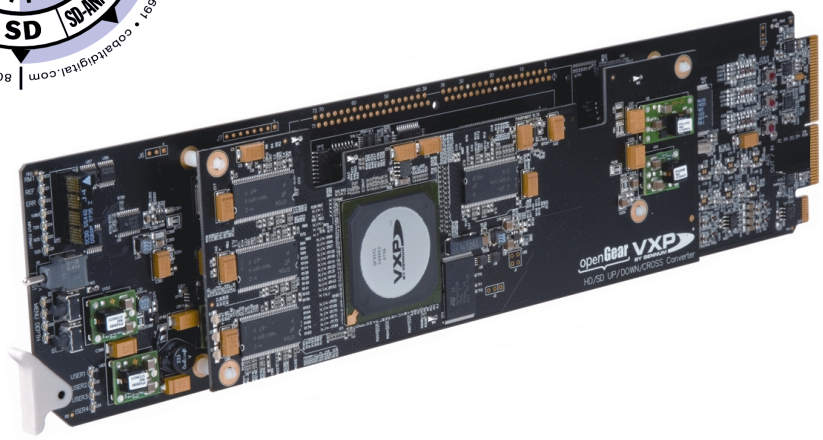
9062



Up/Down/Cross Format Converter

with HD/SD-SDI Input, Embedded Audio Support and Frame Sync

Product Manual

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9062-OM (V3.1)

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Congratulations on choosing the Cobalt® 9062 Up/Down/Cross Format Converter with HD/SD-SDI Input, Embedded Audio Support and Frame Sync. The 9062 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 9062, please contact us at the contact information on the front cover.

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Applicable for Software Version:	3.0 / 2634

Table of Contents

Chapter 1

Introduction

Overview

This manual provides installation and operating instructions for the 9062 Up/Down/Cross Format Converter with HD/SD-SDI Input, Embedded Audio Support and Frame Sync card (also referred to herein as the 9062).

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 9062.
- **Chapter 2, "Installation and Setup"** – Provides instructions for installing the 9062 in a frame, and optionally installing a 9062 Rear I/O Module.
- **Chapter 3, "Operating Instructions"** – Provides overviews of operating controls and instructions for using the 9062.

This chapter contains the following information:

9062 Card Software Versions and this Manual

When applicable, Cobalt Digital Inc. provides for continual COMPASS™ card product enhancements through software updates. As such, functions described in this manual may pertain specifically to cards loaded with a particular software build. Cobalt Digital Inc. releases an updated manual whenever a card's software is updated. Therefore, **if you received your 9062 and this manual at the same time, this issue is not a concern**.

This manual (9062-OM (V3.1)) was specifically written for
Software Version: 3.0 / 2634

If your 9062 was purchased **earlier** than receiving this manual make certain the Software Release Number/Software Build Number of your 9062 matches the Software Release Number/Software Build Number covered by this manual. If necessary, the Software Release Number/Software Build Number of your 9062 can be checked by viewing this information as displayed on the **Info** submenu on the card-edge display, or by checking the **Card Info** menu in DashBoard™. See Checking 9062 Card Information (p. 3-12) in Chapter 3, "Operating Instructions" for more information.

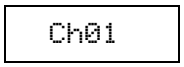
Proceed as follows if your card's software does not match this manual:

Card Software **earlier** than version in manual	Card is not loaded with the latest software. Not all functions described in this manual may be available. If desired, contact Cobalt Digital Inc. to receive the latest Update software for your card. Software is typically sent by e-mail. You can update your card by uploading the new Update software by going to the **Support>Downloads** link at www.cobaltdigital.com. Then, go to the listing for your card and download "COMPASS™ Firmware Update Guide".
Card Software **newer** than version in manual	A new manual is expediently released whenever a card's software is updated **and specifications and/or functionality have changed** as compared to an earlier version (a new manual is not necessarily released if specifications and/or functionality have not changed). A manual earlier than a card's software version may not completely or accurately describe all functions available for your card. If your card shows features not described in this manual, you can check for the latest manual (if applicable) and download it by going to the **Support>Downloads** link at www.cobaltdigital.com.

Manual Conventions

In this manual, display messages and connectors are shown using the exact name shown on the 9062 itself. Examples are provided below.

- Card-edge display messages are shown like this:

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

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

- **9062** refers to the 9062 Up/Down/Cross Format Converter with HD/SD-SDI Input, Embedded Audio Support and Frame Sync card.
- **Frame** refers to the 8310 (or similar) frame that houses the Cobalt® COMPASS™ cards.
- **Device** and/or **Card** refers to a COMPASS™ card.
- **System** and/or **Video System** refers to the mix of interconnected production and terminal equipment in which the 9062 and other COMPASS™ cards operate.

Warnings, Cautions, and Notes

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

Warnings

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

Cautions

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

Notes

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

Labeling Symbol Definitions

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

Safety Summary

Warnings

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

Cautions

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

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

CAUTION **Heat and power distribution requirements within a frame may dictate specific slot placement of cards. Cards with many heat-producing components should be arranged to avoid areas of excess heat build-up, particularly in frames using only convection cooling. The 9062 has a moderate power dissipation (24 W max.). 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 9062 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.**

9062 Functional Description

Figure 1-1 shows a functional block diagram of the 9062. The 9062 format converter also includes embedded audio support and routing and a full video frame synchronizer. The 9062 also handles AFD code detection and processing, timecode insertion, and closed captioning support.

The video source can be either an HD or SD-SDI. The video can be up, down, or cross-converted to a different format, and aspect ratio can be corrected to provide proper output aspect.

Note: Some of the functions described below are available only when using the DashBoard™, or Cobalt® OGCP-9000 or OGCP-9000/CC Control Panels user interfaces. Refer to User Control Interface (p. 1-15) for user interface descriptions.

9062 Input/Output Formats

The 9062 provides the following inputs and outputs:

- **Inputs:**
  - **HD/SD-SDI IN** – dual-rate HD/SD-SDI input
- **Outputs:**
  - **HD/SD-SDI OUT** – four dual-rate HD/SD-SDI buffered video outputs
  - **RCK OUT** – four dual-rate HD/SD-SDI reclocked buffered video outputs

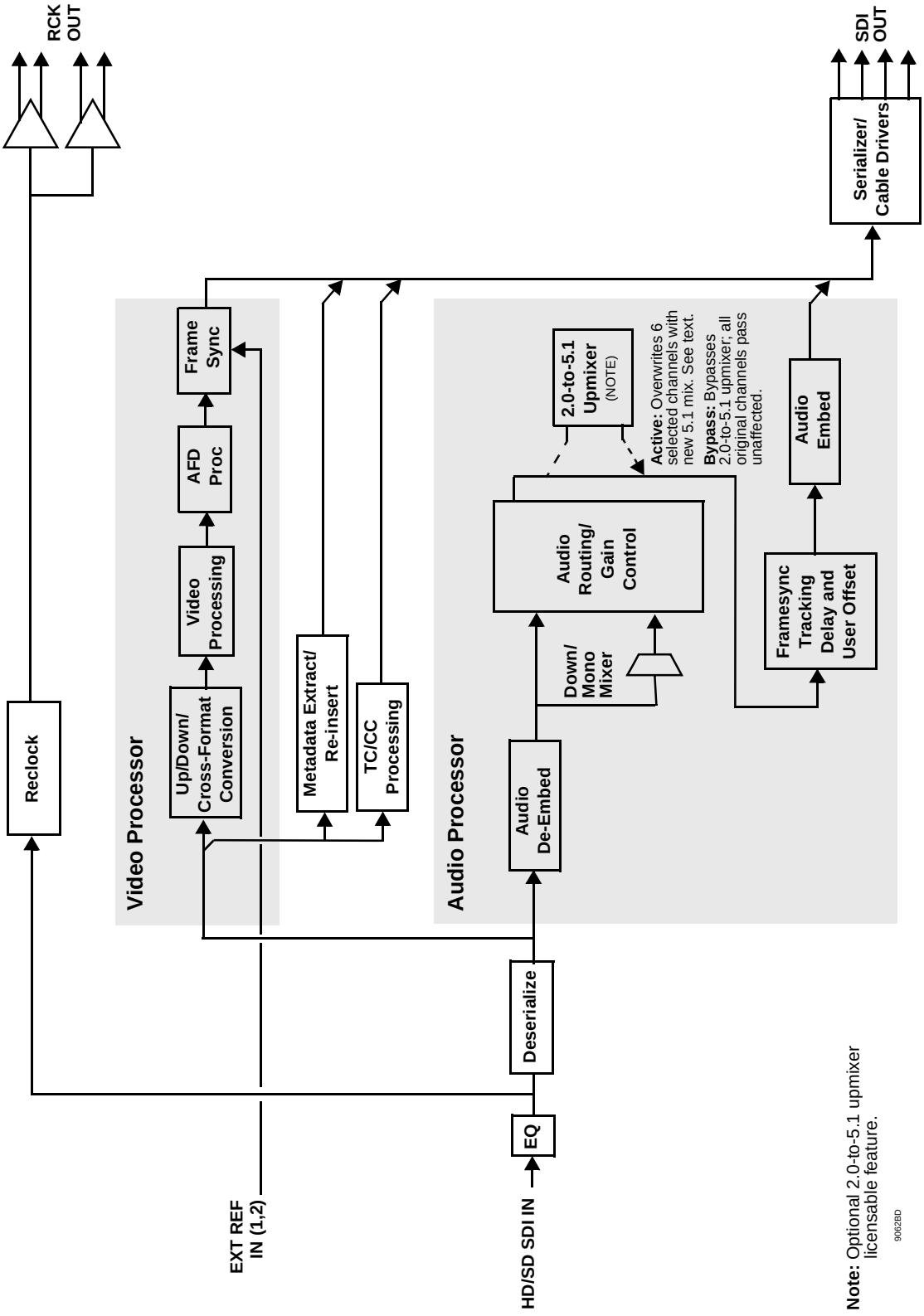


Figure 1-1 9062 Functional Block Diagram

Video Processor Description

The 9062 features a scaler that provides up, down, and cross-conversion using de-interlacing and motion adaptation for high quality up-conversions. The scaler also provides user-adjustable aspect ratio control and zoom control. Separate controls are provided for SD and HD inputs that allow the card to flexibly and independently handle mixed input formats.

The 9062 video subsystem also provides the functions described below.

Video Processor

The 9062 provides full color processing control (luma gain and lift, chroma saturation, and color phase) of the output video.

Frame Sync Function

This function provides for frame sync control using either one of two external **EXT 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.

A video/audio delay offset function allows adding or reducing audio delay from the matching video delay. This function is useful for correcting lip sync problems when video and audio paths in the chain experience differing overall delays. A Reset Framesync function resets the frame sync following any horizontal or vertical offset changes, clearing any buffered audio and video and re-establishing the frame sync. The 9062 re-establishes video/audio sync following framesync changes by applying an offset in small, progressive amounts to provide a seamless, glitch-free retiming. A user-selectable hard resync function allows setting a threshold at which hard resync is applied if audio-video offset exceeds a selectable threshold. Hard resync provides fastest snyc-up suitable for off-air manipulation. Conversely, a threshold setting that avoids hard resync allows glitch-free on-air manipulation.

In the event of input video loss of signal, this function provides for disabling the video, going to a desired color raster, or freezing to the last intact frame (frame having valid SAV and EAV codes).

Scaler Function

The scaler function provides up, down, and cross-conversions between multiple standard SD and HD video formats, multiple frame rates, film frame rates, and cross-conversion between interlaced and progressive formats. Table 1-1 lists the 9062 conversion choices available for various input formats and frame rates.

Table 1-1 Scaler Function Conversions

Input Format	SD (NTSC/ PAL)	720p	720p half-rate	720p (film rates)	1080i	1080p	1080p (film rates)	1080PsF (film rates)
525i 59.94	525i 59.94	720p 59.94	720p 29.97	720p 23.98(4)	1080i 59.94	1080p 29.97	1080p 23.98(4)	1080PsF 23.98(4)
625i 50	625i 50	720p 50	720p 25	X	1080i 50	1080p 25	X	X
720p 60	X	720p 60	720p 30	720p 24(4)	1080i 60	1080p 30	1080p 24(4)	1080PsF 24(4)
720p 59.94	525i 59.94	720p 59.94	720p 29.97	720p 23.98(4)	1080i 59.94	1080p 29.97	1080p 23.98(4)	1080PsF 23.98(4)
720p 50	625i 50	720p 50	720p 25	X	1080i 50	1080p 25	X	X
720p 30	X	720p 60	720p 30	720p 24(5)	1080i 60	1080p 30	1080p 24(5)	1080PsF 24(5)
720p 29.97	525i 59.94	720p 59.94	720p 29.97	720p 23.98(5)	1080i 59.94	1080p 29.97	1080p 23.98(5)	1080PsF 23.98(5)
720p 25	625i 50	720p 50	720p 25	X	1080i 50	1080p 25	X	X
720p 24	X	720p 60	720p 30	720p 24	1080i 60	1080p 30	1080p 24	1080PsF 24
720p 23.98	525i 59.94	720p 59.94	720p 29.97	720p 23.98	1080i 59.94	1080p 29.97	1080p 23.98	1080PsF 23.98
1080i 60	X	720p 60	720p 30	720p 24(4)	1080i 60	1080p 30	1080p 24(4)	1080PsF 24(4)
1080i 59.94	525i 59.94	720p 59.94	720p 29.97	720p 23.98(4)	1080i 59.94	1080p 29.97	1080p 23.98(4)	1080PsF 23.98(4)
1080i 50	625i 50	720p 50	720p 25	X	1080i 50	1080p 25	X	X
1080p 30	X	720p 60	720p 30	720p 24(5)	1080i 60	1080p 30	1080p 24(5)	1080PsF 24(5)
1080p 29.97	525i 59.94	720p 59.94	720p 29.97	720p 23.98(5)	1080i 59.94	1080p 29.97	1080p 23.98(5)	1080PsF 23.98(5)
1080p 25	625i 50	720p 50	720p 25	X	1080i 50	1080p 25	X	X
1080p 24	X	720p 60	720p 30	720p 24	1080i 60	1080p 30	1080p 24	1080PsF 24
1080p 23.98	525i 59.94	720p 59.94	720p 29.97	720p 23.98	1080i 59.94	1080p 29.97	1080p 23.98	1080PsF 23.98
1080PsF 24	X	720p 60	720p 30	720p 24	1080i 60	1080p 30	1080p 24	1080PsF 24
1080PsF 23.98	525i 59.94	720p 59.94	720p 29.97	720p 23.98	1080i 59.94	1080p 29.97	1080p 23.98	1080PsF 23.98

Notes: 1. The drop-down list choice of “Same as Input” is used when no conversion is desired. For clarity, it is not redundantly listed here.

2. “X” denotes conversions not available or invalid conversions.

3. Interlaced formats rates listed are field rates. Progressive format rates listed are frame rates.

4. If the original material does not have a proper 3-2 cadence suitable for conversion to film rates, the conversion reverts to standard de-interlacing. While this video can be converted to film rates, the resulting image motion will lack smoothness. Therefore, make certain interlaced video is appropriately constructed for 3-2 reverse pulldown when converting video to film rates. See 3-2 Pulldown Conversion and Considerations (p. 1-11).

5. Formats using a 30/29.97 Hz progressive frame rate can be converted to a 24/23.98 Hz progressive frame rate, however some image motion irregularity will appear in the converted output.

6. “NTSC” and “PAL” in this manual informally 486i5994 and 575i50 (respectively) SD-SDI video formats.

When output video is set to 720p for either SD or HD video, the 720p output can be converted to 720p half-rate formats as listed in Table 1-1. When output video is set to 1080 film (1080p23.98) for either SD or HD inputs, the 9062 can convert the output to 1080PsF23.98 (segmented frame progressive). Both of these functions can be independently applied to either SD and/or HD video inputs.

The scaler function also provides aspect ratio conversion that provides a choice from several standard aspect ratios. Additionally, user defined and "Follow AFD Settings" conversion can be applied. User defined settings allow custom user-defined H and V aspect ratio control. "Follow AFD Settings" sets the output aspect ratio to track with AFD (Active Format Description) settings embedded in the received video signal.

Timecode Processor

(See Figure 1-2.) This function provides for extraction of timecode data from the input video, and in turn re-insertion of timecode data into the output SDI. In this manner, timecode data can be preserved, even after format conversion. The function can monitor the SDI video input of the card for supported timecode formats, and then select and prioritize among SDI VITC, SDI ATC_VITC, and SDI ATC_LTC timecode sources. 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.

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

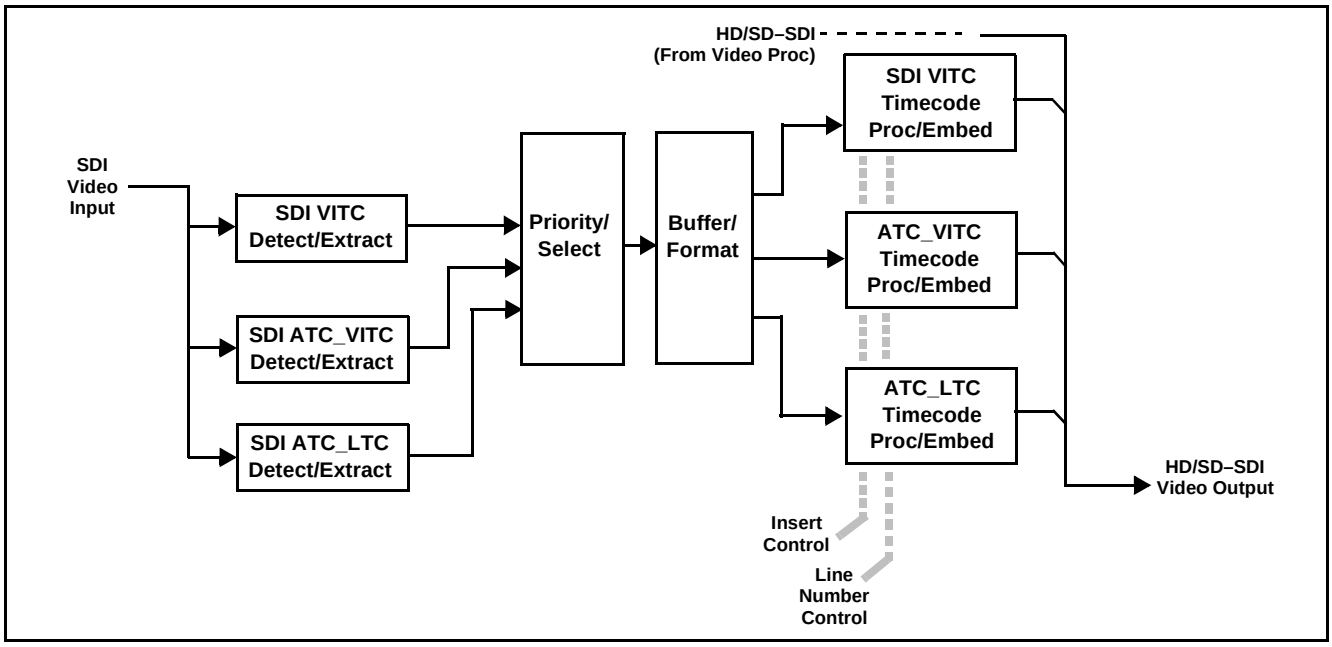


Figure 1-2 Timecode Processor

Closed Captioning Processor

This function provides support for closed captioning setup. The function also allows the selection of the ancillary data line number where the ancillary closed caption data is outputted when the output is HD.

Dolby® Metadata Extractor/Re-inserter

This function extracts and preserves Dolby® metadata from the input SDI, and in turn allows the metadata to be re-inserted in the output SDI. This allows scaling and/or format conversions without losing Dolby® metadata. (The 9062 does not offer Dolby® decoding or encoding, but will pass Dolby® E and/or Dolby® Digital™ encoded signals and metadata intact.) The extracted metadata is buffered and then output on a user-selectable line number on the SDI output.

AFD Processor

This function provides aspect ratio controls and assignment of AFD codes to the SDI output video.

Using this function, aspect ratios in accordance with the standard 4-bit AFD codes can be applied to the output video. Additionally, custom aspect ratios can be independently defined for any of the AFD codes.

Separate, independent AFD controls are provided for both 16:9 coded and 4:3 coded frames.

This function also provides AFD-controlled ARC by checking for any existing AFD code within the received video input. If a code is present, the code is displayed. With the Scaler function **Aspect Ratio Conversion** set to **Follow AFD Settings**, the H and V settings corresponding to the received code are applied to the video by the 9062. The default, standard aspect ratio described by the AFD code can be applied, or custom horizontal/vertical scaling can be applied for a given code.

The function also allows the selection/changing of the AFD code ancillary data line number for the outputted AFD code.

3-2 Pulldown Conversion and Considerations

Figure 1-3 depicts the 3-2 pulldown process used for conversions between progressive film video formats and interlaced video formats. (Although the term "3-2" is used here per convention, it is more accurately described as 2-3 per the diagram here and SMPTE definitions which stipulate that first film frame **A** be represented exclusively by 2 fields from the same frame). As shown in Figure 1-3, the term 2-3 is derived from the pattern, or *cadence*, in which four consecutive film video frames are converted into five consecutive interlaced video frames (i.e., 10 interlaced video fields). Odd and even interlaced fields are denoted in Figure 1-3 by "$_O$" and "$_E$" (for example, "A_O" and "A_E"). Note the considerations described in Figure 1-3 for converting to film rates.

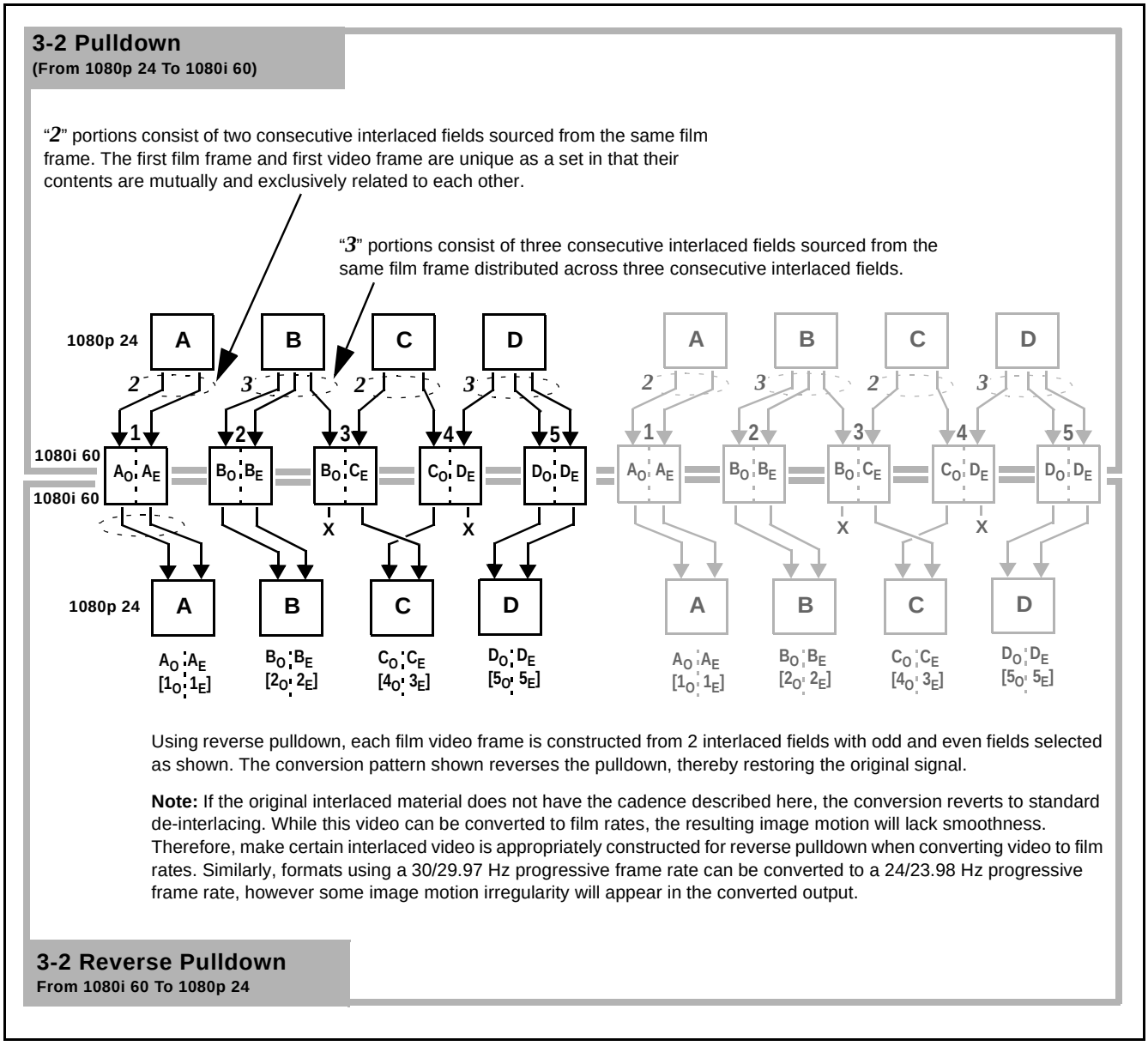


Figure 1-3 3-2 Pulldown and Reverse Pulldown

Audio Processor Description

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

- 16 channels of embedded audio from the SDI video input
- Four independent internal tone generators (described below)
- Internal Down Mix and Mono Mixer outputs (described below)
- Digital silence (mute) setting

The router function provides up to 16 channels of embedded audio on the **SDI OUT** outputs. The router acts as a full audio cross point. Each of the 16 embedded output channels can receive signal from any one of the 16 embedded input channels, four internal tone generators, or several mixer outputs. Unused output channels can be mapped to a “Silence” source. Each output also provides gain adjustment and selectable polarity inversion.

Output audio rates are always 48 kHz locked to output video. (embedded audio must be nominally 48 kHz input; 32, 44.1, 96, and 192 kHz inputs are not compatible with the 9062.) Embedded output audio is always precisely synchronized with the output video.

As set with the default settings, the routing between embedded audio channels is basic 1-for-1 for the 16 embedded audio channels (with embedded Ch 1 being embedded to embedded Ch 1 at the SDI output, and so on). Other sources and/or destinations for each channel are selected using the card edge controls or a remote control system.

Audio Down Mix and Mono Mix Function

(See Figure 1-4.) The Audio Down Mixer function provides for the selection of any five embedded audio sources 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 and processed just like any of the other audio sources described earlier.

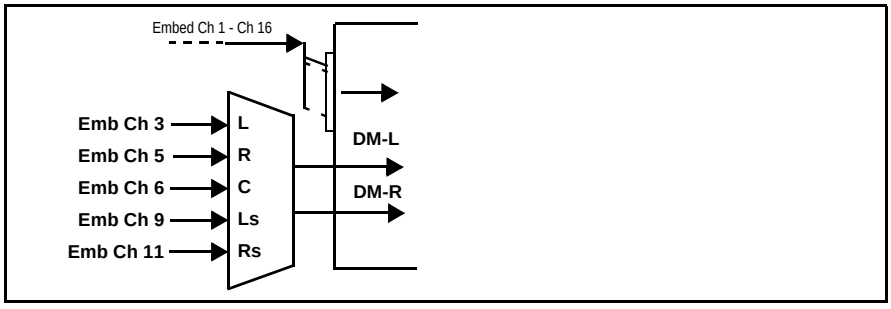


Figure 1-4 Audio Down Mix Functional Block Diagram with Example Sources

The Mono Mixer function (Figure 1-5) generates an additional mono-mixed channel from two selected embedded input channels serving as left and right inputs. The resulting mono mix channel is available as an audio source for any of the 16 destination embedded output channels.

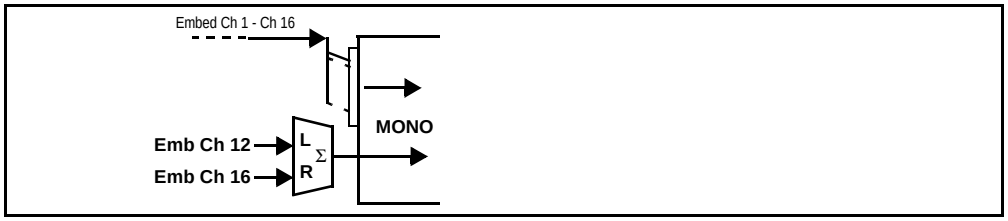


Figure 1-5 Audio Mono Mix Functional Block Diagram with Example Sources

2.0-to-5.1 Upmix Function

Note: Upmix function is an optional licensable feature. This function and its controls appear only when a license key is entered and activated. (This option (identified in Cobalt® price lists as "OPT-SW-UM") can be purchased upon initial order, or field-activated using a key string which is sent to you when this option is purchased.)

The 2.0-to-5.1 upmixer function receives a normal PCM stereo pair from the Audio Routing/Gain Control function and upmixes the pair to provide 5.1 channels (Left (**L**), Right (**R**), Center (**C**), Low Frequency Effects (**LFE**), Left Surround (**Ls**), and Right Surround (**Rs**)). Whenever the upmixer is active, it overwrites the six selected channels with the new 5.1 upmix signals (including replacing the original source stereo **L** and **R** inputs with new **L** and **R** signals).

The 2.0-to-5.1 upmixer can be set to up mix in any of three modes: Always upmix, Bypass upmix, or Auto enable/bypass upmixing. The Auto upmixing mode looks at the signal levels on the selected channels and compares them to a selectable level threshold. It then determines whether or not to generate 5.1 upmixing from the stereo pair as follows:

- If the upmixer detects signal level **below** a selected threshold on **all four** of the selected channels designated as **C**, **LFE**, **Ls**, and **Rs**, this indicates to the upmixer that these channels are not carrying 5.1. In this case, the upmixer overwrites all six selected channels with the new 5.1 content.
- If the upmixer detects signal level **above** a selected threshold on **any** of the four selected channels designated as **C**, **LFE**, **Ls**, and **Rs**, this indicates to the upmixer that the channel(s) are already carrying viable 5.1 content. In this case, the upmixer is bypassed, allowing the original channels to pass unaffected.

The examples in Figure 1-6 show the automatic enable/disable up-mixing function applied to example selected channels **Emb Ch 1** thru **Emb Ch 6**. As shown and described, the processing is contingent upon the signal levels of the channels selected to carry the new 5.1 upmix relative to the selected threshold (in this example, -60 dBFS). Note also that this function is applied **after** the Audio Routing/Gain Control function.

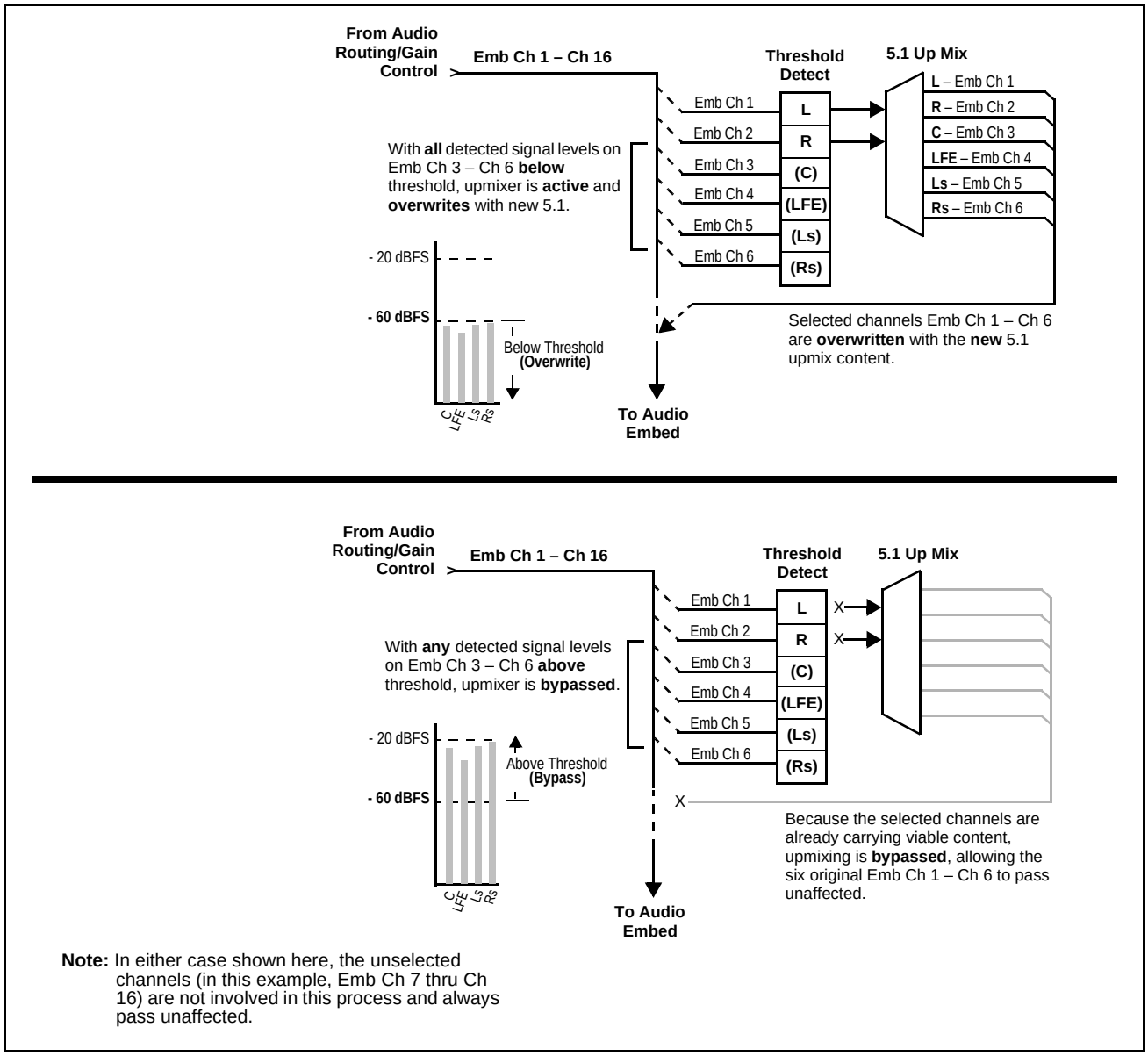


Figure 1-6 Up Mix Auto Enable/Bypass with Example Sources

Tone Generator Function

The 9062 contains four built-in tone generators (Tone Generator 1 thru Tone Generator 4). Each of the four tone generators can be set to a different frequency, and are available as audio sources for the embedded audio outputs. 18 discrete sine wave frequencies are available, ranging from 50 Hz to 16 kHz (default frequency is 1.0 kHz).

User Control Interface

Figure 1-7 shows the user control interface options for the 9062. 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.

- **Built-in Card Edge User Interface** – Using the built-in card edge controls and display, card control settings can be set using a front panel menu which is described in Chapter 3,“Operating Instructions”.

Note: Some of the 9062 functions described in this manual are available only when using the DashBoard™, or Cobalt® OGCP-9000 or OGCP-9000/CC Remote Control Panel user interfaces.

- **DashBoard™ User Interface** – Using DashBoard™, the 9062 and other cards installed in openGear™ frames such as the Cobalt® 8310-C Frame can be controlled from a computer and monitor.

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

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

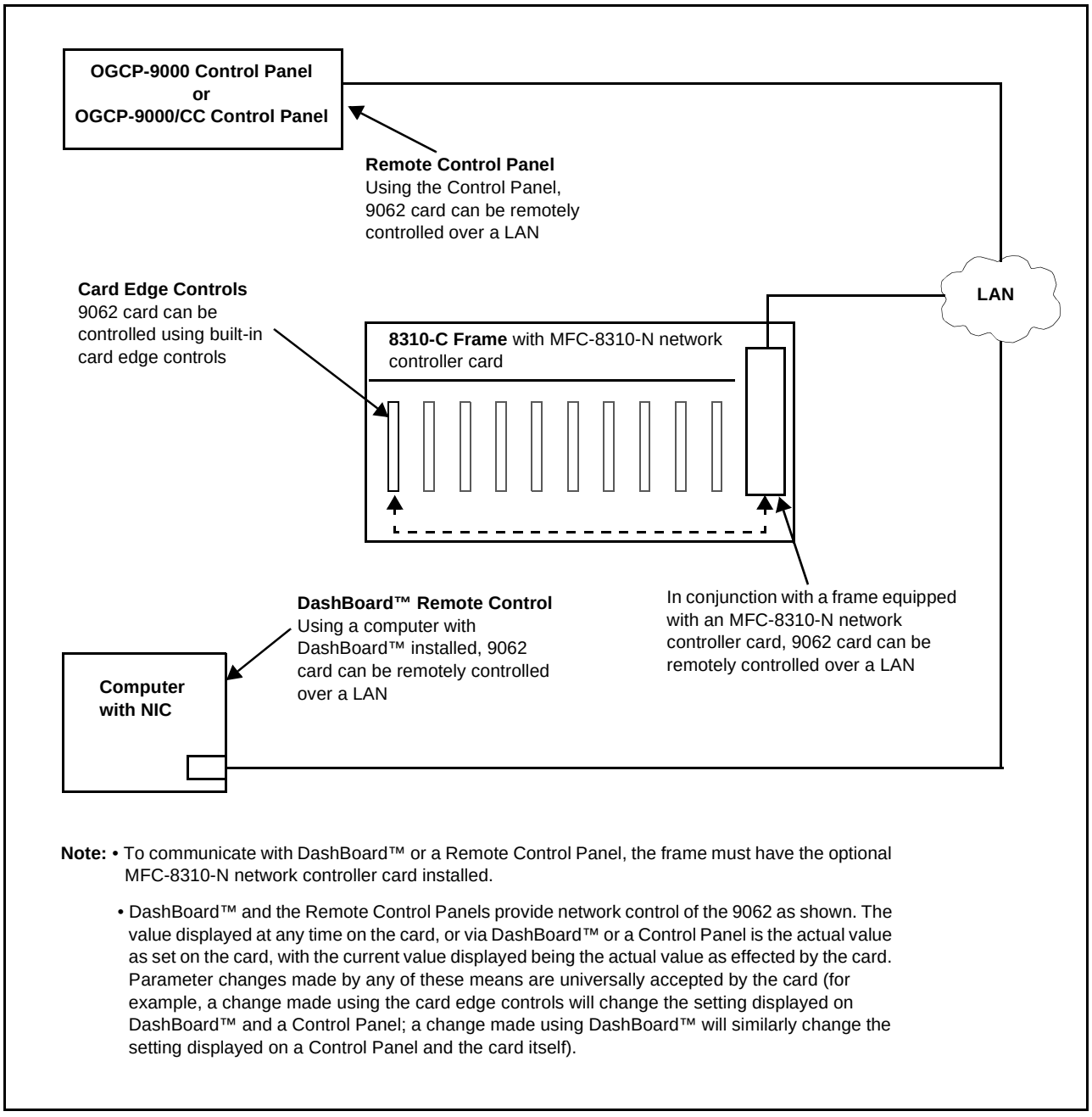


Figure 1-7 9062 User Control Interface

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

Download a copy of this guide by clicking on the **Support>Downloads** 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. 1-22).

- **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 9062 and other video and audio processing terminal equipment meeting the open-architecture Cobalt COMPASS™ cards for openGear™ standard.

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

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

9062 Rear I/O Modules

The 9062 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 9062 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 9062 card edge connections to BNC connectors that interface with other components and systems in the signal chain.

These required BNC connections are provided by either an 8310-BNC or 8310-C-BNC frame (which both have a built-in BNC connector backplane module), or by using an optional RM-9062-A Rear I/O Module.

Audio and Video Formats Supported by the 9062

The 9062 supports all current SMPTE standard SD and HD video formats. Table 1-2 lists and provides details regarding the audio and video formats supported by the 9062.

Table 1-2 Supported Audio and Video Formats

Item	Description/Specification	
Input / Output Video	Raster Structure:	Frame Rate(1):
	1080PsF	23.98; 24
	1080p	23.98; 24
	1080i(1)	25; 29.97; 30
	720p	23.98; 24; 25; 29.97; 30; 50; 59.94; 60
	486i(1)	29.97
	575i(1)	25
Embedded Audio	The 9062 supports all four groups (16 channels) of embedded audio at full 24-bit resolution in both SD (with extended data packets) and HD.	
(1) All rates displayed as frame rates; interlaced (“i”) field rates are two times the rate value shown.		

Technical Specifications

Table 1-3 lists the technical specifications for the 9062 Up/Down/Cross Format Converter, Video/Audio In with Frame Sync card.

Table 1-3 Technical Specifications

Item	Characteristic
Part number, nomenclature	9062 Up/Down/Cross Format Converter with HD/SD-SDI Input, Embedded Audio Support and Frame Sync
Installation/usage environment	Intended for installation and usage in frame meeting openGear™ modular system definition.
Power consumption	< 24 Watts maximum
Environmental: Operating temperature: Relative humidity (operating or storage):	 32° – 104° F (0° – 40° C) < 95%, non-condensing
Frame communication	10/100 Mbps Ethernet with Auto-MDIX.
Indicators	Card edge display and indicators as follows: • 4-character alphanumeric display • Status/Error LED indicator • Input Format LED indicator
Controls	Card edge switches as follows: • Menu Enter pushbutton switch • Menu exit pushbutton switch • Up/down selection toggle switch
Internal Tone Generators	Four built-in tone generators, each configurable for 18 discrete sine wave frequencies ranging from 50 Hz to 16 kHz. Generator source signal level is equivalent to -20 dBu.
Serial Digital Video Input	Data Rates Supported: SMPTE 292 HD-SDI: 1.485 Gbps or 1.485/1.001 Gbps SMPTE 259M-C SD-SDI: 270 Mbps Impedance: 75 Ω terminating Equalization (HD): 328 ft (100 m) Belden 1694A Equalization (SD): 1000 ft (305 m) Belden 1694A Return Loss: > 18dB at 5 MHz – 1.485 GHz
Post-Processor Serial Digital Video Outputs	Number of Outputs: Four HD/SD-SDI BNC per IEC 60169-8 Amendment 2 Impedance: 75 Ω

Table 1-3 Technical Specifications — continued

Item	Characteristic
Post-Processor Serial Digital Video Outputs (cont.)	Return Loss: > 15 dB at 5 MHz – 270 MHz > 12 dB at 270 MHz – 1.485 GHz Signal Level: 800 mV ± 10% DC Offset: 0 V ± 50 mV Jitter (HD): < 0.15 UI (all outputs) Jitter (SD): < 0.06 UI (all outputs) Overshoot: < 0.2% of amplitude
Pre-Processor (Reclocked) Serial Digital Video Outputs	Number of Outputs: Four HD/SD-SDI BNC per IEC 60169-8 Amendment 2 Impedance: 75 Ω
Reference Video Input	Number of Inputs: Two non-terminating (looping) Frame Reference inputs Standards Supported (HD): 720p 24; 25; 29.97; 30; 50; 59.94 1080i 25; 29.97 1080p 23.98; 24; 25; 29.97; 30 1080p/sF 23.98; 24 Standards Supported (SD): 486i 29.97 (NTSC); 575i 25 (PAL) Signal Level: 1 Vp-p nominal Signal Type: Analog video sync (black burst or tri-level) Impedance: 75 Ω Return Loss: > 30 dB to 30 MHz Allowable Maximum DC on Ref Input: ±1.0 V

Warranty and Service Information

Cobalt Digital Inc. Limited Warranty

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

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

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

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

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Contact Cobalt Digital Inc.

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

- Name and address of your local dealer
- Product information and pricing
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Technical Support:	support@cobaltdigital.com

Chapter 2

Installation and Setup

Overview

This chapter contains the following information:

Installing the 9062 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 9062 has a moderate power dissipation (24 W max.). As such, avoiding placing the card adjacent to other cards with similar dissipation values if possible.

CAUTION

	**This device contains semiconductor devices which are susceptible to serious damage from Electrostatic Discharge (ESD). ESD damage may not be immediately apparent and can affect the long-term reliability of the device.** **Avoid handling circuit boards in high static environments such as carpeted areas, and when wearing synthetic fiber clothing. Always use proper ESD handling precautions and equipment when working on circuit boards and related equipment.**

Note:

- **If installing the 9062 in an 8310-C-BNC or 8310-BNC frame** (which is pre-equipped with a 100-BNC rear I/O module installed across the entire backplane) or a slot already equipped with a suitable I/O module, proceed to card installation steps below.

- **If installing the 9062 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 9062 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 9062 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 9062 into a frame slot as follows:

1. Determine the slot in which the 9062 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.

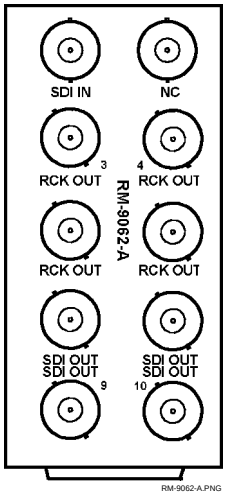
6. Verify that the card is fully engaged in rear I/O module mating connector.
7. Close the frame front access panel.
8. Connect the input and output cables as shown in Figure 2-1.
9. Repeat steps 1 through 8 for other 9062 cards.

Note: The 9062 BNC inputs are internally 75-ohm terminated. It is not necessary to terminate unused BNC inputs or outputs.

Note: To remove a card, press down on the ejector tab to unseat the card from the rear I/O module mating connector. Evenly draw the card from its slot.

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 9062 Network Remote Control (p. 2-4).

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.



Both the built-in Rear I/O Modules on the 8310-BNC/ 8310-C-BNC frames and the optional RM-9062-A Rear I/O Module use the connector arrangements shown to the left.

Connect cabling as shown. Unused connectors do not require external termination.

Figure 2-1 9062 Rear I/O Module Connections

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 9062 is to be installed.

If installing the 9062 in a 8310-C-BNC or 8310-BNC frame (which is pre-equipped with a 100-BNC rear I/O module installed across the entire backplane) or a slot already equipped with a suitable I/O module, omit this procedure.

Install a Rear I/O Module as follows:

1. On the 8310 frame, determine the slot in which the 9062 is to be installed.

2. In the mounting area corresponding to the slot location, install Rear I/O Module as shown in Figure 2-2.

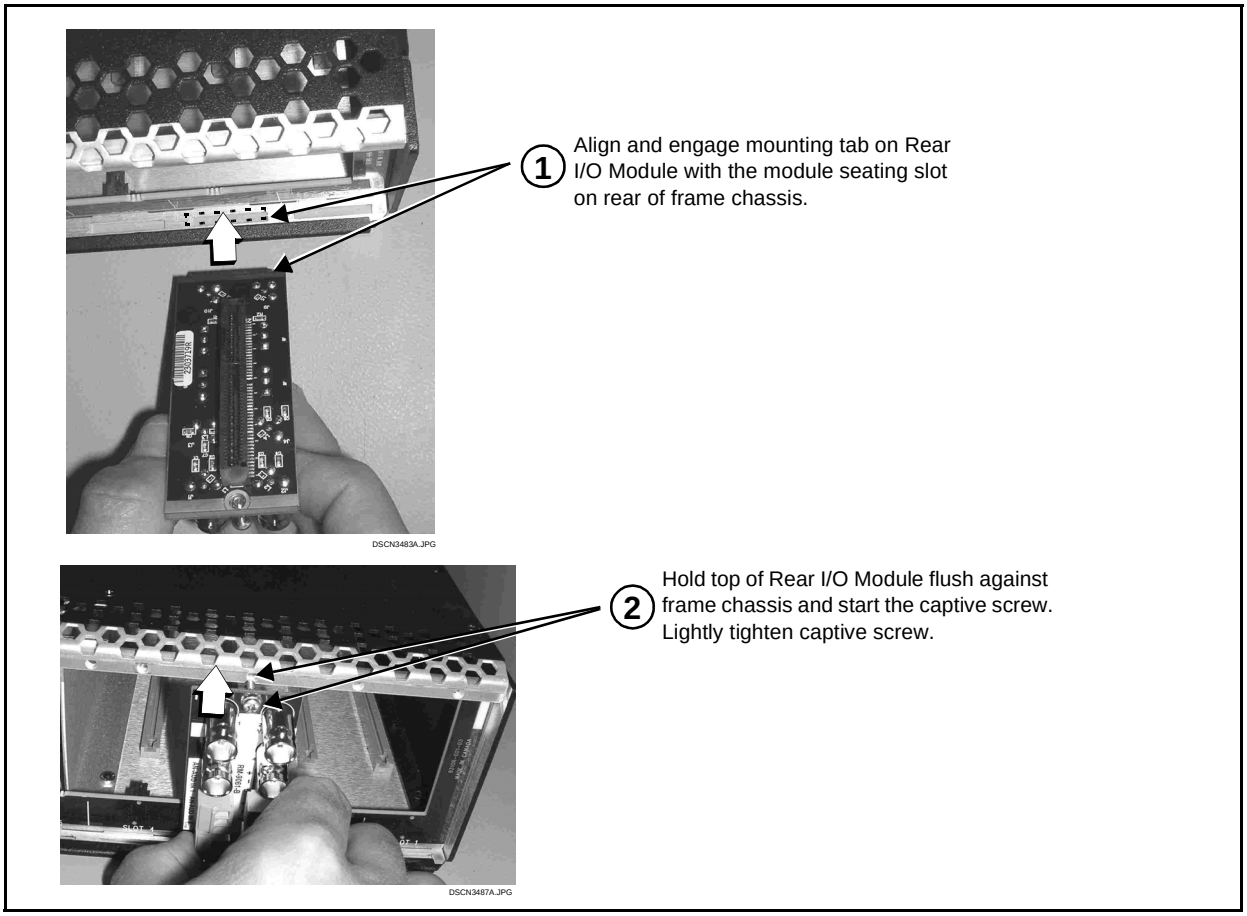


Figure 2-2 Rear I/O Module Installation

Setting Up 9062 Network Remote Control

Perform remote control setup in accordance with Cobalt® reference guide "COMPASS™ 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 **COMPASS™ Remote Control User Guide (PN 9000RCS-RM)** provides thorough information and step-by-step instructions for setting up network remote control of COMPASS™ 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>Downloads** 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. 1-22).

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

Chapter 3

Operating Instructions

Overview

This chapter contains the following information:

Control and Display Descriptions

This section describes the user interface controls, indicators, and displays (both on-card and remote controls) for using the 9062 card. The 9062 functions can be accessed and controlled using any of the user interfaces described here.

The format in which the 9062 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 9062 functions (and the controls, indicators, and displays related to a particular function) follows a general arrangement of Function Submenus under which related parameters can be accessed (as described in Function Submenu/Parameter Submenu Overview below).

After familiarizing yourself with the arrangement described in Function Submenu/Parameter Submenu Overview, proceed to the subsection for the particular user interface being used. Descriptions and general instructions for using each of the three user interfaces are individually described in the following subsections:

Note: Instructions provided here are applicable for all available user control methods. However, DashBoard™ and the Remote Control Panel provide greatly simplified user interfaces as compared to using the card edge controls. For this reason, **it is strongly recommended** that DashBoard™ or a Remote Control Panel be used for all card applications other than the most basic cases.

Note: Not all functions available using DashBoard™ or the Control Panel are available using the card edge controls.

Note: When a setting is changed, settings displayed on DashBoard™ (or the Remote Control Panel) are the settings as effected by the 9062 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 Submenu/Parameter Submenu Overview

The functions and related parameters available on the 9062 card are organized into function **submenus**, which consist of parameter groups as shown below.

Figure 3-1 shows how the 9062 card and its submenus are organized, and also provides an overview of how navigation is performed between cards, function submenus, and parameters.

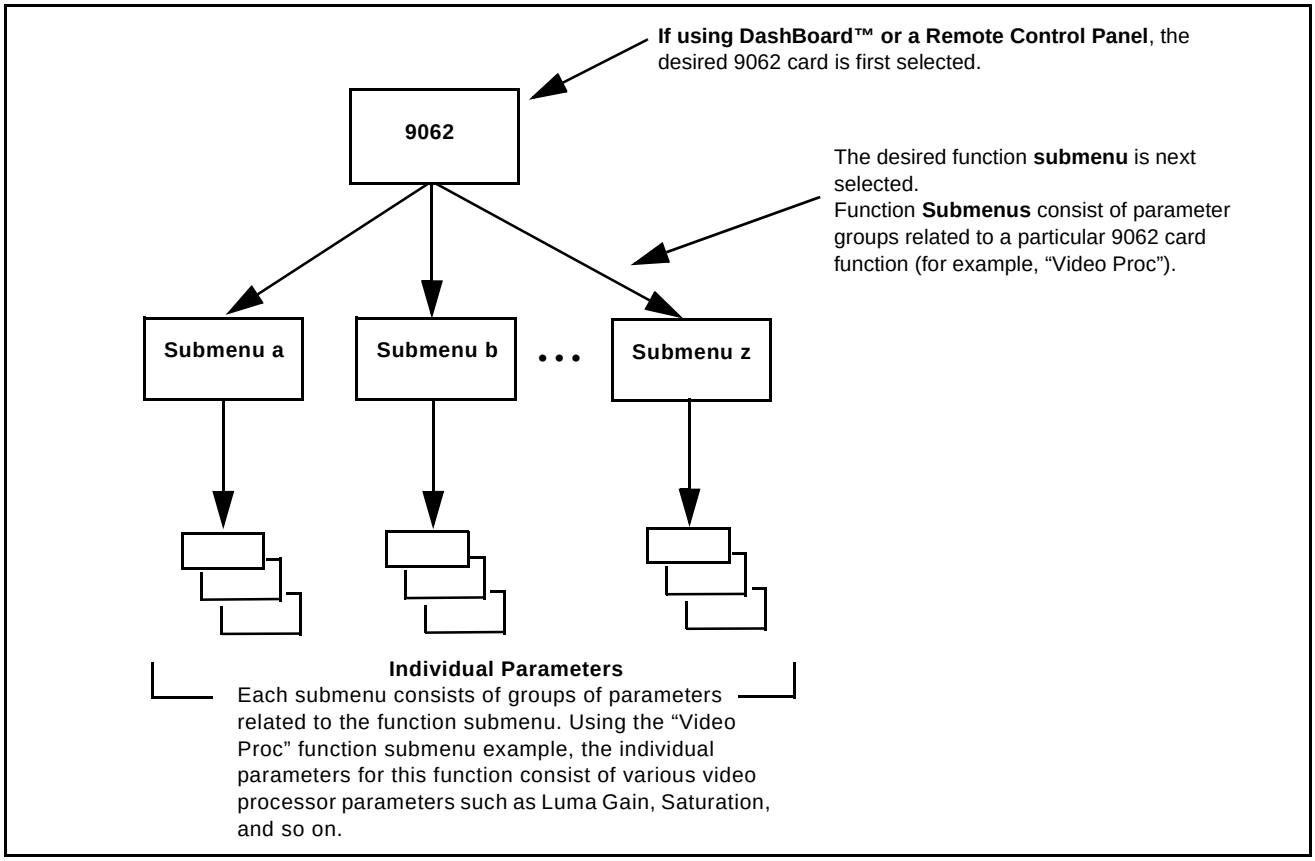
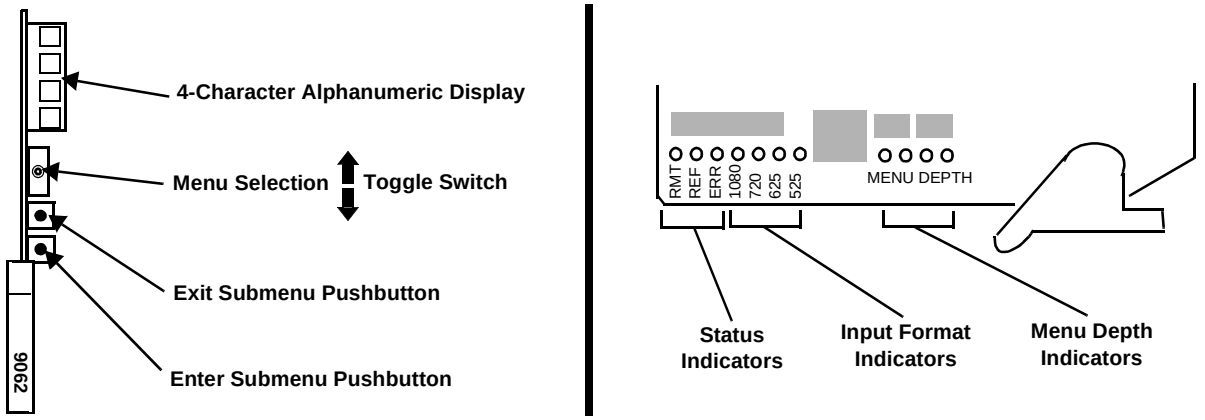


Figure 3-1 Function Submenu/Parameter Submenu Overview

9062 Card Edge Controls, Indicators, and Display

Figure 3-2 shows and describes the 9062 card edge controls, indicators, and display.



Item	Function
Display	Displays 4-digit abbreviated code showing menu and submenu selections. When in a menu displaying a parameter setting, the display shows parametric scalar value (and +/- sign where applicable).
Menu Selection toggle switch	• When in a menu or submenu selection mode, moving the switch up or down toggles up and down through the menu or submenu item choices. • When in a mode where parameter setting is displayed, moving the switch up or down increase or decreases the parametric value.
Enter Menu Pushbutton	When pressed, selects and opens the current mode shown on the display. At this point, submenu choices within the selected menu are now displayed. Pressing the pushbutton again goes deeper into the submenu, now opening items subordinate to the selected submenu. In this manner, pressing the **Enter Menu** pushbutton navigates into a menu and its submenus.
Exit Menu Pushbutton	When pressed, moves in the opposite direction of the Enter Menu pushbutton. It closes the currently selected submenu and moves to the next higher menu, eventually moving completely out of the item's submenus. In this manner, pressing the **Exit Menu** pushbutton navigates out of a menu and its submenus.
Input Format Indicators	Four blue LEDs indicate the input signal raster format being received and locked onto by the 9062 (1080, 720, 625, 525). Continuous cycling of the LEDs indicates the 9062 has not locked onto a particular format (as in the case of no signal input).
Menu Depth Indicators	Four green LEDs show the currently selected menu/submenu depth navigation. • **No** LEDs indicate **top-level menu** items are now ready for selection. • **One** LED indicates **first submenu** items (items subordinate to currently selected menu item) are now ready for selection. • **Two** LEDs indicates **second submenu** items (items subordinate to currently selected submenu item) are now ready for selection. • **Three** LEDs indicates **third submenu** items (items subordinate to currently selected submenu item) are now ready for selection. Typically, this is the level where values can now be adjusted for a specific parameter. • **Four** LEDs indicate **fourth submenu** items are now ready for selection. (This depth is not applicable to most items.)
RMT LED	Blue LED flashes when 9062 is receiving control message from remote network control (e.g., DashBoard™ or Cobalt® Remote Control Panel)
REF LED	Blue LED illuminates when 9062 is receiving valid framesync enable when set up for reference framesync.
ERR LED	Red LED illuminates when 9062 unable to lock to framesync, or unable to lock to input standard.

Figure 3-2 9062 Controls, Indicators, and Display

9062 Card Edge Control Menu/Submenu Structure

(See below.) Using the menu system of group menus and submenus described earlier, the 9062 parameters/controls are organized into menus and submenus. As appropriate, a submenu similarly may have its own further additional subordinate submenus.

Menu Group Item	Menu Depth	Menu depth (as indicated by 9062 Menu Depth LEDs) none
Submenu 1 (Submenu 1 selection items)	1	● ○ ○ ○
Submenu 2 (Submenu 2 selection items)	2	● ● ○ ○
Submenu 3 (Submenu 3 selection items and/or parameter values)	3	● ● ● ○
Submenu 4 (Submenu 4 selection items and/or parameter values)	4	● ● ● ●

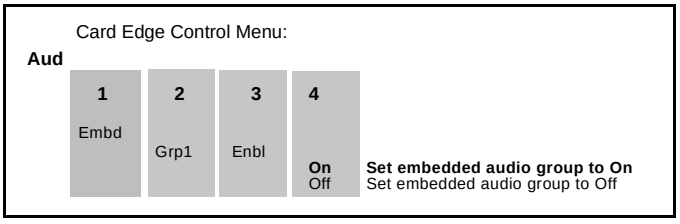
Figure 3-3 shows an example of using the card edge controls to access the Embedded Audio processing group menu (along with some of its submenus) to set the routing and signal processing parameters for an embedded audio channel. (A) through (K) in Figure 3-3 denote the discrete tasks required in performing the example setup using the 9062 card edge controls.

In this example, the following input processing and routing is being performed:

- Embedded Channel 3 is selected as the source for Embedded Channel 1 within Embedded Audio Group 1.
- Gain is increased over unity default by 12.1.
- Phase is inverted.

Due to the limited control available when using the built-in card edge control user interface, the navigation into and out of submenus shown in Figure 3-3 is required to perform the setup described above.

Note: In Table 3-2, “9062 Function Submenu/Parameter List” abbreviated diagrams (as shown below) show the navigation required to access a particular sub-menu item or parameter when using the card edge controls. In this example, group enable for Embedded Audio Group 1 is being enabled.



Embedded Audio

Select a top-level menu item (in this example, select **Aud** (embedded audio routing/control))

Submenu Depth

	1	2	3	4	
Ⓐ	**Embd** Tone				Press **Enter Menu** and in this example, select **Embd** (Embedded Audio Groups). This selects embedded audio function of the Audio processor.
Ⓑ		**Grp1** Grp2 Grp3 Grp4			Press **Enter Menu** again and in this example, select **Grp1** (Embedded Audio Group 1). This selects the embedded audio group to be accessed.
Ⓒ			**Enbl**		Press **Enter Menu** again and in this example, select **Enbl** (Enable).
Ⓓ				**On** Off	Press **Enter Menu** again and in this example, select **On**. This sets the selected embedded audio group to **Enabled**.
Ⓔ			**Ch01** Ch02 Ch03 Ch04		Press **Exit Menu** and in this example, select **Ch01** (Destination: Embedded Channel 1). This selects the embedded channel to be accessed.
Ⓕ				**Src** Gain Pol	Press **Enter Menu** and select in this example, **Src** (source for embedded channel 1). This selects the source for the embedded channel.
Ⓖ				Em01 Em02 **Em03** ...	Press **Enter Menu** again and in this example, select **Em03** (embeddded channel 3 as source for embedded channel 1). This selects embedded channel 3 as the source for embedded channel 1.
Ⓗ				Src **Gain** Pol	Press **Exit Menu** and in this example, select **Gain** (gain adjustment field for selected embedded audio channel).
Ⓘ				(gain value)	Press **Enter Menu** again and in this example, select a gain value of 12.1 for this channel.
Ⓙ				Src Gain **Pol**	Press **Exit Menu** and in this example, select **Pol** (phase for embedded channel 1).
Ⓚ				Norm **Inv**	Press **Enter Menu** again and in this example, select **Inv** (invert polarity for embedded channel 1).

Figure 3-3 Card Edge Controls Setup of Example Embedded Audio Function

Card Edge Display Orientation, Brightness, and Timeout Adjust

The card edge 4-Character Alphanumeric Display can be changed between vertical or horizontal character orientation to suit the mounting position of the card as shown and described below.

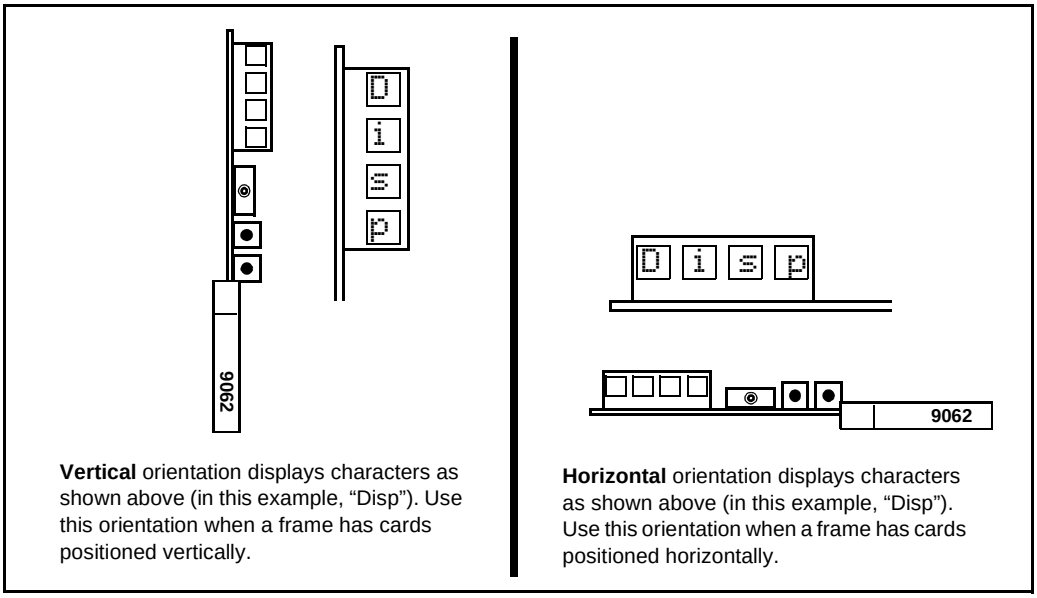
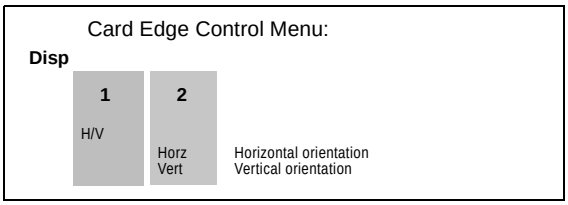


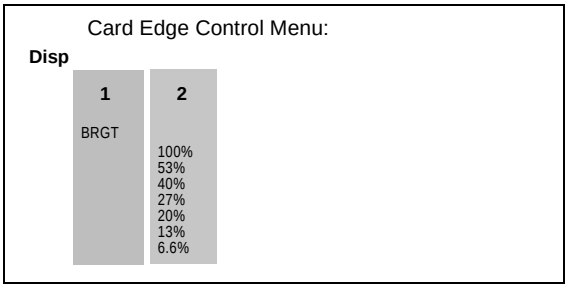
Figure 3-4 Card Edge Display Orientation

1. Access the **Displ** (Display) menu.
2. Select between Horizontal or Vertical as shown below.



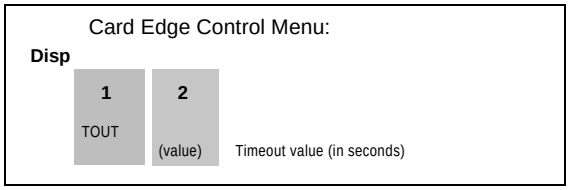
Adjust the display brightness as described below.

1. Access the **Displ** (Display) menu.
2. Select from the relative brightness levels as shown below.



The timeout period from when a menu is entered to when the display times outs (reverts to the default card model display) can be adjusted from 5 to 9999 seconds (166.7 minutes) as described below.

1. Access the **Displ** (Display) menu.
2. Use the up/down switch to enter the desired timeout value as shown below.



DashBoard™ User Interface

(See Figure 3-5.) The 9062 function submenus are organized in DashBoard™ using tabs (for example, “Embedded Audio Group 1/2” in Figure 3-5). 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. (In this manner, the setting effected using controls and selection lists displayed in DashBoard™ are comparable to the submenu items accessed and committed using the 9062 card edge controls.)

Figure 3-5 shows the same setup described in Figure 3-3 as performed using DashBoard™. Note how this setup is greatly simplified using DashBoard™ with most of the discrete tasks ((A) through (K) in Figure 3-3) performed with the card edge controls now rolled into simple actions using DashBoard™.

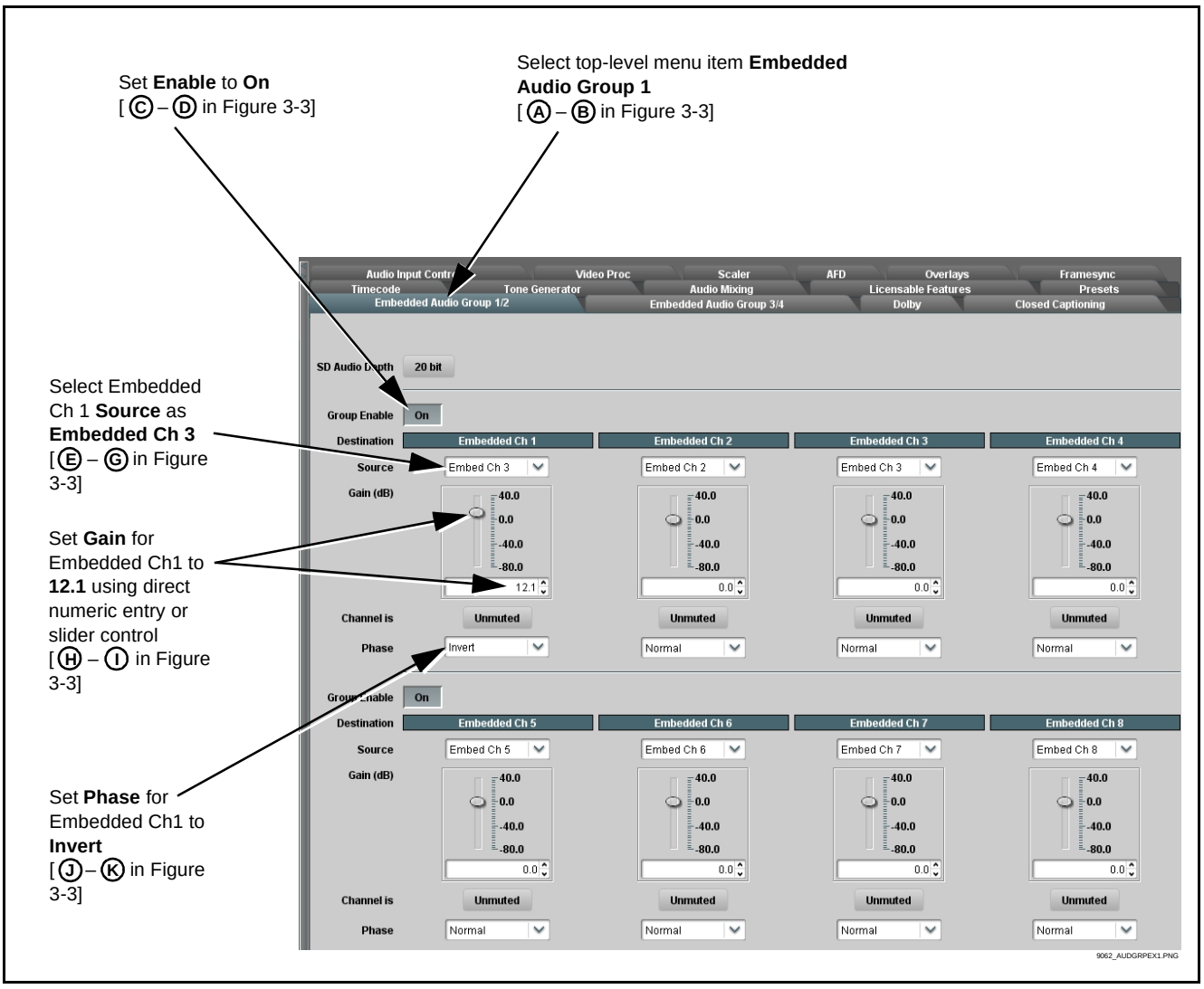


Figure 3-5 DashBoard™ Setup of Example Embedded Audio Function

Cobalt® Remote Control Panel User Interfaces

(See Figure 3-6.) Similar to the function submenu tabs using DashBoard™, the Remote Control Panels have a Select Submenu key that is used to display a list of function submenus. From this list, a control knob on the Control Panel is used to select a function from the list of displayed function submenu items.

When the desired function submenu is selected, each parametric control or selection list item associated with the function is displayed. Scalar (numeric) parametric values can then be adjusted as desired using the control knobs, which act as potentiometers. Items in a list can then be selected using the control knobs which correspondingly act as rotary switches. (In this manner, the setting effected using controls and selection lists displayed on the Control Panel are comparable to the submenu items accessed and committed using the 9062 card edge controls.)

Figure 3-6 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.

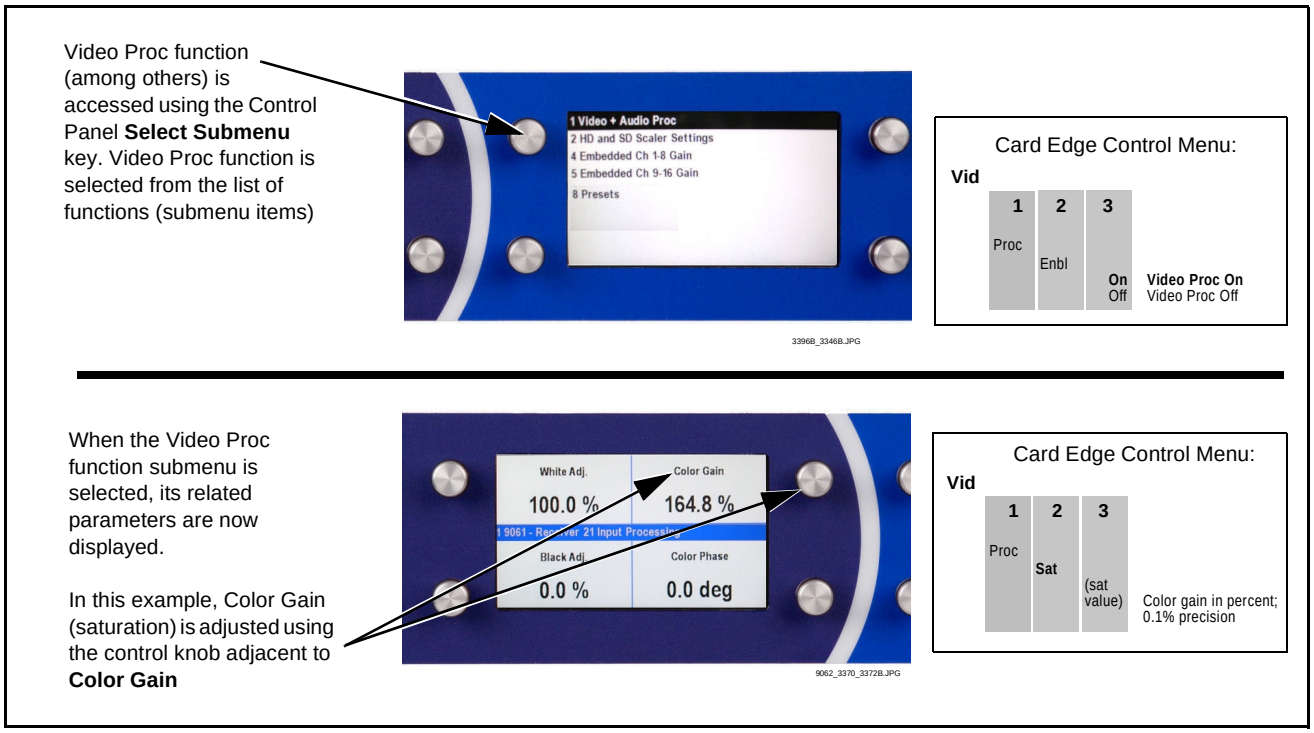


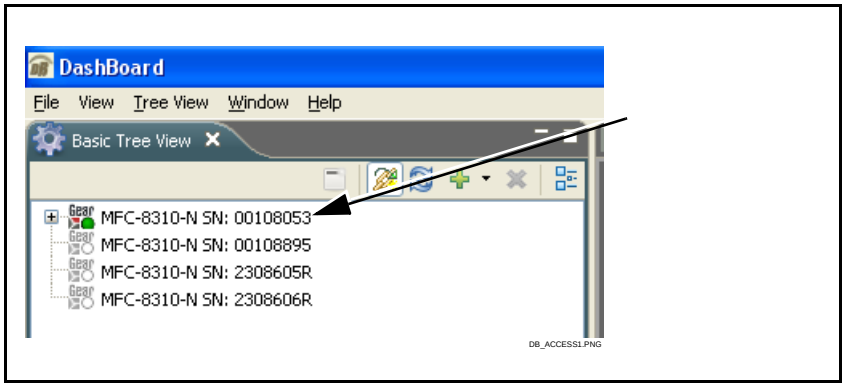
Figure 3-6 Remote Control Panel Setup of Example Video Proc Function

Accessing the 9062 Card via Remote Control

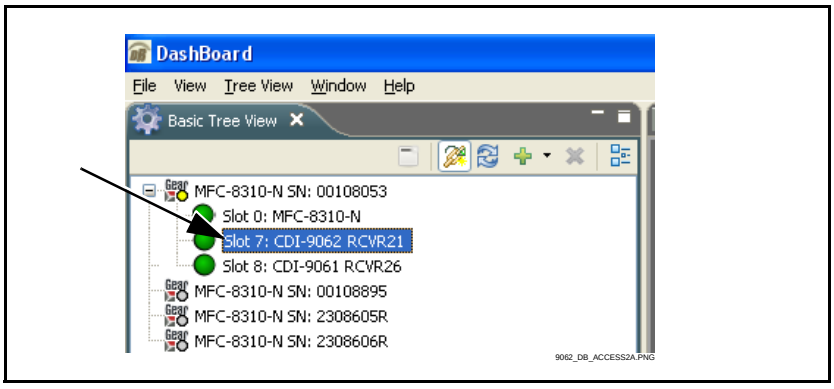
Access the 9062 card using DashBoard™ or Cobalt® Remote Control Panel as described below.

Accessing the 9062 Card Using DashBoard™

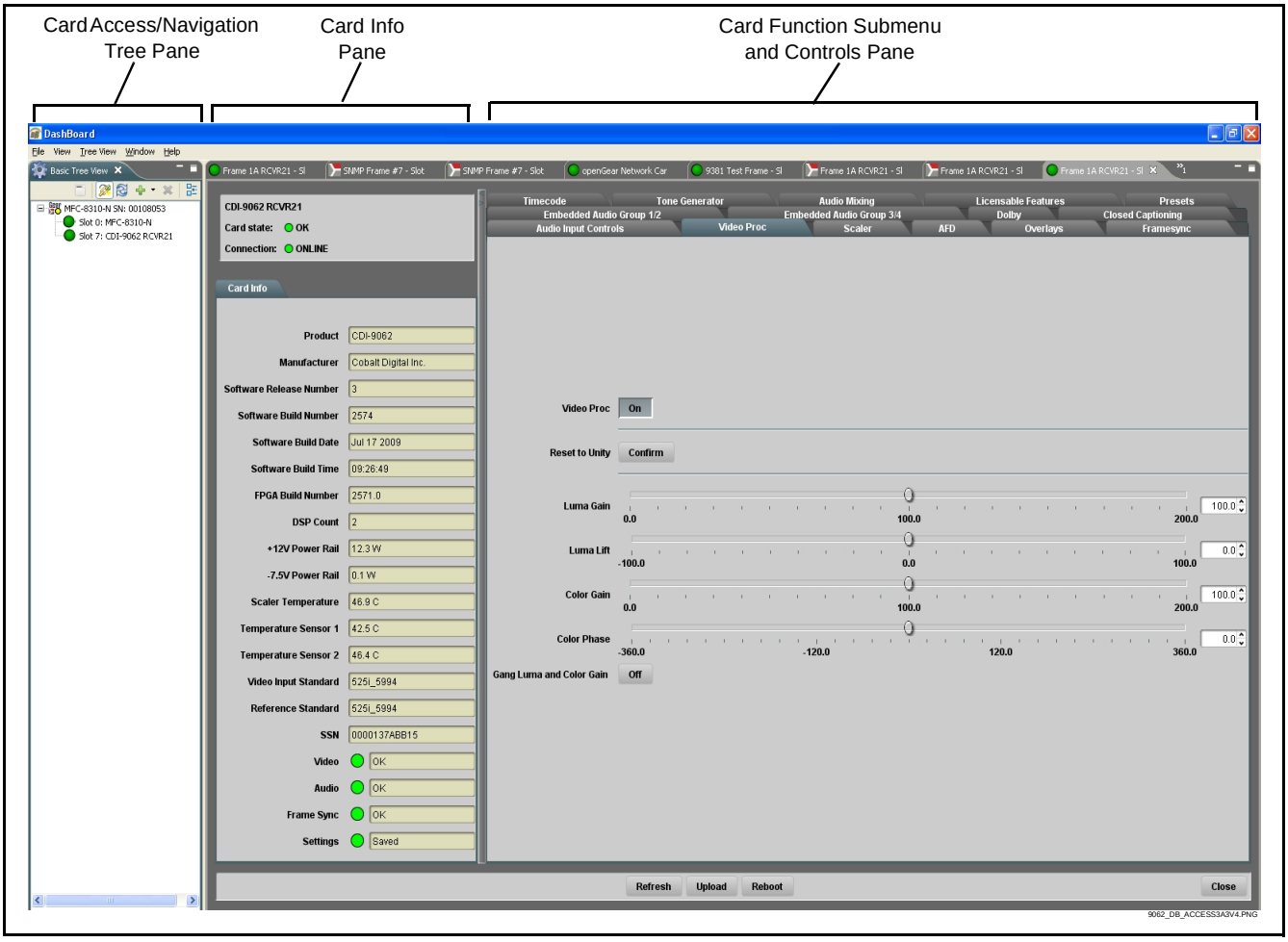
1. On the computer connected to the frame LAN, open DashBoard™.
2. As shown below, in the left side Basic View Tree locate the Network Controller Card associated with the frame containing the 9062 card to be accessed (in this example, “MFC-8310-N SN: 00108053”).



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 7: CDI-9062 RCVR21”).



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



Accessing the 9062 Card Using a Cobalt® Remote Control Panel

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

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

This display shows the devices assigned to the Control Panel.

- Rotate any knob to select from the list of devices. The device selected using a knob is displayed with a reversed background (in this example, “1 9062 - Receiver 21 Input Processing”).
- Directly enter a device by entering its list number using the numeric keypad, and then pressing **Enter** or pressing in any knob).

Checking 9062 Card Information

The operating status and software version the 9062 card can be checked using DashBoard™ or the card edge control user interface. Figure 3-7 shows and describes the 9062 card information screen using DashBoard™ and accessing card information using the card edge control user interface.

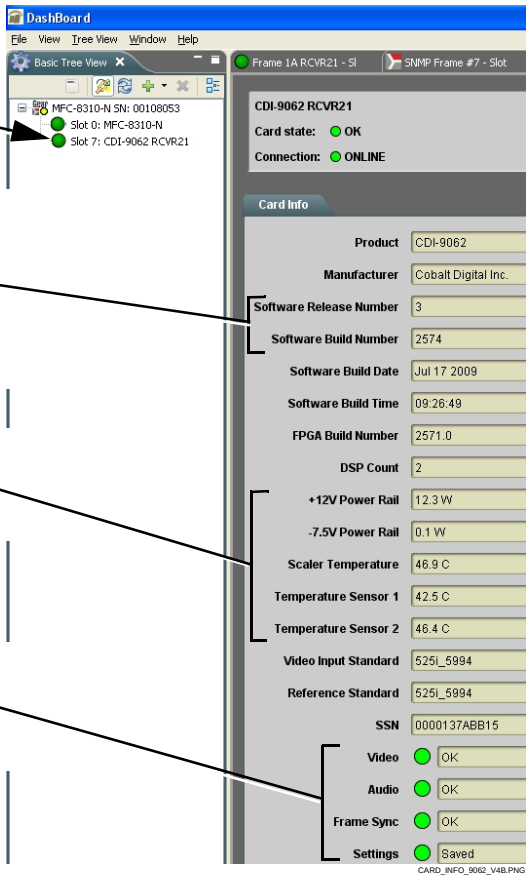
Note: Proper operating status in DashBoard™ is denoted by green icons for the status indicators shown in Figure 3-7. Yellow or red icons respectively indicate an alert or failure condition. Refer to Troubleshooting (p. 3-57) for corrective action.

The **Tree View** shows the cards seen by DashBoard™. In this example, Network Controller Card MFC-8310-N (serial number ...8053) is hosting a 9062 card in slot 7.

Software Release Number and Software Build Number
Refer to these numbers to check that documentation (such as this manual) matches the card's Software Release Number and Software Build Number. Use these numbers also when communicating to Cobalt® regarding this card.

Power Consumption and Temperature Displays
This display shows the power consumed by the 9062 for both the +12V and -7.5V rails, as well as key device temperatures.

Status Displays
These displays show the status the signal being received by the 9062. Green Settings icon shows that any changes made on DashBoard™ are sucessfully saved on the card's memory.



Checking Card Using Card Edge Controls

Info

1	2	
+POW	(value)	+12V Watts consumed
-POW	(value)	- 7.5V Watts consumed
SWR#	(value)	Software Release Number
SWB#	(value)	Software Build Number
FPG#	(value)	FPGA Build Number

Figure 3-7 9062 Card Info Utility

Ancillary Data Line Number Locations and Ranges

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

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

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

Notes:

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

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

Because line number allocation is not standardized for all ancillary items, consideration should be given to all items when performing set-ups. Figure 3-8 shows an example of improper and corrected VANC allocation within an HD-SDI stream.

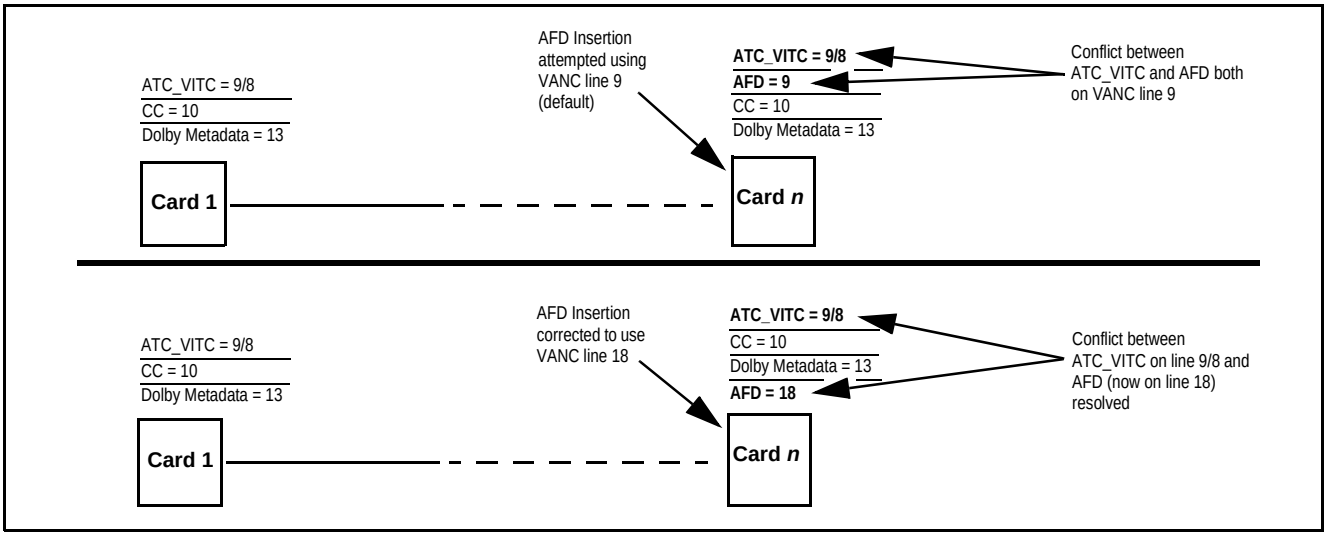


Figure 3-8 Example VANC Line Number Allocation Example

9062 Function Submenu List and Descriptions

Table 3-2 individually lists and describes each 9062 function submenu and its related list selections, controls, and parameters. Where helpful, examples showing usage of a function are also provided. Table 3-2 is primarily based upon using DashBoard™ to access each function and its corresponding submenus and parameters.

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

Note: Table 3-2 also provides abbreviated menu structure charts showing the menu structure for accessing the function/parameter using the card edge controls. Where this is not shown for a particular control, this indicates the control is **not** available using card edge controls.

If using card edge controls, refer to 9062 Card Edge Control Menu/Submenu Structure (p. 3-4) and Figure 3-3 for an explanation and an example of card edge control menu structure navigation.

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

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

Table 3-2 9062 Function Submenu/Parameter List

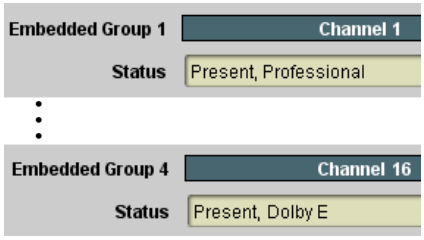
Audio Input Controls	Displays signal status for the 16 embedded audio channels. Also provides global unity routing/parameter control resets.
• **Status Displays** 	Individual signal status displays embedded audio channels 1-16 as follows: • **Not Present:** Indicates embedded channel does not contain recognized audio PCM data. **Note:** Channel displaying Not Present may still carry usable audio data with **Unlocked** being displayed due to invalid headers. • **Present, Professional:** Indicates embedded channel contains recognized AES audio PCM data. • **Present, Consumer:** Indicates embedded channel contains audio PCM data other than AES (for example, S/PDIF). • **Present, Dolby E:** Indicates embedded channel contains audio encoded with Dolby® E data. • **Present, Dolby Digital:** Indicates embedded channel contains audio encoded with Dolby® Digital data. **Note:** Dolby status displays shown to the left only occur for valid Dolby® signals meeting SMPTE 337M standard. This card does not perform Dolby® processing on the signal. Although the card controls will appear to be usable for this signal tag, the signal is passed with 1-to-1 routing and all related gain and polarity controls set to unity.
• **Embedded Unity Channel Selection** 	Selects unity reset of Embedded Audio Group 1/2 and 3/4 controls and re-establishes default 1-to-1 routing as follows: • **Embedded:** Routes Embedded Ch 1 thru Ch 16 as sources to destination channels Embedded Ch 1 thru Embedded Ch 16.
• **Apply Audio Channel Selection** 	Applies embedded unity channel selection (as set in the above drop-down lists). To apply the selections, click the **Confirm** button. 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. For any selection following confirm, the destination channel controls are default reset as follows: • Gain is to unity • Phase control is set to Normal • Channel is set to Unmuted

Table 3-2 9062 Function Submenu/Parameter List — continued

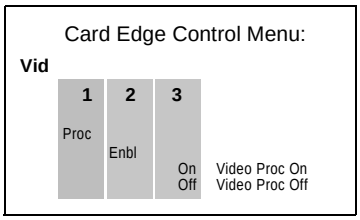
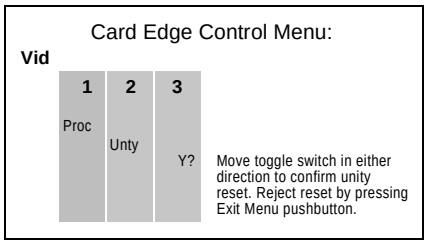
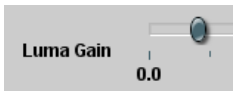
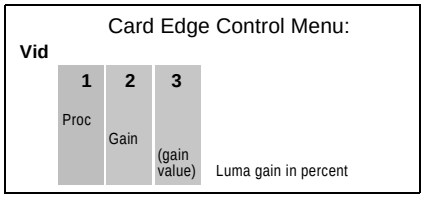
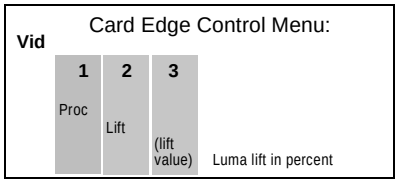
Video Proc	Provides the following Video Proc parametric controls.
• **Video Proc**  	**Video Proc (On/Off)** provides master on/off control of all Video Proc functions. • When set to **Off**, Video Proc is bypassed. • When set to **On**, currently displayed parameter settings take effect.
• **Reset to Unity**  	**Reset to Unity** provides unity reset control of all Video Proc functions. When Confirm is clicked, a **Confirm?** pop-up appears, requesting confirmation. • Click **Yes** to proceed with the unity reset. • Click **No** to reject unity reset.
• **Luma Gain**  	Adjusts gain percentage applied to Luma (Y channel). (0% to 200% range in 0.1% steps; unity = 100%)
• **Luma Lift**  	Adjusts lift applied to Luma (Y-channel). (-100% to 100% range in 0.1% steps; null = 0.0%)

Table 3-2 9062 Function Submenu/Parameter List — continued

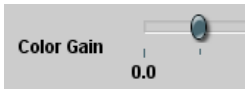
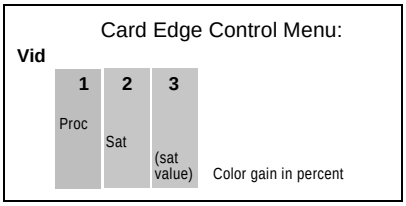
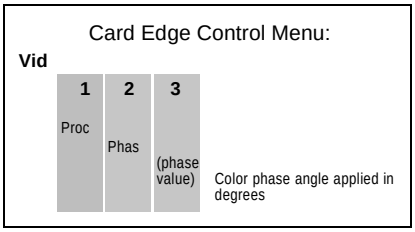
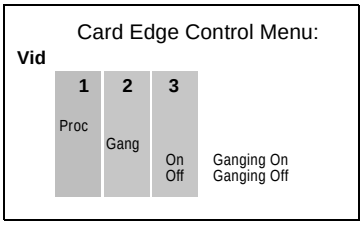
Video Proc	**(continued)**
• **Color Gain**  	Adjusts gain percentage (saturation) applied to Chroma (C-channel). (0% to 200% range in 0.1% steps; unity = 100%)
• **Color Phase**  	Adjusts phase angle applied to Chroma. (-360° to 360° range in 0.1° steps; null = 0°)
• **Gang Luma and Color Gain**  	When set to **On**, changing either the **Color Gain** or **Luma Gain** controls increases or decreases both the Video and Chroma levels by equal amounts.

Table 3-2 9062 Function Submenu/Parameter List — continued

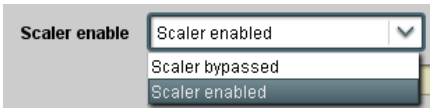
Scaler	Provides video format up/down/cross-conversions and aspect ratio controls.
Note: Scaling and/or format conversion removes Dolby® metadata and ATC packets (if present). If Dolby® metadata is present and needs to be preserved, use the **Dolby Metadata** function tab to preserve and re-apply the metadata on the output SDI. Refer to **Dolby Metadata** function on page 3-44 for more information.	
• **Scaler enable**  Card Edge Control Menu: **Sclr** **1** Enbl **2** On = Scaler enabled; Off = Scaler bypassed	Enables or bypasses Scaler function as follows: • **Enabled:** Provides Scaler functions for the received video input. • **Bypassed:** Received video input bypasses the Scaler functions.
• **Current Input Format**  Card Edge Control Menu: **Sclr** **1** In **2**: 5i-- 525i; 6i-- 625i; 7p-- 720p; 1i-- 1080i; 1p-- 1080p **Note:** Items shown in column **2** are for reference only. No input control is available in this mode. "--" on display shows frame/field rate (as applicable) in first 2 most significant digits (e.g., "5i59" denotes 525i 59.94 Hz field rate).	Displays the input format of the video currently being received by the 9062 (for example, 1080p HD at 29.97 Hz frame rate as shown here). **Note:** Rates displayed for progressive formats are frame rates; rates displayed for interlaced formats are field rates.
• **Current Output Format**  Card Edge Control Menu: **Sclr** **1** Out **2**: 5i-- 525i; 6i-- 625i; 7p-- 720p; 1i-- 1080i; 1p-- 1080p **Note:** Items shown in column **2** are for reference only. No output control is available in this mode. "--" on display shows frame/field rate (as applicable) in first 2 most significant digits (e.g., "5i59" denotes 525i 59.94 Hz field rate).	Displays the currently selected output format of the video currently being processed by the 9062 (for example, 1080p HD at 29.97 Hz frame rate as shown here). The output format displayed is the output present on the card's **SDI OUT** BNC connectors. **Note:** Output format shown in this display tracks with selection made in **HD: Convert to** or **SD: Convert to** drop-down lists. **Output Format** display only tracks with changes applicable to the currently received input format (for example, when currently receiving HD video, changes made in the **SD: Convert to** drop-down list have no effect on the **Output Format** display). Output format also tracks with any applicable Scaler functions that affect output format. **Note:** Rates displayed for progressive formats are frame rates; rates displayed for interlaced formats are field rates.

Table 3-2 9062 Function Submenu/Parameter List — continued

Scaler	**(continued)**

Scaler Video Format Conversions

The Scaler **HD: Convert to:** and **SD: Convert to:** drop-down lists (as shown and described in the following pages) allows selection of up/down/cross-conversions (or no conversion) for various input formats. The table below lists the conversion choices available for various input formats and frame rates provided by the Scaler **Convert to:** function. Also shown are the resulting frame rates for the converted outputs.

Input Format	SD (NTSC/ PAL)	720p	720p half-rate	720p (film rates)	1080i	1080p	1080p (film rates)	1080PsF (film rates)
525i 59.94	525i 59.94	720p 59.94	720p 29.97	720p 23.98(4)	1080i 59.94	1080p 29.97	1080p 23.98(4)	1080PsF 23.98(4)
625i 50	625i 50	720p 50	720p 25	X	1080i 50	1080p 25	X	X
720p 60	X	720p 60	720p 30	720p 24(4)	1080i 60	1080p 30	1080p 24(4)	1080PsF 24(4)
720p 59.94	525i 59.94	720p 59.94	720p 29.97	720p 23.98(4)	1080i 59.94	1080p 29.97	1080p 23.98(4)	1080PsF 23.98(4)
720p 50	625i 50	720p 50	720p 25	X	1080i 50	1080p 25	X	X
720p 30	X	720p 60	720p 30	720p 24(5)	1080i 60	1080p 30	1080p 24(5)	1080PsF 24(5)
720p 29.97	525i 59.94	720p 59.94	720p 29.97	720p 23.98(5)	1080i 59.94	1080p 29.97	1080p 23.98(5)	1080PsF 23.98(5)
720p 25	625i 50	720p 50	720p 25	X	1080i 50	1080p 25	X	X
720p 24	X	720p 60	720p 30	720p 24	1080i 60	1080p 30	1080p 24	1080PsF 24
720p 23.98	525i 59.94	720p 59.94	720p 29.97	720p 23.98	1080i 59.94	1080p 29.97	1080p 23.98	1080PsF 23.98
1080i 60	X	720p 60	720p 30	720p 24(4)	1080i 60	1080p 30	1080p 24(4)	1080PsF 24(4)
1080i 59.94	525i 59.94	720p 59.94	720p 29.97	720p 23.98(4)	1080i 59.94	1080p 29.97	1080p 23.98(4)	1080PsF 23.98(4)
1080i 50	625i 50	720p 50	720p 25	X	1080i 50	1080p 25	X	X
1080p 30	X	720p 60	720p 30	720p 24(5)	1080i 60	1080p 30	1080p 24(5)	1080PsF 24(5)
1080p 29.97	525i 59.94	720p 59.94	720p 29.97	720p 23.98(5)	1080i 59.94	1080p 29.97	1080p 23.98(5)	1080PsF 23.98(5)
1080p 25	625i 50	720p 50	720p 25	X	1080i 50	1080p 25	X	X
1080p 24	X	720p 60	720p 30	720p 24	1080i 60	1080p 30	1080p 24	1080PsF 24
1080p 23.98	525i 59.94	720p 59.94	720p 29.97	720p 23.98	1080i 59.94	1080p 29.97	1080p 23.98	1080PsF 23.98
1080PsF 24	X	720p 60	720p 30	720p 24	1080i 60	1080p 30	1080p 24	1080PsF 24
1080PsF 23.98	525i 59.94	720p 59.94	720p 29.97	720p 23.98	1080i 59.94	1080p 29.97	1080p 23.98	1080PsF 23.98

Notes: 1. The drop-down list choice of “Same as Input” is used when no conversion is desired. For clarity, it is not redundantly listed here.

2. “X” denotes conversions not available or invalid conversions.

3. Interlaced formats rates listed are field rates. Progressive format rates listed are frame rates.

4. If the original material does not have a proper 3-2 cadence suitable for conversion to film rates, the conversion reverts to standard de-interlacing. While this video can be converted to film rates, the resulting image motion will lack smoothness. Therefore, make certain interlaced video is appropriately constructed for 3-2 reverse pulldown when converting video to film rates. (See 3-2 Pulldown Conversion and Considerations (p. 1-11) for more information.)

5. Formats using a 30/29.97 Hz progressive frame rate can be converted to a 24/23.98 Hz progressive frame rate, however some image motion irregularity will appear in the converted output.

Table 3-2 9062 Function Submenu/Parameter List — continued

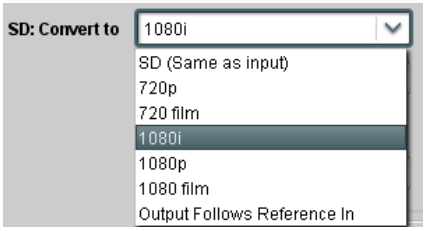
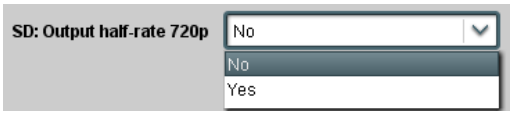
Scaler	**(continued)**
Note: HD: controls described below affect **HD inputs**; **SD:** controls described below affect **SD inputs**.	
• **SD: Convert To**  Card Edge Control Menu: **Sclr** **1** SDIn **2** Out **3** SD SD (same as input); 720p 720p; 720f 720 film; 108i 1080i; 108p 1080p; 108f 1080 film; FREF Output Follows Reference In	When SD video input is received by the 9062, provides output format conversions, or re-aspecting to SD when SD is the detected input format as described below. • **SD (Same as input):** Output follows currently received video input format, with Current Input Format and Current Output Format displays showing same selection. • **720p:** Output is converted to 720p • **720 film:** Output is converted to corresponding 720p film frame rate • **1080i:** Output is converted to 1080i • **1080p:** Output is converted to 1080p • **1080 film:** Output is converted to corresponding 1080i film frame rate • **Output Follows Reference In:** Output tracks with format set in Reference Video Input **Note: Output Follows Reference In** selection automatically sets the output format to that of the received reference signal input (this signal is distributed to the 9062 and other cards via an 8310 frame bus). In addition to extracting a frame sync and rate, this function determines the type of black burst (i.e., black burst or tri-level) and sets the output format to match.
• **SD: Output Half-rate 720p**  Card Edge Control Menu: **Sclr** **1** SDIn **2** H720 **3** Yes Yes; No No	When **SD: Convert to** drop-down list is set to **720p**, converts output to 720p half-rate. **Yes/No** control functions as follows: • **No:** Do not apply half-rate; leave output at standard frame rate • **Yes:** Output set at half- rate **Note:** Half-rate outputs are available for the 720p frame rates listed under “720p” in the “Scaler Video Format Conversions” table on the previous page.
• **SD: Output PsF**  Card Edge Control Menu: **Sclr** **1** SDIn **2** SDSF **3** On On; Off Off	When enabled (and with the output video is set to 1080 film), converts the output to1080PsF (segmented frame progressive).

Table 3-2 9062 Function Submenu/Parameter List — continued

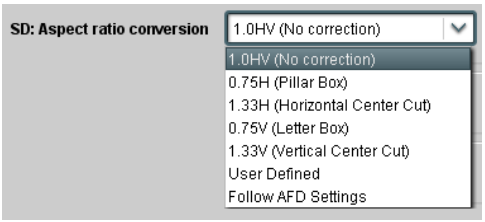
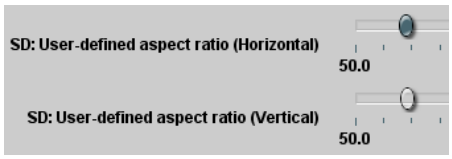
Scaler	**(continued)**
• SD: Aspect Ratio Conversion  Card Edge Control Menu: **Sclr** **1** SDIn **2** ARC **3** 1.0HV 1.0HV (No correction) 0.75H 0.75H (Pillar Box) 1.33H 1.33H (Horizontal Center Cut) 0.75V 0.75V (Letter Box) 1.33V 1.33V (Vertical Center Cut) User User Defined AFD Follow AFD Settings	Selects between the standard preset Aspect Ratio Conversions (ARC) shown here, as well as **User Defined** and **Follow AFD Settings**. • **User Defined** settings allow custom user-defined H and V aspect ratio control. • **Follow AFD Settings** sets the output aspect ratio to track with AFD settings performed in AFD (p. 3-25). **Note:** This function is intended for aspect ratio adjustment of a particular signal without AFD considerations. • If ARC is being used on a case-by-case basis for a particular signal, it is easier to use the Scaler ARC tools described here. • If AFD is to be used to set and apply a standard AFD code label for ARC, use **Follow AFD Settings**. Do not perform ARC here; instead, perform ARC as described in the **AFD** function description on page 3-25.
• SD: User-defined aspect ratio  Card Edge Control Menu: **Sclr** **1** SDIn **2** UsrH **3** (H zoom value) H zoom in percent **1** SDIn **2** UsrV **3** (V zoom value) V zoom in percent	**(Horizontal)** and **(Vertical)** controls adjust horizontal and vertical zoom percentage. Settings less than (<) 100% provide zoom-out; settings greater than (>) 100% provide zoom-in. (50% to 200% range in 0.1% steps; null = 100.0)
• SD: Top line suppression  Card Edge Control Menu: **Sclr** **1** SDIn **2** TopL **3** (value) Top line suppression value	Selects the number of lines suppressed at the beginning of video. In this manner, the image is scaled proportionally to replace the top few lines suppressed using this control. When upconverting from SD to HD, using this control can hide unwanted closed caption or timecode data. (Range is 0 thru 10 lines.)

Table 3-2 9062 Function Submenu/Parameter List — continued

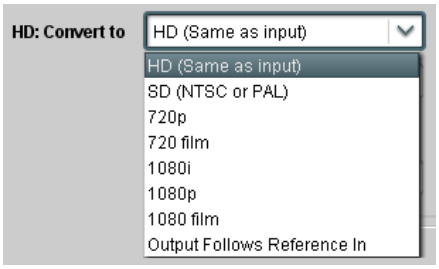
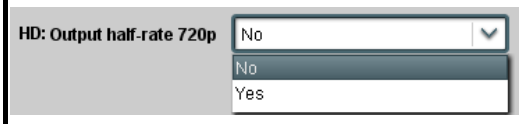
Scaler	**(continued)**
• HD: Convert To  Card Edge Control Menu: **Sclr** **1** HDIn **2** Out **3** SD HD (same as input) SD SD (NTSC or PAL) 720p 720p 720f 720 film 1080i 1080i 1080p 1080p 1080f 1080 film FREF Output Follows Reference In	When HD video input is received by the 9062, provides output format conversions listed below. • **HD (Same as input):** Output follows currently received video input format, with Current Input Format and Current Output Format displays showing same selection. • **SD (NTSC or PAL):** Output is converted to 525i at 59.94 Hz frame rate or 625i at 50 Hz rate, as applicable. • **720p:** Output is converted to 720p • **720 film:** Output is converted to corresponding 720p film frame rate • **1080i:** Output is converted to 1080i • **1080p:** Output is converted to 1080p • **1080 film:** Output is converted to corresponding 1080i film frame rate • **Output Follows Reference In:** Output tracks with format set in Reference Video Input **Note: Output Follows Reference In** selection automatically sets the output format to that of the received reference signal input (this signal is distributed to the 9062 and other cards via an 8310 frame bus). In addition to extracting a frame sync and rate, this function determines the type of black burst (i.e., black burst or tri-level) and sets the output format to match.
• HD: Output Half-rate 720p  Card Edge Control Menu: **Sclr** **1** HDIn **2** H720 **3** Yes Yes No No	When **HD: Convert to** drop-down list is set to **720p**, converts output to 720p half-rate. **Yes/No** control functions as follows: • **No:** Do not apply half-rate; leave output at standard frame rate • **Yes:** Output set at half-rate **Note:** Half-rate outputs are available for the 720p frame rates listed under "720p" in the "Scaler Video Format Conversions" table on page 3-19.
• HD: Output PsF  Card Edge Control Menu: **Sclr** **1** HDIn **2** HDSF **3** On On Off Off	When enabled (and with the output video is set to 1080 film) converts output to 1080PsF (segmented frame progressive).

Table 3-2 9062 Function Submenu/Parameter List — continued

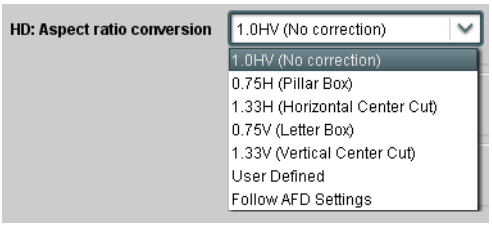
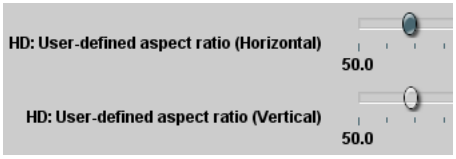
Scaler	**(continued)**
• HD: Aspect Ratio Conversion  Card Edge Control Menu: **Sclr** **1** HDIn; **2** ARC; **3** 1.0HV — 1.0HV (No correction) 0.75H — 0.75H (Pillar Box) 1.33H — 1.33H (Horizontal Center Cut) 0.75V — 0.75V (Letter Box) 1.33V — 1.33V (Vertical Center Cut) User — User Defined AFD — Follow AFD Settings	Selects between the standard preset Aspect Ratio Conversions (ARC) shown here, as well as **User Defined** and **Follow AFD Settings**. • **User Defined** settings allow custom user-defined H and V aspect ratio control. • **Follow AFD Settings** sets the output aspect ratio to track with AFD settings performed in AFD (p. 3-25). **Note:** This function is intended for aspect ratio adjustment of a particular signal without AFD considerations. • If ARC is being used on a case-by-case basis for a particular signal, it is easier to use the Scaler ARC tools described here. • If AFD is to be used to set and apply a standard AFD code label for ARC, use **Follow AFD Settings**. Do not perform ARC here; instead, perform ARC as described in the **AFD** function description on page 3-25.
• HD: User-defined aspect ratio  Card Edge Control Menu: **Sclr** **1** HDIn; **2** UsrH; **3** (H zoom value) — H zoom in percent **1** HDIn; **2** UsrV; **3** (V zoom value) — V zoom in percent	**(Horizontal)** and **(Vertical)** controls adjust horizontal and vertical zoom percentage. Settings less than (<) 100% provide zoom-out; settings greater than (>) 100% provide zoom-in. (50% to 200% range in 0.1% steps; null = 100.0)
• HD: Top line suppression  Card Edge Control Menu: **Sclr** **1** HDIn; **2** TopL; **3** (value) — Top line suppression value	Selects the number of lines suppressed at the beginning of video. In this manner, the image is scaled proportionally to replace the top few lines suppressed using this control. When upconverting from SD to HD, using this control can hide unwanted closed caption or timecode data. (Range is 0 thru 10 lines.)

Table 3-2 9062 Function Submenu/Parameter List — continued

Scaler	(continued)
• **Detail Enhancement Controls**	Sharpness Level, Threshold, and Noise Reduction controls (individually described below) which can be used to tailor output video sharpness per program material and aesthetic preferences. **Note:** Detail Enhancement Controls apply to both SD and HD conversions.
• **Sharpness Level Control**  Card Edge Control Menu: **Sclr** 1 DETE 2 LEVL 3 (value) Sharpness level value	Adjusts the aggressiveness of sharpening applied to MPEG video. Optimum setting results in overall perception of increased sharpness, while avoiding pattern noise artifacts. (Range is 0 thru 255)
• **Sharpness Threshold Control**  Card Edge Control Menu: **Sclr** 1 DETE 2 THRS 3 (value) Threshold level value	Adjusts the point at which sharpening rules become active. Data below the threshold setting is passed unaffected. Higher settings allow for a more subtle sharpness enhancement (especially with content showing motion). Lower settings allow more content in general to be acted upon by the enhancement process. (Range is 0 thru 255)
• **Noise Reduction Control**  Card Edge Control Menu: **Sclr** 1 DETE 2 NOIR 3 (value) Noise reduction value	Adjusts the amount of statistical low-pass filtering applied to the data. Using this control, regular pattern noise artifacts from the sharpening process can be reduced, resulting in subjectively smoother raster backgrounds and detail boundaries. (Range is 0 thru 63)

Table 3-2 9062 Function Submenu/Parameter List — continued

AFD	Allows assignment of AFD (Active Format Description) codes to the SDI output video, and allows unique ARC settings to be applied for each AFD code. When an appropriate AFD code is received by this card, this function can be used to apply the AFD-directed re-aspecting, resulting in a properly scaled and cropped image area.

Without AFD

NTSC-Coded (4:3) 1080i Video Signal → **Up-Conversion to 16:9** → **1080i Video Signal with 16:9 uncorrected signal**

NTSC-Coded image on 16:9 display shows letterbox cropping

Uncorrected up-conversion results in “postage stamp” effect with both letterbox and sidebars visible on 16:9 display

With AFD

NTSC-Coded (4:3) 1080i Video Signal with 1010 AFD Code → **9062 with 1010 AFD Code Received and Applied** → **Up-Conversion to 16:9** → **1080i Video Signal with 16:9 corrected signal**

NTSC-Coded image on 16:9 display shows letterbox cropping

AFD Corrected up-conversion results in intended image area properly visible on 16:9 display

Table 3-2 9062 Function Submenu/Parameter List — continued

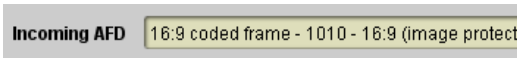
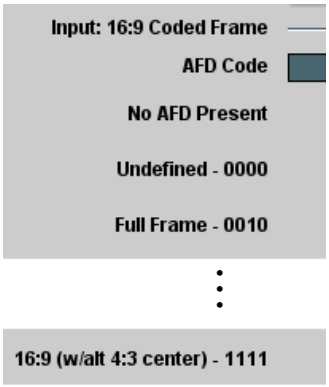
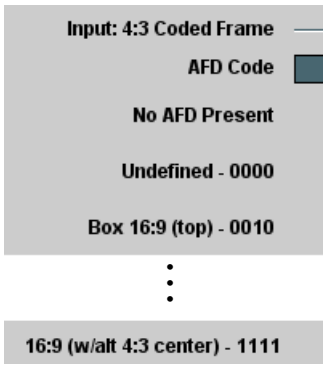
AFD	(continued)
• **Incoming AFD** 	Displays incoming AFD setting as follows: • If AFD code is present, one of the 11, four-bit AFD codes is displayed (as shown in the example to the left). Also displayed is the VANC line number of the incoming AFD code. • If no AFD setting is present in the video signal, **No AFD Present** is displayed.
• **16:9 Controls** 	Individual user (custom) **H Zoom**, **V Zoom**, and **AFD Output Code** tools for the following 12 AFD codes/formats suited for 16:9 sources: **AFD Code(1) / Description / AFD Code(1) / Description** – / No code present / 1001 / 4:3 (center) 0000 / Undefined / 1010 / 16:9 (image protected)(2) 0010 / Full frame / 1011 / 14:9 (center) 0011 / 4:3 (center) / 1101 / 4:3 (with alternate 14:9 center) 0100 / Box > 16:9 (center) / 1110 / 16:9 (with alternate 14:9 center)(2) 1000 / Full frame / 1111 / 16:9 (with alternate 4:3 center)(2) 1: AFD codes numbering and definitions conform to SMPTE 2016-1-2007. 2: Image Protected implies picture content that must not be cropped by conversion processes or display devices. Alternate center formats may have protected center areas, with areas outside of the protected area not containing mandatory content. Refer to SMPTE 2016-1-2007 for more information if needed.
• **4:3 Controls** 	Individual user (custom) **H Zoom**, **V Zoom**, and **AFD Output Code** tools for the following 12 AFD codes/formats suited for 4:3 sources: **AFD Code(1) / Description / AFD Code(1) / Description** – / No code present / 1001 / Full frame 0000 / Undefined / 1010 / 16:9 (center) 0010 / Box 16:9 (top) / 1011 / 14:9 (center) 0011 / Box 14:9 (top) / 1101 / 4:3 (with alternate 14:9 center) 0100 / Box > 16:9 (center) / 1110 / 16:9 (with alternate 14:9 center)(2) 1000 / Full frame / 1111 / 16:9 (with alternate 4:3 center)(2) 1: AFD codes numbering and definitions conform to SMPTE 2016-1-2007. 2: Image Protected implies picture content that must not be cropped by conversion processes or display devices. Alternate center formats may have protected center areas, with areas outside of the protected area not containing mandatory content. Refer to SMPTE 2016-1-2007 for more information if needed.

Table 3-2 9062 Function Submenu/Parameter List — continued

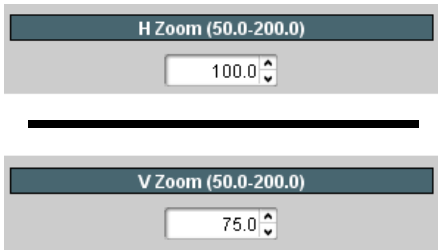
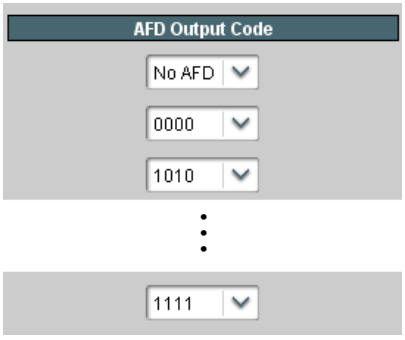
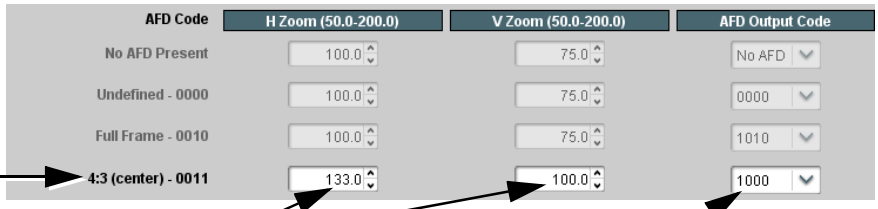
	**(continued)**
• H Zoom and V Zoom Controls 	Individual **H Zoom** and **V Zoom** controls for each of the 12 AFD code choices for both 4:3 and 16:9 coded input frames described above allow adjustment of horizontal and vertical zoom percentage for each AFD code. (50% to 200% range in 0.1% steps) **Note:** To apply H and V settings for a given AFD code using this card, Scaler **Aspect Ratio Conversion** must be set to **Follow AFD Settings**. **Note:** Default zoom percentages use the following rules: • The default zoom percentages displayed when this function is accessed are the default percentages corresponding to the respective AFD standard ratio definitions (for example, default horizontal and vertical zoom percentages for 4:3 ratios are correspondingly 133% and 100%, yielding a 4:3 aspect ratio). In these cases, the null values for this definition are the default values shown. • In cases where a different aspect ratio is to be used for a given received aspect ratio, the default ratio displayed is the null value that results (assuming no H or V zoom modification). For example, for a 16:9 signal and settings set for a 1111 (15) AFD code ("16:9 with 4:3 protected image"), the respective displayed default H and V zoom settings of 100% and 75% protect the Protected Image Area.
• AFD Output Code 	Twelve drop-down lists that allow assignment of AFD codes to the 12 individual **H Zoom** and **V Zoom** tools described above. **Note:** • The default AFD codes displayed when this function is accessed show the SMPTE AFD code most closely reflecting the aspect ratio when the corresponding default settings are applied. • An AFD Output Code setting has no effect on aspect on ARC performed by this card; it merely applies a selected AFD code to the output video.
 In this example, if a "0011" AFD code is received, the entered **H Zoom** and **V Zoom** values corresponding to AFD code 0011 are applied to the image (133.0% and 100.0%, respectively, in this example). The H Zoom and V Zoom values for any AFD code can be changed as desired. When the card **Scaler Aspect Ratio Conversion** is set to **Follow AFD Settings**, the H and V zoom values set here are applied to the output video. In this example, with the AFD Output Code drop-down set to 1000, if a 0011 code is received on the input, an AFD code of 1000 is ouputted by the card. (Note that the assigned output code has no effect on ARC performed within this card.)	

Table 3-2 9062 Function Submenu/Parameter List — continued

AFD	**(continued)**
• **Output Line** 	Allows selecting the line location of the AFD data within the video signal Ancillary Data space. (Range is 9 thru 41) **Note:** • Although the output line drop-down will allow any choice within the 9 thru 41 range, the actual range is automatically clamped (limited) to certain ranges to prevent inadvertent conflict with active picture area depending on video format. See Ancillary Data Line Number Locations and Ranges (p. 3-13) for more information. • The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.
• **Restore Defaults** 	**Restore Defaults** provides default restore of all user settings described in the remainder of the AFD function description. When Confirm is clicked, a **Confirm?** pop-up appears, requesting confirmation. • Click **Yes** to proceed with restore defaults. • Click **No** to reject restore defaults.

Table 3-2 9062 Function Submenu/Parameter List — continued

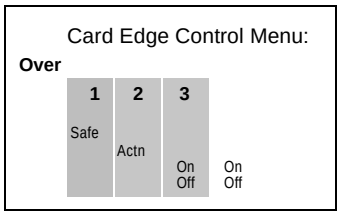
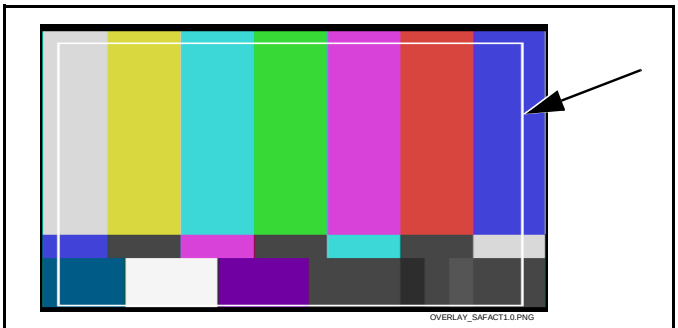
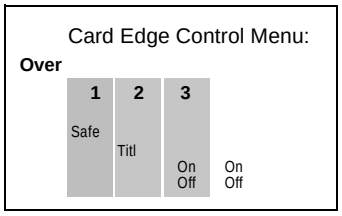
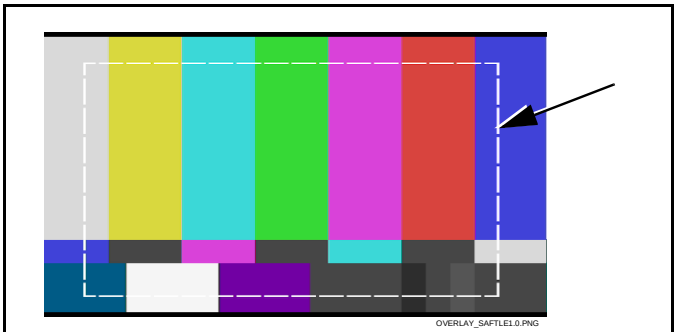
Overlays	Allows Safe Action and/or Safe Title overlays to be added to the image. The overlays can be used to identify safe action and safe title areas within the image.
Note: Overlay markers using this function are for setup only. When enabled, these markers are embedded in the SDI video output signal and may appear in the image. Use this function **only** on preview video and not on-air video. Make certain any overlay tools are turned **off** when done. **Note:** Multiple overlay markers described below can be simultaneously enabled as desired.	
• **Safe Action Area**  	When enabled (**On**), turns on the Safe Action Area overlay.  When enabled (**On**), outline shows Safe Action Area boundary. Color of boundary is selected using **Color** drop-down list.
• **Safe Title Area**  	When enabled (**On**), turns on the Safe Title Area overlay.  When enabled (**On**), outline shows Safe Title Area boundary. Color of boundary is selected using **Color** drop-down list.

Table 3-2 9062 Function Submenu/Parameter List — continued

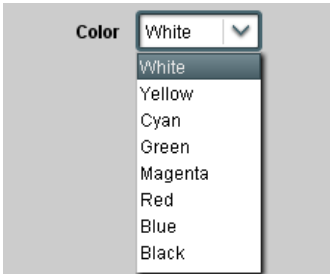
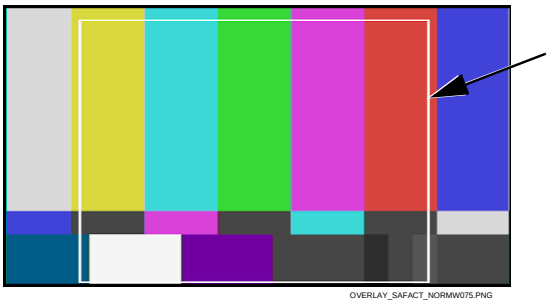
Overlays	(continued)
• **Safe Action/Title Area Color**  Card Edge Control Menu: **Over** **1** Safe **2** Colr **3** WHT White, YELO Yellow, CYAN Cyan, GRN Green, MAGE Magenta, RED Red, BLUE Blue, BLAC Black	Selects the Safe Action and Safe Title overlay color from choices shown to the left.
• **0.75H Safe Action Area**  Card Edge Control Menu: **Over** **1** 0.75H **2** Actn **3** On Off, On Off	When enabled (**On**), turns on the 0.75H Safe Action Area overlay that shows the 4:3 safe area on a 16:9 image (i.e., the resulting safe area when the image is converted to 4:3).  Outline shows 0.75H Safe Action Area boundary. Color of boundary is selected using **Color** drop-down list. **Note:** If **0.75H (Pillar Box)** is selected using the Aspect Ratio Conversion tool in the **Scaler** function, and **Overlays Follow ARC** is selected for this function, the overlays will be additionally reduced 0.75H beyond the standard 4:3 safe areas

Table 3-2 9062 Function Submenu/Parameter List — continued

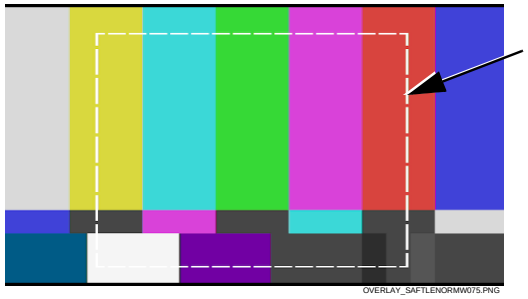
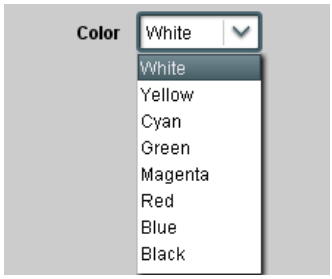
Overlays	**(continued)**
• **0.75H Safe Title Area**  Card Edge Control Menu: **Over** **1** 0.75H **2** Titl **3** On / Off On / Off	When enabled (**On**), turns on the 0.75H Safe Title Area overlay that shows the 4:3 safe title area on a 16:9 image (i.e., resulting safe title area when the image is converted to 4:3).  Outline shows 0.75H Safe Title Area boundary. Color of boundary is selected using **Color** drop-down list. **Note:** If **0.75H (Pillar Box)** is selected using the Aspect Ratio Conversion tool in the **Scaler** function, and **Overlays Follow ARC** is selected for this function, the overlays will be additionally reduced 0.75H beyond the standard 4:3 safe areas
• **0.75H Safe Action/Title Area Color**  Card Edge Control Menu: **Over** **1** 0.75H **2** Colr **3** WHT White / YELO Yellow / CYAN Cyan / GRN Green / MAGE Magenta / RED Red / BLUE Blue / BLAC Black	Selects the 0.75H Safe Action and 0.75H Safe Title overlay color from choices shown to the left.

Table 3-2 9062 Function Submenu/Parameter List — continued

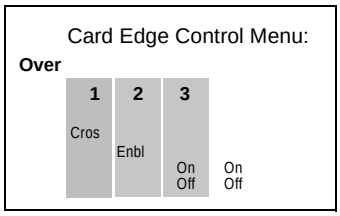
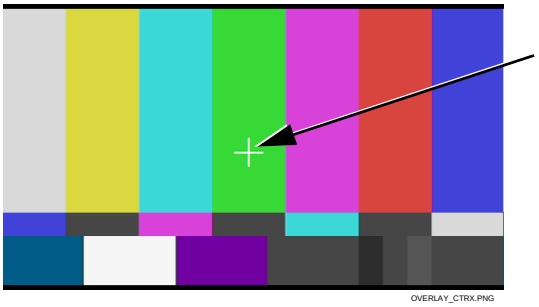
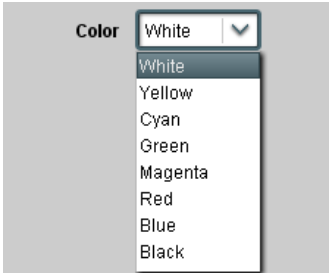
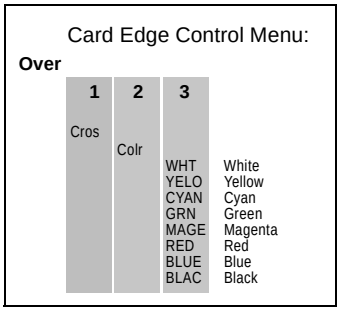
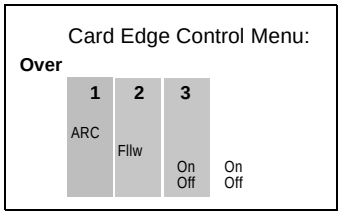
Overlays	(continued)
• **Center Cross**  	When enabled (**On**), turns on the Center Cross overlay.  Color of marker is selected using **Color** drop-down list.
• **Center Cross Color**  	Selects the Center Cross overlay color from choices shown to the left.
• **Overlays Follow ARC**  	When enabled (**On**), overlays are resized along with the image in accordance with any ARC settings. **Note:** This choice functions only when a zoom-out is applied (settings less than 100%).

Table 3-2 9062 Function Submenu/Parameter List — continued

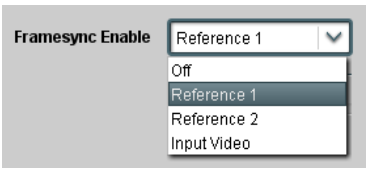
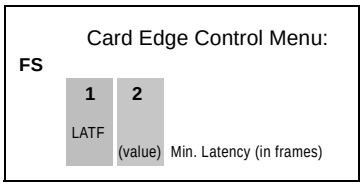
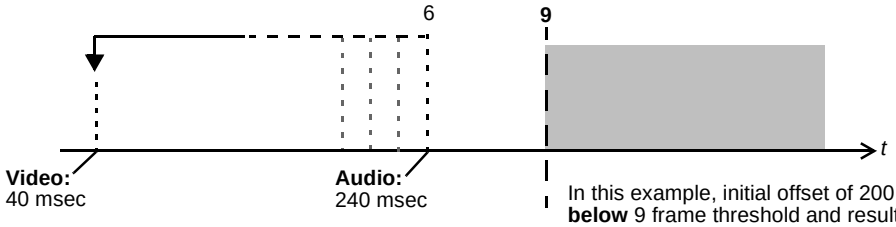
Framesync	Provides video Frame Sync offset and audio re-sync tools.
• **Framesync Enable**  Card Edge Control Menu: **FS** **1** Enbl **2** Off — Frame Sync Off (disabled) Ref1 — Reference 1 selected Ref2 — Reference 2 selected	Disables the Frame Sync function, or selects from choices below. • **Off:** Disables Frame Sync function; output video timing matches the input video timing. • **Reference 1:** Allows Frame Sync function to use external Reference 1 as the reference standard. • **Reference 2:** Allows Frame Sync function to use external Reference 2 as the reference standard. **Note:** If Reference 1 or Reference 2 is selected and an appropriate external reference is not received, the Frame Sync Reference Invalid indication appears in the Card Info status portion of DashBoard™, indicating invalid frame sync reference error. (Additionally, the card edge ERR indicator illuminates indicating the same.) External reference signals Reference 1 and Reference 2 are distributed to the card and other cards via an 8310 frame bus. • **Input Video:** Uses the input video signal as the reference standard. **Note:** If **Input Video** is used for framesync, any timing instability on the input video will result in corresponding instability on the output video.
• **Vertical Delay Control**  Card Edge Control Menu: **FS** **1** VOS **2** (value) Vertical delay value (in number of lines)	When Framesync is enabled, sets vertical delay (in number of lines of **output video/format**) between the output video and the frame sync reference. (Range is -1124 thru 1124 lines.) **Note:** Lines refer to lines in the output video format, and not to the reference format.
• **Horizontal Delay Control**  Card Edge Control Menu: **FS** **1** HOS **2** (value) Horizontal delay value	When Framesync is enabled, sets (in µsec of **output video timing**) horizontal delay between the output video and the frame sync reference. (Range is -64.000 thru 64.000 µsec) **Note:** When an external framesync reference is used, the card will not produce a framesync reset until the variance between framesync reference and output video exceeds ± 2 clock periods. Therefore, a framesync reset will not result if offsets within this window are applied. To apply an offset/framesync reset within this window, first apply a relatively large offset, then apply the target smaller offset. **Example:** To apply a 1-period offset, first apply a 10-period positive offset and then apply a 9-period negative offset. This results in the target 1-period offset being applied to the output video.

Table 3-2 9062 Function Submenu/Parameter List — continued

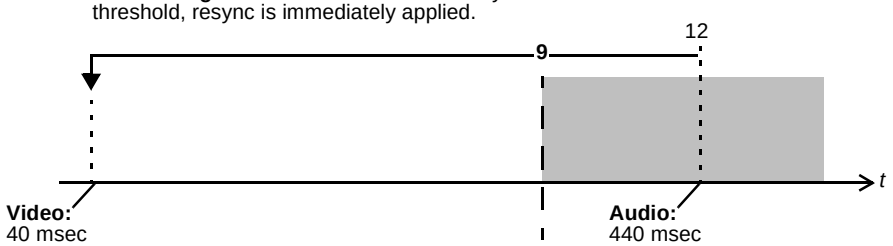
Framesync	(continued)
• **Minimum Latency Control**  	When Framesync is enabled, specifies the smallest amount of latency allowed by the frame sync (latency measurement in output video frames). The frame sync will not output a frame unless the specified number of frames are captured in the buffer. **The operational latency of the frame sync is always between the specified minimum latency and minimum latency plus one frame (not one field).** (Maximum range is 0 to 13.) **Note:** Due to card memory limits, the maximum available Minimum Latency Frames is related to the output video format. For example, with a 1080i59.94 output, the maximum allowed setting is 5. For a 1080i film (23.98) output, the maximum allowed setting is 3. Conversely, greater maximum settings are allowed for SD formats such as 525i59.94, where the practical maximum limit is 13. When using this control, be sure to check the **Framesync Status** display as follows:  • Latency frames selection within limits.  • Latency frames selection exceeds limits.
• **Audio Hard Resync Threshold Control** 	Sets threshold at which hard resync is applied if audio-video offset exceeds threshold (see below). Hard resync provides fastest snyc-up suitable for off-air manipulation. Conversely, a threshold setting high enough to accommodate normal on-air offsets allows on-air resync that is glitch-free. (Range is 1.5 to 13.0 frames in 0.1 frame increments)

With offset **less than** selected hard resync threshold, resync is progressively applied in many small steps to provide a seamless, glitch-free retiming. After the successive steps, the audio is synchronized with the video (in this example, 40 msec). (Progressive correction is applied at 1 msec/sec appr. rate.)



In this example, initial offset of 200 msec (appr. 6 frames) is **below** 9 frame threshold and results in soft resync being progressively applied.

With offset **greater than** selected hard resync threshold, resync is immediately applied.



In this example, initial offset of 400 msec (appr. 12 frames) is **above** 9 frame threshold and results in immediate hard resync.

Table 3-2 9062 Function Submenu/Parameter List — continued

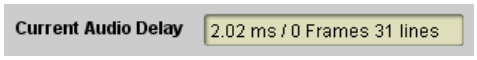
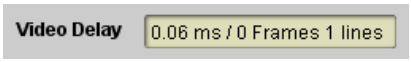
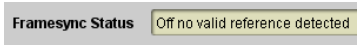
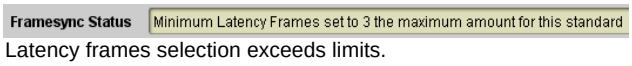
Framesync	**(continued)**
• **Audio Offset Control** 	Adds or reduces (offsets) audio delay from the matching video delay (audio delay offset setting adds or removes delay in addition to any delay included by other actions). This control is useful for correcting lip sync problems when video and audio paths in the chain experience differing overall delays. (-575.0 msec to 575.0 msec range; null = 0.0 msec) **Note:** Delay offset values of less than approximately 1 frame are progressively applied by the card to provide a seamless, glitch-free retiming. However, delay offset values exceeding 1-1/2 frames may result in a slight audio discontinuity at the moment when the offset is applied using this control if the **Audio Hard Resync Threshold** control is not at a setting greater than the delay offset. To prevent this condition during an on-air manipulation, it is recommended that the **Audio Hard Resync Threshold** control be set high enough such that expected delay offsets exceeding 1-1/2 frames are progressively applied. **Note:** If using Audio Offset control to perform off-air corrections, it is recommended to temporarily set the **Audio Hard Resync Threshold** control to its **minimum** setting, thereby allowing the offset to be assessed and corrected as fast as possible.
• **Current Audio Delay Display** 	Displays the current input-to-output audio delay (in msec units) as well as in terms of Frames/fractional frame (in number of lines).
• **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).
• **Framesync Status Display** 	Displays the current framesync status as follows:  • Framesync status OK.  • Framesync Enable set to **Off**.  • Improper or missing framesync reference.  • Latency frames selection exceeds limits. **Note:** See **Minimum Latency Frames Control** (p. 3-34) for more information about this message.

Table 3-2 9062 Function Submenu/Parameter List — continued

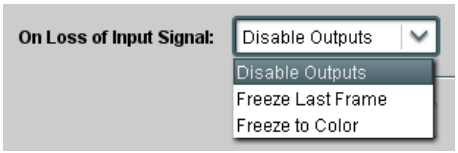
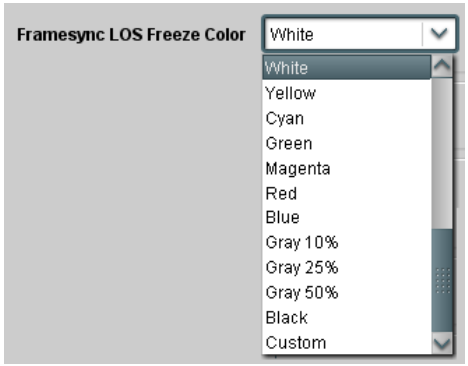
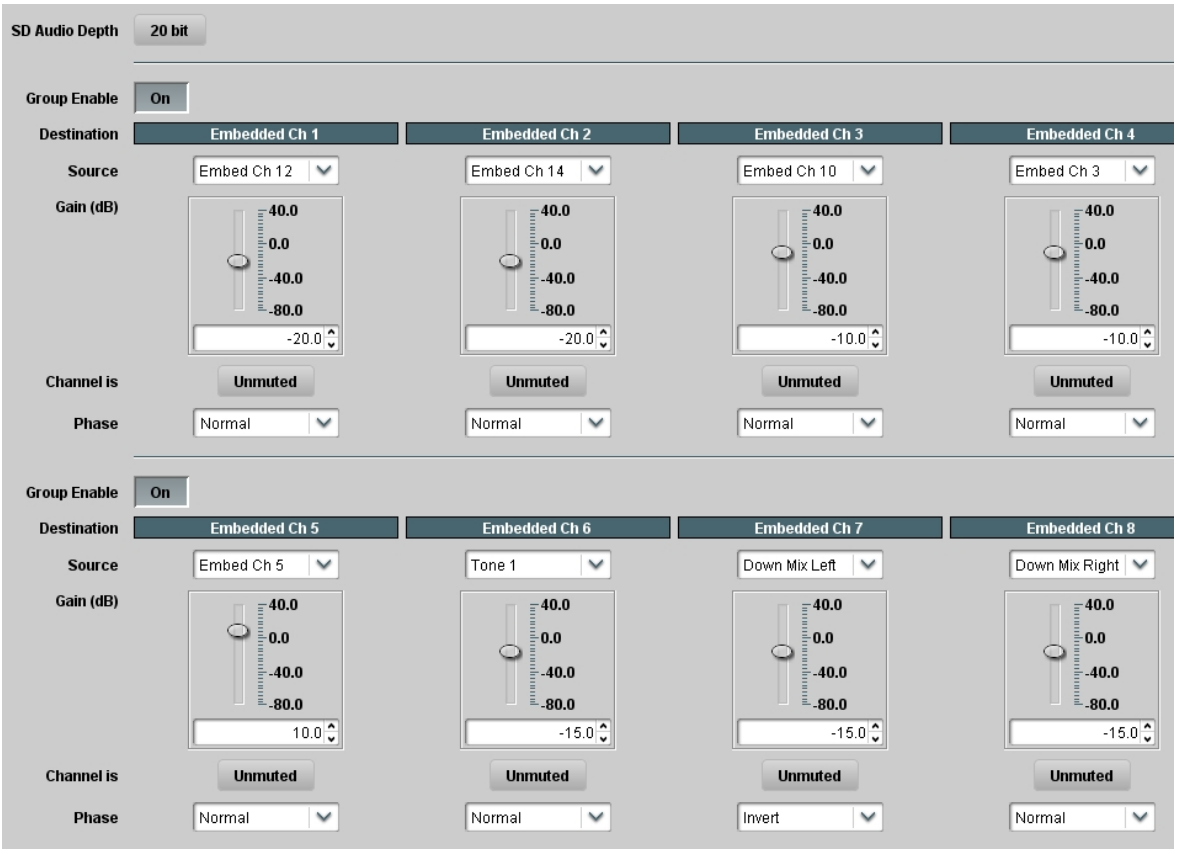
Framesync	(continued)
• **Loss of Input Signal Selection** 	In the event of input video Loss of Signal (LOS), determines action to be taken as follows: • **Disable Outputs:** Disable all outputs. • **Freeze Last Frame:** Freeze image to last good frame (last frame having valid SAV and EAV codes). • **Freeze to Color:** Freeze image to a color raster (as selected using Framesync LOS Freeze Color control).
• **Framesync LOS Freeze Color** 	In the event of LOS with **Freeze to Color** enabled above, sets the image raster color from choices shown to the left.
• **Custom Color Hue** 	Adjusts raster hue (phase angle) for custom LOS color. (-360° to 360° range in 0.1° steps; null = 0°)
• **Custom Color Saturation** 	Adjusts raster saturation level for custom LOS color. (0% to 100% range in 0.1% steps)
• **Custom Color Y Level** 	Adjusts raster luma level for custom LOS color. (64 to 940 range)
• **Reset Framesync** 	Resets the frame sync, clearing any buffered audio and video. When Confirm is clicked, a **Confirm?** pop-up appears, requesting confirmation. • Click **Yes** to reset the frame sync. • Click **No** to reject reset.

Table 3-2 9062 Function Submenu/Parameter List — continued

Embedded Audio Group 1/2	Selects the audio source for each embedded audio channel 1 thru 8 (Embedded Audio Groups 1 and 2). Also provides Gain, Phase Invert, and Muting controls for each channel.



The example above shows various Source selections and individual audio control settings for audio sources fed to the Destination channels **Embedded Ch 1** thru **Embedded Ch 8** in Embedded Audio Groups 1 and 2, with the resulting setup (right).

The source-to-destination correlation shown here is only an example; **any** of the sources on the left can connect to **any** of the destinations on the right, or to Embedded Audio Groups 3 and 4 (not shown here). Additional sources not shown here are also available. These are described on the following pages.

The controls shown here are described in detail on the following pages.

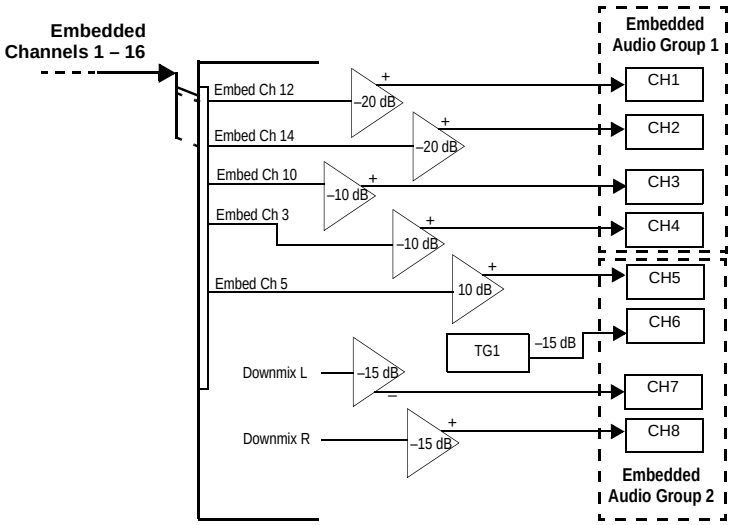


Table 3-2 9062 Function Submenu/Parameter List — continued

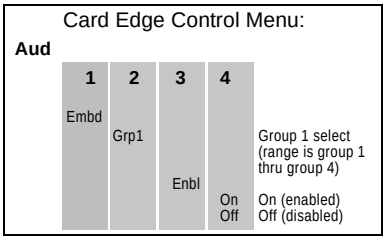
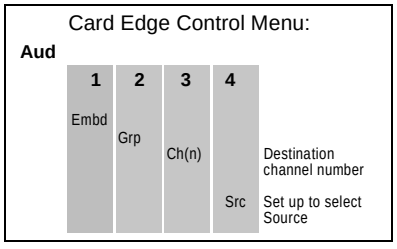
Embedded Audio Group 1/2	(continued)
• **SD Audio Depth** 	Allows option of using 24-bit audio data structure per SMPTE 272M, §3.10 (default is 20-bit per SMPTE 272M, §3.5). **Note:** • If 24-bit depth is desired, make certain downstream equipment is compatible with 24-bit SD audio data. • Depth control setting applied here affects both Embedded Audio Group 1/2 and 3/4.
• **Group Enable**  	When enabled (**On**), enables the embedding of the corresponding embedded audio group (Embedded Audio Group 1 or Embedded Audio Group 2). • Embedded Audio Group 1 consists of embedded channels 1 thru 4. • Embedded Audio Group 2 consists of embedded channels 5 thru 8. Two Group Enable buttons correspondingly enable or disable Embedded Audio Group 1 and Embedded Audio Group 2. Disabling a group removes the entire group of embedded audio channels while preserving the settings of the channels belonging to the group.
Note: • **Embedded Ch 2** thru **Embedded Ch 8** have controls identical to the **Source**, **Gain**, **Mute**, and **Phase** controls described here for **Embedded Ch 1**. Therefore, only the **Embedded Ch 1** controls are shown here. • For each channel, its source and destination should be considered and appropriately set. Unused destination channels should be set to the **Silence** selection.	
• **Embedded Channel Source**  	Using the **Source** drop-down list, selects the audio input source to be embedded in the corresponding embedded channel from the choices described below.

Table 3-2 9062 Function Submenu/Parameter List — continued

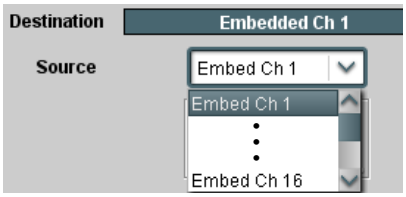
Embedded Audio Group 1/2	**(continued)**
• Embedded Ch 1 thru Ch 16 as Source  Card Edge Control Menu: **Aud** **1** Embd **2** Grp **3** Ch(n) **4** Src Em(n) Source; Embedded Channel (1 thru 16)	**Embed Ch 1** thru **Embed Ch 16** range in Source drop-down list enables an embedded channel (Ch 1 thru Ch 16) to be the source for the selected destination Embedded Audio Group channel. (In this example, Embed Ch 1 (embedded Ch 1) is the source for destination Embedded Ch 1)
• Down Mix Left or Right as Source  Card Edge Control Menu: **Aud** **1** Embd **2** Grp **3** Ch(n) **4** Src DM L Downmix L channel DM R Downmix R channel	**Down Mix Left** and **Down Mix Right** selections in Source drop-down list allow either downmixer left or right channel to be the source for the selected destination Embedded Audio Group channel. (In this example, the Down Mix Left channel is the source for destination Embedded Ch 1) **Note:** Down Mix Left and Down Mix Right channels are a stereo pair derived from the L, C, R, Ls, and Rs channel inputs selected using the Audio Mixing function. The stereo pair consists of simple L/R PCM signals with no additional encoded information. Refer to **Audio Mixing** function description on page 3-50 for more information.
• Mono Mix as Source  Card Edge Control Menu: **Aud** **1** Embd **2** Grp **3** Ch(n) **4** Src Mono Mono mix selection as source	**Mono** selection in Source drop-down list allows mono mix content to be the source for the selected destination Embedded Audio Group channel. (In this example, the mono content is the source for destination Embedded Ch 1) **Note:** Mono mix content is set up using Mono Mixer Selection in the **Audio Mixing** function). Refer to **Audio Mixing** function description on page 3-50 for more information.

Table 3-2 9062 Function Submenu/Parameter List — continued

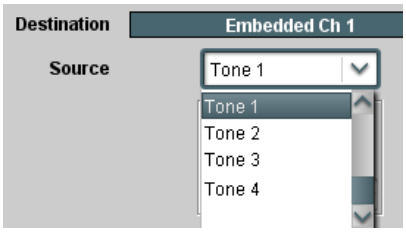
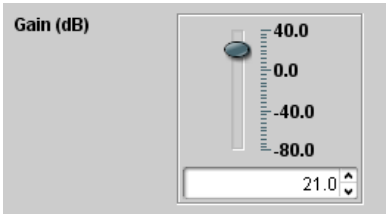
Embedded Audio Group 1/2	(continued)
• Tone Generator 1 thru 4 as Source  Card Edge Control Menu: **Aud** 1 Embd, 2 Grp, 3 Ch(n), 4 Src TG(n) — Source; TG 1 thru 4	**Tone Generator 1** thru **Tone Generator 4** range in Source drop-down list enables one of four tone generators (Tone 1 thru Tone 4) to be the source for the selected destination Embedded Audio Group channel. (In this example, Tone 1 (tone generator 1) is the source for destination Embedded Ch 1) **Note:** Tone generator frequencies can be independently set for the four tone generator sources. Refer to **Tone Generator** function description on page 3-49 for more information.
• Silence (Mute) as Source  Card Edge Control Menu: **Aud** 1 Embd, 2 Grp, 3 Ch(n), 4 Src Off — Channel Silence	**Silence** selection in Source drop-down list mutes the selected destination Embedded Audio Group channel. **Use this setting for unused destination channels.** (In this example, silence (muting) is applied to Embedded Ch 1)
• Gain (dB) Control  Card Edge Control Menu: **Aud** 1 Embd, 2 Grp, 3 Ch(n), 4 Gain (value) — Gain value (in dB)	Adjusts and displays relative gain (in dB) applied to the corresponding destination Embedded Audio Group channel. (-80 to +40 dB range in 0.1 dB steps; unity = 0.0 dB)

Table 3-2 9062 Function Submenu/Parameter List — continued

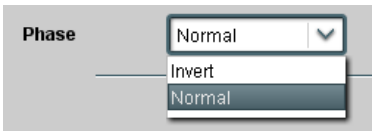
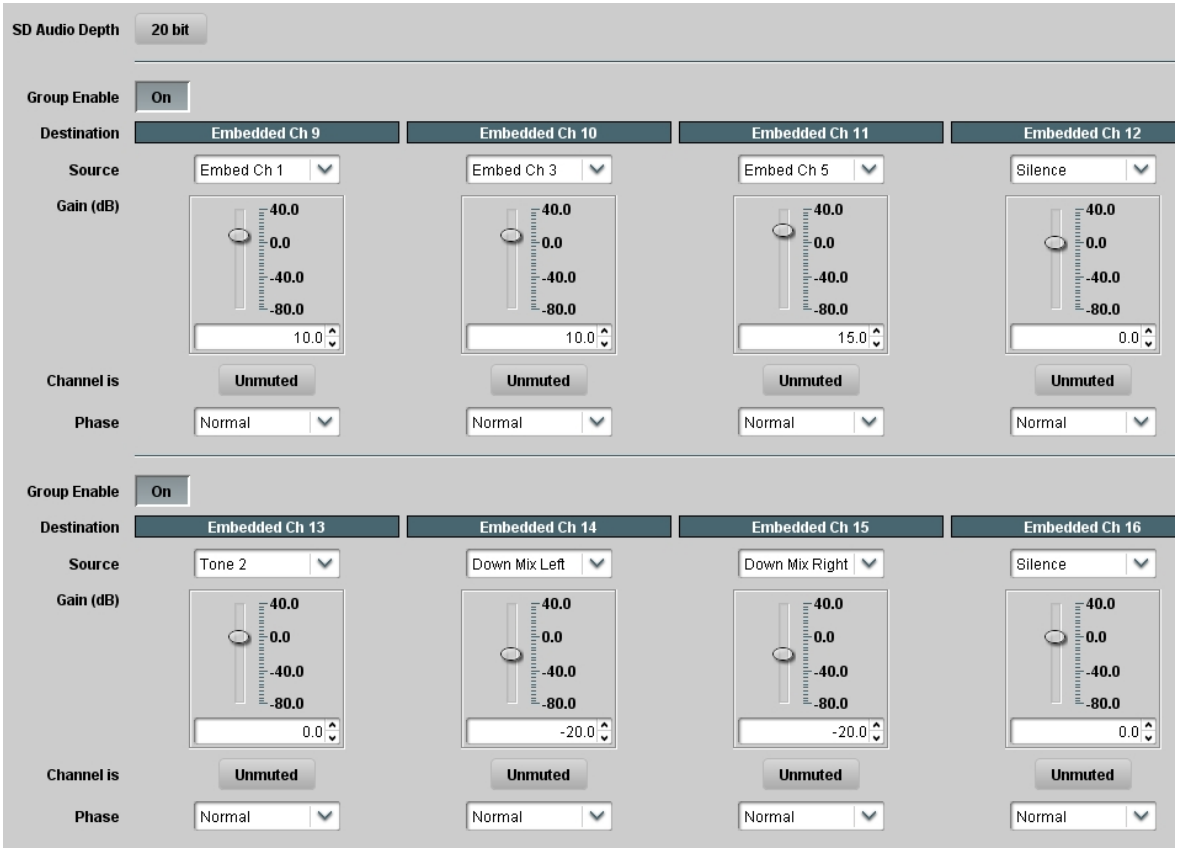
Embedded Audio Group 1/2	**(continued)**
• Mute Control  Card Edge Control Menu: **Aud** **1** Embd **2** Grp **3** Ch(n) **4** Mute Off On Unmuted Muted	Allows pushbutton On/Off channel muting while saving all other settings.
• Phase Control  Card Edge Control Menu: **Aud** **1** Embd **2** Grp **3** Ch(n) **4** Pol Norm Inv non-invert invert	Selects between **Normal** and **Invert** phase (relative to source original phase) for the destination Embedded Audio Group channel.

Table 3-2 9062 Function Submenu/Parameter List — continued

Embedded Audio Group 3/4	Selects the audio source for each embedded audio channel 9 thru 16 (Embedded Audio Groups 3 and 4). Also provides Gain, Phase Invert, and Muting controls for each channel.



The example above shows various Source selections and individual audio control settings for various audio sources fed to the Destination channels **Embedded Ch 9** thru **Embedded Ch 16** in Embedded Audio Groups 3 and 4, with the resulting setup (right).

The source-to-destination correlation shown here is only an example; **any** of the sources on the left can connect to **any** of the destinations on the right, or to Embedded Audio Groups 1 and 2 (not shown here). Additional sources not shown here are also available.

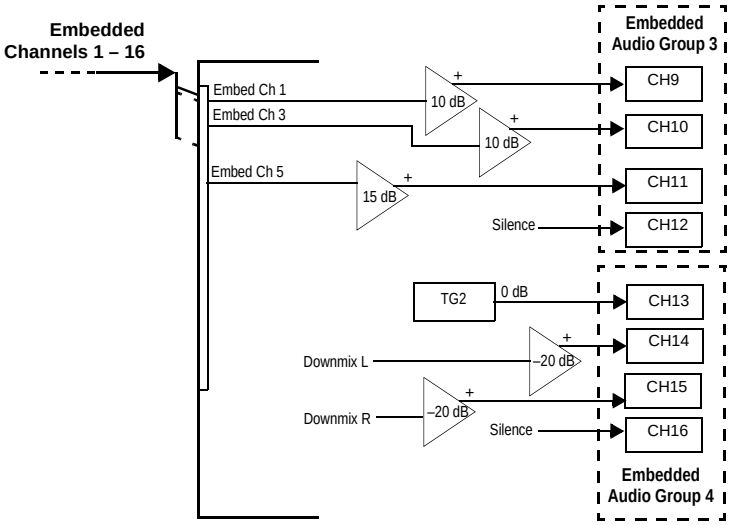


Table 3-2 9062 Function Submenu/Parameter List — continued

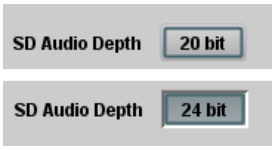
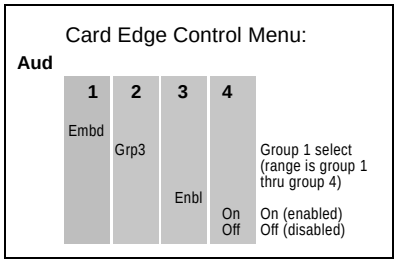
Embedded Audio Group 3/4	**(continued)**
• **SD Audio Depth** 	Allows option of using 24-bit audio data structure per SMPTE 272M, §3.10 (default is 20-bit per SMPTE 272M, §3.5). **Note:** • If 24-bit depth is desired, make certain downstream equipment is compatible with 24-bit SD audio data. • Depth control setting applied here affects both Embedded Audio Group 1/2 and 3/4.
• **Group Enable**  	When enabled (**On**), enables the embedding of the corresponding embedded audio group (Embedded Audio Group 3 or Embedded Audio Group 4). • Embedded Audio Group 3 consists of embedded channels 9 thru 12. • Embedded Audio Group 4 consists of embedded channels 13 thru 16. Two Group Enable buttons correspondingly enable or disable Embedded Audio Group 3 and Embedded Audio Group 4. Disabling a group removes the entire group of embedded audio channels while preserving the settings of the channels belonging to the group.
Note: • Embedded Ch 9 thru Embedded Ch 16 have controls that are identical to the **Source**, **Gain**, **Mute**, and **Phase** controls described for Embedded Ch 1. Refer to Embedded Audio Group 1/2 on page 3-37 for descriptions of these controls. • For each channel, its source and destination should be considered and appropriately set. Unused destination channels should be set to the **Silence** selection.	

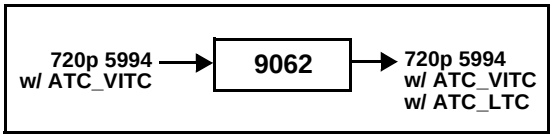
Table 3-2 9062 Function Submenu/Parameter List — continued

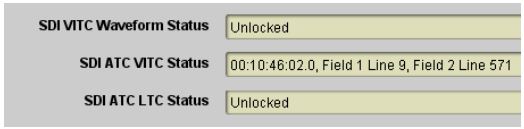
Dolby	Extracts and preserves Dolby® metadata from the input SDI, and allows the metadata to be re-inserted in the output SDI. This allows scaling and/or format conversions without losing Dolby® metadata.
• **Metadata Embedding** 	**Metadata Embedding (On/Off)** controls SMPTE 2020-1 metadata embedding in the SDI video output. • When set to **On**, metadata is extracted from the SDI input video, buffered, and re-directed to the output SDI video. • When set to **Off**, metadata is not embedded in the output SDI video.
• **Metadata Output Line** 	Allows selection of SMPTE 2020-1 metadata line location within the VANC space for re-inserted Dolby® metadata. (Range is 9 thru 41; default is line #13.) **Note:** • Although the output line drop-down will allow any choice within the 9 thru 41 range, the actual range is automatically clamped (limited to) certain ranges to prevent inadvertent conflict with active picture area depending on video format. See Ancillary Data Line Number Locations and Ranges (p. 3-13) for more information. • The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data unless existing metadata is to be intentionally overwritten.
Closed Captioning	Provides support for closed captioning setup.
• **Closed Captioning On/Off**  **CC** Card Edge Control Menu: **1** Enbl **2** Off / On Closed Captioning function disabled Closed Captioning function enabled	Turns on or turns off the Closed Captioning on the output. **Note:** • When set to On, closed captioning is set to standard default line number. See Ancillary Data Line Number Locations and Ranges (p. 3-13). • The card does not check for conflicts on a given line number. Make certain selected line is available and carrying no other data. • Closed captioning line may contain active unintended data even if closed captioning is set to **Off**. If closed captioning is not to be used, it is recommended to use the **Top Line Suppression** control to eliminate the possibility of this unintended data from appearing in the active video area. (See Scaler tab **Top line suppression** control for more details.)
• **Closed Captioning Input Status** 	Displays incoming Closed Captioning status as follows: • If closed captioning is present, a message similar to the example shown left is displayed. Also displayed is the VANC line number of the incoming closed captioning packet. • If no closed captioning is present in the video signal, **Not Present** or **Disabled** is displayed.
• **Closed Captioning HD Output Line**  **CC** Card Edge Control Menu: **1** HDL# **2** (value) HD line number (9 thru 41)	Selects the VANC line number (9 thru 41) for the closed caption data when the output is HD. (The default is line #10.) **Note:** • Although the output line drop-down will allow any choice within the 9 thru 41 range, the actual range is automatically clamped (limited to) certain ranges to prevent inadvertent conflict with active picture area depending on video format. See Ancillary Data Line Number Locations and Ranges (p. 3-13) for more information. • The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data unless existing metadata is to be intentionally overwritten.

Table 3-2 9062 Function Submenu/Parameter List — continued

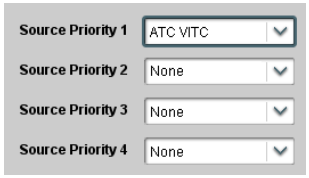
Timecode	Provides timecode data extraction from various sources, and provides formatting and re-insertion controls for inserting the timecode into the output video.

Shown below is an example in which received 720p 5994 SDI video containing an SDI ATC_VITC timecode is to be outputted instead with both ATC_VITC and ATC_LTC timecodes using this function. Each Timecode control is fully described on the pages that follow.



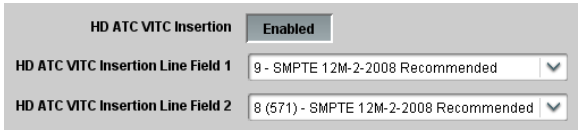


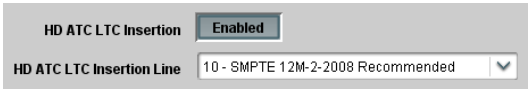
Ⓐ Noting that the incoming video contains SDI ATC_VITC timecode data (as shown in the status display), set the Source Priority drop-down lists to include SDI ATC_VITC timecode data as a choice. This extracts SDI ATC_VITC timecode data from the incoming video.



Ⓑ In this example, it is desired to provide both SDI ATC_VITC and ATC_LTC timecode data in the HD output video. As such, set both **HD ATC VITC Insertion** and **HD ATC LTC Insertion** to **Enabled**.

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





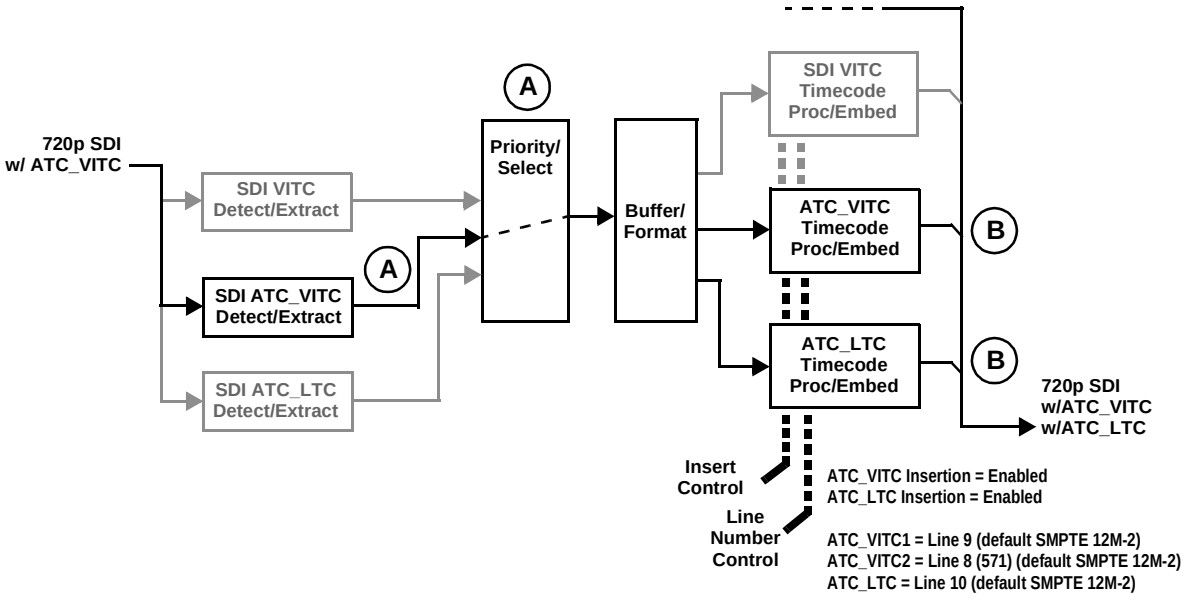


Table 3-2 9062 Function Submenu/Parameter List — continued

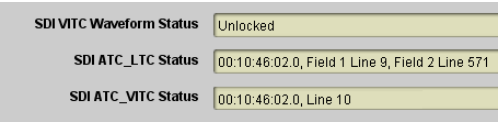
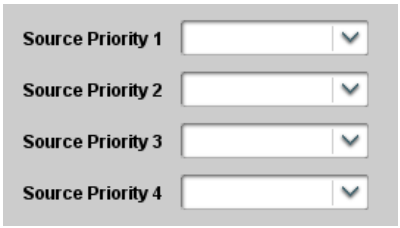
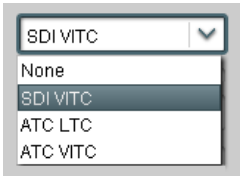
Timecode	(continued)
• **Timecode Source Status Displays** 	Displays the current status and contents of the three supported timecode formats shown to the left. • If a format is receiving timecode data, the current content (timecode running count and line number) is displayed. • If a format is not receiving timecode data, Unlocked is displayed.
• **Incoming ATC Packet Removal Control**  Card Edge Control Menu: **TC** **1** Rmvl **2** Off Packet removal disabled On Packet removal enabled	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:** When the Scaler is enabled, ATC packets are automatically removed. The Timecode function must be used to re-insert the timecode data into the output video.
• **Source Priority**  Card Edge Control Menu: **TC** **1** PRI(n) Priority (1 thru 4) **2** None No source selected SVIT SDI VITC ATCL ATC_LTC ATCV ATC_VITC	As described here, selects the priority assigned to each of the three supported formats (or none) in the event the preferred source is unavailable. Each of the four Source Priority selection lists allows assignment of source priority from the following choices:  **Source Priority 1** thru **Source Priority 4** select the preferred format to be used in descending order (i.e., Source Priority 2 selects the second-most preferred format, and so on).

Table 3-2 9062 Function Submenu/Parameter List — continued

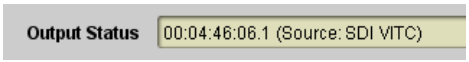
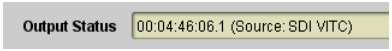
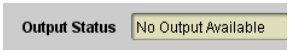
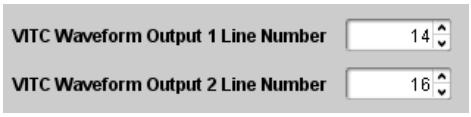
Timecode	(continued)
• **Output Status Display** 	Displays the current content and source being used for the timecode data as follows:  • Output status OK (in this example, SDI VITC timecode received and outputted).  • Timecode not available due to lack of appropriate input timecode data on enabled formats. **Note:** Timecode output requires that source and priority are appropriately selected (as described above in **Source Priority**). Also, video input must contain appropriate timecode data.  • **Timecode Insertion** button set to **Disabled**; output insertion disabled.
• **VITC Waveform Output Line**  Card Edge Control Menu: **TC** **1** VITO **2** (value) VITC output 1 line number only (6 thru 22)	Selects the VITC1 and VITC2 line numbers (6 thru 22) where the VITC data is inserted. (The default is line #14/16.) **Note:** • Although the output line drop-down will allow any choice within the 6 thru 22 range, the actual range is automatically clamped (limited) to certain ranges to prevent inadvertent conflict with active picture area depending on video format. See Ancillary Data Line Number Locations and Ranges (p. 3-13) for more information. • The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data. • If only one output line is to be used, set both controls for the same line number.
• **SD VITC Waveform Insertion Control**  Card Edge Control Menu: **TC** **1** SDVC **2** Off SD VITC timecode insertion disabled On SD VITC timecode insertion enabled	For SD output, enables or disables VITC waveform timecode insertion into the video stream.
• **SD ATC Insertion Control**  Card Edge Control Menu: **TC** **1** SDAT **2** Off SD ATC_VITC timecode insertion disabled On SD ATC_VITC timecode insertion enabled	For SD output, enables or disables SD ATC_VITC timecode insertion into the video stream. **Note:** SD ATC_VITC is locked to line 12. The card does not check for conflicts on a given line number. Make certain this line is available if SD ATC_VITC is to be used. See Ancillary Data Line Number Locations and Ranges (p. 3-13) for more information.

Table 3-2 9062 Function Submenu/Parameter List — continued

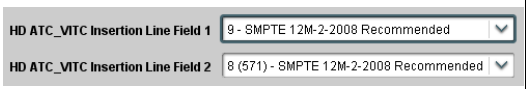
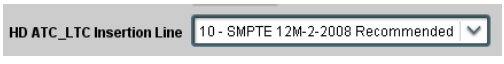
Timecode	(continued)
• **HD ATC_VITC Insertion Control**  Card Edge Control Menu: **TC** **1** HFVC **2** Off — HD ATC_VITC timecode insertion disabled On — HD ATC_VITC timecode insertion enabled	For HD output, enables or disables ATC_VITC timecode insertion into the video stream.
• **HD ATC_VITC Line Insertion Controls** 	For HD ATC_VITC timecode output, selects the line number for ATC_VITC1 and ATC_VITC2. **Note:** • Although the output line drop-down will allow any choice within the 8 thru 20 range, the actual range is automatically clamped (limited) to certain ranges to prevent inadvertent conflict with active picture area depending on video format. See Ancillary Data Line Number Locations and Ranges (p. 3-13) for more information. • The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data. • If only one output line is to be used, set both controls for the same line number.
• **HD ATC_LTC Insertion Control**  Card Edge Control Menu: **TC** **1** HDLT **2** Off — HD ATC LTC timecode insertion disabled On — HD ATC LTC timecode insertion enabled	For HD output, enables or disables ATC_LTC timecode insertion into the video stream.
• **HD ATC_LTC Line Insertion Control** 	For HD timecode output, selects the line number for ATC_LTC timecode data. **Note:** • Although the output line drop-down will allow any choice within the 9 thru 20 range, the actual range is automatically clamped (limited) to certain ranges to prevent inadvertent conflict with active picture area depending on video format. See Ancillary Data Line Number Locations and Ranges (p. 3-13) for more information. • The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.

Table 3-2 9062 Function Submenu/Parameter List — continued

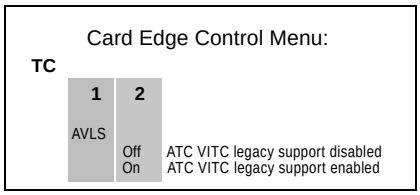
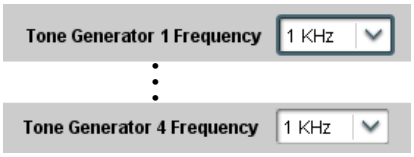
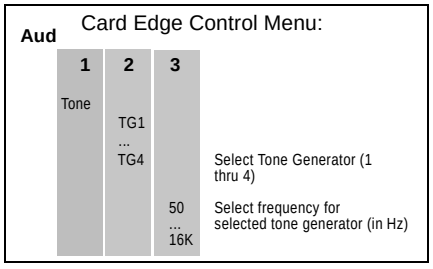
Timecode	**(continued)**
• ATC_VITC Legacy Support Control  	When enabled, accommodates equipment requiring ATC_VITC packet in both fields as a “field 1” packet (non-toggling). **Note:** Non-toggling VITC1 and VITC2 packets do not conform to SMPTE 12M-2-2008 preferences. As such, ATC_VITC Legacy Support should be enabled only if required by downstream equipment.
Tone Generator	Sets the test tone frequency for each of four tone generators (Tone Generator 1 thru 4).
• Frequency Selection Lists  	Selects the frequency for each of the four tone generators. 18 discrete sine wave frequencies are available, ranging from 50 Hz to 16 kHz (default frequency is 1.0 kHz). **Note:** Unity-gain signal level is equivalent to -20 dBu.

Table 3-2 9062 Function Submenu/Parameter List — continued

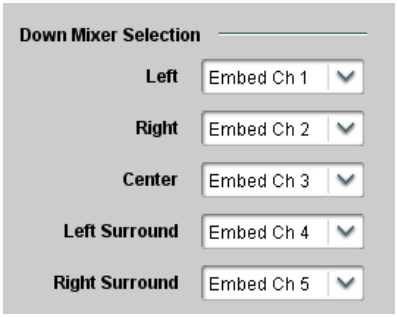
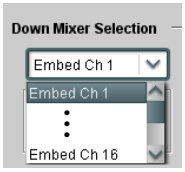
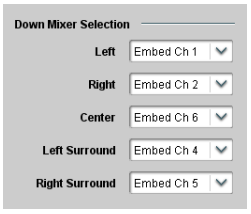
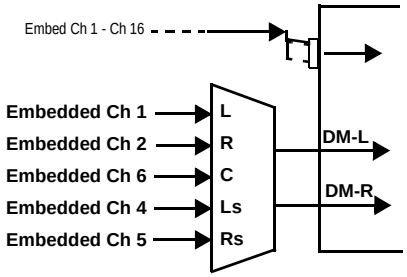
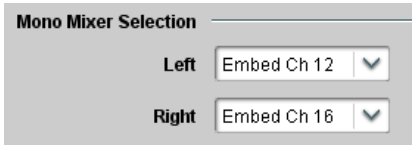
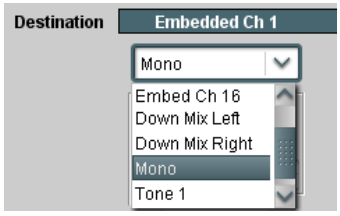
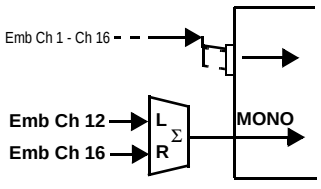
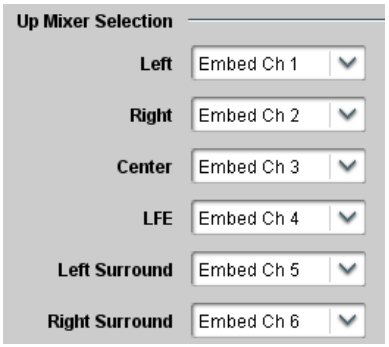
Audio Mixing	Provides down-mix audio routing selections that multiplexes any five embedded audio channel sources into a stereo pair (Down Mix Left and Down Mix Right), or selection of any two audio sources to be mono-mixed to serve as a monaural source. With an optional upmixer licensable feature activated, any normal PCM stereo pair can be fed to the upmixer to generate 5.1 surround sound audio which in turn can be applied to six user-selectable channels.
• **Down Mixer Selection** 	Separate drop-down lists for **Left**, **Right**, **Center**, **Left Surround (Ls)**, and **Right Surround (Rs)** inputs allow embedded channel (or silence) audio source selection for each of the five inputs as shown below.  The example below shows selection from various sources and the resulting stereo pair DM-L and DM-R. The two signals comprising the pair can be routed and processed the same as any other audio input source.   **Note:** The stereo pair are simple L/R PCM signals with no additional encoded information.
• **Mono Mixer Selection** 	Separate drop-down lists for **Left** and **Right** inputs allow selected embedded input channels to provide an additional mono-mixed channel. The resulting mono mix (**Mono**) is available as an audio source for any of the destination embedded output channels as shown below.   **Note:** Selection of any two channels for mono mixing in no way affects the source channels themselves.

Table 3-2 9062 Function Submenu/Parameter List — continued

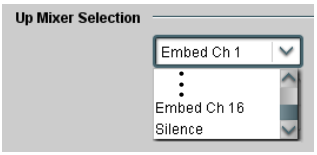
Audio Mixing	**(continued)**

Note:
- 2.0-to-5.1 upmixer function is an optional licensable feature. This function and its controls appear only when a license key is entered and activated. Refer to **Licensable Features** function description on page 3-54 for more information.
- Channel sources used by the upmixer are post-processed signals received from the Audio Routing/Gain Control function. When active, the channel selections made using this function are **directly embedded in the output SDI**. Refer to 2.0-to-5.1 Upmix Function (p. 1-13) in Chapter 1, “Introduction” for detailed functional description and signal flow.
- For any six channels selected for this function, the **Left** and **Right** channel selections always serve as the stereo input pair.

• 2.0-to-5.1 Up Mixer Selection



Separate drop-down lists for **Left**, **Right**, **Center**, **LFE, Left Surround**, and **Right Surround** allow embedded audio source selection, and embedded channel assignments for the six generated 5.1 channels.



The example below shows selection of embedded channels 1 and 2 as the received stereo source (Embed Ch1 and Ch 2 for **Left** and **Right** drop-down list selections in the Up Mixer Selection tool).

Using the setup shown in the example, when upmix is active the embedded channel 1/2 stereo pair is overwritten with the new stereo pair L/R on channels 1/2. As selected in the example, the additional 5.1 channels C, LFE, Left Surround (Ls), and Right Surround (Rs) overwrite Emb Ch 3 – Ch 6, respectively.

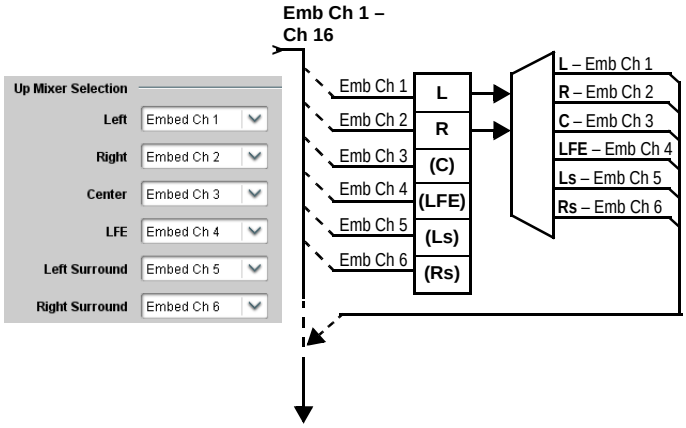
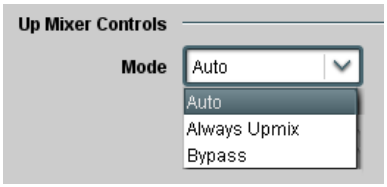


Table 3-2 9062 Function Submenu/Parameter List — continued

Audio Mixing	(continued)

• **Up Mixer Mode Control**
 
	Enables or bypasses upmixer as follows:
	• **Auto:** Automatic enable/bypass of 5.1 upmix function as follows:
	  • If detected signal level on **all four** of the selected channels designated as **Center**, **LFE**, **Left Surround**, and **Right Surround** are **below** the level threshold set using the **5.1 Detection Threshold** control, upmixer overwrites all six selected channels with the new 5.1 content generated by the upmixer.
	  • If detected signal level on **any of the four** of the selected channels designated as **Center**, **LFE**, **Left Surround**, and **Right Surround** is **above** the level threshold set using the **5.1 Detection Threshold** control, upmixer is bypassed and the original channels pass unaffected.
	• **Always Upmix:** Manual enable turns on upmixer and overwrites content on all six selected channels with new 5.1 content generated by the upmixer regardless of original signal level or content.
	• **Bypass:** Manual disable bypasses the upmixer. When bypassed, the six embedded audio channels pass unaffected.

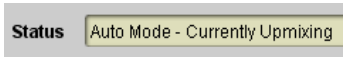
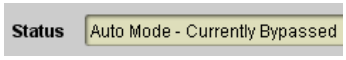
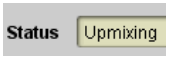
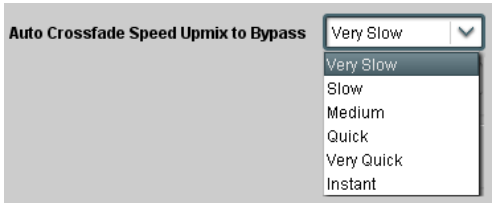
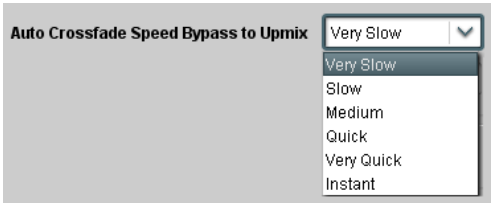
• **Up Mixer Status Display**    	Shows activity status of upmixer processing as follows: • **Auto Mode - Currently Upmixing:** With upmixer enable set to **Auto**, indicates selected channels designated as **Center**, **LFE**, **Left Surround**, and **Right Surround** are clear for use (as described above); upmixer is currently up-mixing received stereo pair and overwriting the six selected channels with new 5.1 upmix. • **Auto Mode - Currently Bypassed:** With upmixer enable set to **Auto**, indicates selected channels designated as **Center**, **LFE**, **Left Surround**, and **Right Surround** have content (such as existing original 5.1 or other content); upmixer is bypassed (disabled) and allows normal passage of six selected channels. • **Upmixing:** Indicates upmixer is manually enabled (set to Always Upmix) and is currently up-mixing received stereo pair and overwriting the six selected channels with new 5.1 upmix. • **Bypassed:** Indicates upmixer is manually disabled (set to Bypass) and is currently passing all selected channels unaffected.
• **Auto Crossfade Speed Controls**  	Individual controls select the relative crossfade transition speed between Upmix to Bypass (going to inactive; from 5.1 to 2.0) and Bypass to Upmix (going to active; from 2.0 to 5.1) when upmixer enable is set to **Auto** and the active threshold (as set by the **5.1 Detection Threshold** control) is crossed in either direction. To suit program material and production aesthetic preferences, several choices are available as shown to the left. Slower settings allow for a more gradual transition between modes, however with a longer interval before levels stabilize. Faster settings conversely allow for a smaller interval before levels stabilize, however with greater perceived abruptness.

Table 3-2 9062 Function Submenu/Parameter List — continued

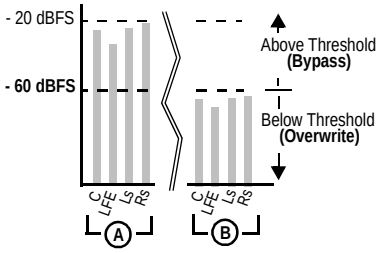
Audio Mixing	**(continued)**
• 5.1 Detection Threshold Control 	Adjusts the threshold at which selected channels designated as C, LFE, Ls, and Rs are considered to have viable content, or at which signal levels can be considered insignificant when upmixer enable is set to **Auto**. Setting affects automatic enable/bypass of 5.1 upmix function as follows: • If detected signal level on **all four** of the selected channels designated as Center, LFE, Left Surround, and Right Surround are **below** the level threshold set using the **5.1 Detection Threshold** control, upmixer allows **overwrite** of all six selected channels with the new 5.1 signal complement. • If detected signal level on **any of the four** of the selected channels designated as Center, LFE, Left Surround, and Right Surround is **above** the level threshold set using the **5.1 Detection Threshold** control, upmixer is **bypassed**, thereby releasing the selected six channels and allowing the original channels to pass unaffected. (Range is -150 dB to 0 dB in 0.1dB steps; 0 dB equivalent to +24 dBu=> 0 dBFS) Typically, the **5.1 Detection Threshold** control should be set to provide a usable threshold that maintains a threshold at which valid levels large enough over the threshold **disable** the auto upmix (Ⓐ, left), while nuisance levels considerably below the threshold (Ⓑ, left) are rejected, allowing the upmixer to stay locked in the enabled mode and **overwrite** these signals with the new signals.  Optimum setting is dependent on program material general overall levels. A -60 dB setting is recommended for material closely adhering to the SMPTE -20 dBFS Alignment level for normal material such as dialog.
• Center Width Control 	Adjusts center channel content (in terms of percentage) applied to L and R channels. • Minimum setting keeps all L+R (mono) content confined to center (C) channel, with any center channel content removed from L and R channels. • Higher settings progressively blend respective L and R mono content back into L and R channels, with 100% setting resulting in center channel level going to zero and L/R channels becoming normal L/R channels containing some mono content. (0% to 100% range in 0.1% steps; default = 0%)
• Surround Depth Control 	Adjusts surround channel content (in terms of percentage) applied to Ls and Rs channels. • Maximum setting results in greatest surround channel levels. • Lower settings progressively diminish surround channel levels, with 0% setting resulting in no Ls or Rs level, with Ls and Rs content progressively folded back into L and R, respectively. (0% to 100% range in 0.1% steps; default = 100%)

Table 3-2 9062 Function Submenu/Parameter List — continued

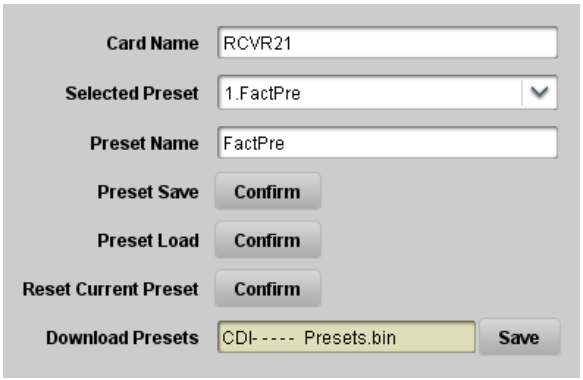
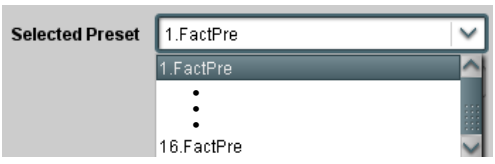
Licensable Features	Allows activation of optional licensed features.
Note: For card pre-ordered with licensed feature(s), the activation steps described below are not required; the feature will already be installed activated. To order features and obtain a license key, contact Cobalt® sales at sales@cobaltdigital.com or at the contact information in Contact Cobalt Digital Inc. in Chapter 1, "Introduction". Please provide the "SSN" number of your card (displayed in the Card Info pane) when contacting us for your key.	
• License Feature and Key Entry window 	Activate licensable feature as described below. 1. Enter the feature key string in the **Feature Key** box. Press return or click outside of the box to acknowledge entry. **Note:** Entry string is case sensitive. Do not enter any spaces. 2. In the DashBoard™ Card Info pane, wait for the feature identification to be shown for the card product number (for example, "-UM" appearing after the card part number) and **Valid Key Entered** to be displayed. This indicates the key was correctly entered and recognized by the card. **Note:** If DashBoard™ card function submenu/control pane does not re-appear, close the card and re-open it. 3. Click and confirm **Reboot**. When the card function submenu/control pane appears again, the licensable feature will be available. **Note:** Applying the licensable feature and its reboot has no effect on prior settings. All control settings and drop-down selections are retained.
Presets	Allows up to 16 card user settings configuration presets to be saved in a Preset and then recalled (loaded) as desired. All current settings (including list selections and scalar (numeric) control settings such as Gain, etc.) are saved when a Preset Save is invoked.
	The **Preset Name** field and **Preset Save** button allow custom user setting configurations to be labeled and saved to a Preset for future use. The **Preset Load** button and the **Selected Preset** drop-down list allow saved presets to be selected and loaded as desired. When a preset is loaded, it immediately becomes active with all user settings now automatically set as directed by the preset. Saved presets can be uploaded to a computer for use with other same-model COMPASS™ cards. Each of the items to the left are described in detail on the following pages.
• Selected Preset 	**Selected Preset 1** thru **Selected Preset 16** range in drop-down list selects one of 16 stored presets as ready for **Save** (being written to) or for **Load** (being applied to the card). **Note:** The preset names shown to the left are the default (unnamed) preset names. All 16 presets in this case are loaded identically with the factory default settings.

Table 3-2 9062 Function Submenu/Parameter List — continued

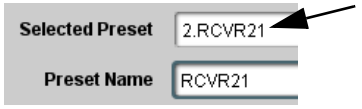
Presets	(continued)
• **Preset Save and Load** 	• **Preset Save** stores all current card control settings to the currently selected preset. (For example, if Preset 1 is selected in the Selected Preset drop-down list, clicking and confirming Preset Save will then save all current card control settings to Preset 1) • **Preset Load** loads (applies) all card control settings defined by whatever preset (**Preset 1** thru **Preset 16**) is currently selected in the **Selected Preset** drop-down list. (For example, if Preset 3 is selected in the Selected Preset drop-down list, clicking and confirming Preset Load will then apply all card control settings defined in Preset 3) The above buttons have a **Confirm?** pop-up that appears, requesting confirmation. **Note:** Applying a change to a preset using the buttons described above **rewrites** the previous preset contents with the invoked contents. Make certain change is desired before confirming preset change.
• **Card Name** 	Text entry field provides for optional entry of card name, function, etc. (as shown in this example). **Note:** Card name can be 31 ASCII characters maximum.
• **Preset Name** 	With one of 16 presets selected, provides for entry of custom name for the preset (as shown in example below).  Entering text in Preset Name field (in this example, “RCVR21”) applies custom name to selected Preset (in this example, Preset 2) **Note:** • Preset name can be seven ASCII characters maximum. • The Preset ID number does not need to be entered; it is added automatically.

Table 3-2 9062 Function Submenu/Parameter List — continued

<table>
<tr><td>Presets</td><td>(continued)</td></tr>
<tr><td>• Download Presets
 
</td><td>Download Presets allows all 16 presets to be stored to a specified location on a network computer for use with other same-model COMPASS™ cards.

Refer to Cobalt® reference guide “COMPASS™ Remote Control User Guide” (PN 9000RCS-RM) for instructions on using the Download Presets function.</td></tr>
<tr><td>• Reset Current Preset
 
</td><td>• Reset Current Preset resets all parameters (including preset custom name entered) of the currently selected Preset (as displayed in the Selected Preset field) to factory default settings.

The above button has a Confirm? pop-up that appears, requesting confirmation.

The factory default settings are as follows:

<table>
<tr><th>Function</th><th>Parameter/Setting</th></tr>
<tr><td>Audio Mapping (Embedded Audio Group 1/2 and Embedded Audio Group 3/4)</td><td>Audio mapping reset for --to-1 channel routing (embedded input channels 1-16 are mapped to embedded output channels 1-16).</td></tr>
<tr><td>Audio controls (all audio functions)</td><td>All Gain and Phase (polarity) controls are set to unity and normal, respectively.</td></tr>
<tr><td>Closed Captioning</td><td>Closed captioning set to On.</td></tr>
<tr><td>Timecode</td><td>Source priority 1 thru 4 all set to None.</td></tr>
<tr><td>Video Proc</td><td>All parameters set to unity/null settings.</td></tr>
<tr><td>Framesync</td><td>Framesync is disabled; Reference 1 or 2 must be selected to enable the frame sync.</td></tr>
<tr><td>Scaler</td><td>• Scaler is enabled, with both SD and HD set to be the same as input.
• Output half-rate 720p is turned off for both SD and HD.
• Aspect ratio conversion is turned off for both SD and HD.</td></tr>
</table></td></tr>
</table>

Troubleshooting

This section provides general troubleshooting information and specific symptom/corrective action for the 9062 card and its remote control interface. The 9062 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 9062 card itself and its remote control systems all (to varying degrees) provide error and failure indications. Depending on how the 9062 card is being used (i.e, standalone or network controlled through DashBoard™ or a Remote Control Panel), check all available indications in the event of an error or failure condition.

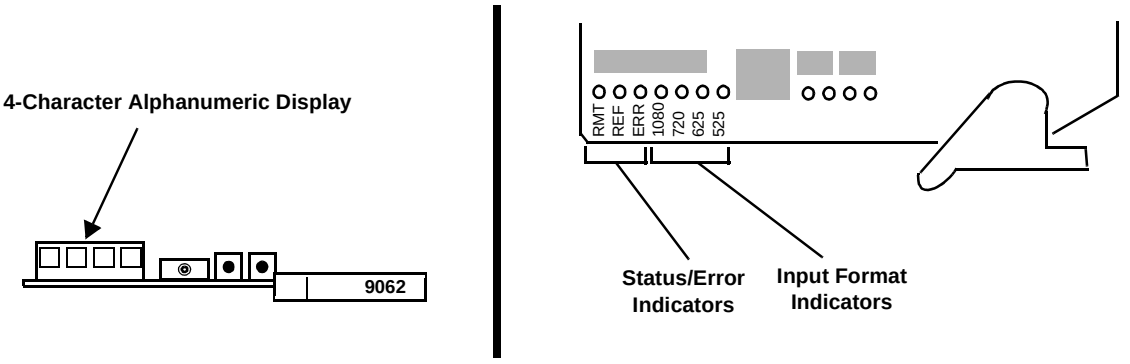
The various 9062 card and remote control error and failure indicators are individually described below.

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. 3-61)
- 9062 Processing Error Troubleshooting (p. 3-62)
- Troubleshooting Network/Remote Control Errors (p. 3-64)

9062 Card Edge Status/Error Indicators and Display

Figure 3-9 shows and describes the 9062 card edge status indicators and display. These indicators and the display show status and error conditions relating to the card itself and remote (network) communications (where applicable). Because these indicators are part of the card itself and require no external interface, the indicators are particularly useful in the event of communications problems with external devices such as network remote control devices.



Item	Function
Alphanumeric Display	Displays 4-digit alphanumeric code indicating status or errors as follows: • **E0XX:** Video Errors • **E002:** Video Acquiring Lock • **E1XX:** Audio Errors • **E2XX:** Frame Sync Errors • **E200:** Reference is Incompatible with Input Video • **E201:** Reference Standard is Invalid/No Reference Present • **E202:** Reference Standard is 720p2398 (a reference standard not supported by the framesync) • **E203:** Reference Standard is 720p2997 (a reference standard not supported by the framesync)
RMT LED	Blue LED flashes when 9062 is receiving control message from remote network control (e.g., DashBoard™ or Cobalt® Remote Control Panel)
REF LED	Blue LED illuminates indicating 9062 is receiving valid reference when set up for framesync operation.
ERR LED	Red LED illuminates when 9062 unable to lock to framesync, or unable to lock to input standard.
Input Format LEDs	Four blue LEDs indicate the input signal raster format being received and locked onto by the 9062 (1080, 720, 625, 525). Continuous cycling of the LEDs indicates the 9062 has not locked onto a particular format (as in the case of no signal input).

Figure 3-9 9062 Card Edge Status Indicators and Display

DashBoard™ Status/Error Indicators and Displays

Figure 3-10 shows and describes the DashBoard™ status indicators and displays. These indicator icons and displays show status and error conditions relating to the 9062 card itself and remote (network) communications.

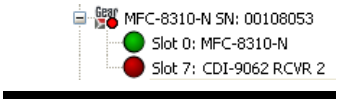
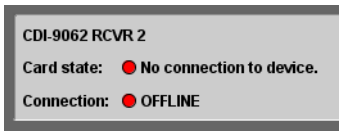
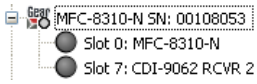
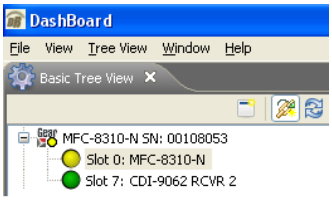
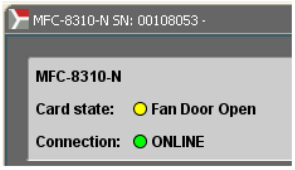
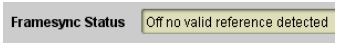
Indicator Icon or Display	Error Description
	Red indicator icon in Card Access/Navigation Tree pane shows card with Error condition (in this example, the Card Access/Navigation Tree pane shows a general error issued by the 9062 card in slot 7).
	Specific errors are displayed in the Card Info pane (in this example “No connection to device” indicating 9062 card is not connecting to frame/LAN).
	If the 9062 card is not connecting to the frame or LAN, all controls are grayed-out (as shown in the example here).
	Gray indicator icon in Card Access/Navigation Tree pane shows card(s) are not being seen by DashBoard™ due to lack of connection to frame LAN (in this example, both a 9062 card in slot 7 and the MFC-8310-N Network Controller Card for its frame in slot 0 are not being seen).
	Yellow indicator icon in Card Access/Navigation Tree pane shows card with Alert condition (in this example, the Card Access/Navigation Tree pane shows a general alert issued by the MFC-8310-N Network Controller Card).
	Clicking the card slot position in the Card Access/Navigation Tree (in this example Network Controller Card “Slot 0: MFC-8310-N”) opens the Card Info pane for the selected card. In this example, a “Fan Door Open” specific error is displayed.
	Yellow indicator icon in 9062 Card Info pane shows error alert, along with cause for alert (in this example, the 9062 is receiving no video input, or a video input that is invalid for the card and/or its current settings).
	Where available, error messages within a function submenu pane show highly specific information relating to detected errors (in this example, message shows an invalid or missing Framesync Enable reference selection).

Figure 3-10 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 3-11).

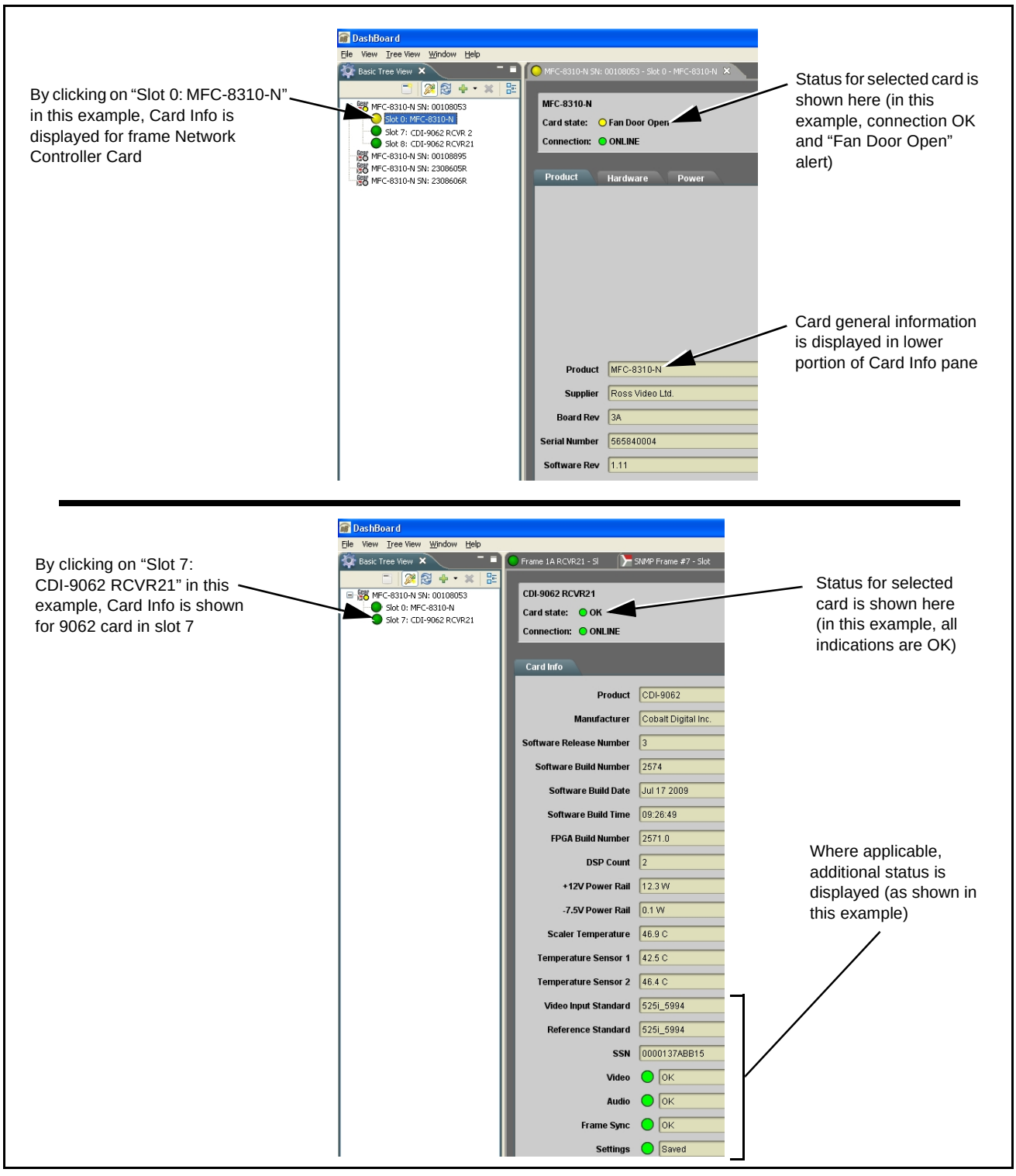


Figure 3-11 Selecting Specific Cards for Card Info Status Display

Basic Troubleshooting Checks

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

Table 3-3 Basic Troubleshooting Checks

Item	Checks

Verify power presence and characteristics	• On both the frame Network Controller Card and the 9062, 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 indications for both the +12 V and -7.5 V supply rails for the 9062 card. This can be observed using the DashBoard™ Card Info pane, or using the card edge controls and indicators as shown in Figure 3-7 on page 3-12.
	  • If either of the rail supplies show **no** power being consumed, either the frame power supply, connections, or the 9062 card itself is defective.
	  • If either of the rail supplies show **excessive** power being consumed (see Technical Specifications (p. 1-19) in Chapter 1, “Introduction”), the 9062 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 9062 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.

9062 Processing Error Troubleshooting

Table 3-4 provides 9062 processing troubleshooting information. If the 9062 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 9062 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 9062 card edge status indicators.

Note: Where errors are displayed on both the 9062 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 **Video** yellow icon and Input Invalid message in 9062 Card Info pane.  • Card edge **Input Format** LEDs show continuous cycling.	No video input present	Make certain intended video source is connected to appropriate 9062 card video input. Make certain BNC cable connections between frame Rear I/O Module for the card and signal source are OK.
• **DashBoard™** shows **Frame Sync** red icon and Reference Invalid message in 9062 Card Info pane.  • Card edge red **ERR** indicator illuminated.	Frame sync reference not properly selected or not being received	• If external frame sync reference is not intended to be used, make certain the Framesync Enable selection list is set to **Off** or **Input Video** as desired. • If external frame sync reference is intended to be used, make certain selected external frame sync reference is active on frame sync 8310 frame bus. (External reference signals Reference 1 and Reference 2 are distributed to the 9062 and other cards via an 8310 frame bus.) Refer to **Framesync** function submenu tab on page 3-33 for more information.

Table 3-4 Troubleshooting Processing Errors by Symptom — continued

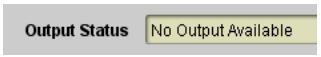
Symptom	Error/Condition	Corrective Action
DashBoard™ shows **Framesync Status** error message in 9062 Framesync function submenu screen. 	Specified Minimum Latency Frames setting exceeds 9062 card buffer space for the selected output video format	Reduce the Minimum Latency Frames setting as specified in the error message to correct the error. **Note:** Due to card memory limits, the maximum available Minimum Latency Frames is related to the output video format selected. For example, with a 1080i 5994 output, the maximum setting is 5. For a 1080i film (2398) output, the maximum setting is 3 (due to the increased buffer space needed for the slower frame rate). Conversely, greater maximum settings are allowed for SD formats such as 525i 5994, where the practical maximum limit is 13.
DashBoard™ shows **Output Status** error message in 9062 Timecode function submenu screen. 	Timecode not available due to lack of appropriate input timecode data	Timecode output requires that source and priority are appropriately selected. Also, video input must contain appropriate timecode data and framesync reference. Refer to **Timecode** function submenu tab on page 3-45 for more information.
Video/audio synchronization or delay noted.	Source synchronization condition	Use the **Audio Offset from Video** control to compensate for video/audio delay. Refer to **Framesync** function submenu tab on page 3-33 for more information.
Ancillary data (closed captioning, timecode, Dolby® metadata, AFD) not transferred through 9062.	• Control(s) not enabled	• Make certain respective control is set to **On** or **Enabled** (as appropriate).
	• VANC line number conflict between two or more ancillary data items	• Make certain each ancillary data item to be passed is assigned a unique line number (see Ancillary Data Line Number Locations and Ranges on page 3-13).
Audio signal(s) do not route as expected. Parameter control not available as expected.	Embedded audio contains Dolby® E or Dolby Digital encoded signal	When a valid Dolby® E or Dolby Digital signal (in accordance with SMPTE 337M) is detected on an embedded audio signal, gain and polarity controls are bypassed (even though controls may appear to be functional). Gain and polarity controls are not available for this signal type. Refer to Status displays in **Audio Input Controls** function submenu tab on page 3-15 for more information.

Table 3-4 Troubleshooting Processing Errors by Symptom — continued

Symptom	Error/Condition	Corrective Action
Audio not processed or passed through card.	• Input audio of type that cannot be locked by 9062 card	• Embedded audio must be nominal 48 kHz input. **Note:** Although the Status Displays in **Audio Input Controls** function submenu tab will show audio formats other than "Present, Professional" as being locked (such as "Present, Consumer"), in any case the audio must be at nominal 48 kHz rate for lock and processing to occur.
	• Enable control not turned on	• **Group Enable** button for **Embedded Audio Group 1/2** or **Embedded Audio Group 3/4** function submenu must be turned on for sources to be embedded into respective embedded channels.
	• Upmixer inadvertently enabled (Upmixer Licensed Feature Only)	• Make certain upmixer is set to **Bypass** if not intended for use. **Note:** When manually enabled or set for automatic enable with appropriate signal levels, upmixer overwrites selected embedded channels with new data; same-channel embedded output will no longer represent same-channel embedded inputs for selected channels.

Troubleshooting Network/Remote Control Errors

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

In Case of Problems

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

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

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

See Contact Cobalt Digital Inc. (p. 1-22) in Chapter 1, "Introduction" for contact information.

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