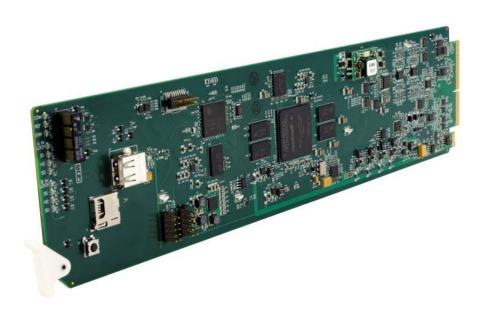
COBALT.

9922-FS



3G/HD/SD-SDI Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/ De-Embedding, CVBS I/O, and Dual-Channel Option (+2FS)

Product Manual



Cobalt Digital Inc.

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

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Congratulations on choosing the Cobalt[®] 9922-FS 3G/HD/SD-SDI Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, CVBS I/O, and Dual-Channel Option (+2FS). The 9922-FS 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-FS, please contact us at the contact information on the front cover.

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Introduction

Overview

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

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

This chapter contains the following information:

- 9922-FS Card Software Versions and this Manual (p. 1-2)
- Manual Conventions (p. 1-3)
- Safety and Regulatory Summary (p. 1-5)
- 9922-FS Functional Description (p. 1-6)
- Technical Specifications (p. 1-20)
- Warranty and Service Information (p. 1-23)
- Contact Cobalt Digital Inc. (p. 1-24)

9922-FS 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 DashBoardTM. See Checking 9922-FS 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 TM .
	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.

Introduction Manual Conventions

Manual Conventions

In this manual, display messages and connectors are shown using the exact name shown on the 9922-FS itself. Examples are provided below.

• Card-edge display messages are shown like this:



Connector names are shown like this: SDI IN A

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

- **9922-FS** refers to the 9922-FS 3G/HD/SD-SDI Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/ De-Embedding, CVBS I/O, and Dual-Channel Option (+2FS) card.
- **Frame** refers to the HPF-9000, oGx, OG3-FR, 8321, or similar 20-slot frame that houses Cobalt® or other cards.
- **Device** and/or **Card** refers to a Cobalt[®] or other card.
- System and/or Video System refers to the mix of interconnected production and terminal equipment in which the 9922-FS and other cards operate.
- Functions and/or features that are available only as an option are denoted in this manual like this:



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

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

1 Manual Conventions

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.

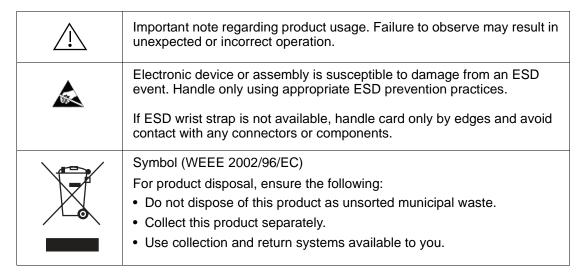
Cautions

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



Safety and Regulatory Summary

Warnings

! WARNING!

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

Cautions

CAUTION

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

CAUTION

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

CAUTION

Heat and power distribution requirements within a frame may dictate specific slot placement of cards. Cards with many heat-producing components should be arranged to avoid areas of excess heat build-up, particularly in frames using only convection cooling. The 9922-FS 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-FS 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-FS FPGA is designed for a normal-range operating temperature around 85° C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within device operating safe parameters, and can be allowed by setting this control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum card protection.

EMC Compliance Per Market

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

9922-FS Functional Description

Figure 1-1 shows a functional block diagram of the 9922-FS. The 9922-FS frame sync 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 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-FS also provides timecode/closed-captioning conversion from packet-based timecode formats and CEA608/708 HD formats to HD ATC, SD_ATC, and SD VITC-based (waveform) timecode.

9922-FS Input/Output Formats

The 9922-FS provides the following inputs and outputs:

• 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.
- RLY BYP B –3G/HD/SD-SDI which 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.
- AES OUT BNC (AES-3id, 75 Ω) 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.

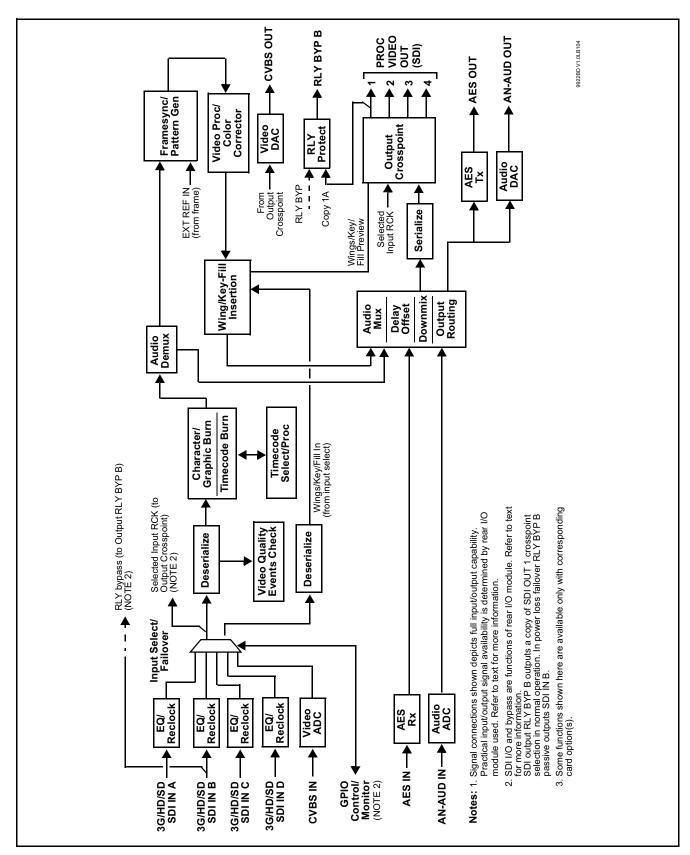


Figure 1-1 9922-FS Functional Block Diagram

Video Processor Description

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

Input Video Select/Quality Check Functions

A GUI-based control allows the card to select from up to four 3G/HD/ SD-SDI inputs, and a SD CVBS analog video 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. An input Allowed Rasters and Allowed Frame Rates filter allows inputs to be filtered (screened) for only user-allowed raster sizes and frame rates, with unallowed raster/rates being rejected as an input (input unlock). 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 video routing changes, GPO, and other actions.

Auto-Changeover Function

(See Figure 1-2.) This function allows the card logic assert of input select and routing to the RLY BYP B card processed output under normal conditions, while providing latching relays at both the input and output nodes to provide input failover to select an alternate input, and also provides output failover which can passively relay-route the currently selected input directly to the output if the card loses power or is removed from the frame. (Both relays are located on the card rear module; rear module used must be type that is relay-equipped.)

The RLY BYP B SDI output retains selected routing regardless of whether a selection was manually invoked or by a unit-detected failover (such as loss of power). For example, prior to a power loss event if a changeover from SDI IN A to SDI IN B was active at the time, this selection is retained by the latching relays. In a power-loss event, **SDI IN B** would be directly routed to output **RLY BYP B**, and the card automatically removed from the signal path until normal operation again commences. In normal operation, the output relay always maintains routing from the card processed output to output RLY BYP B.

- Note: The card also provides active (DA-driven) outputs RCK/PROC 1 thru RCK/PROC 4. These outputs are independent of the relay failover function and will lose signal in the event of a power loss.
 - The above failover uses basic signal presence as failover criteria and is limited to inputs A and B. Failover using active assessments (Quality Check) can be set to provide failovers using frozen/black frame and other criteria. See Video Quality Events Detect Function (p. 1-13) for more information.

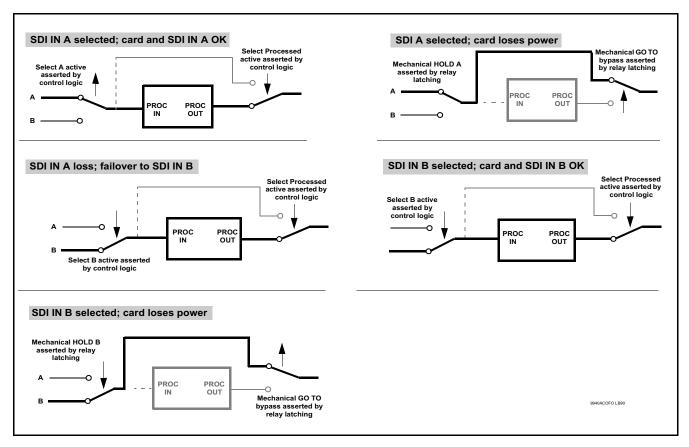


Figure 1-2 Auto-Changeover Function and Signal Flow

Video Output Crosspoint

A four-output video matrix crosspoint 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.

An additional output (RLY BYP B) provides a relay-protected output that outputs a copy of SDI OUT 1 crosspoint selection in normal operation. In power loss failover RLY BYP B passive outputs the signal connected to SDI IN B.

Timecode Processor

(See Figure 1-3.) 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.

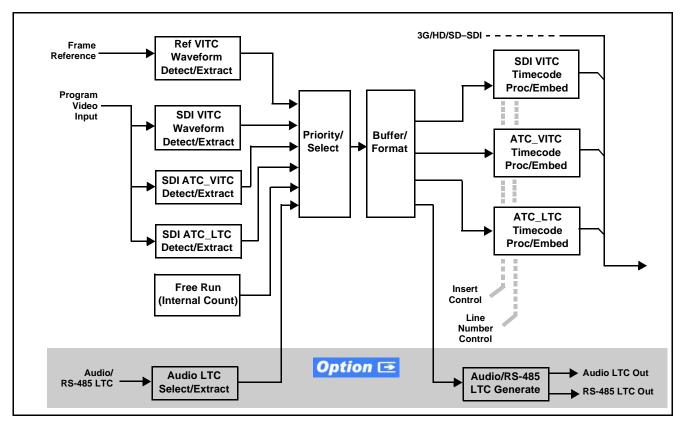


Figure 1-3 Timecode Processor

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.

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 various 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.

When licensed with option +2FS, this function enables a second independent video/frame sync path in which the input and output crosspoints supply two video paths to and from the dual processing paths.

Note:

When this option is enabled, the 9922-FS card becomes a 9922-2FS card. Refer to 9922-2FS Product Manual for dual-channel frame sync card descriptions.

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.)

The wings L/R insertion width can be manually configured using a wings width control.

Key/Fill Insertion Option 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.

EAS Text Crawl Generation Option Option Option +EAS provides for automated keying Emergency Alert System (EAS) text crawls in the active program video output. The function receives its text stream via a card serial data input. The EAS crawl start can be set to trigger upon receiving the serial data message, or be set to use a GPI to trigger start of the EAS crawl.

Embedded in the received serial data are commands which set the message severity to be shown by the keyed crawl (severity is correlated to user-specified text color and background color for the crawl). User controls allow control of the crawl speed and repeat of the crawl burn-in (if desired). Refer to +EAS Manual Supplement OPT-SW-PHXEAS-MS for detailed information and installation/setup instructions.

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 Burn-in Functions

User text, video format, 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.

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

Video Quality Events Detect Function Option 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).

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).

Ancillary Data Processor Option 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.

This option also provides SMPTE 337 embed/de-embed, which allows serial user data to be embedded and de-embedded over unused embedded audio pairs.

Audio Processor Description

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 input¹
- Up to 4 channels of balanced analog audio input

(See Figure 1-4.) 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.

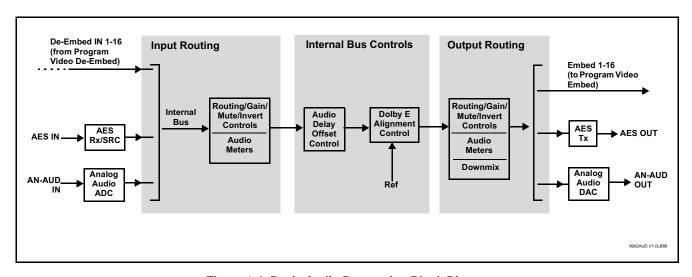


Figure 1-4 Basic Audio Processing Block Diagram

^{1.} Discrete audio I/O channel count is dependent on rear I/O module used. Not all rear I/O modules may not support maximum number of available discrete channels.

Option (Option +CQS). Clean and Quiet Switching allows SDI input selection to be changed from one source to another while ducking audio during controlled input video switching transitions to provide silence between input switches. The cross-fade is queued for the next available RP168 switch line following the switch command.

Note

- Clean audio switching is assured only for intentional, controlled switches via user control. Clean audio switching cannot be assured for failover switches.
- Clean switching requires that both SDI signals (switch from and switch to) be stable and present.
- Clean audio switching function is designed for PCM audio. This function does not assure clean decoded audio when switching from/to Dolby or other non-PCM audio.

Audio Down Mix Function

(See Figure 1-5.) 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).

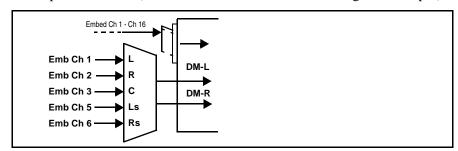


Figure 1-5 Audio Down Mix Functional Block Diagram with Example Sources

Flex Buses

For both input and output nodes before and after the card internal buses, flex buses provide flexible-structure mixer in which any of 16 summing nodes (Flex Mix Bus A thru Flex Mix Bus P) can receive any card audio input, thereby allowing several customizable mixing schemes. Similarly, any of the 16 card internal bus signals can be applied to an output flex bus mixer.

Cobalt Digital **+TTS** is a complete 21CVAA digital text-to-speech generation / audio insertion solution for embedded and discrete audio systems.

+TTS interfaces with industry standard Windows Share folder systems to receive non-proprietary text, XML, or similar plain text files, and converts and inserts realistic human-voice audio into user-configured audio channels (typically an SAP channel pair intended for this playout). +TTS allows for prioritization based on the organization's discretion (for example, severe weather alerts out-prioritizing school closings). Alert tones are inserted over the main program channels to alert the visually impaired that emergency content is to occur on the SAP channel. Alerts can be played a configurable number of times, and alerts with higher priority can interrupt current lists for breaking news. Once the interrupt message is broadcast, +TTS automatically reverts to normal audio programming. Refer to +TTS Manual Supplement OPT-TTS-MS for detailed information and installation/setup instructions.

Audio Events Detect Function Option

Option +QC provides a Audio Detect Events user interface and an Event Triggers user interface for checking user-selected channels to detect audio silence conditions. 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).

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.

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-FS 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, and provide RS-485 LTC I/O (when licensed with option **+LTC**). Either port can be configured as RS-232 Tx/Rx or RS-422 non-duplexed Tx or Rx.

+SCTE104 Insertion Option Option

Option +SCTE104 provides generation and insertion of SCTE 104 messages into baseband SDI. Message send can be triggered from automation GPI or other event action modes. The option can also execute card actions based on SCTE 104 messages received by the card, as well as send triggered SCTE 104 packets to other downstream systems.

The user interface is based on common SCTE 104 operations: Splice Start Normal, Splice Start Intermediate, Splice End Normal, Splice End Intermediate, and Splice Cancel (splice_request_data variants), offering full control of splice start, end, and cancel as well as pre-roll and break duration offsets. (A Manual Supplement is planned for this option. Please check product web page.)

Alarm Function

The card can be set to monitor input video/audio for input errors such as input LOS, frozen or black frame, loss of reference, closed captioning ancillary data loss, and/or per-channel audio absences. These alarms can be propagated as a card general error or warning message, and can be downloaded as basic .txt logs or via a Syslog function.

User setup tables configure the alarm severity escalation as well as trigger holdoff/release and other thresholds as applicable.

User Control Interface

Figure 1-6 shows the user control interface options for the 9922-FS. 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-FS 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 DashBoardTM software can be downloaded from the Cobalt Digital Inc. website: $\underline{www.cobaltdigital.com}$ (enter "DashBoard" in the search window). The DashBoardTM 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-FS and other video and audio processing terminal equipment meeting the open-architecture Cobalt® cards for openGearTM 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 openGearTM control software DashBoardTM; 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 TM is a trademark of Ross Video Limited.

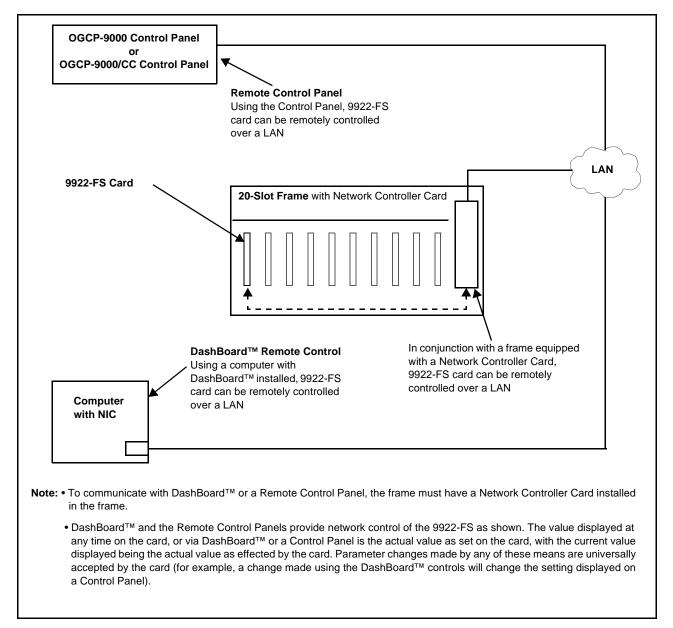


Figure 1-6 9922-FS User Control Interface

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. 1-24).

9922-FS Rear I/O Modules

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

The full assortment of 9922-FS Rear I/O Modules is shown and described in 9922-FS 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-FS 3G/HD/SD-SDI Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/ De-Embedding, CVBS I/O, and Dual-Channel Option (+2FS) card.

Table 1-1 Technical Specifications

Item	Characteristic
Part number, nomenclature	9922-FS 3G/HD/SD-SDI Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, CVBS I/O, and Dual-Channel Option (+2FS)
Installation/usage environment	Intended for installation and usage in frame meeting openGear™ modular system definition
Power consumption	< 18 Watts maximum
Installation Density	Up to 20 cards per 20-slot frame
Environmental: Operating temperature: Relative humidity (operating or storage):	32° – 104° F (0° – 40° C) < 95%, non-condensing
Frame communication	10/100/1000 Mbps Ethernet with Auto-MDIX
Indicators	Card edge display and indicators as follows: • 4-character alphanumeric display • Status/Error LED indicator • Input Presence LED indicators
Serial Digital Video Input	Number of Inputs: Up to (4), with manual select or failover to alternate input. Data Rates Supported: SMPTE 424M, 292M, SMPTE 259M-C

Table 1-1 Technical Specifications — continued

Item	Characteristic
Serial Digital Video Input (Cont)	Impedance: 75 Ω terminating Return Loss: > 15 dB up to 1.485 GHz
Analog Video Input	> 10 dB up to 2.970 GHz 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.
Post-Processor Serial Digital Video Outputs	Number of Outputs: Up to 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

Table 1-1 Technical Specifications — continued

Item	Characteristic
Post-Processor Serial Digital Video Outputs (Cont)	Minimum Latency (frame sync 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 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	(2) GPI; (2) GPO; opto-isolated GPO Specifications: Max I: 120 mA Max V: 30 V Max P: 120 mW GPI Specifications: GPI LO @ Vin < 1.5 V GPI HI @ Vin > 2.3 V Max Vin: 9 V

Warranty and Service Information

Cobalt Digital Inc. Limited Warranty

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

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

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

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

Cobalt Digital Inc. Factory Service Center

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

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- Name and address of your local dealer
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Phone:	(217) 344-1243
Fax:	(217) 344-1245
Web:	www.cobaltdigital.com
General Information:	info@cobaltdigital.com
Technical Support:	support@cobaltdigital.com

Installation and Setup

Overview

This chapter contains the following information:

- Installing the 9922-FS Into a Frame Slot (p. 2-1)
- Installing a Rear I/O Module (p. 2-3)
- Setting Up 9922-FS Network Remote Control (p. 2-10)

Installing the 9922-FS 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-FS 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-FS 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-FS 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-FS 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-FS into a frame slot as follows:

- Determine the slot in which the 9922-FS is to be installed.
- Open the frame front access panel.
- While holding the card by the card edges, align the card such that the plastic ejector tab is on the bottom.
- Align the card with the top and bottom guides of the slot in which the card is being installed.
- 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.

- Verify that the card is fully engaged in rear I/O module mating connector.
- Close the frame front access panel.
- Connect the input and output cables as shown in 9922-FS Rear I/O Modules (p. 2-4).
- Repeat steps 1 through 8 for other 9922-FS cards.

- Note: The 9922-FS 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-FS Network Remote Control (p. 2-10).

Note:

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

Installing a Rear I/O Module

Note: This procedure is applicable **only if a Rear I/O Module is not currently installed** in the slot where the 9922-FS is to be installed.

If installing the 9922-FS 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-FS 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.

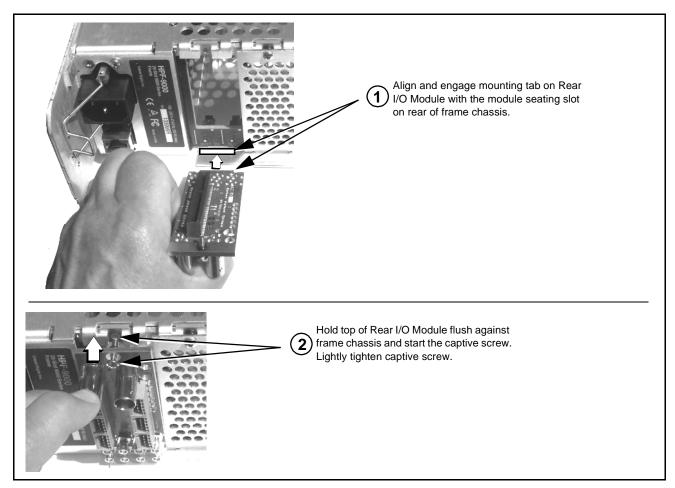


Figure 2-1 Rear I/O Module Installation

9922-FS Rear I/O Modules

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

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-FS Rear I/O Modules

9922-FS Rear I/O Module	Description
CARD 2 CARD 2 SDI IN A SDI OUT 1 SDI OUT 2 SDI OUT 3	Split Rear Module. Provides each of the following connections for two 9922-FS cards: • Two 3G/HD/SD-SDI coaxial input BNCs (SDI IN A and SDI IN C) • Three 3G/HD/SD-SDI Video Out BNCs (SDI OUT 1 thru SDI OUT 3)
RM20-9922-FS-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-FS Rear I/O Modules — continued

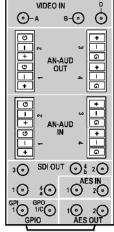
9922-FS Rear I/O Module Description RM20-9922-FS-C Provides the following connections: Four 3G/HD/SD-SDI video input BNCs (SDI IN A) thru **SDI IN D**) 0 0 Four 3G/HD/SD-SDI video output BNCs SDI ÎN A (RCK/PROC 1 thru RCK/PROC 4: each GUI Note: RCK/PROC 1 thru selectable as processed out, selected-input 0 RCK/PROC 4 are DA reclocked, or wings/key-fill preview where outputs which can be SOLING available) individually set as reclocked or processed **GPIO** \odot One relay-protected SDI processed output BNC outputs of the COM (RLY BYP B; outputs a copy of SDI OUT 1 under currently-selected input. SDI IN D normal conditions, or passive outputs the SDI input RLY BYP B is a relay-(·) on **SDI IN B** as a relay failover if card power is lost) protected path which RCK/PROC 1 RCK/PROC 2 carries processed • COMM/GPIO RJ-45 connector SDI out under normal conditions and passive 0 0 Note: Refer to GPIO, Serial (COMM), and Analog routes SDI IN B to this Audio Connections (p. 2-10) for connector RCK/PROC 3 RCK/PROC 4 BNC upon loss of power. pinouts and important information regarding GPO electrical limits. RM20-9922-FS-D Provides the following connections: Two 3G/HD/SD-SDI video inputs (VIDEO IN A and VIDEO IN B) VIDEO IN 6 One CVBS video input (CVBS IN) 10 50 Two analog balanced audio inputs (AN-AUD IN 1 and AN-AUD IN 2) 20 60 • Eight AES audio inputs (AES IN 1 thru AES IN 8) AES • Two 3G/HD/SD-SDI video outputs (VIDEO OUT 1 30 70 and VIDEO OUT 2) 40 80 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: RM20-9922-FS-D-HDBNC or RM20-9922-FS-D-DIN, respectively.

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

9922-FS Rear I/O Module	Description
AES O	• Fight AES addio inputs (AES IN 1 triffu AES IN 6) • 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 addio outputs (AES OUT 1 thru AES OUT 8) Note: Available equipped with High-Density BNC (HDBNC) or DIN1.0/2.3 connectors as: RM20-9922-FS-E-HDBNC or RM20-9922-FS-E-DIN, respectively.
RM20-9922-FS-F SDI IN A SDI IN GRADINA AND OUT SDI OUT 1A AND OUT SDI OUT 3A SDI OUT SDI OUT 3A SDI OUT SDI OUT 3A SDI OUT	(SDI OUT 1A thru SDI OUT 4B; each GUI selectable as selected-input reclocked or processed out) One relay-protected SDI processed output BNC (RLY BYP A/B OUT) 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

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

9922-FS Rear I/O Module Description RM20-9922-FS-H Provides the following connections: Two 3G/HD/SD-SDI video input BNCs (SDI IN A) VIDEO IN and SDI IN B) **⊙**-A B-(0) (0)

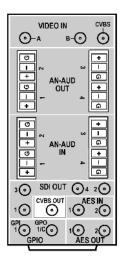


Note: Refer to GPIO, Serial (COMM), and Analog Audio Connections (p. 2-10) for connector pinouts and important information regarding GPO electrical limits.

- One SDI/CVBS video input; selectable as 3G/HD/ SD-SDI or CVBS (D/CVBS IN)
- Four analog balanced audio inputs (AN-AUD IN 1 thru AN-AUD IN 4)
- Two AES audio inputs (AES IN 1 and AES IN 2)
- Three 3G/HD/SD-SDI video outputs, selectable as processed or reclocked input (SDI OUT 1 thru SDI OUT 3)
- 3G/HD/SD-SDI video output pair, selectable as processed or reclocked input as a pair (SDI OUT 4a and SDI OUT 4b)
- Four analog balanced audio outputs (AN-AUD OUT 1 thru AN-AUD OUT 4)
- Two AES audio outputs (AES OUT 1 and AES OUT 2)
- One GPI / 6Hz coaxial input (GPI 1)
- One coaxial GPO with isolated return (GPO 1)

Note: Available equipped with High-Density BNC (HDBNC) or DIN1.0/2.3 connectors as: RM20-9922-FS-H-HDBNC or RM20-9922-FS-H-DIN, respectively.

RM20-9922-FS-J



Note: Refer to GPIO, Serial (COMM), and Analog Audio Connections (p. 2-10) for connector pinouts and important information regarding GPO electrical limits.

Provides the following connections:

- Two 3G/HD/SD-SDI video input BNCs (SDI IN A and SDI IN B)
- One SDI/CVBS video input; selectable as 3G/HD/ SD-SDI or CVBS (D/CVBS IN)
- Four analog balanced audio inputs (AN-AUD IN 1 thru AN-AUD IN 4)
- Two AES audio inputs (AES IN 1 and AES IN 2)
- Four 3G/HD/SD-SDI video outputs, selectable as processed or reclocked input (SDI OUT 1 thru SDI OUT 4)
- One CVBS video output (CVBS OUT)
- Four analog balanced audio outputs (AN-AUD OUT 1 thru AN-AUD OUT 4)
- Two AES audio outputs (AES OUT 1 and AES OUT 2)
- One GPI / 6Hz coaxial input (GPI 1)
- One coaxial GPO with isolated return (GPO 1)

Note: Available equipped with High-Density BNC (HDBNC) or DIN1.0/2.3 connectors as: RM20-9922-FS-J-HDBNC or RM20-9922-FS-J-DIN, respectively.

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

9922-FS Rear I/O Module	Description
P922-FS Rear I/O Module RM20-9922-FS-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. 2-10) for connector pinouts and important information regarding GPO electrical limits. • Available equipped with High-Density BNC (HDBNC) or DIN1.0/2.3 connectors as: RM20-9922-FS-K-HDBNC or RM20-9922-FS-K-DIN, respectively.
RM20-9922-FS-L SDI IN B O D O TO COM A RX 6 - COM A RX 6	Provides the following connections: • Four 3G/HD/SD-SDI video inputs (SDI IN A thru SDI IN D • CVBS video input (CVBS IN) • Eight 3G/HD/SD-SDI video outputs (SDI OUT 1A thru SDI OUT 4B; 1x2 DA output of each crosspoint output) • CVBS video output (CVBS OUT) • COMM/GPIO RJ-45 connector • ETHERNET 100/1000 BaseT Ethernet connector Note: Available equipped with High-Density BNC (HDBNC) or DIN1.0/2.3 connectors as: RM20-9922-FS-L-HDBNC or RM20-9922-FS-L-DIN, respectively.

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

9922-FS Rear I/O Module	Description	
RM20-9922-FS-M/S CARD 2 CARD 1 ○ SDI IN A ○ SDI IN A ○ SDI IN B ○ SDI IN B ○ SDI IN C ○ SDI IN C ○ SDI IN D ○ SDI IN D ○ 1A SDI OUT ○ 2A 3A 3B ○ 2A 3B ○ 2A 3A	 Split Rear Module. Provides each of the following connections for two 9922-FS cards: Four 3G/HD/SD-SDI coaxial input BNCs (SDI IN A and SDI IN D) Six 3G/HD/SD-SDI Video Out BNCs (SDI OUT 1A thru SDI OUT 4B) Note: Available equipped with High-Density BNC (HDBNC) or DIN1.0/2.3 connectors as: RM20-9922-FS-M/S-HDBNC or RM20-9922-FS-M/S-DIN, respectively. 	
RM20-9922-FS-N GPIO/COMM T ALS IN T ALWIND OUT T ALWIN	Double-width rear modules provides the following connections: • Four 3G/HD/SD-SDI video inputs (SDI IN A thru SDI IN D • CVBS video input (CVBS IN) • Four analog balanced audio inputs (AN-AUD IN 1 thru AN-AUD IN 4) • Eight AES audio inputs (AES IN 1 thru AES IN 8) • Four 3G/HD/SD-SDI video outputs (SDI OUT 1B thru SDI OUT 4B (OUT 1B with relay bypass protect) • CVBS video output (CVBS OUT) • Four analog balanced audio outputs (AN-AUD OUT 1 thru AN-AUD OUT 4) • Eight AES audio outputs (AES OUT 1 thru AES OUT 8) • COMM/GPIO RJ-45 connector • ETHERNET 100/1000 BaseT Ethernet connector Note: Available equipped with High-Density BNC (HDBNC) or DIN1.0/2.3 connectors as: RM20-9922-FS-N-HDBNC or RM20-9922-FS-N-DIN, respectively.	

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-FS 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. 1-24).

 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.

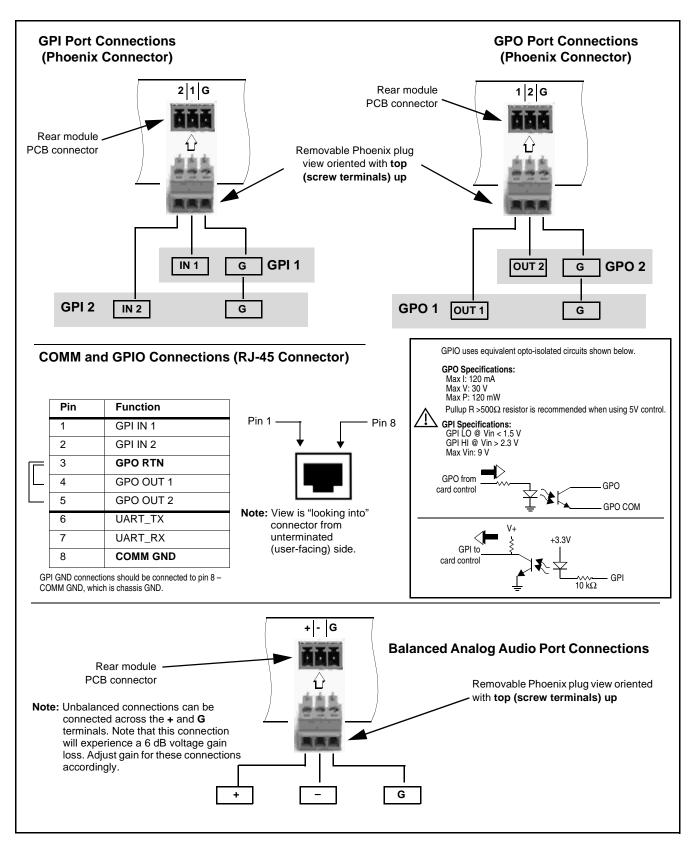


Figure 2-2 COMM, GPIO, and Analog Audio Connector Pinouts

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

This chapter contains the following information:

- Control and Display Descriptions (p. 3-1)
- Accessing the 9922-FS Card via Remote Control (p. 3-6)
- Checking 9922-FS Card Information (p. 3-8)
- Ancillary Data Line Number Locations and Ranges (p. 3-9)
- 9922-FS Function Menu List and Descriptions (p. 3-10)
- Troubleshooting (p. 3-73)

Control and Display Descriptions

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

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

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

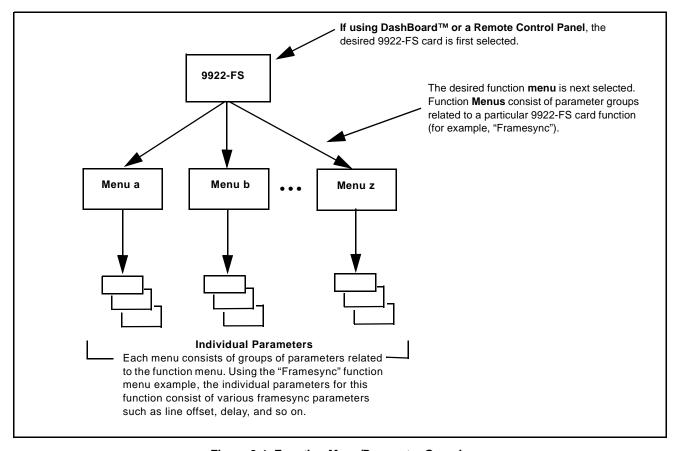


Figure 3-1 Function Menu/Parameter Overview

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.

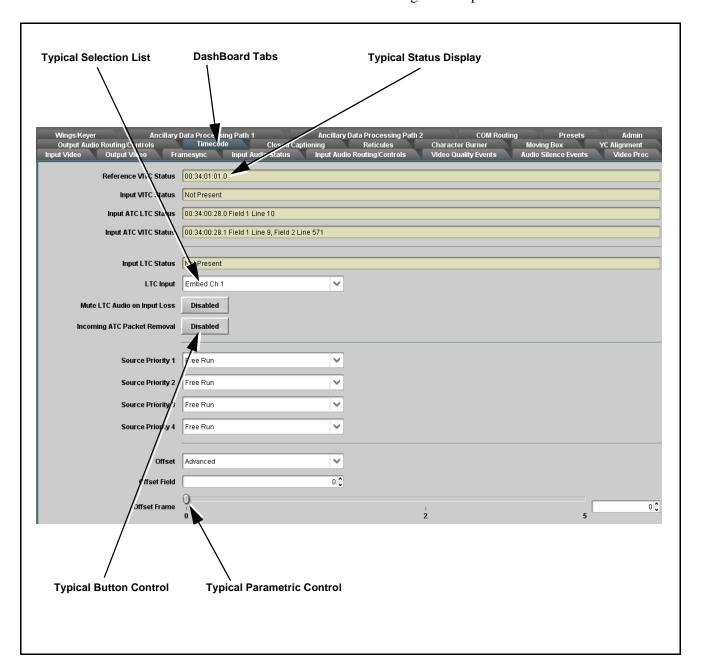


Figure 3-2 Typical DashBoard Tabs and Controls

Cobalt® Remote Control Panel User Interfaces

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

When the desired function submenu is selected, each parametric control or selection list item associated with the function is displayed. Scalar (numeric) parametric values can then be adjusted as desired using the control knobs, which act like a potentiometer. Items in a list can then be selected using the control knobs which correspondingly act like a rotary switch.

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

Note:

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

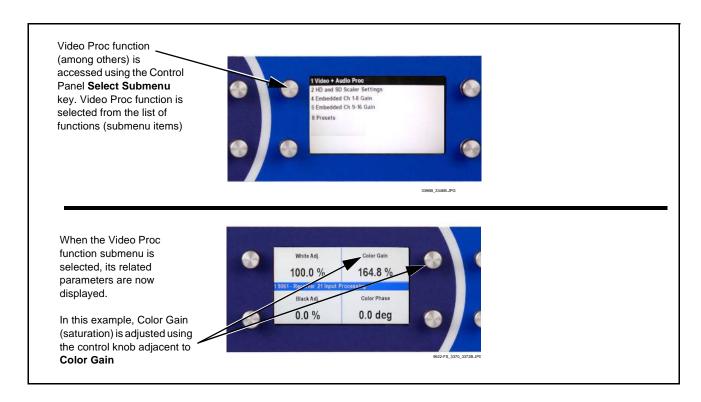


Figure 3-3 Remote Control Panel Setup of Example Video Proc Function Setup

Web HTML5 User Interface

(See Figure 3-4.) When equipped with a rear I/O module having an Ethernet port, the 9922-FS 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 (p. 3-65) for more information.)

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

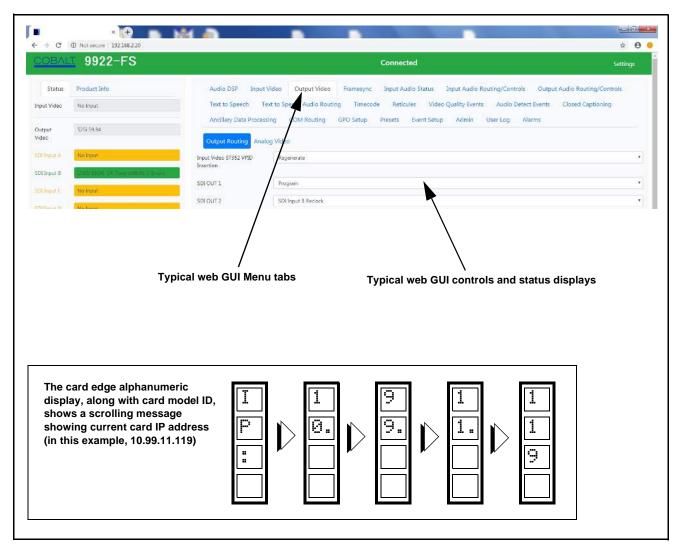


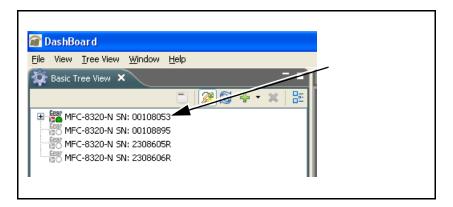
Figure 3-4 Typical Web GUI Tabs and Controls

Accessing the 9922-FS Card via Remote Control

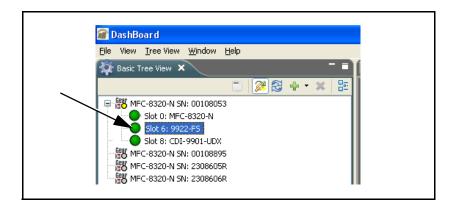
Access the 9922-FS card using DashBoardTM or Cobalt[®] Remote Control Panel as described below.

Accessing the 9922-FS Card Using DashBoard™

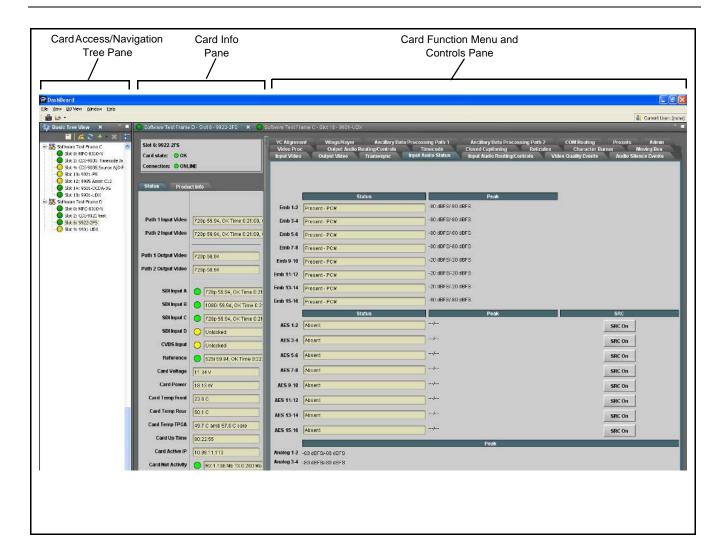
- 1. On the computer connected to the frame LAN, open DashBoardTM.
- 2. As shown below, in the left side Basic View Tree locate the Network Controller Card associated with the frame containing the 9922-FS card to be accessed (in this example, "MFC-8320-N SN: 00108053").



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-FS").

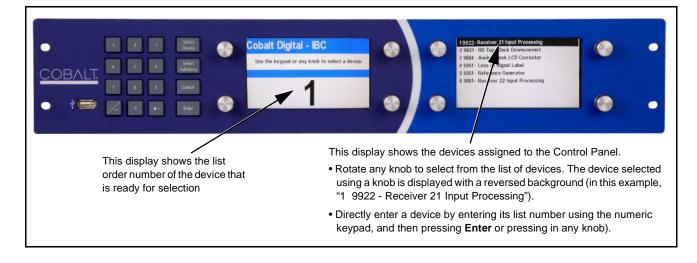


As shown on the next page, when the card is accessed in DashBoardTM its function menu screen showing tabs for each function is displayed. (The particular menu screen displayed is the previously displayed screen from the last time the card was accessed by DashBoardTM).



Accessing the 9922-FS Card Using a Cobalt® Remote Control Panel

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



Checking 9922-FS Card Information

The operating status and software version the 9922-FS card can be checked using DashBoardTM or the card edge control user interface. Figure 3-5 shows and describes the 9922-FS card information screen using DashBoardTM 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. 3-73) for corrective

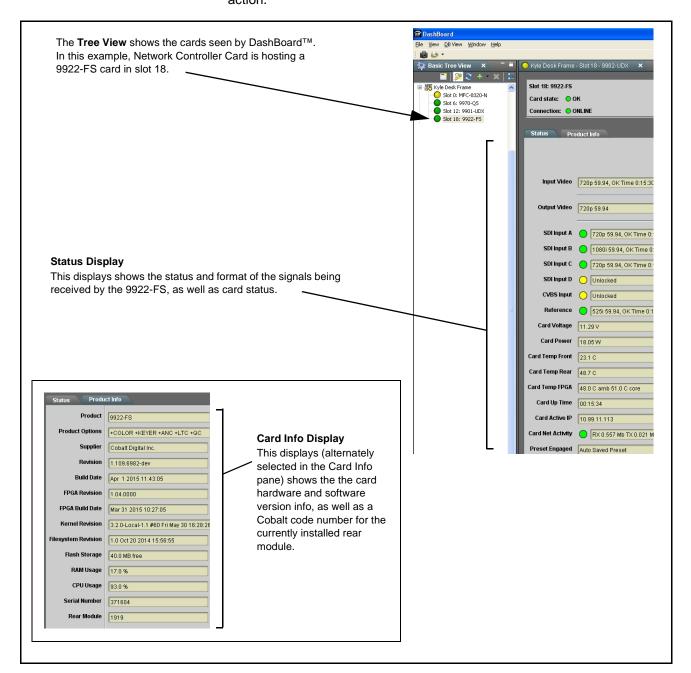


Figure 3-5 9922-FS Card Info/Status Utility

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 Ancillar	y Data Line Number	Locations/Ranges
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	Default Line No. / Range		
Item	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.

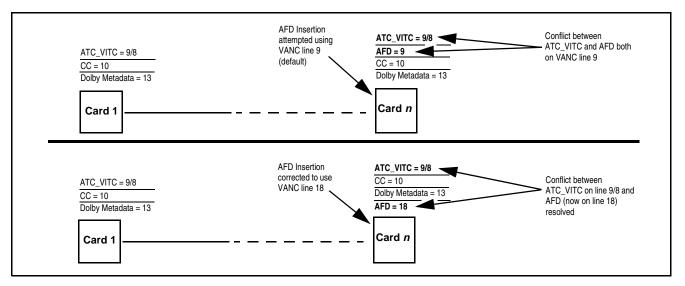


Figure 3-6 Example VANC Line Number Allocation Example

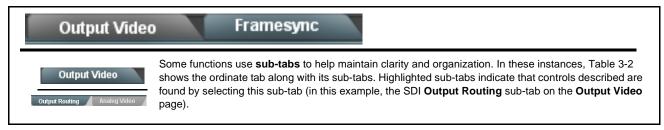
9922-FS Function Menu List and Descriptions

Table 3-2 individually lists and describes each 9922-FS 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:

- Option For any DashBoard tabs on card not appearing in this manual, this indicates the function is an option and covered in a separate Manual Supplement. Please refer to card web page Product Downloads for pdf Manual Supplements covering these options.
- When licensed with option +2FS (dual-channel framesync), this card becomes a 9922-2FS card. Refer to 9922-2FS Product Manual for 2FS control descriptions and usage.

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



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

Function Menu Item	Page	Function Menu Item	Page
Input Video Controls	3-11	Moving Box Insertion	3-47
Timecode	3-12	Y/C Alignment Controls	3-48
Reticules	3-17	Wings Insertion	3-49
Output Video Mode Controls	3-20	Keyer	3-50
Framesync	3-22	Ancillary Data Proc Controls	3-53
Input Audio Status	3-25	COMM Ports Setup Controls	3-56
Input Audio Routing/Controls	3-26	Presets	3-58
Video Quality Events	3-31	GPO Setup Controls	3-60
Audio Detect Events Setup Controls	3-32	Event Setup Controls	3-61
Closed Captioning	3-33	Admin	3-65
Video Proc/Color Correction	3-34	User Log	3-68
Output Audio Routing/Controls	3-37	Alarms Setup Controls	3-69
Character Burner	3-42		

Table 3-2 9922-FS Function Menu List

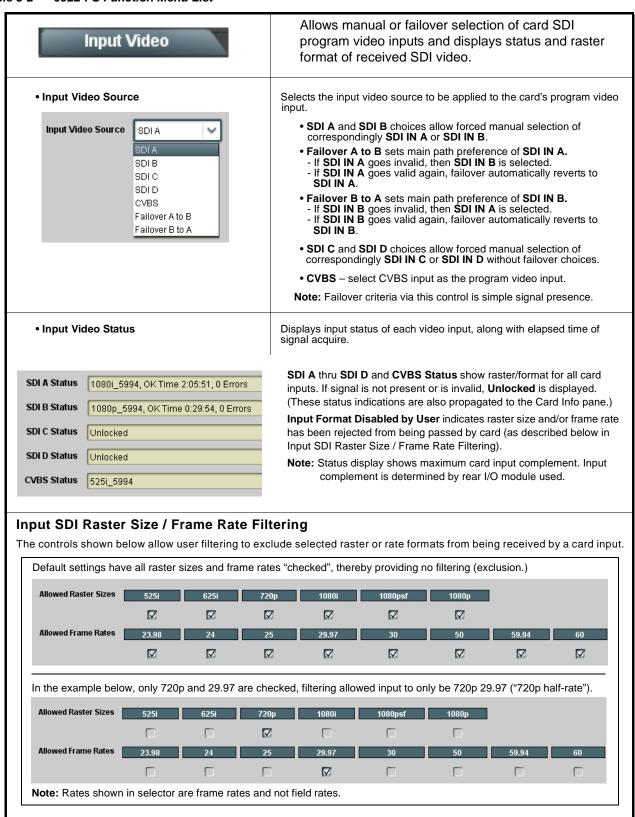


Table 3-2 9922-FS Function Menu List — continued

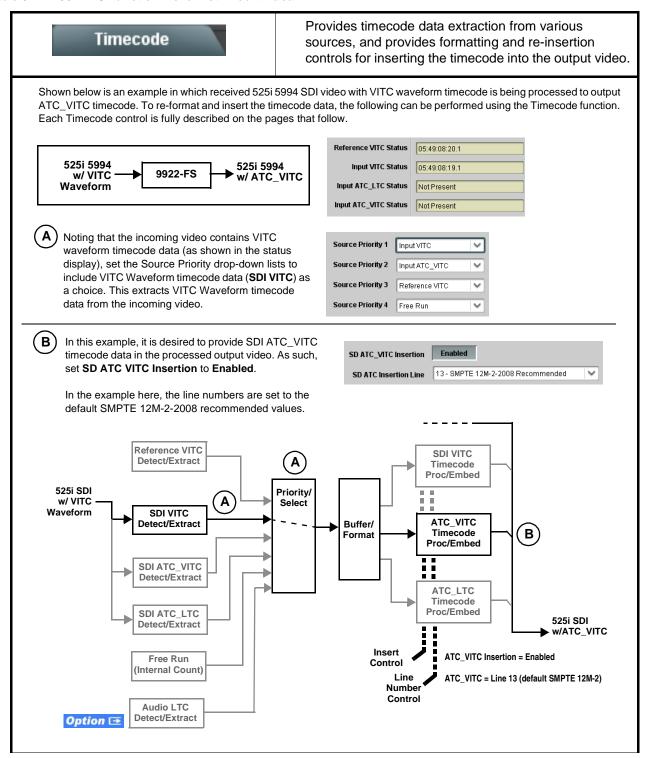


Table 3-2 9922-FS Function Menu List — continued

Timecode (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. Reference VITC Status 06:09:15:06.0 • If a format is receiving timecode data, the current content (timecode Input VITC Status 06:09:15:05.0 running count and line number) is displayed. • If a format is not receiving timecode data, Not Present is displayed. Input ATC_LTC Status | Not Present Input ATC_VITC Status 06:09:15:05.0 Field 1 Line 13, Field 2 Line 278 Selects source to be used by card to receive LTC as listed below. LTC Input Control • RS-485 over COM1 or COM 2 • Audio LTC over Emb Ch 1 thru Ch 16 LTC Input COM 1 (RS485) • Audio LTC over AES Ch 1 thru Ch 16 COM 1 (RS485) Audio LTC over Analog audio Ch 1 thru Ch 4 COM 2 (RS485) Note: • Audio LTC Source must be appropriately set for card to receive Embed Ch 1 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. 3-56) Analog Input 8 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. 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: Mute LTC Audio on input loss Enabled • 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 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 Disabled Incoming ATC Packet Removal 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.) Note: Set this control to Enabled if Free-Run timecode is to be used. If incoming packets are not removed, output embedded SMPTE timecode may alternate between free-run and embedded SMPTE timecode values.

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

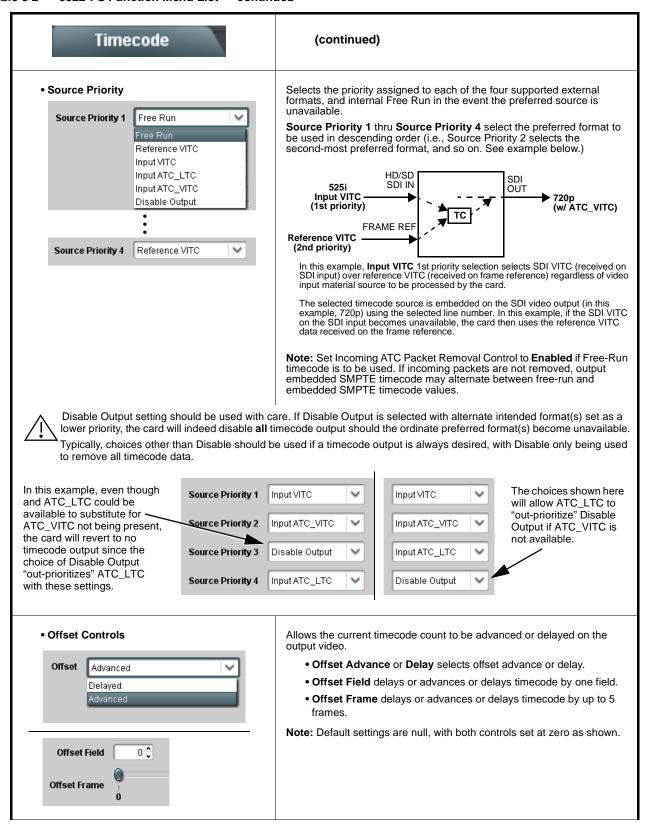


Table 3-2 9922-FS Function Menu List — continued

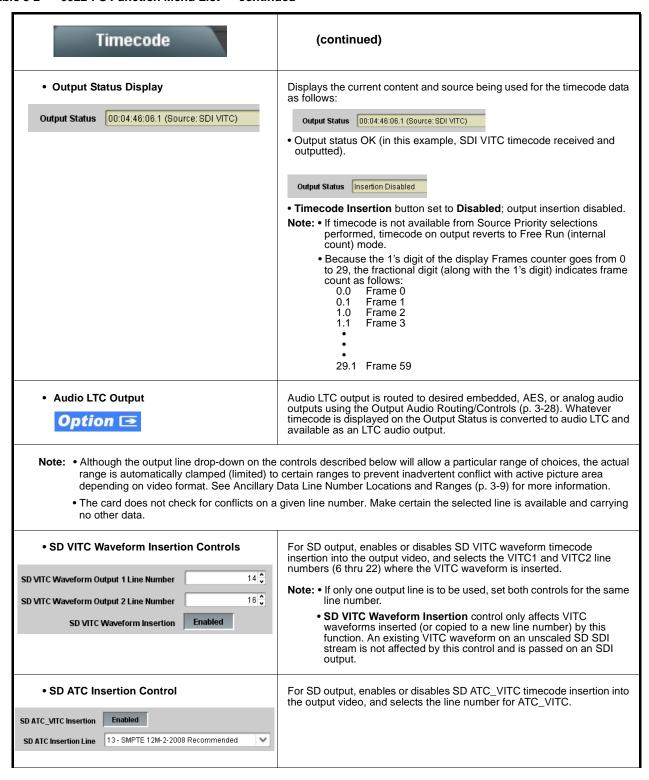


Table 3-2 9922-FS Function Menu List — continued

Timecode	(continued)
HD ATC_LTC Insertion Control HD ATC_LTC Insertion Enabled HD ATC_LTC Insertion Line 10 - SMPTE 12M-2-2008 Recommended To SMPTE 12M-2-2008 Recommended To SMPTE 12M-	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 HD ATC_VITC Insertion	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 ATC VITC Legacy Support	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 Free Run Hours 7	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-FS Function Menu List — continued

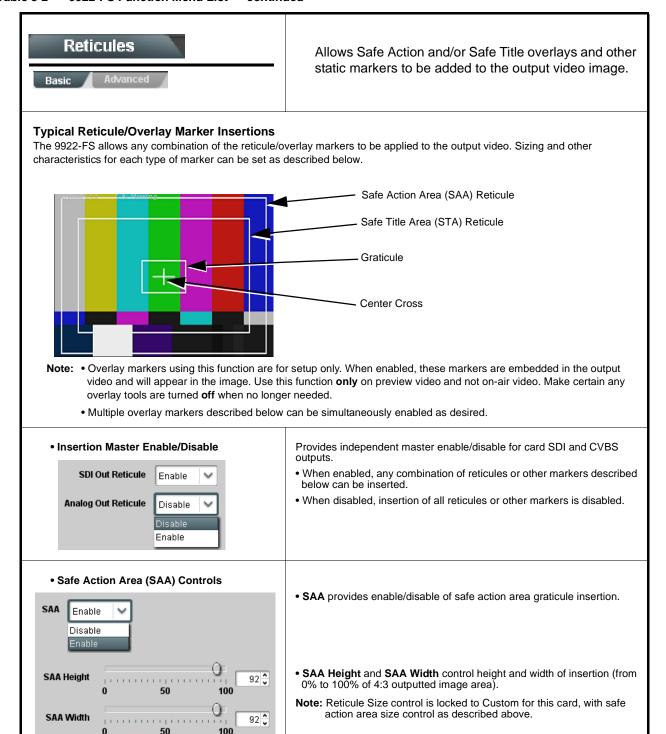


Table 3-2 9922-FS Function Menu List — continued

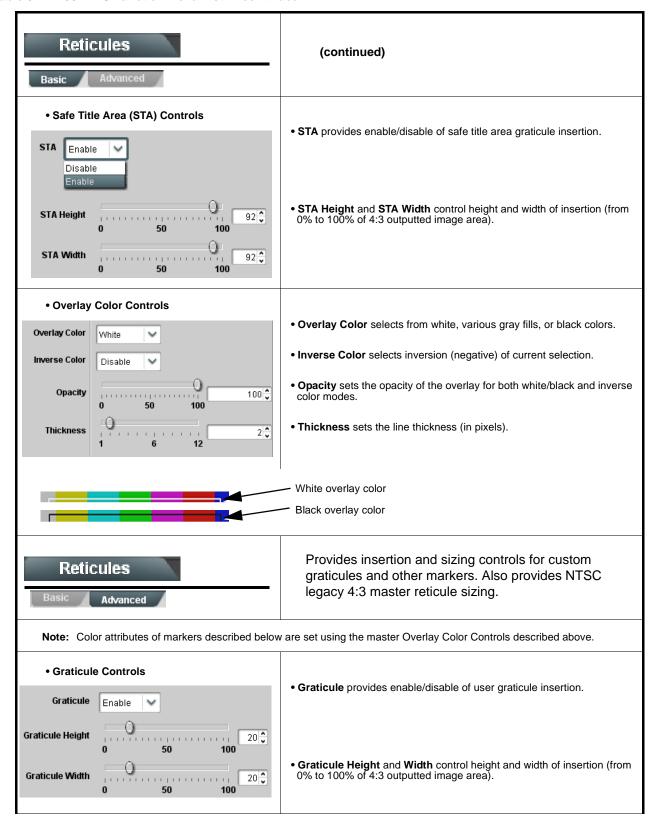


Table 3-2 9922-FS Function Menu List — continued

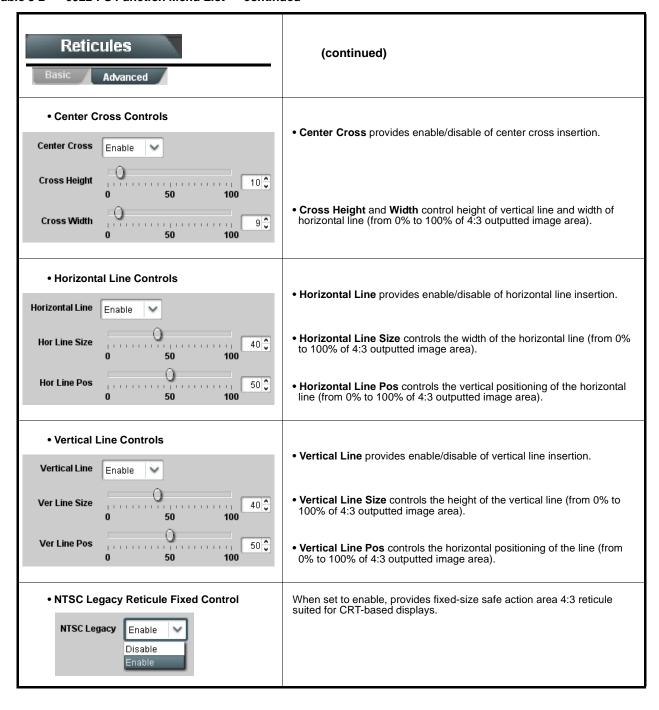


Table 3-2 9922-FS Function Menu List — continued

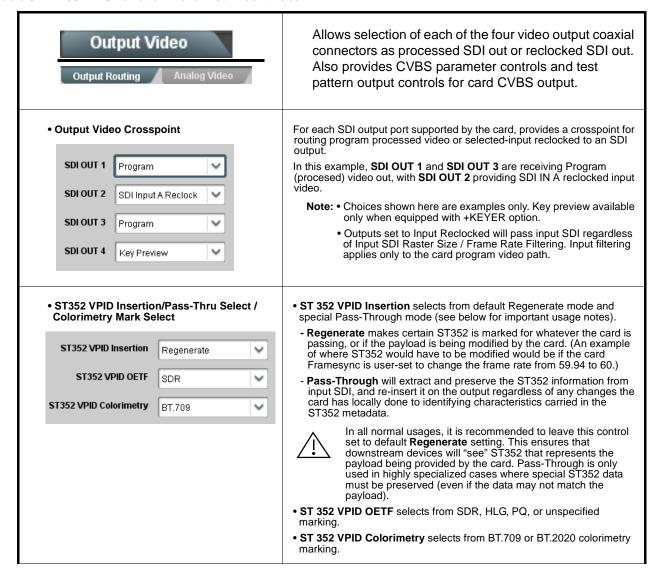


Table 3-2 9922-FS Function Menu List — continued

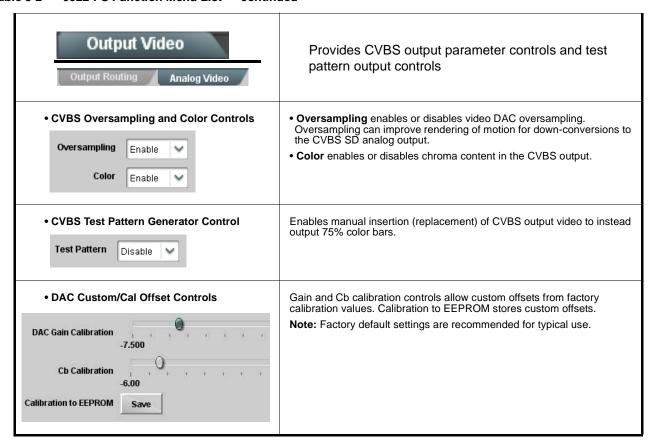


Table 3-2 9922-FS Function Menu List — continued

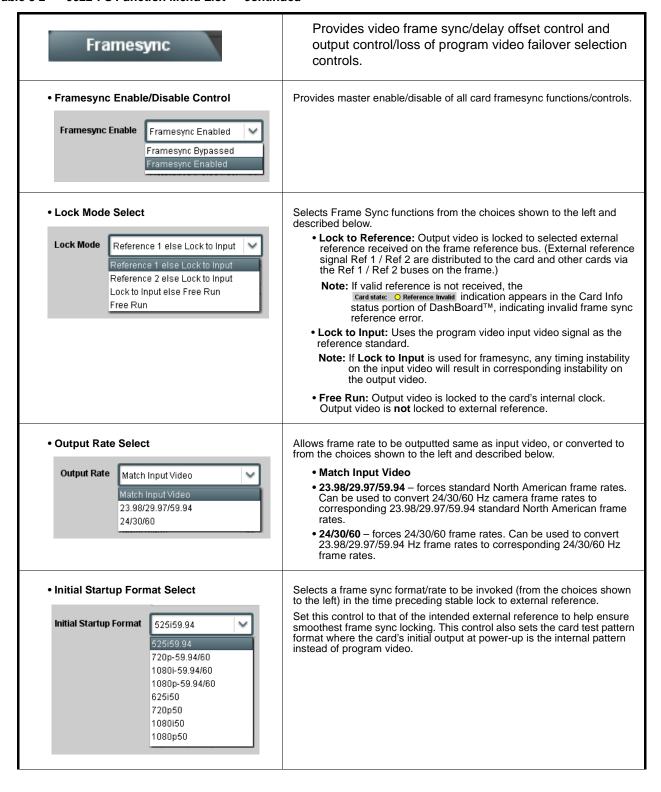


Table 3-2 9922-FS Function Menu List — continued

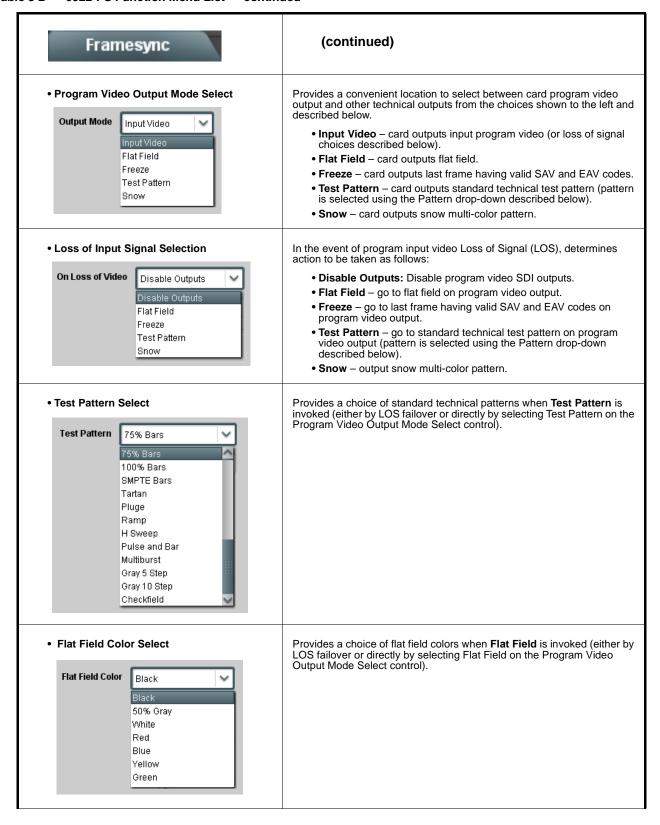


Table 3-2 9922-FS Function Menu List — continued

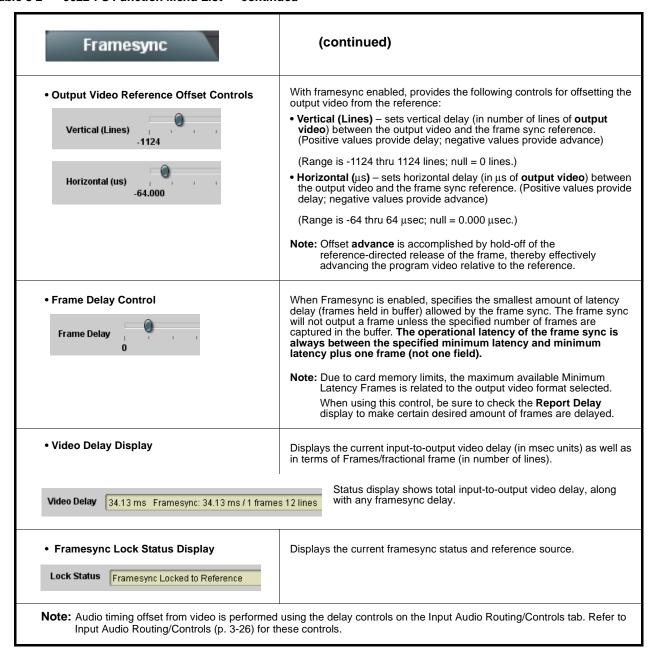


Table 3-2 9922-FS Function Menu List — continued

Input Audio Status

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

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

- 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.

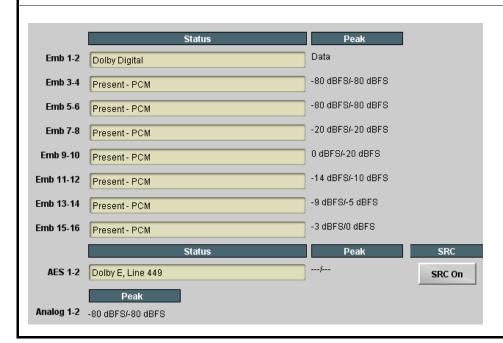


Table 3-2 9922-FS Function Menu List — continued

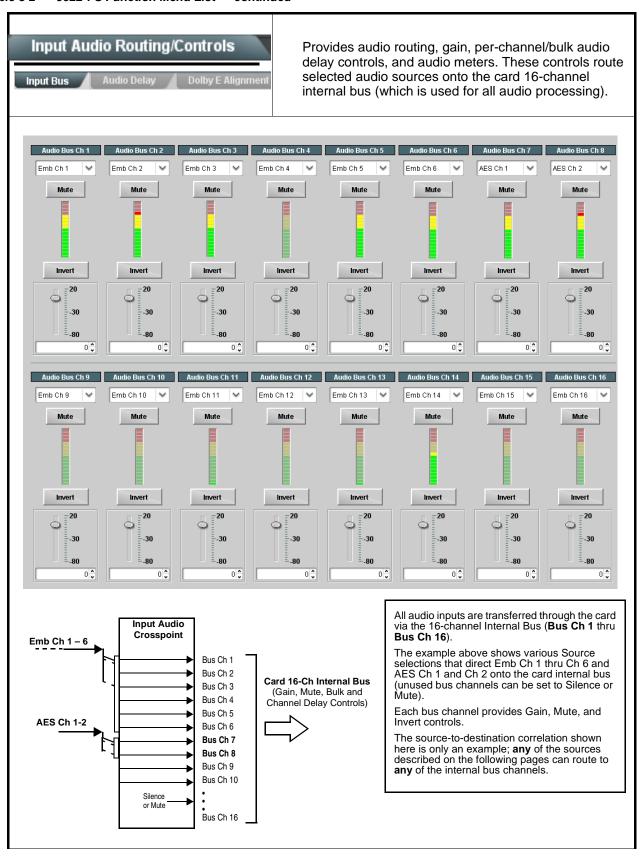


Table 3-2 9922-FS Function Menu List — continued

Input Audio Routing/Controls (continued) Input Bus 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: Audio Bus Ch 1 • 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) Emb Ch 1 • Analog input channel 1 thru 16 (Analog Ch 1 thru Analog Ch 4) • Input flex mix summed mix output nodes Flex Bus A thru P Note: AES pair and analog channel count are dependent on rear I/O module used. Current rear modules may not support full input complement. • Channel Mute/Phase Invert/Gain Controls Provides Mute and phase Invert channel controls, as well as peak level and Peak Level Display meter for each output channel. (Meter shows level as affected by Level control.) Gain controls allow relative gain (in dB) control for the corresponding Mute Mute 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. Invert Invert -20 30 -30 -80 -80 0 0 0 0 Input Audio Routing/Controls Audio Delay – Provides bulk (all four groups/master) and individual card audio bus channel delay offset controls and delay parametric displays. Audio Delay • 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 Audio Bulk Delay (msec) 219 🗘 problems when video and audio paths in the chain experience differing 3000 overall delays. (-33 to +3000 msec range in 0.01-msec steps; null = 0 msec). Large rapid changes in bulk delay (> 500 msec) can result in momentary full-scale noise burst on output processed audio. This burst can damage monitors or other equipment if not considered. Gain on output should be reduced if performing large adjustments to delay.

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

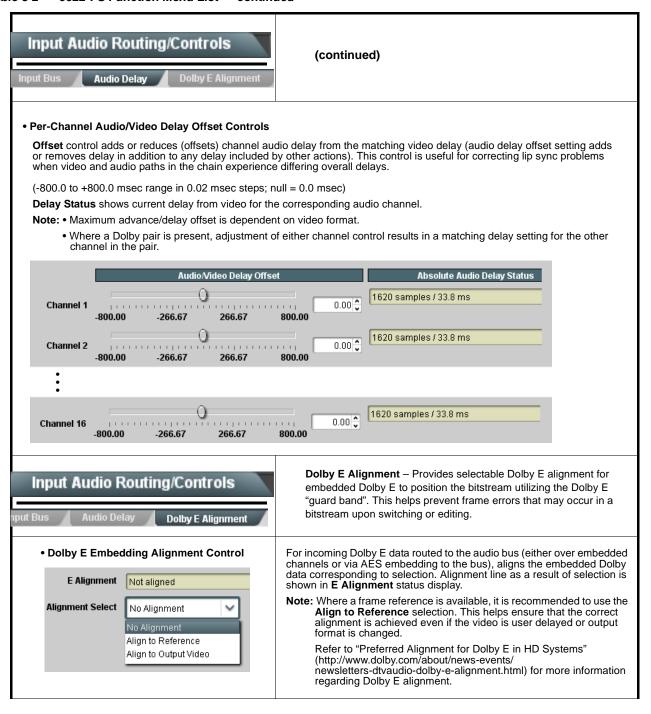


Table 3-2 9922-FS Function Menu List — continued

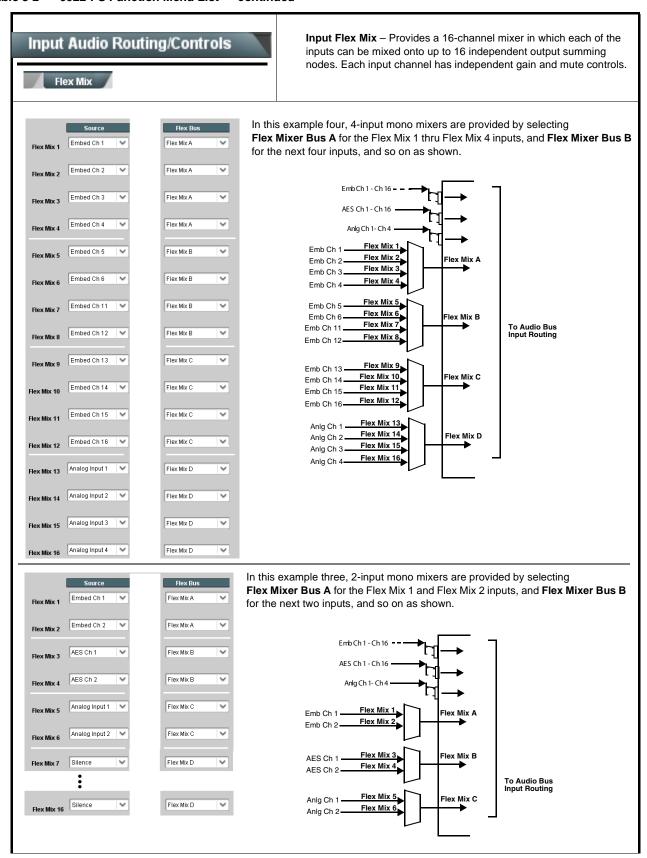


Table 3-2 9922-FS Function Menu List — continued

Input Audio Routing/Controls (continued) Flex Mix Note: • Flex Mix input channels Flex Mix 2 thru Flex Mix 16 have controls identical to that described here for Flex Mix 1. Therefore, only the Flex Mix 1 controls are shown here. • For each Flex Mix input channel, its source should be considered and appropriately set. Unused input channels should be set to the Silence selection. • Flex Mix Input Channel Source/Bus Using the **Source** drop-down list, selects the audio input source to be Assignment directed to the corresponding bus channel from the choices listed below. • Embed Ch 1 thru Embed Ch 16 Flex Mix Input 1 • AES Ch 1 thru AES Ch 16 Flex Bus Flex Bus A • Analog Ch 1 thru Analog Ch 4 The Flex Bus drop-down selects the bus (A thru P) to which the input is Source Emb Ch 1 assigned to. Note: See the examples on the previous page showing various types of mixers using multiple flex buses. Gain / Mute Control Provides relative gain (in dB) control and a channel Mute checkbox. (-80 to +20 dB range in 0.1 dB steps; unity = 0.0 dB)Mute -20 30 0 🕽 Clean and Quiet Switching (option +CQS only) - Allows SDI input Input Audio Routing/Controls selection to be changed from one source to another while ducking audio during controlled input video switching transitions to provide silence between input switches. Option 🖃 Clean and Quiet Switching Note: • Clean audio switching is assured only for intentional, controlled switches via user control. Clean audio switching cannot be assured for failover switches. • Clean switching requires that both SDI signals (switch from and switch to) be stable and present. • Clean audio switching function is designed for PCM audio. This function does not assure clean decoded audio when switching from/to Dolby or other non-PCM audio. Switching Enabled check box enables Clean and Quiet Switching. Duration sets the attack and decay ramp intervals (300 msec is recommended for typical use). Clean and Quiet Switching Enabled Ramp Time Duration (ms) 300 🗘

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

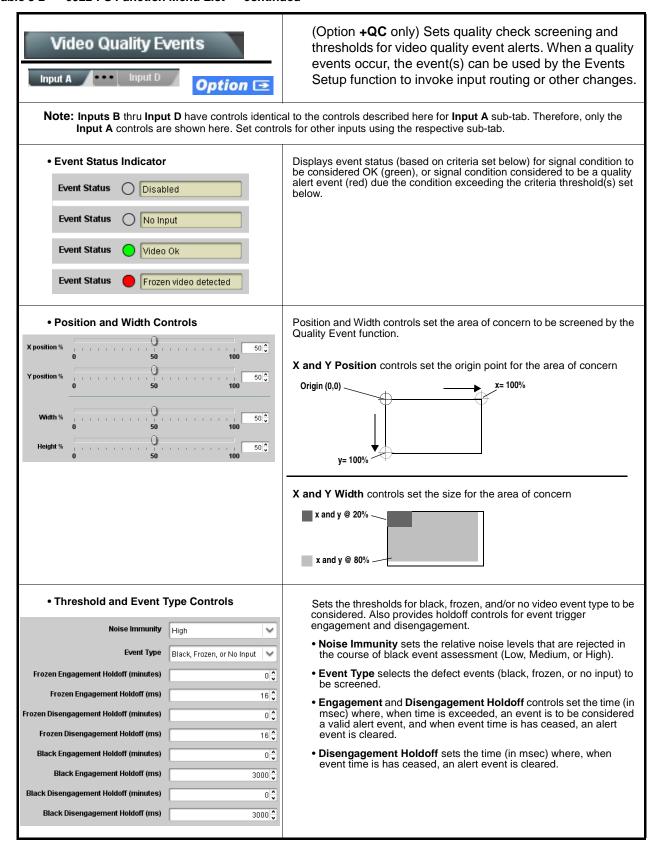


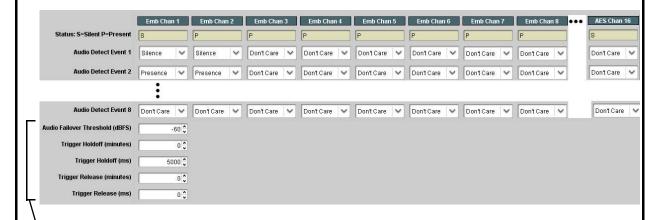
Table 3-2 9922-FS Function Menu List — continued



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

Any combination of embedded and AES input channels can be selected to be screened for silence or presence. In the example here, **Audio Detect Event 1** is set to trigger if audio on **any** of channels Emb Ch 1 thru Ch 6 fall below the selected threshold for an interval exceeding the selected threshold. Status indicators for each channel show silence (S) / presence (P) status based on the configured thresholds.

Up to eight independent audio silence/presence 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 **Events Setup** tab controls to issue a GPO, preset engage, or other command when audio silence events are detected.



- Audio Failover Threshold sets the dBFS 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.
 - "Don't Care" setting may be labeled as **Don't Care**, **DC**, or **DSBL** (disabled). All notations mean ignoring the channel from event triggering.
 - Selections other than Don't Care work as an AND function. Where multiple selections are set, a true (trigger) condition is not propagated unless all selected channels experience the configured criteria.
 (In the example shown above, both channels Emb Ch 1 and Emb Ch 2 need to experience a Silence event for a trigger to be propagated.)

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

Provides support for closed captioning setup. Also Closed Captioning provides controls for setting closed captioning absence and presence detection thresholds. Closed Captioning Input Status Displays incoming Closed Captioning status as follows: • If closed captioning is present, a message similar to the example shown Input Status | CDP Packet on Line 16 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. Description Message Film rate closed-captioning (either as pass-through or up/down conversion) is not Unsupported Frame Rate supported by the card. Data Not Packet is marked from closed captioning Present source external to the card that no data is Packet from closed captioning source No Data ID external to the card is not properly identified with 0x9669 as the first word of the header (unidentified packet). • 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. Closed Captioning Remove/Regenerate Allows removal of closed captioning packets and regeneration of packets. and HD Insertion Line Controls This is useful where closed captioning must be moved to a different line than that received on. Note: • Although the output line drop-down will allow any choice within Incoming Disabled the 9 thru 41 range, the actual range is automatically clamped Packet Removal (limited to) certain ranges to prevent inadvertent conflict with If Regenerate Closed Captioning active picture area depending on video format. See Ancillary is enabled incoming Data Line Number Locations and Ranges (p. 3-9) for more packets will always be removed. information. Regenerate • The card does not check for conflicts on a given line number. Disabled Make certain selected line is available and carrying no other **Closed Captioning HD Output Line** • Presence/Absence Check Controls Displays CC presence and/or absence event status. This status can be propagated to the **Events Setup** tab controls to issue a card GPO or other command when CC presence/absence events are detected. Presence Event Delay (sec) 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 Presence Event Status valid alert event. Active Absence Event Delay (sec) Absence Event Status Inactive

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

	-	
Video Proc Color Correction	Provides the following Video Proc and Color Correction parametric controls. 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.	
Video Proc Enabled		
Reset to Unity Reset to Unity Confirm	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 Luma Gain 0.0	Adjusts gain percentage applied to Luma (Y channel). (0% to 200% range in 0.1% steps; unity = 100%)	
• Luma Lift Luma Lift -100.0	Adjusts lift applied to Luma (Y-channel). (-100% to 100% range in 0.1% steps; null = 0.0%)	
• Color Gain Color Gain 0.0	Adjusts gain percentage (saturation) applied to Chroma (C-channel). (0% to 200% range in 0.1% steps; unity = 100%)	
• Color Phase Color Phase -360.0	Adjusts phase angle applied to Chroma. (-360° to 360° range in 0.1° steps; null = 0°)	
Gang Luma/Color Gain Gang Luma/Color Gain On	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-FS Function Menu List — continued

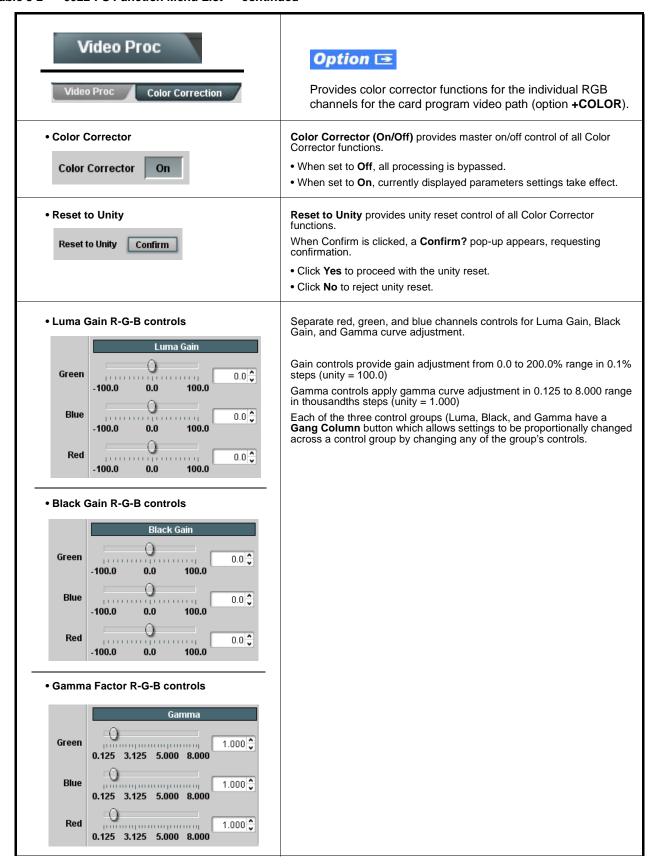
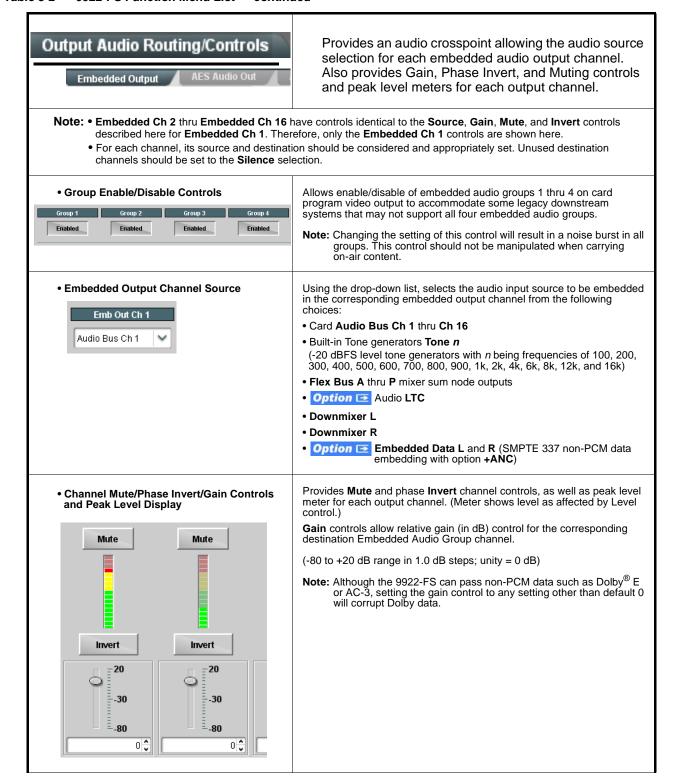


Table 3-2 9922-FS Function Menu List — continued

Video Proc Color Correction	(continued)
Black Hard Clip Black Hard Clip -6.8	Applies black hard clip (limiting) at specified percentage. (-6.8% to 50.0%; null = -6.8%)
White Hard Clip White Hard Clip 50.0	Applies white hard clip (limiting) at specified percentage. (50.0% to 109.1%; null = 109.1%)
White Soft Clip White Soft Clip 50.0	Applies white soft clip (limiting) at specified percentage. (50.0% to 109.1%; null = 109.1%)
Chroma Saturation Clip Chroma Saturation Clip 50.0	Applies chroma saturation clip (limiting) chroma saturation at specified percentage. (50.0% to 160.0%; null = 160.0%)

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





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

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.

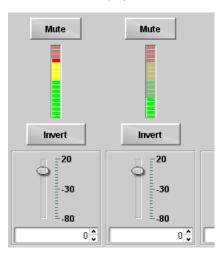
• AES Output Channel Source



Using the **Source** drop-down list, selects the audio input source to be routed to the corresponding AES output channel from the following choices:

- Card Audio Bus Ch 1 thru Ch 16
- Built-in Tone generators Tone n
 (-20 dBFS level tone generators with n being frequencies of 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k)
- Flex Bus A thru P mixer sum node outputs
- Option 🔁 Audio LTC
- Downmixer L
- Downmixer R
- Option Embedded Data L and R (SMPTE 337 non-PCM data embedding with option +ANC)

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-FS 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-FS Function Menu List — continued

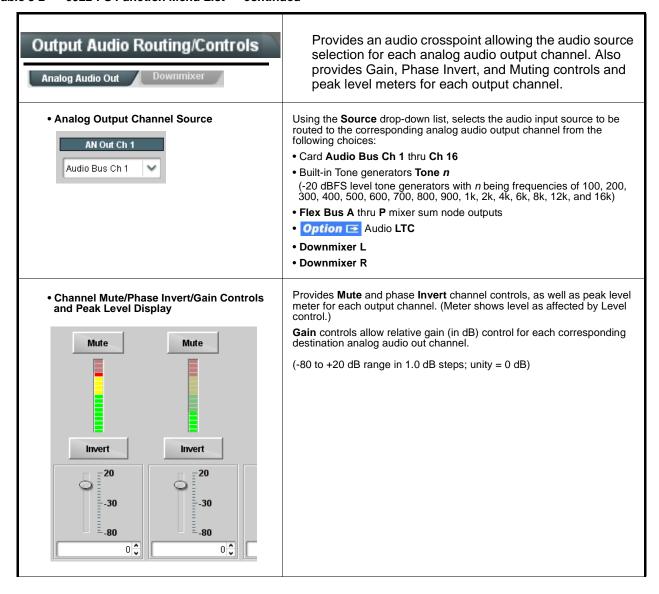


Table 3-2 9922-FS Function Menu List — continued

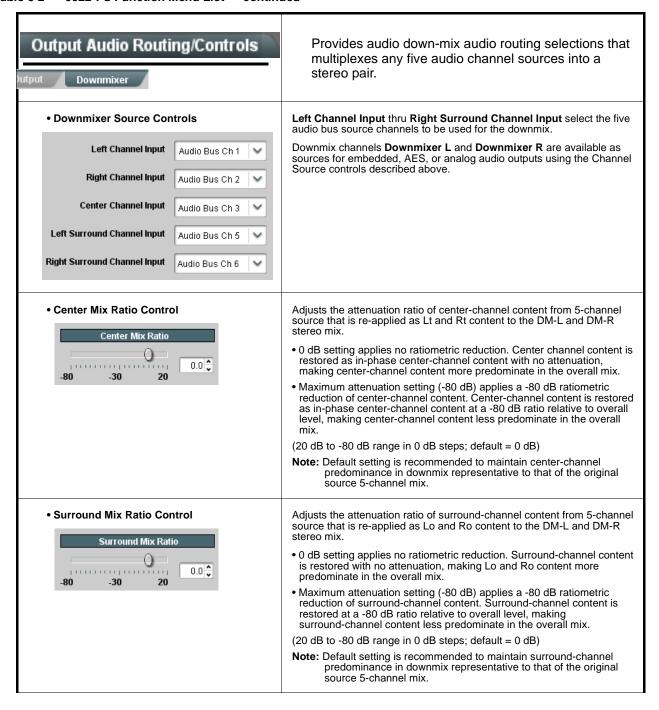


Table 3-2 9922-FS Function Menu List — continued

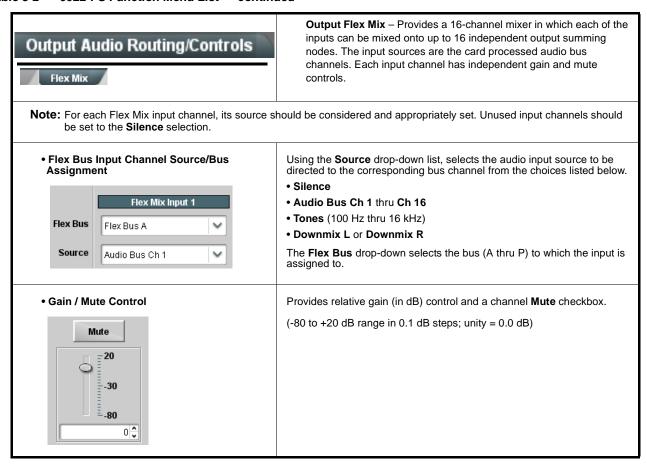


Table 3-2 9922-FS Function Menu List — continued

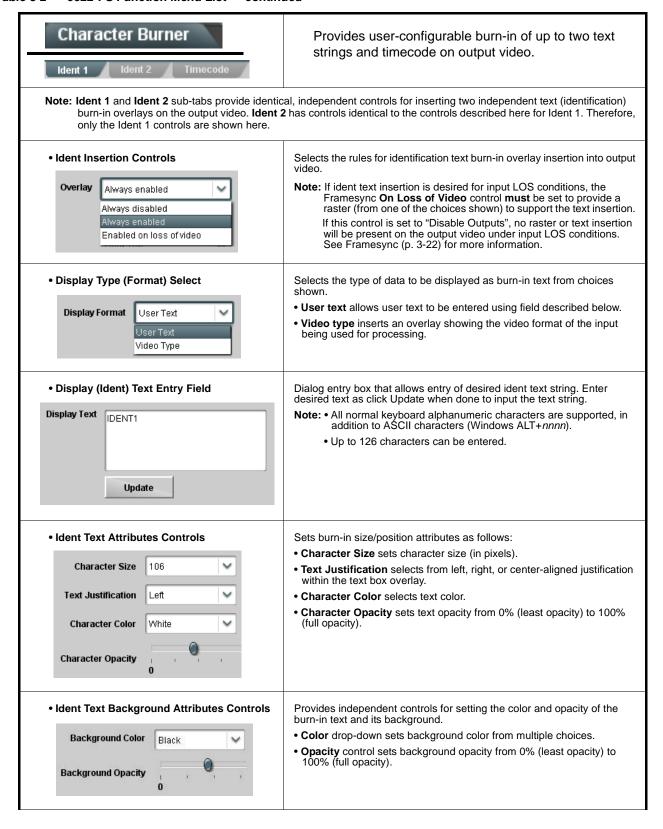


Table 3-2 9922-FS Function Menu List — continued

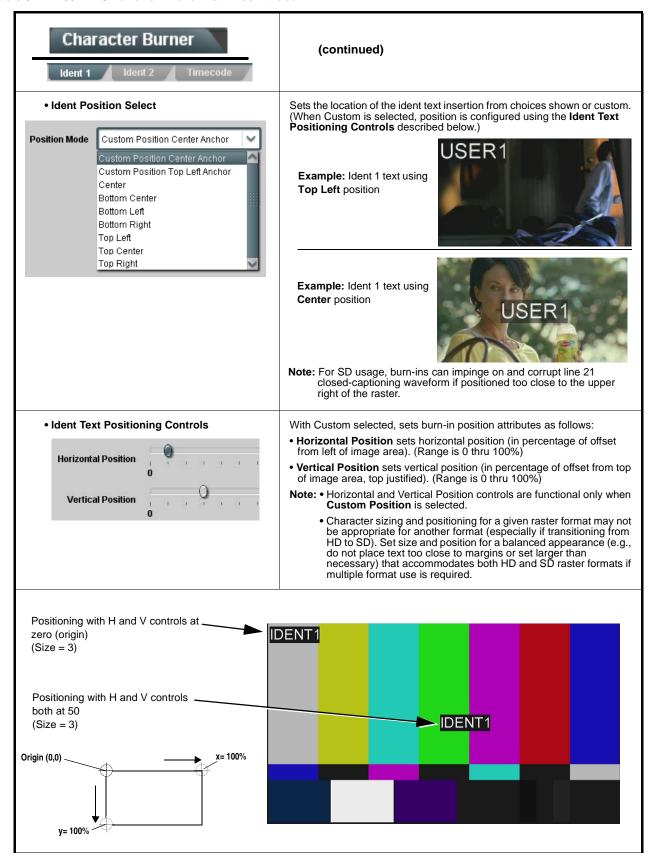


Table 3-2 9922-FS Function Menu List — continued

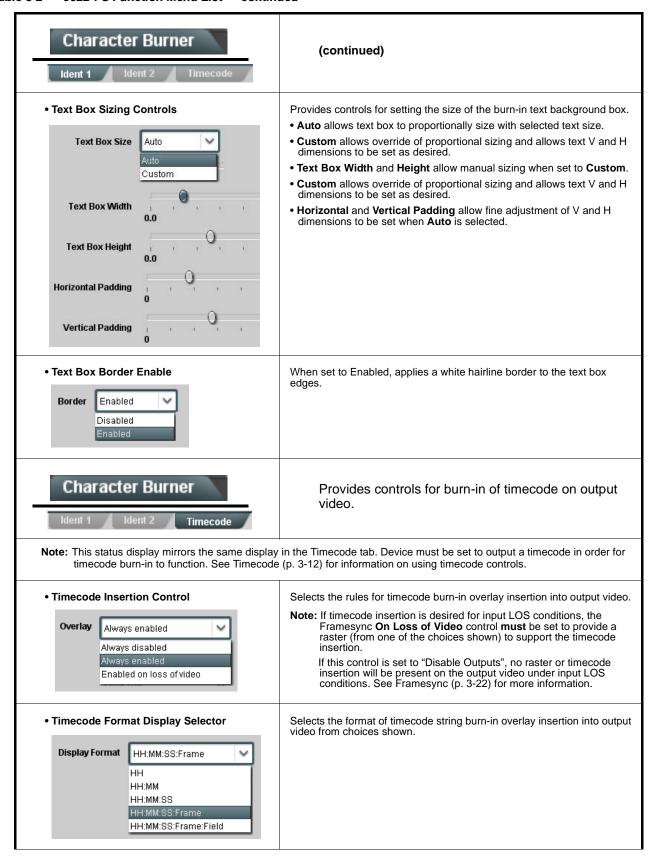


Table 3-2 9922-FS Function Menu List — continued

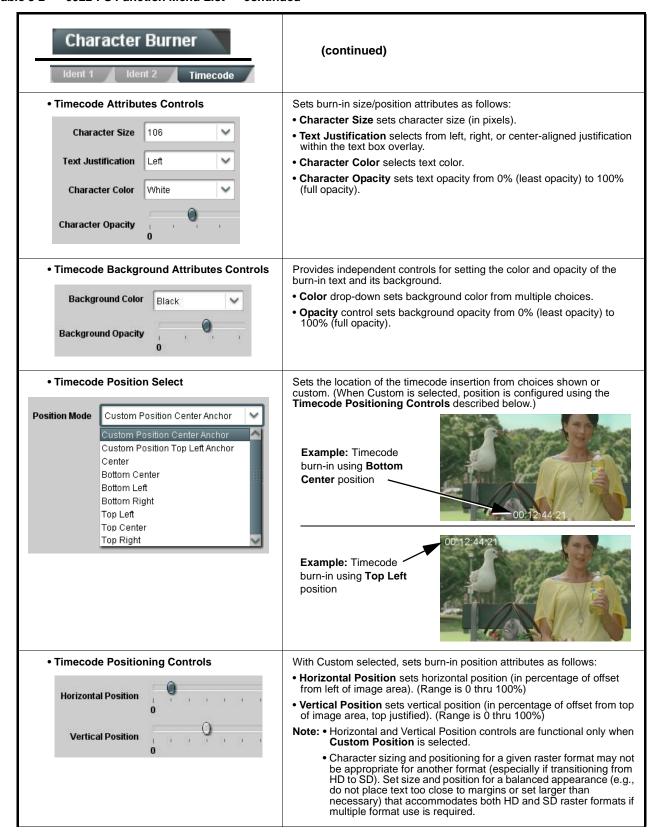


Table 3-2 9922-FS Function Menu List — continued

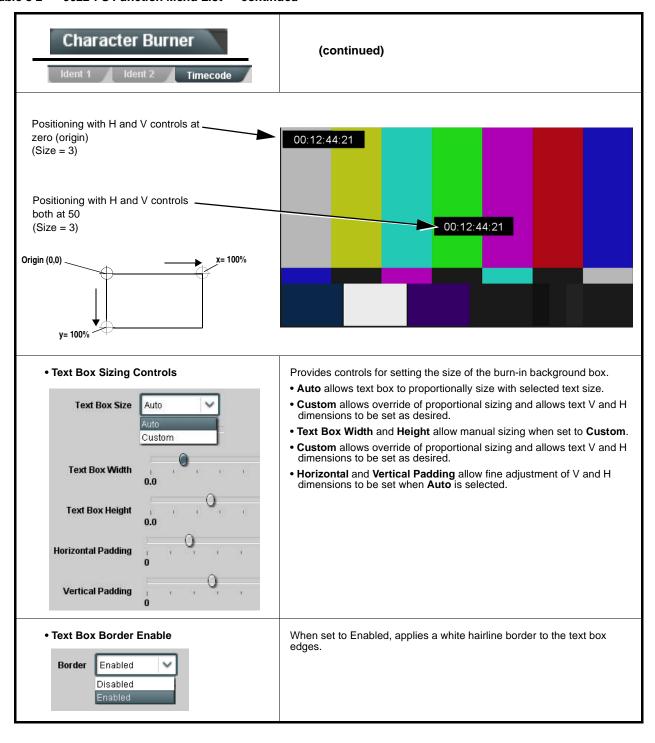


Table 3-2 9922-FS Function Menu List — continued

Provides a "moving box" graphic insertion (overlay) on Moving Box 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. 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 must be set to provide a Moving Box Always disabled 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 Enabled on loss of video conditions. See Framesync (p. 3-22) 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 Width (%) • 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 Moving Box Height (%) 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. • For SD usage, moving box can impinge on and corrupt line 21 closed-captioning waveform if positioned too close to the upper right of the raster. • 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 Moving Box Horizontal Speed Normal • Moving Box Vertical Speed sets the Y-axis speed from choices shown. None Slow Fast Moving Box Vertical Speed Normal

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

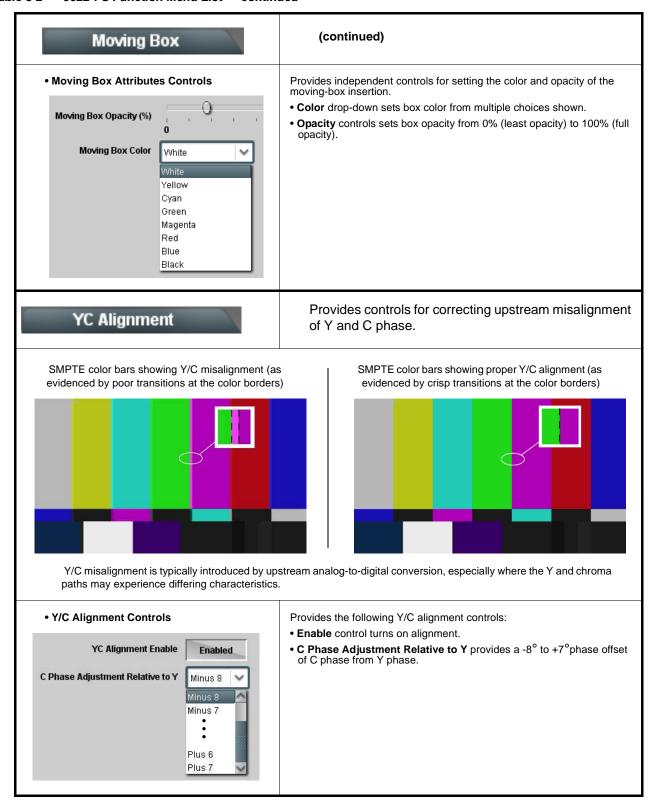


Table 3-2 9922-FS Function Menu List — continued

Wings	Provides wings insertion/width controls and displays insertion status.		
• Wings Source Control Wings Source SDIA SDIA SDIB SDIC SDID	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.		
Wings Insertion Enable Control Wings Enable	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 (pixels) 0	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)		
Wings Status Displays	Displays wings timing status (on both Wings tab and Card Status displays) 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).		
Wings Timing Error Wings Status Insertion Error Adjust Wings Timing, V	Wings Offset 0 lines early, 99 samples late Wings insertion late Wings insertion too early		
Wings Format Mismatch Wings Status Wings Format Does Not Match Output	t Format, Wings Offset 259 lines early, 1685 samples late Wings video wrong/mismatched format		

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

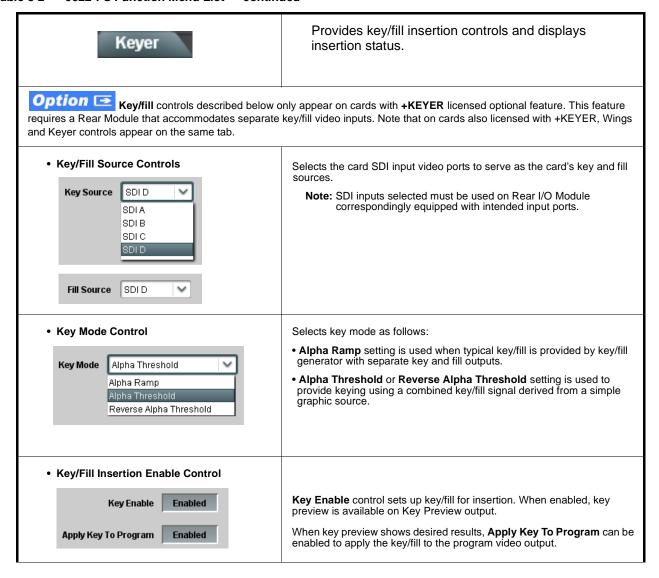
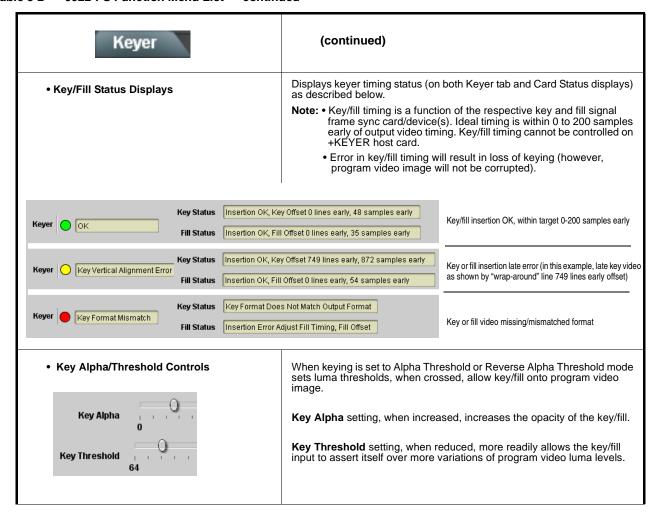


Table 3-2 9922-FS Function Menu List — continued





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

backgrounds.

Alpha Ramp sources using Alpha Threshold black Reverse Alpha Threshold Reverse Alpha

Threshold mode setting is suited for graphic sources using white backgrounds.

Key Mode Alpha Threshold

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

Key Source	SDID	~
Fill Source	SDID	~

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

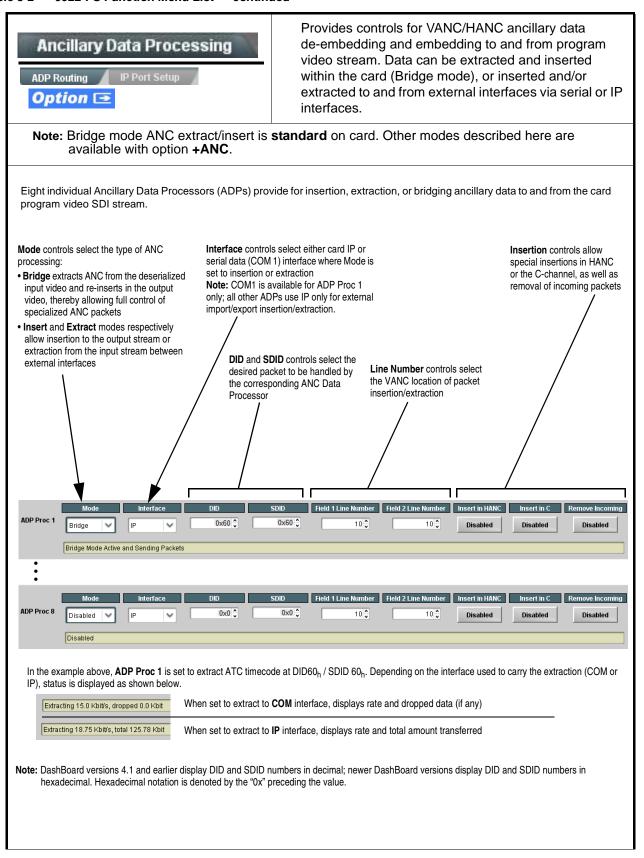
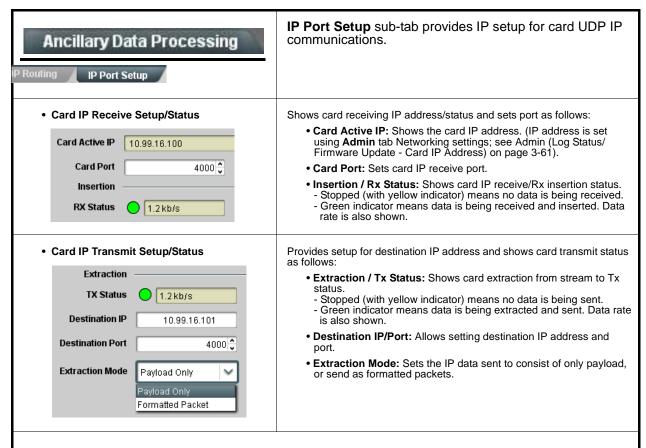


Table 3-2 9922-FS Function Menu List — continued



- Notes: Packets received must be sized to fit in a native ancillary data packet (i.e., payloads that span multiple ancillary packets need to be broken down by the sending controller before they are sent to the device).
 - Device can be configured to send back ACK packets each time data is inserted. The ACK packet is sent immediately after the data is actually inserted.
 Packets need to be broken down by the sending controller before they are sent to the device. Device can also be configured to send out "heartbeat" packets every two seconds as an additional safeguard.
 - · Packet formatting for insertion/extraction, ACK, and heartbeat is as follows:

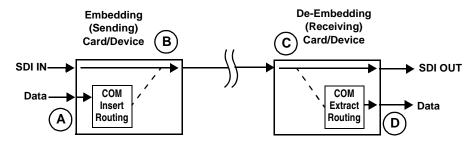
Packet formatting used for insertion/extraction:		ACK Packet Format		Heartbeat Packets	
Bytes	Field	Bytes	Field	Bytes	Field
3:0	Packet Type (0xF5AB02ED)	3:0	Packet Type (0xAC73B938)	3:0	Packet Type (0x20120831)
5:4	Packet size	5:4	Received packet size	31:4	Reserved
6	DID	6	Received DID		<u>'</u>
7	SDID	7	Received SDID		
9:8	Line number for Insertion. If set to 0, use the line number set by software.	9:8	Line number on which the received packet was inserted		
11:10	Payload size	11:10	Received payload size		
15:12	User packet ID	15:12	Received user packet ID		
N:16	Payload	31:16	Reserved		

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



Data-Over-Audio sub-tab provides controls that allow SMPTE 337/338/339 non-PCM data to be embedded and de-embedded on embedded audio pairs, offering a very convenient self-contained transport within the program stream physical media.

Shown below is an example setup where serial data is embedded as SMPTE 337 non-PCM data on a sending embedded pair, and then extracted on a receiving pair and converted back to serial data using two cards/devices with the **+ANC** option.



- A The **COM Routing** tab and appropriate sub-tab is set to receive serial data, noting bit rate and parity settings to conform to the received serial data. (See COMM Ports Setup Controls (p. 3-56))
- B The received serial data is then directed to an embedded audio output channel pair by setting a pair to Embedded Data using the Output Audio Routing/Controls tab (in this example, Emb pair 7/8).



The embedded data pair on the receiving end is then selected using the De-Embed Source select drop-down on the **Data-Over-Audio Setup** sub-tab (in this example, Emb Pair 4 (channels 7/8) as correspondingly set on the sending card).



D On the **COM Routing** tab, select Audio Data Extractor to extract and route the received SMPTE 337 data to the desired COM port, noting bit rate, protocol, and parity settings. (See COMM Ports Setup Controls (p. 3-56))



When data is successfully being de-embedded, the status display shows green and indicates the bit rate (bit rate is bit rate configured on sending end; typically SMPTE 337 data transfer is much faster than serial)



Notes: • Embedded channel pair selected must be a standard boundary pair (e.g., 1/2, 3/4 and so on).

SMPTE 337/338/339 embedded pair carrying non-PCM data here is marked as "Non-PCM Data Unknown". Any intermediate devices between
the Cobalt sending card/device and the Cobalt receiving card/device will transfer this data intact, as long as these devices can transfer in a
bit-accurate manner. Most devices capable of carrying Dolby® streams are capable of this. However, any intermediate devices must have
functions such as PCM level controls and SRC disabled.

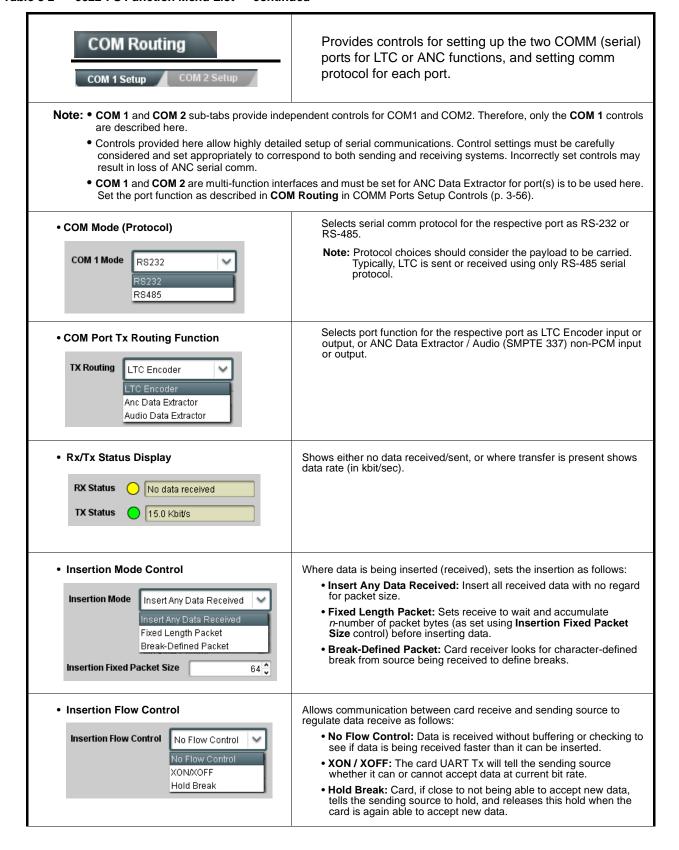
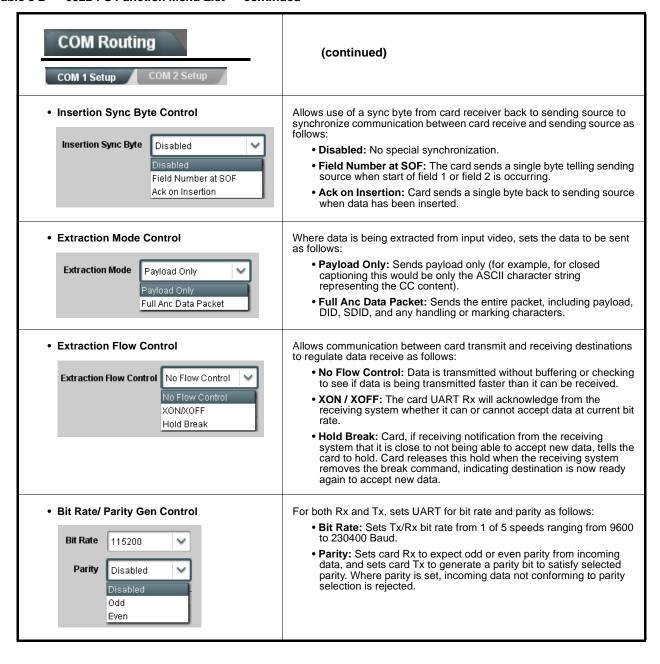


Table 3-2 9922-FS Function Menu List — continued



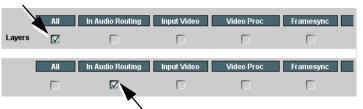
Presets

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.

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.

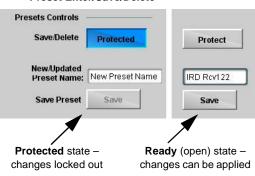


Selecting a layer (in the example, "In Audio Routing") will set the preset to **only** "look at" and "touch" audio routing settings and save these settings under the preset. When the preset is loaded (recalled), the card will only "touch" the audio routing layer.

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 modified or deleted. Use this setting when all presets are as intended.
- New/Updated Preset Name: 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.

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

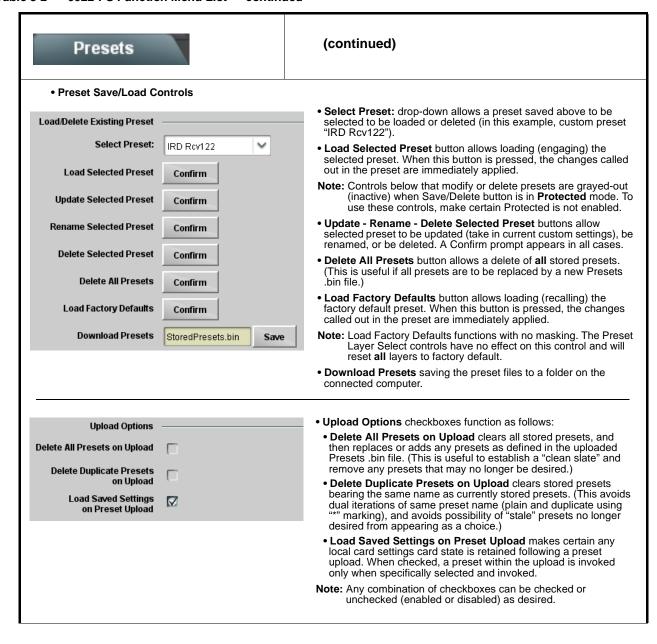


Table 3-2 9922-FS Function Menu List — continued

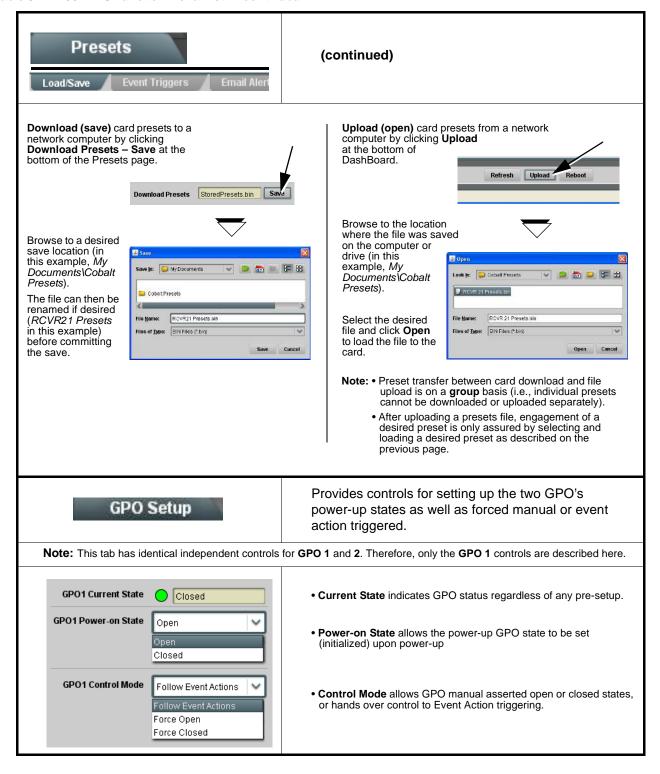
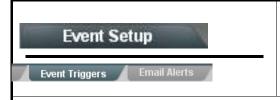


Table 3-2 9922-FS Function Menu List — continued



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.



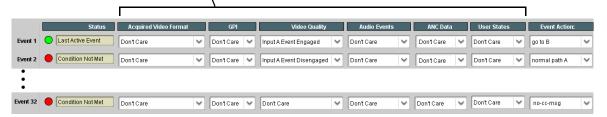
- Event based preset loading is not passive and can result in very significant and unexpected card control and signal processing changes if not properly used. If event based presets are not to be used, make certain the **Event Based Loading** button is set to **Disabled**.
- Because event based preset 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. 3-64) for setting up e-mail alerts).
- Each Event (Event 1 thru Event 32) can be set to screen for any or several Definer 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.
- Some columns in the DashBoard Event Setup table are present only when certain options are installed (for example, Video Quality column appears only with option **+QC**).

Event Definers

Each event can be uniquely set up for any of the condition types in these columns. Unless set to Don't Care, all defined conditions will need to be true in order for the Event to be considered active



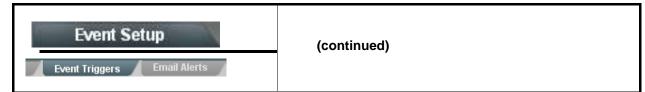
Note: Event criteria settings in any row comprise an AND function. Where multiple criteria are selected, a true (trigger) condition is not propagated unless **all** specified criteria are true. To independently screen for multiple criteria, rows should be set up where each criteria is screened in its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



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-FS Function Menu List — continued

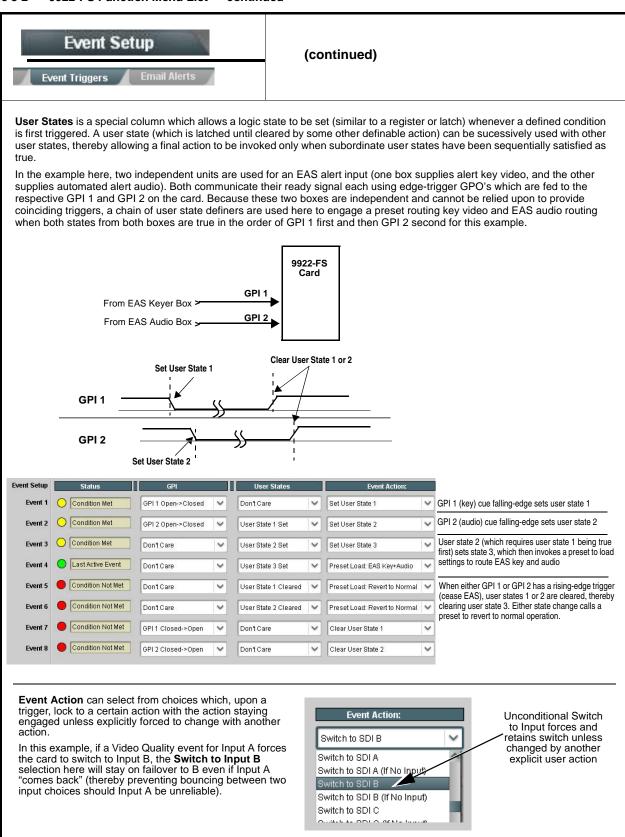


Table 3-2 9922-FS Function Menu List — continued

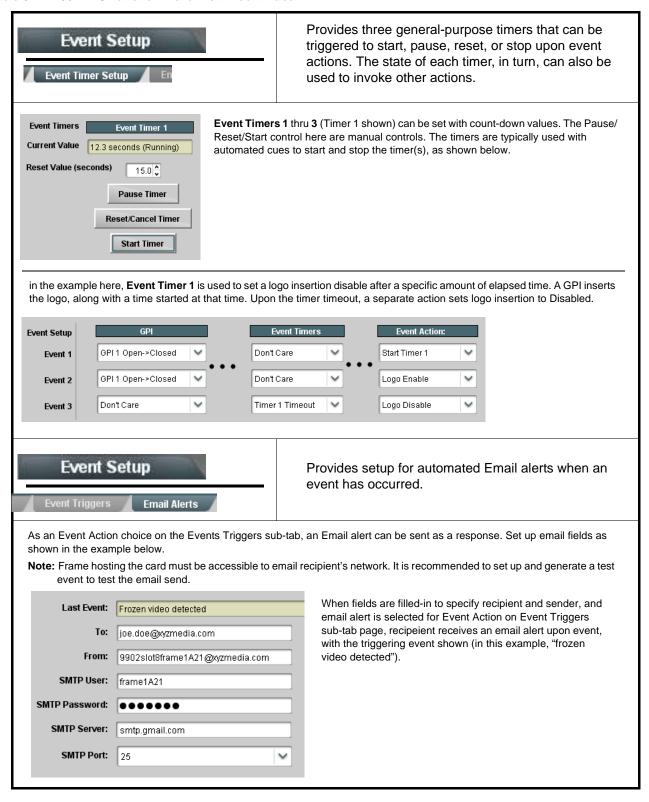
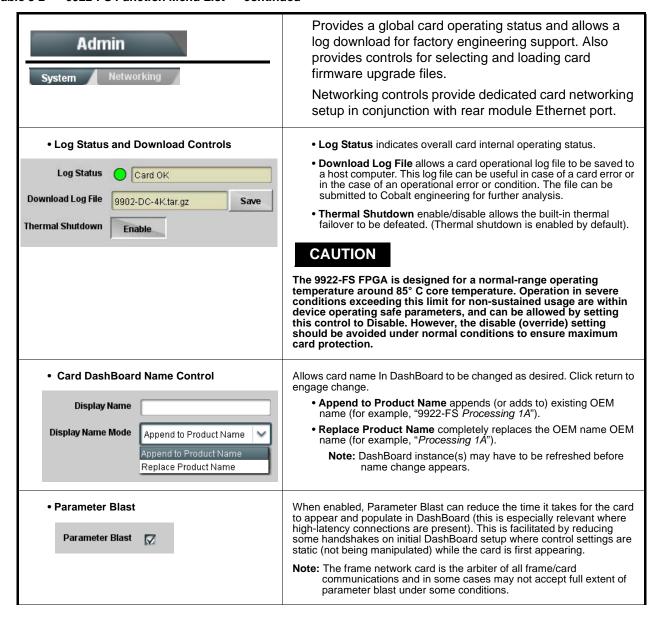


Table 3-2 9922-FS Function Menu List — continued



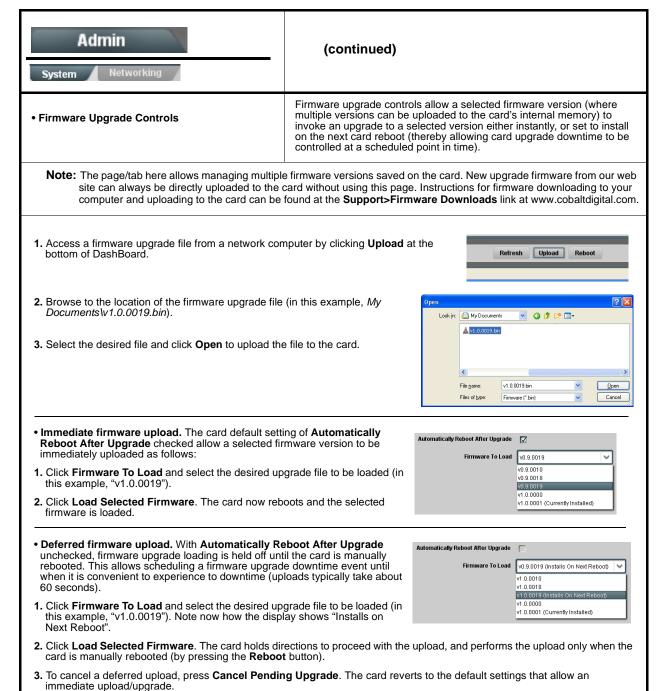


Table 3-2 9922-FS Function Menu List — continued

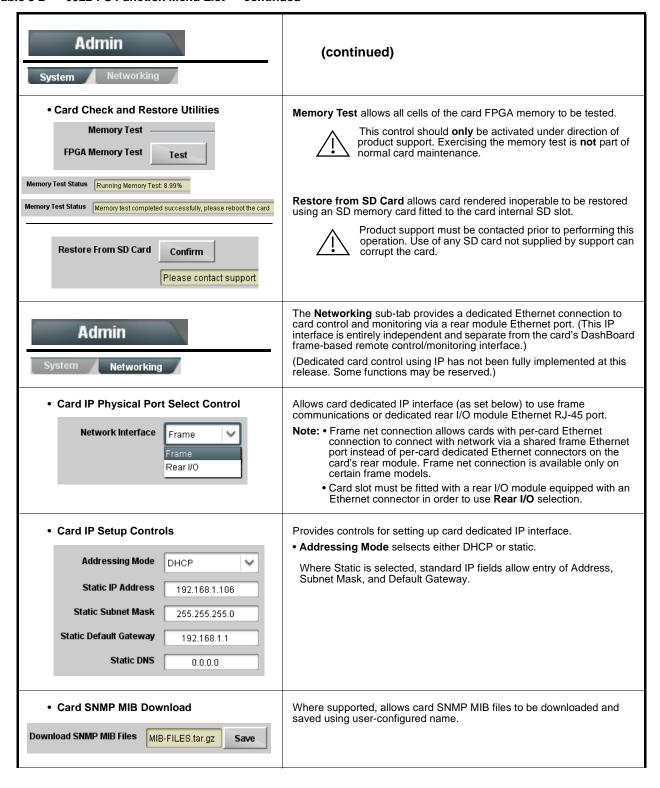


Table 3-2 9922-FS Function Menu List — continued

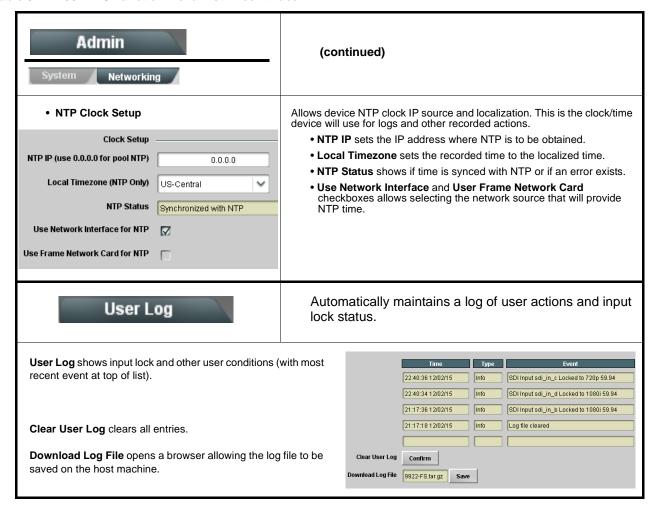


Table 3-2 9922-FS Function Menu List — continued

Alarms

Provides controls for setting up controls which screen for and propagate input program video alarms for video, audio, and ancillary data defect conditions.

Conditions and alarm status can be propagated as DashBoard tree-view frame alarms, downloadable .txt files and/or Syslog IP-based alarms.

The **Alarms** tab has several sub-tabs which allow setting up detection and alarm severity/propagation for input program video alarms for video, audio, and ancillary data defect conditions (as described and shown below)

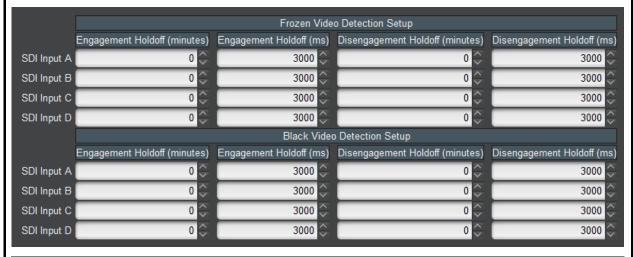
Video Alarm Setup Ancillary Data Alarm Setup Logging
Video Ancillary Data

Video Alarm Setup

Video Alarm Setup sub-tab allows setting up screening engagement and disengagement holdoff for frozen and/or black video detection on the card's four SDI inputs (independent for each SDI input). In the default example settings shown here, engagement and disengagement of alarm generation occurs 3000 msec after event detect.



Factory default holdoff settings shown here are recommended for at least initial settings. If holdoff periods are too brief, nuisance alarms may be generated during transitions to and from programs and interstitials.



Audio Alarm Setup



Audio Alarm Setup sub-tab allows setting up screening trigger threshold, engagement and disengagement holdoff for low or missing audio levels on the card's embedded audio input channels.

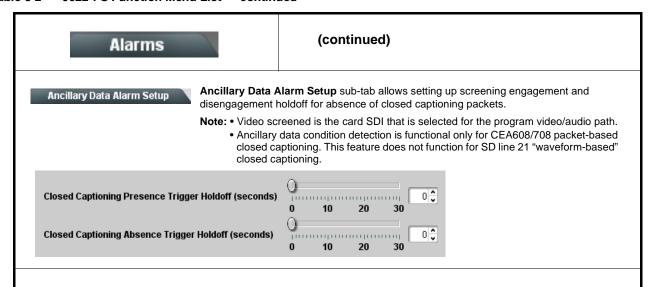
- Levels above the Failover Threshold are considered normal.
- Levels **below** the Failover Threshold (and exceeding the holdoff) are considered below normal.

Note: Audio channels screened are from the card SDI that is selected for the program video/audio path (for example, if SDI A is selected as the input source on the **Input Video** tab, the 16 embedded channels comprising this video/audio input are screened).



Factory default holdoff and threshold settings shown here are recommended for at least initial settings. If holdoff periods are too brief (or threshold set too high), nuisance alarms may be generated during transitions to and from programs and interstitials, as well as during certain content.

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



Alarm Propagation Tabs

Video, Audio, and Ancillary Data sub-tabs set alarm propagation attributes, including:

- Logging of alarms and conditions
- Propagation of alarms to the card general Card State/DashBoard frame-based tree-view pane
- Ignore alarm, or set severity as Warning (yellow "LED") or Error (red "LED")

Each of these sub-tabs is described below.

Video

Video sub-tab independently shows for all four SDI inputs any LOS (loss of signal), frozen, or black conditions triggered for any of the SDI IN A thru SDI IN D inputs.

Condition/Status has LOS, Frozen, and Black status fields for all 4 SDI inputs. Illuminated "LED" indicates that condition is presently occurring. Color of LED is determined by user-set Severity level.

- Log (when checked) propagates the alarm to a log file.
- Alarm (when checked) propagates the alarm to the Card State and frame-level DashBoard tree-view "LEDs".
- Severity selects from Ignore/OK (green "LED"), Warning (yellow "LED"), and Error (red "LED") alarm escalation states.
- Duration and Last Occurence shows details for each triggered alarm event.



Note: The Log, Alarm, Severity, and Duration/Last Occurrence columns appear on the other alarm sub-tabs and function identically as described here.

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

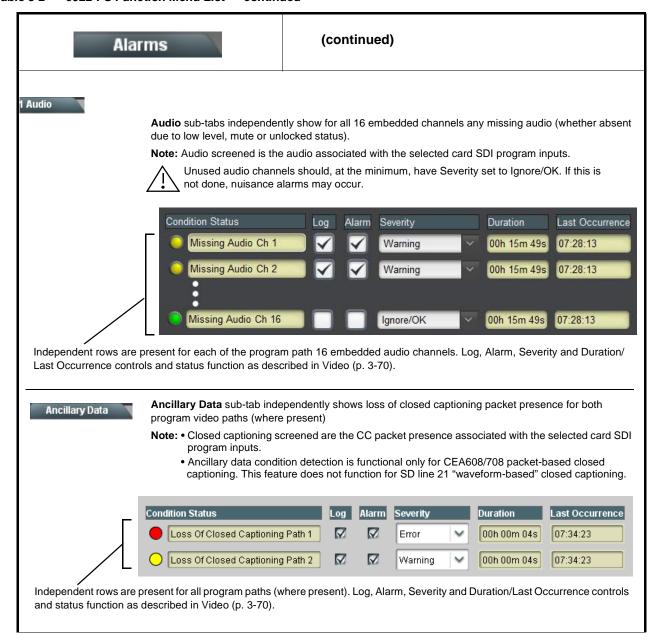
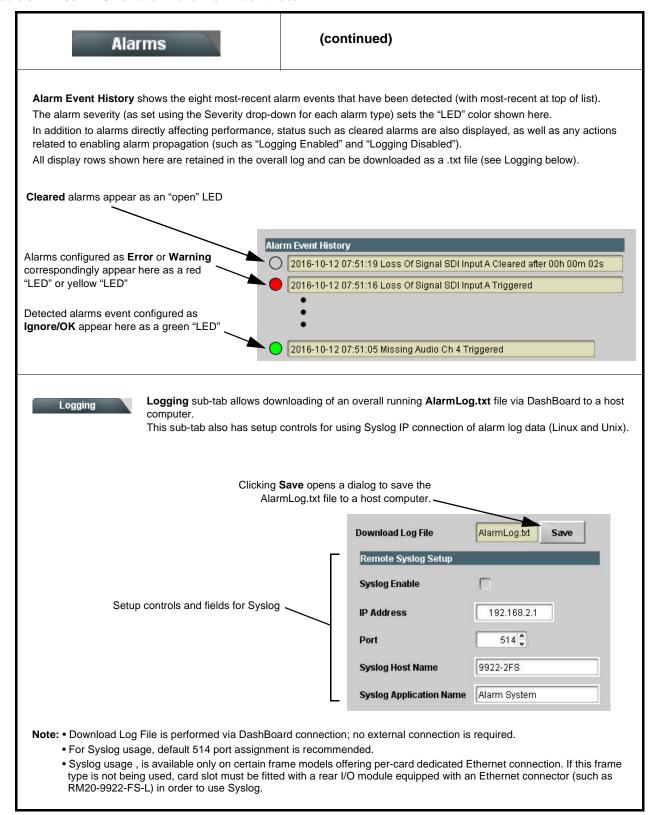


Table 3-2 9922-FS Function Menu List — continued



This section provides general troubleshooting information and specific symptom/corrective action for the 9922-FS card and its remote control interface. The 9922-FS 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-FS card itself and its remote control systems all (to varying degrees) provide error and failure indications. Depending on how the 9922-FS card is being used (i.e, standalone or network controlled through DashBoardTM or a Remote Control Panel), check all available indications in the event of an error or failure condition.

The various 9922-FS 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. 3-77)
- 9922-FS Processing Error Troubleshooting (p. 3-78)
- Troubleshooting Network/Remote Control Errors (p. 3-79)

9922-FS Card Edge Status/Error Indicators and Display

Figure 3-7 shows and describes the 9922-FS 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.

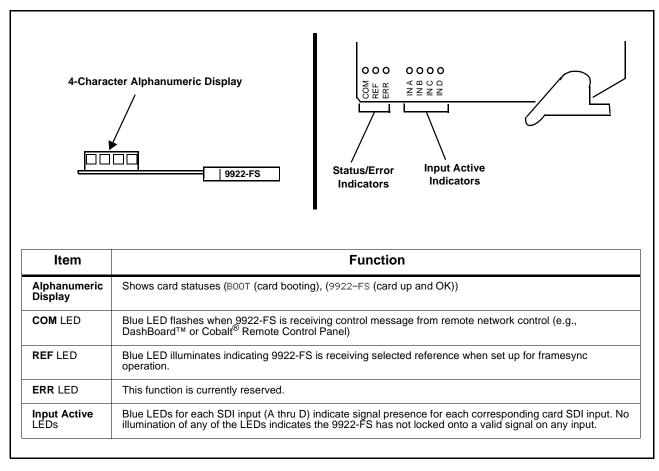


Figure 3-7 9922-FS Card Edge Status Indicators and Display

DashBoard™ Status/Error Indicators and Displays

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

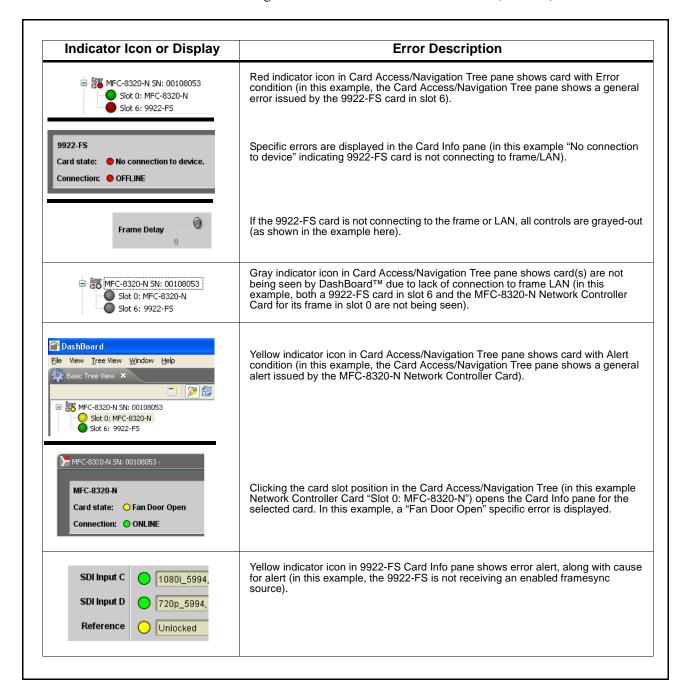


Figure 3-8 DashBoard™ Status Indicator Icons and Displays

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).

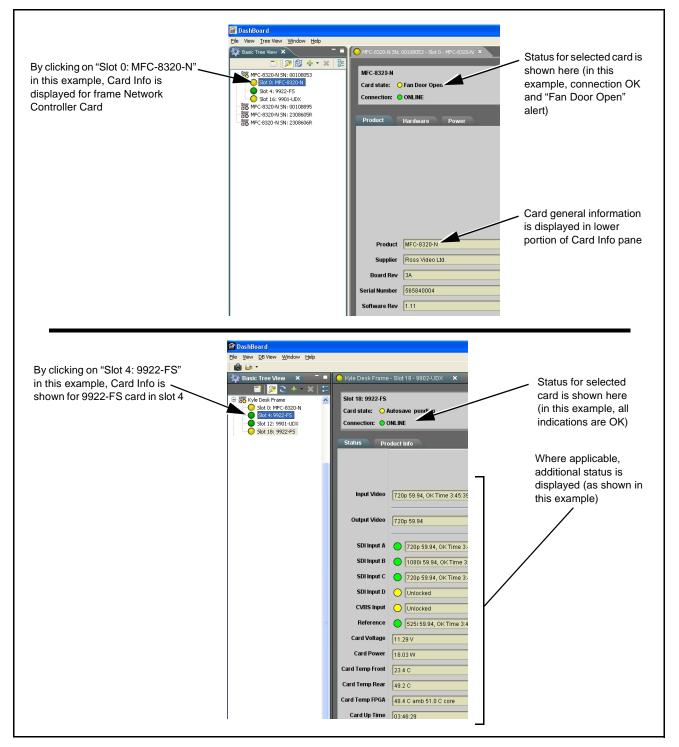


Figure 3-9 Selecting Specific Cards for Card Info Status Display

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-FS, 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-FS 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-FS card itself is defective. 		
	 If display shows excessive power being consumed (see Technical Specifications (p. 1-20) in Chapter 1, "Introduction"), the 9922-FS 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-FS 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-FS Processing Error Troubleshooting

Table 3-4 provides 9922-FS processing troubleshooting information. If the 9922-FS 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-FS 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-FS card edge status indicators.
 - Where errors are displayed on both the 9922-FS 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-FS Card Info pane SDI Input A	No video input present	Make certain intended video source is connected to appropriate 9922-FS 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	Control(s) not enabled	Make certain respective control is set to On or Enabled (as appropriate).	
through 9922-FS	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 (p. 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.	
Excessive or nuisance input signal quality events in log or Card State status display	Holdoff periods are too brief (or threshold set too high)	If holdoff periods are too brief (or threshold set too sensitive), nuisance alarms may be generated during transitions to and from programs and interstitials, as well as during certain content.	
(Option +QC only) Audio silence event not detected or triggered on	Holdoff set too long to detect condition	The Trigger Holdoff controls on the Audio Detect Events tab allow ignoring silence events unless the event duration exceeds the holdoff setting. Make certain holdoff is set sufficiently low to detect events as desired.	

Table 3-4 Troubleshooting Processing Errors by Symptom — continued

Symptom	Error/Condition	Corrective Action	
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.	
SD closed captioning waveform or character rendering is corrupted	Character burner and/or moving box insertions running into line 21	For SD usage, burn-ins can impinge on and corrupt line 21 closed-captioning waveform if positioned too close to the upper right of the raster. Typically, character burn and/or moving box insertions are not intended for content (such as OTA) where CC is required. If CC is present and must be retained, make certain to check CC content if burn-in insertions are enabled and reposition burn-ins to avoid line 21 interference.	
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 (Events Setup 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 Event Setup Controls (p. 3-61) 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 loading on Events Setup tab is disabled (either using master Enable/ Disable control or through events settings. See Event Setup Controls (p. 3-61) 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

Recovering Card From SD Memory Card

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

1. (See Figure 3-10.) Make certain the card has the proper SD card installed in the under-card slot. If SD card is **not** installed, contact Product Support to obtain an SD card.

- Note: (Option +TTS only) Cards shipped with option +TTS use an SD card for the TTS library in addition to recovery files. If your +TTS-equipped device was received earlier than December 2015, your SD may not contain the recovery files. Contact Product Support to obtain the updated SD card containing both TTS library and SD recovery files.
 - If unit is a BBG-1000 Series device, remove the top cover before proceeding.

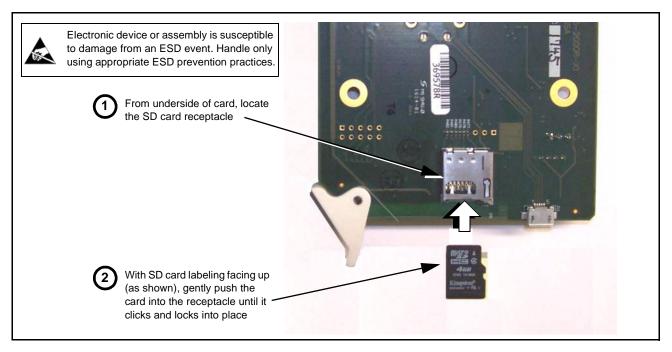


Figure 3-10 SD Card Installation

2. (See Figure 3-11.) With card powered-down, locate the MMC BOOT button on the card. Proceed as shown in picture.

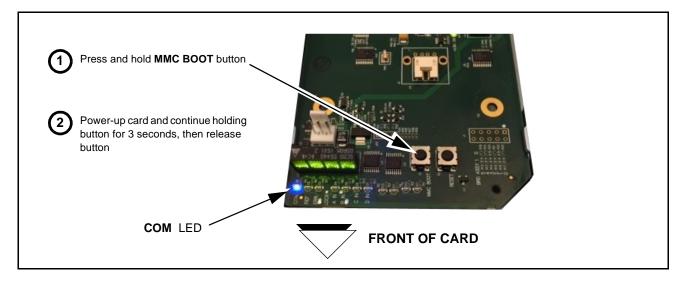


Figure 3-11 MMC Boot Button

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

Contact and Return Authorization

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

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

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

See Contact Cobalt Digital Inc. (p. 1-24) in Chapter 1, "Introduction" for contact information.

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Cobalt Digital Inc.



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

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