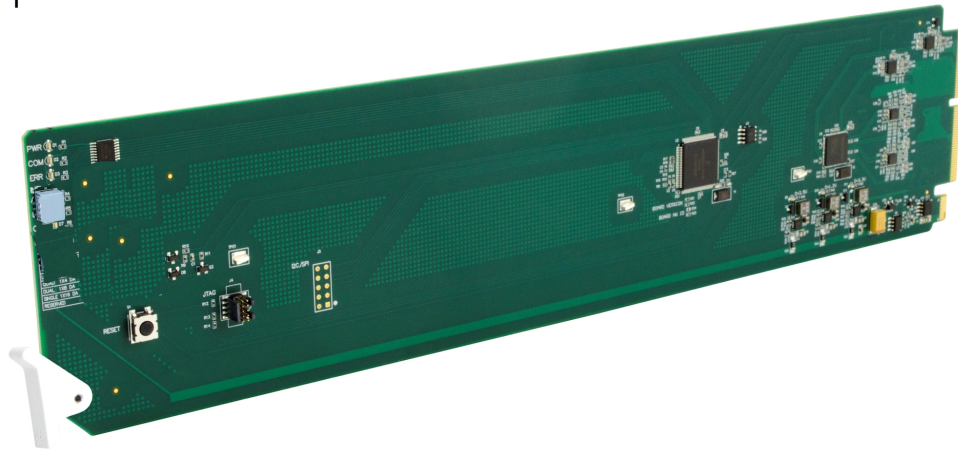


# 9910DA-AV



## Analog Video Distribution Amplifier

# *Product Manual*

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Congratulations on choosing the Cobalt® 9910DA-AV Analog Video Distribution Amplifier. The 9910DA-AV 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 card, please contact us at the contact information on the front cover.

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<b>Document Version:</b>	V1.0
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<b>Description of product/manual changes:</b>	- Add EMC statements to manual.

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# *Introduction*

## Overview

This manual provides installation and operating instructions for the 9910DA-AV Analog Video Distribution Amplifier card (also referred to herein as the 9910DA-AV).

**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 9501.
- **Chapter 2, “Installation and Setup”** – Provides instructions for installing the 9501 in a frame, and optionally installing a 9910DA-AV Rear I/O Module.
- **Chapter 3, “Operating Instructions”** – Provides overviews of operating controls and instructions for using the 9910DA-AV.

**This chapter** contains the following information:

- **Manual Conventions (p. 1-2)**
- **Manual Conventions (p. 1-2)**
- **Safety and Regulatory Summary (p. 1-3)**
- **9910DA-AV Functional Description (p. 1-4)**
- **Technical Specifications (p. 1-6)**
- **Warranty and Service Information (p. 1-7)**
- **Contact Cobalt Digital Inc. (p. 1-8)**

## Manual Conventions

In this manual, display messages and connectors are shown using the exact name shown on the 9910DA-AV itself (for example, connector names are shown like this: **ANLG IN**).

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

- **9910DA-AV** refers to the 9910DA-AV Analog Video Distribution Amplifier card.
- **Frame** refers to the HPF-9000, 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 9910DA-AV and other cards operate.

## Warnings, Cautions, and Notes

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

### Warnings

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




### Cautions

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

### Notes

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

## Labeling Symbol Definitions

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

---

## 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® or equivalent frame. Refer to the frame Product Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as its component products.

**CAUTION**

If required, make certain Rear I/O Module(s) is installed before installing the 9910DA-AV 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.

### EMC Compliance Per Market

Market	Regulatory Standard or Code
United States of America	FCC "Code of Federal Regulations" Title 47 Part 15, Subpart B, Class A
Canada	ICES-003
International/CE	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 CISPR 22:2008

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## 9910DA-AV Functional Description

Figure 1-1 shows a functional block diagram of the 9910DA-AV. With the appropriate rear module, the 9910DA-AV can provide up to eight DA analog video outputs and a looping input where desired.

### 9910DA-AV Input/Output Formats

The 9910DA-AV provides the following inputs and outputs:

- **Inputs:**
  - **ANALOG VIDEO IN** – coaxial analog composite video input
- **Outputs:**
  - **ANALOG OUT (1-8)** – up to eight analog composite outputs
  - **LOOP OUT** – where enabled using card jumper and with appropriate rear module, the card provides a hi-Z (unterminated) looped output of the input

### Input Differential/Single-Ended Select

Using an on-card jumper, the 9910DA-AV can float the input shield connection from ground, and use both the + and shield connections as a differential pair, thereby providing much improved common-mode noise rejection that minimizes the effects of ground-loop noise and other issues. A single-ended jumper position provides normal operation where the shield connection is tied to chassis ground. (Default position is typical single-ended operation with shield lead tied to chassis GND.)

### Input Loop/Termination Select

Using an on-card jumper, the 9910DA-AV can terminate the input into a  $Z_o = 75\Omega$  or offer a hi-Z input with the input available as a looped output. (Default position is  $75\Omega$  terminated position with no looping output.)

### Gain Adjust

A card-edge trimmer potentiometer allows gain adjustment of for the DA outputs (the default setting is unity gain). Regardless of most distribution purposes, gain adjustment (if necessary) should provide for linear operation with 100 IRE at the destination. (Default control setting is unity gain.)

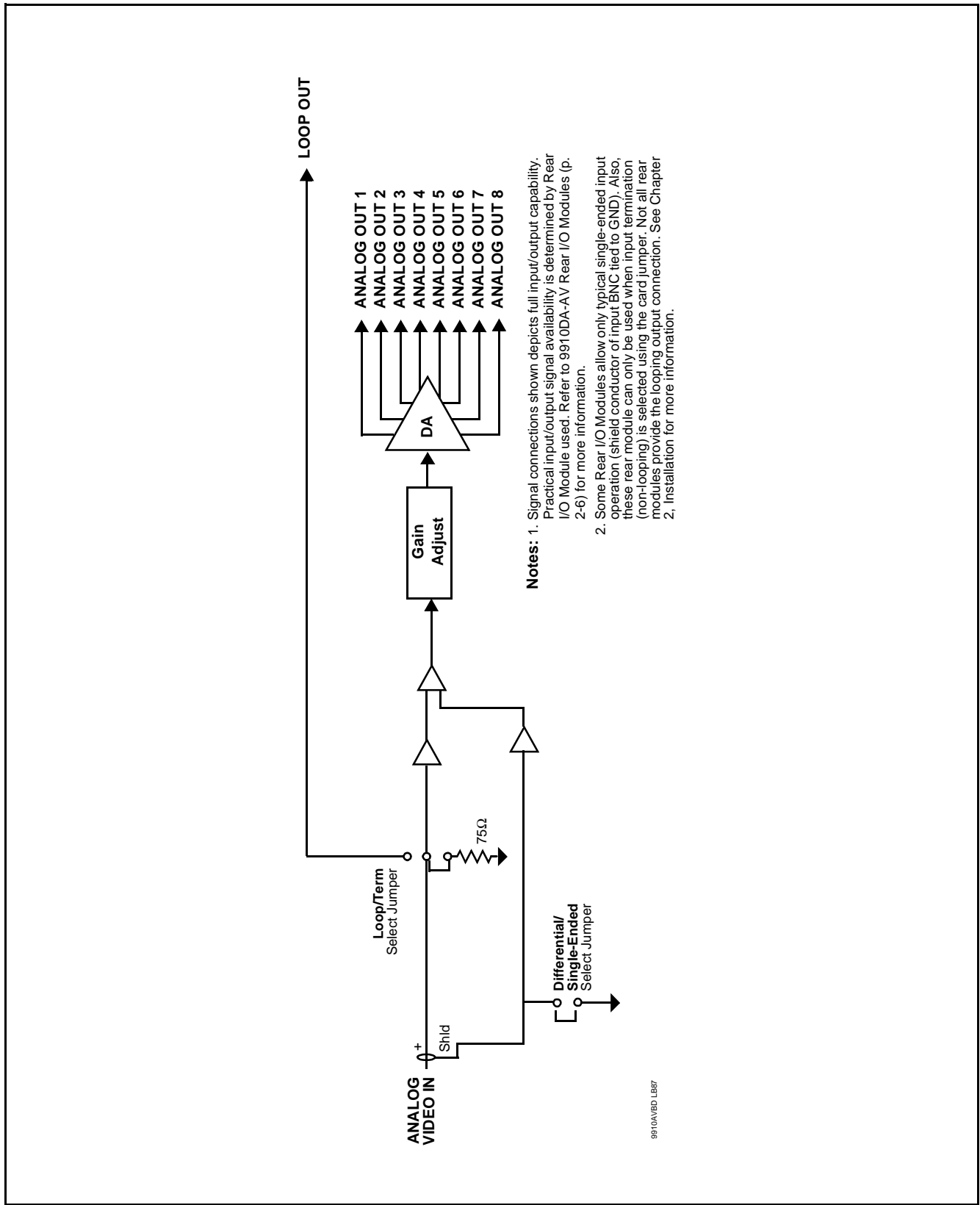


Figure 1-1 9910DA-AV Functional Block Diagram

## 9910DA-AV Rear I/O Modules

The 9910DA-AV physically interfaces to system video connections at the rear of its frame using a Rear I/O Module. The full assortment of 9910DA-AV Rear I/O Modules is shown and described in 9910DA-AV Rear I/O Modules (p. 2-6) in Chapter 2, “Installation and Setup”.

## Technical Specifications

Table 1-1 lists the technical specifications for the 9910DA-AV 9910DA-AV Analog Video Distribution Amplifier card.

**Table 1-1 Technical Specifications**

Item	Characteristic
Part number, nomenclature	9910DA-AV-3G Analog Video Distribution Amplifier
Installation/usage environment	Intended for installation and usage in frame meeting openGear™ modular system definition.
Power consumption	< 2 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 Mbps Ethernet with Auto-MDIX.
Indicators	Card edge display and indicators as follows: <ul style="list-style-type: none"> <li>• Status/Error LED indicator</li> <li>• Input Presence LED indicator</li> </ul>
Analog Video Input	Number of inputs: (1) Impedance: User selectable as hi-Z looping or card-terminated 75Ω Level: 1 Vp-p, nominal Return Loss: 46 dB @ 3.58 MHz Input modes: User selectable as differential/single-ended and AC or DC coupled
Analog Video Outputs	Number of DA outputs: up to (8) Impedance: 75 Ω Level: 1 Vp-p, nominal Looping Output: (1)
Performance	Frequency response: >0.05 dB @ 3.58 MHz Differential Gain: >0.15% @ 3.58 MHz Differential Phase: >0.15° @ 3.58 MHz S/N: >60 dB; 5 MHz BW

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## Warranty and Service Information

### Cobalt Digital Inc. Limited Warranty

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

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

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

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

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## Contact Cobalt Digital Inc.

Feel free to contact our 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

<b>Phone:</b>	(217) 344-1243
<b>Fax:</b>	(217) 344-1245
<b>Web:</b>	<a href="http://www.cobaltdigital.com">www.cobaltdigital.com</a>
<b>General Information:</b>	info@cobaltdigital.com
<b>Technical Support:</b>	support@cobaltdigital.com

# Installation and Setup

## Overview

This chapter contains the following information:

- Setting Card Jumpers (p. 2-1)
- Installing the 9910DA-AV Into a Frame Slot (p. 2-3)
- Installing a Rear I/O Module (p. 2-5)

## Setting Card Jumpers

### 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.**

**Always use proper ESD handling precautions and equipment when working on circuit boards and related equipment.**

Figure 2-1 and Table 2-1 show the location and orientation of the card jumpers and provide details for setting the jumpers. These settings should be considered and changed (if required) to optimize card operation for the intended payload.

Table 2-1 9910DA-AV Card Jumpers and Details

Jumper	Details and Recommended Settings	Default Settings
Input Differential/ Single-Ended Select	<p>Sets the input shield connection as tied to chassis ground (normal position) or as float the input shield connection from ground, and use both the + and shield connections as a differential pair.</p> <p>The differential setting can provide much improved common-mode noise rejection that minimizes the effects of ground-loop noise and other issues.</p> <p><b>Note:</b> Some Rear I/O Modules have the input shield connector tied to GND at the rear I/O module. When used with these rear I/O modules, differential input is not available and jumper should be set to default single-ended position. See 9910DA-AV Rear I/O Modules (p. 2-6) for more information.</p>	Single-ended
Input Loop/ Termination Select	<p>Sets the input to terminate into a <math>Z_o = 75\Omega</math> non-looping termination or offer a hi-Z input with the input available as a looped output.</p> <p><b>Note:</b> Some Rear I/O Modules are not equipped with a LOOP OUT connector. When used with these rear I/O modules, jumper should be set to default TERM (terminated) position. See 9910DA-AV Rear I/O Modules (p. 2-6) for more information.</p>	Terminated; non-looping

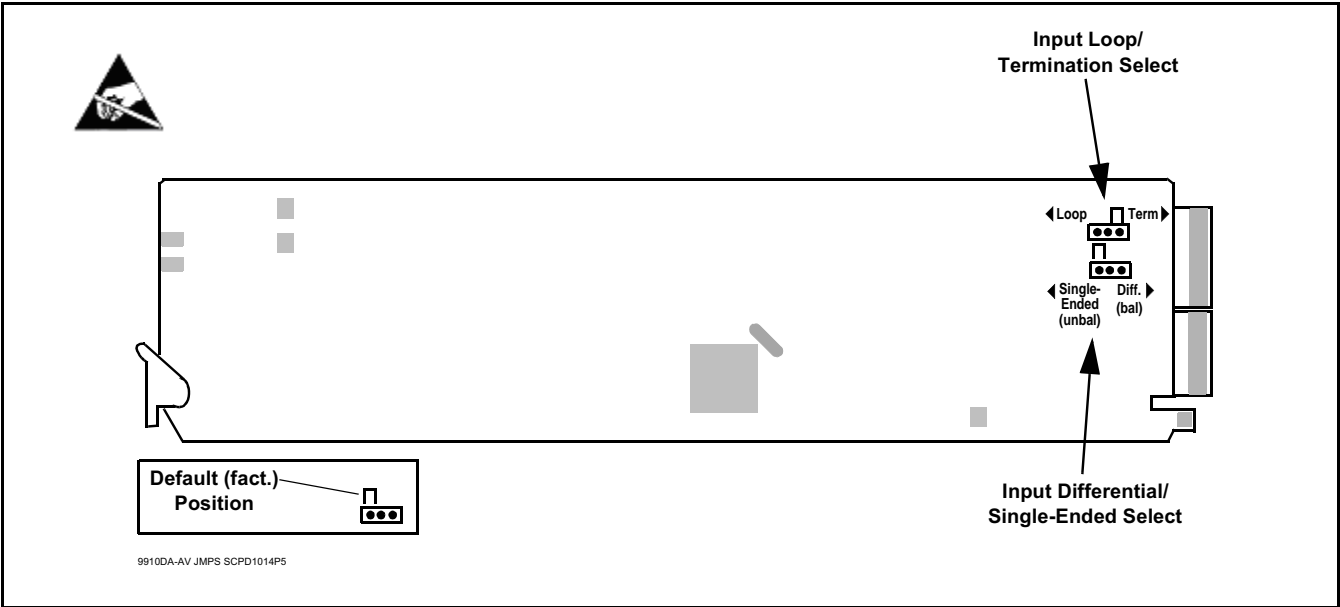


Figure 2-1 9910DA-AV Card Jumpers

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## Installing the 9910DA-AV Into a Frame Slot

**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 9910DA-AV 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. 2-5) for rear I/O module installation procedure.

**CAUTION**

If required, make certain **Rear I/O Module(s)** is installed before installing the 9910DA-AV 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 9910DA-AV 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 9910DA-AV into a frame slot as follows:

1. Determine the slot in which the 9910DA-AV 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 9910DA-AV Rear I/O Modules (p. 2-6).
9. Repeat steps 1 through 8 for other 9910DA-AV cards.

**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.

**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.

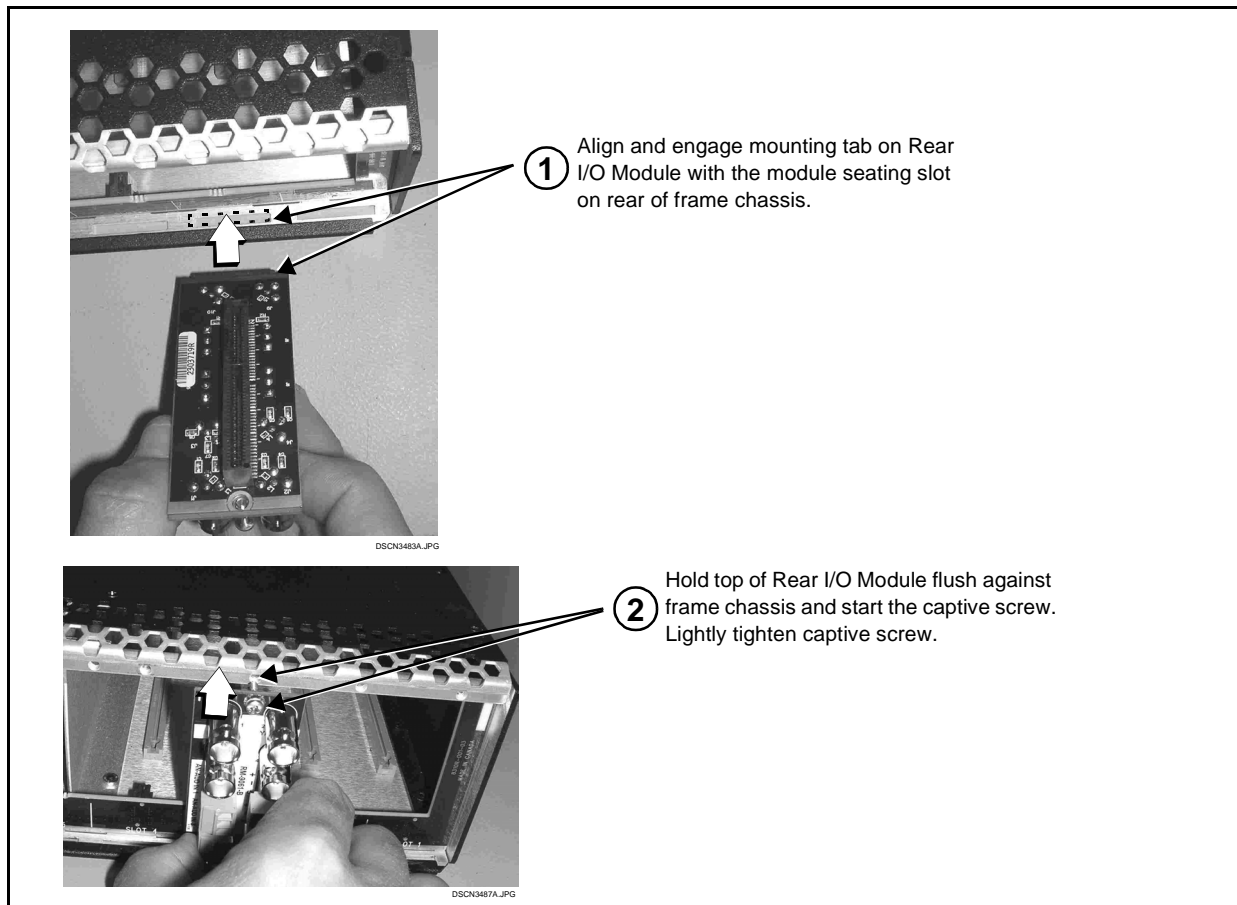
## Installing a Rear I/O Module

**Note:** This procedure is applicable **only if a Rear I/O Module is not currently installed** in the slot where the 9910DA-AV is to be installed.

If installing the 9910DA-AV 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 9910DA-AV is to be installed.
2. In the mounting area corresponding to the slot location, install Rear I/O Module as shown in Figure 2-2.

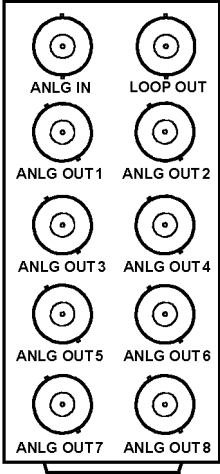
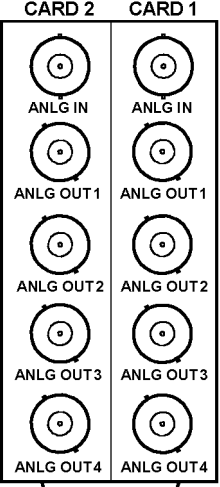


**Figure 2-2 Rear I/O Module Installation**

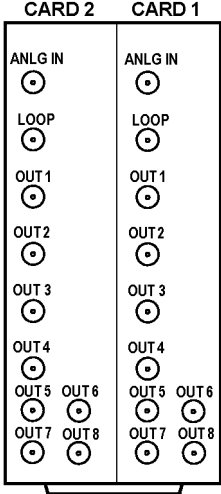

## 9910DA-AV Rear I/O Modules

Table 2-2 shows and describes the full assortment of Rear I/O Modules specifically for use with the 9910DA-AV.

**Table 2-2 9910DA-AV Rear I/O Modules**

9910DA-AV Rear I/O Module	Description
<b>RM20-9910AV-B</b> 	<p>Provides the following connections:</p> <ul style="list-style-type: none"> <li>• Analog video input (<b>ANLG IN</b>)</li> <li>• One input looping output (<b>LOOP OUT</b>)</li> <li>• Eight DA outputs (<b>ANLG OUT 1</b> thru <b>ANLG OUT 8</b>)</li> </ul> <p><b>Note:</b> <b>Loop/Term</b> jumper must be set to Loop position in order to use looping output.</p>
<b>RM20-9910AV-A/S</b> 	<p>Split Rear Module. Provides <b>each</b> of the following connections for two 9910DA cards:</p> <ul style="list-style-type: none"> <li>• Analog video input (<b>ANLG IN</b>)</li> <li>• Four DA outputs (<b>ANLG OUT 1</b> thru <b>ANLG OUT 4</b>)</li> </ul> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• <b>Loop/Term</b> jumper must be set to Term position when using this rear module.</li> <li>• This rear module has shield connectors tied to GND and can only be used in the typical single-ended input mode; the Differential position has no effect when using this rear module.</li> </ul>

**Table 2-2 9910DA-AV Rear I/O Modules — continued**

9910DA-AV Rear I/O Module	Description
<p><b>RM20-9910AV-B/S</b></p> 	<p>Split Rear Module. Provides <b>each</b> of the following connections for two 9910DA cards:</p> <ul style="list-style-type: none"> <li>• Analog video input (<b>ANLG IN</b>)</li> <li>• One input looping output (<b>LOOP OUT</b>)</li> <li>• Eight DA outputs (<b>ANLG OUT 1</b> thru <b>ANLG OUT 8</b>)</li> </ul> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• <b>Loop/Term</b> jumper must be set to Term position when using this rear module.</li> <li>• This rear module has shield connectors tied to GND and can only be used in the typical single-ended input mode; the Differential position has no effect when using this rear module.</li> </ul> <p><b>Note:</b> Available equipped with High-Density BNC (HDBNC) or DIN1.0/2.3 connectors as: RM20-9910DA-B/S-HDBNC or RM20-9910DA-B/S-DIN, respectively.</p>
<div>  <p><b>COBALT</b> RM20-9001-B/S-DIN</p> <p>**SAMPLE-NOT FOR USE**</p> </div> <p>Due to the density of connector placement on Rear Modules using high-density connectors (e.g., RM20-9001-B/S-DIN), these modules use a QR barcode label instead a regular label. Simply scan the image with a smart phone and a link to the rear module label (as shown in our catalog) will appear. (Smart phone must have a QR reader app such as QuickMark QR Code Reader or equivalent.)</p> <p>Not all devices may be able to acquire the image. If this occurs, use the device to access the web page for card/rear module to view the diagram.</p>	

## Card Gain Control

This control should be adjusted as desired when the card is up and receiving an input, with an output applied to an intended destination.

Adjust this control as described in Chapter 3. Operating Instructions, Card-Edge Controls and Indicators (p. 3-3).

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# Operating Instructions

## Overview

This chapter contains the following information:

- Accessing the 9910DA-AV Card via Remote Control (p. 3-1)
- Checking 9910DA-AV Card Information and Status (p. 3-2)
- Card-Edge Controls and Indicators (p. 3-3)
- Troubleshooting (p. 3-3)

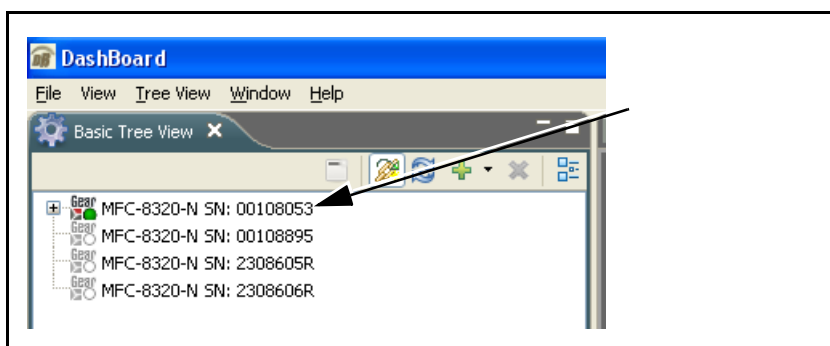
## Accessing the 9910DA-AV Card via Remote Control

The 9910DA-AV card can be remote monitored via DashBoard™ or Cobalt® Remote Control Panel. Access the 9910DA-AV card using DashBoard™ or Cobalt® Remote Control Panel as described below.

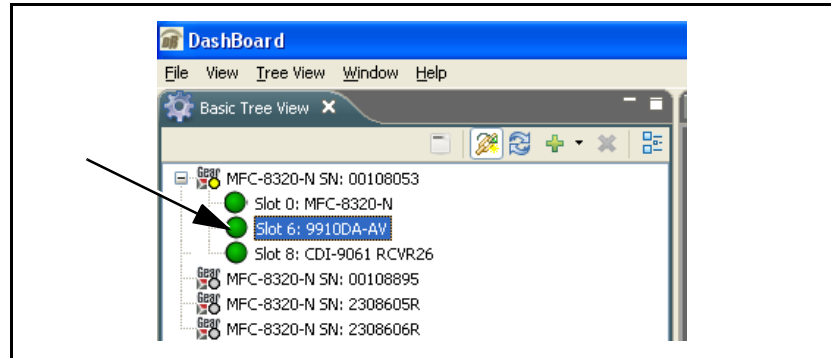
**Note:** Remote control only shows card status. Remote control is not required for card parametric or operating setup or control.

## Accessing the 9910DA-AV 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 9910DA-AV card to be accessed (in this example, “MFC-8320-N SN: 00108053”).



- 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: 9910DA-AV”).



## Checking 9910DA-AV Card Information and Status

The operating status of the 9910DA-AV card can be checked using DashBoard™. Figure 3-1 shows and describes the 9910DA-AV card information screen using DashBoard™.

The **Tree View** shows the cards seen by DashBoard™. In this example, Network Controller Card is hosting a 9910DA-AV card in slot 6.

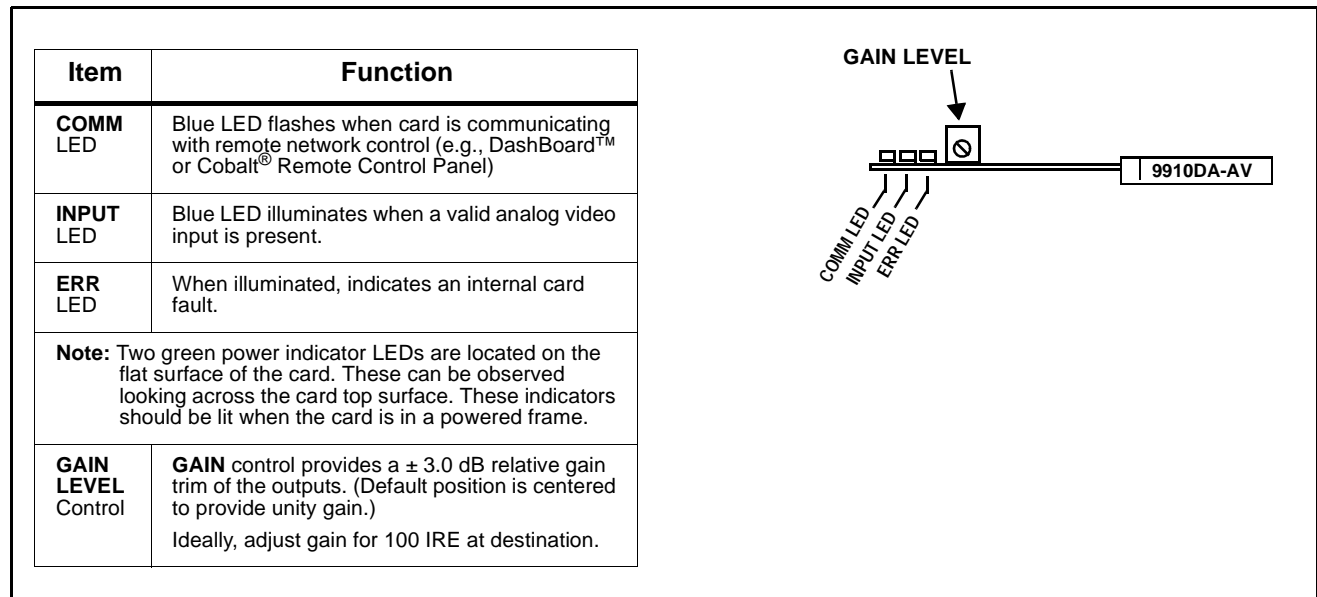
**Card Info Display**  
This displays shows the 9910DA-AV card product details and operating status (including current and previous video format received, as well as card power/temperature status)

The Rear Module indicator shows the Cobalt mfg PN of the currently-installed rear module and compatibility of the rear module with this card (with green indicating a compatible rear module)

**Figure 3-1 9910DA-AV Card Info/Status Utility**

## Card-Edge Controls and Indicators

Figure 3-2 shows card edge controls and indicators, and provides information about optimizing control settings for various use cases of the card.



*Figure 3-2 9910DA-AV Card-Edge Controls and Indicators*

## Troubleshooting

### 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 3-1 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 3-1 Basic Troubleshooting Checks**

Item	Checks
<b>Verify power presence and characteristics</b>	<ul style="list-style-type: none"> <li>On both the frame Network Controller Card and the 9910DA-AV, 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.</li> <li>Check the Power Consumed indication for the 9910DA-AV card. This can be observed using the DashBoard™ Card Info pane. <ul style="list-style-type: none"> <li>If display shows <b>no</b> power being consumed, either the frame power supply, connections, or the 9910DA-AV card itself is defective.</li> <li>If display shows <b>excessive</b> power being consumed (see Technical Specifications (p. 1-6) in Chapter 1, “Introduction”), the 9910DA-AV card may be defective.</li> </ul> </li> </ul>
<b>Check Cable connection secureness and connecting points</b>	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.
<b>Card seating within slots</b>	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.)
<b>Check status indicators and displays</b>	On both DashBoard™ and the 9910DA-AV 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.
<b>Troubleshoot by substitution</b>	All cards within the frame can be hot-swapped, replacing a suspect card or module with a known-good item.

## 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. 1-8) in Chapter 1, “Introduction“ for contact information.





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