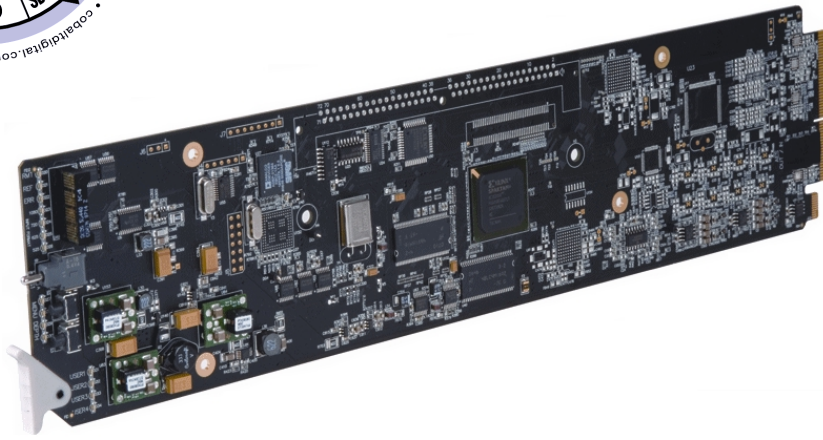# 9363

## Multi-Format Reference Generator

# *Product Manual*

**Cobalt Digital Inc.**

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Congratulations on choosing the Cobalt® 9363 Mutli-Format Reference Generator. The 9363 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 9363, please contact us at the contact information on the front cover.

| | |
|---|---|
| **Manual No.:** | 9363-OM |
| **Document Version:** | 1.2 |
| **Release Date:** | December 30, 2013 |

# *Table of Contents*

*Chapter 1*

# *Introduction*

## Overview

This manual provides installation and operating instructions for the 9363 Multi-Format Reference Generator card (also referred to herein as the 9363).

**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 9363.

- **Chapter 2, "Installation and Setup"** – Provides instructions for installing the 9363 in a frame, and optionally installing a 9363 Rear I/O Module.

- **Chapter 3, "Operating Instructions"** – Provides overviews of operating controls and instructions for using the 9363.

**This chapter** contains the following information:

- **Manual Conventions (p. 1-2)**
- **Safety Summary (p. 1-3)**
- **9363 Functional Description (p. 1-4)**
- **Technical Specifications (p. 1-10)**
- **Warranty and Service Information (p. 1-12)**
- **Contact Cobalt Digital Inc. (p. 1-13)**

# Manual Conventions

In this manual, display messages and connectors are shown using the exact name shown on the 9363 itself. Examples are provided below.

- Card-edge display messages are shown like this:

```
9363
```
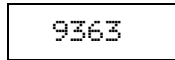
- Connector names are shown like this: **OUT 1A**

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

- **9363** refers to the 9363 Multi-Format Reference Generator card.
- **Frame** refers to the 8321 (or similar) frame that houses the Cobalt® COMPASS™ cards.
- **Device** and/or **Card** refers to a COMPASS™ card.
- **System** and/or **Video System** refers to the mix of interconnected production and terminal equipment in which the 9363 and other COMPASS™ cards operate.

## Warnings, Cautions, and Notes

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

### Warnings

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

### Cautions

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

### Notes

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

## Labeling Symbol Definitions

| | |
|---|---|
| ⚠ | Attention, consult accompanying documents. |
| (ESD symbol) | Electronic device or assembly is susceptible to damage from an ESD event. Handle only using appropriate ESD prevention practices.

If ESD wrist strap is not available, handle card only by edges and avoid contact with any connectors or components. |
| (WEEE symbol) | Symbol (WEEE 2002/96/EC)

For product disposal, ensure the following:
• Do not dispose of this product as unsorted municipal waste.
• Collect this product separately.
• Use collection and return systems available to you. |

# Safety Summary

## Warnings

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

## Cautions

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

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

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

**CAUTION**  If required, make certain Rear I/O Module(s) is installed before installing the 9363 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.

# 9363 Functional Description

Figure 1-1 shows a functional block diagram of the 9363. In addition to providing four reference output signal pairs, the 9363 also provides a synchronized AES/word clock output.

The 9363 can select from external references from openGear™ frame reference distributed signals **Ref 1** or **Ref 2**, or **Ext Ref** (**Local**) which is received via a rear module BNC connector.

The 9363 is compatible with the input formats and rates (including AES and basic word clock signals), and provides multiple output formats and rates as listed in Table 1-1. Using the card's internal generator source, the 9363 can also generate reference outputs without using any external reference.

## Available Output Formats/Rates

Table 1-1 lists the available output formats/rates for input references supported by the 9363. Note in Table 1-1 that when converting between formats and rates, various lock states exist for different conversions (for example, when going from a progressive-format reference to an interlaced format output, the card cannot provide an output that is assured always to indicate an odd or even field). Described below are the three types of lock states provided for various conversions provided by the card.
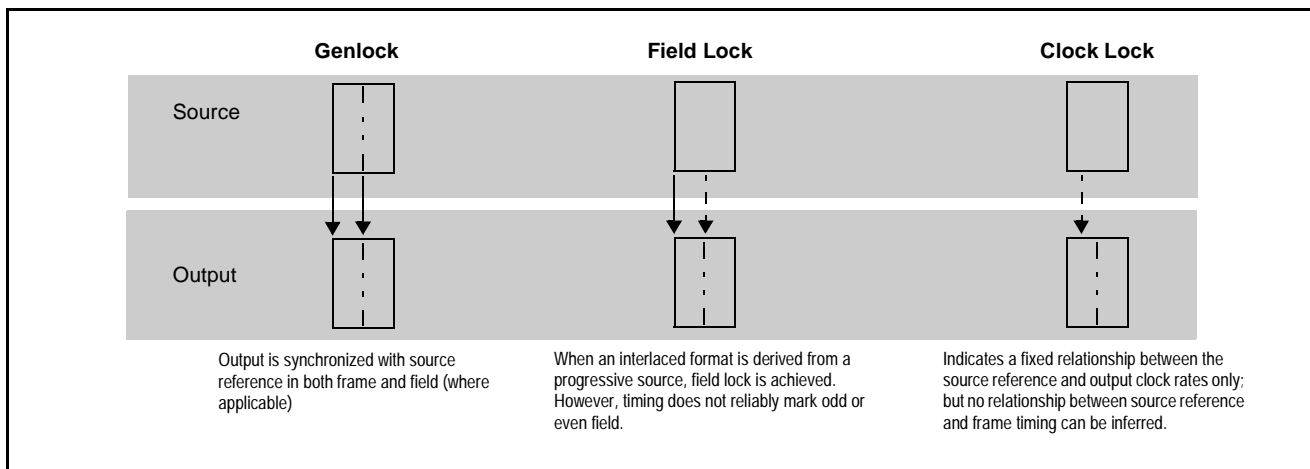


Four pairs of outputs are provided, with each pair **OUT 1A / OUT 1B** thru **OUT 4A / OUT 4B** being independently configurable as black burst or tri-level reference outputs. Each of the outputs can be independently configured for any rate/format related to the source reference format, and can additionally be independently delayed or advanced (in terms of vertical lines or horizontal pixels) relative to the source timing. If the card internal reference clock source is used, the four output pairs operate as described above, with the internal source instead serving as the timing basis.
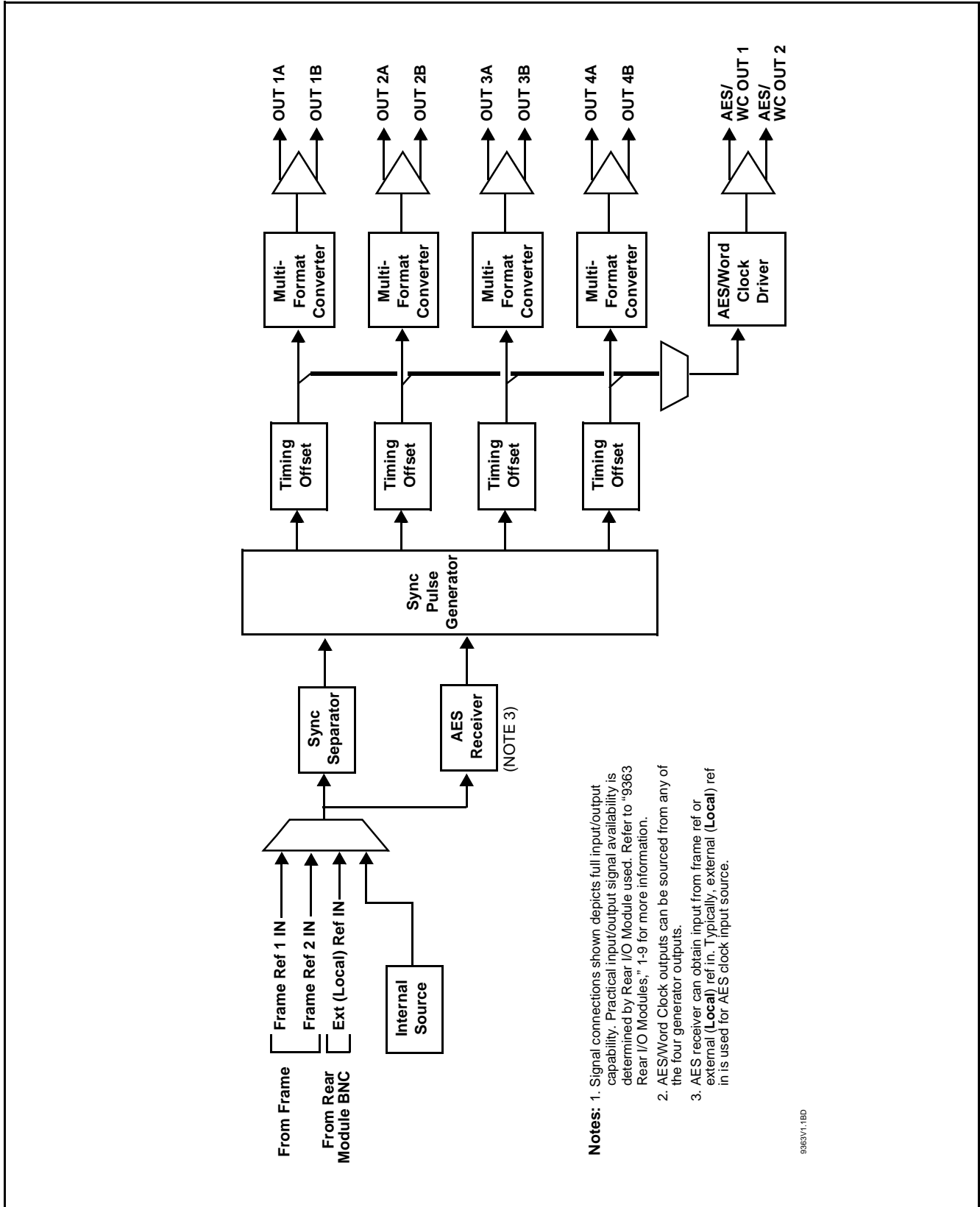
**Figure 1-1  9363 Functional Block Diagram**

Notes: 1. Signal connections shown depicts full input/output capability. Practical input/output signal availability is determined by Rear I/O Module used. Refer to "9363 Rear I/O Modules," 1-9 for more information.

2. AES/Word Clock outputs can be sourced from any of the four generator outputs.

3. AES receiver can obtain input from frame ref or external (**Local**) ref in. Typically, external (**Local**) ref in is used for AES clock input source.

*Table 1-1    9363 Output Formats*

| Input Format | Output Format/Rate | Lock State | Output Format/Rate | Lock State | Output Format/Rate | Lock State |
|---|---|---|---|---|---|---|
| **480i 5994**, 1080i 5994 | 480i 5994 | Genlock | 1080 i5994 | Genlock | AES | Genlock |
| | 720p 5994 | Genlock | 1080p 2997 | Genlock | Word Clock | Genlock |
| | 720p 2997 | Genlock | 1080p 2398 | Clock Lock | | |
| | 720p 2398 | Clock Lock | 1080pSF 2398 | Clock Lock | | |
| **576i 50**, 1080i 50 | 576i 50 | Genlock | 1080 i50 | Genlock | AES | Genlock |
| | 720p 60 | Clock Lock | 1080p 30 | Clock Lock | Word Clock | Genlock |
| | 720p 50 | Genlock | 1080p 25 | Genlock | | |
| | 720p 30 | Clock Lock | 1080p 24 | Clock Lock | | |
| | 720p 25 | Genlock | 1080pSF 24 | Clock Lock | | |
| | 720p 24 | Clock Lock | 1080i 60 | Clock Lock | | |
| 720p 5994, **1080p 2997** | 480i 5994 | Field Lock | 1080 i5994 | Field Lock | AES | Genlock |
| | 720p 5994 | Genlock | 1080p 2997 | Genlock | Word Clock | Genlock |
| | 720p 2997 | Genlock | 1080p 2398 | Clock Lock | | |
| | 720p 2398 | Clock Lock | 1080pSF 2398 | Clock Lock | | |
| 720p 50, **1080p 25** | 576i 50 | Field Lock | 1080i 60 | Clock Lock | AES | Genlock |
| | 720p 60 | Clock Lock | 1080 i50 | Field Lock | Word Clock | Genlock |
| | 720p 50 | Genlock | 1080p 30 | Clock Lock | | |
| | 720p 30 | Clock Lock | 1080p 25 | Genlock | | |
| | 720p 25 | Genlock | 1080p 24 | Clock Lock | | |
| | 720p 24 | Clock Lock | 1080pSF 24 | Clock Lock | | |
| 720p 60, **1080p 30** | 576i 50 | Clock Lock | 1080i 60 | Field Lock | AES | Genlock |
| | 720p 60 | Genlock | 1080 i50 | Clock Lock | Word Clock | Genlock |
| | 720p 50 | Clock Lock | 1080p 30 | Genlock | | |
| | 720p 30 | Genlock | 1080p 25 | Clock Lock | | |
| | 720p 25 | Clock Lock | 1080p 24 | Clock Lock | | |
| | 720p 24 | Clock Lock | 1080pSF 24 | Clock Lock | | |

**Notes:** 1. Format/rates listed in **bold** indicate format/rates also available using Internal source.

2. "NTSC" and "PAL" in this manual informally refer to 480i 5994 and 575i 50 SD-SDI video formats, respectively.

**Table 1-1    9363 Output Formats — continued**

| Input Format | Output Format/ Rate | Lock State | Output Format/ Rate | Lock State | Output Format/ Rate | Lock State |
|---|---|---|---|---|---|---|
| **1080i 60** | 576i 50 | Clock Lock | 1080i 60 | Genlock | AES | Genlock |
| | 720p 60 | Genlock | 1080 i50 | Clock Lock | Word Clock | Genlock |
| | 720p 50 | Clock Lock | 1080p 30 | Genlock | | |
| | 720p 30 | Genlock | 1080p 25 | Clock Lock | | |
| | 720p 25 | Clock Lock | 1080p 24 | Clock Lock | | |
| | 720p 24 | Clock Lock | 1080pSF 24 | Clock Lock | | |

| Input Format | Output Format/ Rate | Lock State | Output Format/ Rate | Lock State | Output Format/ Rate | Lock State |
|---|---|---|---|---|---|---|
| **1080p 24**, 1080pSF 24 | 720p 60 | Clock Lock | 1080i 60 | Clock Lock | AES | Genlock |
| | 720p 50 | Clock Lock | 1080 i50 | Clock Lock | Word Clock | Genlock |
| | 720p 30 | Clock Lock | 1080i 30 | Clock Lock | | |
| | 720p 25 | Clock Lock | 1080p 25 | Clock Lock | | |
| | 720p 24 | Genlock | 1080p 24 | Genlock | | |
| | | | 1080pSF 24 | Genlock | | |

| Input Format | Output Format/ Rate | Lock State | Output Format/ Rate | Lock State | Output Format/ Rate | Lock State |
|---|---|---|---|---|---|---|
| **1080p 2398**, 1080pSF 2398 | 720p 5994 | Clock Lock | 1080i 5994 | Clock Lock | AES | Genlock |
| | 720p 2997 | Clock Lock | 1080p 2997 | Clock Lock | Word Clock | Genlock |
| | 720p 25 | Clock Lock | 1080p 2398 | Genlock | | |
| | 720p 2398 | Genlock | 1080pSF 2398 | Genlock | | |

| Input Format | Output Format/ Rate | Lock State | Output Format/ Rate | Lock State | Output Format/ Rate | Lock State |
|---|---|---|---|---|---|---|
| AES, Word Clock | 480i 5994<br>576i 50<br>720p 60<br>720p 5994<br>720p 50<br>720p 30<br>720p 2997<br>720p 25<br>720p 2398<br>1080i 60<br>1080i 5994<br>1080i 50 | Genlock | 1080p 60<br>1080p 5994<br>1080p 50<br>1080p 30<br>1080p 2997<br>1080p 25<br>1080p 24<br>1080pSF 24<br>1080pSF 2398<br>AES<br>Word Clock | Genlock | | |

**Notes:** 1. Format/rates listed in **bold** indicate format/rates also available using Internal source.

2. "NTSC" and "PAL" in this manual informally refer to 480i 5994 and 575i 50 SD-SDI video formats, respectively.

## Notes Regarding Color Framing

When an NTSC or PAL SD reference is received by the 9363, and one or more outputs are set to the same format/rate as the received input, the color frame of these outputs match the reference color framing. It should be noted that this initial relationship will not necessarily follow any changes in the received reference that are external to this card. However, the 9363 re-establishes color framing re-lock upon:

- Card power-up or reboot
- Change in reference (either by manually toggling reference selection, or by removing and re-applying the received reference)
- Manually changing/manipulating the output timing offset for an output channel.

## AES/Word Clock Output

The 9363 can provide an AES output signal (suitable as a DARS signal) which is timing referenced to any of the four card reference outputs. When set for an AES output, the AES output can be set to various frequencies and levels.

## User Control Interface

The 9363 uses DashBoard™ as the normal graphical user interface for the card, similar to other Cobalt® COMPASS™ cards.

Using DashBoard™, the 9363 and other cards installed in openGear™ frames such as the Cobalt® 8321-C Frame can be controlled from a computer and monitor. DashBoard™ allows users to view all frames on a network with control and monitoring for all populated slots inside a frame. This simplifies the setup and use of numerous modules in a large installation and offers the ability to centralize monitoring. Cards define their controllable parameters to DashBoard™, so the control interface is always up to date.

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

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

Download a copy of this guide by clicking on the **Support>Reference Documents** link at www.cobaltdigital.com and then select DashBoard Remote Control Setup Guide as a download, or contact Cobalt® as listed in Contact Cobalt Digital Inc. (p. 1-13).

## AES Audio Output Channel Status Data

Table 1-2 lists the channel status information that is encoded into the AES audio data outputted by the 9363.

**Note:** The AES channel status settings outputted by the card are non-configurable.

*Table 1-2      AES Audio Output Channel Status Data*

| Byte | Bit/Function | Configured Setting |
|------|--------------|--------------------|
| 0 | 0 –  Professional or Consumer use of Channel Status Block<br>1 –  Normal Audio or Non-Normal Audio<br>2-4 –  Emphasis<br>5 –  Lock Indication<br>6-7 –  Sampling Rate | Professional (1)<br>Normal Audio (0)<br>No Emphasis (100)<br>Not Indicated (0)<br>48 kHZ (01) |
| 1 | 0-3 –  Channel Mode<br>4-7 –  User Bit Mode | 2-channel Mode (0001)<br>192-bit (0001) |
| 2 | 0-2 –  Aux Bit Usage<br>3-5 –  Sample Word Length<br>6-7 –  Alignment Level | 24-bit audio sample; aux bit audio (001)<br>24-bits (101)<br>Not Indicated (00) |
| 3 | 0-7 –  Multi-channel Modes | Undefined (0) |
| 4 | 0-1 –  Digital Audio Reference Signal (DARS)<br>2 –  Reserved<br>3-6 –  Sampling Frequency<br>7 –  Sampling Frequency Scaling Flag | Not a reference (0)<br>0<br>Not Indicated (0000)<br>No Scaling (0) |
| 5 | 0-7 –  Reserved | Unused (0) |
| 6-9 | ASCII Source ID | Unused (0) |
| 10-13 | ASCII Destination ID | Unused (0) |
| 14-17 | Local Sample Address | Unused (0) |
| 18-22 | Time of Day | Unused (0) |
| 22 | 0-7 –  C Data Reliability | All status bytes marked as Reliable |
| 23 | 0-7 –  CRC | Calculated CRC |

## 9363 Rear I/O Modules

The 9363 physically interfaces to system video connections at the rear of its frame using a Rear I/O Module.

All inputs and outputs (except frame distributed reference signals **Frame Ref 1** and **Frame Ref 2**) shown in the 9363 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 9363 card edge connections to BNC connectors that interface with other components and systems in the signal chain. See "Installation", Chapter 2 for Rear I/O Module connections.

# Technical Specifications

Table 1-3 lists the technical specifications for the 9363 Multi-Format Reference Generator card.

**Table 1-3    *Technical Specifications***

| Item | Characteristic |
|------|----------------|
| Part number, nomenclature | 9363 Multi-Format Reference Generator |
| Installation/usage environment | Intended for installation and usage in frame meeting openGear™ modular system definition. |
| Power consumption | < 6 Watts maximum |
| Environmental:<br> Operating temperature:<br> Relative humidity (operating or storage): | 32° – 104° F (0° – 40° C)<br>< 95%, non-condensing |
| Frame communication | 10/100 Mbps Ethernet with Auto-MDIX. |
| Analog Video Output (Reference Output Channels) | Standards Accommodated:<br>  SMPTE 274M, 296M, and 170M<br>  ITU-R BT.470-6 (PAL-B)<br><br>Number of Channels:<br>  4x2 (with RM20-9363-A)<br>  4X1 (with RM20-9363-A/S)<br><br>Signal Level:<br>  1 Vp-p<br><br>DC Offset:<br>  < 50 mV<br><br>Output Impedance:<br>  75 Ω<br><br>Return Loss:<br>  > 40 dB to 30 MHz<br><br>Signal Level:<br>  1 Vp-p<br><br>Internal Reference Frequency Stability:<br>  1ppm initial; 4.6ppm/10 years<br><br>Thermal Stability:<br>  ± 0.25ppm (0° to 70° C) |

*Table 1-3    Technical Specifications — continued*

| Item | Characteristic |
|---|---|
| AES/Word Clock Output | Number of Channels:<br><br>  1x2 (with RM20-9363-A)<br>  1 (with RM20-9363-A/S)<br><br>Signal Level:<br><br>  1 Vp-p<br><br>DC Offset:<br><br>  < 50 mV<br><br>Output Impedance:<br><br>  75 Ω<br><br>Return Loss:<br><br>  > 25 dB to 10 MHz<br><br>Sample Rate (AES Output):<br><br>  48 kHz |
| Local (External) Reference Input | Number of Channels:<br><br>  1<br><br>Input Impedance:<br><br>  75 Ω terminated or hi-z<br><br>Return Loss:<br><br>  > 40 dB to 10 MHz<br><br>Minimum Input (AES/Word Clock mode):<br><br>  100 mVp-p<br><br>Maximum Input (AES/Word Clock mode):<br><br>  4.0 Vp-p<br><br>Sample Rate (AES Input):<br><br>  48 kHz<br><br>Standards Accommodated (Ref Input Mode):<br><br>  SMPTE 274M, 296M, and 170M<br>  ITU-R BT.470-6 (PAL-B)<br><br>Signal Level (Ref Input Mode):<br><br>  1.0 Vp-p |

# Warranty and Service Information

## Cobalt Digital Inc. Limited Warranty

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

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

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

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

**Cobalt Digital Inc. Factory Service Center**

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

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## Contact Cobalt Digital Inc.

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

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

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

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*Chapter 2*

# *Installation and Setup*

## Overview

This chapter contains the following information:

- Setting Card Jumpers (p. 2-1)
- Installing the 9363 Into a Frame Slot (p. 2-4)
- Installing a Rear I/O Module (p. 2-2)
- Setting Up 9363 Network Remote Control (p. 2-5)

## Setting Card Jumpers

The **AUX I/O** connector on the 9363 Rear I/O Module is a multi-purpose BNC port that can be set as either a **Local (External)** BNC reference source input, or an AES/Word Clock (**AES/WC OUT**) output depending on the jumper positions.

(See Figure 2-1.) Jumpers **JP1** and **JP2** set the **AUX I/O** BNC connector function as described below. Depending on function desired, set these jumpers **before** installing the card in a frame.

- **JP1 (EXT TERM)** – Sets card aux BNC connector to use card internal 75-ohm termination. This position is the default position and is recommended unless the connection is to be looped within a 75-ohm externally terminated chain.

- **JP2 (REF IN / AES OUT)** – Sets card aux BNC connector to either serve as an extra (**Local/External**) reference input (factory default position), or serve as an AES/word clock output (**AES/WC OUT**).
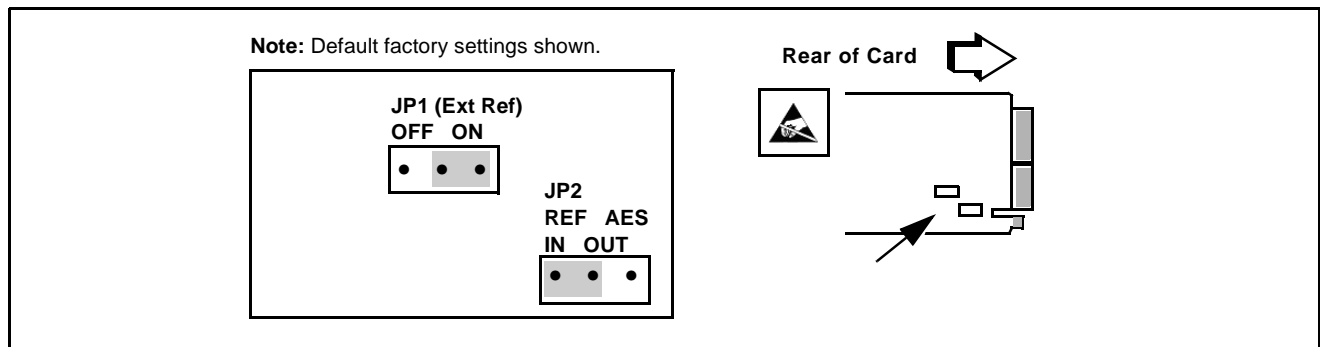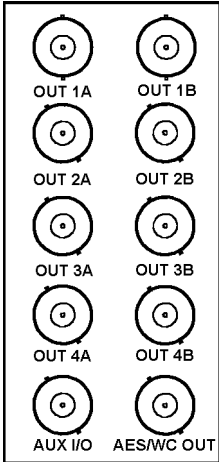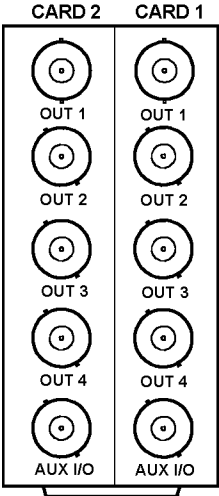


*Figure 2-1  9363 Termination and AUX I/O BNC Jumpers*

# Installing a Rear I/O Module

## 9363 Rear I/O Modules

Table 2-1 shows and describes the full assortment of Rear I/O Modules specifically for use with the 9363.

*Table 2-1    9363 Rear I/O Modules*

| 9363 Rear I/O Module | Description |
|---|---|
| **RM20-9363-A**<br><br>OUT 1A  OUT 1B<br>OUT 2A  OUT 2B<br>OUT 3A  OUT 3B<br>OUT 4A  OUT 4B<br>AUX I/O  AES/WC OUT<br>RM20-9363-A.PNG | Provides the following connections:<br><br>• Four pairs of output reference channels (**OUT 1A / OUT 1B** thru **OUT 4A / OUT 4B**)<br><br>• Dedicated AES/word clock output (**AES/WC OUT**)<br><br>• Multi-function port (**AUX I/O**). Serves as either extra reference input or AES/word clock output copy.<br><br>**Note:** Refer to Setting Card Jumpers (p. 2-1) for setting connector function. |
| **RM20-9363-A/S**<br><br>CARD 2   CARD 1<br>OUT 1  OUT 1<br>OUT 2  OUT 2<br>OUT 3  OUT 3<br>OUT 4  OUT 4<br>AUX I/O  AUX I/O<br>RM20-9363-AS.PNG | Split Rear Module. Provides **each** of the following connections for two 9363 cards:<br><br>• Four output reference channels (**OUT 1** thru **OUT 4**)<br><br>• Multi-function port (**AUX I/O**). Serves as either extra reference input or AES/word clock output.<br><br>**Note:** Refer to Setting Card Jumpers (p. 2-1) for setting connector function. |

## Installing a Rear I/O Module

Install a Rear I/O Module as follows:

1.    On the frame, determine the slot in which the 9363 is to be installed.

2.    In the mounting area corresponding to the slot location, install
      Rear I/O Module as shown in Figure 2-2.



① Align and engage mounting tab on Rear I/O Module with the module seating slot on rear of frame chassis.

DSCN3483A.JPG

② Hold top of Rear I/O Module flush against frame chassis and start the captive screw. Lightly tighten captive screw.

DSCN3487A.JPG
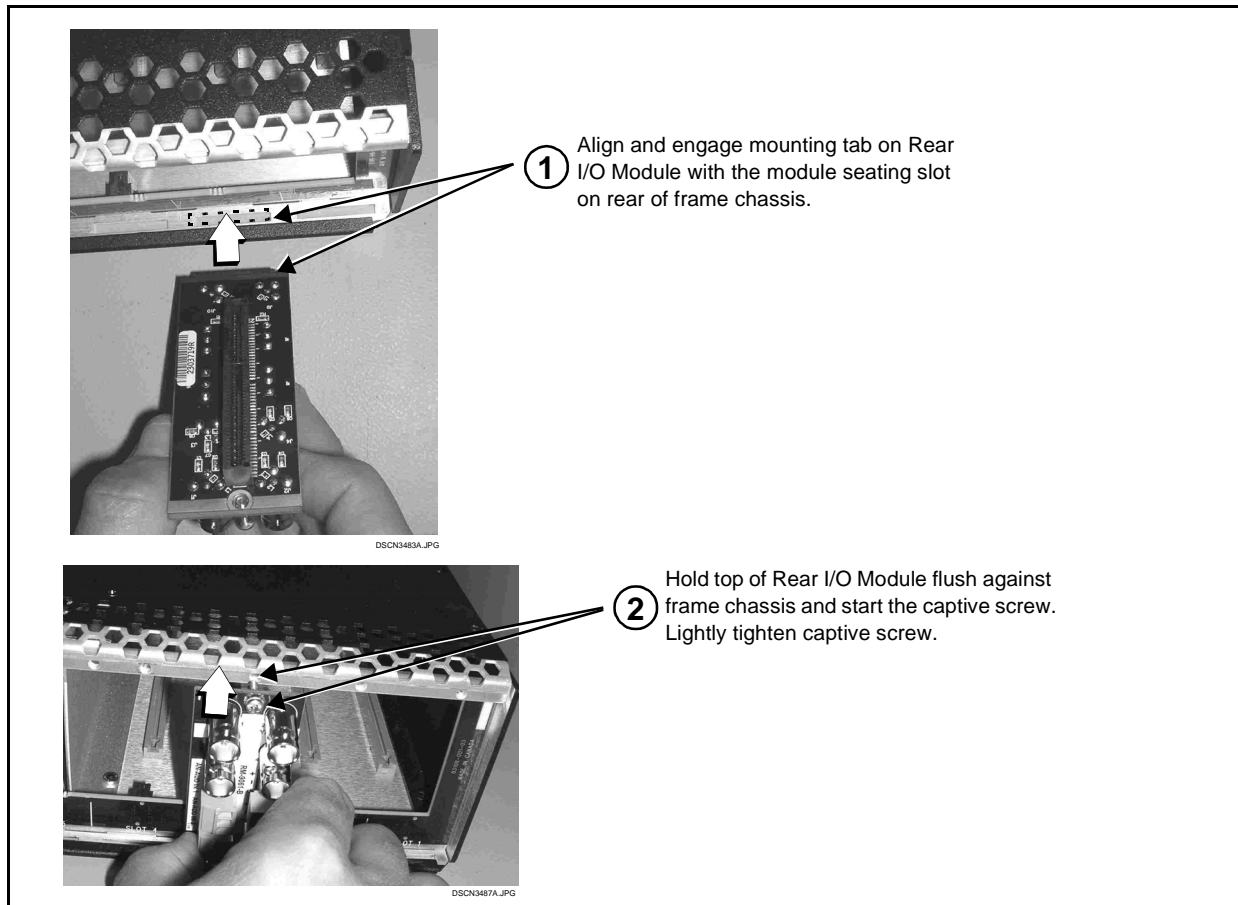
*Figure 2-2  Rear I/O Module Installation*

# Installing the 9363 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.**

**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:** A Rear I/O Module is required before cabling can be connected. Refer to Installing a Rear I/O Module (p. 2-2) for rear I/O module installation procedure.

**CAUTION**

**If required, make certain Rear I/O Module(s) is installed before installing the 9363 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 9363 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 9363 into a frame slot as follows:

1. Determine the slot in which the 9363 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 Installing a Rear I/O Module (p. 2-3).

9. Repeat steps 1 through 8 for other 9363 cards.

**Note:**   **Frame 1** and **Frame 2** reference signals are received by the card over a reference bus on the card frame, and not on any card rear I/O module connectors. The frame has BNC connectors labeled **REF 1** and **REF 2** which receive the reference signal from an external source such as a house distribution.

**Note:**   To remove a card, press down on the ejector tab to unseat the card from the rear I/O module mating connector. Evenly draw the card from its slot.

10. If network remote control is to be used for the frame and the frame has not yet been set up for remote control, perform setup in accordance with Setting Up 9363 Network Remote Control (p. 2-5).

**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.

# Setting Up 9363 Network Remote Control

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

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

Download a copy of this guide by clicking on the **Support>Reference Documents** link at www.cobaltdigital.com and then select DashBoard Remote Control Setup Guide as a download, or contact Cobalt® as listed in Contact Cobalt Digital Inc. (p. 1-13).

• 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.

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# *Operating Instructions*

## Overview

> If you are already familiar with using DashBoard or a Cobalt Remote Control Panel to control Cobalt cards, please skip to 9363 Function Submenu List and Descriptions (p. 3-2).

This chapter contains the following information:

- Accessing the 9363 Card Using DashBoard™ Remote Control (p. 3-1)
- 9363 Function Submenu List and Descriptions (p. 3-2)
- Card-Edge Control/Display (p. 3-8)
- Troubleshooting (p. 3-9)

## Accessing the 9363 Card Using DashBoard™ Remote Control

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 9363 card to be accessed (in this example, "MFC-8320-N SN: 00108053").
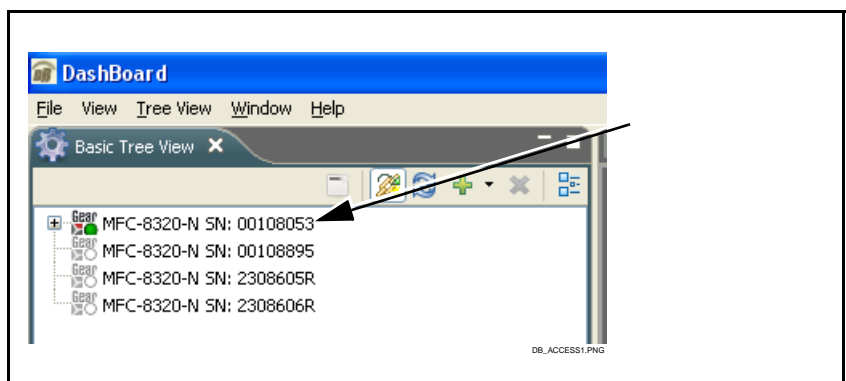
**3.** As shown below, expand the tree to access the cards within the frame. Click on the card to be accessed (in this example, "Slot 6: CDI-9363").
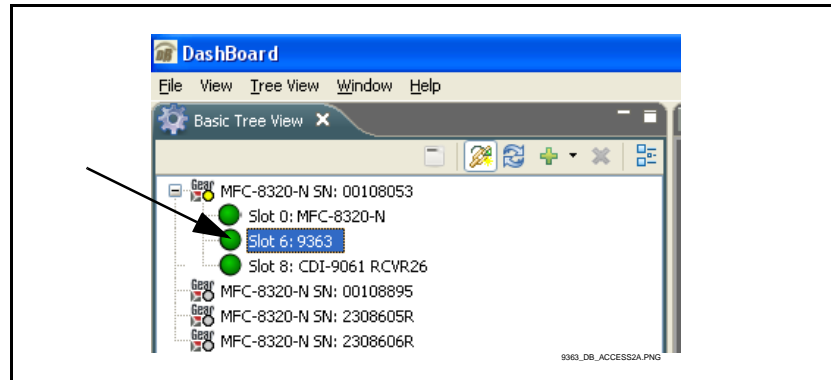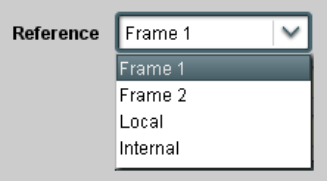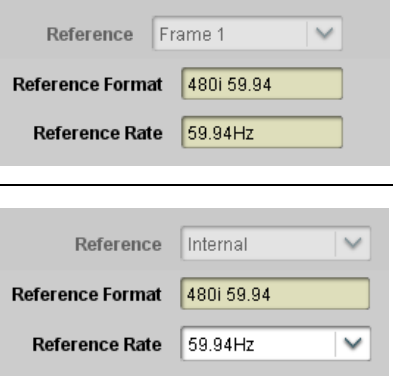


When the card is accessed in DashBoard™ its function submenu screen showing tabs for each function is displayed.

## 9363 Function Submenu List and Descriptions

Table 3-1 individually lists and describes each 9363 function submenu and its related list selections, controls, and parameters. Where helpful, examples showing usage of a function are also provided. Table 3-1 is primarily based upon using DashBoard™ to access each function and its corresponding submenus and parameters.

**Note:** If DashBoard is unavailable, the card edge controls can be used to access all controls described here. Refer to Card-Edge Control/Display (p. 3-8) for using card edge controls.

*Table 3-1      9363 Function Submenu List*

| **Setup** | Provides controls for selecting input reference source and configuring the four reference output pairs. |
|---|---|

| • **Input Reference Source Select** | Selects source to be used as basic timing reference input as follows: |
|---|---|
| Reference [Frame 1 ▼] Frame 1 / Frame 2 / Local / Internal | • **Frame 1:** Selects Frame 1 distributed reference signal as base source. <br> • **Frame 2:** Selects Frame 2 distributed reference signal as base source. <br> • **Local:** Selects Rear I/O Module External input BNC input as base source. <br> **Note:** Card jumper **JP2** must be set to **REF IN** position for this input to work (this is the default factory position). See Setting Card Jumpers (p. 2-1) in Chapter 2, "Installation" for more information. <br> • **Internal:** Selects the card internal reference as base source. |

| • **Reference Format Display** | Display reference format and rate of external (frame or external) reference source. Provides selection of format when **Internal** source is selected. |
|---|---|
| Reference [Frame 1 ▼] <br> Reference Format [480i 59.94] <br> Reference Rate [59.94Hz] | • When an external reference source (**Frame 1**, **Frame 2**, or External (**Local**)) is selected, displays received format and rate. |
| Reference [Internal ▼] <br> Reference Format [480i 59.94] <br> Reference Rate [59.94Hz ▼] | • When the **Internal** reference source is being used (or when an AES or Word Clock external input is received), **Reference Rate** drop-down allows selection of internal base references from choices listed below. |

| Setting | Format/Rate | Setting | Format/Rate |
|---|---|---|---|
| 60Hz | 1080i 60 | 29.97Hz | 1080p 29.97 |
| 59.94Hz | 480i 5994 | 25Hz | 1080p 25 |
| 50Hz | 576i 50 | 24Hz | 1080p 24 |
| 30Hz | 1080p 30 | 23.98Hz | 1080p 23.98 |

***Table 3-1     9363 Function Submenu List — continued***
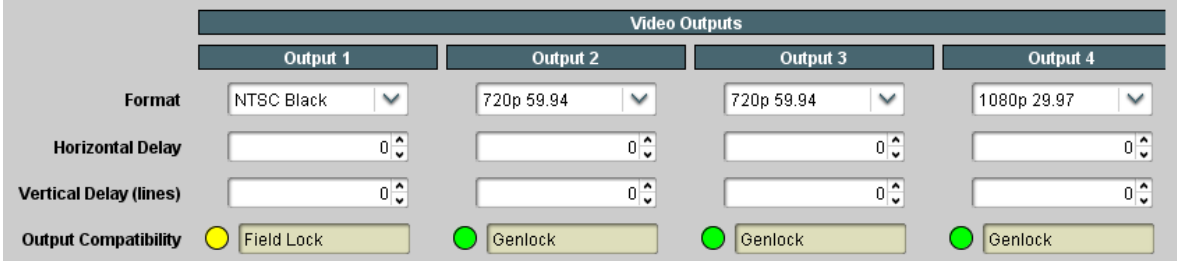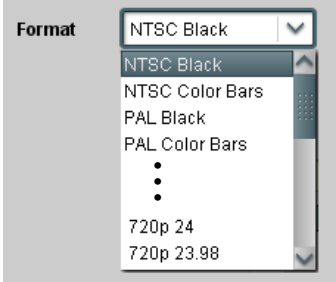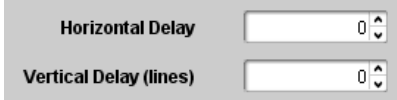
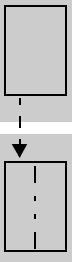| **Setup** | **(continued)** |
|---|---|
| • **Reference Video Output Controls**  | For each of the card's four reference output pairs, provides independent controls for output format/rate, as well as horizontal and vertical delay controls. Also shows lock status for each channel selection.<br><br>Each of the four output channels have identical, independent controls which are described below. |
| • **Format Select**  | Provides multiple format and rate choices for respective output channel.<br><br>**Note:** Refer to Available Output Formats/Rates (p. 1-4) in Chapter 1, "Introduction" for available formats for each input format supported and other notes. |
| • **Horizontal/Vertical Offset Controls**  | Provides controls to offset output video sync relative from input or internal source (Horizontal Delay values in pixels; Vertical Delay values in lines).<br>    • **Positive** setting delay-offsets output reference by selected value (e.g., in NTSC Black output mode for Vertical Delay setting of 1, output sync is delayed 1 line).<br>    • **Negative** (wrap-around) setting advance-offsets output reference by selected value (e.g., in NTSC Black output mode for Vertical Delay setting of 524 (same as "-1"), output sync coincides with 524th line (525 minus 1 line) of input reference.<br><br>**Note:** All offset control values are relative to the selected input reference source. |

*Table 3-1     9363 Function Submenu List — continued*
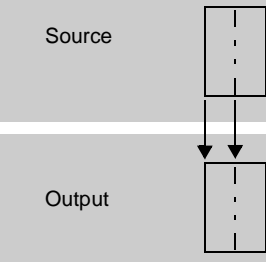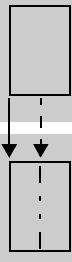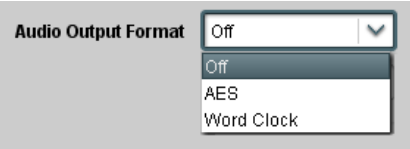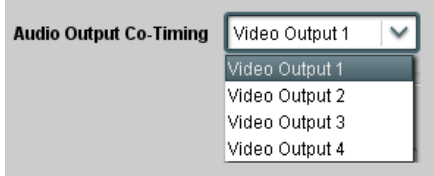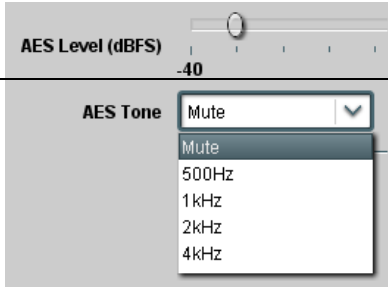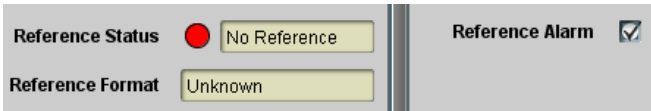
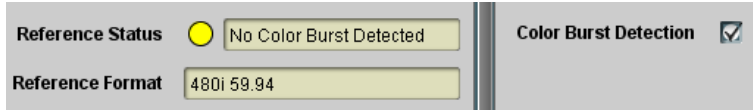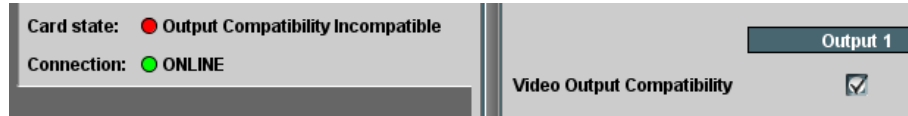| **Setup** | **(continued)** |
|---|---|
| • **Compatibility Status Indicator**<br><br>Output Compatibility ● Genlock | Shows compatibility of output format choice in regards to received input or selected internal source.<br><br>    • **Genlock:** (see below)<br>    • **Field Lock:** (see below)<br>    • **Clock Lock:** (see below)<br>    • **Incompatible:** Indicates an output format selection that is incompatible in respect to the received or selected internal source (e.g., a PAL (50 Hz) output selection when using a 59.94 Hz-based source).<br><br>**Note:** See Available Output Formats/Rates (p. 1-4) in Chapter 1, "Introduction" for available formats for each input format supported and other notes. |



|  | **Genlock** | **Field Lock** | **Clock Lock** |
|---|---|---|---|
| **Source** | | | |
| **Output** | | | |
| | Output is synchronized with source reference in both frame and field (where applicable) | When an interlaced format is derived from a progressive source, field lock is achieved. However, timing does not reliably mark odd or even field. | Indicates a fixed relationship between the source reference and output clock rates only; but no relationship between source reference and frame timing can be inferred. |

| • **Audio Output Format Select**<br><br>Audio Output Format [ Off ▼ ]<br>Off<br>AES<br>Word Clock | Selects audio output produced from received or internal base timing source as follows:<br><br>    • **Off:** AES output is muted.<br><br>    • **AES: AES/WC OUT** BNC output produces an AES output.<br><br>      **Note:** • See Table 1-2, "AES Audio Output Channel Status Data (p. 1-9)" in Chapter 1, "Introduction" for AES data specifications for this output mode.<br>          • Card jumper **JP2** must be set to **AES OUT** position for this output to work (this is **not** the default factory position). See Setting Card Jumpers (p. 2-1) in Chapter 2, "Installation" for more information.<br>    • **Word Clock: AES/WC OUT** BNC output produces basic word clock output. |

***Table 3-1       9363 Function Submenu List — continued***

| **Setup** | **(continued)** |
|---|---|
| • **Audio Output Co-Timing Source Select** | Selects the card output to which the AES or word clock output is referenced. |
| | **Note:** Any offset applied to the output using the Horizontal/Vertical Offset Controls is applied to the AES/word clock output. |
| • **AES Audio Output Level Controls** | When AES output is used, provides level, mute, and audio tone frequency controls. |
| | • **AES Level** sets output level (in dBFS; default is -20 dBFS sine wave). |
| | • **AES Tone** selects from the frequencies shown, and mute. |
| | **Note:** Mute setting simply mutes the audio tone on the AES signal. The output is a valid functional AES signal in all other aspects. |
| **Alarm** | Provides controls for setting DashBoard card status alarms indicating processing status conditions. |

• **Reference Alarm**

With **Reference Alarm** checked, conditions related to received reference status are propagated to the DashBoard card signal status display (in this example, no reference signal received on selected input reference).

• **Color Burst Presence Alarm**

With **Color Burst Detection** checked, if selected received reference does not contain color burst, this status is propagated to the DashBoard card signal status display (in this example, a black burst signal is being received on selected input reference).

• **Output Incompatibility Alarm**

With **Video Output Compatibility** for output channel checked, if selected output format on corresponding output channel is incompatible with received (or selected internal) reference, this status is propagated to the DashBoard card signal status display.

# Wings Insertion Synchronization Example

Figure 3-1 shows an example of using the 9363 to receive a house reference and provide coincident and a locked offset reference such that wings video insertion can be delayed, allowing the wings video to align with the program video, considering the inherent delay of the wings inserter.
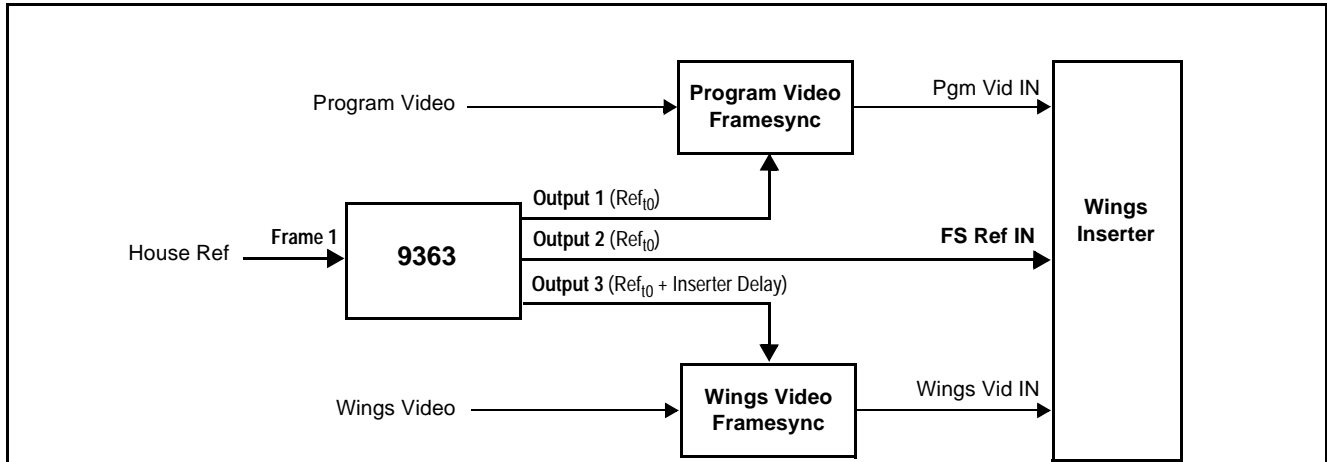


In this example, the wings video input to the Wings Inserter device must be delayed by 152 lines in order to compensate for program video delay inherent in the inserter. The house reference is provided undelayed to the basic reference inputs of the program video framesync and wings inserter framesync input.

The wings video path here is equipped with its own framesync, which receives the delay offset reference from the 9363, thereby maintaining a precise, stable offset regardless of any drift in the house reference.

Shown below are the 9363 DashBoard control settings for this setup.
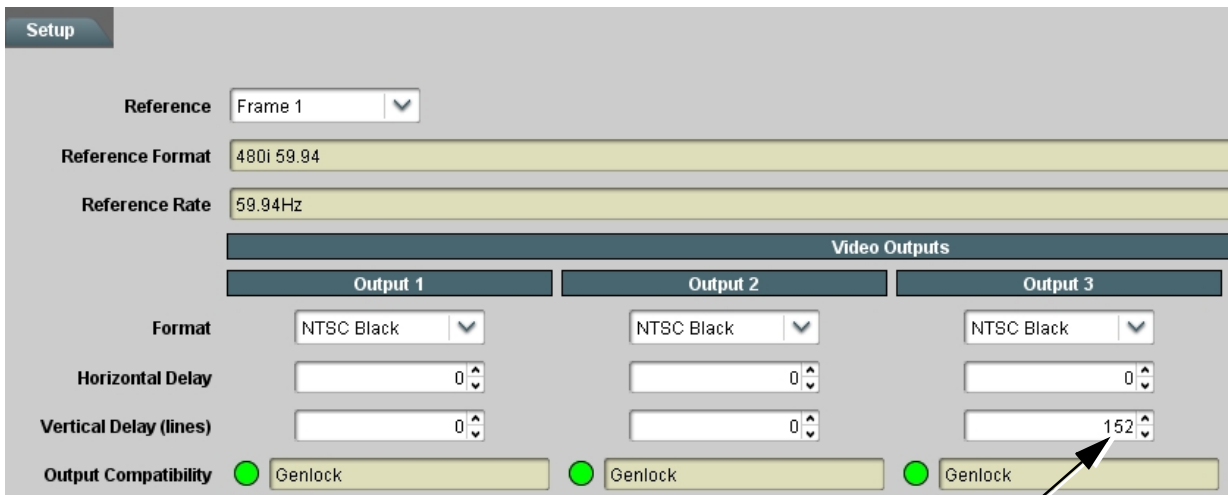


*Figure 3-1  Wings Insertion Synchronization Example*

# Card-Edge Control/Display

**Note:** If using DashBoard remote control, ignore this section. Use of these controls is required **only** if DashBoard is unavailable.

Figure 3-2 shows and describes the 9363 card edge controls, indicators, and display. Refer to 9363 Function Submenu List and Descriptions (p. 3-2) for detailed descriptions and selections available for the controls described in Figure 3-2.



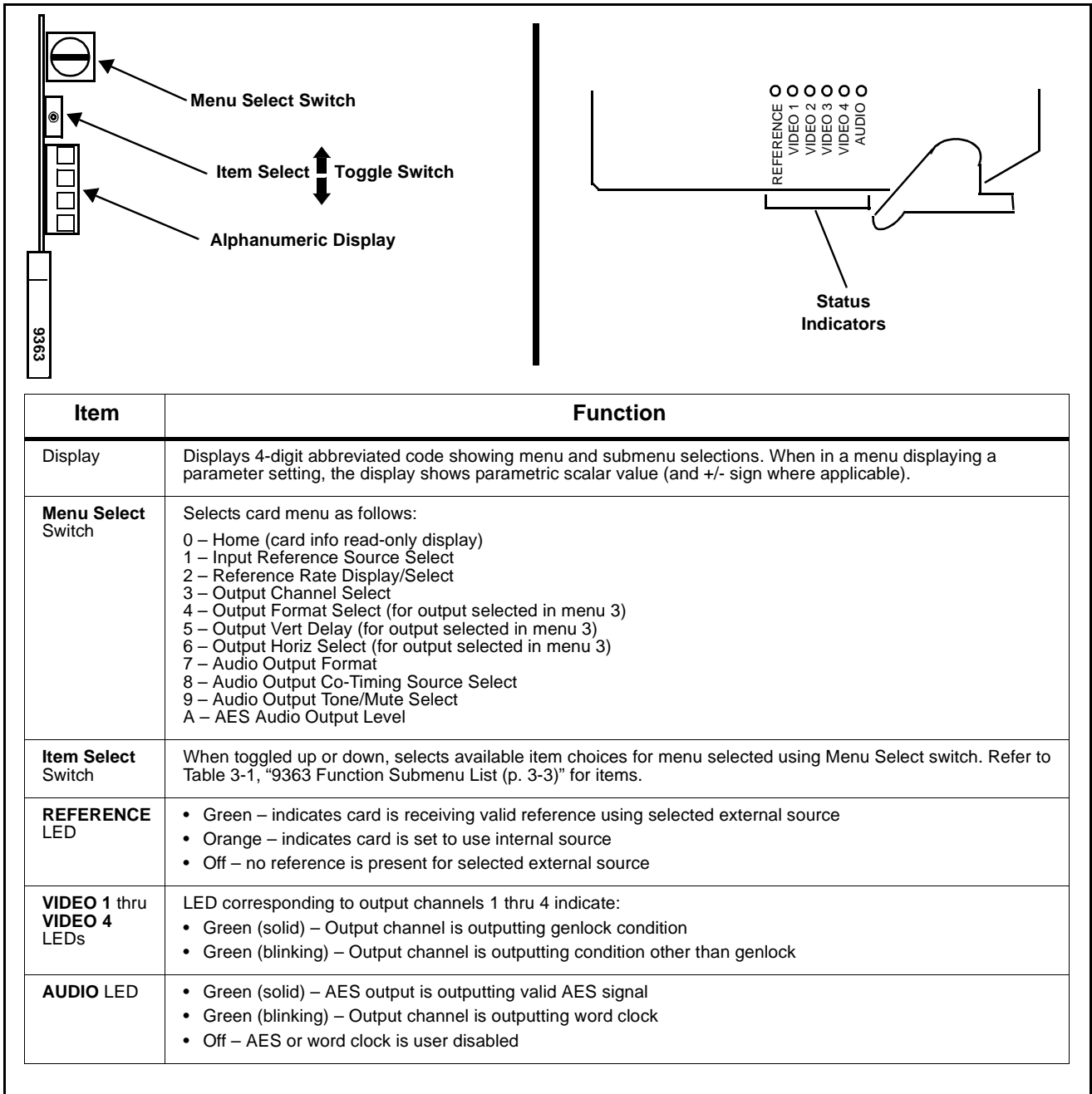| Item | Function |
|---|---|
| Display | Displays 4-digit abbreviated code showing menu and submenu selections. When in a menu displaying a parameter setting, the display shows parametric scalar value (and +/- sign where applicable). |
| **Menu Select** Switch | Selects card menu as follows:<br><br>0 – Home (card info read-only display)<br>1 – Input Reference Source Select<br>2 – Reference Rate Display/Select<br>3 – Output Channel Select<br>4 – Output Format Select (for output selected in menu 3)<br>5 – Output Vert Delay (for output selected in menu 3)<br>6 – Output Horiz Select (for output selected in menu 3)<br>7 – Audio Output Format<br>8 – Audio Output Co-Timing Source Select<br>9 – Audio Output Tone/Mute Select<br>A – AES Audio Output Level |
| **Item Select** Switch | When toggled up or down, selects available item choices for menu selected using Menu Select switch. Refer to Table 3-1, "9363 Function Submenu List (p. 3-3)" for items. |
| **REFERENCE** LED | • Green – indicates card is receiving valid reference using selected external source<br>• Orange – indicates card is set to use internal source<br>• Off – no reference is present for selected external source |
| **VIDEO 1** thru **VIDEO 4** LEDs | LED corresponding to output channels 1 thru 4 indicate:<br>• Green (solid) – Output channel is outputting genlock condition<br>• Green (blinking) – Output channel is outputting condition other than genlock |
| **AUDIO** LED | • Green (solid) – AES output is outputting valid AES signal<br>• Green (blinking) – Output channel is outputting word clock<br>• Off – AES or word clock is user disabled |

*Figure 3-2  9363 Card Edge Controls*

# Troubleshooting

This section provides general troubleshooting information and specific symptom/corrective action for the 9363 card and its remote control interface. The 9363 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 9363 card itself and its remote control systems all (to varying degrees) provide error and failure indications. Depending on how the 9363 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.

Red indicators in DashBoard typically signify a condition where the card is lacking a required input, or controls are improperly set for the mode(s) selected.

## 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 3-2 provides basic system checks that typically locate the source of most general problems.

## Troubleshooting Network/Remote Control Errors

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

## In Case of Problems

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

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

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

See Contact Cobalt Digital Inc. (p. 1-13) in Chapter 1, "Introduction" for contact information.

*Table 3-2    Basic Troubleshooting Checks*

| Item | Checks |
|---|---|
| **Verify power presence and characteristics** | On both the frame Network Controller Card and the 9363, in all cases when power is being properly supplied there is always at least one indicator illuminated. Any card showing no illuminated indicators should be cause for concern. |
| **Check Cable connection secureness and connecting points** | Make certain all cable connections are fully secure (including coaxial cable attachment to cable ferrules on BNC connectors). Also, make certain all connecting points are as intended. Make certain the selected connecting points correlate to the intended card inputs and/or outputs. Cabling mistakes are especially easy to make when working with large I/O modules. |
| **Card seating within slots** | Make certain all cards are properly seated within its frame slot. (It is best to assure proper seating by ejecting the card and reseating it again.) |
| **Check status indicators and displays** | On DashBoard™, red indications typically signify an error condition. If a status indicator signifies an error, proceed to the following tables in this section for further action. |
| **Troubleshoot by substitution** | All cards within the frame can be hot-swapped, replacing a suspect card or module with a known-good item. |