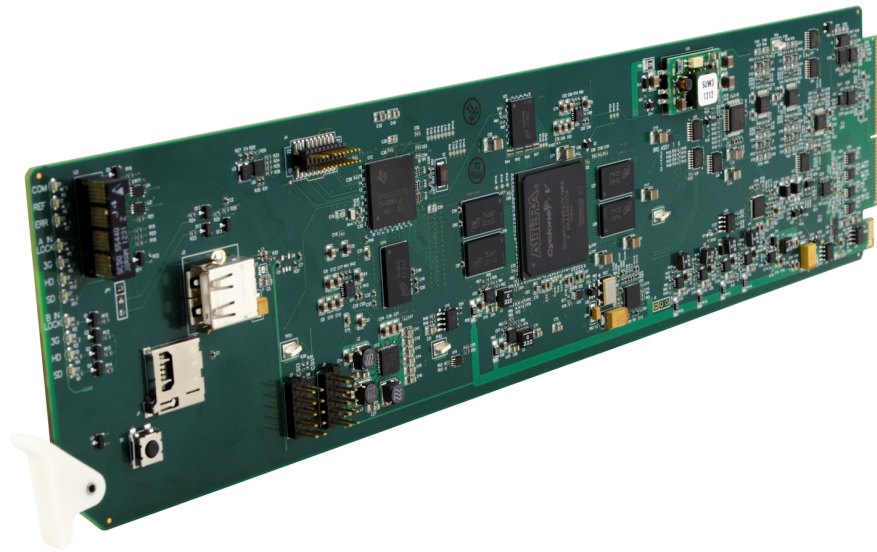


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COBALT<sup>®</sup>

# ***9950-EMDE-ANC***



**3G/HD/SD-SDI Ancillary Data  
Embedder/De-Embedder**

## ***Product Manual***

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COBALT<sup>®</sup>

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PRELIMINARY

9950EMDE-OM (V1.0PB)

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Congratulations on choosing the Cobalt<sup>®</sup> 9950-EMDE-ANC 3G/HD/SD-SDI Ancillary Data Embedder/De-Embedder. The 9950-EMDE-ANC 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 9950-EMDE-ANC, please contact us at the contact information on the front cover.

<b>Manual No.:</b>	9950EMDE-OM
<b>Document Version:</b>	V1.0PB (Preliminary)
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<b>Applicable for Firmware Version (or greater):</b>	1.67.0000 or greater
<b>Description of product/manual changes:</b>	- Preliminary Product Release. Updated to reflect latest product functionality.

# Table of Contents

---

<b>Chapter 1</b>	<b>Introduction</b> .....	<b>1-1</b>
	Overview .....	1-1
	9950-EMDE-ANC Card Software Versions and this Manual.....	1-2
	Cobalt Reference Guides .....	1-2
	Manual Conventions.....	1-3
	Warnings, Cautions, and Notes .....	1-4
	Labeling Symbol Definitions.....	1-4
	Safety and Regulatory Summary .....	1-5
	Warnings.....	1-5
	Cautions .....	1-5
	EMC Compliance Per Market .....	1-5
	9950-EMDE-ANC Functional Description .....	1-6
	Ancillary Data Processor .....	1-6
	9950-EMDE-ANC Input/Outputs.....	1-6
	Ancillary Data Input/Output Interfaces .....	1-7
	User Control Interface .....	1-7
	9950-EMDE-ANC Rear I/O Modules .....	1-10
	Technical Specifications.....	1-10
	Contact Cobalt Digital Inc.....	1-11
	Warranty and Service Information .....	1-12
	Cobalt Digital Inc. Limited Warranty.....	1-12
<b>Chapter 2</b>	<b>Installation and Setup</b> .....	<b>2-1</b>
	Overview .....	2-1
	Installing the 9950-EMDE-ANC Into a Frame Slot.....	2-1
	Installing a Rear I/O Module .....	2-3
	9950-EMDE-ANC Rear I/O Modules.....	2-4
	Setting Up 9950-EMDE-ANC Network Remote Control.....	2-4
<b>Chapter 3</b>	<b>Operating Instructions</b> .....	<b>3-1</b>
	Overview .....	3-1
	Control and Display Descriptions.....	3-1
	Function Menu/Parameter Overview.....	3-2
	DashBoard™ User Interface.....	3-3
	Accessing the 9950-EMDE-ANC Card via Remote Control .....	3-4
	Accessing the 9950-EMDE-ANC Card Using DashBoard™ .....	3-4
	Checking 9950-EMDE-ANC Card Information.....	3-5

---

Ancillary Data Line Number Locations and Ranges .....	3-7
9950-EMDE-ANC Function Menu List and Descriptions.....	3-8
Output Video Mode Controls .....	3-9
Input Audio Status .....	3-9
Timecode .....	3-10
Output Audio Routing/Controls .....	3-14
Ancillary Data Proc Controls .....	3-15
COMM Ports Setup Controls .....	3-18
Presets .....	3-20
Admin (Log Status/Firmware Update - Card IP Address) .....	3-26
User Log .....	3-26
Troubleshooting .....	3-27
Error and Failure Indicator Overview .....	3-27
Basic Troubleshooting Checks.....	3-31
9950-EMDE-ANC Processing Error Troubleshooting .....	3-31
Troubleshooting Network/Remote Control Errors.....	3-32
In Case of Problems .....	3-33

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# Introduction

## Overview

This manual provides installation and operating instructions for the 9950-EMDE-ANC 3G/HD/SD-SDI Ancillary Data Embedder/De-Embedder card (also referred to herein as the 9950-EMDE-ANC).

**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 9950-EMDE-ANC.
- **Chapter 2, “Installation and Setup”** – Provides instructions for installing the 9950-EMDE-ANC in a frame, and optionally installing a 9950-EMDE-ANC Rear I/O Module.
- **Chapter 3, “Operating Instructions”** – Provides overviews of operating controls and instructions for using the 9950-EMDE-ANC.

**This chapter** contains the following information:

- **9950-EMDE-ANC Card Software Versions and this Manual (p. 1-2)**
- **Manual Conventions (p. 1-3)**
- **Safety and Regulatory Summary (p. 1-5)**
- **9950-EMDE-ANC Functional Description (p. 1-6)**
- **Technical Specifications (p. 1-10)**
- **Contact Cobalt Digital Inc. (p. 1-11)**
- **Warranty and Service Information (p. 1-12)**

## 9950-EMDE-ANC 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 9950-EMDE-ANC Card Information (p. 3-5) in Chapter 3, “Operating Instructions” for more information. You can then check our website for the latest software version currently released for the card as described below.

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

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

<p>Card Software <b>earlier</b> 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 <b>Support&gt;Firmware Downloads</b> link at <a href="http://www.cobaltdigital.com">www.cobaltdigital.com</a>. 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><b>Software updates are field-installed without any need to remove the card from its frame.</b></p>
<p>Card Software <b>newer</b> than version in manual</p>	<p>A new manual is expediently released whenever a card’s software is updated <b>and specifications and/or functionality have changed</b> 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 card’s web page on <a href="http://www.cobaltdigital.com">www.cobaltdigital.com</a>.</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 9950-EMDE-ANC itself. Examples are provided below.

- Card-edge display messages are shown like this:



BOOT

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

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

- **9950-EMDE-ANC** refers to the 9950-EMDE-ANC 3G/HD/SD-SDI Ancillary Data Embedder/De-Embedder 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 9950-EMDE-ANC and other cards operate.
- Functions and/or features that are available only as an option are denoted in this manual like this:



**Option** ➔

## 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

	<p>Important note regarding product usage. Failure to observe may result in unexpected or incorrect operation.</p>
	<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"> <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® 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 9950-EMDE-ANC has a moderate power dissipation (<18 W). As such, avoiding placing the card adjacent to other cards with similar dissipation values if possible.

#### CAUTION

If required, make certain Rear I/O Module(s) is installed before installing the 9950-EMDE-ANC into the frame slot. Damage to card and/or Rear I/O Module can occur if module installation is attempted with card already installed in slot.

#### CAUTION

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

#### CAUTION

The 9950-EMDE-ANC FPGA is designed for a normal-range operating temperature around 85° C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within device operating safe parameters, and can be allowed by setting this control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum card protection.

### EMC Compliance Per Market

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

## 9950-EMDE-ANC Functional Description

### Ancillary Data Processor

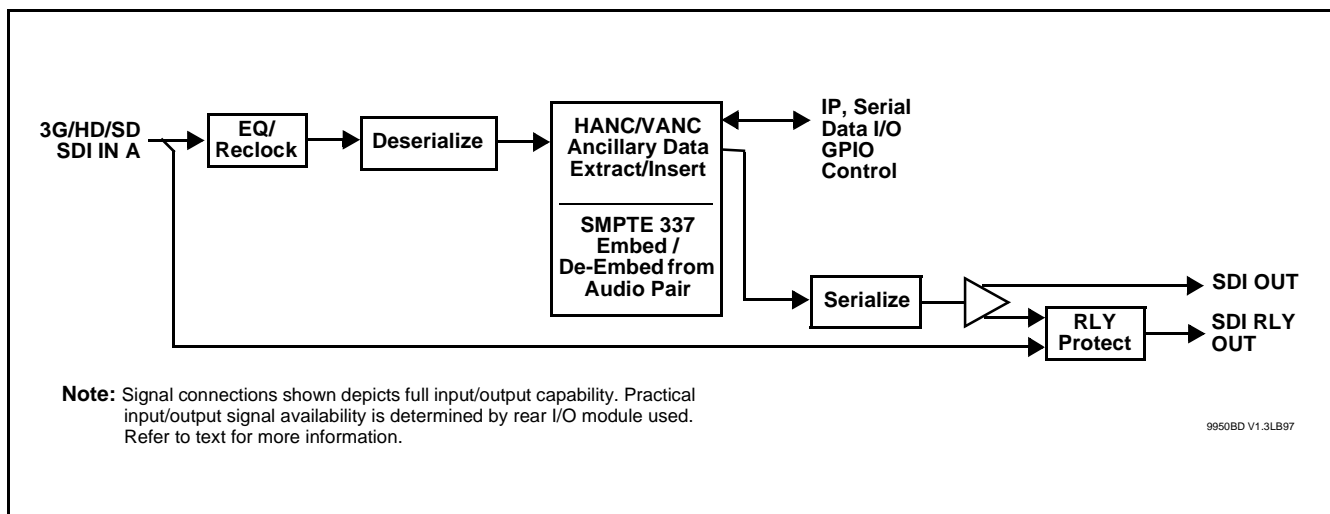
Figure 1-1 shows a functional block diagram of the 9950-EMDE-ANC. This function provides full VANC/HANC ancillary data de-embedding and embedding for 3G/HD/SD-SDI streams. Direct access to DID and SDID locations allows extraction or insertion of user data such as camera PTZ, SCTE 104, closed-captioning read/insert, or other specialized user payloads. Data can be extracted and inserted to and from the SDI stream via serial or IP interfaces connecting to external devices/systems. A rear I/O module with a dedicated IP port can be used with the ancillary data processor function for data insertion or extraction via IP.

In addition to ANC embed/de-embed over external IP or serial media, the 9950-EMDE-ANC also provides SMPTE 337 embed/de-embed, allowing serial user data to be embedded and de-embedded over unused embedded audio pairs.

### 9950-EMDE-ANC Input/Outputs

The 9950-EMDE-ANC provides the following inputs and outputs:

- **3G/HD/SD SDI IN A** – 3G/HD/SD-SDI input
- **3G/HD/SD-SDI OUT (1-2)** – two 3G/HD/SD-SDI processed video outputs
- **COM A thru COM D**– four RS-485 Tx/Rx serial ports
- **ETHERNET** – 10/100Base-T Ethernet port
- **SMPTE 337 Data Over Audio** interfaces



**Figure 1-1 9950-EMDE-ANC Functional Block Diagram**

---

## Ancillary Data Input/Output Interfaces

### Serial (COMM) Ports

The 9950-EMDE-ANC is equipped with four, 3-wire serial ports (**COM 1 - COM 4**). The ports provide for embedding or de-embedding via the Ancillary Data Processor for data insertion or extraction. Modes allow for extraction/insertion of entire packets, or payload only. Sync and rate controls allow the 9950-EMDE to coordinate insertion or extraction with external systems. Status indicators are provided which show Tx/Rx OK status and bit rate.

### IP (Ethernet) Port

Separate Tx and Rx controls are provided to set the address and port for Tx and Rx, and set the protocol (UDP, TCP) for Tx and Rx. Modes allow for extraction/insertion of entire packets, or payload only.

Port can be configured to send ACK packets back to a sending source when receiving IP-based insertion data. The port can also be configured to send heartbeat packets to keep external connections open if required. Status indicators are provided which show Tx/Rx OK status, IP address of external connections, bit rate, and total running data amount sent or received.

### SMPTE 337 Data Embed / De-Embed

SMPTE 337/338/339 non-PCM data can be embedded and de-embedded on embedded audio pairs, offering a very convenient self-contained transport within the program stream physical media. An unused embedded audio pair serves as the media between two EMDE-ANC devices wherein user data (from external serial interfaces) can use the embedded pair between sending and receiving serial nodes.

## User Control Interface

Figure 1-2 shows the user control interface options for the 9950-EMDE-ANC. These options are individually described below.

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

- **DashBoard™ User Interface** – Using DashBoard™, the 9950-EMDE-ANC and other cards installed in openGear®<sup>1</sup> frames can be controlled from a computer and monitor.

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

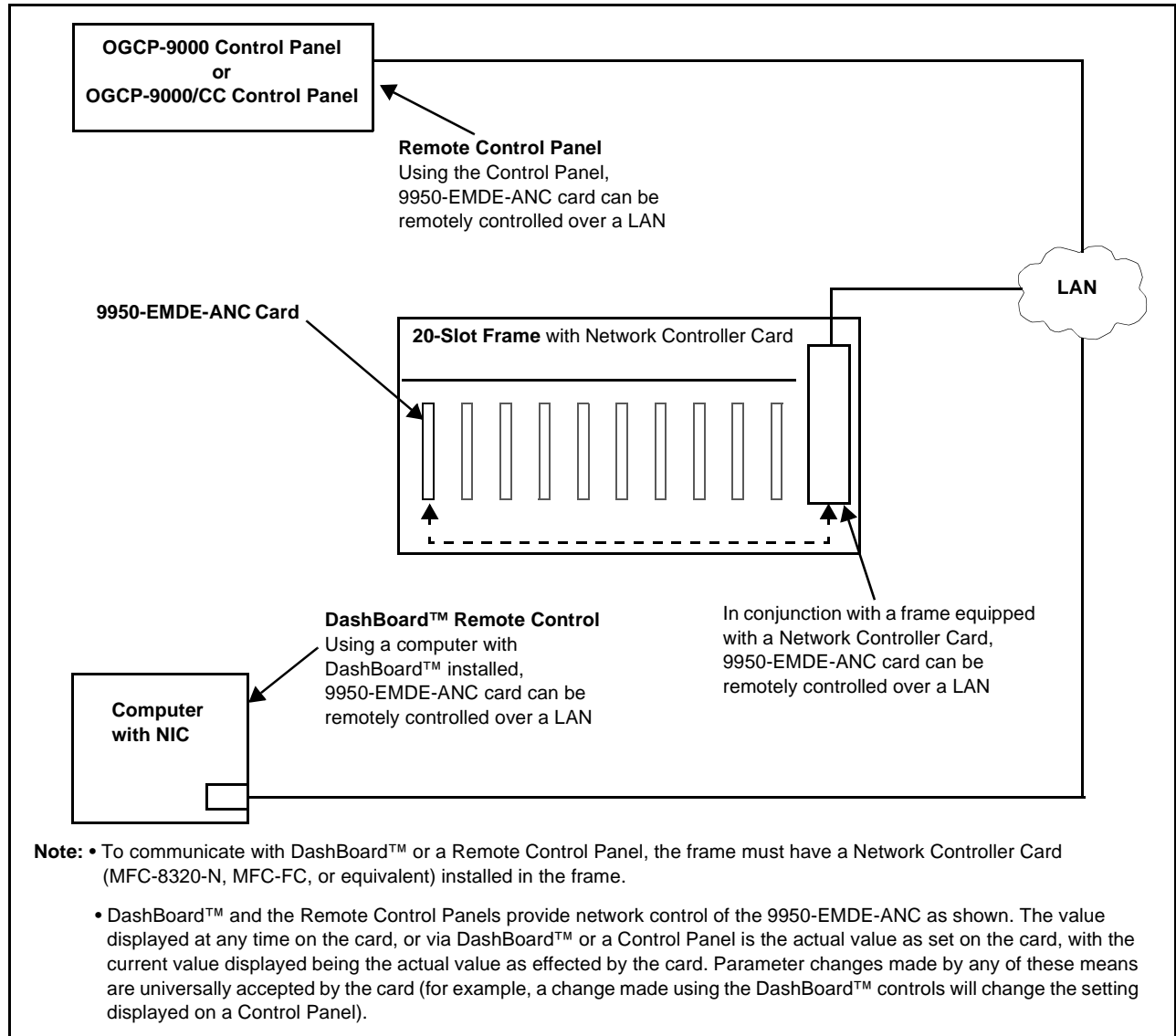
DashBoard™ allows users to view all frames on a network with control and monitoring for all populated slots inside a frame. This simplifies the setup and use of numerous modules in a large installation and offers the ability to centralize monitoring. Cards define their controllable parameters to DashBoard™,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

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

- **Cobalt® OGCP-9000 and OGCP-9000/CC Remote Control Panels** – The OGCP-9000 and OGCP-9000/CC Remote Control Panels conveniently and intuitively provide parameter monitor and control of the 9950-EMDE-ANC and other video and audio processing terminal equipment meeting the open-architecture Cobalt® cards for openGear™ standard.

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

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



**Figure 1-2 9950-EMDE-ANC User Control Interface**

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

Download a copy of this guide by clicking on the **Support>Reference Documents** link at [www.cobaltdigital.com](http://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. 1-11).

## 9950-EMDE-ANC Rear I/O Modules

The 9950-EMDE-ANC physically interfaces to system video connections at the rear of its frame using a Rear I/O Module.

All inputs and outputs shown in the 9950-EMDE-ANC 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 9950-EMDE-ANC card edge connections to BNC and other connectors that interface with other components and systems in the signal chain. The full assortment of 9950-EMDE-ANC Rear I/O Modules is shown and described in 9950-EMDE-ANC Rear I/O Modules (p. 2-4) in Chapter 2, “Installation and Setup”.

## Technical Specifications

Table 1-1 lists the technical specifications for the 9950-EMDE-ANC 3G/HD/SD-SDI Ancillary Data Embedder/De-Embedder card.

**Table 1-1 Technical Specifications**

Item	Characteristic
Part number, nomenclature	9950-EMDE-ANC 3G/HD/SD-SDI Ancillary Data Embedder/De-Embedder
Installation/usage environment	Intended for installation and usage in frame meeting openGear™ modular system definition
Power consumption	< 18 Watts maximum
Installation Density	Up to 20 cards per 20-slot frame
Environmental: Operating temperature: Relative humidity (operating or storage):	32° – 104° F (0° – 40° C) < 95%, non-condensing
Frame communication	10/100 Mbps Ethernet with Auto-MDIX
Indicators	Card edge display and indicators as follows: <ul style="list-style-type: none"> <li>• 4-character alphanumeric display</li> <li>• Status/Error LED indicator</li> <li>• Input Presence LED indicators</li> </ul>
Serial Digital Video Input	Number of Inputs: (1); Input uses relay bypass to output directly to RLY OUT in case of loss of power. Data Rates Supported: SMPTE 424M, 292M, SMPTE 259M-C Impedance: 75 Ω terminating Return Loss: > 15 dB up to 1.485 GHz > 10 dB up to 2.970 GHz

**Table 1-1 Technical Specifications — continued**

Item	Characteristic
Post-Processor Serial Digital Video Outputs	Number of Outputs: Two 3G/HD/SD-SDI BNC (RLY OUT is passive relay bypass protected) Impedance: 75 Ω Return Loss: > 15 dB at 5 MHz – 270 MHz Signal Level: 800 mV ± 10% DC Offset: 0 V ± 50 mV Jitter (3G/HD/SD): < 0.3/0.2/0.2 UI Minimum Latency: SD: 127 pixels; 9.4 us 720p: 330 pixels; 4.45 us 1080i: 271 pixels; 3.65 us 1080p: 361 pixels; 2.43 us
COMM Ports	(4) RS- 485 comm ports. All connections via rear module COMM connector.
Ethernet Port	(1) 10/100Base-T RJ-45; TCP/UDP

## 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

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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.

**Cobalt Digital Inc. Factory Service Center**

2506 Galen Drive

Champaign, IL 61821 USA

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Office: (217) 344-1243

Fax: (217) 344-1245

Email: info@cobaltdigital.com

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# Installation and Setup

## Overview

This chapter contains the following information:

- Installing the 9950-EMDE-ANC Into a Frame Slot (p. 2-1)
- Installing a Rear I/O Module (p. 2-3)
- Setting Up 9950-EMDE-ANC Network Remote Control (p. 2-4)

## Installing the 9950-EMDE-ANC 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 9950-EMDE-ANC has a moderate power dissipation (<18 W). As such, avoiding placing the card adjacent to other cards with similar dissipation values if possible.

### CAUTION



This device contains semiconductor devices which are susceptible to serious damage from Electrostatic Discharge (ESD). ESD damage may not be immediately apparent and can affect the long-term reliability of the device.

Avoid handling circuit boards in high static environments such as carpeted areas, and when wearing synthetic fiber clothing. Always use proper ESD handling precautions and equipment when working on circuit boards and related equipment.

**Note:** If installing the 9950-EMDE-ANC 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 9950-EMDE-ANC 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 9950-EMDE-ANC 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 9950-EMDE-ANC into a frame slot as follows:

1. Determine the slot in which the 9950-EMDE-ANC 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 9950-EMDE-ANC Rear I/O Modules (p. 2-4).
9. Repeat steps 1 through 8 for other 9950-EMDE-ANC cards.

**Note:**

- The 9950-EMDE-ANC BNC inputs are internally 75-ohm terminated. It is not necessary to terminate unused BNC inputs or outputs.
- To remove a card, press down on the ejector tab to unseat the card from the rear I/O module mating connector. Evenly draw the card from its slot.

10. If network remote control is to be used for the frame and the frame has not yet been set up for remote control, perform setup in accordance with Setting Up 9950-EMDE-ANC Network Remote Control (p. 2-4).

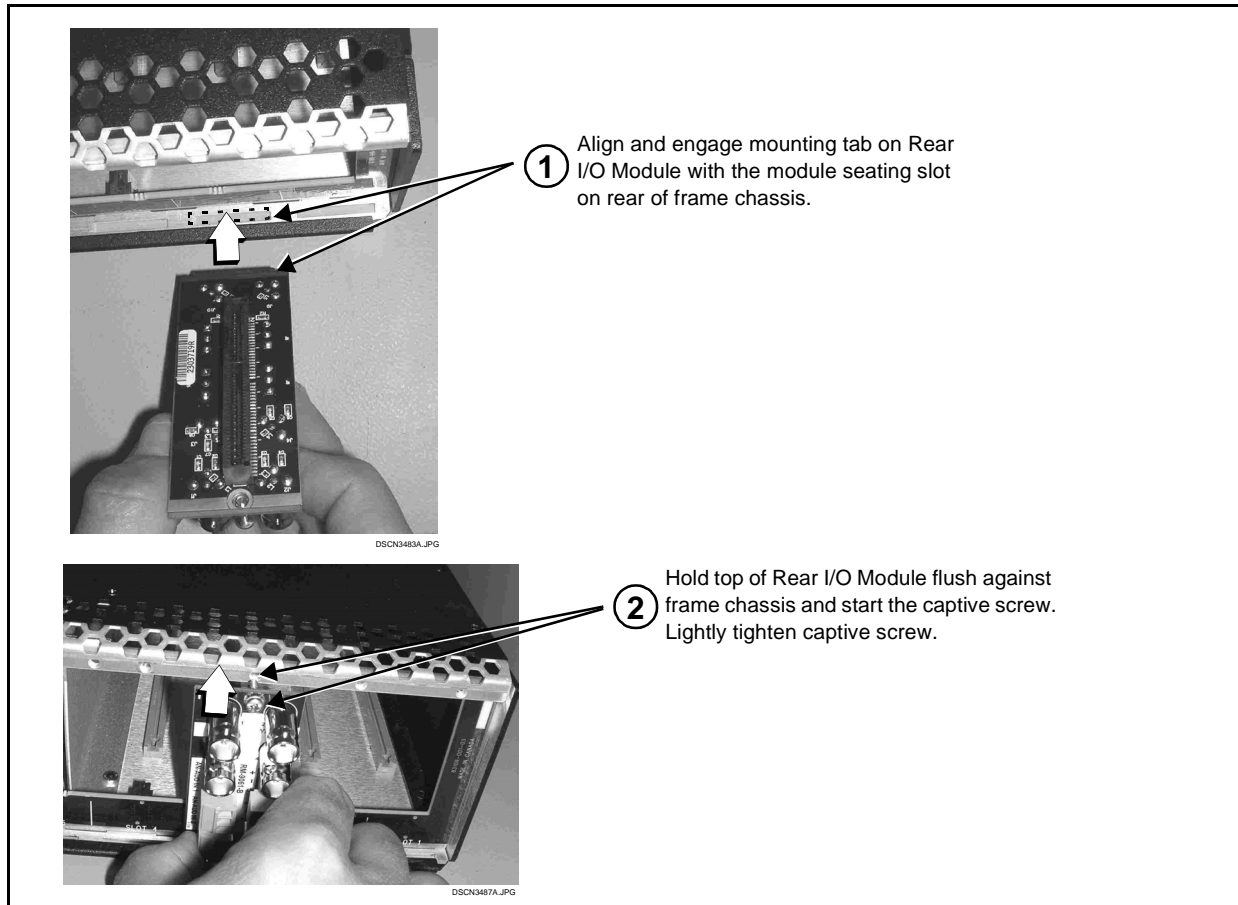
**Note:** If installing a card in a frame already equipped for, and connected to DashBoard™, no network setup is required for the card. The card will be discovered by DashBoard™ and be ready for use.

## 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 9950-EMDE-ANC is to be installed.  
If installing the 9950-EMDE-ANC 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 9950-EMDE-ANC 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.



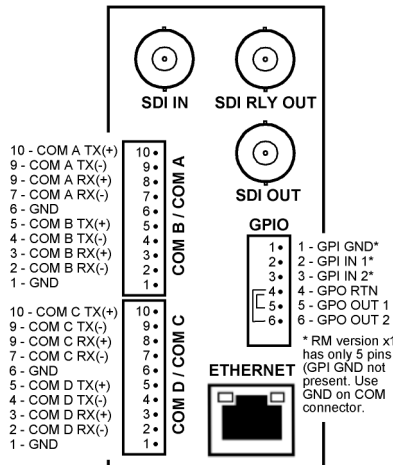
**Figure 2-1 Rear I/O Module Installation**

**9950-EMDE-ANC Rear I/O Modules**

Table 2-1 shows and describes the full assortment of Rear I/O Modules specifically for use with the 9950-EMDE-ANC.

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

**Table 2-1 9950-EMDE-ANC Rear I/O Modules**

9950-EMDE-ANC Rear I/O Module	Description
<p><b>RM20-9950-B</b></p>  <p>The diagram shows the rear panel of the RM20-9950-B module. It features several ports:         <ul style="list-style-type: none"> <li><b>SDI IN</b>: A BNC connector at the top left.</li> <li><b>SDI RLY OUT</b>: A BNC connector at the top right.</li> <li><b>SDI OUT</b>: A BNC connector in the middle right.</li> <li><b>COM A/B/C/D</b>: Four RS-485 serial interfaces, each with a 10-pin connector. COM A is at the top left, COM B in the middle left, COM C at the bottom left, and COM D at the bottom right.</li> <li><b>GPIO</b>: A 6-pin connector in the middle right.</li> <li><b>ETHERNET</b>: A 10/100Base-T IP RJ-45 port at the bottom right.</li> </ul>         Pin configurations for the connectors are listed to the left of each connector:         <ul style="list-style-type: none"> <li><b>COM A/B/C/D</b>: 10 - COM A TX(+), 9 - COM A TX(-), 8 - COM A RX(+), 7 - COM A RX(-), 6 - GND, 5 - COM B TX(+), 4 - COM B TX(-), 3 - COM B RX(+), 2 - COM B RX(-), 1 - GND. Similar patterns for COM C and D.</li> <li><b>GPIO</b>: 1 - GPI GND*, 2 - GPI IN 1*, 3 - GPI IN 2*, 4 - GPO RTN, 5 - GPO OUT 1, 6 - GPO OUT 2.</li> </ul>         A note states: *RM version x1 has only 5 pins (GPI GND not present. Use GND on COM connector.)         </p>	<p>Provides the following connections:</p> <ul style="list-style-type: none"> <li>• One 3G/HD/SD-SDI coaxial input BNC (<b>SDI IN</b>)</li> <li>• One processed coaxial output BNC (<b>SDI OUT</b>)</li> <li>• One relay-protected SDI processed output BNC (<b>SDI RLY OUT</b>; outputs a copy of <b>SDI OUT</b> under normal conditions, or passive outputs the SDI input as a relay failover if card power is lost)</li> <li>• <b>COM A/B, COM C/D</b> Provides four RS-485 independent serial interfaces for ANC extract or insert</li> <li>• <b>Ethernet</b> Provides 10/100Base-T IP RJ-45 port for UDP/TCP ANC extract or insert</li> </ul>

**Setting Up 9950-EMDE-ANC Network Remote Control**

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

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

Download a copy of this guide by clicking on the **Support>Reference Documents** link at [www.cobaltdigital.com](http://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. 1-11).

• 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 to control Cobalt cards, please skip to 9950-EMDE-ANC Function Menu List and Descriptions (p. 3-8).

This chapter contains the following information:

- Control and Display Descriptions (p. 3-1)
- Accessing the 9950-EMDE-ANC Card via Remote Control (p. 3-4)
- Checking 9950-EMDE-ANC Card Information (p. 3-5)
- Ancillary Data Line Number Locations and Ranges (p. 3-7)
- 9950-EMDE-ANC Function Menu List and Descriptions (p. 3-8)
- Troubleshooting (p. 3-27)

## Control and Display Descriptions

This section describes the user interface controls, indicators, and displays for using the 9950-EMDE-ANC card. The 9950-EMDE-ANC functions can be accessed and controlled using any of the user interfaces described here.

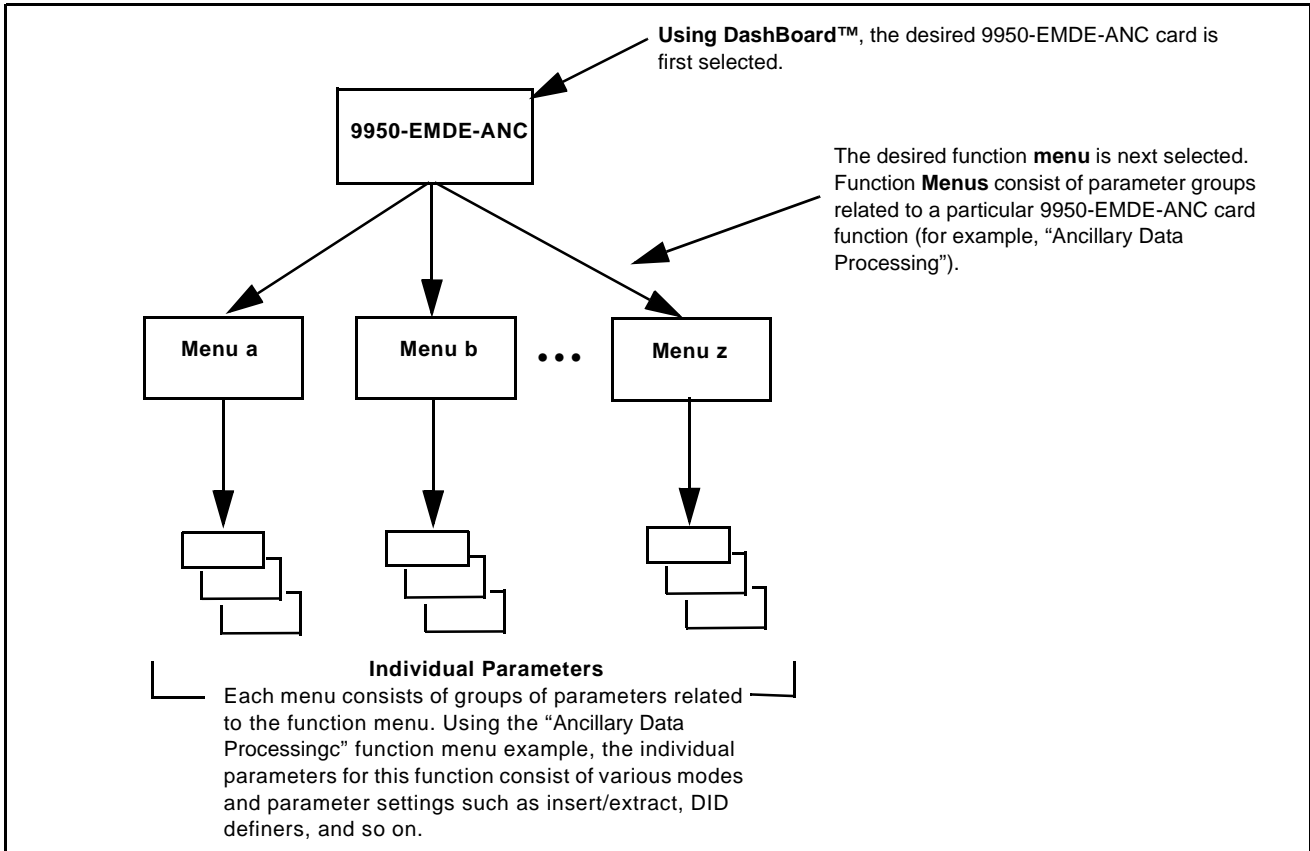
The format in which the 9950-EMDE-ANC functional controls, indicators, and displays appear and are used varies depending on the user interface being used. Regardless of the user interface being used, access to the 9950-EMDE-ANC functions (and the controls, indicators, and displays related to a particular function) follows a general arrangement of Function Menus under which related controls can be accessed (as described in Function Menu/Parameter Overview below).

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

**Function Menu/Parameter Overview**

The functions and related parameters available on the 9950-EMDE-ANC card are organized into function **menus**, which consist of parameter groups as shown below.

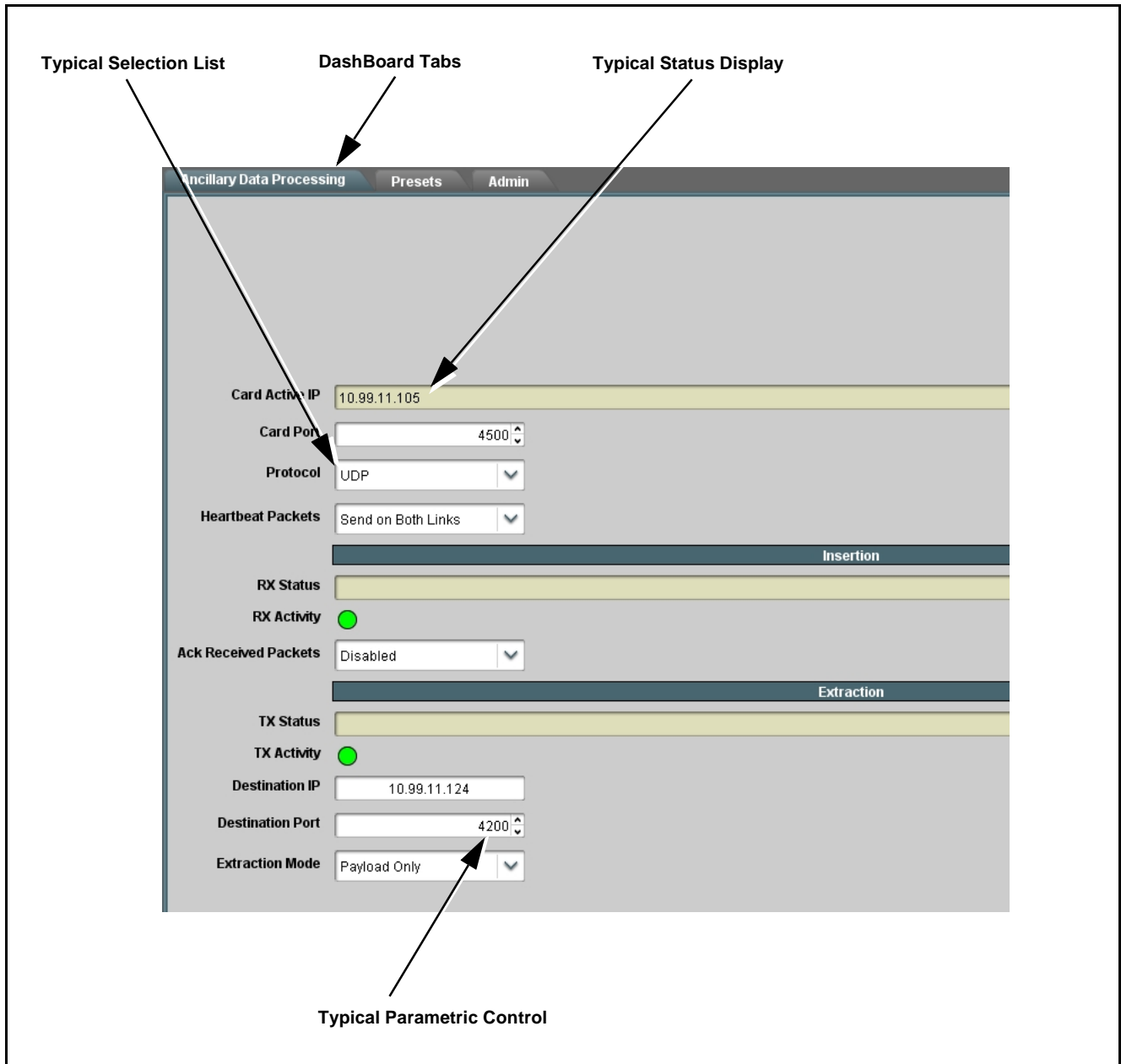
Figure 3-1 shows how the 9950-EMDE-ANC card and its menus are organized, and also provides an overview of how navigation is performed between cards, function menus, and parameters.



**Figure 3-1 Function Menu/Parameter Overview**

**DashBoard™ User Interface**

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



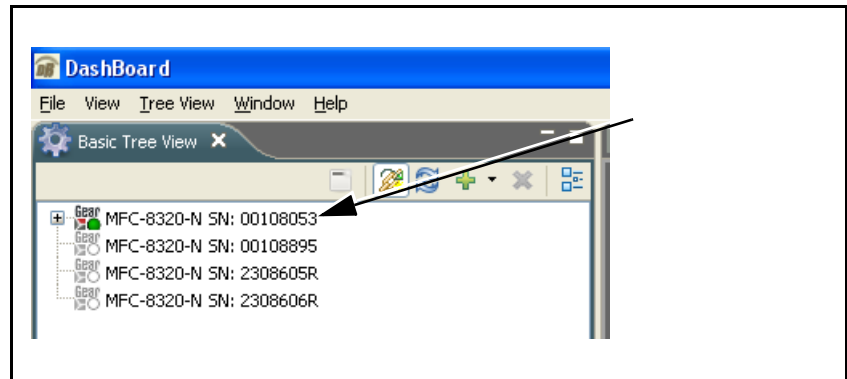
**Figure 3-2 Typical DashBoard Tabs and Controls**

## Accessing the 9950-EMDE-ANC Card via Remote Control

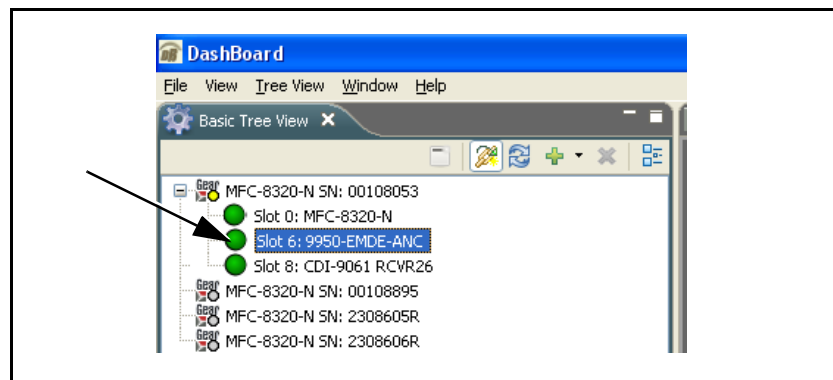
Access the 9950-EMDE-ANC card using DashBoard™ as described below.

### Accessing the 9950-EMDE-ANC 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 9950-EMDE-ANC card to be accessed (in this example, “MFC-8320-N SN: 00108053”).

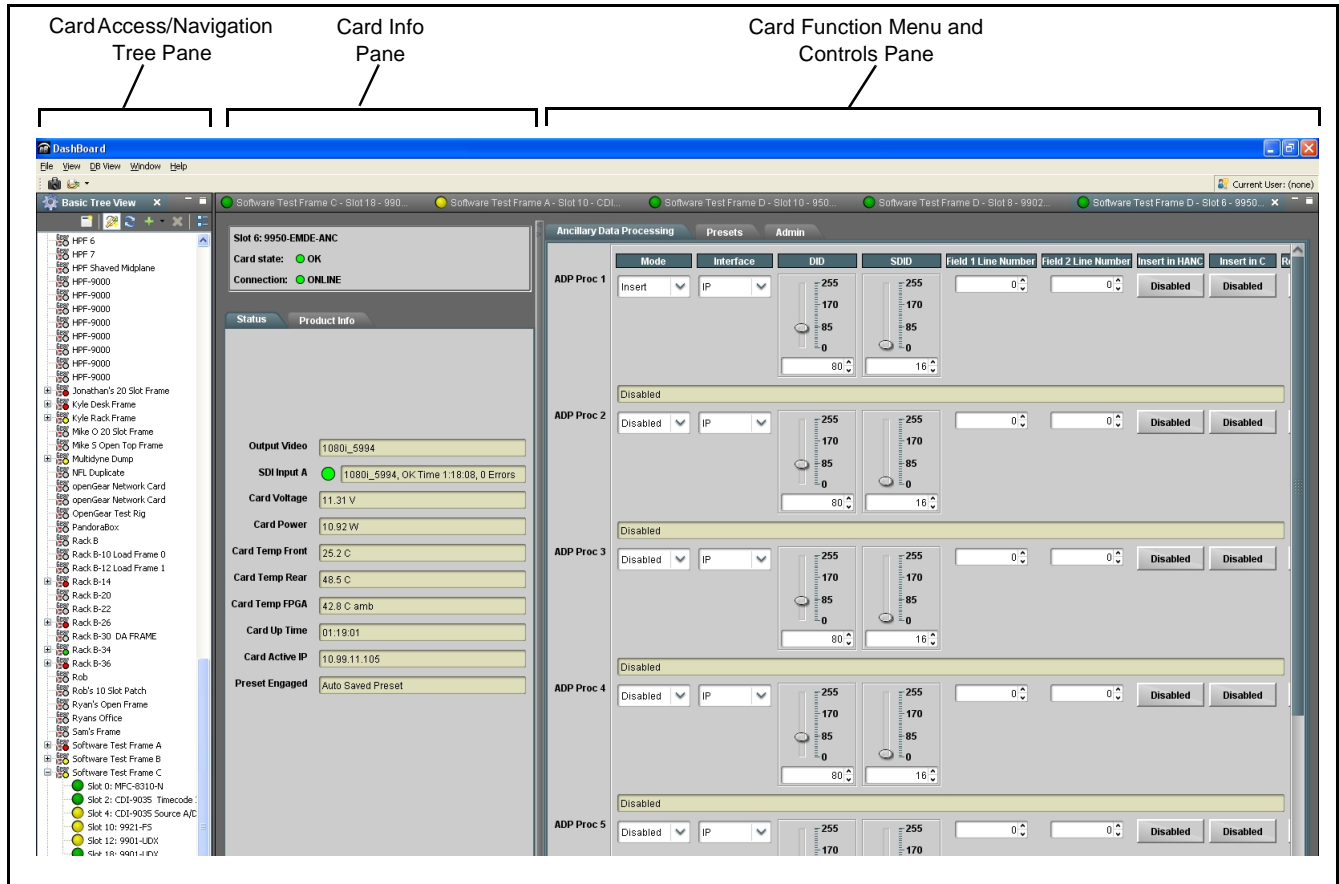


3. As shown below, expand the tree to access the cards within the frame. Click on the card to be accessed (in this example, “Slot 6: 9950-EMDE-ANC”).



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



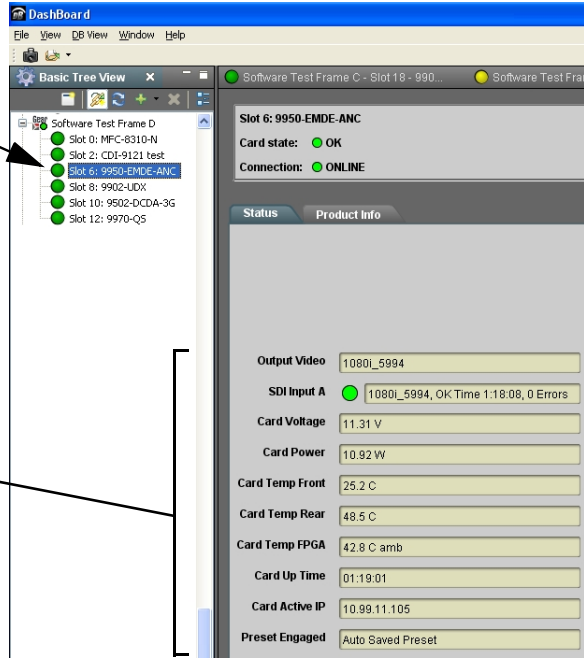


## Checking 9950-EMDE-ANC Card Information

The operating status and software version the 9950-EMDE-ANC card can be checked using DashBoard™ or the card edge control user interface. Figure 3-3 shows and describes the 9950-EMDE-ANC 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 3-3. Yellow or red icons respectively indicate an alert or failure condition. Refer to Troubleshooting (p. 3-27) for corrective action.

The **Tree View** shows the cards seen by DashBoard™. In this example, Network Controller Card is hosting a 9950-EMDE-ANC card in slot 6.



**Status Display**

This displays shows the status and format of the signals being received by the 9950-EMDE, as well as card status.

**Card Product Info Display**

This displays (alternately selected in the Product Info pane) shows the the card hardware and software version info, as well as a Cobalt code number for the currently installed rear module.

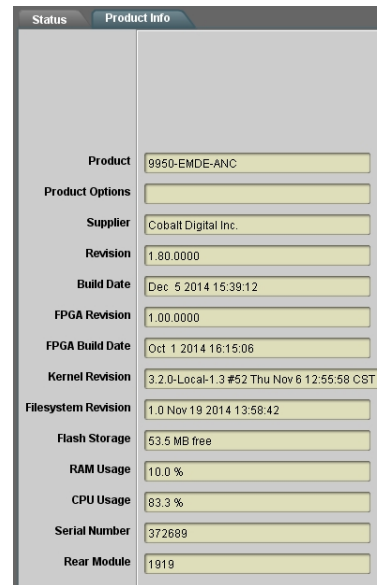


Figure 3-3 9950-EMDE-ANC Card Info/Status Utility

## Ancillary Data Line Number Locations and Ranges

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

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

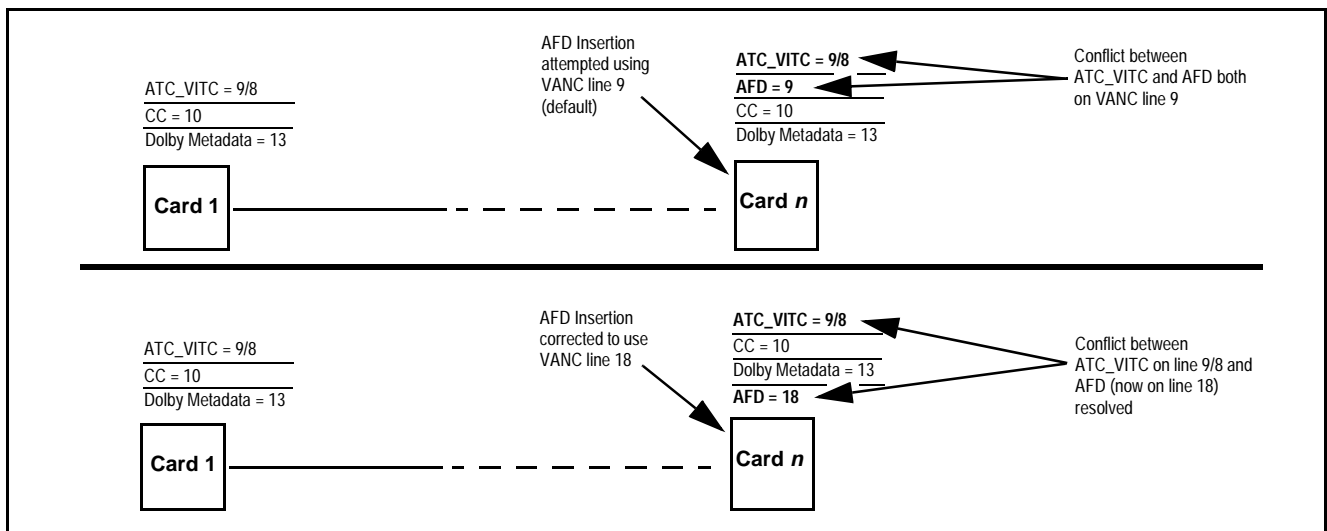
Item	Default Line No. / Range	
	SD	HD
AFD	12 (Note 2)	9 (Note 2)
ATC_VITC	13 (Note 2)	9/8 (Note 2)
ATC_LTC	—	10 (Note 2)
Dolby® Metadata	13 (Note 2)	13 (Note 2)
SDI VITC Waveform	14/16 (Note 2)	—
Closed Captioning	21 (locked)	10 (Note 2)

Notes:

- The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.
- 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 3-4 shows an example of improper and corrected VANC allocation within an HD-SDI stream.



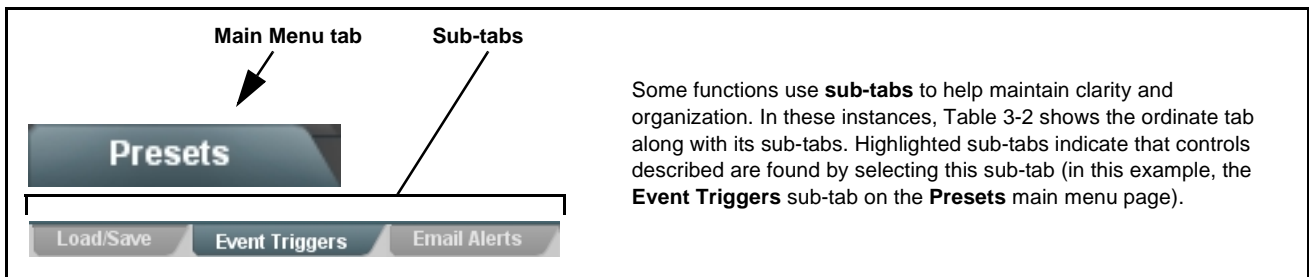
**Figure 3-4 Example VANC Line Number Allocation Example**

## 9950-EMDE-ANC Function Menu List and Descriptions

Table 3-2 individually lists and describes each 9950-EMDE-ANC function menu and its related list selections, controls, and parameters. Where helpful, examples showing usage of a function are also provided. Table 3-2 is primarily based upon using DashBoard™ to access each function and its corresponding menus and parameters.

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

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



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

Function Menu Item	Page	Function Menu Item	Page
Output Video Mode Controls	3-9	COMM Ports Setup Controls	3-18
Input Audio Status	3-9	Presets	3-20
Timecode	3-10	Admin (Log Status/Firmware Update - Card IP Address)	3-26
Output Audio Routing/Controls	3-14	User Log	3-26
Ancillary Data Proc Controls	3-15		

Table 3-2 9950-EMDE-ANC Function Menu List



	(This tab allows selection of output video for card SDI outputs. It is currently locked to <b>Anc Data</b> processed output for all <b>SDI OUT (1 thru 4)</b> drop-downs.)																											
	Displays signal status and payload for embedded and discrete audio received by the card.																											
<p>Individual signal status and peak level displays for embedded audio input pairs as described below.</p> <ul style="list-style-type: none"> <li>• <b>Absent:</b> Indicates embedded channel does not contain recognized audio PCM data.</li> <li>• <b>Present - PCM:</b> Indicates embedded channel pair contains recognized audio PCM data.</li> <li>• <b>Dolby E:</b> Indicates embedded channel pair contains Dolby® E encoded data.</li> <li>• <b>Dolby Digital:</b> Indicates embedded channel pair contains Dolby® Digital encoded data.</li> </ul> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Dolby status displays occur only for valid Dolby® signals meeting SMPTE 337M standard.</li> <li>• Embedded pair carrying non-PCM data other than Dolby may indicate Absent.</li> </ul>																												
<table border="1"> <thead> <tr> <th></th> <th>Status</th> <th>Peak</th> </tr> </thead> <tbody> <tr> <td>Emb 1-2</td> <td>Dolby Digital</td> <td>Data</td> </tr> <tr> <td>Emb 3-4</td> <td>Present - PCM</td> <td>-80 dBFS/-80 dBFS</td> </tr> <tr> <td>Emb 5-6</td> <td>Present - PCM</td> <td>-80 dBFS/-80 dBFS</td> </tr> <tr> <td>Emb 7-8</td> <td>Present - PCM</td> <td>-20 dBFS/-20 dBFS</td> </tr> <tr> <td>Emb 9-10</td> <td>Present - PCM</td> <td>0 dBFS/-20 dBFS</td> </tr> <tr> <td>Emb 11-12</td> <td>Present - PCM</td> <td>-14 dBFS/-10 dBFS</td> </tr> <tr> <td>Emb 13-14</td> <td>Present - PCM</td> <td>-9 dBFS/-5 dBFS</td> </tr> <tr> <td>Emb 15-16</td> <td>Present - PCM</td> <td>-3 dBFS/0 dBFS</td> </tr> </tbody> </table>			Status	Peak	Emb 1-2	Dolby Digital	Data	Emb 3-4	Present - PCM	-80 dBFS/-80 dBFS	Emb 5-6	Present - PCM	-80 dBFS/-80 dBFS	Emb 7-8	Present - PCM	-20 dBFS/-20 dBFS	Emb 9-10	Present - PCM	0 dBFS/-20 dBFS	Emb 11-12	Present - PCM	-14 dBFS/-10 dBFS	Emb 13-14	Present - PCM	-9 dBFS/-5 dBFS	Emb 15-16	Present - PCM	-3 dBFS/0 dBFS
	Status	Peak																										
Emb 1-2	Dolby Digital	Data																										
Emb 3-4	Present - PCM	-80 dBFS/-80 dBFS																										
Emb 5-6	Present - PCM	-80 dBFS/-80 dBFS																										
Emb 7-8	Present - PCM	-20 dBFS/-20 dBFS																										
Emb 9-10	Present - PCM	0 dBFS/-20 dBFS																										
Emb 11-12	Present - PCM	-14 dBFS/-10 dBFS																										
Emb 13-14	Present - PCM	-9 dBFS/-5 dBFS																										
Emb 15-16	Present - PCM	-3 dBFS/0 dBFS																										

Table 3-2 9950-EMDE-ANC Function Menu List — continued

<div style="background-color: #333; color: white; padding: 5px; display: inline-block; border-radius: 5px;">Timecode</div>	<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 525i 5994 SDI video with VITC waveform timecode is being processed to output ATC_VITC timecode. To re-format and insert the timecode data, the following can be performed using the Timecode function. Each Timecode control is fully described on the pages that follow.</p>																	
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p>525i 5994 w/ VITC Waveform → <b>9950-EMDE</b> → 525i 5994 w/ ATC_VITC</p> </div>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Reference VITC Status</td><td>05:49:08:20.1</td></tr> <tr><td>Input VITC Status</td><td>05:49:08:19.1</td></tr> <tr><td>Input ATC_LTC Status</td><td>Not Present</td></tr> <tr><td>Input ATC_VITC Status</td><td>Not Present</td></tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Source Priority 1</td><td>Input VITC</td></tr> <tr><td>Source Priority 2</td><td>Input ATC_VITC</td></tr> <tr><td>Source Priority 3</td><td>Reference VITC</td></tr> <tr><td>Source Priority 4</td><td>Free Run</td></tr> </table>	Reference VITC Status	05:49:08:20.1	Input VITC Status	05:49:08:19.1	Input ATC_LTC Status	Not Present	Input ATC_VITC Status	Not Present	Source Priority 1	Input VITC	Source Priority 2	Input ATC_VITC	Source Priority 3	Reference VITC	Source Priority 4	Free Run
Reference VITC Status	05:49:08:20.1																
Input VITC Status	05:49:08:19.1																
Input ATC_LTC Status	Not Present																
Input ATC_VITC Status	Not Present																
Source Priority 1	Input VITC																
Source Priority 2	Input ATC_VITC																
Source Priority 3	Reference VITC																
Source Priority 4	Free Run																
<p><b>A</b> 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 VITC Waveform timecode data (<b>SDI VITC</b>) as a choice. This extracts VITC Waveform timecode data from the incoming video.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>SD ATC_VITC Insertion</td><td>Enabled</td></tr> <tr><td>SD ATC Insertion Line</td><td>13 - SMPTE 12M-2-2008 Recommended</td></tr> </table>	SD ATC_VITC Insertion	Enabled	SD ATC Insertion Line	13 - SMPTE 12M-2-2008 Recommended												
SD ATC_VITC Insertion	Enabled																
SD ATC Insertion Line	13 - SMPTE 12M-2-2008 Recommended																
<p><b>B</b> In this example, it is desired to provide SDI ATC_VITC timecode data in the processed output video. As such, set <b>SD ATC VITC Insertion</b> to <b>Enabled</b>.</p> <p>In the example here, the line numbers are set to the default SMPTE 12M-2-2008 recommended values.</p>																	

**Table 3-2 9950-EMDE-ANC Function Menu List — continued**



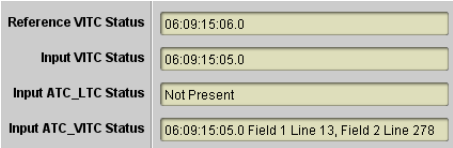
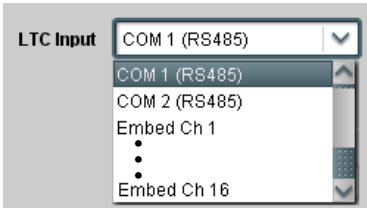


	(continued)
<p><b>Option</b>  <b>Audio LTC</b> controls described below only appear on cards with <b>+LTC</b> licensed optional feature. This feature allows audio LTC from an audio channel to be used as a timecode source, with conversion to a selected SMPTE 12M format on the output video.</p>	
<p>• <b>Timecode Source Status Displays</b></p> 	<p>Displays the current status and contents of the four supported external timecode formats shown to the left.</p> <ul style="list-style-type: none"> <li>• If a format is receiving timecode data, the current content (timecode running count and line number) is displayed.</li> <li>• If a format is not receiving timecode data, Not Present is displayed.</li> </ul>
<p>• <b>LTC Input Control</b></p> 	<p>Selects source to be used by card to <b>receive</b> LTC as listed below.</p> <ul style="list-style-type: none"> <li>• RS-485 over COM1 or COM 2</li> <li>• Audio LTC over Emb Ch 1 thru Ch 16</li> </ul> <p><b>Note:</b> • <b>Audio LTC Source</b> must be appropriately set to receive and process received LTC.</p> <ul style="list-style-type: none"> <li>• If COM 1 or COM 2 is used for LTC receive, the port function must be set for LTC. See COMM Ports Setup Controls (p. 3-18) for more information.</li> <li>• card audio inputs will not center inputs with DC offset. If input has DC offset, the source may need to be capacitively coupled to remove the offset.</li> </ul>
<p>• <b>Mute LTC Control</b></p> 	<p>Allows LTC audio or RS-485 output to mute upon loss of selected timecode inputs.</p> <ul style="list-style-type: none"> <li>• When set to <b>Enabled</b> and input timecode is lost: <ul style="list-style-type: none"> <li>• RS-485 LTC output goes to frozen state.</li> <li>• Audio LTC output mutes.</li> </ul> </li> <li>• When set to <b>Disabled</b> and input timecode is lost: <ul style="list-style-type: none"> <li>• RS-485 LTC output keeps counting, with count value being free-run count.</li> <li>• Audio LTC output is not muted, with count value being free-run count.</li> </ul> </li> </ul> <p><b>Note:</b> If muting upon loss of a particular input format is desired, set all <b>Source Priority 1</b> thru <b>4</b> to that particular input format. If this is not done, the card failover timecode selection may substitute another format choice for the format not being received.</p>
<p>• <b>Incoming ATC Packet Removal Control</b></p> 	<p>Enables or disables removal of existing input video ATC timecode packets from the output. This allows removal of undesired existing timecodes from the output, resulting in a “clean slate” where only desired timecodes are then re-inserted into the output. (For example, if both SDI ATC_VITC and ATC_LTC are present on the input video, and only ATC_LTC is desired, using the Removal control will remove both timecodes from the output. The ATC_LTC timecode by itself can then be re-inserted on the output using the other controls discussed here.)</p> <p><b>Note:</b> Set this control to <b>Enabled</b> if Free-Run timecode is to be used. If incoming packets are not removed, output embedded SMPTE timecode may alternate between free-run and embedded SMPTE timecode values.</p>

Table 3-2 9950-EMDE-ANC Function Menu List — continued

<div style="background-color: #333; color: white; padding: 5px; text-align: center; font-weight: bold;">Timecode</div>	(continued)													
<p><b>• Source Priority</b></p> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 10px;"> <p>Source Priority 1 <span style="float: right;">Free Run ▼</span></p> <div style="border: 1px solid #ccc; padding: 2px; margin-top: 2px;"> <p>Free Run</p> <p>Reference VITC</p> <p>Input VITC</p> <p>Input ATC_LTC</p> <p>Input ATC_VITC</p> <p>Disable Output</p> </div> <p style="text-align: center;">⋮</p> </div> <div style="border: 1px solid #ccc; padding: 5px;"> <p>Source Priority 4 <span style="float: right;">Reference VITC ▼</span></p> </div>	<p>Selects the priority assigned to each of the four supported external formats, and internal Free Run in the event the preferred source is unavailable.</p> <p><b>Source Priority 1</b> thru <b>Source Priority 4</b> select the preferred format to be used in descending order (i.e., Source Priority 2 selects the second-most preferred format, and so on. See example below.)</p> <div style="text-align: center; margin: 10px 0;"> </div> <p>In this example, <b>Input VITC</b> 1st priority selection selects SDI VITC (received on SDI input) over reference VITC (received on frame reference) regardless of video input material source to be processed by the card.</p> <p>The selected timecode source is embedded on the SDI video output (in this example, 720p) using the selected line number. In this example, if the SDI VITC on the SDI input becomes unavailable, the card then uses the reference VITC data received on the frame reference.</p> <p><b>Note:</b> Set Incoming ATC Packet Removal Control to <b>Enabled</b> if Free-Run timecode is to be used. If incoming packets are not removed, output embedded SMPTE timecode may alternate between free-run and embedded SMPTE timecode values.</p>													
<div style="margin-bottom: 10px;"> <p>Disable Output setting should be used with care. If Disable Output is selected with alternate intended format(s) set as a lower priority, the card will indeed disable <b>all</b> timecode output should the ordinate preferred format(s) become unavailable. Typically, choices other than Disable should be used if a timecode output is always desired, with Disable only being used to remove all timecode data.</p> </div> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 45%;"> <p>In this example, even though and ATC_LTC could be available to substitute for ATC_VITC not being present, the card will revert to no timecode output since the choice of Disable Output “out-prioritizes” ATC_LTC with these settings.</p> </div> <div style="width: 50%; border: 1px solid #ccc; padding: 5px;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Source Priority 1</td> <td style="width: 30%;">Input VITC ▼</td> <td style="width: 30%;">Input VITC ▼</td> <td rowspan="4" style="width: 20%; padding-left: 10px; vertical-align: middle;">                 The choices shown here will allow ATC_LTC to “out-prioritize” Disable Output if ATC_VITC is not available.             </td> </tr> <tr> <td>Source Priority 2</td> <td>Input ATC_VITC ▼</td> <td>Input ATC_VITC ▼</td> </tr> <tr> <td>Source Priority 3</td> <td>Disable Output ▼</td> <td>Input ATC_LTC ▼</td> </tr> <tr> <td>Source Priority 4</td> <td>Input ATC_LTC ▼</td> <td>Disable Output ▼</td> </tr> </table> </div> </div>	Source Priority 1	Input VITC ▼	Input VITC ▼	The choices shown here will allow ATC_LTC to “out-prioritize” Disable Output if ATC_VITC is not available.	Source Priority 2	Input ATC_VITC ▼	Input ATC_VITC ▼	Source Priority 3	Disable Output ▼	Input ATC_LTC ▼	Source Priority 4	Input ATC_LTC ▼	Disable Output ▼	<p><b>• Offset Controls</b></p> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 10px;"> <p>Offset <span style="float: right;">Advanced ▼</span></p> <div style="border: 1px solid #ccc; padding: 2px; margin-top: 2px;"> <p>Delayed</p> <p>Advanced</p> </div> </div> <hr style="width: 20%; margin-left: 0;"/> <div style="border: 1px solid #ccc; padding: 5px;"> <p>Offset Field <span style="float: right;">0 ▼</span></p> <p>Offset Frame <span style="float: right;">0</span></p> </div> <p>Allows the current timecode count to be advanced or delayed on the output video.</p> <ul style="list-style-type: none"> <li>• <b>Offset Advance</b> or <b>Delay</b> selects offset advance or delay.</li> <li>• <b>Offset Field</b> delays or advances or delays timecode by one field.</li> <li>• <b>Offset Frame</b> delays or advances or delays timecode by up to 5 frames.</li> </ul> <p><b>Note:</b> Default settings are null, with both controls set at zero as shown.</p>
Source Priority 1	Input VITC ▼	Input VITC ▼	The choices shown here will allow ATC_LTC to “out-prioritize” Disable Output if ATC_VITC is not available.											
Source Priority 2	Input ATC_VITC ▼	Input ATC_VITC ▼												
Source Priority 3	Disable Output ▼	Input ATC_LTC ▼												
Source Priority 4	Input ATC_LTC ▼	Disable Output ▼												



**Table 3-2 9950-EMDE-ANC Function Menu List — continued**

<div style="background-color: #333; color: white; padding: 5px; text-align: center; font-weight: bold;">Timecode</div>	(continued)
<ul style="list-style-type: none"> <li><b>Output Status Display</b></li> </ul> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 10px;"> <b>Output Status</b> 00:04:46:06.1 (Source: SDI VITC)         </div>	<p>Displays the current content and source being used for the timecode data as follows:</p> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 10px;"> <b>Output Status</b> 00:04:46:06.1 (Source: SDI VITC)         </div> <ul style="list-style-type: none"> <li>Output status OK (in this example, SDI VITC timecode received and outputted).</li> </ul> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 10px;"> <b>Output Status</b> Insertion Disabled         </div> <ul style="list-style-type: none"> <li><b>Timecode Insertion</b> button set to <b>Disabled</b>; output insertion disabled.</li> </ul> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>If timecode is not available from Source Priority selections performed, timecode on output reverts to Free Run (internal count) mode.</li> <li>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:             <ul style="list-style-type: none"> <li>0.0 Frame 0</li> <li>0.1 Frame 1</li> <li>1.0 Frame 2</li> <li>1.1 Frame 3</li> <li>•</li> <li>•</li> <li>•</li> <li>29.1 Frame 59</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li><b>Audio LTC Output</b></li> </ul> <div style="background-color: #0070C0; color: white; padding: 5px; display: inline-block; font-weight: bold;">Option </div>	<p>Audio LTC output is routed to desired embedded audio outputs using the Output Audio Routing/Controls (p. 3-14). Whatever timecode is displayed on the Output Status is converted to audio LTC and available as an LTC audio output.</p>
<p><b>Note:</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>The card does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.</li> </ul>	
<ul style="list-style-type: none"> <li><b>SD VITC Waveform Insertion Controls</b></li> </ul> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;">       SD VITC Waveform Output 1 Line Number <input style="width: 80px;" type="text" value="14"/> </div> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;">       SD VITC Waveform Output 2 Line Number <input style="width: 80px;" type="text" value="16"/> </div> <div style="border: 1px solid #ccc; padding: 5px;">       SD VITC Waveform Insertion <input checked="" type="checkbox"/> Enabled     </div>	<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><b>Note:</b></p> <ul style="list-style-type: none"> <li>If only one output line is to be used, set both controls for the same line number.</li> <li><b>SD VITC Waveform Insertion</b> control only affects VITC waveforms inserted (or copied to a new line number) by this function. An existing VITC waveform on an unscaled SD SDI stream is not affected by this control and is passed on an SDI output.</li> </ul>
<ul style="list-style-type: none"> <li><b>SD ATC Insertion Control</b></li> </ul> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;">       SD ATC_VITC Insertion <input checked="" type="checkbox"/> Enabled     </div> <div style="border: 1px solid #ccc; padding: 5px;">       SD ATC Insertion Line <input style="width: 150px;" type="text" value="13 - SMPTE 12M-2-2008 Recommended"/> </div>	<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 9950-EMDE-ANC Function Menu List — continued


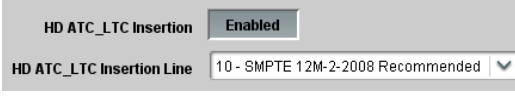
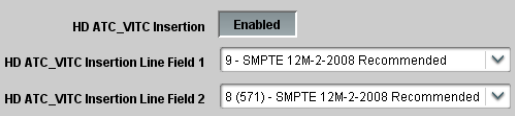

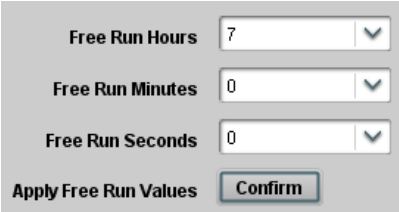

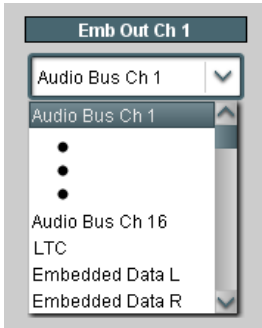

	<p>(continued)</p>
<p>• <b>HD ATC_LTC Insertion Control</b></p> 	<p>For HD output, enables or disables ATC_LTC timecode insertion into the output video, and selects the line number for ATC_LTC timecode data.</p>
<p>• <b>HD ATC_VITC Insertion Control</b></p> 	<p>For HD output, enables or disables ATC_VITC timecode insertion into the output video, and selects the line number for ATC_VITC1 and ATC_VITC2.</p>
<p>• <b>ATC_VITC Legacy Support Control</b></p> 	<p>When enabled, accommodates equipment requiring ATC_VITC packet in both fields as a "field 1" packet (non-toggling).  <b>Note:</b> 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.</p>
<p>• <b>Free Run Timecode Controls</b></p> 	<p>Allows an initial (starting) count to be applied to output video timecode when Free Run insertion is enabled.  <b>Note:</b></p> <ul style="list-style-type: none"> <li>• Initialization can only be applied when card is outputting Free Run timecode (as shown by Output Status displaying "Free Run").</li> <li>• If failover to Free Run occurs due to loss of external timecode(s), the Free Run count assumes its initial count from the last valid externally supplied count.</li> </ul>
	<p>Provides per-channel selectors to allow embedded audio pass-thru, or embed LTC or SMPTE 337 data onto selected channels.</p>
<p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• <b>Embedded Ch 2 thru Embedded Ch 16</b> have controls identical to those shown below. Therefore, only the <b>Embedded Ch 1</b> controls are shown here.</li> <li>• For each channel, its source and destination should be considered and appropriately set.</li> </ul>	
<p>• <b>Embedded Output Channel Source</b></p> 	<p>Using the drop-down list, selects the audio input source to be embedded in the corresponding embedded output channel from the following choices:</p> <ul style="list-style-type: none"> <li>• <b>Audio Bus Ch 1 thru Ch 16</b> (channel pass-thru)</li> <li>• <b>Option</b>  <b>Audio LTC</b></li> <li>• <b>Embedded Data L and R</b> (SMPTE 337 non-PCM data embedding)</li> </ul>

Table 3-2 9950-EMDE-ANC Function Menu List — continued

Ancillary Data Processing

Provides controls for VANC/HANC ancillary data de-embedding and embedding to and from program video stream. Data can be extracted and inserted within the card (Bridge mode), or inserted and/or extracted to and from external interfaces via serial or IP interfaces.

ADP Routing

IP Port Setup

Eight individual Ancillary Data Processors (ADPs) provide for insertion, extraction, or bridging ancillary data to and from the program video SDI stream.

**Mode** controls select the type of ANC processing:

- **Bridge** extracts ANC from the deserialized input video and re-inserts in the output video, thereby allowing specialized ANC packets to be retained and passed on the processed output (for example, preserving special payloads such as STCE 104 for a format-converted output)
- **Insert and Extract** modes respectively allow insertion to the output stream or extraction from the input stream between external interfaces

**Interface** controls select either card IP or serial data (COM 1) interface where Mode is set to insertion or extraction

**Note:** COM1 is available for ADP Proc 1 only; all other ADPs use IP only for external import/export insertion/extraction.

**Insertion** controls allow special insertions in HANC or the C-channel, as well as removal of incoming packets

**DID and SDID** controls select the desired packet to be handled by the corresponding ANC Data Processor

**Line Number** controls select the VANC location of packet insertion/extraction. Setting the line numbers to 0 (zero) lets externally-sourced payload assert and set the line number.

In the example above, **ADP Proc 1** is set to extract ATC timecode at DID<sub>60h</sub> / SDID<sub>60h</sub>. Depending on the interface used to carry the extraction (COM or IP), status is displayed as shown below.

Extracting 15.0 Kbit/s, dropped 0.0 Kbit	When set to extract to <b>COM</b> interface, displays rate and dropped data (if any)
Extracting 18.75 Kbit/s, total 125.78 Kbit	When set to extract to <b>IP</b> interface, displays rate and total amount transferred

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

Table 3-2 9950-EMDE-ANC Function Menu List — continued


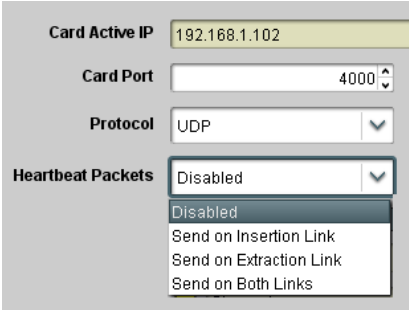
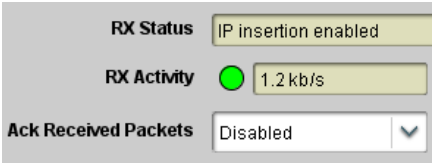
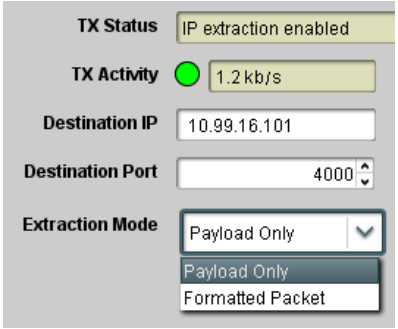
	<p><b>IP Port Setup</b> sub-tab provides IP setup.</p>																																																												
<p>• <b>IP Setup</b></p> 	<p>Provides setup controls for IP insert/extract communications as follows:</p> <ul style="list-style-type: none"> <li>• <b>Active IP:</b> Shows the card IP address. (IP address is set using <b>Admin</b> tab Networking settings).</li> <li>• <b>Card Port:</b> Sets card IP Rx/Tx port.</li> <li>• <b>Protocol:</b> Sets card to match protocol used (UDP or TCP).</li> <li>• <b>Heartbeat Packets:</b> Disables or provides heartbeat packets as shown.</li> </ul>																																																												
<p>• <b>IP Insertion (Receive) Setup/Status</b></p> 	<p>Shows receiving IP address/status follows:</p> <ul style="list-style-type: none"> <li>• <b>Rx Status:</b> Shows if card is set for (and receiving) IP data.</li> <li>• <b>Rx Activity:</b> Shows data rate when data is being received.             <ul style="list-style-type: none"> <li>- Stopped (with yellow indicator) means no data is being received.</li> <li>- Green indicator means data is being received and inserted. Data rate is also shown.</li> </ul> </li> <li>• <b>Ack Received Packets:</b> Disables or enables ACK upon receiving packets. Allows Shows card IP receive/Rx insertion status.</li> </ul>																																																												
<p>• <b>IP Transmit Setup/Status</b></p> 	<p>Shows transmitting IP address/status follows:</p> <ul style="list-style-type: none"> <li>• <b>Extraction / Tx Status:</b> Shows card extraction from stream to Tx status.             <ul style="list-style-type: none"> <li>- Stopped (with yellow indicator) means no data is being sent.</li> <li>- Green indicator means data is being extracted and sent. Data rate is also shown.</li> </ul> </li> <li>• <b>Destination IP/Port:</b> Allows setting destination IP address and port.</li> <li>• <b>Extraction Mode:</b> Sets the IP data sent to consist of only payload, or send as formatted packets.</li> </ul>																																																												
<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• Packets received must be sized to fit in a native ancillary data packet (i.e., payloads that span multiple ancillary packets need to be broken down by the sending controller before they are sent to the card).</li> <li>• card can be configured to send back ACK packets each time data is inserted. The ACK packet is sent immediately after the data is actually inserted. Packets need to be broken down by the sending controller before they are sent to the card. card can also be configured to send out "heartbeat" packets every two seconds as an additional safeguard.</li> <li>• Packet formatting for insertion/extraction, ACK, and heartbeat is as follows:</li> </ul>																																																													
<table border="1"> <thead> <tr> <th colspan="2">Packet formatting used for insertion/extraction:</th> <th colspan="2">ACK Packet Format</th> <th colspan="2">Heartbeat Packets</th> </tr> <tr> <th>Bytes</th> <th>Field</th> <th>Bytes</th> <th>Field</th> <th>Bytes</th> <th>Field</th> </tr> </thead> <tbody> <tr> <td>3:0</td> <td>Packet Type (0xF5AB02ED)</td> <td>3:0</td> <td>Packet Type (0xAC73B938)</td> <td>3:0</td> <td>Packet Type (0x20120831)</td> </tr> <tr> <td>5:4</td> <td>Packet size</td> <td>5:4</td> <td>Received packet size</td> <td>31:4</td> <td>Reserved</td> </tr> <tr> <td>6</td> <td>DID</td> <td>6</td> <td>Received DID</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>SDID</td> <td>7</td> <td>Received SDID</td> <td></td> <td></td> </tr> <tr> <td>9:8</td> <td>Line number for Insertion. If set to 0, use the line number set by software.</td> <td>9:8</td> <td>Line number on which the received packet was inserted</td> <td></td> <td></td> </tr> <tr> <td>11:10</td> <td>Payload size</td> <td>11:10</td> <td>Received payload size</td> <td></td> <td></td> </tr> <tr> <td>15:12</td> <td>User packet ID</td> <td>15:12</td> <td>Received user packet ID</td> <td></td> <td></td> </tr> <tr> <td>N:16</td> <td>Payload</td> <td>31:16</td> <td>Reserved</td> <td></td> <td></td> </tr> </tbody> </table>		Packet formatting used for insertion/extraction:		ACK Packet Format		Heartbeat Packets		Bytes	Field	Bytes	Field	Bytes	Field	3:0	Packet Type (0xF5AB02ED)	3:0	Packet Type (0xAC73B938)	3:0	Packet Type (0x20120831)	5:4	Packet size	5:4	Received packet size	31:4	Reserved	6	DID	6	Received DID			7	SDID	7	Received SDID			9:8	Line number for Insertion. If set to 0, use the line number set by software.	9:8	Line number on which the received packet was inserted			11:10	Payload size	11:10	Received payload size			15:12	User packet ID	15:12	Received user packet ID			N:16	Payload	31:16	Reserved		
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Table 3-2 9950-EMDE-ANC Function Menu List — continued

Ancillary Data Processing

**Data-Over-Audio** sub-tab provides controls that allow SMPTE 337/338/339 non-PCM data to be embedded and de-embedded on embedded audio pairs, offering a very convenient self-contained transport within the program stream physical media.

Port Setup

Data-Over-Audio Setup

Shown below is an example setup where serial data is embedded as SMPTE 337 non-PCM data on a sending embedded pair, and then extracted on a receiving pair and converted back to serial data using two cards/cards with the **+ANC** option.

**A** The **COM Routing** tab and appropriate sub-tab is set to receive serial data, noting bit rate and parity settings to conform to the received serial data. (See COMM Ports Setup Controls (p. 3-18))

**B** The received serial data is then directed to an embedded audio output channel pair by setting a pair to Embedded Data using the **Output Audio Routing/Controls** tab (in this example, Emb pair 7/8).

**C** The embedded data pair on the receiving end is then selected using the De-Embed Source select drop-down on the **Data-Over-Audio Setup** sub-tab (in this example, Emb Pair 4 (channels 7/8) as correspondingly set on the sending card).

Emb Out Ch 7	Emb Out Ch 8
Embedded Data L	Embedded Data R
Mode	Mode

De-Embed Source: Emb Audio Pair 4

- Emb Audio Pair 1
- Emb Audio Pair 2
- Emb Audio Pair 3
- Emb Audio Pair 4
- Emb Audio Pair 5
- Emb Audio Pair 6

Data-Over-Audio Setup

**D** On the **COM Routing** tab, select Audio Data Extractor to extract and route the received SMPTE 337 data to the desired COM port, noting bit rate, protocol, and parity settings. (See COMM Ports Setup Controls (p. 3-18))

COM Mode: RS485

TX Routing: Audio Data Extractor

De-Embed Rate: 1.2 KBIT/s

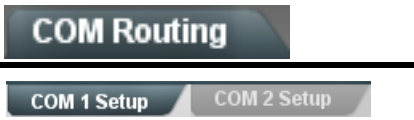
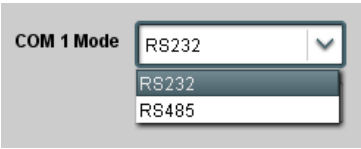
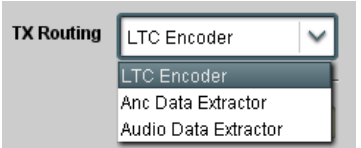

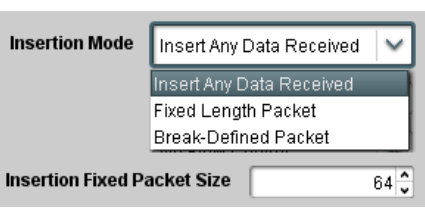
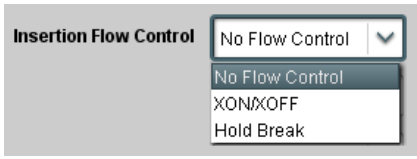
Embed Rate: 0.000 KBIT/s

When data is successfully being de-embedded, the status display shows green and indicates the bit rate (bit rate is bit rate configured on sending end; typically SMPTE 337 data transfer is much faster than serial)

**Notes:**

- Embedded channel pair selected must be a standard boundary pair (e.g., 1/2, 3/4 and so on).
- SMPTE 337/338/339 embedded pair carrying non-PCM data here is marked as "Non-PCM Data Unknown". Any intermediate cards between the Cobalt sending card/card and the Cobalt receiving card/card will transfer this data intact, as long as these cards can transfer in a bit-accurate manner. Most cards capable of carrying Dolby® streams are capable of this. However, any intermediate cards must have functions such as PCM level controls and SRC disabled.

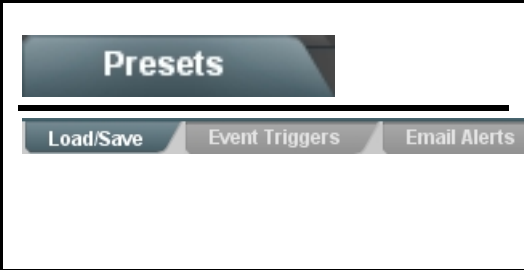
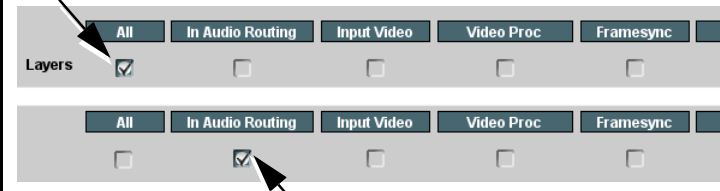
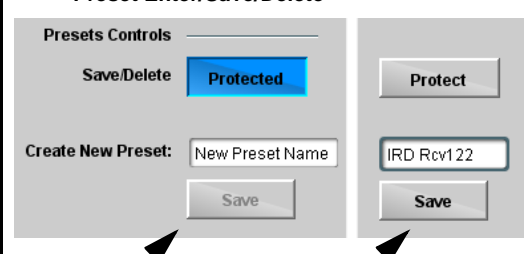
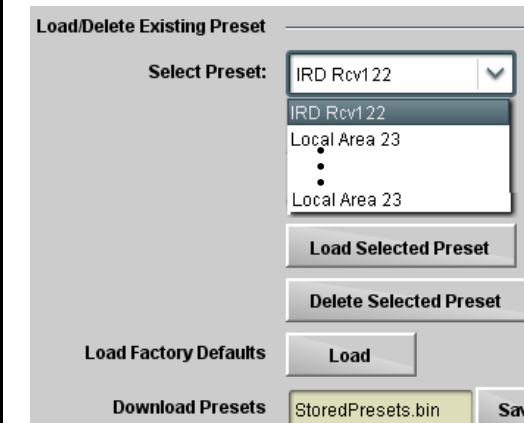
Table 3-2 9950-EMDE-ANC Function Menu List — continued

	<p>Provides controls for setting up the two COMM (serial) ports for LTC or ANC functions, and setting comm protocol for each port.</p>
<p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• <b>COM 1</b> and <b>COM 2</b> sub-tabs provide independent controls for COM1 and COM2. Therefore, only the <b>COM 1</b> controls are described here.</li> <li>• Controls provided here allow highly detailed setup of serial communications. Control settings must be carefully considered and set appropriately to correspond to both sending and receiving systems. Incorrectly set controls may result in loss of ANC serial comm.</li> <li>• <b>COM 1</b> and <b>COM 2</b> are multi-function interfaces and must be set for ANC Data Extractor for port(s) is to be used here. Set the port function as described here.</li> </ul>	
<p>• <b>COM Mode (Protocol)</b></p> 	<p>Selects serial comm protocol for the respective port as RS-232 or RS-485.</p> <p><b>Note:</b> Protocol choices should consider the payload to be carried. Typically, LTC is sent or received using only RS-485 serial protocol.</p>
<p>• <b>COM Port Tx Routing Function</b></p> 	<p>Selects port function for the respective port as LTC Encoder input or output, or ANC Data Extractor / Audio (SMPTE 337) non-PCM input or output.</p>
<p>• <b>Rx/Tx Status Display</b></p> 	<p>Shows either no data received/sent, or where transfer is present shows data rate (in kbit/sec).</p>
<p>• <b>Insertion Mode Control</b></p> 	<p>Where data is being inserted (received), sets the insertion as follows:</p> <ul style="list-style-type: none"> <li>• <b>Insert Any Data Received:</b> Insert all received data with no regard for packet size.</li> <li>• <b>Fixed Length Packet:</b> Sets receive to wait and accumulate <i>n</i>-number of packet bytes (as set using <b>Insertion Fixed Packet Size</b> control) before inserting data.</li> <li>• <b>Break-Defined Packet:</b> card receiver looks for character-defined break from source being received to define breaks.</li> </ul>
<p>• <b>Insertion Flow Control</b></p> 	<p>Allows communication between card receive and sending source to regulate data receive as follows:</p> <ul style="list-style-type: none"> <li>• <b>No Flow Control:</b> Data is received without buffering or checking to see if data is being received faster than it can be inserted.</li> <li>• <b>XON / XOFF:</b> The card UART Tx will tell the sending source whether it can or cannot accept data at current bit rate.</li> <li>• <b>Hold Break:</b> Card, if close to not being able to accept new data, tells the sending source to hold, and releases this hold when the card is again able to accept new data.</li> </ul>

**Table 3-2 9950-EMDE-ANC Function Menu List — continued**

<div style="background-color: #333; color: white; padding: 5px; text-align: center; font-weight: bold;">COM Routing</div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <span style="background-color: #ccc; padding: 2px 5px;">COM 1 Setup</span> <span style="background-color: #ccc; padding: 2px 5px;">COM 2 Setup</span> </div>	(continued)
<p>• <b>Insertion Sync Byte Control</b></p> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p>Insertion Sync Byte <span style="float: right;">▼</span></p> <div style="background-color: #eee; padding: 2px; border: 1px solid #ccc;">Disabled</div> <div style="background-color: #ccc; padding: 2px; border: 1px solid #ccc;">Field Number at SOF</div> <div style="background-color: #fff; padding: 2px; border: 1px solid #ccc;">Ack on Insertion</div> </div>	<p>Allows use of a sync byte from card receiver back to sending source to synchronize communication between card receive and sending source as follows:</p> <ul style="list-style-type: none"> <li>• <b>Disabled:</b> No special synchronization.</li> <li>• <b>Field Number at SOF:</b> The card sends a single byte telling sending source when start of field 1 or field 2 is occurring.</li> <li>• <b>Ack on Insertion:</b> card sends a single byte back to sending source when data has been inserted.</li> </ul>
<p>• <b>Extraction Mode Control</b></p> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p>Extraction Mode <span style="float: right;">▼</span></p> <div style="background-color: #eee; padding: 2px; border: 1px solid #ccc;">Payload Only</div> <div style="background-color: #ccc; padding: 2px; border: 1px solid #ccc;">Payload Only</div> <div style="background-color: #fff; padding: 2px; border: 1px solid #ccc;">Full Anc Data Packet</div> </div>	<p>Where data is being extracted from input video, sets the data to be sent as follows:</p> <ul style="list-style-type: none"> <li>• <b>Payload Only:</b> Sends payload only (for example, for closed captioning this would be only the ASCII character string representing the CC content).</li> <li>• <b>Full Anc Data Packet:</b> Sends the entire packet, including payload, DID, SDID, and any handling or marking characters.</li> </ul>
<p>• <b>Extraction Flow Control</b></p> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p>Extraction Flow Control <span style="float: right;">▼</span></p> <div style="background-color: #eee; padding: 2px; border: 1px solid #ccc;">No Flow Control</div> <div style="background-color: #ccc; padding: 2px; border: 1px solid #ccc;">No Flow Control</div> <div style="background-color: #fff; padding: 2px; border: 1px solid #ccc;">XON/XOFF</div> <div style="background-color: #fff; padding: 2px; border: 1px solid #ccc;">Hold Break</div> </div>	<p>Allows communication between card transmit and receiving destinations to regulate data receive as follows:</p> <ul style="list-style-type: none"> <li>• <b>No Flow Control:</b> Data is transmitted without buffering or checking to see if data is being transmitted faster than it can be received.</li> <li>• <b>XON / XOFF:</b> The card UART Rx will acknowledge from the receiving system whether it can or cannot accept data at current bit rate.</li> <li>• <b>Hold Break:</b> card, if receiving notification from the receiving system that it is close to not being able to accept new data, tells the card to hold. card releases this hold when the receiving system removes the break command, indicating destination is now ready again to accept new data.</li> </ul>
<p>• <b>Bit Rate/ Parity Gen Control</b></p> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p>Bit Rate <span style="float: right;">▼</span></p> <div style="background-color: #eee; padding: 2px; border: 1px solid #ccc;">115200</div> <p>Parity <span style="float: right;">▼</span></p> <div style="background-color: #eee; padding: 2px; border: 1px solid #ccc;">Disabled</div> <div style="background-color: #ccc; padding: 2px; border: 1px solid #ccc;">Disabled</div> <div style="background-color: #fff; padding: 2px; border: 1px solid #ccc;">Odd</div> <div style="background-color: #fff; padding: 2px; border: 1px solid #ccc;">Even</div> </div>	<p>For both Rx and Tx, sets UART for bit rate and parity as follows:</p> <ul style="list-style-type: none"> <li>• <b>Bit Rate:</b> Sets Tx/Rx bit rate from 1 of 5 speeds ranging from 9600 to 230400 Baud.</li> <li>• <b>Parity:</b> Sets card Rx to expect odd or even parity from incoming data, and sets card Tx to generate a parity bit to satisfy selected parity. Where parity is set, incoming data not conforming to parity selection is rejected.</li> </ul>

Table 3-2 9950-EMDE-ANC Function Menu List — continued

	<p>Allows user control settings to be saved in a Preset and then loaded (recalled) as desired, and provides a one-button restore of factory default settings.</p> <p>Also provides event-based loading allowing a defined preset to be automatically engaged upon various received signal status. Also provides automated Email alerts when an event has occurred.</p>
<p><b>• Preset Layer Select</b></p> <p>Allows selecting a functional layer (or “area of concern”) that the preset is concerned with. Limiting presets to a layer or area of concern allows for highly specific presets, and masks changing card settings in areas outside of the layer or area of concern.</p> <p>Default <b>All</b> setting will “look” at all card settings and save all settings to the defined preset with no masking.</p>  <p>Selecting a layer (in the example, “In Audio Routing”) will set the preset to <b>only</b> “look at” and “touch” audio routing settings and save these settings under the preset. When the preset is loaded (recalled), the card will only “touch” the audio routing layer.</p> <p><b>Example:</b> Since EAS audio routing can be considered independent of video proc settings, if normal audio routing was set up with a particular video proc setting in effect, and at a later time EAS audio routing is desired to be saved and invoked as a preset, selecting <b>In Audio Routing</b> here tells the preset save and load to not concern itself with video proc settings. In this manner, any video proc settings in effect when the EAS preset is invoked will not affect any video proc settings that might be currently in effect.</p>	
<p><b>• Preset Enter/Save/Delete</b></p>  <p><b>Protected state</b> – changes locked out</p> <p><b>Ready (open) state</b> – changes can be applied</p>	<p>Locks and unlocks editing of presets to prevent accidental overwrite as follows:</p> <ul style="list-style-type: none"> <li><b>Protect (ready):</b> This state awaits Protected and allows preset Save/Delete button to save or delete current settings to the selected preset. <b>Use this setting when writing or editing a preset.</b></li> <li><b>Protected:</b> Toggle to this setting to lock down all presets from being inadvertently re-saved or deleted. <b>Use this setting when all presets are as intended.</b></li> <li><b>Create New Preset:</b> Field for entering user-defined name for the preset being saved (in this example, “IRD Rcv122”).</li> <li><b>Save:</b> Saves the current settings under the preset name defined above.</li> </ul>
<p><b>• Preset Save/Load Controls</b></p> 	<ul style="list-style-type: none"> <li><b>Select Preset:</b> drop-down allows a preset saved above to be selected to be loaded or deleted (in this example, custom preset “IRD Rcv122”).</li> <li><b>Load Selected Preset</b> button allows loading (recalling) the selected preset. When this button is pressed, the changes called out in the preset are immediately applied.</li> <li><b>Delete Selected Preset</b> button deletes the currently selected preset.</li> <li><b>Load Factory Defaults</b> button allows loading (recalling) the factory default preset. When this button is pressed, the changes called out in the preset are immediately applied.</li> </ul> <p><b>Note:</b> Load Factory Defaults functions with no masking. The Preset Layer Select controls have no effect on this control and will reset <b>all</b> layers to factory default.</p> <ul style="list-style-type: none"> <li><b>Download Presets</b> saving the preset files to a folder on the connected computer.</li> </ul>



**Table 3-2 9950-EMDE-ANC Function Menu List — continued**


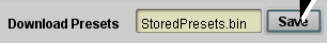
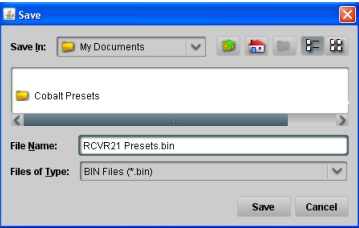

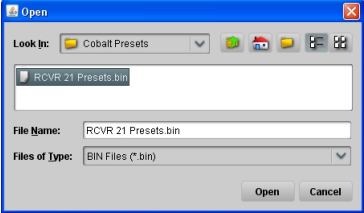
	<p>(continued)</p>
<p><b>Download (save)</b> presets to a network computer by clicking <b>Download Presets – Save</b> at the bottom of the Presets page.</p>  <p>Browse to a desired save location (in this example, <i>My Documents\Cobalt Presets</i>).</p> <p>The file can then be renamed if desired (<i>RCVR21 Presets</i> in this example) before committing the save.</p> 	<p><b>Upload (open)</b> presets from a network computer by clicking <b>Upload</b> 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>).</p> <p>Select the desired file and click <b>Open</b> to load the file to the card.</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Preset transfer between download and file upload is on a <b>group</b> basis (i.e., individual presets cannot be downloaded or uploaded separately).</li> <li>• After uploading a presets file, engagement of a desired preset is only assured by selecting and loading a desired preset as described on the previous page.</li> </ul> 

Table 3-2 9950-EMDE-ANC Function Menu List — continued

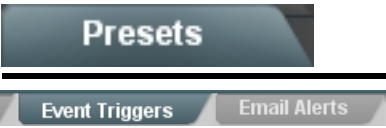

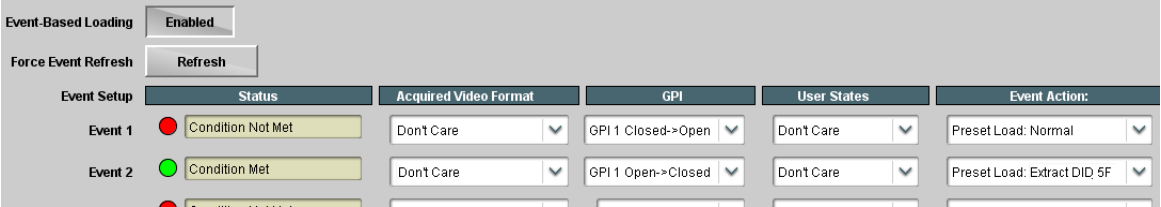
	<p>Provides event-based loading allowing a defined preset to be automatically engaged upon various received signal status. Actions can be “canned” control commands or user-defined by going to a user preset.</p> <p>Event-based loading is particularly useful for automated setup when transitioning from normal processing to processing supporting an alternate format.</p>
<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;">  </div> <div> <ul style="list-style-type: none"> <li>• Event based preset loading is not passive and can result in very significant and unexpected control and signal processing changes if not properly used. If event based presets are not to be used, make certain the <b>Event Based Loading</b> button is set to <b>Disabled</b>.</li> <li>• Because event based preset loading applies control changes by invoking presets, loading conditions cannot be nested within a called preset (event-based loading settings performed here cannot be saved to presets).</li> </ul> </div> </div> <p>Event triggers allow a variety of event screening criteria, and in turn provide an Event Action “go to” in response to the detected event(s). For each screened criteria, categories can be set as “don’t care” or set to specific criteria to broaden or concentrate on various areas of concern.</p> <p>The <b>Event based loading</b> button serves as a master enable/disable for the function.</p> <p>Go-to Event Actions can be user-defined presets, “canned” (hard-coded) selections (such as GPO triggers or routing changes), or automated E-mail alert to a respondent (see Email Alerts (p. 3-24) for setting up e-mail alerts).</p>	
<p>In the example here for Event 1 and Event 2, the card is set to invoke a preset that applies DID extraction settings nested in preset “Extract DID 5F” whenever GPI 1 goes LO. When this GPI goes HI, corresponding action in preset “Normal” invokes another preset to revert the card to default settings.</p>	
	
<p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Screened conditions are triggered upon start of event. Any event-based setup must be done in advance of the triggering event in order for event to be detected.</li> <li>• Loss of true conditions does not disengage an event-based triggering. A new set of true conditions must be defined and then occur to transition from one event-based trigger to another.</li> <li>• Time required to engage an event-based trigger depends upon complexity of the called preset. (For example, a preset that invokes large-scale changes may take longer to engage than a preset involving only a small change.)</li> <li>• Make certain all definable event conditions that the card might be expected to “see” are defined in any of the Event 1 thru Event 32 rows. This makes certain that the card will always have a defined “go-to” action if a particular event occurs. For example, if the card is expected to “see” a 720p5994 stream or as an alternate, a 525i5994 stream, make certain both of these conditions are defined (with your desired go-to presets) in any two of the Event 1 thru Event 32 condition definition rows.</li> </ul>	

Table 3-2 9950-EMDE-ANC Function Menu List — continued

Presets

(continued)

Event Triggers

Email Alerts

**User States** is a special column which allows a logic state to be set (similar to a register or latch) whenever a defined condition is first triggered. A user state (which is latched until cleared by some other definable action) can be successively used with other user states, thereby allowing a final action to be invoked only when subordinate user states have been sequentially satisfied as true.

In the example here, two independent units are used for an EAS alert input (one box supplies alert key video, and the other supplies automated alert audio). Both communicate their ready signal each using edge-trigger GPO's which are fed to the respective GPI 1 and GPI 2 on the card. Because these two boxes are independent and cannot be relied upon to provide coinciding triggers, a chain of user state definers are used here to engage a preset routing key video and EAS audio routing when both states from both boxes are true in the order of GPI 1 first and then GPI 2 second for this example.

Event Setup	Status	GPI	User States	Event Action:	
Event 1	<span style="color: yellow;">●</span> Condition Met	GPI 1 Open->Closed	Don't Care	Set User State 1	GPI 1 (key) cue falling-edge sets user state 1
Event 2	<span style="color: yellow;">●</span> Condition Met	GPI 2 Open->Closed	User State 1 Set	Set User State 2	GPI 2 (audio) cue falling-edge sets user state 2
Event 3	<span style="color: yellow;">●</span> Condition Met	Don't Care	User State 2 Set	Set User State 3	User state 2 (which requires user state 1 being true first) sets state 3, which then invokes a preset to load settings to route EAS key and audio
Event 4	<span style="color: green;">●</span> Last Active Event	Don't Care	User State 3 Set	Preset Load: EAS Key+Audio	
Event 5	<span style="color: red;">●</span> Condition Not Met	Don't Care	User State 1 Cleared	Preset Load: Revert to Normal	When either GPI 1 or GPI 2 has a rising-edge trigger (cease EAS), user states 1 or 2 are cleared, thereby clearing user state 3. Either state change calls a preset to revert to normal operation.
Event 6	<span style="color: red;">●</span> Condition Not Met	Don't Care	User State 2 Cleared	Preset Load: Revert to Normal	
Event 7	<span style="color: red;">●</span> Condition Not Met	GPI 1 Closed->Open	Don't Care	Clear User State 1	
Event 8	<span style="color: red;">●</span> Condition Not Met	GPI 2 Closed->Open	Don't Care	Clear User State 2	

**Table 3-2 9950-EMDE-ANC Function Menu List — continued**

<div style="border: 1px solid black; padding: 5px;"> <div style="background-color: #444; color: white; padding: 5px; text-align: center; font-weight: bold; font-size: 1.2em;">Presets</div> <hr style="border: 1px solid black;"/> <div style="display: flex; justify-content: space-around; background-color: #eee; padding: 2px;"> <span style="border: 1px solid #ccc; padding: 2px;">Event Triggers</span> <span style="border: 1px solid #ccc; padding: 2px; font-weight: bold;">Email Alerts</span> </div> </div>	<p>Provides setup for automated Email alerts when an event has occurred.</p>
<p>As an Event Action choice on the Events Triggers sub-tab, an Email alert can be sent as a response. Set up email fields as shown in the example below.</p> <p><b>Note:</b> Frame hosting the card must be accessible to email recipient's network. It is recommended to set up and generate a test event to test the email send.</p> <div style="display: flex; align-items: flex-start; margin-top: 20px;"> <div style="border: 1px solid #ccc; background-color: #f0f0f0; padding: 10px; width: 40%;"> <p><b>Last Event:</b> <input type="text" value="Frozen video detected"/></p> <p><b>To:</b> <input type="text" value="joe.doe@xyzmedia.com"/></p> <p><b>From:</b> <input type="text" value="9902slot8frame1A21@xyzmedia.com"/></p> <p><b>SMTP User:</b> <input type="text" value="frame1A21"/></p> <p><b>SMTP Password:</b> <input type="password" value="●●●●●●"/></p> <p><b>SMTP Server:</b> <input type="text" value="smtp.gmail.com"/></p> <p><b>SMTP Port:</b> <input type="text" value="25"/> ▼</p> </div> <div style="margin-left: 20px; width: 55%;"> <p>When fields are filled-in to specify recipient and sender, and email alert is selected for Event Action on Event Triggers sub-tab page, recipient receives an email alert upon event, with the triggering event shown (in this example, "frozen video detected").</p> </div> </div>	

Table 3-2 9950-EMDE-ANC Function Menu List — continued


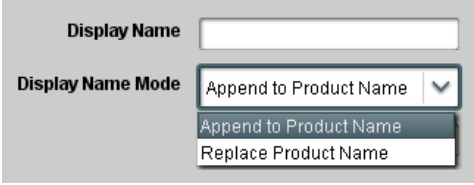

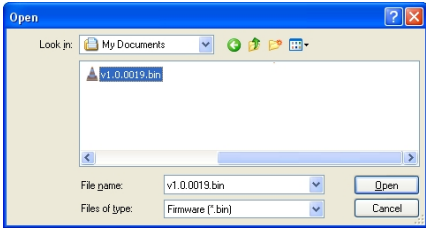
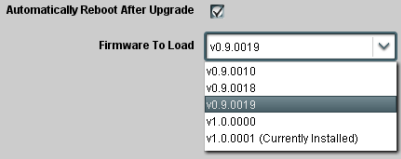
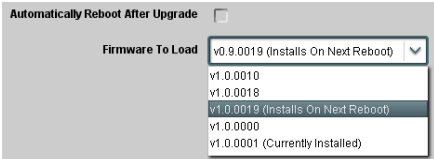
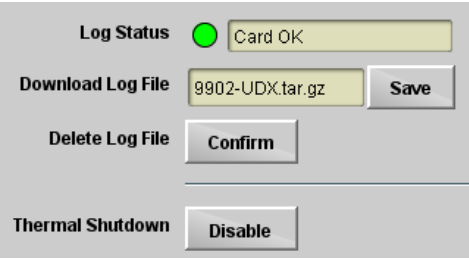
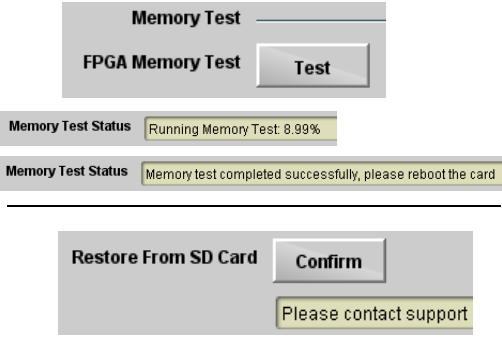


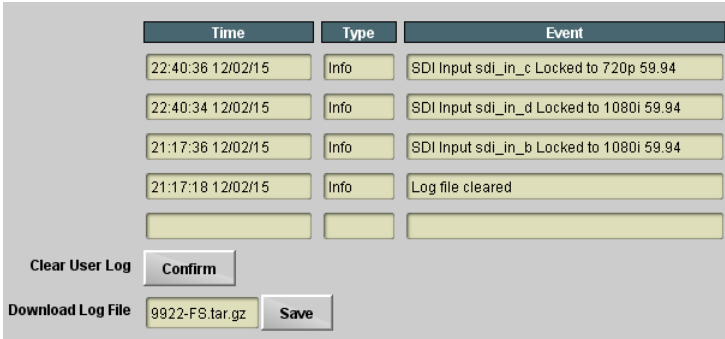
	<p>Provides a global operating status and allows a log download for factory engineering support. Also provides controls for selecting and loading firmware upgrade files, and for setting the comm IP address.</p>
<ul style="list-style-type: none"> <li>• <b>Card DashBoard Name Control</b></li> </ul> 	<p>Allows card name In Dashboard to be changed as desired. Click return to engage change.</p> <ul style="list-style-type: none"> <li>• <b>Append to Product Name</b> appends (or adds to) existing OEM name (for example, "9902-UDX Processing 1A").</li> <li>• <b>Replace Product Name</b> completely replaces the OEM name OEM name (for example, "Processing 1A").</li> </ul> <p><b>Note:</b> DashBoard instance(s) may have to be refreshed before name change appears.</p>
<ul style="list-style-type: none"> <li>• <b>Firmware Upgrade Controls</b></li> </ul>	<p>Firmware upgrade controls allow a selected firmware version (where multiple versions can be uploaded to the card's internal memory) to invoke an upgrade to a selected version either instantly, or set to install on the next card reboot (thereby allowing card upgrade downtime to be controlled at a scheduled point in time).</p>
<p><b>Note:</b> The page/tab here allows managing multiple firmware versions saved on the card. New upgrade firmware from our web site can always be directly uploaded to the card without using this page. Instructions for firmware downloading to your computer and uploading to the card can be found at the <b>Support&gt;Firmware Downloads</b> link at <a href="http://www.cobaltdigital.com">www.cobaltdigital.com</a>.</p>	
<ol style="list-style-type: none"> <li>1. Access a firmware upgrade file from a network computer by clicking <b>Upload</b> at the bottom of Dashboard.</li> <li>2. Browse to the location of the firmware upgrade file (in this example, <i>My Documents\lv1.0.0019.bin</i>).</li> <li>3. Select the desired file and click <b>Open</b> to upload the file to the card.</li> </ol>	 
<ul style="list-style-type: none"> <li>• <b>Immediate firmware upload.</b> The card default setting of <b>Automatically Reboot After Upgrade</b> checked allow a selected firmware version to be immediately uploaded as follows:</li> </ul> <ol style="list-style-type: none"> <li>1. Click <b>Firmware To Load</b> and select the desired upgrade file to be loaded (in this example, "v1.0.0019").</li> <li>2. Click <b>Load Selected Firmware</b>. The card now reboots and the selected firmware is loaded.</li> </ol>	
<ul style="list-style-type: none"> <li>• <b>Deferred firmware upload.</b> With <b>Automatically Reboot After Upgrade</b> unchecked, firmware upgrade loading is held off until the card is manually rebooted. This allows scheduling a firmware upgrade downtime event until when it is convenient to experience to downtime (uploads typically take about 60 seconds).</li> </ul> <ol style="list-style-type: none"> <li>1. Click <b>Firmware To Load</b> and select the desired upgrade file to be loaded (in this example, "v1.0.0019"). Note now how the display shows "Installs on Next Reboot".</li> <li>2. Click <b>Load Selected Firmware</b>. The card holds directions to proceed with the upload, and performs the upload only when the card is manually rebooted (by pressing the <b>Reboot</b> button).</li> <li>3. To cancel a deferred upload, press <b>Cancel Pending Upgrade</b>. The card reverts to the default settings that allow an immediate upload/upgrade.</li> </ol>	

Table 3-2 9950-EMDE-ANC Function Menu List — continued

<div style="text-align: center; background-color: #333; color: white; padding: 5px; border-radius: 5px;">Admin</div>	<p>(continued)</p>
<p>• <b>Log Status and Download Controls</b></p> 	<ul style="list-style-type: none"> <li>• <b>Log Status</b> indicates overall internal operating status.</li> <li>• <b>Download Log File</b> allows a operational log file to be saved to a host computer. This log file can be useful in case of an error or in the case of an operational error or condition. The file can be submitted to Cobalt engineering for further analysis.</li> <li>• <b>Delete Log File</b> deletes the currently displayed log file. A second confirmation dialog is displayed to back out of the delete if desired.</li> <li>• <b>Thermal Shutdown</b> enable/disable allows the built-in thermal failover to be defeated. (Thermal shutdown is enabled by default).</li> </ul> <div style="background-color: #333; color: white; padding: 5px; text-align: center; font-weight: bold; margin-top: 10px;">CAUTION</div> <p>The 9950-EMDE-ANC FPGA is designed for a normal-range operating temperature around 85° C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within card operating safe parameters, and can be allowed by setting this control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum card protection.</p>
<p>• <b>Card Check and Restore Utilities</b></p> 	<p><b>Memory Test</b> allows all cells of the card FPGA memory to be tested.</p>  <p>This control should <b>only</b> be activated under direction of product support. Exercising the memory test is <b>not</b> part of normal card maintenance.</p> <p><b>Restore from SD Card</b> allows card rendered inoperable to be restored using an SD memory card fitted to the card internal SD slot.</p>  <p>Product support must be contacted prior to performing this operation. Use of any SD card not supplied by support can corrupt the card.</p>
<div style="text-align: center; background-color: #333; color: white; padding: 5px; border-radius: 5px;">User Log</div>	<p>Automatically maintains a log of user actions and input lock status. Log file can be downloaded using download utility.</p>
<p><b>User Log</b> shows input lock and other user conditions (with most recent event at top of list).</p> <p><b>Clear User Log</b> clears all entries.</p> <p><b>Download Log File</b> opens a browser allowing the log file to be saved on the host machine.</p>	

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## Troubleshooting

This section provides general troubleshooting information and specific symptom/corrective action for the 9950-EMDE-ANC card and its remote control interface. The 9950-EMDE-ANC 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 9950-EMDE-ANC card itself and its remote control systems all (to varying degrees) provide error and failure indications. Depending on how the 9950-EMDE-ANC card is being used (i.e, standalone or network controlled through DashBoard™), check all available indications in the event of an error or failure condition.

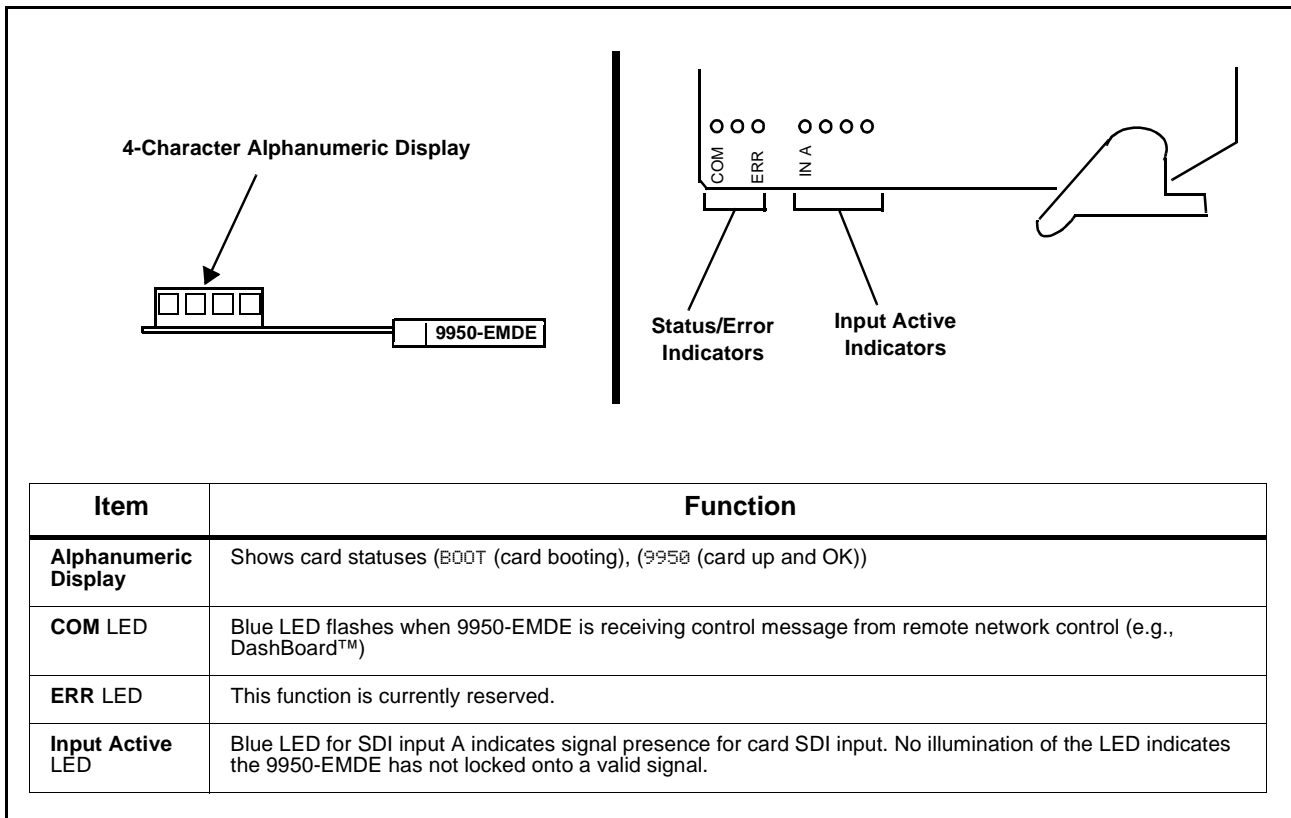
The various 9950-EMDE-ANC card and remote control error and failure indicators are individually described below.

**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. 3-31)
- 9950-EMDE-ANC Processing Error Troubleshooting (p. 3-31)
- Troubleshooting Network/Remote Control Errors (p. 3-32)

## 9950-EMDE-ANC Card Edge Status/Error Indicators and Display

Figure 3-5 shows and describes the 9950-EMDE-ANC 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 cards such as network remote control cards.



**Figure 3-5 9950-EMDE-ANC Card Edge Status Indicators and Display**



### DashBoard™ Status/Error Indicators and Displays

Figure 3-6 shows and describes the DashBoard™ status indicators and displays. These indicator icons and displays show status and error conditions relating to the 9950-EMDE-ANC card itself and remote (network) communications.

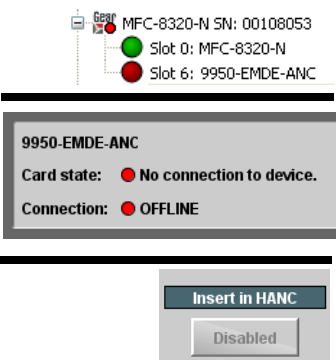
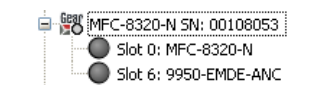
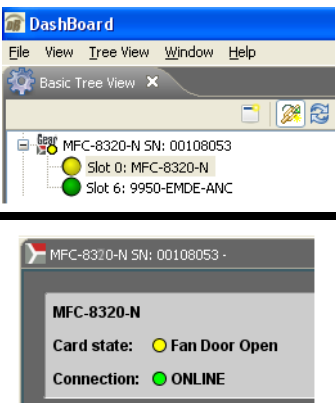

Indicator Icon or Display	Error Description
	<p>Red indicator icon in Card Access/Navigation Tree pane shows card with Error condition (in this example, the Card Access/Navigation Tree pane shows a general error issued by the 9950-EMDE-ANC card in slot 6).</p> <p>Specific errors are displayed in the Card Info pane (in this example "No connection to card" indicating 9950-EMDE-ANC card is not connecting to frame/LAN).</p> <p>If the 9950-EMDE-ANC card is not connecting to the frame or LAN, all controls are grayed-out (as shown in the example here).</p>
	<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 9950-EMDE-ANC card in slot 6 and the MFC-8320-N Network Controller Card for its frame in slot 0 are not being seen).</p>
	<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).</p> <p>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>
	<p>Yellow indicator icon in 9950-EMDE Card Info pane shows error alert, along with cause for alert (in this example, the 9950-EMDE is not receiving an enabled IP ancillary data receive).</p>

Figure 3-6 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 3-7).

By clicking on "Slot 0: MFC-8320-N" in this example, Card Info is displayed for frame Network Controller Card

Status for selected card is shown here (in this example, connection OK and "Fan Door Open" alert)

Card general information is displayed in lower portion of Card Info pane

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By clicking on "Slot 6: CDI-9950-EMDE-ANC" in this example, Card Info is shown for 9950-EMDE-ANC card in slot 6

Status for selected card is shown here (in this example, all indications are OK)

Where applicable, additional status is displayed (as shown in this example)

**Figure 3-7 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
<p><b>Verify power presence and characteristics</b></p>	<ul style="list-style-type: none"> <li>• On both the frame Network Controller Card and the 9950-EMDE-ANC, 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 9950-EMDE-ANC 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 9950-EMDE-ANC card itself is defective.</li> <li>• If display shows <b>excessive</b> power being consumed (see Technical Specifications (p. 1-12) in Chapter 1, “Introduction”), the 9950-EMDE-ANC card may be defective.</li> </ul> </li> </ul>
<p><b>Check Cable connection secureness and connecting points</b></p>	<p>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.</p>
<p><b>Card seating within slots</b></p>	<p>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.)</p>
<p><b>Check status indicators and displays</b></p>	<p>On both DashBoard™ and the 9950-EMDE-ANC 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.</p>
<p><b>Troubleshoot by substitution</b></p>	<p>All cards within the frame can be hot-swapped, replacing a suspect card or module with a known-good item.</p>

**9950-EMDE-ANC Processing Error Troubleshooting**


Table 3-4 provides 9950-EMDE-ANC processing troubleshooting information. If the 9950-EMDE-ANC 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 9950-EMDE-ANC 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 9950-EMDE-ANC card edge status indicators.

**Note:** Where errors are displayed on both the 9950-EMDE-ANC 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"> <li>DashBoard™ shows <b>Unlocked</b> message in 9950-EMDE-ANC Card Info pane</li> </ul>  <ul style="list-style-type: none"> <li>Card edge <b>Input</b> LED corresponding to input is not illuminated</li> </ul>	No video input present	Make certain intended video source is connected to appropriate 9950-EMDE-ANC card video input. Make certain BNC cable connections between frame Rear I/O Module for the card and signal source are OK.
Packet-based ancillary data (closed captioning, timecode) not transferred through 9950-EMDE-ANC	<b>Remove Incoming</b> control inadvertently set to Enabled	The 9950 card can remove packets from the output stream if desired. Make certain this control is set to Disabled if packet removal is not desired (default position is disabled). See Ancillary Data Proc Controls (p. 3-15) for more information.
Audio not passed through card	Packet inserted in HANC possibly interfering with HANC audio packets	If ANC insertion <b>Insert in HANC</b> is enabled, in some cases this insertion can conflict with HANC audio (default position is disabled). See Ancillary Data Proc Controls (p. 3-15) for more information.
Card status displays show extraction, but extracted data not present in external card	Protocol settings on card do not match expected protocols on receiving card.	For extraction sent to external cards using either IP or serial based communication, settings on card must match those expected by receiving card(s). See COMM Ports Setup Controls (p. 3-18) and/or IP Port Setup (p. 3-16) as applicable for more information.
Selected upgrade firmware will not upload	Automatic reboot after upgrade turned off	Card <b>Presets &gt; Automatically Reboot After Upgrade</b> box unchecked. Either reboot the card manually, or leave this box checked to allow automatic reboot to engage an upgrade upon selecting the upgrade.

## Troubleshooting Network/Remote Control Errors

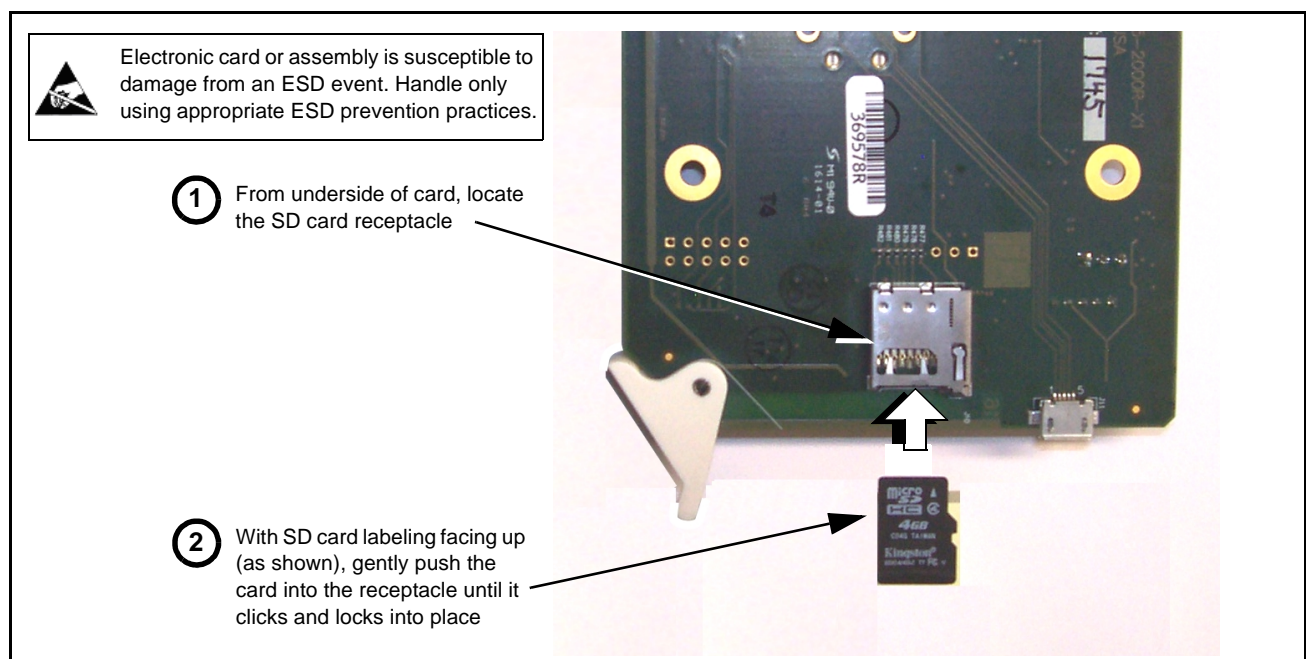
Refer to Cobalt® reference guide “Remote Control User Guide” (PN 9000RCS-RM) for network/remote control troubleshooting information.

In Case of Problems

**Recovering card From SD Memory Card**

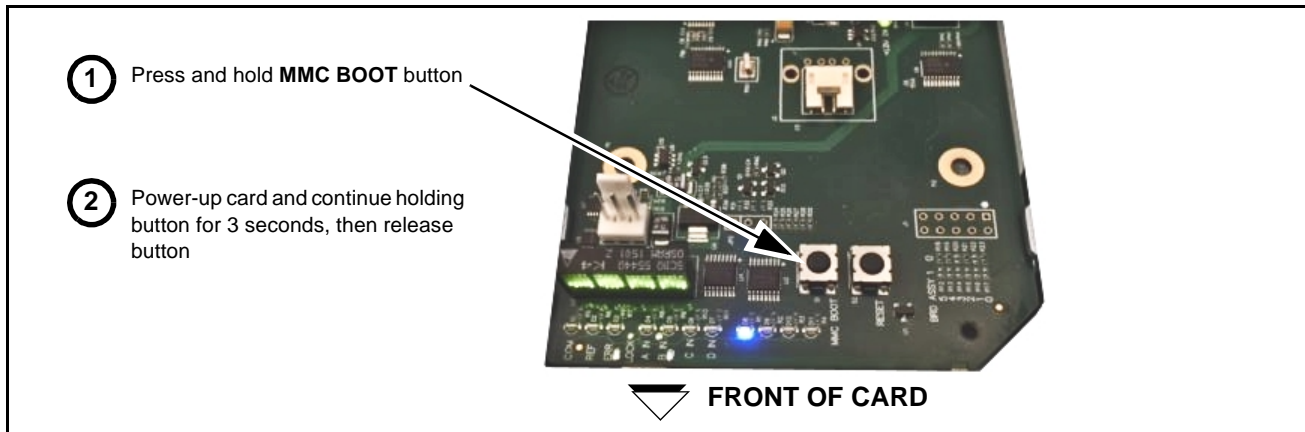
New production cards come equipped with an SD card installed in a slot receptacle on the underside of the card. The data on this SD card can be used to restore a card should the card become unresponsive (can't communicate with DashBoard or other remote control). Recovering a card using the procedure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

1. (See Figure 3-8.) Make certain the card has the proper SD card installed in the under-card slot. If SD card is **not** installed, contact Product Support to obtain an SD card.



**Figure 3-8 SD Card Installation**

2. (See Figure 3-9.) With card powered-down, locate the **MMC BOOT** button on the card. Proceed as shown in picture.



**Figure 3-9 MMC Boot Button**

3. With button now released, the card will begin reprogramming:
  - **COM** LED illuminates and remains illuminated.
  - When reprogram is complete, **COM** LED turns off, on, and then off again (entire process takes about 1-1/2 minute).
4. Remove power from the card (remove card from slot or power-down BBG-1000 Series unit).
5. Re-apply power to the card. The card/card will display as “**UNLICENSED**” in DashBoard/remote control.
6. In Dashboard or web remote control, go to **Admin** tab and click **Restore from SD Card**. After about 1/2-minute, the card license(s) will be restored and card will be using its most recently installed firmware.
7. Card/Device can now be used as normal. On BBG-1000 Series unit, re-install top cover.

### Contact and Return Authorization

Should any problem arise with this product that was not solved by the information in this section, please contact the Cobalt Digital Inc. Technical Support Department. If required, a Return Material Authorization number (RMA) will be issued to you, as well as specific shipping instructions. If required, a temporary replacement item will be made available at a nominal charge. Any shipping costs incurred are the customer’s responsibility. All products shipped to you from Cobalt Digital Inc. will be shipped collect.

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

See Contact Cobalt Digital Inc. (p. 1-11) in Chapter 1, “Introduction“ for contact information.





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