

# 9341

**Analog Audio to AES Converter**

## **Owner's Manual**



9341-OM  
Version: 1.0



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## 9341 • AES Audio Delay Owner's Manual

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## Important Regulatory and Safety Notices

Before using this product and any associated equipment, refer to the “Important Safety Instructions” listed below so as to avoid personnel injury and to prevent product damage.

Products may require specific equipment, and /or installation procedures be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these specific requirements.

### Symbol Meanings



This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage or injury to persons or equipment.



**Warning**

The symbol with the word “**Warning**” within the equipment manual indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.



**Caution**

The symbol with the word “**Caution**” within the equipment manual indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



**Notice**

The symbol with the word “**Notice**” within the equipment manual indicates a situation, which if not avoided, may result in major or minor equipment damage or a situation which could place the equipment in a non-compliant operating state.



**ESD  
Susceptibility**

This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.

### Important Safety Instructions



**Caution**

This product is intended to be a component product of the 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 it’s component products.



**Warning**

Certain parts of this equipment namely the power supply area still present a safety hazard, with the power switch in the OFF position. To avoid electrical shock, disconnect all A/C power cords from the chassis' rear appliance connectors before servicing this area.



**Warning**

Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after any servicing.

This product contains safety critical parts, which if incorrectly replaced may present a risk of fire or electrical shock. Components contained within the product’s power supplies and power supply area, are not intended to be customer serviced and should be returned to the factory for repair.

To reduce the risk of fire, replacement fuses must be the same type and rating.

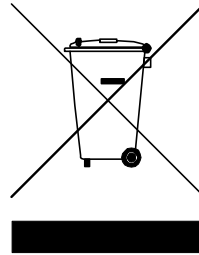
Only use attachments/accessories specified by the manufacturer.

## Environmental Information

**The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.**

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Cobalt Digital encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

The crossed-out wheeled bin symbol invites you to use these systems.



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You can also contact Cobalt Digital for more information on the environmental performances of our products.

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# Introduction

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## In This Chapter

This chapter includes the following sections:

- A Word of Thanks
- Overview
- Functional Block Diagram
- Features
- Documentation Terms

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## A Word of Thanks

Congratulations on choosing the openGear™ **9341 Analog Audio to AES Converter**. The 9341 is part of a full line of modular conversion gear for broadcast TV environments. The Cobalt Digital openGear™ line includes video decoders and encoders, audio embedders and de-embedders, distribution amplifiers, format converters, and much more. Cobalt openGear™ modular conversion gear will meet your signal conversion needs now and well into the future.

Should you have questions pertaining to the installation or operation of your 9341, please contact us at the numbers listed on the back cover of this manual. We are happy to help with any questions regarding this or any other openGear™ card.

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## Overview

The 9341 is a high quality A to D converter capable of converting up to 8 channels of analog audio into four pairs of AES audio. Analog audio is differential input and sampled at 48 kHz with 0 dbFS digital equivalent to a +24 dBu analog.

Beyond analog to digital conversion, the 9341 can also provide AES audio routing. Any of the 8 analog audio inputs can be mapped to any of the 8 AES audio outputs. The gain and phase can also be adjusted on any of the audio channels.

All card configuration is done with a simple front panel menu. There is a four character text display to view and control parameters, and a toggle switch and two buttons to navigate the menu.

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# Supported Audio Formats

## Discrete AES Audio Output

The 9341 can emit 8 channels (4 pairs) of discrete AES audio on 75 ohm BNC connections. The output clock rate of each pair is precisely locked, and derived from the input AES, or the frame reference.

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# Inputs and Outputs

The input and outputs of the 9341 are the following:

### Inputs:

- 8 Analog Audio differential

### Outputs:

- 4 dedicated AES pair output connections. (AES channels 1-8)

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# Signal Timing

The input AES audio rate must be 48 kHz ( $\pm 1\%$ ) nominally. There are sample rate converters on each input that allow the use of asynchronous sources, but the rate must be 48kHz. The output clock rate will be 48 kHz as defined by the AES input, or the frame video reference, depending on user selection.

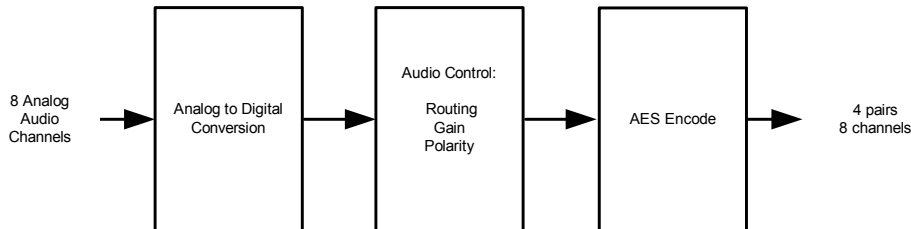
In the case where DARS input is selected as the reference, the timing will be taken from BNC 10. Consequently, to slave the output timing to a DARS audio reference, simply connect it to BNC #10 and all other inputs will be re-sampled to match that channel.

To match the output audio clock to a video reference, select the frame reference ("Reference 1" or "Reference 2"). The card will automatically detect any black burst or tri level format (NTSC, PAL, 1080i, 720p) and generate a 48 kHz output clock accordingly.

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# Functional Block Diagram

This section describes the basic operation of your 9341 product.



9341 Block Diagram

*Figure 1. Simplified Block Diagram of 9341 Functions*

Differential analog audio signals are received on the input phoenix connectors. AES audio is sample rate converted to match the selected clock source. AES routing, gain, and polarity are then applied.

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## Documentation Terms

The following terms are used throughout this guide:

- “**Frame**” refers to the **8310** frame that houses the **9341** card.
- “**Operator**” and “**User**” both refer to the person who uses the **9341**.
- “**Board**” and “**Card**” all refer to the **9341** card itself, including all components and switches.
- “**System**” and “**Video system**” refers to the mix of interconnected production and terminal equipment in which the **9341** operates.



# Installation and Setup

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## In This Chapter

This chapter includes the following sections:

- Static Discharge
- Unpacking
- Rear Module Installation (Optional)
- Board Installation
- Card Control and Status

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## Static Discharge

Whenever handling the card and other related equipment, please observe all static discharge precautions as described in the following note:



Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas, and when wearing synthetic fiber clothing. Always exercise proper grounding precautions when working on circuit boards and related equipment.

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## Unpacking

Unpack each card you received from the shipping container, and check the contents against the packing list to ensure that all items are included. If any items are missing or damaged, contact your sales representative or Cobalt Digital directly.

## Rear Module Installation (Optional)

If you are installing the card in a 8310-C-BNC or 8310-BNC frame (one with a 100 BNC rear module installed across the entire back plane), skip this section.

If you are installing the card into a slot with no rear module, you should have ordered and received one of the following modules; RM-9341-B or RM-9341-C. You will need to install it in your 8310 frame before you can connect cables.

Use the following steps to install a rear module in an 8310 openGear™ frame:

1. Refer to the openGear™ 8310 frame Owner's Manual, to ensure that the frame is properly installed according to instructions.
2. On the rear of the 8310, locate the card frame slot.
3. As shown in Figure 2, seat the bottom of the rear module in the seating slot at the base of the frame's back plane.

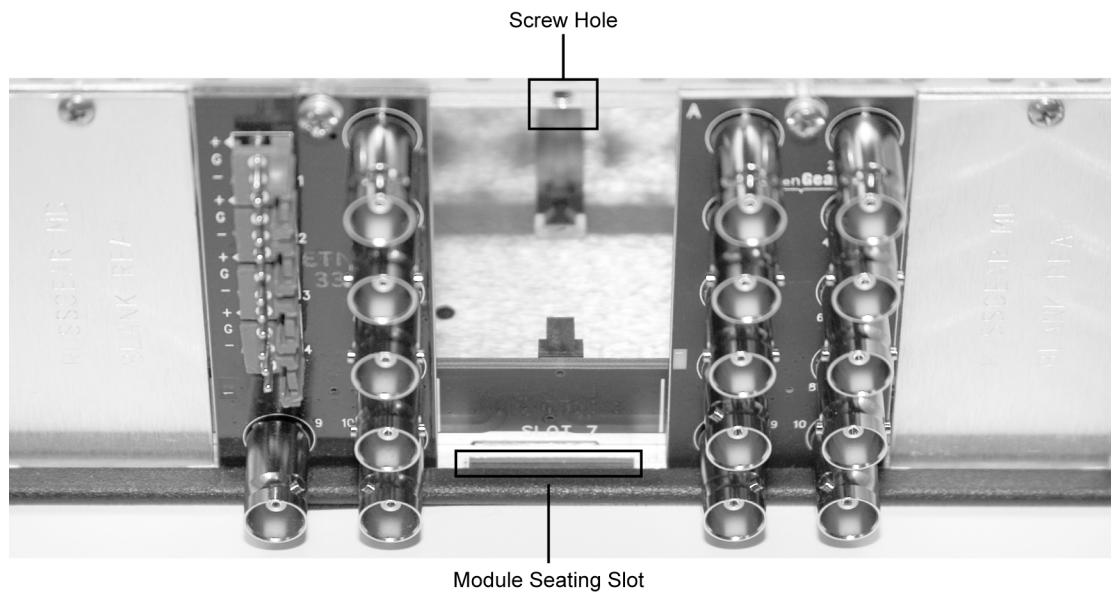


Figure 2. Rear Module Installation

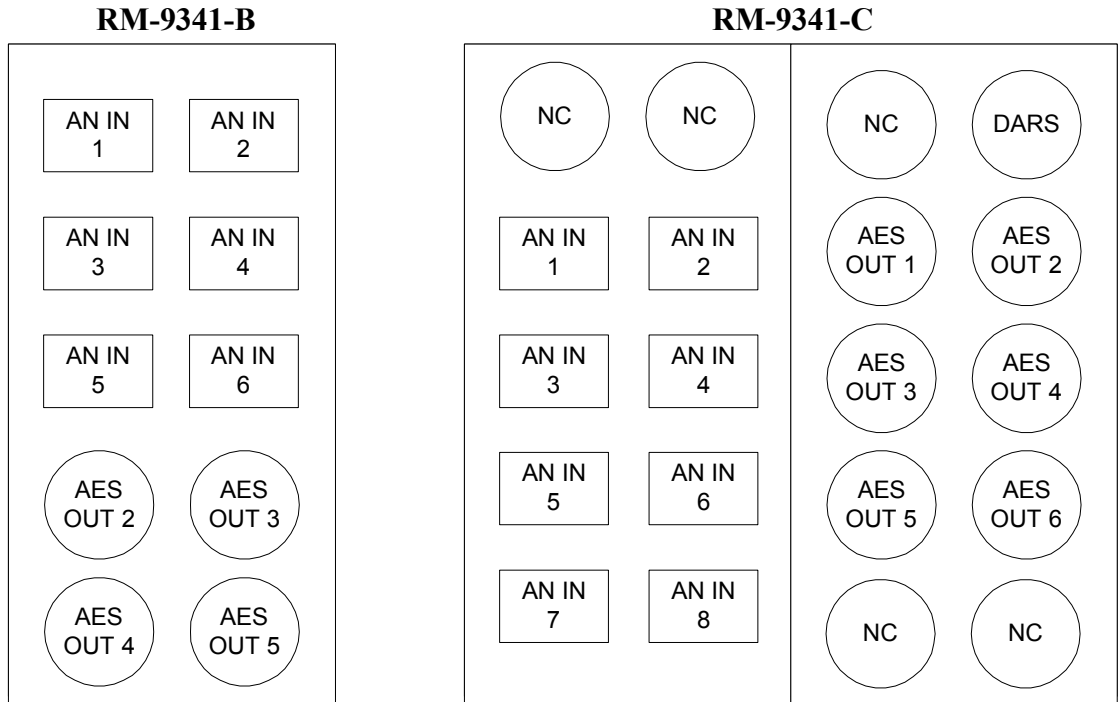
4. Align the top hole of the RM-9341-C with the screw hole on the top edge of the 8310 back plane.
5. Using a Phillips driver and the supplied screw, fasten the rear module to the 8310 back plane. Do not over tighten.

All modules are installed using the same method above.

The following section contains a table of the optional rear modules available for the 9341.

# Rear Modules Available for 9341

Figure 3. BNC Designations for the Card Rear Modules available for the 9341.



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## Board Installation

Use the following steps to install the card in the openGear™ 8310 frame:

1. Refer to the Owner's Manual of the openGear™ 8310 frame to ensure that the frame is properly installed according to instructions.



### Warning

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 convection cooling.

2. After selecting the desired frame installation slot, hold the card by the edges and carefully align the card edges with the slots in the frame. Then, fully insert the card into the frame until the rear connection plugs are properly seated on the midplane and rear modules.

This completes the procedure for installing the card in the openGear™ 8310 frame.

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# Card Control and Status

## Card Status

The card indicates the status of the input signal with the four blue LEDs labeled with the different supported formats (1080, 720, 625, 525), these LEDs correspond to AES Inputs 1-4. The four orange LEDs labeled User 1-4 correspond to AES Inputs 5-8 respectively. When the card has locked to an AES signal, a corresponding LED will be illuminated. When the card has not locked to an AES signal, the card will search for a signal and the lights will cycle rapidly.

## Menu Navigation

The card can be configured from a menu system built in to the front card edge. This provides an intuitive and easy to use method for exploring and using the features of the card.

The menu is navigated by using the toggle switch and the two push buttons. The lower button is the “Enter” button to enter a submenu, and the upper button is the “Exit” button to exit a submenu. Moving the toggle switch up or down moves up or down in menu choices, and pressing the buttons moves in or out of sub menus.

The menu LEDs will illuminate from top to bottom to indicate increasing depth in the menu.

## Audio Submenu

Menu Structure			Parameter Type	
Aud	AN	Ch01- Ch08 (x8)	Src	Output Source
			Gain	Output Gain
			Pol	Output Polarity
	Tone	TG1-TG4 (x4)	Tone Frequency	

### Output Source

Because the cards audio system functions like a router, each output can be sourced from any input channel. This parameter lets you choose from the many different sources. Here is an explanation of the different source names:

Source Name	Description
AnXX	Analog Audio channel X (1 through 8)
TgX	Test Generator channel X (1 through 4)

### Output Gain

The gain of each output is adjustable from -40dB to +40dB in 0.1 dB steps. A setting of 400 is equivalent to +40dB.

### Output Polarity

If set to “Norm” output polarity is the same as input polarity, if set to “Inv” the output polarity is inverted. This can be used to correct polarity errors in the input signals fed to the card.

## **Tone Frequency**

This sets the frequency of the test tone for each of the four tone generators. Each of the four tone generators TG1 – TG4 can be set to a different frequency, and are available as audio sources for the embedded or AES audio outputs. The tones can range from 50Hz to 16kHz.

## **Display Submenu**

<b>Menu Structure</b>		<b>Parameter Type</b>
Disp	H/V	Display Orientation
	BRGT	Display Brightness

### **Display Orientation**

This parameter lets you change the orientation of the display. “Vert” makes the characters look correct when the cards are mounted in a 2 RU frame like the 8310. “Horz” makes the characters look right in a horizontal frame.

### **Display Brightness**

This parameter allows you to set the standard output brightness of the menu display. It is a percentage of maximum brightness.

## **Preset Submenu**

<b>Menu Structure</b>		<b>Parameter Type</b>
Prst	Slet	Select Preset
	Save	Save Settings
	Load	Load Settings
	Fact	Restore Factory Settings

### **Select Preset**

Select from one of the five saved presets.

### **Save Settings**

In this parameter, move the toggle switch up to save the settings to the card persistent storage.

### **Load Settings**

In this parameter, move the toggle switch up to load the saved settings and make them active.

### **Restore Factory Settings**

In this parameter, move the toggle switch up to make the factory default settings active, and make the stored settings equal to the factory settings.

## Information Submenu

Menu Structure		Parameter Type
Info	+POW	Positive Watts Consumed
	-POW	Negative Watts Consumed
	SWR#	Software Release Number
	SWB#	Software Build Number

### **Positive Watts Consumed**

A read only indication of power consumed by the card from the frames +12V rail.

### **Negative Watts Consumed**

A read only indication of power consumed by the card from the frames +-7.5V rail.

### **Software Release Number**

A read only indication of the software release number. A higher number is newer release of software.

### **Software Build Number**

A read only indication of the software build number. Software build number is an internal indicator used by Cobalt engineers to differentiate different software builds.

## Factory Default Settings

The factory default settings are as follows

- 1) The audio mapping is for each Analog input to be routed to its respective AES output, for example ANALOG IN 1 to AES OUT 1.
- 2) Audio gain is set to 0dB and polarity is set to normal on all channels.

# Remote Control

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## In This Chapter

This section provides a detailed explanation on using remote control functions with your card.

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## DashBoard Control System Software

The DashBoard Control System enables you to monitor and control openGear™ frames and controller cards from a computer. The DashBoard software and manual can be downloaded from the Cobalt Digital Inc. website ([www.cobaltdigital.com](http://www.cobaltdigital.com)).

### *Using the Menus and Menu Descriptions*

You must first install the DashBoard Control System software on your computer. Refer to the *DashBoard Owner's Manual* for software installation procedures and for using the DashBoard interface.

The following pages list the parameters from the menu tabs available in the DashBoard software when connected to a 9341.

Menu	Item	Format	Description
<b>Card Info (Read-only)</b>	Product	9341	The product name
	Manufacturer	Cobalt Digital Inc.	The manufacturer of the product
	Software Release Number	###	The release number of the firmware in this card
	Software Build Date	###	The internal build number of this software
	Software Build Time	###	The date and time the software was created
	+12 V Power Rail	### W	Positive Supply Power
	-7.5 Power Rail	### W	Negative Supply Power
	Video Input Standard	#####	Detected Video Standard on SDI or Analog Input
	SSN	#####	Displays the Silicon Serial Number of the card.
	Audio	OK / Analog Input Clipping	Status indicator for analog audio input



Menu	Item	Format	Description
	DARS	Locked / Unlocked	Status indicator for DARS audio input
	Reference Standard	#####	Detected standard of selected reference.
	Settings	Saved / Unsaved	This shows whether the current settings have been saved to a preset.

Menu	Item	Format	Description
<b>AES Audio Out Pairs 1-4</b>	Source (per channel)	Analog Ch 1-8	Selects the source for the AES outputs. Each AES source can be chosen separately.
		Tone Generator 1-4	
		Silence	
	Gain (per channel)	Range (-400) - 400	Gain applied to AES audio output.
	Phase (per channel)	Normal	Inverts the phase of the AES audio output.
		Invert	

Menu	Item	Format	Description
<b>Tone Generator</b>	Tone Generator 1-4 Frequency	Range 50Hz -16KHz	Selects the frequency of the tone generated.

Menu	Item	Format	Description
<b>Presets</b>	Parameter Save	Confirm	Saves the parameters as preset.
	Parameter Load	Confirm	Loads parameters previously saved.
	Restart Parameters to Factory Default	Confirm	Will load factory presets and overwrite the save.

# Technical Specifications

<b>Analog Audio Input</b>	Number of Inputs	8 Balanced Analog Audio
	Connector	Phoenix 3-pin
	Sampling Rate	48KHz (free run or locked to the reference)
	Signal Level	+24dBu => 0dBFS

<b>AES Audio Output</b>	Standard	SMPTE 276M
	Number of Outputs	4 unbalanced
	Output Impedance	75Ω
	Return Loss	> 30dB 100kHz to 6MHz
	Resolution	Up to 24-bit
	Sample Rate	48KHz

Specifications are subject to change without notice.

# Service Information

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## In This Chapter

This chapter includes the following sections:

- Troubleshooting Checklist
- Warranty and Repair Policy

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## Troubleshooting Checklist

Routine maintenance to this openGear™ product is not required. In the event of problems with your card, the following basic troubleshooting checklist may help identify the source of the problem. If the module still does not appear to be working properly after checking all possible causes, please contact your openGear™ products distributor, or the Technical Support department at the numbers listed under the “Contact Us” section at the end of this manual.

1. **Visual Review** — Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the module, the frame, and any associated peripheral equipment for signs of trouble.
2. **Power Check** — Check the power indicator LED on the distribution frame front panel for the presence of power. If the power LED is not illuminated, verify that the power cable is connected to a power source and that power is available at the power main. Confirm that the power supplies are fully seated in their slots. If the power LED is still not illuminated, replace the power supply with one that is verified to work.
3. **Reseat the Card in the Frame** — Eject the card and reinsert it in the frame.
4. **Check Control Settings** — Refer to the Installation and Operation sections of the manual and verify all user-adjustable component settings.
5. **Input Signal Status** — Verify that source equipment is operating correctly and that a valid signal is being supplied.
6. **Output Signal Path** — Verify that destination equipment is operating correctly and receiving a valid signal.
7. **Module Exchange** — Exchanging a suspect module with a module that is known to be working correctly is an efficient method for localizing problems to individual modules.
8. **Error Code E100** — If this error code is displayed, the 9341 is detecting clipping on the analog audio input. Analog input levels must be lowered to avoid clipping.

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## Warranty and Repair Policy

The openGear™ card is warranted to be free of any defect with respect to performance, quality, reliability, and workmanship for a period of FIVE (5) years from the date of shipment from our factory. In the event that your Cobalt Digital Inc. card proves to be defective in any way during this warranty period, Cobalt Digital Inc. reserves the right to repair or replace this piece of equipment with a unit of equal or superior performance characteristics.

Should you find that this openGear™ card has failed after your warranty period has expired, we will repair your defective product should suitable replacement components be available. You, the owner, will bear any labor and/or part costs incurred in the repair or refurbishment of said equipment beyond the FIVE (5) year warranty period.

In no event shall Cobalt Digital Inc. be liable for direct, indirect, special, incidental, or consequential damages (including loss of profits) incurred by the use of this product. Implied warranties are expressly limited to the duration of this warranty.

This openGear™ card Owner's Manual provides all pertinent information for the safe installation and operation of your Cobalt Digital Inc. Product. Cobalt Digital Inc. policy dictates that all repairs to the openGear™ card are to be conducted only by an authorized Cobalt Digital Inc. factory representative. Therefore, any unauthorized attempt to repair this product, by anyone other than an authorized Cobalt Digital Inc. factory representative, will automatically void the warranty. Please contact Cobalt Digital Inc. Technical Support for more information.

### ***In Case of Problems***

Should any problem arise with your openGear™ card, please contact the Cobalt Digital Inc. Technical Support Department. (Contact information is supplied at the end of this publication.)

A Return Material Authorization number (RMA) will be issued to you, as well as specific shipping instructions, should you wish our factory to repair your openGear™ card. If required, a temporary replacement module will be made available at a nominal charge. Any shipping costs incurred will be the responsibility of you, the customer. 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 equipment.

# Ordering Information

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## 9341 and Related Products

Your **9341 Analog Audio to AES Converter** is a part of the openGear™ family of products. Cobalt Digital offers a full line of openGear™ terminal equipment including distribution, conversion, monitoring, synchronizers, encoders, decoders, embedders, and de-embedders, as well as analog audio and video products.

### ***Standard Equipment***

- **9341** Analog Audio to AES Converter
- **9341-OM** Analog Audio to AES Converter Owner's Manual

### ***Optional Equipment***

- **9341-OM** Analog Audio to AES Converter Owner's Manual (additional Owner's Manual)
- **RM-9341-B** openGear™ Rear Module compatible with 9341 (4 BNC, 6 phoenix connector)
- **RM-9341-C** openGear™ Rear Module compatible with 9341 (12 BNC, 8 phoenix connector)
- **8310-C** Digital Products Frame and Power Supply with Cooling Fans (2RU, holds 10 cards)
- **8310-C-BNC** Digital Products Frame and Power Supply with fixed 100-BNC Rear Module and Cooling Fans. (2RU, holds 10 cards)
- **MFC-8310-N** Network Controller Card (Additional)

# Contact Us

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## Contact Cobalt Digital Inc.

<b>PHONE</b>	<b>General Business Office and Technical Support</b>	217.344.1243
	<b>Fax</b>	217.344.1245
<b>E-MAIL</b>	<b>General Information</b>	Info@cobaltdigital.com
	<b>Sales Information</b>	Sales@cobaltdigital.com
<b>POSTAL SERVICE</b>	<b>Cobalt Digital Inc.</b>	2406 East University Avenue Urbana, IL 61802 USA

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