





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.
<u>COBALT.</u>	2506 Galen Drive Champaign, IL 61821 Voice 217.344.1243 • Fax 217.344.1245 www.cobaltdigital.com

9922FS-OM (V1.10)

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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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Chapter 1

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

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.

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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:

Option 🖻

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

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

Warnings, Cautions, and Notes

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

Warnings

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

Cautions

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

Notes

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

Labeling Symbol Definitions

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

Safety and Regulatory Summary

Warnings

! WARNING !	To reduce risk of electric shock do not remove line voltage service barrier cover on frame equipment containing an AC power supply. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.
Cautions	
CAUTION	This device is intended for environmentally controlled use only in appropriate video terminal equipment operating environments.
CAUTION	This product is intended to be a component product of an openGear® frame. Refer to the openGear® frame Owner's Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as its component products.
CAUTION	Heat and power distribution requirements within a frame may dictate specific slot placement of cards. Cards with many heat-producing components should be arranged to avoid areas of excess heat build-up, particularly in frames using only convection cooling. The 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.

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

EMC Compliance Per Market

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.





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 Solution 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.

Option \subseteq 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 **+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 Description 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.

Color Corrector **Option E**

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 +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 Description**

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.

Text-To-Speech **Option E**

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 Detect**

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 +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.

DashBoardTM 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 DashBoardTM, so the control interface is always up to date.

The DashBoard[™] software can be downloaded from the Cobalt Digital Inc. website: <u>www.cobaltdigital.com</u> (enter "DashBoard" in the search window). The DashBoard[™] user interface is described in Chapter 3,"Operating Instructions".

 Cobalt[®] OGCP-9000 and OGCP-9000/CC Remote Control Panels – The OGCP-9000 and OGCP-9000/CC Remote Control Panels conveniently and intuitively provide parameter monitor and control of the 9922-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. DashBoardTM is a trademark of Ross Video Limited.





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.

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

Item	Characteristic
Serial Digital Video Input (Cont)	Impedance: 75 Ω terminating Return Loss: > 15 dB up to 1.485 GHz > 10 dB up to 2.970 GHz
Analog Video Input	Number of Inputs: One SD analog CVBS Impedance: 75 Ω
AES Audio Inputs	Standard: SMPTE 276M Number of Inputs: Up to 16 unbalanced; AES-3id Impedance: 75 Ω
Analog Audio Inputs	Number of Inputs: Up to four balanced using 3-wire removable Phoenix connectors; 0 dBFS => +24 dBu
Input Select/Auto-Changeover Failover (option +QC)	 Failover to alternate input on loss of target input. Failover invoked upon LOS and/or (with option +QC) user configurable parametric criteria such as black/frozen frame or audio silence. Black frame trigger configurable for black intensity threshold and persistence time. Frozen frame trigger configurable for frozen percentage difference and persistence time.
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

Item	Characteristic
Post-Processor Serial Digital Video	Minimum Latency (frame sync disabled):
Outputs (Cont)	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

 Table 1-1
 Technical Specifications — continued

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

Contact Cobalt Digital Inc.

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

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

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

Chapter 2

Installation and Setup

Overview

This chapter contains the following information:

- Installing the 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



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:

- 1. Determine the slot in which the 9922-FS is to be installed.
- **2.** Open the frame front access panel.
- **3.** While holding the card by the card edges, align the card such that the plastic ejector tab is on the bottom.
- 4. Align the card with the top and bottom guides of the slot in which the card is being installed.
- **5.** Gradually slide the card into the slot. When resistance is noticed, gently continue pushing the card until its rear printed circuit edge terminals engage fully into the rear I/O module mating connector.

CAUTION

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

- **6.** Verify that the card is fully engaged in rear I/O module mating connector.
- 7. Close the frame front access panel.
- 8. Connect the input and output cables as shown in 9922-FS Rear I/O Modules (p. 2-4).
- **9.** 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.

9922-FS Rear I/O Module	Description
RM20-9922-FS-A/S	 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) One 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



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

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

9922-FS Rear I/O Module	Description
RM20-9922-FS-E	Provides the following connections:
	 Four 3G/HD/SD-SDI video inputs (SDI IN A thru SDI IN D)
	• Eight AES audio inputs (AES IN 1 thru AES IN 8)
$ \bigcirc C \qquad \bigcirc \bigcirc$	 Four 3G/HD/SD-SDI video outputs; selectable as processed or input reclocked out (SDI PROC/RCK OUT 1 thru SDI PROC/RCK OUT 4)
	 Eight AES audio outputs (AES OUT 1 thru AES OUT 8)
	Note: Available equipped with High-Density BNC (HDBNC) or DIN1.0/2.3 connectors as: RM20-9922-FS-E-HDBNC or RM20-9922-FS-E-DIN, respectively.
RM20-9922-FS-F	Provides the following connections:
SDI IN A SDI IN B GPI 1 GPI C	 Two 3G/HD/SD-SDI video input BNCs (SDI IN A and SDI IN B)
	 Three 3G/HD/SD-SDI video output BNCs (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)
SDI OUT 3A SDI OUT 4B	Note: Refer to GPIO, Serial (COMM), and Analog Audio Connections (p. 2-10) for connector pinouts and important information regarding GPO electrical limits.

9922-FS Rear I/O Module	Description
RM20-9922-FS-H	Provides the following connections:
VIDEO IN O<	 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) 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 (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-DDN, respectively.
RM20-9922-FS-JImage: colspan="2">Image: colspan="2" Colspa=	 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 SDI OUT 4) One CVBS video 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.

9922-FS Rear I/O Module	Description
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)
$\bigcirc C \qquad + \sum_{M \in \mathcal{M}} \frac{1}{M} + \frac{1}{M} \bigcirc 2 \xrightarrow{AES} 5 \bigcirc \bigcirc 3 \\ \bigcirc 3 \qquad 6 \bigcirc \xrightarrow{OUIT 1} \frac{1}{SDI} \\ \boxed{M} & \bigcirc 1 \qquad 4 \bigcirc 0 \\ \hline 0 \qquad 2 \xrightarrow{AES} 5 \bigcirc \bigcirc 0 \\ \hline 0 \qquad 0 \\ \hline 0 $	 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
$ \begin{array}{c c} \hline \bullet \\ \hline \hline$	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	Provides the following connections:
SDIIN B O DO A O C SDIIN B O DO B C C C C SDIIN B O DO B C C C C C C C C C C C C C	 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)
PREVIEW OUT 1B 2B 3B 4B Out 0 B 4B	COMM/GPIO RJ-45 connector
are DA pairs of corresponding outputs	• 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

2
9922-FS Rear I/O Module	Description
$\begin{array}{c c} CARD & 2 & CARD & 1 \\ \hline \odot & SDI IN A & \odot & SDI IN A \\ \hline \odot & SDI IN B & \odot & SDI IN B \\ \hline \odot & SDI IN B & \odot & SDI IN B \\ \hline \odot & SDI IN C & \odot & SDI IN C \\ \hline \odot & SDI IN D & \odot & SDI IN D \\ \hline \odot & SDI OUT & & SDI OUT \\ \hline \odot & 2A & 3B \\ \hline \odot & \odot & & \odot & & \odot \\ 3A & 3B & 3A & 3B \\ \hline \odot & \odot & & & & \odot & & \odot \\ 4A & 4B & 4A & 4B \\ \hline \odot & \odot & & & & & \odot & & \\ \hline \end{array}$	 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.
SPOCOMM I ISO ISO <td< th=""><th> 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 AES OUT 1 thru AES OUT 1) Eight AES audio outputs (AES OUT 1 thru AES OUT 1) 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: </th></td<>	 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 AES OUT 1 thru AES OUT 1) Eight AES audio outputs (AES OUT 1 thru AES OUT 1) 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:

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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Chapter 3

Operating Instructions

Overview

This chapter contains the following information:

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).

- 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

3

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 DashBoardTM. 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 DashBoard[™] 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).

Operating Instructions



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 action.



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.

	Default Line No. / Range		
ltem	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)	

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

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 DashBoardTM to access each function and its corresponding menus and parameters.

- **Option D** For any DashBoard tabs on card not appearing in this Note: 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 DashBoard[™] itself and in Table 3-2, the function menu items are organized using tabs as shown below.



shows the ordinate tab along with its sub-tabs. Highlighted sub-tabs indicate that controls described are found by selecting this sub-tab (in this example, the SDI Output Routing sub-tab on the Output Video page).

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

Function Menu Item	Page	Function Menu Item	Page
Input 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 3-29922-FS Function Menu List

	Input Video		Allows manu program vide format of rec	ual or failov eo inputs a ceived SDI	er selection nd display video.	on of card s status	d SDI and raster
• Input Vic	deo Source		Selects the input vie	deo source to	be applied t	o the card's	s program vid
Input Vid	eo Source SDI A	~	• SDI A and SD corresponding	I B choices al alv SDI IN A o	llow forced n r SDI IN B .	nanual sele	ection of
SDI A SDI B SDI C		• Failover A to - If SDI IN A g - If SDI IN A g SDI IN A	B sets main p goes invalid, th goes valid aga	oath preferen nen SDI IN E in, failover a	nce of SDI I is selected utomaticall	I N A. d. y reverts to	
	CVBS Failover A to B Failover B to A		• Failover B to - If SDI IN B g - If SDI IN B g SDI IN B.	A sets main p goes invalid, th goes valid aga	bath preferen nen SDI IN A in, failover a	nce of SDI I is selected utomaticall	I N B. d. y reverts to
			 SDI C and SD corresponding 	I D choices al Iy SDI IN C of	llow forced n r SDI IN D w	nanual sele vithout failov	ection of ver choices.
			• CVBS – selec	t CVBS input	as the progr	am video ir	nput.
			Note: Failover c	riteria via this	control is sir	nple signal	presence.
• Input Vic	deo Status		Displays input statu signal acquire.	is of each vide	eo input, alor	ng with elap	osed time of
SDI A Status	1080i_5994, OK Time 2:05	::51, 0 Errors	SDI A thru SDI D	and CVBS St	atus show ra	aster/forma	t for all card
SDI B Status 1080p_5994, OK Time 0:29:54, 0 Errors SDI C Status		(These status indications are also propagated to the Card Info pane.) Input Format Disabled by User indicates raster size and/or frame rate					
							SDIC Status
SDI D Status	Unlocked						
CVBS Status 525i_5994			complement is determined by rear I/O module used.				
57D3 3tatu3	525i_5994						
he controls s Default set Allowed Ras	525i_5994 Raster Size / Franshown below allow user shown below allow user tings have all raster size ter Sizes 525i Image: Size state Image: Size state	ne Rate Filt filtering to exc s and frame rate 625i 724 24 24	tering lude selected raster es "checked", thereby pp 1080i 2 29.97	or rate forma providing no 1080psf 30	ts from bein filtering (exc 1080p 20 50	g received lusion.) 59.94	by a card in
nput SDI he controls s Default set Allowed Ras	525i_5994 Raster Size / Franshown below allow user tings have all raster size ter Sizes 5251 Image: Size (Size	ne Rate Filt filtering to exc s and frame rate 625i 72d 72 24 24	tering lude selected raster es "checked", thereby pp 1080i 2 29.97 2 29.97	or rate forma providing no 1080psf 30 20	ts from bein filtering (exc 1080p © 50	g received lusion.) 59.94	by a card in
nput SDI he controls s Default set Allowed Ras Allowed Fran	525i_5994 Raster Size / Franshown below allow user tings have all raster size ter Sizes 525i me Rates 23.98 Imple below, only 720p ar	ne Rate Filt filtering to exc s and frame rate 625i 72t 24 2 24 2 10 29.97 are che	tering lude selected raster es "checked", thereby 1080i 29.97 29.97 20 20 20 20 20 20 20 20 20 20 20 20 20	or rate forma providing no 1080psf 30 30 d input to only	ts from bein filtering (exc 1080p 250 20 be 720p 29	g received lusion.) 59.94 ☑ .97 ("720p l	by a card in
> put SDI he controls s Default set Allowed Ras Allowed Fran In the exam Allowed Rast	525i_5994 Raster Size / Franshown below allow user shown below allow user tings have all raster size ter Sizes 525i Image: Size state state Image: Size state state state Size state Image: Size state state Image: Si	ne Rate Filt filtering to exc s and frame rate 221 24 24 24 10 29.97 are che 625i 720	tering lude selected raster es "checked", thereby p 1080i 29.97 20.00 29.97 20.00 29.97 20.00 29.97 20.00 29.97 20.00 29.97 20.00 20	or rate forma providing no 1080psf 30 30 d input to only 1080psf	ts from bein filtering (exc 1080p 50 50 0 be 720p 29 1080p	g received lusion.) 59.94 2 .97 ("720p l	by a card in
he controls s Default set Allowed Ras Allowed Fran	525i_5994 Raster Size / Fransishown below allow user tings have all raster size ter Sizes 525i Image: Size and Size an	ne Rate Filt filtering to exc s and frame rate 24 24 24 24 10 29.97 are che 625i 720	tering lude selected raster es "checked", thereby 1080i 2 29.97 2 29.97 2 20 2 20 2 20 2 20 2 20 2 20 2 20 2 2	or rate forma providing no 1080psf 30 2 d input to only 1080psf	ts from bein filtering (exc 1080p 20 50 20 be 720p 29 1080p	g received lusion.) 59.94 2 .97 ("720p l	by a card in
he controls s Default SDI Allowed Ras Allowed Fran Allowed Rast Allowed Fran	525i_5994 Raster Size / Franshown below allow user shown below allow user tings have all raster size ter Sizes 525i Image: Size in the size mage: Size in the size in the size mage: Size in the size in t	me Rate Filt filtering to exc s and frame rate 221 24 24 24 10 29.97 are che 6251 720 24 29.97 are che	tering lude selected raster es "checked", thereby p 1080i 29.97 2000 2000 2000 2000 2000 2000 2000 20	or rate forma providing no 1080psf 30 d input to only 1080psf 1080psf 30	ts from bein filtering (exc 1080p 50 be 720p 29 1080p 50	g received lusion.) 59.94 2 .97 ("720p l 59.94	by a card in



Timecode

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

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



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

Timecode	(continued)
Option E Audio LTC controls described bela allows audio LTC from an audio channel to be used as the output video.	ow only appear on cards with +LTC licensed optional feature. This feature s a timecode source, with conversion to a selected SMPTE 12M format on
• Timecode Source Status Displays Reference VITC Status 06:09:15:06.0 Input VITC Status 06:09:15:05.0 Input ATC_LTC Status Not Present 06:09:15:06.0 Field 1 Line 13, Field 2 Line 278 • LTC Input Control LTC Input COM 1 (RS485) COM 1 (RS485) Embed Ch 1 • Analog Input 8	 Displays the current status and contents of the four supported external timecode formats shown to the left. If a format is receiving timecode data, the current content (timecode running count and line number) is displayed. If a format is not receiving timecode data, Not Present is displayed. If a format is not receiving timecode data, Not Present is displayed. Selects source to be used by card to receive LTC as listed below. RS-485 over COM1 or COM 2 Audio LTC over Emb Ch 1 thru Ch 16 Audio LTC over AES Ch 1 thru Ch 16 Audio LTC over Analog audio Ch 1 thru Ch 4 Note: Audio LTC Source must be appropriately set for card to receive and process received LTC. If COM 1 or COM 2 is used for LTC receive, the port function must be set for LTC. See COMM Ports Setup Controls (p. 3-56) 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 Mute LTC Audio on input loss Enabled	 Allows LTC audio or RS-485 output to mute upon loss of selected timecode inputs. When set to Enabled and input timecode is lost: RS-485 LTC output goes to frozen state. Audio LTC output mutes. When set to Disabled and input timecode is lost: RS-485 LTC output mutes. When set to Disabled and input timecode is lost: RS-485 LTC output keeps counting, with count value being free-run count. Audio LTC output is not muted, with count value being free-run count. Note: If muting upon loss of a particular input format is desired, set all Source Priority 1 thru 4 to that particular input format. If this is not done, the card failover timecode selection may substitute another format choice for the format not being received.
Incoming ATC Packet Removal Control Incoming ATC Packet Removal Disabled	Enables or disables removal of existing input video ATC timecode packets from the output. This allows removal of undesired existing timecodes from the output, resulting in a "clean slate" where only desired timecodes are then re-inserted into the output. (For example, if both SDI ATC_VITC and ATC_LTC are present on the input video, and only ATC_LTC is desired, using the Removal control will remove both timecodes from the output. The ATC_LTC timecode by itself can then be re-inserted on the output using the other controls discussed here.) 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
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Timecode	(continued)
• Output Status Display Output Status 00:04:46:06.1 (Source: SDI VITC)	 Displays the current content and source being used for the timecode data as follows: Output Status 00:04:46:06.1 (Source: SDI VITC) Output status OK (in this example, SDI VITC timecode received and outputted). Output Status Insertion Disabled Timecode Insertion button set to Disabled; output insertion disabled. Note: • If timecode is not available from Source Priority selections performed, timecode on output reverts to Free Run (internal count) mode. Because the 1's digit of the display Frames counter goes from 0 to 29, the fractional digit (along with the 1's digit) indicates frame count as follows: 0.0 0.1 Frame 1 1.0 Frame 2 1.1 Frame 3 29.1
Audio LTC Output Option	Audio LTC output is routed to desired embedded, AES, or analog audio outputs using the Output Audio Routing/Controls (p. 3-28). Whatever timecode is displayed on the Output Status is converted to audio LTC and available as an LTC audio output.
 Note: Although the output line drop-down on the range is automatically clamped (limited) to depending on video format. See Ancillary The card does not check for conflicts on a no other data. 	e controls described below will allow a particular range of choices, the actual o certain ranges to prevent inadvertent conflict with active picture area Data Line Number Locations and Ranges (p. 3-9) for more information. a given line number. Make certain the selected line is available and carrying
SD VITC Waveform Insertion Controls SD VITC Waveform Output 1 Line Number SD VITC Waveform Output 2 Line Number SD VITC Waveform Insertion Enabled	 For SD output, enables or disables SD VITC waveform timecode insertion into the output video, and selects the VITC1 and VITC2 line numbers (6 thru 22) where the VITC waveform is inserted. Note: • If only one output line is to be used, set both controls for the same line number. • SD VITC Waveform Insertion control only affects VITC waveforms inserted (or copied to a new line number) by this function. An existing VITC waveform on an unscaled SD SDI stream is not affected by this control and is passed on an SDI output.
• SD ATC Insertion Control SD ATC_VITC Insertion Enabled SD ATC Insertion Line 13 - SMPTE 12M-2-2008 Recommended	For SD output, enables or disables SD ATC_VITC timecode insertion into the output video, and selects the line number for ATC_VITC.

Table 3-2	9922-ES	Function	Monu I	ist —	continued
	<i>9922-</i> F3	Function	wenu L	.131 —	continueu

Timecode	(continued)
HD ATC_LTC Insertion Control HD ATC_LTC Insertion ID- SMPTE 12M-2-2008 Recommended	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 HD ATC_VITC Insertion Line Field 1 9 - SMPTE 12M-2-2008 Recommended HD ATC_VITC Insertion Line Field 2 8 (571) - SMPTE 12M-2-2008 Recommended	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 Disabled	 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 Free Run Minutes 0 Free Run Seconds 0 Apply Free Run Values Confirm	 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.

Reticules Basic Advanced	Allows Safe Action and/or Safe Title overlays and other static markers to be added to the output video image.
Typical Reticule/Overlay Marker Insertions The 9922-FS allows any combination of the reticule/or characteristics for each type of marker can be set as o	verlay markers to be applied to the output video. Sizing and other described below.
	Safe Action Area (SAA) Reticule Safe Title Area (STA) Reticule
	Graticule
	Center Cross
 Note: • Overlay markers using this function are for video and will appear in the image. Use the overlay tools are turned off when no longer • Multiple overlay markers described below 	r setup only. When enabled, these markers are embedded in the output is function only on preview video and not on-air video. Make certain any er needed. can be simultaneously enabled as desired.
Insertion Master Enable/Disable	Provides independent master enable/disable for card SDI and CVBS
SDI Out Reticule Enable	When enabled, any combination of reticules or other markers described below can be inserted.
Analog Out Reticule Disable Disable Enable	When disabled, insertion of all reticules or other markers is disabled.
• Safe Action Area (SAA) Controls	SAA provides enable/disable of safe action area graticule insertion.
Disable Enable SAA Height	• SAA Height and SAA Width control height and width of insertion (from
0 50 100 SAA Width 0 92 0 0 50 100	Note: Reticule Size control is locked to Custom for this card, with safe action area size control as described above.



Reticules Basic Advanced	(continued)
Center Cross Controls Center Cross Enable	Center Cross provides enable/disable of center cross insertion.
Cross Height 0 50 100 Cross Width 0 50 100 0 50 100	 Cross Height and Width control height of vertical line and width of horizontal line (from 0% to 100% of 4:3 outputted image area).
Horizontal Line Controls Horizontal Line Enable	• Horizontal Line provides enable/disable of horizontal line insertion.
Hor Line Size	• Horizontal Line Size controls the width of the horizontal line (from 0% to 100% of 4:3 outputted image area).
Hor Line Pos 50 50	• Horizontal Line Pos controls the vertical positioning of the horizontal line (from 0% to 100% of 4:3 outputted image area).
Vertical Line Controls Vertical Line Enable Ver Line Size 0	 Vertical Line provides enable/disable of vertical line insertion. Vertical Line Size controls the height of the vertical line (from 0% to 100% of 4:3 outputted image area). Vertical Line Pos controls the horizontal positioning of the line (from 0% to 100% of 4:3 outputted image area).
NTSC Legacy Reticule Fixed Control NTSC Legacy Enable Disable Enable	When set to enable, provides fixed-size safe action area 4:3 reticule suited for CRT-based displays.

Output Video Output Routing Analog Video	Allows selection of each of the four video output coaxial connectors as processed SDI out or reclocked SDI out. Also provides CVBS parameter controls and test pattern output controls for card CVBS output.
• Output Video Crosspoint SDI OUT 1 Program SDI OUT 2 SDI Input A Reclock SDI OUT 3 Program SDI OUT 4 Key Preview	 For each SDI output port supported by the card, provides a crosspoint for routing program processed video or selected-input reclocked to an SDI output. In this example, SDI OUT 1 and SDI OUT 3 are receiving Program (procesed) video out, with SDI OUT 2 providing SDI IN A reclocked input video. Note: • Choices shown here are examples only. Key preview available only when equipped with +KEYER option. • Outputs set to Input Reclocked will pass input SDI regardless of Input SDI Raster Size / Frame Rate Filtering. Input filtering applies only to the card program video path.
ST352 VPID Insertion/Pass-Thru Select / Colorimetry Mark Select ST352 VPID Insertion Regenerate ST352 VPID OETF SDR ST352 VPID Colorimetry BT.709	 ST 352 VPID Insertion selects from default Regenerate mode and special Pass-Through mode (see below for important usage notes). Regenerate makes certain ST352 is marked for whatever the card is passing, or if the payload is being modified by the card. (An example of where ST352 would have to be modified would be if the card Framesync is user-set to change the frame rate from 59.94 to 60.) Pass-Through will extract and preserve the ST352 information from input SDI, and re-insert it on the output regardless of any changes the card has locally done to identifying characteristics carried in the ST352 metadata. In all normal usages, it is recommended to leave this control set to default Regenerate setting. This ensures that downstream devices will "see" ST352 that represents the payload being provided by the card. Pass-Through is only used in highly specialized cases where special ST352 data must be preserved (even if the data may not match the payload). ST 352 VPID OETF selects from SDR, HLG, PQ, or unspecified marking.

3

Output Video Output Routing Analog Video	Provides CVBS output parameter controls and test pattern output controls
• CVBS Oversampling and Color Controls Oversampling Enable Color Enable	 Oversampling enables or disables video DAC oversampling. Oversampling can improve rendering of motion for down-conversions to the CVBS SD analog output. Color enables or disables chroma content in the CVBS output.
• CVBS Test Pattern Generator Control Test Pattern Disable	Enables manual insertion (replacement) of CVBS output video to instead output 75% color bars.
DAC Custom/Cal Offset Controls DAC Gain Calibration -7.500 Cb Calibration -6.00 Calibration to EEPROM Save	Gain and Cb calibration controls allow custom offsets from factory calibration values. Calibration to EEPROM stores custom offsets. Note: Factory default settings are recommended for typical use.





3



Framesync	(continued)
• Program Video Output Mode Select Output Mode Input Video Flat Field Freeze Test Pattern Snow	 Provides a convenient location to select between card program video output and other technical outputs from the choices shown to the left and described below. Input Video – card outputs input program video (or loss of signal choices described below). Flat Field – card outputs flat field. Freeze – card outputs last frame having valid SAV and EAV codes. Test Pattern – card outputs standard technical test pattern (pattern is selected using the Pattern drop-down described below). Snow – card outputs snow multi-color pattern.
• Loss of Input Signal Selection On Loss of Video Disable Outputs Flat Field Freeze Test Pattern Snow	 In the event of program input video Loss of Signal (LOS), determines action to be taken as follows: Disable Outputs: Disable program video SDI outputs. Flat Field – go to flat field on program video output. Freeze – go to last frame having valid SAV and EAV codes on program video output. Test Pattern – go to standard technical test pattern on program video output (pattern is selected using the Pattern drop-down described below). Snow – output snow multi-color pattern.
• Test Pattern Select Test Pattern 75% Bars 75% Bars 100% Bars SMPTE Bars Tartan Pluge Ramp H Sweep Pulse and Bar Multiburst Gray 5 Step Gray 10 Step Checkfield	Provides a choice of standard technical patterns when Test Pattern is invoked (either by LOS failover or directly by selecting Test Pattern on the Program Video Output Mode Select control).
• Flat Field Color Select Flat Field Color Black 50% Gray White Red Blue Yellow Green	Provides a choice of flat field colors when Flat Field is invoked (either by LOS failover or directly by selecting Flat Field on the Program Video Output Mode Select control).

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

Framesync	(continued)
Output Video Reference Offset Controls	With framesync enabled, provides the following controls for offsetting the output video from the reference:
Vertical (Lines) - 1124	 Vertical (Lines) – sets vertical delay (in number of lines of output video) between the output video and the frame sync reference. (Positive values provide delay; negative values provide advance)
0	(Range is -1124 thru 1124 lines; null = 0 lines.)
Horizontal (us) -64.000	 Horizontal (μs) – sets horizontal delay (in μs of output video) between the output video and the frame sync reference. (Positive values provide delay; negative values provide advance)
	(Range is -64 thru 64 μsec; null = 0.000 μsec.)
	Note: Offset advance is accomplished by hold-off of the reference-directed release of the frame, thereby effectively advancing the program video relative to the reference.
Frame Delay Control Frame Delay 0	When Framesync is enabled, specifies the smallest amount of latency delay (frames held in buffer) allowed by the frame sync. The frame sync will not output a frame unless the specified number of frames are captured in the buffer. The operational latency of the frame sync is always between the specified minimum latency and minimum latency plus one frame (not one field).
	Note: Due to card memory limits, the maximum available Minimum Latency Frames is related to the output video format selected.
	When using this control, be sure to check the Report Delay display to make certain desired amount of frames are delayed.
• Video Delay Display	Displays the current input-to-output video delay (in msec units) as well as in terms of Frames/fractional frame (in number of lines).
Video Delay 34.13 ms Framesync: 34.13 ms / 1 frames 12 lines Status display shows total input-to-output video delay, along with any framesync delay.	
Framesync Lock Status Display	Displays the current framesync status and reference source.
Lock Status Framesync Locked to Reference	
Note: Audio timing offset from video is performed Input Audio Routing/Controls (p. 3-26) for the set of the	using the delay controls on the Input Audio Routing/Controls tab. Refer to nese controls.

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. 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. 			
	Status	Peak	
Emb 1-2	Dolby Digital	Data	
Emb 3-4	Present - PCM	-80 dBFS/-80 dBFS	
Emb 5-6	Present - PCM	-80 dBFS/-80 dBFS	
Emb 7-8	Present - PCM	-20 dBFS/-20 dBFS	
Emb 9-10	Present - PCM	0 dBFS/-20 dBFS	
Emb 11-12	Present - PCM	-14 dBFS/-10 dBFS	
Emb 13-14	Present - PCM	-9 dBFS/-5 dBFS	
Emb 15-16	Present - PCM	-3 dBFS/0 dBFS	
	Status	Peak SRC	
AES 1-2	Dolby E, Line 449	/ SRC On	
	Peak		
Analog 1-2	-80 dBFS/-80 dBFS		





le 3-2 9922-FS Function Menu List — continued	
Input Audio Routing/Controls	(continued)
Note: • Default factory preset routing routes emb • Bus Ch 2 thru Bus Ch 16 have controls i Bus Ch 1 controls are shown here.	edded Ch 1 thru Ch 16 to bus channels Audio Bus Ch 1 thru Ch 16. identical to the controls described here for Bus Ch 1 . Therefore, only the
• Bus Channel Source	 Using the Source drop-down list, selects the audio input source to be routed to the card bus channel from the following choices: Embedded input channel 1 thru 16 (Emb Ch 1 thru Emb Ch 16) AES input channel 1 thru 16 (AES Ch 1 thru AES Ch 16) Analog input channel 1 thru 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 and Peak Level Display Mute	 Provides Mute and phase Invert channel controls, as well as peak level meter for each output channel. (Meter shows level as affected by Level control.) Gain controls allow relative gain (in dB) control for the corresponding destination Embedded Audio Group channel. (-80 to +20 dB range in 1.0 dB steps; unity = 0 dB) Note: Although the card can pass non-PCM data such as Dolby[®] E or AC-3, setting the gain control to any setting other than default 0 will corrupt Dolby data.
Input Audio Routing/Controls Input Bus Audio Delay Dolby E Alignment	Audio Delay – Provides bulk (all four groups/master) and individual card audio bus channel delay offset controls and delay parametric displays.
• Bulk (Master) Audio/Video Delay Control Audio Bulk Delay (msec)	Bulk Delay control adds bulk (all four groups) audio delay from any video delay (net audio delay offset setting adds delay in addition to any delay included by other actions). This control is useful for correcting lip sync problems when video and audio paths in the chain experience differing overall delays. (-33 to +3000 msec range in 0.01-msec steps; null = 0 msec). Image: the transmission of the

Tahle 3-2	9922-ES Function Menu List continued

Input Audio Routing/Controls Input Bus Audio Delay Dolby E Alignment	(continued)	
Per-Channel Audio/Video Delay Offset Controls Offset control adds or reduces (offsets) channel audio delay from the matching video delay (audio delay offset setting adds or removes delay in addition to any delay included by other actions). This control is useful for correcting lip sync problems when video and audio paths in the chain experience differing overall delays.		
Delay Status shows current delay from video for the	e corresponding audio channel.	
Note: • Maximum advance/delay offset is depender	nt on video format.	
Where a Dolby pair is present, adjustment of channel in the pair.	of either channel control results in a matching delay setting for the other	
Audio/Video Delay Offse Channel 1 -800.00 -266.67 266.67 Channel 2	Absolute Audio Delay Status 0.00 1620 samples / 33.8 ms 1620 samples / 33.8 ms 1620 samples / 33.8 ms	
-800.00 -266.67 266.67 800.00		
Input Audio Routing/Controls	Dolby E Alignment – Provides selectable Dolby E alignment for embedded Dolby E to position the bitstream utilizing the Dolby E "guard band". This helps prevent frame errors that may occur in a bitstream upon switching or editing.	
Dolby E Embedding Alignment Control E Alignment Not aligned Alignment Select No Alignment Align to Reference Align to Output Video	 For incoming Dolby E data routed to the audio bus (either over embedded channels or via AES embedding to the bus), aligns the embedded Dolby data corresponding to selection. Alignment line as a result of selection is shown in E Alignment status display. Note: Where a frame reference is available, it is recommended to use the Align to Reference selection. This helps ensure that the correct alignment is achieved even if the video is user delayed or output format is changed. Refer to "Preferred Alignment for Dolby E in HD Systems" (http://www.dolby.com/about/news-events/ newsletters-dtvaudio-dolby-e-alignment.html) for more information regarding Dolby E alignment. 	



Input Audio Routing/Controls	(continued)	
 Note: • Flex Mix input channels Flex Mix 2 thru Fle Therefore, only the Flex Mix 1 controls are • For each Flex Mix input channel, its source be set to the Silence selection. 	x Mix 16 have controls identical to that described here for Flex Mix 1. shown here. should be considered and appropriately set. Unused input channels should	
• Flex Mix Input Channel Source/Bus Assignment	Using the Source drop-down list, selects the audio input source to be directed to the corresponding bus channel from the choices listed below. • Silence • Embed Ch 1 thru Embed Ch 16 • AES Ch 1 thru AES Ch 16 • Analog Ch 1 thru Analog Ch 4 The Flex Bus drop-down selects the bus (A thru P) to which the input is 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)	
Input Audio Routing/Controls	Clean and Quiet Switching (option +CQS only) – 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.	
 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)	2500 5000	



Video Quality Events Input A Input D Option Imput D Note: Inputs B thru Input D have controls identication input A controls are shown here. Set control		(Option +QC only) Sets quality check screening and thresholds for video quality event alerts. When a quality events occur, the event(s) can be used by the Events Setup function to invoke input routing or other changes.
Event Status Indicator Event Status Disabled Event Status No Input Event Status Video Ok Event Status Frozen video detected		Displays event status (based on criteria set below) for signal condition to be considered OK (green), or signal condition considered to be a quality alert event (red) due the condition exceeding the criteria threshold(s) set below.
Position and Width Controls X position % 0 50 100 yposition % 0 50 100 50 50 100 50 50 100 50		Position and Width controls set the area of concern to be screened by the Quality Event function. X and Y Position controls set the origin point for the area of concern Origin (0,0) y = 100% X and Y Width controls set the size for the area of concern x and y @ 20%
• Threshold and Event	Type Controls	x and y @ 80%
Noise Immunity	High	engagement and disengagement.
Event Type	Black, Frozen, or No Input	 Noise immunity sets the relative noise levels that are rejected in the course of black event assessment (Low, Medium, or High).
Frozen Engagement Holdoff (minutes)	0	• Event Type selects the defect events (black, frozen, or no input) to be screened
Frozen Engagement Holdoff (ms)	16 🗘	 Engagement and Disengagement Holdoff controls set the time (in
Frozen Disengagement Holdoff (minutes)		msec) where, when time is exceeded, an event is to be considered a valid alert event, and when event time is has ceased, an alert event is cleared
Black Engagement Holdoff (minutes)		Disengagement Holdoff sets the time (in msec) where when
Black Engagement Holdoff (ms)	3000	event time is has ceased, an alert event is cleared.
Black Disengagement Holdoff (minutes)		
Black Disengagement Holdoff (ms)	3000	

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

Audio Det	nts <u>Opti</u>	on		(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.													
	Emb Chan	1	Emb Chan :	2	Emb Chan 3	Emb Chan 4	Emb Chan 5	Emb Chan 6	Emb Chan 7	Emb Chan 8	AES Chan 16		
Status: S=Silent P=Present	S		P		P	Р	Р	P	P	P	S		
Audio Detect Event 1	Silence	~	Silence	~	Don't Care 🖌 🗸	Don't Care 🖌 🛩	Don't Care 🖌 🗸	Don't Care 🖌 🗸					
Audio Detect Event 2	Presence	~	Presence	~	Don't Care 🖌 🗸	Don't Care 🖌 🗸	Don't Care 🖌 🗸	Don't Care 🗸 🗸	Don't Care 🖌 🗸	Don't Care 🗸 🗸	Don't Care 🖌		
	:												
Audio Detect Event 8	Don't Care	~	Don't Care	~	Don't Care 🗸	Don't Care 🗸	Don't Care 🗸	Don't Care 🗸	Don't Care 🗸 🗸	Don't Care 🗸	Don't Care 🗸 🗸		
Audio Failover Threshold (dBFS)	-6	50 🗘											
Trigger Holdoff (minutes)		0 🗘											
Trigger Holdoff (ms)	500	00											
Trigger Release (minutes)		0 🗘											
Trigger Release (ms)		0 🗘											
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 three	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.) 													
Closed Captioning	Provides supp provides contr and presence	oort for closed captioning setup. Also ols for setting closed captioning absence detection thresholds.											
---	--	---											
Closed Captioning Input Status	Displays incoming Clo	osed Captioning status as follows:											
	If closed captioning is displayed	s present, a message similar to the example shown											
Input Status CDP Packet on Line 16	 If no closed captioni 	ng is present in the video signal. Not Present or											
	Disabled is displaye	ed.											
	Note: • Packet closed message can closed caption <i>cdp_frame_ra</i> items containe listed below. F	appear due to the items described below. The ning function assesses <i>cdp_identifier</i> , <i>te</i> , <i>ccdata_present</i> , and <i>caption_service_active</i> ed in the packet header to make the determinations Refer to CEA-708-B for more information.											
	Message	Description											
	Unsupported Frame Rate	Film rate closed-captioning (either as pass-through or up/down conversion) is not supported by the card.											
	Data Not Present	Packet is marked from closed captioning source external to the card that no data is present.											
	No Data ID	Packet from closed captioning source external to the card is not properly identified with 0x9669 as the first word of the header (unidentified packet).											
	caption servi packet from u inactive. In th processed an The closed ca captioning sta	ice is marked as inactive display indicates bit in pstream source may inadvertently be set as is case, closed captioning data (if present) is still d passed by the card as normal. aptioning function does not support PAL closed undards.											
Closed Captioning Remove/Regenerate and HD Insertion Line Controls	Allows removal of clos This is useful where o than that received on.	sed captioning packets and regeneration of packets. losed captioning must be moved to a different line											
Incoming Packet Removal If Regenerate Closed Captioning is enabled incoming packets will always be removed.	Note: • Although the of the 9 thru 41 (limited to) ce active picture Data Line Nur information.	butput line drop-down will allow any choice within range, the actual range is automatically clamped rtain ranges to prevent inadvertent conflict with area depending on video format. See Ancillary nber Locations and Ranges (p. 3-9) for more											
Regenerate Disabled Closed Captioning Image: Closed Captioning HD Output Line Image: Closed Captioning	The card doe: Make certain data.	s not check for conflicts on a given line number. selected line is available and carrying no other											
Presence/Absence Check Controls	Displays CC presence propagated to the Eve	e and/or absence event status. This status can be ents Setup tab controls to issue a card GPO or											
Presence Event Delay (sec)	Controls for both pres seconds) where, whe	ence and absence provide for a holdoff time (in n time is exceeded, an event is to be considered a											
Absence Event Delay (sec)													
Absence Event Status Inactive													

Video Proc Video Proc Color Correction	Provides the following Video Proc and Color Correction parametric controls.
• Video Proc Video Proc Enabled	 Video Proc (Enable/Disable) provides master on/off control of all Video Proc functions. When set to Disable, Video Proc is bypassed. When set to Enable, currently displayed parameter settings take effect.
Reset to Unity Reset to Unity 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	Adjusts gain percentage (saturation) applied to Chroma (C-channel). (0% to 200% range in 0.1% steps; unity = 100%)
• Color Phase	Adjusts phase angle applied to Chroma. (-360° to 360° range in 0.1° steps; null = 0°)
• Gang Luma/Color Gain 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.

Video Proc Video Proc Color Correction	Option E Provides color corrector functions for the individual RGB channels for the card program video path (option +COLOR).
Color Corrector Color Corrector On	 Color Corrector (On/Off) provides master on/off control of all Color Corrector functions. When set to Off, all processing is bypassed. When set to On, currently displayed parameters settings take effect.
Reset to Unity Reset to Unity Confirm	 Reset to Unity provides unity reset control of all Color Corrector functions. When Confirm is clicked, a Confirm? pop-up appears, requesting confirmation. Click Yes to proceed with the unity reset. Click No to reject unity reset.
• Luma Gain R-G-B controls Green Green Blue -100.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Separate red, green, and blue channels controls for Luma Gain, Black Gain, and Gamma curve adjustment. Gain controls provide gain adjustment from 0.0 to 200.0% range in 0.1% steps (unity = 100.0) Gamma controls apply gamma curve adjustment in 0.125 to 8.000 range in thousandths steps (unity = 1.000) Each of the three control groups (Luma, Black, and Gamma have a Gang Column button which allows settings to be proportionally changed across a control group by changing any of the group's controls.
• Black Gain R-G-B controls Green Green Blue 100.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	
• Gamma Factor R-G-B controls Green Green Blue 0.125 3.125 5.000 8.000 1.000 1.0000 1.000 1.000 1.000 1.0000 1.000	

Video Proc Video Proc Color Correction	(continued)
• Black Hard Clip Black Hard Clip	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%)

e 3-2 9922-PS Function Menu List — continued		
Output Audio Routing/Controls Embedded Output AES Audio Out Note: • Embedded Ch 2 thru Embedded Ch 16 th described here for Embedded Ch 1. There	Provides an audio crosspoint allowing the audio source selection for each embedded audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.	
 For each channel, its source and destinati channels should be set to the Silence sele 	on should be considered and appropriately set. Unused destination ection.	
Group Enable/Disable Controls Group 1 Group 2 Group 3 Group 4 Enabled Enabled Enabled Enabled	 Allows enable/disable of embedded audio groups 1 thru 4 on card program video output to accommodate some legacy downstream systems that may not support all four embedded audio groups. Note: Changing the setting of this control will result in a noise burst in all groups. This control should not be manipulated when carrying on-air content. 	
• Embedded Output Channel Source	 Using the drop-down list, selects the audio input source to be embedded in the corresponding embedded output channel from the following choices: Card Audio Bus 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 E 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 Embedded Audio Group 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. 	

Output Audio Routing/Controls	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 th	e Source, Gain, Mute, and Invert controls described here for AES Out
Ch 1. Therefore, only the AES Out Ch 1 of	controls are shown here.
 For each channel, its source and destinat channels should be set to the Silence set 	ion should be considered and appropriately set. Unused destination ection.
AES Output Channel Source AES Out Ch 1	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
Audio Bus Ch 1	Built-in Tone generators Tone <i>n</i> (20 dBES lovel tone generators with a 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
	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.)
Mute	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.
Invert Invert	
=20 =20	

Output Audio Routing/Controls Analog Audio Out	Provides an audio crosspoint allowing the audio source selection for each analog audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.
Analog Output Channel Source AN Out Ch 1 Audio Bus Ch 1	Using the Source drop-down list, selects the audio input source to be routed to the corresponding analog audio output channel from the following choices: • Card Audio Bus Ch 1 thru Ch 16 • Built-in Tone generators Tone <i>n</i> (-20 dBFS level tone generators with <i>n</i> 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 C Audio LTC • Downmixer L • Downmixer R
• Channel Mute/Phase Invert/Gain Controls and Peak Level Display Mute Mute Mute Invert Invert -30 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Provides Mute and phase Invert channel controls, as well as peak level meter for each output channel. (Meter shows level as affected by Level control.) Gain controls allow relative gain (in dB) control for each corresponding destination analog audio out channel. (-80 to +20 dB range in 1.0 dB steps; unity = 0 dB)

Output Audio Routing/Controls	Provides audio down-mix audio routing selections that multiplexes any five audio channel sources into a stereo pair.
Downmixer Source Controls	Left Channel Input thru Right Surround Channel Input select the five audio bus source channels to be used for the downmix
Left Channel Input Audio Bus Ch 1 🗸	Downmix channels Downmixer L and Downmixer R are available as sources for embedded, AES, or analog audio outputs using the Channel
Right Channel Input Audio Bus Ch 2	Source controls described above.
Center Channel Input Audio Bus Ch 3 🗸	
Left Surround Channel Input Audio Bus Ch 5 🗸	
Right Surround Channel Input Audio Bus Ch 6	
• Center Mix Ratio Center Mix Ratio	 Adjusts the attenuation ratio of center-channel content from 5-channel source that is re-applied as Lt and Rt content to the DM-L and DM-R stereo mix. 0 dB setting applies no ratiometric reduction. Center channel content is restored as in-phase center-channel content with no attenuation, making center-channel content more predominate in the overall mix. Maximum attenuation setting (-80 dB) applies a -80 dB ratiometric reduction of center-channel content. Center-channel content is restored as in-phase center-channel content. Center-channel content is restored as in-phase center-channel content less predominate in the overall level, making center-channel content less predominate in the overall mix. (20 dB to -80 dB range in 0 dB steps; default = 0 dB) Note: Default setting is recommended to maintain center-channel predominance in downmix representative to that of the original source 5-channel mix.
• Surround Mix Ratio Surround Mix Ratio	 Adjusts the attenuation ratio of surround-channel content from 5-channel source that is re-applied as Lo and Ro content to the DM-L and DM-R stereo mix. 0 dB setting applies no ratiometric reduction. Surround-channel content is restored with no attenuation, making Lo and Ro content more predominate in the overall mix. Maximum attenuation setting (-80 dB) applies a -80 dB ratiometric reduction of surround-channel content. Surround-channel content is restored at a -80 dB ratio relative to overall level, making surround-channel content less predominate in the overall mix. (20 dB to -80 dB range in 0 dB steps; default = 0 dB) Note: Default setting is recommended to maintain surround-channel predominance in downmix representative to that of the original source 5-channel mix.

Output Audio Routing/Controls	Output Flex Mix – Provides a 16-channel mixer in which each of the inputs can be mixed onto up to 16 independent output summing nodes. The input sources are the card processed audio bus channels. Each input channel has independent gain and mute controls.
Note: For each Flex Mix input channel, its source s be set to the Silence selection.	hould be considered and appropriately set. Unused input channels should
Flex Bus Input Channel Source/Bus Assignment Flex Mix Input 1 Flex Bus A Source Audio Bus Ch 1	Using the Source drop-down list, selects the audio input source to be directed to the corresponding bus channel from the choices listed below. • Silence • Audio Bus Ch 1 thru Ch 16 • Tones (100 Hz thru 16 kHz) • Downmix L or Downmix R The Flex Bus drop-down selects the bus (A thru P) to which the input is assigned to.
• 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)

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

Character Burner	Provides user-configurable burn-in of up to two text strings and timecode on output video.
Note: Ident 1 and Ident 2 sub-tabs provide identic burn-in overlays on the output video. Ident 2 only the Ident 1 controls are shown here.	cal, independent controls for inserting two independent text (identification) 2 has controls identical to the controls described here for Ident 1. Therefore,
Ident Insertion Controls Overlay Always enabled Always disabled Always enabled Enabled on loss of video	 Selects the rules for identification text burn-in overlay insertion into output video. Note: If ident text insertion is desired for input LOS conditions, the Framesync On Loss of Video control must be set to provide a raster (from one of the choices shown) to support the text insertion. If this control is set to "Disable Outputs", no raster or text insertion will be present on the output video under input LOS conditions. See Framesync (p. 3-22) for more information.
Display Type (Format) Select Display Format User Text User Text Video Type	 Selects the type of data to be displayed as burn-in text from choices shown. User text allows user text to be entered using field described below. Video type inserts an overlay showing the video format of the input being used for processing.
Display (Ident) Text Entry Field Display Text IDENT1 Update	 Dialog entry box that allows entry of desired ident text string. Enter desired text as click Update when done to input the text string. Note: • All normal keyboard alphanumeric characters are supported, in addition to ASCII characters (Windows ALT+<i>nnnn</i>). • Up to 126 characters can be entered.
Ident Text Attributes Controls Character Size 106 Text Justification Left Character Color White Character Opacity 0	 Sets burn-in size/position attributes as follows: Character Size sets character size (in pixels). Text Justification selects from left, right, or center-aligned justification within the text box overlay. Character Color selects text color. Character Opacity sets text opacity from 0% (least opacity) to 100% (full opacity).
Ident Text Background Attributes Controls Background Color Black Background Opacity 0	 Provides independent controls for setting the color and opacity of the burn-in text and its background. Color drop-down sets background color from multiple choices. Opacity control sets background opacity from 0% (least opacity) to 100% (full opacity).



Character Burner Ident 1 Ident 2 Timecode	(continued)
Ident Position Select Position Mode Custom Position Center Anchor Custom Position Top Left Anchor Center Bottom Center Bottom Left Bottom Right Torp Left	Sets the location of the ident text insertion from choices shown or custom. (When Custom is selected, position is configured using the Ident Text Positioning Controls described below.) Example: Ident 1 text using Top Left position
Top Center Top Right	Example: Ident 1 text using Center position Image: Center position Note: 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.
Ident Text Positioning Controls Horizontal Position Uertical Position 0	 With Custom selected, sets burn-in position attributes as follows: Horizontal Position sets horizontal position (in percentage of offset from left of image area). (Range is 0 thru 100%) Vertical Position sets vertical position (in percentage of offset from top of image area, top justified). (Range is 0 thru 100%) Note: • Horizontal and Vertical Position controls are functional only when Custom Position is selected. • Character sizing and positioning for a given raster format may not be appropriate for another format (especially if transitioning from HD to SD). Set size and position for a balanced appearance (e.g., do not place text too close to margins or set larger than necessary) that accommodates both HD and SD raster formats if multiple format use is required.
Positioning with H and V controls at zero (origin) (Size = 3) Positioning with H and V controls both at 50 (Size = 3) Origin (0,0) x = 100%	

Character Burner Ident 1 Ident 2	(continued)
Text Box Sizing Controls Text Box Size Auto Custom Text Box Width 0	 Provides controls for setting the size of the burn-in text background box. Auto allows text box to proportionally size with selected text size. Custom allows override of proportional sizing and allows text V and H dimensions to be set as desired. Text Box Width and Height allow manual sizing when set to Custom. Custom allows override of proportional sizing and allows text V and H dimensions to be set as desired. Horizontal and Vertical Padding allow fine adjustment of V and H
Text Box Height I I I I I I I I Horizontal Padding Vertical Padding 0 0 0 0 0 0 0 0 0 0 0 0 0	dimensions to be set when Auto is selected.
• Text Box Border Enable Border Enabled Disabled Enabled	When set to Enabled, applies a white hairline border to the text box edges.
Character Burner Ident 1 Ident 2 Timecode	Provides controls for burn-in of timecode on output video.
Note: This status display mirrors the same display timecode burn-in to function. See Timecode	r in the Timecode tab. Device must be set to output a timecode in order for e (p. 3-12) for information on using timecode controls.
• Timecode Insertion Control Overlay Always enabled Always disabled Always enabled Always enabled Enabled on loss of video	 Selects the rules for timecode burn-in overlay insertion into output video. Note: If timecode insertion is desired for input LOS conditions, the Framesync On Loss of Video control must be set to provide a raster (from one of the choices shown) to support the timecode insertion. If this control is set to "Disable Outputs", no raster or timecode insertion will be present on the output video under input LOS conditions. See Framesync (p. 3-22) for more information.
• Timecode Format Display Selector Display Format HH:MM:SS:Frame HH HH:MM HH:MM:SS HH:MM:SS:Frame HH:MM:SS:Frame:Field	Selects the format of timecode string burn-in overlay insertion into output video from choices shown.



Character Burner	(continued)	
Timecode Attributes Controls Character Size 106 Text Justification Left Character Color White Character Opacity 0	 Sets burn-in size/position attributes as follows: Character Size sets character size (in pixels). Text Justification selects from left, right, or center-aligned justification within the text box overlay. Character Color selects text color. Character Opacity sets text opacity from 0% (least opacity) to 100% (full opacity). 	
Timecode Background Attributes Controls Background Color Black Background Opacity 0	 Provides independent controls for setting the color and opacity of the burn-in text and its background. Color drop-down sets background color from multiple choices. Opacity control sets background opacity from 0% (least opacity) to 100% (full opacity). 	
• Timecode Position Select Position Mode Custom Position Center Anchor Custom Position Top Left Anchor Custom Position Top Left Anchor Center Bottom Center Bottom Right Top Left Top Center Top Right	Sets the location of the timecode insertion from choices shown or custom. (When Custom is selected, position is configured using the Timecode Positioning Controls described below.) Example: Timecode burn-in using Bottom Center position Example: Timecode burn-in using Top Left position	
Timecode Positioning Controls Horizontal Position Vertical Position 0 0	 With Custom selected, sets burn-in position attributes as follows: Horizontal Position sets horizontal position (in percentage of offset from left of image area). (Range is 0 thru 100%) Vertical Position sets vertical position (in percentage of offset from top of image area, top justified). (Range is 0 thru 100%) Note: • Horizontal and Vertical Position controls are functional only when Custom Position is selected. Character sizing and positioning for a given raster format may not be appropriate for another format (especially if transitioning from HD to SD). Set size and position for a balanced appearance (e.g., do not place text too close to margins or set larger than necessary) that accommodates both HD and SD raster formats if multiple format use is required. 	



Moving Box	Provides a "moving box" graphic insertion (overlay) on the output video. Moving-box insertion can serve as a dynamic raster confidence check even in cases where the input video image is static or lost.	
	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 Moving Box Always disabled Always disabled Always enabled Enabled on loss of video	 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 raster (from one of the choices shown) to support the moving-box insertion. If this control is set to "Disable Outputs", no raster or moving-box insertion will be present on the output video under input LOS conditions. See Framesync (p. 3-22) for more information. 	
Moving Box Size Controls Moving Box Width (%) I Moving Box Height (%) I	 Sets size of box image burn-in as follows: Moving Box Width sets the width (as a percentage of maximum available raster width. (Range is 0% thru 40%) Moving Box Height sets the height (as a percentage of maximum available raster height. (Range is 0% thru 40%) Note: • Moving box sizing for a given raster format may not be appropriate for another format (especially if transitioning from HD to SD). Set size and position for a balanced appearance that accommodates both HD and SD raster formats if multiple format use is required. 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 Moving Box Horizontal Speed Normal Fast Moving Box Vertical Speed Normal	 Sets speed of motion for moving box image burn-in as follows: Moving Box Horizontal Speed sets the X-axis speed from choices shown. Moving Box Vertical Speed sets the Y-axis speed from choices shown. 	



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	Enables or disables wings insertion into the output video.	
Wings Enable Enabled Note: For conditions where wings is not intended to be inserted certain this control is set to Disabled.		
Wings Width Control	Allows symmetrical L/R wings insertion width, from none to widths	
Wings Width (pixels)	(0 to 300 pixel range; null = 0)	
Wings Status Displays	Displays wings timing status (on both Wings tab and Card Status	
	 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 OK Wings Status Insertion OK, Wings Offset 0 lines ea	Wings insertion within target 0-200 samples early	
Wings Timing Error Wings Status Insertion Error Adjust Wings Timing,	Wings Offset 0 lines early, 99 samples late Wings insertion late	
Wings Timing Error Wings Status Insertion Error Adjust Wings Timing,	Wings Offset 0 lines early, 984 samples early 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	



Option E Key/fill controls described below only appear on cards with +KEYER licensed optional feature. This feature requires a Rear Module that accommodates separate key/fill video inputs. Note that on cards also licensed with + KEYER, W and Keyer controls appear on the same tab.		
• Key/Fill Source Controls Key Source SDID SDIA SDIA SDIB SDIC SDID Fill Source SDID	Selects the card SDI input video ports to serve as the card's key and fill sources. Note: SDI inputs selected must be used on Rear I/O Module correspondingly equipped with intended input ports.	
• Key Mode Control Key Mode Alpha Threshold Alpha Ramp Alpha Threshold Reverse Alpha Threshold	 Selects key mode as follows: Alpha Ramp setting is used when typical key/fill is provided by key/fill generator with separate key and fill outputs. Alpha Threshold or Reverse Alpha Threshold setting is used to provide keying using a combined key/fill signal derived from a simple graphic source. 	
Key/Fill Insertion Enable Control Key Enable Enabled Apply Key To Program Enabled	Key Enable control sets up key/fill for insertion. When enabled, key preview is available on Key Preview output. When key preview shows desired results, Apply Key To Program can be enabled to apply the key/fill to the program video output.	



Keyer	(continued)	
Key/Fill Status Displays	Displays keyer timing status (on both Keyer tab and Card Status displays) as described below.	
	Note: • Key/fill timing is a function of the respective key and fill signal frame sync card/device(s). Ideal timing is within 0 to 200 samples early of output video timing. Key/fill timing cannot be controlled on +KEYER host card.	
	 Error in key/fill timing will result in loss of keying (however, program video image will not be corrupted). 	
Keyer OK Key Status Insertion OK, I Fill Status Insertion OK, I	Key/fill insertion OK, within target 0-200 samples early	
Keyer Key Vertical Alignment Error Key Status Insertion OK, F Fill Status Insertion OK, F Insertion OK, F	Key Offset 749 lines early, 872 samples early Key or fill insertion late error (in this example, late key video as shown by "wrap-around" line 749 lines early offset)	
Keyer Key Format Mismatch Key Status Key Format Do Fill Status Insertion Error	Adjust Fill Timing, Fill Offset Key or fill video missing/mismatched format	
Key Alpha/Threshold Controls	When keying is set to Alpha Threshold or Reverse Alpha Threshold mode sets luma thresholds, when crossed, allow key/fill onto program video image.	
Key Alpha	Key Alpha setting, when increased, increases the opacity of the key/fill.	
Key Threshold	Key Threshold setting, when reduced, more readily allows the key/fill input to assert itself over more variations of program video luma levels.	





Ancillary Data Processing ADP Routing IP Port Setup Option (E)	Provides controls for VANC/HANC ancillary data de-embedding and embedding to and from program video stream. Data can be extracted and inserted within the card (Bridge mode), or inserted and/or extracted to and from external interfaces via serial or IP interfaces.	
Note: Bridge mode ANC extract/insert is standard on card. Other modes described here are available with option +ANC .		
Eight individual Ancillary Data Processors (ADPs) prov program video SDI stream.	vide for insertion, extraction, or bridging ancillary data to and from the card	
Eigni individual Anclinary Data Processors (ADP-s) provide for insertion, extraction, or bridging ancillary data to and from the card program video SDI stream. Mode controls select the type of ANC processing: Interface controls select either card IP or serial data (COM 1) interface where Mode is set to insertion or extraction Note: COMI is available for ADP Proc 1 or extraction ANC packets Insert and Extract modes respectively allow insertion to the output stream or extraction from the input stream or extraction for the input stream or extraction from the input stream or extraction of packet to be handled by the corresponding ANC Data Processor Mode enterfaces Mode enterface Mode enterfaces Mode enterfaces Mode enterfaces Mode enterface Mode enterfa		
ADP Proc 8 Disabled V IP V 0x0 V	SDID Field 1 Line Number Field 2 Line Number Insert in HANC Insert in C Remove Incoming 0x0 + 10 + 10 + Disabled Disabled Disabled Disabled	
In the example above, ADP Proc 1 is set to extract ATC timeco IP), status is displayed as shown below. Extracting 15.0 Kbit/s, dropped 0.0 Kbit Extracting 18.75 Kbit/s, total 125.78 Kbit When set to extract to	de at DID60 _h / SDID 60 _h . Depending on the interface used to carry the extraction (COM or COM interface, displays rate and dropped data (if any)	
Note: DashBoard versions 4.1 and earlier display DID and SDID n hexadecimal. Hexadecimal notation is denoted by the "0x" p	umbers in decimal; newer DashBoard versions display DID and SDID numbers in preceding the value.	

Ancillary Data Processing			IP Port Setup sub-tab provi communications.	des IP se	tup for card UDP IP
• Card	d IP Receive Setup/Status d Active IP 10.99.16.100 Card Port 4000 Insertion RX Status 1.2 kb/s		 Shows card receiving IP address/status and sets port as follows: Card Active IP: Shows the card IP address. (IP address is set using Admin tab Networking settings; see Admin (Log Status/ Firmware Update - Card IP Address) on page 3-61). Card Port: Sets card IP receive port. Insertion / Rx Status: Shows card IP receive/Rx insertion status Stopped (with yellow indicator) means no data is being received. Green indicator means data is being received and inserted. Data rate is also shown. 		
• Card D Des Exti	A IP Transmit Setup/Status Extraction TX Status 1.2 kb/s Destination IP 10.99.16.101 stination Port 4000 raction Mode Payload Only Payload Only		 Provides setup for destination IP address and shows card transmit status as follows: Extraction / Tx Status: Shows card extraction from stream to Tx status. Stopped (with yellow indicator) means no data is being sent. Green indicator means data is being extracted and sent. Data rate is also shown. Destination IP/Port: Allows setting destination IP address and port. Extraction Mode: Sets the IP data sent to consist of only payload, or send as formatted packets. 		
	Formatted Packet				
es: • Packé sendi • Devic Packé packé • Packé Packét fi Bytes 3:0	ets received must be sized to fit in a native an ling controller before they are sent to the devi- ce can be configured to send back ACK packet tets need to be broken down by the sending of ets every two seconds as an additional safeg et formatting for insertion/extraction, ACK, ar formatting used for insertion/extraction: Field Packet Type (0xF5AB02ED)	cillary data ice). ets each tin controller b uard. nd heartbea Bytes 3:0	a packet (i.e., payloads that span multiple ar ne data is inserted. The ACK packet is sent before they are sent to the device. Device ca at is as follows: ACK Packet Format Field Packet Type (0xAC73B938)	ncillary packets immediately a an also be con Bytes 3:0	is need to be broken down by the fter the data is actually inserted. figured to send out "heartbeat" leartbeat Packets Field Packet Type (0x20120831)
es: • Packé sendi • Devic Packé • Packé • Packé Bytes 3:0 5:4	ets received must be sized to fit in a native an ling controller before they are sent to the devi- ce can be configured to send back ACK packe- tets need to be broken down by the sending o ets every two seconds as an additional safeg set formatting for insertion/extraction, ACK, ar formatting used for insertion/extraction. Field Packet Type (0xF5AB02ED) Packet size	cillary data ice). ets each tin controller b uard. d heartbea Bytes 3:0 5:4	a packet (i.e., payloads that span multiple ar me data is inserted. The ACK packet is sent before they are sent to the device. Device ca at is as follows: ACK Packet Format Field Packet Type (0xAC73B938) Received packet size Paceired DID	ncillary packets immediately a an also be con H Bytes 3:0 31:4	reed to be broken down by the fter the data is actually inserted. figured to send out "heartbeat" leartbeat Packets Field Packet Type (0x20120831) Reserved
es: • Packé sendi • Devic Packé • Packé • Packé • Packé • Packé • Si • Si • Si • Si • Si • Si • Si • Si	ets received must be sized to fit in a native an ling controller before they are sent to the devi- ce can be configured to send back ACK packet ets need to be broken down by the sending of ets every two seconds as an additional safeg et formatting for insertion/extraction, ACK, ar formatting used for insertion/extraction. Field Packet Type (0xF5AB02ED) Packet size DID SDID	cillary data ice). ets each tin controller b uard. nd heartbea Bytes 3:0 5:4 6 7	a packet (i.e., payloads that span multiple ar ne data is inserted. The ACK packet is sent refore they are sent to the device. Device ca at is as follows: ACK Packet Format Field Packet Type (0xAC73B938) Received packet size Received SDD	ncillary packets immediately a an also be con H Bytes 3:0 31:4	reed to be broken down by the fter the data is actually inserted. figured to send out "heartbeat" leartbeat Packets Field Packet Type (0x20120831) Reserved
es: • Packé sendi • Devic Packé • Packé • Packé • Packé • Packé • Si • Packé •	ets received must be sized to fit in a native an ling controller before they are sent to the devi ce can be configured to send back ACK packe ets need to be broken down by the sending of ets every two seconds as an additional safeg tet formatting for insertion/extraction, ACK, ar formatting used for insertion/extraction. Field Packet Type (0xF5AB02ED) Packet size DID SDID Line number for Insertion. If set to 0, use the line number set by software.	cillary data ice). ets each tin ontroller b uard. ad heartbea Bytes 3:0 5:4 6 7 9:8	a packet (i.e., payloads that span multiple ar ne data is inserted. The ACK packet is sent vefore they are sent to the device. Device ca at is as follows: ACK Packet Format Field Packet Type (0xAC73B938) Received packet size Received DID Received SDID Line number on which the received packet was inserted	ncillary packets immediately a an also be con Bytes 3:0 31:4	reed to be broken down by the fter the data is actually inserted. figured to send out "heartbeat" leartbeat Packets Field Packet Type (0x20120831) Reserved
es: • Packe sendi • Devic Packe packet fr Bytes 3:0 5:4 6 7 9:8 11:10	ets received must be sized to fit in a native an ling controller before they are sent to the devi ce can be configured to send back ACK packet tests need to be broken down by the sending of ets every two seconds as an additional safeg et formatting for insertion/extraction, ACK, ar formatting used for insertion/extraction: Field Packet Type (0xF5AB02ED) Packet size DID SDID Line number for Insertion. If set to 0, use the line number set by software. Payload size	cillary data ice). ets each tin ontroller b uard. ad heartbea <u>Bytes</u> 3:0 5:4 6 7 9:8 11:10	a packet (i.e., payloads that span multiple ar ne data is inserted. The ACK packet is sent refore they are sent to the device. Device ca at is as follows: ACK Packet Format Field Packet Type (0xAC73B938) Received packet size Received DID Received SDID Line number on which the received packet was inserted Received payload size	ncillary packets immediately a an also be con Bytes 3:0 31:4	reed to be broken down by the fter the data is actually inserted. figured to send out "heartbeat" Heartbeat Packets Field Packet Type (0x20120831) Reserved
es: • Packet sendi • Devic Packet • Packet fr Bytes 3:0 5:4 6 7 9:8 11:10 15:12	ets received must be sized to fit in a native an ling controller before they are sent to the devi- ce can be configured to send back ACK packet tests need to be broken down by the sending of ets every two seconds as an additional safeg et formatting for insertion/extraction, ACK, ar formatting used for insertion/extraction: Field Packet Type (0xF5AB02ED) Packet size DID SDID Line number for Insertion. If set to 0, use the line number set by software. Payload size User packet ID	cillary data ice). ets each tin controller b uard. id heartbea Bytes 3:0 5:4 6 7 9:8 11:10 15:12	a packet (i.e., payloads that span multiple ar ne data is inserted. The ACK packet is sent before they are sent to the device. Device ca at is as follows: ACK Packet Format Field Packet Type (0xAC73B938) Received packet size Received DID Received DID Line number on which the received packet was inserted Received payload size Received user packet ID	ncillary packets immediately a an also be con H Bytes 3:0 31:4	reed to be broken down by the fter the data is actually inserted. figured to send out "heartbeat" ieartbeat Packets Field Packet Type (0x20120831) Reserved







COM Routing	Provides controls for setting up the two COMM (serial) ports for LTC or ANC functions, and setting comm protocol for each port.	
 Note: • COM 1 and COM 2 sub-tabs provide independent controls for COM1 and COM2. Therefore, only the COM 1 or are described here. • Controls provided here allow highly detailed setup of serial communications. Control settings must be carefull considered and set appropriately to correspond to both sending and receiving systems. Incorrectly set contro result in loss of ANC serial comm. • COM 1 and COM 2 are multi-function interfaces and must be set for ANC Data Extractor for port(s) is to be use 		
Set the port function as described in COI	I Routing in COMM Ports Setup Controls (p. 3-56).	
• COM Mode (Protocol)	Selects serial comm protocol for the respective port as RS-232 or RS-485.	
COM 1 Mode RS232 RS232 RS485	Note: Protocol choices should consider the payload to be carried. Typically, LTC is sent or received using only RS-485 serial protocol.	
COM Port Tx Routing Function TX Routing LTC Encoder LTC Encoder Anc Data Extractor Audio Data Extractor	Selects port function for the respective port as LTC Encoder input or output, or ANC Data Extractor / Audio (SMPTE 337) non-PCM input or output.	
Rx/Tx Status Display RX Status No data received TX Status 15.0 Kbit/s	Shows either no data received/sent, or where transfer is present shows data rate (in kbit/sec).	
Insertion Mode Control Insertion Mode Insert Any Data Received insert Any Data Received Fixed Length Packet Break-Defined Packet Insertion Fixed Packet Size 64	 Where data is being inserted (received), sets the insertion as follows: Insert Any Data Received: Insert all received data with no regard for packet size. Fixed Length Packet: Sets receive to wait and accumulate <i>n</i>-number of packet bytes (as set using Insertion Fixed Packet Size control) before inserting data. Break-Defined Packet: Card receiver looks for character-defined break from source being received to define breaks. 	
Insertion Flow Control Insertion Flow Control No Flow Control No Flow Control XON/XOFF Hold Break	 Allows communication between card receive and sending source to regulate data receive as follows: No Flow Control: Data is received without buffering or checking to see if data is being received faster than it can be inserted. XON / XOFF: The card UART Tx will tell the sending source whether it can or cannot accept data at current bit rate. Hold Break: Card, if close to not being able to accept new data, tells the sending source to hold, and releases this hold when the card is again able to accept new data. 	

Table 2.2	0022 ES Eurotion Monullist continued
Table 3-2	9922-FS FUNCTION MENU LIST — CONTINUED

COM Routing COM 1 Setup COM 2 Setup	(continued)	
• Insertion Sync Byte Control Insertion Sync Byte Disabled Disabled Field Number at SOF Ack on Insertion	 Allows use of a sync byte from card receiver back to sending source to synchronize communication between card receive and sending source as follows: Disabled: No special synchronization. Field Number at SOF: The card sends a single byte telling sending source when start of field 1 or field 2 is occurring. Ack on Insertion: Card sends a single byte back to sending source when data has been inserted. Where data is being extracted from input video, sets the data to be sent as follows: Payload Only: Sends payload only (for example, for closed captioning this would be only the ASCII character string representing the CC content). Full Anc Data Packet: Sends the entire packet, including payload, DID, SDID, and any handling or marking characters. 	
Extraction Mode Control Extraction Mode Payload Only Payload Only Full Anc Data Packet		
Extraction Flow Control Extraction Flow Control No Flow Control No Flow Control XON/XOFF Hold Break	 Allows communication between card transmit and receiving destinations to regulate data receive as follows: No Flow Control: Data is transmitted without buffering or checking to see if data is being transmitted faster than it can be received. XON / XOFF: The card UART Rx will acknowledge from the receiving system whether it can or cannot accept data at current bit rate. Hold Break: Card, if receiving notification from the receiving system that it is close to not being able to accept new data, tells the card to hold. Card releases this hold when the receiving system removes the break command, indicating destination is now ready again to accept new data. 	
• Bit Rate/ Parity Gen Control Bit Rate 115200 V Parity Disabled V Disabled Odd Even	 For both Rx and Tx, sets UART for bit rate and parity as follows: Bit Rate: Sets Tx/Rx bit rate from 1 of 5 speeds ranging from 9600 to 230400 Baud. Parity: Sets card Rx to expect odd or even parity from incoming data, and sets card Tx to generate a parity bit to satisfy selected parity. Where parity is set, incoming data not conforming to parity selection is rejected. 	







Presets		(continued)
Preset Save/Load Content	ontrols	
Load/Delete Existing Preset		• Select Preset: drop-down allows a preset saved above to be selected to be loaded or deleted (in this example, custom preset "IRD Rcv122").
Select Preset:	IRD Rcv122	 Load Selected Preset button allows loading (engaging) the selected preset. When this button is pressed, the changes called out in the preset are immediately applied.
Update Selected Preset	Confirm	Note: Controls below that modify or delete presets are grayed-out (inactive) when Save/Delete button is in Protected mode. To use these controls, make certain Protected is not enabled.
Rename Selected Preset	Confirm	• Update - Rename - Delete Selected Preset buttons allow selected preset to be updated (take in current custom settings), be renamed, or be deleted. A Confirm prompt appears in all cases.
Delete Selected Preset Delete All Presets	Confirm	• Delete All Presets button allows a delete of all stored presets. (This is useful if all presets are to be replaced by a new Presets bin file.)
Load Factory Defaults	Confirm	 Load Factory Defaults button allows loading (recalling) the factory default preset. When this button is pressed, the changes called out in the preset are immediately applied.
Download Presets	StoredPresets.bin Save	Note: Load Factory Defaults functions with no masking. The Preset Layer Select controls have no effect on this control and will reset all layers to factory default.
		• Download Presets saving the preset files to a folder on the connected computer.
Upload Options		Upload Options checkboxes function as follows:
Delete All Presets on Upload		 Delete All Presets on Upload clears all stored presets, and then replaces or adds any presets as defined in the uploaded Presets .bin file. (This is useful to establish a "clean slate" and
Delete Duplicate Presets on Upload		 remove any presets that may no longer be desired.) Delete Duplicate Presets on Upload clears stored presets
Load Saved Settings on Preset Upload		bearing the same name as currently stored presets. (This avoids dual iterations of same preset name (plain and duplicate using "*" marking), and avoids possibility of "stale" presets no longer desired from appearing as a choice.)
		 Load Saved Settings on Preset Upload makes certain any local card settings card state is retained following a preset upload. When checked, a preset within the upload is invoked only when specifically selected and invoked.
		Note: Any combination of checkboxes can be checked or unchecked (enabled or disabled) as desired.



Presets Load/Save Event Triggers Email Alert	(continued)		
Download (save) card presets to a network computer by clicking Download Presets – Save at the bottom of the Presets page.	Upload (open) card presets from a network computer by clicking Upload at the bottom of DashBoard.		
Browse to a desired save location (in this example, <i>My</i> <i>Documents</i> Cobat <i>Presets</i>). The file can then be renamed if desired (<i>RCVR21 Presets</i> in this example) before committing the save.	Browse to the location where the file was saved on the computer or drive (in this example, My Documents \Cobalt Presets). Image: Colored the desired file and click Open to load the file to the card. Select the desired file and click Open to load the file to the card. Image: Colored the files (Colored Presets bin the card). Note: • Preset transfer between card download and file upload is on a group basis (i.e., individual presets cannot be downloaded or uploaded separately). • After uploading a preset sfile, engagement of a desired preset is only assured by selecting and loading a desired preset as described on the previous page.		
GPO Setup	Provides controls for setting up the two GPO's power-up states as well as forced manual or event action triggered.		
Note: This tab has identical independent controls	for GPO 1 and 2. Therefore, only the GPO 1 controls are described here.		
GPO1 Current State Closed GPO1 Power-on State Open Closed	 Current State indicates GPO status regardless of any pre-setup. Power-on State allows the power-up GPO state to be set (initialized) upon power-up 		
GPO1 Control Mode Follow Event Actions Follow Event Actions Force Open Force Closed	 Control Mode allows GPO manual asserted open or closed states, or hands over control to Event Action triggering. 		

Event Trig	gers Email Alerts	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.
La beneficial de la construcción	vent based preset loading is not passive rocessing changes if not properly used. oading button is set to Disabled . ecause event based preset loading can ested within a called preset (event-base ettings are persistent across power cycle	e and can result in very significant and unexpected card control and signal If event based presets are not to be used, make certain the Event Based apply card control changes by invoking presets, loading conditions cannot be id loading settings performed here cannot be saved to presets, although the es).
Event trigger event(s). For on various ar • The Event • Go-to Even	s allow a variety of event screening crite each screened criteria, categories can reas of concern. based loading button serves as a mas t Actions can be user-defined presets,	ria, and in turn provide an Event Action "go to" in response to the detected be set as "Don't Care" or set to specific criteria to broaden or concentrate ter enable/disable for the function. "canned" (hard-coded) selections (such as GPO triggers or routing
 changes), o Each Event Up to 32 se Event 1 thr 	r automated E-mail alert to a responder : (Event 1 thru Event 32) can be set to s parate events can be defined.	nt (see Email Alerts (p. 3-64) for setting up e-mail alerts). screen for any or several Definer criteria as shown in the example below.
event scree and last acti does not ma	ining is enabled, lower-priority events are ion taken as well as last item logged in th ask detection of higher-priority event(s).	e serviced first, with the highest-priority event being the final event serviced ne Event History (see below). This helps ensure that a lower-priority event
engaged. • Some colur Quality colu	nns in the DashBoard Event Setup table mn appears only with option +QC). Event Definers Each event can be uniquely so Care, all defined conditions w	e are present only when certain options are installed (for example, Video et up for any of the condition types in these columns. Unless set to Don't vill need to be true in order for the Event to be considered active
	Obstant CDI	164-2 Auglie Long Europe Mile Data Ulars Cadas Europe Addisor
Front 1	Status Acquired Video Format GPI	Video Quality Audio Events ANC Data User States Event Action:
	Dont Care Dont Care	Input A Event Engaged Don't Care Don't Care Don't Care Go to B
Event 2 Com	dition Not Met Don't Care Don't Care	Input A Event Disengaged 💙 Don't Care V Don't Care V Don't Care V normal path A V
:		
Event 32 🔴 Con	dition Not Met Don't Care 🗸 Don't Care	Dont Care V Dont Care V Dont Care V no-cc-msg V
Note: Event is not p where	criteria settings in any row comprise an propagated unless all specified criteria a each criteria is screened in its own Eve	AND function. Where multiple criteria are selected, a true (trigger) condition are true. To independently screen for multiple criteria, rows should be set up ent row. Examples of this are shown on the following pages.
Event History	Time Event Number 19:22:39 02/05/15 2 0 19:22:39 02/05/15 4 0 19:22:17 02/05/15 2 0 19:22:17 02/05/15 4 0	Event ActionThe Event History log shows any triggered events in groups of five most recent events (newest at the top).BPO 2 CloseIn the example here, log shows Event 2 as the most recent event, and its user-selected action of GPO 1 Close.BPO 2 ClosePressing the Force Event Refresh button updates the list.
Card Time	19:25:43 02/05/15	
	Force Event Refresh	

Event Setup Event Triggers Email A	lerts		(continued)					
In the example here for Event 1, status can be used here (Video Q Action selector, go-to action of " g an alternate input source).	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).					d, this Event to use		
Conversely, to go back to the orig Disengaged" and in turn invoke a " normal path A ").	ginal source, an even an event action return	nt co ning	ould be set up with routing to the origin	Vide nal v	o Quality here looking fo ideo source (in this exai	or "Ir mple	nput A Event e, user preset	:
Video Quality Events	Z							
	Video Quality	_	Audio Events	_	ANC Data		Event Action:	
Event Type Black or Frozen 🗸	Input A Event Engaged	~	Don't Care	~	Don't Care	~	go to B	~
	Input A Event Disengaged	~	Don't Care	~	Don't Care	~	normal path A	~
Input A Input B		1		1	1	(1	
separate Event rows for Video Q independently detected and acte different actions can be taken as In this example, frozen video call to burn a "no CC" message on th when the event ceases (in this ex	uality and ANC Data d upon with user acti selected). s a preset using an ir e raster. Both Events kample, a preset "nor	(clo ons npu s 1 a ma	sed-captioning abs s tailored to the ever t video routing chan and 3 have correspo I path A").	ienc nt (w ige, i ondi	 e) screening allows thes then either of the conditi while loss of closed cap ng go-to actions to resur- 	tioni me r	are detected ng calls a pre normal operat	e , eset tion
Status	Video Quality		Audio Events	_	ANC Data		Event Action:	_
Event 1 Ulast Active Event	Input A Event Engaged	~	Don't Care	~	Don't Care	~	go to B	~
Event 2 Condition Not Met	Input A Event Disengaged	~	Don't Care	~	Don't Care	~	normal path A	~
Event 3 Condition Met	Don't Care	~	Don't Care	~	Closed Caption Absence Event	~	no-cc-msg	~
Event 4 Condition Not Met	Don't Care	~	Don't Care	~	Closed Caption Presence Event	~	normal path A	\sim
Note: • Screened conditions are triggering event in order • If a desired user preset of at the bottom of the page	 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 with the terms of the preset to be detected by the terms of the preset does not appear in the Event Action drop-down, press the DashBoard Refresh button 							
 Loss of true conditions of defined and then occur t 	loes not disengage to transition from on	an ie e	event-based trigge	ering	g. A new set of true con another.	nditi	ons must be	1
 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 sc higher priority than lesse absence). Also, this prio change (such as input vi 	reening is set up, th er events (as shown ritization helps ensu ideo source change	ne e i in ure) is	event you consider the example above that all desired ev effected.	to b e wh ents	be the highest priority s nere Video Quality scre are screened for befo	shou eeni ore a	Ild be set as ng trumps C a significant	с





Table 3-2	9922-FS	Function	Menu L	.ist —	continued

Event S	Setup tup En	Provides three general-purpose timers that can be triggered to start, pause, reset, or stop upon event actions. The state of each timer, in turn, can also be used to invoke other actions.			
Event Timers Event Timer 1 Current Value 12.3 seconds (Running) Reset Value (seconds) 15.0 ° Pause Timer Reset/Cancel Timer Start Timer					
in the example he the logo, along wi	re, Event Timer 1 is used to set a lo th a time started at that time. Upon	ogo insertion disable after a specific amount of elapsed time. A GPI inserts the timer timeout, a separate action sets logo insertion to Disabled.			
Event Setup	GPI E	Event Timers Event Action:			
Event 1 GP	I1 Open->Closed ∨ Don't	Care Start Timer 1			
Event 2 GP	1 Open->Closed 💙 Don't	Care V Logo Enable V			
Event 3 Dor	n't Care 💙 Timer	1 Timeout 💙 Logo Disable 💙			
Event S Event Triggers	Event Setup Provides setup for automated Email alerts when an event has occurred. Event Triggers Email Alerts				
As an Event Actio shown in the exan	n choice on the Events Triggers su nple below.	b-tab, an Email alert can be sent as a response. Set up email fields as			
Note: Frame hosting the card must be accessible to email recipient's network. It is recommended to set up and generate a test event to test the email send.					
Last Event:	Frozen video detected	When fields are filled-in to specify recipient and sender, and email alert is selected for Event Action on Event Triggers			
То:	joe.doe@xyzmedia.com	sub-tab page, recipeient receives an email alert upon event,			
From:	9902slot8frame1A21@xyzmedia.com	video detected").			
SMTP User:	frame1A21				
SMTP Password:	•••••				
SMTP Server:	smtp.gmail.com				
SMTP Port:	25	~			

Admin System Networking	Provides a global card operating status and allows a log download for factory engineering support. Also provides controls for selecting and loading card firmware upgrade files. Networking controls provide dedicated card networking setup in conjunction with rear module Ethernet port.
Log Status and Download Controls	Log Status indicates overall card internal operating status.
Log Status Card OK Download Log File 9902-DC-4K.tar.gz Save	 Download Log File allows a card operational log file to be saved to a host computer. This log file can be useful in case of a card error or in the case of an operational error or condition. The file can be submitted to Cobalt engineering for further analysis.
Thermal Shutdown Enable	Thermal Shutdown enable/disable allows the built-in thermal failover to be defeated. (Thermal shutdown is enabled by default).
	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.
Card DashBoard Name Control	Allows card name In DashBoard to be changed as desired. Click return to engage change.
Display Name	 Append to Product Name appends (or adds to) existing OEM name (for example, "9922-FS Processing 1A").
Display Name Mode Append to Product Name	 Replace Product Name completely replaces the OEM name OEM name (for example, "Processing 1A").
Append to Product Name Replace Product Name	Note: DashBoard instance(s) may have to be refreshed before name change appears.
• Parameter Blast Parameter Blast	When enabled, Parameter Blast can reduce the time it takes for the card to appear and populate in DashBoard (this is especially relevant where high-latency connections are present). This is facilitated by reducing some handshakes on initial DashBoard setup where control settings are static (not being manipulated) while the card is first appearing.
	Note: The frame network card is the arbiter of all frame/card communications and in some cases may not accept full extent of parameter blast under some conditions.

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

Admin System Networking	(continued)	
• Firmware Upgrade Controls	Firmware upgrade contri- multiple versions can be invoke an upgrade to a s on the next card reboot controlled at a schedule	ols allow a selected firmware version (where uploaded to the card's internal memory) to selected version either instantly, or set to install (thereby allowing card upgrade downtime to be d point in time).
Note: The page/tab here allows managing multiple site can always be directly uploaded to the computer and uploading to the card can be	e firmware versions saved o card without using this pag found at the Support>Firn	on the card. New upgrade firmware from our web e. Instructions for firmware downloading to your nware Downloads link at www.cobaltdigital.com.
 Access a firmware upgrade file from a network con bottom of DashBoard. 	nputer by clicking Upload a	at the Refresh Upload Reboot
 Browse to the location of the firmware upgrade file Documents\v1.0.0019.bin). Select the desired file and click Open to upload the 	(in this example, <i>My</i>	Open Look jr. My Documents Control of the series of the
 Immediate firmware upload. The card default setti Reboot After Upgrade checked allow a selected fir immediately uploaded as follows: Click Firmware To Load and select the desired up this example, "v1.0.0019"). Click Load Selected Firmware. The card now reb firmware is loaded. 	ing of Automatically mware version to be grade file to be loaded (in oots and the selected	Automatically Reboot After Upgrade Firmware To Load V0.9.0019 V0.9.0010 V0.9.0018 V0.9.0018 V1.0.0000 V1.0.0001 (Currently installed)
 Deferred firmware upload. With Automatically Reunchecked, firmware upgrade loading is held off unt rebooted. This allows scheduling a firmware upgrad when it is convenient to experience to downtime (up 60 seconds). Click Firmware To Load and select the desired up this example, "v1.0.0019"). Note now how the disple Next Reboot". 	boot After Upgrade il the card is manually e downtime event until loads typically take about grade file to be loaded (in lay shows "Installs on	Automatically Reboot After Upgrade Firmware To Load VI.0.0010 VI.0.0010 VI.0.0018 VI.0.0019 (Installs On Next Reboot) VI.0.0019 (Installs On Next Reboot) VI.0.0019 (Installs On Next Reboot) VI.0.0000 VI.0.0001 (Currently Installed)
 2. Click Load Selected Firmware. The card holds dir card is manually rebooted (by pressing the Reboot 	ections to proceed with the thet to button).	e upload, and performs the upload only when the
 To cancel a deferred upload, press Cancel Pendin immediate upload/upgrade. 	Ig Upgrade . The card reve	erts to the default settings that allow an

3-66

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

Admin System Networking	(continued)
Card Check and Restore Utilities Memory Test FPGA Memory Test Test	Memory Test allows all cells of the card FPGA memory to be tested. This control should only be activated under direction of product support. Exercising the memory test is not part of normal card maintenance.
Memory Test Status Running Memory Test 8.99% Memory Test Status Memory test completed successfully, please reboot the card Restore From SD Card Confirm Please contact support	Restore from SD Card allows card rendered inoperable to be restored using an SD memory card fitted to the card internal SD slot. Product support must be contacted prior to performing this operation. Use of any SD card not supplied by support can corrupt the card.
Admin System Networking • Card IP Physical Port Select Control Network Interface Frame Frame Rear I/O	The Networking sub-tab provides a dedicated Ethernet connection to card control and monitoring via a rear module Ethernet port. (This IP interface is entirely independent and separate from the card's DashBoard frame-based remote control/monitoring interface.) (Dedicated card control using IP has not been fully implemented at this release. Some functions may be reserved.) Allows card dedicated IP interface (as set below) to use frame communications or dedicated rear I/O module Ethernet RJ-45 port. Note: • Frame net connection allows cards with per-card Ethernet connection to connect with network via a shared frame Ethernet port instead of per-card dedicated Ethernet connectors on the card's rear module. Frame net connection is available only on
	 certain frame models. Card slot must be fitted with a rear I/O module equipped with an Ethernet connector in order to use Rear I/O selection.
• Card IP Setup Controls Addressing Mode DHCP V Static IP Address 192.168.1.106 Static Subnet Mask 255.255.255.0 Static Default Gateway 192.168.1.1 Static DNS 0.0.0	 Provides controls for setting up card dedicated IP interface. Addressing Mode selsects either DHCP or static. Where Static is selected, standard IP fields allow entry of Address, Subnet Mask, and Default Gateway.
Card SNMP MIB Download Download SNMP MIB Files MIB-FILES.tar.gz Save	Where supported, allows card SNMP MIB files to be downloaded and saved using user-configured name.

Admin System Networking	(continued)
• NTP Clock Setup Clock Setup NTP IP (use 0.0.0 for pool NTP) 0.0.0 Local Timezone (NTP Only) US-Central NTP Status Synchronized with NTP Use Network Interface for NTP Use Frame Network Card for NTP	 Allows device NTP clock IP source and localization. This is the clock/time device will use for logs and other recorded actions. NTP IP sets the IP address where NTP is to be obtained. Local Timezone sets the recorded time to the localized time. NTP Status shows if time is synced with NTP or if an error exists. Use Network Interface and User Frame Network Card checkboxes allows selecting the network source that will provide NTP time.
User Log	Automatically maintains a log of user actions and input lock status.
User Log shows input lock and other user conditions (recent event at top of list).	Time Type Event 22:40:36 12/02/15 Info SDI Input sdi_in_c Locked to 720p 59.94 22:40:34 12/02/15 Info SDI Input sdi_in_d Locked to 1080i 59.94 21:17:36 12/02/15 Info SDI Input sdi_in_d Locked to 1080i 59.94
Clear User Log clears all entries. Download Log File opens a browser allowing the log saved on the host machine.	y file to be Clear User Log Confirm Download Log File 9922-FS.tar.gz Save

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

Alar	rms	Provides co for and prop video audio	ontrols for setting up bagate input program	controls which screen n video alarms for defect conditions
		Conditions	o, and anomaly data	
		DashBoard	tree-view frame alar	ms. downloadable .txt
		files and/or	Syslog IP-based ala	irms.
The Alarms tab has se alarms for video, audio	everal sub-tabs which allov o, and ancillary data defect	w setting up detection and t conditions (as described	alarm severity/propagation and shown below)	on for input program video
Video Alarm Setur	o Audio Aları	m Setup	Ancillary Data Alarm Setup	Logging
Video		Audio	Ancillary	/ Data
Video Alarm Setup	for frozen and/or bla	sub-tab allows setting up ick video detection on the	card's four SDI inputs (in	nd disengagement holdoff dependent for each SDI
		oxample cottings shown	here engagement and dis	sengagement of alarm
	input). In the default	000 msec after event det	act	
	input). In the default generation occurs 30	000 msec after event dete	ect.	st initial settings. If holdoff
	input). In the default generation occurs 30 Factory default holdc periods are too brief,	off settings shown here ar , nuisance alarms may be	e recommended for at lea	st initial settings. If holdoff ons to and from programs
	Input). In the default generation occurs 30 Factory default holdo periods are too brief, and interstitials.	off settings shown here ar , nuisance alarms may be	e recommended for at lea	st initial settings. If holdoff ons to and from programs
	input). In the default generation occurs 30 Factory default holdo periods are too brief, and interstitials.	off settings shown here ar , nuisance alarms may be Frozen Video Detect	e recommended for at lea generated during transition tion Setup	st initial settings. If holdoff ons to and from programs
Engagemer	input). In the default generation occurs 30 Factory default holdor periods are too brief, and interstitials. nt Holdoff (minutes)	Frozen Video Detectement Holdoff (ms)	e recommended for at lea generated during transition tion Setup pagement Holdoff (minutes)	st initial settings. If holdoff ons to and from programs Disengagement Holdoff (ms)
Engagemen SDI Input A	input). In the default generation occurs 3(Factory default holdo periods are too brief, and interstitials.	Frozen Video Detect ament Holdoff (ms) Disence 3000	tion Setup gagement Holdoff (minutes)	st initial settings. If holdoff ons to and from programs Disengagement Holdoff (ms) 3000
Engagemer SDI Input A SDI Input B	input). In the default generation occurs 30 Factory default holdo periods are too brief, and interstitials.	Frozen Video Detect anno Diserti de la construction de la construction Frozen Video Detect ement Holdoff (ms) Disert 3000 Construction de la construction 3000	tion Setup generated during transition generated during transition tion Setup gagement Holdoff (minutes)	Disengagement Holdoff (ms)
Engagemen SDI Input A SDI Input B SDI Input C	input). In the default generation occurs 3(Factory default holdo periods are too brief, and interstitials. nt Holdoff (minutes) Engage 0 0 0 0	Frozen Video Detectement Holdoff (ms) Disense 3000 \$ 300 \$ 3000 \$	tion Setup pagement Holdoff (minutes) 0 0 0	bisengagement Holdoff (ms)
Engagemen SDI Input A SDI Input B SDI Input C SDI Input D	input). In the default generation occurs 3(Factory default holdo periods are too brief, and interstitials. nt Holdoff (minutes) Engage 0 0 0 0 0 0 0 0 0	Example settings shown 000 msec after event deter off settings shown here ar nuisance alarms may be Frozen Video Detect ement Holdoff (ms) Disens 3000 3000 3000 3000	tion Setup pagement Holdoff (minutes) 0 0 0	Disengagement Holdoff (ms) 3000 3000 3000 3000 3000
Engagemen SDI Input A SDI Input B SDI Input C SDI Input D	input). In the default generation occurs 30 Factory default holdo periods are too brief, and interstitials.	Frozen Video Detec ement Holdoff (ms) Diseng 3000 000 000 000 000 000 000 000 000 00	tion Setup agement Holdoff (minutes) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	bisengagement Holdoff (ms) 3000 3000 3000 3000 3000 3000 3000
Engagemen SDI Input A SDI Input B SDI Input C SDI Input D Engagemen SDI Input A	input). In the default generation occurs 3(Factory default holdo periods are too brief, and interstitials. nt Holdoff (minutes) Engage 0 0 0 0 0 0 1 Holdoff (minutes) Engage	Example settings shown 000 msec after event deter off settings shown here ar nuisance alarms may be Frozen Video Detect ement Holdoff (ms) 3000 3000 3000 Black Video Detect ement Holdoff (ms) Disend 3000 3000 3000	tion Setup agement Holdoff (minutes) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Disengagement Holdoff (ms) 3000 3000 3000 3000 3000 3000 3000 3000 3000
Engageme SDI Input A SDI Input B SDI Input C SDI Input D Engagemen SDI Input A	input). In the default generation occurs 30 Pactory default holdo periods are too brief, and interstitials. nt Holdoff (minutes) Engage	Frozen Video Detect ement Holdoff (ms) 3000 © Black Video Detect Black Video Detect Black Video Detect Black Video Detect Black Video Detect Black Video Detect	tion Setup pagement Holdoff (minutes) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Disengagement Holdoff (ms) 3000 3000 3000 3000 Disengagement Holdoff (ms) 3000 30
Engagemer SDI Input A SDI Input B SDI Input C SDI Input D Engagemer SDI Input A SDI Input A SDI Input B	input). In the default generation occurs 3(Factory default holdo periods are too brief, and interstitials. Int Holdoff (minutes) Engage 0 0 0 0 0 0 1 0 0 1 Engage 0 0 0 0 0 0 0 0 0 0 0	Example settings shown 000 msec after event deter off settings shown here ar nuisance alarms may be Frozen Video Detect ement Holdoff (ms) 3000 3000 3000 Black Video Detect ement Holdoff (ms) Diseng 3000 Black Video Detect ement Holdoff (ms) Diseng 3000 3000	tion Setup pagement Holdoff (minutes) 0 0 0 0 0 0	Disengagement Holdoff (ms) 3000 3000 Disengagement Holdoff (ms) 3000 3000 3000 Disengagement Holdoff (ms) 3000 3000 2000 30
Engageme SDI Input A SDI Input B SDI Input C SDI Input D Engagemen SDI Input A SDI Input A SDI Input B SDI Input C	input). In the default generation occurs 30 Factory default holdo periods are too brief, and interstitials. nt Holdoff (minutes) Engage 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Example settings shown 000 msec after event deter off settings shown here ar nuisance alarms may be Frozen Video Detect ement Holdoff (ms) 3000 3000 3000 Black Video Detect ement Holdoff (ms) Diseng 3000 3000 3000 3000 3000 3000 3000 3000 3000	tion Setup pagement Holdoff (minutes) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Disengagement Holdoff (ms) 3000 Disengagement Holdoff (ms) 3000 3000 Disengagement Holdoff (ms) 3000 3000 2000 30

-60	Ş
0	ŝ
5000	\sim
0	Ŷ
0	Ŷ
	-60 0 5000 0 0

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.



Alarms	(continued)
Ancillary Data Alarm Setup disengagement H Note: • Video scr • Ancillary closed ca closed ca	Alarm Setup sub-tab allows setting up screening engagement and holdoff for absence of closed captioning packets. reened is the card SDI that is selected for the program video/audio path. data condition detection is functional only for CEA608/708 packet-based aptioning. This feature does not function for SD line 21 "waveform-based" aptioning.
Closed Captioning Presence Trigger Holdoff (seconds) Closed Captioning Absence Trigger Holdoff (seconds)	0 10 20 30 0 10 20 30 0 10 20 30
Alarm Propagation Tabs Video, Audio, and Ancillary Data sub-tabs set alarm • Logging of alarms and conditions • Propagation of alarms to the card general Card State • Ignore alarm, or set severity as Warning (yellow "LE Each of these sub-tabs is described below.	propagation attributes, including: e/DashBoard frame-based tree-view pane D") or Error (red "LED")
Video Sub-tab independently shows triggered for any of the SDI IN A thru 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 • Log (for all four SDI inputs any LOS (loss of signal), frozen, or black conditions a SDI IN D inputs. (when checked) propagates the alarm to a log file. n (when checked) propagates the alarm to the Card State and e-level DashBoard tree-view "LEDs". rity selects from Ignore/OK (green "LED"), Warning (yellow "LED"), and (red "LED") alarm escalation states.
determined by user-set Severity level. • Dura	tion and Last Occurence shows details for each triggered alarm event.
Condition Status Log A Loss Of Signal SDI Input A	Alarm Severity Duration Last Occurrence Frror O0h 00m 23s 07:28:13
 Frozen Video SDI Input A Black Video SDI Input A 	Warning 00h 00m 16s 07:23:57 Warning Never Triggered Never Triggered
Loss Of Reference	Error 01h 52m 00s 03:37:57

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Troubleshooting

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 DashBoard[™] 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.

Indicator Icon or Display	Error Description
## MFC-8320-N SN: 00108053 Slot 0: MFC-8320-N Slot 6: 9922-F5	Red indicator icon in Card Access/Navigation Tree pane shows card with Error condition (in this example, the Card Access/Navigation Tree pane shows a general error issued by the 9922-FS card in slot 6).
9922-FS Card state: • No connection to device. Connection: • OFFLINE	Specific errors are displayed in the Card Info pane (in this example "No connection to device" indicating 9922-FS card is not connecting to frame/LAN).
Frame Delay	If the 9922-FS card is not connecting to the frame or LAN, all controls are grayed-out (as shown in the example here).
Slot 6: 9922-F5	Gray indicator icon in Card Access/Navigation Tree pane shows card(s) are not being seen by DashBoard™ due to lack of connection to frame LAN (in this example, both a 9922-FS card in slot 6 and the MFC-8320-N Network Controller Card for its frame in slot 0 are not being seen).
DashBoard File View Iree View Window Help Basic Tree View Basic Tree View Slot 0: MFC-8320-N Slot 0: MFC-8320-N Slot 6: 9922-F5	Yellow indicator icon in Card Access/Navigation Tree pane shows card with Alert condition (in this example, the Card Access/Navigation Tree pane shows a general alert issued by the MFC-8320-N Network Controller Card).
MFC-8330-N SN: 00108053 - MFC-8320-N Card state: O Fan Door Open Connection: ONLINE	Clicking the card slot position in the Card Access/Navigation Tree (in this example Network Controller Card "Slot 0: MFC-8320-N") opens the Card Info pane for the selected card. In this example, a "Fan Door Open" specific error is displayed.
SDI Input C 1080i_5994, SDI Input D 720p_5994, Reference Utologicad	Yellow indicator icon in 9922-FS Card Info pane shows error alert, along with cause for alert (in this example, the 9922-FS is not receiving an enabled framesync source).

Figure 3-8 DashBoard[™] Status Indicator Icons and Displays

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



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

Basic Troubleshooting Checks

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

ltem	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 accessive power being consumed (see Technical)
	 In 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.

Table 3-3 Basic Troubleshooting Checks

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 O Unlocked SDI Input B O Unlocked Card edge Input LED corresponding to input is not illuminated 	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-r-S	 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.

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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.

Table 3-4	Troubleshooting Processing Errors by Symptom — continued
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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