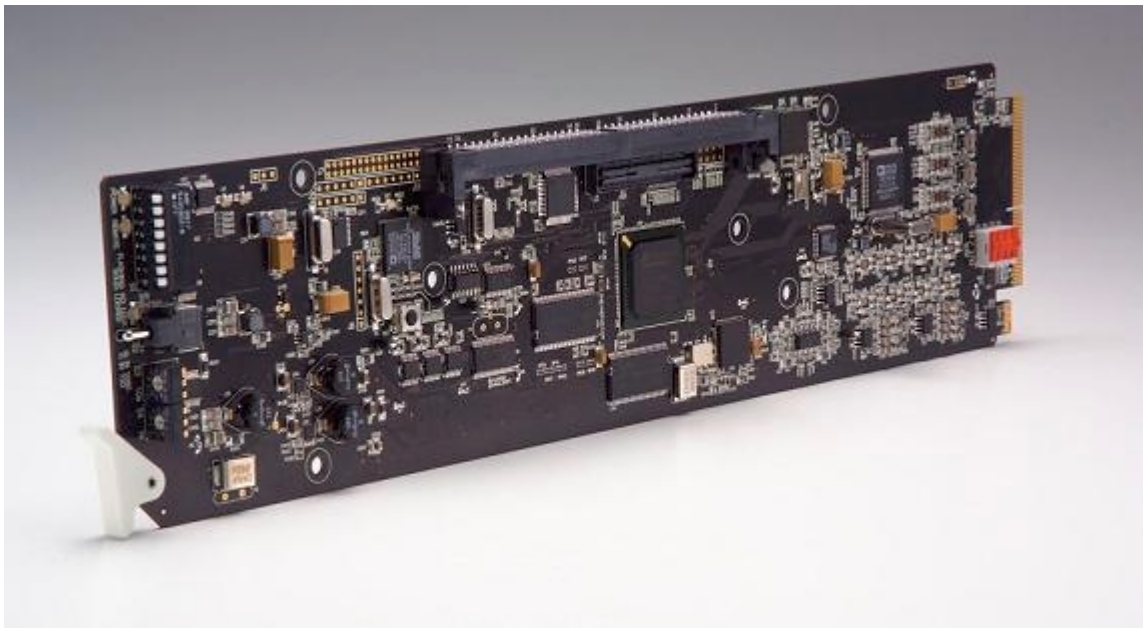
Cobalt Digital Incorporated

9081

HD/SD Frame Sync

Preliminary Owner's Manual



9081-UM
Version: 0.5

9081 • HD/SD Frame Sync User 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 User 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.

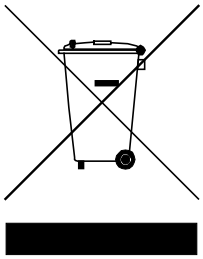
To reduce the risk of fire, replacement fuses must be the same type and rating.

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.

openGear Contents

Introduction

In This Chapter

This chapter includes the following sections:

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

A Word of Thanks

Congratulations on choosing the openGear **CDI-9081 HD/SD Frame Sync**. The 9081 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 embeders and de-embeders, 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 9081, 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.

Overview

The 9081 is a high quality HD/SD frame syncronizer. It supports all popular standard definition and high definition video formats including 525i, 625i, 720p, 1080i and 1080p/sF. Auto detection of the input video format simplifies system setup. The 9081 accepts either an HD SDI input (1.485 Gbit) or an SD SDI input (270 Mbit), automatically equalizes for cable loss, and provides a reclocked SDI output. The video is then synchronized to either a frame-wide reference or a local reference. For further flexibility in resolving system timing problems, additional fixed delay can be added to the video. Ancillary Data (VANC) is protected, and is passed from input to output, ensuring data is not lost during the frame sync operation.

The product also provides full color processing control of the output video, with separate controls for Gain, Lift, Saturation and Color Phase.

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. All settings available on the front panel can also be accessed through Dashboard remote control software provided the openGear frame being used has an 8310-N network card installed.

The card has persistent storage of all settings. There is a menu option to trigger a save or load of stored settings, or to restore the factory default configuration.

The input and outputs of the 9081 are the following:

Input:

- One dual-rate HD/SD-SDI video input

Outputs:

- Two dual-rate HD/SD-SDI video outputs
- Four dual-rate HD/SD-SDI Reclocked video outputs

Functional Block Diagram

The 9081 has a very flexible signal flow path and feature set that combines several products into one compact package. This section describes the basic operation of your 9081 product.

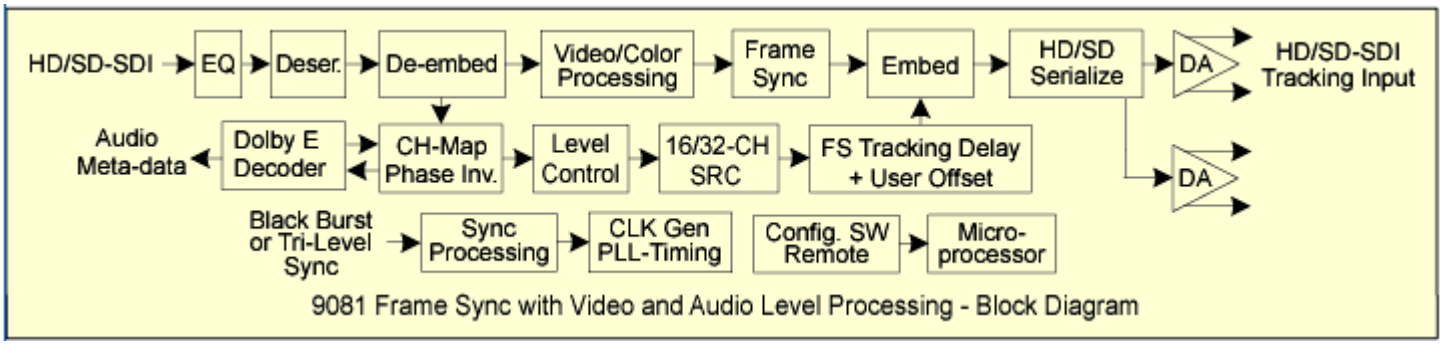


Figure 1. Simplified Block Diagram of 9081 Functions

Supported Audio and Video Formats

Input and Output Video

The 9081 supports a wide range of video formats for embedding and dembedding. The output video rate is always precisely the same as the input video rate. Video delay through the device is less than one microsecond.

Table 1. Supported Embedding/De-embedding formats

Video standard	
1080	sF 23.98
1080	p 23.98
1080	sF 24
1080	p 24
1080	i 25
1080	p 25
1080	i 29.97
1080	p 29.97
1080	i 30
1080	p 30
720	p23.98
720	p24
720	p 25
720	p 29.97
720	p 30
720	p 50
720	p 59.94
720	p 60
486	i 29.97
575	i 25

Notes:

1. All rates translated to effective frame rates, interlaced rates " i " are two times the number shown. For example, i 29.97 is 59.94 fields per second (two fields per frame thus the interlaced frame rate is 29.97); but progressive " p " 29.97 is 29.97 frames per second.

2. SD active line rates are PAL (575) and NTSC (486).

Embedded Audio

The 9081 supports all four groups (16 channels) of embedded audio at full 24 bit resolution in both SD (with extended data packets) and HD.

Dolby E Decoding

Dolby E decoding is available as an optional feature. It allows decoding from an embedded audio pair. The decoder will return up to 8 decoded channels (according to the Dolby E sub-format) plus a 2 channel down mix for monitoring. All 10 of these channels are available as inputs to the audio router.

Documentation Terms

The following terms are used throughout this guide:

- "**Frame**" refers to the **8310** frame that houses the **9081** card.
- "**Operator**" and "**User**" both refer to the person who uses the **9081**.
- "**Board**" and "**Card**" all refer to the **9081** card itself, including all components and switches.
- "**System**" and "**Video system**" refers to the mix of interconnected production and terminal equipment in which the **9081** operates.

Installation and Setup

In This Chapter

This chapter includes the following sections:

- Static Discharge
- Unpacking
- Rear Module Installation (Optional)
- Board Installation
- BNC Connections
- Menu Structure
- Factory Defaults

Static Discharge

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

ESD Susceptibility

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.

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 a 8310-RM-10 Rear Module with your card. You will need to install it in your 8310 frame before you can connect cables.

Use the following steps to install the 8310-RM-10 in an 8310 openGear frame:

1. Refer to the openGear 8310 frame User 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 8310-RM-10 in the seating slot at the base of the frame's back plane.

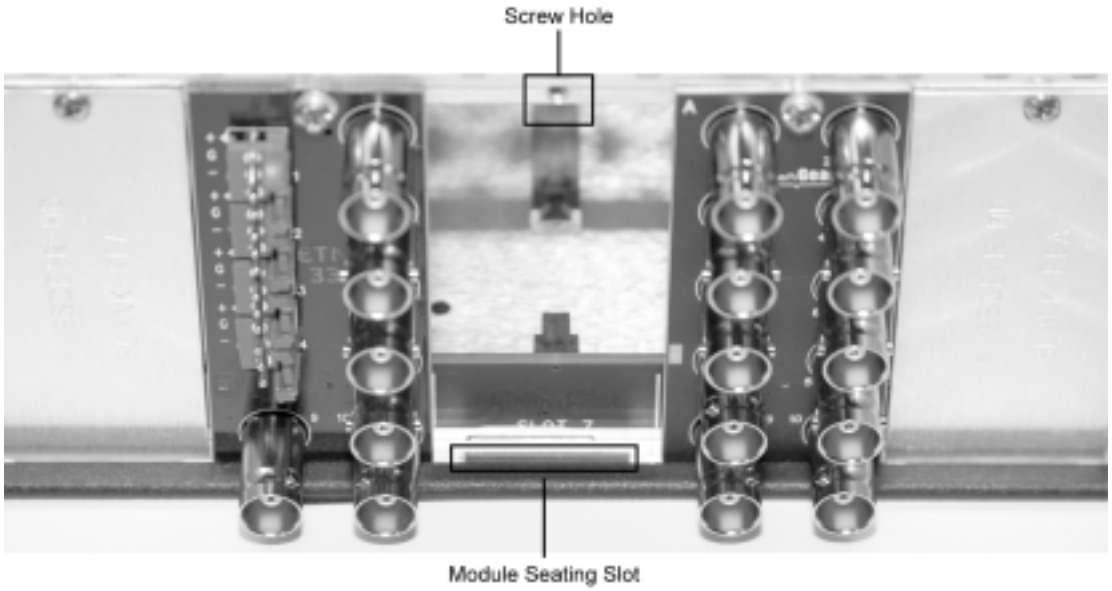


Figure 2. Rear Module Installation

4. Align the top hole of the 8310-RM-10 with the screw hole on the top edge of the 8310 back plane.
5. Using a Phillips driver and the supplied screw, fasten the 8310-RM-10 panel to the 8310 back plane. Do not over tighten.

This completes the procedure for installing the 8310-RM-10 in an 8310 openGear frame.

Board Installation

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

1. Refer to the User 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.

Cable Connections

This section provides instructions for connecting cables to the installed BNC rear modules on the 8310 series frame backplane. Connect the input and output cables according to the following diagram. The input is internally terminated with 75 Ohms. It is not necessary to terminate unused outputs.

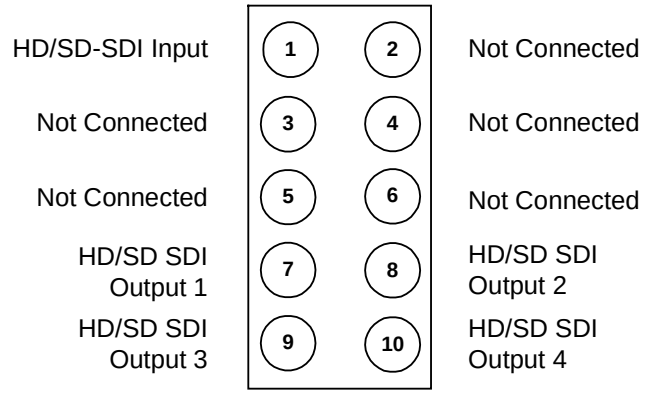


Figure 3. BNC Designations for the Card Rear Module 8310-RM-10 or 8310-RM-100

Card Control and Status

Card Status

The card indicates the status of the input signal with the four blue LEDs labled with the different supported formats (1080, 720, 625, 525). When the card has locked to a particular input format, that LED will be illuminated. When the card has not locked to a particular video format, the card will search all possible formats, 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.

Menu Structure

The entire 9081 menu looks like this:

MENU STRUCTURE					**Parameter Type**
Vid-Proc	Enbl				Proc Enable
	Gain				Proc Gain
	Lift				Proc Lift
	Sat				Proc Sat
	Phas				Proc Phase
FS	Enbl				Frame Sync Enable
	HOS				Horizontal Offset
	VOS				Vertical Offset
	WHYS				Window Hysteresis
	LATL				Line Latency
	LATF				Field Latency
	ADLY				Audio Delay
	RSET				Reset
Aud	Embd	Grp1	Enbl		Embedded Group Enable
			Ch01	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
			Ch02	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
			Ch03	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
			Ch04	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
		Grp2	Enbl		Embedded Group Enable

			Ch05	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
			Ch06	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
			Ch07	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
			Ch08	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
		Grp3	Enbl		Embedded Group Enable
			Ch09	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
			Ch10	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
			Ch11	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
			Ch12	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
		Grp4	Enbl		Embedded Group Enable
			Ch13	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
			Ch14	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
			Ch15	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
			Ch16	Src	Output Source
				Gain	Output Gain
				Pol	Output Polarity
Disp	H/V				Display Orientation
	BRGT				Display Brightness
Prst	Save				Save Settings
	Load				Load Settings
	Fact				Restore Factory Settings
Info	+POW				Positive Watts Consumed
	-POW				Negative Watts Consumed
	SWR#				Software Release Number
	SWB#				Software Build Number

Parameter Type Descriptions

Proc Enable

Enables the Proc module. You can keep all the proc settings, and enable/disable the module without having to reset the settings.

Proc Gain

This is Luma (Y channel) gain, expressed as a percentage. It ranges from 0.0% to 200.0% in 0.1% steps.

Proc Lift

This is Luma (Y channel) offset, expressed as an actual video value ranging from -1024 to 1024. If set to 0 no change is made. If set to 1024 absolute black (value 004) becomes absolute white (value 3FB). If set to –1024, absolute white becomes absolute black.

Proc Saturation

This is Chroma (C channel) gain, expressed as a percentage. It ranges from 0.0% to 200.0% in 0.1% steps.

Proc Phase

This is Chroma (C channel) phase adjustment, expressed in degrees, ranging from –360 to +360 in steps of one degree.

Frame Sync Enable

Enables the frame sync.

Horizontal Offset

Allows the user to specify an additional horizontal offset in samples.

Vertical Offset

Allows the user to specify an additional vertical offset in lines.

Window Hysteresis

Specifies the amount of hysteresis applied to the frame sync operation. A larger value will in effect allow the input timing to drift further from the reference before the frame sync corrects it giving a larger “window” to the frame sync.

Line Latency

Specifies the smallest amount of latency allowed by the frame sync. The minimum setting for the latency is three lines and zero fields.

Audio Delay

Specifies the amount of audio delay applied.

Embedded Group Enable

Enables or disables the embedding of a particular embedded audio group. Disabling a group preserves the settings of the channels belonging to that group.

Output Gain

The gain of each output is adjustable from +30 dB to –100 dB in 0.1 dB steps. After –100 dB gain is set to –Inf, which means that output is present, but muted.

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.

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.

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.

Factory Default Settings

The factory default settings are as follows

1) The proc module is enabled, but all parameters are set to not change the video.
2) The Frame Sync is disabled, reference 1 or 2 must be chosen to enable the frame sync.
3) Audio gain is set to 0dB and polarity is set to normal on all channels.

Service Information

In This Chapter

This chapter includes the following sections:

- Troubleshooting Checklist
- Warranty and Repair Policy

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.

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 Incorporated card proves to be defective in any way during this warranty period, Cobalt Digital Incorporated 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 Incorporated 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 User Manual provides all pertinent information for the safe installation and operation of your Cobalt Digital Incorporated Product. Cobalt Digital Incorporated policy dictates that all repairs to the openGear card are to be conducted only by an authorized Cobalt Digital Incorporated factory representative. Therefore, any unauthorized attempt to repair this product, by anyone other than an authorized Cobalt Digital Incorporated factory representative, will automatically void the warranty. Please contact Cobalt Digital Incorporated Technical Support for more information.

In Case of Problems

Should any problem arise with your openGear card, please contact the Cobalt Digital Incorporated 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 Incorporated will be shipped collect.

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

Ordering Information

9081 and Related Products

Your **9081 HD/SD Frame Sync** 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

- **9081** HD/SD HD/SD Frame Sync
- **9081-UM** HD/SD HD/SD Frame Sync User Manual

Optional Equipment

- **9081-UM** HD/SD HD/SD Frame Sync User Manual (additional User Manual)
- **8310-RM-10** openGear Rear Module compatible with 9081 (10 BNC 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)

Notes:

Contact Us

Contact our friendly and professional support representatives for the following:

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

PHONE	**General Business Office and Technical Support**	217 • 344 • 1243
	Fax	217 • 344 • 1245
E-MAIL	**General Information**	info@cobaltdigital.com
	Technical Support	support@cobaltdigital.com
POSTAL SERVICE	**Cobalt Digital Incorporated**	2406 East University Avenue Urbana, IL 61802 USA

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