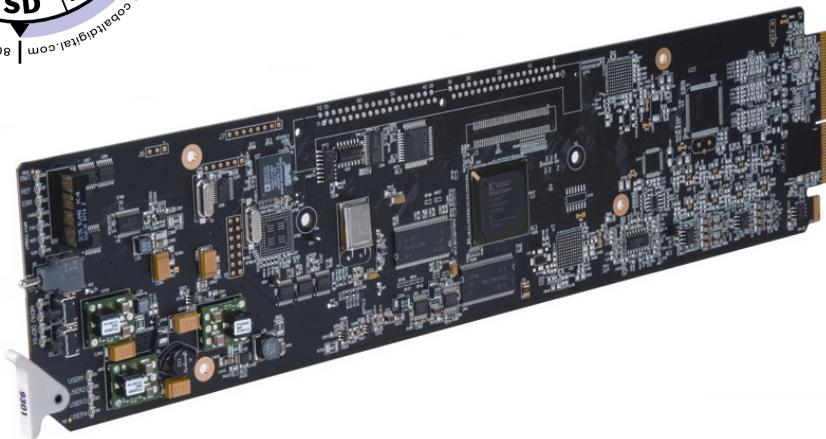


9031



HD/SD 12-Bit Analog to Digital Video Converter with Universal Inputs

Product Manual



Cobalt Digital Inc.

2406 E. University Ave.
Urbana, IL 61802
Voice 217.344.1243 • Fax 217.344.1245
www.cobaltdigital.com

Copyright

©Copyright 2014, Cobalt Digital Inc. All Rights Reserved.

Duplication or distribution of this manual and any information contained within is strictly prohibited without the express written permission of Cobalt Digital Inc. This manual and any information contained within, may not be reproduced, distributed, or transmitted in any form, or by any means, for any purpose, without the express written permission of Cobalt Digital Inc. Reproduction or reverse engineering of software used in this device is prohibited.

Disclaimer

The information in this document has been carefully examined and is believed to be entirely reliable. However, no responsibility is assumed for inaccuracies. Furthermore, Cobalt Digital Inc. reserves the right to make changes to any products herein to improve readability, function, or design. Cobalt Digital Inc. does not assume any liability arising out of the application or use of any product or circuit described herein.

Trademark Information

Cobalt® is a registered trademark of Cobalt Digital Inc.

COMPASS® and **FUSION3G®** are registered trademarks of Cobalt Digital Inc.

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

Congratulations on choosing the Cobalt® 9031 HD/SD 12-Bit Analog to Digital Video Converter with Universal Inputs. (9031-SD is a functionally identical SD-only version.) The 9031 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 9031, please contact us at the contact information on the front cover.

Manual No.:	9031-OM
Document Version:	V4.1
Release Date:	February 12, 2014
Applicable for Firmware Version (or greater):	3302
Description of product/manual changes:	<ul style="list-style-type: none">- New manual design with added GUI sections.- Revise manual for latest functionality with latest firmware.- Update manual to include latest available card options.

Table of Contents

Chapter 1	Introduction	1-1
	Overview	1-1
	9031 Card Software Versions and this Manual	1-2
	Cobalt Reference Guides	1-2
	Manual Conventions	1-3
	Warnings, Cautions, and Notes	1-3
	Labeling Symbol Definitions.....	1-4
	Safety Summary	1-4
	Warnings.....	1-4
	Cautions	1-4
	9031 Functional Description	1-5
	9031 Input/Output Formats	1-5
	Video Processor Description	1-7
	User Control Interface	1-9
	9031 Rear I/O Modules	1-11
	Video Formats Supported by the 9031	1-12
	Technical Specifications.....	1-12
	Warranty and Service Information	1-15
	Cobalt Digital Inc. Limited Warranty.....	1-15
	Contact Cobalt Digital Inc.....	1-16
Chapter 2	Installation and Setup	2-1
	Overview	2-1
	Installing the 9031 Into a Frame Slot	2-1
	Installing a Rear I/O Module	2-3
	9031 Rear I/O Modules	2-4
	Setting Up 9031 Network Remote Control	2-6

Chapter 3	Operating Instructions	3-1
	Overview	3-1
	Control and Display Descriptions	3-1
	Function Submenu/Parameter Submenu Overview	3-2
	DashBoard™ User Interface	3-3
	Cobalt® Remote Control Panel User Interfaces	3-4
	Accessing the 9031 Card via Remote Control	3-5
	Accessing the 9031 Card Using DashBoard™	3-5
	Accessing the 9031 Card Using a Cobalt® Remote Control Panel	3-6
	Checking 9031 Card Information.....	3-7
	Ancillary Data Line Number Locations and Ranges	3-8
	9031 Function Submenu List and Descriptions	3-9
	Video Signal Controls	3-10
	Video Proc	3-11
	AFD	3-12
	Timecode	3-13
	Closed Captioning	3-16
	Licensable Features	3-17
	Presets	3-17
	Troubleshooting	3-20
	Error and Failure Indicator Overview	3-20
	Basic Troubleshooting Checks.....	3-24
	9031 Processing Error Troubleshooting.....	3-25
	Troubleshooting Network/Remote Control Errors.....	3-26
	In Case of Problems	3-26

Chapter 1

Introduction

Overview

This manual provides installation and operating instructions for the 9031 HD/SD 12-Bit Analog to Digital Video Converter with Universal Inputs card (also referred to herein as the 9031).

Note: This manual also covers the 9031-SD, which is an SD-input only version of the card. The 9031-SD is functionally identical to the 9031 in other respects.

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 9031.
- **Chapter 2, “Installation and Setup”** – Provides instructions for installing the 9031 in a frame, and optionally installing 9031 Rear I/O Modules.
- **Chapter 3, “Operating Instructions”** – Provides overviews of operating controls and instructions for using the 9031.

This chapter contains the following information:

- **9031 Card Software Versions and this Manual (p. 1-2)**
- **Manual Conventions (p. 1-3)**
- **Safety Summary (p. 1-4)**
- **9031 Functional Description (p. 1-5)**
- **Technical Specifications (p. 1-12)**
- **Warranty and Service Information (p. 1-15)**
- **Contact Cobalt Digital Inc. (p. 1-16)**

9031 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 9031 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.

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

<p>Card Software earlier than latest version</p>	<p>Card is not loaded with the latest software. Not all functions and/or specified performance described in this manual may be available.</p> <p>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™.</p> <p>Software updates are field-installed without any need to remove the card from its frame.</p>
<p>Card Software newer than version in manual</p>	<p>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.</p> <p>If your card shows features not described in this manual, you can check for the latest manual (if applicable) and download it by going to the Support>Documents>Product Information and Manuals link at www.cobaltdigital.com.</p>

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 9031 itself. Examples are provided below.

- Card-edge display messages are shown like this:

Ch01

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

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

- **9031** refers to the 9031 HD/SD 12-Bit Analog to Digital Video Converter with Universal Inputs card.
- **Frame** refers to the HPF-9000 or similar 20-slot frame that houses the Cobalt® COMPASS® cards.
- **Device** and/or **Card** refers to a COMPASS® card.
- **System** and/or **Video System** refers to the mix of interconnected production and terminal equipment in which the 9031 and other COMPASS® cards operate.
- Functions and/or features that are available only as an option are denoted in this manual like this:



Warnings, Cautions, and Notes

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

Warnings

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

Cautions

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

Notes

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

Labeling Symbol Definitions

	Attention, consult accompanying documents.
	<p>Electronic device or assembly is susceptible to damage from an ESD event. Handle only using appropriate ESD prevention practices.</p> <p>If ESD wrist strap is not available, handle card only by edges and avoid contact with any connectors or components.</p>
	<p>Symbol (WEEE 2002/96/EC)</p> <p>For product disposal, ensure the following:</p> <ul style="list-style-type: none"> • Do not dispose of this product as unsorted municipal waste. • Collect this product separately. • Use collection and return systems available to you.

Safety Summary

Warnings

! WARNING !

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

Cautions

CAUTION

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

CAUTION

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

CAUTION

Heat and power distribution requirements within a frame may dictate specific slot placement of cards. Cards with many heat-producing components should be arranged to avoid areas of excess heat build-up, particularly in frames using only convection cooling. The 9031 has a moderate power dissipation (10 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 9031 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.

9031 Functional Description

Figure 1-1 shows a functional block diagram of the 9031. The 9031 includes a 12-bit video ADC which accepts CVBS, Y/C, and component analog video inputs. The 9031 also handles AFD code insertion and conversion of analog VITC timecode to VITC waveform and ATC packet-based formats. Line-21 closed captioning is preserved and transferred to line 21 on the SDI output. All timecode and closed captioning data insertion can be user enabled or disabled on the SDI output.

Note: Some of the functions described below are available only when using the DashBoard™, or Cobalt® OGCP-9000 or OGCP-9000/CC Control Panels user interfaces. Refer to User Control Interface (p. 1-9) for user interface descriptions.

9031 Input/Output Formats

The 9031 provides the following inputs and outputs:

- **Inputs:**
 - Y/Cmpst IN, Pr/C IN, Pb IN – analog composite/component video inputs
- **Outputs:**
 - SDI OUT – four dual-rate HD/SD-SDI buffered video outputs
 - **Option E RS-485 LTC I/O** – RS-485 port allows LTC input as timecode source, or output of video-based timecode on the RS-485 port.

Note: The input/output complement listed above represents the maximum capability of the 9031. The practical input/output complement is determined by the particular Rear I/O Module used with the 9031. Refer to 9031 Rear I/O Modules (p. 1-11) for more information.

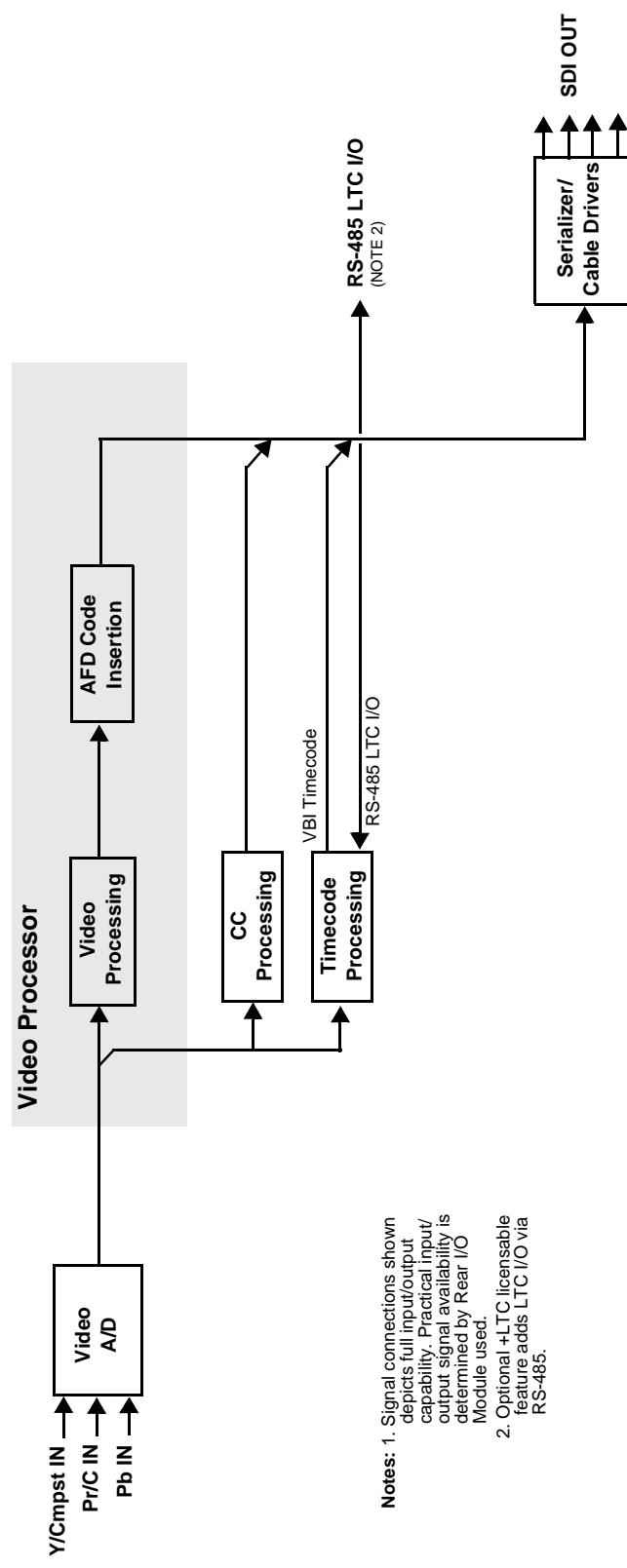


Figure 1-1 9031 Functional Block Diagram

Video Processor Description

Video Processor

The 9031 provides full color processing control (luma gain and lift, chroma saturation, and color phase) of the output video.

AFD Inserter

This function provides for assignment and insertion of AFD codes into the SDI output video. Using this function, AFD codes in accordance with the standard 4-bit AFD code designations can be applied to the output video.

When used in conjunction with a separate downstream card capable of providing AFD-directed scaling, the image can in turn be scaled in accordance with the AFD coding embedded by this card.

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

Timecode Processor

(See Figure 1-2.) This function provides for extraction of timecode data from the input video (for SD formats), and in turn re-insertion of timecode data into the output SDI. Timecode insertion (depending on raster format) can select and prioritize among SDI VITC, SDI ATC VITC, and SDI ATC LTC timecode sources.

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

Option ↗ Option +LTC allows bidirectional transfer and conversion between VBI formats over SDI and RS-485 LTC. LTC can be received or sent over an RS-485 interface. In this manner, a basic HD analog video input can import RS-485 and embed this timecode data on the SDI ouput as ATC_VITC or ATC_LTC timecode data.

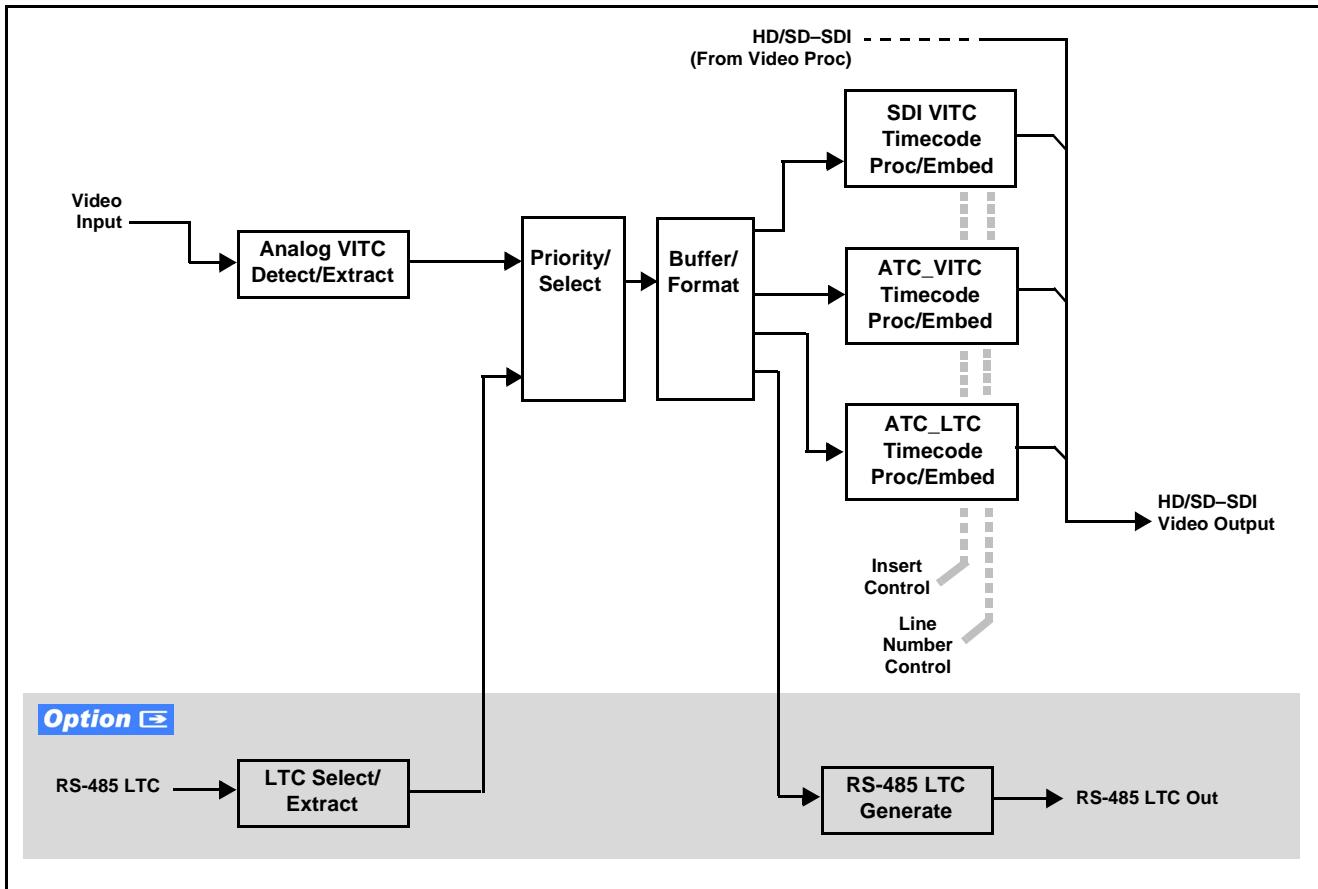


Figure 1-2 Timecode Processor

User Control Interface

Figure 1-3 shows the user control interface options for the 9031. 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.

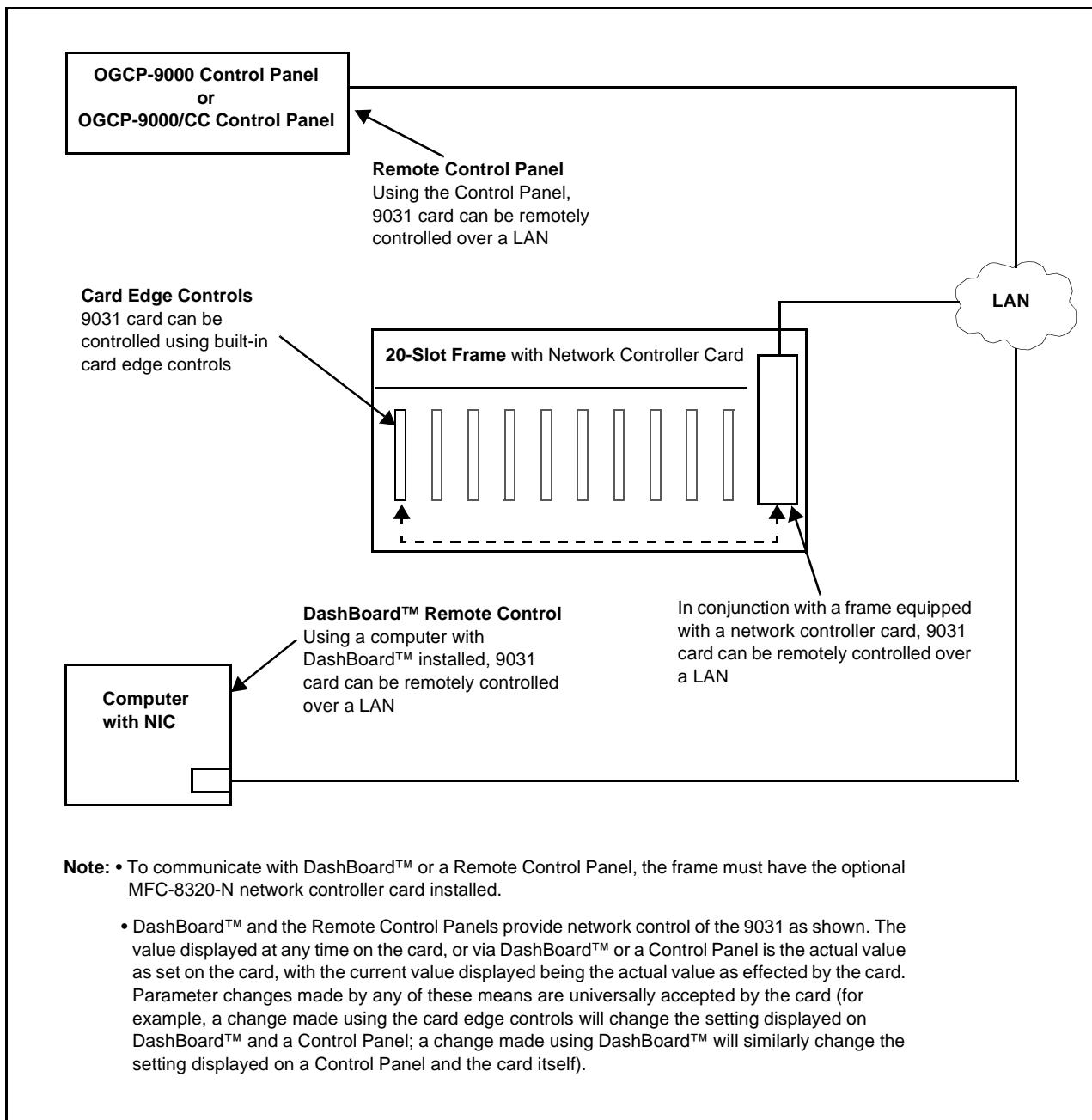


Figure 1-3 9031 User Control Interface

- **Built-in Card Edge User Interface** – Using the built-in card edge controls and display, card control settings can be set using a front panel menu.

Note: Some of the 9031 functions described in this manual are available only when using the DashBoard™, or Cobalt® OGCP-9000 or OGCP-9000/CC Remote Control Panel user interfaces.

- **DashBoard™ User Interface** – Using DashBoard™, the 9031 and other cards installed in openGear®¹ frames such as the Cobalt® 8321 or HPF-9000 frame can be controlled from a computer and monitor.

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

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

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 COMPASS® cards using DashBoard™. (Cobalt® OGCP-9000 and OGCP-9000/CC Remote Control Panel product manuals have complete instructions for setting up remote control using a Remote Control Panel.)

Download a copy of this guide by clicking on the **Support>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. 1-16).

- **Cobalt® OGCP-9000, OGCP-9000/CC and WinOGCP Remote Control Panels** – The OGCP-9000, OGCP-9000/CC, and WinOGCP Remote Control Panels conveniently and intuitively provide parameter monitor and control of the cards within the HPF-9000 or 8321 frame.

The remote 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.

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

9031 Rear I/O Modules

The 9031 physically interfaces to system video connections using a Rear I/O Module. Figure 1-4 shows a typical 9031 Rear I/O Module.

All inputs and outputs shown in the 9031 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 9031 card edge connections to industry standard connections that interface with other components and systems in the signal chain.

In this manner, the particular inputs and outputs required for a particular application can be accommodated using a Rear I/O Module that best suits the requirements. The required input and outputs are broken out to the industry standard connectors on the Rear I/O Module; the unused inputs and outputs remain unterminated and not available for use.

The full assortment of 9031 Rear I/O Modules is shown and described in 9031 Rear I/O Modules (p. 2-4) in Chapter 2, “Installation and Setup”.

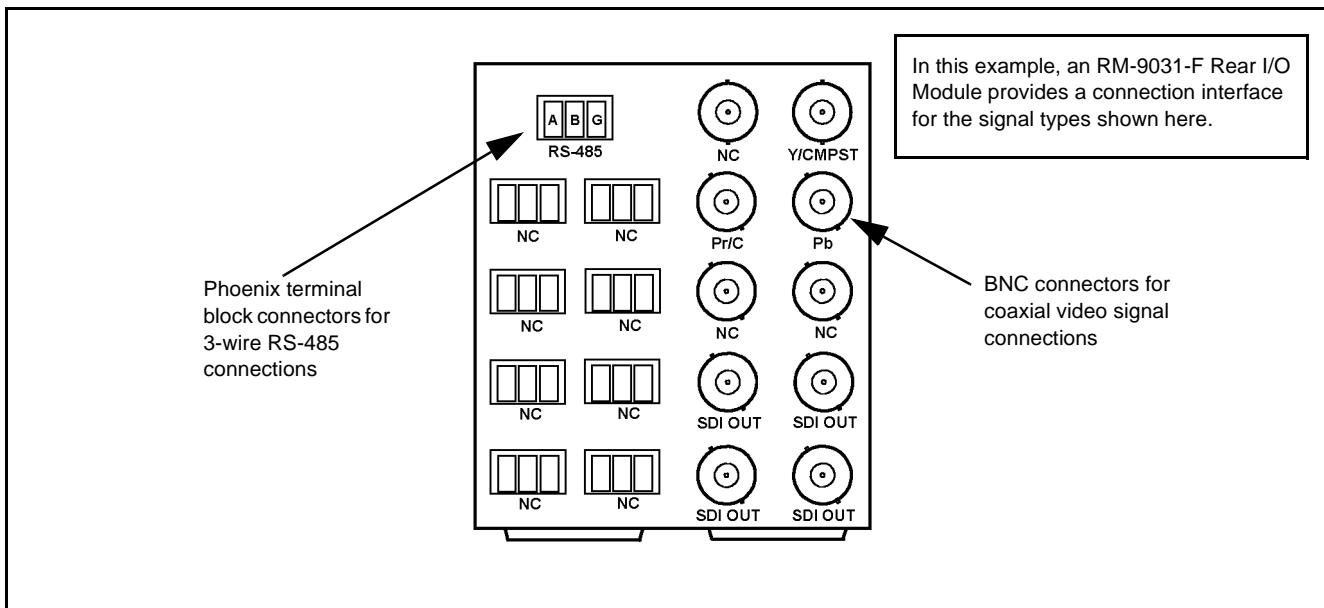


Figure 1-4 Typical 9031 Rear I/O Module

Video Formats Supported by the 9031

The 9031 supports all current SMPTE standard SD and HD video formats. Table 1-1 lists and provides details regarding the video formats supported by the 9031.

Table 1-1 Supported Video Formats

Item	Description/Specification	
Input / Output Video	Raster Structure:	Frame Rate:
	1080PsF	23.98; 24
	1080p	23.98; 24
	1080i ⁽¹⁾	25; 29.97; 30
	720p	23.98; 24; 25; 29.97; 30; 50; 59.94; 60
	486i ^(1, 2)	29.97
	575i ^(1, 2)	25
(1) All rates displayed as frame rates; interlaced ("i") field rates are two times the rate value shown. (2) 9031-SD support only NTSC and PAL SD rates.		

Technical Specifications

Table 1-2 lists the technical specifications for the 9031 HD/SD 12-Bit Analog to Digital Video Converter with Universal Inputs card.

Table 1-2 Technical Specifications

Item	Characteristic
Note: HD specifications apply only to 9031; 9031-SD only accepts and outputs SD signals.	
Part number, nomenclature	<ul style="list-style-type: none"> • 9031 – HD/SD 12-Bit Analog to Digital Video Converter with Universal Inputs • 9031-SD is functionally equivalent, but processes only SD analog video with a resulting SMPTE 259M SDI output
Installation/usage environment	Intended for installation and usage in frame meeting openGear® modular system definition.
Power consumption	10 Watts
Environmental: Operating temperature: Relative humidity (operating or storage):	32° – 104° F (0° – 40° C) < 95%, non-condensing

Table 1-2 Technical Specifications — continued

Item	Characteristic
Frame communication	10/100 Mbps Ethernet with Auto-MDIX.
Indicators	Card edge display and indicators as follows: <ul style="list-style-type: none">• 4-character alphanumeric display• Status/Error LED indicator• Input Format LED indicator
Controls	Card edge switches as follows: <ul style="list-style-type: none">• Menu Enter pushbutton switch• Menu Exit pushbutton switch• Up/down selection toggle switch
Analog Video Input	<p>Input Complement: Separate component Y/composite, Pr/C, and Pb inputs</p> <p>Input Type: Differential; Common Mode Rejection = 5 VAC</p> <p>Video Input Types: HD: Component YPbPr and RGB SMPTE SD: Composite, Component YPbPr (BetaCam™, MIIT™, SMPTE/N10), RGB, and Y/C</p> <p>Conversion Bit Depth: 12 bits</p> <p>SD Color Separation: 5-Line Adaptive Comb or Notch Filter</p> <p>Frequency Response (HD): Y: 0 – 25 MHz ± 0.3 dB Pb/B: 0 – 13.5 MHz ± 0.3 dB Pr/R: 0 – 13.5 MHz ± 0.3 dB</p> <p>Frequency Response (SD): 0 – 5.2 MHz ± 0.25dB</p> <p>Differential Phase (SD): < ± 0.4° typical</p> <p>Differential Gain (SD): < ± 0.4% typical</p> <p>Analog Front-End Crosstalk: Within noise floor measurement</p> <p>Return Loss: > 20 dB to 30 MHz</p>
Resolution	10-bit video data path

Table 1-2 Technical Specifications — continued

Item	Characteristic
Video A/D Process	HD: 4:4:4 SD: 8:8:8
Resolution:	12-bit A/D and 10-bit video data path
SD Comb Filter:	5-line adaptive
Post-Processor Serial Digital Video Outputs	<p>Number of Outputs: Four HD/SD-SDI BNC per IEC 60169-8 Amendment 2 (9031-SD is SD only)</p> <p>Impedance: 75Ω</p> <p>Return Loss: > 15 dB at 5 MHz – 270 MHz > 12 dB at 270 MHz – 1.485 GHz</p> <p>Signal Level: $800 \text{ mV} \pm 10\%$</p> <p>DC Offset: $0 \text{ V} \pm 50 \text{ mV}$</p> <p>Jitter (HD): < 0.15 UI (all outputs)</p> <p>Jitter (SD): < 0.10 UI (all outputs)</p> <p>Overshoot: < 0.2% of amplitude</p>
RS-485 I/O	With option +LTC, also provides RS-485 LTC input or output.

Warranty and Service Information

Cobalt Digital Inc. Limited Warranty

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

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

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

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

Cobalt Digital Inc. Factory Service Center

2406 E. University Avenue Urbana, IL 61802 USA www.cobaltdigital.com	Office: (217) 344-1243 Fax: (217) 344-1245 Email: info@cobaltdigital.com
---	--

THIS LIMITED WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON COBALT'S PART. ANY SOFTWARE PROVIDED WITH, OR FOR USE WITH, THE PRODUCT IS PROVIDED "AS IS." THE BUYER OF THE PRODUCT ACKNOWLEDGES THAT NO OTHER REPRESENTATIONS WERE MADE OR RELIED UPON WITH RESPECT TO THE QUALITY AND FUNCTION OF THE GOODS HEREIN SOLD. COBALT PRODUCTS ARE NOT AUTHORIZED FOR USE IN LIFE SUPPORT APPLICATIONS.

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

Contact Cobalt Digital Inc.

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

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

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

Chapter 2

Installation and Setup

Overview

This chapter contains the following information:

- Installing the 9031 Into a Frame Slot (p. 2-1)
- Installing the 9031 Into a Frame Slot (p. 2-1)
- Installing a Rear I/O Module (p. 2-3)
- Setting Up 9031 Network Remote Control (p. 2-6)

Installing the 9031 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 9031 has a moderate power dissipation (10 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 9031 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 9031 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 9031 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 9031 into a frame slot as follows:

1. Determine the slot in which the 9031 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 follows:
 - If the 9031 is being installed in a PN 8310-BNC or 8310-C-BNC frame, refer to the label on the connector bank corresponding to the card's slot location for connector designations.
 - If the 9031 is being installed in a frame using a specific 9031 Rear I/O Module, connect cabling in accordance with the appropriate diagram shown in Table 2-1, "9031 Rear I/O Modules" (p. 2-5).
9. Repeat steps 1 through 8 for other 9031 cards.

Note: The 9031 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 Cobalt® reference guide “COMPASS™ Remote Control User Guide” (PN 9000RCS-RM).

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 9031 is to be installed.

If installing the 9031 in a slot already equipped with a suitable I/O module, omit this procedure.

The full assortment of 9031 Rear I/O Modules is shown and described in 9031 Rear I/O Modules (p. 2-4). Install a Rear I/O Module as follows:

1. On the frame, determine the slot in which the 9031 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.

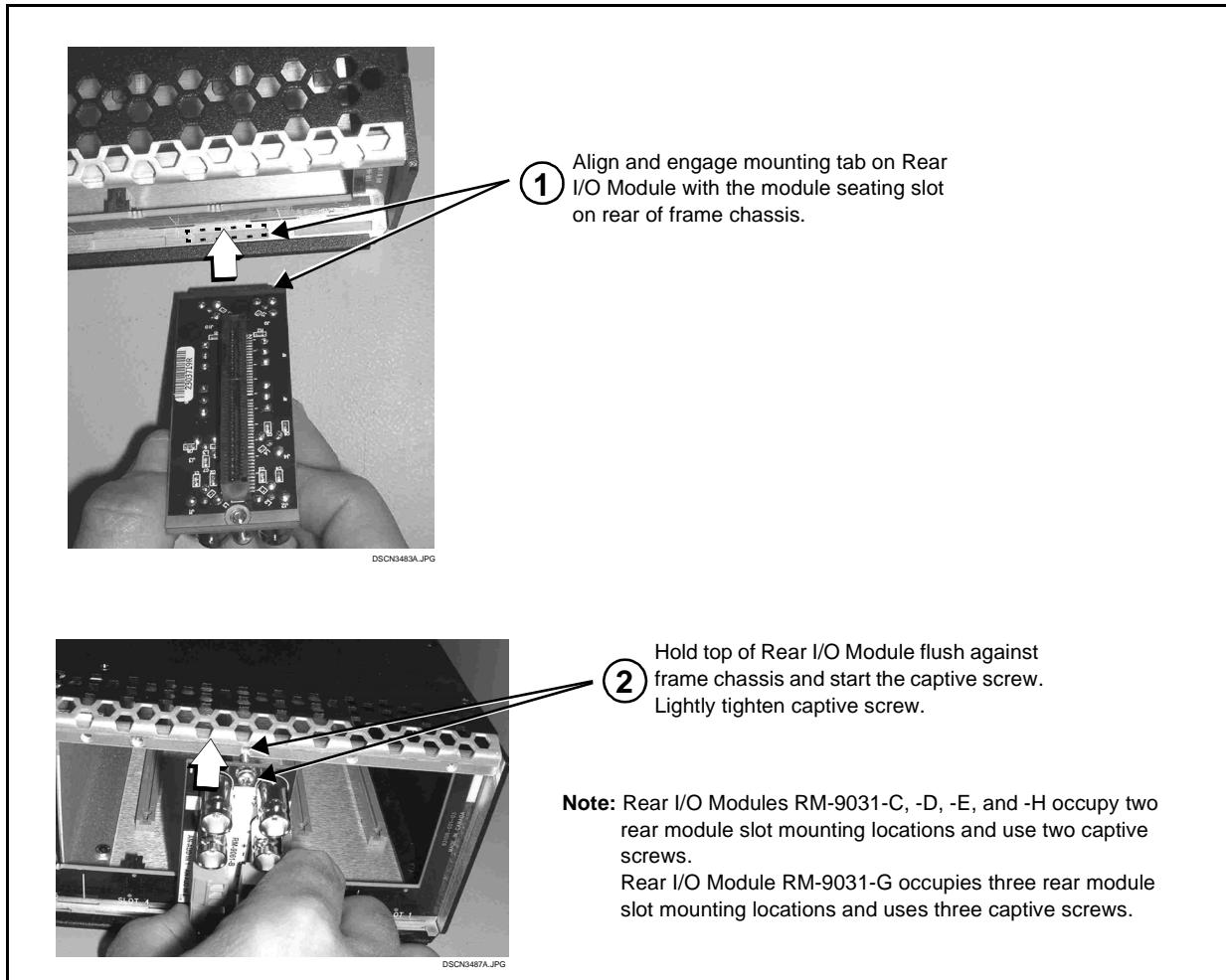


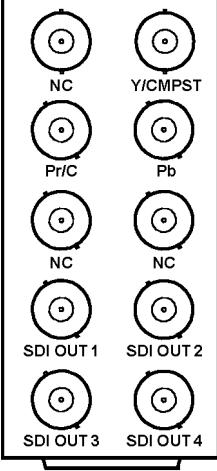
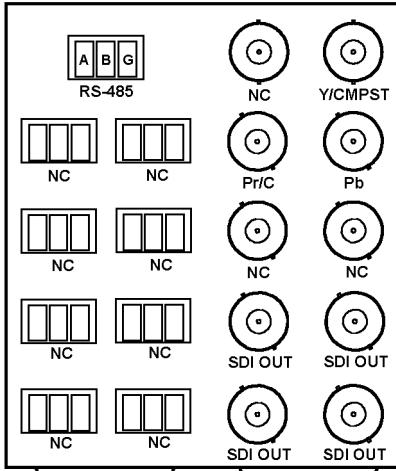
Figure 2-1 Rear I/O Module Installation

9031 Rear I/O Modules

Table 2-1 shows and describes the full assortment of Rear I/O Modules specifically for use with the 9031.

- 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.
 - RM20-x Rear I/O Modules compatible **only** with 20-slot frames.

Table 2-1 9031 Rear I/O Modules

9031 Rear I/O Module	Description
RM20-9031-A 	Provides the following connections: <ul style="list-style-type: none"> Analog Y/composite, Pr/C, and Pb coaxial inputs (Y/Cmpst, Pr/C, and Pb, respectively) Four buffered SDI coaxial outputs (SDI OUT 1 and SDI OUT 2)
RM20-9031-F 	Provides the following connections: <ul style="list-style-type: none"> Analog Y/composite, Pr/C, and Pb coaxial inputs (Y/Cmpst, Pr/C, and Pb, respectively) Four buffered SDI coaxial outputs (SDI OUT) RS-485 LTC I/O port <p>Note: Usable only on card licensed with +LTC option.</p> <p>Note: This rear module may not be currently listed in ordering information in web page or price lists. PN RM20-9033-F can be ordered and used for this product, with unused connectors functioning as "NC" as labeled here.</p>

Setting Up 9031 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 COMPASS™ cards using DashBoard™. (Cobalt® OGCP-9000 and OGCP-9000/CC Remote Control Panel product manuals have complete instructions for setting up remote control using a Remote Control Panel.)

Download a copy of this guide by clicking on the **Support>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. 1-16).

- 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.

Operating Instructions

Overview

If you are already familiar with using DashBoard or a Cobalt Remote Control Panel to control Cobalt cards, please skip to 9031 Function Submenu List and Descriptions (p. 3-9).

This chapter contains the following information:

- Control and Display Descriptions (p. 3-1)
- Accessing the 9031 Card via Remote Control (p. 3-5)
- Checking 9031 Card Information (p. 3-7)
- Ancillary Data Line Number Locations and Ranges (p. 3-8)
- 9031 Function Submenu List and Descriptions (p. 3-9)
- Troubleshooting (p. 3-20)

Control and Display Descriptions

This section describes the user interface controls, indicators, and displays for using the 9031 card. The 9031 functions can be accessed and controlled using any of the user interfaces described here.

The format in which the 9031 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 9031 functions (and the controls, indicators, and displays related to a particular function) follows a general arrangement of Function Submenus under which related controls can be accessed (as described in Function Submenu/Parameter Submenu Overview below).

Note: DashBoard™ and the Remote Control Panel provide greatly simplified user interfaces as compared to using the card edge controls. For this reason, **it is strongly recommended** that DashBoard™ or a Remote Control Panel be used for all card applications other than the most basic cases. Card edge control codes are not included in this manual. If card-edge control is to be used, obtain a copy of "Manual Supplement – Card-Edge Control Reference Master List and Instructions for Using Compass® Card-edge (Local) Control Codes" (989CEC-MS.pdf) at www.cobaltdigital.com>Support>Documents>Reference Guides.

Note: When a setting is changed, settings displayed on DashBoard™ (or a Remote Control Panel) are the settings as effected by the 9031 card itself and reported back to the remote control; the value displayed at any time is the actual value as set on the card.

Function Submenu/Parameter Submenu Overview

The functions and related parameters available on the 9031 card are organized into function **submenus**, which consist of parameter groups as shown below.

Figure 3-1 shows how the 9031 card and its submenus are organized, and also provides an overview of how navigation is performed between cards, function submenus, and parameters.

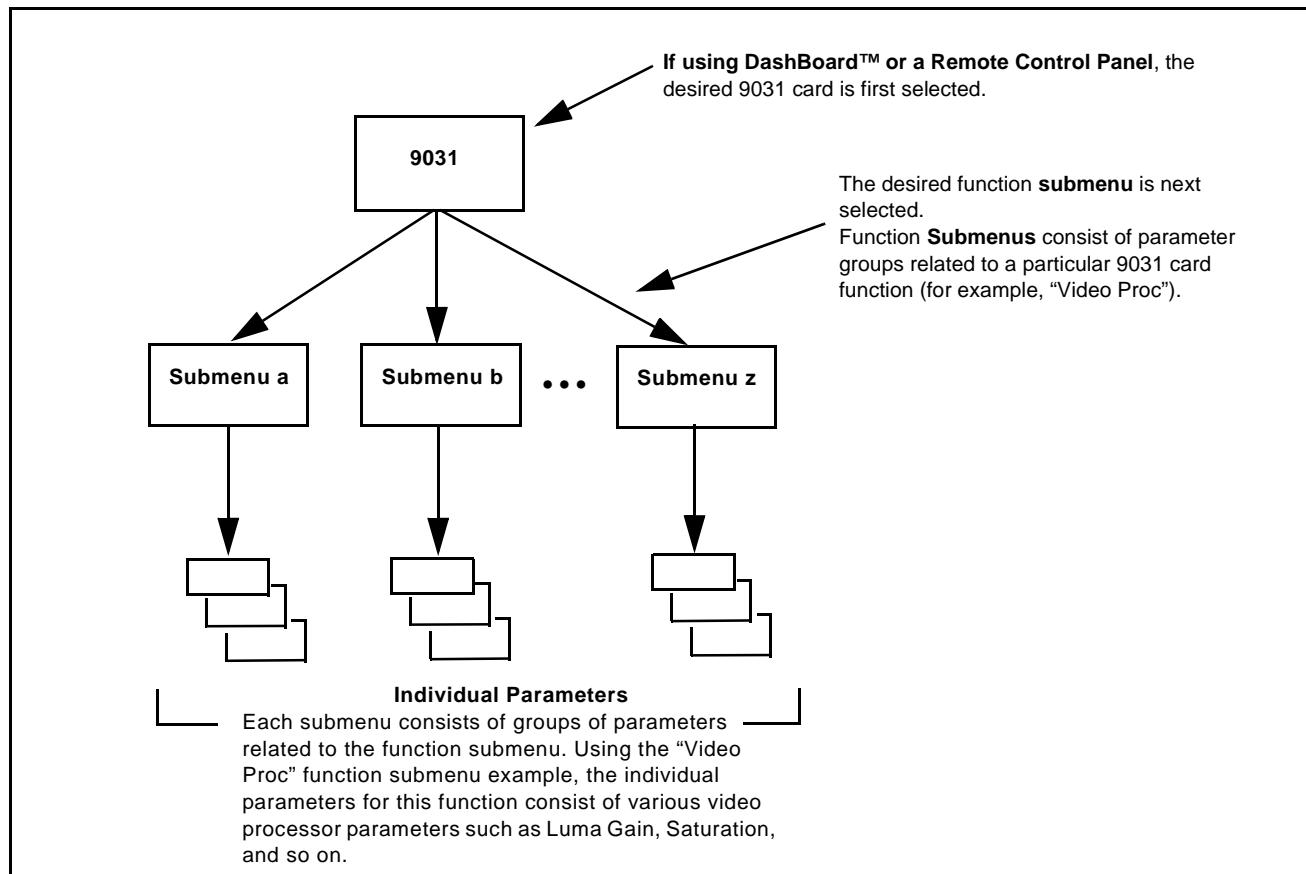


Figure 3-1 Function Submenu/Parameter Submenu Overview

DashBoard™ User Interface

(See Figure 3-2.) The 9031 function submenus 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. (In this manner, the setting effected using controls and selection lists displayed in DashBoard™ are comparable to the submenu items accessed and committed using the 9031 card edge controls.)

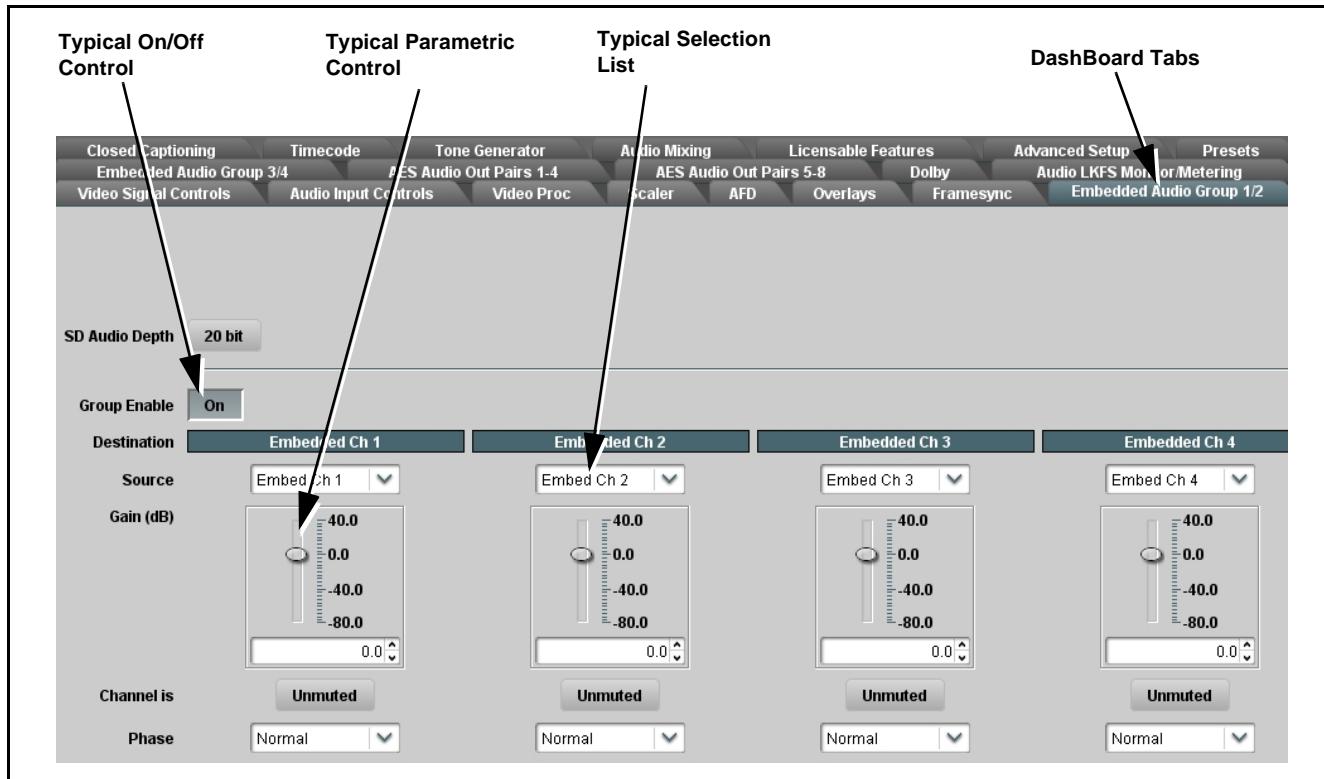


Figure 3-2 Typical DashBoard Tabs and Controls

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 acts like a potentiometer. Items in a list can then be selected using the control knobs which correspondingly acts like a rotary switch. (In this manner, the setting effected using controls and selection lists displayed on the Control Panel are comparable to the submenu items accessed and committed using the 9031 card edge controls.)

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

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

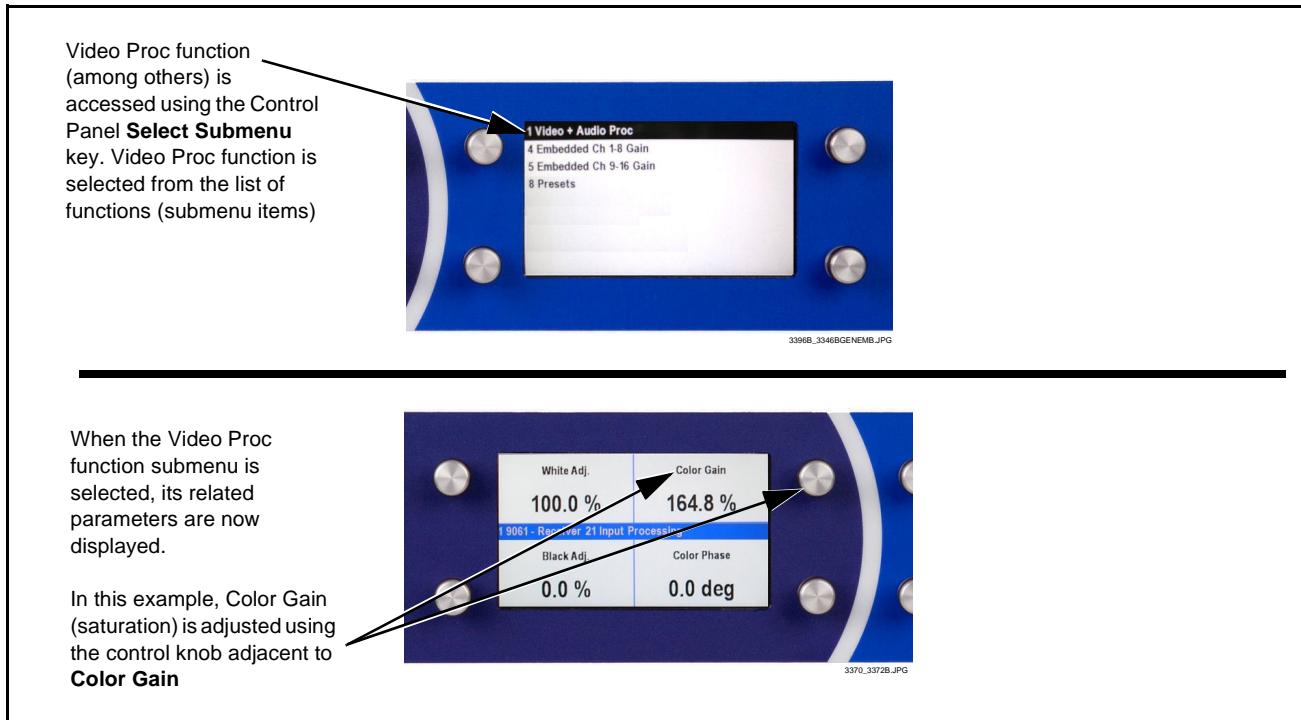


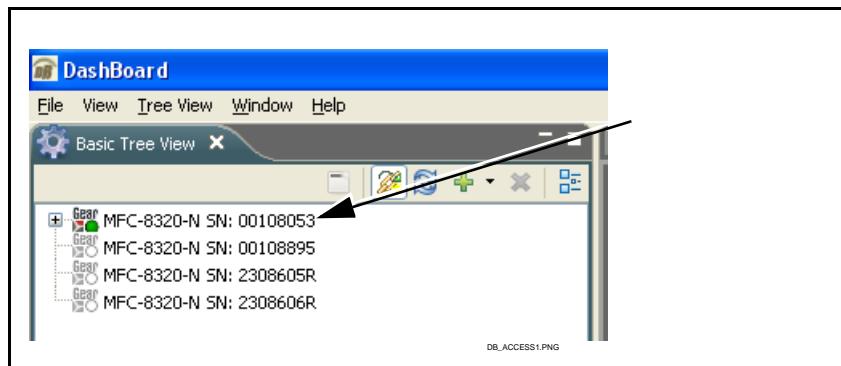
Figure 3-3 Remote Control Panel Setup of Example Video Proc Function Setup

Accessing the 9031 Card via Remote Control

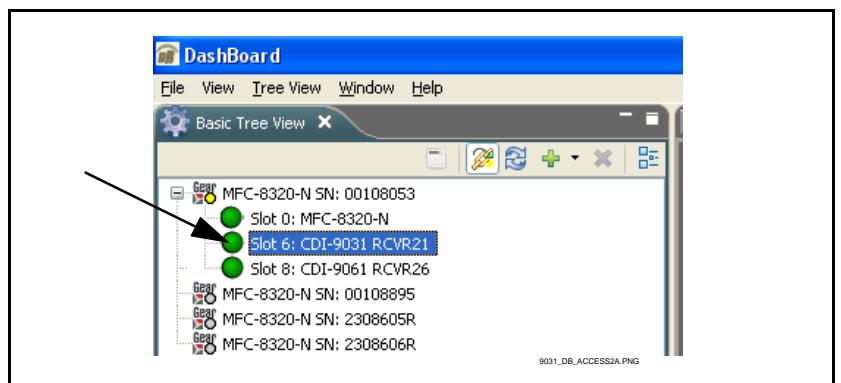
Access the 9031 card using DashBoard™ or Cobalt® Remote Control Panel as described below.

Accessing the 9031 Card Using DashBoard™

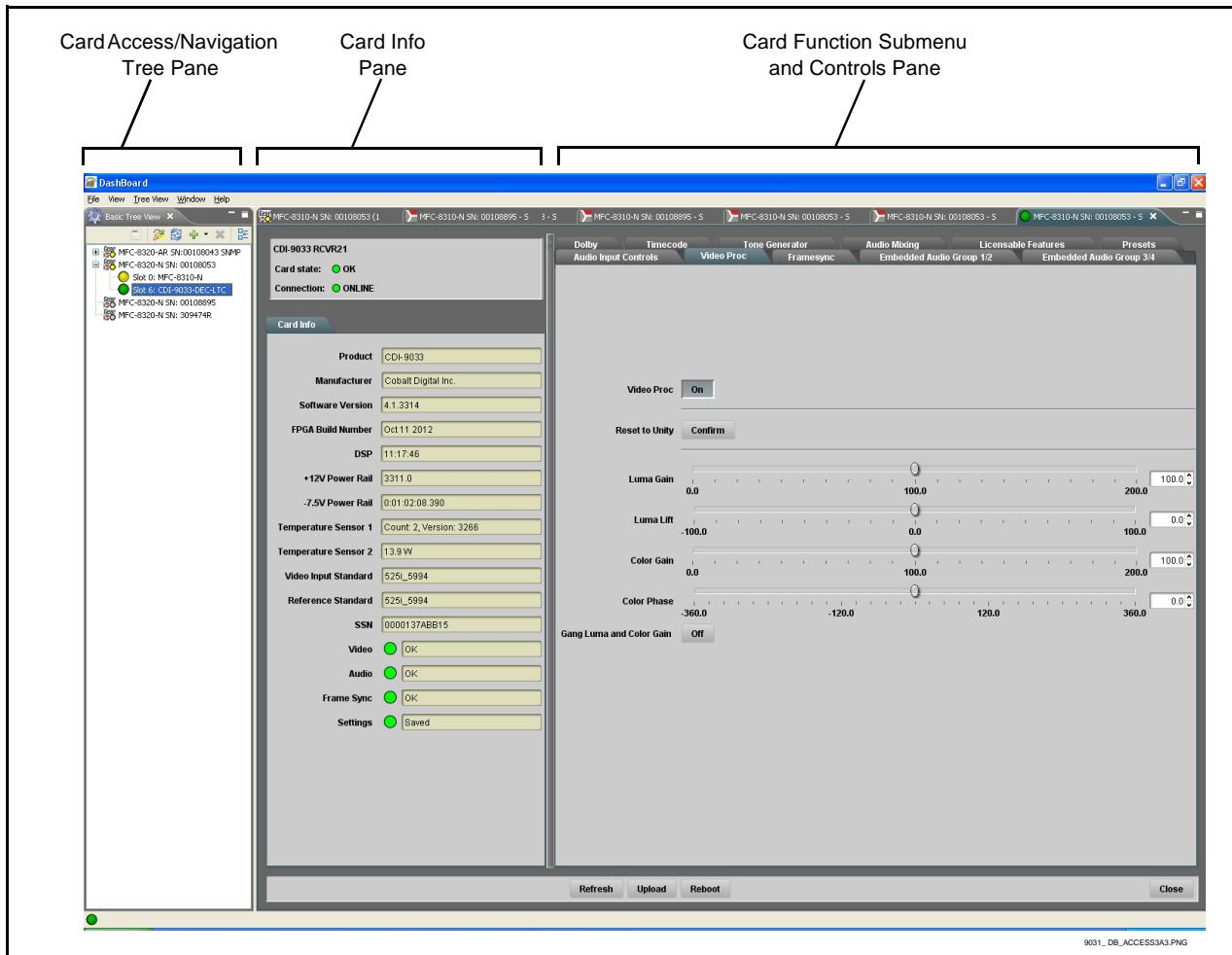
1. On the computer connected to the frame LAN, open DashBoard™.
2. As shown below, in the left side Basic View Tree locate the Network Controller Card associated with the frame containing the 9031 card to be accessed (in this example, “MFC-8320-N SN: 00108053”).



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: CDI-9031 RCVR21”).

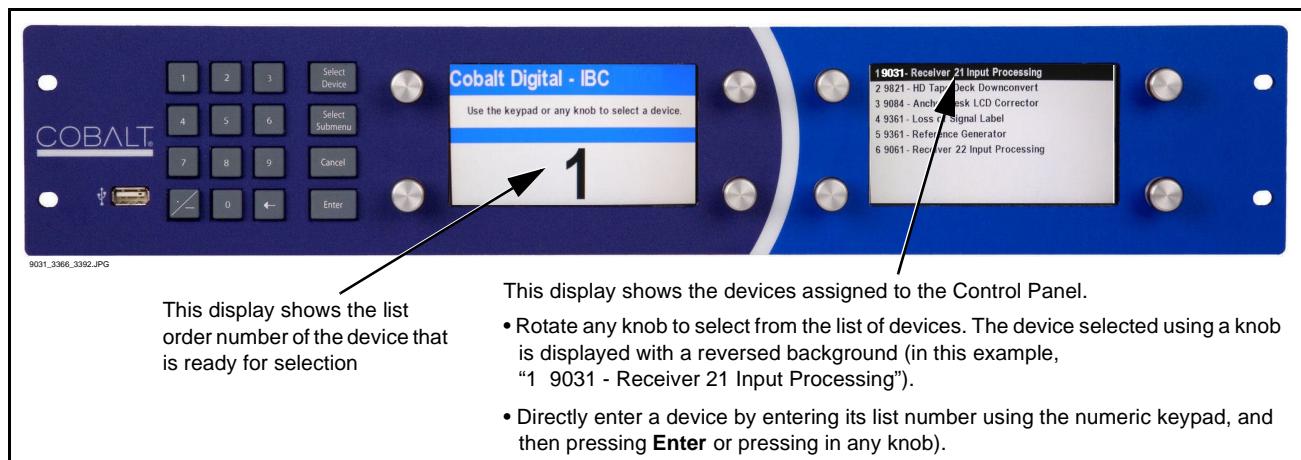


As shown on the next page, when the card is accessed a DashBoard™ its function submenu screen showing tabs for each function is displayed. (The particular submenu screen displayed is the previously displayed screen from the last time the card was accessed by DashBoard™).



Accessing the 9031 Card Using a Cobalt® Remote Control Panel

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



Checking 9031 Card Information

The operating status and software version the 9031 card can be checked using DashBoard™ or the card edge control user interface. Figure 3-4 shows and describes the 9031 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. 3-20) for corrective action.

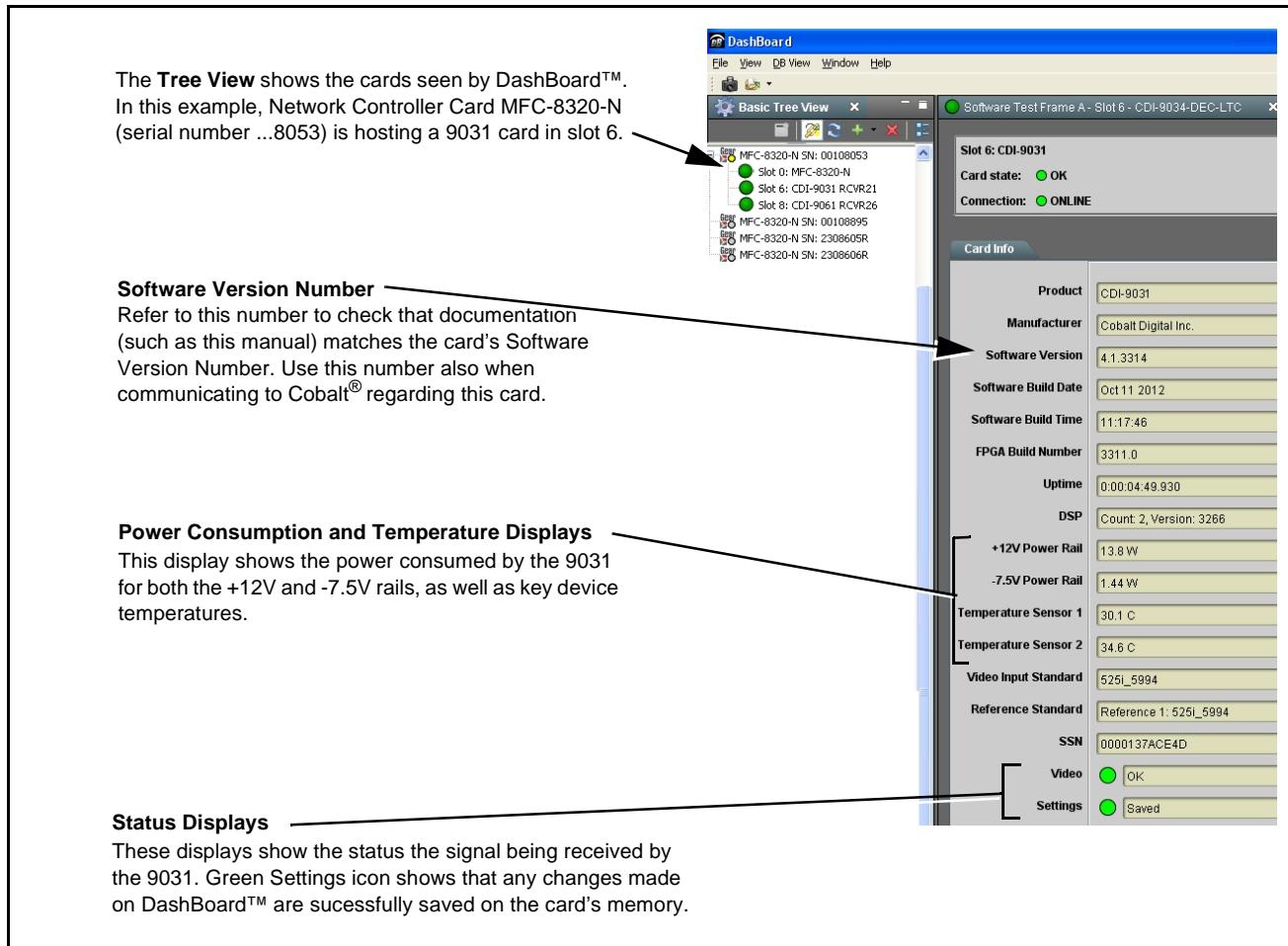


Figure 3-4 9031 Card Info Utility

Ancillary Data Line Number Locations and Ranges

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

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

Item	Default Line No. / Range	
	SD	HD
AFD	12 (Note 2)	9 (Note 2)
ATC_VITC	12 (locked)	9/8 (Note 2)
ATC_LTC	—	10 (Note 2)
Dolby® Metadata	13 (Note 2)	13 (Note 2)
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.

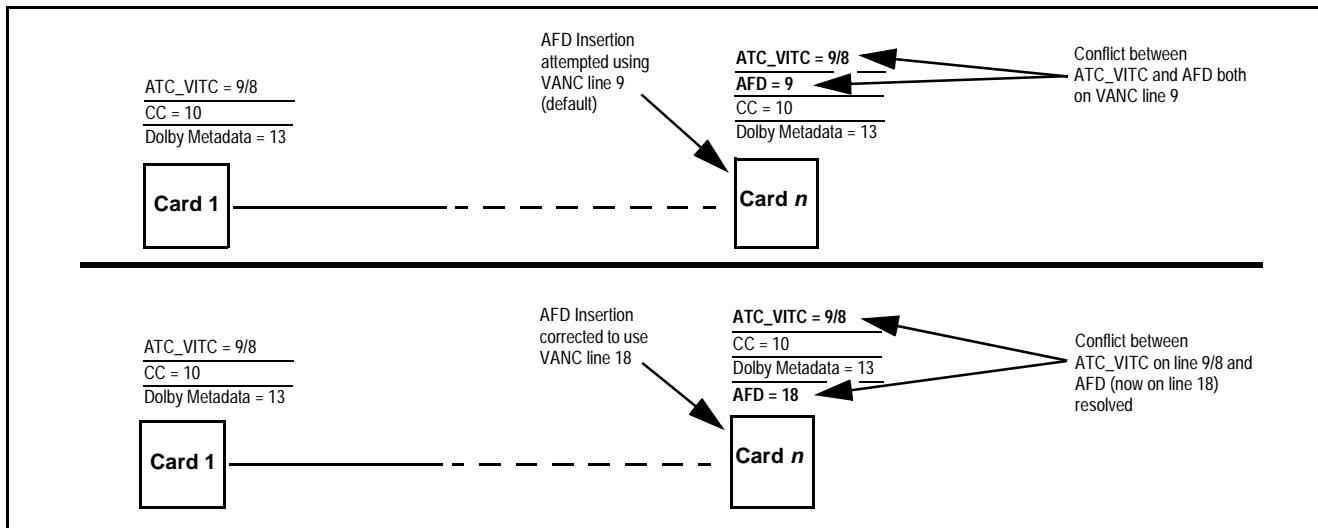


Figure 3-5 Example VANC Line Number Allocation Example

9031 Function Submenu List and Descriptions

Table 3-2 individually lists and describes each 9031 function submenu (“tab”) and its related list selections, controls, and parameters. Where helpful, examples showing usage of a function are also provided. Table 3-2 is primarily based upon using DashBoard™ to access each function and its corresponding submenus and parameters.

- Note:**
- All numeric (scalar) parameters displayed on DashBoard™ can be changed using the slider controls, [] arrows, or by numeric keypad entry in the corresponding numeric field. (When using numeric keypad entry, add a return after the entry to commit the entry.)
 - HD controls and setting described in this section are not applicable for 9031-SD card model.

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

Function Submenu Item	Page	Function Submenu Item	Page
Video Signal Controls	3-10	Closed Captioning	3-16
Video Proc	3-11	Licensable Features	3-17
AFD	3-12	Presets	3-17
Timecode	3-13		

Table 3-2 9031 Function Submenu List

Video Signal Controls	Sets the 9031 video signal input type and preference and priority.
<ul style="list-style-type: none"> • HD Analog Input Type <p>Input Video Preference: SDI Only HD Analog Input Type: YPbPr SD Analog Input Type: YPbPr (selected), GBR NTSC Contains: 7.5 IRE of Setup</p>	<p>When receiving analog video input, sets the 9031 HD input video type to accept received input signal from choices shown.</p> <p>Note: Input type must be appropriately set for the 9031 to correctly process the received input.</p>
<ul style="list-style-type: none"> • SD Analog Input Type <p>Input Video Preference: SDI Only HD Analog Input Type: YPbPr SD Analog Input Type: Composite (selected), Y/C NTSC Contains: Composite, Y/C, YPbPr BetaCam, YPbPr MII, YPbPr SMPTE</p>	<p>When receiving analog video input, sets the 9031 SD input video type to accept received input signal from choices shown.</p> <p>Note: Input format must be appropriately set for the 9031 to correctly lock to the input.</p>
<ul style="list-style-type: none"> • NTSC Contains <p>Input Video Preference: SDI Only HD Analog Input Type: YPbPr SD Analog Input Type: Composite NTSC Contains: 0 IRE of Setup (selected), 0 IRE of Setup, 7.5 IRE of Setup</p>	<p>This setting tells the 9031 how much setup (pedestal) needs to be removed from an NTSC-formatted input.</p> <ul style="list-style-type: none"> • 0 IRE of Setup: No setup removed. • 7.5 IRE of Setup: Removes 7.5 IRE of setup. This is typically preferred when analog signals containing 7.5 IRE pedestal are converted to SDI.

Table 3-2 9031 Function Submenu List — continued

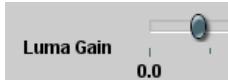
Video Proc	Provides the following Video Proc parametric controls.
• Video Proc 	Video Proc (On/Off) provides master on/off control of all Video Proc functions. <ul style="list-style-type: none">• When set to Off, all processing is bypassed.• When set to On, currently displayed parameter settings take 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. <ul style="list-style-type: none">• 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 and Color Gain 	When set to On , changing either the Luma Gain or Color Gain controls increases or decreases both the Luma and Chroma levels by equal amounts.

Table 3-2 9031 Function Submenu List — continued

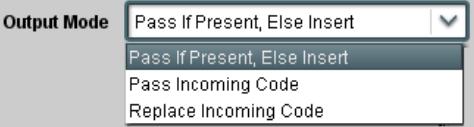
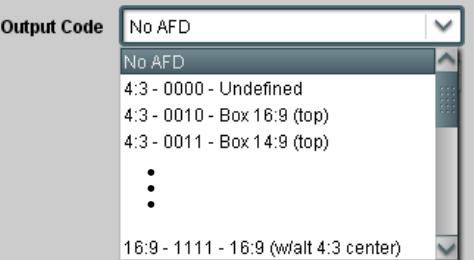
	Allows assignment of AFD (Active Format Description) codes to the SDI output video.																																																																
<p>Note: This function only marks the SDI output with an AFD code. Actual AFD processing must be performed by a downstream card or system that recognizes an AFD code assigned here.</p>																																																																	
<p>• Output Mode</p>  <ul style="list-style-type: none"> Output Mode Pass If Present, Else Insert Pass If Present, Else Insert (selected) Pass Incoming Code Replace Incoming Code 	<p>Drop-down selection determines action to take in presence or absence of existing AFD code on input video.</p> <p>Note: The Incoming AFD and Pass Incoming AFD Code selections, while present on this card, are non-functional since the analog video input does not support AFD code embedding.</p>																																																																
<p>• Output Code</p>  <ul style="list-style-type: none"> Output Code No AFD No AFD (selected) 4:3 - 0000 - Undefined 4:3 - 0010 - Box 16:9 (top) 4:3 - 0011 - Box 14:9 (top) ⋮ ⋮ 16:9 - 1111 - 16:9 (w/alt 4:3 center) 	<p>Drop-down list assigns desired AFD to output SDI.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">4:3 Coded Frame</th> </tr> <tr> <th>AFD Code⁽¹⁾</th> <th>Description</th> <th>AFD Code⁽¹⁾</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>–</td> <td>No code present</td> <td>1001</td> <td>Full frame</td> </tr> <tr> <td>0000</td> <td>Undefined</td> <td>1010</td> <td>16:9 (center)</td> </tr> <tr> <td>0010</td> <td>Box 16:9 (top)</td> <td>1011</td> <td>14:9 (center)</td> </tr> <tr> <td>0011</td> <td>Box 14:9 (top)</td> <td>1101</td> <td>4:3 (with alternate 14:9 center)</td> </tr> <tr> <td>0100</td> <td>Box > 16:9 (center)</td> <td>1110</td> <td>16:9 (with alternate 14:9 center)⁽²⁾</td> </tr> <tr> <td>1000</td> <td>Full frame</td> <td>1111</td> <td>16:9 (with alternate 4:3 center)⁽²⁾</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">16:9 Coded Frame</th> </tr> <tr> <th>AFD Code⁽¹⁾</th> <th>Description</th> <th>AFD Code⁽¹⁾</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>–</td> <td>No code present</td> <td>1001</td> <td>4:3 (center)</td> </tr> <tr> <td>0000</td> <td>Undefined</td> <td>1010</td> <td>16:9 (image protected)⁽²⁾</td> </tr> <tr> <td>0010</td> <td>Full frame</td> <td>1011</td> <td>14:9 (center)</td> </tr> <tr> <td>0011</td> <td>4:3 (center)</td> <td>1101</td> <td>4:3 (with alternate 14:9 center)</td> </tr> <tr> <td>0100</td> <td>Box > 16:9 (center)</td> <td>1110</td> <td>16:9 (with alternate 14:9 center)⁽²⁾</td> </tr> <tr> <td>1000</td> <td>Full frame</td> <td>1111</td> <td>16:9 (with alternate 4:3 center)⁽²⁾</td> </tr> </tbody> </table> <p>1: AFD codes numbering and definitions conform to SMPTE 2016-1-2007. 2: Image Protected implies picture content that must not be cropped by conversion processes or display devices. Alternate center formats may have protected center areas, with areas outside of the protected area not containing mandatory content.</p>	4:3 Coded Frame				AFD Code ⁽¹⁾	Description	AFD Code ⁽¹⁾	Description	–	No code present	1001	Full frame	0000	Undefined	1010	16:9 (center)	0010	Box 16:9 (top)	1011	14:9 (center)	0011	Box 14:9 (top)	1101	4:3 (with alternate 14:9 center)	0100	Box > 16:9 (center)	1110	16:9 (with alternate 14:9 center) ⁽²⁾	1000	Full frame	1111	16:9 (with alternate 4:3 center) ⁽²⁾	16:9 Coded Frame				AFD Code ⁽¹⁾	Description	AFD Code ⁽¹⁾	Description	–	No code present	1001	4:3 (center)	0000	Undefined	1010	16:9 (image protected) ⁽²⁾	0010	Full frame	1011	14:9 (center)	0011	4:3 (center)	1101	4:3 (with alternate 14:9 center)	0100	Box > 16:9 (center)	1110	16:9 (with alternate 14:9 center) ⁽²⁾	1000	Full frame	1111	16:9 (with alternate 4:3 center) ⁽²⁾
4:3 Coded Frame																																																																	
AFD Code ⁽¹⁾	Description	AFD Code ⁽¹⁾	Description																																																														
–	No code present	1001	Full frame																																																														
0000	Undefined	1010	16:9 (center)																																																														
0010	Box 16:9 (top)	1011	14:9 (center)																																																														
0011	Box 14:9 (top)	1101	4:3 (with alternate 14:9 center)																																																														
0100	Box > 16:9 (center)	1110	16:9 (with alternate 14:9 center) ⁽²⁾																																																														
1000	Full frame	1111	16:9 (with alternate 4:3 center) ⁽²⁾																																																														
16:9 Coded Frame																																																																	
AFD Code ⁽¹⁾	Description	AFD Code ⁽¹⁾	Description																																																														
–	No code present	1001	4:3 (center)																																																														
0000	Undefined	1010	16:9 (image protected) ⁽²⁾																																																														
0010	Full frame	1011	14:9 (center)																																																														
0011	4:3 (center)	1101	4:3 (with alternate 14:9 center)																																																														
0100	Box > 16:9 (center)	1110	16:9 (with alternate 14:9 center) ⁽²⁾																																																														
1000	Full frame	1111	16:9 (with alternate 4:3 center) ⁽²⁾																																																														
<p>• Output Line</p> 	<p>Allows selecting the line location of the AFD data within the video signal Ancillary Data space. (Range is 9 thru 41.)</p> <p>Note:</p> <ul style="list-style-type: none"> • 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 the selected line is available and carrying no other data. 																																																																

Table 3-2 9031 Function Submenu List — continued

	<p>Provides timecode data extraction from various sources, and provides formatting and re-insertion controls for inserting the timecode into the output video.</p>
<p>Shown below is an example in which received video with VITC waveform timecode is to be converted to SDI ATC_VITC timecode data. Each Timecode control is fully described on the pages that follow.</p>	
<p>A Noting that the incoming video contains VITC waveform timecode data (as shown in the status display), set the Source Priority drop-down lists to include analog VITC timecode data as a choice. This extracts VITC Waveform timecode data from the incoming video.</p>	
<p>B In this example, it is desired to provide SDI ATC_VITC timecode data in the output video. As such, set SD ATC Insertion Insertion to Enabled.</p>	

Table 3-2 9031 Function Submenu List — continued

Timecode	(continued)
Option ➔ RS-485 LTC RS-485 LTC controls described below only appear on cards with +LTC licensed optional feature. This feature allows bidirectional conversion between VBI-based timecode and LTC timecode on an RS-485 interface.	
<ul style="list-style-type: none"> • Timecode Source Status Displays <p>Analog VITC Waveform Status 05:41:12:00.1 Audio LTC Status Unlocked</p>	<p>Displays the current status and contents of the supported timecode formats shown to the left.</p> <ul style="list-style-type: none"> If a format is receiving timecode data, the current content (timecode running count and line number) is displayed. If a format is not receiving timecode data, Unlocked is displayed. <p>If LTC is being received, the timecode running count is displayed.</p> <p>LTC Source selects source to be used by card LTC function as listed below.</p>
<ul style="list-style-type: none"> • RS-485 Port LTC Control <p>RS-485 Port Function LTC In (Overrides Audio LTC Source) Dolby Metadata LTC In (Overrides Audio LTC Source) LTC Output</p>	<p>Allows RS-485 port to be used to receive LTC, or send LTC over RS-485 port as follows:</p> <ul style="list-style-type: none"> If RS-485 LTC is to be received via the shared RS-485 port, set the RS-485 Port Function control to LTC In. If RS-485 LTC is to be outputted via the shared RS-485 port, set the RS-485 Port Function control to LTC Output. The timecode string carried on the LTC output is that selected using the Source Priority controls described on the next page.
<ul style="list-style-type: none"> • Incoming ATC Packet Removal Control <p>Incoming ATC Packet Removal Disabled</p>	<p>This control is not applicable for this card.</p>
<ul style="list-style-type: none"> • Source Priority <p>Source Priority 1 Source Priority 2 Source Priority 3 Source Priority 4</p>	<p>As described here, selects the priority assigned to each of the four supported formats in the event the preferred source is unavailable. Each of the four Source Priority selection lists allows assignment of source priority from the following choices:</p> <p>Analog VITC None Analog VITC Audio LTC</p> <p>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).</p>

Table 3-2 9031 Function Submenu List — continued

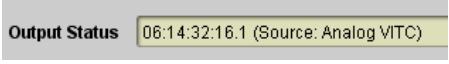
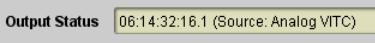
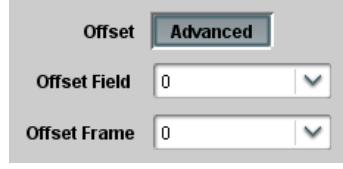
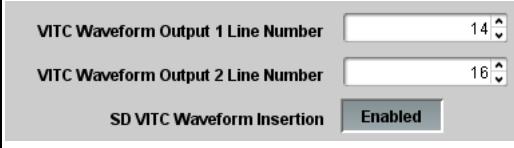
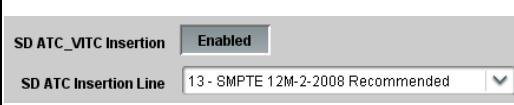
Timecode	(continued)														
<ul style="list-style-type: none"> • Output Status Display 	<p>Displays the current content and source being used for the timecode data as follows:</p>  <ul style="list-style-type: none"> • Output status OK (in this example, running analog VITC timecode received and outputted).  <ul style="list-style-type: none"> • Timecode not available due to lack of appropriate input timecode data on enabled formats. <p>Note: • Timecode output requires that source and priority are appropriately selected (as described above in Source Priority). Also, video input must contain appropriate timecode data.</p> <ul style="list-style-type: none"> • 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: <table style="margin-left: 20px;"> <tr><td>0.0</td><td>Frame 0</td></tr> <tr><td>0.1</td><td>Frame 1</td></tr> <tr><td>1.0</td><td>Frame 2</td></tr> <tr><td>1.1</td><td>Frame 3</td></tr> <tr><td>•</td><td></td></tr> <tr><td>•</td><td></td></tr> <tr><td>29.1</td><td>Frame 59</td></tr> </table> 	0.0	Frame 0	0.1	Frame 1	1.0	Frame 2	1.1	Frame 3	•		•		29.1	Frame 59
0.0	Frame 0														
0.1	Frame 1														
1.0	Frame 2														
1.1	Frame 3														
•															
•															
29.1	Frame 59														
<ul style="list-style-type: none"> • Offset Controls 	<p>Allows the current timecode count to be advanced or delayed on the output video.</p> <ul style="list-style-type: none"> • 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. <p>Note: Default settings are null, with both controls set at zero as shown.</p>														
<p>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.</p> <ul style="list-style-type: none"> • The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data. 															
<ul style="list-style-type: none"> • SD VITC Waveform Insertion Controls 	<p>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.</p> <p>Note: • If only one output line is to be used, set both controls for the same line number.</p> <ul style="list-style-type: none"> • SD VITC Waveform Insertion control only affects VITC waveforms inserted (or copied to a new line number) by this function. 														
<ul style="list-style-type: none"> • SD ATC Insertion Control 	<p>For SD output, enables or disables SD ATC_VITC timecode insertion into the output video, and selects the line number for ATC_VITC.</p>														

Table 3-2 9031 Function Submenu List — continued

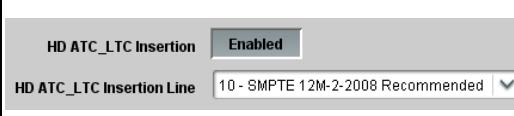
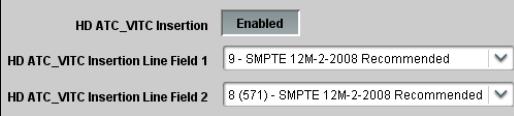
Timecode	(continued)
<ul style="list-style-type: none"> • HD ATC_LTC Insertion Control 	For HD output, enables or disables ATC_LTC timecode insertion into the output video, and selects the line number for ATC_LTC timecode data.
<ul style="list-style-type: none"> • HD ATC_VITC Insertion Control 	For HD output, enables or disables ATC_VITC timecode insertion into the output video, and selects the line number for ATC_VITC1 and ATC_VITC2. Note: If only one output line is to be used, set both controls for the same line number.
<ul style="list-style-type: none"> • 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.
Closed Captioning	Provides support for closed captioning setup.
<ul style="list-style-type: none"> • Closed Captioning Regeneration On/Off 	Turns on or turns off the Closed Captioning on the output.
<ul style="list-style-type: none"> • Closed Captioning Input Status 	Displays incoming Closed Captioning status as follows: <ul style="list-style-type: none"> 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.

Table 3-2 9031 Function Submenu List — continued

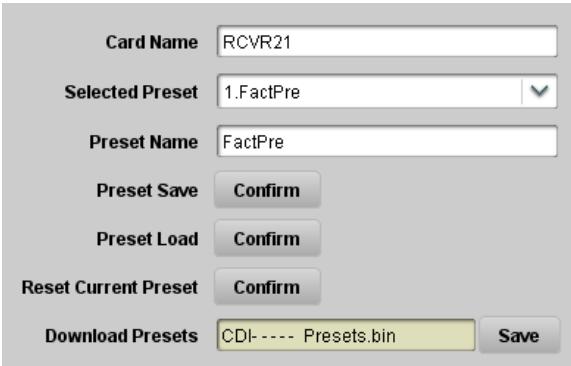
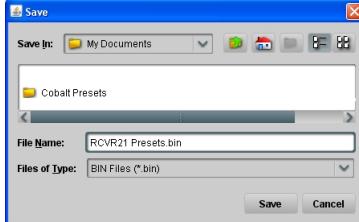
Licensable Features	Allows activation of optional licensed features.
<p>Note: For card pre-ordered with licensed feature(s), the activation steps described below are not required; the feature will already be installed activated. To order features and obtain a license key, contact Cobalt® sales at sales@cobaltdigital.com or at the contact information in Contact Cobalt Digital Inc. in Chapter 1, “Introduction”. Please provide the “SSN” number of your card (displayed in the Card Info pane) when contacting us for your key.</p>	
<ul style="list-style-type: none"> • License Feature and Key Entry window 	<p>Activate licensable feature as described below.</p> <ol style="list-style-type: none"> 1. Enter the feature key string in the Feature Key box. Press return or click outside of the box to acknowledge entry. Note: Entry string is case sensitive. Do not enter any spaces. 2. In the DashBoard™ Card Info pane, wait for the feature identification to be shown for the card product number (for example, “-UM” appearing after the card part number) and Valid Key Entered to be displayed. This indicates the key was correctly entered and recognized by the card. Note: If DashBoard™ card function submenu/control pane does not re-appear, close the card and re-open it. 3. Click and confirm Reboot. When the card function submenu/control pane appears again, the licensable feature will be available. Note: Applying the licensable feature and its reboot has no effect on prior settings. All control settings and drop-down selections are retained.
Presets	Allows up to 16 card user settings configuration presets to be saved in a Preset and then recalled (loaded) as desired. All current settings (including list selections and scalar (numeric) control settings such as Gain, etc.) are saved when a Preset Save is invoked.
	<p>The Preset Name field and Preset Save button allow custom user setting configurations to be labeled and saved to a Preset for future use.</p> <p>The Preset Load button and the Selected Preset drop-down list allow saved presets to be selected and loaded as desired. When a preset is loaded, it immediately becomes active with all user settings now automatically set as directed by the preset.</p> <p>Saved presets can be uploaded to a computer for use with other same-model COMPASS™ cards.</p> <p>Each of the items to the left are described in detail on the following pages.</p>

Table 3-2 9031 Function Submenu List — continued

Presets	(continued)
<ul style="list-style-type: none"> • Preset Save and Load 	<p>• Preset Save stores all current card control settings to the currently selected preset. (For example, if Preset 1 is selected in the Selected Preset drop-down list, clicking and confirming Preset Save will then save all current card control settings to Preset 1)</p> <p>• Preset Load loads (applies) all card control settings defined by whatever preset (Preset 1 thru Preset 16) is currently selected in the Selected Preset drop-down list. (For example, if Preset 3 is selected in the Selected Preset drop-down list, clicking and confirming Preset Load will then apply all card control settings defined in Preset 3)</p> <p>The above buttons have a Confirm? pop-up that appears, requesting confirmation.</p> <p>Note: Applying a change to a preset using the buttons described above rewrites the previous preset contents with the invoked contents. Make certain change is desired before confirming preset change.</p>
<ul style="list-style-type: none"> • Selected Preset 	<p>Selected Preset 1 thru Selected Preset 16 range in drop-down list selects one of 16 stored presets as ready for Save (being written to) or for Load (being applied to the card).</p> <p>Note: The preset names shown to the left are the default (unnamed) preset names. All 16 presets in this case are loaded identically with the factory default settings.</p>
<ul style="list-style-type: none"> • Card Name 	<p>Text entry field provides for optional entry of card name, function, etc. (as shown in this example).</p> <p>Note: Card name can be 31 ASCII characters maximum.</p>
<ul style="list-style-type: none"> • Preset Name 	<p>With one of 16 presets selected, provides for entry of custom name for the preset (as shown in example below).</p> <p>Entering text in Preset Name field (in this example, "RCVR21") applies custom name to selected Preset (in this example, Preset 2)</p> <p>Note: • Preset name can be seven ASCII characters maximum. • The Preset ID number does not need to be entered; it is added automatically.</p>

Table 3-2 9031 Function Submenu List — continued

Presets	(continued)
<ul style="list-style-type: none"> • Reset Current Preset 	<ul style="list-style-type: none"> • Reset Current Preset resets all parameters (including preset custom name entered) of the currently selected Preset (as displayed in the Selected Preset field) to factory default settings. The button has a Confirm? pop-up that appears, requesting confirmation.
<ul style="list-style-type: none"> • Download Presets 	<p>Download Presets allows all 16 presets to be stored to a specified location on a network computer for use with other same-model COMPASS™ cards.</p> <p>Refer to Cobalt® reference guide “Remote Control User Guide” (PN 9000RCS-RM) for instructions on using the Download Presets function.</p> <p>Download a presets file to a computer on the card's DashBoard network to save presets. Preset files stored on a computer can then be uploaded back to the card.</p> <p>Note also that a presets file can also be uploaded to other same-model COMPASS® cards. In this manner, presets built up using a single card can be easily applied to other same-model cards without repeating the setup work on the other cards.</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Download (save) card presets to a network computer by clicking Download Presets – Save at the bottom of the Presets page.</p>  <p>Browse to a desired save location (in this example, <i>My Documents\ Cobalt Presets</i>). The file can then be renamed if desired (<i>RCVR21 Presets</i> in this example) before saving.</p>  </div> <div style="width: 45%;"> <p>Upload (open) card presets from a network computer by clicking Upload at the bottom of DashBoard.</p>  <p>Browse to the location where the file was saved on the computer or drive (in this example, <i>My Documents\ Cobalt Presets</i>). Select the desired file and click Open to load the file to the card. To upload presets saved from one card to another same-model card, simply click Upload on the other same-model card's DashBoard page and repeat the same steps here.</p>  <p>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 pressing the Preset Load button for a desired preset.</p> </div> </div>

Troubleshooting

This section provides general troubleshooting information and specific symptom/corrective action for the 9031 card and its remote control interface. The 9031 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 9031 card itself and its remote control systems all (to varying degrees) provide error and failure indications. Depending on how the 9031 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 9031 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. 3-24)
- 9031 Processing Error Troubleshooting (p. 3-25)
- Troubleshooting Network/Remote Control Errors (p. 3-26)

9031 Card Edge Status/Error Indicators and Display

Figure 3-6 shows and describes the 9031 card edge status indicators and display. These indicators and the display show status and error conditions relating to the card itself and remote (network) communications (where applicable). Because these indicators are part of the card itself and require no external interface, the indicators are particularly useful in the event of communications problems with external devices such as network remote control devices.

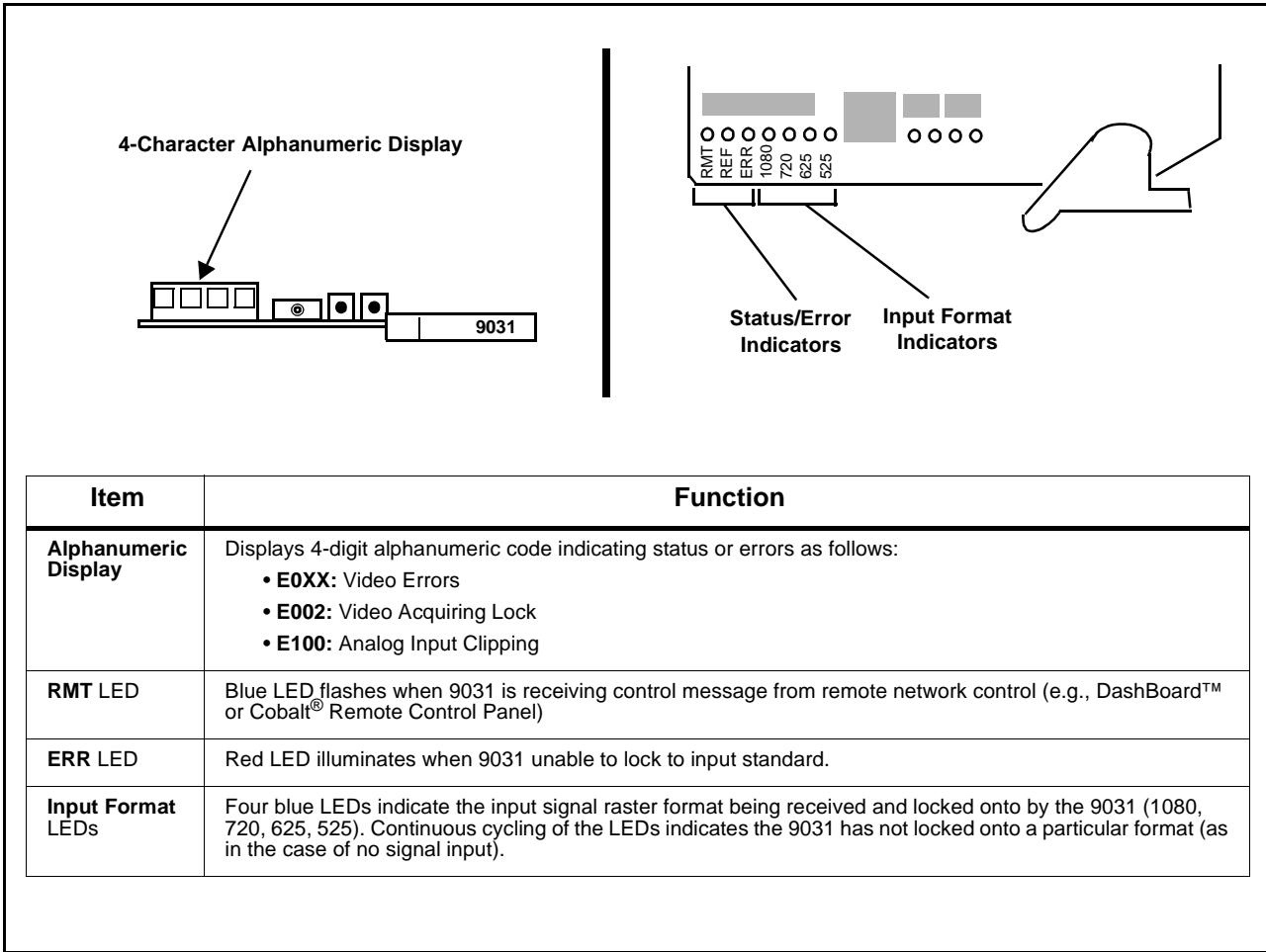


Figure 3-6 9031 Card Edge Status Indicators and Display

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 9031 card itself and remote (network) communications.

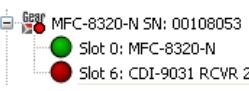
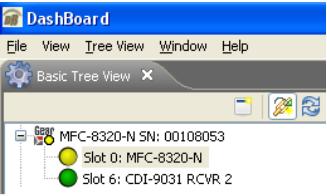
Indicator Icon or Display	Error Description
 <p>MFC-8320-N SN: 00108053 Slot 0: MFC-8320-N Slot 6: CDI-9031 RCVR 2</p>	Red indicator icon in Card Access/Navigation Tree pane shows card with Error condition (in this example, the Card Access/Navigation Tree pane shows a general error issued by the 9031 card in slot 6).
<p>CDI-9031 Card state: ● No connection to device. Connection: ● OFFLINE</p>	Specific errors are displayed in the Card Info pane (in this example "No connection to device" indicating 9031 card is not connecting to frame/LAN).
<p>Gain (dB)</p> <div style="text-align: center;"> <input type="range" value="40.0"/> 40.0 0.0 </div>	If the 9031 card is not connecting to the frame or LAN, all controls are grayed-out (as shown in the example here).
 <p>MFC-8320-N SN: 00108053 Slot 0: MFC-8320-N Slot 7: CDI-9031 RCVR 2</p>	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 9031 card in slot 6 and the MFC-8320-N Network Controller Card for its frame in slot 0 are not being seen).
 <p>Dashboard File View Tree View Window Help Basic Tree View X</p> <p>MFC-8320-N SN: 00108053 Slot 0: MFC-8320-N Slot 6: CDI-9031 RCVR 2</p> <p>MFC-8320-N SN: 00108053 MFC-8320-N Card state: ● Fan Door Open Connection: ● ONLINE</p>	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.
<p>Video Input Standard: INVALID SSN: 000011672394 Video: ● Input Invalid</p>	Yellow indicator icon in 9031 Card Info pane shows error alert, along with cause for alert (in this example, the 9031 is receiving no video input, or a video input that is invalid for the card and/or its current settings).

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).

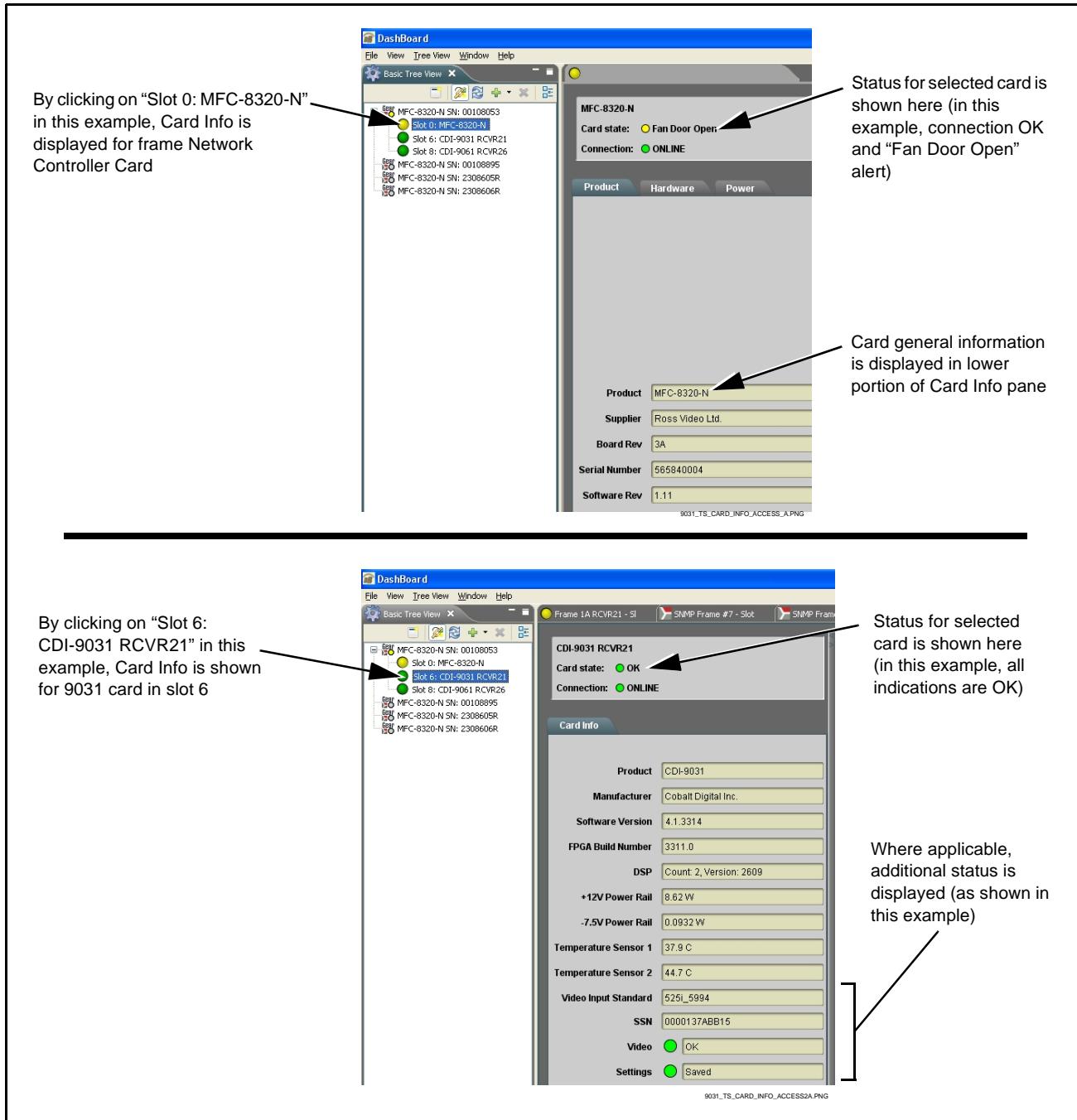


Figure 3-8 Selecting Specific Cards for Card Info Status Display

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	<ul style="list-style-type: none"> • On both the frame Network Controller Card and the 9031, in all cases when power is being properly supplied there is always at least one indicator illuminated. Any card showing no illuminated indicators should be cause for concern. • Check the Power Consumed indications for both the +12 V and -7.5 V supply rails for the 9031 card. This can be observed using the DashBoard™ Card Info pane, or using the card edge controls and indicators as shown in Figure 3-4 on page 3-7. <ul style="list-style-type: none"> • If either of the rail supplies show no power being consumed, either the frame power supply, connections, or the 9031 card itself is defective. • If either of the rail supplies show excessive power being consumed (see Technical Specifications (p. 1-12) in Chapter 1, “Introduction”), the 9031 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 9031 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.

9031 Processing Error Troubleshooting

Table 3-4 provides 9031 processing troubleshooting information. If the 9031 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 9031 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 9031 card edge status indicators.

Note: Where errors are displayed on both the 9031 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
<ul style="list-style-type: none"> • DashBoard™ shows Video yellow icon and Input Invalid message in 9031 Card Info pane. 	No video input present	Make certain intended video source is connected to appropriate 9031 card video input. Make certain BNC cable connections between frame Rear I/O Module for the card and signal source are OK.
<ul style="list-style-type: none"> • Card edge Input Format LEDs show continuous cycling. 	• 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).
DashBoard™ shows Output Status error message in 9031 Timecode function submenu screen.	Timecode not available due to lack of appropriate input timecode data	Timecode output requires that source and priority are appropriately selected. Also, video input must contain appropriate timecode data and framesync reference. Refer to Timecode function submenu tab on page 3-46 for more information.
Analog VITC waveform timecode not received and/or processed.	Card erroneously set for NTSC signal with 0 IRE of setup with input containing setup	If analog VITC timecode source contains 7.5 IRE of setup, make certain Video Signal Controls → NTSC Contains is set to 7.5 IRE of Setup . If this is not done, analog VITC waveform may not be received and processed by the card.

Troubleshooting Network/Remote Control Errors

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

In Case of Problems

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

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

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

See Contact Cobalt Digital Inc. (p. 1-16) in Chapter 1, “Introduction” for contact information.



Cobalt Digital Inc.

2406 E. University Ave.
Urbana, IL 61802
Voice 217.344.1243 • Fax 217.344.1245
www.cobaltdigital.com