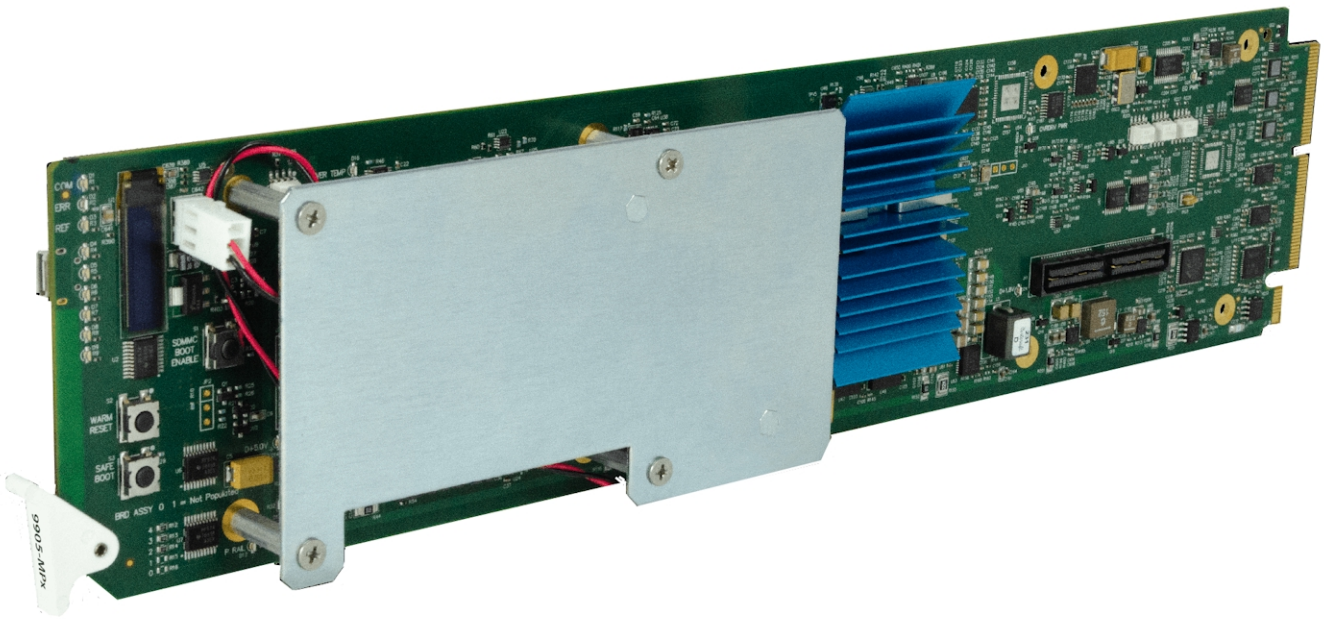
9905-MPx



3G/HD/SD Quad-Path Up/Down/Cross Converter / Frame Sync / Embed/De-Embed Audio Processor

Product Manual

Cobalt Digital Inc.

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

9905-MPX-OM (V1.1)

Copyright

Disclaimer

The information in this document has been carefully examined and is believed to be entirely reliable. However, no responsibility is assumed for inaccuracies. Furthermore, Cobalt Digital Inc. reserves the right to make changes to any products herein to improve readability, function, or design. Cobalt Digital Inc. does not assume any liability arising out of the application or use of any product or circuit described herein.

Trademark Information

Cobalt® is a registered trademark of Cobalt Digital Inc.

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

Dolby® is a registered trademark of Dolby Laboratories, Inc. Other product names or trademarks appearing in this manual are the property of their respective owners.

BBC is a tradename of British Broadcasting Corporation. Tradename and BBC LUT contents are copyright, BBC.

Congratulations on choosing the Cobalt® 9905-MPx 3G/HD/SD Quad-Path Up/Down/Cross Converter / Frame Sync / Embed/De-Embed Audio Processor. The 9905-MPx is part of a full line of modular processing and conversion gear for broadcast TV environments. The Cobalt Digital Inc. line includes video decoders and encoders, audio embedders and de-embedders, distribution amplifiers, format converters, remote control systems and much more. Should you have questions pertaining to the installation or operation of your 9905-MPx, please contact us at the contact information on the front cover.

Manual No.:	9905-MPX-OM
Document Version:	V1.1
Release Date:	July 8, 2021
Applicable for Firmware Version (or greater):	1.000 or greater
Description of product/manual changes:	- Update manual to show latest rear module models.

Table of Contents

Chapter 1

Introduction

Overview

This manual provides installation and operating instructions for the 9905-MPx 3G/HD/SD-SDI 3G/HD/SD Quad-Path Up/Down/Cross Converter / Frame Sync / Embed/De-Embed Audio Processor card (also referred to herein as the 9905-MPx).

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 9905-MPx.
- **Chapter 2, "Installation and Setup"** – Provides instructions for installing the 9905-MPx in a frame, and optionally installing a 9905-MPx Rear I/O Module.
- **Chapter 3, "Operating Instructions"** – Provides overviews of operating controls and instructions for using the 9905-MPx.

This chapter contains the following information:

9905-MPx Card Software Versions and this Manual

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

The Software Version of your card can be checked by viewing the **Card Info** menu in DashBoard™. See Checking 9905-MPx Card Information (p. 3-7) in Chapter 3, “Operating Instructions” for more information. You can then check our website for the latest software version currently released for the card as described below.

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

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

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

Cobalt Reference Guides

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

Manual Conventions

In this manual, display messages and connectors are shown using the exact name shown on the 9905-MPx itself. Examples are provided below.

- Card-edge display messages are shown like this:

  BOOT

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

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

- **9905-MPx** refers to the 9905-MPx 3G/HD/SD Quad-Path Up/Down/Cross Converter / Frame Sync / Embed/De-Embed Audio Processor card.
- **Frame** refers to the HPF-9000, oGx, OG3-FR, 8321, or similar 20-slot frame that houses Cobalt® or other cards.
- **Device** and/or **Card** refers to a Cobalt® or other card.
- **System** and/or **Video System** refers to the mix of interconnected production and terminal equipment in which the 9905-MPx and other cards operate.
- Functions and/or features that are available only as an option are denoted in this manual like this:

  Option

  Most options are covered in this manual. However, if your card has DashBoard tabs that are not described in this manual it indicates that the optional function/feature is covered in a separate Manual Supplement.

  You can download a pdf of the option supplement by entering the option code on the Cobalt web page search window (for example, **+T-SLATE**) and then clicking on **Product Downloads** to view or download the supplement pdf.

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 9905-MPx has a high power dissipation with frame loading recommendations as follows:**

- **OG3 Frame: (5) cards**
- **HPF-9000 Frame: (5) cards**
- **oGx Frame: (7) cards**

CAUTION **If required, make certain Rear I/O Module(s) is installed before installing the 9905-MPx 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.**

9905-MPx Functional Description

Note: Not all functions described below may be present on cards with initial preliminary software.

Figure 1-1 shows a functional block diagram of the 9905-MPx. The 9905-MPx provides four independent signal paths (**Path** 1 thru **Path 4**) of UDX / frame sync / audio embedding and de-embedding. The four paths share an input and output SDI crosspoint to receive and send four discrete SDI inputs and outputs. The 9905-MPx also includes AES and MADI audio support which can be embedded to, or de-embedded from, any of the four SDI processing paths. Independent frame sync processing allows independent V/H offsets and frame delay settings for the four processing paths. Each path can be set to provide disable, freeze, or flat-field insert upon loss of respective video input.

The 9905-MPx also provides multiple ANC bridging around the scaler blocks to preserve ANC packet-based data such as timecode.

9905-MPx Input/Output Formats

The 9905-MPx provides the following inputs and outputs (which can be independently used for **Path 1** thru **Path 4**:

- **Inputs:**
  - **3G/HD/SD SDI IN 1** thru **SDI IN 5** – five 3G/HD/SD-SDI inputs which can be selected to be applied to the four independent processing paths.
  - **AES IN –** (8) coaxial (AES-3id, 75Ω) ports as AES input (number of ports dependent on rear I/O module used).
  - **MADI IN –** Coaxial port as MADI input (availability dependent on rear I/O module used).
- **Outputs:**
  - **3G/HD/SD-SDI OUT (1-4)** – four independent 3G/HD/SD-SDI processed video outputs (Corresponding to **Path 1** thru **Path 4**).
  - **AES OUT –** (8) coaxial (AES-3id, 75Ω) ports as AES output (number of ports dependent on rear I/O module used).
  - **MADI OUT –** Coaxial port as MADI output (availability dependent on rear I/O module used).
  - **HDMI OUT –** HDMI 2.0, which can be sourced as selected from any of the **SDI OUT (1-4)** outputs.

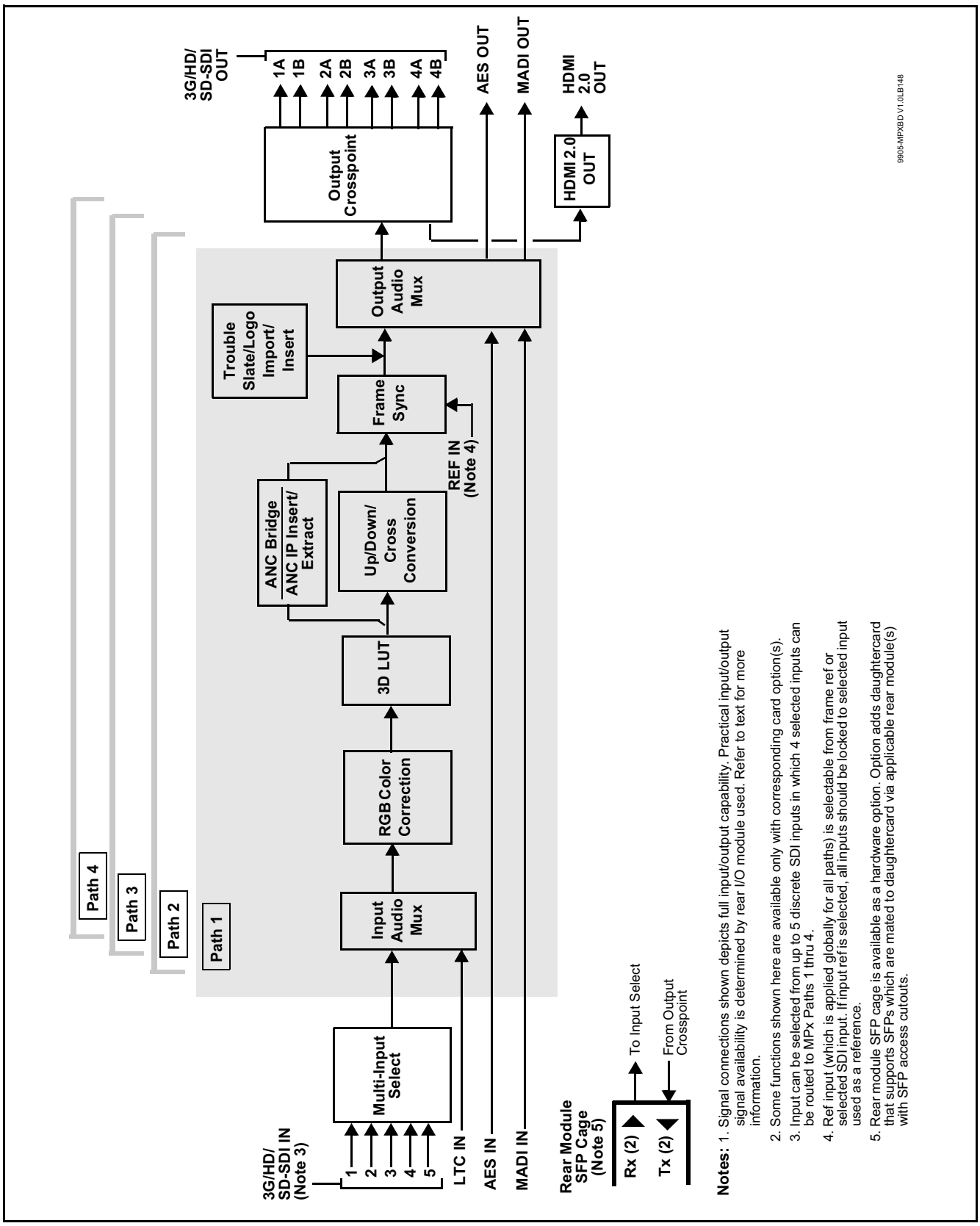


Figure 1-1 9905-MPx Functional Block Diagram

Video Processor Description

Note: Unless otherwise noted, the following functions are independently available for Path 1 thru Path 4 processing paths.

The 9905-MPx video subsystem provides the functions described below.

Input Video Select Functions

Used in common as a routing source for **Path 1** thru **Path 4** is a GUI-based control that allows the card to select from up to five 3G/HD/SD-SDI inputs to be used as four sources for **Path 1** thru **Path 4** processed video paths.

Option Where options **-UDX-SFP** or **-UDX-SFP-MSA** are installed, fiber inputs can also be among input video choices.

The inputs can be selected using DashBoard manual control or tied to a preset that invokes channel selection (which, in turn, can be tied to card GPI automation).

Frame Sync Function

This function provides for frame sync control using either one of two external **FRAME REF IN (1,2)** reference signals distributed with the card frame, selected input video, or internal timing as a frame sync reference.

This function also independently allows horizontal and/or vertical offset to be added between the output video and the frame sync reference for any of the card's four processed video paths.

Frame sync can select from either of two card frame reference sources, or free-run input video sync. Selectable failover allows alternate reference selection should the initial reference source become unavailable or invalid. In the event of input video loss of signal, the output can be set to disable video, go to an internal flat-field generator, or freeze to the last intact frame (last frame having valid SAV and EAV codes).

Scaler Function

The scaler function provides up/down/cross-conversion ranging from conversions to SD, cross-conversions between 3G/HD formats, and 3G level A output formats. Formats and other parameters (such as enhancements and custom ARC) can be independently set for Path 1 thru Path 4 processed video. Table 1-1 lists the available input and output formats supported by the 9905-MPx card.

Table 1-1 9905-MPx Scaler Input/Output Formats

525i 59.94	1920x1080p 29.97
625i 50	1920x1080p 30
1280x720p 23.98	1920x1080psf 23.98
1280x720p 24	1920x1080psf 24
1280x720p 25	1920x1080psf 25
1280x720p 29.97	1920x1080psf 29.97
1280x720p 30	1920x1080psf 30
1280x720p 50	1920x1080p 50 A
1280x720p 59.94	1920x1080p 59.94 A
1280x720p 60	1920x1080p 60 A
1920x1080i 50	2048x1080p 23.98
1920x1080i 59.94	2048x1080p 24
1920x1080i 60	2048x1080p 25
1920x1080p 23.98	2048x1080p 50 A
1920x1080p 24	2048x1080p 59.94 A
1920x1080p 25	2048x1080p 60 A

The scaler function also provides aspect ratio conversion that allows custom user-defined H and V aspect ratio control. The scaler provides special modes and controls that provides downscale filter sharpness, P to I (Progressive to Interlaced) conversion sharpness, deinterlace temporal noise reduction, and selectable deinterlacer film rate detection that automatically optimizes noise reduction specifically for these cases.

To preserve ANC data for video that passes through scaling, an ANC bridge function is available (see Ancillary Data Processor (p. 1-11) for more information).

Color Corrector Option

Option **+COLOR** converts the YCbCr SDI input video to the 4:4:4 RGB color space (where the color correction is applied), and then back to YCbCr SDI on the output. Controls are available to adjust each RGB level independently for both white levels (gain) and black levels (offset). Gamma can also be independently adjusted for each RGB channels. Various controls can be ganged to provide adjustment for all three color channels simultaneously. Color Correction allows custom independent user settings for each of the four processing paths.

3D LUT Processor

3D LUT Processor provide 33-cube LUT for mapping from BT.709 or BT.2020 color spaces to desired HDR>SDR or SDR>HDR conversions applied to downstream systems/workflows. The positioning of the 3D LUT function before the UDX scaler allows LUT such that scaler artifacts are not “amplified” by these processes.

The 3D LUT Processor offers several modes which interface with external systems and/or files to provide desired LUT functions. LUT setup can be set up independently for each of the card’s four paths.

Option Option **+3D-LUT-BBC** allows selection from an assortment of licensed BBC LUT profiles. Other LUT functionality is provided standard.

Trouble Slate Insertion Function Option

Option **+T-SLATE** provides for graphic insertion onto the SDI processed output raster. The function allows for uploading a .png image graphic file to the card/device memory. (png files are converted to a special format using a web tool before uploading to the host card/device; this is described in the setup/operating instructions later in this supplement.)

When the image file(s) is uploaded to the card, its insertion can be enabled via DashBoard Event Setup controls that enable the graphic insertion only under certain conditions as desired. (For example, a trouble slate graphic can be set to insert upon detected input Loss of Signal (LOS).

Option Options **+T-SLATE** and **+LOGO** respectively provide for automated trouble slate and logo (such as ID “bug”) into the output video raster. Refer to +LOGO / +T-SLATE Manual Supplement OPT-SW-PHXLTS-MS for detailed information and installation/setup instructions.

Ancillary Data Processor

This function provides full VANC/HANC ancillary data de-embedding and embedding for 3G/HD/SD-SDI streams. Direct access to DID and SDID locations allows extraction or insertion of user data such as camera PTZ, SCTE 104, closed-captioning read/insert, GPI/GPO via ANC, or other specialized user payloads. Data can be extracted and inserted within the card (Bridge mode), or inserted and/or extracted to and from the card via serial or IP interfaces connecting to external devices/systems. A rear I/O module with a dedicated IP port can be used with the ancillary data processor function for data insertion or extraction via IP.

Note: Option ANC Bridging (which bridges the Scaler to preserve ANC data) is standard on the 9905-MPx, with four discrete bridge "connections" provided for each processing path. Option **+ANC** adds functionality to insert and extract ANC data via external IP connection.

Video Output Crosspoint

Used in common as a routing source for **Path 1** thru **Path 4** is a four-output video matrix crosspoint that allows independently applying the card processed video output to any of the four card discrete coaxial outputs (**SDI OUT 1** thru **SDI OUT 4**).

Note: Many rear modules expose DA copies of each SDI output channel (for example, offering eight outputs **SDI OUT 1A/1B** thru **SDI OUT 4A/4B**).

Audio Processor Description

The audio processing block consists of an Input Audio crosspoint/mixer (which directs selected input audio to the processing paths) and an Output Audio crosspoint/mixer (which selects from any of the four path's embedded audio, as well as discrete external MADI and AES audio sources).

Input Audio Processing

Note: **Path 1** thru **Path 4** have individual independent digital audio routing controls for each of the processing path's 16-channels of embedded audio.

The input audio processor operates as an internal audio router to each path's Audio Bus Channel bank. This function chooses from the following inputs:

- 16 channels of embedded audio from the path SDI video input (default 1-to-1 routing to SDI output)
- Downmixer outputs (see below)
- Flex Mix summing node outputs (see below)

The input audio processing subsection is built around a card internal 16-channel audio buses corresponding to each processing path (Path 1 thru Path 4). Each 16-channel bus receives inputs from an input routing crosspoint that routes audio on Audio Bus Channels 1 thru 16 corresponding to each processing path.

Input Audio Down Mix Function. (See Figure 1-2.) The Audio Down Mixer function provides for the selection of any five path embedded channels serving as Left (**L**), Right (**R**), Center (**C**), Left Surround (**Ls**), and Right Surround (**Rs**) individual signals to be multiplexed into stereo pair Down Mix Left (**DM-L**) and Down Mix Right (**DM-R**). The resulting stereo pair **DM-L** and **DM-R** can in turn be routed to any embedded audio bus pair as desired.

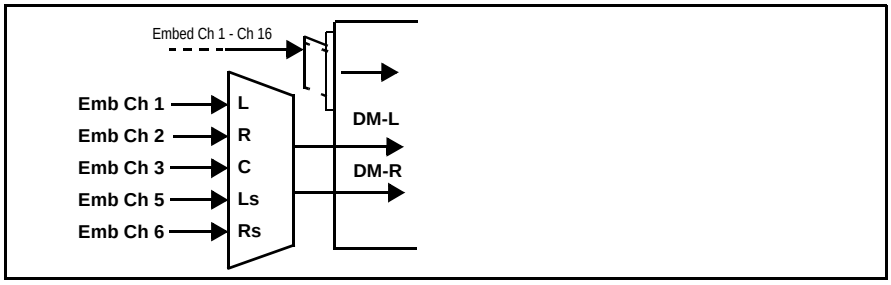


Figure 1-2 Audio Down Mix Functional Block Diagram with Example Sources

Flex Buses. For both input and output nodes before and after the card internal buses, flex buses provide flexible-structure mixer in which any of 16 summing nodes (**Flex Mix Bus A** thru **Flex Mix Bus P**) can receive any card audio input, thereby allowing several customizable mixing schemes. Similarly, any of the 16 card internal bus signals can be applied to an output flex bus mixer. The output flex bus allows cross-sourcing from Path 1 thru Path 4 embedded internal Audio Bus sources to the Path 1 thru Path 4 discrete output audio crosspoints.

Audio Delay Processing. Each of the four paths offers an overall Bulk Delay control, as well as Per-channel Delay Offset controls.

Note:
- Per-channel audio delay controls will allow individual delay offsets for channels within a pair for PCM. However, when the card detects a Dolby pair it will offset both channels an identical amount as set using either channel controls. This preserves the integrity of the Dolby pair.
- The audio delay function is available only for audio processed by the Input Audio Processing block. External audio embedding is processed by the Output Audio Processing block (which does offer user audio delay offset). However, embedded audio can typically be matched with video, if necessary, by using the Frame Sync video delay features.

Output Audio Processing

The output audio processing subsection is built around a card internal 16-channel audio buses corresponding to each processing path (Path 1 thru Path 4). From this point, path-specific Audio Bus channels are directed to path embedded audio channels, AES output channels, or MADI output channels.

The output audio processor chooses from the following inputs:

- 16 channels of Path 1 thru Path 4 Audio Bus channels
- Downmixer outputs
- Output Flex Mix summing node outputs
- Up to 16 channels (8 pairs) of discrete AES input embedding[1]
- MADI input channels (1 thru 64) embedding

From the Output Audio processor, discrete AES and MADI audio is sourced from selected Path 1 thru Path Audio Bus channels. Physical AES ports can be set as input ports or output ports

An Audio Status display shows the presence of each SDI embedded pair for each of the four paths. Lock status and payload is identified (PCM or data such as Dolby® D or E).

1. Discrete audio I/O AES pair count is dependent on rear I/O module used.

Control and Data Input/Output Interfaces

GPI Interface

Six independent ground-closure sensing GPI inputs (**GPI 1** thru **GPI 6**; each sharing common ground connection as chassis potential) are available. Associated with each GPI user control is a selection of one of eight user-defined card presets in which GPI activation invokes a selected card control preset. Because the GPI closure invokes a user-defined preset, the resulting setup is highly flexible and totally user-defined. Invoking a user preset to effect a change involves card setup communication limited **only** to the items being changed; the card remains on-line during the setup, and the called preset is rapidly applied.

GPO Interface

Two independent phototransistor non-referenced (floating) contact pairs (**GPO 1/1** and **GPO 2/2**) are available. A GPO can be invoked by setting a GPO to be enabled when a card preset is in turn applied (i.e., when a preset is invoked (either manually or via event-based loading), the GPO is correspondingly also activated.

Serial (COMM) Ports

The 9905-MPx is equipped with two, 3-wire serial ports (**COM 1 - Serial Port 1**, **COM 2 - Serial Port 2**). (This function is largely reserved on initial product releases.)

SFP-Based I/O

Option When licensed with hardware option **-UDX-SFP-MSA** or **-UDX-SFP**, two factory-installed dual-slot SFP cages are present (**SFP Cage 1** and **SFP Cage 2**), which are accessible through rear module cutouts that allow rear-module access for SFP installation and swapping. These cages support various EO (Tx) and/or OE (Rx) SFP types which allow the card to accept or provide optical-base fiber SDI signals in addition to the standard coaxial I/O signals handled by the card. When fitted, the user input and output crosspoints allow routing from and to the SFP ports.

Note: SFP options above provide only the SFP cages. SFP cages can be user-fitted with desired and compatible SFP types (ordered as separate items). SFP options are compatible rear modules. See SFP Types (Rear Modules with SFP Cage Access) (p. 2-7) in Chapter 2. Installation and Setup for SFP types and details.

User Control Interface

Figure 1-3 shows the user control interface options for the 9905-MPx. 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 9905-MPx and other cards installed in openGear®[1] frames can be controlled from a computer and monitor.

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

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

- **Cobalt® OGCP-9000 and OGCP-9000/CC Remote Control Panels** – The OGCP-9000 and OGCP-9000/CC Remote Control Panels conveniently and intuitively provide parameter monitor and control of the 9905-MPx and other video and audio processing terminal equipment meeting the open-architecture Cobalt® cards for openGear™ standard.

  In addition to circumventing the need for a computer to monitor and control signal processing cards, the Control Panels allow quick and intuitive access to hundreds of cards in a facility, and can monitor and allow adjustment of multiple parameters at one time.

  The Remote Control Panels are totally compatible with the openGear™ control software DashBoard™; any changes made with either system are reflected on the other. The Remote Control Panel user interface is described in Chapter 3,“Operating Instructions”.

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

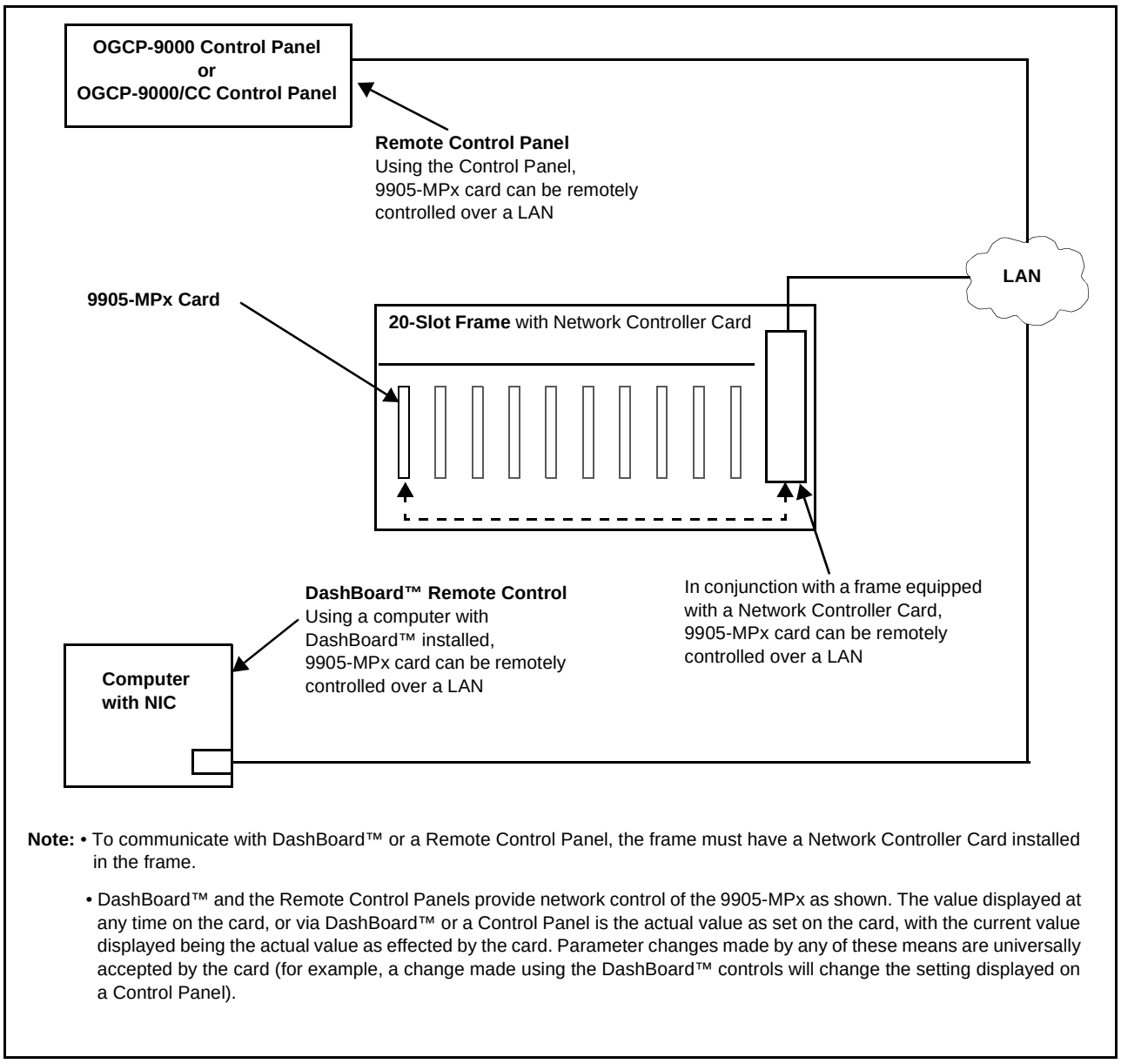


Figure 1-3 9905-MPx User Control Interface

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

Download a copy of this guide by clicking on the **Support>Reference Documents** link at www.cobaltdigital.com and then select DashBoard Remote Control Setup Guide as a download, or contact Cobalt® as listed in Contact Cobalt Digital Inc. (p. 1-20).

9905-MPx Rear I/O Modules

The 9905-MPx 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 9905-MPx 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 9905-MPx card edge connections to coaxial and other connectors that interface with other components and systems in the signal chain.

The full assortment of 9905-MPx Rear I/O Modules is shown and described in 9905-MPx Rear I/O Modules (p. 2-4) in Chapter 2, “Installation and Setup”.

Technical Specifications

Table 1-2 lists the technical specifications for the 9905-MPx 3G/HD/SD Quad-Path Up/Down/Cross Converter / Frame Sync / Embed/De-Embed Audio Processor card.

Table 1-2 Technical Specifications

Item	Characteristic
Part number, nomenclature	9905-MPx 3G/HD/SD Quad-Path Up/Down/Cross Converter / Frame Sync / Embed/De-Embed Audio Processor
Installation/usage environment	Intended for installation and usage in frame meeting openGear™ modular system definition
Installation Density	Up to 7 cards per 20-slot frame as follows: • OG3 Frame: (5) cards • HPF-9000 Frame: (5) cards • oGx Frame: (7) cards
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

Table 1-2 Technical Specifications — continued

Item	Characteristic
3G/HD/SD-SDI Input/Outputs	(5) 75Ω inputs (max); (4) inputs can be simultaneously routed to the four UDX/FS paths. (2x4) 75Ω outputs (max) SDI Formats Supported: SMPTE 424M, 292M, SMPTE 259M Return Loss: > 15 dB up to 1.485 GHz > 10 dB up to 3 GHz Input Cable Length: 120m Belden 1694A cable at 2.97 Gbps 240m Belden 1694A cable at 1.485 Gbps 400m Belden 1694A cable at 270 Mbps Output Signal Level: 800 mV ±10% DC Offset: 0 V ± 50 mV Alignment Jitter (3G/HD/SD): < 0.3/0.2/0.2 UI
AES Audio Inputs/Outputs	(8) AES-3id 75Ω coaxial ports (max); port direction assignable as inputs or outputs in groups of 4 ports.
MADI Audio Inputs/Outputs	(2) 75Ω coaxial ports (max) **Note:** Not all rear modules support full MADI I/O. MADI I/O is a function of Rear Module Used. See Rear Module illustrations for specific information.
HDMI Output	HDMI 2.0 Output; type A standard connector
Frame Reference Input	Number of Inputs: Two, REF 1 and REF 2 from frame with selectable failover Standards Supported: SMPTE 170M/318M (“black burst”) SMPTE 274M/296M (“tri-level”) Return Loss: > 35 dB up to 5.75 MHz
Frame Sync Audio/VIdeo Delay	Max offset: 20 frames Latency (min): 1 frame
User Audio Delay Offset from Video	Bulk delay control: -33 msec to +3000 msec. Per-channel delay controls: -800 msec to +800 msec
GPIO	6 GPI (max); 2 GPO (max) Note: GPIO max capacity is a function of Rear Module used. See Rear Module Options tab for specific information.

Warranty and Service Information

Cobalt Digital Inc. Limited Warranty

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

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

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

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

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

THIS LIMITED WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON COBALT'S PART. ANY SOFTWARE PROVIDED WITH, OR FOR USE WITH, THE PRODUCT IS PROVIDED “AS IS.” THE BUYER OF THE PRODUCT ACKNOWLEDGES THAT NO OTHER REPRESENTATIONS WERE MADE OR RELIED UPON WITH RESPECT TO THE QUALITY AND FUNCTION OF THE GOODS HEREIN SOLD. COBALT PRODUCTS ARE NOT AUTHORIZED FOR USE IN LIFE SUPPORT APPLICATIONS.

COBALT'S LIABILITY, WHETHER IN CONTRACT, TORT, WARRANTY, OR OTHERWISE, IS LIMITED TO THE REPAIR OR REPLACEMENT, AT ITS OPTION, OF ANY DEFECTIVE PRODUCT, AND SHALL IN NO EVENT INCLUDE SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS), EVEN IF IT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Contact Cobalt Digital Inc.

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

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

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

Chapter 2

Installation and Setup

Overview

This chapter contains the following information:

Installing the 9905-MPx 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 9905-MPx has a high power dissipation with frame loading recommendations as follows:

- **OG3 Frame: (5) cards**
- **HPF-9000 Frame: (5) cards**
- **oGx Frame: (7) cards**

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 9905-MPx 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 9905-MPx 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 9905-MPx 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 9905-MPx into a frame slot as follows:

1. Determine the slot in which the 9905-MPx 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 9905-MPx Rear I/O Modules (p. 2-4).
9. Repeat steps 1 through 8 for other 9905-MPx cards.

Note:
- The 9905-MPx BNC inputs are internally 75-ohm terminated. It is not necessary to terminate unused coaxial inputs or outputs.
- External frame sync reference signals are received by the card over a reference bus on the card frame, and not on any card rear I/O module connectors. The frame has BNC connectors labeled **REF 1** and **REF 2** which receive the reference signal from an external source such as a house distribution.
- To remove a card, press down on the ejector tab to unseat the card from the rear I/O module mating connector. Evenly draw the card from its slot.

10. If network remote control is to be used for the frame and the frame has not yet been set up for remote control, perform setup in accordance with Setting Up 9905-MPx Network Remote Control (p. 2-10).

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 9905-MPx is to be installed.
- When determining slot to use, see 9905-MPx Rear I/O Modules (p. 2-4) and check notes (where applicable) for rear module being considered for use.

Install a Rear I/O Module as follows:

1. On the frame, determine the slot in which the 9905-MPx 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.

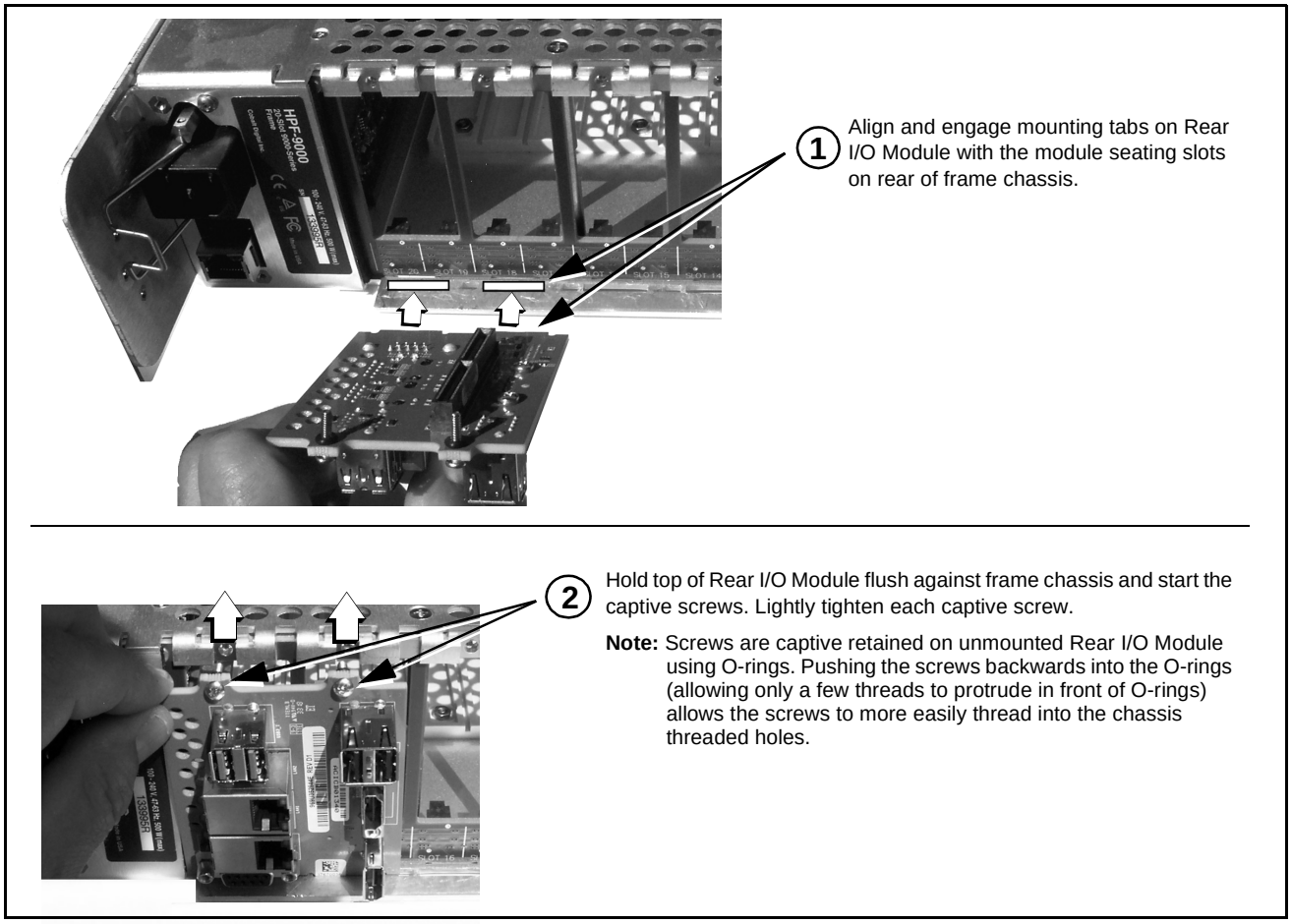


Figure 2-1 Rear I/O Module Installation

9905-MPx Rear I/O Modules

Table 2-1 shows and describes the full assortment of Rear I/O Modules specifically for use with the 9905-MPx.

Note: For each SDI output channel, the 9905-MPx is equipped with a 1x2 DA. On some rear modules, DA outputs are available (for example, **SDI OUT 1A** and **SDI OUT 1B**).

Table 2-1 9905-MPx Rear I/O Modules

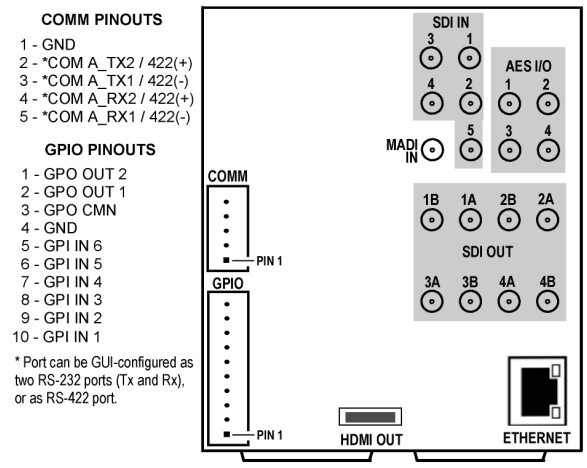
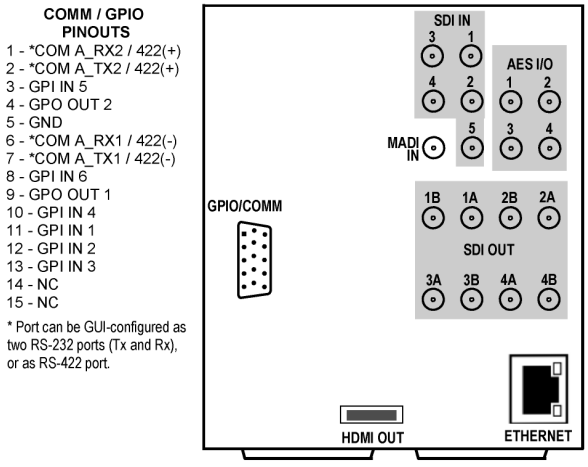
9905-MPx Rear I/O Module	Description
RM20-9905-A-HDBNC 	Provides the following connections: • Five 3G/HD/SD-SDI coaxial input (**SDI IN 1** thru **SDI IN 5**) • Eight 3G/HD/SD-SDI coaxial outputs (**SDI OUT 1A** thru **SDI OUT 4B**) • Four AES I/O (user selectable) (**AES I/O 1** thru **AES I/O 4**) • **MADI IN** • **GPIO** and **COMM** connectors • **HDMI OUT** type A standard connector • **ETHERNET** 100/1000 BaseT Ethernet connector **Note:** This rear module replaces rear module RM20-9904-B-HDBNC below, which will be discontinued.
RM20-9905-B-HDBNC 	Provides the following connections: • Five 3G/HD/SD-SDI coaxial input (**SDI IN 1** thru **SDI IN 5**) • Eight 3G/HD/SD-SDI coaxial outputs (**SDI OUT 1A** thru **SDI OUT 4B**) • Four AES I/O (user selectable) (**AES I/O 1** thru **AES I/O 4**) • **MADI IN** • **GPIO/COMM** connector • **HDMI OUT** type A standard connector • **ETHERNET** 100/1000 BaseT Ethernet connector

Table 2-1 9905-MPx Rear I/O Modules — continued

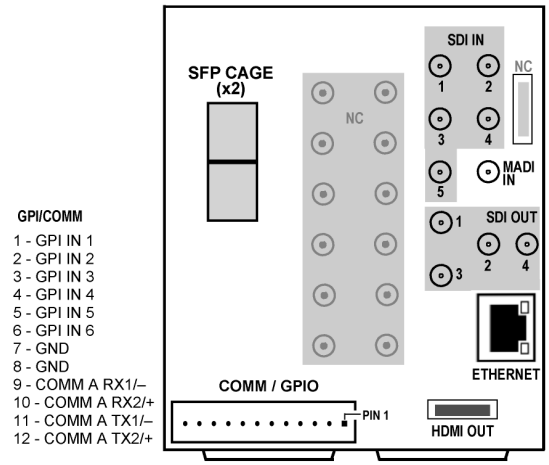
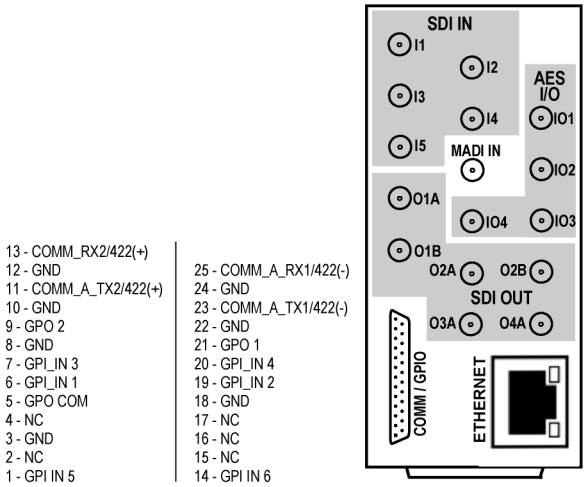
9905-MPx Rear I/O Module	Description
RM20-9905-C-HDBNC 	Provides the following connections: • Five 3G/HD/SD-SDI coaxial input (**SDI IN 1** thru **SDI IN 5**) • Four 3G/HD/SD-SDI coaxial outputs (**SDI OUT 1** thru **SDI OUT 4**) • **MADI IN** • **GPIO/COMM** connector • **HDMI OUT** type A standard connector • **SFP CAGE (x2):** Two user-accessible SFP cages that can be user-fitted with various SFP types. See SFP Types (Rear Modules with SFP Cage Access) (p. 2-7) for available SFP types and other details. • **ETHERNET** 100/1000 BaseT Ethernet connector
RM20-9905-D-HDBNC 	Provides the following connections: • Five 3G/HD/SD-SDI coaxial input (**SDI IN 1** thru **SDI IN 5**) • Six 3G/HD/SD-SDI coaxial outputs (**SDI OUT 1A** thru **SDI OUT 4A**) • Four AES I/O (user selectable) (**AES I/O 1** thru **AES I/O 4**) • **MADI IN** • **GPIO/COMM** connector • **ETHERNET** 100/1000 BaseT Ethernet connector **Note:** • Due to the alignment of the 9905-MPx card and this rear module, the combination of the card and rear module will consume the adjacent odd frame slot in addition to the even slot occupied by the card. • This rear module cannot be installed in frame slots 19/20 location. The 9905-MPx card, when installation is attempted, will clash/interfere with the frame network controller card.

Table 2-1 9905-MPx Rear I/O Modules — continued

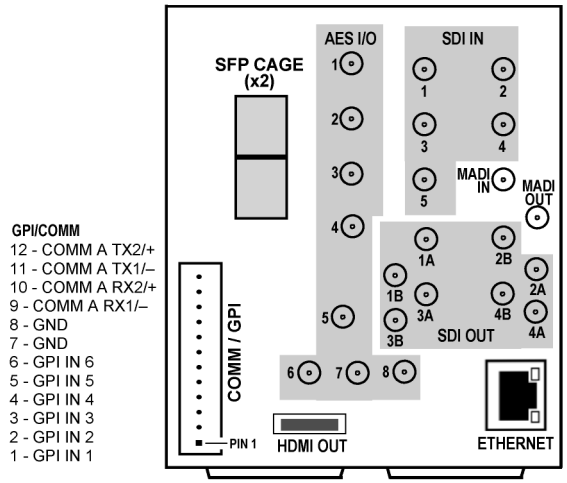
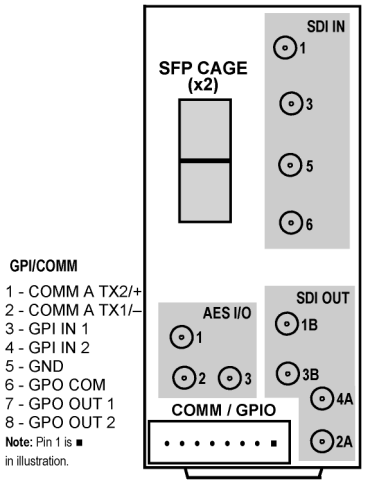
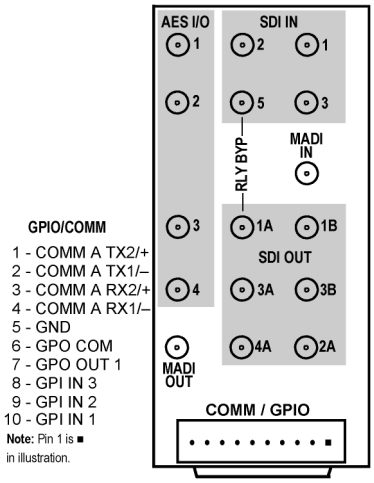
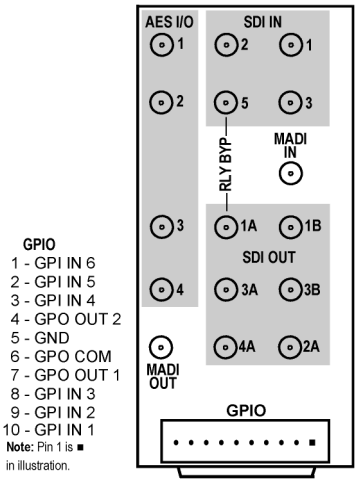
9905-MPx Rear I/O Module	Description
RM20-9905-F-HDBNC 	Provides the following connections: • Five 3G/HD/SD-SDI coaxial input (**SDI IN 1** thru **SDI IN 5**) • Eight 3G/HD/SD-SDI coaxial outputs (**SDI OUT 1A** thru **SDI OUT 4B**) • Eight AES I/O (user selectable) (**AES I/O 1** thru **AES I/O 8**) • **MADI IN** • **MADI OUT** • **HDMI OUT** type A standard connector • **SFP CAGE (x2):** Two user-accessible SFP cages that can be user-fitted with various SFP types. See SFP Types (Rear Modules with SFP Cage Access) (p. 2-7) for available SFP types and other details. • **GPIO/COMM** connector • **ETHERNET** 100/1000 BaseT Ethernet connector
RM20-9905-G-HDBNC 	Provides the following connections: • Four 3G/HD/SD-SDI coaxial input (**SDI IN 1** thru **SDI IN 4**) • Four 3G/HD/SD-SDI coaxial outputs (**SDI OUT 1B** thru **SDI OUT 4A**) • Three AES I/O (user selectable) (**AES I/O 1** thru **AES I/O 3**) • **SFP CAGE (x2):** Two user-accessible SFP cages that can be user-fitted with various SFP types. See SFP Types (Rear Modules with SFP Cage Access) (p. 2-7) for available SFP types and other details. • **GPIO/COMM** connector **Note:** Mates to card in **odd** slot.

Table 2-1 9905-MPx Rear I/O Modules — continued

9905-MPx Rear I/O Module	Description
RM20-9905-H-HDBNC  	Provides the following connections: • Four 3G/HD/SD-SDI coaxial input (**SDI IN 1** thru **SDI IN 4**; (one 3G/HD/SDI Output with relay bypass failover) • Six 3G/HD/SD-SDI coaxial outputs (**SDI OUT 1A** thru **SDI OUT 4A**) • Four AES I/O (user selectable) (**AES I/O 1** thru **AES I/O 4**) • One **MADI IN** • One **MADI OUT** • **GPIO/COMM** connector **Note:** Mates to card in **odd** slot. **Note:** 12G signals over relay bypass path stipulates maximum cable length not to exceed 10m for **total** of both input **and** output cable lengths.
RM20-9905-J-HDBNC  	Provides the following connections: • Four 3G/HD/SD-SDI coaxial input (**SDI IN 1** thru **SDI IN 4**; (one 3G/HD/SDI Output with relay bypass failover) • Six 3G/HD/SD-SDI coaxial outputs (**SDI OUT 1A** thru **SDI OUT 4A**) • Four AES I/O (user selectable) (**AES I/O 1** thru **AES I/O 4**) • One **MADI IN** • One **MADI OUT** • **GPIO** connector **Note:** Mates to card in **odd** slot. **Note:** 12G signals over relay bypass path stipulates maximum cable length not to exceed 10m for **total** of both input **and** output cable lengths.

SFP Types (Rear Modules with SFP Cage Access)

Option (See Table 2-2.) For the rear modules shown above on cards with factory-ordered/installed SFP support, the following user-accessible SFP types/functions are available. SFPs install in a factory-installed daughtercard in which the SFP cages are accessible via rear module cutouts on compatible rear modules.

Table 2-2 SFP Types Available

Cobalt Part Number	Description/Details
-UDX-SFP	Daughter card supporting externally-accessible dual SFP cage; orderable as new option. **Note:** To support SFP option(s), this option is required in addition to desired specific SFP options below. The SFP modules listed below are available for the 9905-MPx card when also fitted with SFP option -UDX-SFP. • **-UDX-SFP-2S** is required where **2-slot** ("Standard-Width") rear module (such as RM20-9905-G-HDBNC) is to be fitted with SFP option. • **-UDX-SFP-4S** is required where **4-slot** ("Double-Width") rear module (such as RM20-9905-C-HDBNC or RM20-9905-F-HDBNC) is to be fitted with SFP option (such as RM20-9905-G-HDBNC) is to be fitted with SFP option.
-SFP-EOOE-12G	12G/6G/3G/HD/SD-SDI UHD Transceiver (LC female connectors)
-SFP-EO-12G	12G/6G/3G/HD/SD-SDI UHD Transmitter (LC female connector).
-SFP-OE-12G	12G/6G/3G/HD/SD-SDI UHD Receiver (LC female connector)
-SFP-2EO-12G	12G/6G/3G/HD/SD-SDI UHD Dual Transmitter (LC female connector).
-SFP-2OE-12G	12G/6G/3G/HD/SD-SDI UHD Dual Receiver (LC female connector)
-SFP-EOOE	Transceiver (LC female connectors)
-SFP-EO	Transmitter (LC female connector).
-SFP-OE	Receiver (LC female connector)
-SFP-2EO	Dual Transmitter (LC female connector).
-SFP-2OE	Dual Receiver (LC female connector)

Table 2-2 SFP Types Available — continued

Cobalt Part Number	Description/Details
-SFP-IP-SWD	Software-Defined EmSFP 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for cards using SFP type -SPF-IP-SWD (Up to 3 software licenses can be added to the -SFP-IP-SWD, but only 1 license can be active at a time): **+ADD-SFP-2SDI-TO-IP-2022-6** SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2022-6 **+ADD-SFP-2SDI-TO-IP-2110** SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2110 **+ADD-SFP-IP-TO-2SDI-2022-6** SFP Software License; Dual-Channel De-Encapsulator IP-2022-6-to-2SDI **+ADD-SFP-IP-TO-2SDI-2110** SFP Software License; Dual-Channel De-Encapsulator IP-2110-to-2SDI **+ADD-SFP-IP-TO-SDI-2022-6** SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-SDI **+ADD-SFP-IP-TO-SDI-2110** SFP Software License; Single-Channel De-Encapsulator IP-2110-to-SDI **+ADD-SFP-SDI-TO-IP-2022-6** SFP Software License; Single-Channel Encapsulator SDI-to-IP-2022-6 **+ADD-SFP-SDI-TO-IP-2110** SFP Software License; Single-Channel Encapsulator SDI-to-IP-2110
-UDX-SFP-MSA	Daughter card supporting externally-accessible dual MSA SFP cage; orderable as new option. **Note:** To support SFP option(s), this option is required in addition to desired specific SFP options below. The SFP modules listed below are available for the 9905-MPx card when also fitted with SFP option -UDX-SFP-MSA. • **-UDX-SFP-MSA-2S** is required where **2-slot** ("Standard-Width") rear module (such as RM20-9905-G-HDBNC) is to be fitted with SFP option. • **-UDX-SFP-MSA-4S** is required where **4-slot** ("Double-Width") rear module (such as RM20-9905-C-HDBNC or RM20-9905-F-HDBNC) is to be fitted with SFP option (such as RM20-9905-G-HDBNC) is to be fitted with SFP option. Rear modules RM20-9905-C-HDBNC, RM20-9905-F-HDBNC, or RM20-9905-G-HDBNC and option -UDX-SFP-MSA-2S or -UDX-SFP-MSA-4S are purchased and available separately.
-SFP-EOOE-MSA-12G	12G/6G/3G/HD/SD-SDI UHD Transceiver (LC female connectors)
-SFP-MSA-EO-12G	12G/6G/3G/HD/SD-SDI UHD Transmitter (LC female connector).
-SFP-MSA-OE-12G	12G/6G/3G/HD/SD-SDI UHD Receiver (LC female connector)
-SFP-MSA-EOOE	Transceiver (LC female connectors)
-SFP-MSA-EO	Transmitter (LC female connector).

Table 2-2 SFP Types Available — continued

Cobalt Part Number	Description/Details
-SFP-MSA-OE	Receiver (LC female connector)
-SFP-IP-SWD-MSA	Software-Defined MSA SFP; 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for cards using SFP type **-SPF-IP-SWD-MSA** (Up to 3 software licenses can be added to the -SFP-IP-SWD-MSA, but only 1 license can be active at a time): **+ADD-SFP-IP-TO-SDI-2022-6** SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-SDI **+ADD-SFP-IP-TO-SDI-2110** SFP Software License; Single-Channel De-Encapsulator IP-2110-to-SDI **+ADD-SFP-SDI-TO-IP-2022-6** SFP Software License; Single-Channel Encapsulator SDI-to-IP-2022-6 **+ADD-SFP-SDI-TO-IP-2110** SFP Software License; Single-Channel Encapsulator SDI-to-IP-2110

Setting Up 9905-MPx Network Remote Control

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

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

Download a copy of this guide by clicking on the **Support>Reference Documents** link at www.cobaltdigital.com and then select DashBoard Remote Control Setup Guide as a download, or contact Cobalt® as listed in Contact Cobalt Digital Inc. (p. 1-20).

• 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.

Chapter 3

Operating Instructions

Overview

If you are already familiar with using DashBoard or a Cobalt Remote Control Panel to control Cobalt cards, please skip to 9905-MPx Function Menu List and Descriptions (p. 3-8).

This chapter contains the following information:

Control and Display Descriptions

This section describes the user interface controls, indicators, and displays for using the 9905-MPx card. The 9905-MPx functions can be accessed and controlled using any of the user interfaces described here.

The format in which the 9905-MPx functional controls, indicators, and displays appear and are used varies depending on the user interface being used. Regardless of the user interface being used, access to the 9905-MPx 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 Overview below).

Note: When a setting is changed, settings displayed on DashBoard™ (or a Remote Control Panel) 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 Overview

The functions and related parameters available on the 9905-MPx card are organized into function **menus**, which consist of parameter groups as shown below.

Figure 3-1 shows how the 9905-MPx card and its menus are organized, and also provides an overview of how navigation is performed between cards, function menus, and parameters.

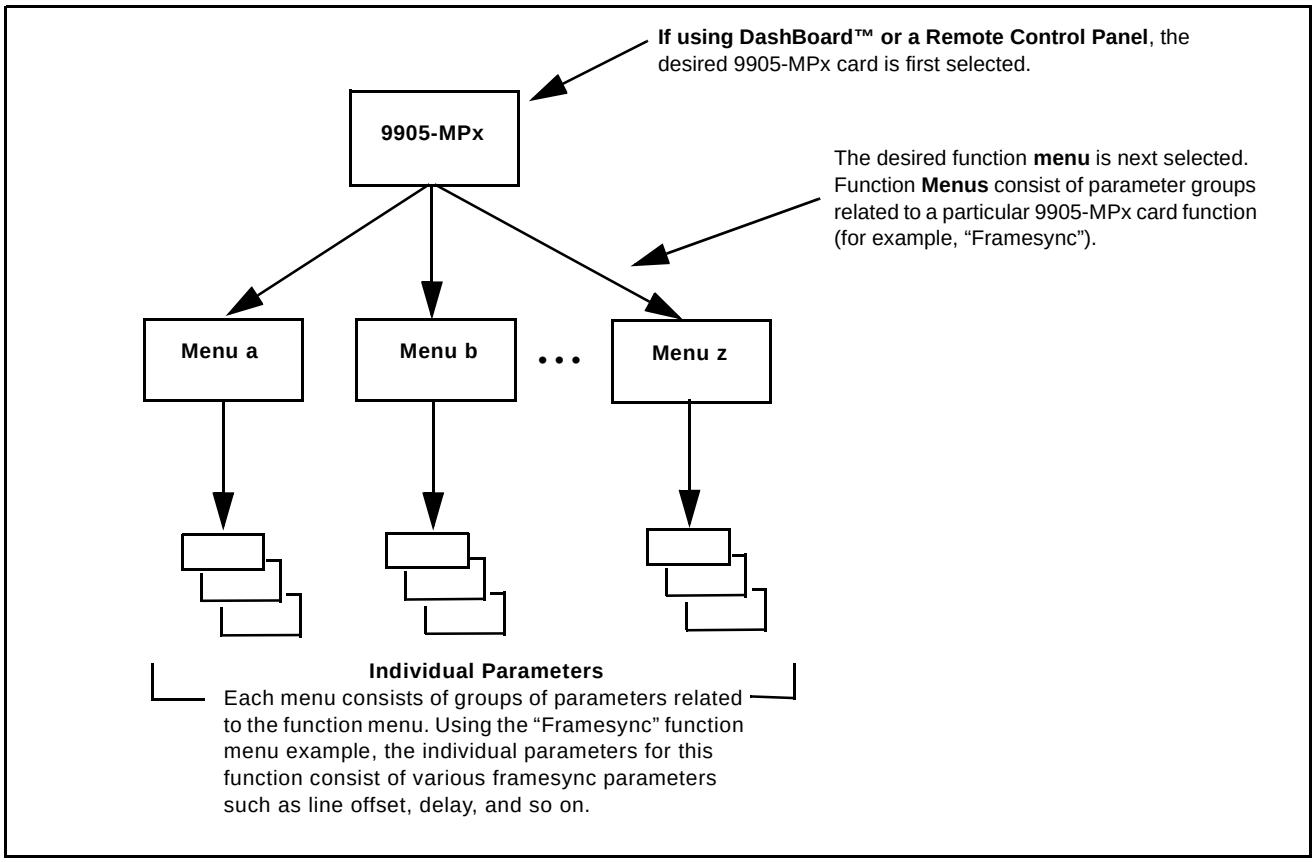


Figure 3-1 Function Menu/Parameter Overview

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.

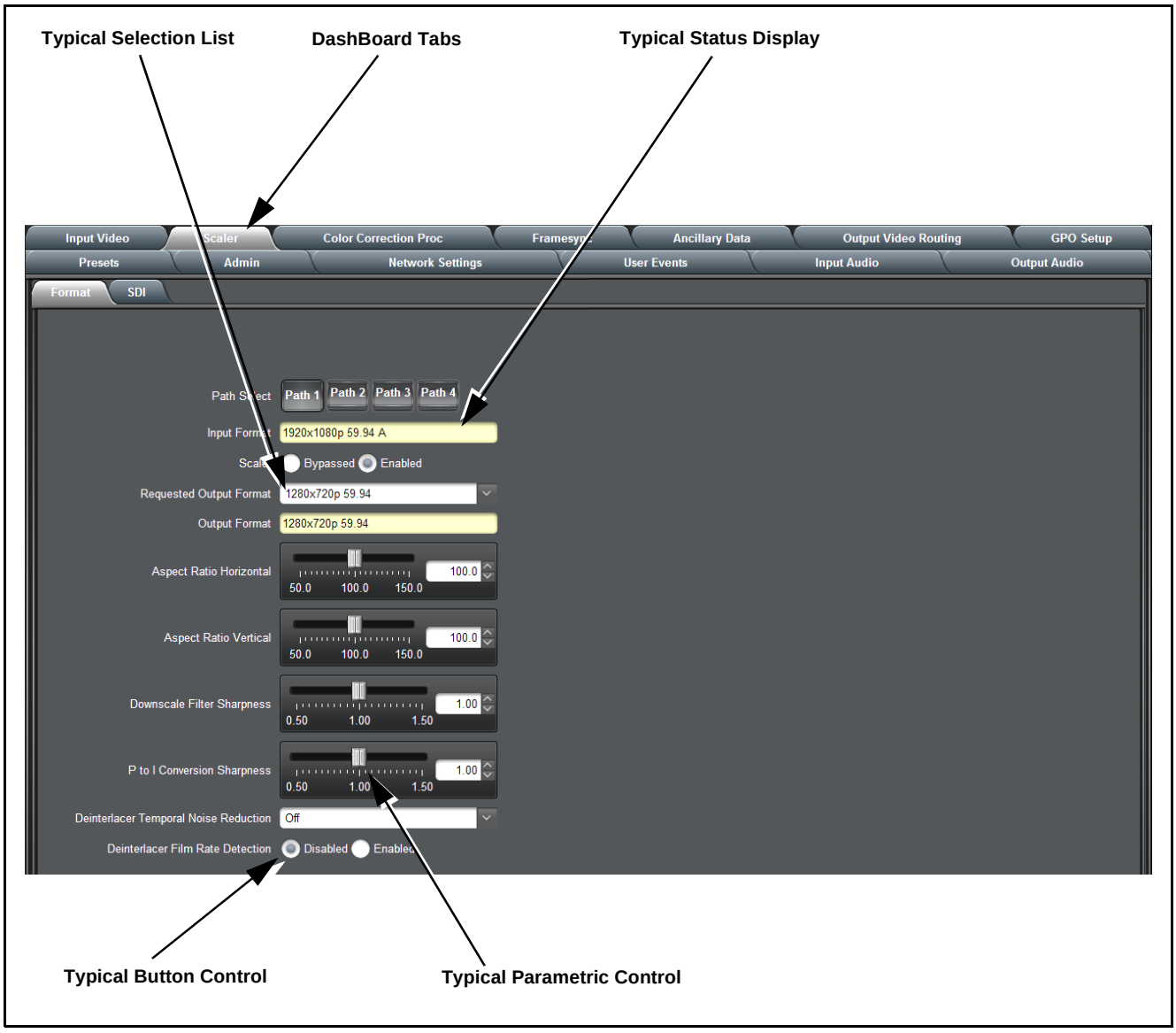


Figure 3-2 Typical DashBoard Tabs and Controls

Cobalt® Remote Control Panel User Interfaces

(See Figure 3-3.) Similar to the function menu tabs using DashBoard™, the Remote Control Panels have a Select Submenu key that is used to display a list of function submenus. From this list, a control knob on the Control Panel is used to select a function from the list of displayed function submenu items.

When the desired function submenu 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 control knobs, which act like a potentiometer. Items in a list can then be selected using the control knobs which correspondingly act like a rotary switch.

Figure 3-3 shows accessing a function submenu and its parameters (in this example, “Video Proc”) using the Control Panel as compared to using the card edge controls.

Note: Refer to “OGCP-9000 Remote Control Panel User Manual” (PN OGCP-9000-OM) or “OGCP-9000/CC Remote Control Panel User Manual” (PN OGCP-9000/CC-OM) for complete instructions on using the Control Panels.

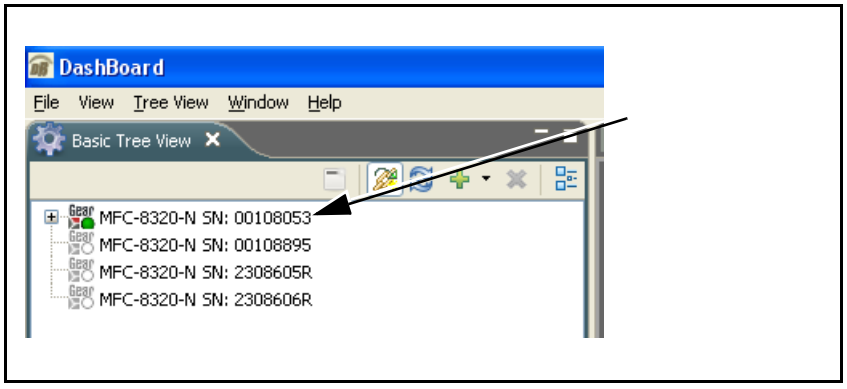
Figure 3-3 Remote Control Panel Setup of Example Video Proc Function Setup

Accessing the 9905-MPx Card via Remote Control

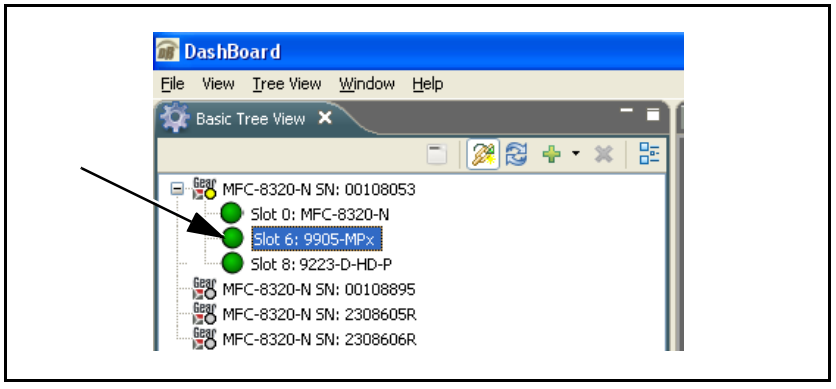
Access the 9905-MPx card using DashBoard™ or Cobalt® Remote Control Panel as described below.

Accessing the 9905-MPx Card Using DashBoard™

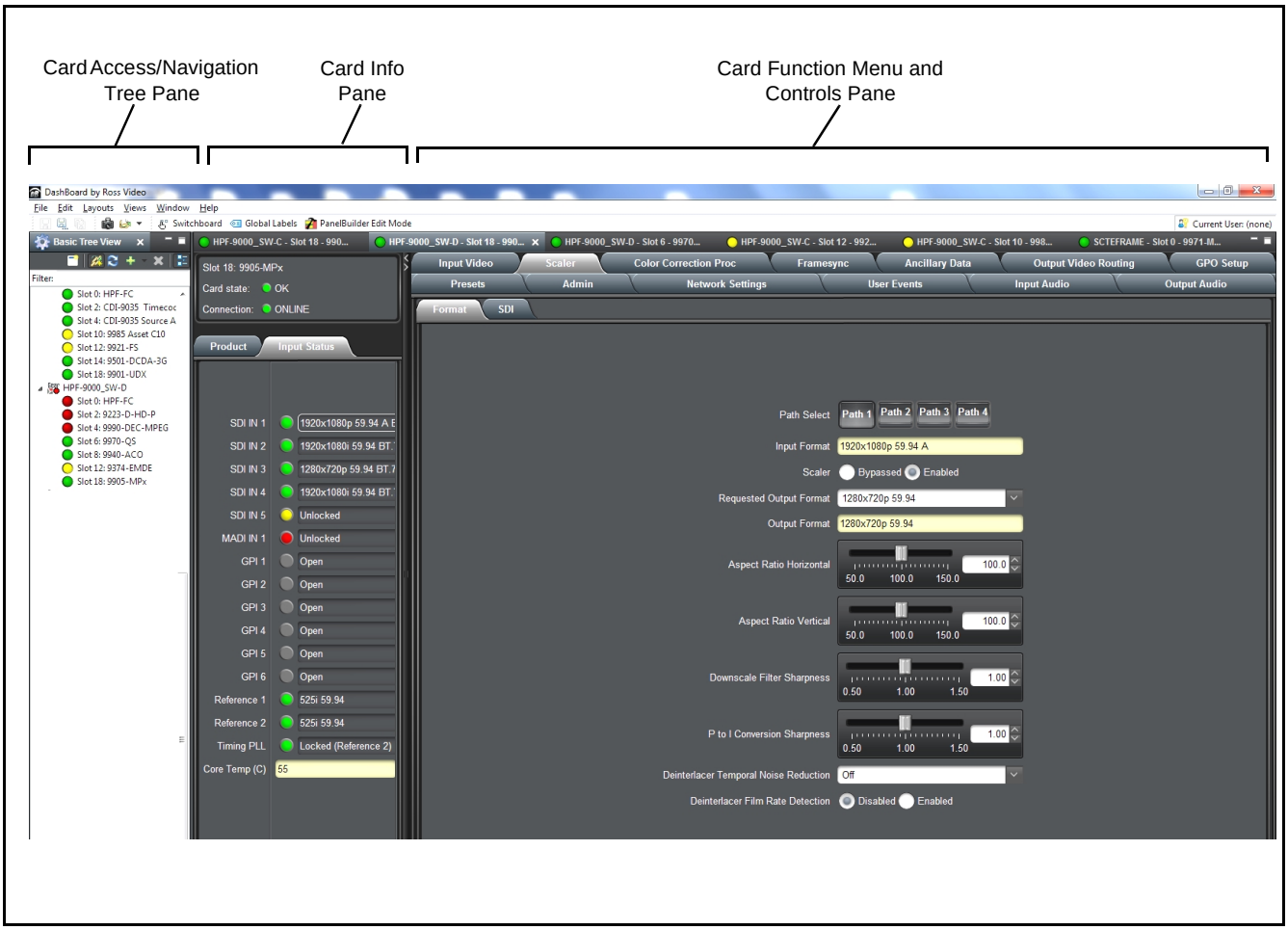
1. On the computer connected to the frame LAN, open DashBoard™.
2. As shown below, in the left side Basic View Tree locate the Network Controller Card associated with the frame containing the 9905-MPx card to be accessed (in this example, "MFC-8320-N SN: 00108053").



3. As shown below, expand the tree to access the cards within the frame. Click on the card to be accessed (in this example, "Slot 6: 9905-MPx").



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™).



Accessing the 9905-MPx Card Using a Cobalt® Remote Control Panel

Press the **Select Device** key and select a card as shown in the example below.

This display shows the list order number of the device that is ready for selection

This display shows the devices assigned to the Control Panel.

- Rotate any knob to select from the list of devices. The device selected using a knob is displayed with a reversed background (in this example, “1 9905 - Receiver 21 Input Processing”).
- Directly enter a device by entering its list number using the numeric keypad, and then pressing **Enter** or pressing in any knob).

Checking 9905-MPx Card Information

The operating status and software version the 9905-MPx card can be checked using DashBoard™ or the card edge control user interface. Figure 3-4 shows and describes the 9905-MPx card information screen using DashBoard™ and accessing card information using the card edge control user interface.

Note: Proper operating status in DashBoard™ is denoted by green icons for the status indicators shown in Figure 3-4. Yellow or red icons respectively indicate an alert or failure condition. Refer to Troubleshooting (p. 3-39) for corrective action.

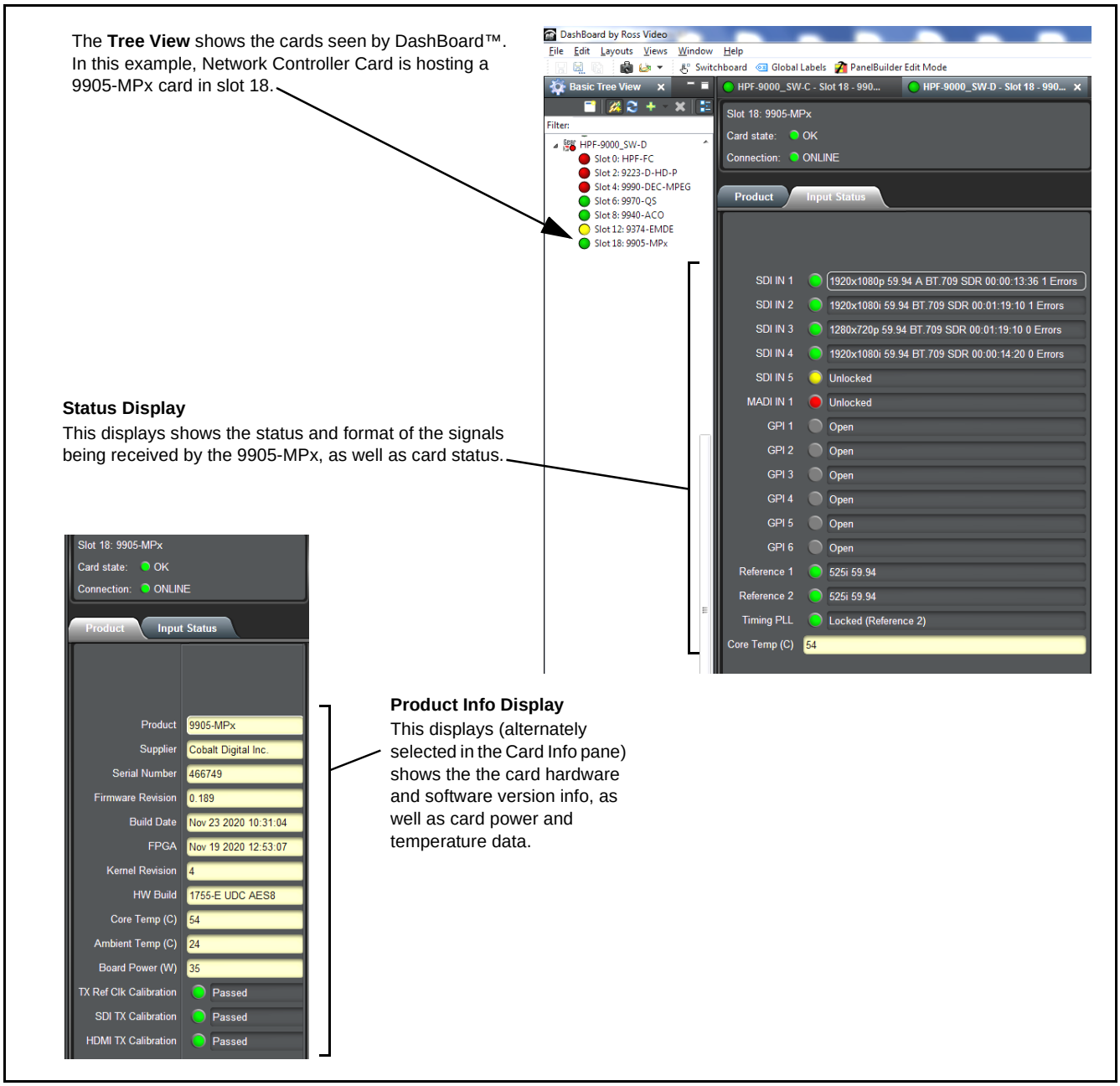


Figure 3-4 9905-MPx Card Info/Status Utility

9905-MPx Function Menu List and Descriptions

Table 3-1 individually lists and describes each 9905-MPx 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: Option For any DashBoard tabs on card not appearing in this manual, this indicates the function is an option and covered in a separate Manual Supplement. Please refer to card web page Product Downloads for pdf Manual Supplements covering these options.

Note: Some tabs and descriptions shown here may be preliminary and not currently representing full functionality.

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

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

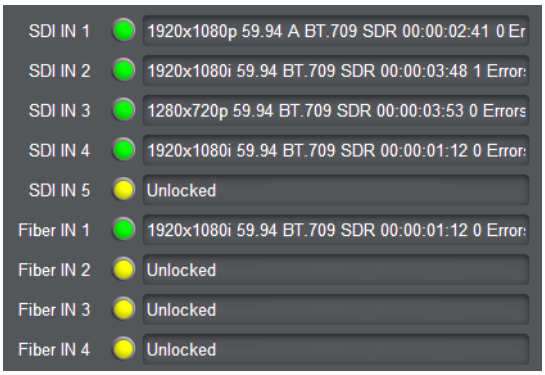
The table below provides a quick-reference to the page numbers where each function menu item can be found.

Table 3-1 9905-MPx Function Menu List

Displays input video status for the up to five SDI card inputs. Provides an input crosspoint for routing up to four inputs to desired Path 1 thru Path 4 processing paths.

• Input Video Status

Displays input status of each video input, along with format where lock is detected.



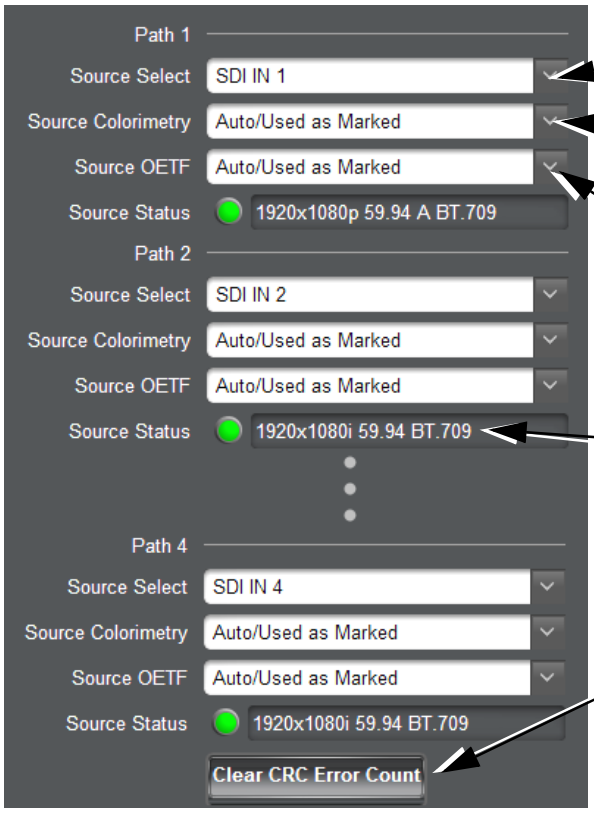
Shows presence/lock of each input, as well as raster, rate, and other info. Also shows a running count of any detected SDI errors.

In this example, **SDI IN 1** thru **SDI IN 4** shows raster/format for detected inputs, with unused input **SDI IN 5** showing **Unlocked**. Where optional fiber inputs are present, these input status displays are also shown. (These status indications are also propagated to the Card Info pane.)

Note: Upon initial acquire/lock of inputs, display here can show an error logged during lock (especially id upstream video was not stable during card acquire/lock).

• Input Video Source Select

Source Select drop-downs for card **Path 1** thru **Path 4** flexibly crosspoint select from five card SDI inputs **SDI IN 1** thru **SDI IN 5** to be applied to the card's 4-path program video inputs. Each **Path 1** thru **Path 4** input destination is equipped with identical, independent controls.



Source Select drop-down routes desired external SDI input **SDI IN 1** thru **SDI IN 5** to respective processing path

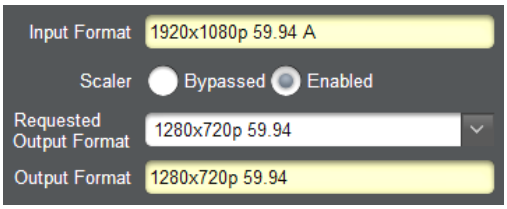
Source Colorimetry drop-down allows using colorimetry marked as is/auto, or marking colorimetry as follows:
• BT.709
• BT.2020

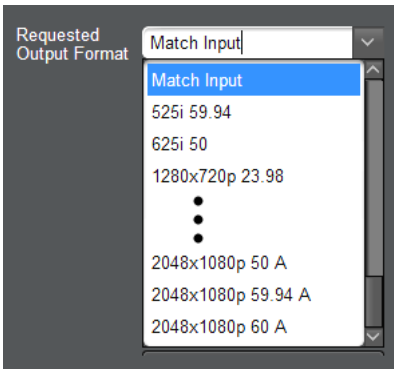
Source OETF drop-down allows using transfer function marked as is/auto, or marking as follows:
• SDR
• PQ/ST 2084
• HLG

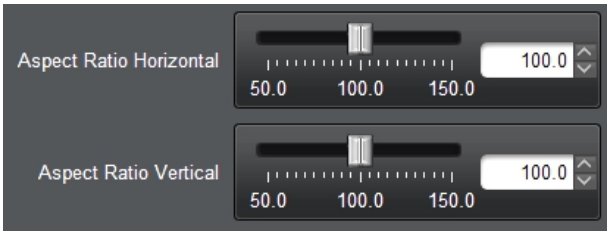
Source Status shows format of selected input video as well as colorimetry standard as it appears in the inputted native video.

Clear CRC Error Count provides a master clear for all four path crosspoint **Input Video Status** displays

Table 3-1 9905-MPx Function Menu List — continued

<table>
<tr>
<td> 
</td>
<td>Allows independent selection of output format (and other scaling details) for each processing path. Also displays current SDI input and output formats.</td>
</tr>
<tr>
<td>• Select Path For Scaler Setup
 
</td>
<td>Activates the Scaler user interface (UI) controls for a desired path. For example, when Path 1 is selected here, the Scaler UI is now active for Path 1. When Path 2 is selected here, now the Scaler UI becomes active for Path 2.
Note: • When settings for a particular path are done (and Path Select is set for another path), the previous path settings are locked in and do not change unless manually touched again.
• All paths use the same UI and have identical independent controls.
• Where Path Select control appears for other functions (such as Framesync, the current path selected also applies/”gangs” for other functions (for example, if Path 1 is selected here, Path 1 UI will also be enabled for Framesync page).</td>
</tr>
<tr>
<td>• Output Video Format Select
 

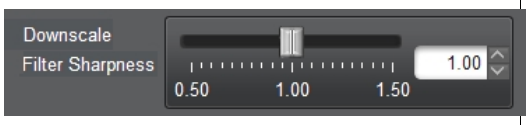
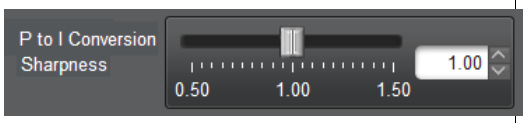
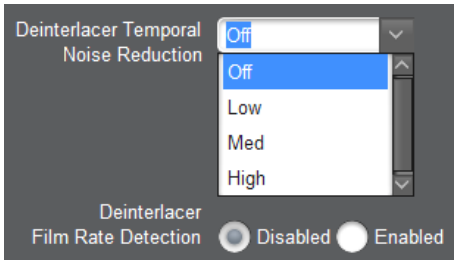
 
</td>
<td>Enables (or bypasses) Scaler for selected Path, and shows current input format and output format. (in example shown, conversion from 1920x1080p to 1280x720p.)

Requested Output Format allows conversions from SD to 2048x1080p. (See Input/Output Formats Supported table on next page for full list of conversion choices available.)
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 acknowledge that frames will be dropped and/or duped when performing such conversions.</td>
</tr>
<tr>
<td>• User-defined Aspect Ratio Controls
 
</td>
<td>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)

For any settings or output format, using the Horizontal or Vertical controls allow manual user custom settings deviating from null (100%) ARC.</td>
</tr>
</table>

Table 3-1 9905-MPx Function Menu List — continued

Scaler	**(continued)**
• Filter Sharpness Control 	Adjusts the aggressiveness of sharpening or filtering applied to output video. Optimum setting results in overall perception of increased sharpness, while avoiding pattern noise artifacts. (Range is 0.50 thru 1.50 in 0.01 steps; null = 1.00) **Note:** Filter Sharpness control only affects downscaled output with scaler enabled.
• P-to-I Conversion Sharpness Control 	Adjusts the aggressiveness of sharpening applied to output video specifically for Progressive to Interlaced conversions. Optimum setting results in overall perception of increased sharpness, while avoiding pattern noise artifacts. (Range is 0.50 thru 1.50 in 0.01 steps; null = 1.00) **Note:** Progressive to Interlaced Sharpness control only affects output set for interlaced formats with scaler enabled.
• Deinterlacer NR / Rate Detection Controls 	• **Deinterlacer Temporal Noise Reduction** provides relative selections of Off, Low, to High. (These settings are subjective and should be evaluated for suitability to specific cases.) • **Deinterlacer Film Rate Detection** provides detection of incoming rates and other aspects to detect the original film rate (and then converted to interlaced via 3-2 pulldown) to optimize processing based on this knowledge.

Input/Output Formats Supported

525i 59.94	1920x1080p 29.97	3840x2160p 50 QL 2SI	4096x2160p 50 QL 2SI
625i 50	1920x1080p 30	3840x2160p 59.94 QL 2SI	4096x2160p 59.94 QL 2SI
		3840x2160p 60 QL 2SI	4096x2160p 60 QL 2SI
1280x720p 23.98	1920x1080psf 23.98		4096x2160p 50 QL SDM
1280x720p 24	1920x1080psf 24	3840x2160p 23.98 QL SDM	4096x2160p 59.94 QL SDM
1280x720p 25	1920x1080psf 25	3840x2160p 24 QL SDM	4096x2160p 60 QL SDM
1280x720p 29.97	1920x1080psf 29.97	3840x2160p 25 QL SDM	
1280x720p 30	1920x1080psf 30	3840x2160p 29.97 QL SDM	4096x2160p 50 12G
1280x720p 50		3840x2160p 30 QL SDM	4096x2160p 59.94 12G
1280x720p 59.94	1920x1080p 50 A	3840x2160p 50 QL SDM	4096x2160p 60 12G
1280x720p 60	1920x1080p 59.94 A	3840x2160p 59.94 QL SDM	
	1920x1080p 60 A	3840x2160p 60 QL SDM	
1920x1080i 50			
1920x1080i 59.94	2048x1080p 23.98	3840x2160p 50 12G	
1920x1080i 60	2048x1080p 24	3840x2160p 59.94 12G	
	2048x1080p 25	3840x2160p 60 12G	
1920x1080p 23.98	2048x1080p 50 A		
1920x1080p 24	2048x1080p 59.94 A		
1920x1080p 25	2048x1080p 60 A		

Table 3-1 9905-MPx Function Menu List — continued

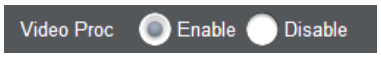
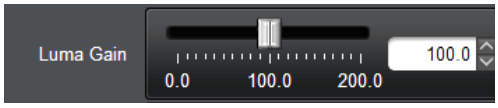
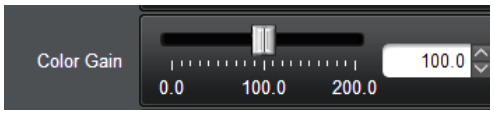
	Provides the following Video Proc and optional Color Correction parametric controls.
• **Select Path For Vid Proc/Correction Setup** 	Activates the Vid Proc/Color Correction user interface (UI) controls for a desired path. For example, when Path 1 is selected here, the Vid Proc/ Color Correction UI is now active for Path 1. When Path 2 is selected here, now the Vid Proc/Color Correction UI becomes active for Path 2. **Note:** • When settings for a particular path are done (and Path Select is set for another path), the previous path settings are locked in and do not change unless manually touched again. • When the **Path Select** is set for a particular path, the **Color Proc** and (optional) **Color Correction** controls are tied to the specified path. • All paths use the same UI and have identical independent controls.
• **Video Proc Enable/Disable** 	**Video Proc (Enable/Disable)** provides enable/disable of **Video Proc** functions. • When set to **Disable**, Video Proc is bypassed. • When set to **Enable**, currently displayed parameter settings take effect.
• **Reset to Unity** 	**Reset to Unity** provides unity reset control of all Video Proc functions. • Click **Yes** to proceed with the unity reset. • Click **No** to reject unity reset.
• **Luma Gain** 	Adjusts gain percentage applied to Luma (Y channel). (0% to 200% range in 0.1% steps; unity = 100%)
• **Luma Lift** 	Adjusts lift applied to Luma (Y-channel). (-100% to 100% range in 0.1% steps; null = 0.0%)
• **Color Gain** 	Adjusts gain percentage (saturation) applied to Chroma (C-channel). (0% to 200% range in 0.1% steps; unity = 100%)
• **Color Phase** 	Adjusts phase angle applied to Chroma. (-360° to 360° range in 0.1° steps; null = 0°)
• **Gang Luma/Color Gain** 	When set to **On**, changing either the **Luma Gain** or **Color Gain** controls increases or decreases both the Luma and Color gain levels by equal amounts.

Table 3-1 9905-MPx Function Menu List — continued

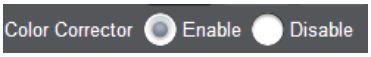
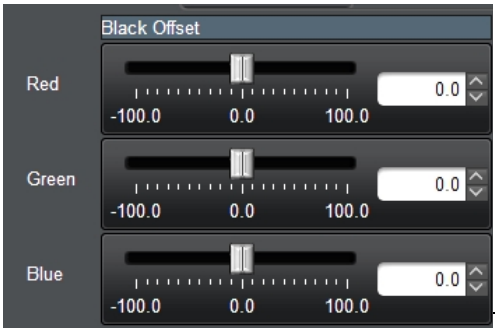
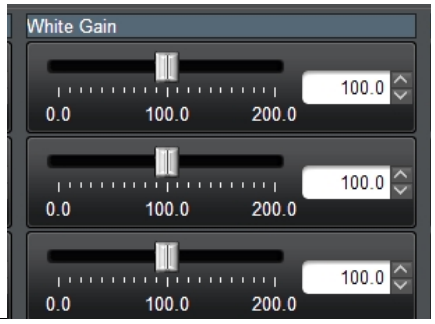
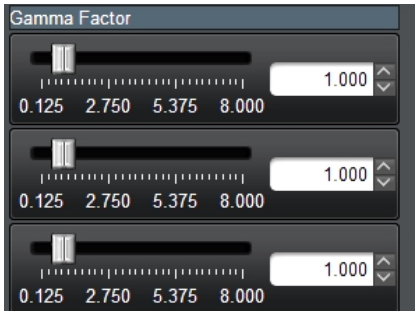
	(Option **+COLOR**) Provides color correction for the individual RGB channels for the each program video path.
• **Color Corrector** 	**Color Corrector (On/Off)** provides master on/off control of all Color Corrector functions. • When set to **Disable**, all processing is bypassed. • When set to **Enable**, currently displayed settings take effect.
• **Reset to Unity** 	**Reset to Unity** provides unity reset control of all Color Corrector functions. • Click **Yes** to proceed with the unity reset. • Click **No** to reject unity reset.
• **Black Offset R-G-B controls**  • **White Gain R-G-B controls**  • **Gamma Factor R-G-B controls** 	Separate red, green, and blue channels controls for Black Offset, White Gain, and Gamma Factor curve adjustment. Gain controls provide gain adjustment from 0.0 to 200.0% range in 0.1% steps (unity = 100.0) Gamma controls apply gamma curve adjustment in 0.125 to 8.000 range in thousandths steps (unity = 1.000) Each of the three control groups (Black Offset, White Gail, and Gamma have a **Gang Column** button which allows settings to be proportionally changed across a control group by changing any of the group's controls.

Table 3-1 9905-MPx Function Menu List — continued

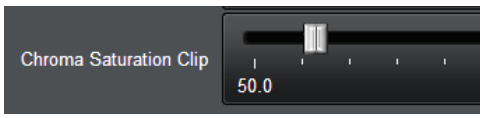
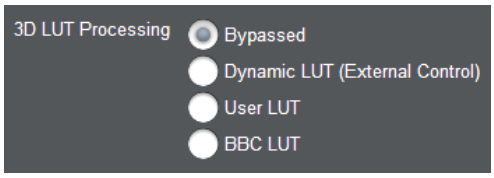
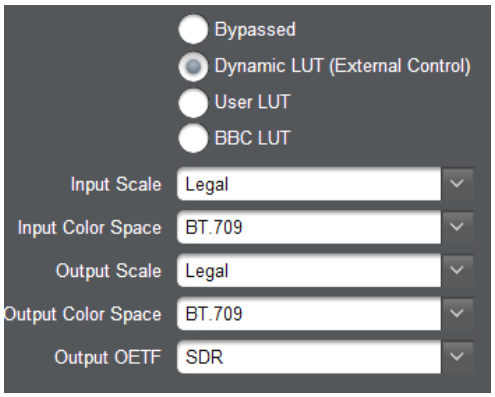
	**(continued)**
• **Black Hard Clip** 	Applies black hard clip (limiting) at specified percentage. (-6.8% to 50.0%; null = -6.8%)
• **White Hard Clip** 	Applies white hard clip (limiting) at specified percentage. (50.0% to 109.1%; null = 109.1%)
• **White Soft Clip** 	Applies white soft clip (limiting) at specified percentage. (50.0% to 109.1%; null = 109.1%)
• **Chroma Saturation Clip** 	Applies chroma saturation clip (limiting) chroma saturation at specified percentage. (50.0% to 160.0%; null = 160.0%)
	Provides 3D Look-Up Table to convert from 10-bit SDR values to values appropriate for HDR downstream devices and displays.
• **Select Path For 3D LUT Setup** 	Activates the user interface (UI) controls for a desired path. For example, when Path 1 is selected here, the UI is now active for Path 1. When Path 2 is selected here, now the UI becomes active for Path 2. **Note:** • When settings for a particular path are done (and Path Select is set for another path), the previous path settings are locked in and do not change unless manually touched again. • All paths use the same UI and have identical independent controls. The Path Select control here is primarily intended to provide flexibility in selecting **3D LUT Processing Type Select** (below) for individual paths (for example, “User LUT” for Path 1, with other paths set to “Bypassed”).
• **3D LUT Processing Type Select** 	Selects 3D LUT functions from the choices shown to the left and described below. • **Bypass –** All LUT processing is disabled and bypassed. • **Dynamic LUT –** LUT is enabled and functions in accordance with upstream LUT settings. • **User LUT –** Offers provision to apply user LUT profiles uploaded to the card. • **BBC LUT –** When licensed, allows select and apply from licensed BBC profile choices.

Table 3-1 9905-MPx Function Menu List — continued

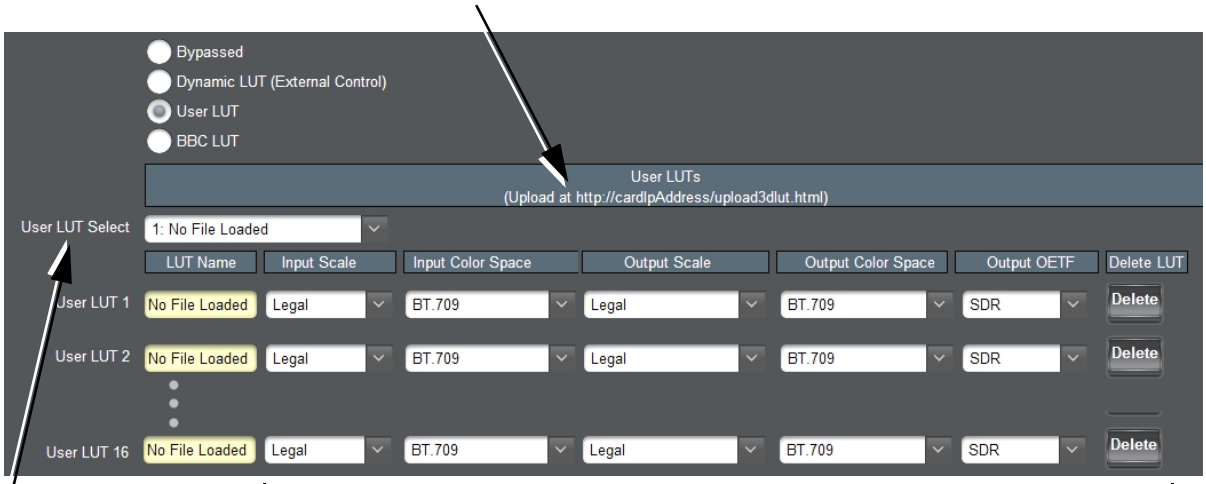
3D LUT	**(continued)**
• **Dynamic (External) LUT Setup** 	Allows 9905-MPx to acquire LUT from an external system/app. The control from the external LUT system is communicated to the 9905-MPx via an IP connection. When the external system's commands are communicated to the 9905-MPx, the commands/instructions are held in 9905-MPx non-volatile local memory (pending any other changes done using the external system). Scale, Color Space and other drop-down controls here set the LUT process for expected/desired input and output video characteristics. **Note:** Card must have unique IP address set up to continue. This is separate and unrelated from the frame address. • If card is hosted by "smart" frame that allows per-slot IP connections, no additional connections are required. • If card is hosted by normal frame, a rear module equipped with an Ethernet port is required, as well as media connection.
• **User LUT Setup**	Allows setup from choices of User LUT files that are uploaded to the card and then selected from and applied here.

User LUTs are uploaded to the card by going to the URL shown in the UI (for "cardIpAddress", substitute the card IP address as set up in Network Settings Controls (p. 3-27)).

Note: Card must have unique IP address set up to continue. This is separate and unrelated from the frame address.

• If card is hosted by "smart" frame that allows per-slot IP connections, no additional connections are required.

• If card is hosted by normal frame, a rear module equipped with an Ethernet port is required, as well as media connection.



When user LUTs upload is finished, **User LUT Select** allows selecting from up to 16 user LUTs, for which parameters are shown and available for changes here in each row corresponding to user LUT.

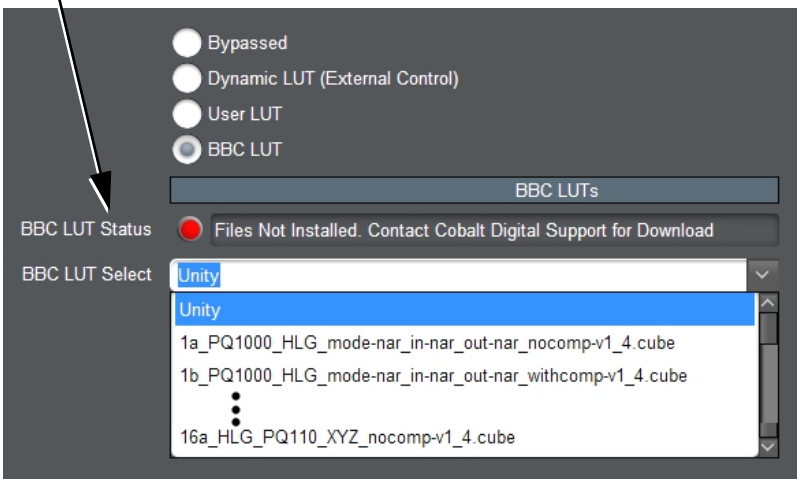
Parameter drop-downs for each LUT row allow Scale, Color Space and other drop-down controls here set the LUT process for expected/desired input and output video characteristics..

Note: User LUT 1 thru 16 customizations here are intended for customizing a LUT profile (regardless of path considerations).

Table 3-1 9905-MPx Function Menu List — continued

3D LUT	**(continued)**
• **BBC LUT Setup** Option	Allows selection from assortment of licensed BBC LUT profiles that are selected from and applied here.

BBC LUT Status shows presence or absence of BBC licensed files on card. (Message shown in this example indicates files are not present and need to be ordered and installed (via a download) to the card.)



When files are present, **BBC LUT Select** allows selecting from BBC LUTs.

BBC is a tradename of British Broadcasting Corporation. Tradename and BBC LUT contents are copyright, BBC.

Table 3-1 9905-MPx Function Menu List — continued

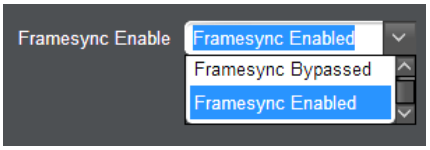
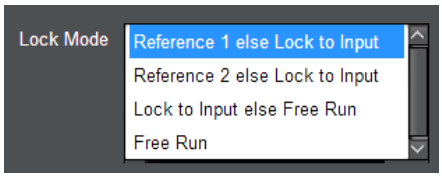
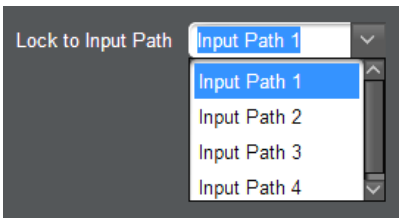
	Provides four-path independent video frame sync/delay offset control and output control/loss of program video failover selection controls.
• Select Path For Frame Sync Setup 	Activates the Frame Sync user interface (UI) controls for a desired path. For example, when Path 1 is selected here, the Frame Sync UI is now active for Path 1. When Path 2 is selected here, now the Frame Sync UI becomes active for Path 2. **Note:** • When settings for a particular path are done (and Path Select is set for another path), the previous path settings are locked in and do not change unless manually touched again. • All paths use the same UI and have identical independent controls.
• Framesync Enable/Disable Control 	Provides master enable/disable of all card framesync functions/controls. If this control is set to Disabled, all upstream sources used must be sychronous with each other (such as upstream ref locked). Asynchronous unlocked paths in this mode may experience complete loss of output video/audio and/or severe video and audio corruption/"hits".
• Lock Mode Select 	Selects Frame Sync functions from the choices shown to the left and described below. • **Lock to Reference:** Output video is locked to selected external reference received on the frame reference bus. (External reference signal Ref 1 / Ref 2 are distributed to the card and other cards via the Ref 1 / Ref 2 buses on the frame.) **Note:** If valid reference is not received, the **Reference 1** and/or **Reference 2** (as applicable) status indication in the Card Info status portion of DashBoard™ will indicate **Unlocked** frame sync reference error. • **Lock to Input:** Uses a selected program video input video signal as the reference standard. **Note:** If **Lock to Input** is used for framesync, any timing instability on the input video will result in corresponding instability on the output video. • **Free Run:** Output video is locked to the card's internal clock. Output video is **not** locked to external reference. If SDI sources on other paths are not locked to the source/path used for lock to input, **Lock To Input** should **not** be used. For asyncrhonous inputs, setting this control to use a frame ref 1 or 2 in common is required (selection made here is ganged for **all** paths). If asynchronous paths are set to lock to input where input is not synced with other inputs, severe video and audio corruption/"hits" can occur.
• Lock to Input Path Select 	Where Lock to Input is selected, selects the input path for which frame sync will lock to (including lock used by other paths).

Table 3-1 9905-MPx Function Menu List — continued

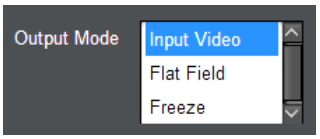
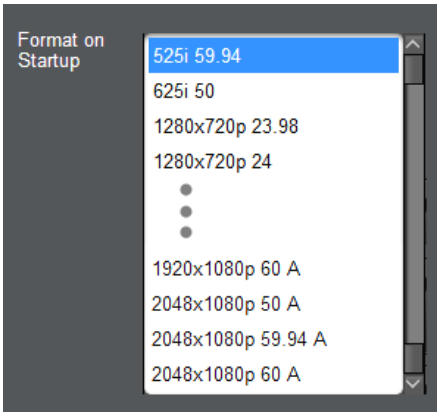
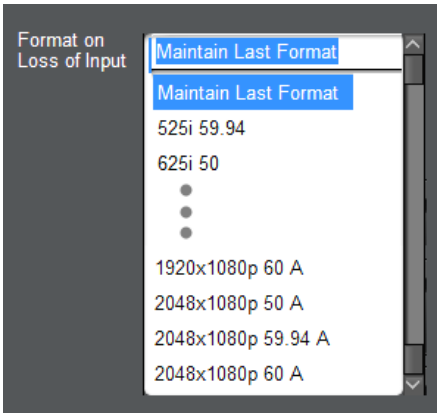
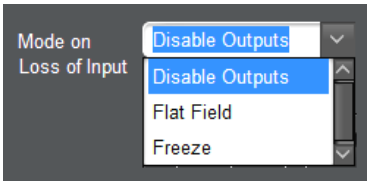
Framesync	(continued)
• **Program Video Output Mode Select** 	Provides a convenient location to select between card program video output and other technical outputs from the choices shown to the left and described below. • **Input Video** – card outputs input program video (or loss of signal choices described below). • **Flat Field** – card outputs flat field. • **Freeze** – card outputs last frame having valid SAV and EAV codes.
• **Format on Startup Select** 	Selects a frame sync format/rate to be invoked in the time preceding stable lock to external reference. Setting this control to that of the intended external reference helps ensure smoothest frame sync locking. This control also sets the card format where the card's initial output at power-up is the internally generated flat field instead of program video.
• **Format on Loss of Input Select** 	Selects a frame sync format/rate to be invoked in case of loss of input video. Set this control to that of the input video (which can be done by setting to Maintain Last Format), or set to other alternate format as desired. This control also sets the card freeze or flat field format in cases of LOS.
• **Loss of Input Signal Mode Select** 	In the event of program input video Loss of Signal (LOS), determines action to be taken as follows: • **Disable Outputs:** Disable program video SDI output. • **Flat Field** – go to flat field on program video output. • **Freeze** – go to last frame having valid SAV and EAV codes on program video output.

Table 3-1 9905-MPx Function Menu List — continued

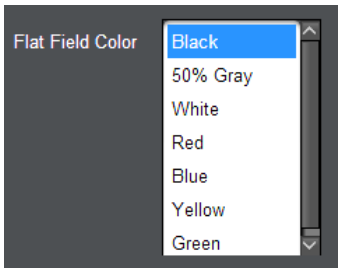
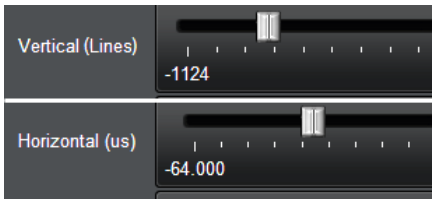
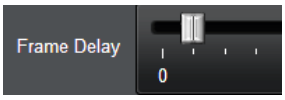
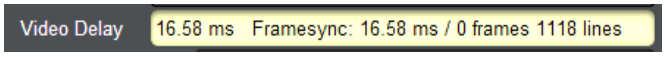
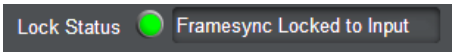
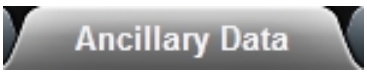
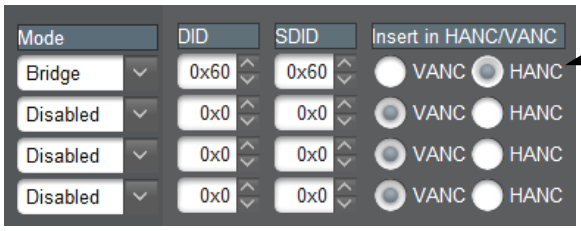
	**(continued)**
• **Flat Field Color Select** 	Provides a choice of flat field colors when **Flat Field** is invoked (either by LOS failover or directly by selecting Flat Field on the Program Video Output Mode Select control).
• **Output Video Reference Offset Controls** 	With framesync enabled, provides the following controls for offsetting the output video from the reference: • **Vertical (Lines)** – sets vertical delay (in number of lines of **output video** between the output video and the frame sync reference. (Positive values provide delay; negative values provide advance) (Range is -1124 thru 1124 lines; null = 0 lines.) • **Horizontal (µs)** – sets horizontal delay (in µs of **output video**) between the output video and the frame sync reference. (Positive values provide delay; negative values provide advance) (Range is -64 thru 64 µsec; null = 0.000 µsec.) **Note:** Offset **advance** is accomplished by hold-off of the reference-directed release of the frame, thereby effectively advancing the program video relative to the reference.
• **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. **The operational latency of the frame sync is always between the specified minimum latency and minimum latency plus one frame (not one field).** **Note:** Due to card memory limits, the maximum available Minimum Latency Frames is related to the output video format selected. When using this control, be sure to check the **Video Delay** display to make certain desired amount of frames are delayed.
• **Video Delay Display** 	Displays the current input-to-output video delay (in msec units) as well as in terms of Frames/fractional frame (in number of lines). Status display shows total input-to-output video delay, along with any framesync delay.
• **Framesync Lock Status Display** 	Displays the current framesync status and reference source. (Depending on Lock Mode selected above, status will indicate valid Lock to Reference, Lock to Input, or in cases where no external lock is present Framesync Free Running.)

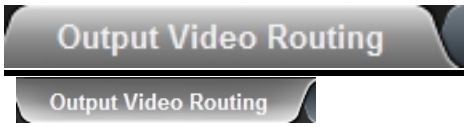
Table 3-1 9905-MPx Function Menu List — continued

<table>
<tr><td> 
</td><td>Provides controls for extracting packetized ANC data for re-insertion following scaling (bridge re-insertion). This allows selected ANC data to be preserved for re-insertion following scaling.</td></tr>
<tr><td>• Select Path For Frame Sync Setup
 
</td><td>Activates the user interface (UI) controls for a desired path. For example, when Path 1 is selected here, the UI is now active for Path 1. When Path 2 is selected here, now the UI becomes active for Path 2.
Note: • When settings for a particular path are done (and Path Select is set for another path), the previous path settings are locked in and do not change unless manually touched again.
• All paths use the same UI and have identical independent controls.</td></tr>
<tr><td colspan="2"> 

In this example, one of the 4x independent ANC bridge extractor/inserters (one 4x bridge per path) is set to extract packets at DID 60_h / SDID 60_h (packetized ATC_VITC timecode in this example). These packets are preserved and re-inserted in the output video SDI VANC or HANC ancillary space as selected (in this example, HANC).
Mode select sets each extraction row to either Bridge (bridge extract/re-insert) or Disabled.

Note: • +ANC option allows IP insertion and extraction of ANC to/from external sources and the 9905-MPx card. The ANC bridge function shown here is standard. .
• ANC packet-based closed captioning ($61_h/1_h$) is not available in SD (which instead uses “waveform”-based closed captioning (CC)). As such, waveform-based CC within SD cannot be processed or passed by the card, nor is it preserved and converted/inserted as packet-based CC for SD-to-HD conversions.</td></tr>
</table>

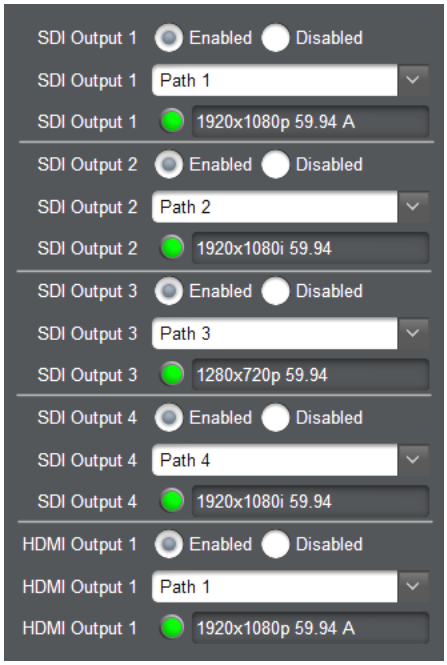
Table 3-1 9905-MPx Function Menu List — continued



Provides crosspoint, status displays, and enable/disable for the four card SDI outputs, HDMI output, and outputs routed to SFP fiber Tx.

- **Output Video Enable / Status/Identification Display**

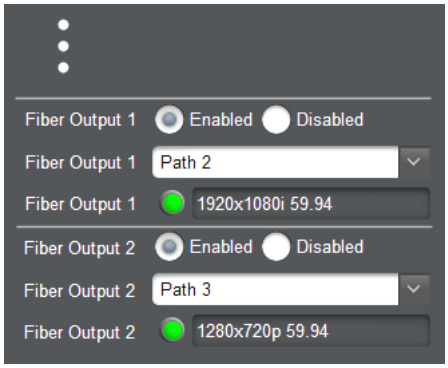
Provides path-to-video output crosspoint and enable/disable for each SDI output, and shows video format and other information for card outputs.



In this example, the card is set to provide **Path 1** thru **Path 4** processed video to SDI OUT 1 thru SDI OUT 4, respectively.

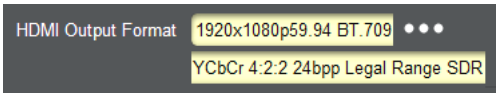
This control also provides a crosspoint which applies a selected processed video output Path to the card HDMI output and a crosspoint which allows Path outputs to be sent to SFP fiber output Tx ports.

Note: ***Option*** Fiber outputs are functional only on card equipped with **-UDX-SFP** or **-UDX-SFP-MSA** hardware option populated with appropriate plug-in SFP module(s). Fiber output controls present only on card licensed for SFP fiber outputs.

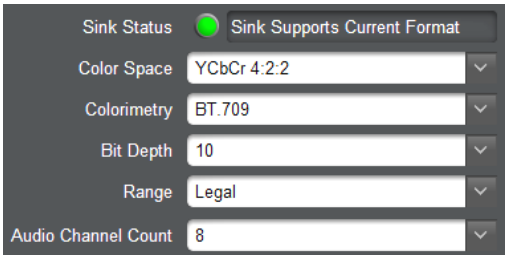


HDMI subtab exposes format controls specifically for the card HDMI output.

- **HDMI Standards Controls**



- **HDMI Output Format** shows the current HDMI output format (as selected using the **Scaler > Requested Output Format** control).



- **Sink Status** shows the downstream device/monitor acceptance or rejection handshake of the HDMI package being sourced to the downstream device.
- **Color Space** sets the color space of the HDMI output
- **Colorimetry** sets the BT HDR colorimetry of the HDMI output
- **Bit Depth** sets the HDMI output of either 10-bit or 8-bit bit depth.
- **Range** selects from full or legal boundaries for the HDMI output color space.
- **Audio Channel Count** selects from 2-channel or 8-channel audio complement.

Table 3-1 9905-MPx Function Menu List — continued

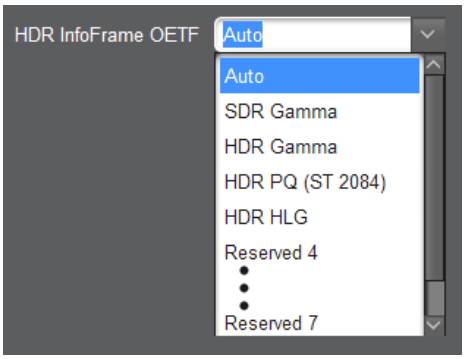
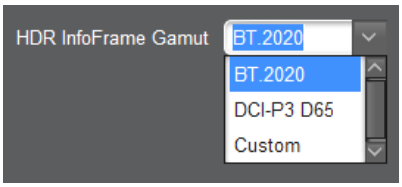
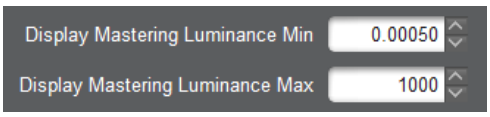
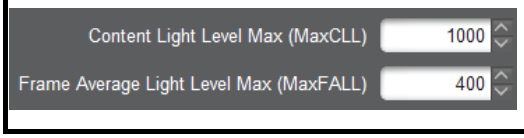
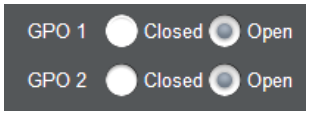
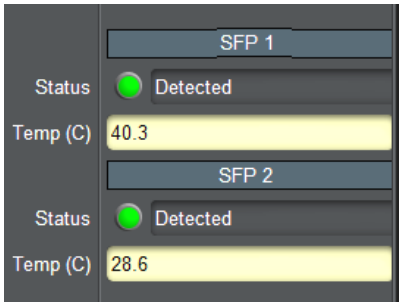
<table>
<tr><td> 
</td><td>(continued)</td></tr>
<tr><td> 
</td><td>• HDR InfoFrame Insertion provides insertion on InfoFrame (Auto-populate, enabled with manual user settings (as performed below), or disabled (remove InfoFrame)).</td></tr>
<tr><td>• HDR InfoFrame OETF Select
 
</td><td>Provides insertion of ANC metadata informing the display device what to “expect” in terms of OETF for the HDMI signal being provided.</td></tr>
<tr><td>• HDR InfoFrame Gamut Select
 
</td><td>Provides insertion of ANC metadata informing the display device what to “expect” in terms of Gamut for the HDMI signal being provided.</td></tr>
<tr><td>• RGB White Point Adjust/Set
 
</td><td>Provides insertion of ANC metadata informing the display device what to “expect” in terms of RGB white points for the HDMI signal being provided.</td></tr>
<tr><td>• Display Mastering Luminance Controls
 
</td><td>Provides insertion of ANC metadata informing the display device what to “expect” in terms of mastering luminance min/max for the HDMI signal being provided.</td></tr>
<tr><td>• Content/Frame Light Level Controls
 
</td><td>Provides insertion of ANC metadata informing the display device what to “expect” in terms of content light level max and frame average light level max for the HDMI signal being provided.</td></tr>
</table>

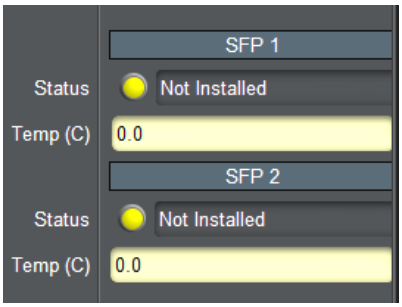
Table 3-1 9905-MPx Function Menu List — continued

<table>
<tr><td> 
</td><td>Provides controls for setting up the two GPO's power-up states as well as forced manual triggering.</td></tr>
<tr><td>• GPO Static Controls
 
</td><td>Power-on State allows the power-up GPO state to be set (initialized) upon power-up</td></tr>
<tr><td> 
</td><td>Provides status info for SFP option and SFP modules installed in user SFP cages.</td></tr>
<tr><td colspan="2">• SFP Status Displays

Status for cages SFP 1 and SFP 2 show presence of SFP option, as well as core temperature reported by installed SFP(s).
Note: Option SFP I/O is functional only on card equipped with -UDX-SFP or -UDX-SFP-MSA hardware option populated with appropriate plug-in SFP module(s).

Where SFP(s) are detected in cage(s), status shows Detected, as well as core temperature reported by installed SFP(s).
Note: SFP(s) installed must utilize I2C interface to report status to the hosting card. Although non-conforming SFPs will be fully functional, these SFPs may report No Communication instead of the expected Detected.

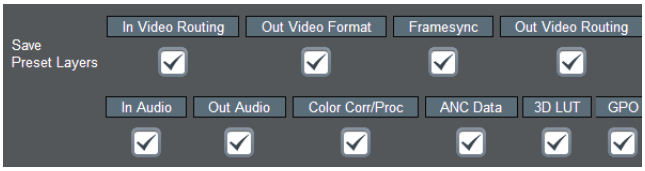
 

In cases where SFP option -UDX-SFP or -UDX-SFP-MSA is not provisioned/installed, status display shows Not Installed.</td></tr>
</table>

Table 3-1 9905-MPx Function Menu List — continued

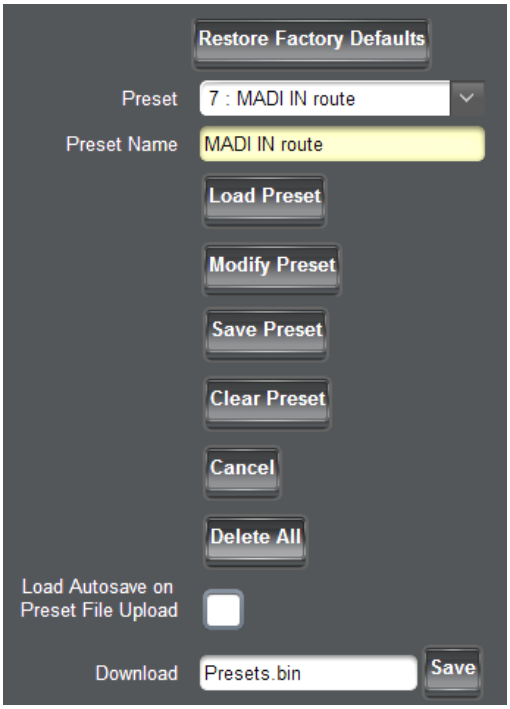
Allows user custom control settings to be saved in a Preset and then loaded (recalled) as desired, and provides a one-button restore of factory default settings.

- **Preset Save / Select / Load Controls**



- **Preset Layer Select** allows selecting a functional layer (or "area of concern") that confines the preset to a layer it 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.

Selecting a layer will set the preset to **only** "look at" and "touch" the selected layer(s) settings and save these settings under the preset. When the preset is invoked (loaded), **only** the layer(s) selected when the preset was saved are "touched".

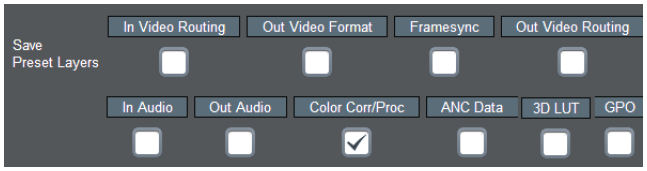


- **Load Preset** button allows loading (recalling) a selected previously saved preset. When this button is pressed, the changes called out in the preset are immediately applied.
- **Clear Preset** button deletes the currently selected preset, rendering the preset back to Empty default.
- **Modify Preset** button activates/opens other buttons such as Save Preset, Clear Preset, and Delete All to allow changes.
- Pressing **Save Preset** saves current states to user-named preset.
- **Restore Factory Defaults** button allows loading (recalling) the factory default preset. When this button is pressed, the changes called out in the factory default preset are immediately applied.
- **Download** saves all individual presets to a .bin file to be downloaded to a connected computer.
- **Delete All** deletes all saved presets within the current user presets list.
- **Load Autosave on Preset File Upload**
  When a Download .bin file is created, all defined presets as well as any current transient ("unwritten") card settings/state in place are also saved within the Presets .bin.
  - Leaving the box **unchecked** will, upon subsequent Presets .bin upload, push the saved presets to the card but will not invoke or write over any transient settings the card may have in place (no settings changes occur unless manually enacted).
  - **Checking** the box will, upon subsequent Presets .bin upload, also invoke any transient settings the card may have had in place during Presets .bin save/download, as well as pushing the saved presets to the card.

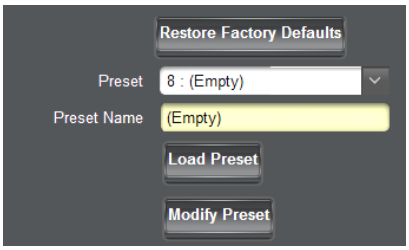
Table 3-1 9905-MPx Function Menu List — continued

Presets	(continued)

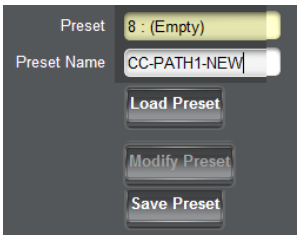
• **Saving Card State to a Preset**



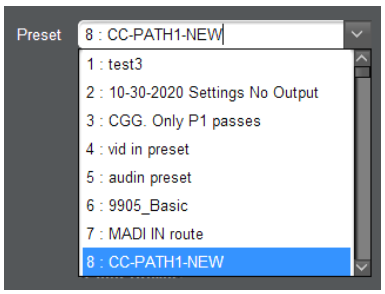
1. (See **Preset Layer Select** on previous page) If preset to be saved is desired to be targeted to a specific function layer, in **Save Preset Layer** uncheck boxes of no concern, and check desired layer boxes where concerned.
(In this example, only Color Correction details are involved in the preset, and any other aspects are desired to be left untouched when this preset is invoked. As such, only the **Color Corr/Proc** box is checked, with all others unchecked.)

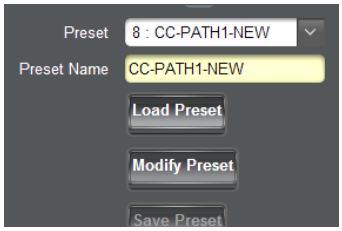


2. In **Preset** drop-down, select an empty preset holder (in this example, “8: Empty).



3. Click **Modify Preset** and enter desired preset name In **Preset Name** field (in this example, “CC-PATH1-NEW”). Click **Save Preset** when done.





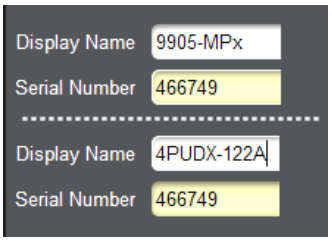
4. Saved preset is now in **Preset** drop-down list. To manually load the saved preset from this page, select the desired saved preset from the list and click **Load Preset**. After confirming with Confirm pop-up, selected preset will be loaded and invoked.

Note: User Events tab/page allows automated preset invoking using GPI states as a trigger. See User Events Setup Controls (p. 3-29) for more information.

Table 3-1 9905-MPx Function Menu List — continued

Shows card display name and serial number. Allows custom card naming in DashBoard.

- **Card DashBoard Name Control**



< Default (Cobalt) name

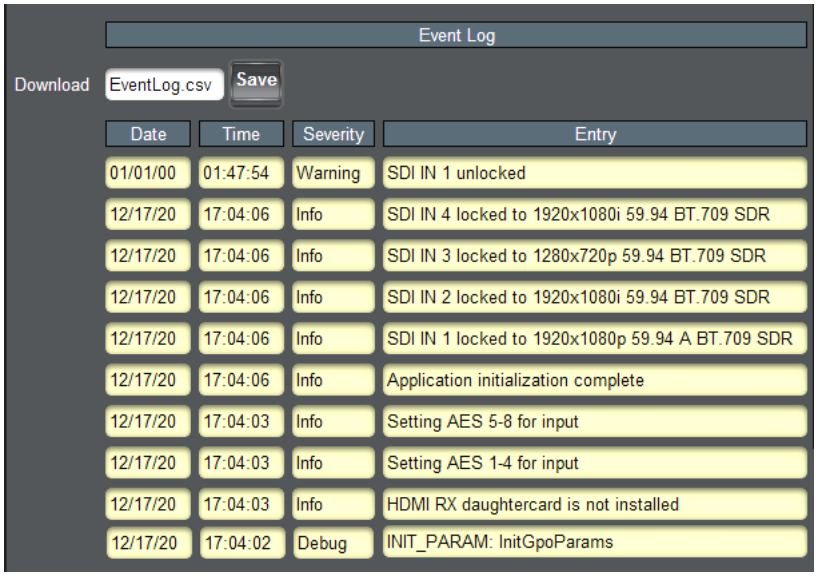
< Example Custom name

Allows card name In DashBoard to be changed as desired (default name is Cobalt SKU name of “9905-MPx”).

To change name:

- Enter desired name in field (name can contain letter, number, and common ASCII characters).
- Press [return] to engage name change. New name then appears in DashBoard for card tab, card Product Info pane, and in frame Basic Tree View.

Displays a chronological categorized event log, and allows event log download as a .csv file.



Event Log shows significant events in chronolgical order (newest at top), along with severity and event summary (Entry). A Download utility allows saving all events and export via a .csv file.

In the example here, most messages are Info level, indicating normal card and upstream actions. In the case of an impactful event (such as upstream LOS/ Unlock), a **Warning** level is issued, indicating an event where program is seriously affected.

Note: • Upon opening the Event Log page, press DashBoard **Refresh** to make certain event log is fully up-to-date and to populate any rows that read “Empty”.

- Only newest 10 events are displayed on page (although older events are written in the Download .csv file).
- Event Download is volatile in terms of card power state. Prior event write is lost if card is powered-down.

Table 3-1 9905-MPx Function Menu List — continued

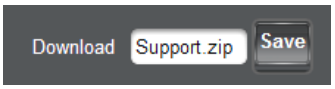
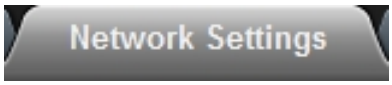
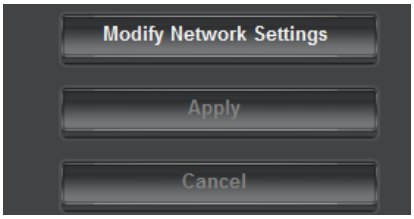
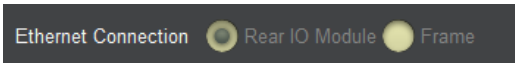
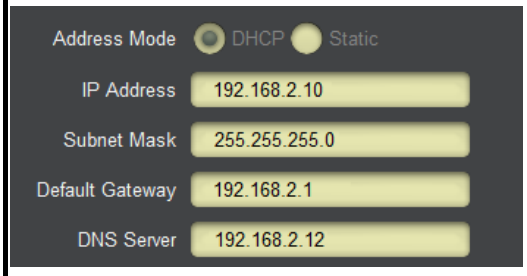
	Provides utility to send engineering card data to Cobalt Support (as a .zip file) to aid in troubleshooting or special use cases needing assistance.
• **Download Support zip Download/Save** 	Allows download/save of .zip file for use by Cobalt engineering/support. **Note:** File can be saved when and if desired with no limitations (card operation is not affected during this process). However, transfer of the file to Cobalt Support should follow normal channels of soliciting Support to receive the file.
	The **Network Settings** tab provides a dedicated Ethernet connection to card control and monitoring via a rear module Ethernet port. (This IP interface is entirely independent and separate from the card's DashBoard frame-based remote control/monitoring interface.)
• **Opening Fields for Editing** 	• **Modify Network Settings** button opens dialog field for setting network parameters. • **Apply** button commits and applies the settings. • **Cancel** button exits dialog with no changes committed.
• **Card IP Physical Port Select Control** 	Allows card dedicated IP interface (as set below) to use frame communications or dedicated rear I/O module Ethernet RJ-45 port. **Note:** • Frame net connection allows cards with per-card Ethernet connection to connect with network via a shared frame Ethernet port instead of per-card dedicated Ethernet connectors on the card's rear module. Frame net connection is available only on certain frame models. • Card slot must be fitted with a rear I/O module equipped with an Ethernet connector in order to use **Rear I/O** selection.
• **Card IP Setup Controls** 	Provides controls for setting up card dedicated IP interface. • **Addressing Mode** selsects either DHCP or static. • Where **Static** is selected, standard IP fields allow entry of Address, Subnet Mask, and Default Gateway. • Where **DHCP** is selected, DNS Server address field is provided.

Table 3-1 9905-MPx Function Menu List — continued

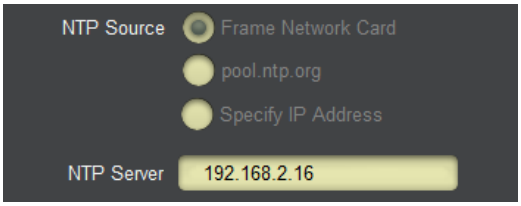
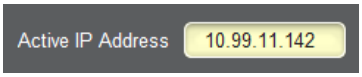
	**(continued)**
• **NTP Clock Setup** 	Allows device NTP clock IP source and localization. This is the clock/time device will use for logs and other recorded actions. • **NTP Source** buttons allow selecting the network source that will provide NTP time. • **NTP Server** sets the IP address where NTP is to be obtained when “Specify IP Address” is checked.
• **Card Active IP Address Display** 	Shows the connected (active) IP address the card is using (as set up using the controls described above).

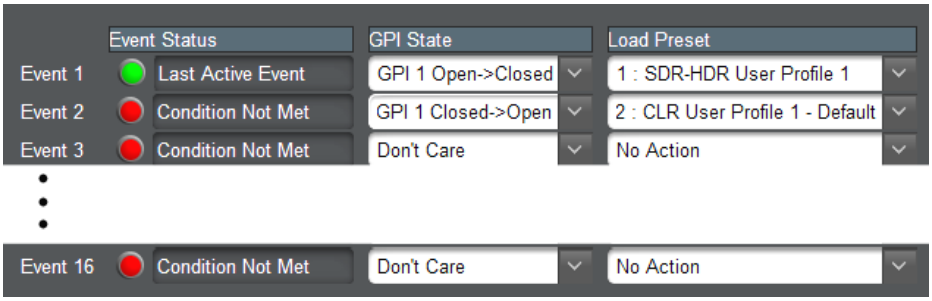
Table 3-1 9905-MPx Function Menu List — continued

User Events	Provides GPI-triggered (Event) loading of user presets. Any combination of card settings can be nested within a preset. The preset can be automatically engaged when a defined GPI condition occurs.

- GPI-based preset loading is not passive and can result in very significant and unexpected card control and signal processing changes if not properly used. If user event presets are not to be used, make certain controls described here are not set to invoke a preset.
- Because preset loading can apply card control changes by invoking presets, loading conditions cannot be nested within a called preset (GPI-invoked loading settings performed here cannot be saved to presets, although the settings are persistent across power cycles).

A GPI Event trigger (GPI State) provides a trigger to invoke a card preset (Load Preset).

- Event 1 thru Event 16 are arranged with Event 1 having the highest priority, descending down to Event 16. Where multiple event screening is enabled, lower-priority events are serviced first, with the highest-priority event being the final event serviced and last action taken. This helps ensure that a lower-priority event does not mask detection of higher-priority event(s).
- The **Status** indicator and message shows the activation status of each Event. Green indicator means event is currently engaged.
- Up to six GPI inputs (GPI 1 thru GPI 6) can be used and monitored. Engage action for each independent GPI is edge triggering (open>closed or closed>open). Logic combinations using multiple GPIs for a given preset load (Event 1-Event 16) are not supported.



In the example above, a GPI 1 open>closed trigger will invoke selected user preset 1 (in this case, “1: SDR-HDR User Profile 1”). Also in this example, a GPI 1 closed>open trigger will be used to exit the previously invoked preset and go to a new preset (in this case, “2: CLR User Profile 1 - Default”).

Note:
- For an event to show Active Event (green indicator), a Load Preset must already be selected and present in the drop-down. Events, even if true, will not be acknowledged unless a go-to event (selection other than No Action) is selected for the corresponding row.
- Invoking of a preset via GPI is triggered upon start of event. Any event-based setup must be done in advance of the triggering event in order for event to be detected.
- Loss of true conditions does not disengage an event-based triggering. Another GPI trigger must be tied to another preset and then occur to transition from one triggered preset to another.
- Time required to engage a triggered preset depends upon complexity of the called preset. (For example, a preset that invokes a video change will take longer to engage than a preset involving only an audio routing change.)
- Make certain all definable event conditions that the card might be expected to “see” are defined in any of the Event 1 thru Event 16 rows. This makes certain that the card will always have a defined “go-to” action if a particular setup action is again needed.

Table 3-1 9905-MPx Function Menu List — continued

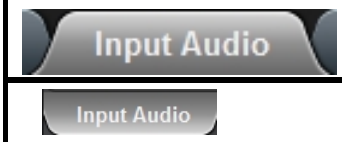
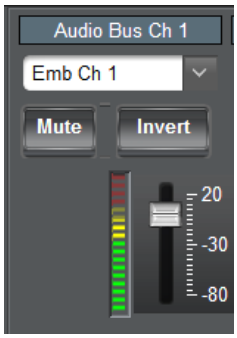
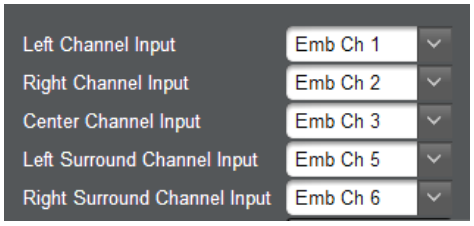
<table>
<tr><td> 
</td><td>Provides audio routing and per-channel/bulk audio delay controls, and audio meters. These controls route selected audio sources onto the card 16-channel internal bus (which is used for all audio processing). Also provides a Downmixer and Flex Mixer which can be applied to program audio.</td></tr>
<tr><td colspan="2">Note: • Embedded Ch 2 thru Embedded Ch 16 have controls identical to the Source 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.</td></tr>
<tr><td>• Select Path For Input Audio Setup
 
</td><td>Activates the user interface (UI) controls for a desired path. For example, when Path 1 is selected here, the UI is now active for Path 1. When Path 2 is selected here, now the UI becomes active for Path 2.
Note: • When settings for a particular path are done (and Path Select is set for another path), the previous path settings are locked in and do not change unless manually touched again.
• All paths use the same UI and have identical independent controls.</td></tr>
<tr><td>• Embedded Channel Source Select
 
</td><td>Provides Mute and phase Invert channel controls, as well as gain and peak level meter for each channel. Using the drop-down list, selects the audio input source to be embedded in the corresponding Audio Bus channel from the following choices:
• Embedded Ch 1 thru Ch 16
• Downmixer L (input downmixer)
• Downmixer R (input downmixer)
• Flex Bus A thru P mixer sum node outputs (input flex mix)
• Silence</td></tr>
<tr><td> 
</td><td>Provides audio down-mix audio routing selections that multiplexes any five audio channel sources into a stereo pair.</td></tr>
<tr><td>• Downmixer Source Controls
 
</td><td>Left Channel Input thru Right Surround Channel Input select the five source channels to be used for the downmix.
Downmix channels Downmixer L and Downmixer R are available as sources for embedded audio channels using the Channel Source controls described above.</td></tr>
</table>

Table 3-1 9905-MPx Function Menu List — continued

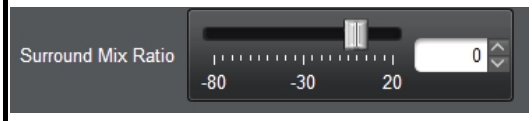
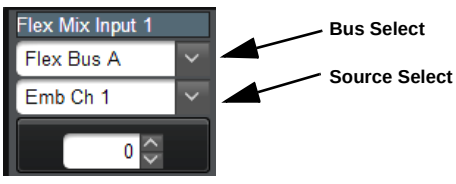
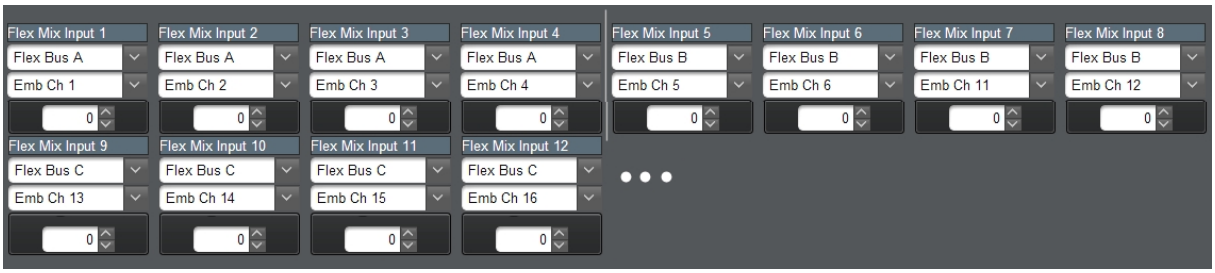
	**(continued)**
• **Center Mix Ratio Control** 	Adjusts the attenuation ratio of center-channel content from 5-channel source that is re-applied as Lt and Rt content to the DM-L and DM-R stereo mix. • 0 dB setting applies no ratiometric reduction. Center channel content is restored as in-phase center-channel content with no attenuation, making center-channel content more predominate in the overall mix. • Maximum attenuation setting (-80 dB) applies a -80 dB ratiometric reduction of center-channel content. Center-channel content is restored as in-phase center-channel content at a -80 dB ratio relative to overall level, making center-channel content less predominate in the overall mix. (20 dB to -80 dB range in 0 dB steps; Default = 0 dB) **Note:** Default setting is recommended to maintain center-channel predominance in downmix representative to that of the original source 5-channel mix.
• **Surround Mix Ratio Control** 	Adjusts the attenuation ratio of surround-channel content from 5-channel source that is re-applied as Lo and Ro content to the DM-L and DM-R stereo mix. • 0 dB setting applies no ratiometric reduction. Surround-channel content is restored with no attenuation, making Lo and Ro content more predominate in the overall mix. • Maximum attenuation setting (-80 dB) applies a -80 dB ratiometric reduction of surround-channel content. Surround-channel content is restored at a -80 dB ratio relative to overall level, making surround-channel content less predominate in the overall mix. (20 dB to -80 dB range in 0 dB steps; Default = 0 dB) **Note:** Default setting is recommended to maintain surround-channel predominance in downmix representative to that of the original source 5-channel mix.
	**Flex Mixer** – Provides a 16-channel mixer in which each of the inputs can be mixed onto up to 16 independent output summing nodes. The input sources are the flex mix input channels. Each input channel has independent gain and mute controls.
Note: For each Flex Mix input channel, its source should be considered and appropriately set. Unused input channels should be set to the **Silence** selection.	
• **Flex Bus Input Channel Source/Bus Assignment — Gain** 	**Bus Select** drop-down select the flex bus (**A** thru **P**) to which the source will be applied. **Source Select** drop-down selects a source channel to be applied to the selected bus from the choices listed below. • **Embedded Ch 1** thru **Ch 16** • **Silence** Also provides relative gain (in dB) control (-80 to +20 dB range in 0.1 dB steps; unity = 0.0 dB)

Table 3-1 9905-MPx Function Menu List — continued

Input Audio Flex Mixer	**(continued)**



In this example – three, 4-input mono mixers are provided by selecting **Flex Mixer Bus A** for the Flex Mix 1 thru Flex Mix 4 inputs, and **Flex Mixer Bus B** for the next four inputs, and so on as shown.

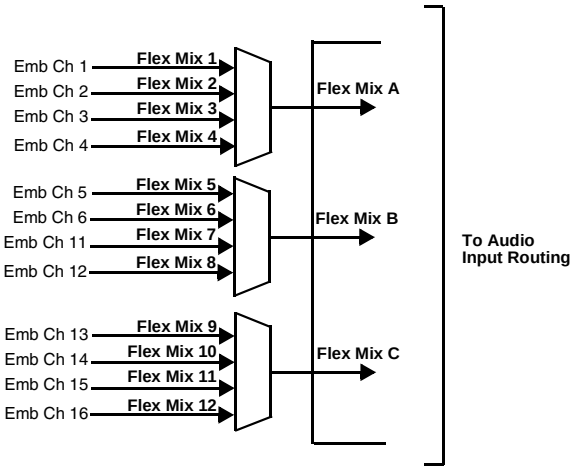
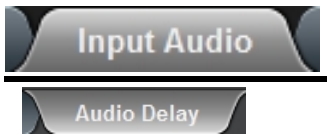


Table 3-1 9905-MPx Function Menu List — continued



Audio Delay – Provides bulk (all four groups/master) and individual card audio bus channel delay offset controls and delay parametric displays.

• Bulk (Master) Audio/Video Delay Control

Bulk Delay control adds bulk (all four groups) audio delay from any video delay (net audio delay offset setting adds delay in addition to any delay included by other actions). This control is useful for correcting lip sync problems when video and audio paths in the chain experience differing overall delays. (-33 to +3000 msec range in 0.01-msec steps; null = 0 msec).

Large rapid changes in bulk delay (> 500 msec) can result in momentary full-scale noise burst on output processed audio. This burst can damage monitors or other equipment if not considered. Gain on output should be temporarily reduced if performing large adjustments to delay.

• Per-Channel Audio/Video Delay Offset Controls

Offset control adds or reduces (offsets) channel audio delay from the matching video delay (audio delay offset setting adds or removes delay in addition to any delay included by other actions). This control is useful for correcting lip sync problems when video and audio paths in the chain experience differing overall delays.

(-800.0 to +800.0 msec range in 0.02 msec steps; null = 0.0 msec)

Delay Status shows current absolute delay from video for the corresponding audio channel.

Note: • Maximum advance/delay offset is dependent on video format.
- Where a Dolby pair is present, adjustment of either channel control results automatically in a matching delay setting for the other channel in the pair.
- Audio delay function is available only for audio processed by the Input Audio Processing block. External audio embedding (AES, MADI) is processed by the Output Audio Processing block (which does offer user audio delay offset). However, audio embedded from external sources can typically be matched with video, if necessary, by using the Frame Sync video delay features.

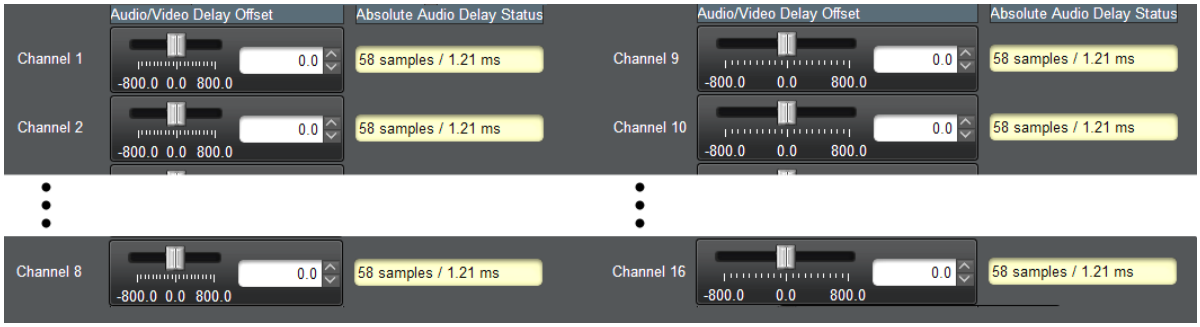
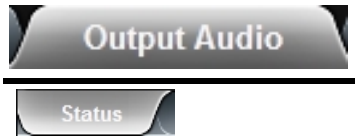
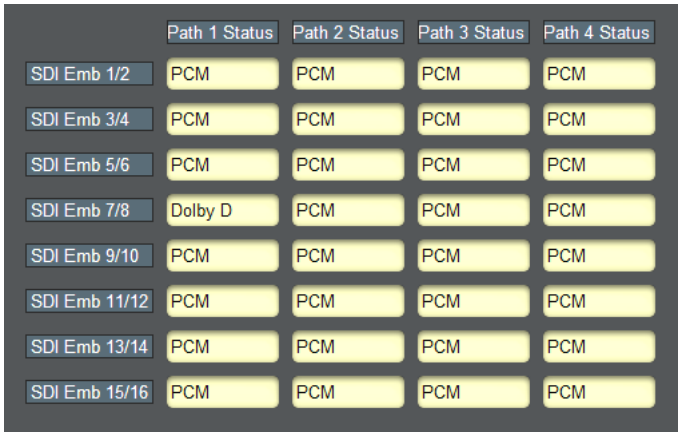


Table 3-1 9905-MPx Function Menu List — continued



Provides an audio crosspoint allowing the audio source selection for each embedded audio output channel. Also provides an output node Downmixer and Flex Mixer which can be applied to output program audio.

Status display shows content type for each embedded output channel for all 4 paths.

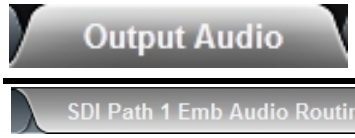


- **Status**

For each SDI embedded output pair, shows content presence and type.

- **PCM** indicates recognized PCM present.
- **Dolby D** or **Dolby E** indicates Dolby non-PCM content is present.
- **Non-PCM** indicates non-PCM content.
- **Unlocked** indicates no lock/content detected (as in cases where upstream device has removed or not embedded any audio on the pair/group).

Note: If Frame Sync is set to provide Freeze or Flat Field upon input LOS, upon pair unlock, pairs here will indicate PCM, since PCM silence audio will be inserted when frame sync inserts a card-generated raster (such as cases of input LOS).



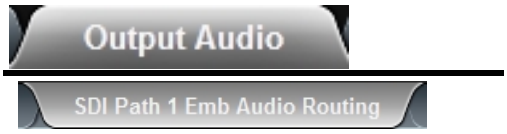
Provides an audio crosspoint allowing the audio source selection for each embedded audio output channel. Also provides an output node Downmixer and Flex Mixer which can be applied to output program audio.

Note:
- **Path 2** thru **Path 4 – Embedded Ch 2** thru **Embedded Ch 16** have controls identical to those described here for **Path 1 – Embedded Ch 1**. Therefore, only the **Path 1 – 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.
- Downmixer and Flex Bus choices shown in UI here are **Output Audio** downmixer and flex mix functions. These are separate from downmixer and flex mix functions found in Input Audio function.
- AES channel count depends on card hardware rev.
  -Rev -E or later cards show **AES Ch 1** thru **AES Ch 16** where AES channels are shown and available on UI.
  -Cards of lower rev show **AES Ch 1** thru **AES Ch 8** where AES channels are shown and available on UI.

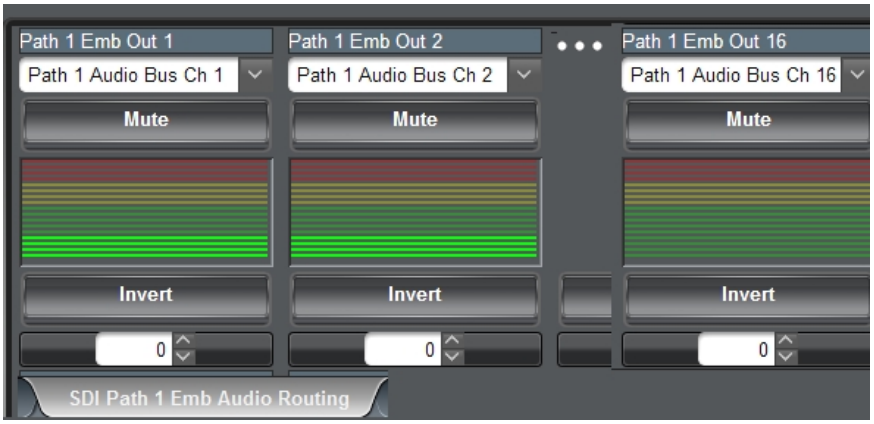
SDI Embedded Output Group Enable/Disable

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.

Table 3-1 9905-MPx Function Menu List — continued



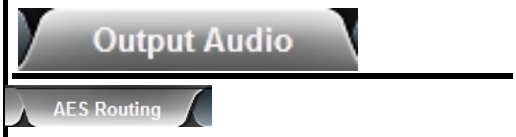
(continued)

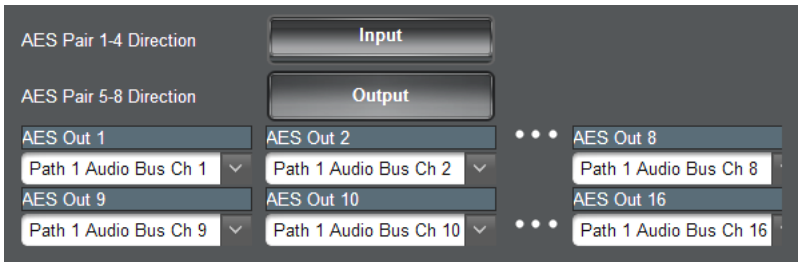


SDI Embedded Output Channel Source

Provides Gain, Phase Invert, and Muting controls and peak level meters for each embedded output channel. Using the drop-down list, selects the card audio bus source to be embedded in the corresponding embedded output channel from the following choices:

- Card **Path 1** thru **Path 4 Audio Bus Ch 1** thru **Ch 16**
- **AES Ch1** thru **Ch*n***
- **MADI Rx** 1 thru **Rx 64**
- **Downmixer L** and **R** (output downmixer)
- **Flex Bus** (summing node) **A** thru **P** (output flex mix)





AES Channel Source/Direction Controls

Sets pair groups of AES to function as AES input or AES output.

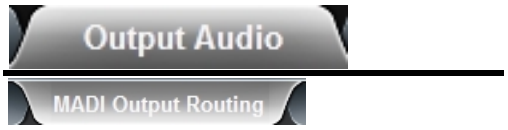
Using the drop-down list, for AES groups set as **Output** selects the source to be routed to the corresponding AES output channel from the following choices:

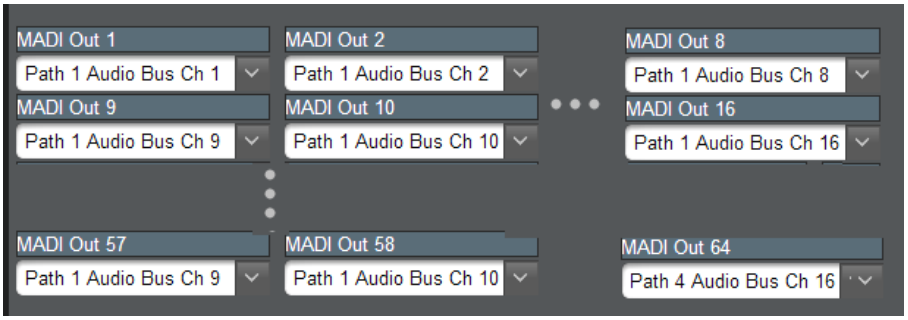
- Card **Path 1** thru **Path 4 Audio Bus Ch 1** thru **Ch 16**
- **AES Ch1** thru **Ch*n***
- **MADI Rx** 1 thru **Rx 64**
- **Downmixer L** and **R** (output downmixer)
- **Flex Bus** (summing node) **A** thru **P** (output flex mix)
- **Silence**

Note: • The **Input / Output** button sets **four pairs of AES ports** (pairs of 8 channels) as **all outputs** (de-embed selected card Audio Bus Channels to desired AES outputs), or sets **four pairs of AES ports** (8 channels) as **all inputs** (embed desired AES port(s) to selected card Audio Bus Channels). (Card hardware versions earlier than -E show controls only for pairs 1 thru 8.)

• The AES inputs are not equipped with SRC or other tools for handling async AES. AES inputs must be synchronous with video to avoid async clicks or pops.

Table 3-1 9905-MPx Function Menu List — continued

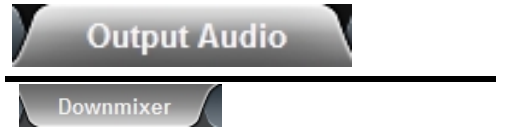




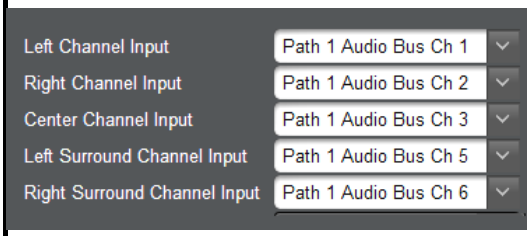
MADI Out Source Controls

Using the drop-down list, selects the card audio bus source to be embedded in the corresponding MADI output channel from the following choices:

- Card **Path 1** thru **Path 4 Audio Bus Ch 1** thru **Ch 16**
- **AES Ch1** thru **Ch*n***
- **MADI Rx** 1 thru **Rx 64**
- **Downmixer L** and **R** (output downmix)
- **Flex Bus** (summing node) **A** thru **P** (output flex mix)
- **Silence**



- **Downmixer Source Controls**



Left Channel Input thru **Right Surround Channel Input** select the five source channels to be used for the downmix from the following choices:

- Card **Path 1** thru **Path 4 Audio Bus Ch 1** thru **Ch 16**
- **AES Ch1** thru **Ch*n***
- **MADI Rx** 1 thru **Rx 64**
- **Silence**

Downmix channels **Downmixer L** and **Downmixer R** are available as sources for output audio channels using the Channel Source controls described above.

- **Center Mix Ratio Control**

Adjusts the attenuation ratio of center-channel content from 5-channel source that is re-applied as Lt and Rt content to the DM-L and DM-R stereo mix.

- 0 dB setting applies no ratiometric reduction. Center channel content is restored as in-phase center-channel content with no attenuation, making center-channel content more predominate in the overall mix.
- Maximum attenuation setting (-80 dB) applies a -80 dB ratiometric reduction of center-channel content. Center-channel content is restored as in-phase center-channel content at a -80 dB ratio relative to overall level, making center-channel content less predominate in the overall mix.

(20 dB to -80 dB range in 0 dB steps; Default = 0 dB)

Note: Default setting is recommended to maintain center-channel predominance in downmix representative to that of the original source 5-channel mix.

Table 3-1 9905-MPx Function Menu List — continued

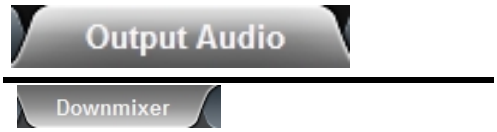
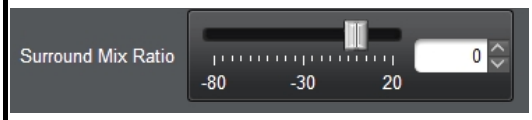
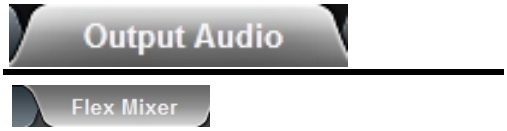
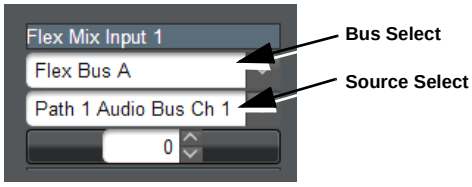
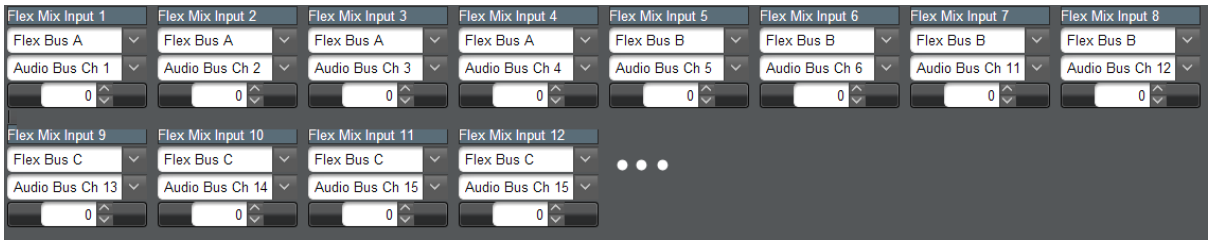
	**(continued)**
• Surround Mix Ratio Control 	Adjusts the attenuation ratio of surround-channel content from 5-channel source that is re-applied as Lo and Ro content to the DM-L and DM-R stereo mix. • 0 dB setting applies no ratiometric reduction. Surround-channel content is restored with no attenuation, making Lo and Ro content more predominate in the overall mix. • Maximum attenuation setting (-80 dB) applies a -80 dB ratiometric reduction of surround-channel content. Surround-channel content is restored at a -80 dB ratio relative to overall level, making surround-channel content less predominate in the overall mix. (20 dB to -80 dB range in 0 dB steps; Default = 0 dB) **Note:** Default setting is recommended to maintain surround-channel predominance in downmix representative to that of the original source 5-channel mix.
	**Flex Mixer** – Provides a 16-channel mixer in which each of the inputs can be mixed onto up to 16 independent output summing nodes. The input sources are the flex mix input channels. Each input channel has independent gain and mute controls.
Note: For each Flex Mix input channel, its source should be considered and appropriately set. Unused input channels should be set to the **Silence** selection.	
• Flex Bus Input Channel Source/Bus Assignment — Gain 	**Bus Select** drop-down select the flex bus (**A** thru **P**) to which the source will be applied. **Source Select** drop-down selects a source channel to be applied to the selected bus from the choices listed below. • Card **Path 1** thru **Path 4 Audio Bus Ch 1** thru **Ch 16** • **AES Ch1** thru **Ch*n*** • **MADI Rx** 1 thru **Rx 64** • **Silence** Also provides relative gain (in dB) control (-80 to +20 dB range in 0.1 dB steps; unity = 0.0 dB)

Table 3-1 9905-MPx Function Menu List — continued

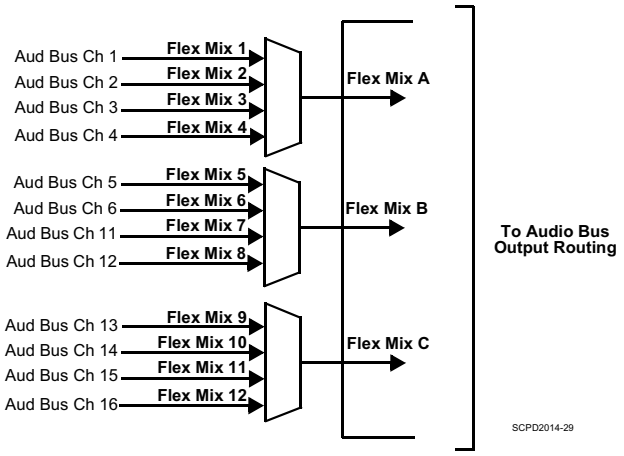
Output Audio

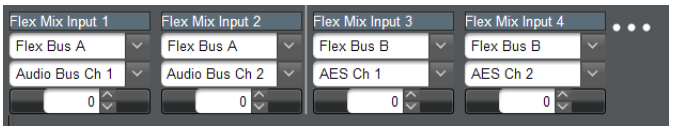
Flex Mixer

(continued)

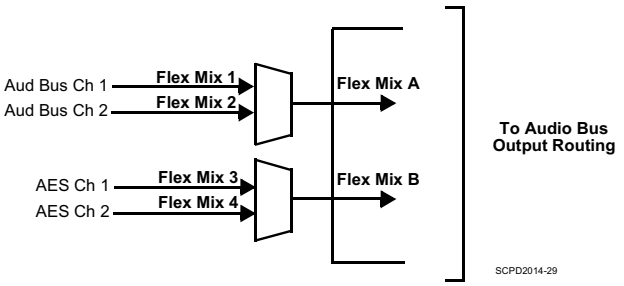


In this example – three, 4-input mono mixers are provided by selecting **Flex Mixer Bus A** for the Flex Mix 1 thru Flex Mix 4 inputs, and **Flex Mixer Bus B** for the next four inputs, and so on as shown.





In this example – two, 2-input mono mixers are provided by selecting **Flex Mixer Bus A** for the Flex Mix 1 and Flex Mix 2 inputs, and **Flex Mixer Bus B** for the next two inputs as shown.



Troubleshooting

This section provides general troubleshooting information and specific symptom/corrective action for the 9905-MPx card and its remote control interface. The 9905-MPx 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 9905-MPx card itself and its remote control systems all (to varying degrees) provide error and failure indications. Depending on how the 9905-MPx card is being used (i.e, standalone or network controlled through DashBoard™ or a Remote Control Panel), check all available indications in the event of an error or failure condition.

The various 9905-MPx 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. 3-41)
- Troubleshooting Network/Remote Control Errors (p. 3-42)
- In Case of Problems (p. 3-42)

DashBoard™ Status/Error Indicators and Displays

Figure 3-5 shows and describes the DashBoard™ status indicators and displays. These indicator icons and displays show status and error conditions relating to the 9905-MPx card itself and remote (network) communications.

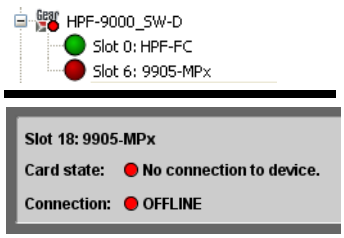
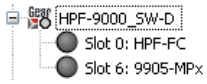
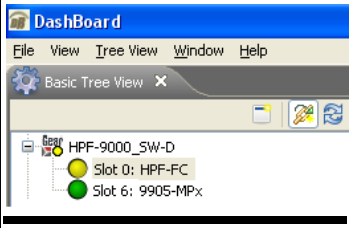
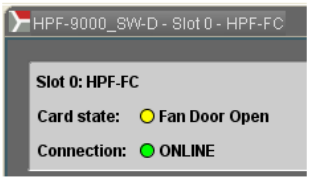
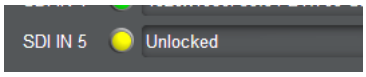
Indicator Icon or Display	Error Description
	Red indicator icon in Card Access/Navigation Tree pane shows card with Error condition (in this example, the Card Access/Navigation Tree pane shows a general error issued by the 9905-MPx card in slot 6). Specific errors are displayed in the Card Info pane (in this example “No connection to device” indicating 9905-MPx card is not connecting to frame/LAN).
	Gray indicator icon in Card Access/Navigation Tree pane shows card(s) are not being seen by DashBoard™ due to lack of connection to frame LAN (in this example, both a 9905-MPx card in slot 6 and the HPF-FC Network Controller Card for its frame in slot 0 are not being seen).
 	Yellow indicator icon in Card Access/Navigation Tree pane shows card with Alert condition (in this example, the Card Access/Navigation Tree pane shows a general alert issued by the HPF-FC Network Controller Card). Clicking the card slot position in the Card Access/Navigation Tree (in this example Network Controller Card “Slot 0: HPF-FC”) opens the Card Info pane for the selected card. In this example, a “Fan Door Open” specific error is displayed.
	Yellow indicator icon in 9905-MPx Card Info pane shows error alert, along with cause for alert (in this example, the 9905-MPx is not receiving an SDI input on SDI IN 5).

Figure 3-5 DashBoard™ Status Indicator Icons and Displays

Basic Troubleshooting Checks

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

Table 3-2 Basic Troubleshooting Checks

Item	Checks

Verify power presence and characteristics	• On both the frame Network Controller Card and the 9905-MPx, 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 9905-MPx 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 9905-MPx card itself is defective.
	  • If display shows **excessive** power being consumed (see Technical Specifications (p. 1-17) in Chapter 1, “Introduction”), the 9905-MPx card may be defective.

Check Cable connection secureness and connecting points	Make certain all cable connections are fully secure (including coaxial cable attachment to cable ferrules on coaxial connectors). Also, make certain all connecting points are as intended. Make certain the selected connecting points correlate to the intended card inputs and/or outputs. Cabling mistakes are especially easy to make when working with large I/O modules.
Card seating within slots	Make certain all cards are properly seated within its frame slot. (It is best to assure proper seating by ejecting the card and reseating it again.)
Check status indicators and displays	On both DashBoard™ and the 9905-MPx card edge indicators, red indications signify an error condition. If a status indicator signifies an error, proceed to the following tables in this section for further action.
Troubleshoot by substitution	All cards within the frame can be hot-swapped, replacing a suspect card or module with a known-good item.

Troubleshooting Network/Remote Control Errors

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

In Case of Problems

Contact and Return Authorization

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

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

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

See Contact Cobalt Digital Inc. (p. 1-20) in Chapter 1, “Introduction“ for contact information.

Cobalt Digital Inc.

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