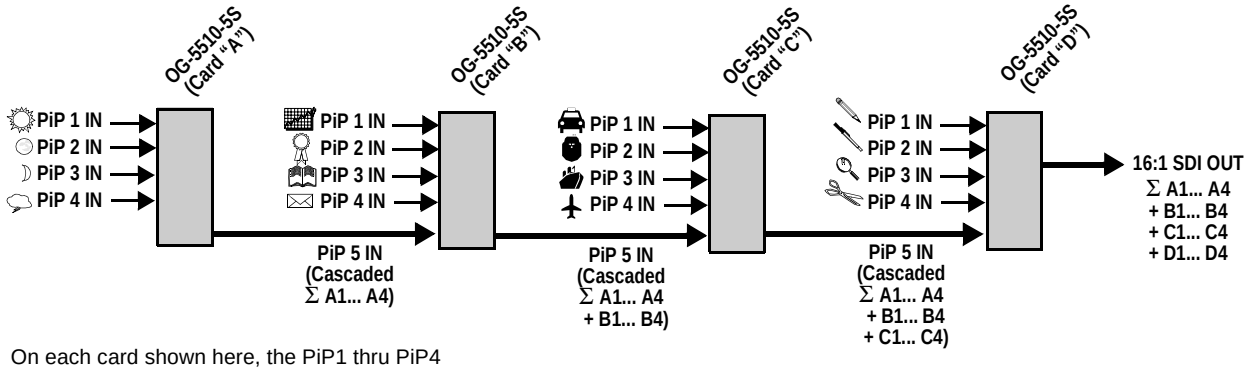
Each PiP image area has setup controls to provide audio meters in several formats (channel count) as desired. Each PiP image has an audio meter display that can display from 2-bar stereo up to all four embedded audio groups for the audio associated with the PiP input. User controls allow setting meter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

Cascading (Multi-Card) OG-5510-5S Operation and Setup Overview

(See Figure 1-2.) The OG-5510-5S **PIP 5** input is ideally suited to allow multiple OG-5510-5S cards to operate in a **cascading** arrangement, where four of the card inputs serve as program video inputs local to the card, and the fifth input receives the cascading combined layout of a preceding OG-5510-5S card in a daisy-chain arrangement. In this mode, the **PIP 5** input is configured to serve as a full-size underlay with **PIP 1** thru **PIP 4** being overlays. In this manner, added PiPs can be positioned within the imported underlay resulting in a combined image of the imported underlay PiPs and the locally added PiPs.

Cascading Low-Latency Operation

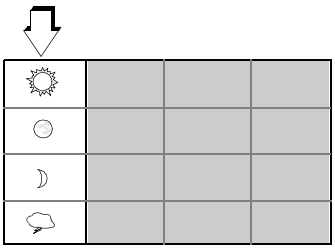
Low-latency modes provide for reducing card I/O latency by bypassing the cascade input framesync. Low-latency modes apply framesyncing when needed (applying framesync and bypassing low-latency during these intervals). When alignment is again detected by the local card, framesyncing is correspondingly disabled and low-latency operation is again applied.



On each card shown here, the PiP1 thru PiP4 inputs on the repective card can be considered **local** inputs, and the PiP5 input on cards B thru D considered **cascade** inputs.

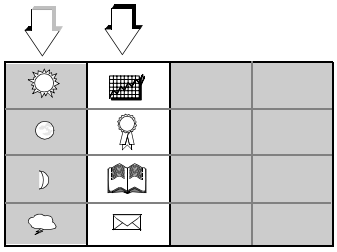
Card "A" has its controls set to position PiP1 thru PiP4 in the **1st** (left-most) column of a 4-column grid.

The card "A" output is fed to card "B" as the PiP5 full-sized **cascading** input, which serves as an underlay that rests underneath any added PiPs.



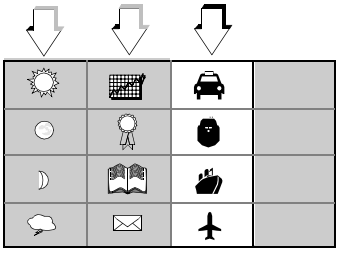
Card "B" has its controls set to position its PiP1 thru PiP4 inputs in the **2nd** column of a 4-column grid.

Along with the full-sized cascading underlay of preceding card "A", eight PiPs are now positioned in the two resulting columns.



Card "C" has its controls set to position its PiP1 thru PiP4 inputs in the **3rd** column of a 4-column grid.

Along with the full-sized cascading underlay of preceding cards "A" and "B", 12 PiPs are now positioned in the three resulting columns.



Card "D" has its controls set to position its PiP1 thru PiP4 inputs in the **4th** column of a 4-column grid.

Along with the full-sized cascading underlay of preceding cards "A" thru "C", all 16 PiPs are now positioned in the four resulting columns. This provides the 16:1 multiviewer layout using four cards ("A" thru "D") in a cascaded form.

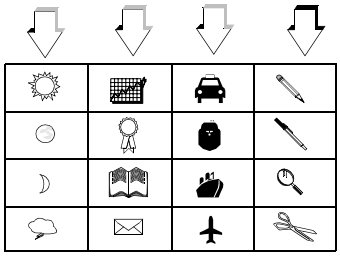


Figure 1-2 Cascaded OG-5510-5S Example 16:1 Setup and Overview

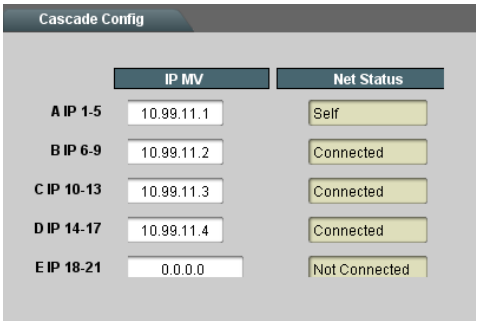
Cascade Config (Configurator) DashBoard Control Consolidation

(See Figure 1-3.) The **Cascade Config** DashBoard tabs and multi-card network connection allows cascade chain network-connected OG-5510-5S cards to communicate with each other and expose settings and attributes from all of the cards within the chain. In this setup, each card will “see” the other cards in the network chain connection, with access to PiP controls for all PiPs from any card within the chain. Cascade Config consolidated control can span card chains within a frame or across multiple frames.

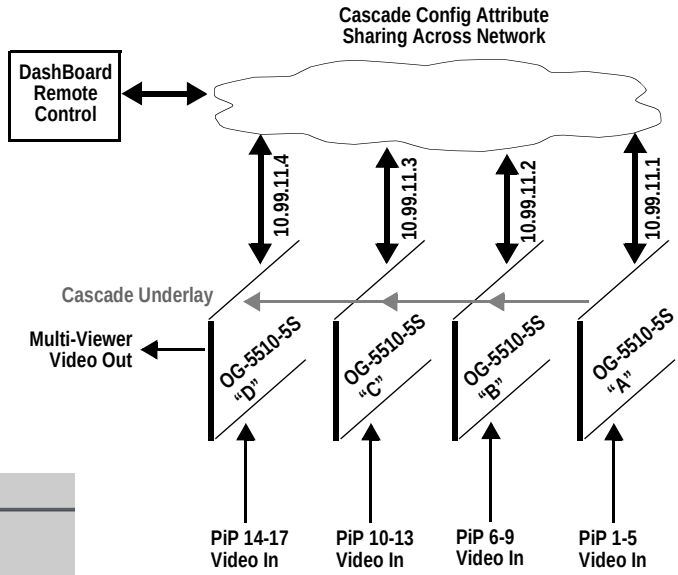
This global consolidation allows setup control of any of the PiPs from one card. Settings can be performed on one PiP, and then be cloned across as many PiPs in the chain as desired. This removes the need to set up each card individually, with settings manually repeated for several cards. It also allows presets that can “look at” and set up all the cards in the chain from a single preset.

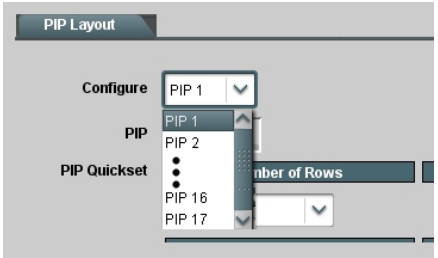
Cascade Config DashBoard tabs and multi-card card network connection allows cascade chain network-connected OG-5510-5S cards (OG-5510-5S cards “A” thru “D” in this example) to communicate with each other and centrally expose setup attributes of all of the cards within the chain.

Cascade Config is designed to use the first card as a full quint-split processor, with subsequent cards in the chain taking in the cascade underlay as **In E** and additional PiP inputs as **In A** thru **In D**. In this example, a 17-input multiviewer is attained (four cards providing 5+4+4+4 = 17 input channels).



OG-5510-5S cards within the chain (equipped with Ethernet-port rear modules) are connected to a shared network. This allows the cards to “see” each other, with each card exposing control attributes for **all** the cards.





For each per-PiP control, the result is **all** PiPs within the chain being exposed, allowing settings to be performed from **any** of the cards and cloned to any card as desired. User presets can encompass all cards in the chain and be invoked in a single action done at one card.

SCPD2014-28

Figure 1-3 Example Cascade Config Connection and Functionality

User Control Interface

Figure 1-4 shows the user control interface options for the OG-5510-5S. 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 OG-5510-5S 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.

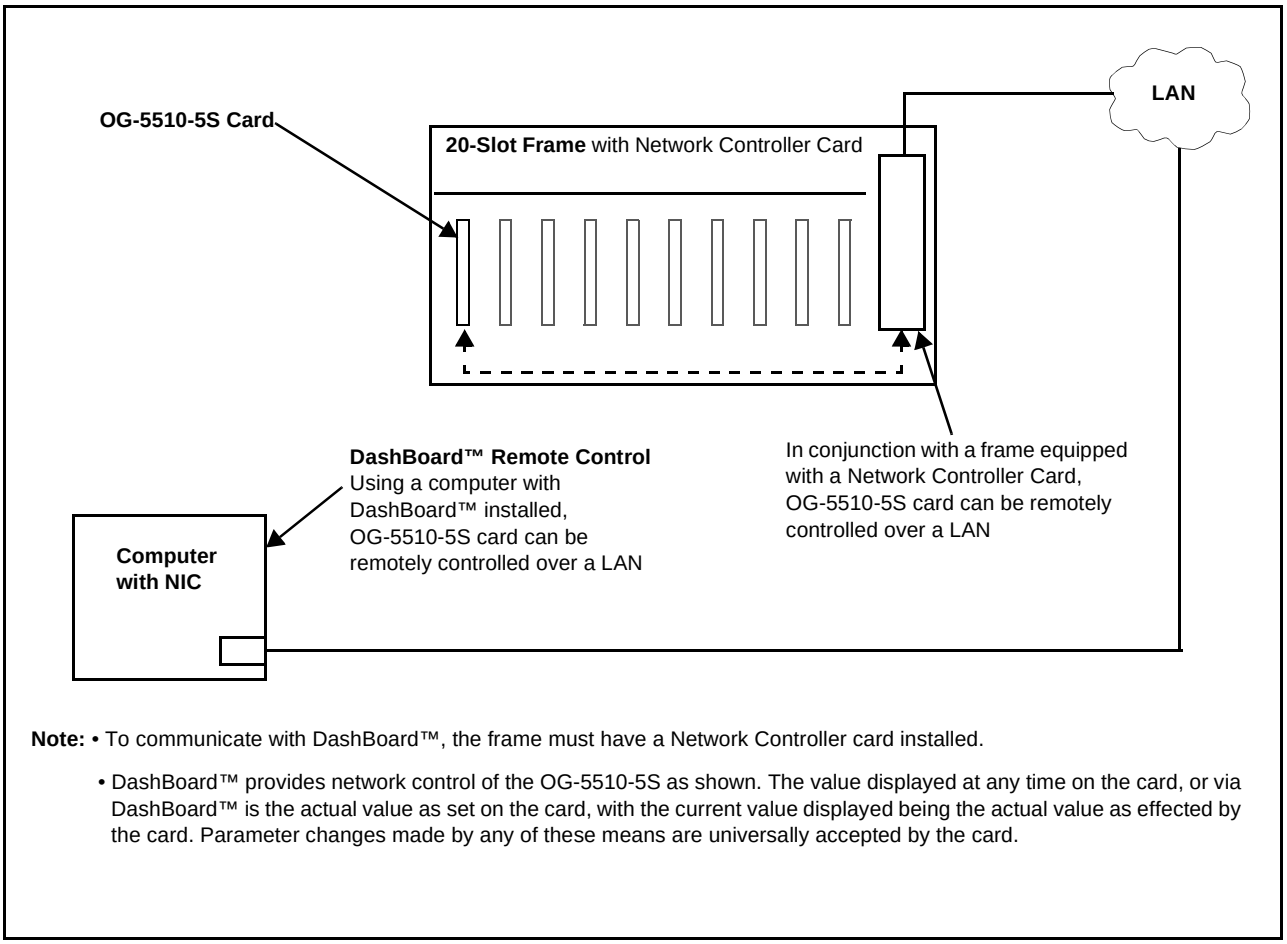


Figure 1-4 OG-5510-5S User Control Interface

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

OG-5510-5S Rear I/O Modules

The OG-5510-5S 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 OG-5510-5S 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 OG-5510-5S card edge connections to BNC and other connectors that interface with other components and systems in the signal chain.

The full assortment of OG-5510-5S Rear I/O Modules is shown and described in OG-5510-5S Rear I/O Modules (p. 2-4) in Chapter 2, “Installation and Setup”.

Technical Specifications

Table 1-1 lists the technical specifications for the OG-5510-5S 3G/HD/SD-SDI/CVBS Expandable Multiviewer with Advanced On-Screen Graphics card.

Table 1-1 Technical Specifications

Item	Characteristic
Part number, nomenclature	OG-5510-5S 3G/HD/SD-SDI/CVBS Expandable Multiviewer with Advanced On-Screen Graphics
Installation/usage environment	Intended for installation and usage in frame meeting openGear™ modular system definition
Power consumption	< 18 Watts maximum
Installation Density	Up to 20 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	Five video inputs, auto-detecting CVBS or 3G/HD/SD-SDI Data Rates Supported: SMPTE 424M, 292M, SMPTE 259M-C (Inputs C thru E also support SMPTE 425 Level B) Impedance: 75 Ω terminating Receive Cable Length: 3G/HD/SD-SDI: 120/180/320 m (Belden 1694A) Return Loss (SDI): > 15 dB up to 1.485 GHz > 10 dB up to 2.970 GHz
Serial Digital PiP Video Output	Number of Outputs: Two 3G/HD/SD-SDI BNC Impedance: 75 Ω Return Loss: > 15 dB at 5 MHz – 270 MHz Signal Level: 800 mV ± 10% DC Offset: 0 V ± 50 mV Jitter (3G/HD/SD): < 0.3/0.2/0.2 UI
SDI Input-Output Latency (720p5994)	Basic I/O latency < 1.5 frames (max) PiP channel derived from cascaded preceding-card output consists of source card basic delay with < 2 line added delay.
HDMI PiP Video Output	HDMI CEA-861D
GPIO	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

Table 1-1 Technical Specifications — continued

Item	Characteristic
Frame Reference Input	Number of Inputs: Two non-terminating (looping) Frame Reference inputs with selectable failover Standards Supported: SMPTE 170M/318M (“black burst”) SMPTE 274M/296M (“tri-level”) Return Loss: > 35 dB up to 5.75 MHz

Warranty and Service Information

For service please go to www.multidyne.com/technical-support

Contact Multidyne

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
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Chapter 2

Installation

Overview

This chapter contains the following information:

- Installing the OG-5510-5S Into a Frame Slot (p. 2-1)
- Installing a Rear I/O Module (p. 2-3)

Installing the OG-5510-5S 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 OG-5510-5S has a moderate power dissipation (<18 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 OG-5510-5S 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 OG-5510-5S 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 OG-5510-5S 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 OG-5510-5S into a frame slot as follows:

1. Determine the slot in which the OG-5510-5S 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 OG-5510-5S Rear I/O Modules (p. 2-4).
9. Repeat steps 1 through 8 for other OG-5510-5S cards.

Note: The OG-5510-5S 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.

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 OG-5510-5S is to be installed.

If installing the OG-5510-5S 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 OG-5510-5S 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.

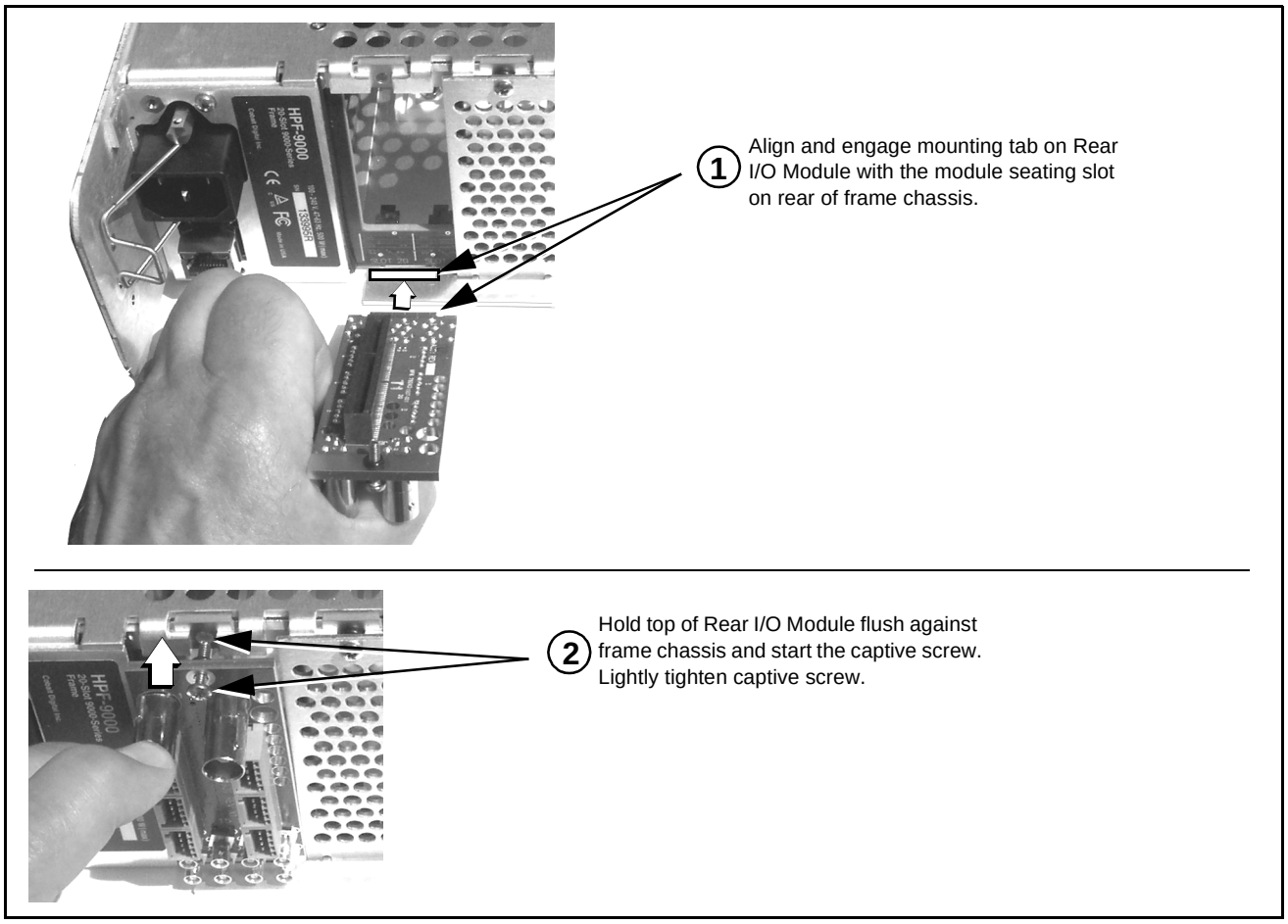


Figure 2-1 Rear I/O Module Installation

OG-5510-5S Rear I/O Modules

Table 2-1 shows and describes the full assortment of Rear I/O Modules specifically for use with the OG-5510-5S.

Table 2-1 OG-5510-5S Rear I/O Modules

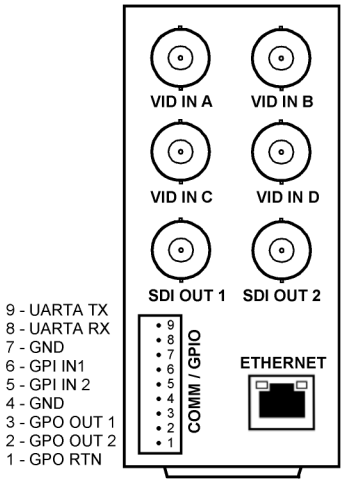
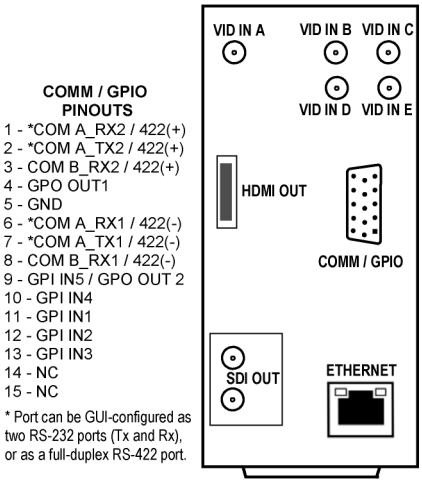
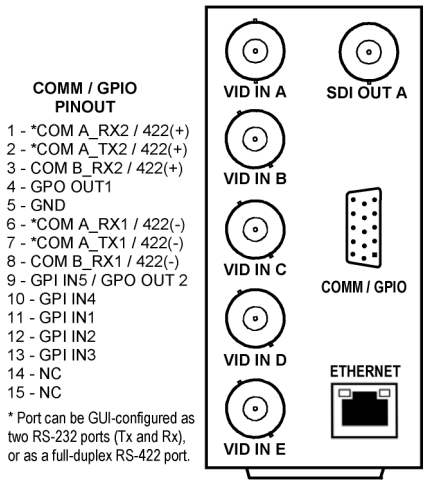
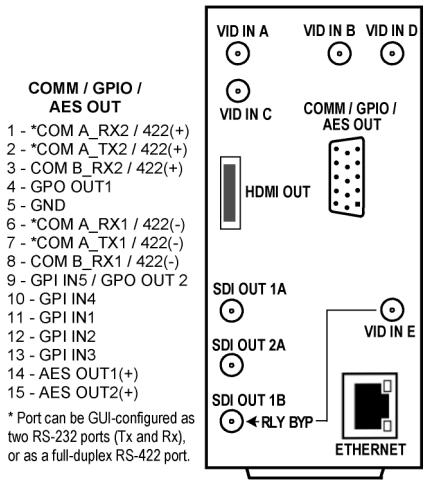
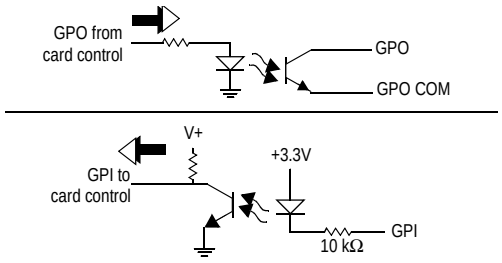
OG-5510-5S Rear I/O Module	Description
Note: Rear modules may not in all cases have labeling showing connector designations. Use the 4-digit Manufacturing Part Number (MPN) screened on the rear module PCB to correlate the rear module with its illustration and description shown here.	
R2-5510-A  **MPN: 1919**	Provides the following connections: • Four PiP Video In BNCS (**VID IN A** thru **VID IN D**); auto-detecting as 3G/HD/SD-SDI or CVBS • Two 3G/HD/SD-SDI PiP Combined Video Out BNCs (**SDI OUT 1** and **SDI OUT 2**) • **COMM/GPI** multi-conductor connector • **ETHERNET** 10/100 connector (reserved) **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.
R2-5510-B (DIN1.0/2.3 **R2-5510-C (HD-BNC)**  **MPN: 1923D**	• Five PiP Video In (**VID IN A** thru **VID IN E**); auto-detecting as 3G/HD/SD-SDI or CVBS • Two 3G/HD/SD-SDI PiP Combined Video Out (**SDI OUT 1** and **SDI OUT 2**) • **COMM/GPIO/AES OUT** multi-conductor connector • **ETHERNET** 10/100 connector (reserved) • **HDMI OUT** connector **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 OG-5510-5S Rear I/O Modules — continued

OG-5510-5S Rear I/O Module	Description
R2-5510-D  **MPN: 1924**	• Five PiP Video In (**VID IN A** thru **VID IN E**) BNCs; auto-detecting as 3G/HD/SD-SDI or CVBS • One 3G/HD/SD-SDI PiP Combined Video Out BNC (**SDI OUT A**) • **COMM/GPIO/AES OUT** multi-conductor connector • **ETHERNET** 10/100 connector (reserved) **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.
R2-5510-E (DIN1.0/2.3) **R2-5510-F (HD-BNC)**  **MPN: 1944D**	• Four PiP Video In (**VID IN A** thru **VID IN D**); auto-detecting as 3G/HD/SD-SDI or CVBS • Cascade PiP SDI In (PiP E) (Relay bypass protected cascade path) (**VID IN E**) • Two 3G/HD/SD-SDI PiP Combined Video Out (**SDI OUT 1A** and **SDI OUT 2A**) • Cascade relay bypass protected cascade path out **SDI OUT 1B**) (Relay bypass provides passive VID IN E cascade input to SDI output upon card removal or loss of power.) • **COMM/GPIO/AES OUT** multi-conductor connector • **ETHERNET** 10/100 connector (reserved) • **HDMI OUT** connector **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

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Chapter 3

Setup Instructions

Overview

If you are already familiar with using DashBoard to control openGear cards, please skip to Overview of Operator User Controls Outline and Setup Overview (p. 3-7).

This chapter contains the following information:

- Control and Display Descriptions (p. 3-1)
- Accessing the OG-5510-5S Card via Remote Control (p. 3-4)
- Checking OG-5510-5S Card Information (p. 3-6)
- OG-5510-5S Function Menu List and Descriptions (p. 3-9)
- Troubleshooting (p. 3-59)

Control and Display Descriptions

This section describes the user interface controls, indicators, and displays for using the OG-5510-5S card.

Access to the OG-5510-5S 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 OG-5510-5S card are organized into function **menus**, which consist of parameter groups as shown below.

Figure 3-1 shows how the OG-5510-5S card and its menus are organized, and also provides an overview of how navigation is performed between cards, function menus, and parameters.

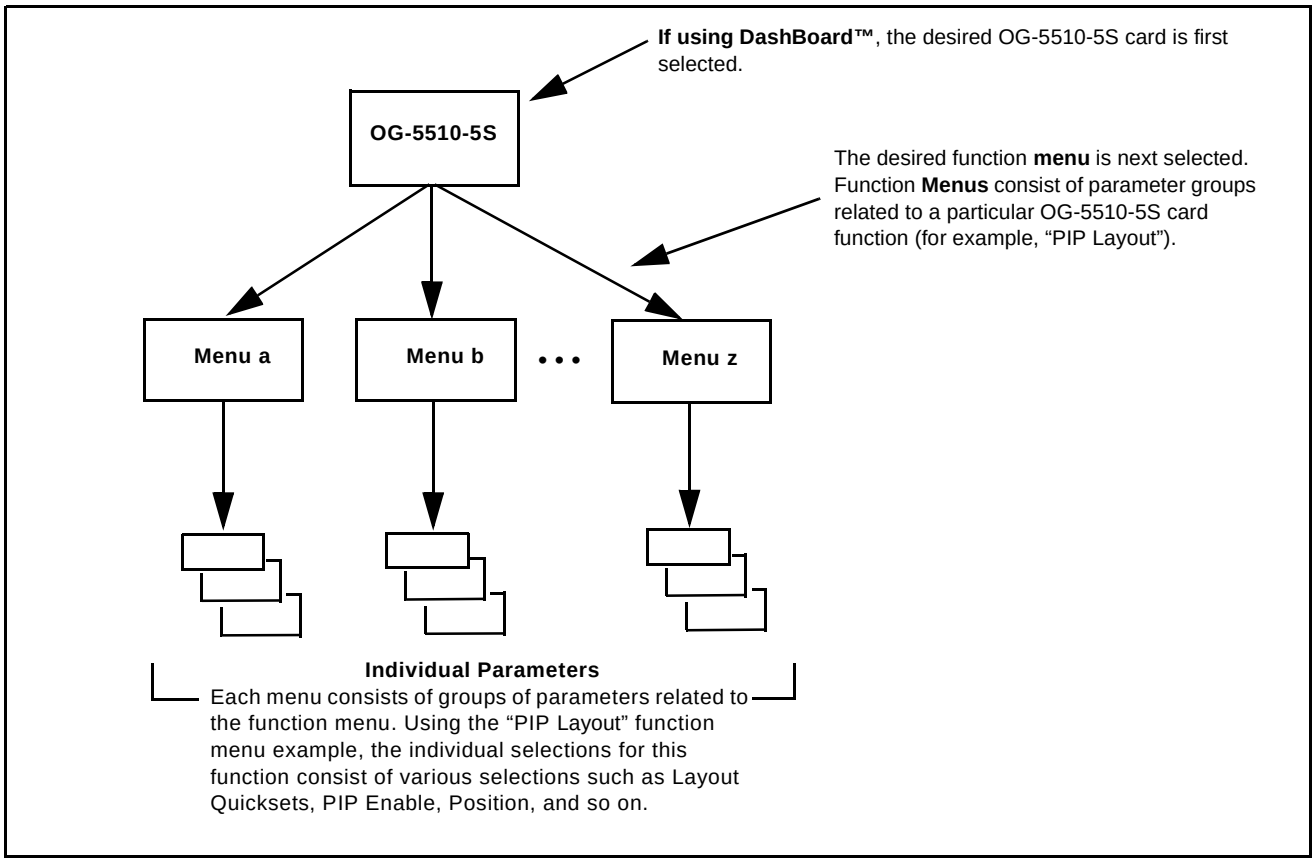


Figure 3-1 Function Menu/Parameter Menu Overview

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.

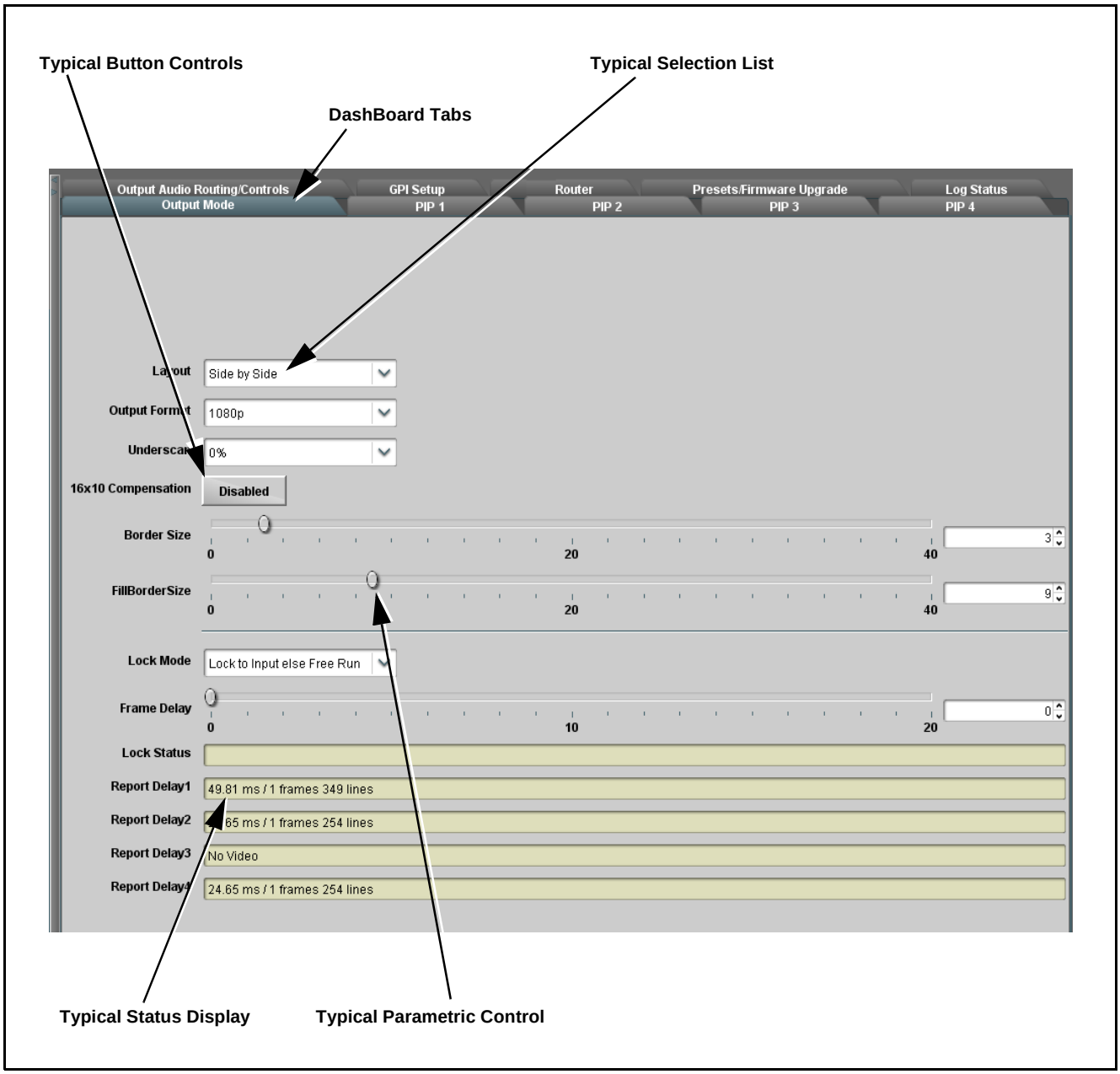


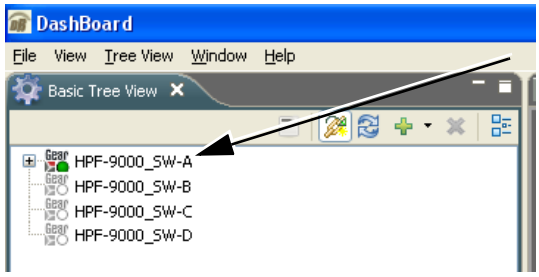
Figure 3-2 Typical DashBoard Tabs and Controls

Accessing the OG-5510-5S Card via Remote Control

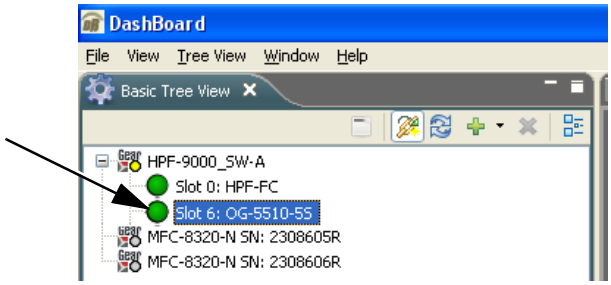
Access the OG-5510-5S card using DashBoard™ as described below.

Accessing the OG-5510-5S Card Using DashBoard™

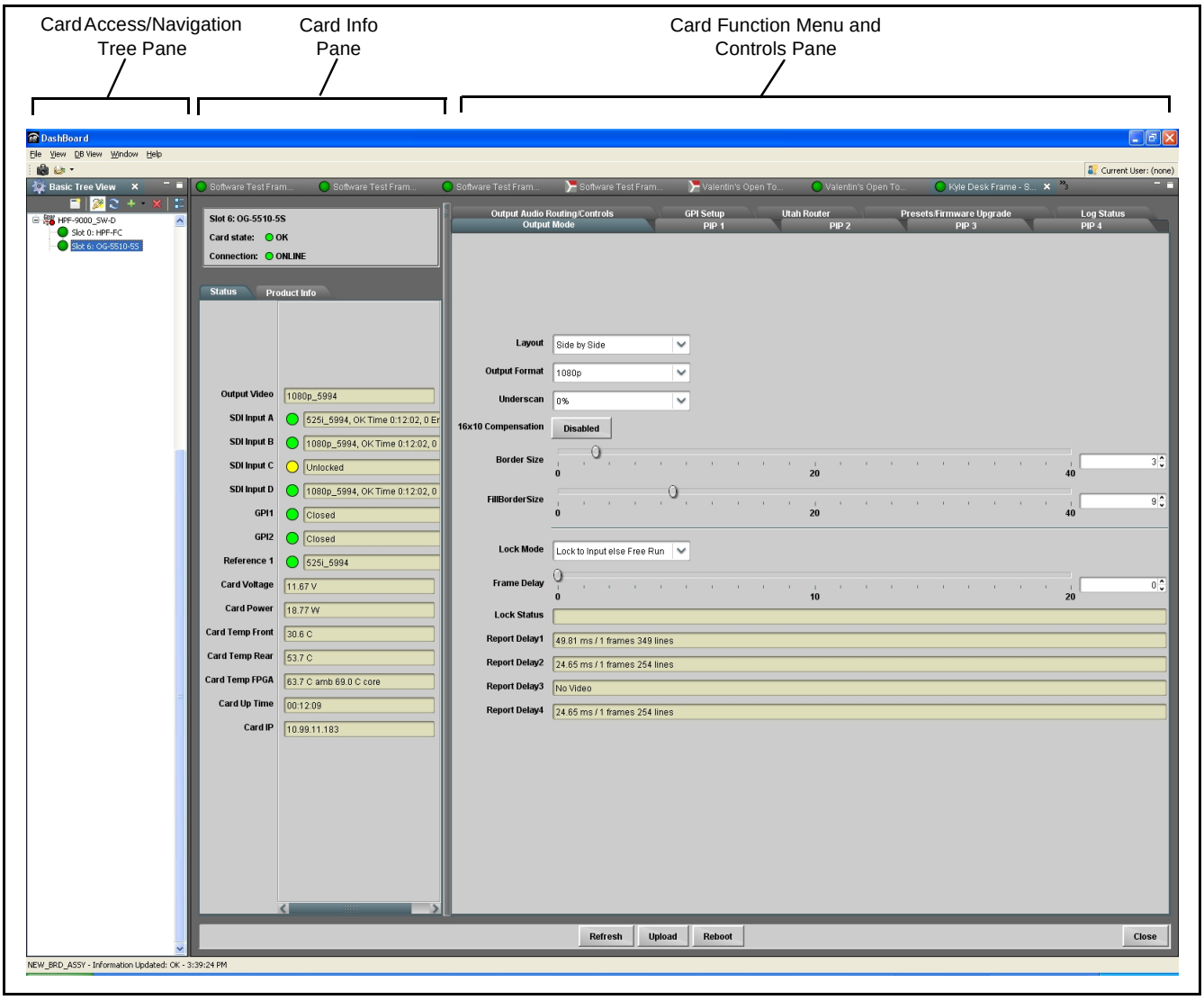
1. On the computer connected to the frame LAN, open DashBoard™.
2. As shown below, in the left side Basic View Tree locate the Network Controller Card associated with the frame containing the OG-5510-5S card to be accessed (in this example, “HPF-9000_SW-A”).



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: OG-5510-5S”).



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
DashBoard
Basic Tree View
HPF-9000_SW-D
Slot 0: HPF-FC
Slot 6: OG-5510-5S
Slot 6: OG-5510-5S
Card state: OK
Connection: ONLINE
Status
Product Info
Output Video 1080p_5994
SDI Input A 525i_5994, OK Time 0:12:02, 0 Er
SDI Input B 1080p_5994, OK Time 0:12:02, 0
SDI Input C Unlocked
SDI Input D 1080p_5994, OK Time 0:12:02, 0
GPI1 Closed
GPI2 Closed
Reference 1 525i_5994
Card Voltage 11.67 V
Card Power 18.77 W
Card Temp Front 30.6 C
Card Temp Rear 53.7 C
Card Temp FPGA 63.7 C amb 69.0 C core
Card Up Time 00:12:09
Card IP 10.99.11.183
Output Audio Routing/Controls
GPI Setup
Utah Router
Presets/Firmware Upgrade
Log Status
Output Mode
PIP 1
PIP 2
PIP 3
PIP 4
Layout Side by Side
Output Format 1080p
Underscan 0%
16x10 Compensation Disabled
Border Size
FillBorderSize
Lock Mode Lock to Input else Free Run
Frame Delay
Lock Status
Report Delay1 49.81 ms / 1 frames 349 lines
Report Delay2 24.65 ms / 1 frames 254 lines
Report Delay3 No Video
Report Delay4 24.65 ms / 1 frames 254 lines
Refresh
Upload
Reboot
Close
NEW_BRD_ASSY - Information Updated: OK - 3:39:24 PM

Checking OG-5510-5S Card Information

The operating status and software version the OG-5510-5S card can be checked using DashBoard™. Figure 3-3 shows and describes the OG-5510-5S 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. 3-59) for corrective action.

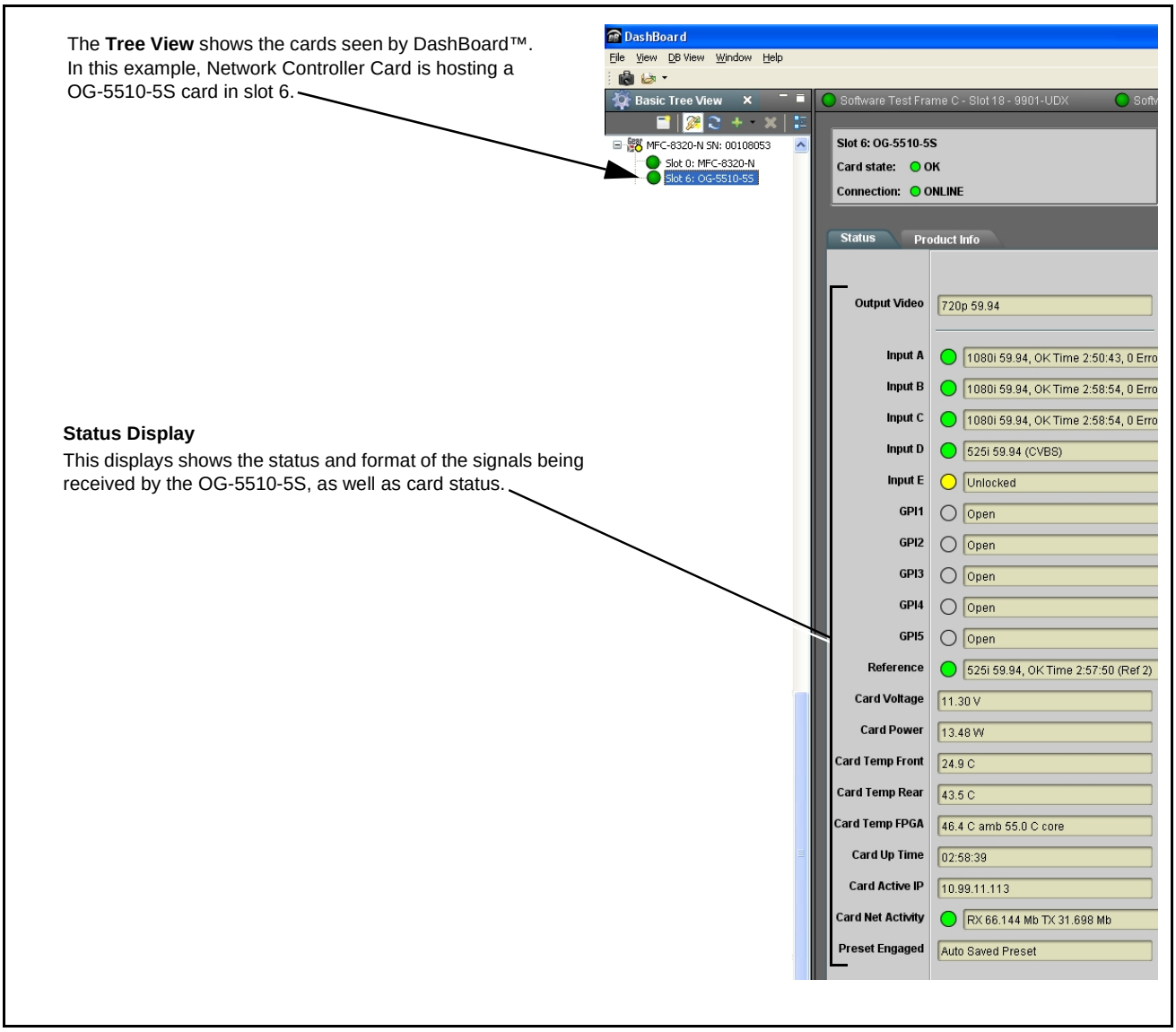


Figure 3-3 OG-5510-5S Card Info/Status Utility

Overview of Operator User Controls Outline and Setup Overview

Figure 3-4 shows an example quint-split output image along with the OG-5510-5S menus and functions that control the attributes shown. Figure 3-5 outlines the basic flow of setting up the OG-5510-5S, along with the DashBoard tabs where these tasks are performed.

Note: Although Figure 3-5 can be used as a guide to the basic tasks required in setting up the OG-5510-5S, the detailed descriptions and examples in OG-5510-5S Function Menu List and Descriptions (p. 3-9) should **always** be read and understood before committing to a setup. Some DashBoard tabs/ functions not directly related to basic setup are not shown in this overview.

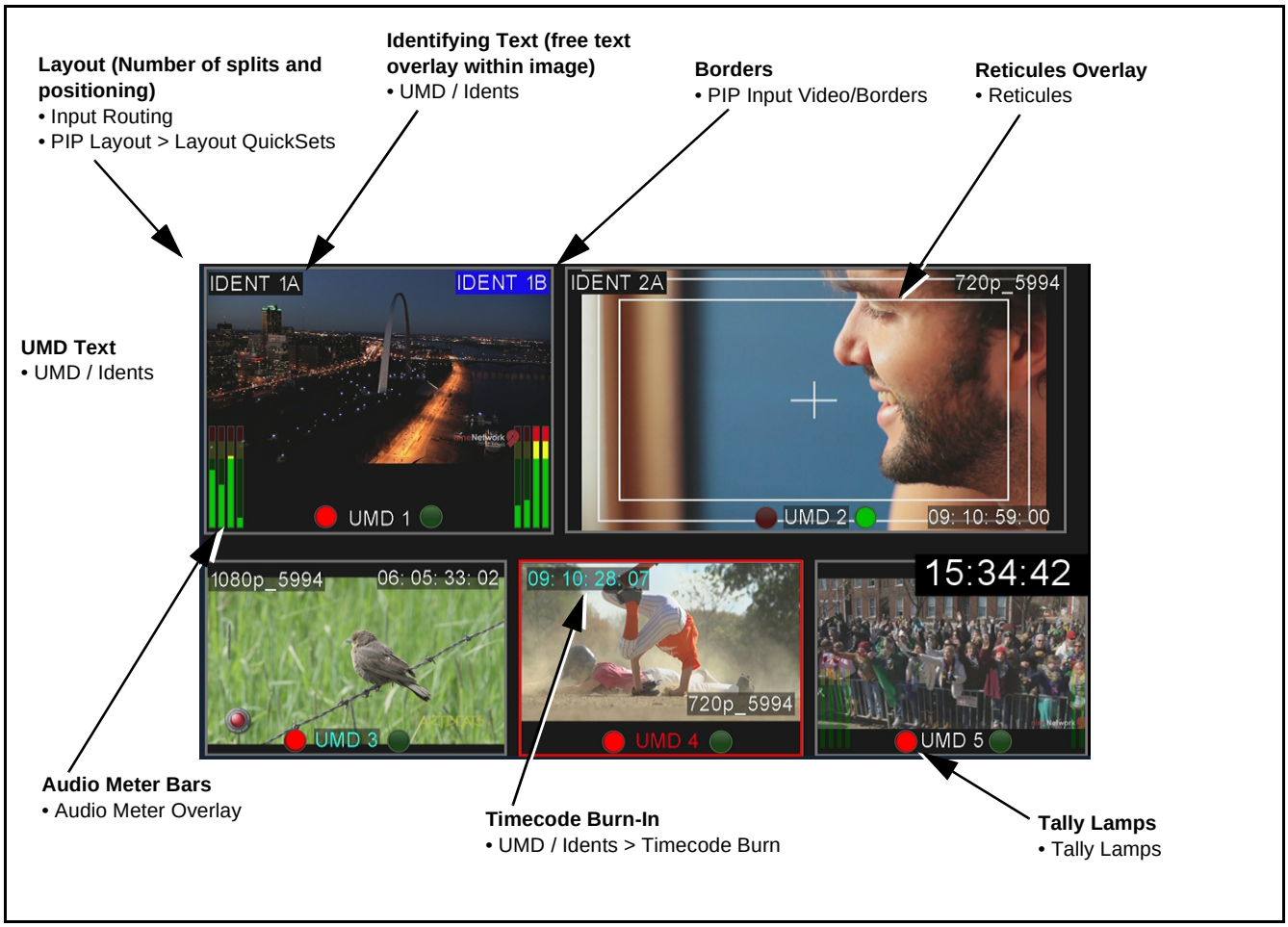


Figure 3-4 Example Quint-Split Image and Configurable Functions

Set Input Routing

Input Routing

- **PiP Input Souce** – Sets the input source to be applied to each PiP cell.
- **Cascade Mode** – Sets the PiP 5 input as a normal 5th input or a cascade input to be received from another upstream QS card. (See **Cascading (Multi-Card) Operation and Setup Overview** in Chapter 1, Introduction for more information.)

Set Number of Splits/Layout Base

PIP Layout

- **Layout Base Set** – Sets the base layout/number of splits to be Quint, Quad, etc. Allows setting fill between the PiP cells. If desired, after the base split is set allows each PiP to be custom sized and positioned.
- **PIP QuickSets** – (Cascade Mode only) Sets layouts consisting of symmetrical columns and rows for cascade layouts where the merged cascade output exceeds the card base 5-split max. (See **PiP Layout Controls > Example 16:1 Multiviewer Setup Using Multi-Card Cascading Mode and Quicksets** in this chapter for more information.)

Set Borders and Per-PIP ARC

PIP Input Video/Borders

- **PIP Borders Enb/Size** – Sets the border widths between the PiP cells and enables/disables border insertion.
- **Per-PIP ARC** – Allows per-PiP ARC of image within the PiP cell.

Insert/Set Tally Lamps

Tally Lamps

- **Overlay Enb** – Allows per-PiP enable of L and R tally lamp insertions.
- **Position/Size** – Sets position of each tally lamp inserted (either anchored to UMD or custom user-positioned and sized).

Insert/Set UMD/Ident/Timecode Text Burn-In

UMD/Idents

- **UMD Enb/Position**
- **Ident 1/2 Enb/Position**
- **Timecode Enb/Position**

Enables and allows position, size, and attribute control of UMD, Ident 1 and 2, and Timecode text burn-ins for each PiP. Also allows selection of the source of text to be burned-in (user text, automation-sourced, video format, etc).

Insert/Set Audio Meter Overlays

Audio Meter Overlay

- **Audio Bars Enb/Layout Select**
- **Position/Attributes Set**

Each PiP cell can display full 4-group audio levels or be set to other layouts of progressively lesser pair combinations. Audio bars can be positioned, sized, and have color and opacity set as desired. (Audio displayed are the channels associated with the respective PiP video input.)

Insert/Set Reticules

Reticules

- **SAA/STA Overlay Enb/Size/Position**
- **Advanced Overlay Enb/Size/Position**

Per-Pip individual Safe Action Area (SAA) and Safe Title Area (STA) can be set as desired. Color, line thickness, and opacity can be set as desired. An Advanced sub-menu tab allows insertion of other reticule elements such as custom graticules and center crosses.

Set Output Audio Routing

Output Audio Routing/Controls

- **Select PiP Input Emb Audio Source**
- **Per-Channel Crosspoint/Controls**

Routes selected embedded audio channels to the merge SDI output. Provides group enable/disable, level, invert, and mute controls, as well as output audio DashBoard level meters.

- Audio sources are from a selected PiP input and cannot be selected from mixed PiP input sources.
- Embedded channels 1 thru 8 directly correspond to HDMI channels 1-8. Channels 3 and 4 are swapped on the HDMI output to maintain conformance with CEA-861D. See detailed instructions for more information.

Set Output Format of Merged Output Video

Output Format

- **Output Format**
- **Underscan/Compensation**
- **Ref Lock Mode**
- **HDMI/DVI Mode Select**

Sets merged SDI output format, as well as merged image underscan and 16x10 compensation if desired. A master card reference lock source (if desired) is also selected here.

Also provides controls for setting the HDMI/DVI merged video output.

Set IP Router Integration Protocols

Protocols

- **Set Utah Router Port-to-PiP Input Correlation**
- **Set Image Video-to- PIP Cell UMD/Tally Correlation**

Where desired, sets router to PiP correlation for UMD and tally automation via IP.

Set GPI/Card Intelligent Automation (Event Actions)

GPI Setup

Event Actions

- **Set GPI to provide card virtual GPIs (up to 32)**
- **Set Event Actions to trigger on GPI and/or selected video criteria**

Where desired, up to 5 GPI inputs can be used as multi-bit input to provide up to 32 "virtual" GPI codes to effect independent attribute controls such as border, UMD, and tallies. Internal intelligent event triggers provide attribute control based off of detected signal conditions.

Insert/Set Wall-Clock Time

Clock

- **Select NTP/user mode and regionalization**
- **Set burn-in location, position, and size/attributes**

When set and configured, wall-clock time can serve as a burn-in in the overall merged output, or be used as a per-PiP burn-in as desired.

Figure 3-5 Overview and Flow of Setting-Up OG-5510-5S

OG-5510-5S Function Menu List and Descriptions

Table 3-1 individually lists and describes each OG-5510-5S 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.)

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

Some functions use **sub-tabs** to help maintain clarity and organization. In these instances, Table 3-1 shows the ordinate tab along with its sub-tabs. Highlighted sub-tabs indicate that controls described are found by selecting this sub-tab (in this example, the **UMD** sub-tab on the **UMD/Idents** page).

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

Function Menu Item	Page	Function Menu Item	Page
Input Routing	3-10	Cascade Config Setup Controls	3-41
PIP Clone Global Controls	3-13	Protocols (Router Integration) Controls	3-46
PIP Layout Controls	3-14	GPI Setup Controls	3-48
PIP ARC/Borders Controls	3-19	Event Actions Setup Controls	3-49
Tally Lamp Insertion Controls	3-21	Output Preview	3-51
UMD/Identification Text Insertion Controls	3-23	Logo (User Graphic) Insertion Controls	3-52
Audio Meter Overlay Controls	3-31	Clock (Wall-Clock Time/LTC) Controls	3-53
Reticules Controls	3-35	Presets	3-54
Output Format Controls	3-38	Admin (Log Status/Firmware Update)	3-58
Output Audio Routing/Controls	3-40	User Log	3-59

Table 3-1 OG-5510-5S Function Menu List

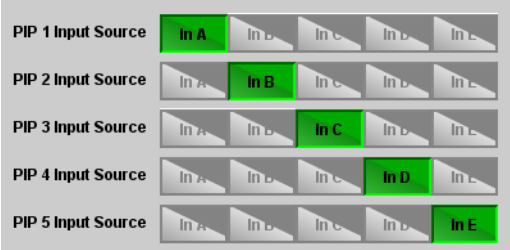
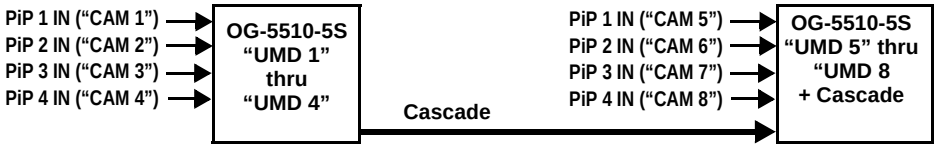
Input Routing	Select inputs to be applied to each PiP. Also provides controls for using Cascade Mode (where required).
• **PiP Input Source Select**  	Routes the card SDI inputs (VID IN A thru VID IN E as **In A** thru **In E**, respectively) to the respective card PiP input. (In this example, VID IN A thru VID IN E are respectively routed as PIP 1 thru PIP 5 input sources.) **Note:** A CVBS input is automatically detected by the card input, with the CVBS ADC converter automatically engaged.
• **Identify PIPs Button** 	Pressing this button momentarily displays an overlay on each PiP image that correlates the PiP to its card PiP identity. This control is useful if you “lose track” of which displayed PiP correlates to which card PiP input channel. Pressing Identify PIPs shows the PIP assignment in the merged output (display ceases after about 3 seconds)

Table 3-1 OG-5510-5S Function Menu List — continued

Input Routing	(continued)
• **Cascade Mode Select** 	**Note:** • See Cascading (Multi-Card) OG-5510-5S Operation and Setup Overview (p. 1-8) in Chapter 1, Introduction for an overview of multi-card cascading that provides multiviewer images exceeding that of a single quint-split card. • See Cascade Mode Using PiP Layout QuickSet Template Presets (p. 3-16) for examples control settings using Cascade Mode along with other per-PiP settings to provide a cascaded multiviewer image setup. **Cascade Mode Select** sets PiP 5 as a input to be used to receive a cascade output from another OG-5510-5S card or to be set as a regular fifth PiP input as follows: • **Enabled:** Sets PiP 5 input to receive a cascade output from another OG-5510-5S card. Because this cascaded underlay will have any burn-in insertions already in place from the upstream source card, all PiP 5 burn-in insertions are automatically disabled in this mode. Also, since this PiP will serve as an underlay for any added PiPs, in this mode PiP 5 is inserted full-size, with all sizing and positioning controls locked out for this PiP insertion. • **Disabled:** Sets PiP 5 input to be used as regular input, with full aspect and sizing/positioning control and burn-ins as PiPs 1 thru 4. Use this mode when only a single, non-cascaded OG-5510-5S is to used for multi-image processing.



First OG-5510-5S card receives "CAM 1" thru "CAM 4", as PiP 1 thru PiP 4 inputs. This output is fed to a second, daisy-chained OG-5510-5S as a **cascading** input.

The second OG-5510-5S card receives "CAM 5" thru "CAM 8", as PiP 1 thru PiP 4 inputs and is set to position these images in a 2nd column. The imported PiP 5 cascade input (carrying "CAM 1" thru "CAM 4") serves as an underlay.

The resulting output (consisting of eight PiPs) now consists of the imported cascading "CAM 1" thru "CAM 4" images, as well as the local input "CAM 5" thru CAM 8" images.

Note: When using cascade mode, the symmetrical alignments shown here are available as "QuickSet" presets using the card per-PiP controls as described in PIP Layout Controls (p. 3-14) and in the example shown in Cascade Mode Using PiP Layout QuickSet Template Presets (p. 3-16).

Table 3-1 OG-5510-5S Function Menu List — continued

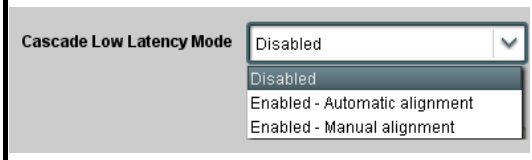
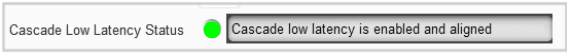
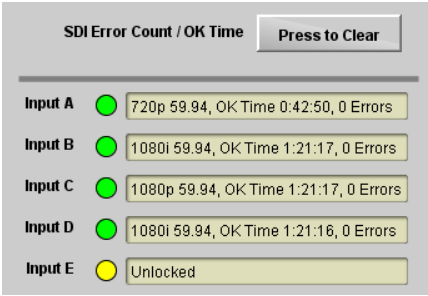
Input Routing	**(continued)**
Card **Local** inputs are inputs received by the card to serve as an individual PiP image. A **Cascade** input is an image imported into the card from an upstream OG-5510-5S used in a multi-card cascading multiviewer arrangement. An input used as a cascade input has controls related to local setup locked out (for example, burn-ins and sizing) since a cascading input serves as an underlay with all its burn-ins and other attributes already provided by the upstream card. Note that on a downstream card receiving a cascade input, this input should be considered independent of the local input positioning and attribute control provided by the downstream card.	
• Cascade Mode Low-Latency Mode Select  	Provides modes where card I/O latency can be reduced (by bypassing cascade input framesync) using the choices shown and described below. • **Disabled:** Normal default mode where an upstream cascaded input is **always** aligned to the local card's selected reference. This results in the normal, expected one-frame delay due to the framesyncing action. Where low-latency is not required, it is recommended to use this mode. • **Enabled – Automatic alignment:** This mode applies framesyncing when needed (**applying** framesync and **bypassing** low-latency during these intervals). When alignment is again detected by the local card, framesyncing is correspondingly disabled and low-latency operation is again applied. Because this mode can automatically enable and disable framesyncing, an occasional video "hit" should be expected when using this mode. • **Enabled – Manual alignment:** Similar to the Automatic alignment mode, this mode will disable low-latency framesync bypass when needed. However, it will not apply alignment until the **Cascade Alignment Apply** button is pressed, thereby circumventing an unexpected auto-align video "hit". **Note:** Where a multi-card cascaded arrangement is being used, locking **all** inputs and **all** OG-5510-5S cards to the same house reference will optimize alignment and help allow unimpeded low-latency operation (with Latency Mode being set to Enabled - Automatic alignment).
• Cascade Mode Low-Latency Status	Displays the low-latency framesync bypass status as shown below.
 	• Green indicator and "disabled" message indicates low-latency framesync bypass is disabled by Low Latency control being set to Disabled.
 	• Yellow indicator and "drifting" message indicates low-latency framesync bypass is disabled by event requiring framesync with low-latency correspondingly disabled. This message typically appears when auto mode is selected and cascaded input is experiencing timing drift versus local card timing.
 	• Yellow indicator and "requires alignment" message indicates cascading input is now detected as being locked, but local card requires **Align** button to be pressed to remove any buffer excess and re-establish sync.
 	• Green indicator and "enabled and aligned" message indicates cascading input is now detected as being locked, with full bypass of framesyncing and low-latency now is effect.
• SDI Error Counter/Clear  	In conjunction with the card **Status** page and its Input status indicators (where an SDI input(s) is being used) allows running error totals to be cleared. **Status** page shows input status and **OK Time / Errors** for inputs receiving SDI.

Table 3-1 OG-5510-5S Function Menu List — continued

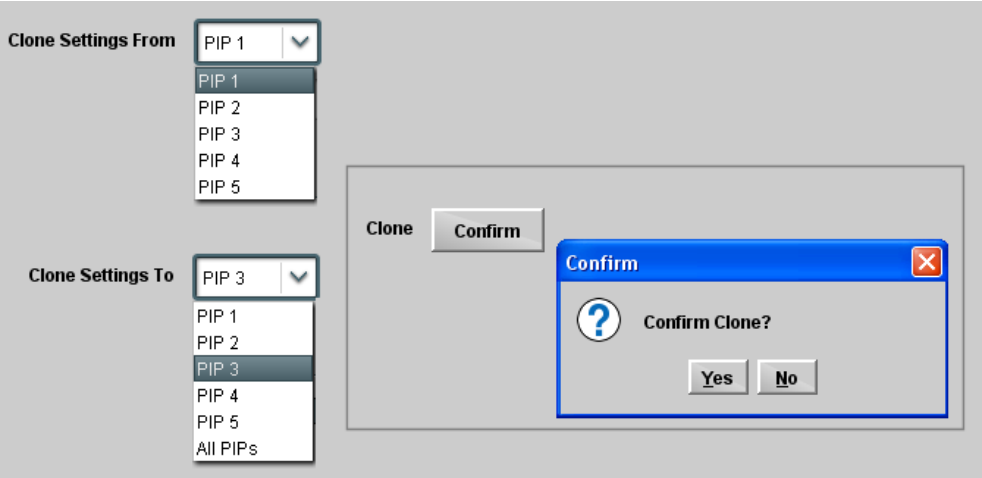
PIP Clone	Provides controls to set global “cloning” of card graphics attributes settings from one PiP to another. This helps in providing a consistent and easily set layout across selected PiPs.

Cloned settings can significantly affect layouts. Make certain all aspects of layouts/attributes are understood (as described in this Chapter) before applying clones to other PiPs. Make certain only desired attributes are cloned as intended (using the controls described below). Individual tabs also have clone controls which can be used to clone only certain layout attributes to other PiPs as desired.

Note: • When cloned settings are applied, they can be left as is, or changed as desired on the PiP receiving the cloned settings. The cloning can serve as a baseline or as the final intended setup as desired.

• For multi-card setup using Cascade Config mode/setup, Clone Settings **from any** of the cards in the chain can be cloned **to any** card in the chain (i.e., **all** cards in the chain appear in the **Clone Settings From** and **Clone Settings To** drop-downs). See Cascade Config Setup Controls (p. 3-41) for more information.

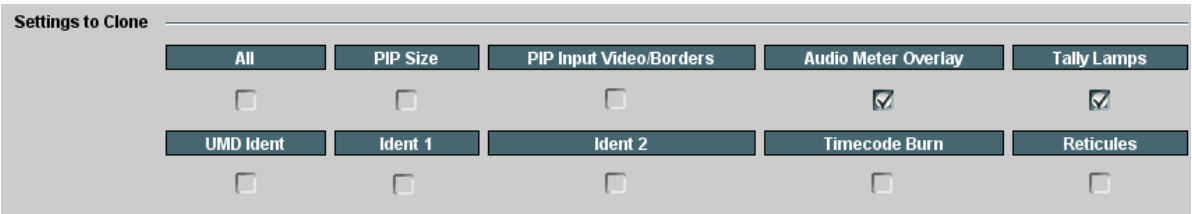
• **Clone Settings From/To PiP Selector**	**Clone Settings From** and **Clone Settings To** drop-downs select the PiP to serve as the cloned source, and the PiP(s) to receive the cloned settings.



In the example here, **PIP 1** is the settings source to be cloned for **PIP 3**. The **Confirm** pop-up allows applying or backing out of the clone operation.

Note: This dialog is also present on several layout tabs (for example, “Tally Lamps”) described later in this Chapter. As such, cloning can be performed on this page/tab, or on tabs specific to a particular function.

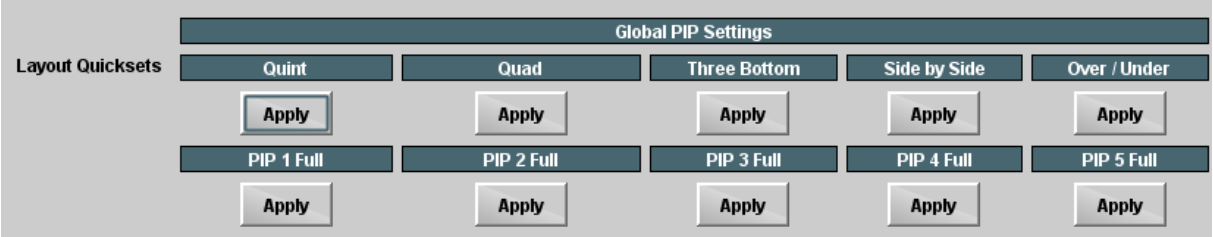
• **Clone Settings Attribute Select (Settings to Clone)**	Check boxes allow all (global), or only certain attributes to be cloned to a receiving PiP(s) as desired.



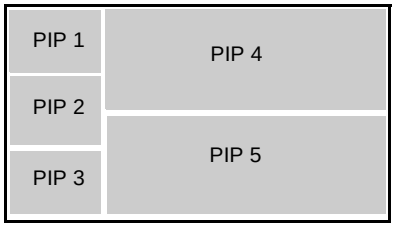
In the example here, specifically the **Audio Meter Overlays** and **Tally Lamps** settings will be applied to the cloned PiPs (while other attributes will be left as is). Any combination of checks can be applied as desired.

Table 3-1 OG-5510-5S Function Menu List — continued

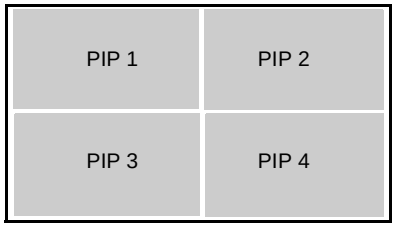
PIP Layout	Provides PiP layout presets templates and other controls related to the number of splits and layout for the overall merged-image output.
• **Layout Preset Template Select**	For **local** (**non-cascading) inputs**, selects from several preset global (base) layout templates from the choices shown and depicted below. **Note:** The Preset templates described below are intended for non-cascading layouts. For symmetrical cascaded layouts (layouts exceeding five PiPs), see Cascade Mode Using PiP Layout QuickSet Template Presets (p. 3-16).



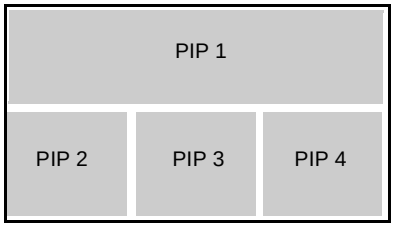
Quint



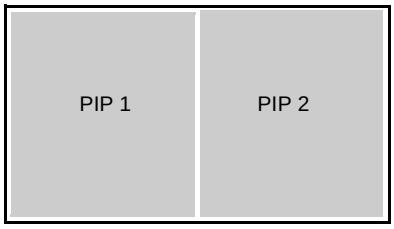
Quad (symmetrical)



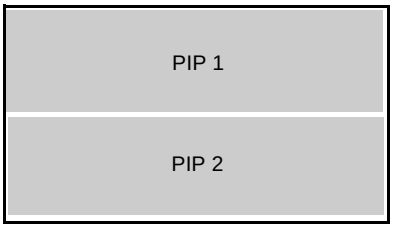
Three Bottom



Side-by-Side



Over / Under



PiP 1, 2...thru PiP 5 Full

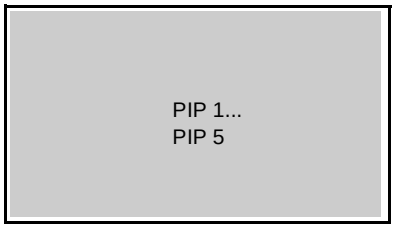


Table 3-1 OG-5510-5S Function Menu List — continued

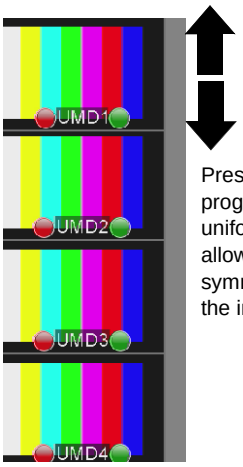
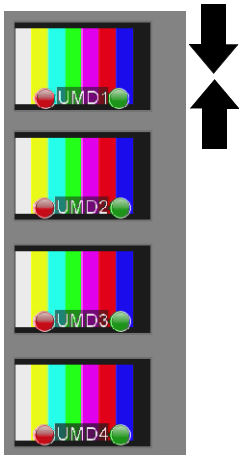
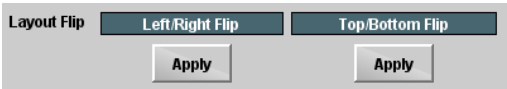
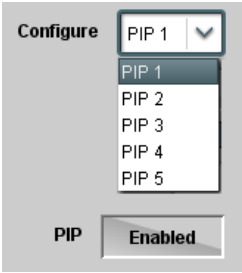
	(continued)
• **Decrease/Increase Spacing Controls** 	Provides tailoring of the PiP image sizes relative to background fill.
 Pressing **Decrease** progressively expands all PiPs uniformly over the fill areas, allowing each PiP to symmetrically occupy more of the image area	Pressing **Increase** progressively reduces all PiPs, allowing fill to symmetrically occupy more of the PiP image area 
• **Layout Flip Controls**  	For local inputs to the card, allows PiP layout to flip top/bottom or L/R.
Note: • The following controls are used for **individual PiP (per-PiP)** layout and positioning control. • Any sizing/positioning performed using cloning controls can be overwritten using these controls.	
• **PiP Size/Position Edit/Select**  	Individually selects any of the five PiP inputs to be selected for sizing/ positioning edits, and enables PiP insertion into the merged output. (In this example, PiP 1 is selected for editing.) **Note:** • These controls are intended only for card local inputs and not a cascade underlay imported from an upstream OG-5510-5S card. • For multi-card setup using Cascade Config mode/setup, Clone Settings **from any** of the cards in the chain can be cloned **to any** card in the chain (i.e., **all** cards in the chain appear in the **Clone Settings From** and **Clone Settings To** drop-downs). See Cascade Config Setup Controls (p. 3-41) for more information.

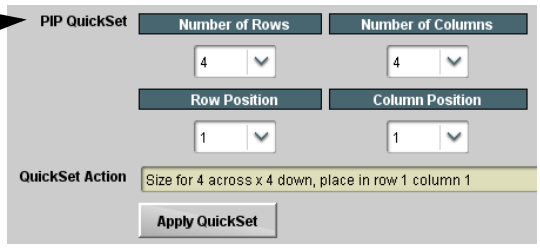
Table 3-1 OG-5510-5S Function Menu List — continued

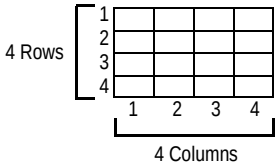
PIP Layout	(continued)
• **PiP Layout QuickSet Template Presets (Cascade Mode)**	Layout QuickSets provide for layouts consisting of symmetrical **columns** and **rows** that are intended for cascade layouts where, for example, an upstream OG-5510-5S card provides a first column of PiP images, and then a second OG-5510-5S provides the second column of PiP images. The descriptions here describe using the controls and also provide examples using the controls and the resulting multi-card cascade setups.

The **Number of Rows** and **Number of Columns** drop-downs set the grid format to be used for a multi-card, multiviewer setup. Once the number of rows/columns is set, this is propagated to other PiP controls on the card, since this will be a card global setting that allows other PiP insertions to conform with the desired grid layout.

The **QuickSet Action** field shows a summary of the configured layout. Click **Apply QuickSet** to enact the layout setup.

In this example, a 4-row x 4-column grid is being set up (which can provide a 16:1 multiviewer layout using four OG-5510-5S cards, each handling four PiP images).





The **Row Position** and **Column Position** drop-downs set where in the grid the PiP image will be inserted (in this example, position row 1 / column 1).

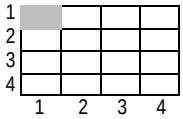


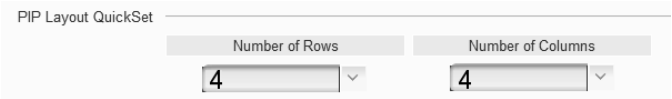
Table 3-1 OG-5510-5S Function Menu List — continued

PIP Layout	(continued)

Example 16:1 Multiviewer Setup Using Multi-Card Cascading Mode and Quicksets

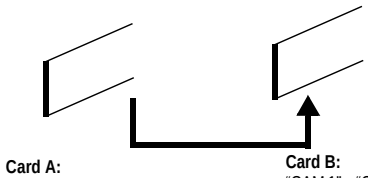
This example shows a layout setup that provides a 16:1 multiviewer output. It uses four OG-5510-5S cards, each handling four PiP inputs, and with each card set to work with a 16-PiP (4x4) grid.

1. First, on the **PIP 1 > PIP Position** tab a 4x4 grid is set up. This setup will propagate to the PiP 2 thru PIP 4 same controls on the card. (This must also be done for any other OG-5510-5S cards in the chain.)



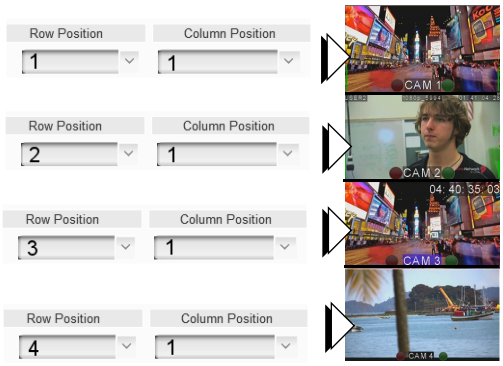
2. On the **first** OG-5510-5S card, PiP 1 thru PiP 4 images ("CAM 1 thru "CAM 4") are routed and positioned as Row Positions 1 thru 4, all in Column 1. This results in the first column of four images for the 16:1 multiviewer setup.

The SDI output of this card is routed to the next OG-5510-5S card as the PIP 5 input, with this card set up with **Cascade Mode > Enabled**. This places the first card output as an underlay with its merged PiP output positioned in the first column.



Card A:
"CAM 1" – "CAM 4" in 1st column

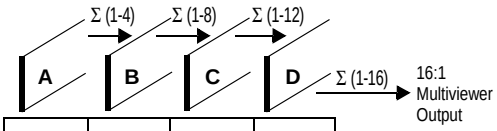
Card B:
"CAM 1" – "CAM 4" in 1st column imported as underlay.
"CAM 5" – "CAM 8" (card 2 local inputs 1-4) positioned in 2nd column.



3. On the **second** OG-5510-5S card, PiP 1 thru PiP 4 images ("CAM 5" thru "CAM 8") are routed and positioned as Row Positions 1 thru 4, all now set in Column 2.

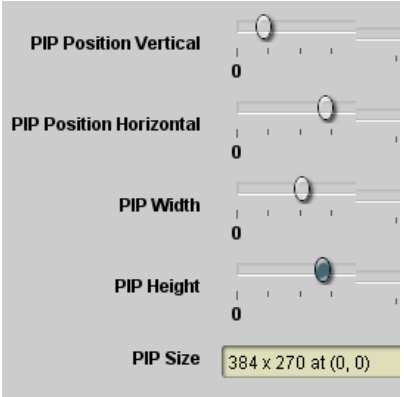
Along with the underlay imported from card 1 as column 1, this now results in the first column of four underlay imported images and the second column of four more locally inputed PiP images ("CAM 1" thru "CAM 8").

4. Using a total of four OG-5510-5S cards (**Card A** thru **Card D**) similarly configured in a daisy-chain arrangement, the SDI output of an upstream OG-5510-5S card provides the cumulative built-up underlay, and allows positioning local PiP images in successive columns. In this example, four cards each are set to progressively position local PiP inputs in columns 1 thru 4, respectively. This results in four multiviewer columns consisting here of:
"CAM 1" – "CAM 4"
"CAM 5" – "CAM 8"
"CAM 9" – "CAM 12"
"CAM 13" – "CAM 16"



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

Table 3-1 OG-5510-5S Function Menu List — continued

PIP Layout	(continued)
• **PiP Custom Positioning Controls**  	Controls allow the positioning and sizing of the PiP within the overall merged output image. • **Position Vertical** and **Position Horizontal** sets the PiP origin location (Vertical in lines; horizontal in pixels) • **Width** and **Height** sets the PiP size (Vertical in lines; horizontal in pixels) The **PIP Size** display shows the PiP size and H/V origin point position. **Note:** Even if a PiP layout QuickSet was applied, these controls allow manipulating PiP position and size as desired.

PiP 2 with custom positioning/sizing placed in normal upper-right corner of merged quint-split output

PiP 2 with new custom positioning/sizing now places PiP 2 in lower-left corner (over PiP 3) of merged quint-split output

When using custom positioning, it is helpful to first size all the PiP small (as thumbnail sized). This helps avoid a PiP "hiding" underneath another PiP. Pressing the **Identify PIPs** button as shown here will help make sure each PiP input correlation is known, and all PiP are present as expected.

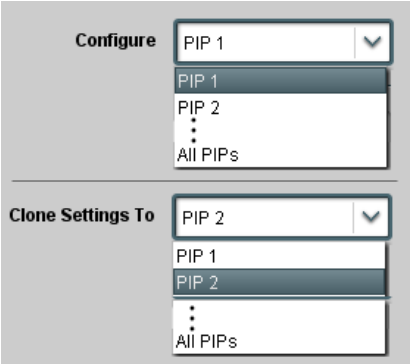
With the PiP identities now known, one-by-one each PiP can be sized and positioned to its desired size/position as shown in the example here.

Table 3-1 OG-5510-5S Function Menu List — continued

PIP ARC/Borders

Provides controls to individually set border, ARC, and custom sizing for each local PiP input.

• PiP Configure Select/Clone

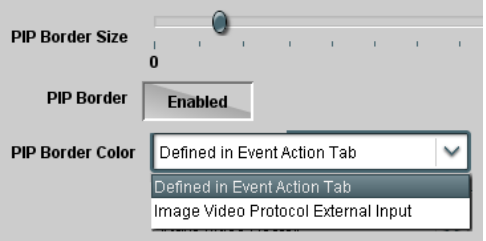


Individually selects any of the five PiP inputs to be selected for sizing/ positioning edits (as described below). Allows cloning settings to other PiPs.

Note: • These controls are intended only for base program video inputs and not a cascade underlay imported from an upstream OG-5510-5S card.

• For multi-card setup using Cascade Config mode/setup, Clone Settings **from any** of the cards in the chain can be cloned **to any** card in the chain (i.e., **all** cards in the chain appear in the **Clone Settings From** and **Clone Settings To** drop-downs). See Cascade Config Setup Controls (p. 3-41) for more information.

• PiP Border Size/Enable Control



• **PIP Border Size** sets the border thickness for **all** PiP borders.

• **PIP Border** enables/disables border insertion.

• **PIP Border Color** allows setting border colors as directed by Event Action settings or by direction of Image Video™ Protocol external input.

Note: The Enable control inserts or removes borders for **only** the PiP(s) selected using the Configure Select drop-down above.

Border set for 0
(all images touch with no border)

Border set for 10
(a 10-pixel border is added)

Note: PiP border colors are typically controlled in an automated manner using GPI coding or IP automation. However, the border colors of each PiP can be set for static manual user control using forced settings, as described in Event Actions Setup Controls (p. 3-49).

Table 3-1 OG-5510-5S Function Menu List — continued

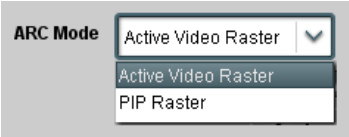
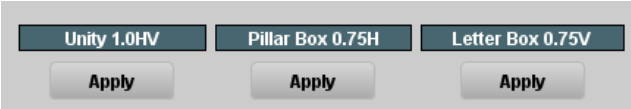
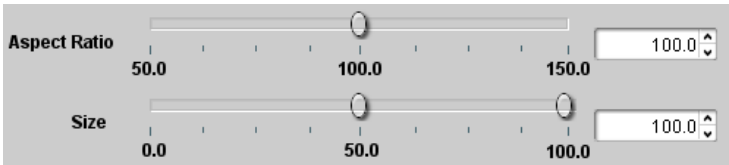
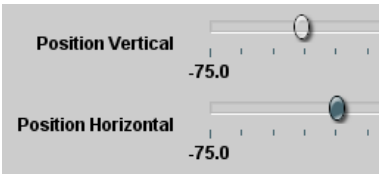
PIP ARC/Borders	(continued)
• **PiP ARC Mode Select**  	ARC Mode select allows the ARC controls to either use the aspect ratio defined by the incoming PiP video to serve as the referenced aspect ratio for other ARC controls, or to use a custom-sized aspect ratio PiP raster as the referenced aspect ratio. • **Active Video Raster** selection sets ARC action to use the incoming PiP video as the referenced aspecting (e.g., with a 16:9 input, setting ARC to Unity 1.0 HV results in a PiP with a 16:9 aspect ratio). • **PiP Raster** selection ARC action to use a custom-configured aspect ratio to serve as the referenced aspecting. PiP Raster selection can accommodate use cases where non-standard aspect ratios are desired even with image stretching or collapsing.
• **Standard Preset Template Aspect Ratio Conversion Selectors**	Selects between the standard preset Aspect Ratio Conversions (ARC) shown below.
 	
• **User-defined Aspect Ratio Controls**	**Aspect Ratio Horizontal** and **Aspect Ratio Vertical** controls adjust horizontal and vertical zoom percentage. Settings less than 100% provide zoom-out; settings greater than 100% provide zoom-in. (50% to 150% range in 0.1% steps; null = 100.0)
 	**Aspect Ratio** control applies a custom ARC with scaling reflecting the division of the aspect ratio (e.g., "50%" setting is equivalent to 2H:4V, or 2 divided by 4). **Size** control provides a proportional scaling of the PiP Image within the PiP area, maintaining whatever aspect ratio is in effect.
• **Within-PiP Positioning Controls**  	Where ARC settings result in an image smaller than the PiP active area, allows the image to be vertically and horizontally positioned within the PiP area boundaries. (-75% to 75% range in 0.1% steps) **Note:** This control affects only image positioning within the PiP image area cell. It will not move an image to an area outside the currently-defined PiP area cell.

Table 3-1 OG-5510-5S Function Menu List — continued

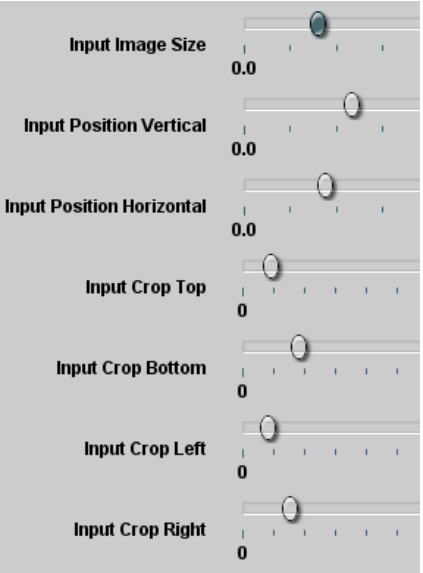
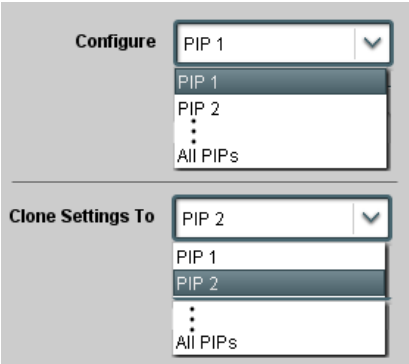
PIP ARC/Borders	**(continued)**
• **Input PiP Video Size/Position Controls**  	The controls shown here allow manipulating the input scaling and positioning of the selected PiP image before it is processed by the image area ARC. **Note:** This control affects only image positioning within the PiP image area cell. It will not move an image to an area outside the currently-defined PiP area cell.
Tally Lamps	Provides controls for each PiP to insert tally indicator "lamps" as overlays into the output video.
Note: • Tally lamp activation (ON/OFF and color control) is set using IP automation, or other external actions such as GPI (see Event Actions Setup Controls (p. 3-49) for setting up tally lamp control). The controls here enable lamp overlay insertion, and set size and position attributes. These controls do not control tally activation. • Identical independent controls are provided for a **Tally Lamp 1** and **Tally Lamp 2** tally lamps. Therefore, only the **Tally Lamp 1** controls are shown here.	
• **PiP Configure Select/Clone**  	Individually selects any of the five PiP inputs to be selected for tally insertion edits (as described below). Allows cloning settings to other PiPs. **Note:** For multi-card setup using Cascade Config mode/setup, Clone Settings **from any** of the cards in the chain can be cloned **to any** card in the chain (i.e., **all** cards in the chain appear in the **Clone Settings From** and **Clone Settings To** drop-downs). See Cascade Config Setup Controls (p. 3-41) for more information.

Table 3-1 OG-5510-5S Function Menu List — continued

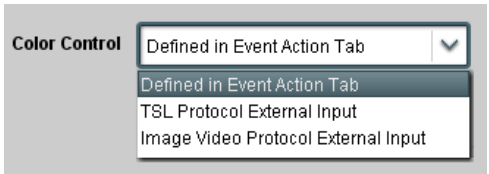
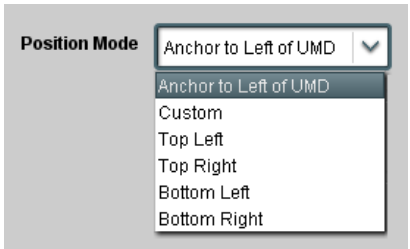
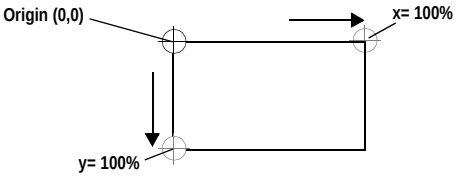
Tally Lamps	(continued)
• **Tally Insertion Select** 	Enables or disables lamp insertion overlay for selected PiP(s).
• **Lamp Color Control** 	Provides control for setting selected tally lamp “illuminated” color as directed by the control inputs shown.
• **Tally Position Select** 	Sets the location of the tally lamp as anchored to UMD, custom, or one of the positions shown here. (When Custom is selected, tally lamp position and size is configured using the controls described below.) **Note:** Tally Lamp 1 has anchored position Left of UMD (and is intended for left placement). Tally Lamp 2 has anchored position Right of UMD (and is intended for right placement).
• **Tally Custom Sizing/Position Controls** 	Where Custom is selected, allows tally lamp to be positioned anywhere in the image area of the respective PiP. **Horizontal** and **Vertical Position** controls set the origin point for the tally lamp overlay. 

Table 3-1 OG-5510-5S Function Menu List — continued

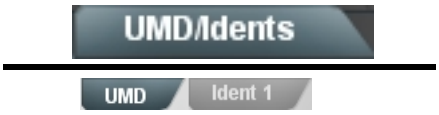
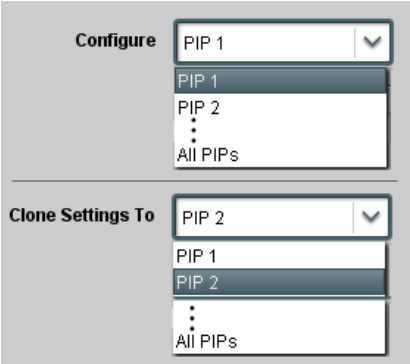
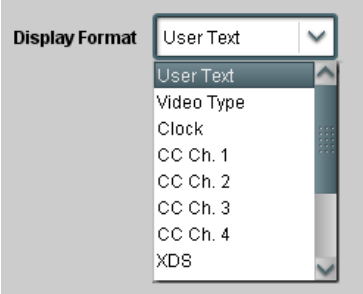
	Provides controls for each PiP to insert UMD text, user identification text, and timecode burn-in. Also allows setting insertion rules and text attributes such as size and color.
• **PiP Configure Select/Clone** 	Individually selects any of the five PiP inputs to be selected for UMD text insertion edits (as described below). Allows cloning settings to other PiPs. **Note:** For multi-card setup using Cascade Config mode/setup, Clone Settings **from any** of the cards in the chain can be cloned **to any** card in the chain (i.e., **all** cards in the chain appear in the **Clone Settings From** and **Clone Settings To** drop-downs). See Cascade Config Setup Controls (p. 3-41) for more information.
• **UMD Insertion Select** 	Selects the rules for UMD overlay insertion into the PiP area.
• **UMD Text Type (Format) Select** 	Selects the type of data to be displayed as UMD text from choices shown. • **User text** allows user text to be entered using field described below. • **Video type** inserts an overlay showing the video format of the respective PiP input. • **Clock** inserts a wall-clock time overlay (see Clock (Wall-Clock Time/ LTC) Controls (p. 3-53) for setting the wall-clock time clock feature). • **CC Ch 1** thru **XDS** insert the selected closed-captioning related text from the video associated with the correlated PiP input video.

Table 3-1 OG-5510-5S Function Menu List — continued

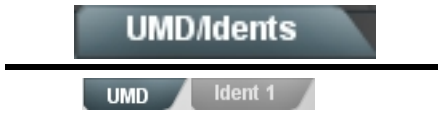
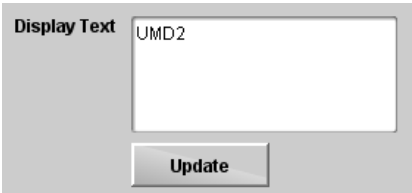
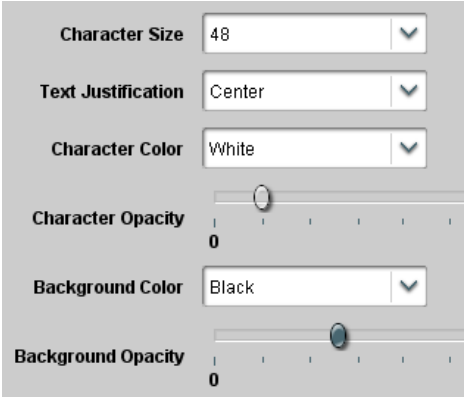
	**(continued)**
• **UMD Text Entry Field** 	Dialog entry box that allows entry of desired ident text string. Enter desired text as click **Update** when done to input the text string. **Note:** • All normal keyboard alphanumeric characters are supported. Not all ASCII special characters (Windows ALT+*nnnn*) are supported. • Up to 126 characters can be entered. • User custom text cannot be cloned and must be entered manually for each PiP UMD and/or Ident field.
Note: The sizing/positioning controls below for text and background have an interrelation where a background shading box can automatically track with text size/position and vice-versa as described below.	
• **UMD Text Character/Background Attributes Controls** 	Provides independent controls for setting the color and opacity of the UMD text and its background. • **Character Size** drop-downs set text size (in pixels). • **Text Justification** selects from left, center, or right-aligned text. • **Character** and **Background Color** drop-downs select text and background colors from various independent choices. • **Opacity** controls set text or background opacity from 0% (least opacity) to 100% (full opacity).

Table 3-1 OG-5510-5S Function Menu List — continued

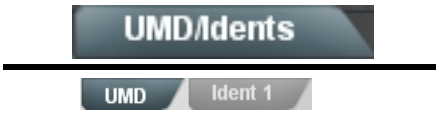
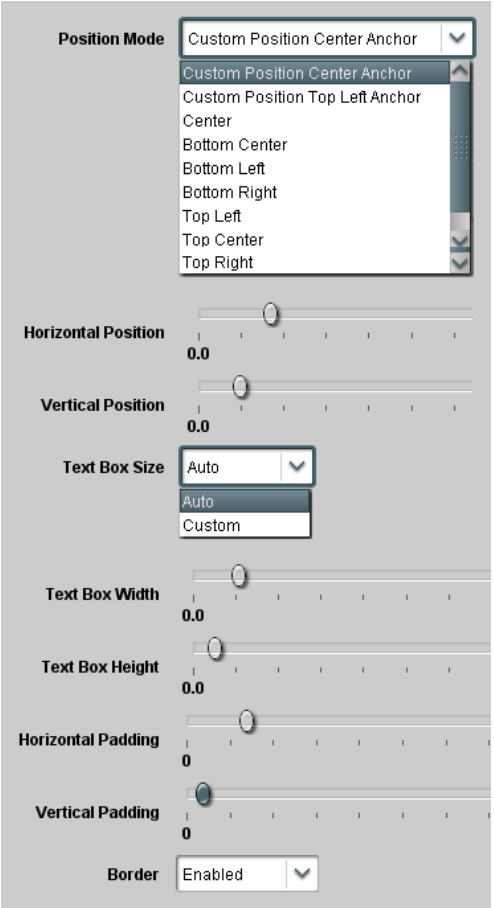
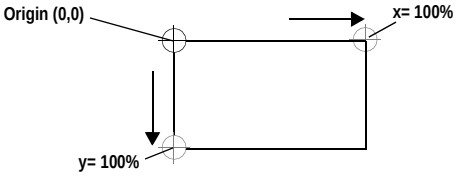
	**(continued)**
• **Text/Background Positioning Controls** 	• Using the **Position Mode** drop-down, UMD text and its background can be positioned using template choices (as shown) or can use the Custom choices which provide basic positioning which can then be further manipulated as described below. • When Custom is selected, the **Horizontal** and **Vertical Position** controls allow fine adjustment of the text/background positioning.  • **Text Box Size** selects from **Auto** (in which the box size tracks with the configured text size) and **Custom** (in which the box size is then set using the **Text Box Width** and **Height** controls. • **Horizontal** and **Vertical Padding** add padding (“white space”) within the box and its text. • **Border** enables/disables a border around whatever box size is present. (The border color tracks with whatever the text color is set to.)

Table 3-1 OG-5510-5S Function Menu List — continued

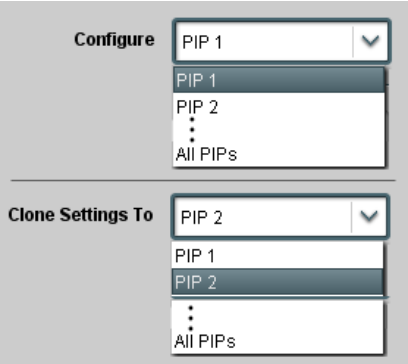
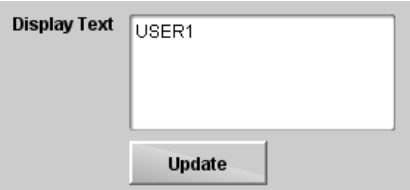
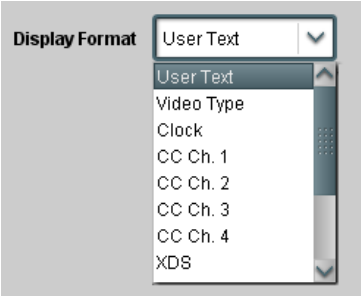
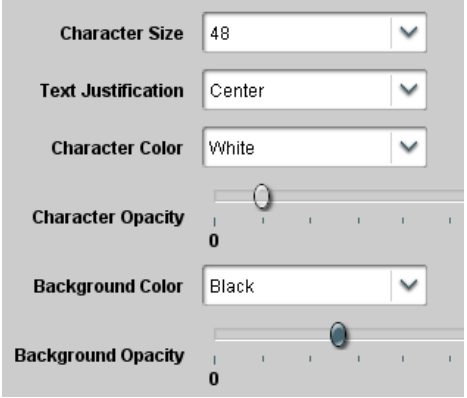
	Provides controls for each PiP to insert identifying active-video area burn-in text, and set insertion rules and text attributes such as size and color.
Note: Identical independent controls are provided for additional ident text insertion **Ident 2**. Therefore, only the **Ident 1** controls are shown here.	
• Ident Insertion Select 	Selects the rules for ident text overlay insertion into the PiP area.
• PiP Configure Select/Clone 	Individually selects any of the five PiP inputs to be selected for Ident text insertion edits (as described below). Allows cloning settings to other PiPs.
• Text Entry Field 	Dialog entry box that allows entry of desired ident text string. Enter desired text as click **Update** when done to input the 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. • User custom text cannot be cloned and must be entered manually for each PiP UMD and/or Ident field.
• Text Type (Format) Select 	Selects the type of data to be displayed as UMD text from choices shown. • **User text** allows user text to be entered using field described below. • **Video type** inserts an overlay showing the video format of the respective PiP input. • **Clock** inserts a wall-clock time overlay (see Clock (Wall-Clock Time/ LTC) Controls (p. 3-53) for setting the wall-clock time clock feature). • **CC Ch 1** thru **XDS** insert the selected closed-captioning related text from the video associated with the correlated PiP input video.

Table 3-1 OG-5510-5S Function Menu List — continued

(continued)

Note: The sizing/positioning controls below for text and background have an interrelation where a background shading box can automatically track with text size/position and vice-versa as described below.

- **Text Character/Background Attributes Controls**



Provides independent controls for setting the color and opacity of the ident text and its background.

- **Character Size** drop-downs set text size (in pixels).
- **Text Justification** selects from left, center, or right-aligned text.
- **Character** and **Background Color** drop-downs select text and background colors from various independent choices.
- **Opacity** controls set text or background opacity from 0% (least opacity) to 100% (full opacity).

Using both **Ident 1** and **Ident 2** provides enhanced flexibility in burn-in identification.

In this example, **Ident 1** is being used to display user text, and **Ident 2** is being used to display PiP input video format

Ident 1 set to display user text (in this example, “USER 1”)

Ident 2 set to display video format (in this example, PiP input with 1080i_5994)

Table 3-1 OG-5510-5S Function Menu List — continued

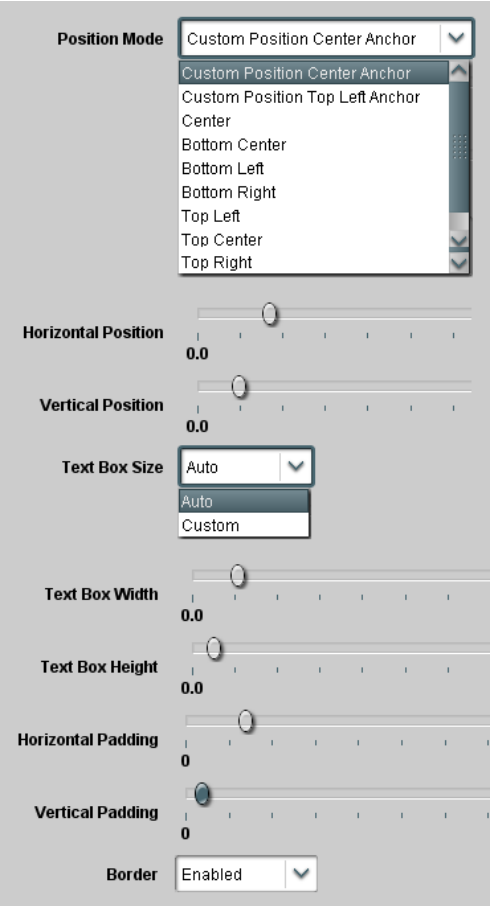
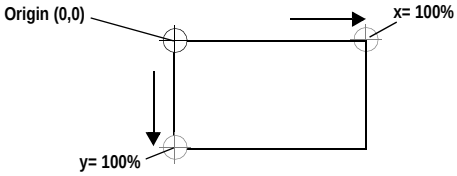
	(continued)
• **Text/Background Positioning Controls** 	• Using the **Position Mode** drop-down, ident text and its background can be positioned using template choices (as shown) or can use the Custom choices which provide basic positioning which can then be further manipulated as described below. • When Custom is selected, the **Horizontal** and **Vertical Position** controls allow fine adjustment of the text/background positioning.  • **Text Box Size** selects from **Auto** (in which the box size tracks with the configured text size) and **Custom** (in which the box size is then set using the **Text Box Width** and **Height** controls. • **Horizontal** and **Vertical Padding** add padding (“white space”) within the box and its text. • **Border** enables/disables a border around whatever box size is present. (The border color tracks with whatever the text color is set to.)

Table 3-1 OG-5510-5S Function Menu List — continued

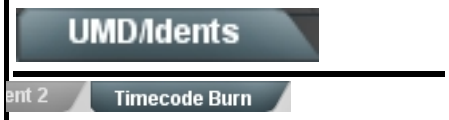
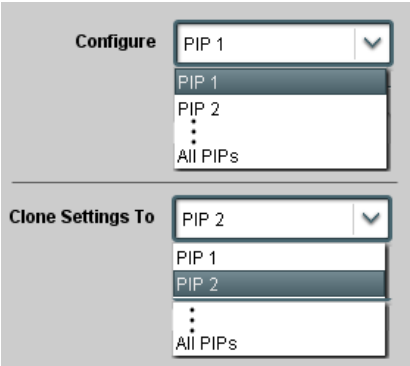
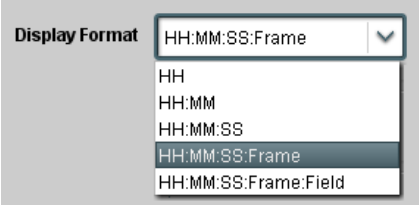
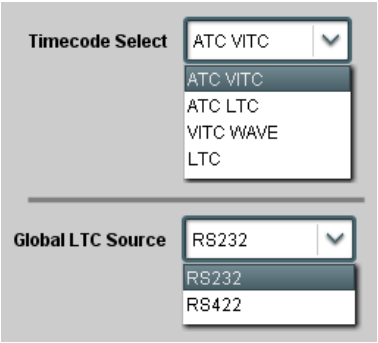
	Provides controls for each PiP to insert active-video area timecode burn-in, and set insertion rules and attributes such as size and color.
Note: Timecode character burn-in is always the embedded timecode associated with the PiP (i.e., PiP 1 Timecode Burn uses only the timecode value embedded on PiP 1 input video).	
• **PiP Configure Select/Clone** 	Individually selects any of the five PiP inputs to be selected for Timecode insertion edits (as described below). Allows cloning settings to other PiPs. **Note:** For multi-card setup using Cascade Config mode/setup, Clone Settings **from any** of the cards in the chain can be cloned **to any** card in the chain (i.e., **all** cards in the chain appear in the **Clone Settings From** and **Clone Settings To** drop-downs). See Cascade Config Setup Controls (p. 3-41) for more information.
• **Timecode Insertion Select** 	Selects the rules for timecode overlay insertion into the PiP area.
• **Timecode Format Display Select** 	Selects the format of timecode string burn-in overlay insertion from choices shown.
• **Timecode Input Select** 	• For the selected PiP and its input video, **Timecode Select** filters the timecode format choice to be used and burned in from the following choices: • **ATC_VITC** – SD or HD packet-based ATC_VITC timecode • **ATC_LTC** – HD packet-based ATC_LTC timecode • **VITC WAVE**– SD “waveform-based” VITC timecode (SD-SDI or CVBS) • **LTC** – externally-sourced LTC timecode not integrated within SDI or CVBS video • **Global LTC Source** selects from RS232 or RS422 external timecode source when **LTC** is selected above.

Table 3-1 OG-5510-5S Function Menu List — continued

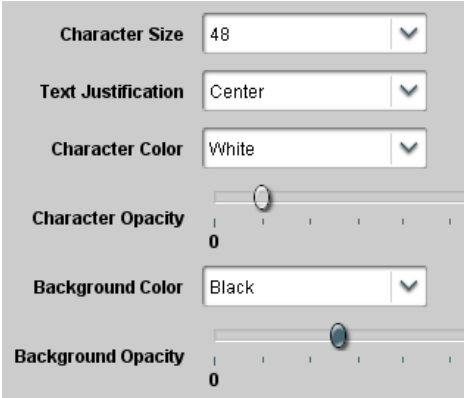
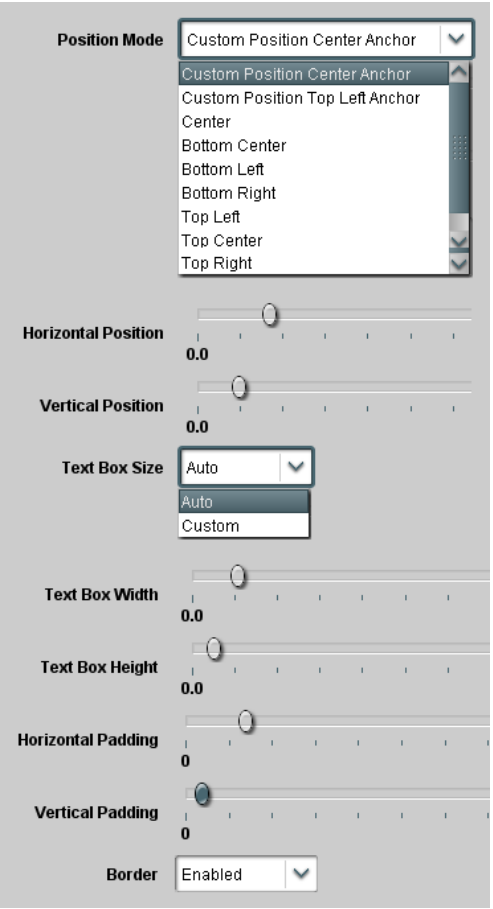
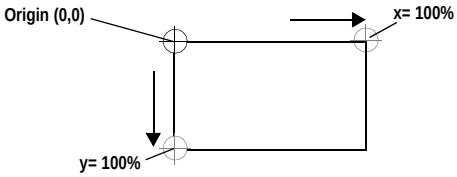
	(continued)
• **Text Character/Background Attributes Controls** 	Provides independent controls for setting the color and opacity of the ident text and its background. • **Character Size** drop-downs set text size (in pixels). • **Text Justification** selects from left, center, or right-aligned text. • **Character** and **Background Color** drop-downs select text and background colors from various independent choices. • **Opacity** controls set text or background opacity from 0% (least opacity) to 100% (full opacity).
• **Text/Background Positioning Controls** 	• Using the **Position Mode** drop-down, ident text and its background can be positioned using template choices (as shown) or can use the Custom choices which provide basic positioning which can then be further manipulated as described below. • When Custom is selected, the **Horizontal** and **Vertical Position** controls allow fine adjustment of the text/background positioning.  • **Text Box Size** selects from **Auto** (in which the box size tracks with the configured text size) and **Custom** (in which the box size is then set using the **Text Box Width** and **Height** controls. • **Horizontal** and **Vertical Padding** add padding (“white space”) within the box and its text. • **Border** enables/disables a border around whatever box size is present. (The border color tracks with whatever the text color is set to.)

Table 3-1 OG-5510-5S Function Menu List — continued

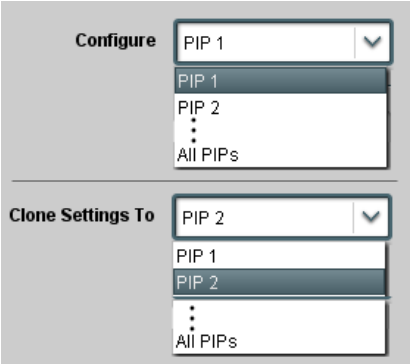
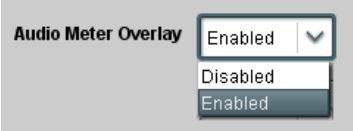
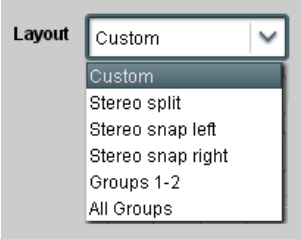
Audio Meter Overlay	Provides controls for each PiP to insert active-video area audio meters (bars), and set insertion rules and attributes such as layout, size and position.
Note: Audio meters are correlated with the embedded audio associated with the PiP input video. Each PiP can be set to display audio meters as desired.	
• PiP Configure Select/Clone  	Individually selects any of the five PiP inputs to be selected for Audio Meter insertion edits (as described below). Allows cloning settings to other PiPs. **Note:** For multi-card setup using Cascade Config mode/setup, Clone Settings **from any** of the cards in the chain can be cloned **to any** card in the chain (i.e., **all** cards in the chain appear in the **Clone Settings From** and **Clone Settings To** drop-downs). See Cascade Config Setup Controls (p. 3-41) for more information.
• Meter Insertion Enable/Disable  	Selects the rules for audio meters overlay insertion into the selected PiP area(s).
• Layout Select  	Selects from several preset layout templates and custom from the choices shown and depicted below. **Note:** Stereo selections are always correlated to embedded channels 1 and 2.

Table 3-1 OG-5510-5S Function Menu List — continued

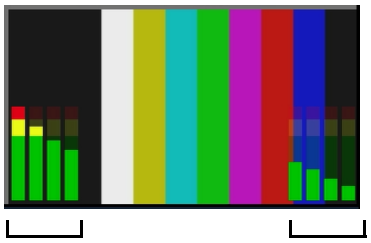
Example Meter Layouts

Stereo snap left

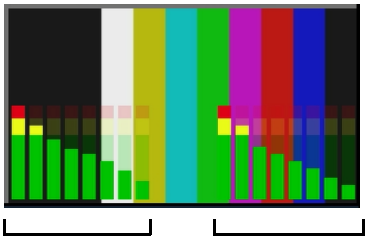
Stereo snap right

Stereo split

Groups 1-2



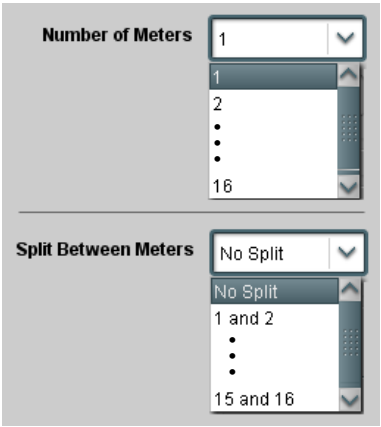
All Groups

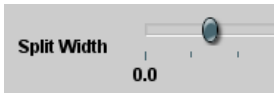


Custom

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

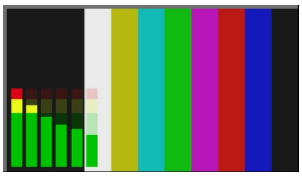
- **Number of Meters / Split Between Meters / Position (Custom Mode only)**





Where **Custom** mode is selected, allows for custom 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)

Position controls raise the meter base when the control setting is increased, and move the display as a unit left or right.

Note: Where custom channel number complement is configured, channel correlation is always contiguous assignments starting at embedded channel 1.

Table 3-1 OG-5510-5S Function Menu List — continued

Audio Meter Overlay	(continued)
• **Meter Width Control** 	Sets the relative height 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 OG-5510-5S Function Menu List — continued

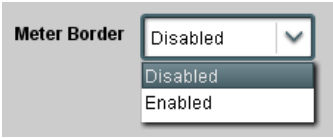
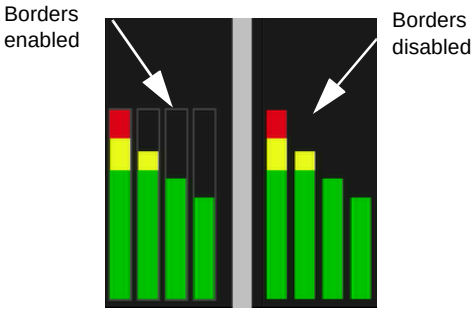
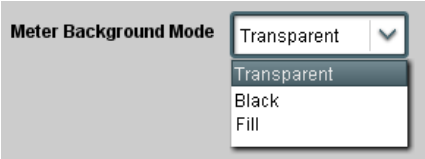
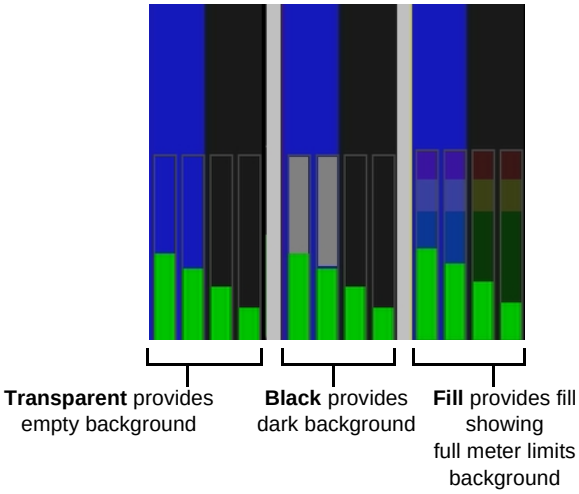
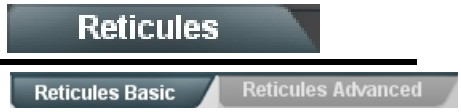
Audio Meter Overlay	(continued)
• **Meter Borders Select**  	Enables or disables limit borders surrounding each audio bar. 
• **Meter Brightness Control** 	Adjusts relative brightness of audio meter bars display.
• **Meter Background Select**  	Provides choice of three background themes for each meter bar. 

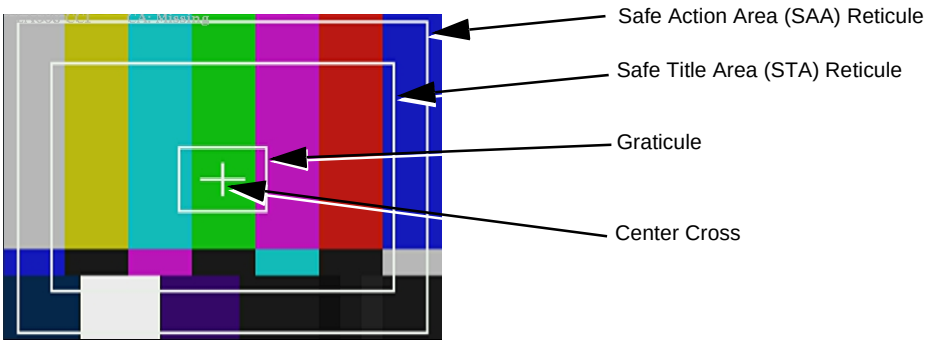
Table 3-1 OG-5510-5S Function Menu List — continued



Provides controls for each PiP for Safe Action and/or Safe Title overlays and other static reticule markers to be added to the output video image.

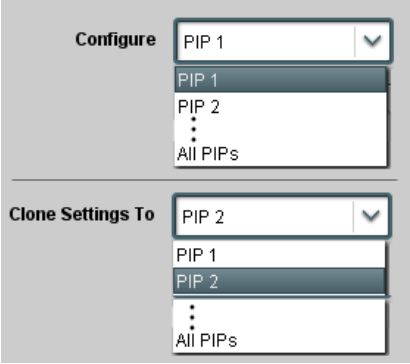
Typical Reticule/Overlay Marker Insertions

The OG-5510-5S allows any combination of the reticule/overlay markers to be applied to the output video. Sizing and other characteristics for each type of marker can be set as described below.



Note: Multiple overlay markers described below can be simultaneously enabled as desired.

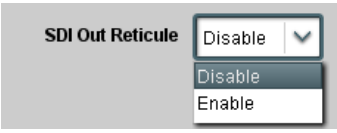
- **PiP Configure Select/Clone**



Individually selects any of the five PiP inputs to be selected for Reticule insertion edits (as described below). Allows cloning settings to other PiPs.

Note: For multi-card setup using Cascade Config mode/setup, Clone Settings **from any** of the cards in the chain can be cloned **to any** card in the chain (i.e., **all** cards in the chain appear in the **Clone Settings From** and **Clone Settings To** drop-downs). See Cascade Config Setup Controls (p. 3-41) for more information.

- **Insertion Master Enable/Disable**



For each PiP, provides master reticule enable/disable for any or all reticule(s) inserted for each PiP.

- When enabled, any combination of reticules or other markers described below can be inserted.
- When disabled, insertion of all reticules or other markers is disabled.

Table 3-1 OG-5510-5S Function Menu List — continued

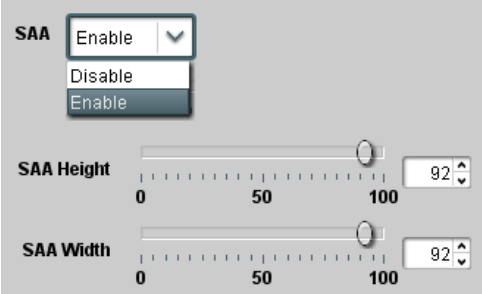
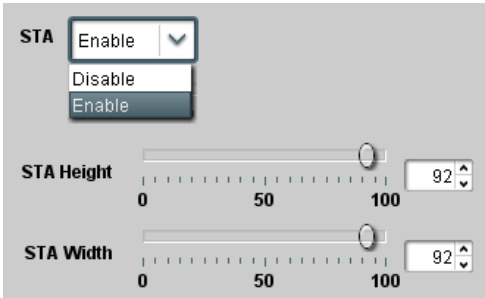
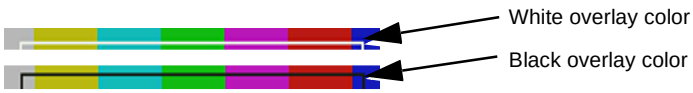
	(continued)
• **Safe Action Area (SAA) Controls** 	• **SAA** provides enable/disable of safe action area graticule insertion. • **SAA Height** and **SAA Width** control height and width of insertion (from 0% to 100% of 4:3 outputted image area). **Note:** Reticule Size control is locked to Custom for this card, with safe action area size control as described above.
• **Safe Title Area (STA) Controls** 	• **STA** provides enable/disable of safe title area graticule insertion. • **STA Height** and **STA Width** control height and width of insertion (from 0% to 100% of 4:3 outputted image area).
• **Overlay Color Controls** 	• **Overlay Color** selects from white or black colors. • **Thickness** sets the line thickness of each reticule element.
	White overlay color Black overlay color

Table 3-1 OG-5510-5S Function Menu List — continued

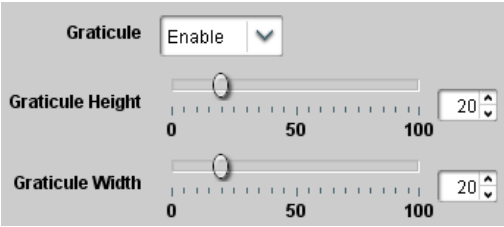
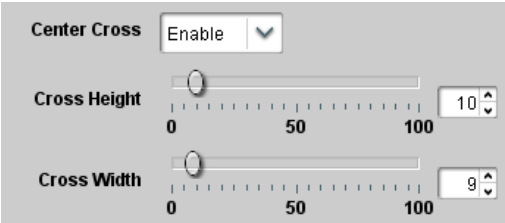
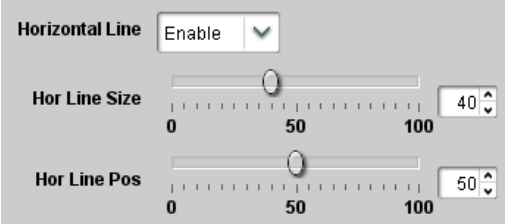
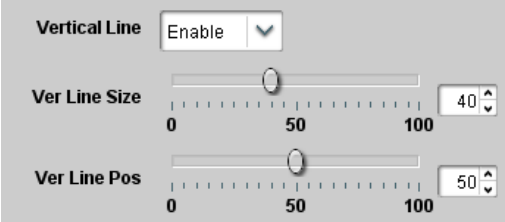
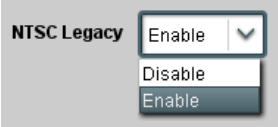
	Provides controls for each PiP for insertion and sizing controls for custom graticules and other markers. Also provides NTSC legacy 4:3 master reticule sizing.
Note: Color attributes of markers described below are set using the master Overlay Color Controls described on the previous page.	
• **Graticule Controls** 	• **Graticule** provides enable/disable of user graticule insertion. • **Graticule Height** and **Width** control height and width of insertion (from 0% to 100% of 4:3 outputted image area).
• **Center Cross Controls** 	• **Center Cross** provides enable/disable of center cross insertion. • **Cross Height** and **Width** control height of vertical line and width of horizontal line (from 0% to 100% of 4:3 outputted image area).
• **Horizontal Line Controls** 	• **Horizontal Line** provides enable/disable of horizontal line insertion. • **Horizontal Line Size** controls the width of the horizontal line (from 0% to 100% of 4:3 outputted image area). • **Horizontal Line Pos** controls the vertical positioning of the horizontal line (from 0% to 100% of 4:3 outputted image area).
• **Vertical Line Controls** 	• **Vertical Line** provides enable/disable of vertical line insertion. • **Vertical Line Size** controls the height of the vertical line (from 0% to 100% of 4:3 outputted image area). • **Vertical Line Pos** controls the horizontal positioning of the line (from 0% to 100% of 4:3 outputted image area).
• **NTSC Legacy Reticule Fixed Control** 	When set to enable, provides fixed-size safe action area 4:3 reticule suited for CRT-based displays.

Table 3-1 OG-5510-5S Function Menu List — continued

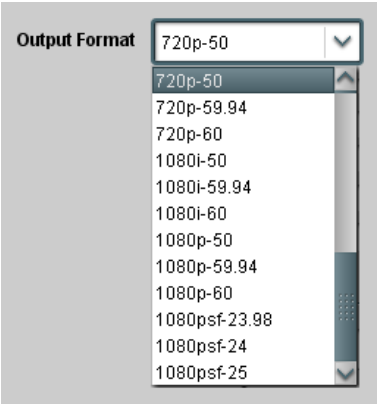
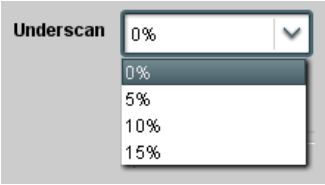
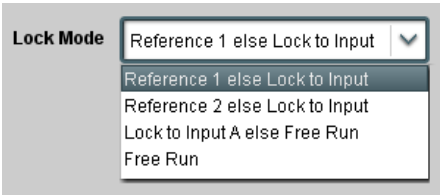
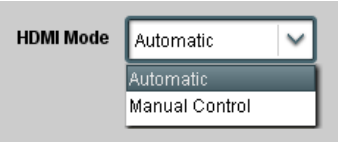
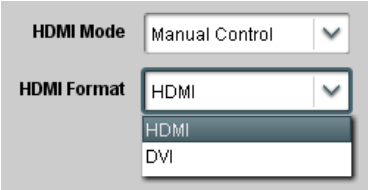
Output Format	Provides controls to set merged split output format/ conditioning and card global ref lock mode. Also provides settings to force an HDMI or DVI output suitable for direct connection to monitors using a DVI input in case the connection is not detected by the monitor. Also provides color mode controls to match HDMI/DVI output to the color space of the monitor.
• **Output Format Selector**  	Provides conversions to formats as shown. **Note:** Although drop-down and card will allow output video raster/rate choices unrelated to the input rates (for example, PAL 50Hz rate for NTSC 59.94Hz input rates), cross-rate conversion choices should not be used for critical applications (frames will be dropped when performing such conversions).
• **Underscan Select**  	Provides underscanning to reduce the merged output raster size by choices shown.
• **16x10 Compensation Select** 	Provides compensating rescaling to fully fit a native 16x10 aspect ratio image into the 16x9 aspect ratios used for various layouts.
• **Video Lock Mode Select**  	Selects lock to reference functions from the choices shown and described below. • **Free Run:** PiP inputs and output video is locked to the card's internal clock. Output video is **not** locked to external reference. • **Lock to Reference:** PiP inputs and output video is locked to selected external reference (Ref 1 or Ref 2) received on the frame reference bus, else input. • **Lock to Input A:** Uses Input A program video input video signal as the reference standard, else free-run. **Note:** Lock to reference provides the most stable operation, and is preferred where available. In this case, source video should also be locked to the same reference.

Table 3-1 OG-5510-5S Function Menu List — continued

Output Format	**(continued)**
• **Frame Delay Control** 	When Framesync is enabled, specifies the smallest amount of latency delay (frames held in buffer) allowed by the frame sync. The frame sync will not output a frame unless the specified number of frames are captured in the buffer.
• **HDMI Mode Control** 	Sets HDMI/DVI output to use the connected monitor to inform OG-5510-5S to automatically detect the monitor format, or to use manual (forced) control. Where the monitor may not be able to provide this handshake signal, it is recommended to use **Manual** mode and force the desired mode as described below.
• **HDMI/DVI Format Manual (Forced) Mode Control** 	When set to Manual Control, sets HDMI card output as forced HDMI or DVI mode.
• **HDMI Colorspace Control** 	When set to Manual Control, forces output colorspace as either YCbCr or RGB.

Note: The HDMI output on this card conforms with CEA-861D HDMI audio channel line-up specifications. As such, a swap between the C and LFE channels for the HDMI output is automatically performed.

If connecting to a device that does not meet CEA-861D HDMI, a Ch3 / Ch4 swap using the Output Audio Routing/Controls may be required to effect desired C - LFE line-up.

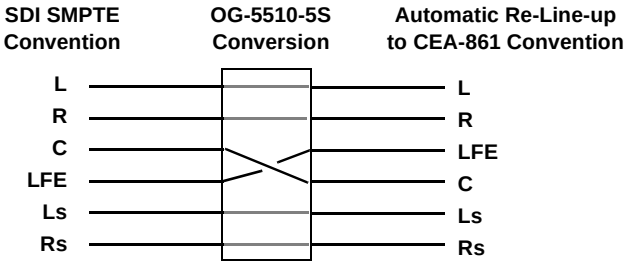


Table 3-1 OG-5510-5S Function Menu List — continued

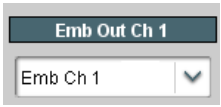
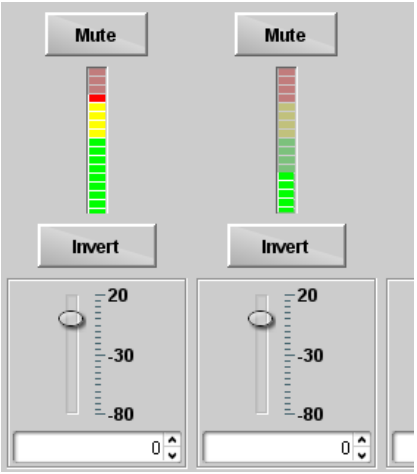
Output Audio Routing/Controls	Provides an audio crosspoint allowing the audio source selection for each embedded audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.
Note: • **Embedded Ch 2** thru **Embedded Ch 16** have controls identical to the **Source**, **Gain**, **Mute**, and **Invert** controls described here for **Embedded Ch 1**. Therefore, only the **Embedded Ch 1** controls are shown here. • For each channel, its source and destination should be considered and appropriately set. Unused destination channels should be set to the **Silence** selection.	
• **Embedded Audio Output Input Source** 	• **Audio Output Source** selects the four-group embedded audio to be embedded in the output embedded SDI audio (and HDMI Ch1 - Ch8 embedded audio). (In this example, PIP1 input audio is selected as the output four-group audio.) • **Audio Follow Full Screen** (when checked) automatically forwards audio associated with a full-screen video input whenever full screen is selected.
• **Group Enable/Disable Controls** 	Allows enable/disable of embedded audio groups 1 thru 4 on card program video output to accommodate some legacy downstream systems that may not support all four embedded audio groups. **Note:** Changing the setting of this control will result in a noise burst in all groups. This control should not be manipulated when carrying on-air content.
• **Embedded Output Channel Source**  	Using the drop-down list, selects the audio input source to be embedded in the corresponding embedded output channel from the following choices: • Card **Audio Bus (Emb) Ch 1** thru **Ch 16** • Built-in Tone generators **Tone 1** thru **Tone 16** (all are -20 dBFS level; freq (Hz) in ascending order are 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k)•
• **Channel Mute/Phase Invert/Gain Controls and Peak Level Display**  	Provides **Mute** and phase **Invert** channel controls, as well as peak level meter for each output channel. (Meter shows level as affected by Level control.) **Gain** controls allow relative gain (in dB) control for the corresponding destination Embedded Audio Group channel. (-80 to +20 dB range in 1.0 dB steps; unity = 0 dB) **Note:** Although this card can pass non-PCM data such as Dolby® E or AC-3, setting the gain control to any setting other than default 0 will corrupt Dolby data.

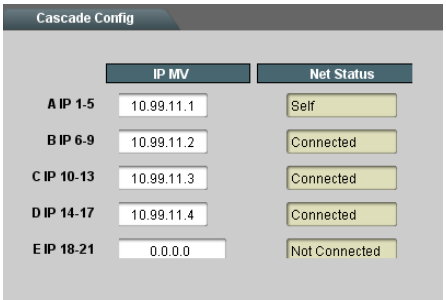
Table 3-1 OG-5510-5S Function Menu List — continued

Cascade Config	Cascade Config (in conjunction with multi-card network connection) provides cascade chain network-connected OG-5510-5S cards to communicate with each other and expose settings and attributes from all of the cards within the chain. Each card “sees” the other OG-5510-5S cards in the network chain connection, with access to PiP controls for all PiPs from any card within the chain. The Cascade Config tab allows setting up the cards in the cascade chain to communicate with each other.

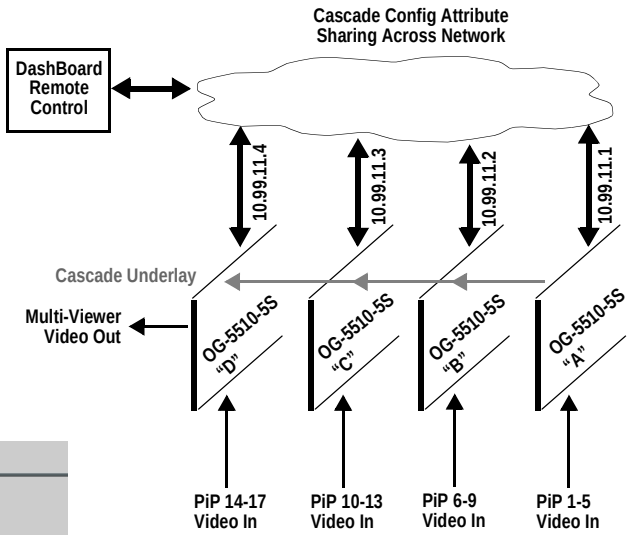
Note:
- Cards within a cascade chain communicate via Ethernet using each card’s dedicated rear module Ethernet port (DashBoard CAN bus is not used for this function). Cards must be fitted with a rear modules equipped with an Ethernet port (or use a smart frame that provides per-card dedicated Ethernet communication).
- In Cascade Config mode, any control setting changes are saved for all cards in the chain. However, to load a saved configuration from a Presets files to new of different cards for a Cascade Config chain, a special procedure must be used to make certain all cards in the chain receive the intended settings. See Loading Saved Presets to New or Different Cards (Cascade Config Usage) (p. 3-56) in Presets for instructions.
- If a global preset is to apply in some manner to all cards in the chain, it is recommended to have all cards in the chain set up as desired, and then save the preset on the **last** card in the chain. This helps ensure that **all** saved states in each card will be saved in an “umbrella” preset encompassing **all** cards in the chain.

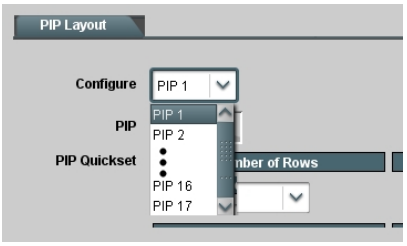
Cascade Config DashBoard tabs and multi-card card network connection allows cascade chain network-connected OG-5510-5S cards (OG-5510-5S cards “A” thru “D” in this example) to communicate with each other and centrally expose setup attributes of all of the cards within the chain.

Cascade Config is designed to use the first card as a full quint-split processor, with subsequent cards in the chain taking in the cascade underlay as **In E** and additional PiP inputs as **In A** thru **In D**. In this example, a 17-input multiviewer is attained (four cards providing 5+4+4+4 = 17 input channels).



OG-5510-5S cards within the chain (equipped with Ethernet-port rear modules) are connected to a shared network. This allows the cards to “see” each other, with each card exposing control attributes for **all** the cards.





SCPD2014-28

For each per-PiP control, the result is **all** PiPs within the chain being exposed, allowing settings to be performed from **any** of the cards and cloned to any card as desired. User presets can encompass all cards in the chain and be invoked in a single action done at one card.

Table 3-1 OG-5510-5S Function Menu List — continued

Cascade Config	**(continued)**

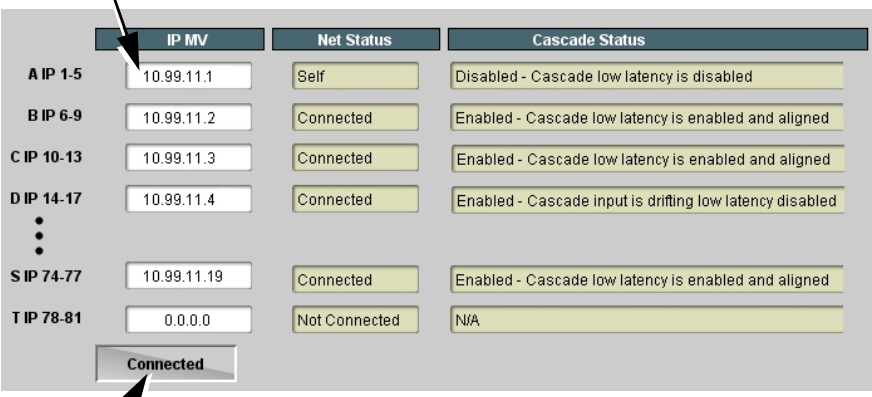
Cascade Configurator Network Setup

The configurator definer tool defines the OG-5510-5S cards within a particular cascade chain by card IP address, and each card's position within the multiviewer setup. The setup is based on OG-5510-5S cards being used with the first card receiving 5 program video inputs, and subsequent cascade OG-5510-5S cards each receiving an upstream cascade underlay (on **PiP 5 In**) with 4 program video inputs being received on **PiP In 1** thru **PiP In 4** (in other words, as a **5 + 4*n*** matrix, with ***n*** being the number of downstream cascade cards).

This allows multiviewer setups using up to 20 cards (**A** thru **T** in the definer shown below) to provide an up to 81-split combined multiviewer image.

1. Assign each card in the cascade chain a card dedicated IP address (if not done so already). Working from the starting card to each downstream cascade card, enter the card IP address in each **IP MV** field.

   Refer to Card Network Setup (p. 3-58) for details on setting card IP address.



2. When done, click the **Connect** button. When all cards enter are connected, button shows Connected.

Net Status fields show connection status of each entered card.

- **Self** indicates card that is currently being viewed in setup dialog.
- **Connected** indicates other card that is defined in dialog .
- **Not Connected** indicates that card IP hasn't been entered in **IP MV** row, or simply a blank MV definer row that isn't being used.
- **Connection Failed** indicates a card that has IP entered is no longer connected (due to cabling issue or other network issue).

Cascade Status fields show cascade mode settings (Enabled or Dsiabled) and status for each defined card in the chain (as shown in the example here, first card in chain is not set for cascade since it uses all inputs as program video PiPs).

Note: When all cards are connected, this pane is available in **all** defined cards in the chain.

All OG-5510-5S cards (except for card in first-card row **A** position) **must** be set for **Cascade Mode**. This allows subsequent cards to receive the PiP images from preceding cards.

See Cascade Mode Select (p. 3-11) for details on using the cascade mode.

3. Set up PiP positioning, sizing, and attributes (UMD, Idents, tallies, audio bars etc.) as described in respective sections of this chapter. Once the definer described above is connected, these attributes for all cards can be configured from any card in the chain. See the example on the next page for an overview and tips on using Cascade Config.

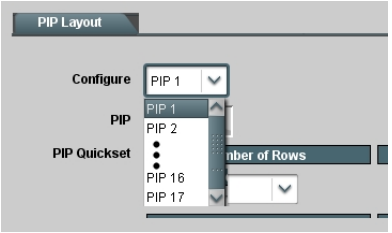
Table 3-1 OG-5510-5S Function Menu List — continued

Cascade Config	**(continued)**

Cascade Configurator Example and Setup Tips

The following shows an example where a 17:1 multiviewer is furnished using Cascade Config with four OG-5510-5S cards forming a 4-card chain (5+4+4+4 PiP inputs which provides a 17-PiP multiviewer).

A very important and clarifying aspect of using Cascade Config is when the cards are cascade network defined (as described on the previous page) **the DashBoard UI simply combines all the discrete cards as a single device**. A primary function of Cascade Config is to provide a global, centralized setup point for all cards in the chain, thereby creating (from the UI perspective) a virtual single-device multiviewer.



As shown to the left, all DashBoard layout and attribute controls appear and function just like using the single-card OG-5510-5S. The only difference is now **all the PiPs can be accessed from a single point** (rather than going from card-to-card). In our example, the **PIP Layout** drop-down now has **Configure** definers for PiPs 1 thru 17 instead of just PiPs 1 thru 5 for a single, non-networked card.

With Cascade Config, the only setup aspects that remain local to each card in the chain are:

- **Input Routing** (each card still needs its per-card input sources defined)
- **Output Audio** (each card needs to know whether to pass audio from an upstream card, or use audio sourced from a local PiP input
- **Output Format** (Output format will likely be set consistent across all cards in the chain. If a format change is needed for the final output, this is best accomplished by doing this on the last card in the chain.)

Shown below is the example multiviewer setup described in this example. For this example, Idents are set as **PIP1** thru **PIP 17** for the 17 PiPs in the merged MV output. Also for example purposes, the parenthetical designations correlate to the card **A** thru **D** per-card PiP inputs that provide the 5+4+4+4 that result in the 17-PiP aggregate.

— Example continued on next page —

Table 3-1 OG-5510-5S Function Menu List — continued

Cascade Config **(continued)**

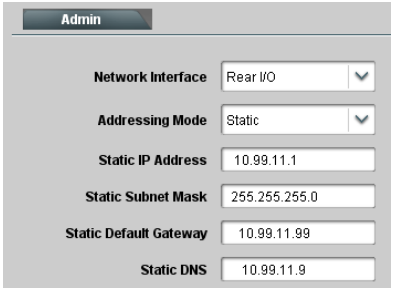
Cascade Configurator Example and Setup Tips (cont.)

1. First, all OG-5510-5S cards in the cascade chain need to be assigned dedicated IP addresses to be used in conjunction with the per-card dedicated rear I/O module Ethernet RJ-45 port. (See Card Network Setup (p. 3-58) for details on setting card IP address.)

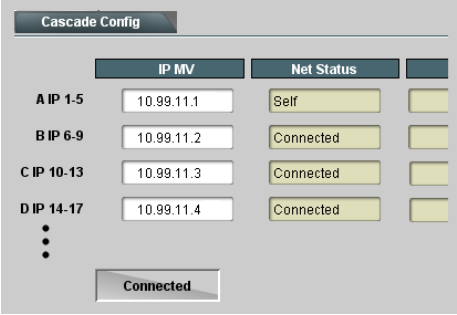
   In the example here, four cards (**A** thru **D** in the cascade chain) are using dedicated IP addresses **10.99.11.1** thru **10.99.11.4**, respectively. This provides for a 17-PiP multiviewer setup

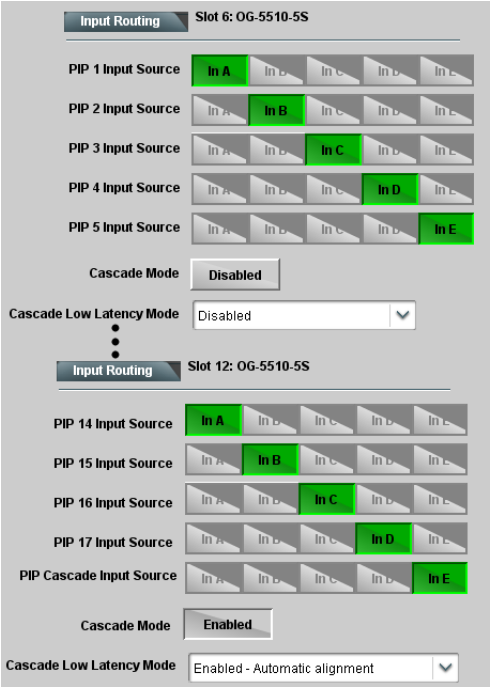
   Card A (10.99.11.1) PiP 1 thru 5
   Card B (10.99.11.2) PiP 6 thru 9
   Card C (10.99.11.3) PiP 11 thru 13
   Card D (10.99.11.4) PiP 14 thru 17

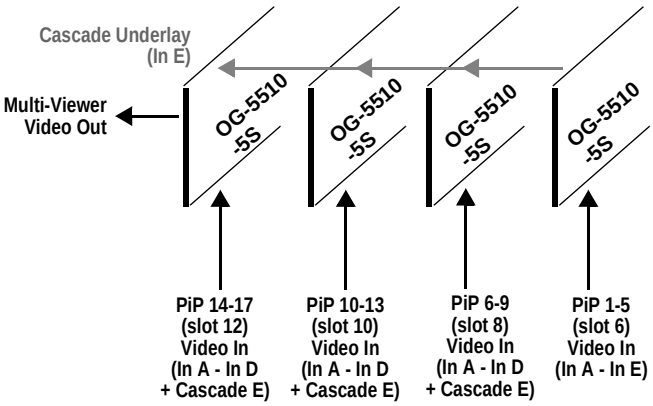
   Total: PiPs 1 thru 17 on combined MV output



2. With the four cards (A thru D comprising the chain) assigned dedicated IP addresses, the IP addresses of the four cards are entered in the **A** thru **D** definer slots in Cascade Config page. When all card IP's are entered, click **Connect**. The cards are now connected in the Cascade mode.







3. On a per-card basis, the physical routing of PiP sources to each card's Source-to-PiP routing needs to be set up.

   Shown here is the routing setup that applies the 17 PiP inputs to the respective inputs in the four-card Cascade chain.

   - The **first** card in the chain (**Slot 6 Card A** in the example) is set as a regular quint-split, with five discrete program inputs and Cascade Mode disabled (since this card is not receiving a cascade underlay).
   - **Subsequent downstream** cards in the chain (**Slot 8 Card B** thru **Slot 12 Card D** in the example) are set as cascade, with four discrete program inputs per card and Cascade Mode enabled (since these cards receive a cascade underlay).

— Example continued on next page —

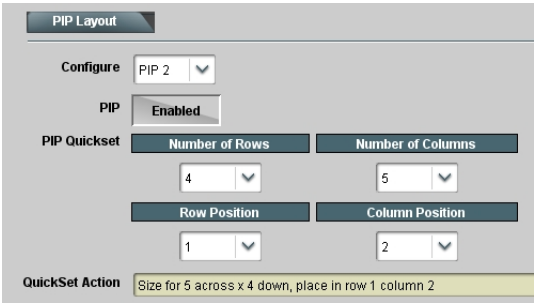
Table 3-1 OG-5510-5S Function Menu List — continued

Cascade Config	**(continued)**

4 All of the PiP Layout, ARC/Borders, Tally, UMD/Idents, and other graphical attributes are under the cloning “umbrella” (i.e., attributes can be set up for a given PiP and then cloned across others as desired). Knowing the desired general layout, set up any PiP meeting your desired layout, and then clone and modify the settings to achieve the overall desired layout. The example below shows some examples of setting up a given PiP, and then cloning and “tweaking” the settings for another PiP.

Note: Refer to setup control sections (e.g., PIP ARC/Borders Controls, UMD/Identification Text Insertion Controls, etc.) for specific instructions on using the particular graphic tool.

In the example layout shown, knowing a layout with 4 rows and 5 columns is desired, the PiP Layout settings for any PiP can be set for 4x5 rows/columns as shown. In this example starting with PiP 2, the row 1 position and column 2 position is set and applied, and the PiP is sized accordingly (20x25 in this example).



Once this is done, this PiP is cloned across **all** PiPs to establish the baseline consistency across all PiPs. Then after this, the row/column positions for the other PiPs can be tweaked to place them as desired. Other attributes such as UMD/Idents and Tally settings are then group cloned and then tweaked as desired.

Using the global 4x5 rows/columns layout, **PiP 2** is accordingly sized and set up to be positioned in Row Position 1 and Column Position 2. This baseline setting is cloned across all PiPs.

Using the global cloned settings from PiP 2, **PiP 9** is set up by using all cloned settings and simply tweaking the Row/Column positions to place it as desired.

Note that **any** PiP settings can be accessed from **any** card in the cascade chain.

Note: User custom text entered in UMD or Ident cells **must** be manually entered for each UMD and/or Ident cell. User custom text cannot be cloned from one PiP to another.

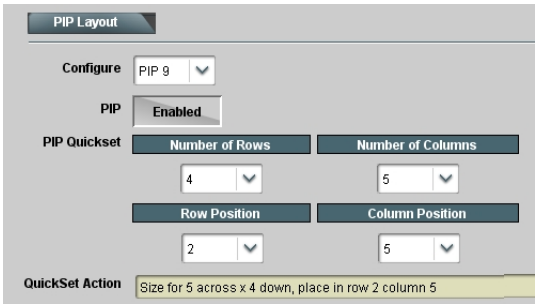
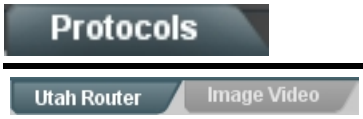


Table 3-1 OG-5510-5S Function Menu List — continued



Provides controls for integrating Utah Scientific™ router (such as SC-4) IP communication with OG-5510-5S to provide automated UMD and Ident text burn-in, independently for PiP IN A thru IN E input channels.

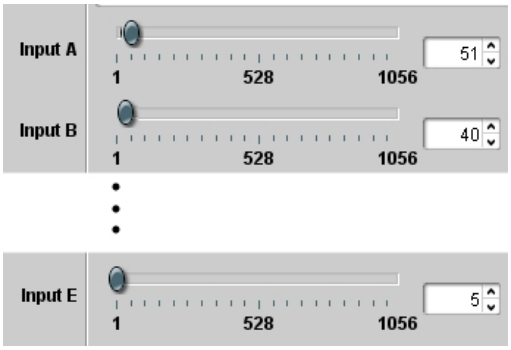
Note:
- Router address must be accessible to network used for OG-5510-5S rear module Ethernet port (as set using the card Admin > Networking function (see pg. 3-58).
- When router access (fetch) is enabled, control of certain burn-in aspects is asserted by router control, with user manual control locked out.
- Utah routers (such as SC-4) are limited to UMD text assert only. This router cannot assert tally lamp activation states.
- The **PESA Router** sub-tab has controls and functions similar to those described below.

• Router Fetch Enable / Address Controls

Enables or disables Utah router command fetch and provides entry for Utah router address.

Note: When router access (fetch) is enabled, UMD text is asserted by Utah router commands. The **UMD > Display Format** control is locked to **External Input**, with user text entry or other UMD type selections locked out.

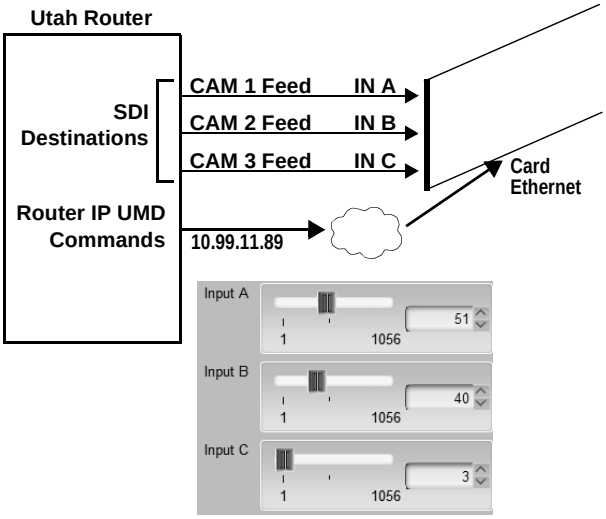
• Router Fetch Enable / Address Controls



Sets the router logical port-to-card input correlation for up to 5 card inputs (**IN A** thru **IN E**).

In the example below:

- Router logical port 51 is correlated to card input A
- Router logical port 40 is correlated to card input B
- Router logical port 5 is correlated to card input E



With the router destination commands for Input A thru Input C as shown here, router-enabled settings allow router to assert UMD text correlated to router destination outputs, and in turn, OG-5510-5S inputs (in this example, router IP ports 51, 40, and 3 used for packet streams for IN A thru IN C, respectively).

As shown in the example, this asserts the “CAM 1” thru CAM 3” UMD text insertions for these three card inputs.

Table 3-1 OG-5510-5S Function Menu List — continued

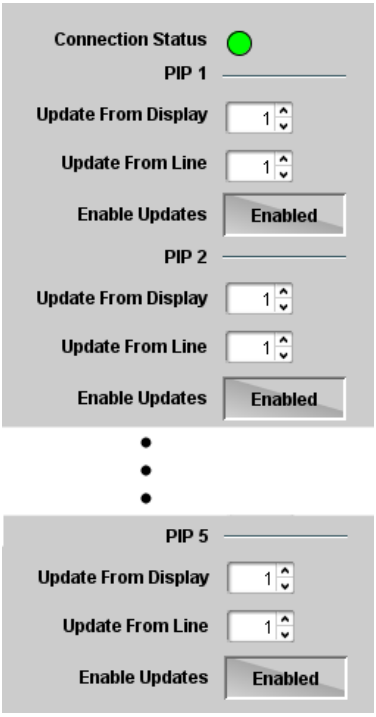
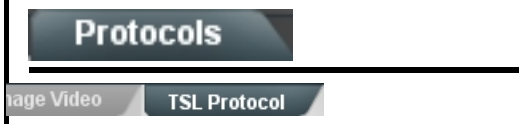
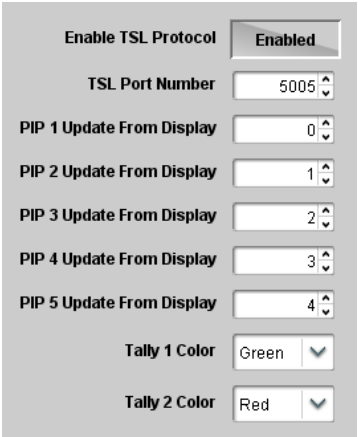
	Provides controls for integrating Image Video™ router IP communication with OG-5510-5S to provide automated UMD and Tally burn-ins, independently for PiP 1 thru PiP 5.
• **Router Enable Controls** 	Enables or disables Image Video router updates for each of the five card PiPs. • **Update from Display** asserts PiP tally lamp activation. • **Update from Line** asserts UMD text. **Note:** • The Image Video integration works on a PiP-by-PiP basic (rather than commands being tied to card input channels). • Image Video router/server holds OG-5510-5S IP address to establish connection. Therefore, the Image Video address is not required here.
	Provides controls for integrating TSL™ router IP communication with OG-5510-5S to provide automated UMD and Tally burn-ins, independently for PiP 1 thru PiP 5.
• **Router Enable/Correlate to PiP Controls** 	TSL router messages typically provide automated UMD text correlating to names used on the TSL control surface (for example, “CAM 1” for PiP1). • **Enable TSL Protocol** enables and sets card to look for TSL messages. • **TSL Port Number** is the logical port assigned for the TSL router. • **PIP *n* Update From Display** correlates the TSL display number to the OG-5510-5S PiP channel. • **Tally 1 Color / Tally 2 Color** selects the “illumination” colors to be used when either Tally Lamp 1 or Tally Lamp 2 is activated. **Note:** • The TSL integration works on a PiP-by-PiP basic (rather than commands being tied to card input channels). • TSL router/server holds OG-5510-5S IP address to establish connection. Therefore, the Image Video address is not required here.

Table 3-1 OG-5510-5S Function Menu List — continued

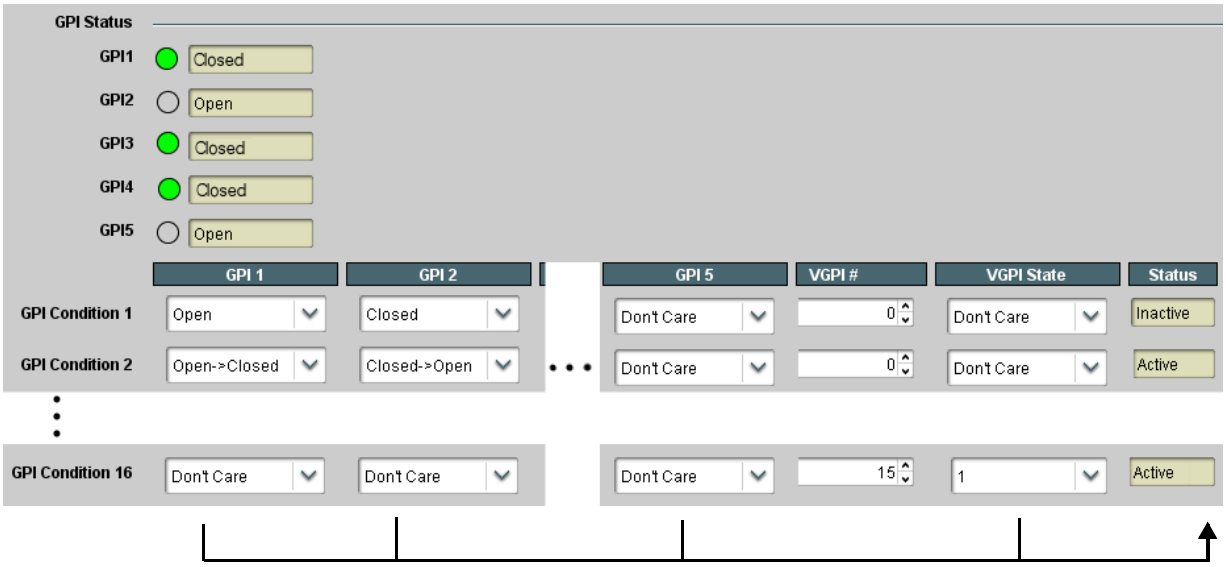
GPI Setup	Provides controls for setting up to 16 “virtual GPIs” using the up to five discrete GPI inputs. The virtual GPIs can in turn be used for attribute control such as tally lamp activation, borders, and ident text (in conjunction with the **Event Action** tab controls).

Up to five GPI inputs are available which can be used as direct or logic statement control inputs. Additionally, up to 256 VGPIs (virtual GPIs) can be received via certain automation system via the card network connection.

In examples here, **GPI Condition 2** goes active when triggers defined as other than Don’t Care become true (in this case, the GPI 1 and GPI 2 2 conditions shown).

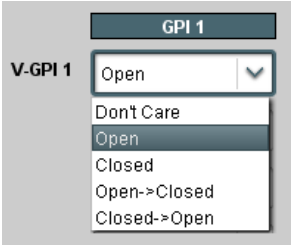
In the **GPI Condition 15** example shown here, the card GPI inputs are not used (set to Don’t Care), while when **VGPI# 15** goes true, GPI Condition 15 becomes active.

GPI Condition 1 thru **GPI Condition 16** defined here are in turn used with the **Event Actions** page to provide tally, border, and other attributes control based off of GPI inputs received. (See Event Actions Setup Controls (p. 3-49) for instructions on setting up action triggering controls.)



GPI 1 thru **GPI 4** definers have drop-down which allow setting the logic associated with the input:

Open = pullup HI
Closed = pulldown LO
Open->Closed = falling-edge trigger
Closed->Open = rising-edge trigger



• Unused GPI inputs should be set to “Don’t Care”

Make certain GPI inputs are in accordance with GPI Inputs in Technical Specifications, Chapter 1. Introduction.

Table 3-1 OG-5510-5S Function Menu List — continued

Event Actions	Provides controls for setting up attribute control such as tally lamp activation, borders, and ident text using GPI, video format, or other action triggers. Internal intelligent event triggers provide attribute control based off of detected signal conditions.

The Event Actions page allows defining up to 32 discrete events that can be used to control attributes (color, on/off states, and other visual cues) of tally, border, or other graphics in response to GPI, data, or video status conditions. This provides easily incorporated and flexible attributes control using internally assessed conditions or via integration with external IP assets.

Event Trigger Select

Sets conditions or inputs that control attributes actions:

- **Engage Mode** tells row settings to be engaged upon defined rules being true, or by forcing the event. **Force Event** setting is useful for testing how the Action appears, or for manually setting an attribute without external triggers.
- **GPI Condition #** allows virtual GPI control to be used to trigger an Action (see GPI Setup Controls (p. 3-48) for info on GPI setup).
- **Data** allows camera metadata to be used to trigger an Action.
- **Video Format** allows received video format of the selected PiP to be used to trigger an Action.
- **Video Condition** allows triggering on true video format conditions, or triggering on false (inverse) video format conditions. This is useful in defining a trigger that invokes an action to indicate contrary formats.

Event Correlator Rows

Allows up to 32 discrete events to be defined and used in any combination for PiPs 1 thru 5

	PIP #	Engage Mode	GPI Condition #	Data	Video Format	Video Condition
Event 1	PIP 1	Use Event Rules	GPI Condition 4	RED Record	Don't Care	Enable if True
Event 2	PIP 1	Use Event Rules	Don't Care	RED Stop	Don't Care	Enable if True
⋮						
Event 32	PIP 4	Use Event Rules	Don't Care	Don't Care	1080i 59.94	Enable if False

Event Action Select

Sets the action to take place when a corresponding trigger is received:

- **Tally Select** allows selecting tally lamp 1 and/or 2 attribute actions to be applied when a trigger is true.
- **Tally Color** assigns a color to be applied to the selected lamp when a trigger is true.
- **Border Action** allows border color to be changed when a trigger is true.
- **Ident Select** selects fromUMD, Ident1, Ident2, Timecode, or No Action to be invoked when a trigger is true.
- **Ident FG (foreground) Color** and **BG (background) Color** allow text and/or background color changes to either Ident1 and/or Ident2 text insertions to be applied when a trigger is true.
- **Ident Text** allows alternative Ident text to be optionally asserted when a trigger is true.

Tally Select	Tally Color	Border Action	Ident Select	Ident FG Color	Ident BG Color	Ident Text:	Status
Tally Lamp 1	Green	Green	Ident 1	Green	Red		Active
Tally Lamp 2	Red	Red	Ident 1	Magenta	Yellow		Inactive
⋮							
No Action	Red	Red	No Action	No Action	No Action		Inactive

Note:
- Event Trigger conditions, when used in a combination and not set as “Don’t Care” comprise an **AND** function. Make certain any conditions not to be considered are set to Don’t Care. Similarly, if an attribute is not to be “touched” by the invoking of an event, make certain these actions are set to “No Action”.
- Loss of true conditions does not disengage an event-based triggering. A new set of true conditions (or a separate row defined as the false of the condition) must be defined and then occur to transition from one event-based trigger to another.
- Any attribute can be manually set by defining an event, and then setting Engage Mode to **Force Event**.

Table 3-1 OG-5510-5S Function Menu List — continued

Event Actions	**(continued)**

Event Action Examples

	PIP #	Engage Mode	GPI Condition #	Data	Video Format	Video Condition	
Event 1	PIP 1	Use Event Rules	GPI Condition 1	Don't Care	Don't Care	Enable if True	• • •
Event 2	PIP 1	Use Event Rules	GPI Condition 2	Don't Care	Don't Care	Enable if True	• • •

	Tally Select	Tally Color	Border Action	Ident Select	Ident FG Color	Ident BG Color	Ident Text:	Status
• • •	Tally Lamp 1	Green	No Action	No Action	No Action	No Action		Active
• • •	Tally Lamp 2	Red	No Action	No Action	No Action	No Action		Inactive

In this example, **GPI Condition 1** and **GPI Condition 2** are used to control the color and activation of the PiP 1 tally lamps.
- When **GPI Condition 1** is active as a trigger (Event 1) , the event action sets the tally lamp 1 to **green**.
- When **GPI Condition 2** is active (Event 2), the event action sets the tally lamp 1 to **red**.

	PIP #	Engage Mode	GPI Condition #	Data	Video Format	Video Condition	
Event 1	PIP 5	Use Event Rules	Don't Care	Don't Care	1080i 59.94	Enable if True	• • •
Event 2	PIP 5	Use Event Rules	Don't Care	Don't Care	1080i 59.94	Enable if False	• • •

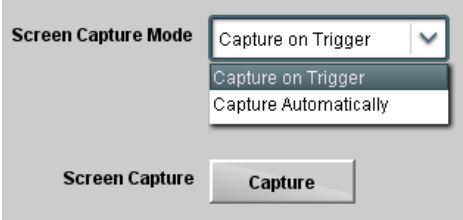
	Tally Select	Tally Color	Border Action	Ident Select	Ident FG Color	Ident BG Color	Ident Text:	Status
• • •	No Action	No Action	Green	No Action	No Action	No Action		Active
• • •	No Action	No Action	Red	No Action	No Action	No Action		Inactive

In this example, **Video Format** is used as a trigger to put up a special border for PiP 5 if the PiP format is anything other than 1080i 5994.
- If 1080i 5994 is being received (Event 1), the border displays as **green**.
- If a format other than 1080i 5994 is received (comprising a false condition as set in Event 2), the previous action is overwritten with a new action to turn the border to **red**.

Table 3-1 OG-5510-5S Function Menu List — continued

Output Preview displays regularly-sampled screen captures in the card DashBoard page. The transfer of screen image frame captures (via the card through the DashBoard network connection) allows over-the-network confidence assessment of input video program content and presence over DashBoard remote control without physical collocation with the card or its input or output streams.

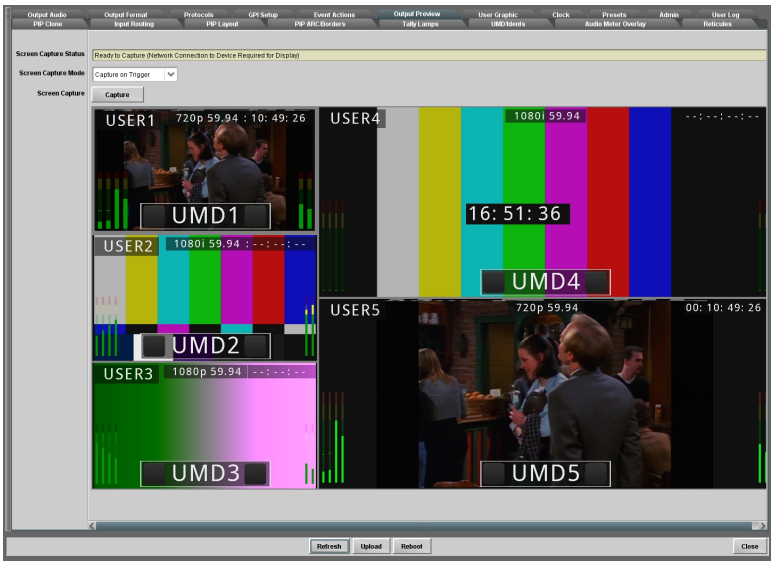
• **Screen Capture Mode Controls**



Screen Capture Mode sets the capture/display action as follows:

- **Capture on Trigger** allows manually initiated screen captures which are executed **only** when the **Screen Capture** button is pressed.
- **Capture Automatically** provides periodic samplings consisting of a new capture about every 5 seconds.

It is recommended to set the Screen Capture Mode control to Capture On Trigger (or entirely disable Output Preview) when the preview function is no longer needed. DashBoard control motion may lack smoothness or act "jerky" if Capture Automatically is left enabled.



- When the card is acquiring frame captures (either 5-second periodic-updated continuous images or single frame when Capture on Trigger > Capture is invoked), the area on the bottom of the DashBoard page displays the multiviewer image of the input video PiPs.
- The preview frame(s) will remain displayed in DashBoard.
- To exit from the capture display, click on any other DashBoard tab. DashBoard will then resume with the normal DashBoard control surface display.
- (See below). DashBoard acquires program video frame captures using an external network connection from a card rear module **Ethernet** port to the network/computer hosting the card's DashBoard connection.
  - DashBoard "learns" the card's IP address.
  - When preview is requested, DashBoard queries the card address for the image (with the image transferred via the card rear module Ethernet connection).

Note: This feature requires that card be fitted with a rear module with an Ethernet connection to the network hosting DashBoard. This connection is used to transfer the image from the card to the computer hosting DashBoard (the image is **not** transferred via the regular frame CAN bus/frame connection). Connection can be DHCP or static IP. See Admin (Log Status/ Firmware Update) (p. 3-58) for card network setup.

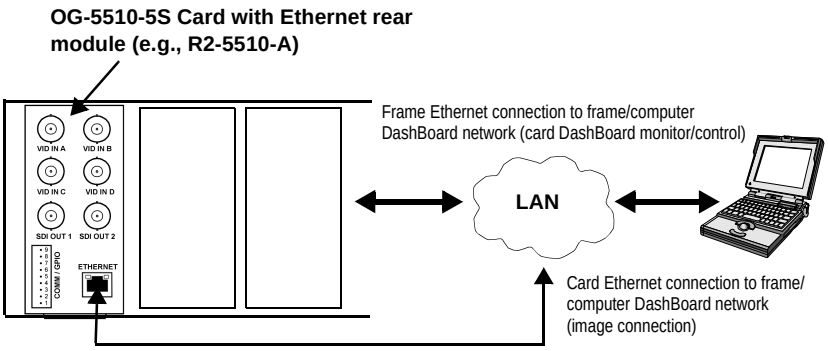


Table 3-1 OG-5510-5S Function Menu List — continued

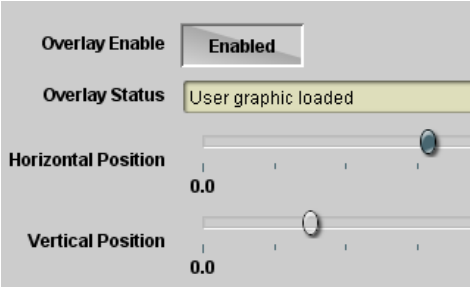
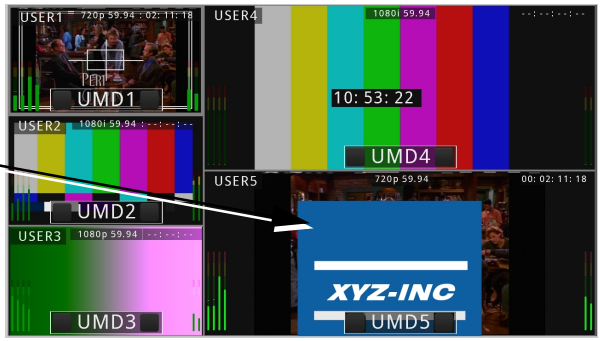
Logo Insertion	Provides for insertion of loaded user graphic file which can be used as a branding “bug” or a personalized background “skin”.
Note: • Currently, import of your graphic file is via Technical Support. Multidyne will convert your .png graphic into a form that can be uploaded and used by the card. • For a background skin, the file must have layer settings that allow transparency or PiP “windows” such that the graphic does not obscure the PiP image. Consult Technical Support with any questions, or for questions regarding file formats and sizing.	
• User Graphic Overlay Insert/Size Controls  	Provides basic controls for enabling insertion and positioning the insertion within the overall merged PiP output video raster.
In the example here, the user graphic is inserted over the lower right PiP image area. Note that the graphic insertion layer is behind burn-ins (such as UMD) but on top of the PiP video image. Sizing and transparency must be considered depending on the purpose of the graphic.	

Table 3-1 OG-5510-5S Function Menu List — continued

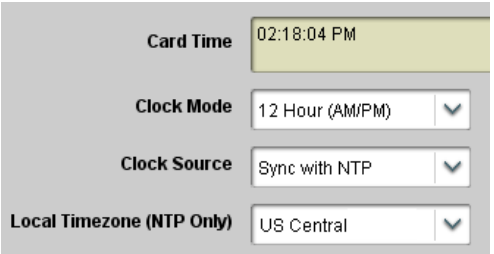
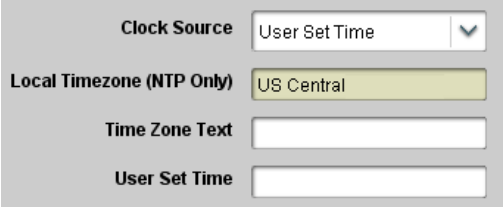
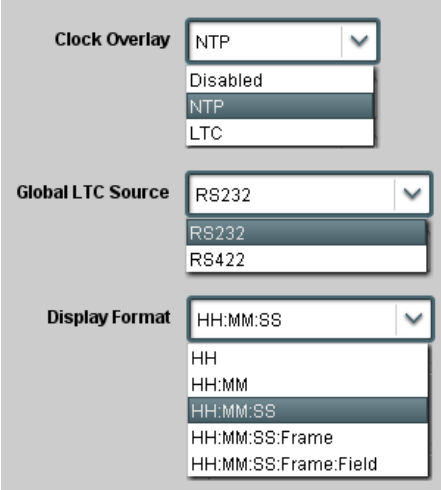
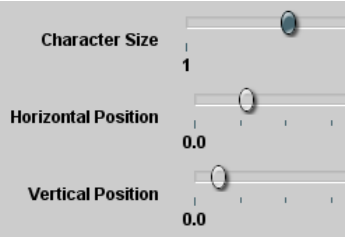
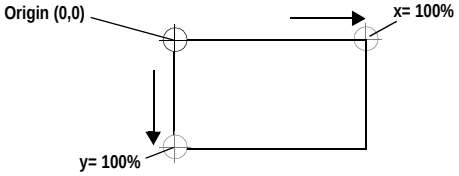
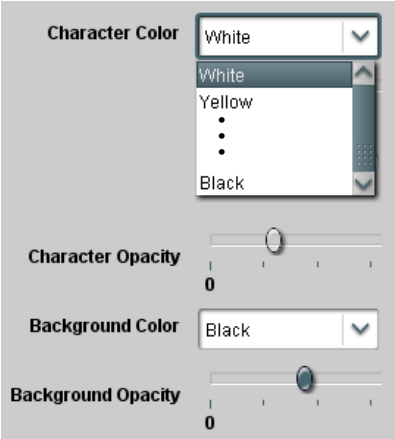
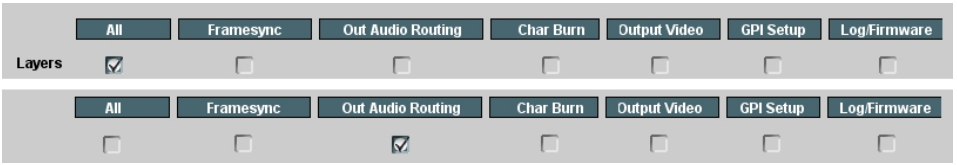
Clock	Provides controls for setting and inserting wall-clock time into merged output or as a per-PiP insertion selection.
• **Clock Mode / Set Controls**  	Allows clock time and display mode to be set as follows: • **Clock Mode** selects between 24-hour ("military") time, or time using AM and PM designations. • **Clock Source** selects user-entered arbitrary time or NTP-synced time. • **Local Timezone** provides timezone offsets for localization when using NTP time. • **Card Time** display shows the currently configured running wall-clock time (whether set as user-entered arbitrary time or NTP-synced time). **Note:** NTP syncing is only done at various intervals. To invoke resyncing, power-cycle to card to immediately sync with NTP.
• **User Set Mode Controls**  	When **Clock Source** is set to **User Set Time**, allows entry of user time, and also allows entry of user text identifying the time zone or other text (this time zone text is displayed when entered for either user time or NTP time) Click **Set Time** to invoke user set time.
Note: Clock can be burned in as an overlay over the merged split output (using the controls below) and/or as a per-PiP insertion using the individual PiP 1 thru PiP 5 **UMD/Idents** insertion controls. Where insertion as a per-PiP Ident burn-in is desired, the enable control below does not have to be set to Enabled.	
• **Clock Overlay Select/Enable**  	• **Clock Overlay** allows wall-clock time to be burned into the **overall merged** video output. Also allows selecting source as NTP/User or external LTC. • **Global LTC Source** selects from RS232 or RS422 external timecode source when **LTC** is selected above. • Display Format (when LTC is selected above) selects the format of timecode string burn-in overlay insertion from choices shown. . **Clock Overlay** set to Enabled inserts a clock burn-in into the merged video output and not directly bound to any PiP area

Table 3-1 OG-5510-5S Function Menu List — continued

Clock	**(continued)**
• **Clock Character Size and Custom Position Controls**  	**Horizontal** and **Vertical Position** controls set the origin point for the clock overlay. 
• **Clock Text Character/Background Attributes Controls**  	Provides independent controls for setting the color and opacity of the clock text and its background. • **Color** drop-downs set text or background color from multiple choices. • **Opacity** controls set text or background opacity from 0% (least opacity) to 100% (full opacity).
Presets	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 Layer Select**

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.



Default **All** setting will “look” at all device settings, and save and invoke **all** settings when the preset is invoked (loaded).

Selecting a layer (in this example, “Out Audio Routing”) will set the preset to **only** “look at” and “touch” output audio routing settings and save these settings under the preset. When the preset is invoked (loaded), **only** the output audio routing layer is “touched”.

Example: Since audio routing can be considered independent of PiP layout settings, if normal audio routing was set up with a particular PiP setting in effect, and at a later time audio routing is desired to be saved as a preset, selecting **Out Audio Routing** here limits preset-invoked changes to **only** the audio routing layer, “telling” the preset save/load to not concern itself with other aspects such as PiP settings. In this manner, when the preset is invoked any PiP settings in effect will remain untouched, with only the audio routing changes invoked.

Table 3-1 OG-5510-5S Function Menu List — continued

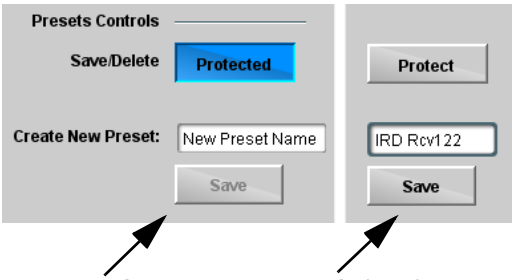
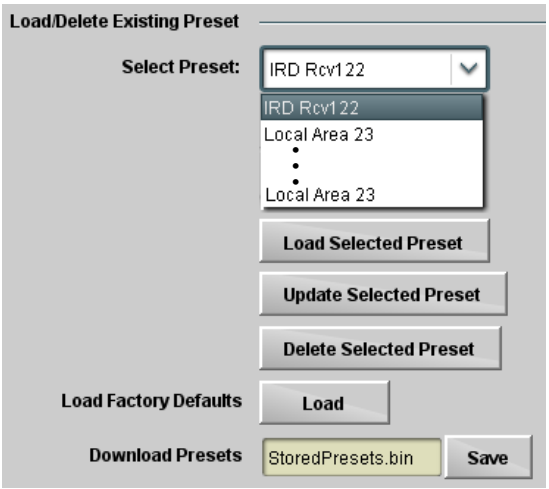
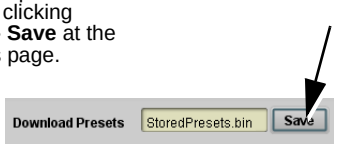
Presets	**(continued)**
• **Preset Enter/Save/Delete**  **Protected** state – changes locked out **Ready** (open) state – changes can be applied	Locks and unlocks editing of presets to prevent accidental overwrite as follows: • **Protect (ready):** This state awaits Protected and allows preset Save/Delete button to save or delete current card settings to the selected preset. **Use this setting when writing or editing a preset.** • **Protected:** Toggle to this setting to lock down all presets from being inadvertently re-saved or deleted. **Use this setting when all presets are as intended.** • **Create New Preset:** Field for entering user-defined name for the preset being saved (in this example, "IRD Rcv122"). • **Save:** Saves the current card settings under the preset name defined above.
• **Preset Save/Load Controls**  	• **Select Preset:** drop-down allows a preset saved above to be selected to be loaded or deleted (in this example, custom preset "IRD Rcv122"). • **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. • **Update Selected Preset** button allows saving any card settings changes to the selected preset. When this button is pressed, the changes in effect are rolled into the selected preset. • **Delete Selected Preset** button deletes the currently selected preset. • **Load 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. **Note:** Load Factory Defaults functions with no masking. The Preset Layer Select controls have no effect on this control and will reset **all** layers to factory default. • **Download Presets** saving the preset files to a folder on the connected computer.
Note: If using **Cascade Config** mode where a global preset is to apply in some manner to all cards in the chain, it is recommended to have all cards in the chain set up as desired, and then save the preset on the **last** card in the chain. This helps ensure that **all** saved states in each card will be saved in an "umbrella" preset encompassing **all** cards in the chain.	

Table 3-1 OG-5510-5S Function Menu List — continued

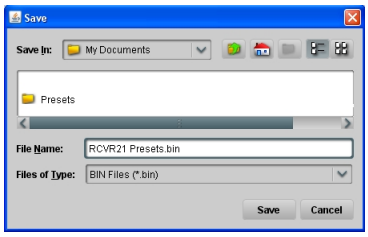
(continued)

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\Presets*).

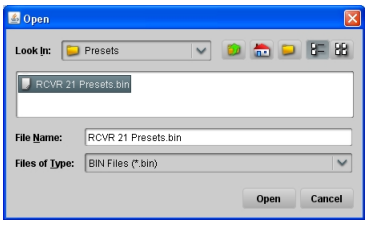
The file can then be renamed if desired (*RCVR21 Presets* in this example) before committing the save.



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\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 on the previous page.

Uploading Saved Presets to New or Different Cards (Cascade Config Usage)

When uploading presets .bin files to OG-5510-5S cards in a Cascade Config chain, the steps below must be used to make certain each card receives cascade setup info which is stored individually on each card.

1. Upload the desired presets .bin file to all cards in the chain.

2. On the **Cascade Config** tab in any card in the chain, re-link the IP settings for the cards within the cascade chain.

3. Select one of the presets you want to configure; all the connected cards will then have the matching preset automatically selected. On **Presets** page of any card in the chain, click **Load Selected Preset**. All cards will now be loaded with that preset.

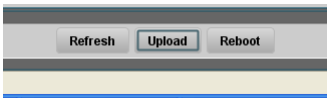
4. On **Preset** page of any card in the chain, now click **Upload Selected Preset**. This step now re-saves the cascade IP settings to each card's memory.

5. Repeat steps 3 and 4 for **each** preset in the **Select Preset** drop-down list. (Note that even presets that may not apply to other cards in the chain need to updated as described here. For subsequent presets, remove all IPs from the Cascade Config tab and click **Disconnect**. Then load the presets and then update the preset.) **Contact Support for assistance if necessary.**

Table 3-1 OG-5510-5S Function Menu List — continued

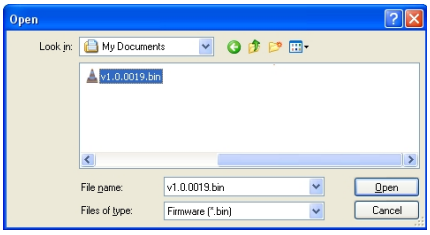
	Provides a global card operating status and allows a log download for factory engineering support. Also provides controls for selecting and loading card firmware upgrade files.
• **Firmware Upgrade Controls**	Firmware upgrade controls allow a selected firmware version (where multiple versions can be uploaded to the card's internal memory) to invoke an upgrade to a selected version either instantly, or set to install on the next card reboot (thereby allowing card upgrade downtime to be controlled at a scheduled point in time).

1. Access a firmware upgrade file from a network computer by clicking **Upload** at the bottom of DashBoard.



2. Browse to the location of the firmware upgrade file (in this example, *My Documents\v1.0.0019.bin*).

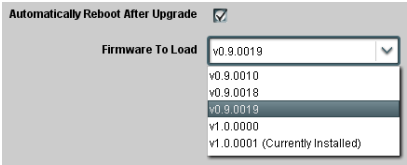
3. Select the desired file and click **Open** to upload the file to the card.



• **Immediate firmware upload.** The card default setting of **Automatically Reboot After Upgrade** checked allow a selected firmware version to be immediately uploaded as follows:

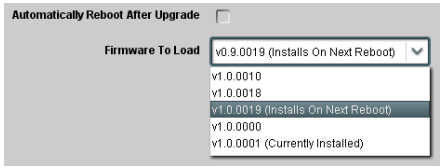
1. Click **Firmware To Load** and select the desired upgrade file to be loaded (in this example, "v1.0.0019").

2. Click **Load Selected Firmware**. The card now reboots and the selected firmware is loaded.



• **Deferred firmware upload.** With **Automatically Reboot After Upgrade** unchecked, firmware upgrade loading is held off until the card is manually rebooted. This allows scheduling a firmware upgrade downtime event until when it is convenient to experience to downtime (uploads typically take about 60 seconds).

1. Click **Firmware To Load** and select the desired upgrade file to be loaded (in this example, "v1.0.0019"). Note now how the display shows "Installs on Next Reboot".



2. Click **Load Selected Firmware**. The card holds directions to proceed with the upload, and performs the upload only when the card is manually rebooted (by pressing the **Reboot** button).

3. To cancel a deferred upload, press **Cancel Pending Upgrade**. The card reverts to the default settings that allow an immediate upload/upgrade.

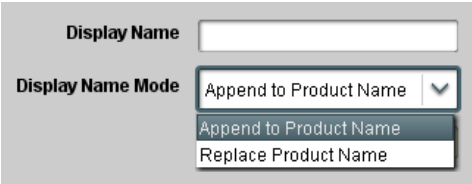
• **Card DashBoard Name Control** 	Allows card name In DashBoard to be changed as desired. Click return to engage change. • **Append to Product Name** appends (or adds to) existing OEM name (for example, "OG-5510-5S *Processing 1A*"). • **Replace Product Name** completely replaces the OEM name (for example, "*Processing 1A*"). **Note:** DashBoard instance(s) may have to be refreshed before name change appears.

Table 3-1 OG-5510-5S Function Menu List — continued

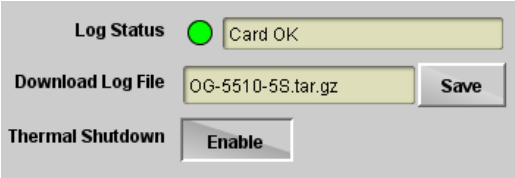
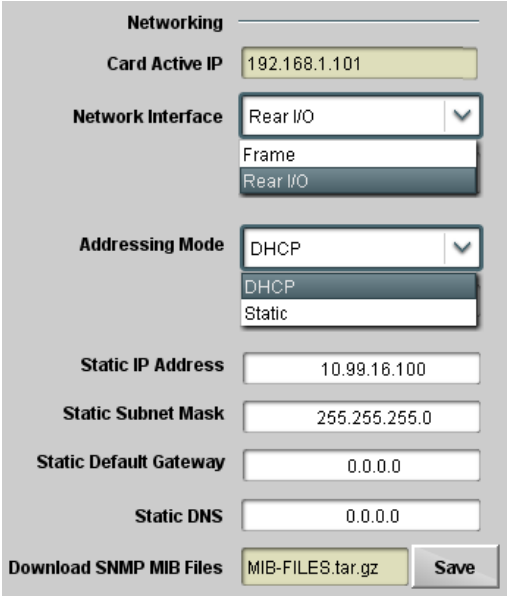
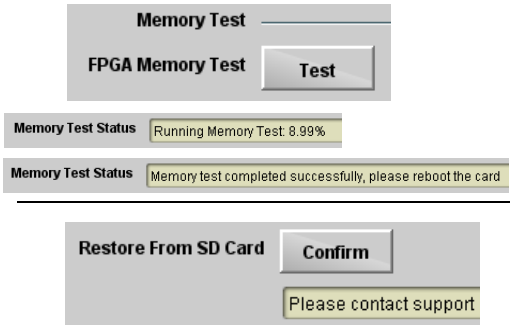
Admin	(continued)
• **Log Status and Download Controls**  	• **Log Status** indicates overall card internal operating status. • **Download Log File** allows a card operational log file to be saved to a host computer. This log file can be useful in case of a card error or in the case of an operational error or condition. The file can be submitted to engineering for further analysis. • **Thermal Shutdown** enable/disable allows the built-in thermal failover to be defeated. (Thermal shutdown is enabled by default). **CAUTION** **The OG-5510-5S FPGA is designed for a normal-range operating temperature around 85° C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within device operating safe parameters, and can be allowed by setting this control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum card protection.**
• **Card Network Setup Controls**  	**Note:** The IP address setting here is independent of a frame IP typically used for DashBoard or other frame/card remote control. • **Network Interface** 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. • **Addressing Mode** allows setting address to static (user) address or via DHCP (where a DHCP server is available for the connection). • **Static IP Address**, **Static Subnet Mask**, and **Static Default Gateway** fields allow setting IP parameters when Static mode is selected. • **Card Active IP** shows the currently configured IP address (whether static or DHCP).
• **Card Check and Restore Utilities**  	**Memory Test** allows all cells of the card FPGA memory to be tested. This control should **only** be activated under direction of Technical Support. Exercising the memory test is **not** part of normal card maintenance. **Restore from SD Card** allows card rendered inoperable to be restored using an SD memory card fitted to the card internal SD slot. Technical Support must be contacted prior to performing this operation. Use of any SD card not supplied by support can corrupt the card.

Table 3-1 OG-5510-5S Function Menu List — continued

Admin	**(continued)**
• **NTP Clock Setup** **Clock Setup** **NTP IP (use 0.0.0.0 for pool NTP)** 0.0.0.0 **Local Timezone (NTP Only)** US-Central **NTP Status** Synchronized with NTP	Allows device NTP clock IP source and localization. This is the clock/time device will use for logs and other recorded actions. • **NTP IP** sets the IP address where NTP is to be obtained. • **Local Timezone** sets the recorded time to the localized time. • **NTP Status** shows if time is synced with NTP or if an error exists.
User Log	Automatically maintains a log of user actions and input lock status.
User Log shows input lock and other user conditions (with most recent event at top of list). **Clear User Log** clears all entries. **Download Log File** opens a browser allowing the log file to be saved on the host machine.	Time / Type / Event 22:40:36 12/02/15 / Info / SDI Input sdi_in_c Locked to 720p 59.94 22:40:34 12/02/15 / Info / SDI Input sdi_in_d Locked to 1080i 59.94 21:17:36 12/02/15 / Info / SDI Input sdi_in_b Locked to 1080i 59.94 21:17:18 12/02/15 / Info / Log file cleared Clear User Log: Confirm Download Log File: 9922-FS.tar.gz Save

Troubleshooting

This section provides general troubleshooting information and specific symptom/corrective action for the OG-5510-5S card and its remote control interface. The OG-5510-5S 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 OG-5510-5S card itself and its remote control systems all (to varying degrees) provide error and failure indications.

The various OG-5510-5S card and remote control error and failure indicators are individually described below.

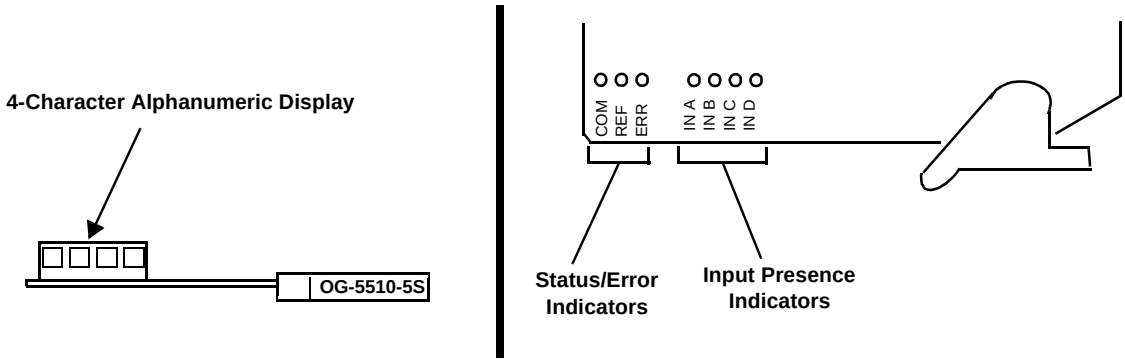
Note: The descriptions below provide general information for the various status and error indicators. For specific failures, also use the appropriate subsection listed below.

• Basic Troubleshooting Checks (p. 3-63)

• OG-5510-5S Processing Error Troubleshooting (p. 3-63)

OG-5510-5S Card Edge Status/Error Indicators and Display

Figure 3-6 shows and describes the OG-5510-5S card edge status indicators and display. These indicators and the display show status and error conditions relating to the card itself and remote (network) communications (where applicable). Because these indicators are part of the card itself and require no external interface, the indicators are particularly useful in the event of communications problems with external devices such as network remote control devices.



Item	Function
Alphanumeric Display	Reserved
COM LED	Blue LED flashes when OG-5510-5S is receiving control message from remote network control (e.g., DashBoard™)
REF LED	Blue LED illuminates indicating OG-5510-5S is receiving valid reference when set up for framesync operation.
ERR LED	Red LED illuminates when OG-5510-5S unable to lock to framesync.
Input Presence LEDs	LEDs for SDI inputs A thru D indicate the input signal presence.

Figure 3-6 OG-5510-5S Card Edge Status Indicators and Display

DashBoard™ Status/Error Indicators and Displays

Figure 3-7 shows and describes the DashBoard™ status indicators and displays. These indicator icons and displays show status and error conditions relating to the OG-5510-5S card itself and remote (network) communications.

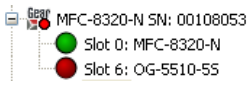
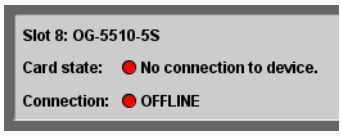
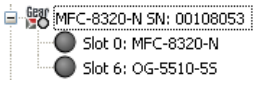
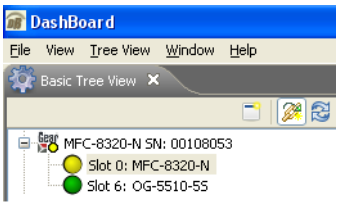
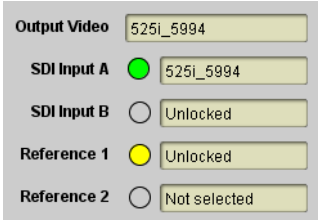
Indicator Icon or Display	Error Description
	Red indicator icon in Card Access/Navigation Tree pane shows card with Error condition (in this example, the Card Access/Navigation Tree pane shows a general error issued by the OG-5510-5S card in slot 6).
	Specific errors are displayed in the Card Info pane (in this example “No connection to device” indicating OG-5510-5S card is not connecting to frame/LAN).
	If the OG-5510-5S card is not connecting to the frame or LAN, all controls are grayed-out (as shown in the example here).
	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 OG-5510-5S card in slot 6 and the MFC-8320-N 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 MFC-8320-N Network Controller Card).
	Clicking the card slot position in the Card Access/Navigation Tree (in this example Network Controller Card “Slot 0: MFC-8320-N”) opens the Card Info pane for the selected card. In this example, a “Fan Door Open” specific error is displayed.
	Yellow indicator icon in OG-5510-5S Card Info pane shows error alert, along with cause for alert (in this example, the OG-5510-5S is not receiving an enabled framesync source).

Figure 3-7 DashBoard™ Status Indicator Icons and Displays

Access Card Info panes for specific cards by clicking the card slot position in the Card Access/Navigation Tree pane (as shown in the example in Figure 3-8).

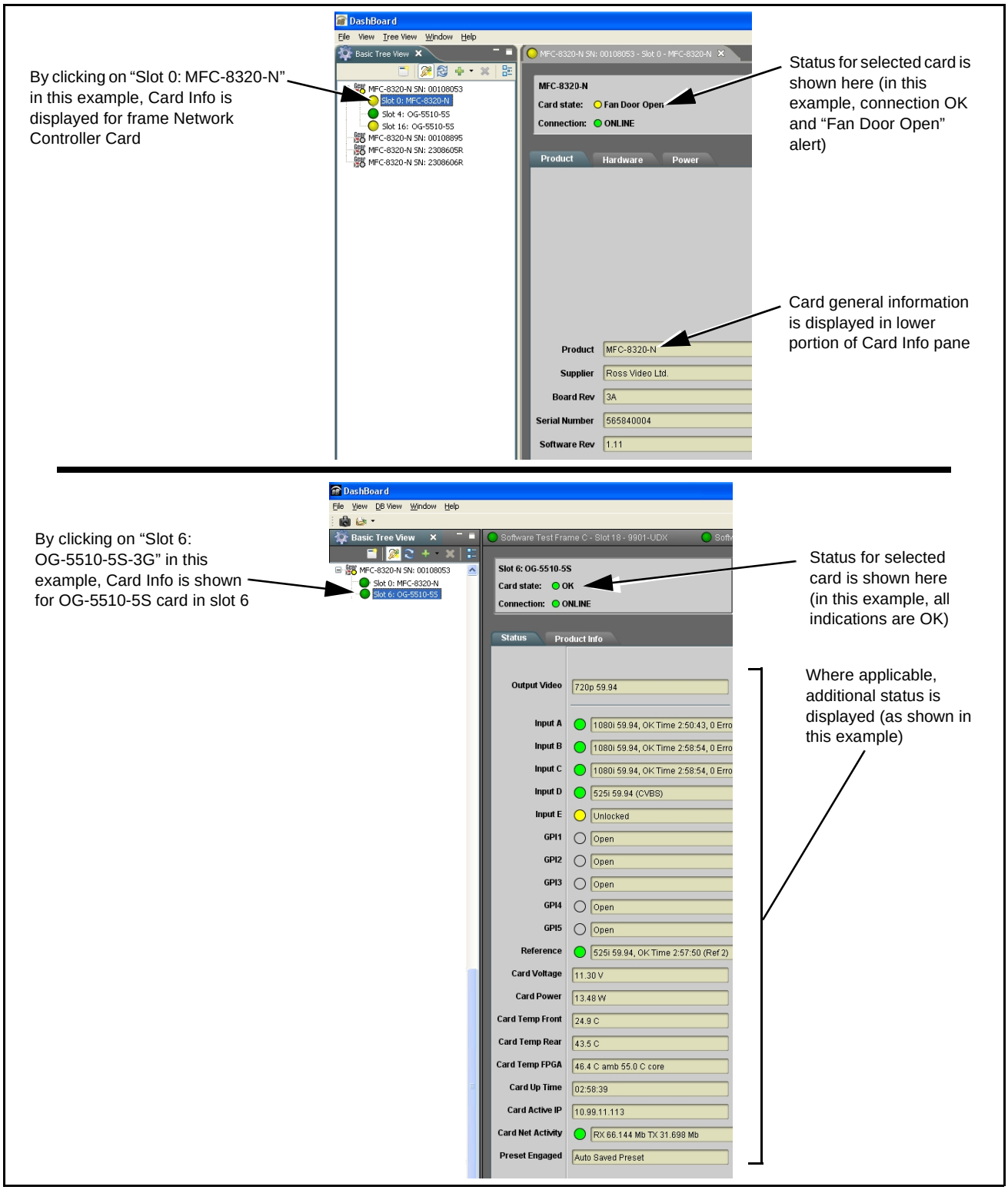


Figure 3-8 Selecting Specific Cards for Card Info Status Display

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 OG-5510-5S, 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 OG-5510-5S 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 OG-5510-5S card itself is defective.
	  • If display shows **excessive** power being consumed (see Technical Specifications (p. 1-15) in Chapter 1, “Introduction”), the OG-5510-5S 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 BNC 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 OG-5510-5S 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.

OG-5510-5S Processing Error Troubleshooting

Table 3-3 provides OG-5510-5S processing troubleshooting information. If the OG-5510-5S card exhibits any of the symptoms listed in Table 3-3, follow the troubleshooting instructions provided.

In the majority of cases, most errors are caused by simple errors where the OG-5510-5S is not appropriately set for the type of signal being received by the card.

Note:
- The error indications shown below are typical for the corresponding error conditions listed. Other error indications not specified here may also be displayed on DashBoard™ and/or the OG-5510-5S card edge status indicators.
- Where errors are displayed on both the OG-5510-5S card and network remote controls, the respective indicators and displays are individually described in this section.

Table 3-3 Troubleshooting Processing Errors by Symptom

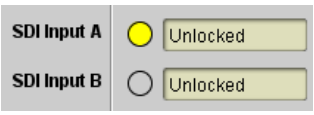
Symptom	Error/Condition	Corrective Action
• **DashBoard™** shows **Unlocked** message in OG-5510-5S Card Info pane.  • Card edge **Input Presence** LED(s) not illuminated.	No video input present	Make certain intended video source is connected to appropriate OG-5510-5S card video input. Make certain BNC cable connections between frame Rear I/O Module for the card and signal source are OK.
Cannot see one of five PiPs on output	PiP obscured by another PiP	When custom layouts are being used, it is easy for a PiP to “hide” underneath another PiP. When using this mode, size all PiPs small enough such that a PiP cannot be obscured. See Input Routing (p. 3-10) for more information.
Cascade mode upstream card image not as expected	• Cards in cascade chain not set for same grid layout	• All cards used in a cascading chain must be set for the same number of columns and rows. See Cascade Mode Using PiP Layout QuickSet Template Presets (p. 3-16) for more information.
	• Downstream card importing a cascade input not set for cascading mode	• Downstream OG-5510-5S which are receiving a cascade output from an upstream OG-5510-5S card must use the PiP 5 input and have the card set with **Cascade Mode > Enabled**. This ensures the imported upstream image is inserted as full-screen and with no burn-ins caused by the receiving card. See Input Routing (p. 3-10) controls for more information.
Cascade grid layout has been inadvertently lost	Non-cascade mode using the Layout Presets (Quint, Quad, Three Bottom, etc.) was possibly applied	The non-cascade Layout Presets will clear or change row/column settings previously set for a custom cascading grid that was set up using the cascading QuickSet setup controls. The basic non-cascade Layout Presets should not be re-applied once a cascade layout is set up.
Cannot set UMD text Display Format to choice other than External Input	Protocols tab inadvertently set to use router for UMD assert/ burn-in	If the **Protocols** tab > **Enable Utah Router Fetch** control is set to Enabled, UMD text is asserted by Utah router commands. The UMD > Display Format control is locked to External Input, with user text entry or other UMD type selections locked out.

Table 3-3 Troubleshooting Processing Errors by Symptom — continued

Symptom	Error/Condition	Corrective Action
Audio not processed or passed through card	Enable control not turned on	On **Output Audio Routing/Controls** tab, **Audio Group Enable** control for group 1 thru 4 must be turned on for sources to be embedded into respective embedded channel groups.
Output Preview function does not provide preview pane display.	Card is not using external card rear module Ethernet connection to network/ computer hosting DashBoard	DashBoard acquires program video frame captures using an external network connection from the card rear module to the network/ computer hosting the card's DashBoard connection. This feature requires that card be fitted with a rear module with an Ethernet connection for this function. See Output Preview (p. 3-51) and Admin (Log Status/Firmware Update) (p. 3-58) for more information.
DashBoard card slider controls lack fluidity, have "jerky" motion.	DashBoard experiencing high traffic volume due to **Output Preview** mode set to Capture Automatically	Automatically updated captures are useful for assessing incoming content on a dynamic basis. However, due to the traffic demands imposed by this mode, it is recommended to set the **Screen Capture Mode** control to Capture On Trigger (or entirely disable Output Preview) when the preview function is no longer needed. When the mode is set to capture on trigger or this function is disabled, normal fluid control motion will be restored. See Output Preview (p. 3-51) for more information.
(Cascade Config mode) User text (UMD, Idents) does not appear in cloned PiPs	Manually entered user text cannot be cloned	Only pre-defined DashBoard selections (from drop-downs or other selections) can be cloned from one PiP to another. User custom text cannot be cloned and **must** be entered manually for each PiP UMD and/or Ident field.
(Cascade Config mode) Presets cannot be uploaded from computer to cards	Special upload steps required	Saved preset .bin files from a computer to target cards must be uploaded as described in Loading Saved Presets to New or Different Cards (Cascade Config Usage) (p. 3-56).
Selected upgrade firmware will not upload	Automatic reboot after upgrade turned off	Card **Presets** > **Automatically Reboot After Upgrade** box unchecked. Either reboot the card manually, or leave this box checked to allow automatic reboot to engage an upgrade upon selecting the upgrade.

In Case of Problems

Recovering Card From SD Memory Card

New production cards come equipped with an SD card installed in a slot receptacle on the underside of the card. The data on this SD card can be used to restore a card should the card become unresponsive (can't communicate with DashBoard or other remote control). Recovering a card using the procedure here will restore the card to any installed option licenses and the most recent firmware installed.

1. (See Figure 3-9.) Make certain the card has the proper SD card installed in the under-card slot. If SD card is **not** installed, contact Service to obtain an SD card.

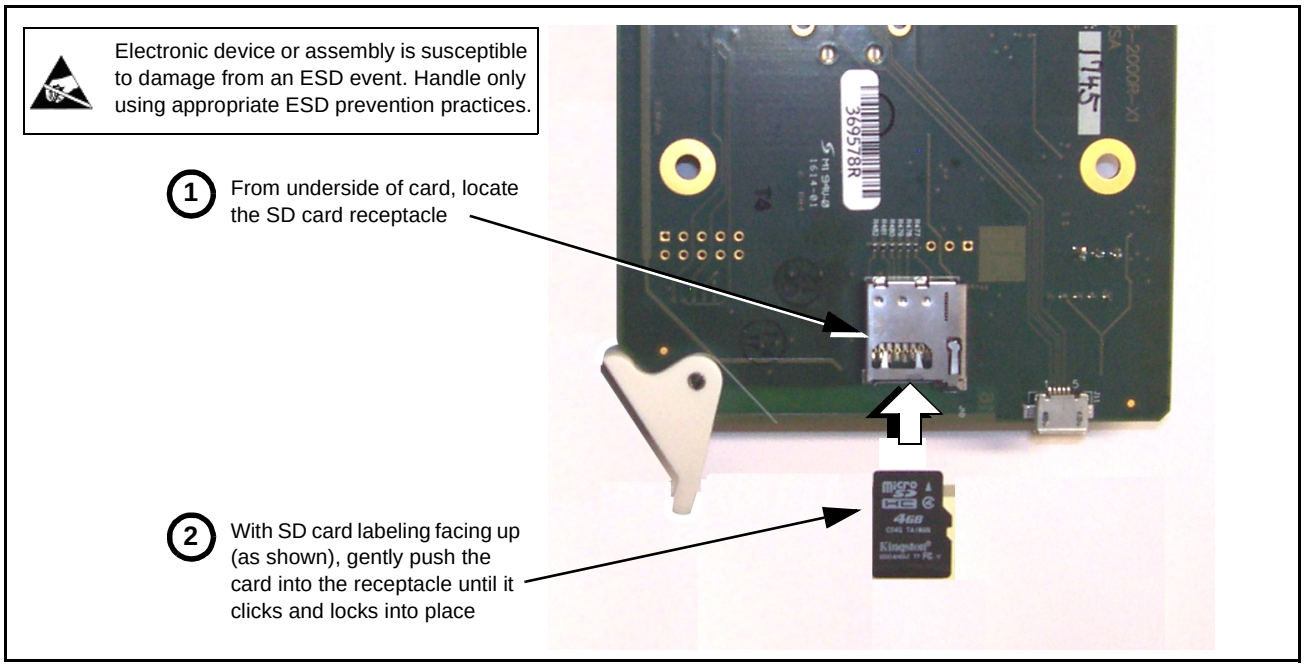


Figure 3-9 SD Card Installation

2. (See Figure 3-10.) With card powered-down, locate the **MMC BOOT** button on the card. Proceed as shown in picture.

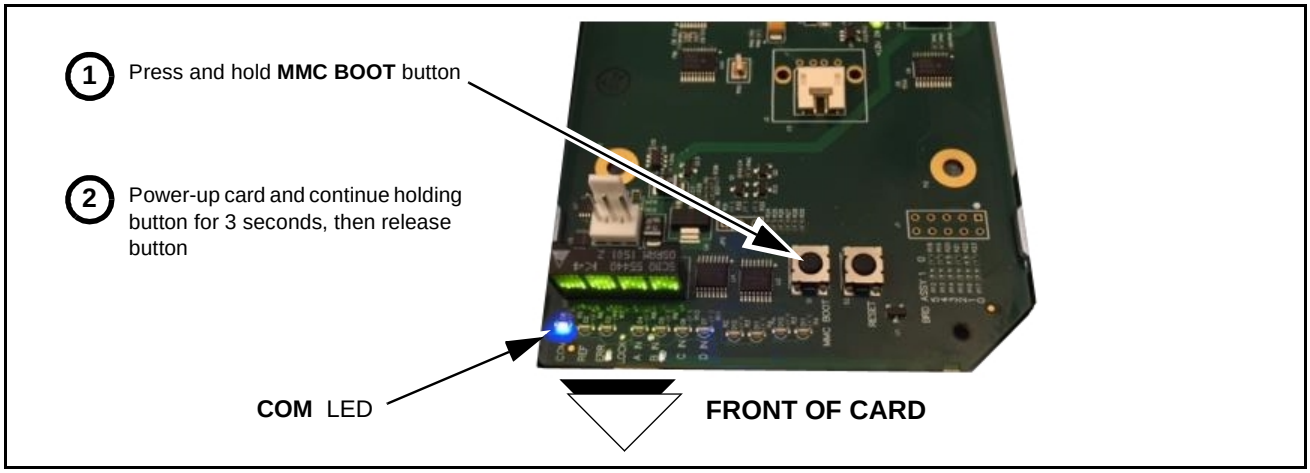


Figure 3-10 MMC Boot Button

3. With button now released, the card will begin reprogramming:
   - **COM** LED illuminates and remains illuminated.
   - When reprogram is complete, **COM** LED turns off, on, and then off again (entire process takes about 1-1/2 minute).
4. Remove power from the card (remove card from slot or power-down BBG-1000 Series unit).
5. Re-apply power to the card. The card/device will display as "***UNLICENSED***" in DashBoard/remote control.
6. In Dashboard or web remote control, go to **Admin** tab and click **Restore from SD Card**. After about 1/2-minute, the card license(s) will be restored and card will be using its most recently installed firmware.
7. Card/device can now be used as normal.

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