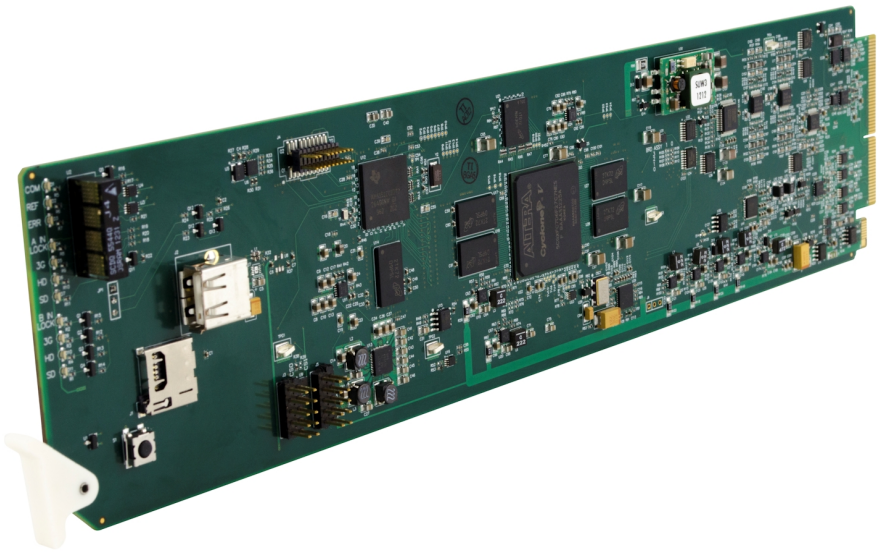
9922-2FS



3G/HD/SD-SDI Dual-Channel Framesync
with Audio/Video Processing, AES/Analog Audio Embedding/ De-Embedding, and CVBS I/O

Product Manual

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9922-2FS-OM (V1.0)

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Congratulations on choosing the Cobalt® 9922-2FS3G/HD/SD-SDI Dual-Channel Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O. The 9922-2FS 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 9922-2FS, please contact us at the contact information on the front cover.

Manual No.:	9922-2FS-OM
Document Version:	V1.0
Release Date:	May 4, 2015
Applicable for Firmware Version (or greater):	V1.109 or greater
Description of product/manual changes:	- Initial release.

Table of Contents

Chapter 1

Introduction

Overview

This manual provides installation and operating instructions for the 9922-2FS 3G/HD/SD-SDI 3G/HD/SD-SDI Dual-Channel Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O card (also referred to herein as the 9922-2FS).

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 9922-2FS.
- **Chapter 2, "Installation and Setup"** – Provides instructions for installing the 9922-2FS in a frame, and optionally installing a 9922-2FS Rear I/O Module.
- **Chapter 3, "Operating Instructions"** – Provides overviews of operating controls and instructions for using the 9922-2FS.

This chapter contains the following information:

9922-2FS 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 9922-2FS Card Information (p. 3-8) 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 9922-2FS 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:

- **9922-2FS** refers to the 9922-2FS 3G/HD/SD-SDI Dual-Channel Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O card.
- **Frame** refers to the HPF-9000, 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 9922-2FS and other cards operate.
- Functions and/or features that are available only as an option are denoted in this manual like this:

  Option

Warnings, Cautions, and Notes

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

Warnings

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

Cautions

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

Notes

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

Labeling Symbol Definitions

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

Safety 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 9922-2FS has a moderate power dissipation (<18 W). As such, avoiding placing the card adjacent to other cards with similar dissipation values if possible.**

CAUTION **If required, make certain Rear I/O Module(s) is installed before installing the 9922-2FS into the frame slot. Damage to card and/or Rear I/O Module can occur if module installation is attempted with card already installed in slot.**

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

CAUTION **The 9922-2FS FPGA is designed for a normal-range operating temperature around 85° C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within device operating safe parameters, and can be allowed by setting this control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum card protection.**

9922-2FS Functional Description

Figure 1-1 shows a functional block diagram of the 9922-2FS. The 9922-2FS dual-channel framesync provides two independent signal paths (**Path 1** and **Path 2**) of framesync / audio embedding and de-embedding on a single card. The two paths share an input and output SDI crosspoint to receive and send two discrete SDI inputs and outputs. The 9922-2FS also includes AES/analog audio support and CVBS video I/O. In addition to a basic signal presence input failover function, a Quality Check option allows failover to alternate inputs based on user-configurable subjective criteria such as black or frozen frame. Two discrete character burn strings and timecode burn (per path) can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even in cases where the input video image is static or lost.

The 9922-2FS also provides timecode/closed-captioning conversion from packet-based timecode formats and CEA608/708 HD formats to HD ATC, SD_ATC, and SD VITC waveform-based timecode.

9922-2FS Input/Output Formats

The 9922-2FS provides the following inputs and outputs (which can be independently used for Path 1 and/or Path 2:

- **Inputs:**
  - **3G/HD/SD SDI IN A** thru **SDI IN D** – four 3G/HD/SD-SDI inputs. **SDI IN A** or **SDI IN B** can be set to failover to **A** or **B** in absence of opposite channel of this pair.
  - **CVBS IN –** CVBS coaxial analog video input.
  - **AES IN –** BNC (AES-3id, 75Ω) ports as AES input (number of ports dependent on rear I/O module used).
  - **AN-AUD IN –** Four balanced analog audio embed inputs.
- **Outputs:**
  - **3G/HD/SD-SDI OUT (1-4)** – four 3G/HD/SD-SDI buffered video outputs. Each output can be independently set as processed output video or selected input video reclocked.
  - **AES OUT –** BNC (AES-3id, 75Ω) ports as AES outputs (number of ports dependent on rear I/O module used).
  - **AN-AUD OUT –** Four balanced analog audio de-embed outputs.
  - **CVBS OUT –** CVBS coaxial analog video usable with SD video streams.

Note: Input select also allows internal connection from one processing path output to the opposite processing path input. This allows “serial” processing connections without requiring external jumpering on the card rear I/O module.

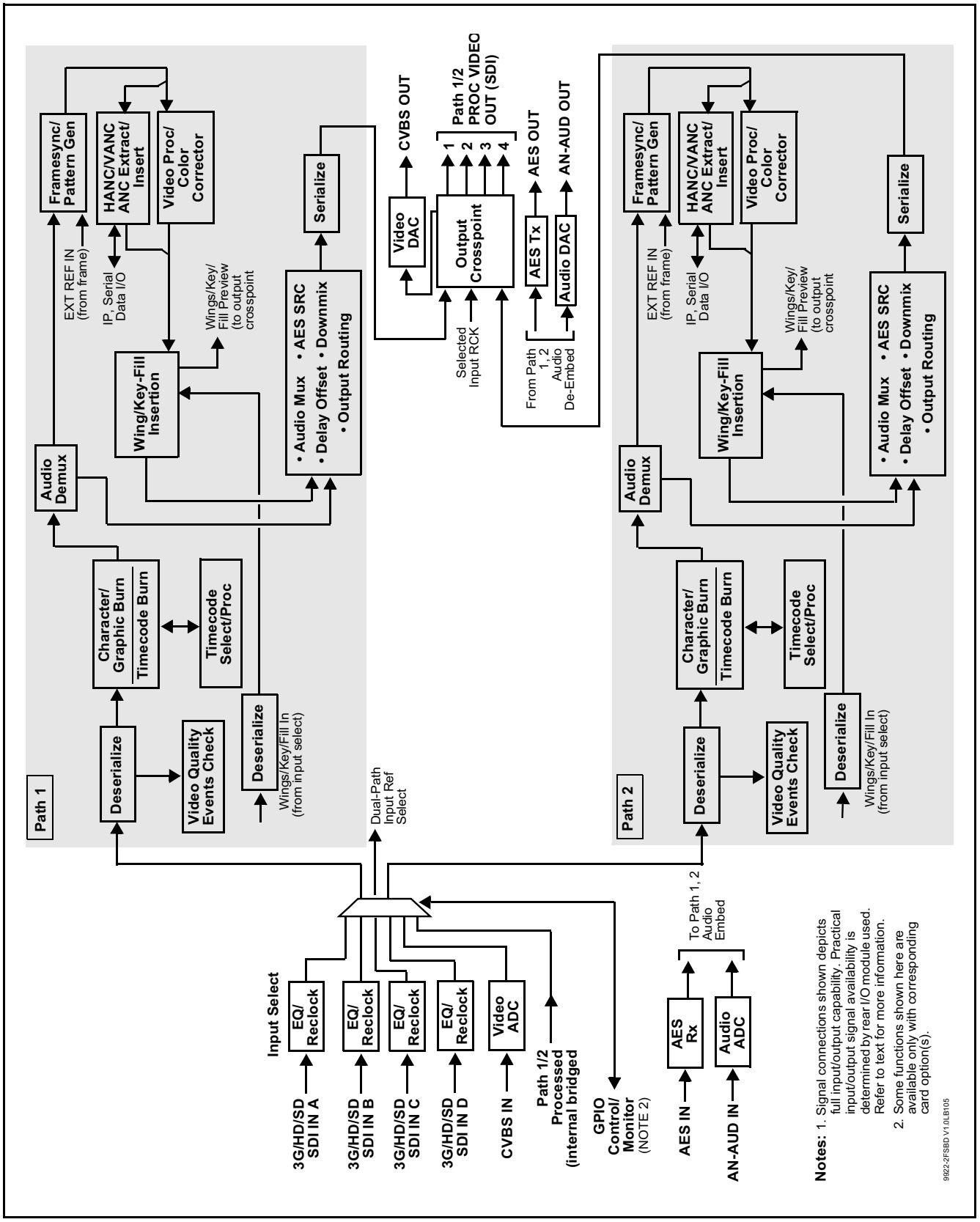

Figure 1-1 9922-2FS Functional Block Diagram

Video Processor Description

Note: Unless otherwise noted, the following functions are independently available for Path 1 and Path 2 processing paths.

The 9922-2FS video subsystem provides the functions described below.

Input Video Select/Quality Check Functions

Used in common as a routing source for both **Path 1**/**Path 2** is a GUI-based control that allows the card to select from up to four 3G/HD/SD-SDI inputs, and a SD CVBS analog video input. This function also allows processed outputs from one path to be routed to the alternate path input. For analog inputs, waveform-based ancillary data is preserved for extraction and usage later in the card processing chain.

The input can be selected using DashBoard manual control, set to failover to an alternate input upon loss of the target input, and can be externally selected via a GPIO interface. Reclocked copies of any SDI input can be outputted by the card when selected as a choice on the output crosspoint.

Option **(Option +QC)**. Quality Check allows criteria such as black/frozen frame events to propagate an event alert. This alert can be used by the card Presets function to invoke input video routing changes, GPO, and other actions.

Timecode Processor

(See Figure 1-2.) This function provides for extraction of timecode data from input video source, and in turn allow individual timecode strings to be embedded and/or burned into the output video. The function can monitor any of the video inputs of the card for supported timecode formats such as ATC_LTC or ATC_VITC for down-conversions to HD, and ATC_VITC or VITC waveform (with selectable odd/even field line number control) for SD SDI or CVBS inputs. Waveform VITC timecode can also be extracted from a reference input and used as the output timecode value. If the preferred format is detected, the preferred format is used by the card; if the preferred format is not detected, the card uses other formats (where available) as desired. An internally-generated free-run timecode can be also be embedded on output video if desired.

The function also provides conversion between various timecode formats and provides independent insertion and line number controls for each SDI timecode output format.

Option When licensed with option **+LTC**, this function also can receive, send and translate between audio/RS-485 LTC timecode formats and the VBI formats described above.

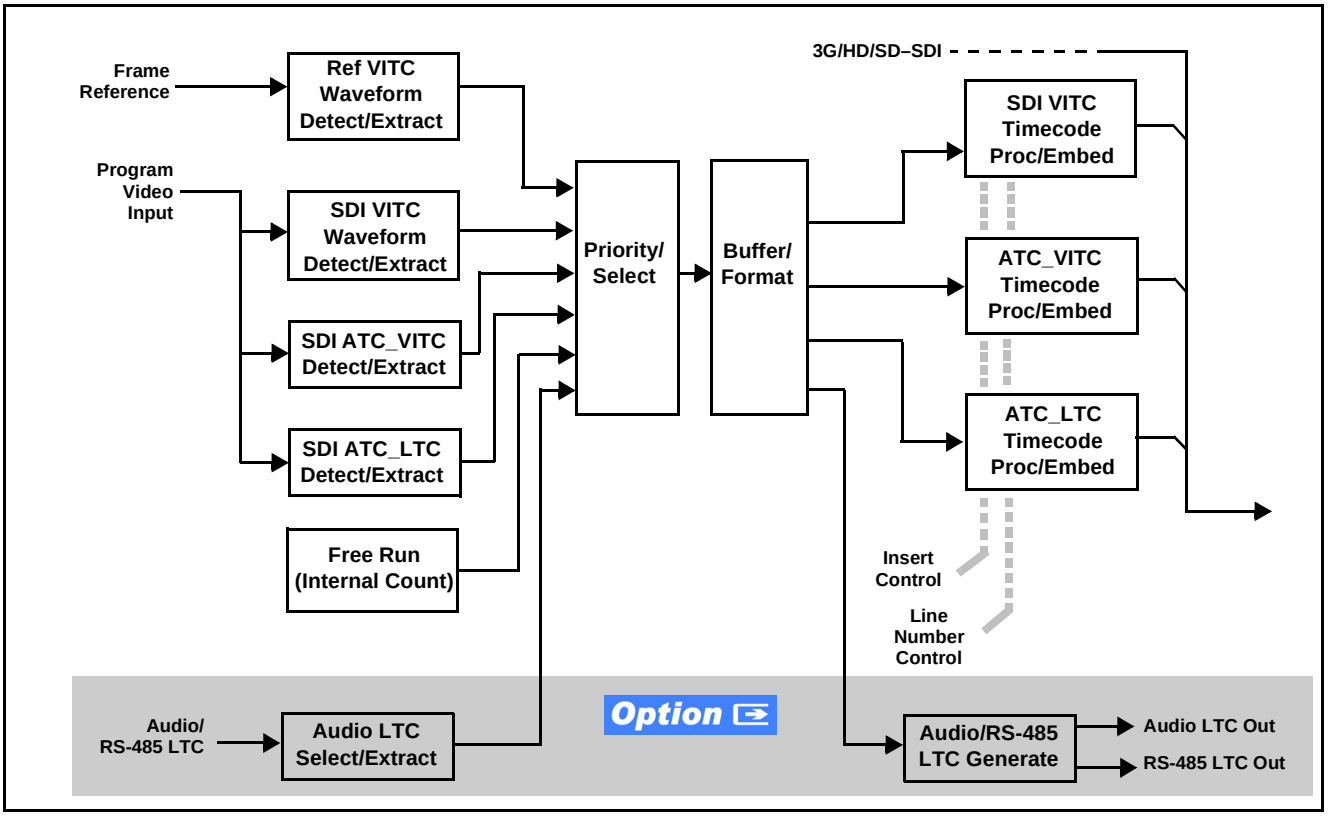

Figure 1-2 Timecode Processor

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, or the input video as a frame sync reference. Any of the received SDI input signals can also serve as a reference for either framesync path.

This function also allows horizontal and/or vertical offset to be added between the output video and the frame sync reference.

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 black, go to an internal test signal generator pattern, or freeze to the last intact frame (last frame having valid SAV and EAV codes).

An internal test signal generator provides a selection of several standard patterns such as color bars, sweep patterns, and other technical patterns. The test patterns can be applied to the output video upon loss of input or manually inserted at any time.

Wings Insertion

Wings insertion allows a symmetrical L-R wings insertion to be integrated into the card program video output. Wings video is accommodated using a separate wings SDI input. The wings user interface displays wings timing relative to the card output video, allowing wings timing offset to be adjusted such that wings can be properly framed. (This function does not provide timing offset control of the wings video; offset must be provided by a external frame sync card or device controlling the wings video feed.)

Key/Fill Insertion Option

Option **+KEYER** provides for three of the card SDI video inputs to be used as respective program video, key, and fill inputs. This function provides chroma keying using the **KEY VID IN** signal. The **FILL VID IN** signal provides the fill video that is inserted in the area “cleared out” by the key. The keying user interface displays key and fill timing relative to the card output video, allowing timing offset to be adjusted such that key and fill can be properly framed. (The option and its host card does not provide timing offset control of the key/fill video; offset must be provided by external frame sync cards or devices controlling the key and fill video feed.) The program video input when using keying accommodates either an SDI or an analog video input; key and fill inputs are SDI only.

Alpha threshold keyer modes allow full-color key/fill from cost-effective generic sources such as a standard PC (with appropriate HDMI-to-SDI output conversion) hosting simple .bmp, .jpeg, or .png graphic files. In these modes, a common key/fill SDI input provides both the key and fill input.

Closed Captioning Processor

This function provides support for closed captioning setup. The function allows the selection of the ancillary data line number where the ancillary closed caption data is outputted when the output is HD. When receiving HD-SDI, both CEA 608 and CEA 708 are supported. Line 21 CEA 608 waveform-based SD closed captioning is also supported.

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.

Character/Image Burn-in Functions

User text and timecode (as selected using the timecode function) can be burned into the output video. Burn-in attributes such as size, position, background, color, and opacity are user-configurable. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even in cases where the input video image is static or lost.

Ancillary Data Processor Option

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.

Video Quality Events Detect Function Option

Option **+QC** provides a **Video Quality Events** user interface and an **Event Triggers** user interface for setting an area of concern across the program raster which can be monitored for frozen or black video events. Threshold controls allow setting the sensitivity of the function, while engage and disengage threshold timing controls allow setting how fast the event detection engages and releases when triggered. The **Event Triggers** user interface allows instructing the card as to the action to take upon an event (such as go to a changed signal routing, activate a GPO, send an automated email, or go to a user-defined preset).

Closed Captioning Events Detect Function

An **Event Triggers** user interface can detect Closed Caption Presence and Closed Caption Absence events. The **Event Triggers** user interface in turn allows instructing the card as to the action to take upon an event (such as go to a changed signal routing, activate a GPO, send an automated email, or go to a user-defined preset).

Video Output Crosspoint

Used in common as a routing source for both **Path 1**/**Path 2** is a four-output video matrix crosspoint that allows independently applying the card processed video output, reclocked input, or wings/key-fill previews to any of the four card discrete coaxial outputs (**SDI OUT 1** thru **SDI OUT 4**). For an SD output, a CVBS coaxial output is available as a processed video output.

Audio Processor Description

Note: **Path 1** and **Path 2** have individual independent digital audio embed and de-embed banks for each of the processing path's 16-channels of embedded audio. The card's 16 channels of AES embed/de-embed can be allocated individually to any or either path's embed or de-embed nodes. Similarly, four-channel analog audio can be individually allocated across any or either path's embed or de-embed nodes.

The audio processor operates as an internal audio router. This function chooses from the following inputs:

- 16 channels of embedded audio from the SDI video input (default 1-to-1 routing to SDI output)
- Up to 16 channels (8 pairs) of discrete AES input[1]
- Up to 4 channels of balanced analog audio input

(See Figure 1-3.) The audio processing subsection is built around a card internal 16-channel audio bus. This 16-channel bus receives inputs from an input routing crosspoint that routes de-embedded, and discrete AES and analog audio inputs, over the 16-channel card bus. Correspondingly, at the output end of the 16-channel bus is an output routing crosspoint that in turn distributes the 16-channel bus signals to embedded, and discrete AES and analog audio outputs.

An Input Audio Status display shows the presence and peak level of each input audio channel received by the card. In addition to SDI embedded audio channel sources, analog and coaxial AES inputs are available as input audio choices. For AES audio inputs, payload is identified (PCM or data such as Dolby® Digital or E). Each AES input pair has independent sample rate converters to align each input pair with video timing to accommodate cases where AES audio is not synchronous with input video (SRC automatically bypassed for non-PCM payloads). As such, the audio subsection provides a full crosspoint between all supported audio inputs and output types.

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

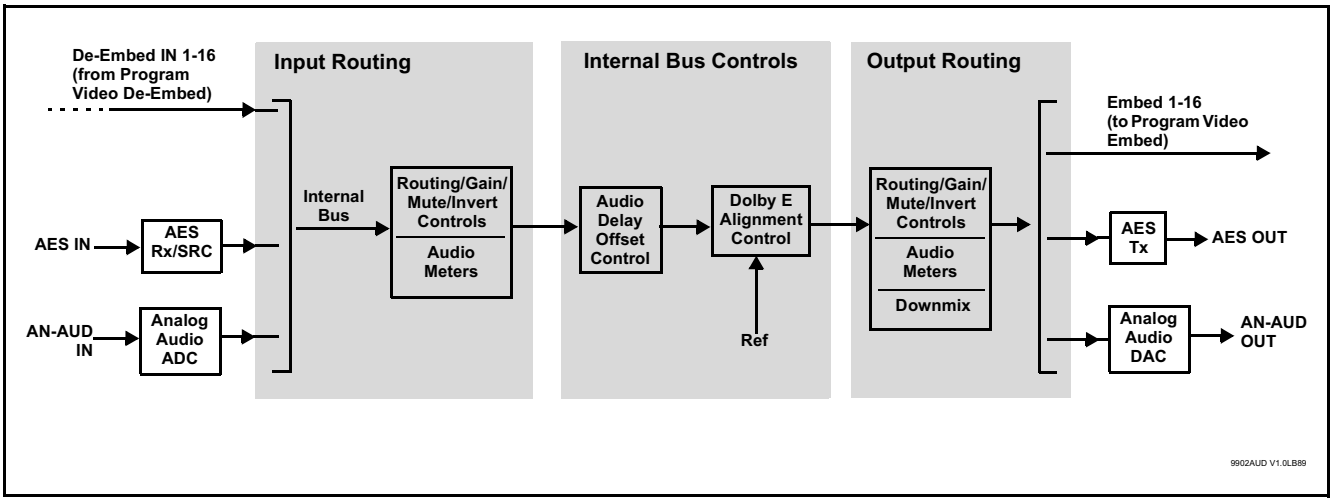

Figure 1-3 Basic Audio Processing Block Diagram

Audio Down Mix Function

(See Figure 1-4.) The Audio Down Mixer function provides for the selection of any five 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 pair as desired (or de-embedded to an AES or analog audio output).

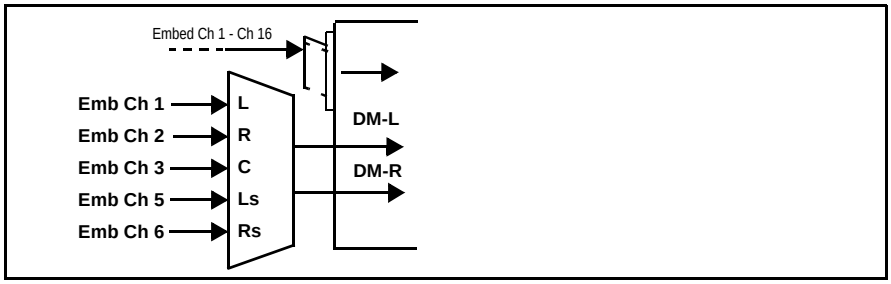

Figure 1-4 Audio Down Mix Functional Block Diagram with Example Sources

Control and Data Input/Output Interfaces

GPI Interface

Two independent ground-closure sensing GPI inputs (**GPI 1** and **GPI 2**; each sharing common ground connection as chassis potential) are available. Associated with each GPI user control is a selection of one of 32 user-defined card presets in which GPI activation invokes a 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.

GPI triggering can be user selected to consider the activity on discrete GPI ports, or combinations of logic states considering both GPI inputs, as well as be set for level or edge triggering. This flexibility allows multistage, progressive actions to be invoked if desired. Indication is provided showing whenever a GPI input has been invoked.

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 9922-2FS is equipped with two, 3-wire serial ports (**COM 1 - Serial Port 1**, **COM 2 - Serial Port 2**). The ports provide for SMPTE 2020 de-embedding to an output port, provide RS-485 LTC I/O (when licensed with option **+LTC**). Either port can be configured as RS-232 Tx/Rx or RS-4585 non-duplexed Tx or Rx.

User Control Interface

Figure 1-5 shows the user control interface options for the 9922-2FS. 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 9922-2FS 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 9922-2FS 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.

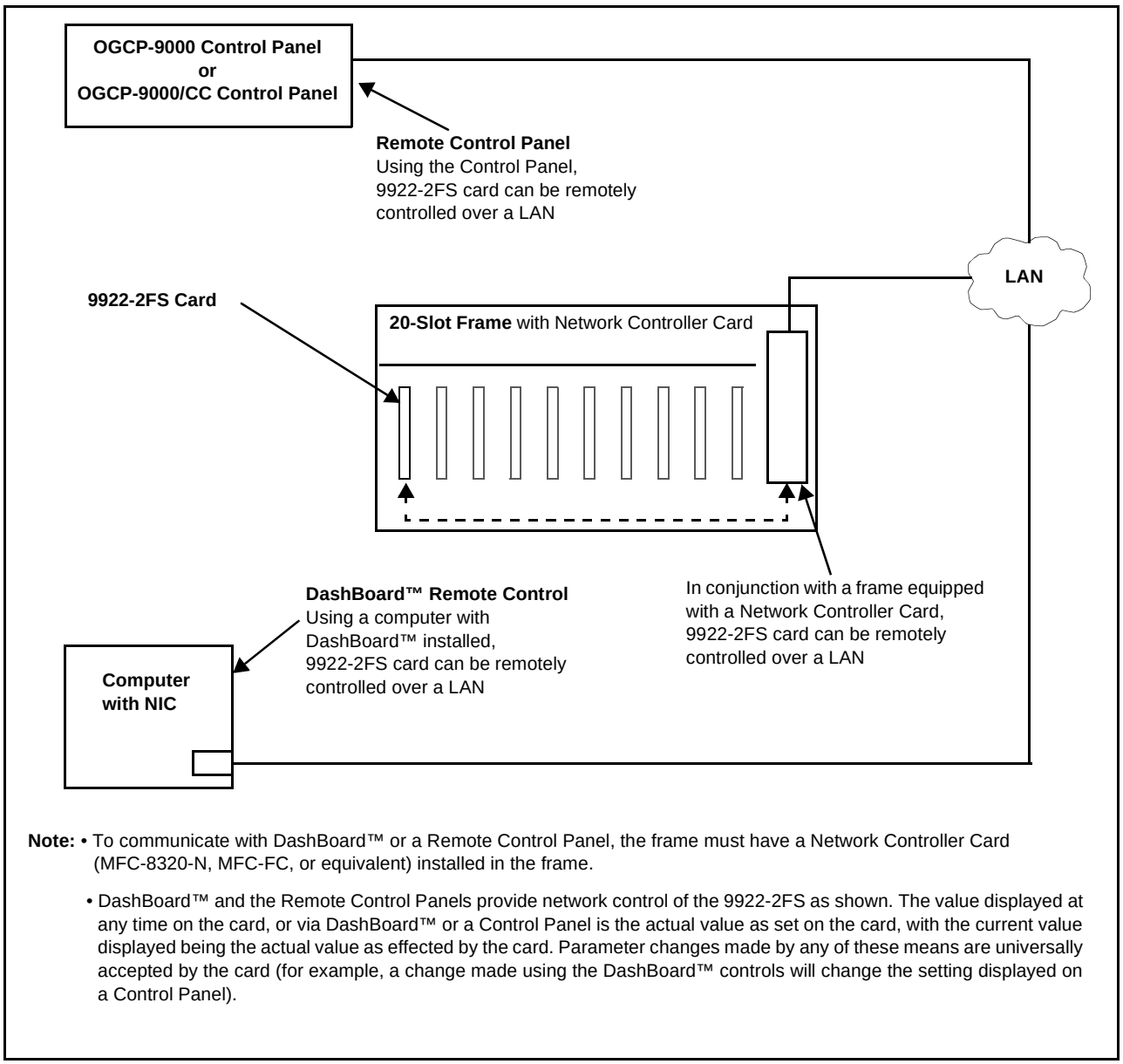

Figure 1-5 9922-2FS User Control Interface

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).

9922-2FS Rear I/O Modules

The 9922-2FS 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 9922-2FS 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 9922-2FS card edge connections to BNC and other connectors that interface with other components and systems in the signal chain.

The full assortment of 9922-2FS Rear I/O Modules is shown and described in 9922-2FS Rear I/O Modules (p. 2-4) in Chapter 2, “Installation and Setup”.

Technical Specifications

Table 1-1 lists the technical specifications for the 9922-2FS 3G/HD/SD-SDI Dual-Channel Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O card.

Table 1-1 Technical Specifications

Item	Characteristic
Part number, nomenclature	9922-2FS 3G/HD/SD-SDI Dual-Channel Framesync with Audio/ Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O
Installation/usage environment	Intended for installation and usage in frame meeting openGear™ modular system definition
Power consumption	< 18 Watts maximum
Installation Density	Up to 20 cards per 20-slot frame
Environmental: Operating temperature: Relative humidity (operating or storage):	 32° – 104° F (0° – 40° C) < 95%, non-condensing
Frame communication	10/100 Mbps Ethernet with Auto-MDIX
Indicators	Card edge display and indicators as follows: • 4-character alphanumeric display • Status/Error LED indicator • Input Presence LED indicators

Table 1-1 Technical Specifications — continued

Item	Characteristic
Serial Digital Video Input	Number of inputs: Up to (4), with manual select or failover to alternate input. Input B uses relay bypass to output RLY BYP B. Data Rates Supported: SMPTE 424M, 292M, SMPTE 259M-C Impedance: 75 Ω terminating Return Loss: > 15 dB up to 1.485 GHz > 10 dB up to 2.970 GHz Minimum Latency (framesync disabled): SD: 127 pixels; 9.4 us 720p: 330 pixels; 4.45 us 1080i: 271 pixels; 3.65 us 1080p: 361 pixels; 2.43 us
Analog Video Input	Number of Inputs: One SD analog CVBS Impedance: 75 Ω
AES Audio Inputs	Standard: SMPTE 276M Number of Inputs: Up to 16 unbalanced; AES-3id Impedance: 75 Ω
Analog Audio Inputs	Number of Inputs: Up to four balanced using 3-wire removable Phoenix connectors; 0 dBFS => +24 dBu
Input Select/Auto-Changeover Failover (option +QC)	Failover to alternate input on loss of target input. Failover invoked upon LOS and/or (with option +QC) user configurable parametric criteria such as black/frozen frame or audio silence. - Black frame trigger configurable for black intensity threshold and persistence time. - Frozen frame trigger configurable for frozen percentage difference and persistence time.

Table 1-1 Technical Specifications — continued

Item	Characteristic
Post-Processor Serial Digital Video Outputs	Number of Outputs: Four 3G/HD/SD-SDI BNC Impedance: 75 Ω Return Loss: > 15 dB at 5 MHz – 270 MHz Signal Level: 800 mV ± 10% DC Offset: 0 V ± 50 mV Jitter (3G/HD/SD): < 0.3/0.2/0.2 UI
Analog Video Output	Number of Outputs: One SD analog CVBS Impedance: 75 Ω
Embedded Audio Output	16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.
AES Audio Outputs	Standard: SMPTE 276M Number of Outputs: Up to 16 unbalanced; AES-3id Impedance: 75 Ω
Analog Audio Outputs	Number of Outputs: Up to four balanced using 3-wire removable Phoenix connectors; 0 dBFS => +24 dBu
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
GPIO/COMM	(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. (2) RS-232/485 comm ports.

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.

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Chapter 2

Installation and Setup

Overview

This chapter contains the following information:

Installing the 9922-2FS 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 9922-2FS has a moderate power dissipation (<18 W). As such, avoiding placing the card adjacent to other cards with similar dissipation values if possible.

CAUTION

This device contains semiconductor devices which are susceptible to serious damage from Electrostatic Discharge (ESD). ESD damage may not be immediately apparent and can affect the long-term reliability of the device.

Avoid handling circuit boards in high static environments such as carpeted areas, and when wearing synthetic fiber clothing. Always use proper ESD handling precautions and equipment when working on circuit boards and related equipment.

Note: **If installing the 9922-2FS 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 9922-2FS 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 9922-2FS 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 9922-2FS into a frame slot as follows:

1. Determine the slot in which the 9922-2FS 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 9922-2FS Rear I/O Modules (p. 2-4).
9. Repeat steps 1 through 8 for other 9922-2FS cards.

Note:
- The 9922-2FS BNC inputs are internally 75-ohm terminated. It is not necessary to terminate unused BNC 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 9922-2FS Network Remote Control (p. 2-8).

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 9922-2FS is to be installed.

If installing the 9922-2FS in a slot already equipped with a suitable I/O module, omit this procedure.

Install a Rear I/O Module as follows:

1. On the frame, determine the slot in which the 9922-2FS 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.

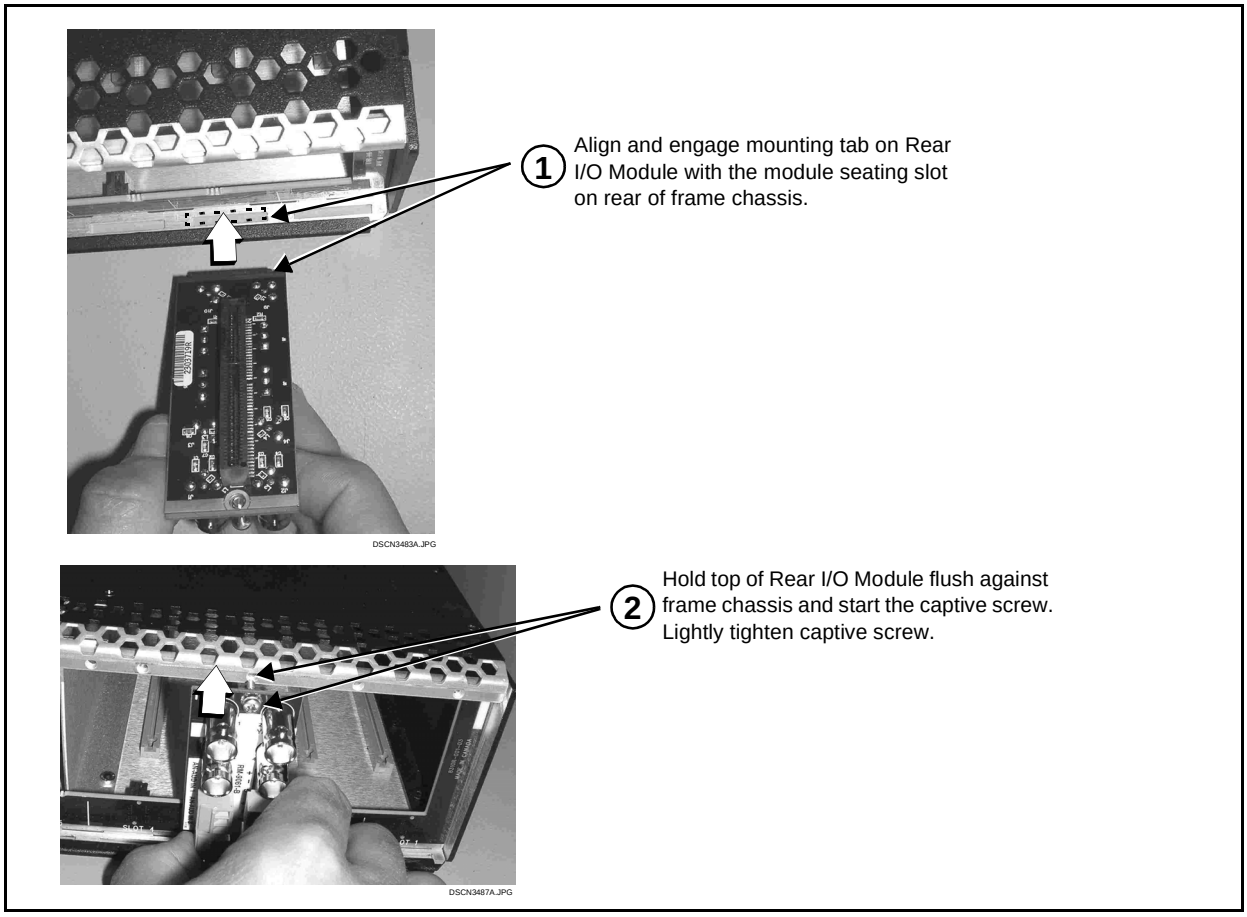


Figure 2-1 Rear I/O Module Installation

9922-2FS Rear I/O Modules

Table 2-1 shows and describes the full assortment of Rear I/O Modules specifically for use with the 9922-2FS.

Notes: Rear I/O Modules equipped with 3-wire Phoenix connectors are supplied with removable screw terminal block adapters. For clarity, the adapters are omitted in the drawings below.

Table 2-1 9922-2FS Rear I/O Modules

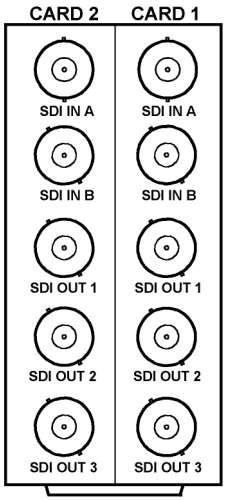
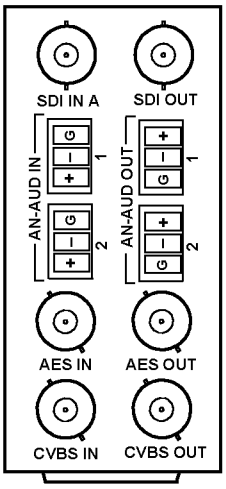
9922-2FS Rear I/O Module	Description
RM9922-2FS-A/S 	Split Rear Module. Provides **each** of the following connections for two 9922-2FS cards: • Two 3G/HD/SD-SDI coaxial input BNCs (**SDI IN A** and **SDI IN B**) • Three 3G/HD/SD-SDI Video Out BNCs (**SDI OUT 1** thru **SDI OUT 3**)
RM9922-2FS-B 	Provides the following connections: • One 3G/HD/SD-SDI coaxial input BNC (**SDI IN A**) • One analog video CVBS coaxial input BNC (**CVBS IN**) • Two analog balanced audio inputs (**AN-AUD IN 1** and **AN-AUD IN 2**) • One AES input BNC (**AES IN**) • One processed coaxial output BNC (**SDI OUT**) • One analog video CVBS coaxial output BNC (**CVBS OUT**) • Two analog balanced audio outputs (**AN-AUD OUT 1** and **AN-AUD OUT 2**) • One AES output BNC (**AES OUT**)

Table 2-1 9922-2FS Rear I/O Modules — continued

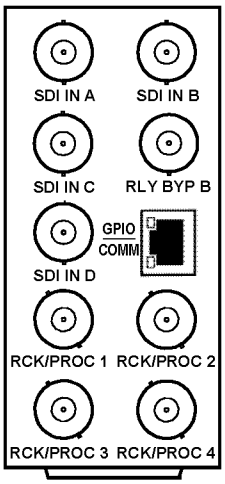
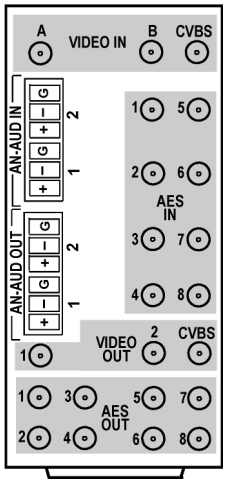
9922-2FS Rear I/O Module	Description
RM9922-2FS-C  Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input. RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.	Provides the following connections: • Four 3G/HD/SD-SDI video input BNCs (**SDI IN A** thru **SDI IN D**) • Four 3G/HD/SD-SDI video output BNCs (**RCK/PROC 1** thru **RCK/PROC 4**; each GUI selectable as processed out, selected-input reclocked, or wings/key-fill preview where available) • One relay-protected SDI processed output BNC (**RLY BYP B**; outputs a copy of **SDI OUT 1** under normal conditions, or passive outputs the SDI input on **SDI IN B** as a relay failover if card power is lost) • **COMM/GPIO** RJ-45 connector **Note:** Refer to GPIO, Serial (COMM), and Analog Audio Connections (p. 2-8) for connector pinouts and important information regarding GPO electrical limits.
RM9922-2FS-D  	Provides the following connections: • Two 3G/HD/SD-SDI video inputs (**VIDEO IN A** and **VIDEO IN B**) • One CVBS video input (**CVBS IN**) • Two analog balanced audio inputs (**AN-AUD IN 1** and **AN-AUD IN 2**) • Eight AES audio inputs (**AES IN 1** thru **AES IN 8**) • Two 3G/HD/SD-SDI video outputs (**VIDEO OUT 1** and **VIDEO OUT 2**) • One CVBS video output (**CVBS OUT**) • Two analog balanced audio outputs (**AN-AUD OUT 1** and **AN-AUD OUT 2**) • Eight AES audio outputs (**AES OUT 1** thru **AES OUT 8**) **Note:** Available equipped with High-Density BNC (HDBNC) or DIN1.0/2.3 connectors as: RM9922-2FS-D-HDBNC or RM9922-2FS-D-DIN, respectively.

Table 2-1 9922-2FS Rear I/O Modules — continued

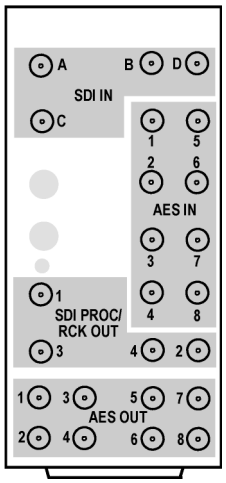
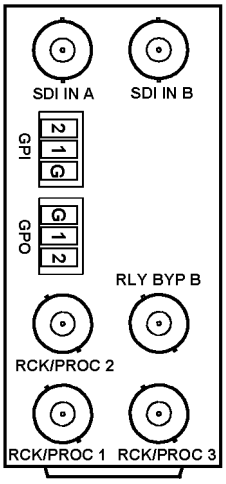
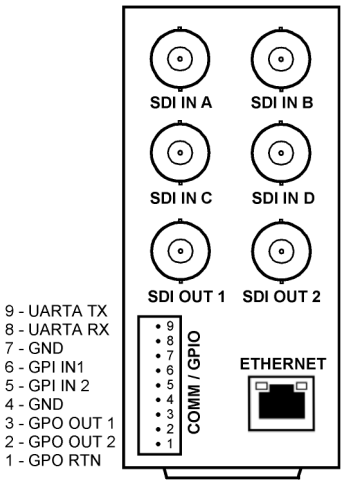
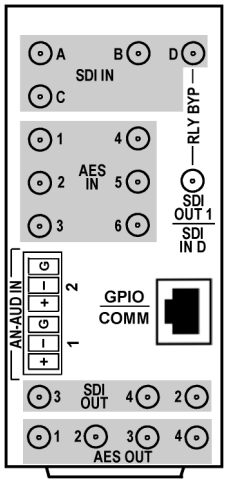
9922-2FS Rear I/O Module	Description
RM9922-2FS-E 	Provides the following connections: • Four 3G/HD/SD-SDI video inputs (**SDI IN A** thru **SDI IN D**) • Eight AES audio inputs (**AES IN 1** thru **AES IN 8**) • Four 3G/HD/SD-SDI video outputs; selectable as processed or input reclocked out (**SDI PROC/RCK OUT 1** thru **SDI PROC/RCK OUT 4**) • Eight AES audio outputs (**AES OUT 1** thru **AES OUT 8**) **Note:** Available equipped with High-Density BNC (HDBNC) or DIN1.0/2.3 connectors as: RM9922-2FS-E-HDBNC or RM9922-2FS-E-DIN, respectively.
RM9922-2FS-F 	Provides the following connections: • Two 3G/HD/SD-SDI video input BNCs (**SDI IN A** and **SDI IN B**) • Three 3G/HD/SD-SDI video output BNCs (**RCK/PROC 1** thru **RCK/PROC 3**; each GUI selectable as selected-input reclocked or processed out) • One relay-protected SDI processed output BNC (**RLY BYP B**) • Two opto-isolated GPI inputs (terminals **GPI 1-G** and **GPI 2-G**) • Two opto-coupled GPO (**GPO 1/G** and **GPO 2/G**) **Note:** Refer to GPIO, Serial (COMM), and Analog Audio Connections (p. 2-8) for connector pinouts and important information regarding GPO electrical limits.

Table 2-1 9922-2FS Rear I/O Modules — continued

9922-2FS Rear I/O Module	Description
RM9922-2FS-G 	Provides the following connections: • Four 3G/HD/SD-SDI video inputs (**SDI IN A** thru **SDI IN D**) • Two 3G/HD/SD-SDI video outputs (**SDI OUT 1** and **SDI OUT 2**) • **COMM/GPIO** multi-conductor connector • **ETHERNET** 10/100 connector (reserved) **Note:** Ethernet connector is reserved for card IP data interface and direct web GUI access. This port is independent of frame network remote control.
RM9922-2FS-K 	Provides the following connections: • Four 3G/HD/SD-SDI video inputs (**SDI IN A** thru **SDI IN D**; IN D-to-OUT 1 as passive RLY bypass) • SIx AES audio inputs (**AES IN 1** thru **AES IN 6**) • Two analog balanced audio inputs (**AN-AUD IN 1** and **AN-AUD IN 2**) • Four 3G/HD/SD-SDI video outputs (**SDI OUT 1** thru **SDI OUT 4**) • Four AES audio outputs (**AES OUT 1** thru **AES OUT 4**) • **COMM/GPIO** RJ-45 connector **Note:** • Refer to GPIO, Serial (COMM), and Analog Audio Connections (p. 2-8) for connector pinouts and important information regarding GPO electrical limits. • Available equipped with High-Density BNC (HDBNC) or DIN1.0/2.3 connectors as: RM9922-2FS-K-HDBNC or RM9922-2FS-K-DIN, respectively.
COBALT RM20-9001-B/S-DIN **SAMPLE-NOT FOR USE** Due to the density of connector placement on Rear Modules using high-density connectors (e.g., RM20-9001-B/S-DIN), these modules use a QR barcode label instead a regular label. Simply scan the image with a smart phone and a link to the rear module label (as shown in our catalog) will appear. (Smart phone must have a QR reader app such as QuickMark QR Code Reader or equivalent.) Not all devices may be able to acquire the image. If this occurs, use the device to access the web page for card/rear module to view the diagram.	

GPIO, Serial (COMM), and Analog Audio Connections

Figure 2-2 shows connections to the card multi-pin terminal block connectors. These connectors are used for card serial comm, GPIO, and balanced analog audio connections.

Note: It is preferable to wire connections to plugs oriented as shown in Figure 2-2 rather than assessing orientation on rear module connectors. Note that the orientation of rear module 3-wire audio connectors is not necessarily consistent within a rear module, or between different rear modules. If wiring is first connected to plug oriented as shown here, the electrical orientation will be correct regardless of rear module connector orientation.

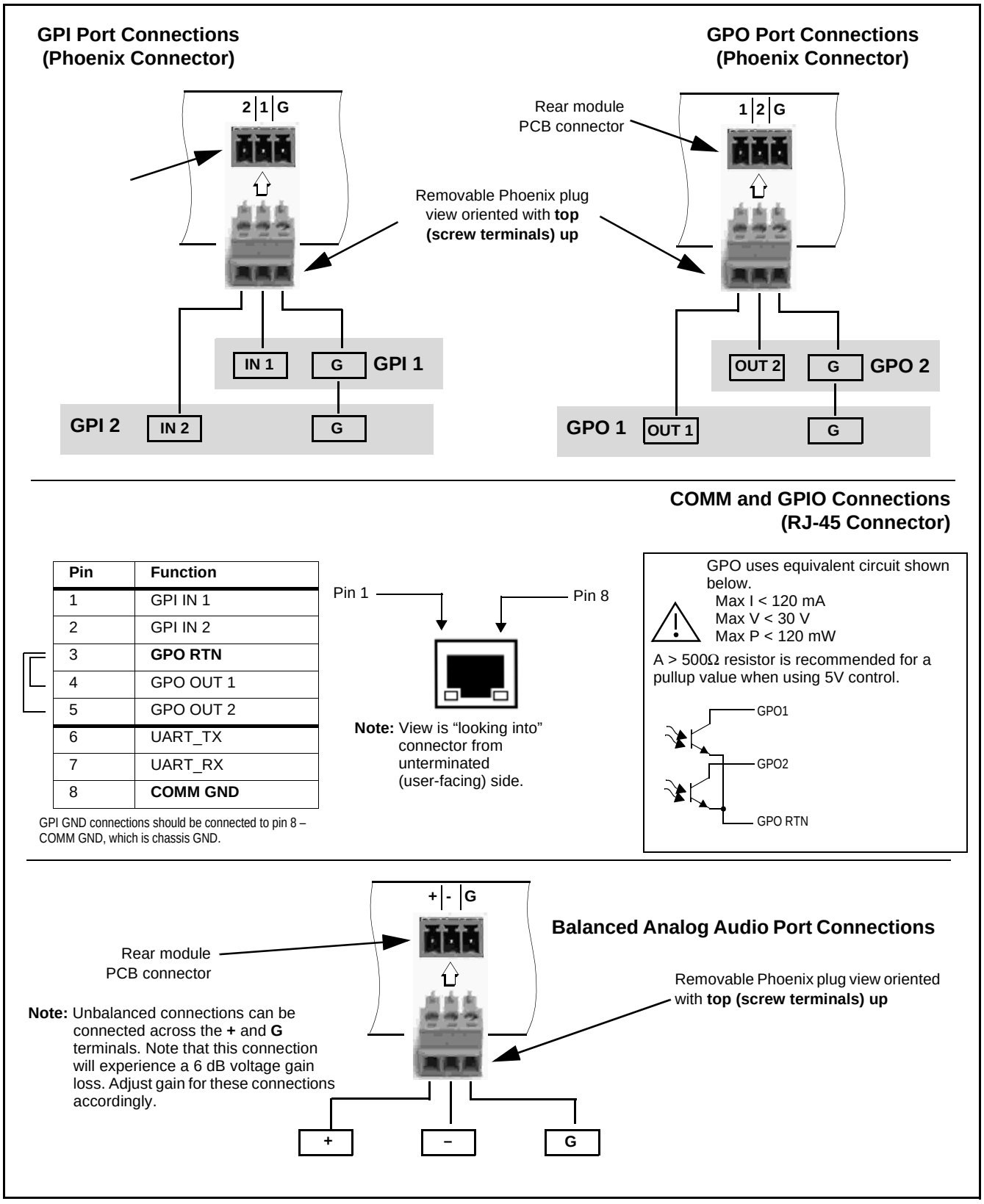
Setting Up 9922-2FS Network Remote Control

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.



Pin	Function
1	GPI IN 1
2	GPI IN 2
3	**GPO RTN**
4	GPO OUT 1
5	GPO OUT 2
6	UART_TX
7	UART_RX
8	**COMM GND**

Figure 2-2 COMM, GPIO, and Analog Audio Connector Pinouts

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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 9922-2FS Function Menu List and Descriptions (p. 3-10).

This chapter contains the following information:

Control and Display Descriptions

This section describes the user interface controls, indicators, and displays for using the 9922-2FS card. The 9922-2FS functions can be accessed and controlled using any of the user interfaces described here.

The format in which the 9922-2FS 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 9922-2FS 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 9922-2FS card are organized into function **menus**, which consist of parameter groups as shown below.

Figure 3-1 shows how the 9922-2FS card and its menus are organized, and also provides an overview of how navigation is performed between cards, function menus, and parameters.

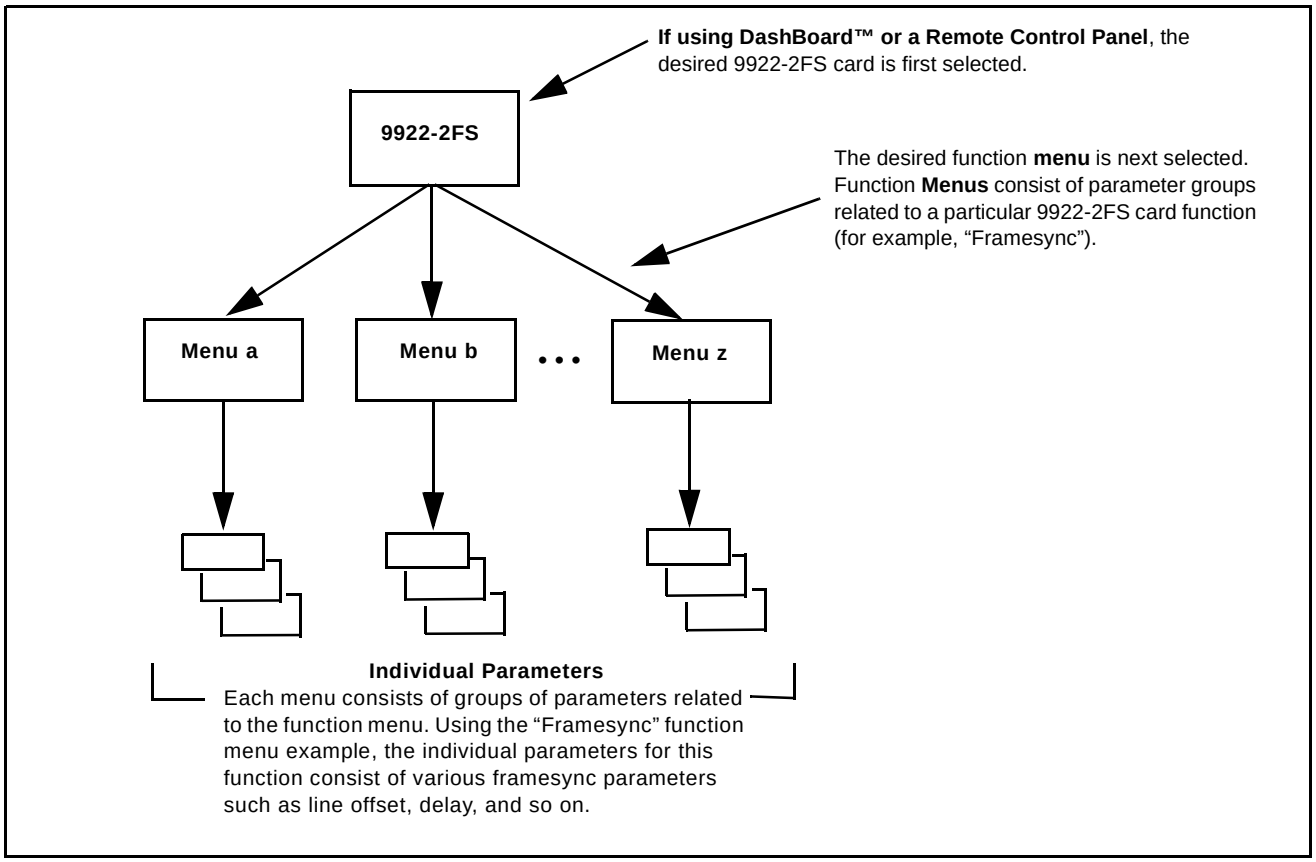


Figure 3-1 Function Menu/Parameter Overview

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.

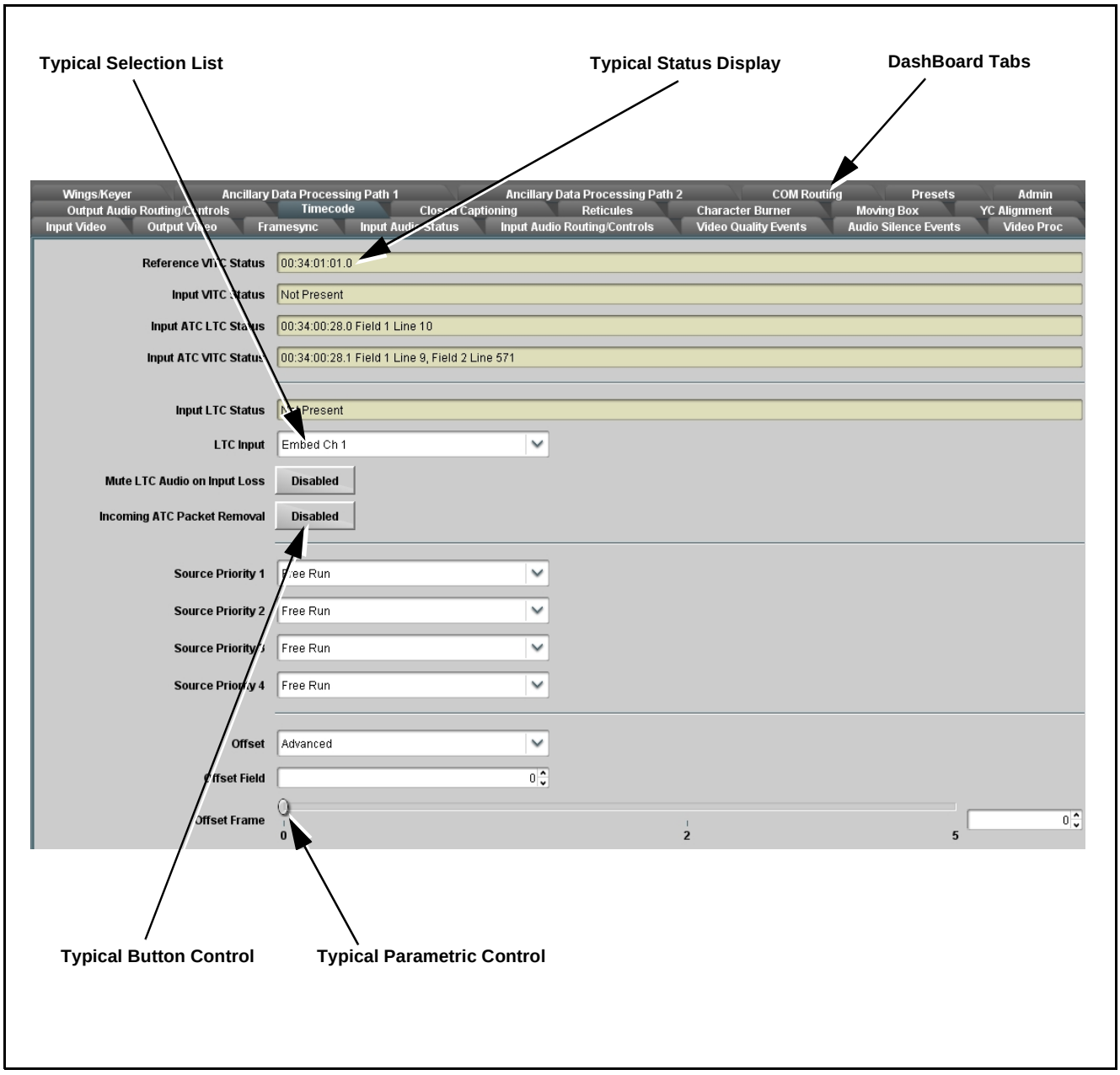


Figure 3-2 Typical DashBoard Tabs and Controls

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. (In this manner, the setting effected using controls and selection lists displayed on the Control Panel are comparable to the submenu items accessed and committed using the 9922-2FS card edge controls.)

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

Web HTML5 User Interface

(See Figure 3-4.) When equipped with a rear I/O module having an Ethernet port, the 9922-2FS controls can be accessed via a web network connection with no additional remote control software needed. The web GUI shows the same tabs, controls and status displays as those accessed using DashBoard™. This allows very convenient control access to the card, even if using a computer without DashBoard remote control or in case the frame network connection is down.

The card can be accessed in a web browser by entering the card IP address as set in the card **Admin** tab. (See Admin (Log Status/Firmware Update - Card IP Address) (p. 3-58) for more information.)

Note: Card must be equipped with a rear I/O module with an Ethernet port to use html access. The card address is entirely independent of, and requires no association with, the frame openGear IP address.

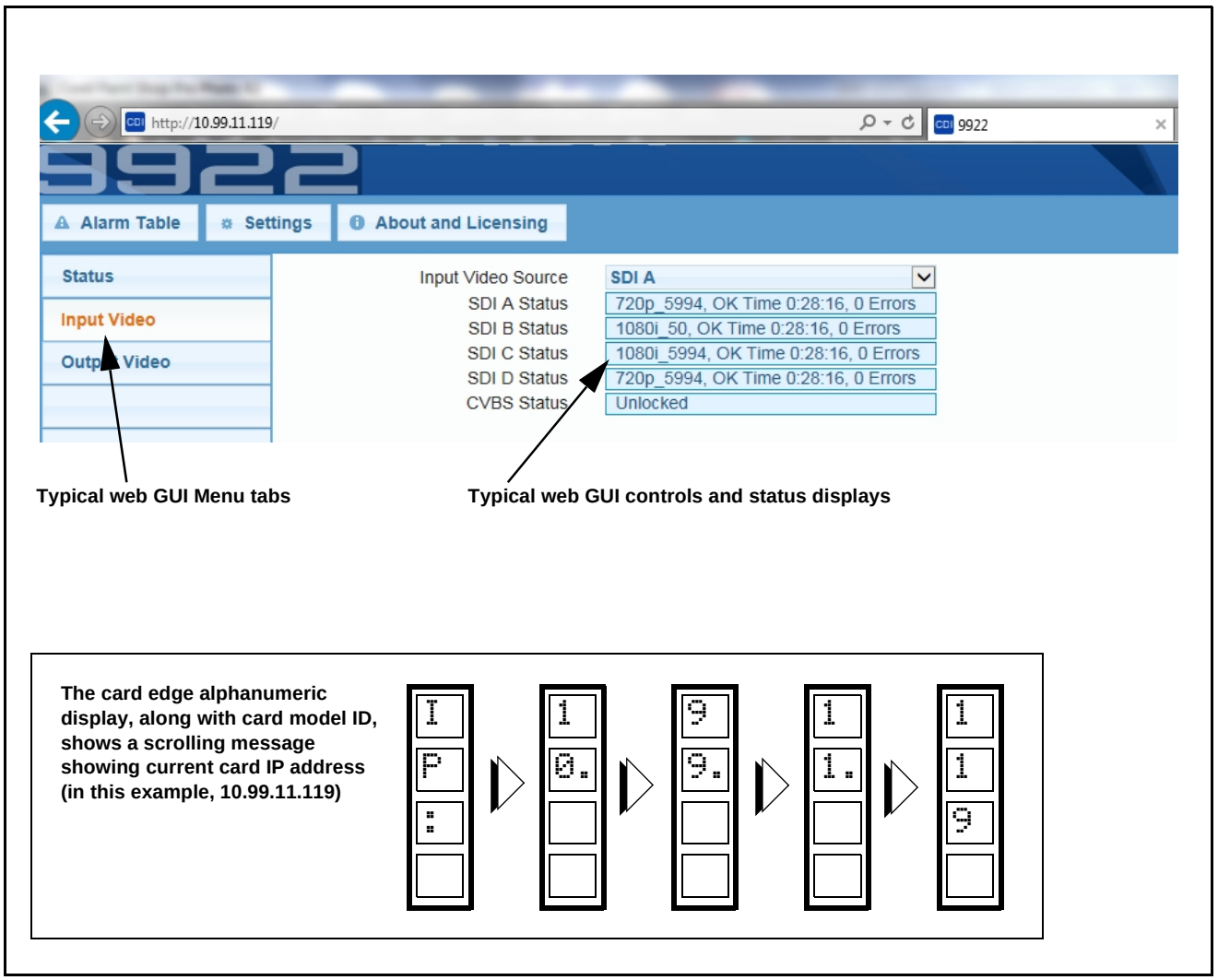


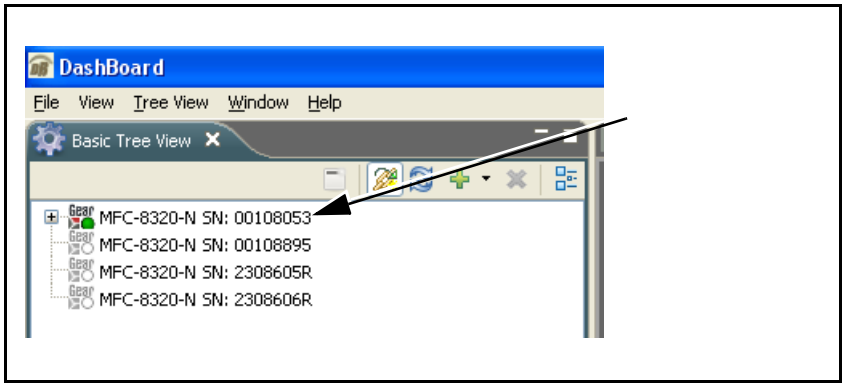
Figure 3-4 Typical Web GUI Tabs and Controls

Accessing the 9922-2FS Card via Remote Control

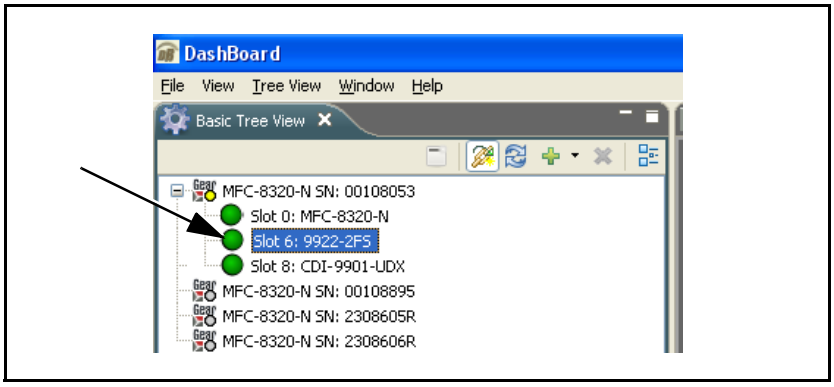
Access the 9922-2FS card using DashBoard™ or Cobalt® Remote Control Panel as described below.

Accessing the 9922-2FS Card Using DashBoard™

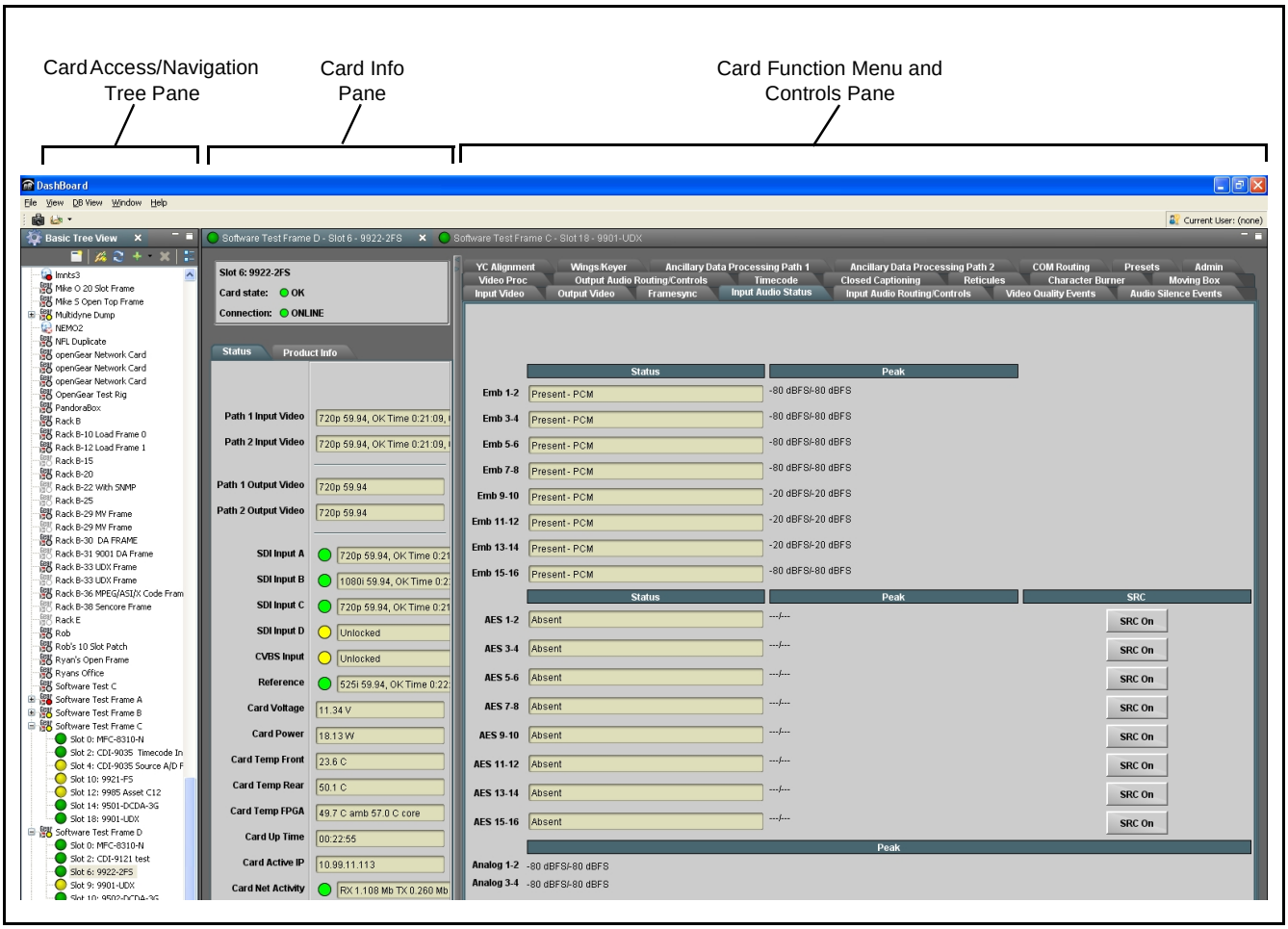
1. On the computer connected to the frame LAN, open DashBoard™.
2. As shown below, in the left side Basic View Tree locate the Network Controller Card associated with the frame containing the 9922-2FS card to be accessed (in this example, “MFC-8320-N SN: 00108053”).



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: 9922-2FS”).



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 9922-2FS 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 9922 - 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 9922-2FS Card Information

The operating status and software version the 9922-2FS card can be checked using DashBoard™ or the card edge control user interface. Figure 3-5 shows and describes the 9922-2FS 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 3-5. Yellow or red icons respectively indicate an alert or failure condition. Refer to Troubleshooting (p. 3-60) for corrective action.

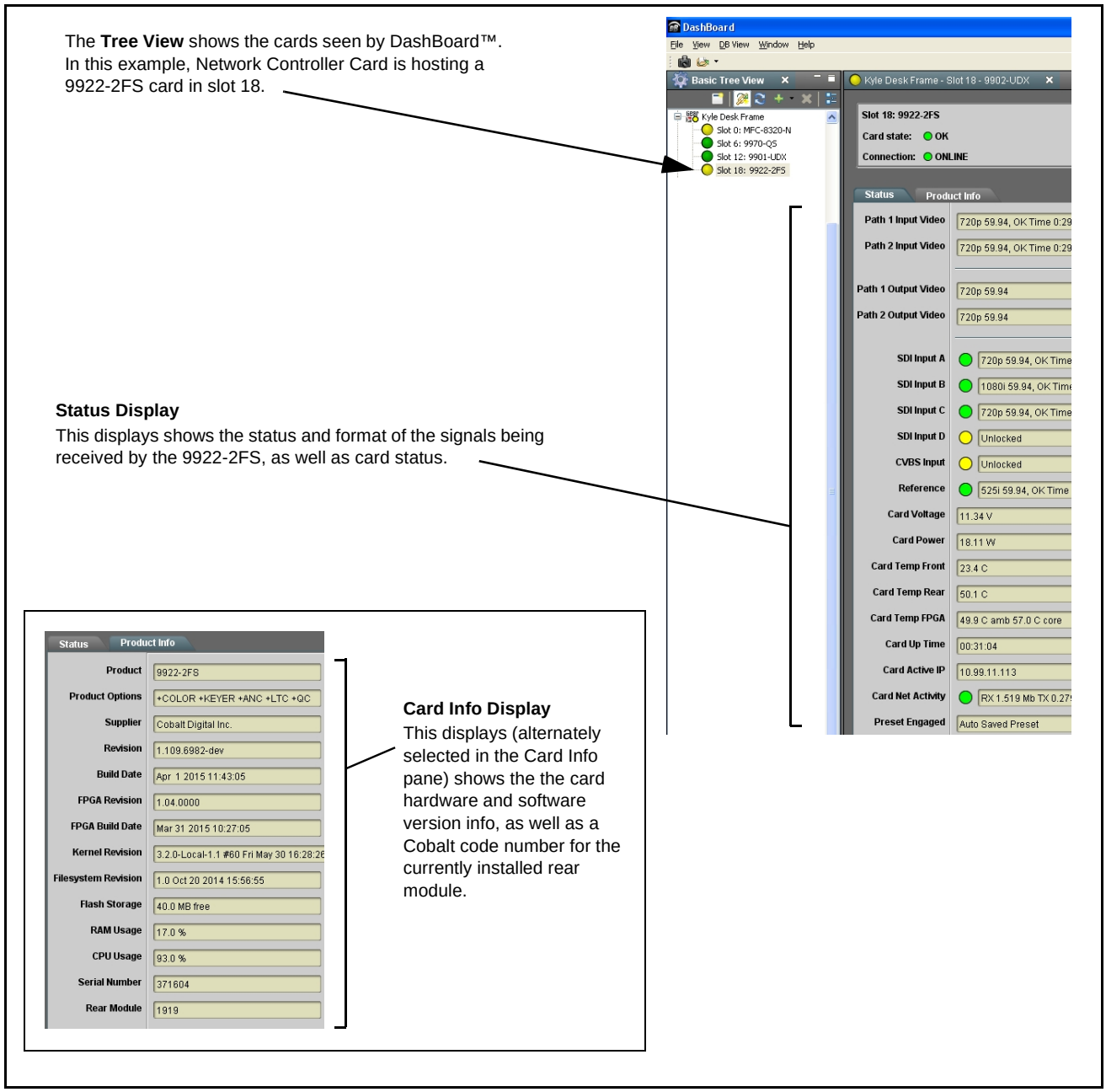


Figure 3-5 9922-2FS Card Info/Status Utility

Ancillary Data Line Number Locations and Ranges

Table 3-1 lists typical default output video VANC line number locations for various ancillary data items that may be passed or handled by the card.

Table 3-1 Typical Ancillary Data Line Number Locations/Ranges

Item	Default Line No. / Range	
	SD	HD
AFD	12 (Note 2)	9 (Note 2)
ATC_VITC	13 (Note 2)	9/8 (Note 2)
ATC_LTC	—	10 (Note 2)
Dolby® Metadata	13 (Note 2)	13 (Note 2)
SDI VITC Waveform	14/16 (Note 2)	—
Closed Captioning	21 (locked)	10 (Note 2)

Notes:

1. The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.
2. While range indicated by drop-down list on GUI may allow a particular range of choices, the actual range is automatically clamped (limited) to certain ranges to prevent inadvertent conflict with active picture area depending on video format. Limiting ranges for various output formats are as follows:

Format	Line No. Limiting	Format	Line No. Limiting	Format	Line No. Limiting
525i	12-19	720p	9-25	1080p	9-41
625i	9-22	1080i	9-20		

Because line number allocation is not standardized for all ancillary items, consideration should be given to all items when performing set-ups. Figure 3-6 shows an example of improper and corrected VANC allocation within an HD-SDI stream.

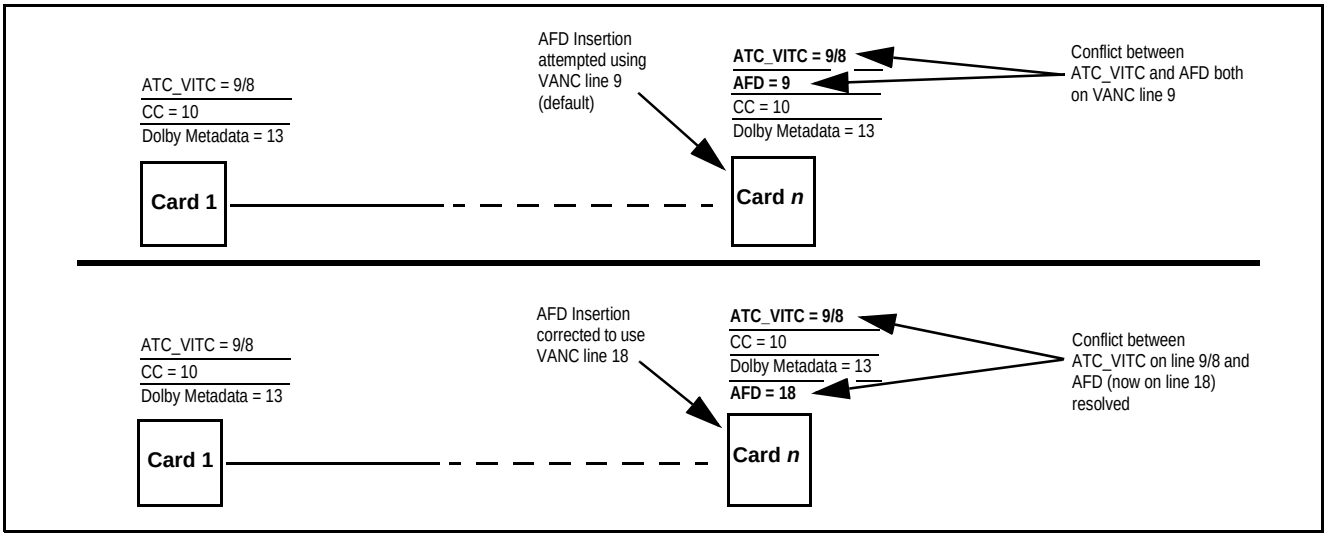


Figure 3-6 Example VANC Line Number Allocation Example

9922-2FS Function Menu List and Descriptions

Table 3-2 individually lists and describes each 9922-2FS function menu and its related list selections, controls, and parameters. Where helpful, examples showing usage of a function are also provided. Table 3-2 is primarily based upon using DashBoard™ to access each function and its corresponding menus and parameters.

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

On DashBoard™ itself and in Table 3-2, the function menu items are organized using tabs as shown below.

Some functions use **sub-tabs** to help maintain clarity and organization. In these instances, Table 3-2 shows the ordinate tab along with its sub-tabs. Highlighted sub-tabs indicate that controls described are found by selecting this sub-tab (in this example, the **Path 1** sub-tab on the **Framesync** page).

Note that selection of controls from one processing path to another is selected using this sub-tab which appears on many card function tabs.

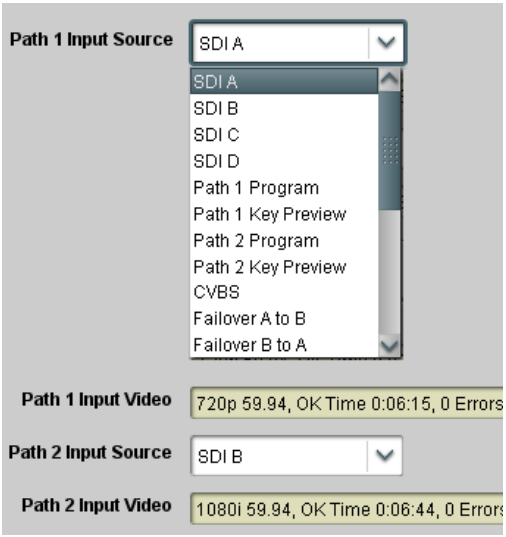
The table below provides a quick-reference to the page numbers where each function menu item can be found.

Table 3-2 9922-2FS Function Menu List

Input Video

Allows manual or failover selection of card SDI program video inputs and displays status and raster format of received SDI video.

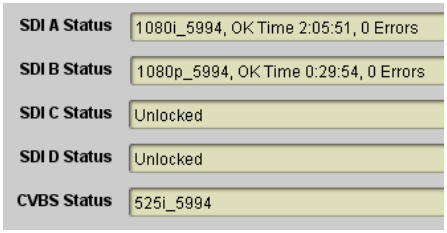
• Input Video Source/Status



Selects the input video source to be applied to the card's **Path 1** and **Path 2** program video inputs.

Note: • SDI inputs selected must be used with Rear I/O Module correspondingly equipped with intended input ports.
• Some choices shown are a function of card options.
• Input select also allows internal connection from one processing path output to the opposite processing path input. This allows "serial" or cascaded processing connections without requiring external jumpering on the card rear I/O module. Serial jumpering can, in addition to other functions, provide identical program video output streams with a delay offset between the two streams.

• Care should be taken to make certain an output from a video path is not applied as an input for the same path.

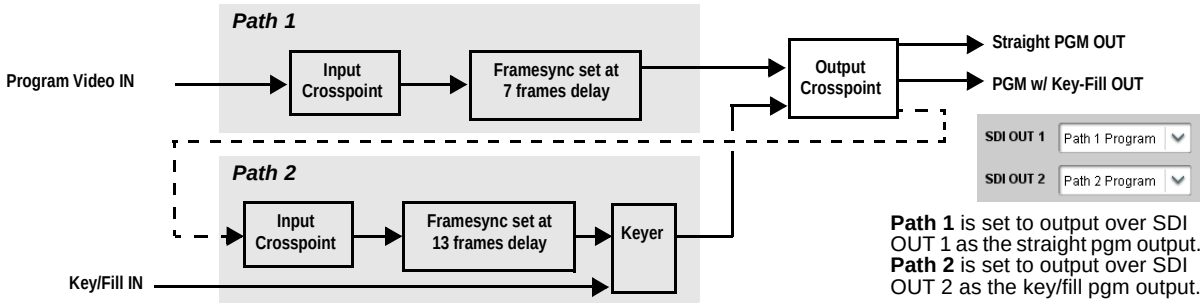


SDI A thru **SDI D** and **CVBS Status** show raster/format for all card inputs. If signal is not present or is invalid, **Unlocked** is displayed. (These status indications are also propagated to the Card Info pane.)

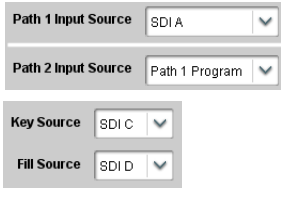
Note: Status display shows maximum card input complement. Input complement is determined by rear I/O module used.

Cascaded "Serial" Dual Path Example

In this example, the dual paths are used to provide a regular program video path, as well as an identical path that imports key/fill. The second path used for key/fill uses an independent delay value to accommodate the key/fill graphics external devices.



Path 1 is set to output over SDI OUT 1 as the straight pgm output. **Path 2** is set to output over SDI OUT 2 as the key/fill pgm output.



Path 1 receives the basic pgm input, while **Path 2** receives the 7-frame delayed pgm output. Along with key/fill inputs received over SDI IN C and D, this path provides the key/fill version of the pgm video, with added delay to accommodate the key/fill sources.

Table 3-2 9922-2FS Function Menu List — continued

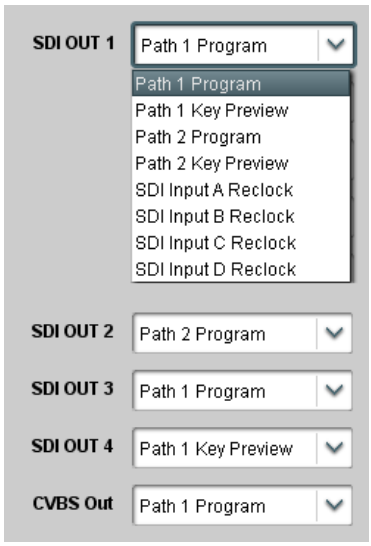
<table>
<tr>
<td> 
</td>
<td>Allows selection of each of the four video output coaxial connectors as processed SDI out or reclocked SDI out. Also provides CVBS parameter controls and test pattern output controls for card CVBS output.</td>
</tr>
<tr>
<td>• Output Video Crosspoint
 
</td>
<td>For each SDI output port supported by the card, provides a crosspoint for routing Path 1 and Path 2 program processed video or selected-input reclocked to an SDI output. Also selects Path 1 or Path 2 as the source to be used for the card analog video (CVBS) output.
In this example:
- SDI OUT 1 set to use Path 1 Program video out
- SDI OUT 2 set to use Path 2 Program video out
- CVBS Out set to use Path 1 Program video out
Note: Choices shown here are examples only. Key preview available only when equipped with +KEYER option.</td>
</tr>
<tr>
<td> 
</td>
<td>Provides CVBS output parameter controls and test pattern output controls</td>
</tr>
<tr>
<td>• CVBS Oversampling and Color Controls
 
</td>
<td>• Oversampling enables or disables video DAC oversampling. Oversampling can improve rendering of motion for down-conversions to the CVBS SD analog output.
• Color enables or disables chroma content in the CVBS output.</td>
</tr>
<tr>
<td>• CVBS Test Pattern Generator Control
 
</td>
<td>Enables manual insertion (replacement) of CVBS output video to instead output 75% color bars.</td>
</tr>
</table>

Table 3-2 9922-2FS Function Menu List — continued

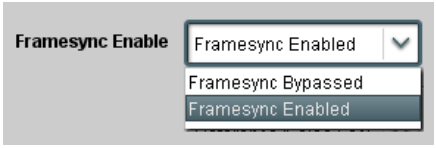
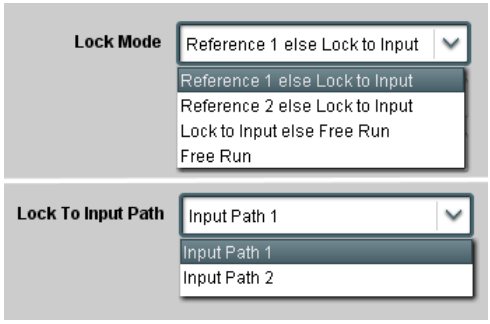
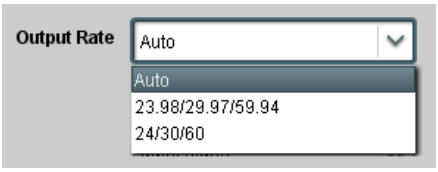
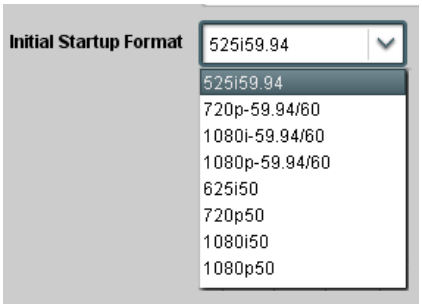
	Provides video frame sync/delay offset control and output control/loss of program video failover selection controls.
Note: Framesync tab has identical independent controls for both Path 1 and Path 2 using the **Path 1 / Path 2** sub-tabs. Therefore, only the **Path 1** controls are shown here. Set controls for other path using the respective sub-tab.	
• **Framesync Enable/Disable Control** 	Provides master enable/disable of all card framesync functions/controls.
• **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 Card state: Reference Invalid indication appears in the Card Info status portion of DashBoard™, indicating invalid frame sync reference error. • **Lock to Input:** Uses the selected program video for the path as the reference standard. **Lock To Input Path** selects the program video source which is used for ref. **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.
• **Output Rate Select** 	Allows frame rate to be outputted same as input video, or converted to from the choices shown to the left and described below. • **Auto** – output video frame rate tracks with input video. • **23.98/29.97/59.94** – forces standard North American frame rates. Can be used to convert 24/30/60 Hz camera frame rates to corresponding 23.98/29.97/59.94 standard North American frame rates. • **24/30/60** – forces 24/30/60 frame rates. Can be used to convert 23.98/29.97/59.94 Hz frame rates to corresponding 24/30/60 Hz frame rates.
• **Initial Startup Format Select** 	Selects a synthesized frame sync format/rate to be invoked (from the choices shown to the left) in the time preceding stable lock to external reference. Set this control to that of the intended external reference to help ensure smoothest frame sync locking. This control also sets the card test pattern format where the card's initial output at power-up is the internal pattern instead of program video.

Table 3-2 9922-2FS Function Menu List — continued

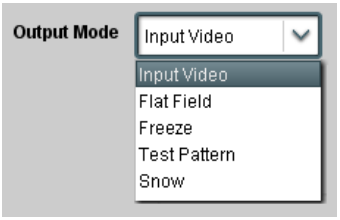
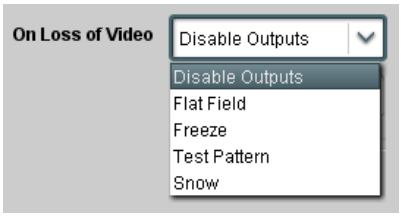
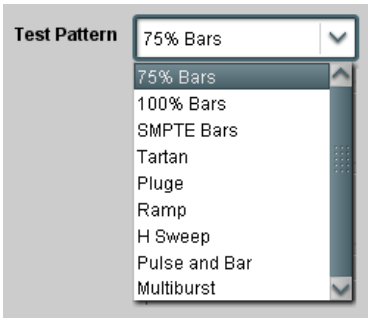
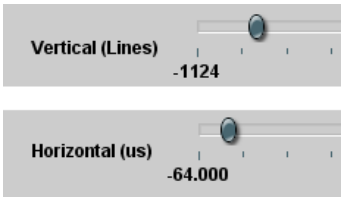
	**(continued)**
• Program Video Output Mode Select 	Provides a convenient location to select between card program video output and other technical outputs from the choices shown to the left and described below. • **Input Video** – card outputs input program video (or loss of signal choices described below). • **Flat Field (Black)** – card outputs black flat field. • **Freeze** – card outputs last frame having valid SAV and EAV codes. • **Test Pattern** – card outputs standard technical test pattern (pattern is selected using the Pattern drop-down described below). • **Snow** – card outputs synthesized snow multi-color pattern.
• Loss of Input Signal Selection 	In the event of program input video Loss of Signal (LOS), determines action to be taken as follows: • **Disable Outputs:** Disable program video SDI outputs. • **Flat Field (Black)** – go to black flat field on program video output. • **Freeze** – go to last frame having valid SAV and EAV codes on program video output. • **Test Pattern** – go to standard technical test pattern on program video output (pattern is selected using the Pattern drop-down described below). • **Snow** – output synthesized snow multi-color pattern.
• Test Pattern Select 	Provides a choice of standard technical patterns (shown to the left) when **Test Pattern** is invoked (either by LOS failover or directly by selecting Test Pattern 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.

Table 3-2 9922-2FS Function Menu List — continued

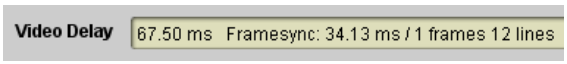
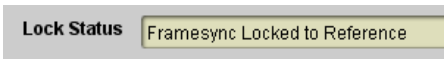
	**(continued)**
• **Frame Delay Control** 	When Framesync is enabled, specifies the smallest amount of latency delay (frames held in buffer) allowed by the frame sync. The frame sync will not output a frame unless the specified number of frames are captured in the buffer. **The operational latency of 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 **Report Delay** display to kame 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.
Note: Audio timing offset from video is performed using the delay controls on the Input Audio Routing/Controls tab. Refer to Input Audio Routing/Controls (p. 3-17) for these controls.	

Table 3-2 9922-2FS Function Menu List — continued

Displays signal status and payload for embedded and discrete audio received by the card.

Note: **Input Audio Status** tab has identical independent controls/status displays for both Path 1 and Path 2 using the **Path 1 / Path 2** sub-tabs. Therefore, only the **Path 1** controls are shown here. Access controls and status for other path using the respective sub-tab.

Individual signal status and peak level displays for embedded audio input pairs, and AES/analog input pairs as described below. AES pair status also shows sample rate.

- **Absent:** Indicates embedded channel or AES pair does not contain recognized audio PCM data.
- **Present - PCM:** Indicates AES pair or embedded channel contains recognized audio PCM data.
- **Dolby E:** Indicates embedded channel or AES pair contains Dolby® E encoded data.
- **Dolby Digital:** Indicates embedded channel or AES pair contains Dolby® Digital encoded data.

Note: • Dolby status displays occur only for valid Dolby® signals meeting SMPTE 337M standard.

• AES Dolby-encoded inputs that are routed directly to card are directed via a special path that automatically bypasses SRC. However, AES inputs to other destinations (e.g., AES embedding) are first applied through SRC. These paths disable SRC if Dolby-encoded data is detected. To avoid a possible “Dolby noise burst” if an input on these paths changes from PCM to Dolby, it is recommended to set the AES **SRC** control for the pair to **SCR Off** for an AES input that is expected to carry a Dolby signal.

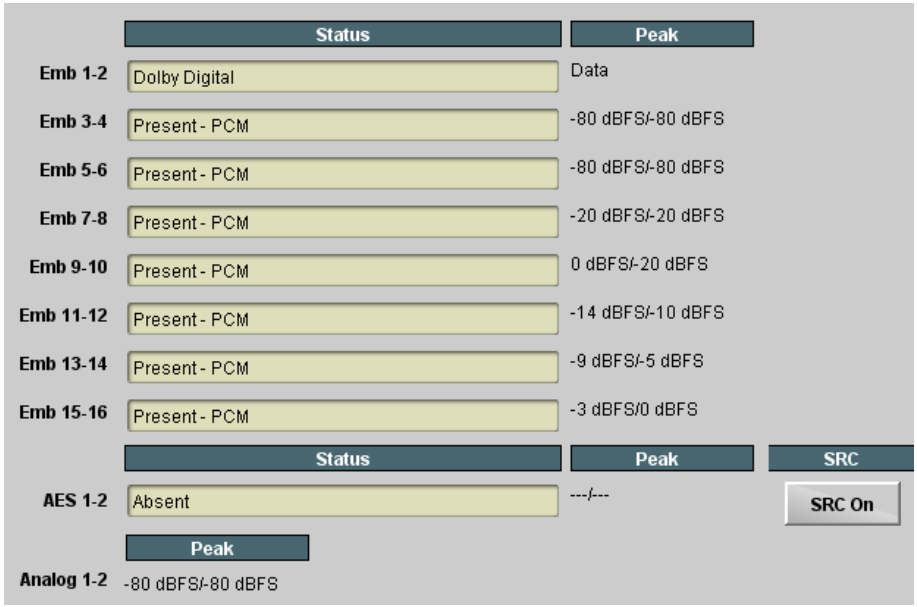
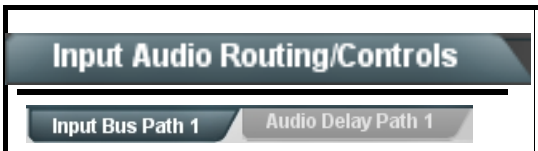


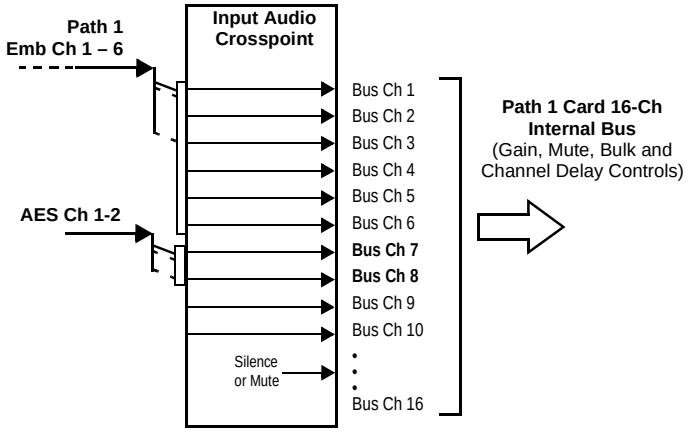
Table 3-2 9922-2FS Function Menu List — continued



Provides audio routing, gain, 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).

Note:
- **Input Audio Routing/Controls** tab has identical independent controls for both Path 1 and Path 2 using the **Path 1 / Path 2** sub-tabs. Therefore, only the **Path 1** controls are shown here. Set controls for other path using the respective sub-tab.
- Although either path can embed from, and de-embed to, discrete audio interfaces, the embedded channels within a path can only be cross-routed embedded within the respective path's 4-group embedded audio (e.g., Path 1 Emb Ch 1 can not be sourced from Path 2 Emb Ch 1).

• • •



All audio inputs are transferred through the card via each path's 16-channel Internal Bus (**Bus Ch 1** thru **Bus Ch 16**).

The example above shows various Source selections that direct Emb Ch 1 thru Ch 6 and AES Ch 1 and Ch 2 onto the card internal bus (unused bus channels can be set to Silence or Mute).

Each bus channel provides Gain, Mute, and Invert controls.

The source-to-destination correlation shown here is only an example; **any** of the sources described on the following pages can route to **any** of the internal bus channels.

Table 3-2 9922-2FS Function Menu List — continued

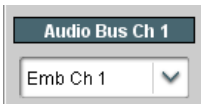
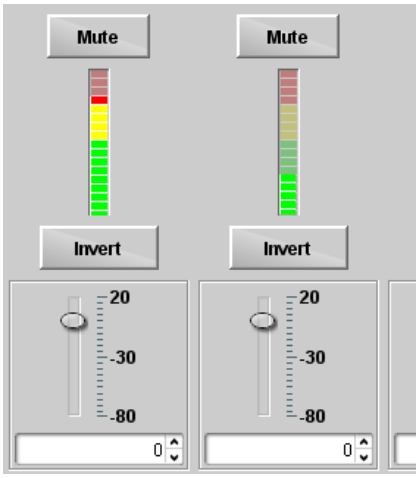
	**(continued)**
Note: • Default factory preset routing routes embedded Ch 1 thru Ch 16 to bus channels Audio Bus Ch 1 thru Ch 16. • **Bus Ch 2** thru **Bus Ch 16** have controls identical to the controls described here for **Bus Ch 1**. Therefore, only the **Bus Ch 1** controls are shown here.	
• **Bus Channel Source** 	Using the **Source** drop-down list, selects the audio input source to be routed to the card bus channel from the following choices: • Embedded input channel 1 thru 16 (**Emb Ch 1** thru **Emb Ch 16**) • AES input channel 1 thru 16 (**AES Ch 1** thru **AES Ch 16)** • Analog input channel 1 thru 4 (**Analog Ch 1** thru **Analog Ch 4**) **Note:** • AES pair and analog channel count are dependent on rear I/O module used. Current rear modules may not support full input complement. • Embedded channel sources are only the embedded channels associated with the respective path.
• **Channel Mute/Phase Invert/Gain Controls and Peak Level Display** 	Provides **Mute** and phase **Invert** channel controls, as well as peak level meter for each output channel. (Meter shows level as affected by Level control.) **Gain** controls allow relative gain (in dB) control for the corresponding destination Embedded Audio Group channel. (-80 to +20 dB range in 1.0 dB steps; unity = 0 dB) **Note:** Although the card can pass non-PCM data such as Dolby® E or AC-3, setting the gain control to any setting other than default 0 will corrupt Dolby data.
	**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).

Table 3-2 9922-2FS Function Menu List — continued

(continued)

• **Per-Channel Audio/Video Delay Offset Controls**

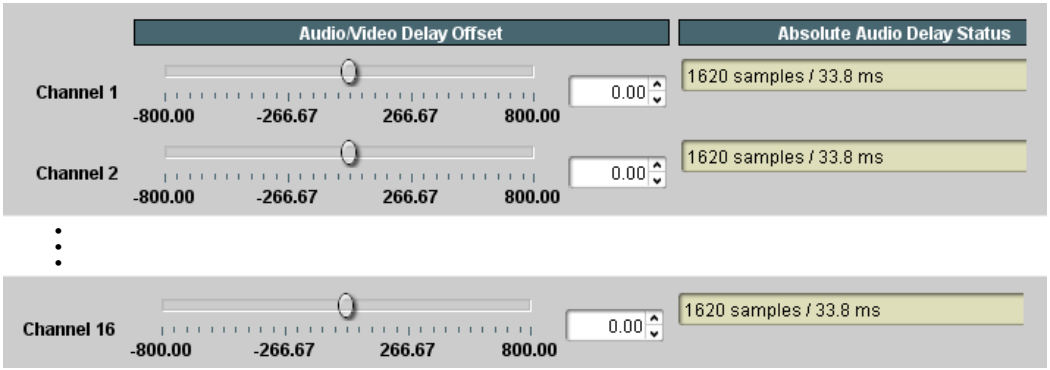
Offset control adds or reduces (offsets) channel audio delay from the matching video delay (audio delay offset setting adds or removes delay in addition to any delay included by other actions). This control is useful for correcting lip sync problems when video and audio paths in the chain experience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

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

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

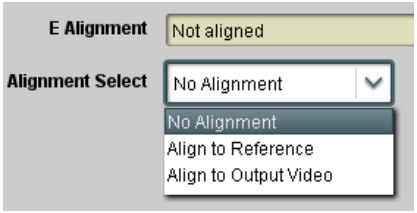
Note: • Maximum advance/delay offset is dependent on video format.

• Where a Dolby pair is present, adjustment of either channel control results in a matching delay setting for the other channel in the pair.



Dolby E Alignment – Provides selectable Dolby E alignment for embedded Dolby E to position the bitstream utilizing the Dolby E "guard band". This helps prevent frame errors that may occur in a bitstream upon switching or editing.

• **Dolby E Embedding Alignment Control**

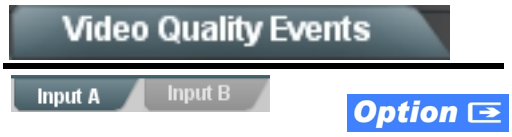


For incoming Dolby E data routed to the card audio bus (either over embedded channels or via AES embedding to the bus), aligns the embedded Dolby data corresponding to selection. Alignment line as a result of selection is shown in **E Alignment** status display.

Note: Where a frame reference is available, it is recommended to use the **Align to Reference** selection. This helps ensure that the correct alignment is achieved even if the video is user delayed or output format (scaling) is changed.

Refer to "Preferred Alignment for Dolby E in HD Systems" (http://www.dolby.com/about/news-events/newsletters-dtvaudio-dolby-e-alignment.html) for more information regarding Dolby E alignment.

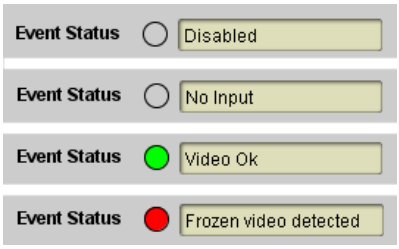
Table 3-2 9922-2FS Function Menu List — continued



(Option **+QC** only) Sets quality check screening and thresholds for video quality event alerts. When a quality events occur, the event(s) can be used by the Presets function to invoke input routing or other changes.

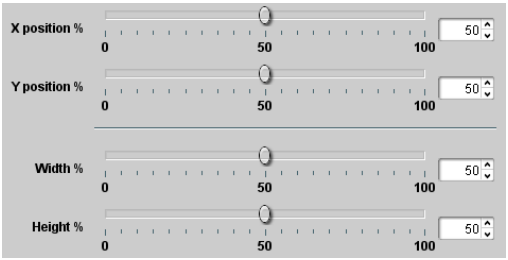
Note: **Input B** thru **Input D** have controls identical to the controls described here for **Input A** sub-tab. Therefore, only the **Input A** controls are shown here. Set controls for other inputs using the respective sub-tab.

• Event Status Indicator



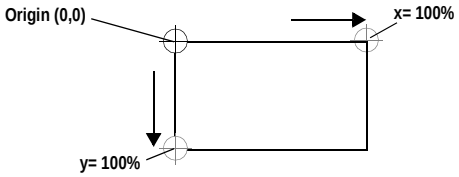
Displays event status (based on criteria set below) for signal condition to be considered OK (green), or signal condition considered to be a quality alert event (red) due the condition exceeding the criteria threshold(s) set below.

• Position and Width Controls

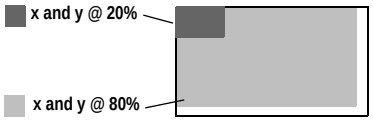


Position and Width controls set the area of concern to be screened by the Quality Event function.

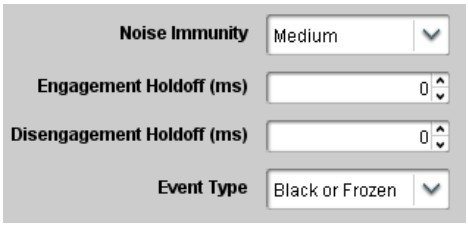
X and Y Position controls set the origin point for the area of concern



X and Y Width controls set the size for the area of concern



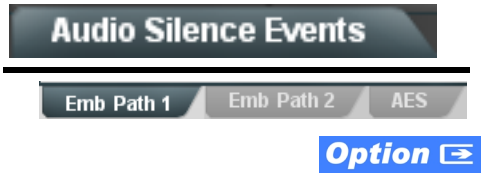
• Threshold and Event Type Controls



Sets the thresholds for black frame and event type to be considered. Also provides holdoff controls for event trigger engagement and disengagement.

- **Noise Immunity** sets the relative noise levels that are rejected in the course of black event assessment (Low, Medium, or High).
- **Engagement Holdoff** sets the time (in msec) where, when time is exceeded, an event is to be considered a valid alert event.
- **Disengagement Holdoff** sets the time (in msec) where, when event time is has ceased, an alert event is cleared.
- **Event Type** sets the type of event(s) to be considered by the event screening (Disabled, Frozen frame, Black frame, or either Black or Frozen frame).

Table 3-2 9922-2FS Function Menu List — continued

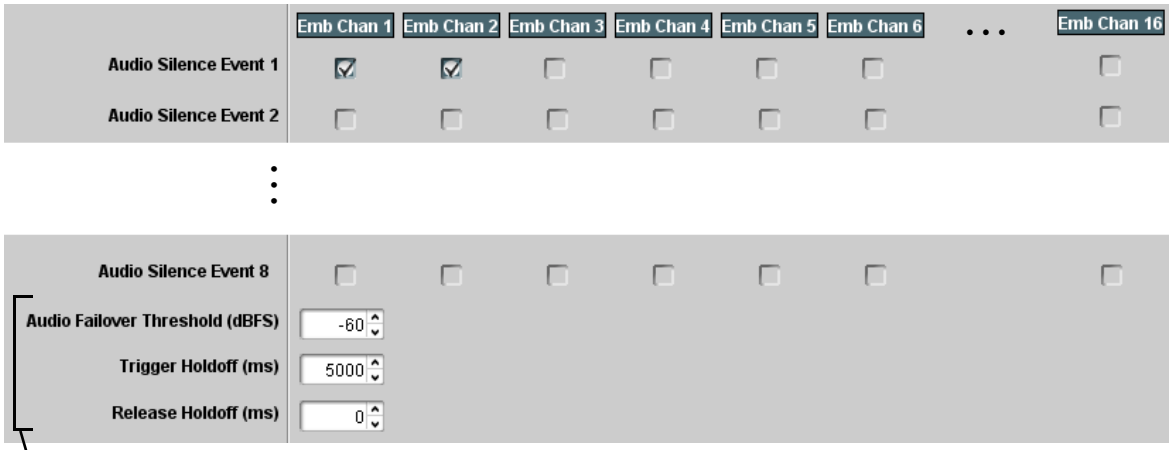


(Option **+QC** only) Sets audio level screening and thresholds for audio silence event alerts on either processing paths and/or AES discrete audio in. When a silence events occur, the event(s) can be used by the Presets function to invoke input routing or other changes.

Note: **Emb Path 1**, **Emb Path 2**, and **AES** input select sub-tabs have controls identical to the controls described here for **Emb Path 1** sub-tab. Therefore, only the **Emb Path 1** controls are shown here. Set controls for other inputs using the respective sub-tab.

Any combination of the processed video path embedded channels can be selected to be screened for silence. In the example here, **Audio Silence Event 1** is set to trigger if audio on **both** Emb Ch 1 and Ch 2 fall below the selected threshold for an interval exceeding the selected threshold.

Up to eight independent audio silence events can be set to be screened (with descending priority of consideration from Event 1 down to Event 8). This status here can be propagated to the **Presets > Event Triggers** sub-tab controls to issue a card GPO, preset engage, or other command when audio silence events are detected.



- **Audio Failover Threshold** sets the level at which channel content is considered to be silent, and correspondingly also a transition back to an untriggered condition with resumption of audio for the selected embedded channels. If the selected channels maintain levels above the selected **Audio Failover Threshold**, no triggering is invoked.
- **Trigger Holdoff** sets the period of time in which selected channel silence must occur before an Audio Silence Event trigger goes true.
- **Release Holdoff** control sets the time in which the trigger is revoked upon an event false condition.

Note: • Default threshold and holdoff settings shown here are recommended for typical use.
• Checkboxes work as an AND function. Where multiple boxes are checked, a true (trigger) condition is not propagated unless **all** selected channels experience the configured silence criteria. (In the example shown above, **both** Emb Ch 1 and Emb Ch 2 would have to experience silence before a Silence Event was propagated.)

Table 3-2 9922-2FS Function Menu List — continued

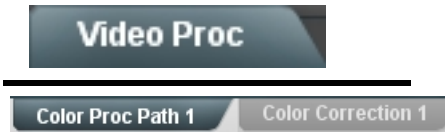
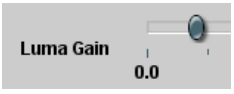
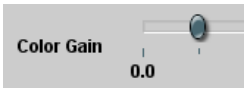
	Provides the following Video Proc and Color Correction parametric controls.
Note: **Video Proc** tab has identical independent controls for both Path 1 and Path 2 using the **Path 1 / Path 2** sub-tabs. Therefore, only the **Path 1** controls are shown here. Set controls for other path using the respective sub-tab.	
• **Video Proc** 	**Video Proc (Enable/Disable)** provides master on/off control of all 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. When Confirm is clicked, a **Confirm?** pop-up appears, requesting confirmation. • 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 3-2 9922-2FS Function Menu List — continued

Option

(Option **+COLOR** only) Provides color corrector functions for the individual RGB channels for the card program video path.

- **Color Corrector**

Color Corrector (On/Off) provides master on/off control of all Color Corrector functions.

- When set to **Off**, all processing is bypassed.
- When set to **On**, currently displayed parameters settings take effect.

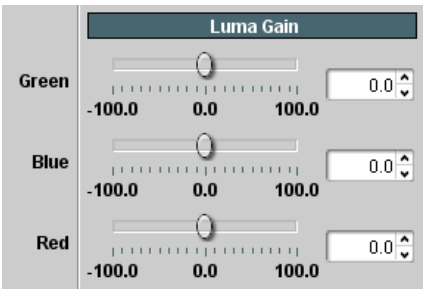
- **Reset to Unity**

Reset to Unity provides unity reset control of all Color Corrector functions.

When Confirm is clicked, a **Confirm?** pop-up appears, requesting confirmation.

- Click **Yes** to proceed with the unity reset.
- Click **No** to reject unity reset.

- **Luma Gain R-G-B controls**



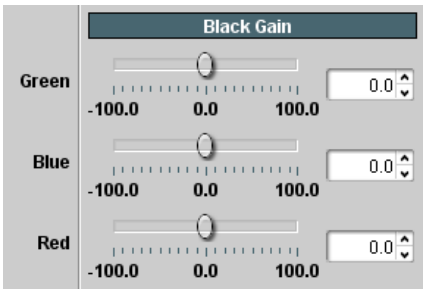
Separate red, green, and blue channels controls for Luma Gain, Black Gain, and Gamma curve adjustment.

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 (Luma, Black, 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.

- **Black Gain R-G-B controls**



- **Gamma Factor R-G-B controls**

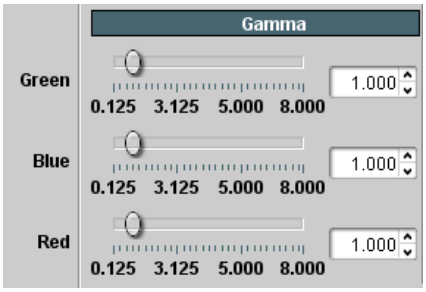
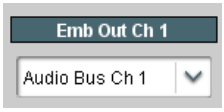


Table 3-2 9922-2FS Function Menu List — continued

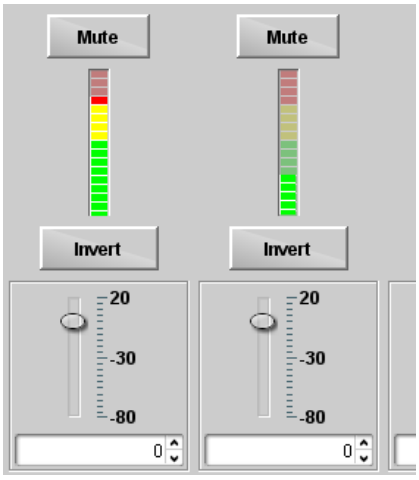
	**(continued)**
• **Black Hard Clip** 	Applies black hard clip (limiting) at specified percentage. (-6.8% to 50.0%; null = -6.8%)
• **White Hard Clip** 	Applies white hard clip (limiting) at specified percentage. (50.0% to 109.1%; null = 109.1%)
• **White Soft Clip** 	Applies white soft clip (limiting) 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%)

Table 3-2 9922-2FS Function Menu List — continued

<table>
<tr><td> 
</td><td>Provides an audio crosspoint allowing the audio source selection for each embedded audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.</td></tr>
<tr><td colspan="2">Note: • Output Audio tab has identical independent controls for both Embedded Path 1 and Path 2 using the Path 1 / Path 2 sub-tabs. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab.
• Embedded Ch 2 thru Embedded Ch 16 have controls identical to the Source, Gain, Mute, and Invert controls described here for Embedded Ch 1. Therefore, only the Embedded Ch 1 controls are shown here.
• Although either path can embed from, and de-embed to, discrete audio interfaces, the embedded channels within a path can only be cross-routed embedded within the respective path's 4-group embedded audio (e.g., Path 1 Emb Ch 1 can not be sourced from Path 2 Emb Ch 1).</td></tr>
<tr><td>• Group Enable/Disable Controls
 
</td><td>Allows enable/disable of embedded audio groups 1 thru 4 on card program video output to accommodate some legacy downstream systems that may not support all four embedded audio groups.

Note: Changing the setting of this control will result in a noise burst in all groups. This control should not be manipulated when carrying on-air content.</td></tr>
<tr><td>• Embedded Output Channel Source
 
</td><td>Using the drop-down list, selects the audio input source to be embedded in the corresponding embedded output channel from the following choices:
• Card Audio Bus Ch 1 thru Ch 16
• Built-in Tone generators Tone 1 thru Tone 16
(all are -20 dBFS level; freq (Hz) in ascending order are 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k)

Note: Multiple tone generators, even if set to the same frequency, may not exhibit phase coherence. If identical tones with frequency and phase coherence are required, use a single tone generator (e.g., "Tone 1") across multiple channels instead of multiple generators set to the same frequency.

• Option Audio LTC
• Downmixer L
• Downmixer R</td></tr>
<tr><td>• Channel Mute/Phase Invert/Gain Controls and Peak Level Display
 
</td><td>Provides Mute and phase Invert channel controls, as well as peak level meter for each output channel. (Meter shows level as affected by Level control.)

Gain controls allow relative gain (in dB) control for the corresponding destination Embedded Audio Group channel.

(-80 to +20 dB range in 1.0 dB steps; unity = 0 dB)

Note: Although the 9922-2FS can pass non-PCM data such as Dolby® E or AC-3, setting the gain control to any setting other than default 0 will corrupt Dolby data.</td></tr>
</table>

Table 3-2 9922-2FS Function Menu List — continued

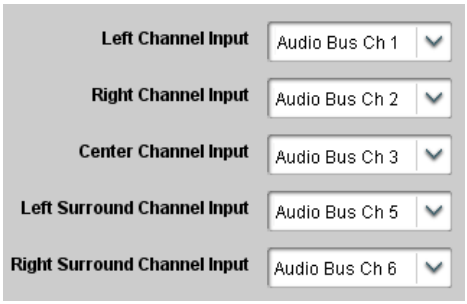
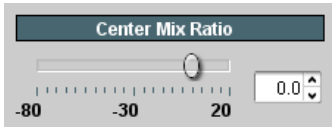
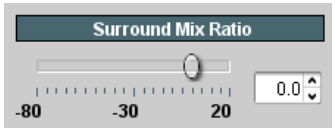
	Provides audio down-mix audio routing selections that multiplexes any five audio channel sources into a stereo pair.
Note: • **Downmixer** sub-tabs offer identical independent controls for both Embedded Path 1 and Path 2. Therefore, only the **Path 1** controls are shown here. Set controls for other path using the respective sub-tab. • Downmix L/R channel pair sources are available only within a respective path (e.g., Path 1 downmixed channels can only be sourced from Path 1).	
• **Downmixer Source Controls** 	**Left Channel Input** thru **Right Surround Channel Input** select the five audio bus source channels to be used for the downmix. Downmix channels **Downmixer L** and **Downmixer R** are available as sources for embedded, AES, or analog audio outputs 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.
• **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.

Table 3-2 9922-2FS Function Menu List — continued

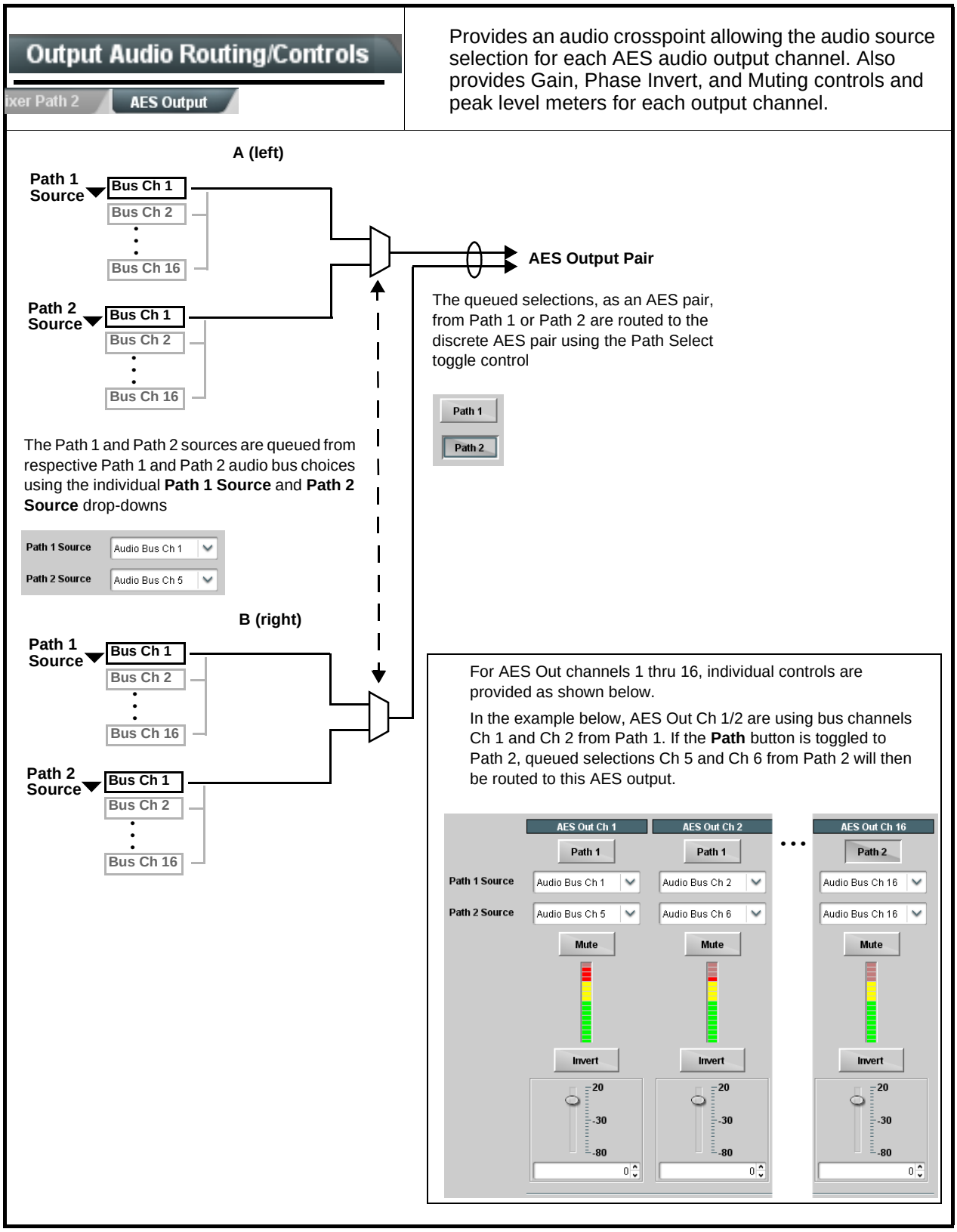


Table 3-2 9922-2FS Function Menu List — continued

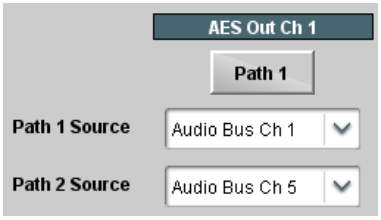
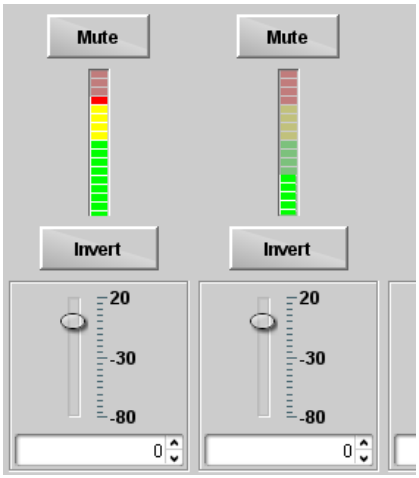
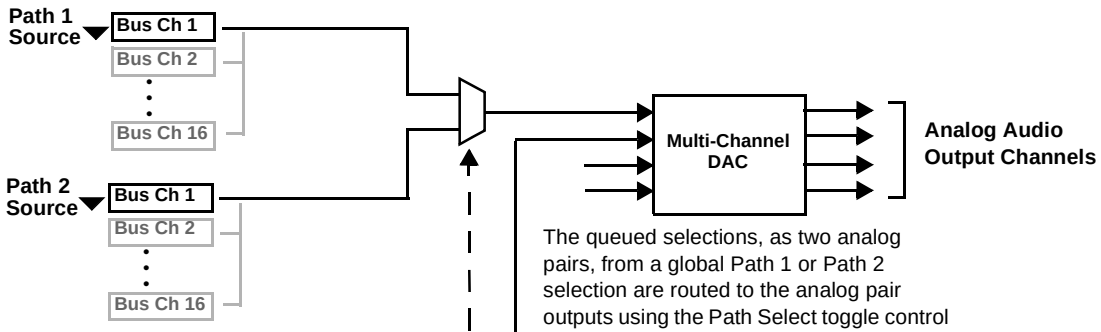
	**(continued)**
Note: • **AES Out Ch 2** has controls identical to the **Source**, **Gain**, **Mute**, and **Invert** controls described here for **AES Out Ch 1**. Therefore, only the **AES Out Ch 1** controls are shown here. • For each channel, its source and destination should be considered and appropriately set. Unused destination channels should be set to the **Silence** selection.	
• **AES Output Channel Source** 	Using the **Path 1 Source** and **Path 2 Source** drop-down lists, selects the audio input source to be routed to the corresponding AES output channel from the choices listed below. Apply the desired path selection using the **Path** toggle button. • Card **Audio Bus Ch 1** thru **Ch 16** • Built-in Tone generators **Tone 1** thru **Tone 16** (all are -20 dBFS level; freq (Hz) in ascending order are 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k) **Note:** Multiple tone generators, even if set to the same frequency, may not exhibit phase coherence. If identical tones with frequency and phase coherence are required, use a single tone generator (e.g., "TG1") across multiple channels instead of multiple generators set to the same frequency. • *Option* Audio **LTC** • **Downmixer L** • **Downmixer R**
• **Channel Mute/Phase Invert/Gain Controls and Peak Level Display** 	Provides **Mute** and phase **Invert** channel controls, as well as peak level meter for each output channel. (Meter shows level as affected by Level control.) **Gain** controls allow relative gain (in dB) control for the corresponding destination AES output channel. (-80 to +20 dB range in 1.0 dB steps; unity = 0 dB) **Note:** Although the 9922-2FS can pass non-PCM data such as Dolby® E or AC-3, setting the gain control to any setting other than default 0 will corrupt Dolby data.

Table 3-2 9922-2FS Function Menu List — continued

Output Audio Routing/Controls

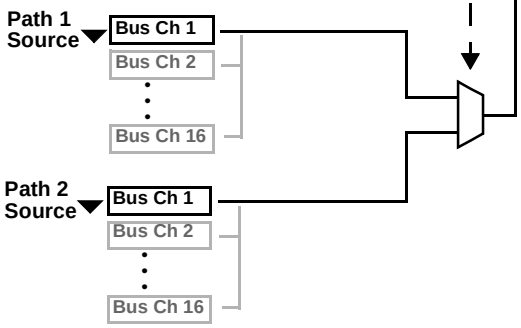
Analog Audio Out | Downmixer

Provides an audio crosspoint allowing the audio source selection for each analog audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.



The queued selections, as two analog pairs, from a global Path 1 or Path 2 selection are routed to the analog pair outputs using the Path Select toggle control

The Path 1 and Path 2 sources are queued from respective Path 1 and Path 2 audio bus choices using the individual **Path 1 Source** and **Path 2 Source** drop-downs



For Analog Out channels 1 thru 4, individual controls are provided as shown below.

In the example below, Analog Out Ch 1/2 are using bus channels Ch 1 and Ch 2 from Path 1. If the **Path** button is toggled to Path 2, queued selections Ch 7 and Ch 8 from Path 2 will then be routed to this AES output. The **Path** select toggle button works globally for all individual channels as a whole.

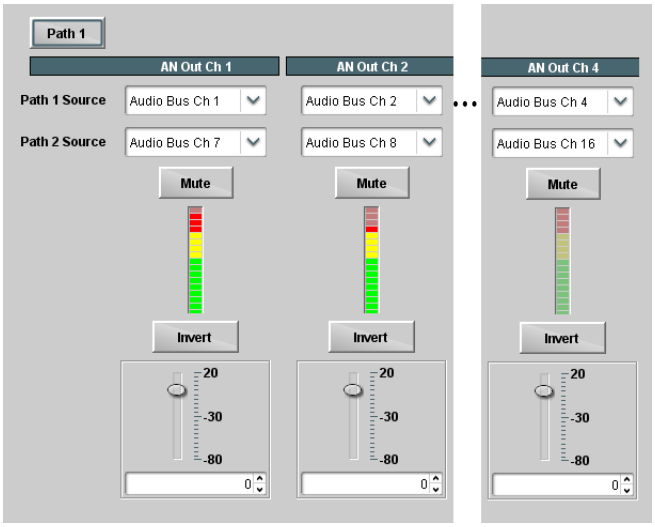


Table 3-2 9922-2FS Function Menu List — continued

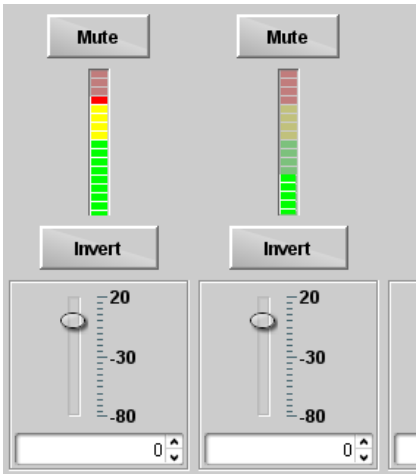
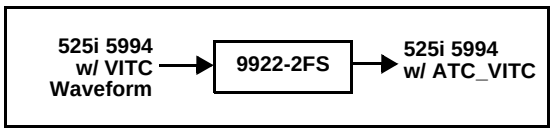
	**(continued)**
• **Analog Output Channel Source** 	Using the **Source** drop-down list, selects the audio input source to be routed to the corresponding analog audio output channel from the following choices: • Card **Audio Bus Ch 1** thru **Ch 16** • Built-in Tone generators **Tone 1** thru **Tone 16** (all are -20 dBFS level; freq (Hz) in ascending order are 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k) **Note:** Multiple tone generators, even if set to the same frequency, may not exhibit phase coherence. If identical tones with frequency and phase coherence are required, use a single tone generator (e.g., "Tone 1") across multiple channels instead of multiple generators set to the same frequency. • *Option* Audio **LTC** • **Downmixer L** • **Downmixer R**
• **Channel Mute/Phase Invert/Gain Controls and Peak Level Display** 	Provides **Mute** and phase **Invert** channel controls, as well as peak level meter for each output channel. (Meter shows level as affected by Level control.) **Gain** controls allow relative gain (in dB) control for each corresponding destination analog audio out channel. (-80 to +20 dB range in 1.0 dB steps; unity = 0 dB)

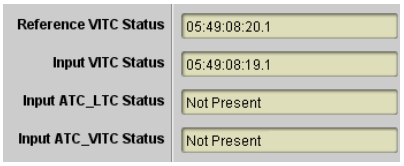
Table 3-2 9922-2FS Function Menu List — continued

Provides timecode data extraction from various sources, and provides formatting and re-insertion controls for inserting the timecode into the output video.

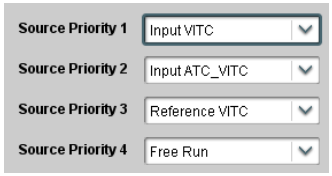
Note:
- **Timecode** tab has identical independent controls for both Path 1 and Path 2 using the **Path 1 / Path 2** sub-tabs. Therefore, only the **Path 1** controls are shown here. Set controls for other path using the respective sub-tab.
- SMPTE embedded timecode controls and processing are correlated only to the path selected. Timecode data cannot be transferred from one path stream to another.

Shown below is an example in which received 525i 5994 SDI video with VITC waveform timecode is being processed to output ATC_VITC timecode. To re-format and insert the timecode data, the following can be performed using the Timecode function. Each Timecode control is fully described on the pages that follow.



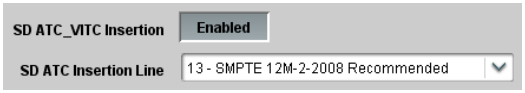


(A) Noting that the incoming video contains VITC waveform timecode data (as shown in the status display), set the Source Priority drop-down lists to include VITC Waveform timecode data (**SDI VITC**) as a choice. This extracts VITC Waveform timecode data from the incoming video.



(B) In this example, it is desired to provide SDI ATC_VITC timecode data in the processed output video. As such, set **SD ATC VITC Insertion** to **Enabled**.

In the example here, the line numbers are set to the default SMPTE 12M-2-2008 recommended values.



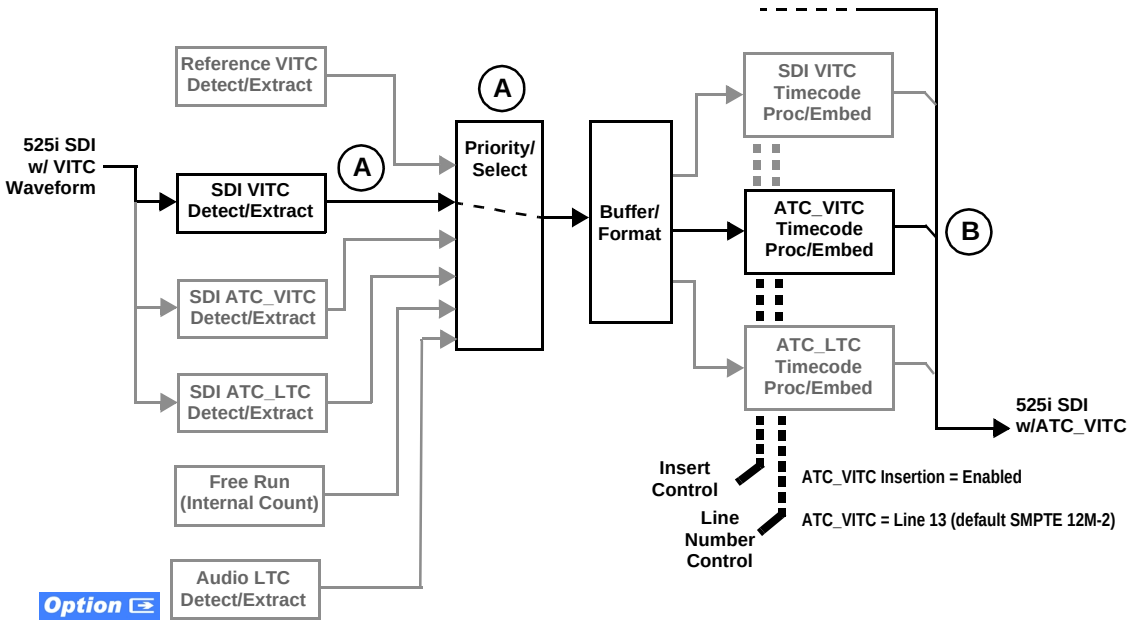


Table 3-2 9922-2FS Function Menu List — continued

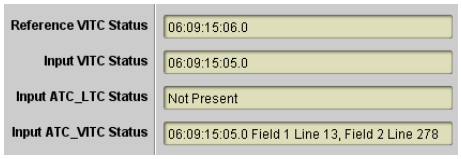
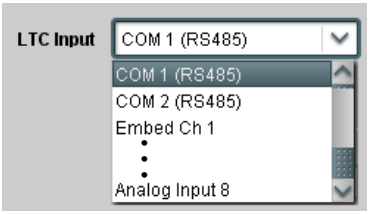
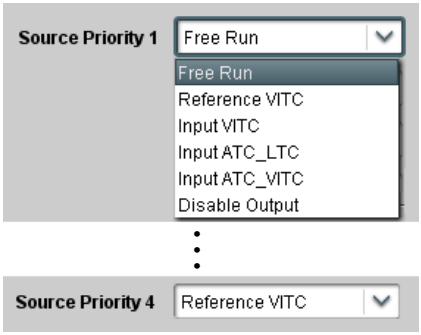
	**(continued)**
Option **Audio LTC** controls described below only appear on cards with **+LTC** licensed optional feature. This feature allows audio LTC from an audio channel to be used as a timecode source, with conversion to a selected SMPTE 12M format on the output video.	
• **Timecode Source Status Displays** 	Displays the current status and contents of the four supported external timecode formats shown to the left. • If a format is receiving timecode data, the current content (timecode running count and line number) is displayed. • If a format is not receiving timecode data, Not Present is displayed.
• **LTC Input Control** 	Selects source to be used by card to **receive** LTC as listed below. • RS-485 over COM1 or COM 2 • Audio LTC over Emb Ch 1 thru Ch 16 • Audio LTC over AES Ch 1 thru Ch 16 • Audio LTC over Analog audio Ch 1 thru Ch 4 **Note:** • **Audio LTC Source** must be appropriately set for card to receive and process received LTC. • If COM 1 or COM 2 is used for LTC receive, the port function must be set for LTC. See COMM Ports Setup Controls (p. 3-52) for more information. • Card audio inputs will not center inputs with DC offset. If input has DC offset, the source may need to be capacitively coupled to remove the offset. • LTC embedded channel selections are only channels associated with the selected path.
• **Mute LTC Control** 	Allows LTC audio or RS-485 output to mute upon loss of selected timecode inputs. • When set to **Enabled** and input timecode is lost: • RS-485 LTC output goes to frozen state. • Audio LTC output mutes. • When set to **Disabled** and input timecode is lost: • RS-485 LTC output keeps counting, with count value being free-run count. • Audio LTC output is not muted, with count value being free-run count. **Note:** If muting upon loss of a particular input format is desired, set all **Source Priority 1** thru **4** to that particular input format. If this is not done, the card failover timecode selection may substitute another format choice for the format not being received.
• **Incoming ATC Packet Removal Control** 	Enables or disables removal of existing input video ATC timecode packets from the output. This allows removal of undesired existing timecodes from the output, resulting in a “clean slate” where only desired timecodes are then re-inserted into the output. (For example, if both SDI ATC_VITC and ATC_LTC are present on the input video, and only ATC_LTC is desired, using the Removal control will remove both timecodes from the output. The ATC_LTC timecode by itself can then be re-inserted on the output using the other controls discussed here.)

Table 3-2 9922-2FS Function Menu List — continued

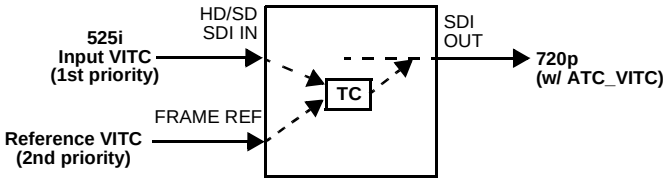
(continued)

• **Source Priority**



Selects the priority assigned to each of the four supported external formats, and internal Free Run in the event the preferred source is unavailable.

Source Priority 1 thru **Source Priority 4** select the preferred format to be used in descending order (i.e., Source Priority 2 selects the second-most preferred format, and so on. See example below.)

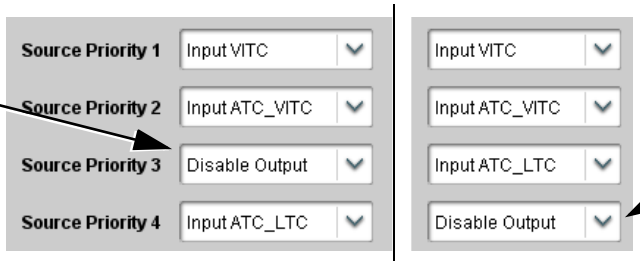


In this example, **Input VITC** 1st priority selection selects SDI VITC (received on SDI input) over reference VITC (received on frame reference) regardless of video input material source to be processed by the card.

The selected timecode source is embedded on the SDI video output (in this example, 720p) using the selected line number. In this example, if the SDI VITC on the SDI input becomes unavailable, the card then uses the reference VITC data received on the frame reference.

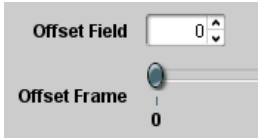
Disable Output setting should be used with care. If Disable Output is selected with alternate intended format(s) set as a lower priority, the card will indeed disable **all** timecode output should the ordinate preferred format(s) become unavailable. Typically, choices other than Disable should be used if a timecode output is always desired, with Disable only being used to remove all timecode data.

In this example, even though and ATC_LTC could be available to substitute for ATC_VITC not being present, the card will revert to no timecode output since the choice of Disable Output "out-prioritizes" ATC_LTC with these settings.



The choices shown here will allow ATC_LTC to "out-prioritize" Disable Output if ATC_VITC is not available.

• **Offset Controls**



Allows the current timecode count to be advanced or delayed on the output video.

- **Offset Advance** or **Delay** selects offset advance or delay.
- **Offset Field** delays or advances or delays timecode by one field.
- **Offset Frame** delays or advances or delays timecode by up to 5 frames.

Note: Default settings are null, with both controls set at zero as shown.

Table 3-2 9922-2FS Function Menu List — continued

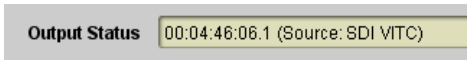
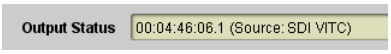
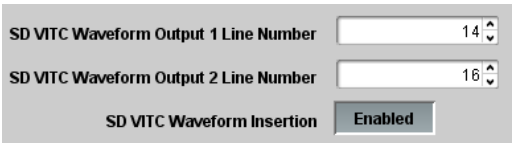
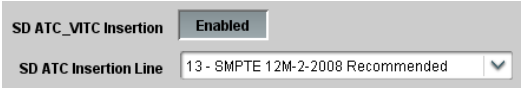
	**(continued)**
• **Output Status Display** 	Displays the current content and source being used for the timecode data as follows:  • Output status OK (in this example, SDI VITC timecode received and outputted).  • **Timecode Insertion** button set to **Disabled**; output insertion disabled. **Note:** • If timecode is not available from Source Priority selections performed, timecode on output reverts to Free Run (internal count) mode. • Because the 1's digit of the display Frames counter goes from 0 to 29, the fractional digit (along with the 1's digit) indicates frame count as follows: 0.0 Frame 0 0.1 Frame 1 1.0 Frame 2 1.1 Frame 3 • • • 29.1 Frame 59
• **Audio LTC Output** Option	Audio LTC output is routed to desired embedded, AES, or analog audio outputs using the Output Audio Routing/Controls (p. 3-25). Whatever timecode is displayed on the Output Status is converted to audio LTC and available as an LTC audio output.
Note: • Although the output line drop-down on the controls described below will allow a particular range of choices, the actual range is automatically clamped (limited) to certain ranges to prevent inadvertent conflict with active picture area depending on video format. See Ancillary Data Line Number Locations and Ranges (p. 3-9) for more information. • The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.	
• **SD VITC Waveform Insertion Controls** 	For SD output, enables or disables SD VITC waveform timecode insertion into the output video, and selects the VITC1 and VITC2 line numbers (6 thru 22) where the VITC waveform is inserted. **Note:** • If only one output line is to be used, set both controls for the same line number. • **SD VITC Waveform Insertion** control only affects VITC waveforms inserted (or copied to a new line number) by this function. An existing VITC waveform on an unscaled SD SDI stream is not affected by this control and is passed on an SDI output.
• **SD ATC Insertion Control** 	For SD output, enables or disables SD ATC_VITC timecode insertion into the output video, and selects the line number for ATC_VITC.

Table 3-2 9922-2FS Function Menu List — continued

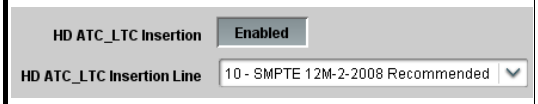
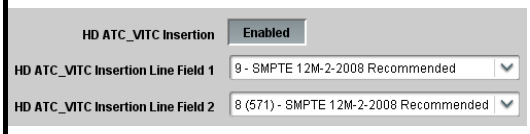
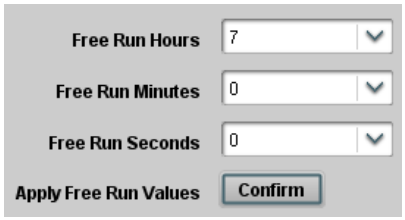
	**(continued)**
• HD ATC_LTC Insertion Control 	For HD output, enables or disables ATC_LTC timecode insertion into the output video, and selects the line number for ATC_LTC timecode data.
• HD ATC_VITC Insertion Control 	For HD output, enables or disables ATC_VITC timecode insertion into the output video, and selects the line number for ATC_VITC1 and ATC_VITC2.
• ATC_VITC Legacy Support Control 	When enabled, accommodates equipment requiring ATC_VITC packet in both fields as a “field 1” packet (non-toggling). **Note:** Non-toggling VITC1 and VITC2 packets do not conform to SMPTE 12M-2-2008 preferences. As such, ATC_VITC Legacy Support should be enabled only if required by downstream equipment.
• Free Run Timecode Controls 	Allows an initial (starting) count to be applied to output video timecode when Free Run insertion is enabled. **Note:** • Initialization can only be applied when card is outputting Free Run timecode (as shown by Output Status displaying “Free Run”). • If failover to Free Run occurs due to loss of external timecode(s), the Free Run count assumes its initial count from the last valid externally supplied count.

Table 3-2 9922-2FS Function Menu List — continued

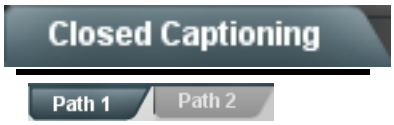
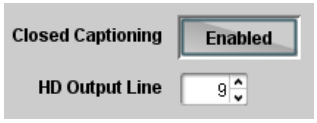
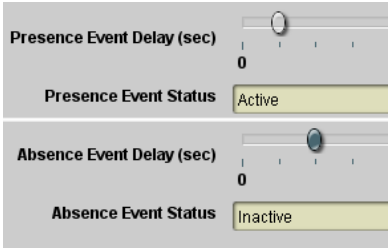
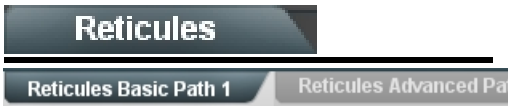
<table>
<tr><td> 
</td><td>Provides support for closed captioning setup.Also provides controls for setting closed captioning absence and presence detection thresholds.</td></tr>
<tr><td colspan="2">Note: • Closed Captioning tab has identical independent controls for both Path 1 and Path 2 using the Path 1 / Path 2 sub-tabs. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab.
• SMPTE embedded CC controls and processing are correlated only to the path selected. CC data cannot be transferred from one path stream to another.</td></tr>
<tr><td>• Closed Captioning Input Status
 
</td><td>Displays incoming Closed Captioning status as follows:
• If closed captioning is present, a message similar to the example shown is displayed.
• If no closed captioning is present in the video signal, Not Present or Disabled is displayed.
Note: • Packet closed captioning status Captioning Rejected Due To message can appear due to the items described below. The closed captioning function assesses cdp_identifier, cdp_frame_rate, ccdata_present, and caption_service_active items contained in the packet header to make the determinations listed below. Refer to CEA-708-B for more information.
<table>
<tr><th>Message</th><th>Description</th></tr>
<tr><td>Unsupported Frame Rate</td><td>Film rate closed-captioning (either as pass-through or up/down conversion) is not supported by the card.</td></tr>
<tr><td>Data Not Present</td><td>Packet is marked from closed captioning source external to the card that no data is present.</td></tr>
<tr><td>No Data ID</td><td>Packet from closed captioning source external to the card is not properly identified with 0x9669 as the first word of the header (unidentified packet).</td></tr>
</table>
• caption service is marked as inactive display indicates bit in packet from upstream source may inadvertently be set as inactive. In this case, closed captioning data (if present) is still processed and passed by the card as normal.
• The closed captioning function does not support PAL closed captioning standards.</td></tr>
<tr><td>• Closed Captioning On/Off and HD Insertion Line
 
</td><td>Turns on or turns off Closed Captioning insertion on the output.
Note: • Although the output line drop-down will allow any choice within the 9 thru 41 range, the actual range is automatically clamped (limited to) certain ranges to prevent inadvertent conflict with active picture area depending on video format. See Ancillary Data Line Number Locations and Ranges (p. 3-9) for more information.
• The card does not check for conflicts on a given line number. Make certain selected line is available and carrying no other data.
• Closed captioning line may contain active unintended data even if closed captioning is set to Off.</td></tr>
<tr><td>• Presence/Absence Check Controls
 
</td><td>Displays CC presence and/or absence event status. This status can be propagated to the Presets > Event Triggers tab controls to issue a card GPO or other command when CC presence/absence events are detected.
Controls for both presence and absence provide for a holdoff time (in seconds) where, when time is exceeded, an event is to be considered a valid alert event.</td></tr>
</table>

Table 3-2 9922-2FS Function Menu List — continued

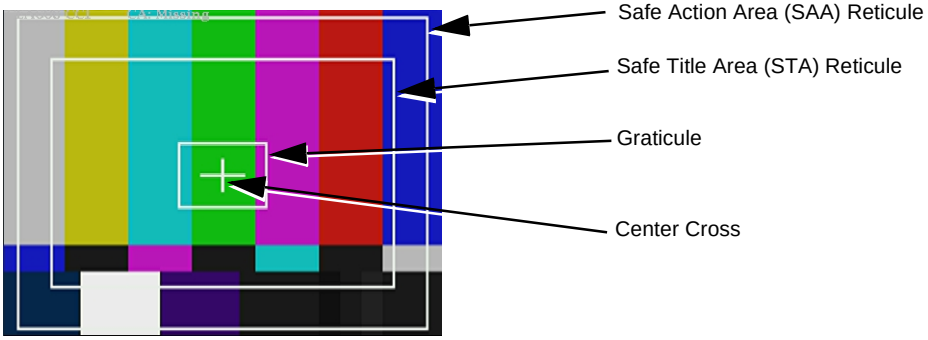


Allows Safe Action and/or Safe Title overlays and other static markers to be added to the output video image.

Note: **Reticules** tab has identical independent controls for both Path 1 and Path 2 using the **Path 1 / Path 2** sub-tabs. Therefore, only the **Path 1** controls are shown here. Set controls for other path using the respective sub-tab.

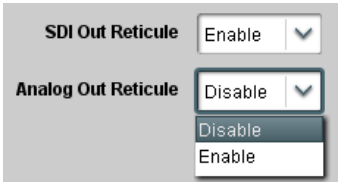
Typical Reticule/Overlay Marker Insertions

The 9922-2FS allows any combination of the reticule/overlay markers to be applied to the output video. Sizing and other characteristics for each type of marker can be set as described below.



Note:
- Overlay markers using this function are for setup only. When enabled, these markers are embedded in the output video and will appear in the image. Use this function **only** on preview video and not on-air video. Make certain any overlay tools are turned **off** when no longer needed.
- Multiple overlay markers described below can be simultaneously enabled as desired.

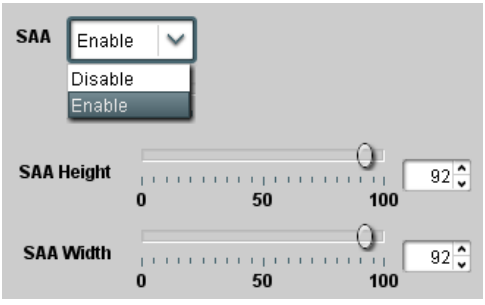
• Insertion Master Enable/Disable



Provides independent master enable/disable for card SDI and CVBS outputs.

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

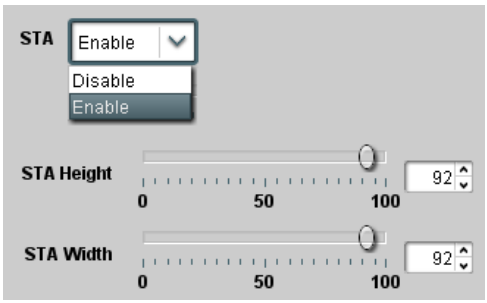
• Safe Action Area (SAA) Controls



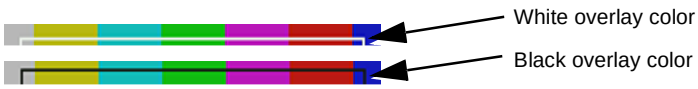
- **SAA** provides enable/disable of safe action area graticule insertion.
- **SAA Height** and **SAA Width** control height and width of insertion (from 0% to 100% of 4:3 outputted image area).

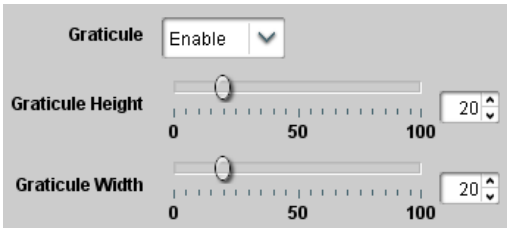
Note: Reticule Size control is locked to Custom for this card, with safe action area size control as described above.

Table 3-2 9922-2FS Function Menu List — continued

<table>
<tr><td> 
</td><td>(continued)</td></tr>
<tr><td>• Safe Title Area (STA) Controls
 
</td><td>• STA provides enable/disable of safe title area graticule insertion.

• STA Height and STA Width control height and width of insertion (from 0% to 100% of 4:3 outputted image area).</td></tr>
<tr><td>• Overlay Color Controls
 

 
</td><td>• Overlay Color selects from white or black colors.

• Opacity sets the opacity of the overlay for both white/black and inverse color modes.</td></tr>
<tr><td> 
</td><td>Provides insertion and sizing controls for custom graticules and other markers. Also provides NTSC legacy 4:3 master reticule sizing.</td></tr>
<tr><td colspan="2">Note: Color attributes of markers described below are set using the master Overlay Color Controls described above.</td></tr>
<tr><td>• Graticule Controls
 
</td><td>• Graticule provides enable/disable of user graticule insertion.

• Graticule Height and Width control height and width of insertion (from 0% to 100% of 4:3 outputted image area).</td></tr>
</table>

Table 3-2 9922-2FS Function Menu List — continued

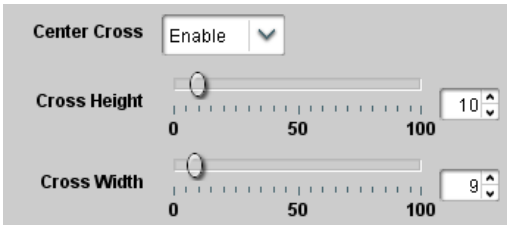
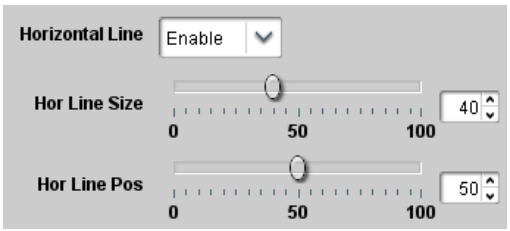
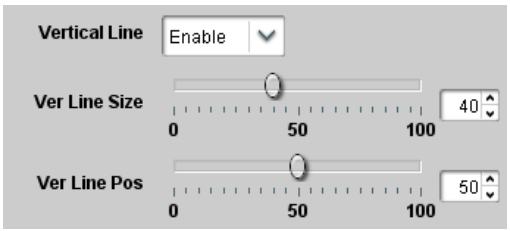
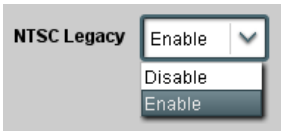
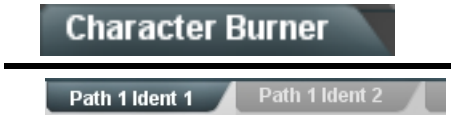
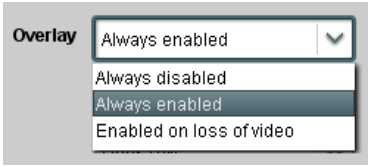
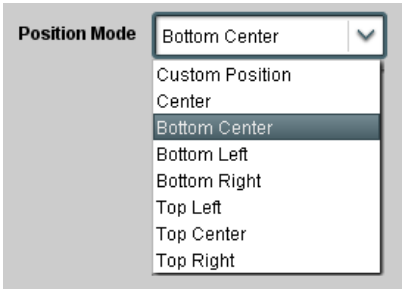
	**(continued)**
• **Center Cross Controls** 	• **Center Cross** provides enable/disable of center cross insertion. • **Cross Height** and **Width** control height of vertical line and width of horizontal line (from 0% to 100% of 4:3 outputted image area).
• **Horizontal Line Controls** 	• **Horizontal Line** provides enable/disable of horizontal line insertion. • **Horizontal Line Size** controls the width of the horizontal line (from 0% to 100% of 4:3 outputted image area). • **Horizontal Line Pos** controls the vertical positioning of the horizontal line (from 0% to 100% of 4:3 outputted image area).
• **Vertical Line Controls** 	• **Vertical Line** provides enable/disable of vertical line insertion. • **Vertical Line Size** controls the height of the vertical line (from 0% to 100% of 4:3 outputted image area). • **Vertical Line Pos** controls the horizontal positioning of the line (from 0% to 100% of 4:3 outputted image area).
• **NTSC Legacy Reticule Fixed Control** 	When set to enable, provides fixed-size safe action area 4:3 reticule suited for CRT-based displays.

Table 3-2 9922-2FS Function Menu List — continued

<table>
<tr><td> 
</td><td>Provides user-configurable burn-in of up to two text strings and timecode on output video.</td></tr>
<tr><td colspan="2">Note: • Character Burner tab has identical independent controls for both Path 1 and Path 2 using the respective Path 1 / Path 2 sub-tabs. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab.
• For both Path 1 and Path 2, Ident 1 and Ident 2 sub-tabs provide identical, independent controls for inserting two independent text (identification) burn-in overlays on each path's output video. Ident 2 has controls identical to the controls described here for Ident 1. (Both Path 1 and Path 2 each have identical independent Ident 1 and Ident 2 insertion controls; only the Ident 1 controls are shown here.)</td></tr>
<tr><td>• Ident Insertion Controls
 
</td><td>Selects the rules for identification text burn-in overlay insertion into output video.
Note: If ident text insertion is desired for input LOS conditions, the Framesync On Loss of Video control must be set to provide a raster (from one of the choices shown) to support the text insertion.
If this control is set to “Disable Outputs”, no raster or text insertion will be present on the output video under input LOS conditions. See Framesync (p. 3-13) for more information.</td></tr>
<tr><td>• Ident Position Select
 
</td><td>Sets the location of the ident text insertion from choices shown or custom. (When Custom is selected, position is configured using the Ident Text Positioning Controls described on the next page.)
Example: Ident 1 text using Top Left position
 

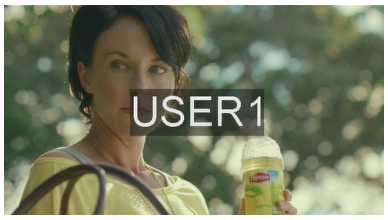
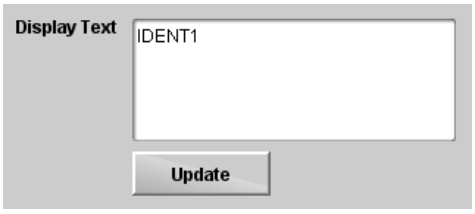
Example: Ident 1 text using Center position
 
</td></tr>
<tr><td>• Display (Ident) Text Entry Field
 
</td><td>Dialog entry box that allows entry of desired ident text string. Enter desired text as click Update when done to input the text string.
Note: • All normal keyboard alphanumeric characters are supported, in addition to ASCII characters (Windows ALT+nnnn).
• Up to 126 characters can be entered.</td></tr>
</table>

Table 3-2 9922-2FS Function Menu List — continued

(continued)

• Ident Text Size/Positioning Controls

Sets burn-in size/position attributes as follows:

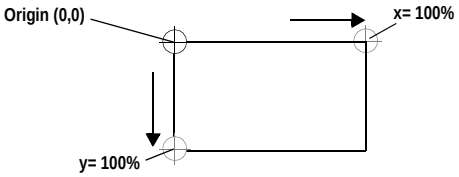
- **Character Size** sets proportional relative sizing. (Range is 0 thru 10)
- **Horizontal Position** sets horizontal position (in percentage of offset from left of image area, left justified). (Range is 0 thru 90)
- **Vertical Position** sets vertical position (in percentage of offset from top of image area, top justified). (Range is 0 thru 90)

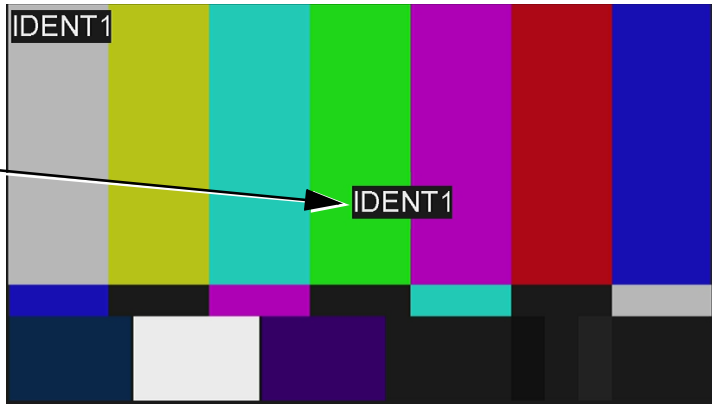
Note: • Horizontal and Vertical Position controls are functional only when **Custom Position** is selected.

• Character sizing and positioning for a given raster format may not be appropriate for another format (especially if transitioning from HD to SD). Set size and position for a balanced appearance (e.g., do not place text too close to margins or set larger than necessary) that accommodates both HD and SD raster formats if multiple format use is required.

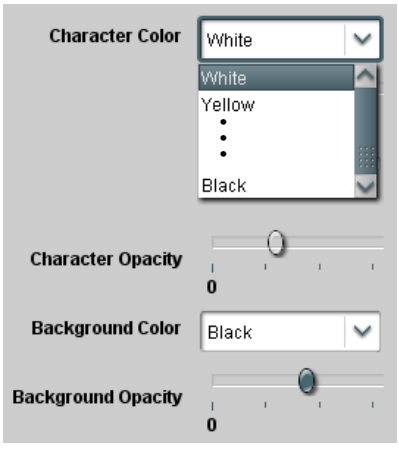
Positioning with H and V controls at zero (origin)
(Size = 3)

Positioning with H and V controls both at 50
(Size = 3)





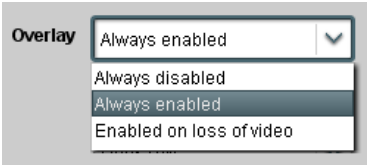
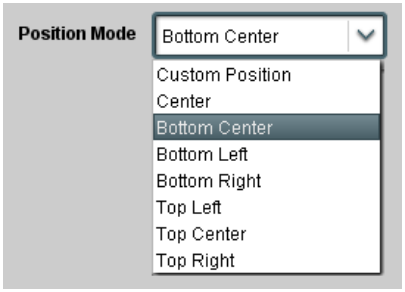
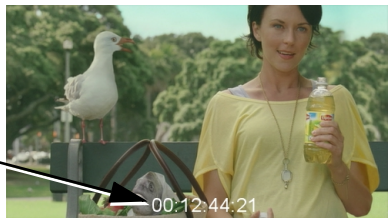
• Ident Text Character/Background Attributes Controls



Provides independent controls for setting the color and opacity of the burn-in text and its background.

- **Color** drop-downs set text or background color from multiple choices.
- **Opacity** controls set text or background opacity from 0% (least opacity) to 100% (full opacity).

Table 3-2 9922-2FS Function Menu List — continued

<table>
<tr><td>Character Burner
Path 1 Ident 2 | Path 1 Timecode Burn</td><td>Provides controls for burn-in of timecode on output video.</td></tr>
<tr><td colspan="2">Note: • Timecode Burn sub-tabs offer identical independent controls for both Path 1 and Path 2. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab.
• SMPTE embedded timecode controls are correlated only to the path selected. Timecode data cannot be transferred from one path stream to another.
• This status display mirrors the same display in the Timecode tab. Respective path must be set to output a timecode in order for timecode burn-in to function. See Timecode (p. 3-31) for information on using timecode controls.</td></tr>
<tr><td>• Timecode Insertion Control
 
</td><td>Selects the rules for timecode burn-in overlay insertion into output video.
Note: If timecode insertion is desired for input LOS conditions, the Framesync On Loss of Video control must be set to provide a raster (from one of the choices shown) to support the timecode insertion.
If this control is set to “Disable Outputs”, no raster or timecode insertion will be present on the output video under input LOS conditions. See Framesync (p. 3-13) for more information.</td></tr>
<tr><td>• Timecode Position Select
 
</td><td>Sets the location of the timecode insertion from choices shown or custom. (When Custom is selected, position is configured using the Ident Text Positioning Controls described on the next page.)
Example: Timecode burn-in using Bottom Center position
 

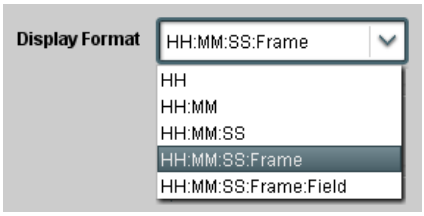
Example: Timecode burn-in using Top Left position
 
</td></tr>
<tr><td>• Timecode Format Display Selector
 
</td><td>Selects the format of timecode string burn-in overlay insertion into output video from choices shown.</td></tr>
</table>

Table 3-2 9922-2FS Function Menu List — continued

(continued)

• Timecode Character Size/Positioning Controls

Sets burn-in size/position attributes as follows:

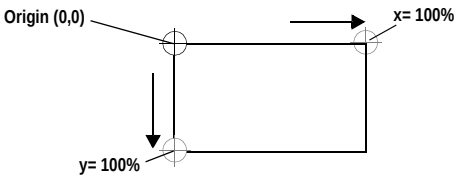
- **Character Size** sets proportional relative sizing. (Range is 0 thru 10)
- **Horizontal Position** sets horizontal position (in percentage of offset from left of image area, left justified). (Range is 0 thru 90)
- **Vertical Position** sets vertical position (in percentage of offset from top of image area, top justified). (Range is 0 thru 90)

Note: • Horizontal and Vertical Position controls are functional only when **Custom Position** is selected.

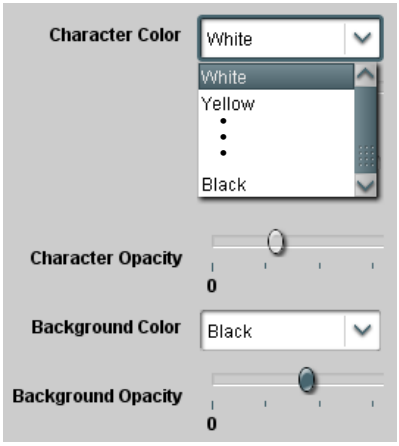
• Character sizing and positioning for a given raster format may not be appropriate for another format (especially if transitioning from HD to SD). Set size and position for a balanced appearance (e.g., do not place text too close to margins or set larger than necessary) that accommodates both HD and SD raster formats if multiple format use is required.

Positioning with H and V controls at zero (origin)
(Size = 3)

Positioning with H and V controls both at 50
(Size = 3)



• Timecode Character/Background Attributes Controls



Provides independent controls for setting the color and opacity of the burn-in timecode string and its background.

- **Color** drop-downs set text or background color from multiple choices.
- **Opacity** controls set text or background opacity from 0% (least opacity) to 100% (full opacity).

Table 3-2 9922-2FS Function Menu List — continued

Provides a “moving box” graphic insertion (overlay) on the output video.

Moving-box insertion can serve as a dynamic raster confidence check even in cases where the input video image is static or lost.

Note: **Moving Box** tab has identical independent controls for both Path 1 and Path 2 using the **Path 1 / Path 2** sub-tabs. Therefore, only the **Path 1** controls are shown here. Set controls for other path using the respective sub-tab.

Moving-box insertion provides dynamic display even on static video. Attributes such as box size, color, vertical movement speed, and horizontal movement speed are all user configurable.

Moving box can be set to insert continuously, or only upon loss of input.

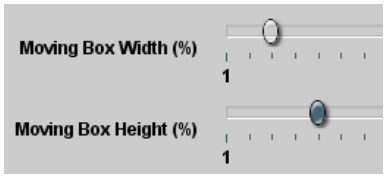
- **Moving Box Insertion Controls**

Selects the rules for moving-box overlay insertion into output video.

Note: If moving-box insertion is desired for input LOS conditions, the Framesync **On Loss of Video** control for the selected path **must** be set to provide a raster (from one of the choices shown) to support the moving-box insertion.

If this control is set to “Disable Outputs”, no raster or moving-box insertion will be present on the output video under input LOS conditions. See Framesync (p. 3-13) for more information.

- **Moving Box Size Controls**

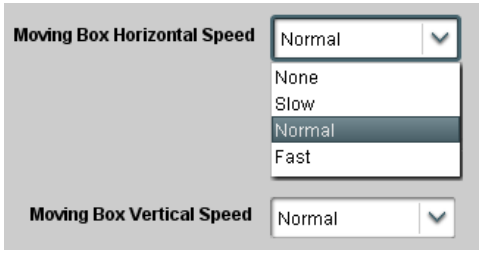


Sets size of box image burn-in as follows:

- **Moving Box Width** sets the width (as a percentage of maximum available raster width. (Range is 0% thru 40%)
- **Moving Box Height** sets the height (as a percentage of maximum available raster height. (Range is 0% thru 40%)

Note: Moving box sizing for a given raster format may not be appropriate for another format (especially if transitioning from HD to SD). Set size and position for a balanced appearance that accommodates both HD and SD raster formats if multiple format use is required.

- **Moving Box Speed Controls**



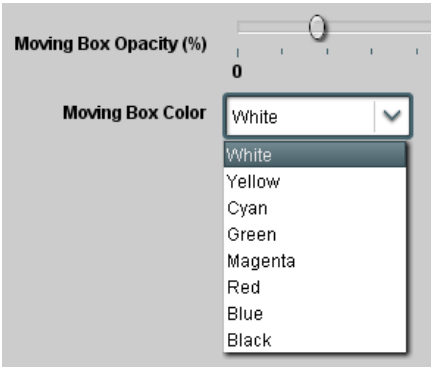
Sets speed of motion for moving box image burn-in as follows:

- **Moving Box Horizontal Speed** sets the X-axis speed from choices shown.
- **Moving Box Vertical Speed** sets the Y-axis speed from choices shown.

Table 3-2 9922-2FS Function Menu List — continued

(continued)

• Moving Box Attributes Controls



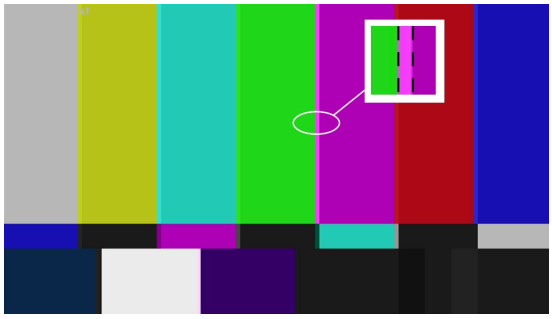
Provides independent controls for setting the color and opacity of the moving-box insertion.

- **Color** drop-down sets box color from multiple choices shown.
- **Opacity** controls sets box opacity from 0% (least opacity) to 100% (full opacity).

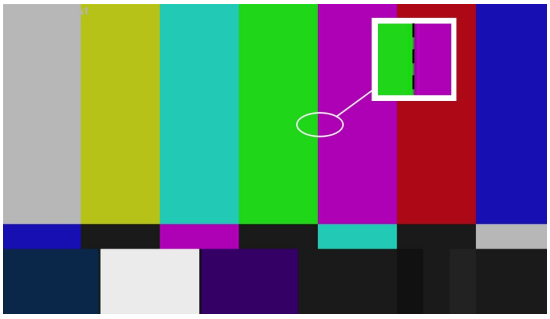
YC Alignment

Provides controls for correcting upstream misalignment of Y and C phase.

SMPTE color bars showing Y/C misalignment (as evidenced by poor transitions at the color borders)

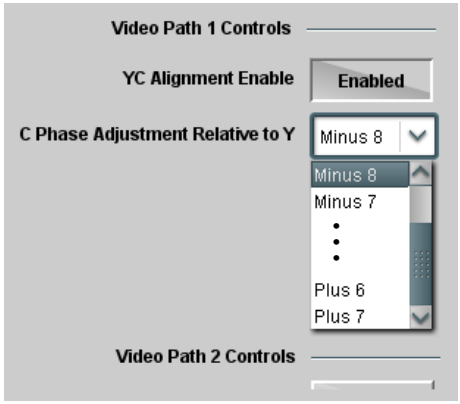


SMPTE color bars showing proper Y/C alignment (as evidenced by crisp transitions at the color borders)



Y/C misalignment is typically introduced by upstream analog-to-digital conversion, especially where the Y and chroma paths may experience differing characteristics.

• Y/C Alignment Controls



Provides the following Y/C alignment controls:

- **Enable** control turns on alignment.
- **C Phase Adjustment Relative to Y** provides a -8° to +7°phase offset of C phase from Y phase.

Note: Y/C Alignment tab has identical independent controls for both Path 1 and Path 2 Therefore, only the **Path 1** controls are shown here.

Table 3-2 9922-2FS Function Menu List — continued

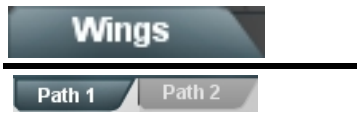
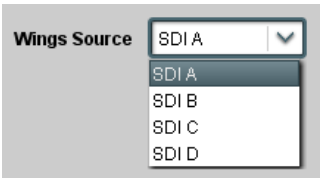
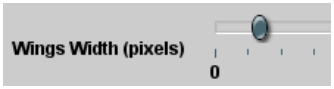
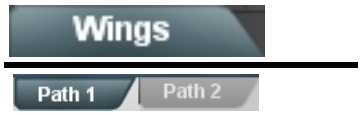
	Provides wings insertion/width controls and displays insertion status.
Note: **Wings** tab has identical independent controls for both Path 1 and Path 2 using the **Path 1 / Path 2** sub-tabs. Therefore, only the **Path 1** controls are shown here. Set controls for other path using the respective sub-tab.	
• **Wings Source Control** 	Selects the card SDI input video port to serve as the card's wings source. **Note:** • SDI inputs selected must be used with Rear I/O Module correspondingly equipped with intended input ports. • Other wings input choices sourced from Path 1 and Path 2 program video outputs also are available using this drop-down. These selections are not typically used for normal use. A white paper describing these use cases may be developed in the future that explains the use of special looping alternate-path inputs. In brief, these alternate inputs are useful for providing two identical video paths with a delay offset provided by the second card path.
• **Wings Insertion Enable Control** 	Enables or disables wings insertion into the output video. **Note:** For conditions where wings is not intended to be inserted, make certain this control is set to Disabled.
• **Wings Width Control** 	Allows symmetrical L/R wings insertion width, from none to widths extending into active image area if desired. (0 to 300 pixel range; null = 0)

Table 3-2 9922-2FS Function Menu List — continued



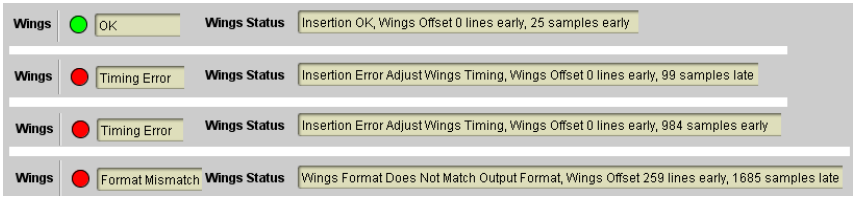
(continued)

- **Wings Status Displays**

Displays wings timing status as described below.

Note: • Wings timing is a function of the wings frame sync card/ device. Ideal wings timing is **within 0 to 200 samples early** of output video timing. Wings timing cannot be controlled on host card wings inserter.

• Error in wings timing will result in loss of wings (however, program video image will not be corrupted).

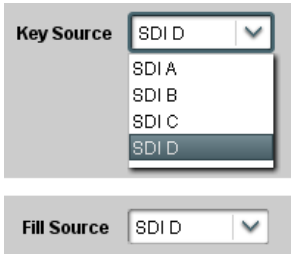


Provides key/fill insertion controls and displays insertion status.

Option **Key/fill** controls described below only appear on cards with **+KEYER** licensed optional feature. This feature requires a Rear Module that accommodates separate key/fill video inputs. Note that on cards also licensed with +KEYER, Wings and Keyer controls appear on the same tab.

Note: **Keyer** tab has identical independent controls for both Path 1 and Path 2 using the **Path 1 / Path 2** sub-tabs. Therefore, only the **Path 1** controls are shown here. Set controls for other path using the respective sub-tab.

- **Key/Fill Source Controls**



Selects the card SDI input video ports to serve as the card's key and fill sources.

Note: • SDI inputs selected must be used with Rear I/O Module correspondingly equipped with intended input ports.

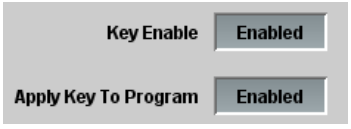
• Other key/fill input choices sourced from Path 1 and Path 2 program video outputs also are available using this drop-down. These selections are not typically used for normal use. A white paper describing these use cases may be developed in the future that explains the use of special looping alternate-path inputs. In brief, these alternate inputs are useful for providing two identical video paths with a delay offset provided by the second card path.

- **Key Mode Control**

Selects key mode as follows:

- **Alpha Ramp** setting is used when typical key/fill is provided by key/fill generator with separate key and fill outputs.
- **Alpha Threshold** or **Reverse Alpha Threshold** setting is used to provide keying using a combined key/fill signal derived from a simple graphic source.

- **Key/Fill Insertion Enable Control**



Key Enable control sets up key/fill for insertion. When enabled, key preview is available on Key Preview output.

When key preview shows desired results, **Apply Key To Program** can be enabled to apply the key/fill to the program video output.

Table 3-2 9922-2FS Function Menu List — continued

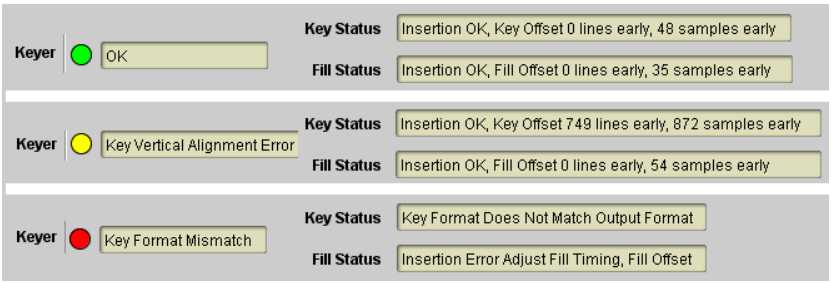
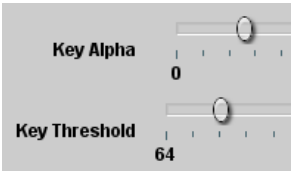
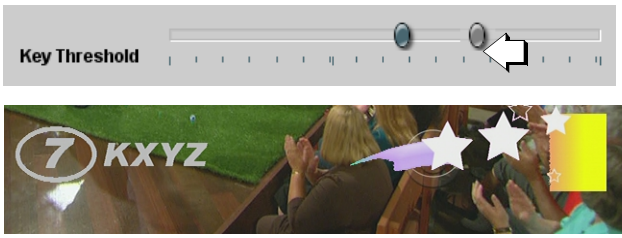
	**(continued)**
• **Key/Fill Status Displays**	Displays keyer timing status as described below. **Note:** • Key/fill timing is a function of the respective key and fill signal frame sync card/device(s). Ideal timing is within 0 to 200 samples early of output video timing. Key/fill timing cannot be controlled on +KEYER host card. • Error in key/fill timing will result in loss of keying (however, program video image will not be corrupted).
	Key/fill insertion OK, within target 0-200 samples early Key or fill insertion late error (in this example, late key video as shown by "wrap-around" line 749 lines early offset) Key or fill video missing/mismatched format
• **Key Alpha/Threshold Controls** 	When keying is set to Alpha Threshold or Reverse Alpha Threshold mode sets luma thresholds, when crossed, allow key/fill onto program video image. **Key Alpha** setting, when increased, increases the opacity of the key/fill. **Key Threshold** setting, when reduced, more readily allows the key/fill input to assert itself over more variations of program video luma levels.

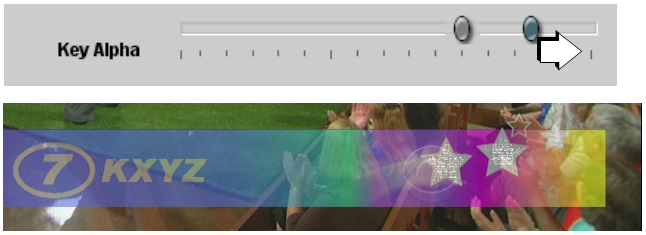
Table 3-2 9922-2FS Function Menu List — continued

Alpha Threshold keying allows cost-effective luminance keying from low-cost generic file-based graphic sources. With the graphic source applied to both the card **Key** and **Fill** inputs, the card **Key Alpha** and **Key Threshold** controls can be set to easily optimize the key/fill as shown below.

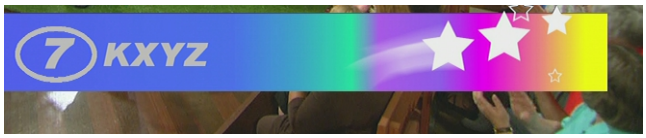
Key Threshold setting, when reduced, more readily allows the key/fill input to assert itself over more variations of program video luma levels. In the example to the right, progressively reducing the threshold setting allows more of the key/fill to assert iteslf over the program video.



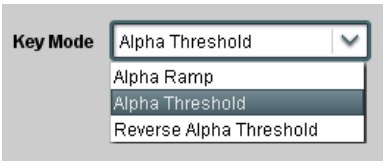
Key Alpha setting, when increased, increases the opacity of the key/fill. In the example to the right, progressively increasing the alpha setting increases the key/fill opacity.



When both settings are optimized, the key/fill appears consistent in opacity and free from edge distortions or graphic bleed lines appearing in the image.



Alpha Threshold mode setting is suited for graphic sources using black backgrounds. **Reverse Alpha Threshold** mode setting is suited for graphic sources using white backgrounds.



When using either alpha threshold modes, set the **Key Source** and **Fill Source** to use the same source (in this example, SDI input D).

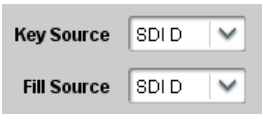


Table 3-2 9922-2FS Function Menu List — continued

Provides controls for VANC/HANC ancillary data de-embedding and embedding to and from program video stream. Data can be extracted and inserted within the card (Bridge mode), or inserted and/or extracted to and from external interfaces via serial or IP interfaces.

Note: Separate **Path 1** and **Path 2** tabs are provided for this function with identical independent controls for both Path 1 and Path 2. Only the **Path 1** controls are shown here. Set controls for other path using the other tab.

Eight individual Ancillary Data Processors (ADPs) provide for insertion, extraction, or bridging ancillary data to and from the card program video SDI stream.

Mode controls select the type of ANC processing:

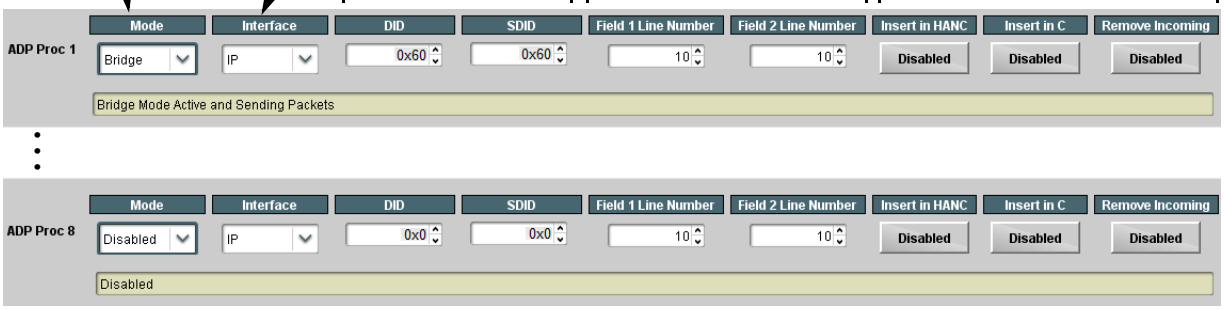
- **Bridge** extracts ANC from the deserialized input video and re-inserts in the output video, thereby allowing full control of specialized ANC packets
- **Insert** and **Extract** modes respectively allow insertion to the output stream or extraction from the input stream between external interfaces

Interface controls select either card IP or serial data (COM 1) interface where Mode is set to insertion or extraction
Note: COM1 is available for ADP Proc 1 only; all other ADPs use IP only for external import/export insertion/extraction.

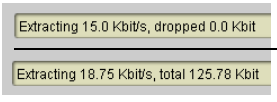
DID and **SDID** controls select the desired packet to be handled by the corresponding ANC Data Processor

Line Number controls select the VANC location of packet insertion/extraction

Insertion controls allow special insertions in HANC or the C-channel, as well as removal of incoming packets



In the example above, **ADP Proc 1** is set to extract ATC timecode at $DID60_h$ / $SDID\ 60_h$. Depending on the interface used to carry the extraction (COM or IP), status is displayed as shown below.



When set to extract to **COM** interface, displays rate and dropped data (if any)

When set to extract to **IP** interface, displays rate and total amount transferred

Note: DashBoard versions 4.1 and earlier display DID and SDID numbers in decimal; newer DashBoard versions display DID and SDID numbers in hexadecimal. Hexadecimal notation is denoted by the "0x" preceding the value.

Table 3-2 9922-2FS Function Menu List — continued

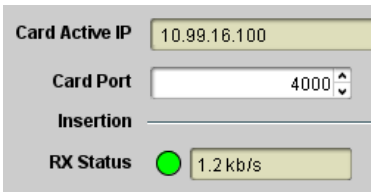
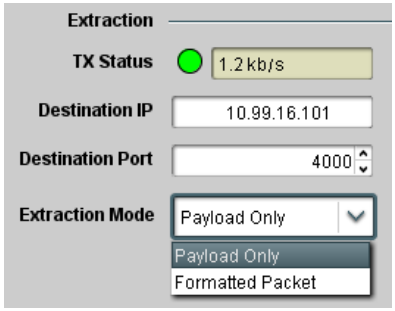
	**IP Port Setup** sub-tab provides IP setup for card UDP IP communications.
• **Card IP Receive Setup/Status** 	Shows card receiving IP address/status and sets port as follows: • **Card Active IP:** Shows the card IP address. (IP address is set using **Admin** tab Networking settings; see Admin (Log Status/ Firmware Update - Card IP Address) on page 3-58). • **Card Port:** Sets card IP receive port. • **Insertion / Rx Status:** Shows card IP receive/Rx insertion status. - Stopped (with yellow indicator) means no data is being received. - Green indicator means data is being received and inserted. Data rate is also shown.
• **Card IP Transmit Setup/Status** 	Provides setup for destination IP address and shows card transmit status as follows: • **Extraction / Tx Status:** Shows card extraction from stream to Tx status. - Stopped (with yellow indicator) means no data is being sent. - Green indicator means data is being extracted and sent. Data rate is also shown. • **Destination IP/Port:** Allows setting destination IP address and port. • **Extraction Mode:** Sets the IP data sent to consist of only payload, or send as formatted packets.

Table 3-2 9922-2FS Function Menu List — continued

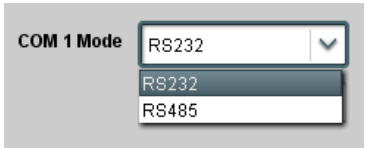
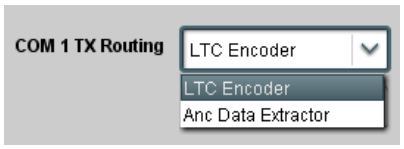
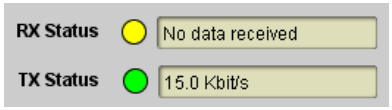
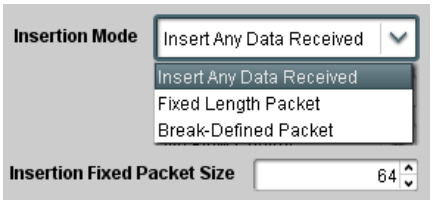
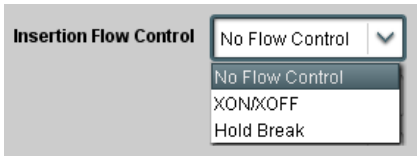
<table>
<tr><td> 
</td><td>Provides controls for setting up the two COMM (serial) ports for LTC or ANC functions, and setting comm protocol for each port.</td></tr>
<tr><td colspan="2">Note: • COM 1 and COM 2 sub-tabs provide independent controls for COM1 and COM2. Therefore, only the COM 1 controls are described here.
• Controls provided here allow highly detailed setup of serial communications. Control settings must be carefully considered and set appropriately to correspond to both sending and receiving systems. Incorrectly set controls may result in loss of ANC serial comm.
• COM 1 and COM 2 are multi-function interfaces and must be set for ANC Data Extractor for port(s) is to be used here. Set the port function as described in COM Routing in COMM Ports Setup Controls (p. 3-52).</td></tr>
<tr><td>• COM Mode (Protocol)
 
</td><td>Selects serial comm protocol for the respective port as RS-232 or RS-485.
Note: Protocol choices should consider the payload to be carried. Typically, LTC is sent or received using only RS-485 serial protocol.</td></tr>
<tr><td>• COM Port Tx Routing Function
 
</td><td>Selects port function for the respective port as LTC Encoder input or output, or ANC Data Extractor input or output.</td></tr>
<tr><td>• Rx/Tx Status Display
 
</td><td>Shows either no data received/sent, or where transfer is present shows data rate (in kbit/sec).</td></tr>
<tr><td>• Insertion Mode Control
 
</td><td>Where data is being inserted (received), sets the insertion as follows:
• Insert Any Data Received: Insert all received data with no regard for packet size.
• Fixed Length Packet: Sets receive to wait and accumulate n-number of packet bytes (as set using Insertion Fixed Packet Size control) before inserting data.
• Break-Defined Packet: Card receiver looks for character-defined break from source being received to define breaks.</td></tr>
<tr><td>• Insertion Flow Control
 
</td><td>Allows communication between card receive and sending source to regulate data receive as follows:
• No Flow Control: Data is received without buffering or checking to see if data is being received faster than it can be inserted.
• XON / XOFF: The card UART Tx will tell the sending source whether it can or cannot accept data at current bit rate.
• Hold Break: Card, if close to not being able to accept new data, tells the sending source to hold, and releases this hold when the card is again able to accept new data.</td></tr>
</table>

Table 3-2 9922-2FS Function Menu List — continued

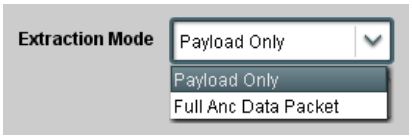
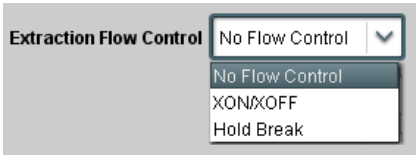
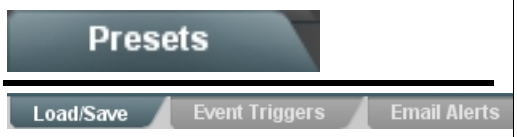
	**(continued)**
• **Insertion Sync Byte Control** 	Allows use of a sync byte from card receiver back to sending source to synchronize communication between card receive and sending source as follows: • **Disabled:** No special synchronization. • **Field Number at SOF:** The card sends a single byte telling sending source when start of field 1 or field 2 is occurring. • **Ack on Insertion:** Card sends a single byte back to sending source when data has been inserted.
• **Extraction Mode Control** 	Where data is being extracted from input video, sets the data to be sent as follows: • **Payload Only:** Sends payload only (for example, for closed captioning this would be only the ASCII character string representing the CC content). • **Full Anc Data Packet:** Sends the entire packet, including payload, DID, SDID, and any handling or marking characters.
• **Extraction Flow Control** 	Allows communication between card transmit and receiving destinations to regulate data receive as follows: • **No Flow Control:** Data is transmitted without buffering or checking to see if data is being transmitted faster than it can be received. • **XON / XOFF:** The card UART Rx will acknowledge from the receiving system whether it can or cannot accept data at current bit rate. • **Hold Break:** Card, if receiving notification from the receiving system that it is close to not being able to accept new data, tells the card to hold. Card releases this hold when the receiving system removes the break command, indicating destination is now ready again to accept new data.
• **Bit Rate/ Parity Gen Control** 	For both Rx and Tx, sets UART for bit rate and parity as follows: • **Bit Rate:** Sets Tx/Rx bit rate from 1 of 5 speeds ranging from 9600 to 230400 Baud. • **Parity:** Sets card Rx to expect odd or even parity from incoming data, and sets card Tx to generate a parity bit to satisfy selected parity. Where parity is set, incoming data not conforming to parity selection is rejected.

Table 3-2 9922-2FS Function Menu List — continued



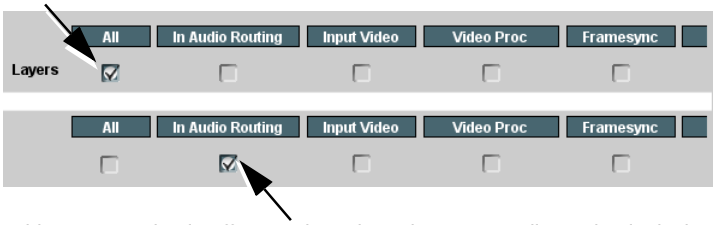
Allows user control settings to be saved in a Preset and then loaded (recalled) as desired, and provides a one-button restore of factory default settings.

Also provides event-based loading allowing a defined preset to be automatically engaged upon various received signal status. Also provides automated Email alerts when an event has occurred.

• Preset Layer Select

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

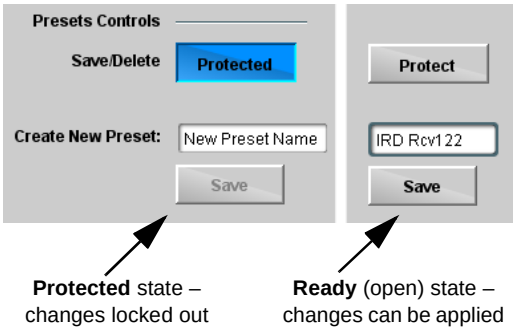
Default **All** setting will "look" at all card settings and save all settings to the defined preset with no masking.



Selecting a layer (in the example, "In Audio Routing") will set the preset to **only** "look at" and "touch" audio routing settings and save these settings under the preset. When the preset is loaded (recalled), the card will only "touch" the audio routing layer.

Example: Since EAS audio routing can be considered independent of video proc settings, if normal audio routing was set up with a particular video proc setting in effect, and at a later time EAS audio routing is desired to be saved and invoked as a preset, selecting **In Audio Routing** here tells the preset save and load to not concern itself with video proc settings. In this manner, any video proc settings in effect when the EAS preset is invoked will not affect any video proc settings that might be currently in effect.

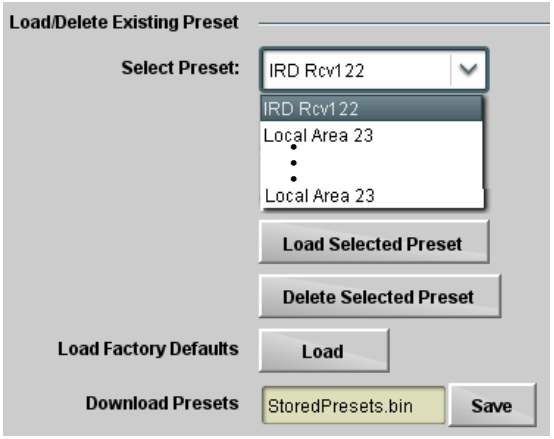
• Preset Enter/Save/Delete



Locks and unlocks editing of presets to prevent accidental overwrite as follows:

- **Protect (ready):** This state awaits Protected and allows preset Save/Delete button to save or delete current card settings to the selected preset. **Use this setting when writing or editing a preset.**
- **Protected:** Toggle to this setting to lock down all presets from being inadvertently re-saved or deleted. **Use this setting when all presets are as intended.**
- **Create New Preset:** Field for entering user-defined name for the preset being saved (in this example, "IRD Rcv122").
- **Save:** Saves the current card settings under the preset name defined above.

• Preset Save/Load Controls



- **Select Preset:** drop-down allows a preset saved above to be selected to be loaded or deleted (in this example, custom preset "IRD Rcv122").
- **Load Selected Preset** button allows loading (recalling) the selected preset. When this button is pressed, the changes called out in the preset are immediately applied.
- **Delete Selected Preset** button deletes the currently selected preset.
- **Load Factory Defaults** button allows loading (recalling) the factory default preset. When this button is pressed, the changes called out in the preset are immediately applied.

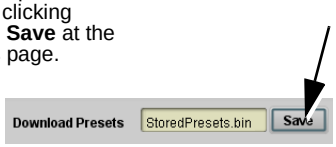
Note: Load Factory Defaults functions with no masking. The Preset Layer Select controls have no effect on this control and will reset **all** layers to factory default.

- **Download Presets** saving the preset files to a folder on the connected computer.

Table 3-2 9922-2FS Function Menu List — continued

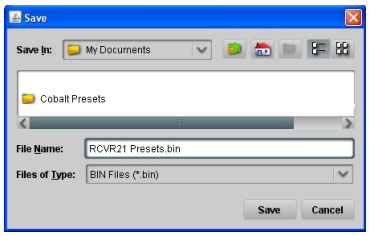
(continued)

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



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

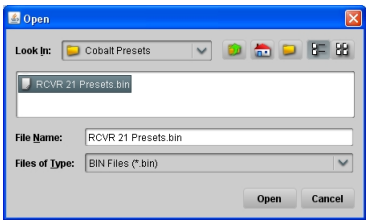
The file can then be renamed if desired (*RCVR21 Presets* in this example) before committing the save.



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

Browse to the location where the file was saved on the computer or drive (in this example, *My Documents\Cobalt Presets*).

Select the desired file and click **Open** to load the file to the card.



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

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

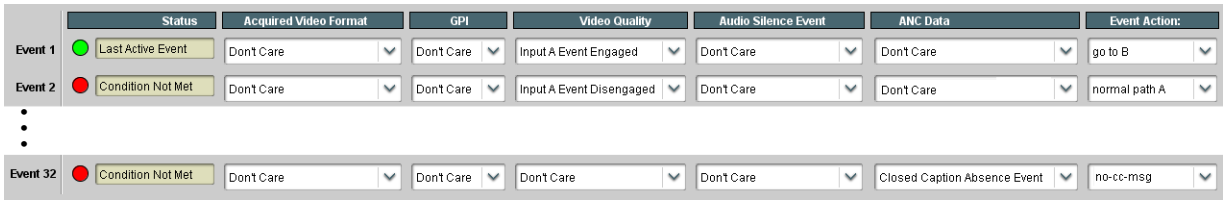
Table 3-2 9922-2FS Function Menu List — continued

Provides event-based loading allowing a defined action to be automatically engaged upon various received signal status. Actions can be “canned” control commands or user-defined by going to a user preset.

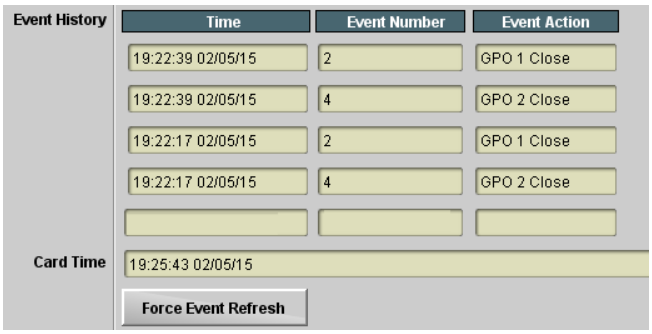
- Event based preset loading is not passive and can result in very significant and unexpected card control and signal processing changes if not properly used. If event based presets are not to be used, make certain the **Event Based Loading** button is set to **Disabled**.
- Because event based preset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

Event triggers allow a variety of event screening criteria, and in turn provide an Event Action “go to” in response to the detected event(s). For each screened criteria, categories can be set as “Don’t Care” or set to specific criteria to broaden or concentrate on various areas of concern.

- The **Event based loading** button serves as a master enable/disable for the function.
- Go-to **Event Actions** can be user-defined presets, “canned” (hard-coded) selections (such as GPO triggers or routing changes), or automated E-mail alert to a respondent (see Email Alerts (p. 3-58) for setting up e-mail alerts).
- Each Event definer (**Event 1** thru **Event 32**) can be set to screen for any or several criteria as shown in the example below. Up to 32 separate events can be defined.
- Event 1 thru Event 32 are arranged with Event 1 having the highest priority, descending down to Event 32. 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 as well as last item logged in the Event History (see below). 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.



Note: Event criteria settings in any row comprise an AND function. Where multiple criteria are selected, a true (trigger) condition is not propagated unless **all** specified criteria are true. To independently screen for multiple criteria, rows should be set up where each criteria is screened in its own Event row. Examples of this are shown on the following pages.



The **Event History** log shows any triggered events in groups of five most recent events (newest at the top).

In the example here, log shows Event 2 as the most recent event, and its user-selected action of GPO 1 Close.

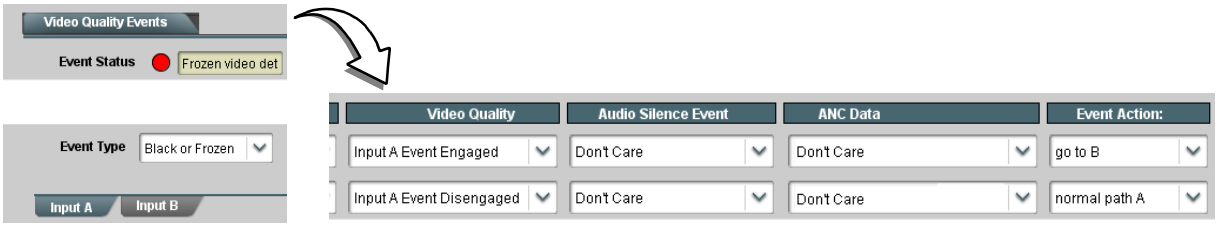
Pressing the **Force Event Refresh** button updates the list.

Table 3-2 9922-2FS Function Menu List — continued

(continued)

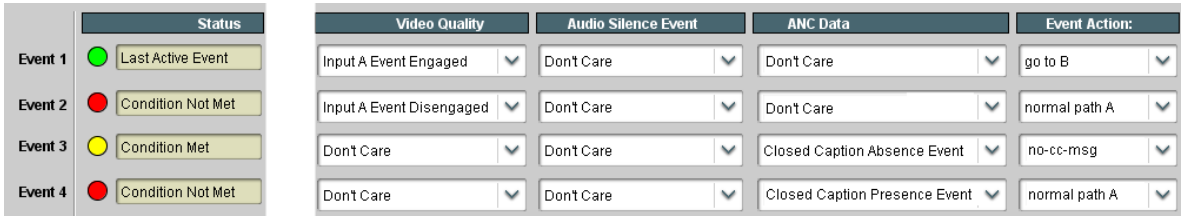
In the example here for Event 1, the **Video Quality Events** tab is set to screen for frozen video on Input A. When detected, this status can be used here (Video Quality set to "Input A Event Engaged" indicating black or frozen video detected). Using the Event Action selector, go-to action of "**go to B**" can be invoked (which in this example is a user preset that changes card routing to use an alternate input source).

Conversely, to go back to the original source, an event could be set up with Video Quality here looking for "Input A Event Disengaged" and in turn invoke an event action returning routing to the original video source (in this example, user preset "**normal path A**").



In the example here, **Event 1** and **Event 3** are respectively set for frozen video and closed captioning absence detection. Using separate Event rows for Video Quality and ANC Data (closed-captioning absence) screening allows these conditions to be independently detected and acted upon with user actions tailored to the event (when either of the conditions are detected, different actions can be taken as selected).

In this example, frozen video calls a preset using an input video routing change, while loss of closed captioning calls a preset to burn a "no CC" message on the raster. Both Events 1 and 3 have corresponding go-to actions to resume normal operation when the event ceases (in this example, a preset "normal path A").



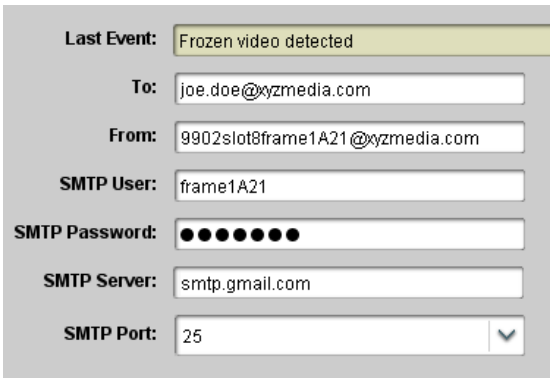
Note:
- Screened conditions are triggered upon start of event. Any event-based setup must be done in advance of the triggering event in order for event to be detected.
- If a desired user preset does not appear in the Event Action drop-down, press the DashBoard **Refresh** button at the bottom of the page to update the list in the drop-down.
- Loss of true conditions does not disengage an event-based triggering. A new set of true conditions must be defined and then occur to transition from one event-based trigger to another.
- Time required to engage an event-based trigger 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 32 rows. This makes certain that the card will always have a defined "go-to" action if a particular event occurs. For example, if the card is expected to "see" a 720p5994 stream or as an alternate, a 525i5994 stream, make certain both of these conditions are defined (with your desired go-to presets) in any two of the Event 1 thru Event 32 condition definition rows.
- Event Actions defined using user presets must be used with care to prevent conditions that could cause looping or the removal or "override" of desired expected settings. When using presets, the Preset Layer selection should be used such that only required aspects are touched (for the example above, the preset "no-cc-msg" should be set to only touch the character burner layer to invoke a character burn).
- Where multiple event screening is set up, the event you consider to be the highest priority should be set as higher priority than lesser events (as shown in the example above where Video Quality screening trumps CC absence). Also, this prioritization helps ensure that all desired events are screened for before a significant change (such as input video source change) is effected.

Table 3-2 9922-2FS Function Menu List — continued

Provides setup for automated Email alerts when an event has occurred.

As an Event Action choice on the Events Triggers sub-tab, an Email alert can be sent as a response. Set up email fields as shown in the example below.

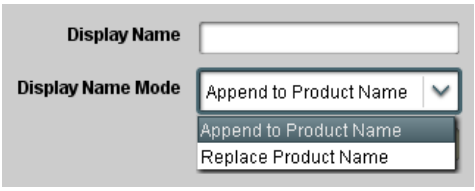
Note: Frame hosting the card must be accessible to email recipient's network. It is recommended to set up and generate a test event to test the email send.



When fields are filled-in to specify recipient and sender, and email alert is selected for Event Action on Event Triggers sub-tab page, recipeient receives an email alert upon event, with the triggering event shown (in this example, "frozen video detected").

Provides a global card operating status and allows a log download for factory engineering support. Also provides controls for selecting and loading card firmware upgrade files, and for setting the card comm IP address.

- **Card DashBoard Name Control**

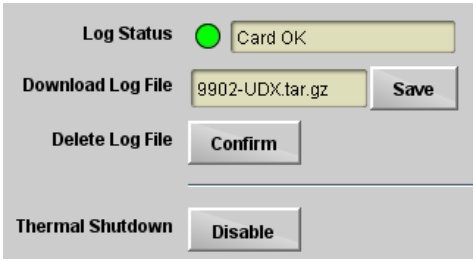


Allows card name In DashBoard to be changed as desired. Click return to engage change.

- **Append to Product Name** appends (or adds to) existing OEM name (for example, "9922-2FS *Processing 1A*").
- **Replace Product Name** completely replaces the OEM name OEM name (for example, "*Processing 1A*").

Note: DashBoard instance(s) may have to be refreshed before name change appears.

- **Log Status and Download Controls**



- **Log Status** indicates overall card internal operating status.
- **Download Log File** allows a card operational log file to be saved to a host computer. This log file can be useful in case of a card error or in the case of an operational error or condition. The file can be submitted to Cobalt engineering for further analysis.
- **Delete Log File** deletes the currently displayed log file. A second confirmation dialog is displayed to back out of the delete if desired.
- **Thermal Shutdown** enable/disable allows the built-in thermal failover to be defeated. (Thermal shutdown is enabled by default).

CAUTION

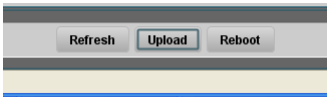
The 9922-2FS FPGA is designed for a normal-range operating temperature around 85° C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within device operating safe parameters, and can be allowed by setting this control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum card protection.

Table 3-2 9922-2FS Function Menu List — continued

Admin	(continued)
• **Firmware Upgrade Controls**	Firmware upgrade controls allow a selected firmware version (where multiple versions can be uploaded to the card's internal memory) to invoke an upgrade to a selected version either instantly, or set to install on the next card reboot (thereby allowing card upgrade downtime to be controlled at a scheduled point in time).

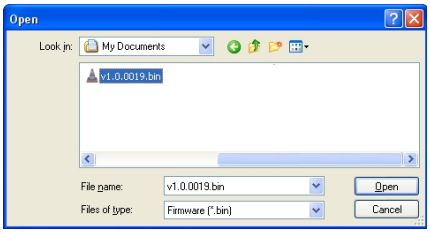
Note: The page/tab here allows managing multiple firmware versions saved on the card. New upgrade firmware from our web site can always be directly uploaded to the card without using this page. Instructions for firmware downloading to your computer and uploading to the card can be found at the **Support>Firmware Downloads** link at www.cobaltdigital.com.

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



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

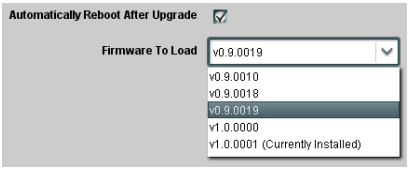
3. Select the desired file and click **Open** to upload the file to the card.



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

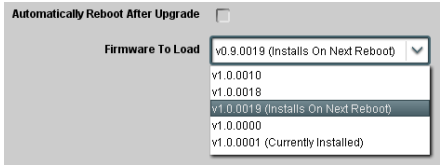
1. Click **Firmware To Load** and select the desired upgrade file to be loaded (in this example, "v1.0.0019").

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



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

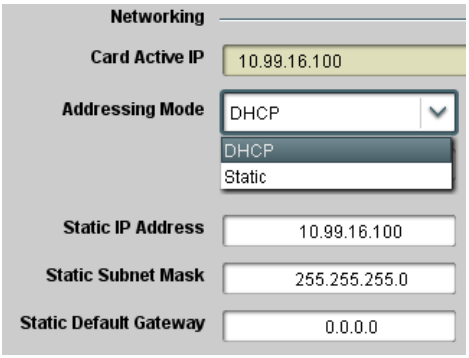
1. Click **Firmware To Load** and select the desired upgrade file to be loaded (in this example, "v1.0.0019"). Note now how the display shows "Installs on Next Reboot".



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

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

• **Card Network Setup Controls**



Note: • The IP address setting here is independent of a frame IP typically used for DashBoard or other frame/card remote control.

• The IP address setting here is required if the card Ancillary Data Proc Controls function is to send or receive data via IP. If IP comm with Ancillary Data Proc Controls is not required, setting these fields can be ignored. See Ancillary Data Proc Controls (p. 3-50) for more information.

• **Addressing Mode** allows setting address to static (user) address or via DHCP (where a DHCP server is available for the connection).

• **Static IP Address**, **Static Subnet Mask**, and **Static Default Gateway** fields allow setting IP parameters when Static mode is selected.

• **Card Active IP** shows the currently configured IP address (whether static or DHCP).

Troubleshooting

This section provides general troubleshooting information and specific symptom/corrective action for the 9922-2FS card and its remote control interface. The 9922-2FS 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 9922-2FS card itself and its remote control systems all (to varying degrees) provide error and failure indications. Depending on how the 9922-2FS 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.

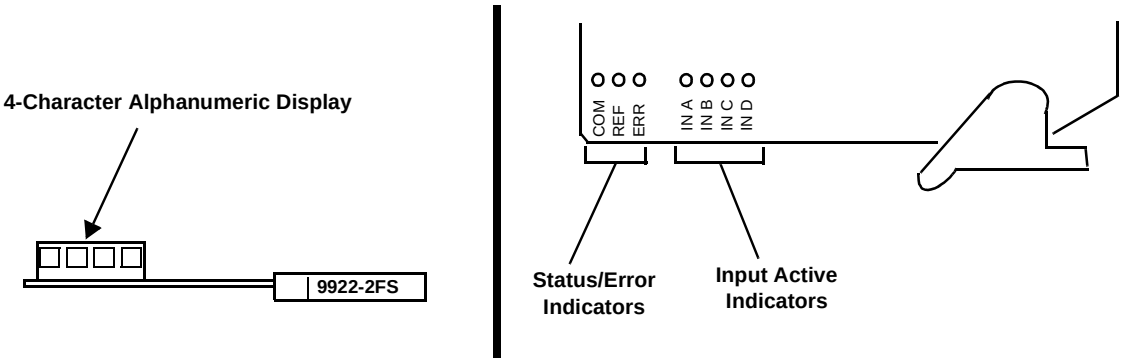
The various 9922-2FS card and remote control error and failure indicators are individually described below.

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. 3-64)
- 9922-2FS Processing Error Troubleshooting (p. 3-65)
- Troubleshooting Network/Remote Control Errors (p. 3-66)

9922-2FS Card Edge Status/Error Indicators and Display

Figure 3-7 shows and describes the 9922-2FS card edge status indicators and display. These indicators and the display show status and error conditions relating to the card itself and remote (network) communications (where applicable). Because these indicators are part of the card itself and require no external interface, the indicators are particularly useful in the event of communications problems with external devices such as network remote control devices.



Item	Function
Alphanumeric Display	Shows card statuses (`BOOT` (card booting), (`9922-2FS` (card up and OK))
COM LED	Blue LED flashes when 9922-2FS is receiving control message from remote network control (e.g., DashBoard™ or Cobalt® Remote Control Panel)
REF LED	Blue LED illuminates indicating 9922-2FS is receiving selected reference when set up for framesync operation.
ERR LED	This function is currently reserved.
Input Active LEDs	Blue LEDs for each SDI input (A thru D) indicate signal presence for each corresponding card SDI input. No illumination of any of the LEDs indicates the 9922-2FS has not locked onto a valid signal on any input.

Figure 3-7 9922-2FS Card Edge Status Indicators and Display

DashBoard™ Status/Error Indicators and Displays

Figure 3-8 shows and describes the DashBoard™ status indicators and displays. These indicator icons and displays show status and error conditions relating to the 9922-2FS card itself and remote (network) communications.

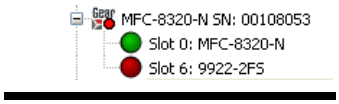
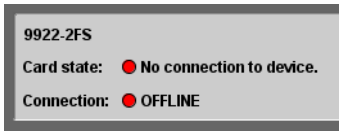
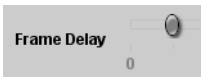
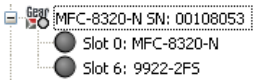
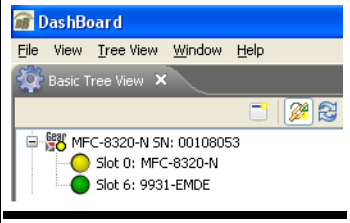
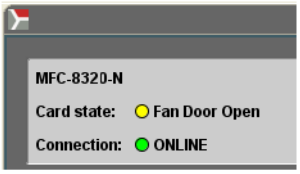
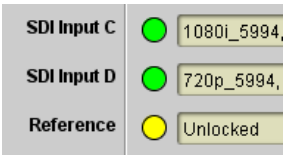
Indicator Icon or Display	Error Description
	Red indicator icon in Card Access/Navigation Tree pane shows card with Error condition (in this example, the Card Access/Navigation Tree pane shows a general error issued by the 9922-2FS card in slot 6).
	Specific errors are displayed in the Card Info pane (in this example “No connection to device” indicating 9922-2FS card is not connecting to frame/LAN).
	If the 9922-2FS card is not connecting to the frame or LAN, all controls are grayed-out (as shown in the example here).
	Gray indicator icon in Card Access/Navigation Tree pane shows card(s) are not being seen by DashBoard™ due to lack of connection to frame LAN (in this example, both a 9922-2FS card in slot 6 and the MFC-8320-N Network Controller Card for its frame in slot 0 are not being seen).
	Yellow indicator icon in Card Access/Navigation Tree pane shows card with Alert condition (in this example, the Card Access/Navigation Tree pane shows a general alert issued by the MFC-8320-N Network Controller Card).
	Clicking the card slot position in the Card Access/Navigation Tree (in this example Network Controller Card “Slot 0: MFC-8320-N”) opens the Card Info pane for the selected card. In this example, a “Fan Door Open” specific error is displayed.
	Yellow indicator icon in 9922-2FS Card Info pane shows error alert, along with cause for alert (in this example, the 9922-2FS is not receiving an enabled framesync source).

Figure 3-8 DashBoard™ Status Indicator Icons and Displays

Access Card Info panes for specific cards by clicking the card slot position in the Card Access/Navigation Tree pane (as shown in the example in Figure 3-9).

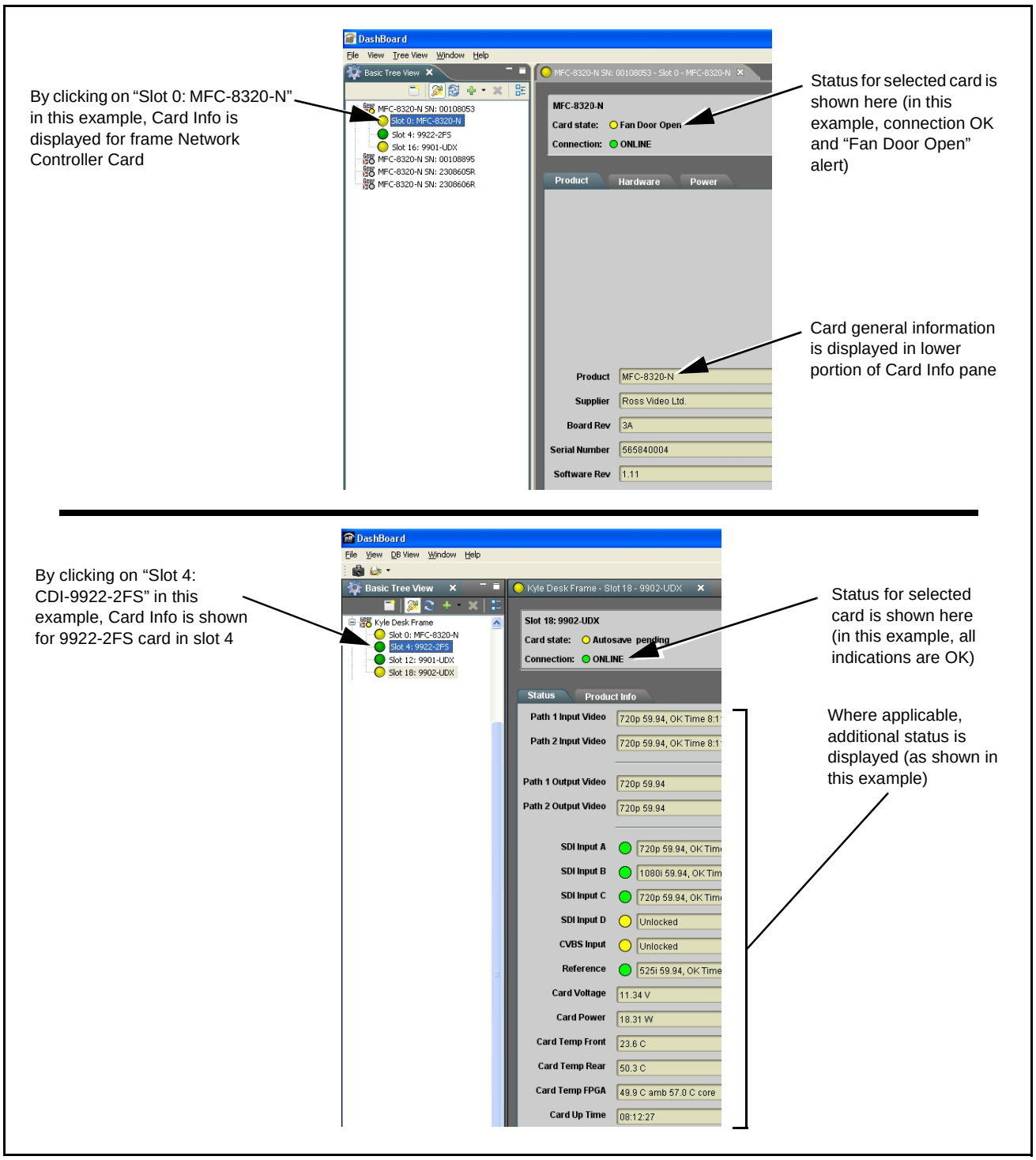


Figure 3-9 Selecting Specific Cards for Card Info Status Display

Basic Troubleshooting Checks

Failures of a general nature (affecting many cards and/or functions simultaneously), or gross inoperability errors are best addressed first by performing basic checks before proceeding further. Table 3-3 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 3-3 Basic Troubleshooting Checks

Item	Checks

Verify power presence and characteristics	• On both the frame Network Controller Card and the 9922-2FS, 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 9922-2FS 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 9922-2FS card itself is defective.
	  • If display shows **excessive** power being consumed (see Technical Specifications (p. 1-12) in Chapter 1, “Introduction”), the 9922-2FS card may be defective.

Check Cable connection secureness and connecting points	Make certain all cable connections are fully secure (including coaxial cable attachment to cable ferrules on BNC connectors). Also, make certain all connecting points are as intended. Make certain the selected connecting points correlate to the intended card inputs and/or outputs. Cabling mistakes are especially easy to make when working with large I/O modules.
Card seating within slots	Make certain all cards are properly seated within its frame slot. (It is best to assure proper seating by ejecting the card and reseating it again.)
Check status indicators and displays	On both DashBoard™ and the 9922-2FS 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.

9922-2FS Processing Error Troubleshooting

Table 3-4 provides 9922-2FS processing troubleshooting information. If the 9922-2FS card exhibits any of the symptoms listed in Table 3-4, follow the troubleshooting instructions provided.

In the majority of cases, most errors are caused by simple errors where the 9922-2FS is not appropriately set for the type of signal being received by the card.

Note: The error indications shown below are typical for the corresponding error conditions listed. Other error indications not specified here may also be displayed on DashBoard™ and/or the 9922-2FS card edge status indicators.

Note: Where errors are displayed on both the 9922-2FS card and network remote controls, the respective indicators and displays are individually described in this section.

Table 3-4 Troubleshooting Processing Errors by Symptom

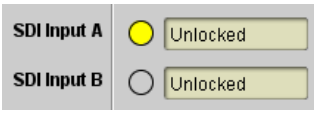
Symptom	Error/Condition	Corrective Action
• **DashBoard™** shows **Unlocked** message in 9922-2FS Card Info pane  • Card edge **Input** LED corresponding to input is not illuminated	No video input present	Make certain intended video source is connected to appropriate 9922-2FS card video input. Make certain BNC cable connections between frame Rear I/O Module for the card and signal source are OK.
Ancillary data (closed captioning, timecode) not transferred through 9922-2FS	• Control(s) not enabled	• Make certain respective control is set to **On** or **Enabled** (as appropriate).
	• VANC line number conflict between two or more ancillary data items	• Make certain each ancillary data item to be passed is assigned a unique line number (see Ancillary Data Line Number Locations and Ranges on page 3-9).
Audio not processed or passed through card	Enable control not turned on	On **Output Audio Routing/Controls** tab, **Audio Group Enable** control for group 1 thru 4 must be turned on for sources to be embedded into respective embedded channel groups.
Selected upgrade firmware will not upload	Automatic reboot after upgrade turned off	Card **Presets** > **Automatically Reboot After Upgrade** box unchecked. Either reboot the card manually, or leave this box checked to allow automatic reboot to engage an upgrade upon selecting the upgrade.

Table 3-4 Troubleshooting Processing Errors by Symptom — continued

Symptom	Error/Condition	Corrective Action
Card does not pass video or audio as expected. Control settings spontaneously changed from expected settings.	Event-based preset inadvertently invoked	Event-based preset loading (**Presets** tab > **Event Triggers** sub-tab) should be set to **Disabled** if this function is not to be used. Read and understand this control description before using these controls to make sure engagement for all expected conditions is considered. See Presets (p. 3-54) for more information.
Card will not retain user settings, or setting changes or presets spontaneously invoke.	**Event Based Loading** sub-tab inadvertently set to trigger on event	If event based loading is not to be used, make certain **Event Based Presets** is disabled (either using master **Enable/Disable** control or through events settings. See Presets (p. 3-54) for more information.

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

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.

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