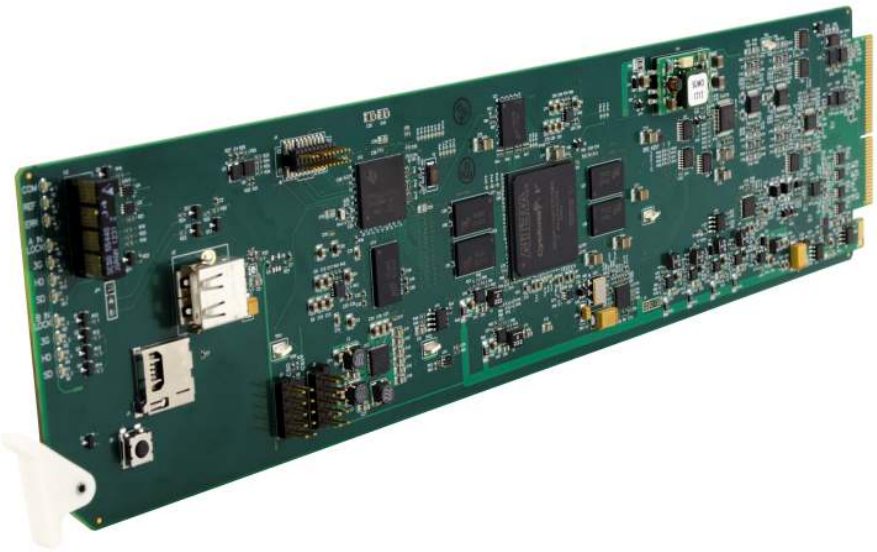
9502-DCDA-3G



Down-Converter / DA

with 3G/HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking

Product Manual

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9502DCDA-OM (V1.8)

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Trademark Information

Congratulations on choosing the Cobalt® 9502-DCDA Down-Converter with 3G/HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking. The 9502 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 9502, please contact us at the contact information on the front cover.

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Chapter 1

Introduction

Overview

This manual provides installation and operating instructions for the 9502-DCDA Down-Converter with 3G/HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking card (also referred to herein as the 9502-DCDA).

Note: This manual also is applicable for reduced functionality version **-HD** which accepts and processes only SD and HD (SMPTE 259M and SMPTE 292M) SDI inputs. 3G inputs, controls, and functions described in this manual are not applicable to 9502-DCDA-HD. In all other aspects, this version function identically as described in this manual.

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 9502.
- **Chapter 2, "Installation and Setup"** – Provides instructions for installing the 9502 in a frame, and optionally installing a 9502-DCDA Rear I/O Module.
- **Chapter 3, "Operating Instructions"** – Provides overviews of operating controls and instructions for using the 9502-DCDA.

This chapter contains the following information:

- **9502 Card Software Versions and this Manual (p. 1-2)**
- **Manual Conventions (p. 1-3)**
- **Safety and Regulatory Summary (p. 1-5)**
- **9502-DCDA Functional Description (p. 1-6)**
- **Technical Specifications (p. 1-15)**
- **Warranty and Service Information (p. 1-17)**
- **Contact Cobalt Digital Inc. (p. 1-18)**

9502 Card Software Versions and this Manual

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

The Software Version of your card can be checked by viewing the **Card Info** menu in DashBoard™. See Checking 9502-DCDA Card Information (p. 3-7) in Chapter 3, “Operating Instructions” for more information. You can then check our website for the latest software version currently released for the card as described below.

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

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

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

Cobalt Reference Guides

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

Manual Conventions

In this manual, display messages and connectors are shown using the exact name shown on the 9502-DCDA itself. Examples are provided below.

- Card-edge display messages are shown like this:

  Ch01

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

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

- **9502-DCDA** refers to the 9502-DCDA Down-Converter with 3G/HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking card.
- **Frame** refers to the HPF-9000, oGx, OG3-FR, 8321, or similar 20-slot frame that houses Cobalt® or other cards.
- **Device** and/or **Card** refers to a Cobalt® or other card.
- **System** and/or **Video System** refers to the mix of interconnected production and terminal equipment in which the 9502-DCDA and other cards operate.
- Functions and/or features that are available only as an option are denoted in this manual like this:

  

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

  You can download a pdf for the option by going to the card's web page and clicking on **Product Downloads**, where you can select from any available option Manual Supplements for the card.

Warnings, Cautions, and Notes

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

Warnings

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

Cautions

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

Notes

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

Labeling Symbol Definitions

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

Safety and Regulatory Summary

Warnings

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

Cautions

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

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

CAUTION **Heat and power distribution requirements within a frame may dictate specific slot placement of cards. Cards with many heat-producing components should be arranged to avoid areas of excess heat build-up, particularly in frames using only convection cooling. The 9502-DCDA has a moderate power dissipation (<18 W). As such, avoiding placing the card adjacent to other cards with similar dissipation values if possible.**

CAUTION **If required, make certain Rear I/O Module(s) is installed before installing the 9502-DCDA into the frame slot. Damage to card and/or Rear I/O Module can occur if module installation is attempted with card already installed in slot.**

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

CAUTION **The 9502 FPGA is designed for a normal-range operating temperature around 85° C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within device operating safe parameters, and can be allowed by setting this control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum card protection.**

EMC Compliance Per Market

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

9502-DCDA Functional Description

Figure 1-1 shows a functional block diagram of the 9502-DCDA. The 9502-DCDA downconverter also includes embedded audio support and de-embedding to AES outputs. 4x distribution amplifiers (DAs) are provided for the card down-converted HD/SD-SDI output.

The 9502-DCDA also provides ARC processing and timecode/ closed-captioning conversion from packet-based timecode formats and CEA608/708 HD formats to HD ATC, SD_ATC, and SD VITC-based (waveform) timecode. Closed captioning from CEA708 to HD formats and line 21 SD closed captioning are available on the processed HD-SD-SDI outputs.

9502-DCDA Input/Output Formats

The 9502-DCDA provides the following inputs and outputs:

- **Inputs:**
  - **3G/HD/SD SDI IN A / SDI IN B** – two 3G/HD/SD-SDI inputs (GUI-selectable or basic failover)
- **Outputs:**
  - **PROCESSED HD/SD-SDI OUT (1-4)** – four HD/SD-SDI buffered video outputs
  - **RCK OUT (1-4)** – four 3G/HD/SD-SDI reclocked buffered video outputs
  - **AES OUT (1-8)** – eight AES-3id (coaxial 75Ω) outputs (16 AES channels)

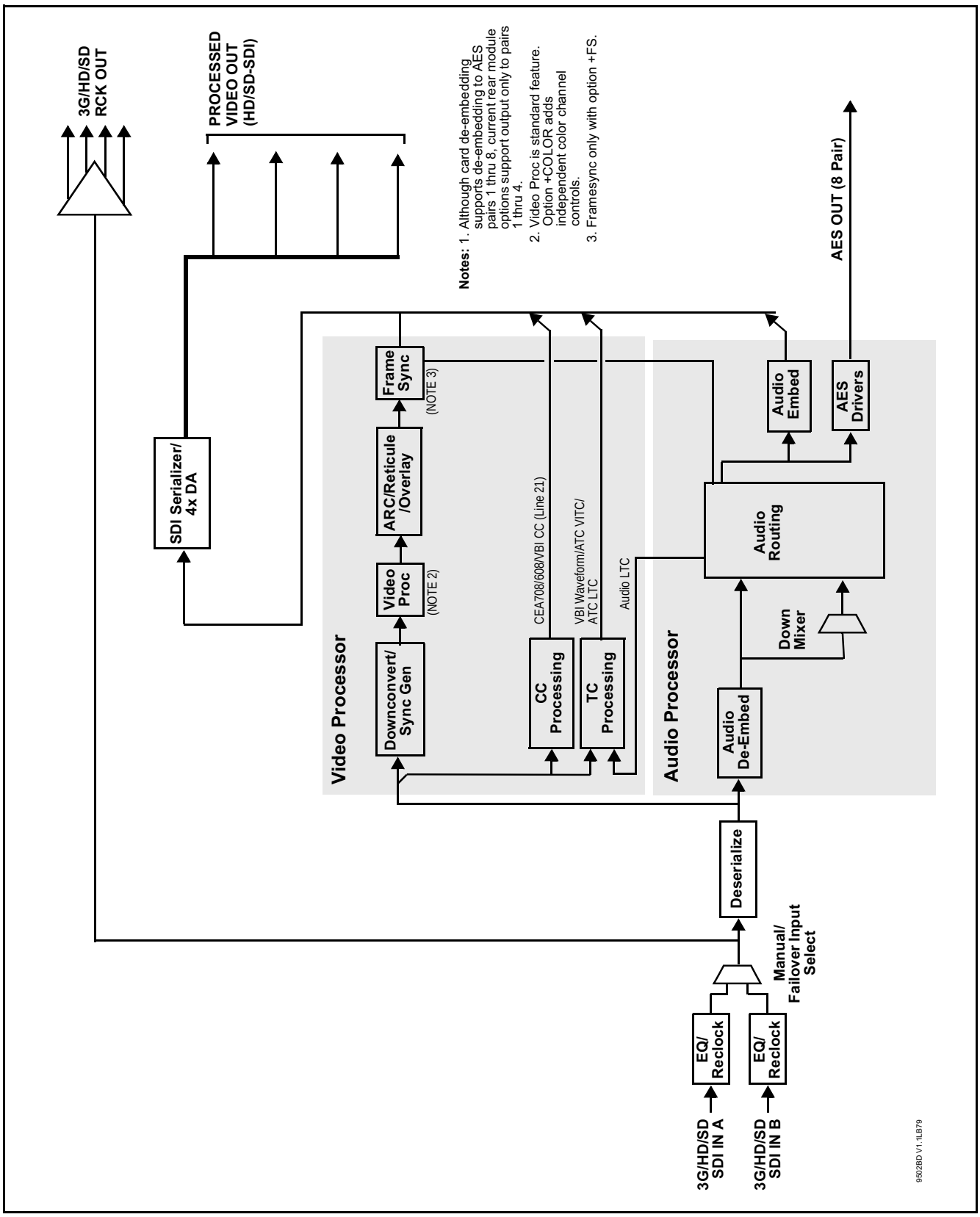

Figure 1-1 9502-DCDA Functional Block Diagram

Video Processor Description

The 9502-DCDA features a downconverting scaler, video proc, and user-adjustable aspect ratio control and zoom control. The 9502-DCDA video subsystem also provides the functions described below.

Input Select

The 9502-DCDA can select from either of two 3G/HD/SD-SDI inputs using either manual control, or settings that provide failover to the alternate secondary input. (Failover is simple signal presence check only.) An input **Allowed Rasters** and **Allowed Frame Rates** filter allows inputs to be filtered (screened) for only user-allowed raster sizes and frame rates, with unallowed raster/rates being rejected as an input (input unlock). Reclocked copies of the selected program video SDI input can be outputted by the card.

Video Processor

The 9502-DCDA provides full color processing control (luma gain and lift, chroma saturation, and color phase) of the output video. The color correction option **(+COLOR)** provides independent RGB channel controls for luma, black, and gamma. The color correction function converts the YCbCr SDI input video to the 4:4:4 RGB color space (where the color correction is applied), and then back to YCbCr SDI on the output of the function. Controls are available to adjust each RGB level independently for both white levels (gain) and black levels (offset). Gamma can also be independently adjusted for each RGB channels. Various controls can be ganged to provide adjustment for all three color channels simultaneously.

Scaler Function

The scaler function provides down-conversion to HD/SD from multiple standard SD and 3G/HD video formats and multiple frame rates, and cross-conversion between interlaced and progressive formats, with auto-format detect/down-conversion of SMPTE 424M/292M/259M formats.

The scaler function also provides aspect ratio conversion that provides a choice from several standard aspect ratios. User-defined settings allow custom user-defined H and V aspect ratio control. Reticule insertion provides safe action area marking as well as other reticule functions and patterns.

Frame Sync Function Option

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

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

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

An internal test signal generator provides a selection of various standard patterns such as color bars, sweep patterns, and other technical patterns. The generator output can be invoked upon loss of program video input, or applied to the program video output via user controls.

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 convert the timecode to either or both ATC_LTC or ATC_VITC for down-conversions to HD, and ATC_VITC or VITC waveform (with selectable odd/even field line number control) for SD down-conversions.

Option When licensed with option **+LTC**, this function also can receive and translate audio LTC timecode (from Emb Ch 1-16) for insertion as SMPTE 12M ATC timecode formats onto the output video as described above.

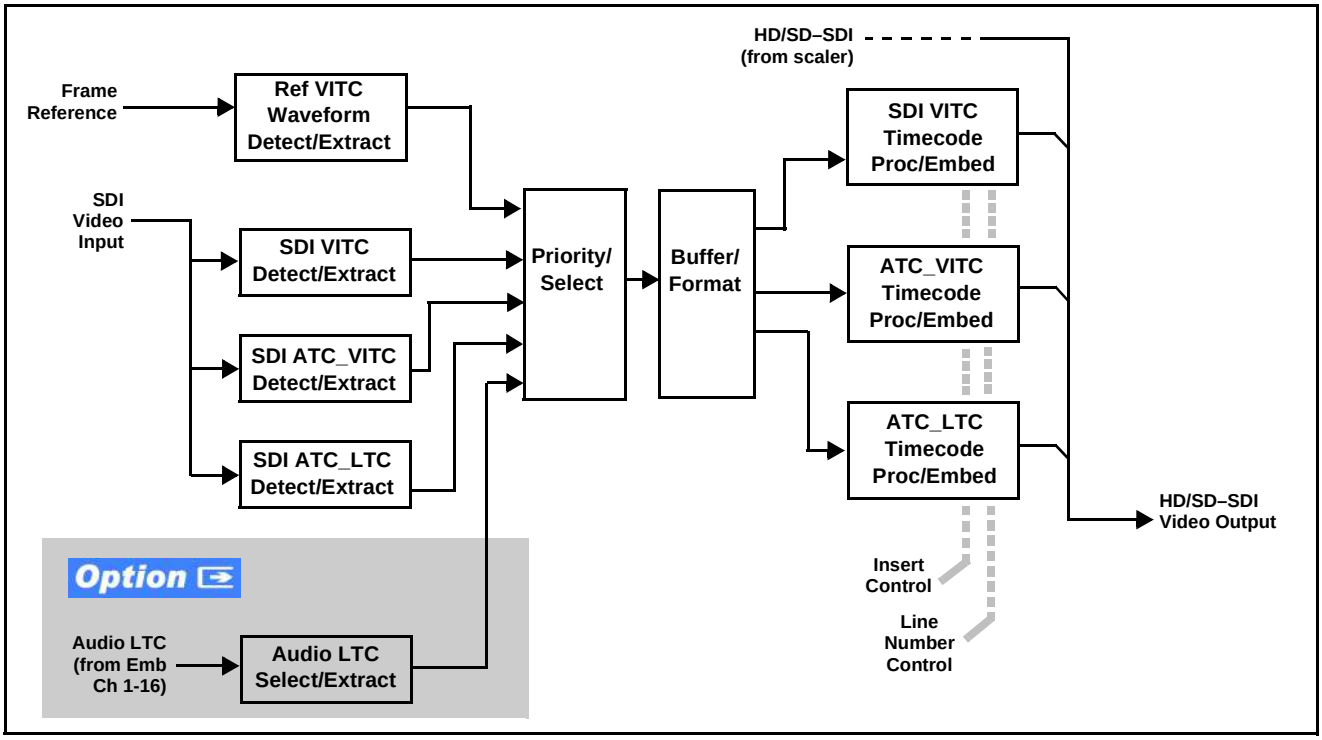

Figure 1-2 Timecode Processor

Closed Captioning Processor

This function provides support for closed captioning setup. The function allows the selection of the ancillary data line number where the ancillary closed caption data is outputted when the output is HD. When receiving HD-SDI, both CEA 608 and CEA 708 are supported, with CEA 608 and CEA 708 (containing CEA 608 packets) converted to line 21 closed captioning on outputs down-converted to SD.

Ancillary Data Processor

This function provides VANC/HANC ancillary data “bridging” to extract ATC packet data from the incoming SDI signal, preserve the ANC data packets, and re-embed the packets post-scaler in the SDI signal. User DID/SDID locations can be specified and then extracted and preserved for bridge reinsertion. Insertion controls provide for inserting the ANC data in VANC, HANC, or C-space.

Color Corrector Option

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

AFD ARC Processor

(See Figure 1-3.) The AFD processor allows extracted Aspect Ratio Control (ARC) data from the input video and provides:

- H/V cross-conversion matrix in which a received code directs a same or other user-selectable alternate H/V ratio on the output for any of several H/V ratios.
- Directs scaler automatic active ARC in response to received and/or converted ARC code (Scaler Follows ARC).

The input video is checked for ARC formats and can be set to provide a trigger upon when a selected ARC format is received. Received H/V codes can also be applied through an H/V conversion matrix that allows alternate H/V ratios for a given received input code. In conjunction with a user-accessible cross-matrix table, the received code then in turn directs any of several user-selectable H/V settings to be inserted on the output video. AFD can be rejected for input consideration. The selected output H/V ratio can be set to automatically apply this aspect ratio to the program video via the card ARC scaler.

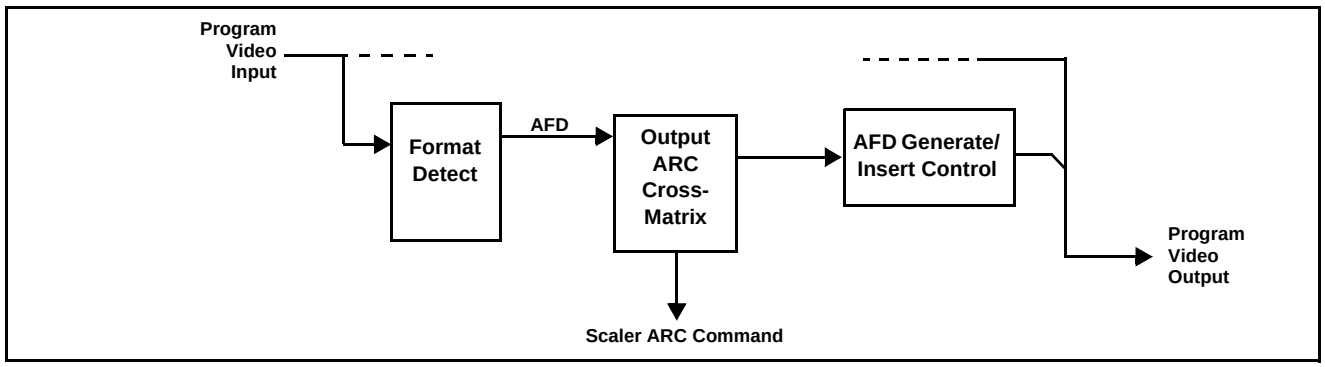

Figure 1-3 AFD ARC Processor

Character Burn-in Functions

User text and timecode (as selected using the timecode function) can be burned into the output video. Burn-in attributes such as size, position, background, color, and opacity are user-configurable. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS.

Audio Processor Description

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

- 16 channels of embedded audio from the SDI video input (1-to-1 routing to SDI output)

The router function provides the following audio outputs:

- 16 channels of embedded audio on SDI processed outputs
- 16 channels of AES de-embedding on eight AES outputs pairs

Note: Although card de-embedding supports de-embedding to AES pairs 1 thru 8, current rear module options support output only to pairs 1 thru 4.

The processor function provides group enable/disable and de-embedding of the 16-channel embedded audio SDI input.

Audio Down Mix Function

(See Figure 1-4.) The Audio Down Mixer function provides for the selection of any five embedded channels serving as Left (**L**), Right (**R**), Center (**C**), Left Surround (**Ls**), and Right Surround (**Rs**) individual signals to be multiplexed into stereo pair Down Mix Left (**DM-L**) and Down Mix Right (**DM-R**). The resulting stereo pair **DM-L** and **DM-R** can in turn be routed to any embedded audio pair as desired (or de-embedded to an AES audio output).

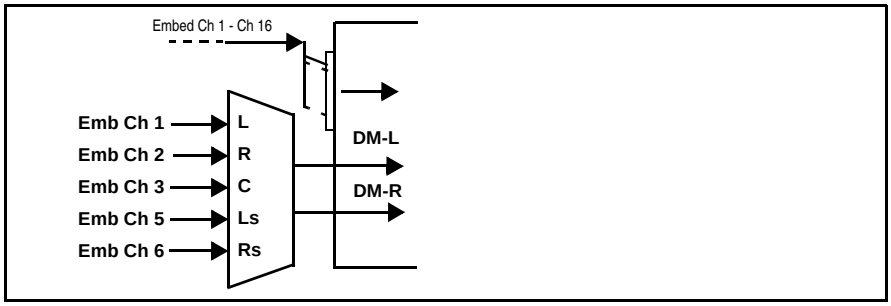

Figure 1-4 Audio Down Mix Functional Block Diagram with Example Sources

Flex Buses. At the output node after the card internal buses, flex buses provide flexible-structure mixer in which any of 16 summing nodes (**Flex Mix Bus A** thru **Flex Mix Bus P**) can receive any card audio input bus channel, thereby allowing several customizable mixing schemes. The flex mix summing nodes can be routed to any of the card embedded or AES output channels.

User Control Interface

Figure 1-5 shows the user control interface options for the 9502-DCDA. These options are individually described below.

Note: All user control interfaces described here are cross-compatible and can operate together as desired. Where applicable, any control setting change made using a particular user interface is reflected on any other connected interface.

- **DashBoard™ User Interface** – Using DashBoard™, the 9502-DCDA and other cards installed in openGear®[1] frames can be controlled from a computer and monitor.

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

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

- **Cobalt® OGCP-9000 and OGCP-9000/CC Remote Control Panels** – The OGCP-9000 and OGCP-9000/CC Remote Control Panels conveniently and intuitively provide parameter monitor and control of the 9502-DCDA and other video and audio processing terminal equipment meeting the open-architecture Cobalt® cards for openGear™ standard.

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

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

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

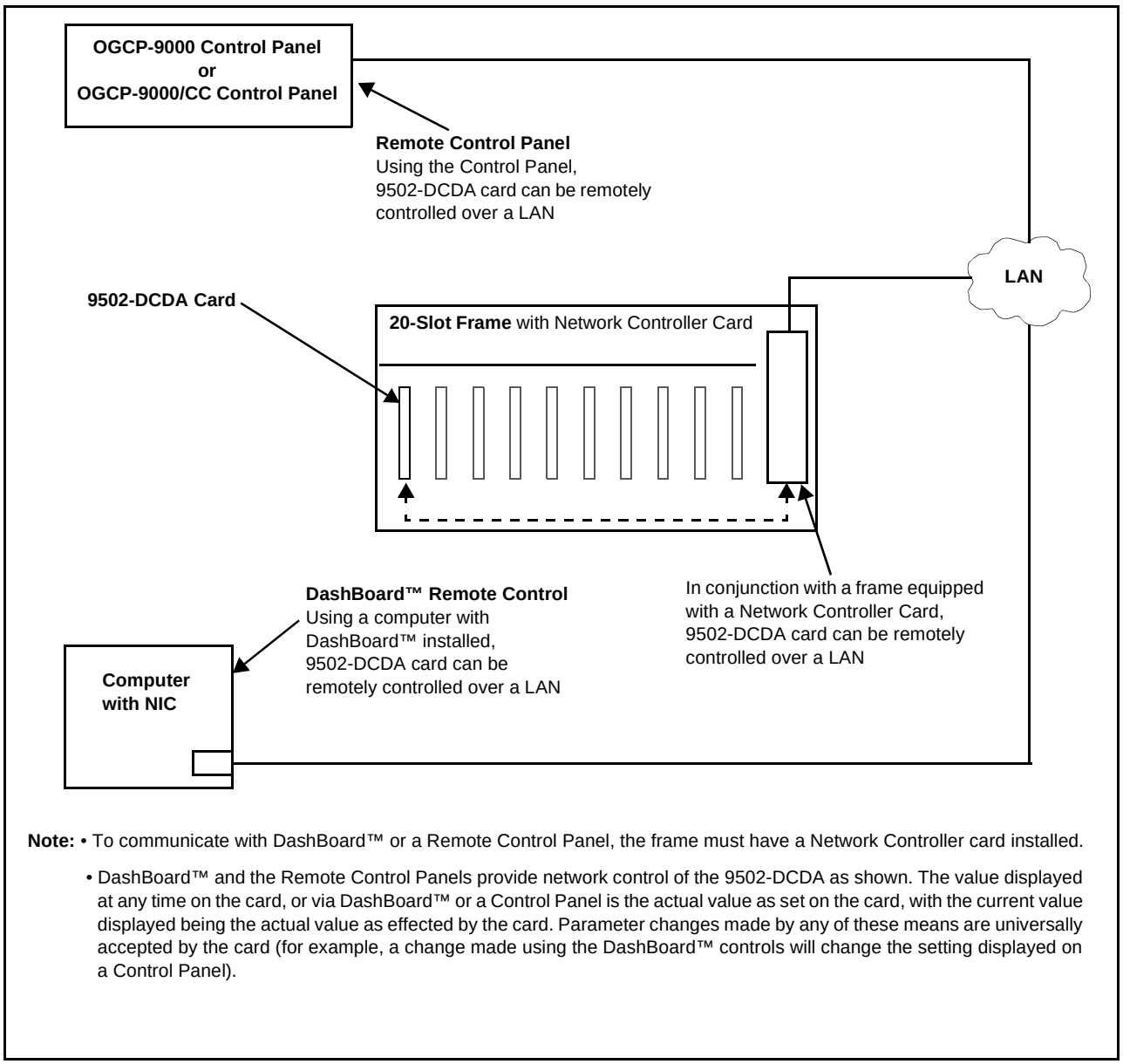

Figure 1-5 9502-DCDA User Control Interface

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

Download a copy of this guide by clicking on the **Support>Reference Documents** link at www.cobaltdigital.com and then select DashBoard Remote Control Setup Guide as a download, or contact Cobalt® as listed in Contact Cobalt Digital Inc. (p. 1-18).

9502-DCDA Rear I/O Modules

The 9502-DCDA 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 9502-DCDA 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 9502-DCDA card edge connections to coaxial and other connectors that interface with other components and systems in the signal chain.

The full assortment of 9502-DCDA Rear I/O Modules is shown and described in 9502-DCDA Rear I/O Modules (p. 2-4) in Chapter 2, “Installation and Setup”.

Technical Specifications

Table 1-1 lists the technical specifications for the 9502-DCDA Down-Converter with 3G/HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking card.

Table 1-1 Technical Specifications

Item	Characteristic
Note: 3G (SMPTE 424M) specifications are applicable for card model 9502-DCDA-3G only.	
Part number, nomenclature	• 9502-DCDA-3G Down-Converter with 3G/HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking • 9502-DCDA-HD Down-Converter with HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking
Installation/usage environment	Intended for installation and usage in frame meeting openGear™ modular system definition
Power consumption	< 18 Watts maximum
Installation Density	Up to 20 cards per 20-slot frame
Environmental: Operating temperature: Relative humidity (operating or storage):	 32° – 104° F (0° – 40° C) < 95%, non-condensing
Frame communication	10/100/1000 Mbps Ethernet with Auto-MDIX
Indicators	Card edge display and indicators as follows: • 4-character alphanumeric display • Status/Error LED indicator • Input Format LED indicator

Table 1-1 Technical Specifications — continued

Item	Characteristic
Serial Digital Video Input	Number of inputs: Two, with manual select or failover to card processing path Data Rates Supported: SMPTE 424M, 292M, SMPTE 259M-C Impedance: 75 Ω terminating Cable Length, Minimum, 3G/HD/SD (Belden 1694A): 120m / 180m / 360m Return Loss: > 15 dB up to 1.485 GHz > 10 dB up to 2.970 GHz
Post-Processor Serial Digital Video Outputs	Number of Outputs: Four 3G/HD/SD-SDI BNC Impedance: 75 Ω Return Loss: > 15 dB at 5 MHz – 270 MHz Signal Level: 800 mV ± 10% DC Offset: 0 V ± 50 mV Jitter (SD): < 0.2 UI (all outputs) Overshoot: < 0.2% of amplitude
Pre-Processor (Reclocked) Serial Digital Video Outputs	Number of Outputs: Four 3G/HD/SD-SDI BNC per IEC 60169-8 Amendment 2 Impedance: 75 Ω
AES Audio Outputs	Standard: SMPTE 276M Number of Outputs: 4 unbalanced (8-ch); AES-3id Output Impedance: 75 Ω

Warranty and Service Information

Cobalt Digital Inc. Limited Warranty

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

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

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

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

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Chapter 2

Installation and Setup

Overview

This chapter contains the following information:

- Installing the 9502-DCDA Into a Frame Slot (p. 2-1)
- Installing a Rear I/O Module (p. 2-3)
- Setting Up 9502-DCDA Network Remote Control (p. 2-6)

Installing the 9502-DCDA 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 9502-DCDA has a moderate power dissipation (<18 W). As such, avoiding placing the card adjacent to other cards with similar dissipation values if possible.

CAUTION

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

Note: **If installing the 9502-DCDA 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 9502-DCDA 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 9502-DCDA 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 9502-DCDA into a frame slot as follows:

1. Determine the slot in which the 9502-DCDA 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 9502-DCDA Rear I/O Modules (p. 2-4).
9. Repeat steps 1 through 8 for other 9502-DCDA cards.

Note: The 9502-DCDA 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 9502-DCDA Network Remote Control (p. 2-6).

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

Installing a Rear I/O Module

Note: This procedure is applicable **only if a Rear I/O Module is not currently installed** in the slot where the 9502-DCDA is to be installed.

If installing the 9502-DCDA in a slot already equipped with a suitable I/O module, omit this procedure.

Install a Rear I/O Module as follows:

1. On the frame, determine the slot in which the 9502-DCDA is to be installed.

2. In the mounting area corresponding to the slot location, install Rear I/O Module as shown in Figure 2-1.

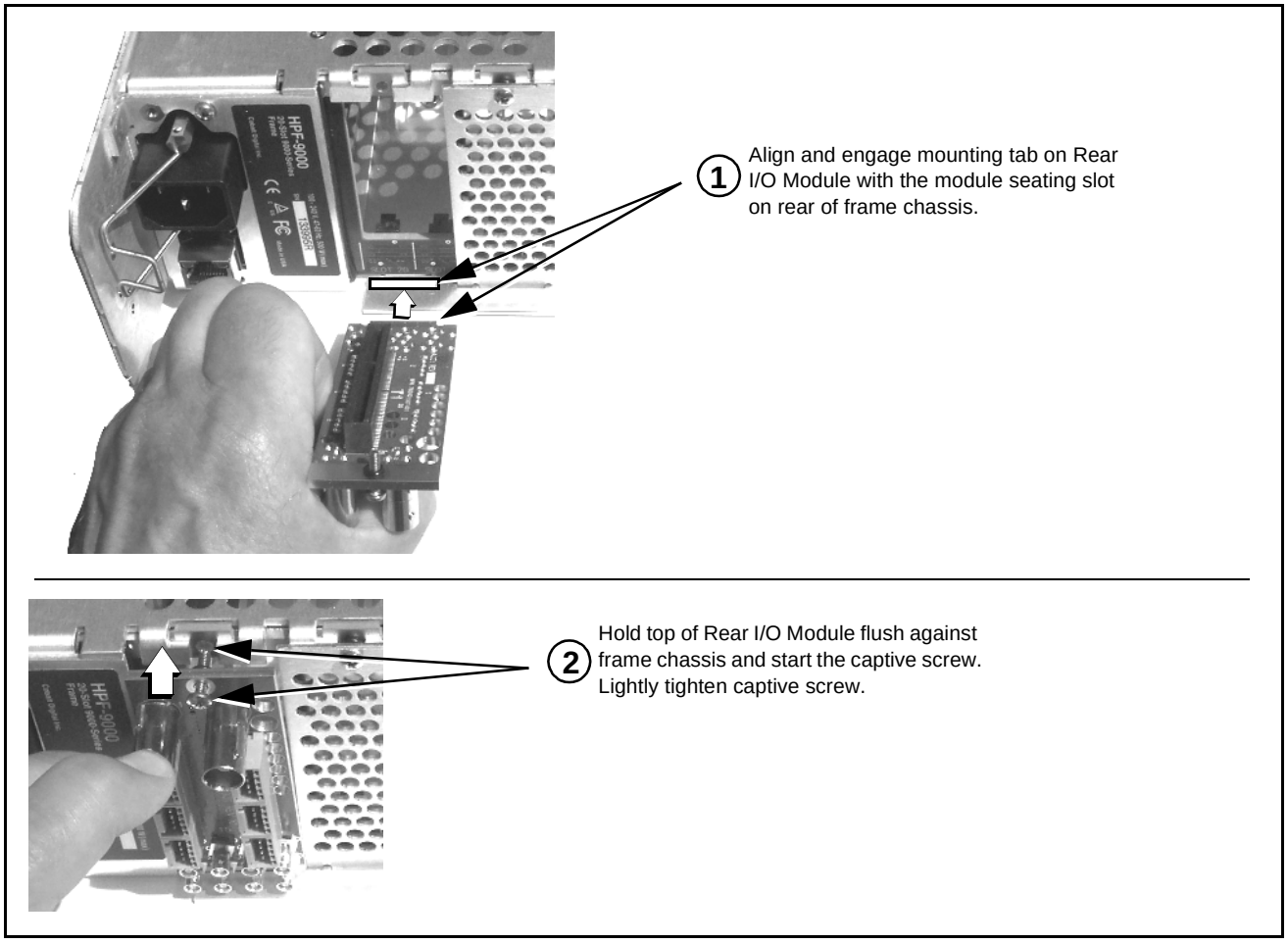


Figure 2-1 Rear I/O Module Installation

9502-DCDA Rear I/O Modules

Table 2-1 shows and describes the full assortment of Rear I/O Modules specifically for use with the 9502-DCDA.

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

Table 2-1 9502-DCDA Rear I/O Modules

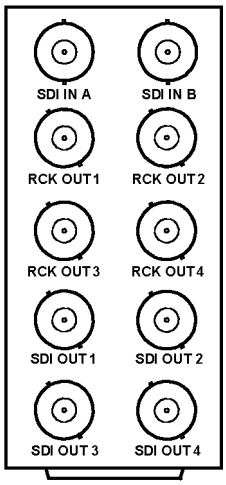
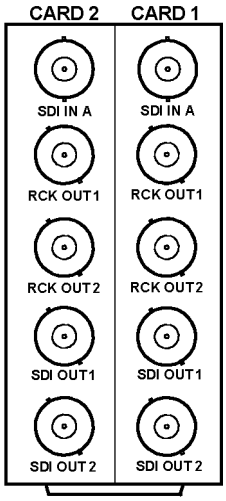
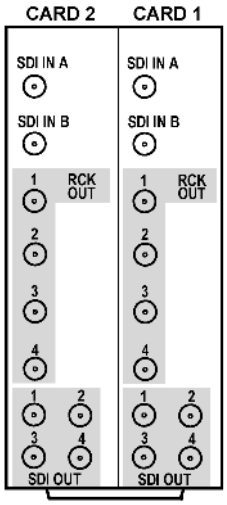
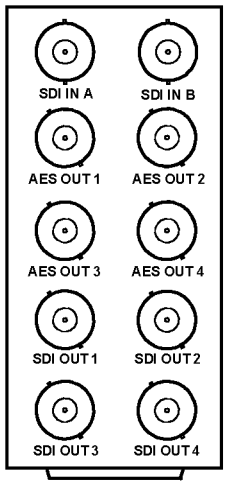
9502-DCDA Rear I/O Module	Description
RM20-9502-A 	Provides the following connections: • Two 3G/HD/SD-SDI coaxial input (**SDI IN A** and **SDI IN B**) • Four reclocked SDI input copies (**RCK OUT 1** thru **RCK OUT 4**) • Four processed coaxial outputs (**SDI OUT 1** thru **SDI OUT 4**)
RM20-9502-A/S 	Split Rear Module. Provides **each** of the following connections for two 9502 cards: • 3G/HD/SD-SDI coaxial input (**SDI IN A**) • Two reclocked SDI input copies (**RCK OUT 1** and **RCK OUT 2**) • Two processed coaxial outputs (**SDI OUT 1** and **SDI OUT 2**)

Table 2-1 9502-DCDA Rear I/O Modules — continued

9502-DCDA Rear I/O Module	Description
RM20-9502-C/S 	Split Rear Module. Provides **each** of the following connections for two 9502 cards: • Two 3G/HD/SD-SDI coaxial input (**SDI IN A** and **SDI IN B**) • Four reclocked SDI input copies (**RCK OUT 1** thru **RCK OUT 4**) • Four processed coaxial outputs (**SDI OUT 1** thru **SDI OUT 4**) **Note:** Available equipped with High-Density BNC (HDBNC) or DIN1.0/2.3 connectors as: RM20-9502-C/S-HDBNC or RM20-9502-C/S-DIN, respectively.
RM20-9502-F 	Provides the following connections: • Two 3G/HD/SD-SDI coaxial input (**SDI IN A** and **SDI IN B**) • Four AES coaxial audio outputs (**AES OUT 1** thru **AES OUT 4**) • Four processed coaxial outputs (**SDI OUT 1** thru **SDI OUT 4**) **Note:** Although card de-embedding supports de-embedding to AES pairs 1 thru 8, current rear module options support output only to pairs 1 thru 4.

Setting Up 9502-DCDA Network Remote Control

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

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

Download a copy of this guide by clicking on the **Support>Reference Documents** link at www.cobaltdigital.com and then select DashBoard Remote Control Setup Guide as a download, or contact Cobalt® as listed in Contact Cobalt Digital Inc. (p. 1-18).

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

Chapter 3

Operating Instructions

Overview

If you are already familiar with using DashBoard or a Cobalt Remote Control Panel to control Cobalt cards, please skip to 9502-DCDA Function Menu List and Descriptions (p. 3-9).

This chapter contains the following information:

- Control and Display Descriptions (p. 3-1)
- Accessing the 9502-DCDA Card via Remote Control (p. 3-5)
- Checking 9502-DCDA Card Information (p. 3-7)
- Ancillary Data Line Number Locations and Ranges (p. 3-8)
- 9502-DCDA Function Menu List and Descriptions (p. 3-9)
- Troubleshooting (p. 3-46)

Control and Display Descriptions

This section describes the user interface controls, indicators, and displays for using the 9502-DCDA card. The 9502-DCDA functions can be accessed and controlled using any of the user interfaces described here.

The format in which the 9502-DCDA 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 9502-DCDA functions (and the controls, indicators, and displays related to a particular function) follows a general arrangement of Function Menus under which related controls can be accessed (as described in Function Menu/Parameter Overview below).

Note: When a setting is changed, settings displayed on DashBoard™ (or a Remote Control Panel) are the settings as effected by the card itself and reported back to the remote control; the value displayed at any time is the actual value as set on the card.

Function Menu/Parameter Overview

The functions and related parameters available on the 9502-DCDA card are organized into function **menus**, which consist of parameter groups as shown below.

Figure 3-1 shows how the 9502-DCDA card and its menus are organized, and also provides an overview of how navigation is performed between cards, function menus, and parameters.

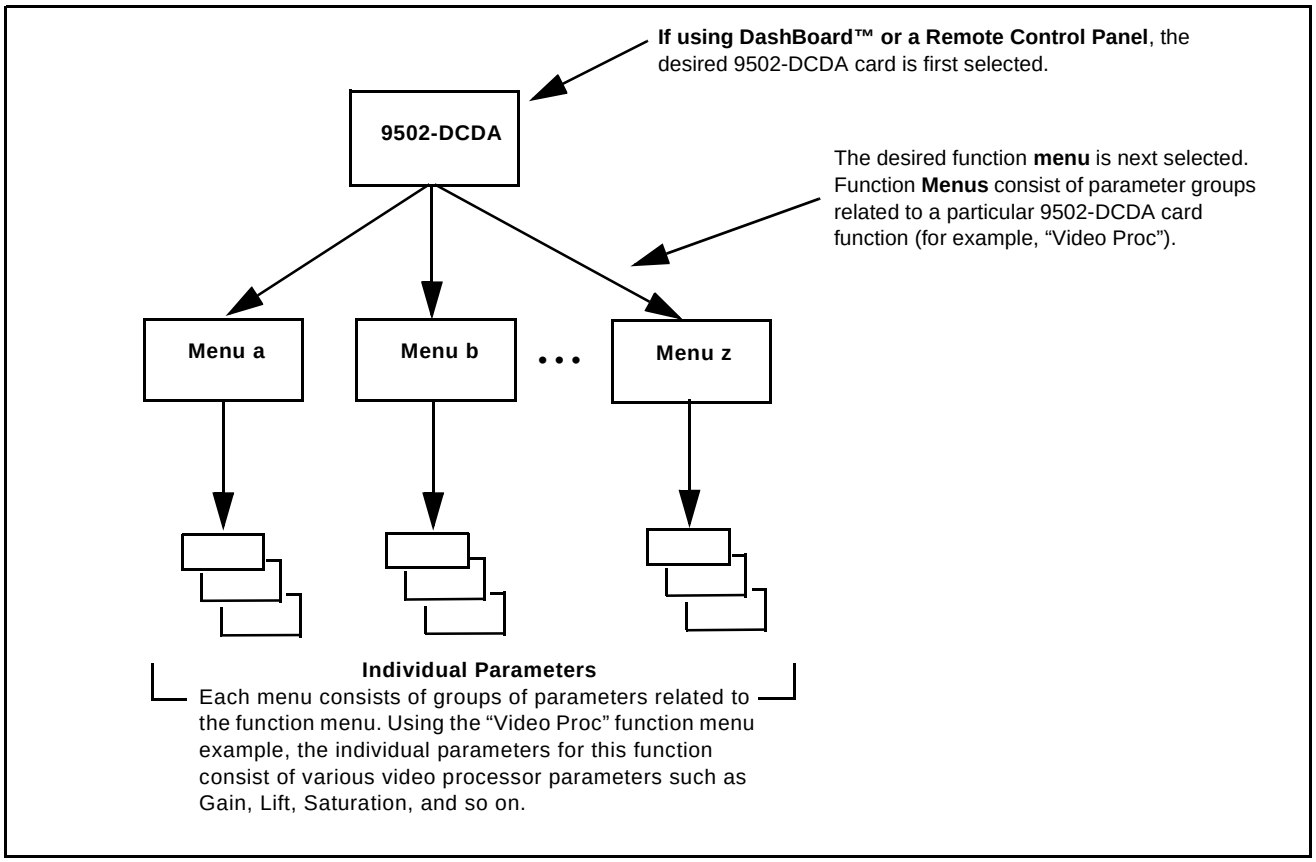


Figure 3-1 Function Menu/Parameter Menu Overview

DashBoard™ User Interface

(See Figure 3-2.) The card function menus are organized in DashBoard™ using tabs. When a tab is selected, each parametric control or selection list item associated with the function is displayed. Scalar (numeric) parametric values can then be adjusted as desired using the GUI slider controls. Items in a list can then be selected using GUI drop-down lists.

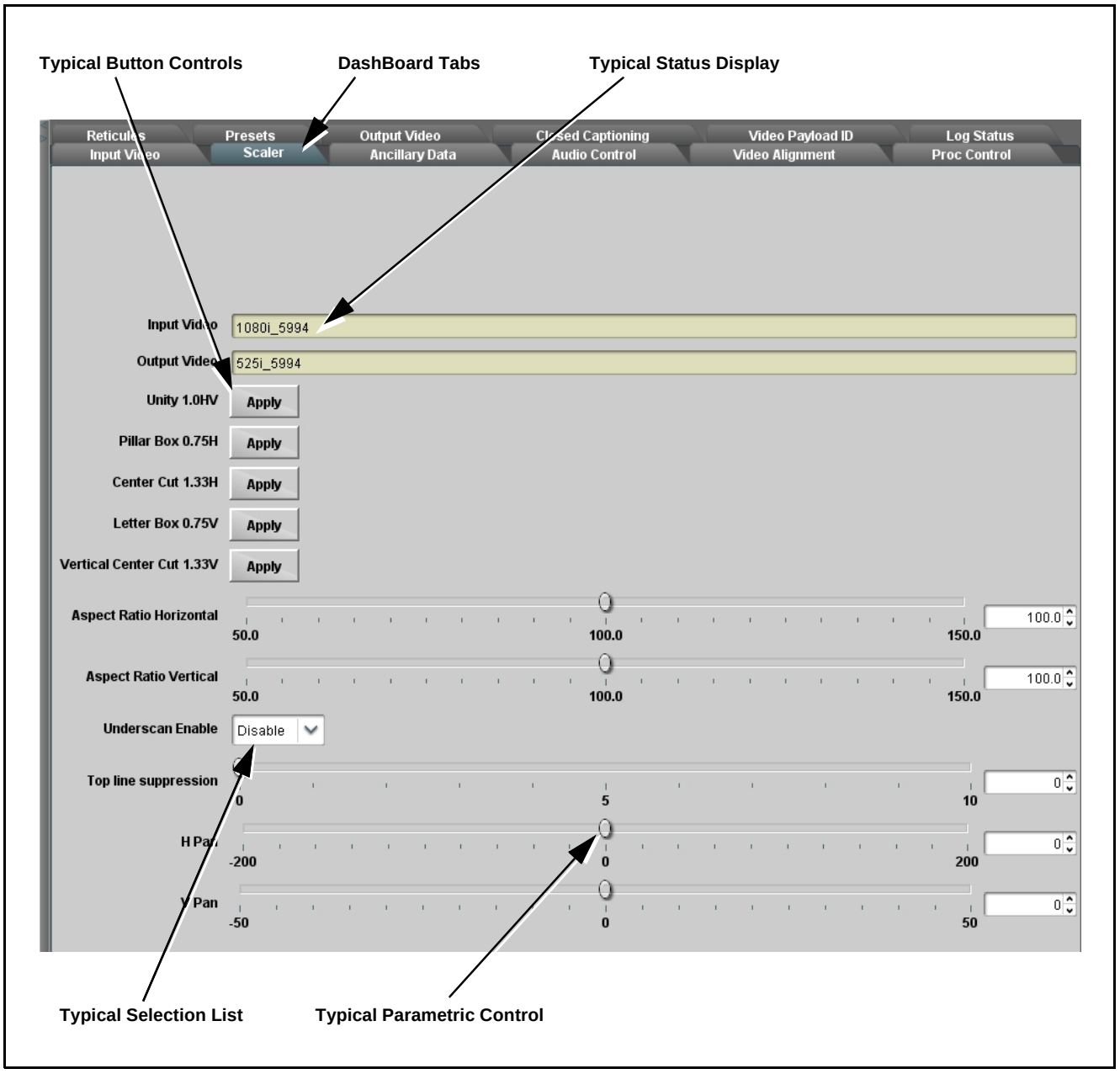


Figure 3-2 Typical DashBoard Tabs and Controls

Cobalt® Remote Control Panel User Interfaces

(See Figure 3-3.) Similar to the function 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 like a potentiometer. Items in a list can then be selected using the control knobs which correspondingly act like a rotary switch.

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

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

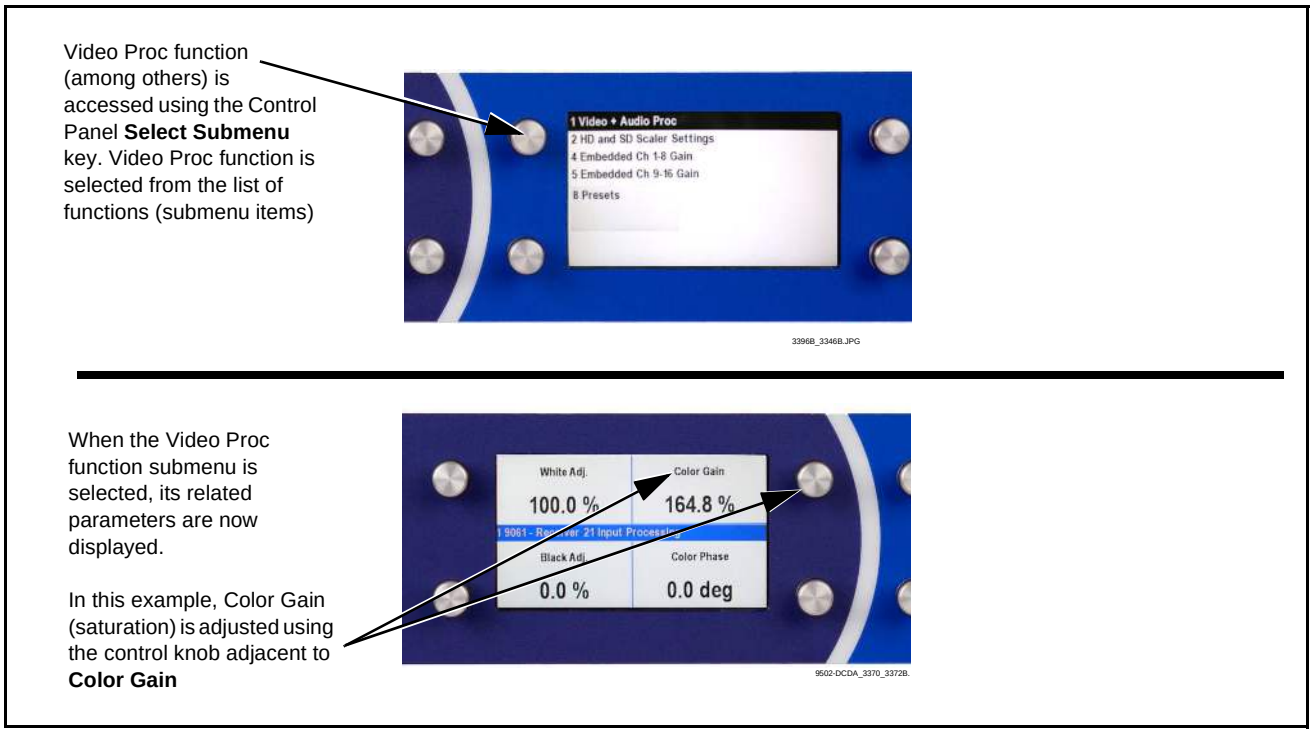


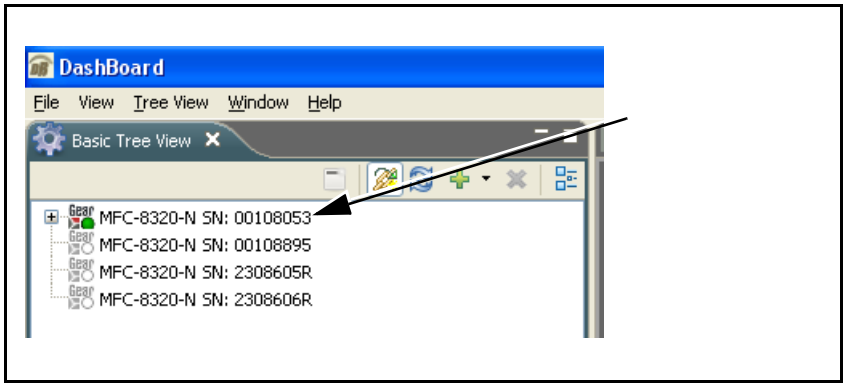
Figure 3-3 Remote Control Panel Setup of Example Video Proc Function Setup

Accessing the 9502-DCDA Card via Remote Control

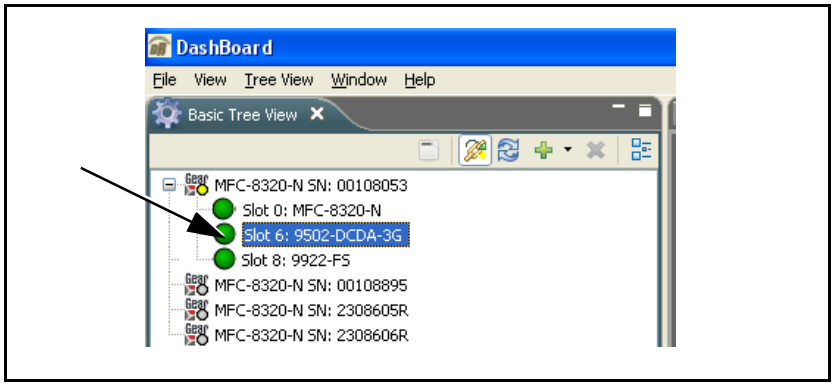
Access the 9502-DCDA card using DashBoard™ or Cobalt® Remote Control Panel as described below.

Accessing the 9502-DCDA Card Using DashBoard™

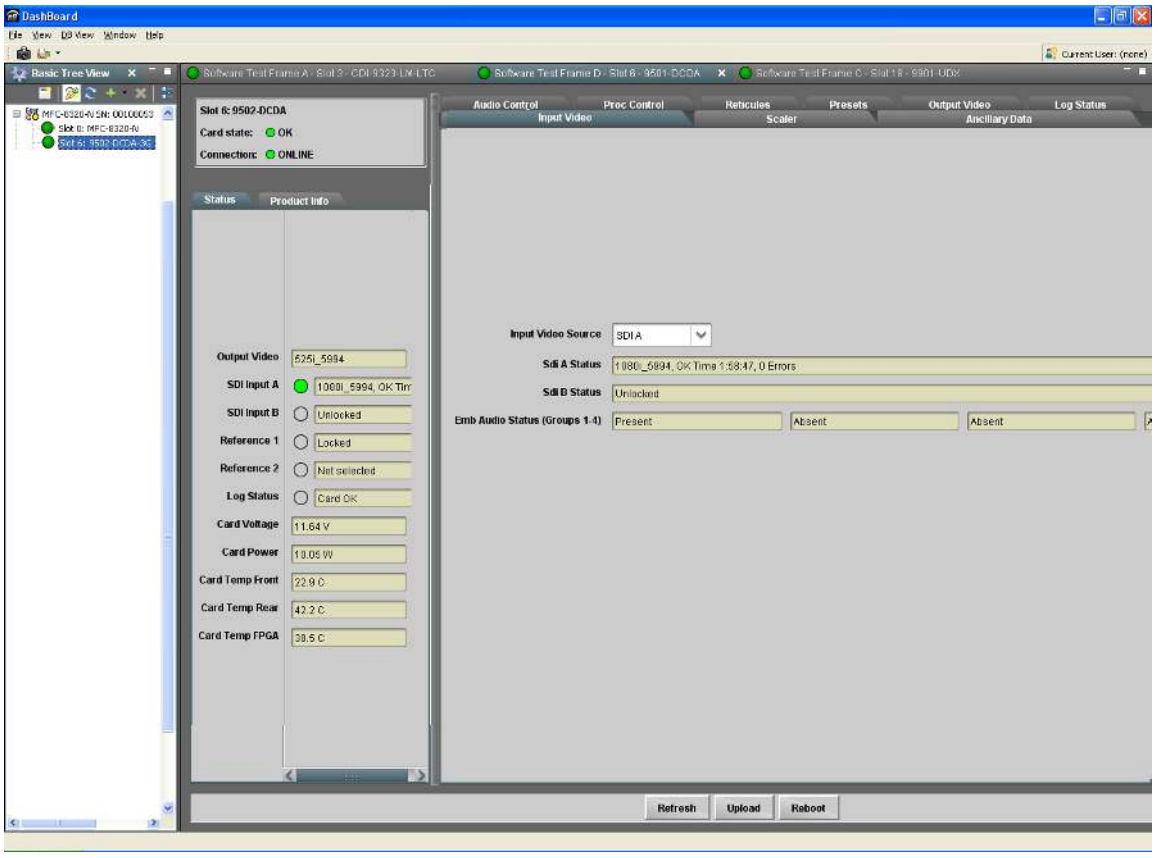
1. On the computer connected to the frame LAN, open DashBoard™.
2. As shown below, in the left side Basic View Tree locate the Network Controller Card associated with the frame containing the 9502-DCDA card to be accessed (in this example, "MFC-8320-N SN: 00108053").



3. As shown below, expand the tree to access the cards within the frame. Click on the card to be accessed (in this example, "Slot 6: 9502-DCDA").



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



Accessing the 9502-DCDA 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 9502-DCDA - 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 9502-DCDA Card Information

The operating status and software version the 9502-DCDA card can be checked using DashBoard™ or the card edge control user interface. Figure 3-4 shows and describes the 9502-DCDA card information screen using DashBoard™ and accessing card information using the card edge control user interface.

Note: Proper operating status in DashBoard™ is denoted by green icons for the status indicators shown in Figure 3-4. Yellow or red icons respectively indicate an alert or failure condition. Refer to Troubleshooting (p. 3-46) for corrective action.

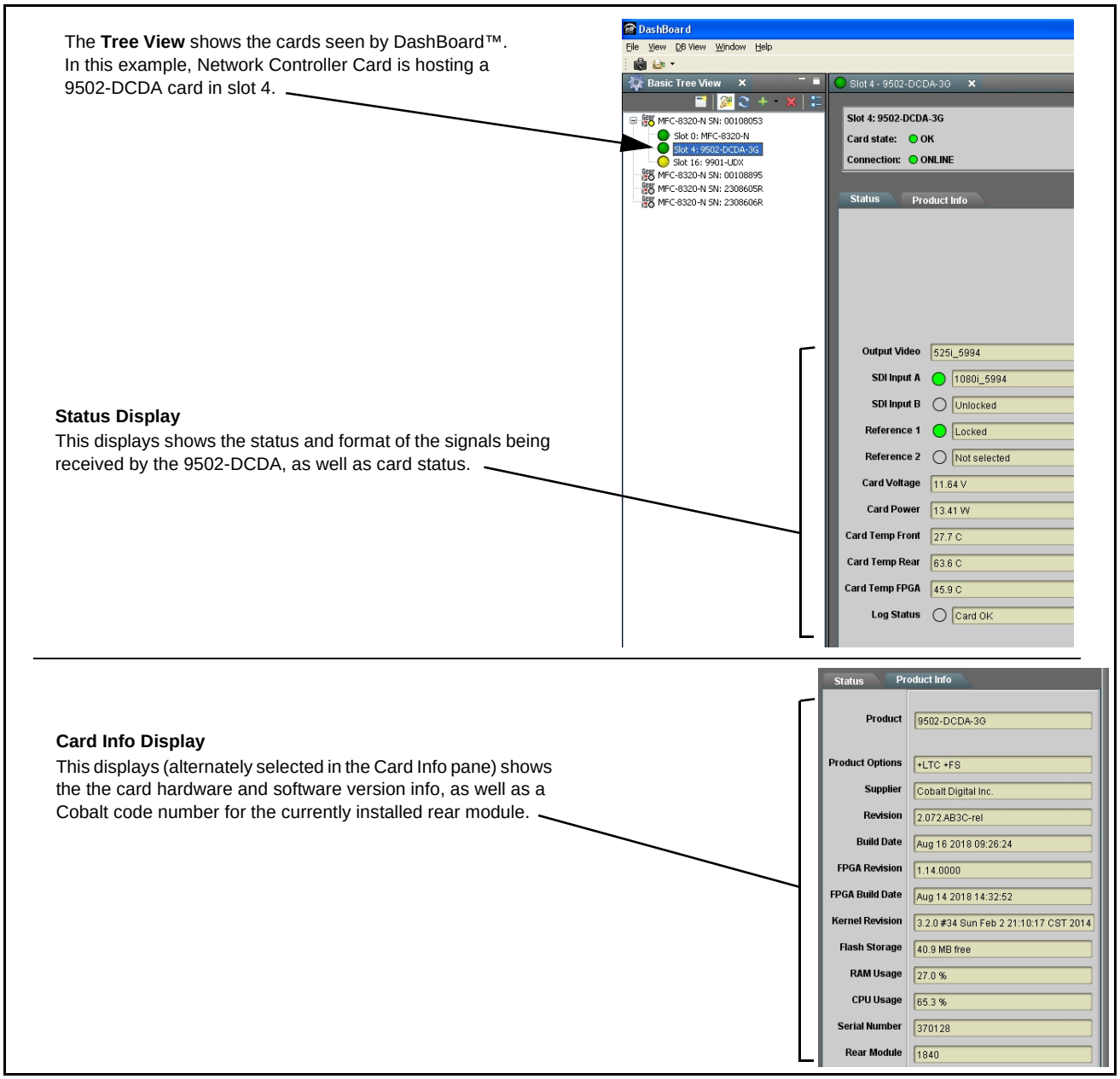


Figure 3-4 9502-DCDA Card Info/Status Utility

Ancillary Data Line Number Locations and Ranges

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

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

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

Notes:

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

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

Because line number allocation is not standardized for all ancillary items, consideration should be given to all items when performing set-ups. Figure 3-5 shows an example of improper and corrected VANC allocation within an HD-SDI stream.

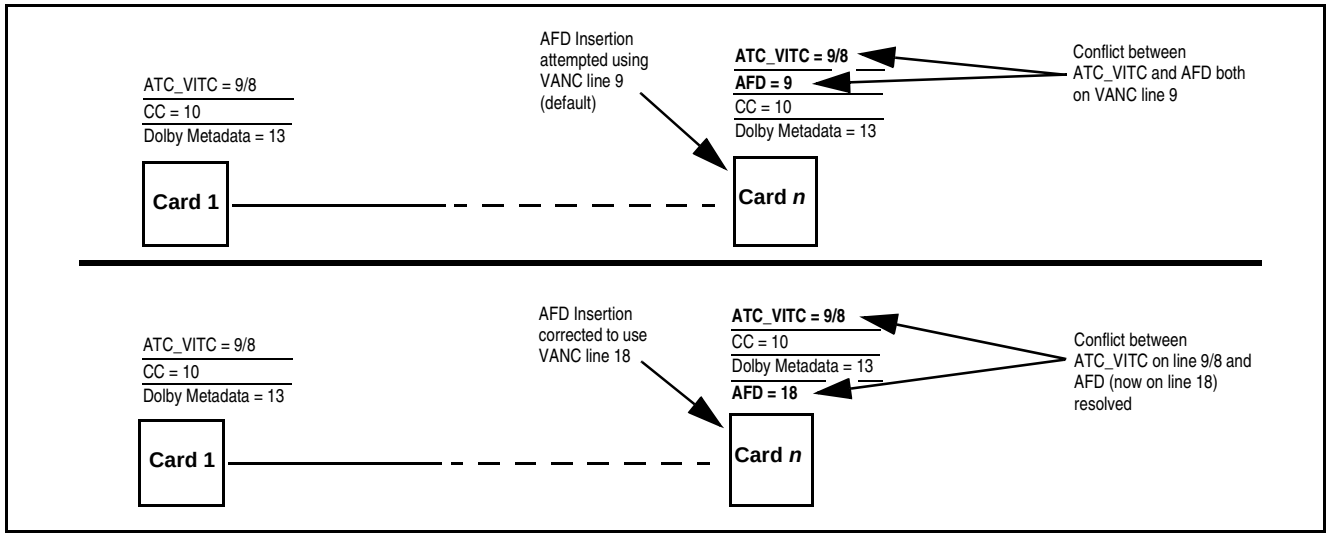


Figure 3-5 Example VANC Line Number Allocation Example

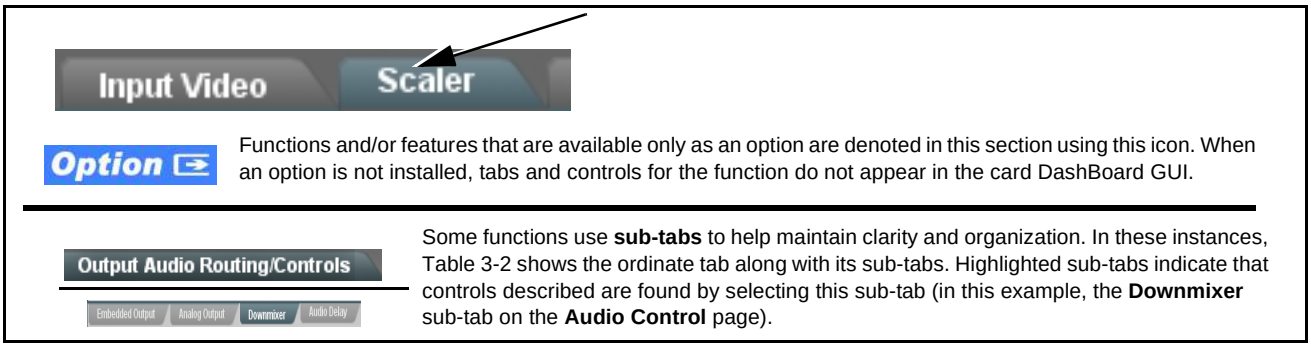
9502-DCDA Function Menu List and Descriptions

Table 3-2 individually lists and describes each 9502-DCDA function menu and its related list selections, controls, and parameters. Where helpful, examples showing usage of a function are also provided. Table 3-2 is primarily based upon using DashBoard™ to access each function and its corresponding menus and parameters.

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

Note: 3G inputs, controls, and functions described in this section are not applicable to 9502-DCDA-HD. In all other aspects, this version function identically as described.

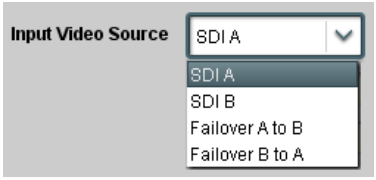
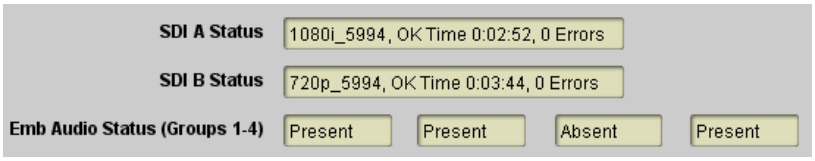
On DashBoard™ itself and in Table 3-2, the function menu items are organized using tabs as shown below.



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

Function Menu Item	Page	Function Menu Item	Page
Input Video Controls	3-10	Output Audio Routing/Controls	3-28
Scaler	3-11	AFD Controls	3-32
Framesync	3-13	Character Burner	3-36
Timecode	3-16	Ancillary Data Proc Controls	3-41
Video Proc/Color Correction	3-21	Presets	3-42
Closed Captioning	3-24	Admin (Log Status/Firmware Update)	3-43
Reticules	3-25	User Log	3-45

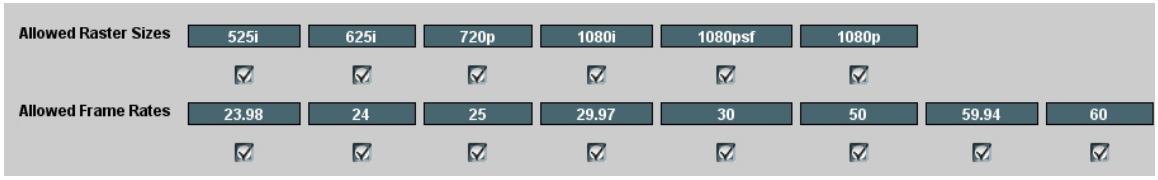
Table 3-2 9502-DCDA Function Menu List

Input Video	Allows manual or failover selection of card SDI inputs and displays status, raster format, and embedded group status of received SDI video.
• **Input Video Source** 	Selects the input video source to be applied to the card's program video input. • **SDI A and SDI B** choices allow forced manual selection of correspondingly **SDI IN A** or **SDI IN B**. • **Failover A to B** sets main path preference of **SDI IN A.** - If **SDI IN A** goes invalid, then **SDI IN B** is selected. - If **SDI IN A** goes valid again, failover automatically reverts to **SDI IN A**. • **Failover B to A** sets main path preference of **SDI IN B.** - If **SDI IN B** goes invalid, then **SDI IN A** is selected. - If **SDI IN B** goes valid again, failover automatically reverts to **SDI IN B**. **Note:** Failover criteria is simple signal presence.
• **Input Video Status**	Displays input status and audio group presence, along with elapsed time of signal acquire.
	**SDI A** and **SDI B Status** show raster/format for both card inputs. If signal is not present or is invalid, **Unlocked** is displayed. (These status indications are also propagated to the Card Info pane.) Presence of each embedded audio group is also displayed for actively selected input.

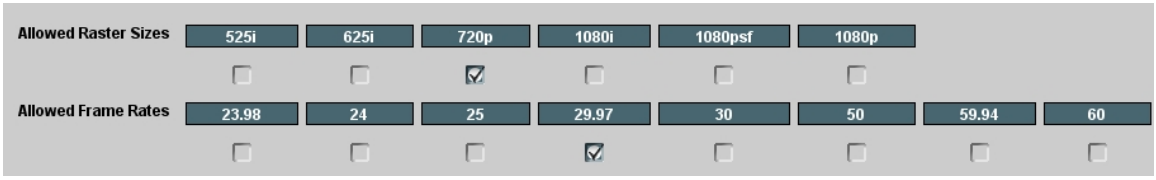
Input SDI Raster Size / Frame Rate Filtering

The controls shown below allow user filtering to only include selected raster or rate formats to be used as a card program video input.

Default settings have all raster sizes and frame rates "checked", thereby providing no filtering (exclusion.)



In the example below, only 720p and 29.97 are checked, filtering allowed input to only be 720p 29.97 ("720p half-rate").



Notes: • Rates shown in selector are frame rates and not field rates.

• Reclocked outputs will pass input SDI regardless of Input SDI Raster Size / Frame Rate Filtering. Input filtering applies only to the card processed program video path.

Table 3-2 9502-DCDA Function Menu List — continued

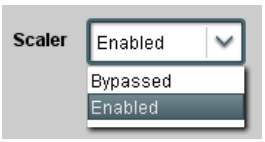
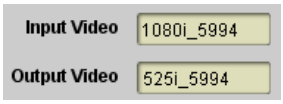
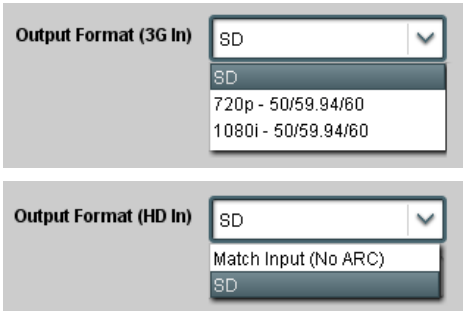
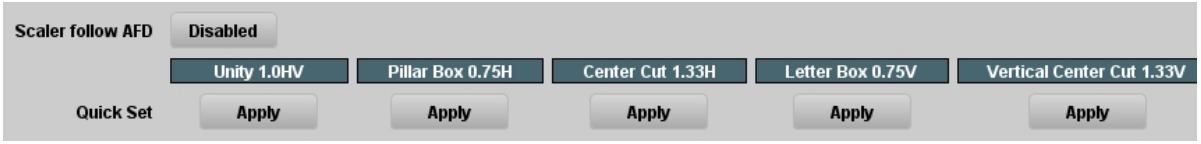
Scaler	Provides down-conversion, aspect ratio controls, and user H/V controls.
• **Scaler Enable Control** 	Enables or disables Scaler function. **Note:** When scaler is disabled, all ancillary data is passed from input to output intact. If the scaler is enabled, ancillary data such as timecode and closed captioning must be set for re-insertion as desired. See Timecode (p. 3-16) and Closed Captioning (p. 3-24) for more information about insertion into scaled output video.
• **Input/Output Video Status** 	Displays signal format/status sent to scaler (as a function of Input Video Source settings above), as well as output format/status. If invalid or no signal is present, **Unlocked** is displayed.
• **Downconverter Controls** 	9502-DCDA provides selectable down-conversion for 3G, HD and SD inputs with the choices as shown using the controls here. Selected settings will automatically engage when corresponding video input format is received by the card.
• **Standard Quick Set Aspect Ratio Conversion Selectors**	Selects between the standard preset Aspect Ratio Conversions (ARC) shown below or scaler follow AFD. **Note:** • The **Scaler follow AFD** control also appears on the **AFD** tab and is mutually ganged with the selection performed on either tab. Refer to AFD Controls (p. 3-32) for more information. • 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 per AFD Controls (p. 3-32).
	

Table 3-2 9502-DCDA Function Menu List — continued

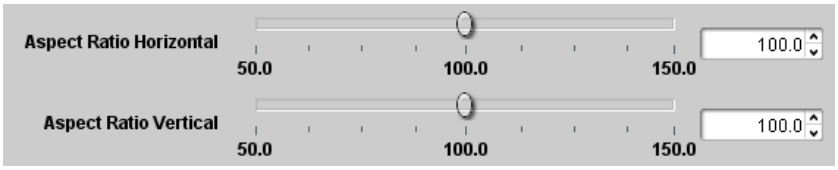
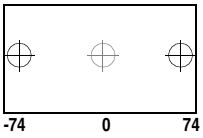
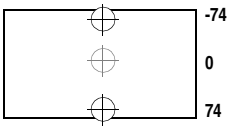
Scaler	(continued)
• **User-defined Aspect Ratio Controls**	**Aspect Ratio Horizontal** and **Aspect Ratio Vertical** controls adjust horizontal and vertical zoom percentage. Settings less than (<) 100% provide zoom-out; settings greater than (>) 100% provide zoom-in. (50% to 150% range in 0.1% steps; null = 100.0)
	Buttons allow standard ARC presets to be applied to output video. For any setting, using the **Horizontal** or **Vertical** controls allow user custom settings. Pressing any of the preset buttons restores the ARC to the selected setting and overrides any previous custom settings.
• **H Pan and V Pan Controls** 	**H Pan** control shifts horizontal center of image left (negative settings) or right (positive settings) (-74% to 74% range in 0.1% steps; null = 0.0)  **V Pan** control shifts vertical center of image down (negative settings) or up (positive settings) (-74% to 74% range in 0.1% steps; null = 0.0) 
• **Downscale Filtering Control** 	Adjusts the aggressiveness of sharpening or filtering applied to output video. Optimum setting results in overall perception of increased sharpness, while avoiding pattern noise artifacts. (Range is 0.50 thru 1.50 in 0.01 steps; null = 1.00)

Table 3-2 9502-DCDA Function Menu List — continued

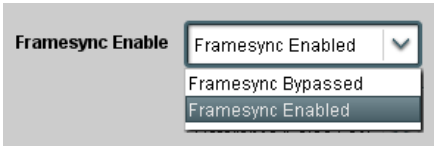
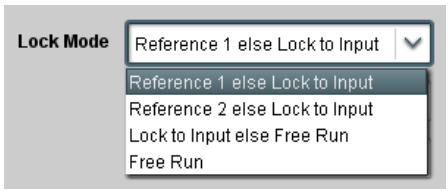
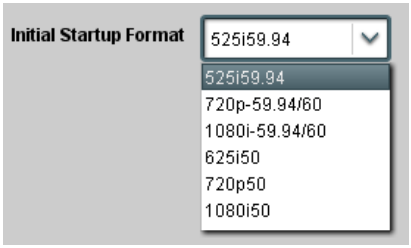
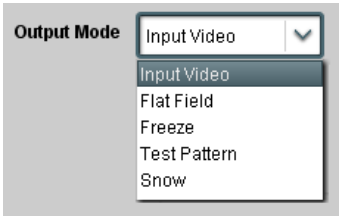
Framesync Option	Provides video frame sync/delay offset control and output control/loss of program video failover selection controls.
• **Framesync Enable/Disable Control** 	Provides master enable/disable of all card framesync functions/controls.
• **Lock Mode Select** 	Selects Frame Sync functions from the choices shown to the left and described below. • **Lock to Reference:** Output video is locked to selected external reference received on the frame reference bus. (External reference signal Ref 1 / Ref 2 are distributed to the card and other cards via the Ref 1 / Ref 2 buses on the frame.) **Note:** If valid reference is not received, the Card state: Reference Invalid indication appears in the Card Info status portion of DashBoard™, indicating invalid frame sync reference error. • **Lock to Input:** Uses the program video input video signal as the reference standard. **Note:** If **Lock to Input** is used for framesync, any timing instability on the input video will result in corresponding instability on the output video. • **Free Run:** Output video is locked to the card's internal clock. Output video is **not** locked to external reference.
• **Initial Startup Format Select** 	Selects a frame sync format/rate to be invoked (from the choices shown to the left) in the time preceding stable lock to external reference. Set this control to that of the intended external reference to help ensure smoothest frame sync locking. This control also sets the card test pattern format where the card's initial output from power-up is the internal pattern instead of program video.
• **Program Video Output Mode Select** 	Provides a convenient location to select between card program video output and other technical outputs from the choices shown to the left and described below. • **Input Video** – card outputs input program video (or loss of signal choices described below). • **Flat Field** – card outputs flat field. • **Freeze** – card outputs last frame having valid SAV and EAV codes. • **Test Pattern** – card outputs standard technical test pattern (pattern is selected using the Pattern drop-down described below). • **Snow** – card outputs snow multi-color pattern.

Table 3-2 9502-DCDA Function Menu List — continued

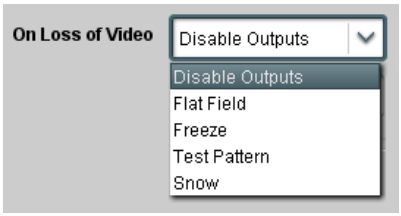
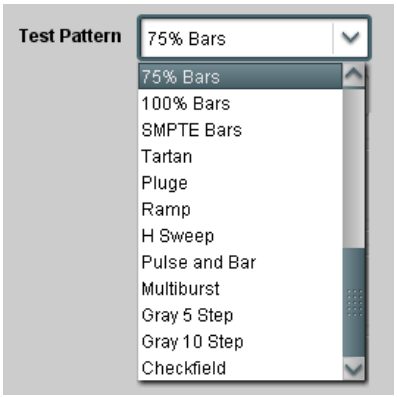
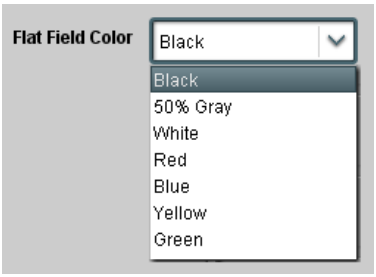
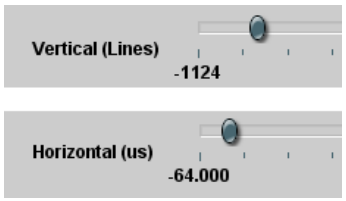
Framesync	**(continued)**
• **Loss of Input Signal Selection** 	In the event of program input video Loss of Signal (LOS), determines action to be taken as follows: • **Disable Outputs:** Disable program video SDI outputs. • **Flat Field** – go to flat field on program video output. • **Freeze** – go to last frame having valid SAV and EAV codes on program video output. • **Test Pattern** – go to standard technical test pattern on program video output (pattern is selected using the Pattern drop-down described below). • **Snow** – output snow multi-color pattern.
• **Pattern Select** 	Provides a choice of standard technical patterns when **Test Pattern** is invoked (either by LOS failover or directly by selecting Test Pattern on the Program Video Output Mode Select control).
• **Flat Field Color Select** 	Provides a choice of flat field colors when **Flat Field** is invoked (either by LOS failover or directly by selecting Flat Field on the Program Video Output Mode Select control).
• **Output Video Reference Offset Controls** 	With framesync enabled, provides the following controls for offsetting the output video from the reference: • **Vertical (Lines)** – sets vertical delay (in number of lines of **output video**) between the output video and the frame sync reference. (Positive values provide delay; negative values provide advance) (Range is -1124 thru 1124 lines; null = 0 lines.) • **Horizontal (µs)** – sets horizontal delay (in µs of **output video**) between the output video and the frame sync reference. (Positive values provide delay; negative values provide advance) (Range is -64 thru 64 µsec; null = 0.000 µsec.) **Note:** Offset **advance** is accomplished by hold-off of the reference-directed release of the frame, thereby effectively advancing the program video relative to the reference.

Table 3-2 9502-DCDA Function Menu List — continued

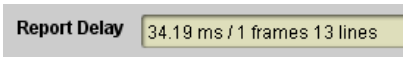
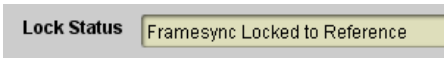
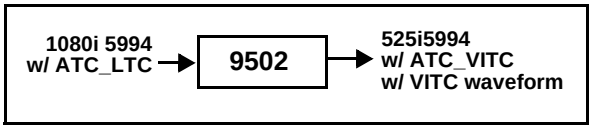
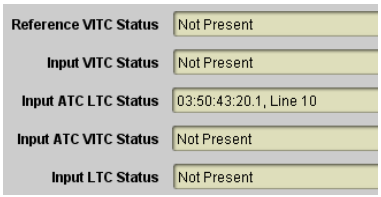
	**(continued)**
• **Frame Delay Control** 	When Framesync is enabled, specifies the smallest amount of latency delay (frames held in buffer) allowed by the frame sync. The frame sync will not output a frame unless the specified number of frames are captured in the buffer. **The operational latency of the frame sync is always between the specified minimum latency and minimum latency plus one frame (not one field).** **Note:** Due to card memory limits, the maximum available Minimum Latency Frames is related to the output video format selected. When using this control, be sure to check the **Report Delay** display to kame certain desired amount of frames are delayed.
• **Video Delay Display** 	Displays the current input-to-output video delay (in msec units) as well as in terms of Frames/fractional frame (in number of lines).
• **Framesync Lock Status Display** 	Displays the current framesync status and reference source.
Note: Audio timing offset from video is performed using the delay controls on the Output Audio Routing/Controls tab. Refer to Output Audio Routing/Controls (p. 3-28) for these controls.	

Table 3-2 9502-DCDA Function Menu List — continued

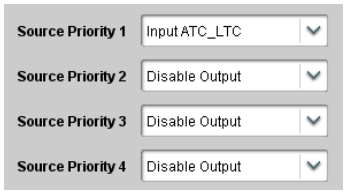
Timecode	Provides timecode data extraction from various sources, and provides formatting and re-insertion controls for inserting the timecode into the output video.

Shown below is an example in which received 1080i 5994 SDI video is being down-converted to 525i 5994. To preserve and re-insert the timecode data after scaling (which removes timecode packets), timecode re-insertion is performed using the Timecode controls. Each Timecode control is fully described on the pages that follow.



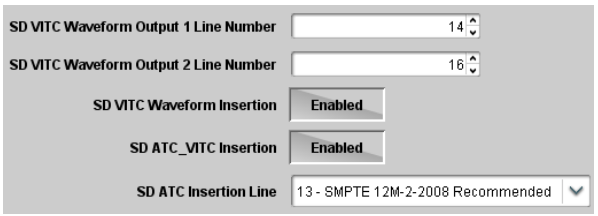


A Noting that the incoming video contains ATC_LTC timecode data (as shown in the status display), set the Source Priority drop-down lists to include ATC_LTC timecode data as a choice. This extracts ATC_LTC timecode data from the incoming video to allow for re-insertion as a selected format.



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

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



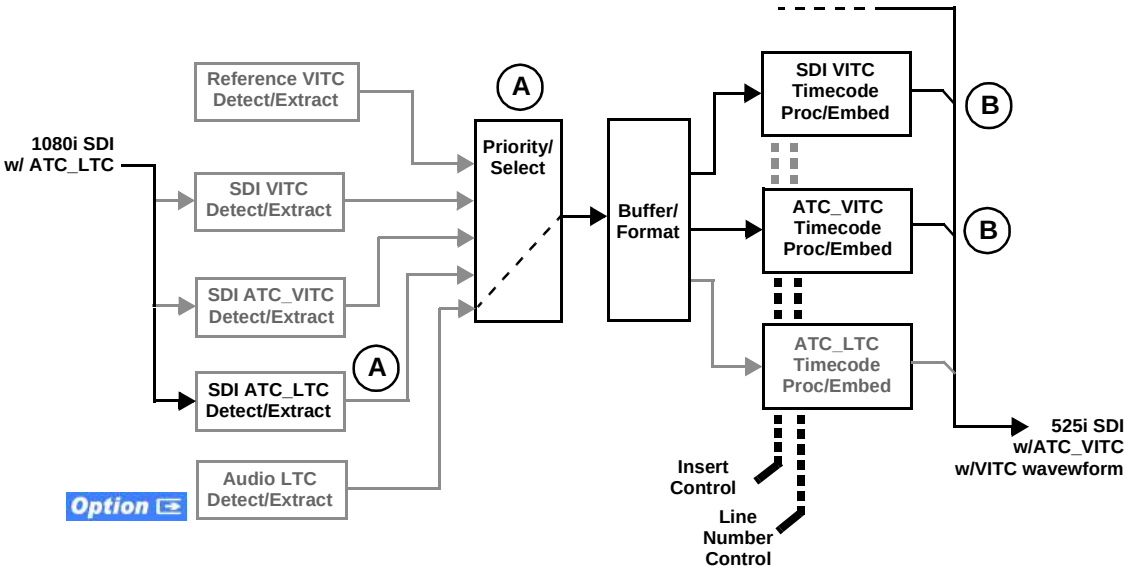


Table 3-2 9502-DCDA Function Menu List — continued

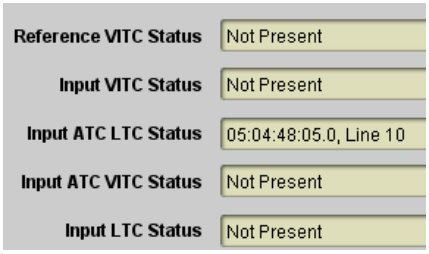
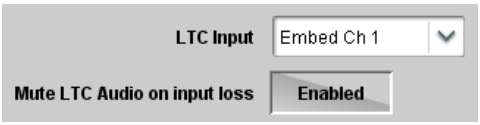
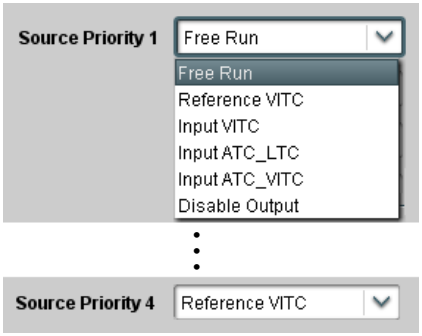
Timecode	**(continued)**
Option **Audio LTC** controls described below only appear on cards with **+LTC** licensed optional feature. This feature allows audio LTC from an embedded audio channel to be used as a timecode source, with conversion to a selected SMPTE 12M format on the output video.	
• **Timecode Source Status Displays** 	Displays the current status and contents of the received timecode formats shown to the left. • If a format is receiving timecode data, the current content (timecode running count) is displayed. • If a format is not receiving timecode data, Not Present is displayed.
• **Audio LTC Source and Mute Controls**  Option	(**+LTC** option only) **LTC Input** control selects input embedded audio channel when audio LTC is to be used as a source. Mute LTC Audio control allows timecode using LTC audio sources to freeze as follows: • When set to **Enabled** and input timecode is lost, timecode insertion is disabled. • When set to **Disabled** and input timecode is lost, timecode output reverts to free-run. **Note:** If muting upon loss of a particular input format is desired, set all **Source Priority 1** thru **4** to that particular input format. If this is not done, the card failover timecode selection may substitute another format choice for the format not being received.
• **Incoming ATC Packet Removal Control** 	Enables or disables removal of existing input video ATC timecode packets from the output. This allows removal of undesired existing timecodes from the output, resulting in a “clean slate” where only desired timecodes are then re-inserted into the output. (For example, if both SDI ATC_VITC and ATC_LTC are present on the input video, and only ATC_LTC is desired, using the Removal control will remove both timecodes from the output. The ATC_LTC timecode by itself can then be re-inserted on the output using the other controls discussed here.) **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. • Set this control to **Enabled** if Free-Run timecode is to be used. If incoming packets are not removed, output embedded SMPTE timecode may alternate between free-run and embedded SMPTE timecode values.

Table 3-2 9502-DCDA Function Menu List — continued

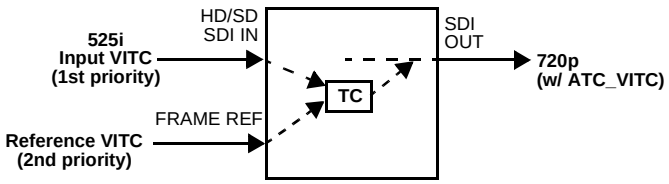
Timecode	(continued)

• **Source Priority**



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

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



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

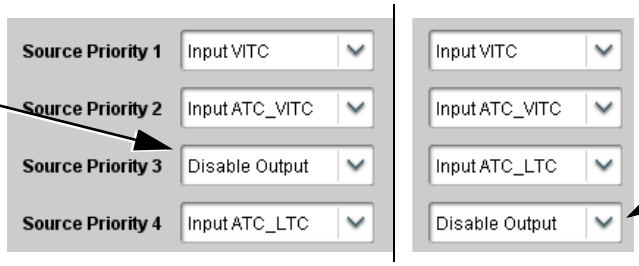
The selected timecode source is embedded on the SDI video output (in this example, 720p) using the selected line number. In this example, if the SDI VITC on the SDI input becomes unavailable, the card then uses the reference VITC data received on the frame reference.

Note: Set Incoming ATC Packet Removal Control to **Enabled** if Free-Run timecode is to be used. If incoming packets are not removed, output embedded SMPTE timecode may alternate between free-run and embedded SMPTE timecode values.

⚠ Disable Output setting should be used with care. If Disable Output is selected with alternate intended format(s) set as a lower priority, the card will indeed disable **all** timecode output should the ordinate preferred format(s) become unavailable.

Typically, choices other than Disable should be used if a timecode output is always desired, with Disable only being used to remove all timecode data.

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



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

• **Offset Controls**

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

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

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

Table 3-2 9502-DCDA Function Menu List — continued

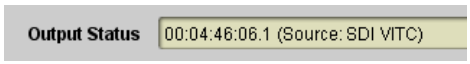
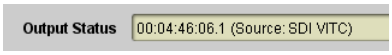
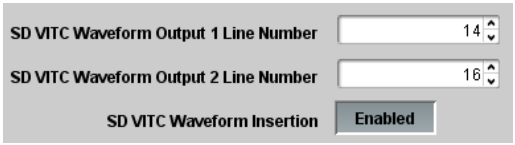
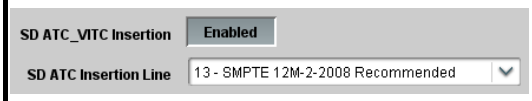
	**(continued)**
• **Output Status Display** 	Displays the current content and source being used for the timecode data as follows:  • Output status OK (in this example, SDI VITC timecode received and outputted).  • **Timecode Insertion** button set to **Disabled**; output insertion disabled. **Note:** • If timecode is not available from Source Priority selections performed, timecode on output reverts to Free Run (internal count) mode. • Because the 1's digit of the display Frames counter goes from 0 to 29, the fractional digit (along with the 1's digit) indicates frame count as follows: 0.0 Frame 0 0.1 Frame 1 1.0 Frame 2 1.1 Frame 3 • • • 29.1 Frame 59
• **Audio LTC Output** 	Audio LTC output is routed to desired embedded or AES audio outputs using the Output Audio Routing/Controls (p. 3-28). Whatever timecode is displayed on the Output Status is converted to audio LTC and available as an LTC audio output.
Note: • Although the output line drop-down on the controls described below will allow a particular range of choices, the actual range is automatically clamped (limited) to certain ranges to prevent inadvertent conflict with active picture area depending on video format. See Ancillary Data Line Number Locations and Ranges (p. 3-8) for more information. • The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.	
• **SD VITC Waveform Insertion Controls** 	For SD output, enables or disables SD VITC waveform timecode insertion into the output video, and selects the VITC1 and VITC2 line numbers (6 thru 22) where the VITC waveform is inserted. **Note:** • If only one output line is to be used, set both controls for the same line number. • **SD VITC Waveform Insertion** control only affects VITC waveforms inserted (or copied to a new line number) by this function. An existing VITC waveform on an unscaled SD SDI stream is not affected by this control and is passed on an SDI output.
• **SD ATC Insertion Control** 	For SD output, enables or disables SD ATC_VITC timecode insertion into the output video, and selects the line number for ATC_VITC.

Table 3-2 9502-DCDA Function Menu List — continued

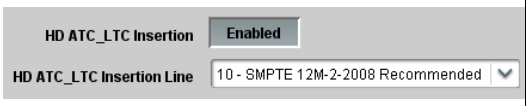
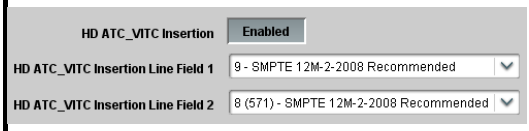
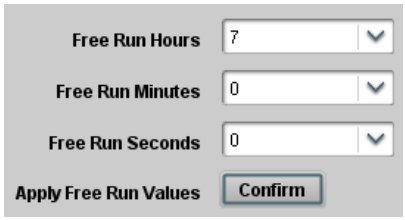
	**(continued)**
• HD ATC_LTC Insertion Control 	For HD output, enables or disables ATC_LTC timecode insertion into the output video, and selects the line number for ATC_LTC timecode data.
• HD ATC_VITC Insertion Control 	For HD output, enables or disables ATC_VITC timecode insertion into the output video,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

Table 3-2 9502-DCDA Function Menu List — continued

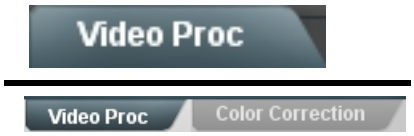
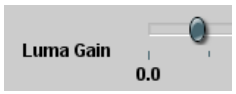
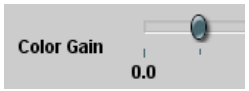
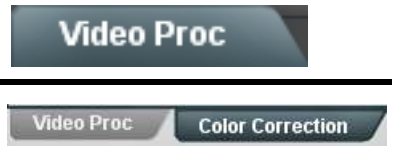
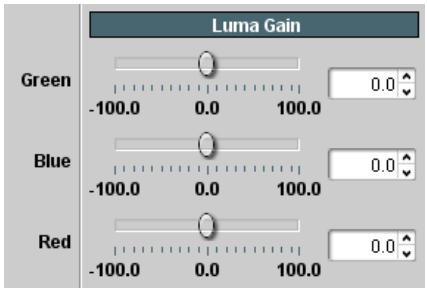
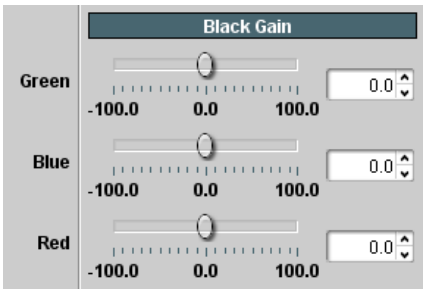
	Provides the following Video Proc and optional Color Correction parametric controls.
• **Video Proc** 	**Video Proc (On/Off)** provides master on/off control of all Video Proc functions. • When set to **Off**, Video Proc is bypassed. • When set to **On**, currently displayed parameter settings take effect.
• **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%)
• **Color Gain** 	Adjusts gain percentage (saturation) applied to Chroma (C-channel). (0% to 200% range in 0.1% steps; unity = 100%)
• **Color Phase** 	Adjusts phase angle applied to Chroma. (-360° to 360° range in 0.1° steps; null = 0°)
• **Gang Luma/Color Gain** 	When set to **On**, changing either the **Luma Gain** or **Color Gain** controls increases or decreases both the Luma and Color gain levels by equal amounts.

Table 3-2 9502-DCDA Function Menu List — continued

<table>
<tr>
<td> 
</td>
<td> 

Provides color corrector functions for the individual RGB channels for the card program video path (option +COLOR).</td>
</tr>
<tr>
<td>• Color Corrector
 
</td>
<td>Color Corrector (On/Off) provides master on/off control of all Color Corrector functions.
• When set to Off, all processing is bypassed.
• When set to On, currently displayed parameters settings take effect.</td>
</tr>
<tr>
<td>• Reset to Unity
 
</td>
<td>Reset to Unity provides unity reset control of all Color Corrector functions.
When Confirm is clicked, a Confirm? pop-up appears, requesting confirmation.
• Click Yes to proceed with the unity reset.
• Click No to reject unity reset.</td>
</tr>
<tr>
<td>• Luma Gain R-G-B controls
 

• Black Gain R-G-B controls
 

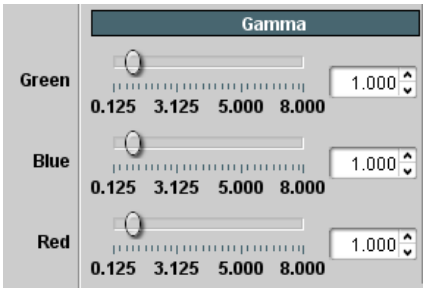
• Gamma Factor R-G-B controls
 
</td>
<td>Separate red, green, and blue channels controls for Luma Gain, Black Gain, and Gamma curve adjustment.
Gain controls provide gain adjustment from 0.0 to 200.0% range in 0.1% steps (unity = 100.0)
Gamma controls apply gamma curve adjustment in 0.125 to 8.000 range in thousandths steps (unity = 1.000)
Each of the three control groups (Luma, Black, and Gamma have a Gang Column button which allows settings to be proportionally changed across a control group by changing any of the group's controls.</td>
</tr>
</table>

Table 3-2 9502-DCDA Function Menu List — continued

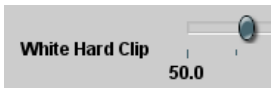
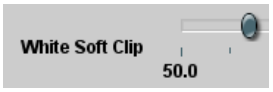
	**(continued)**
• **Black Hard Clip** 	Applies black hard clip (limiting) at specified percentage. (-6.8% to 50.0%; null = -6.8%)
• **White Hard Clip** 	Applies white hard clip (limiting) at specified percentage. (50.0% to 109.1%; null = 109.1%)
• **White Soft Clip** 	Applies white soft clip (limiting)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

Table 3-2 9502-DCDA Function Menu List — continued

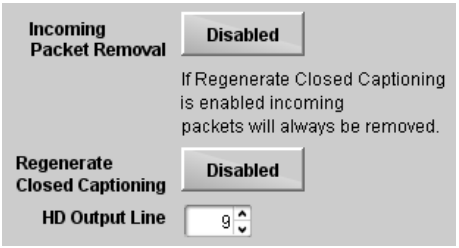
<table>
<tr><td>Closed Captioning</td><td>Provides support for closed captioning setup.</td></tr>
<tr><td colspan="2">Note: When receiving HD-SDI, both CEA 608 and CEA 708 are supported, with CEA 608 and CEA 708 (containing CEA 608 packets) converted to line 21 closed captioning on outputs down-converted to SD.</td></tr>
<tr><td>• Closed Captioning Input Status
  </td><td>Displays incoming Closed Captioning status as follows:
• If closed captioning is present, a message similar to the example shown left is displayed. Also displayed is the VANC line number of the incoming closed captioning packet (or SD waveform-based VANC line number).
• If no closed captioning is present in the video signal, Not Present or Disabled is displayed.
Note: • Packet closed captioning status Captioning Rejected Due To message can appear due to the items described below. The closed captioning function assesses cdp_identifier, cdp_frame_rate, ccdata_present, and caption_service_active items contained in the packet header to make the determinations listed below. Refer to CEA-708-B for more information.
<table><tr><th>Message</th><th>Description</th></tr><tr><td>Unsupported Frame Rate</td><td>Film rate closed-captioning (either as pass-through or up/down conversion) is not supported by the card.</td></tr><tr><td>Data Not Present</td><td>Packet is marked from closed captioning source external to the card that no data is present.</td></tr><tr><td>No Data ID</td><td>Packet from closed captioning source external to the card is not properly identified with 0x9669 as the first word of the header (unidentified packet).</td></tr></table>• caption service is marked as inactive display indicates bit in packet from upstream source may inadvertently be set as inactive. In this case, closed captioning data (if present) is still processed and passed by the card as normal.
• The closed captioning function does not support PAL closed captioning standards.</td></tr>
<tr><td>• Closed Captioning Remove/Regenerate Controls
  </td><td>Turns on or turns off Closed Captioning insertion on the output.
Note: • Closed captioning is set to standard default line number (line 21) for SD output.
• 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. 3-8) for more information.
• The card does not check for conflicts on a given line number. Make certain selected line is available and carrying no other data.
• Closed captioning line may contain active unintended data even if closed captioning is set to Off.</td></tr>
</table>

Table 3-2 9502-DCDA Function Menu List — continued

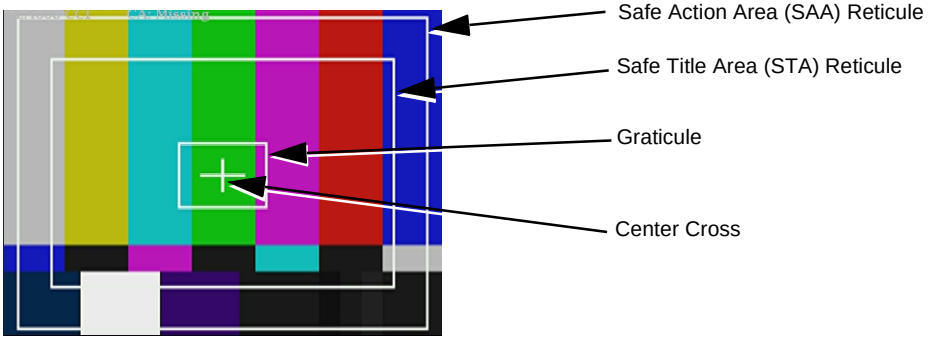
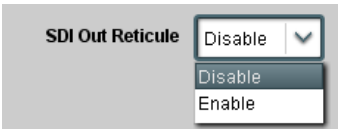
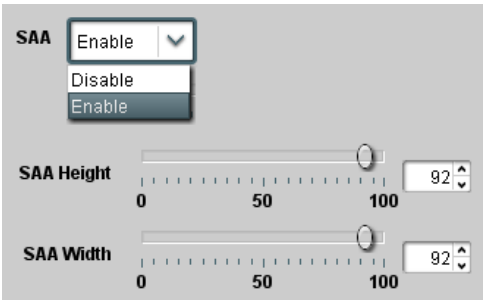
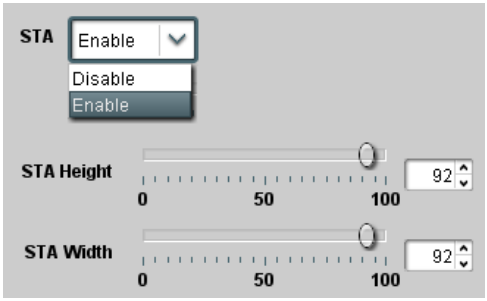
	Allows Safe Action and/or Safe Title overlays and other static markers to be added to the output video image.
Typical Reticule/Overlay Marker Insertions The 9502 allows any combination of the reticule/overlay markers to be applied to the output video. Sizing and other characteristics for each type of marker can be set as described below.  **Note:** • Overlay markers using this function are for setup only. When enabled, these markers are embedded in the output video and will appear in the image. Use this function **only** on preview video and not on-air video. Make certain any overlay tools are turned **off** when no longer needed. • Multiple overlay markers described below can be simultaneously enabled as desired.	
• **Insertion Master Enable/Disable** 	Provides independent master enable/disable for card SDI output. • When enabled, any combination of reticules or other markers described below can be inserted. • When disabled, insertion of all reticules or other markers is disabled.
• **Safe Action Area (SAA) Controls** 	• **SAA** provides enable/disable of safe action area graticule insertion. • **SAA Height** and **SAA Width** control height and width of insertion (from 0% to 100% of 4:3 outputted image area). **Note:** Reticule Size control is locked to Custom for this card, with safe action area size control as described above.

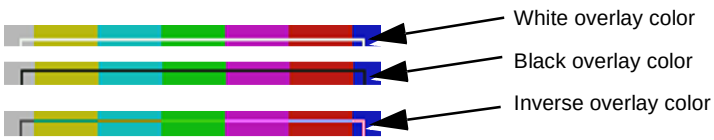
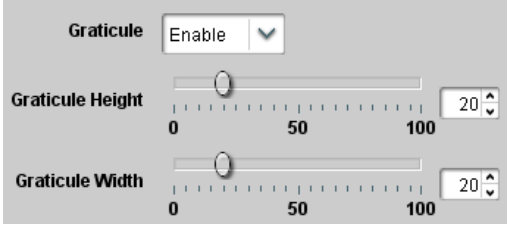
Table 3-2 9502-DCDA Function Menu List — continued

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

• STA Height and STA Width control height and width of insertion (from 0% to 100% of 4:3 outputted image area).</td></tr>
<tr><td>• Overlay Color Controls
 
</td><td>• Overlay Color selects from white, various gray fills, or black colors.

• Inverse Color selects inversion (negative) of current selection.

• Opacity sets the opacity of the overlay for both white/black and inverse color modes.

• Thickness sets the line thickness (in pixels).</td></tr>
<tr><td colspan="2"> 
</td></tr>
<tr><td> 
</td><td>Provides insertion and sizing controls for custom graticules and other markers. Also provides NTSC legacy 4:3 master reticule sizing.</td></tr>
<tr><td colspan="2">Note: Color attributes of markers described below are set using the master Overlay Color Controls described above.</td></tr>
<tr><td>• Graticule Controls
 
</td><td>• Graticule provides enable/disable of user graticule insertion.

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

Table 3-2 9502-DCDA Function Menu List — continued

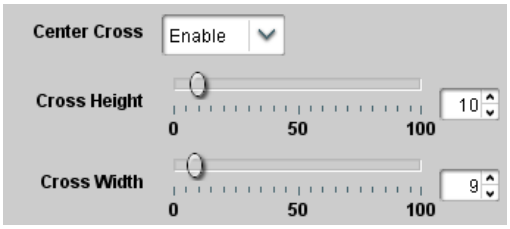
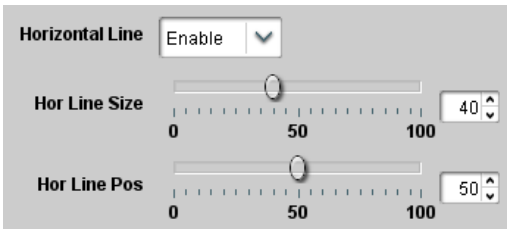
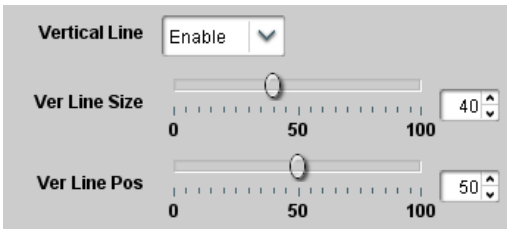
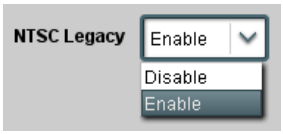
	**(continued)**
• **Center Cross Controls** 	• **Center Cross** provides enable/disable of center cross insertion. • **Cross Height** and **Width** control height of vertical line and width of horizontal line (from 0% to 100% of 4:3 outputted image area).
• **Horizontal Line Controls** 	• **Horizontal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

Table 3-2 9502-DCDA Function Menu List — continued

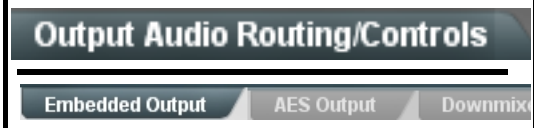
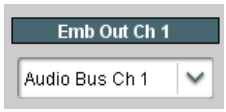
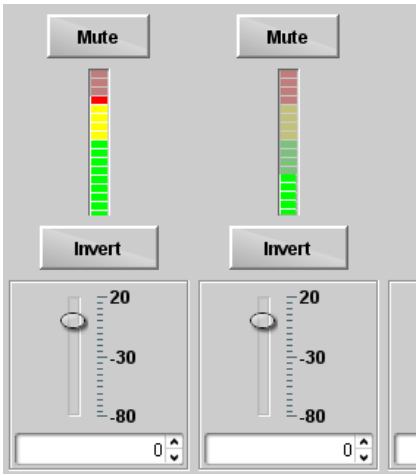
	Provides an audio crosspoint allowing the audio source selection for each embedded audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.
Note: • **Embedded Ch 2** thru **Embedded Ch 16** have controls identical to the **Source**, **Gain**, **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.	
• **Group Enable/Disable Controls** 	Allows enable/disable of embedded audio groups 1 thru 4 on card program video output to accommodate some legacy downstream systems that may not support all four embedded audio groups. **Note:** Changing the setting of this control will result in a noise burst in all groups. This control should not be manipulated when carrying on-air content.
• **Embedded Output Channel Source** 	Using the drop-down list, selects the audio input source to be embedded in the corresponding embedded output channel from the following choices: • Card **Audio Bus (Emb) Ch 1** thru **Ch 16** • Built-in Tone generators **Tone 1** thru **Tone 16** (all are -20 dBFS level; freq (Hz) in ascending order are 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k) • **Flex Bus A** thru **P** mixer sum node outputs • Option Audio **LTC** • **Downmixer L** • **Downmixer R** • **Silence**
• **Channel Mute/Phase Invert/Gain Controls and Peak Level Display** 	Provides **Mute** and phase **Invert** channel controls, as well as peak level meter for each output channel. (Meter shows level as affected by Level control.) **Gain** controls allow relative gain (in dB) control for the corresponding destination Embedded Audio Group channel. (-80 to +20 dB range in 1.0 dB steps; unity = 0 dB) **Note:** Although the 9502 can pass non-PCM data such as Dolby® E or AC-3, setting the gain control to any setting other than default 0 will corrupt Dolby data.

Table 3-2 9502-DCDA Function Menu List — continued

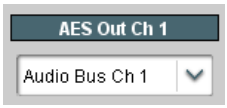
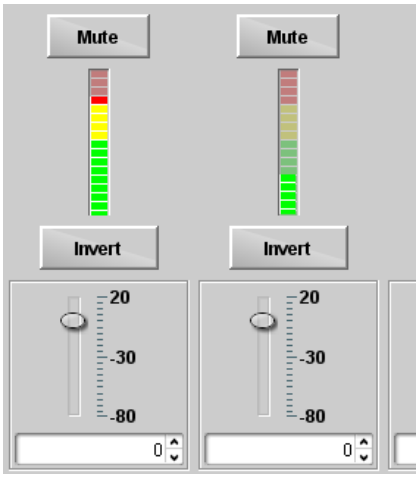
	Provides an audio crosspoint allowing the audio source selection for each AES audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.
Note: • **AES Out Ch 2** thru **AES Out Ch 16** have controls identical to the **Source**, **Gain**, **Mute**, and **Phase** controls described here for **AES Out Ch 1**. Therefore, only the **AES Out Ch 1** controls are shown here. • Although card de-embedding supports de-embedding to AES channels 1 thru 16 (AES pairs 1 thru 8), current rear module options support output only to pairs 1 thru 4. • For each channel, its source and destination should be considered and appropriately set. Unused destination channels should be set to the **Silence** selection.	
• **AES Output Channel Source** 	Using the **Source** drop-down list, selects the audio input source to be routed to the corresponding AES output channel from the following choices: • Embedded input channel 1 thru 16 (**Emb Ch 1** thru **Emb Ch 16**) • Built-in Tone generators **Tone 1** thru **Tone 16** (all are -20 dBFS level; freq (Hz) in ascending order are 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k) • **Flex Bus A** thru **P** mixer sum node outputs • Option Audio **LTC** • **Downmixer L** • **Downmixer R** • **Silence** **Note:** Although DashBoard controls for de-embedding to AES out channels **AES Out Ch 1** thru **AES Out Ch 16** are present, current rear modules allow only **AES Out Ch 1** thru **AES Out Ch 8** (pairs 1 thru 4) to be used.
• **Channel Mute/Phase Invert/Gain Controls and Peak Level Display** 	Provides **Mute** and phase **Invert** channel controls, as well as peak level meter for each output channel. (Meter shows level as affected by Level control.) **Gain** controls allow relative gain (in dB) control for the corresponding destination AES output channel. (-80 to +20 dB range in 1.0 dB steps; unity = 0 dB) **Note:** Although the 9502 can pass non-PCM data such as Dolby® E or AC-3, setting the gain control to any setting other than default 0 will corrupt Dolby data.

Table 3-2 9502-DCDA Function Menu List — continued

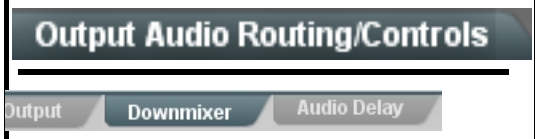
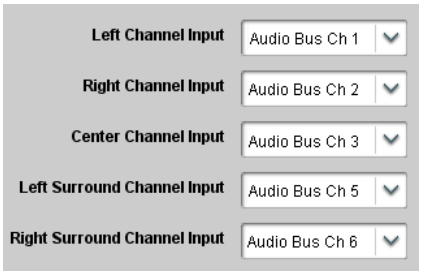
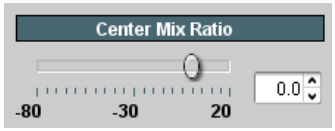
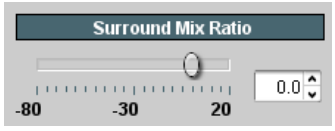
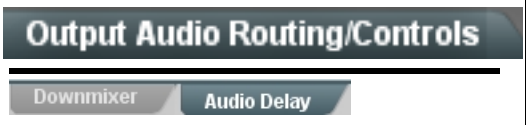
	Provides audio down-mix audio routing selections that multiplexes any five embedded audio channel sources into a stereo pair.
• **Downmixer Source Controls** 	**Left Channel Input** thru **Right Surround Channel Input** select the five audio bus source channels to be used for the downmix. Downmix channels **Downmixer L** and **Downmixer R** are available as sources for embedded or AES audio outputs using the Channel Source controls described above.
• **Center Mix Ratio Control** 	Adjusts the attenuation ratio of center-channel content from 5-channel source that is re-applied as Lt and Rt content to the DM-L and DM-R stereo mix. • -0 dB setting applies no ratiometric reduction. Center channel content is restored as in-phase center-channel content with no attenuation, making center-channel content more predominate in the overall mix. • Maximum attenuation setting (-80 dB) applies a -80 dB ratiometric reduction of center-channel content. Center-channel content is restored as in-phase center-channel content at a -80 dB ratio relative to overall level, making center-channel content less predominate in the overall mix. (20 dB to -80 dB range in 0 dB steps; default = 0 dB) **Note:** Default setting is recommended to maintain center-channel predominance in downmix representative to that of the original source 5-channel mix.
• **Surround Mix Ratio Control** 	Adjusts the attenuation ratio of surround-channel content from 5-channel source that is re-applied as Lo and Ro content to the DM-L and DM-R stereo mix. • -0 dB setting applies no ratiometric reduction. Surround-channel content is restored with no attenuation, making Lo and Ro content more predominate in the overall mix. • Maximum attenuation setting (-80 dB) applies a -80 dB ratiometric reduction of surround-channel content. Surround-channel content is restored at a -80 dB ratio relative to overall level, making surround-channel content less predominate in the overall mix. (20 dB to -80 dB range in 0 dB steps; default = 0 dB) **Note:** Default setting is recommended to maintain surround-channel predominance in downmix representative to that of the original source 5-channel mix.
	Provides a bulk audio delay control.
• **Bulk (Master) Audio/Video Delay Control** 	**Delay** control adds bulk (all four groups) audio delay from any video delay (net audio delay offset setting adds delay in addition to any delay included by other actions). This control is useful for correcting lip sync problems when video and audio paths in the chain experience differing overall delays. (-33 to +3000 msec range in 1-msec steps; null = 0 msec) **Note:** Delay settings are applied to embedded as well as AES audio outputs.

Table 3-2 9502-DCDA Function Menu List — continued

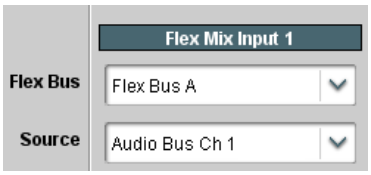
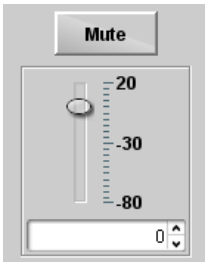
<table>
<tr><td> 
</td><td>Output Flex Mix – Provides a 16-channel mixer in which each of the inputs can be mixed onto up to 16 independent output summing nodes. The input sources are the card processed audio bus channels. Each input channel has independent gain and mute controls.</td></tr>
<tr><td colspan="2">Note: For each Flex Mix input channel, its source should be considered and appropriately set. Unused input channels should be set to the Silence selection.</td></tr>
<tr><td>• Flex Bus Input Channel Source/Bus Assignment
 
</td><td>Using the Source drop-down list, selects the audio input source to be directed to the corresponding bus channel from the choices listed below.
• Silence
• Audio Bus Ch 1 thru Ch 16
• Tones (100 Hz thru 16 kHz)
• Downmix L or Downmix R
The Flex Bus drop-down selects the bus (A thru P) to which the input is assigned to.</td></tr>
<tr><td>• Gain / Mute Control
 
</td><td>Provides relative gain (in dB) control and a channel Mute checkbox.
(-80 to +20 dB range in 0.1 dB steps; unity = 0.0 dB)</td></tr>
</table>

Table 3-2 9502-DCDA Function Menu List — continued

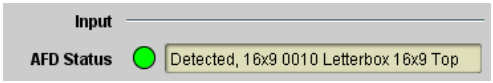
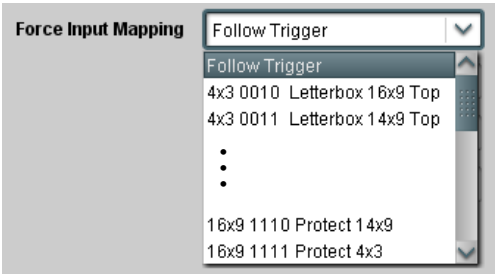
	Allows assignment of AFD codes to the SDI output video, and allows custom ARC settings to be applied for each code. Provides active ARC re-aspecting, resulting in a properly scaled and cropped image area.
• **Input Format Status Displays** 	Displays the current status and contents of the three supported ARC formats shown to the left. • If a format is received, the current formatting code and description is displayed (as shown in the example). • If a format is not receiving data, Not Present is displayed.
• **Scaler AFD Enable** 	Enables scaler to apply ARC settings provided by ARC controls in this function. • **Enabled** sets the output aspect ratio to track with AFD settings performed in this tab, overriding any other scaler manual ARC control settings. • **Disabled** allows ARC coding processing performed in this tab, but does not apply ARC settings in scaler. **Note:** • This control also appears on the **Scaler** tab and is mutually ganged with the selection performed on either tab. • **Scaler follows AFD** functions only when a valid AFD output format is being generated and enabled. The scaler only observes AFD code commands, with the controls on this tab set to generate an AFD-coded output.
• **Input Mapping** 	When received ARC code is received, applies H/V coding as follows: • **Follow Trigger** – Uses the ARC coding inherent in the received triggering ARC. • **4x3 ARC Codes** – For received triggering formats coded as 4x3, applies the H/V coding selected in this drop-down. • **16x9 ARC Codes** – For received triggering formats coded as 16x9, applies the H/V coding selected in this drop-down. **Note:** Settings performed here can be applied directly to the output video, or the settings applied here can be custom modified if desired for any of the 11 4x3 codes and any of the 11 16x9 codes available here using the **AFD Map** sub-tab. Refer to AFD Coding Matrix on page 3-34 for more information and coding descriptions.

Table 3-2 9502-DCDA Function Menu List — continued

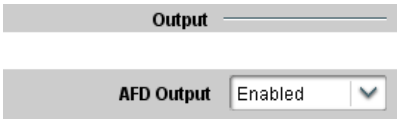
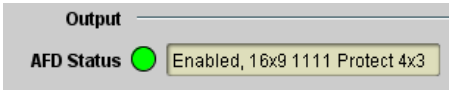
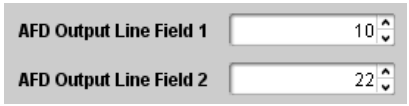
	**(continued)**
• Input Triggering Controls 	Individual ARC format input controls allow accepting or rejecting received ARC formats as follows: • **Trigger on AFD:** • **Off** rejects AFD-coded triggering. • **AFD** allows trigger on AFD.
• Output Enable Controls 	Individual ARC format input controls allow accepting or rejecting received ARC formats as follows: • **AFD Output:** • **Disable** turns off AFD format on output. • **Enable** inserts AFD packet on output, and allows changing line number. • **Follow Input Line** inserts AFD packet on same line as received AFD line number (where applicable).
• Output Status Displays 	Displays the current output status, coding, and H/V ratio for AFD formats. • If a format is active and enabled (as set with the Output Enable controls), the code and H/V description is displayed. • If a format is not outputting data, Disabled is displayed. **Note:** • The code displayed shows the outputted code. If the code is modified by user settings performed in the **AFD Map** sub-tab, these changes are shown here. Refer to **AFD Map** sub-tab for more information. • As shown in the example, settings that result in invalid mapping across format translations will display Disabled. In these cases, no output is inserted for the format.
• AFD Output Line Control 	Allows selecting the line location of the AFD data within the video signal Ancillary Data space. **Note:** • The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data. • For progressive formats, the Field 1 control serves as the line number control.

Table 3-2 9502-DCDA Function Menu List — continued

(continued)

AFD Coding Matrix

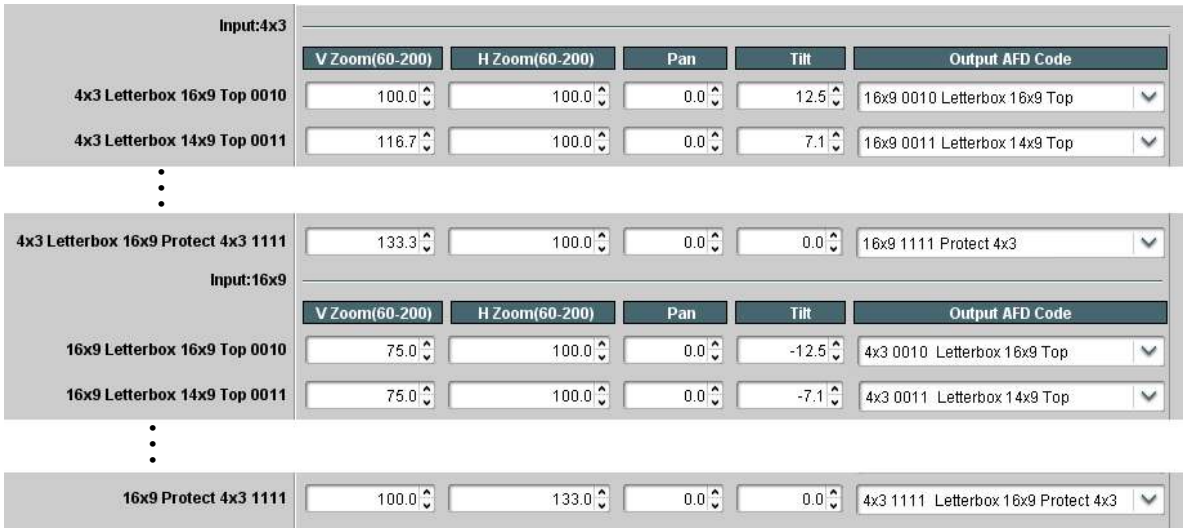
The table below lists valid AFD coding for both 4x3 and 16x9-coded frames.

	Input		Output	
	AFD	**Description**	**AFD**	**Description**
4:3 Coded	0010	4x3 Letterbox 16x9 Top	0010	4x3 Letterbox 16x9 Top
	0011	4x3 Letterbox 14x9 Top	0011	4x3 Letterbox 14x9 Top
	0100	4x3 Letterbox 16x9 Center	0100	4x3 Letterbox 16x9 Center
	0101, 0110, 0111	Undefined		
	1000	4x3 Coded Frame	1000	4x3 Coded Frame
	1001	4x3 Center	1001	4x3 Center
	1010	4x3 16x9 Center	1010	4x3 16x9 Center
	1011	4x3 14x9 Center	1011	4x3 14x9 Center
	1100	Reserved	1100	Reserved
	1101	4x3 Protect 14x9	1101	4x3 Protect 14x9
	1110	4x3 Letterbox 16x9; Protect 14x9 Center	1110	4x3 Letterbox 16x9; Protect 14x9 Center
	1111	4x3 Letterbox 16x9; Protect 4x3 Center	1111	4x3 Letterbox 16x9; Protect 4x3 Center
16:9 Coded	0010	16x9 Letterbox 16x9 Top	0010	16x9 Letterbox 16x9 Top
	0011	16x9 Letterbox 14x9 Top	0011	16x9 Letterbox 14x9 Top
	0100	16x9 Letterbox 16x9 Center	0100	16x9 Letterbox 16x9 Center
	0101, 0110, 0111	Undefined		
	1000	16x9 Coded Frame	1000	16x9 Coded Frame
	1001	16x9 4x3 Center	1001	16x9 4x3 Center
	1010	16x9 Center Protect 16x9	1010	16x9 Center Protect 16x9
	1100	Reserved	1100	Reserved
	1101	16x9 4x3 Protect 14x9	1101	16x9 4x3 Protect 14x9
	1110	16x9 Protect 14x9	1110	16x9 Protect 14x9
	1111	16x9 Protect 4x3	1111	16x9 Protect 4x3

Note: Shaded cells indicate invalid translation which cannot be used.

Table 3-2 9502-DCDA Function Menu List — continued

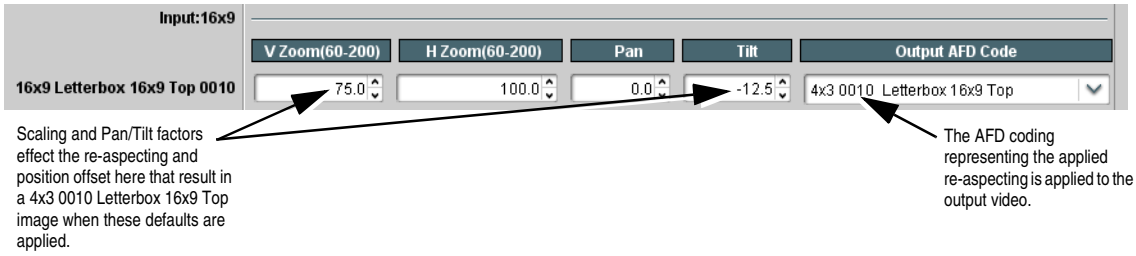
AFD Map sub-tab allows bidirectionally re-aspecting from 4x3 frames to companion 16x9 frames, and allows customizing aspect ratio settings for the AFD codes (and the corresponding WSS and VI translation equivalents) supported by the card.



Separate control groups for 4x3 and 16x9 coded input frames allow custom ARC (as well as pan/tilt) for various coded frames.

- By default, each row is set for its companion re-aspected output, along with output AFD code for the companion output (i.e., 4x3 frames get re-aspected to a companion 16x9 re-aspecting and AFD code, and similarly 16x9 frames get re-aspected to a companion 4x3 re-aspecting and AFD code).

In this example, default settings provide the scaling and tilt factors to convert a 16x9-coded 0010 frame to its companion 4x3 0010 Letterbox 16x9 Top frame.



- When the scaler is set to **Scaler follow AFD** any V, H, pan, or tilt custom changes made here are directly applied to the output video.
- To simply output an AFD code (without any re-aspecting to be done by the card) set the **No Input** row to the desired code to be outputted (in this example, “16x9 Letterbox 16x9 Center; 0100”).

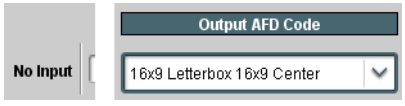


Table 3-2 9502-DCDA Function Menu List — continued

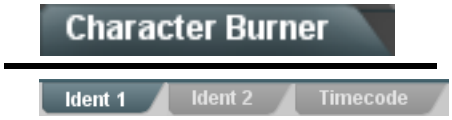
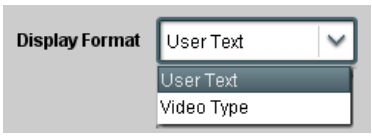
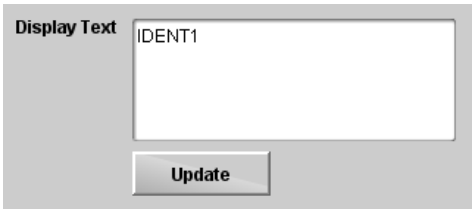
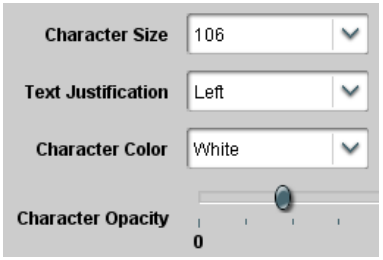
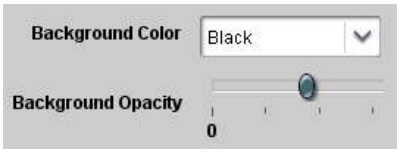
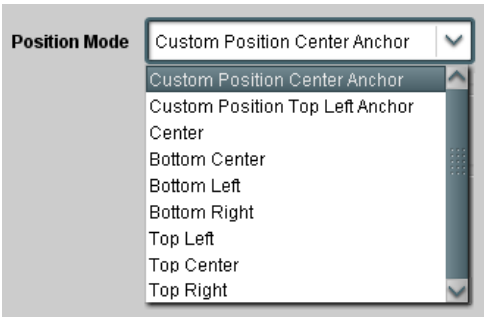
	Provides user-configurable burn-in of up to two text strings and timecode on output video.
Note: Ident 1 and **Ident 2** sub-tabs provide identical, independent controls for inserting two independent text (identification) burn-in overlays on the output video. **Ident 2** has controls identical to the controls described here for Ident 1. Therefore, only the Ident 1 controls are shown here.	
• **Ident Insertion Controls** 	Selects the rules for identification text burn-in overlay insertion into output video. **Note:** Enable on Loss of Video setting is valid **only** for card licensed with **+FS** Framesync Option. If ident text insertion is desired for input LOS conditions, the Framesync **On Loss of Video** control **must** be set to provide a raster (from one of the choices shown) to support the text insertion. If this control is set to “Disable Outputs”, no raster or text insertion will be present on the output video under input LOS conditions. See Framesync (p. 3-13) for more information.
• **Display Type (Format) Select** 	Selects the type of data to be displayed as burn-in text from choices shown. • **User text** allows user text to be entered using field described below. • **Video type** inserts an overlay showing the video format of the input being used for processing.
• **Display (Ident) Text Entry Field** 	Dialog entry box that allows entry of desired ident text string. Enter desired text as click Update when done to input the text string. **Note:** • All normal keyboard alphanumeric characters are supported, in addition to ASCII characters (Windows ALT+*nnnn*). • Up to 126 characters can be entered.
• **Ident Text Attributes Controls** 	Sets burn-in size/position attributes as follows: • **Character Size** sets character size (in pixels). • **Text Justification** selects from left, right, or center-aligned justification within the text box overlay. • **Character Color** selects text color. • **Character Opacity** sets text opacity from 0% (least opacity) to 100% (full opacity).
• **Ident Text Background Attributes Controls** 	Provides independent controls for setting the color and opacity of the burn-in text and its background. • **Color** drop-down sets background color from multiple choices. • **Opacity** control sets background opacity from 0% (least opacity) to 100% (full opacity).

Table 3-2 9502-DCDA Function Menu List — continued

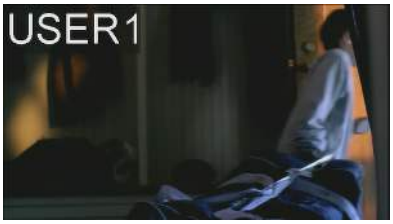
(continued)

- **Ident Position Select**



Sets the location of the ident text insertion from choices shown or custom. (When Custom is selected, position is configured using the **Ident Text Positioning Controls** described below.)

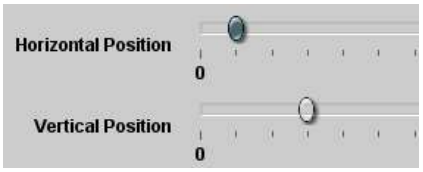
Example: Ident 1 text using **Top Left** position



Example: Ident 1 text using **Center** position

Note: For SD usage, burn-ins can impinge on and corrupt line 21 closed-captioning waveform if positioned too close to the upper right of the raster.

- **Ident Text Positioning Controls**



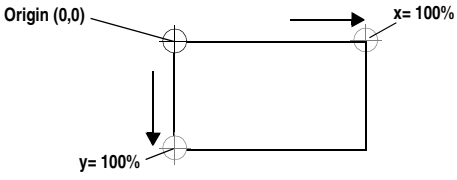
With Custom selected, sets burn-in position attributes as follows:

- **Horizontal Position** sets horizontal position (in percentage of offset from left of image area). (Range is 0 thru 100%)
- **Vertical Position** sets vertical position (in percentage of offset from top of image area, top justified). (Range is 0 thru 100%)

Note:
- Horizontal and Vertical Position controls are functional only when **Custom Position** is selected.
- Character sizing and positioning for a given raster format may not be appropriate for another format (especially if transitioning from HD to SD). Set size and position for a balanced appearance (e.g., do not place text too close to margins or set larger than necessary) that accommodates both HD and SD raster formats if multiple format use is required.

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

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



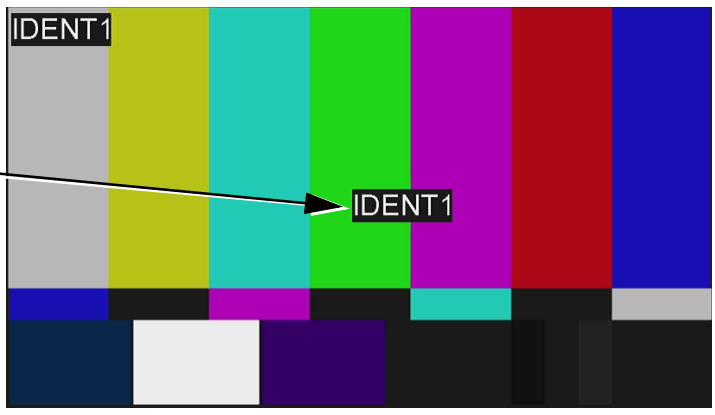


Table 3-2 9502-DCDA Function Menu List — continued

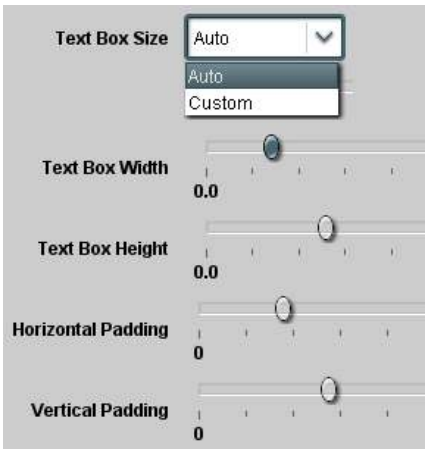
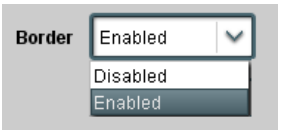
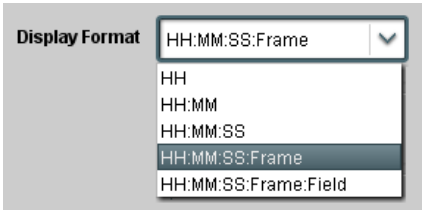
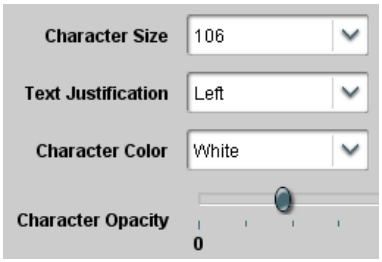
	**(continued)**
• **Text Box Sizing Controls** 	Provides controls for setting the size of the burn-in text background box. • **Auto** allows text box to proportionally size with selected text size. • **Custom** allows override of proportional sizing and allows text V and H dimensions to be set as desired. • **Text Box Width** and **Height** allow manual sizing when set to **Custom**. • **Custom** allows override of proportional sizing and allows text V and H dimensions to be set as desired. • **Horizontal** and **Vertical Padding** allow fine adjustment of V and H dimensions to be set when **Auto** is selected.
• **Text Box Border Enable** 	When set to Enabled, applies a white hairline border to the text box edges.
	Provides controls for burn-in of timecode on output video.
Note: This status display mirrors the same display in the Timecode tab. Device must be set to output a timecode in order for timecode burn-in to function. See Timecode (p. 3-16) for information on using timecode controls.	
• **Timecode Insertion Control** 	Selects the rules for timecode burn-in overlay insertion into output video. **Note:** Enable on Loss of Video setting is valid **only** for card licensed with **+FS** Framesync Option. If timecode insertion is desired for input LOS conditions, the Framesync **On Loss of Video** control **must** be set to provide a raster (from one of the choices shown) to support the timecode insertion. If this control is set to “Disable Outputs”, no raster or timecode insertion will be present on the output video under input LOS conditions. See Framesync (p. 3-13) for more information.
• **Timecode Format Display Selector** 	Selects the format of timecode string burn-in overlay insertion into output video from choices shown.

Table 3-2 9502-DCDA Function Menu List — continued

(continued)

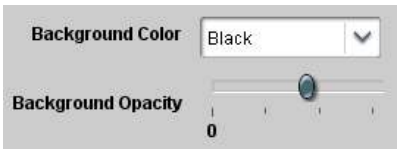
• Timecode Attributes Controls



Sets burn-in size/position attributes as follows:

- **Character Size** sets character size (in pixels).
- **Text Justification** selects from left, right, or center-aligned justification within the text box overlay.
- **Character Color** selects text color.
- **Character Opacity** sets text opacity from 0% (least opacity) to 100% (full opacity).

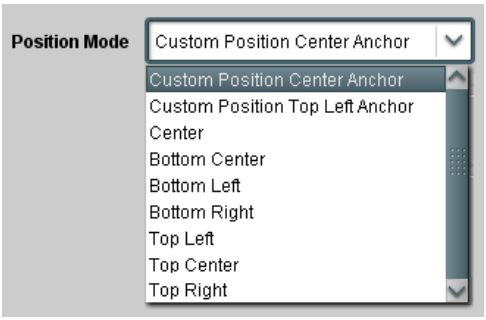
• Timecode Background Attributes Controls



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

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

• Timecode Position Select

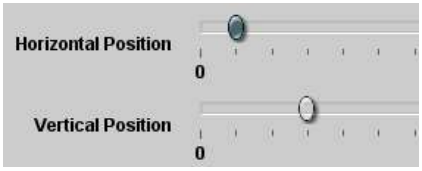


Sets the location of the timecode insertion from choices shown or custom. (When Custom is selected, position is configured using the **Timecode Positioning Controls** described below.)

Example: Timecode burn-in using **Bottom Center** position

Example: Timecode burn-in using **Top Left** position

• Timecode Positioning Controls



With Custom selected, sets burn-in position attributes as follows:

- **Horizontal Position** sets horizontal position (in percentage of offset from left of image area). (Range is 0 thru 100%)
- **Vertical Position** sets vertical position (in percentage of offset from top of image area, top justified). (Range is 0 thru 100%)

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

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

Table 3-2 9502-DCDA Function Menu List — continued

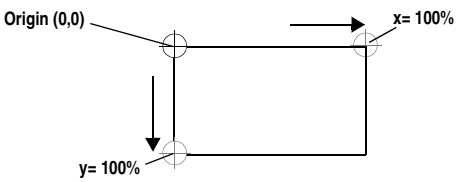
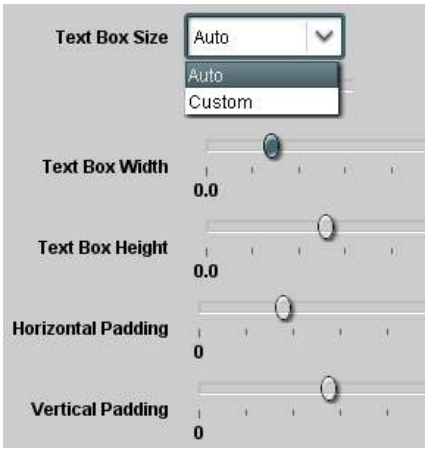
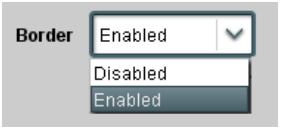
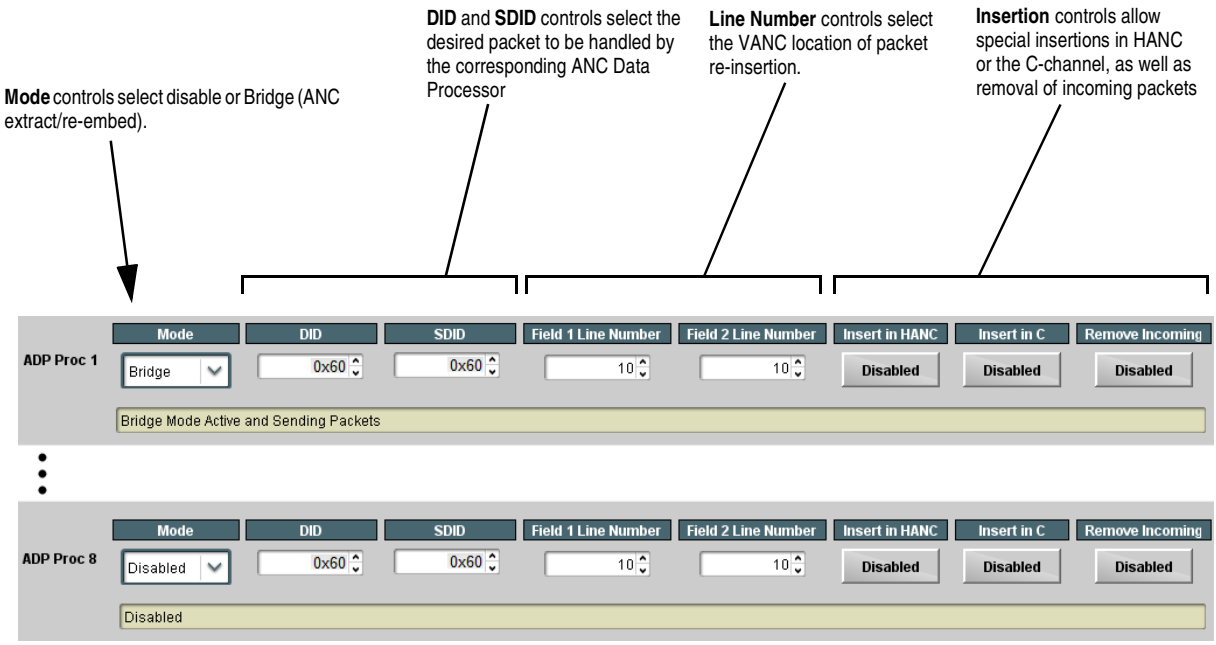
	**(continued)**
Positioning with H and V controls at zero (origin) (Size = 3) Positioning with H and V controls both at 50 (Size = 3)  	
• **Text Box Sizing Controls** 	Provides controls for setting the size of the burn-in background box. • **Auto** allows text box to proportionally size with selected text size. • **Custom** allows override of proportional sizing and allows text V and H dimensions to be set as desired. • **Text Box Width** and **Height** allow manual sizing when set to **Custom**. • **Custom** allows override of proportional sizing and allows text V and H dimensions to be set as desired. • **Horizontal** and **Vertical Padding** allow fine adjustment of V and H dimensions to be set when **Auto** is selected.
• **Text Box Border Enable** 	When set to Enabled, applies a white hairline border to the text box edges.

Table 3-2 9502-DCDA Function Menu List — continued

Ancillary Data Processing	Provides controls for user VANC/HANC ancillary data de-embedding and embedding to and from program video stream. Data can be extracted and inserted within the card, bypassing the scaler (Bridge mode) which preserves the packetized data when program video is scaled.

Eight individual Ancillary Data Processors (ADPs) provide for bridging ancillary data from input SDI program video, bypassing the scaler, and inserting into card output program video SDI.



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

Table 3-2 9502-DCDA Function Menu List — continued

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

• Preset Layer Select

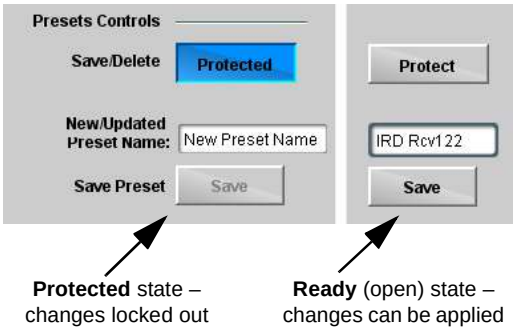
Allows selecting a functional layer (or "area of concern") that the preset is concerned with. Limiting presets to a layer or area of concern allows for highly specific presets, and masks changing card settings in areas outside of the layer or area of concern.

Default **All** setting will "look" at all device settings, and save and invoke **all** settings when the preset is invoked (loaded).

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

Example: Since special SAP audio routing can be considered independent of Video Proc and most other settings, if normal audio routing was set up with a particular custom Video Proc setting in effect, and at a later time SAP audio routing is desired to be saved as a preset, selecting **Out Audio Routing** here limits preset-invoked changes to **only** the audio routing layer, "telling" the preset save/load to not concern itself with Video Proc and other settings. In this manner, when the SAP preset is invoked any Video Proc and other settings in effect will remain untouched, with only the audio routing changes invoked.

• Preset Enter/Save/Delete



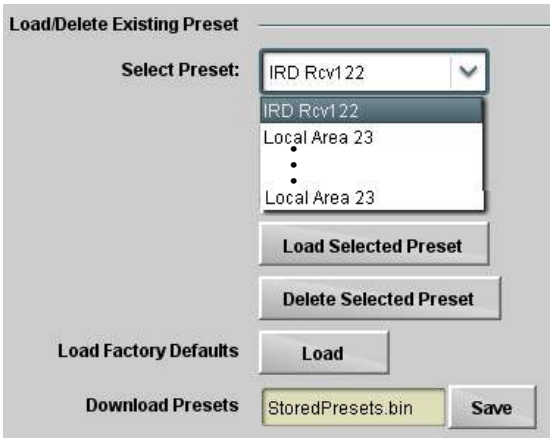
Protected state – changes locked out

Ready (open) state – changes can be applied

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

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

• Preset Save/Load Controls



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

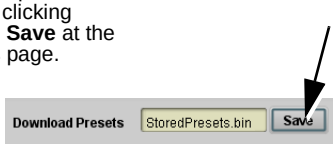
Note: Load Factory Defaults functions with no masking. The Preset Layer Select controls have no effect on this control and will reset **all** layers to factory default.

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

Table 3-2 9502-DCDA Function Menu List — continued

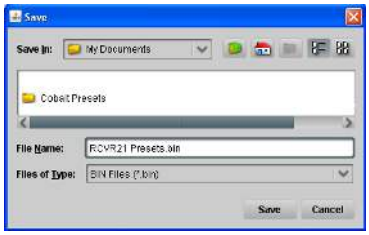
Presets	**(continued)**

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



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

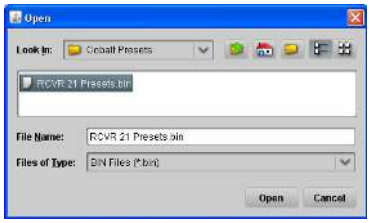
The file can then be renamed if desired (*RCVR21 Presets* in this example) before committing the save.



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

Browse to the location where the file was saved on the computer or drive.

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



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

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

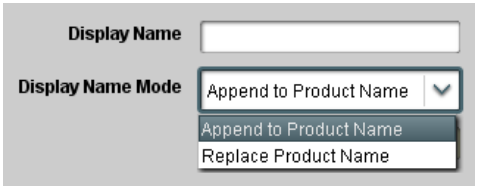
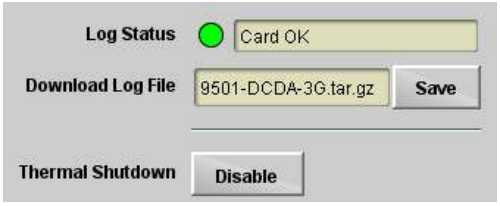
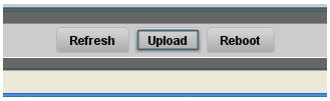
Admin	Provides a global card operating status and allows a log download for factory engineering support. Also provides controls for selecting and loading card firmware upgrade files.
• **Card DashBoard Name Control** 	Allows card name In DashBoard to be changed as desired. Click return to engage change. • **Append to Product Name** appends (or adds to) existing OEM name (for example, "9502-DCDA *Processing 1A*"). • **Replace Product Name** completely replaces the OEM name OEM name (for example, "*Processing 1A*"). **Note:** DashBoard instance(s) may have to be refreshed before name change appears.
• **Log Status and Download Controls** 	• **Log Status** indicates overall card internal operating status. • **Download Log File** allows a card operational log file to be saved to a host computer. This log file can be useful in case of a card error or in the case of an operational error or condition. The file can be submitted to Cobalt engineering for further analysis. • **Thermal Shutdown** enable/disable allows the built-in thermal failover to be defeated. (Thermal shutdown is enabled by default). **CAUTION** **The 9502-DCDA FPGA is designed for a normal-range operating temperature around 85° C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within device operating safe parameters, and can be allowed by setting this control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum card protection.**

Table 3-2 9502-DCDA Function Menu List — continued

Admin	(continued)
• **Parameter Blast** 	When enabled, Parameter Blast can reduce the time it takes for the card to appear and populate in DashBoard (this is especially relevant where high-latency connections are present). This is facilitated by reducing some handshakes on initial DashBoard setup where control settings are static (not being manipulated) while the card is first appearing. **Note:** The frame network card is the arbiter of all frame/card communications and in some cases may not accept full extent of parameter blast under some conditions.
• **Firmware Upgrade Controls**	Firmware upgrade controls allow a selected firmware version (where multiple versions can be uploaded to the card's internal memory) to invoke an upgrade to a selected version either instantly, or set to install on the next card reboot (thereby allowing card upgrade downtime to be controlled at a scheduled point in time).

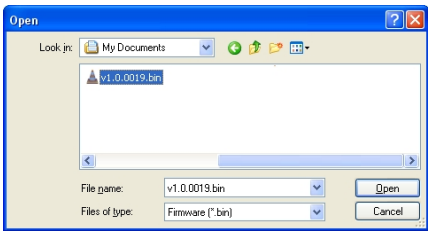
Note: The page/tab here allows managing multiple firmware versions saved on the card. New upgrade firmware from our web site can always be directly uploaded to the card without using this page. Instructions for firmware downloading to your computer and uploading to the card can be found at the **Support>Firmware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

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



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

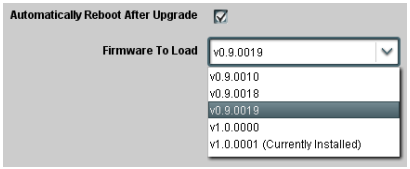
3. Select the desired file and click **Open** to upload the file to the card.



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

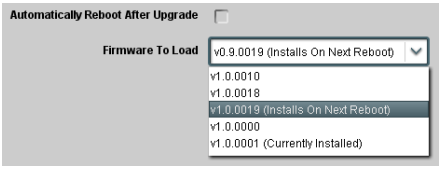
1. Click **Firmware To Load** and select the desired upgrade file to be loaded (in this example, "v1.0.0019").

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



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

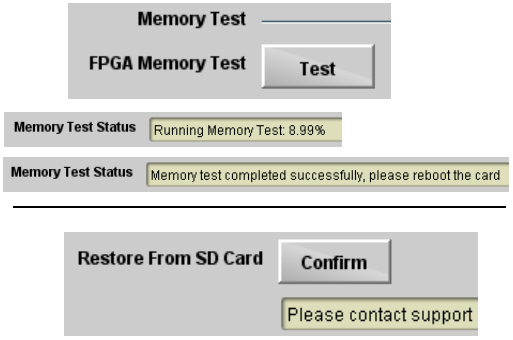
1. Click **Firmware To Load** and select the desired upgrade file to be loaded (in this example, "v1.0.0019"). Note now how the display shows "Installs on Next Reboot".



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

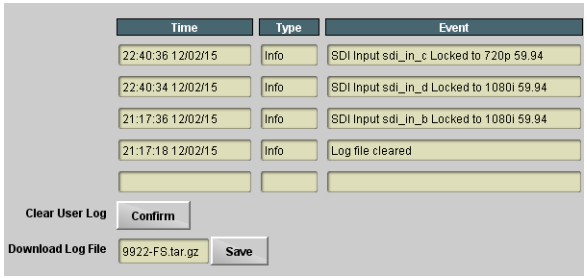
3. To cancel a deferred upload, press **Cancel Pending Upgrade**. The card reverts to the default settings that allow an immediate upload/upgrade.

Table 3-2 9502-DCDA Function Menu List — continued

<table>
<tr><td>Admin</td><td>(continued)</td></tr>
<tr><td>• Card Check and Restore Utilities
 
</td><td>Memory Test allows all cells of the card FPGA memory to be tested.
⚠ This control should only be activated under direction of product support. Exercising the memory test is not part of normal card maintenance.

Restore from SD Card allows card rendered inoperable to be restored using an SD memory card fitted to the card internal SD slot.
⚠ Product support must be contacted prior to performing this operation. Use of any SD card not supplied by support can corrupt the card.</td></tr>
<tr><td>User Log</td><td>Automatically maintains a log of user actions and input lock status.</td></tr>
<tr><td>User Log shows input lock and other user conditions (with most recent event at top of list).

Clear User Log clears all entries.

Download Log File opens a browser allowing the log file to be saved on the host machine.</td><td colspan="2"> 
</td></tr>
</table>

Troubleshooting

This section provides general troubleshooting information and specific symptom/corrective action for the 9502-DCDA card and its remote control interface. The 9502-DCDA 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 9502-DCDA card itself and its remote control systems all (to varying degrees) provide error and failure indications. Depending on how the 9502-DCDA 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.

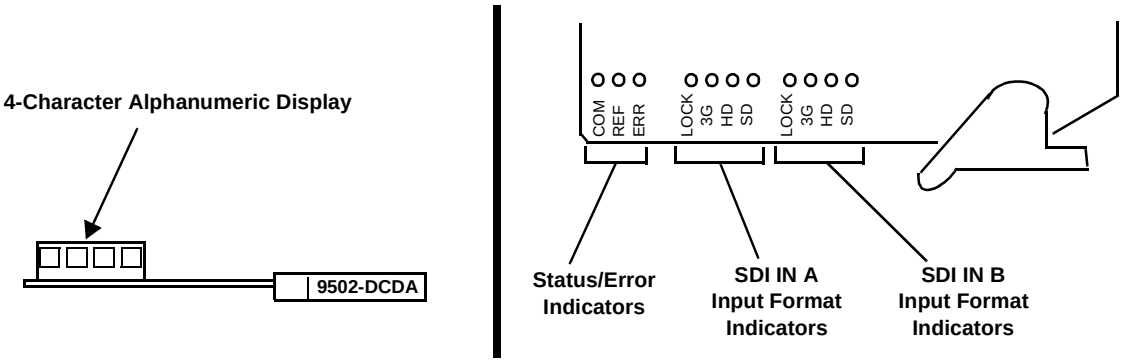
The various 9502-DCDA card and remote control error and failure indicators are individually described below.

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. 3-50)
- 9502-DCDA Processing Error Troubleshooting (p. 3-50)
- Troubleshooting Network/Remote Control Errors (p. 3-52)

9502-DCDA Card Edge Status/Error Indicators and Display

Figure 3-6 shows and describes the 9502-DCDA 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	Reserved
COM LED	Blue LED flashes when 9502-DCDA is receiving control message from remote network control (e.g., DashBoard™ or Cobalt® Remote Control Panel)
REF LED	Blue LED illuminates indicating 9502-DCDA is receiving valid reference when set up for framesync operation.
ERR LED	Red LED illuminates when 9502-DCDA unable to lock to framesync.
Input Format LEDs	Four blue LEDs for each SDI input (A and B) indicate the input signal raster format being received and locked onto by the 9502-DCDA (LOCK, 3G, HD, SD). Continuous cycling of the LEDs indicates the 9502-DCDA has not locked onto a particular format (as in the case of no signal input). **-HD model only:** a blinking 3G LED indicates that a -HD card model is receiving 3G which cannot be processed by the card

Figure 3-6 9502-DCDA Card Edge Status Indicators and Display

DashBoard™ Status/Error Indicators and Displays

Figure 3-7 shows and describes the DashBoard™ status indicators and displays. These indicator icons and displays show status and error conditions relating to the 9502-DCDA card itself and remote (network) communications.

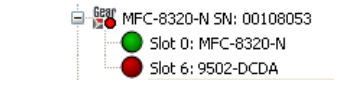
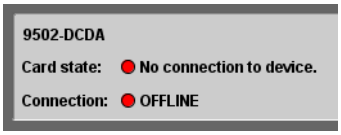
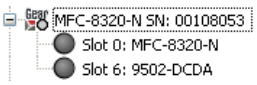
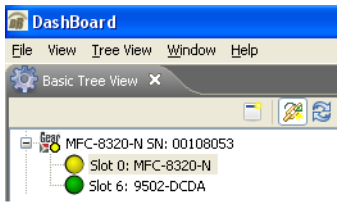
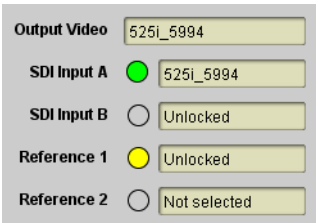
Indicator Icon or Display	Error Description
	Red indicator icon in Card Access/Navigation Tree pane shows card with Error condition (in this example, the Card Access/Navigation Tree pane shows a general error issued by the 9502-DCDA card in slot 6).
	Specific errors are displayed in the Card Info pane (in this example “No connection to device” indicating 9502-DCDA card is not connecting to frame/LAN).
	If the 9502-DCDA 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 9502-DCDA card in slot 6 and the MFC-8320-N Network Controller Card for its frame in slot 0 are not being seen).
	Yellow indicator icon in Card Access/Navigation Tree pane shows card with Alert condition (in this example, the Card Access/Navigation Tree pane shows a general alert issued by the MFC-8320-N Network Controller Card).
	Clicking the card slot position in the Card Access/Navigation Tree (in this example Network Controller Card “Slot 0: MFC-8320-N”) opens the Card Info pane for the selected card. In this example, a “Fan Door Open” specific error is displayed.
	Yellow indicator icon in 9502-DCDA Card Info pane shows error alert, along with cause for alert (in this example, the 9502-DCDA is not receiving an enabled framesync source).

Figure 3-7 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 3-8).

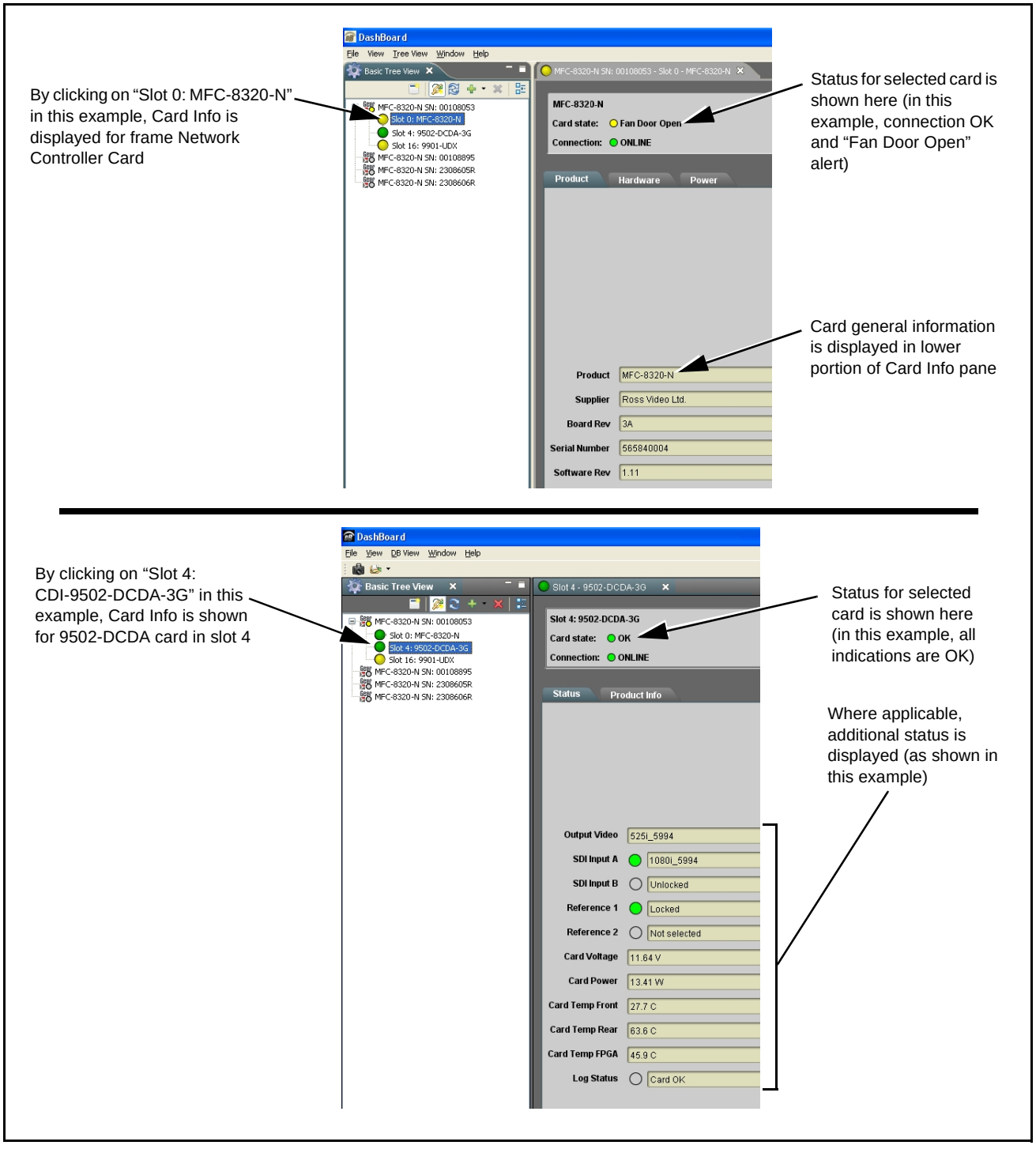


Figure 3-8 Selecting Specific Cards for Card Info Status Display

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 9502-DCDA, in all cases when power is being properly supplied there is always at least one indicator illuminated. Any card showing no illuminated indicators should be cause for concern.
	• Check the Power Consumed indication for the 9502-DCDA card. This can be observed using the DashBoard™ Card Info pane.
	  • If display shows **no** power being consumed, either the frame power supply, connections, or the 9502-DCDA card itself is defective.
	  • If display shows **excessive** power being consumed (see Technical Specifications (p. 1-15) in Chapter 1, “Introduction”), the 9502-DCDA 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 9502-DCDA 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.

9502-DCDA Processing Error Troubleshooting

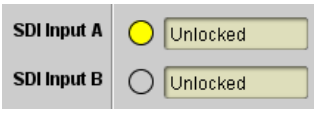
Table 3-4 provides 9502-DCDA processing troubleshooting information. If the 9502-DCDA card exhibits any of the symptoms listed in Table 3-4, follow the troubleshooting instructions provided.

In the majority of cases, most errors are caused by simple errors where the 9502-DCDA 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 9502-DCDA card edge status indicators.

Note: Where errors are displayed on both the 9502-DCDA card and network remote controls, the respective indicators and displays are individually described in this section.

Table 3-4 Troubleshooting Processing Errors by Symptom

Symptom	Error/Condition	Corrective Action
• **DashBoard™** shows **Unlocked** message in 9502-DCDA Card Info pane.  • Card edge **Input Format** LEDs show continuous cycling.	No video input present	Make certain intended video source is connected to appropriate 9502-DCDA card video input. Make certain BNC cable connections between frame Rear I/O Module for the card and signal source are OK.
Ancillary data (closed captioning, timecode) not transferred through 9502-DCDA.	• 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 3-8).
SD closed captioning waveform or character rendering is corrupted	Character burner insertion running into line 21	For SD usage, burn-ins can impinge on and corrupt line 21 closed-captioning waveform if positioned too close to the upper right of the raster. Typically, character burn insertions are not intended for content (such as OTA) where CC is required. If CC is present and must be retained, make certain to check CC content if burn-in insertions are enabled and reposition burn-ins to avoid line 21 interference.
Audio not processed or passed through card	Enable control not turned on	On **Output Audio Routing/Controls** tab, **Audio Group Enable** control for group 1 thru 4 must be turned on for sources to be embedded into respective embedded channel groups.
Selected upgrade firmware will not upload	Automatic reboot after upgrade turned off	Card **Presets** > **Automatically Reboot After Upgrade** box unchecked. Either reboot the card manually, or leave this box checked to allow automatic reboot to engage an upgrade upon selecting the upgrade.

Troubleshooting Network/Remote Control Errors

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

In Case of Problems

Recovering Card From SD Memory Card

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

1. (See Figure 3-9.) Make certain the card has the proper SD card installed in the under-card slot. If SD card is **not** installed, contact Product Support to obtain an SD card.

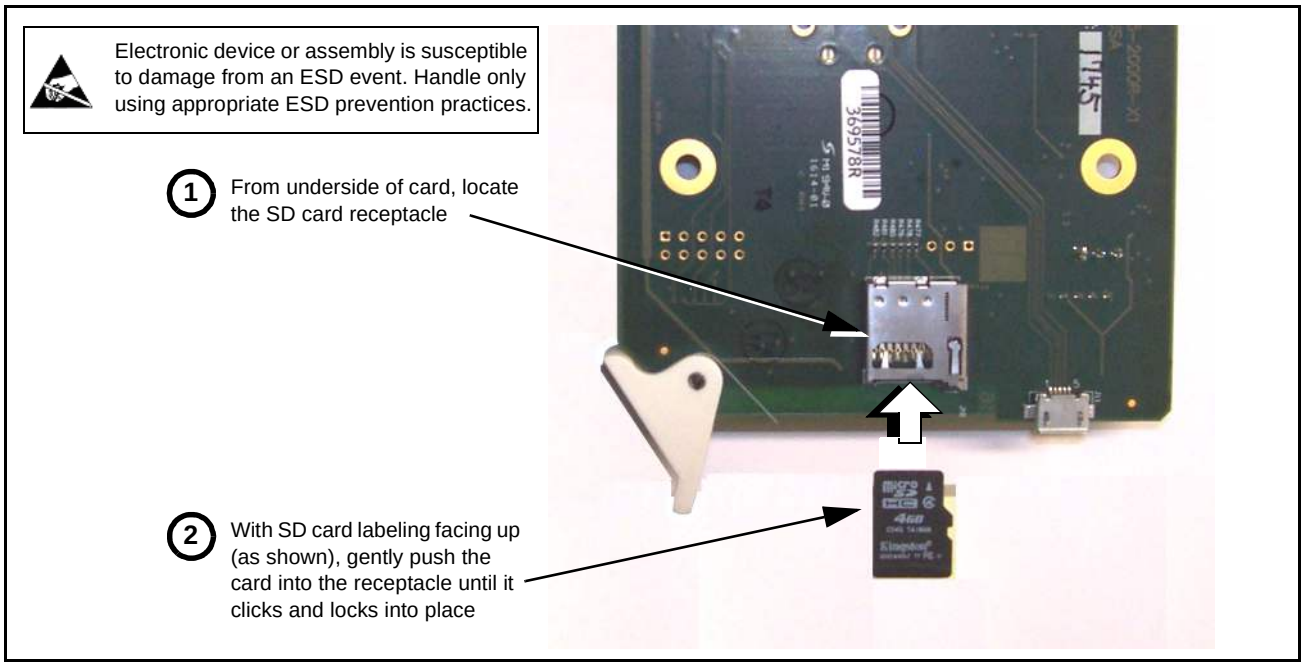


Figure 3-9 SD Card Installation

2. (See Figure 3-10.) With card powered-down, locate the **MMC BOOT** button on the card. Proceed as shown in picture.

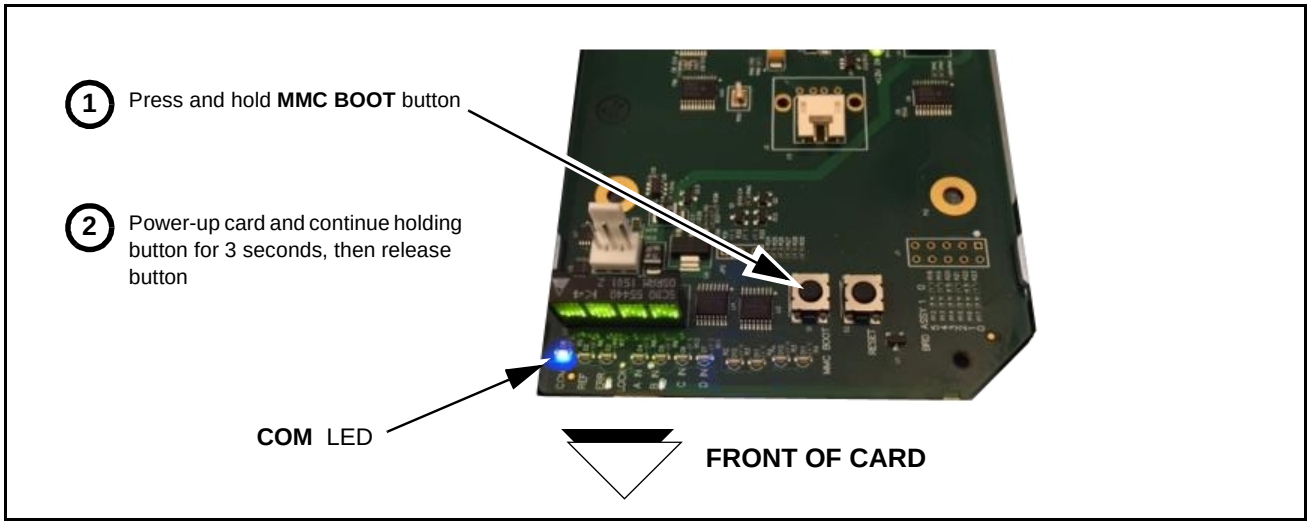


Figure 3-10 MMC Boot Button

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

Contact and Return Authorization

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

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

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

See Contact Cobalt Digital Inc. (p. 1-18) in Chapter 1, "Introduction" for contact information.

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