
COBALT[®]

BBG-1040-ACO



**BLUE
BOX**

**Multi-Input Modular Framesync
with Auto-Changeover and Character Burn**

Product Manual



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PRELIMINARY

BBG1040ACO-OM (V1.1P)

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Congratulations on choosing the Cobalt® BBG-1040-ACO Multi-Input Modular Framesync with Auto-Changeover and Character Burn. The BBG-1040-ACO 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 BBG-1040-ACO, please contact us at the contact information on the front cover.

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Introduction

Overview

This manual provides installation and operating instructions for the BBG-1040-ACO Multi-Input Modular Framesync with Auto-Changeover and Character Burn unit (also referred to herein as the BBG-1040-ACO).

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 BBG-1040-ACO.
- **Chapter 2, “Installation”** – Provides instructions for installing the BBG-1040-ACO and setting up its network access.
- **Chapter 3, “Setup/Operating Instructions”** – Provides overviews of operating controls and instructions for using the BBG-1040-ACO.

This chapter contains the following information:

- **Cobalt Reference Guides (p. 1-1)**
- **Manual Conventions (p. 1-2)**
- **Safety Summary (p. 1-3)**
- **BBG-1040-ACO Functional Description (p. 1-4)**
- **Technical Specifications (p. 1-10)**
- **Warranty and Service Information (p. 1-12)**
- **Contact Cobalt Digital Inc. (p. 1-13)**

Cobalt Reference Guides

From the Cobalt® web home page, go to **Support>Reference Documents** for easy to use guides covering network remote control, device firmware updates, example processing UI setups and other topics.

Manual Conventions

In this manual, display messages and connectors are shown using the exact name shown on the BBG-1040-ACO itself. Examples are provided below.

- Device display messages are shown like this:

BBG-1040-ACO

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

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

- **BBG-1040-ACO** refers to the BBG-1040-ACO Multi-Input Modular Framesync with Auto-Changeover and Character Burn unit.
- **Frame** refers to the HPF-9000, OG3-FR, 8321, or similar 20-slot frame that houses Cobalt® or other cards/devices.
- **Device** and/or **Card** refers to a Cobalt® or other card.
- **System** and/or **Video System** refers to the mix of interconnected production and terminal equipment in which the BBG-1040-ACO and other cards/devices operate.
- Functions and/or features that are available only as an option are denoted in this manual like this:

Option ➞

Warnings, Cautions, and Notes

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

Warnings

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




Cautions

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

Notes

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

Labeling Symbol Definitions

	Important note regarding product usage. Failure to observe may result in unexpected or incorrect operation.
	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 only by edges and avoid contact with any connectors or components.
	Symbol (WEEE 2002/96/EC) For product disposal, ensure the following: <ul style="list-style-type: none"> • 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 device contains no user-serviceable components. Refer servicing to authorized personnel.

CAUTION

This device is intended for use ONLY with specified power supplies. Power connection to unauthorized sources may cause product damage, unreliable operation, and invalidate warranty.

CAUTION

The BBG-1040-ACO FPGA is designed for a normal-range operating temperature around 85° C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within device operating safe parameters, and can be allowed by setting this control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum device protection.

BBG-1040-ACO Functional Description

Figure 1-1 shows a functional block diagram of the 9940-ACO. A Quality Check option allows failover to alternate inputs based on user-configurable subjective criteria such as black/frozen frame or audio silence. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even in cases where the input video image is static.

The BBG-1040-ACO uses a built-in web server that allows control/monitor over computers or smart devices.

BBG-1040-ACO Input/Output Formats

The BBG-1040-ACO provides the following inputs and outputs:

- **Inputs:**
 - **3G/HD/SD SDI IN A / SDI IN B** – two 3G/HD/SD-SDI inputs (GUI-selectable or Auto-Changeover selection)
- **Outputs:**
 - **A/B PROC OUT** – 3G/HD/SD-SDI processed output with relay protect failover of currently active input to this output if device power is lost.
 - **RCK/PROC OUT (1-3)** – three 3G/HD/SD-SDI buffered video outputs. Each output can be independently set as processed output video or selected input video reclocked. (These outputs are via active circuitry/DA and do not offer loss of power failover protection.)

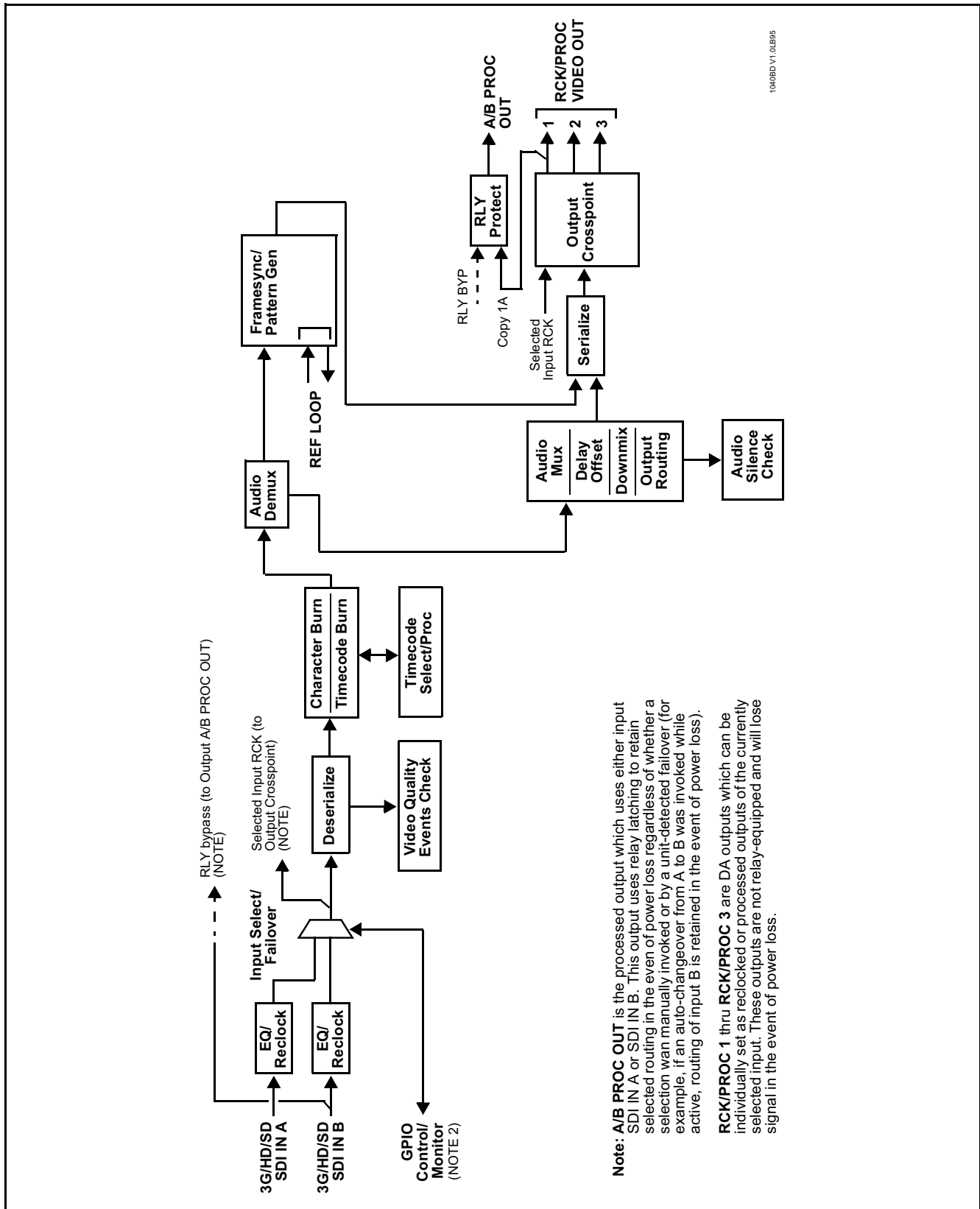



Figure 1-1 BBG-1040-ACO Functional Block Diagram

Video Processor Description

The BBG-1040-ACO features frame sync, character burner, and moving-box insertion. The BBG-1040-ACO video subsystem also provides the functions described below.

Input Video Select/Quality Check Functions

The input can be selected using the user interface manual control, set to failover to an alternate input upon loss of the target input, and can be externally selected via a GPIO interface. Reclocked copies of either SDI input can be outputted by the device when selected as a choice on the output crosspoint.

Option  (Option +QC). A validity/quality check function checks each input for valid video format and type, and displays this information via the device DashBoard status display. A user-configurable Quality Check function allows subjective criteria such as black/frozen frame or audio silence events to propagate an event alert. This alert can be used by the device Presets function to invoke video routing and other changes.

Auto-Changeover Function

(See Figure 1-2.) This function allows the logic assert of input select and routing to the **A/B PROC OUT** processed output under normal conditions, while providing latching relays at both the input and output nodes to provide input failover to select an alternate input, and also provides output failover which can passively relay-route the currently selected input directly to the output if the device loses power.

The **A/B PROC OUT** SDI output retains selected routing regardless of whether a selection was manually invoked or by a unit-detected failover (such as loss of power). For example, prior to a power loss event if a changeover from **SDI IN A** to **SDI IN B** was active at the time, this selection is retained by the latching relays. In a power-loss event, **SDI IN B** would be directly routed to output **A/B PROC OUT**, and the device automatically removed from the signal path until normal operation again commences. In normal operation, the output relay always maintains routing from the device processed output to output **A/B PROC OUT**.

Note: The device also provides active (DA-driven) outputs **RCK/PROC 1** thru **RCK/PROC 3**. These outputs are independent of the relay failover function and will lose signal in the event of a power loss.

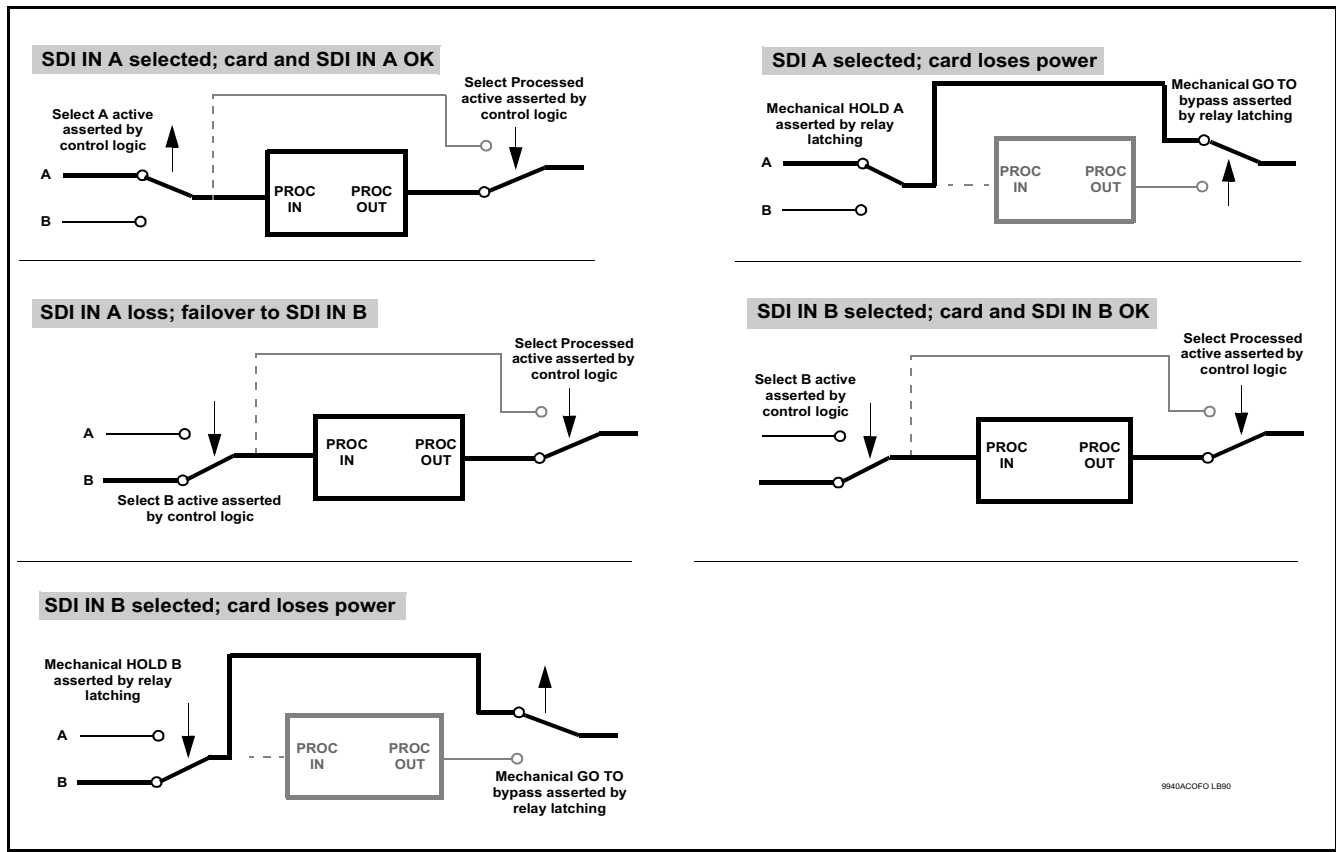


Figure 1-2 Auto-Changeover Function and Signal Flow

Timecode Processor

(See Figure 1-3.) This function provides for extraction of timecode data from input video source, and in turn allow individual timecode strings to be embedded and/or burned into the output video. The function can monitor any of the video inputs of the device for supported timecode formats such as ATC_LTC or ATC_VITC for HD, and ATC_VITC or VITC waveform (with selectable odd/even field line number control) for SD SDI inputs. Waveform VITC timecode can also be extracted from a reference input and used as the output timecode value.

Option

When licensed with option **+LTC**, this function also can receive and translate audio LTC timecode (from Emb Ch 1-16) for insertion as SMPTE 12M ATC timecode formats onto the output video as described above.

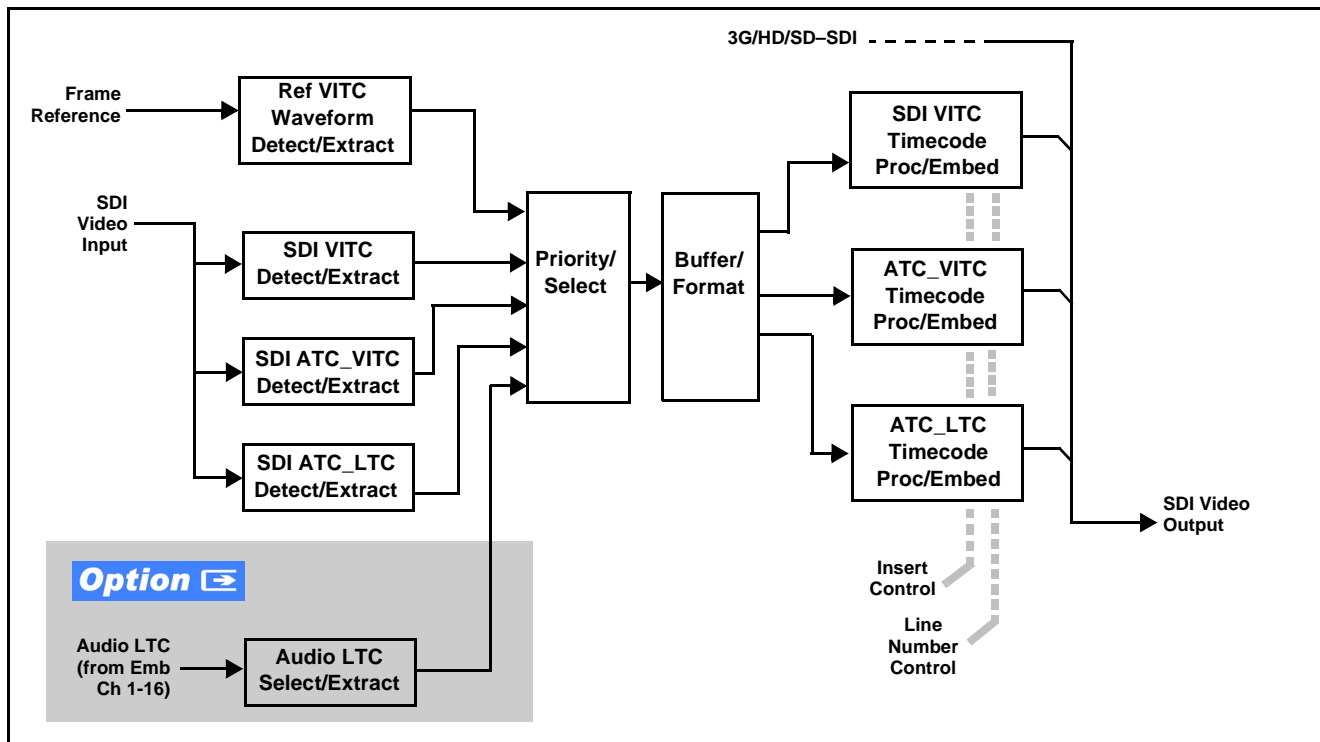


Figure 1-3 Timecode Processor

Frame Sync Function

This function provides for frame sync control using a looping reference input that can use black burst or tri-level sync signals distributed with the plant, or use the input video as a frame sync reference.

This function also allows horizontal and/or vertical offset to be added between the output video and the frame sync reference.

Frame sync can select from either of two device frame reference sources, or free-run input video sync. Selectable failover allows alternate reference selection should the initial reference source become unavailable or invalid. In the event of input video loss of signal, the output can be set to disable video, go to black, go to an internal test signal generator pattern, or freeze to the last intact frame (last frame having valid SAV and EAV codes).

An internal test signal generator provides a selection of nine standard patterns such as color bars, sweep patterns, and other technical patterns. The test patterns can be applied to the output video upon loss of input or manually inserted at any time.

Y/C Phase Alignment Processor

This function can correct upstream misalignment of Y and C phase (which is typically introduced by upstream analog-to-digital converters, especially where the Y and chroma paths may experience differing characteristics). The function provides a phase offset of C phase from Y phase.

Character/Image Burn-in Functions

Text strings and timecode (as selected using the timecode function) can be burned into the output video. Burn-in attributes such as size, position, background, color, and opacity are user-configurable. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even in cases where the input video image is static or lost.

Video Output Crosspoint

A three-output video matrix crosspoint allows independently applying the processed video output or reclocked input to any of the three non-relay outputs **RCK/PROC 1** thru **RCK/PROC 3**).

Audio Processor Description

The audio processor operates as an internal audio router. An Input Audio Status display shows the presence and peak level of each input audio channel received by the device. For digital audio inputs, payload is identified (PCM or data such as Dolby® Digital or E). An audio silence check can detect, on any channel, audio that persists below a specified loudness exceeding a configurable time span. This check can propagate an alert to the device Presets function to invoke audio routing and other changes. As such, the audio subsection provides a full crosspoint between all supported audio inputs and output formats.

Audio Down Mix Function

(See Figure 1-4.) The Audio Down Mixer function provides for the selection of any five embedded channels serving as Left (**L**), Right (**R**), Center (**C**), Left Surround (**Ls**), and Right Surround (**Rs**) individual signals to be multiplexed into stereo pair Down Mix Left (**DM-L**) and Down Mix Right (**DM-R**). The resulting stereo pair **DM-L** and **DM-R** can in turn be routed to any embedded audio pair as desired.

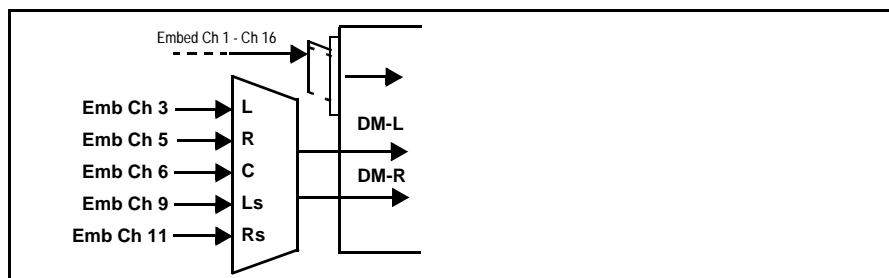


Figure 1-4 Audio Down Mix Functional Block Diagram with Example Sources

User Control Interface

BBG-1040-ACO uses an HTML5 internal web server for control/monitoring communication, which allows control via a web interface with no special or unique application on the client device. Connection to the device to the network media connection is via a standard 10/100/1000 RJ-45 Ethernet connection.

Technical Specifications

Table 1-1 lists the technical specifications for the BBG-1040-ACO Multi-Input Modular Framesync with Auto-Changeover and Character Burn unit.

Table 1-1 Technical Specifications

Item	Characteristic
Part number, nomenclature	BBG-1040-ACO Multi-Input Modular Framesync with Auto-Changeover and Character Burn
Power consumption	< 18 Watts maximum. Power provided by included AC adapter; 100-240 VAC, 50/60 Hz. Second DC power connection allows power redundancy using second (optional) AC adapter.
Installation Density	Up to 3 units per 1RU space
Environmental: Operating temperature: Relative humidity (operating or storage): Dimensions (WxHxD): Weight:	32° – 104° F (0° – 40° C) < 95%, non-condensing 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections. 6 lb (2.8 kg)
Ethernet communication	10/100/1000 Mbps Ethernet with Auto-MDIX via HTML5 web interface.
Front-Panel Controls and Indicators	Backlit LCD display and menu navigation keys. Display and controls provide unit status display and full control as an alternate to web GUI control.
Serial Digital Video Input	Number of inputs: (2), with manual select or failover to alternate input. Data Rates Supported: SMPTE 424M, 292M, SMPTE 259M-C Impedance: 75 Ω terminating Return Loss: > 15 dB up to 1.485 GHz > 10 dB up to 2.970 GHz

Table 1-1 Technical Specifications — continued

Item	Characteristic
Input Select/Auto-Changeover Failover (option +QC)	<p>Failover to alternate input on loss of target input. Failover invoked upon LOS and/or (with option +QC) user configurable parametric criteria such as black/frozen frame or audio silence.</p> <ul style="list-style-type: none"> - Black frame trigger configurable for black intensity threshold and persistence time. - Frozen frame trigger configurable for frozen percentage difference and persistence time.
Post-Processor Serial Digital Video Outputs	<p>Number of Outputs: One 3G/HD/SD-SDI BNC, relay-protected Three 3G/HD/SD-SDI BNC, selectable as processed or input reclocked output</p> <p>Impedance: 75 Ω</p> <p>Return Loss: > 15 dB at 5 MHz – 270 MHz</p> <p>Signal Level: 800 mV \pm 10%</p> <p>DC Offset: 0 V \pm 50 mV</p> <p>Jitter (3G/HD/SD): < 0.3/0.2/0.2 UI</p>
Embedded Audio Output	<p>16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.</p>
Frame Reference Input	<p>Looping 2-BNC connection. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”</p> <p>Return Loss: >35 dB up to 5.75 MHz</p>
GPIO/COMM	<p>(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.</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.

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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

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Installation

Overview

This chapter contains the following information:

- Installing the BBG-1040-ACO (p. 2-1)
- Rear Panel Connections (p. 2-2)
- GPIO Connections (p. 2-4)

Installing the BBG-1040-ACO

- Note:**
- Where BBG-1040-ACO is to be installed on a mounting plate (or regular table or desk surface) **without** optional frame Mounting Tray BBG-1000-TRAY, affix four adhesive-backed rubber feet (supplied) to the bottom of BBG-1040-ACO in locations marked with stamped “x”. If feet are not affixed, chassis bottom cooling vents will be obscured.
 - Where BBG-1040-ACO is to be installed **with** optional frame Mounting Tray BBG-1000-TRAY, **do not** affix adhesive-backed feet.

Installing Using BBG-1000-TRAY Optional Mounting Tray

BBG-1000-TRAY allows up to three BBG-1040-ACO to be mounted and securely attached to a 1 RU tray that fits into a standard EIA 19” rack mounting location. Install BBG-1040-ACO unit into tray as described and shown here.

1. If installing BBG-1040-ACO using optional frame Mounting Tray BBG-1000-TRAY, install BBG-1040-ACO in tray as shown in Figure 2-1.
2. Connect the input and output cables as shown in Figure 2-3.

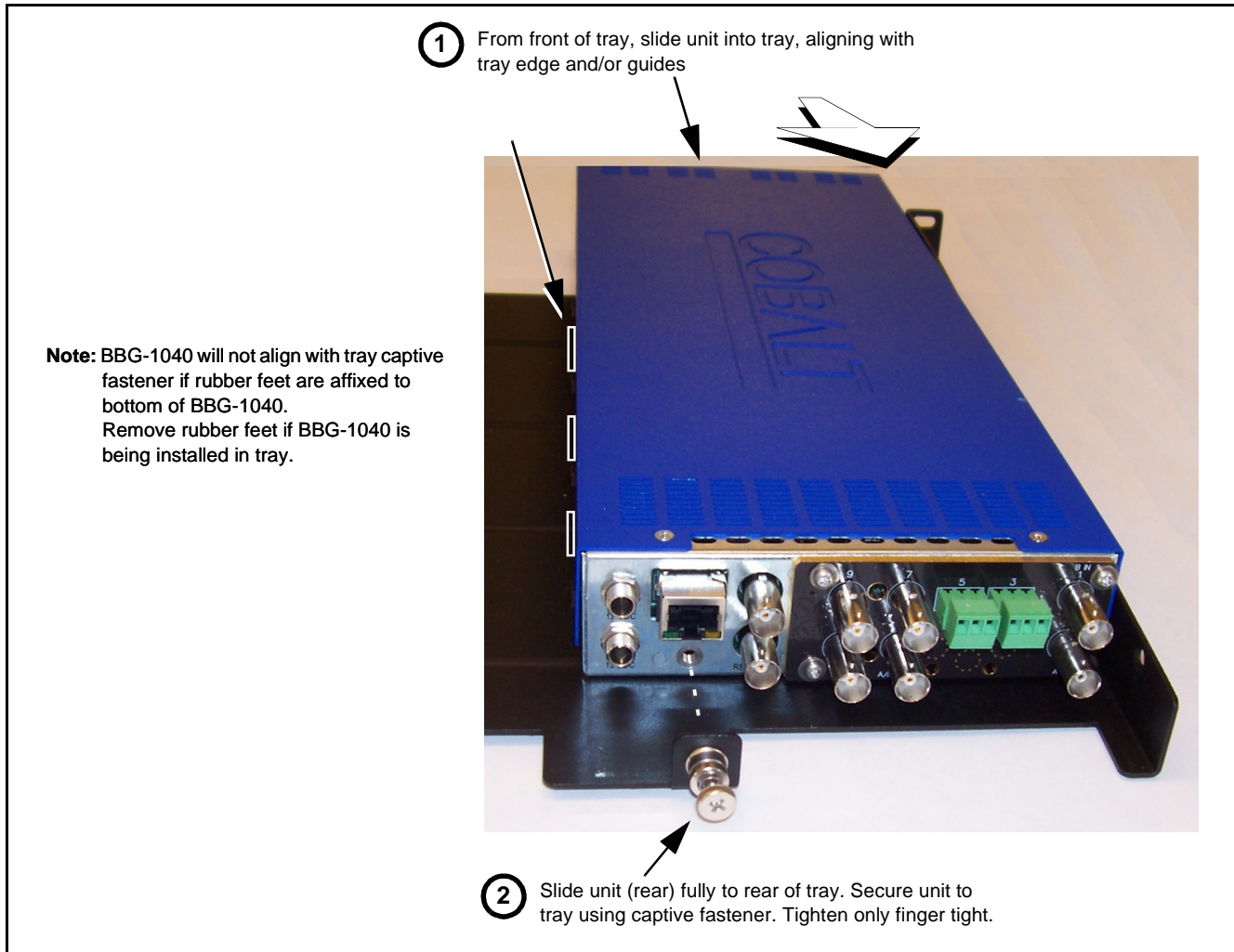


Figure 2-1 Mounting BBG-1040-ACO Using Frame Mounting Tray

BBG-1040-ACO Unit Dimensions

Figure 2-2 shows the BBG-1040-ACO physical dimensions and mounting details for cases where BBG-1040-ACO will be installed in a location not using the optional **BBG-1000-TRAY** mounting tray.

Rear Panel Connections

Perform rear panel cable connections as shown in Figure 2-3.

- Note:**
- The BBG-1040-ACO BNC inputs are internally 75-ohm terminated. It is not necessary to terminate unused BNC video inputs or outputs.
 - External frame sync reference signal (if used) must be terminated if a looping (daisy-chain) connection is not used. Unterminated reference connection can result in unstable reference operation.

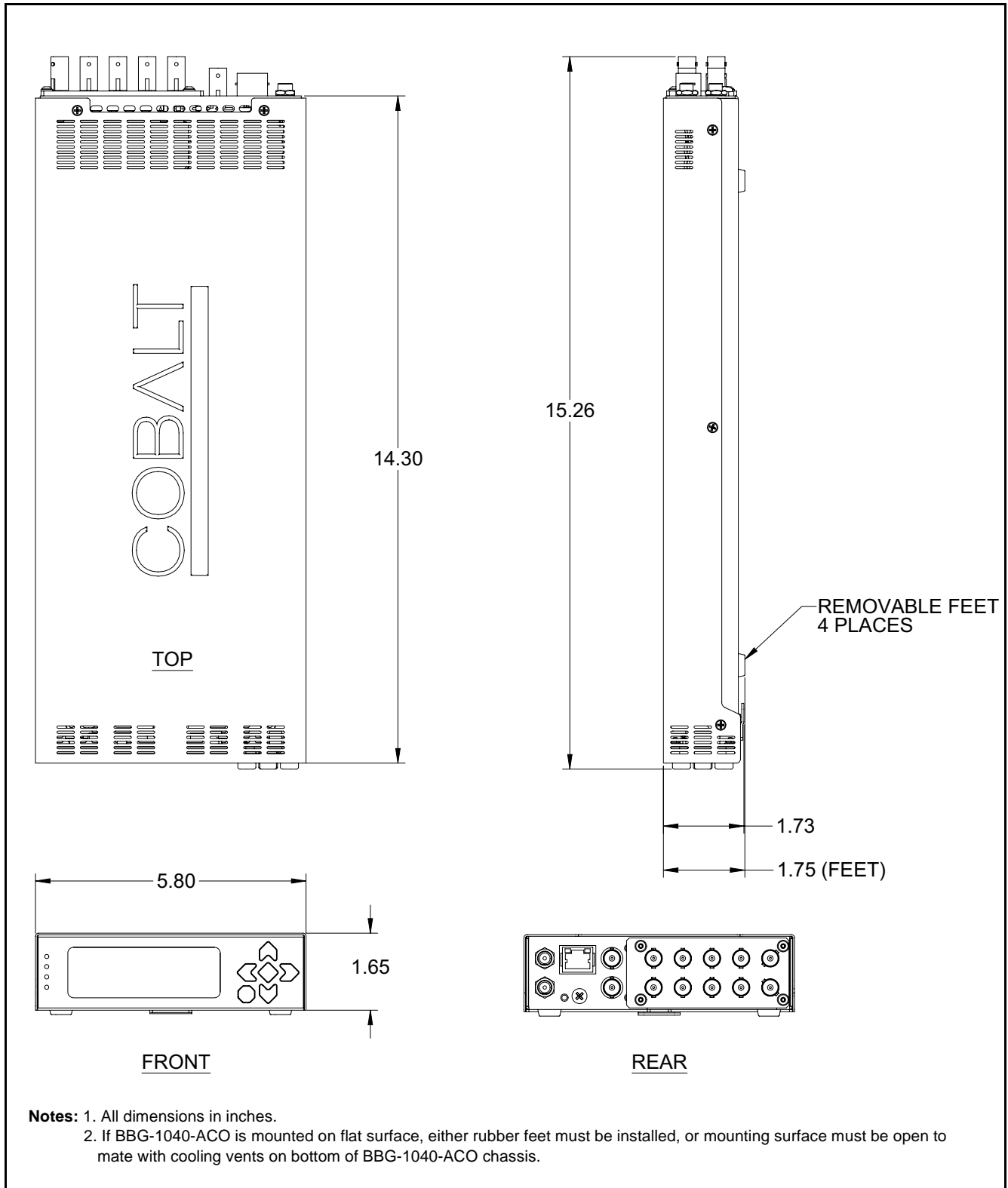


Figure 2-2 BBG-1040-ACO Dimensional Details

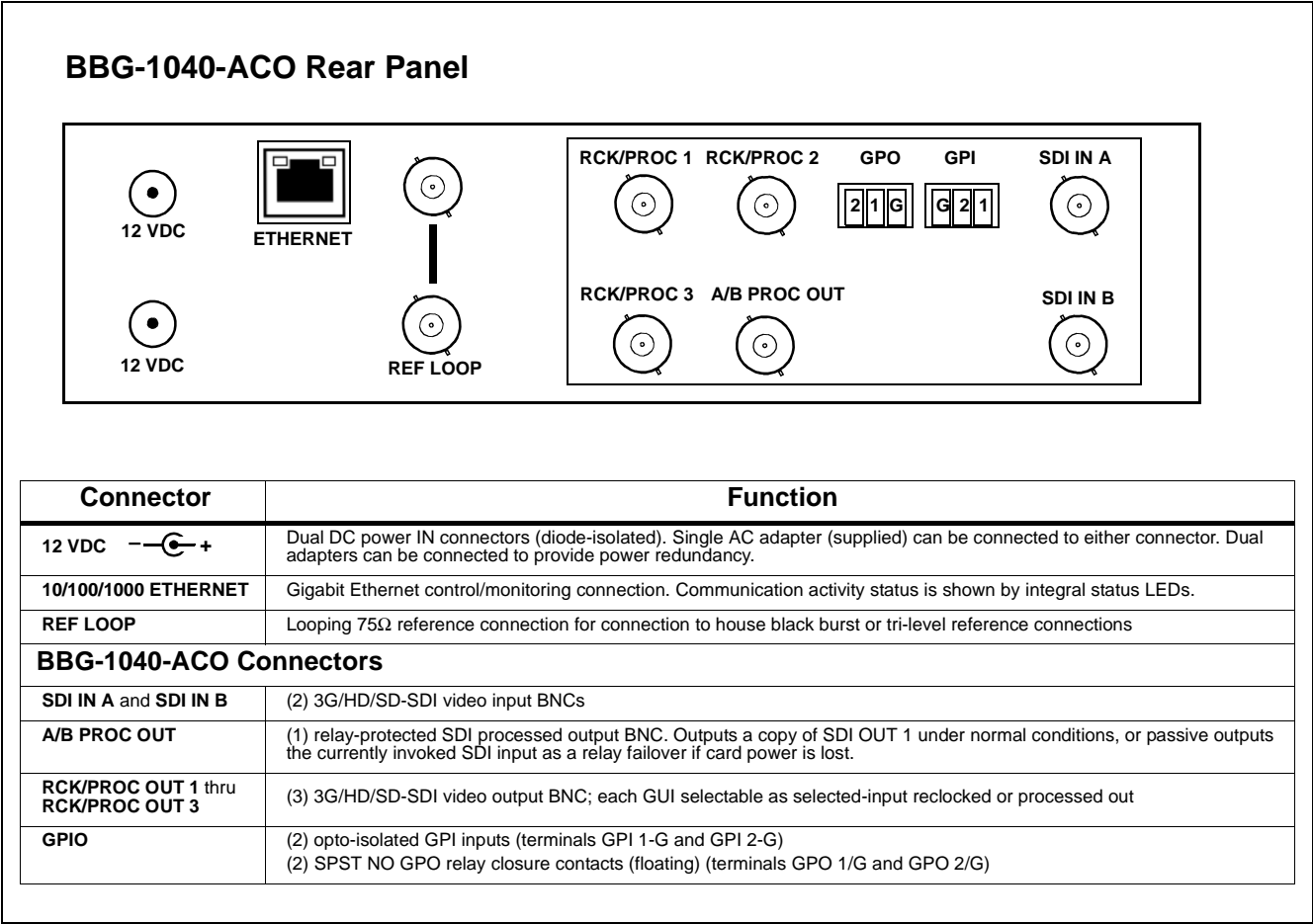


Figure 2-3 BBG-1040-ACO Rear Panel Connectors

GPIO Connections

Figure 2-4 shows connections to the card multi-pin terminal block connectors. These connectors are used for card GPIO connections.

Note: It is preferable to wire connections to plugs oriented as shown in Figure 2-4 rather than assessing orientation on rear module connectors. Note that the orientation of rear module 3-wire audio connectors is not necessarily consistent within a rear module, or between different rear modules. If wiring is first connected to plug oriented as shown here, the electrical orientation will be correct regardless of rear module connector orientation.

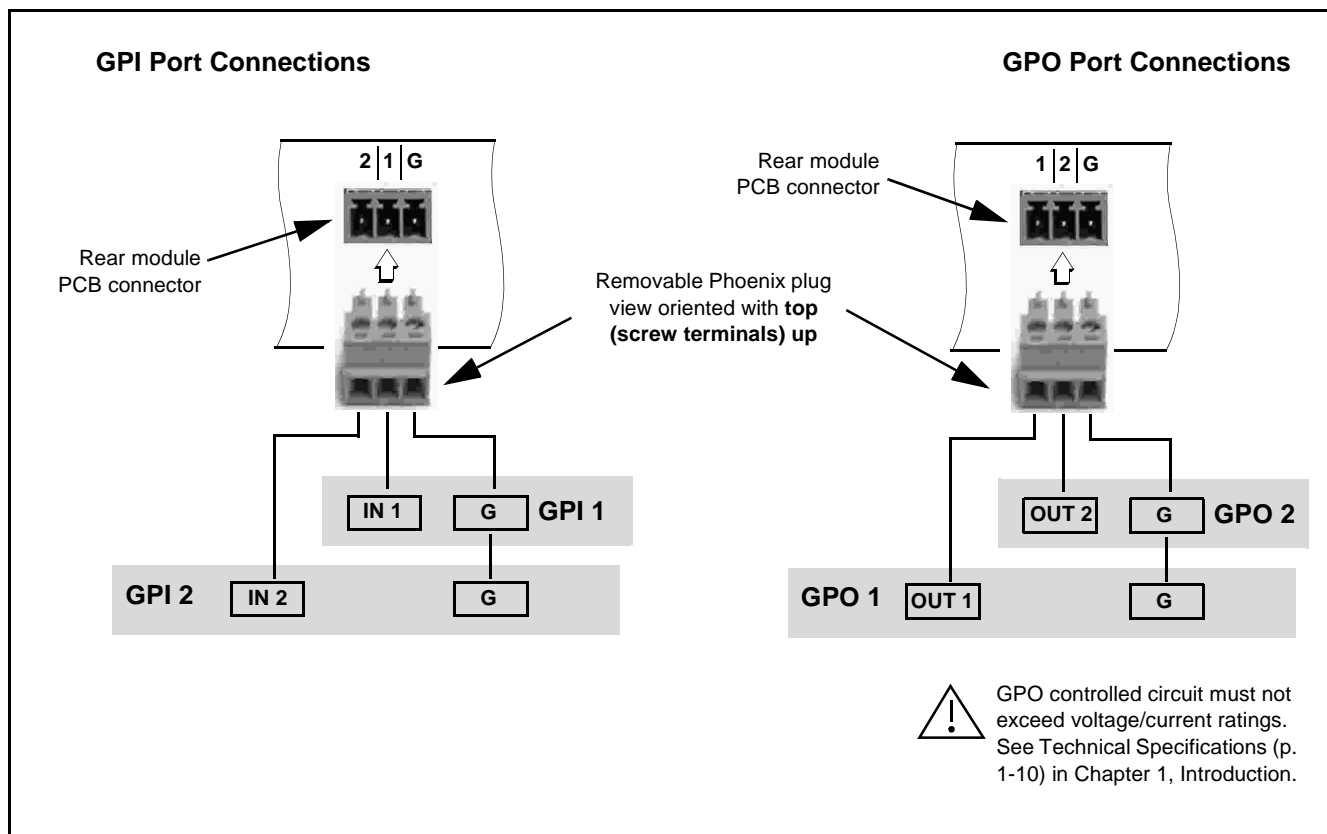


Figure 2-4 GPIO Connector Pinouts

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Setup/Operating Instructions

Overview

This chapter contains the following information:

- BBG-1040 Front Panel Display and Menu-Accessed Control (p. 3-1)
- Connecting BBG-1040 To Your Network (p. 3-3)
- Control and Display Descriptions (p. 3-5)
- Checking BBG-1040-ACO Device Information (p. 3-8)
- Ancillary Data Line Number Locations and Ranges (p. 3-9)
- BBG-1040-ACO Function Menu List and Descriptions (p. 3-10)
- Front Panel User Menus (p. 3-35)
- Troubleshooting (p. 3-37)

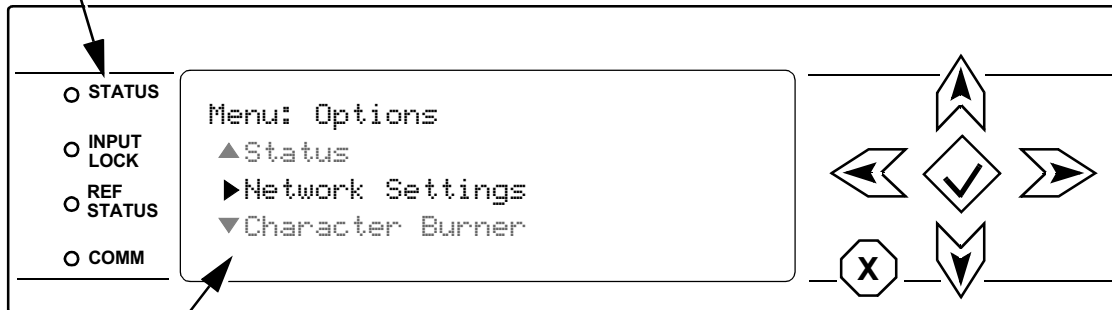
Perform the setup procedures here in the sequence specified. All procedures equally apply to all models unless otherwise noted.

- Note:**
- Unless otherwise noted, all procedures here are applicable for both the BBG-1040-ACO and BBG-1040-ACO-AV-EMDE. Either model is collectively referred to as “BBG-1040”.
 - All instructions here assume BBG-1040 is physically connected to the control physical network as described in Chapter 2. Installation.

BBG-1040 Front Panel Display and Menu-Accessed Control

Figure 3-1 shows and describes the BBG-1040 front panel displays and menu-accessed user interface controls. Initial network setup is performed using these controls.

- **STATUS** LED illuminated green shows unit power is OK and unit is functional.
- **INPUT LOCK** LED illuminated green shows at least one video input is locked to video.
- **REF STATUS** LED illuminated green shows valid reference is being received.
- **COMM** LED illuminated green shows Ethernet connection is OK.



BBG1000_FPUI_SCPD2014P8

Alphanumeric display shows configuration items, and shows and allows changes of settings when a menu item is accessed.

▲ and ▼ arrows denote scroll up or down to access the menu item.

▶ arrows denotes a menu item is accessed to be selected (in the example above, **Network Settings**).

Press the button to now access and enter the menu item. When this button is pressed, the selected menu item is displayed, along with its sub-menus.

In this example showing the Network Settings menu, Menu: Network Settings as menu item is displayed (indicating this is the actively selected menu item) and its sub-menus are now displayed:

```
Menu: Network Settings
▶ IP: 10.99.11.162
▼ Netmask: 255.255.255.0
▼ Gateway: 10.99.11.1
```

In this example, with ▶ pre-selecting the IP: sub-menu, pressing the button again opens the IP: sub-menu.

```
IP
010.099.011.162
```

The carets above and below a character indicate this character is ready for editing. Use the and buttons to decrement or increment the value.
Use the and buttons to navigate to other characters.

To exit a sub-menu or a menu, press the button. This locks in any changes and proceeds to the last-selected sub-menu or menu item. Repeatedly press the button to step up through sub-menus and then to other menus. Access other menu items using the and buttons.

The display backlight automatically brightens with any navigation arrow activity, and then goes dim after a few moments.



Figure 3-1 BBG-1040 Front Panel Display and Menu Controls

Connecting BBG-1040 To Your Network

BBG-1040 ships with network protocol set to DHCP and populates its address with an address allocated by your DHCP server. If your network does not have a DHCP server, the BBG-1040 address field will be blank, and a static address must then be assigned. All initial network settings are performed using the Front Panel Display menu-accessed control (as described on the previous page). Refer to this page for instructions of using the front-panel menu navigation.

Access the Network Settings menu and configure network settings as follows:

Connecting BBG-1040 To Network

1. Power-up BBG-1040 and connect Ethernet cable connection to media. Wait for BBG-1040 to complete booting. When **Product: BBG-1040** ... is displayed, device is ready for configuration.
 2. Press  and access the **Network Settings** menu. Current network settings are displayed (as configured by host DHCP server).
Note: It is recommended to now change the settings to use a static IP address of your choice. The following steps describe using a static IP address.
 3. In **Network Settings > Mode**, change setting to **Mode: Static**.
 4. Configure the following fields as desired and appropriate for your network connection (examples shown below).
- ```
Menu: Network Settings
IP: 10.99.16.105
Netmask: 255.255.255.0
Gateway: 10.99.16.1
Mode: Static
```
5. Press  to commit changes and exit the setup menu.  
**Note:** Current IP address of BBG-1040 can now be checked from the front panel by accessing this at any point.
  6. At this point, BBG-1040 can now be accessed with a web browser pointing to the configured address. Browse to the configured address and check connectivity.

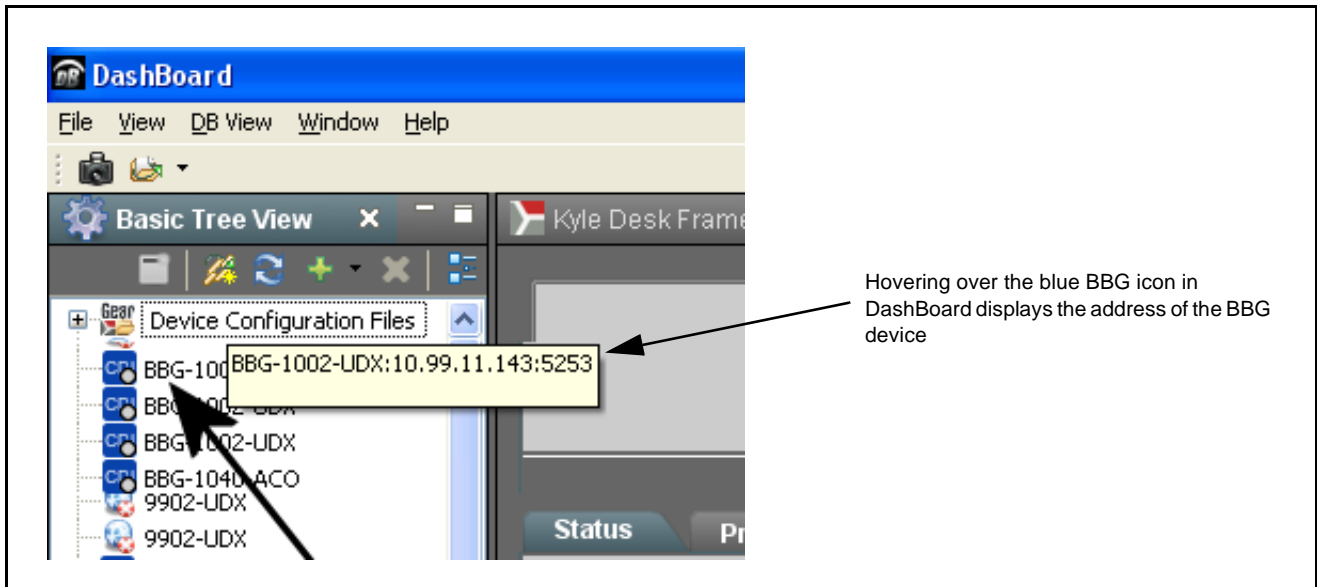
Web browser pointing to configured address displays BBG-1040



## Finding a BBG-1040 Device in DashBoard

(See Figure 3-2) If BBG-1040 is configured with an address within a network also available via DashBoard, a BBG-1040 device appears as a frame entity in the DashBoard Basic Tree View.

**Note:** BBG-1040 DashBoard remote control is also available by opening the device in DashBoard similar to opening an openGear® card.



**Figure 3-2 Finding BBG-1040 Using DashBoard**

## Control and Display Descriptions

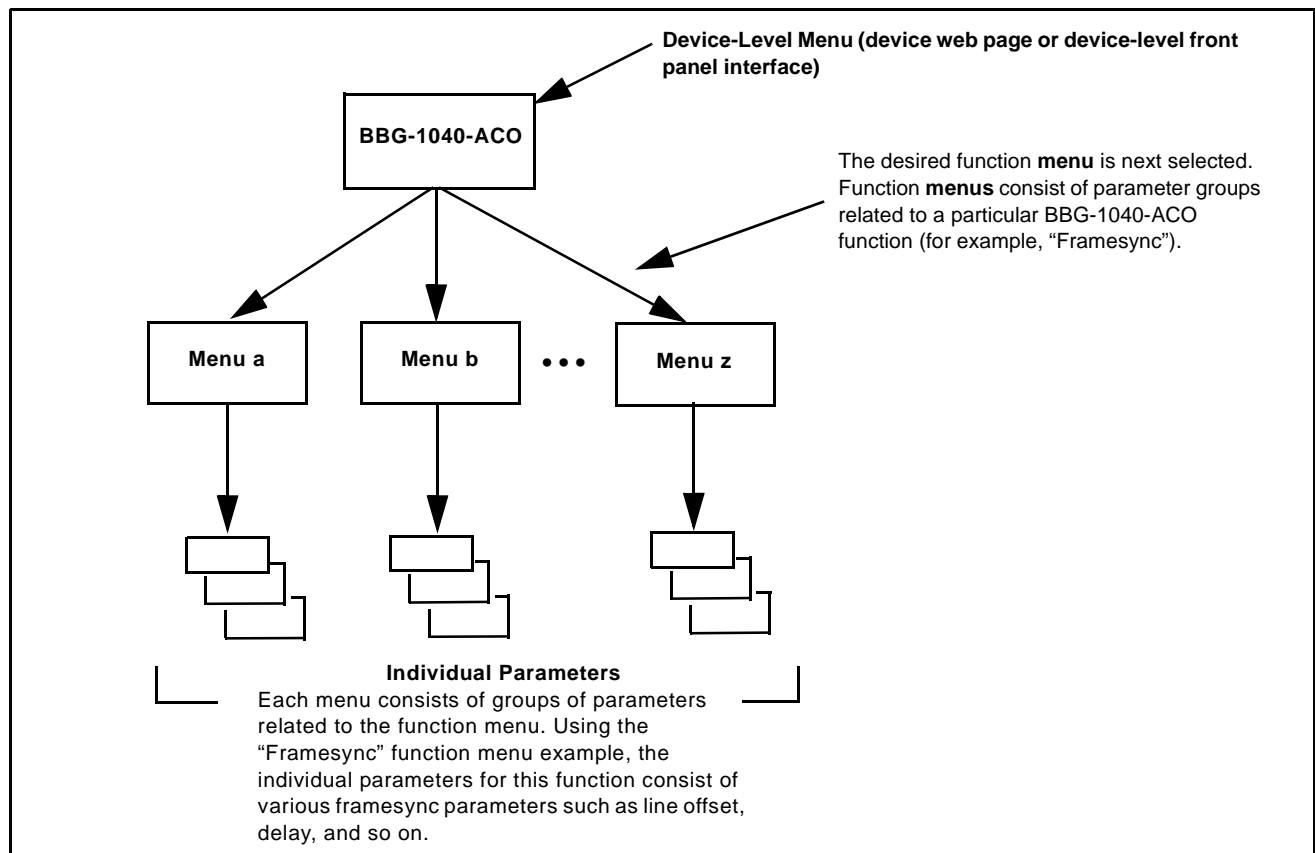
This section describes the web user interface controls for using the BBG-1040-ACO.

The format in which the BBG-1040-ACO functional controls appear follows a general arrangement of Function Submenus under which related controls can be accessed (as described in Function Submenu/Parameter Submenu Overview below).

### Function Submenu/Parameter Submenu Overview

The functions and related parameters available on the BBG-1040-ACO device are organized into function **menus**, which consist of parameter groups as shown below.

Figure 3-3 shows how the BBG-1040-ACO device and its menus are organized, and also provides an overview of how navigation is performed between devices, function menus, and parameters.



**Figure 3-3 Function Submenu/Parameter Submenu Overview**

## Web User Interface

(See Figure 3-4.) The device function menu is organized using main menu navigation tabs which appear on the left side of any pane regardless of the currently displayed pane. When a menu tab is selected, each parametric control or selection list item associated with the function is displayed. Scalar (numeric) parametric values can then be adjusted as desired using the GUI slider controls. Items in a list can then be selected using GUI drop-down lists.

The screenshot displays the BBG-1040 web interface. On the left, a sidebar contains 'Main Menu Navigation Tabs' such as Status, Frame Sync (selected), Input Video, Output Audio Routing, Timecode, Character Burner, Moving Box, GPIO, YC Alignment, Log Status, Input Audio Status, Presets, Video Quality Events, and Input Audio Routing/Controls. The top header shows the device name 'BBG-1040' and the 'COBALT' logo. The main content area, titled 'Typical Drop-Down Selector', lists parameters for the 'Frame Sync' function: Lock Mode (Free Run), Output Rate (Auto), Initial Startup Format (525i59.94), Output Mode (Input Video), On Loss of Video (Freeze), and Test Pattern (Tartan). A 'Drop-Down Expansion' shows the options for 'Free Run': Reference 1 else Free Run, Lock to Input else Free Run, and Free Run. Below these are sliders for Vertical Lines, Horizontal (us), and Frame Delay, each with a numeric input field. A 'Typical Status Display' shows 'Report Delay' as '29.35 ms / 1 frames 854 lines' and 'Lock Status' as 'Framesync Free Running'. A 'Typical Parametric Control' is indicated by an arrow pointing to the 'Report Delay' text.

In this example, the **Frame Sync** main menu tab is selected, with the overall pane now showing all sub-menu items related to the framesync function.

Clicking another main menu tab immediately displays the pane related to the selected main menu tab.

**Figure 3-4 Typical Web UI Display and Controls**

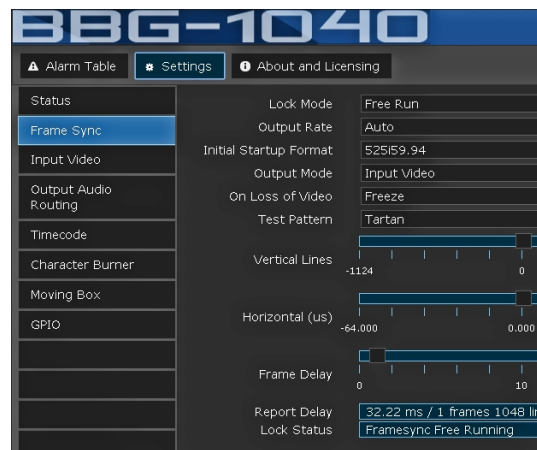
## Display Theme

(See Figure 3-5.) The BBG-1040 user interface theme selection offers light and dark themes suited for various users and environments.

Clicking **Settings** opens a pane where the display **Theme** can be set



**Light** – this is the theme shown in this manual and is useful for normal ambient light environments such as offices.



**Dark** – the dark theme is suited for low-light environments.

**Figure 3-5 Web UI Display Themes**

## Checking BBG-1040-ACO Device Information

The operating status and software version the BBG-1040-ACO device can be checked by clicking the **Status** main menu tab. Figure 3-6 shows and describes the BBG-1040-ACO device information status display.

**Note:** Proper operating status is denoted by green icons for the status indicators shown in Figure 3-6. Yellow or red icons respectively indicate an alert or failure condition. Refer to Troubleshooting (p. 3-37) for corrective action.

**Device Info Display**  
This display shows the the device hardware and software version info.

**Status Display**  
This displays shows the status and format of the signals being received by the BBG-1040-ACO, as well as device status.

| BBG-1040                                                                                 |  |
|------------------------------------------------------------------------------------------|--|
| <a href="#">Alarm Table</a> <a href="#">Settings</a> <a href="#">About and Licensing</a> |  |
| <b>Status</b>                                                                            |  |
| Frame Sync                                                                               |  |
| Input Video                                                                              |  |
| Output Audio Routing                                                                     |  |
| Timecode                                                                                 |  |
| Character Burner                                                                         |  |
| Moving Box                                                                               |  |
| GPIO                                                                                     |  |
| YC Alignment                                                                             |  |
| Log Status                                                                               |  |
| Input Audio Status                                                                       |  |
| Presets                                                                                  |  |
| Video Quality Events                                                                     |  |
| Input Audio Routing/ Controls                                                            |  |

| Card Information |                     |
|------------------|---------------------|
| Product          | BBG-1040-ACO        |
| Product Options  | +LTC                |
| Supplier         | Cobalt Digital Inc. |
| Revision         | 0.9.0011            |
| FPGA Revision    | 1.00.0000           |
| FPGA Build Date  | Apr 5 2014 10:35:33 |
| Build Date       | Apr 6 2014 20:40:30 |
| Serial Number    | 361145              |
| Rear Module      |                     |

| Status          |                                                                           |
|-----------------|---------------------------------------------------------------------------|
| SDI Input A     | <span style="color: green;">●</span> 720p_5994, OK Time 2:37:06, 0 Errors |
| SDI Input B     | <span style="color: yellow;">●</span> Unlocked                            |
| CPI1            | <span style="color: green;">●</span> Open                                 |
| CPI2            | <span style="color: green;">●</span> Open                                 |
| Reference 1     | <span style="color: yellow;">●</span> Unlocked                            |
| Card Voltage    | 11.53 V                                                                   |
| Card Power      | 20.63 W                                                                   |
| Card Temp Front | 29.4 C                                                                    |
| Card Temp Rear  | 61.3 C                                                                    |
| Card Temp FPGA  | 61.0 C amb 70.0 C core                                                    |
| Card Up Time    | 02:37:12                                                                  |

**Figure 3-6 BBG-1040-ACO Device Info/Status Utility**



## Ancillary Data Line Number Locations and Ranges

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

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

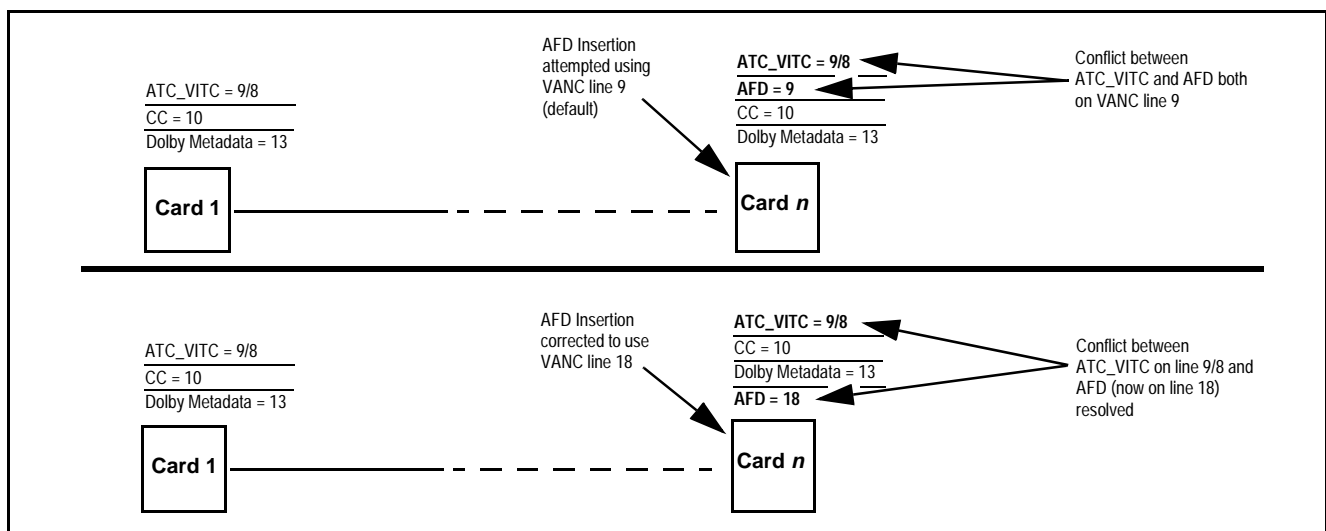
| Item              | Default Line No. / Range |              |
|-------------------|--------------------------|--------------|
|                   | SD                       | HD           |
| AFD               | 12 (Note 2)              | 9 (Note 2)   |
| ATC_VITC          | 13 (Note 2)           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

Notes:

- The device does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.
- While range indicated by drop-down list on GUI may allow a particular range of choices, the actual range is automatically clamped (limited) to certain ranges to prevent inadvertent conflict with active picture area depending on video format. Limiting ranges for various output formats are as follows:

| Format | Line No. Limiting | Format | Line No. Limiting | Format | Line No. Limiting |
|--------|-------------------|--------|-------------------|--------|-------------------|
| 525i   | 12-19             | 720p   | 9-25              | 1080p  | 9-41              |
| 625i   | 9-22              | 1080i  | 9-20              |        |                   |


Because line number allocation is not standardized for all ancillary items, consideration should be given to all items when performing set-ups. Figure 3-7 shows an example of improper and corrected VANC allocation within an HD-SDI stream.



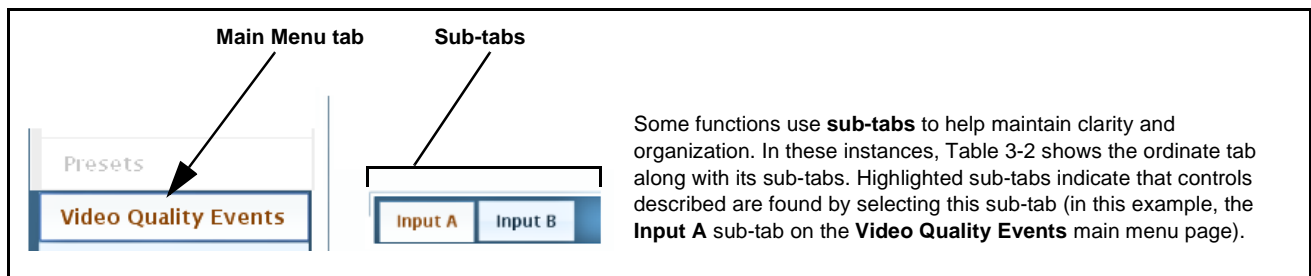
**Figure 3-7 Example VANC Line Number Allocation Example**

## BBG-1040-ACO Function Menu List and Descriptions

Table 3-2 individually lists and describes each BBG-1040-ACO function menu item and its related list selections, controls, and parameters. Where helpful, examples showing usage of a function are also provided.

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

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



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

| Function Main Menu Item | Page | Function Main Menu Item       | Page |
|-------------------------|------|-------------------------------|------|
| Input Audio Status      | 3-11 | Moving Box Insertion          | 3-24 |
| Input Video Controls    | 3-11 | Y/C Alignment Controls        | 3-25 |
| Video Quality Events    | 3-12 | Output Audio Routing/Controls | 3-26 |
| Framesync               | 3-13 | GPIO Controls                 | 3-29 |
| Timecode                | 3-16 | Presets                       | 3-31 |
| Character Burner        | 3-21 |                               |      |

Table 3-2 BBG-1040-ACO Function Submenu List

| <div>Input Audio Status</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Displays signal status and payload for embedded and discrete audio received by BBG-1040.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |      |         |               |                   |         |               |                   |         |               |                   |         |               |                   |          |               |                   |           |               |                   |           |               |                   |           |               |                   |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------|---------|---------------|-------------------|---------|---------------|-------------------|---------|---------------|-------------------|---------|---------------|-------------------|----------|---------------|-------------------|-----------|---------------|-------------------|-----------|---------------|-------------------|-----------|---------------|-------------------|--|
| <p>Individual signal status and peak level displays for embedded audio input pairs as describe below.</p> <ul style="list-style-type: none"><li>• <b>Absent:</b> Indicates embedded channel pair does not contain recognized audio PCM data.</li><li>• <b>Present - PCM:</b> Indicates embedded channel pair contains recognized audio PCM data.</li><li>• <b>Dolby E:</b> Indicates embedded channel pair contains Dolby® E encoded data.</li><li>• <b>Dolby Digital:</b> Indicates embedded channel pair contains Dolby® Digital encoded data.</li></ul> <p><b>Note:</b> • Dolby status displays occur only for valid Dolby® signals meeting SMPTE 337M standard.</p>                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |      |         |               |                   |         |               |                   |         |               |                   |         |               |                   |          |               |                   |           |               |                   |           |               |                   |           |               |                   |  |
| <table><thead><tr><th></th><th>Status</th><th>Peak</th></tr></thead><tbody><tr><td>Emb 1-2</td><td>Present - PCM</td><td>-40 dBFS/-35 dBFS</td></tr><tr><td>Emb 3-4</td><td>Present - PCM</td><td>-30 dBFS/-25 dBFS</td></tr><tr><td>Emb 5-6</td><td>Present - PCM</td><td>-15 dBFS/-10 dBFS</td></tr><tr><td>Emb 7-8</td><td>Present - PCM</td><td>-80 dBFS/-80 dBFS</td></tr><tr><td>Emb 9-10</td><td>Present - PCM</td><td>-80 dBFS/-80 dBFS</td></tr><tr><td>Emb 11-12</td><td>Present - PCM</td><td>-80 dBFS/-80 dBFS</td></tr><tr><td>Emb 13-14</td><td>Present - PCM</td><td>-80 dBFS/-80 dBFS</td></tr><tr><td>Emb 15-16</td><td>Present - PCM</td><td>-80 dBFS/-80 dBFS</td></tr></tbody></table> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Status            | Peak | Emb 1-2 | Present - PCM | -40 dBFS/-35 dBFS | Emb 3-4 | Present - PCM | -30 dBFS/-25 dBFS | Emb 5-6 | Present - PCM | -15 dBFS/-10 dBFS | Emb 7-8 | Present - PCM | -80 dBFS/-80 dBFS | Emb 9-10 | Present - PCM | -80 dBFS/-80 dBFS | Emb 11-12 | Present - PCM | -80 dBFS/-80 dBFS | Emb 13-14 | Present - PCM | -80 dBFS/-80 dBFS | Emb 15-16 | Present - PCM | -80 dBFS/-80 dBFS |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Peak              |      |         |               |                   |         |               |                   |         |               |                   |         |               |                   |          |               |                   |           |               |                   |           |               |                   |           |               |                   |  |
| Emb 1-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Present - PCM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -40 dBFS/-35 dBFS |      |         |               |                   |         |               |                   |         |               |                   |         |               |                   |          |               |                   |           |               |                   |           |               |                   |           |               |                   |  |
| Emb 3-4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Present - PCM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -30 dBFS/-25 dBFS |      |         |               |                   |         |               |                   |         |               |                   |         |               |                   |          |               |                   |           |               |                   |           |               |                   |           |               |                   |  |
| Emb 5-6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Present - PCM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -15 dBFS/-10 dBFS |      |         |               |                   |         |               |                   |         |               |                   |         |               |                   |          |               |                   |           |               |                   |           |               |                   |           |               |                   |  |
| Emb 7-8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Present - PCM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -80 dBFS/-80 dBFS |      |         |               |                   |         |               |                   |         |               |                   |         |               |                   |          |               |                   |           |               |                   |           |               |                   |           |               |                   |  |
| Emb 9-10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Present - PCM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -80 dBFS/-80 dBFS |      |         |               |                   |         |               |                   |         |               |                   |         |               |                   |          |               |                   |           |               |                   |           |               |                   |           |               |                   |  |
| Emb 11-12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Present - PCM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -80 dBFS/-80 dBFS |      |         |               |                   |         |               |                   |         |               |                   |         |               |                   |          |               |                   |           |               |                   |           |               |                   |           |               |                   |  |
| Emb 13-14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Present - PCM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -80 dBFS/-80 dBFS |      |         |               |                   |         |               |                   |         |               |                   |         |               |                   |          |               |                   |           |               |                   |           |               |                   |           |               |                   |  |
| Emb 15-16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Present - PCM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -80 dBFS/-80 dBFS |      |         |               |                   |         |               |                   |         |               |                   |         |               |                   |          |               |                   |           |               |                   |           |               |                   |           |               |                   |  |
| <div>Input Video</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Allows manual or failover selection of SDI program video inputs and displays status and raster format of received SDI video.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |      |         |               |                   |         |               |                   |         |               |                   |         |               |                   |          |               |                   |           |               |                   |           |               |                   |           |               |                   |  |
| <div><div>Input Video Source</div><div><div>SDI A</div><div>SDI B</div><div>Failover A to B</div><div>Failover B to A</div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>Selects the input video source to be applied to the BBG-1040 program video input.</p> <ul style="list-style-type: none"><li>• <b>SDI A</b> and <b>SDI B</b> choices allow forced manual selection of correspondingly <b>SDI IN A</b> or <b>SDI IN B</b>.</li><li>• <b>Failover A to B</b> sets main path preference of <b>SDI IN A</b>.<ul style="list-style-type: none"><li>- If <b>SDI IN A</b> goes invalid, then <b>SDI IN B</b> is selected.</li><li>- If <b>SDI IN A</b> goes valid again, failover automatically reverts to <b>SDI IN A</b>.</li></ul></li><li>• <b>Failover B to A</b> sets main path preference of <b>SDI IN B</b>.<ul style="list-style-type: none"><li>- If <b>SDI IN B</b> goes invalid, then <b>SDI IN A</b> is selected.</li><li>- If <b>SDI IN B</b> goes valid again, failover automatically reverts to <b>SDI IN B</b>.</li></ul></li></ul> <p><b>Note:</b> Failover criteria via this control is simple signal presence.</p> |                   |      |         |               |                   |         |               |                   |         |               |                   |         |               |                   |          |               |                   |           |               |                   |           |               |                   |           |               |                   |  |
| <div><div>Input Video Status</div><div><div>SDI A Status</div><div>720p_5994, OK Time 0:14:37, 0 Errors</div></div><div><div>SDI B Status</div><div>Unlocked</div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>Displays input status and audio group presence, along with elapsed time of signal acquire.</p> <p><b>SDI A</b> and <b>SDI B Status</b> show raster/format for device inputs. If signal is not present or is invalid, <b>Unlocked</b> is displayed. (These status indications are also propagated to the Status pane.)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |      |         |               |                   |         |               |                   |         |               |                   |         |               |                   |          |               |                   |           |               |                   |           |               |                   |           |               |                   |  |

Table 3-2 BBG-1040-ACO Function Submenu List — continued

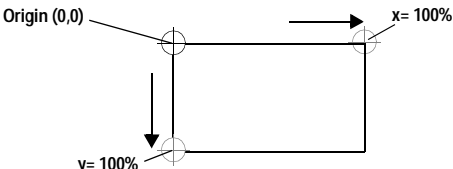
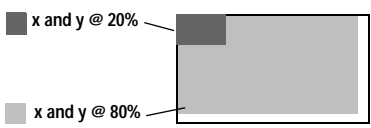
|                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <h2 style="margin: 0;">Video Quality Events</h2> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <span style="border: 1px solid black; padding: 2px 5px;">Input A</span> <span style="border: 1px solid black; padding: 2px 5px;">Input B</span> <span style="border: 1px solid black; padding: 2px 5px;">Option </span> </div> | <p>Sets quality check screening and thresholds for video quality event alerts. When a quality events occur, the event(s) can be used by the Presets function to invoke input routing or other changes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p><b>Note:</b> Input B has controls identical to the controls described here for Input A sub-tab. Therefore, only the Input A controls are shown here. Set controls for other inputs using the respective sub-tab.</p>                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>• <b>Event Status Indicator</b></p> <p>Event Status <span style="color: red;">●</span> Disabled</p> <p>Event Status <span style="color: black;">●</span> No Input</p> <p>Event Status <span style="color: green;">●</span> Video Ok</p> <p>Event Status <span style="color: red;">●</span> Frozen&amp;Black video detected</p>                                                                                                              | <p>Displays event status (based on criteria set below) for signal condition to be considered OK (green), or signal condition considered to be a quality alert event (red) due the condition exceeding the criteria threshold(s) set below.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p>• <b>Position and Width Controls</b></p> <p>X position % </p> <p>Y position % </p> <p>Width % </p> <p>Height % </p>                                                                                                                                                                                                                                                                                                                         | <p>Position and Width controls set the area of concern to be screened by the Quality Event function.</p> <p><b>X and Y Position</b> controls set the origin point for the area of concern</p>  <p><b>X and Y Width</b> controls set the size for the area of concern</p>                                                                                                                                                                                                                                                                                                                                                            |
| <p>• <b>Threshold and Event Type Controls</b></p> <p>Noise Immunity <span style="border: 1px solid black; padding: 2px;">Medium</span></p> <p>Engagement Holdoff (ms) <span style="border: 1px solid black; padding: 2px;">0</span></p> <p>Disengagement Holdoff (ms) <span style="border: 1px solid black; padding: 2px;">0</span></p> <p>Event Type <span style="border: 1px solid black; padding: 2px;">Black or Frozen</span></p>          | <p>Sets the thresholds for black frame and event type to be considered. Also provides holdoff controls for event trigger engagement and disengagement.</p> <ul style="list-style-type: none"> <li>• <b>Noise Immunity</b> sets the relative noise levels that are rejected in the course of black event assessment (Low, Medium, or High).</li> <li>• <b>Engagement Holdoff</b> sets the time (in msec) where, when time is exceeded, an event is to be considered a valid alert event.</li> <li>• <b>Disengagement Holdoff</b> sets the time (in msec) where, when event time is has ceased, an alert event is cleared.</li> <li>• <b>Event Type</b> sets the type of event(s) to be considered by the event screening (Disabled, Frozen frame, Black frame, or either Black or Frozen frame).</li> </ul> |

Table 3-2 BBG-1040-ACO Function Submenu List — continued

|                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div style="border: 1px solid black; padding: 5px; text-align: center;"> <h2 style="margin: 0;">Frame Sync</h2> </div>                                                                                                  | <p>Provides video frame sync/delay offset control and output control/loss of program video failover selection controls.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>• <b>Lock Mode Select</b></p> <p>Lock Mode <span style="border: 1px solid black; padding: 2px;">Reference 1 else Free Run<br/>Reference 1 else Free Run<br/>Lock to Input else Free Run<br/>Free Run</span></p>      | <p>Selects Frame Sync functions from the choices shown to the left and described below.</p> <ul style="list-style-type: none"> <li>• <b>Free Run:</b> Output video is locked to the BBG-1040 internal clock. Output video is <b>not</b> locked to external reference.</li> <li>• <b>Lock to Reference:</b> Output video is locked to external reference received on the frame reference bus. <ul style="list-style-type: none"> <li><b>Note:</b> If valid reference is not received, the indication appears in <b>Status</b>, indicating invalid frame sync reference error.</li> </ul> </li> <li>• <b>Lock to Input:</b> Uses the program video input video signal as the reference standard. <ul style="list-style-type: none"> <li><b>Note:</b> If <b>Lock to Input</b> is used for framesync, any timing instability on the input video will result in corresponding instability on the output video.</li> </ul> </li> </ul> |
| <p>• <b>Output Rate Select</b></p> <p>Output Rate <span style="border: 1px solid black; padding: 2px;">Auto<br/>Auto<br/>23.98/29.97/59.94<br/>24/30/60</span></p>                                                      | <p>Allows frame rate to be outputted same as input video, or converted to from the choices shown to the left and described below.</p> <ul style="list-style-type: none"> <li>• <b>Auto</b> – output video frame rate tracks with input video.</li> <li>• <b>23.98/29.97/59.94</b> – forces standard North American frame rates. Can be used to convert 24/30/60 Hz camera frame rates to corresponding 23.98/29.97/59.94 standard North American frame rates.</li> <li>• <b>24/30/60</b> – forces 24/30/60 frame rates. Can be used to convert 23.98/29.97/59.94 Hz frame rates to corresponding 24/30/60 Hz frame rates.</li> </ul>                                                                                                                                                                                                                                                                                             |
| <p>• <b>Initial Startup Format Select</b></p> <p>Initial Startup Format <span style="border: 1px solid black; padding: 2px;">525i59.94<br/>525i59.94<br/>720p-59.94/60<br/>1080i-59.94/60<br/>1080p-59.94/60</span></p> | <p>Selects a synthesized frame sync format/rate to be invoked (from the choices shown to the left) in the time preceding stable lock to external reference.</p> <p>Set this control to that of the intended external reference to help ensure smoothest frame sync locking. This control also sets the BBG-1040 test pattern format where the device's initial output from power-up is the internal pattern instead of program video.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>• <b>Program Video Output Mode Select</b></p> <p>Output Mode <span style="border: 1px solid black; padding: 2px;">Input Video<br/>Input Video<br/>Flat Field<br/>Freeze<br/>Test Pattern<br/>Snow</span></p>         | <p>Provides a convenient location to select between program video output and other technical outputs from the choices shown to the left and described below.</p> <ul style="list-style-type: none"> <li>• <b>Input Video</b> – device outputs input program video (or loss of signal choices described below).</li> <li>• <b>Flat Field (Black)</b> – device outputs black flat field.</li> <li>• <b>Freeze</b> – device outputs last frame having valid SAV and EAV codes.</li> <li>• <b>Test Pattern</b> – device outputs standard technical test pattern (pattern is selected using the Pattern drop-down described below).</li> <li>• <b>Snow</b> – device outputs synthesized snow multi-color pattern.</li> </ul>                                                                                                                                                                                                          |

Table 3-2 BBG-1040-ACO Function Submenu List — continued


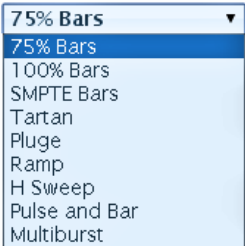



| <div style="border: 1px solid black; padding: 5px; background-color: #f0f0f0;"> <b>Frame Sync</b> </div>                                                                                                                                                                    | (continued)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>• <b>Loss of Input Signal Selection</b></p> <p>On Loss of Video </p>                                                                                                                    | <p>In the event of program input video Loss of Signal (LOS), determines action to be taken as follows:</p> <ul style="list-style-type: none"> <li>• <b>Disable Outputs:</b> Disable program video SDI outputs.</li> <li>• <b>Flat Field (Black)</b> – go to black flat field on program video output.</li> <li>• <b>Freeze</b> – go to last frame having valid SAV and EAV codes on program video output.</li> <li>• <b>Test Pattern</b> – go to standard technical test pattern on program video output (pattern is selected using the Pattern drop-down described below).</li> <li>• <b>Snow</b> – output synthesized snow multi-color pattern.</li> </ul>                                                                                                                                                                                                                                                                                                                |
| <p>• <b>Pattern Select</b></p> <p>Test Pattern </p>                                                                                                                                        | <p>Provides a choice of standard technical patterns (shown to the left) when <b>Test Pattern</b> is invoked (either by LOS failover or directly by selecting Test Pattern on the Program Video Output Mode Select control).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p>• <b>Output Video Reference Offset Controls</b></p> <p>Vertical Lines </p> <p>Horizontal (us) </p> | <p>With framesync enabled, provides the following controls for offsetting the output video from the reference:</p> <ul style="list-style-type: none"> <li>• <b>Vertical (Lines)</b> – sets vertical delay (in number of lines of <b>output video</b>) between the output video and the frame sync reference. (Positive values provide delay; negative values provide advance)</li> <li>(Range is -1124 thru 1124 lines; null = 0 lines.)</li> <li>• <b>Horizontal (us)</b> – sets horizontal delay (in <math>\mu</math>s of <b>output video</b>) between the output video and the frame sync reference. (Positive values provide delay; negative values provide advance)</li> <li>(Range is -64 thru 64 <math>\mu</math>sec; null = 0.000 <math>\mu</math>sec.)</li> </ul> <p><b>Note:</b> Offset <b>advance</b> is accomplished by hold-off of the reference-directed release of the frame, thereby effectively advancing the program video relative to the reference.</p> |
| <p>• <b>Frame Delay Control</b></p> <p>Frame Delay </p>                                                                                                                                  | <p>When Framesync is enabled, specifies the smallest amount of latency delay (frames held in buffer) allowed by the frame sync. The frame sync will not output a frame unless the specified number of frames are captured in the buffer. <b>The operational latency of the frame sync is always between the specified minimum latency and minimum latency plus one frame (not one field).</b></p> <p><b>Note:</b> Due to device memory limits, the maximum available Minimum Latency Frames is related to the output video format selected.</p> <p>When using this control, be sure to check the <b>Report Delay</b> display to make certain desired amount of frames are delayed.</p>                                                                                                                                                                                                                                                                                      |

Table 3-2 BBG-1040-ACO Function Submenu List — continued

|                                                                                                                                                                                                  |                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>Frame Sync</b>                                                                                                                                                                                | <b>(continued)</b>                                                                                                                    |
| <ul style="list-style-type: none"><li>• <b>Video Delay Display</b><br/>Report Delay 29.63 ms / 1 frames 873 lines</li></ul>                                                                      | Displays the current input-to-output video delay (in msec units) as well as in terms of Frames/fractional frame (in number of lines). |
| <ul style="list-style-type: none"><li>• <b>Framesync Lock Status Display</b><br/>Lock Status Framesync Free Running</li></ul>                                                                    | Displays the current framesync status and reference source.                                                                           |
| <b>Note:</b> Audio timing offset from video is performed using the delay controls on the Output Audio Routing/Controls tab. Refer to Output Audio Routing/Controls (p. 3-26) for these controls. |                                                                                                                                       |

Table 3-2 BBG-1040-ACO Function Submenu List — continued

|                                                                                                                                                    |                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div style="border: 1px solid black; padding: 5px; display: inline-block; background-color: #f0f0f0;"> <h2 style="margin: 0;">Timecode</h2> </div> | <p>Provides timecode data extraction from various sources, and provides formatting and re-insertion controls for inserting the timecode into the output video.</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Shown below is an example in which received 720p 5994 SDI video with ATC\_VITC is to have ATC\_LTC also included on the output. To re-format and insert the timecode data, the following can be performed using the Timecode function. Each Timecode control is fully described on the pages that follow.

**720p 5994 w/ ATC\_VITC** → **BBG-1040** → **720p 5994 w/ ATC\_VITC w/ ATC\_LTC**

|                       |               |
|-----------------------|---------------|
| Input ATC LTC Status  | Not Present   |
| Input ATC VITC Status | 07:32:59:25.0 |
| Reference VITC Status | Not Present   |
| Input VITC Status     | Not Present   |

**A** Noting that the incoming video contains ATC\_VITC timecode data (as shown in the status display), set the Source Priority drop-down lists to include ATC\_VITC timecode data as a choice. This extracts ATC\_VITC timecode data from the incoming video.

|                   |                |
|-------------------|----------------|
| Source Priority 1 | Input ATC_VITC |
| Source Priority 2 | Free Run       |
| Source Priority 3 | Free Run       |
| Source Priority 4 | Free Run       |

**B** In this example, it is desired to provide both SDI ATC\_VITC and ATC\_LTC timecode data in the processed HD output video. As such, set both **HD ATC VITC Insertion** and **HD ATC LTC Insertion** to **Enabled**.

In the example here, the line numbers are set to the default SMPTE 12M-2-2008 recommended values.

|                                    |                                       |
|------------------------------------|---------------------------------------|
| HD ATC_LTC Insertion               | Enabled                               |
| HD ATC_LTC Insertion Line          | 10 - SMPTE 12M-2-2008 Recommended     |
| <hr/>                              |                                       |
| HD ATC_VITC Insertion              | Enabled                               |
| HD ATC_VITC Insertion Line Field 1 | 9 - SMPTE 12M-2-2008 Recommended      |
| HD ATC_VITC Insertion Line Field 2 | 8(571) - SMPTE 12M-2-2008 Recommended |



Table 3-2 BBG-1040-ACO Function Submenu List — continued


|                                                                                                                                                                                                                                                                                                                                                                            |                                                 |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |                              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|------------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                           | (continued)                                     |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |                              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>Option</b> ➡ <b>Audio LTC</b> controls described below only appear on devices with <b>+LTC</b> licensed optional feature. This feature allows audio LTC from an audio channel to be used as a timecode source, with conversion to a selected SMPTE 12M format on the output video.</p>                                                                               |                                                 |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |                              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                            |
| <p>• <b>Timecode Source Status Displays</b></p> <table border="1"> <tr> <td>Input ATC LTC Status</td> <td>Not Present</td> </tr> <tr> <td>Input ATC VITC Status</td> <td>00:38:54:04.1 Field 1 Line 13, Field 2 Line 276</td> </tr> <tr> <td>Reference VITC Status</td> <td>00:38:54:07.0</td> </tr> <tr> <td>Input VITC Status</td> <td>00:38:54:04.1</td> </tr> </table> | Input ATC LTC Status                            | Not Present   | Input ATC VITC Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 00:38:54:04.1 Field 1 Line 13, Field 2 Line 276 | Reference VITC Status        | 00:38:54:07.0 | Input VITC Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 00:38:54:04.1 | <p>Displays the current status and contents of the four supported external timecode formats shown to the left.</p> <ul style="list-style-type: none"> <li>• If a format is receiving timecode data, the current content (timecode running count and line number) is displayed.</li> <li>• If a format is not receiving timecode data, Not Present is displayed.</li> </ul> |
| Input ATC LTC Status                                                                                                                                                                                                                                                                                                                                                       | Not Present                                     |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |                              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                            |
| Input ATC VITC Status                                                                                                                                                                                                                                                                                                                                                      | 00:38:54:04.1 Field 1 Line 13, Field 2 Line 276 |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |                              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                            |
| Reference VITC Status                                                                                                                                                                                                                                                                                                                                                      | 00:38:54:07.0                                   |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |                              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                            |
| Input VITC Status                                                                                                                                                                                                                                                                                                                                                          | 00:38:54:04.1                                   |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |                              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                            |
| <p>• <b>Audio LTC Source and Mute Controls</b></p> <table> <tr> <td>Input LTC Status</td> <td>00:39:50:25.0</td> </tr> <tr> <td>LTC Input</td> <td>Embed Ch 8 ▼</td> </tr> <tr> <td>Mute LTC Audio on Input Loss</td> <td>Disabled</td> </tr> </table> <p><b>Option</b> ➡</p>                                                                                              | Input LTC Status                                | 00:39:50:25.0 | LTC Input                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Embed Ch 8 ▼                                    | Mute LTC Audio on Input Loss | Disabled      | <p>(+LTC option only)</p> <p><b>LTC Input</b> control selects an input audio channel when audio LTC is to be used as a source.</p> <p>Mute LTC Audio control allows timecode using LTC audio sources to freeze as follows:</p> <ul style="list-style-type: none"> <li>• When set to <b>Enabled</b> and input timecode is lost, timecode insertion is disabled.</li> <li>• When set to <b>Disabled</b> and input timecode is lost, timecode output reverts to next priority selection.</li> </ul> <p><b>Note:</b> If muting upon loss of a particular input format is desired, set all <b>Source Priority 1</b> thru <b>4</b> to that particular input format. If this is not done, the device failover timecode selection may substitute another format choice for the format not being received.</p> |               |                                                                                                                                                                                                                                                                                                                                                                            |
| Input LTC Status                                                                                                                                                                                                                                                                                                                                                           | 00:39:50:25.0                                   |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |                              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                            |
| LTC Input                                                                                                                                                                                                                                                                                                                                                                  | Embed Ch 8 ▼                                    |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |                              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                            |
| Mute LTC Audio on Input Loss                                                                                                                                                                                                                                                                                                                                               | Disabled                                        |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |                              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                            |
| <p>• <b>Incoming ATC Packet Removal Control</b></p> <table> <tr> <td>Incoming ATC Packet Removal</td> <td>Disabled</td> </tr> </table>                                                                                                                                                                                                                                     | Incoming ATC Packet Removal                     | Disabled      | <p>Enables or disables removal of existing input video ATC timecode packets from the output. This allows removal of undesired existing timecodes from the output, resulting in a “clean slate” where only desired timecodes are then re-inserted into the output. (For example, if both SDI ATC_VITC and ATC_LTC are present on the input video, and only ATC_LTC is desired, using the Removal control will remove both timecodes from the output. The ATC_LTC timecode by itself can then be re-inserted on the output using the other controls discussed here.)</p> |                                                 |                              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                            |
| Incoming ATC Packet Removal                                                                                                                                                                                                                                                                                                                                                | Disabled                                        |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                 |                              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                                                                                                                                                                                                                                                                                                                                                                            |

Table 3-2 BBG-1040-ACO Function Submenu List — continued

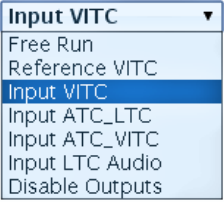
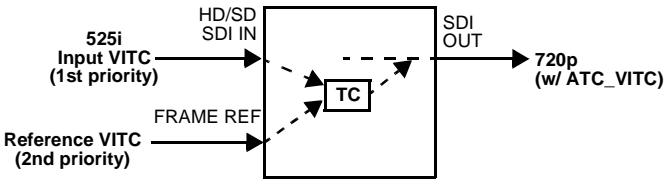



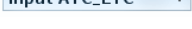


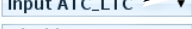
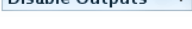


| Timecode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | (continued)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>• <b>Source Priority</b></p> <p>Source Priority 1 </p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p>Selects the priority assigned to each of the four supported external formats, and internal Free Run in the event the preferred source is unavailable.</p> <p><b>Source Priority 1</b> thru <b>Source Priority 4</b> select the preferred format to be used in descending order (i.e., Source Priority 2 selects the second-most preferred format, and so on. See example below.)</p> <hr/>  <p>In this example, <b>Input VITC</b> 1st priority selection selects SDI VITC (received on SDI input) over reference VITC (received on frame reference) regardless of video input material source to be processed by BBG-1040.</p> <p>The selected timecode source is embedded on the SDI video output (in this example, 720p) using the selected line number. In this example, if the SDI VITC on the SDI input becomes unavailable, BBG-1040 then uses the reference VITC data received on the frame reference.</p> |
| <p><b>Note:</b> Disable Output setting should be used with care. If Disable Output is selected with alternate intended format(s) set as a lower priority, all timecode output will indeed be disabled if the ordinate preferred format(s) become unavailable.</p> <p>Typically, choices other than Disable should be used if a timecode output is always desired, with Disable only being used to remove all timecode data.</p> <p>In this example, even though and ATC_LTC could be available to substitute for ATC_VITC not being present, the device will revert to no timecode output since the choice of Disable Output “out-prioritizes” ATC_LTC with these settings.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Source Priority 1 </p> <p>Source Priority 2 </p> <p>Source Priority 3 </p> <p>Source Priority 4 </p> </div> <div style="text-align: center;"> <p></p> <p></p> <p></p> <p></p> </div> </div> <p>The choices shown here will allow ATC_LTC to “out-prioritize” Disable Output if ATC_VITC is not available.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>• <b>Offset Controls</b></p> <p>Offset </p> <hr/> <p>Offset Field <input type="text" value="0"/></p> <p>Offset Frame </p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>Allows the current timecode count to be advanced or delayed on the output video.</p> <ul style="list-style-type: none"> <li>• <b>Offset Advance</b> or <b>Delay</b> selects offset advance or delay.</li> <li>• <b>Offset Field</b> delays or advances or delays timecode by one field.</li> <li>• <b>Offset Frame</b> delays or advances or delays timecode by up to 5 frames.</li> </ul> <p><b>Note:</b> Default settings are null, with both controls set at zero as shown.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

Table 3-2 BBG-1040-ACO Function Submenu List — continued


| <div>Timecode</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | (continued)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |         |     |         |     |         |     |         |   |  |   |  |   |  |      |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---------|-----|---------|-----|---------|-----|---------|---|--|---|--|---|--|------|----------|
| <ul style="list-style-type: none"> <li><b>Output Status Display</b></li> </ul> <p>Output Status <span>01:10:52:17.1 (Source: Input ATC_LTC)</span></p>                                                                                                                                                                                                                                                                                                                                                                           | <p>Displays the current content and source being used for the timecode data as follows:</p> <p>Output Status <span>01:10:52:17.1 (Source: Input ATC_LTC)</span></p> <ul style="list-style-type: none"> <li>Output status OK (in this example, ATC_LTC timecode received and outputted).</li> </ul> <p>Output Status <span>HD Insertions Disabled</span></p> <ul style="list-style-type: none"> <li>Output disabled (either via priority failover to Disabled, or by Insertion button set to <b>Disabled</b>).</li> </ul> <p><b>Note:</b> • If timecode is not available from Source Priority selections performed, timecode on output can be set to revert to Free Run (internal count) mode.</p> <ul style="list-style-type: none"> <li>Because the 1's digit of the display Frames counter goes from 0 to 29, the fractional digit (along with the 1's digit) indicates frame count as follows:</li> </ul> <table border="0"> <tr><td>0.0</td><td>Frame 0</td></tr> <tr><td>0.1</td><td>Frame 1</td></tr> <tr><td>1.0</td><td>Frame 2</td></tr> <tr><td>1.1</td><td>Frame 3</td></tr> <tr><td>•</td><td></td></tr> <tr><td>•</td><td></td></tr> <tr><td>•</td><td></td></tr> <tr><td>29.1</td><td>Frame 59</td></tr> </table> | 0.0 | Frame 0 | 0.1 | Frame 1 | 1.0 | Frame 2 | 1.1 | Frame 3 | • |  | • |  | • |  | 29.1 | Frame 59 |
| 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Frame 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |         |     |         |     |         |     |         |   |  |   |  |   |  |      |          |
| 0.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Frame 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |         |     |         |     |         |     |         |   |  |   |  |   |  |      |          |
| 1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Frame 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |         |     |         |     |         |     |         |   |  |   |  |   |  |      |          |
| 1.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Frame 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |         |     |         |     |         |     |         |   |  |   |  |   |  |      |          |
| •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |         |     |         |     |         |     |         |   |  |   |  |   |  |      |          |
| •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |         |     |         |     |         |     |         |   |  |   |  |   |  |      |          |
| •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |         |     |         |     |         |     |         |   |  |   |  |   |  |      |          |
| 29.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Frame 59                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |         |     |         |     |         |     |         |   |  |   |  |   |  |      |          |
| <ul style="list-style-type: none"> <li><b>Option  Audio LTC Output</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                              | <p>Audio LTC output is routed to desired embedded audio outputs using the Output Audio Routing/Controls (p. 3-26). Whatever timecode is displayed on the Output Status is converted to audio LTC and available as an LTC audio output.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |         |     |         |     |         |     |         |   |  |   |  |   |  |      |          |
| <p><b>Note:</b> • Although the output line drop-down on the controls described below will allow a particular range of choices, the actual range is automatically clamped (limited) to certain ranges to prevent inadvertent conflict with active picture area depending on video format. See Ancillary Data Line Number Locations and Ranges (p. 3-9) for more information.</p> <p>• The device does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |         |     |         |     |         |     |         |   |  |   |  |   |  |      |          |
| <ul style="list-style-type: none"> <li><b>SD VITC Waveform Insertion Controls</b></li> </ul> <p>SD VITC Waveform Output 1 Line Number <span>14 ▼</span></p> <p>SD VITC Waveform Output 2 Line Number <span>16 ▼</span></p> <p>SD VITC Waveform Insertion <span>Enabled</span></p>                                                                                                                                                                                                                                                | <p>For SD output, enables or disables SD VITC waveform timecode insertion into the output video, and selects the VITC1 and VITC2 line numbers (6 thru 22) where the VITC waveform is inserted.</p> <p><b>Note:</b> • If only one output line is to be used, set both controls for the same line number.</p> <ul style="list-style-type: none"> <li><b>SD VITC Waveform Insertion</b> control only affects VITC waveforms inserted (or copied to a new line number) by this function. An existing VITC waveform on an unscaled SD SDI stream is not affected by this control and is passed on an SDI output.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |         |     |         |     |         |     |         |   |  |   |  |   |  |      |          |
| <ul style="list-style-type: none"> <li><b>SD ATC Insertion Control</b></li> </ul> <p>SD ATC_VITC Insertion <span>Enabled</span></p> <p>SD ATC Insertion Line <span>13 - SMPTE 12M-2-2008 Recomm</span></p>                                                                                                                                                                                                                                                                                                                       | <p>For SD output, enables or disables SD ATC_VITC timecode insertion into the output video, and selects the line number for ATC_VITC.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |         |     |         |     |         |     |         |   |  |   |  |   |  |      |          |

Table 3-2 BBG-1040-ACO Function Submenu List — continued


|                                                                                                                                                                                                                                   | (continued)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>• <b>HD ATC_LTC Insertion Control</b></p> <p>HD ATC_LTC Insertion <input type="button" value="Enabled"/></p> <p>HD ATC_LTC Insertion Line <input type="text" value="10 - SMPTE 12M-2-2008 Recd"/></p>                                                                                                           | <p>For HD output, enables or disables ATC_LTC timecode insertion into the output video, and selects the line number for ATC_LTC timecode data.</p>                                                                                                                                                                                                                                                                                                                                                        |
| <p>• <b>HD ATC_VITC Insertion Control</b></p> <p>HD ATC_VITC Insertion <input type="button" value="Enabled"/></p> <p>HD ATC_VITC Insertion Line Field 1 <input type="text" value="9 - SMPTE 12M-2-200"/></p> <p>HD ATC_VITC Insertion Line Field 2 <input type="text" value="8(571) - SMPTE 12M-2-2008 Recd"/></p> | <p>For HD output, enables or disables ATC_VITC timecode insertion into the output video, and selects the line number for ATC_VITC1 and ATC_VITC2.</p>                                                                                                                                                                                                                                                                                                                                                     |
| <p>• <b>ATC_VITC Legacy Support Control</b></p> <p>ATC_VITC Legacy Support <input type="button" value="Enabled"/></p>                                                                                                                                                                                              | <p>When enabled, accommodates equipment requiring ATC_VITC packet in both fields as a "field 1" packet (non-toggling).</p> <p><b>Note:</b> Non-toggling VITC1 and VITC2 packets do not conform to SMPTE 12M-2-2008 preferences. As such, ATC_VITC Legacy Support should be enabled only if required by downstream equipment.</p>                                                                                                                                                                          |
| <p>• <b>Free Run Timecode Controls</b></p> <p>Free Run Hours <input type="text" value="7"/></p> <p>Free Run Minutes <input type="text" value="0"/></p> <p>Free Run Seconds <input type="text" value="0"/></p> <p>Apply Free Run Values <input type="button" value="Confirm"/></p>                                  | <p>Allows an initial (starting) count to be applied to output video timecode when Free Run insertion is enabled.</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Initialization can only be applied when device is outputting Free Run timecode (as shown by Output Status displaying "Free Run").</li> <li>• If failover to Free Run occurs due to loss of external timecode(s), the Free Run count assumes its initial count from the last valid externally supplied count.</li> </ul> |

Table 3-2 BBG-1040-ACO Function Submenu List — continued

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div style="border: 1px solid black; padding: 5px;"> <h2 style="margin: 0;">Character Burner</h2> <div style="display: flex; border-top: 1px solid black; margin-top: 5px;"> <div style="border-right: 1px solid black; padding: 2px 5px; font-weight: bold;">Ident 1</div> <div style="padding: 2px 5px; font-weight: bold;">Ident 2</div> <div style="padding: 2px 5px; font-weight: bold;">Timecode</div> </div> </div>                                                                                         | <p>Provides user-configurable burn-in of up to two text strings and timecode on output video.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>Note:</b> <b>Ident 1</b> and <b>Ident 2</b> sub-tabs provide identical, independent controls for inserting two independent text (identification) burn-in overlays on the output video. <b>Ident 2</b> has controls identical to the controls described here for <b>Ident 1</b>. Therefore, only the <b>Ident 1</b> controls are shown here.</p>                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b>• Ident Insertion Controls</b></p> <p>Ident 1 Overlay <span style="border: 1px solid black; padding: 2px;">Enabled on loss of video ▼</span></p> <div style="border: 1px solid black; padding: 2px; margin-top: 2px;">         Always disabled<br/>         Always enabled<br/>         Enabled on loss of video       </div>                                                                                                                                                                                | <p>Selects the rules for identification text burn-in overlay insertion into output video.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>• Display (Ident) Text Entry Field</b></p> <p>Display Text <span style="border: 1px solid black; padding: 5px; display: inline-block;">IDENT1</span></p> <div style="border: 1px solid black; padding: 2px; margin-top: 5px; text-align: center;">Update</div>                                                                                                                                                                                                                                               | <p>Dialog entry box that allows entry of desired ident text string. Enter desired text as click Update when done to input the text string.</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• All normal keyboard alphanumeric characters are supported, in addition to ASCII characters (Windows ALT+nnnn).</li> <li>• Up to 126 characters can be entered.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p><b>• Ident Text Size/Positioning Controls</b></p> <p>Character Size <span style="display: inline-block; width: 100px; height: 10px; background: linear-gradient(to right, #ccc, #000);"></span></p> <p>Horizontal Position <span style="display: inline-block; width: 100px; height: 10px; background: linear-gradient(to right, #ccc, #000);"></span></p> <p>Vertical Position <span style="display: inline-block; width: 100px; height: 10px; background: linear-gradient(to right, #ccc, #000);"></span></p> | <p>Sets burn-in size/position attributes as follows:</p> <ul style="list-style-type: none"> <li>• <b>Character Size</b> sets proportional relative sizing. (Range is 0 thru 10)</li> <li>• <b>Horizontal Position</b> sets horizontal position (in percentage of offset from left of image area, left justified). (Range is 0 thru 90)</li> <li>• <b>Vertical Position</b> sets vertical position (in percentage of offset from top of image area, top justified). (Range is 0 thru 90)</li> </ul> <p><b>Note:</b> Character sizing and positioning for a given raster format may not be appropriate for another format (especially if transitioning from HD to SD). Set size and position for a balanced appearance (e.g., do not place text too close to margins or set larger than necessary) that accommodates both HD and SD raster formats if multiple format use is required.</p> |
| <p>Positioning with H and V controls at zero (origin)<br/>(Size = 3)</p> <p>Positioning with H and V controls both at 50<br/>(Size = 3)</p>                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

Table 3-2 BBG-1040-ACO Function Submenu List — continued

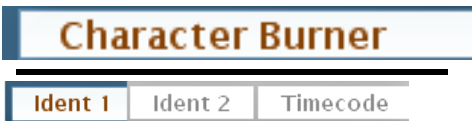
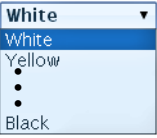




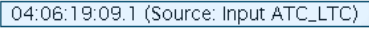

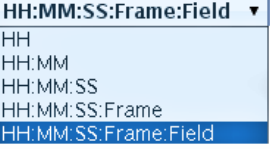
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                              | (continued)                                                                                                                                                                                                                                                                                                                                                      |
| <p>• <b>Ident Text Character/Background Attributes Controls</b></p> <p>Character Color </p> <p>Character Opacity </p> <p>Background Color </p> <p>Background Opacity </p> | <p>Provides independent controls for setting the color and opacity of the burn-in text and its background.</p> <ul style="list-style-type: none"> <li>• <b>Color</b> drop-downs set text or background color from multiple choices.</li> <li>• <b>Opacity</b> controls set text or background opacity from 0% (least opacity) to 100% (full opacity).</li> </ul> |
|                                                                                                                                                                                                                                                                                                                                                                                                                             | Provides controls for burn-in of timecode on output video.                                                                                                                                                                                                                                                                                                       |
| <p>• <b>Output Status Display</b></p> <p>Output Status </p>                                                                                                                                                                                                                                                                                                                                                                | <p>Displays the current content and source being used for the timecode data.</p> <p><b>Note:</b> This status display mirrors the same display in the Timecode tab. BBG-1040 must be set to output a timecode (as shown in this display) in order for timecode burn-in to function. See Timecode (p. 3-16) for information on using timecode controls.</p>        |
| <p>• <b>Timecode Insertion Control</b></p> <p>Timecode Overlay </p>                                                                                                                                                                                                                                                                                                                                                        | Enables or disables timecode burn-in overlay insertion into output video.                                                                                                                                                                                                                                                                                        |
| <p>• <b>Timecode Format Display Selector</b></p> <p>Display Format </p>                                                                                                                                                                                                                                                                                                                                                    | Selects the format of timecode string burn-in overlay insertion into output video from choices shown.                                                                                                                                                                                                                                                            |

Table 3-2 BBG-1040-ACO Function Submenu List — continued




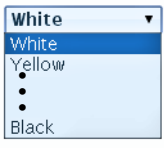


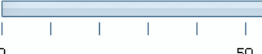
| <div style="background-color: #e0e0e0; padding: 5px; border: 1px solid black; text-align: center;"> <b>Character Burner</b> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <span style="border: 1px solid black; padding: 2px 10px;">Ident 1</span> <span style="border: 1px solid black; padding: 2px 10px;">Ident 2</span> <span style="border: 1px solid black; padding: 2px 10px; background-color: #0070c0; color: white;">Timecode</span> </div>                        | (continued)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>• <b>Timecode Character Size/Positioning Controls</b></p> <p>Character Size </p> <p>Horizontal Position </p> <p>Vertical Position </p>                                                                                                                       | <p>Sets burn-in size/position attributes as follows:</p> <ul style="list-style-type: none"> <li>• <b>Character Size</b> sets proportional relative sizing. (Range is 0 thru 10)</li> <li>• <b>Horizontal Position</b> sets horizontal position (in percentage of offset from left of image area, left justified). (Range is 0 thru 90)</li> <li>• <b>Vertical Position</b> sets vertical position (in percentage of offset from top of image area, top justified). (Range is 0 thru 90)</li> </ul> <p><b>Note:</b> Character sizing and positioning for a given raster format may not be appropriate for another format (especially if transitioning from HD to SD).</p> <p>Set size and position for a balanced appearance that accommodates both HD and SD raster formats if multiple format use is required. Avoiding placing text too close to margins or set larger than necessary helps in making certain text is not cut-off for HD or SD modes.</p> |
| <p>• <b>Timecode Character/Background Attributes Controls</b></p> <p>Character Color </p> <p>Character Opacity </p> <p>Background Color </p> <p>Background Opacity </p> | <p>Provides independent controls for setting the color and opacity of the burn-in timecode string and its background.</p> <ul style="list-style-type: none"> <li>• <b>Color</b> drop-downs set text or background color from multiple choices.</li> <li>• <b>Opacity</b> controls set text or background opacity from 0% (least opacity) to 100% (full opacity).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

Table 3-2 BBG-1040-ACO Function Submenu List — continued





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|                                                                                                                                                                                          | <p>Provides a “moving box” graphic insertion (overlay) on the output video.</p> <p>Moving-box insertion can serve as a dynamic raster confidence check even in cases where the input video image is static or lost.</p>                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                          | <p>Moving-box insertion provides dynamic display even on static video. Attributes such as box size, color, vertical movement speed, and horizontal movement speed are all user configurable.</p> <p>Moving box can be set to insert continuously, or only upon loss of input.</p>                                                                                                                                                                                                                                                                                                                                                                  |
| <p>• <b>Moving Box Insertion Control</b></p> <p>Moving Box <span>Enabled on loss of video ▼</span></p> <ul style="list-style-type: none"> <li>Always disabled</li> <li>Always enabled</li> <li>Enabled on loss of video</li> </ul>                                        | <p>Selects the rules for moving-box overlay insertion into output video.</p> <p><b>Note:</b> If moving-box insertion is desired for input LOS conditions, the Framesync <b>On Loss of Video</b> control <b>must</b> be set to provide a raster (from one of the choices shown) to support the moving-box insertion.</p> <p>If this control is set to “Disable Outputs”, no raster or moving-box insertion will be present on the output video under input LOS conditions. See Framesync (p. 3-13) for more information.</p>                                                                                                                        |
| <p>• <b>Moving Box Size Controls</b></p> <p>Moving Box Width (%) </p> <p>Moving Box Height (%) </p> | <p>Sets size of box image burn-in as follows:</p> <ul style="list-style-type: none"> <li>• <b>Moving Box Width</b> sets the width (as a percentage of maximum available raster width. (Range is 0% thru 40%)</li> <li>• <b>Moving Box Height</b> sets the height (as a percentage of maximum available raster height. (Range is 0% thru 40%)</li> </ul> <p><b>Note:</b> Moving box sizing for a given raster format may not be appropriate for another format (especially if transitioning from HD to SD). Set size and position for a balanced appearance that accommodates both HD and SD raster formats if multiple format use is required.</p> |
| <p>• <b>Moving Box Speed Controls</b></p> <p>Moving Box Horizontal Speed <span>Fast ▼</span></p> <ul style="list-style-type: none"> <li>None</li> <li>Slow</li> <li>Normal</li> <li>Fast</li> </ul> <p>Moving Box Vertical Speed <span>Normal ▼</span></p>                | <p>Sets speed of motion for moving box image burn-in as follows:</p> <ul style="list-style-type: none"> <li>• <b>Moving Box Horizontal Speed</b> sets the X-axis speed from choices shown.</li> <li>• <b>Moving Box Vertical Speed</b> sets the Y-axis speed from choices shown.</li> </ul>                                                                                                                                                                                                                                                                                                                                                        |



Table 3-2 BBG-1040-ACO Function Submenu List — continued



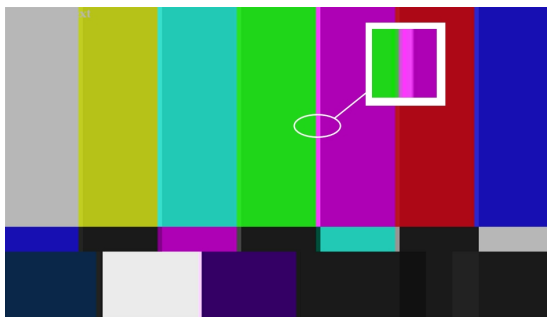
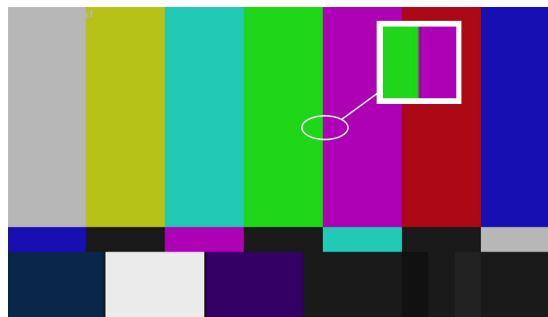


|                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <h2>Moving Box</h2>                                                                                                                                                                                                                                                                                                                                                     | (continued)                                                                                                                                                                                                                                                                                                                    |
| <p>• <b>Moving Box Attributes Controls</b></p> <p>Moving Box Opacity (%) </p> <p>Moving Box Color </p>                                                                                                | <p>Provides independent controls for setting the color and opacity of the moving-box insertion.</p> <ul style="list-style-type: none"> <li>• <b>Color</b> drop-down sets box color from multiple choices shown.</li> <li>• <b>Opacity</b> controls sets box opacity from 0% (least opacity) to 100% (full opacity).</li> </ul> |
| <h2>YC Alignment</h2>                                                                                                                                                                                                                                                                                                                                                   | <p>Provides controls for correcting upstream misalignment of Y and C phase.</p>                                                                                                                                                                                                                                                |
| <p>SMPTE color bars showing Y/C misalignment (as evidenced by poor transitions at the color borders)</p>  <p>Y/C misalignment is typically introduced by upstream analog-to-digital converter, especially where the Y and chroma paths may experience differing characteristics.</p> | <p>SMPTE color bars showing proper Y/C alignment (as evidenced by crisp transitions at the color borders)</p>                                                                                                                              |
| <p>• <b>Y/C Alignment Controls</b></p> <p>YC Alignment Enable </p> <p>C Phase Adjustment Relative to Y </p>                                                                                       | <p>Provides the following Y/C alignment controls:</p> <ul style="list-style-type: none"> <li>• <b>Enable</b> control turns on alignment.</li> <li>• <b>C Phase Adjustment Relative to Y</b> provides a <math>-8^{\circ}</math> to <math>+7^{\circ}</math> phase offset of C phase from Y phase.</li> </ul>                     |

Table 3-2 BBG-1040-ACO Function Submenu List — continued

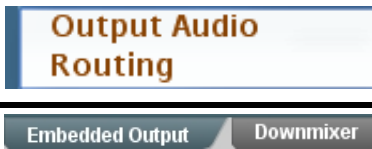

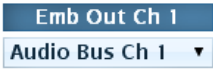

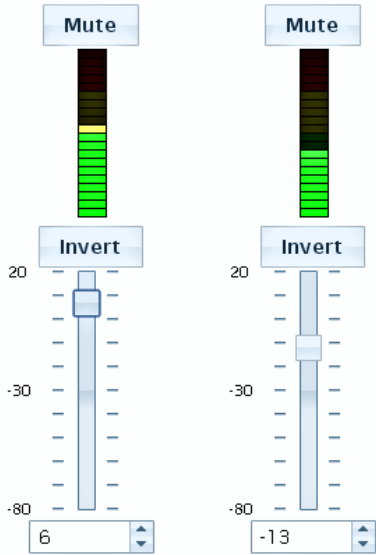
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>Provides an audio crosspoint allowing the audio source selection for each embedded audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• <b>Embedded Ch 2</b> thru <b>Embedded Ch 16</b> have controls identical to the <b>Source</b>, <b>Gain</b>, <b>Mute</b>, and <b>Invert</b> controls described here for <b>Embedded Ch 1</b>. Therefore, only the <b>Embedded Ch 1</b> controls are shown here.</li> <li>• For each channel, its source and destination should be considered and appropriately set. Unused destination channels should be set to the <b>Silence</b> selection.</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>• <b>Group Enable/Disable Controls</b></p>                                                                                                                                                                                                                                                                                                                                                                                       | <p>Allows enable/disable of embedded audio groups 1 thru 4 on program video output to accommodate some legacy downstream systems that may not support all four embedded audio groups.</p> <p><b>Note:</b> Changing the setting of this control will result in a noise burst in all groups. This control should not be manipulated when carrying on-air content.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>• <b>Embedded Output Channel Source</b></p>                                                                                                                                                                                                                                                                                                                                                                                      | <p>Using the drop-down list, selects the audio input source to be embedded in the corresponding embedded output channel from the following choices:</p> <ul style="list-style-type: none"> <li>• <b>Audio Bus Ch 1</b> thru <b>Ch 16</b></li> <li>• Built-in Tone generators <b>Tone 1</b> thru <b>Tone 16</b><br/>(all are -20 dBFS level; freq (Hz) in ascending order are 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k)</li> </ul> <p><b>Note:</b> Multiple tone generators, even if set to the same frequency, may not exhibit phase coherence. If identical tones with frequency and phase coherence are required, use a single tone generator (e.g., "TG1") across multiple channels instead of multiple generators set to the same frequency.</p> <ul style="list-style-type: none"> <li>• <b>Option</b>  <b>Audio LTC</b></li> <li>• <b>Downmixer L</b></li> <li>• <b>Downmixer R</b></li> </ul> |
| <p>• <b>Channel Mute/Phase Invert/Gain Controls and Peak Level Display</b></p>                                                                                                                                                                                                                                                                                                                                                    | <p>Provides <b>Mute</b> and phase <b>Invert</b> channel controls, as well as peak level meter for each output channel. (Meter shows level as affected by Level control.)</p> <p><b>Gain</b> controls allow relative gain (in dB) control for the corresponding destination Embedded Audio Group channel.</p> <p>(-80 to +20 dB range in 1.0 dB steps; unity = 0 dB)</p> <p><b>Note:</b> Although the BBG-1040 can pass non-PCM data such as Dolby® E or AC-3, setting the gain control to any setting other than default 0 will corrupt Dolby data.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Table 3-2 BBG-1040-ACO Function Submenu List — continued



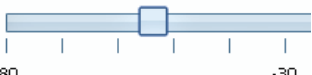
|                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                        | <p>Provides audio down-mix audio routing selections that multiplexes any five audio channel sources into a stereo pair.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>• <b>Downmixer Source Controls</b></p> <p>Left Channel Input <span>Audio Bus Ch 1 ▼</span></p> <p>Right Channel Input <span>Audio Bus Ch 2 ▼</span></p> <p>Center Channel Input <span>Audio Bus Ch 3 ▼</span></p> <p>Left Surround Channel Input <span>Audio Bus Ch 5 ▼</span></p> <p>Right Surround Channel Input <span>Audio Bus Ch 6 ▼</span></p> | <p><b>Left Channel Input</b> thru <b>Right Surround Channel Input</b> select the five audio bus source channels to be used for the downmix.</p> <p>Downmix channels <b>Downmixer L</b> and <b>Downmixer R</b> are available as sources for embedded audio outputs using the Channel Source controls described above.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p>• <b>Center Mix Ratio Control</b></p> <p>Center Mix Ratio </p>                                                                                                                                                                                                      | <p>Adjusts the attenuation ratio of center-channel content from 5-channel source that is re-applied as Lt and Rt content to the DM-L and DM-R stereo mix.</p> <ul style="list-style-type: none"> <li>• 0 dB setting applies no ratiometric reduction. Center channel content is restored as in-phase center-channel content with no attenuation, making center-channel content more predominate in the overall mix.</li> <li>• Maximum attenuation setting (-80 dB) applies a -80 dB ratiometric reduction of center-channel content. Center-channel content is restored as in-phase center-channel content at a -80 dB ratio relative to overall level, making center-channel content less predominate in the overall mix.</li> </ul> <p>(20 dB to -80 dB range in 0 dB steps; default = 0 dB)</p> <p><b>Note:</b> Default setting is recommended to maintain center-channel predominance in downmix representative to that of the original source 5-channel mix.</p> |
| <p>• <b>Surround Mix Ratio Control</b></p> <p>Surround Mix Ratio </p>                                                                                                                                                                                                | <p>Adjusts the attenuation ratio of surround-channel content from 5-channel source that is re-applied as Lo and Ro content to the DM-L and DM-R stereo mix.</p> <ul style="list-style-type: none"> <li>• 0 dB setting applies no ratiometric reduction. Surround-channel content is restored with no attenuation, making Lo and Ro content more predominate in the overall mix.</li> <li>• Maximum attenuation setting (-80 dB) applies a -80 dB ratiometric reduction of surround-channel content. Surround-channel content is restored at a -80 dB ratio relative to overall level, making surround-channel content less predominate in the overall mix.</li> </ul> <p>(20 dB to -80 dB range in 0 dB steps; default = 0 dB)</p> <p><b>Note:</b> Default setting is recommended to maintain surround-channel predominance in downmix representative to that of the original source 5-channel mix.</p>                                                                |

Table 3-2 BBG-1040-ACO Function Submenu List — continued

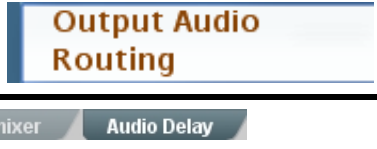

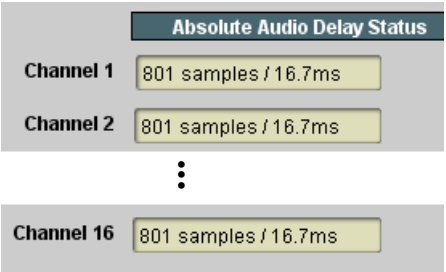





|                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                          | <p><b>Audio Delay</b> – Provides bulk (all four groups/master) delay offset controls and delay parametric displays.</p>                                                                                                                                                                                                                                                                         |
| <p>• <b>Bulk (Master) Audio/Video Delay Control</b></p>  | <p><b>Bulk Delay</b> control adds bulk (all four groups) audio delay from any video delay (net audio delay offset setting adds delay in addition to any delay included by other actions). This control is useful for correcting lip sync problems when video and audio paths in the chain experience differing overall delays. (-33 to +3000 msec range in 0.01-msec steps; null = 0 msec).</p> |
| <p>• <b>Per-Channel Delay Display</b></p>                | <p><b>Delay Status</b> shows current delay from video for the audio bus.</p>                                                                                                                                                                                                                                                                                                                    |

Table 3-2 BBG-1040-ACO Function Submenu List — continued


|                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                  | <p>Provides two independent GPI inputs that can invoke input routing control. GPI inputs can be set to function as edge-trigger individual inputs or in combination as a binary 2-bit word.</p> <p>Also provides two independent contact pairs (GPO 1 and GPO 2) that can be invoked as a function of input routing.</p>                                                                                                                                                                                                                                                                                                                                           |
| <p>• <b>GPI Status Indicators</b></p> <p>GPI Settings</p> <p>GPI1  Open</p> <p>GPI2  Closed</p> | <p>Status displays for GPI 1 and GPI 2 indicate Open (and “unlit” indicator) for GPI not present on GPI input. Display indicates Closed (and “lit” indicator) when GPI is present.</p> <p><b>Note:</b> GPI trigger threshold/type is set using <b>GPI Coding</b> drop-down described below. Refer to Specifications in Introduction, Chapter 1 for GPI electrical specifications and limitations.</p>                                                                                                                                                                                                                                                              |
| <p>• <b>GPI Trigger Coding</b></p> <p>GPI Coding </p>                                                                                                                            | <p>Selects GPI triggering as follows:</p> <ul style="list-style-type: none"> <li>• <b>Disabled:</b> GPI conditions on both GPI ports are ignored; no preset is invoked as a result of GPI status. Use this setting as a master disable of GPI functions.</li> <li>• <b>Edge and Level (Binary):</b> See the description and examples below.</li> </ul> <p> Make certain GPI Trigger Coding is set to <b>Disabled</b> if GPI is not to be used. <b>Selecting Level triggering without controlled GPI inputs may result in inadvertently invoking an unintentional routing.</b></p> |

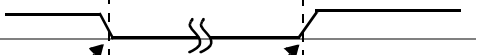
  

**Edge** GPI coding triggers on transitional state changes occurring on **individual** GPI inputs. This provides simple control using a single wire.

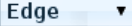
In this example, when **GPI 2** “closes” (edge trigger going from HI to LO), **Route SDI A** is invoked as selected in the corresponding drop-down.

When GPI 2 “opens” (edge trigger going from LO to HI), **Route SDI B** is invoked as selected in the corresponding drop-down.

**GPI 1**  Disabled — Don't Care

**GPI 2** 

Invoke Route SDI A      Invoke Route SDI B


GPI Coding 

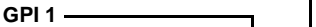
| GPI Event          | GPI Event Action      |
|--------------------|-----------------------|
| GPI 1 Open->Closed | No Action             |
| GPI 1 Closed->Open | No Action             |
| GPI 2 Open->Closed | Route SDI A To Output |
| GPI 2 Closed->Open | Route SDI B To Output |

**Level (Binary)** GPI coding triggers on conditions that consider state combinations on **both** GPI 1 and GPI 2, comprising a 2-bit word that offers four state combinations.

This mode accommodates the maximum number of go-to conditions, and is highly immune to duplicate erroneous conflicting commands.

**GPI 2** 

**GPI 1** 

**Note:** “Pull-up” convention is used for GPI as follows:  
**Open = 1 (hi; pull-up)**  
**Closed = 0 (lo; pull to GND)**

| GPI Event                                                     | GPI Event Action      |
|---------------------------------------------------------------|-----------------------|
| C <sub>0</sub> C <sub>0</sub> → GPI 1 Closed And GPI 2 Closed | Route SDI A To Output |
| C <sub>0</sub> O <sub>1</sub> → GPI 1 Closed And GPI 2 Open   | Route SDI B To Output |
| O <sub>1</sub> C <sub>0</sub> → GPI 1 Open And GPI 2 Closed   | Route SDI C To Output |
| O <sub>1</sub> O <sub>1</sub> → GPI 1 Open And GPI 2 Open     | Route SDI D To Output |

Table 3-2 BBG-1040-ACO Function Submenu List — continued

GPIO

(continued)

- **GPO Settings**

Provides two GPO outputs that can be independently set as manually-invoked engaged, or set to trigger as a function of selected input routing.

- **Manual Control** allows the corresponding GPO Event Action to be invoked immediately (in this example, GPO 1 set to Closed). These manual settings can be saved as part of a preset. Whenever the preset is invoked, any Manual Control settings here will be carried over as part of the preset and in turn applied. (See Presets (p. 3-31) for more information.)

GPO Settings

|       | GPO Event                                                              | GPO Event Action                         |
|-------|------------------------------------------------------------------------|------------------------------------------|
| GPO 1 | Manual Control ▼                                                       | GPO Closed ▼                             |
| GPO 2 | SDI B Selected ▼<br>Manual Control<br>SDI A Selected<br>SDI B Selected | GPO Opened ▼<br>GPO Opened<br>GPO Closed |

- **Channel Selection (SDI A Selected or SDI B Selected)** events can invoke a GPO (as Open or Closed as desired) corresponding to the currently-selected processed input channel. The invoking of a GPO in this case is driven by manually selecting an input channel, or by the failover routing of the channel.

Table 3-2 BBG-1040-ACO Function Submenu List — continued



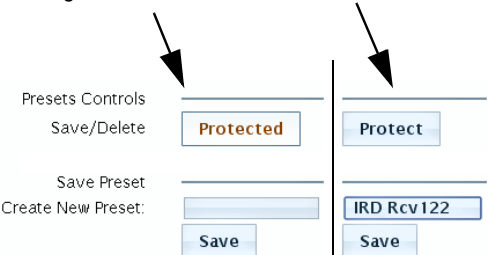
|                                                                                                                                                                                                                                                                                                           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

Table 3-2 BBG-1040-ACO Function Submenu List — continued

| <div>Presets</div> <div>Load/Save Event Triggers Audio</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (continued)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>• <b>Preset Save/Load Controls</b></p> <p>Load/Delete Existing Preset</p> <p>Select Preset:</p> <div data-bbox="479 493 673 630"> IRD Rcv122<br/> IRD Rcv122<br/> Local Area 23<br/> ⋮<br/> Local Area 24 </div> <div data-bbox="479 640 738 808"> Load Selected Preset<br/> Delete Selected Preset<br/> Load<br/> StoredPresets.bin </div> <p>Load Factory Defaults</p> <p>Download Presets</p>                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>• <b>Select Preset:</b> drop-down allows a preset saved above to be selected to be loaded or deleted (in this example, custom preset “IRD Rcv122”).</li> <li>• <b>Load Selected Preset</b> button allows loading (recalling) the selected preset. When this button is pressed, the changes called out in the preset are immediately applied.</li> <li>• <b>Delete Selected Preset</b> button deletes the currently selected preset.</li> <li>• <b>Load Factory Defaults</b> button allows loading (recalling) the factory default preset. When this button is pressed, the changes called out in the preset are immediately applied.</li> </ul> <p><b>Note:</b> Load Factory Defaults functions with no masking. The Preset Layer Select controls have no effect on this control and will reset <b>all</b> layers to factory default.</p> <ul style="list-style-type: none"> <li>• <b>Download Presets</b> saving the preset files to a folder on the connected computer.</li> </ul> |
| <p><b>Download (save)</b> device presets to a network computer by clicking <b>Download Presets – Save</b> at the bottom of the Presets page.</p> <div data-bbox="349 1060 747 1123"> Download Presets    StoredPresets.bin </div> <p>Browse to a desired save location (in this example, <i>My Documents\Cobalt Presets</i>). The file can then be renamed if desired (<i>RCVR21 Presets</i> in this example) before committing the save.</p> <div data-bbox="397 1186 755 1417"> Save<br/> Save In: My Documents<br/> Cobalt Presets<br/> File Name: RCVR21 Presets.bin<br/> Files of Type: BIN Files (*.bin) </div> | <p><b>Upload (open)</b> device presets from a network computer by clicking <b>Settings</b> and then selecting <b>File Upload Utility</b>.</p> <div data-bbox="1023 1018 1404 1270"> BBG-1040-2<br/> Alarm Table Settings About and Licensing<br/> Status<br/> Frame Sync<br/> Input Video<br/> Output Audio<br/> Routing<br/> Card Information<br/> Settings<br/> File Upload Utility </div> <p>Browse to the location where the file was saved on the computer or drive (in this example, <i>My Documents\Cobalt Presets</i>). Select the desired file and click <b>Open</b> to load the file to the device.</p> <div data-bbox="1039 1281 1404 1501"> Open<br/> Look In: Cobalt Presets<br/> RCVR 21 Presets bin<br/> File Name: RCVR 21 Presets bin<br/> Files of Type: BIN Files (*.bin) </div>                                                                                                                                                                                                                         |
| <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Preset transfer between device download and file upload is on a <b>group</b> basis (i.e., individual presets cannot be downloaded or uploaded separately).</li> <li>• After uploading a presets file, engagement of a desired preset is only assured by selecting and loading a desired preset as described on the previous page.</li> </ul>                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |




Table 3-2 BBG-1040-ACO Function Submenu List — continued

Presets

ve
Event Triggers
Audio Events

Provides event-based loading allowing a defined preset to be automatically engaged upon various received signal status.

Event-based loading is particularly useful for automated device setup when transitioning from normal processing to processing supporting an alternate format.



- Event based preset loading is not passive and can result in very significant and unexpected device control and signal processing changes if not properly used. If event based presets are not to be used, make certain the **Event Based Loading** button is set to **Disabled**.
- Because event based preset loading applies device control changes by invoking presets, loading conditions cannot be nested within a called preset (event-based loading settings performed here cannot be saved to presets).

Event triggers allow a variety of event screening criteria, and in turn provide an Event Action “go to” in response to the detected event(s). For each screened criteria, categories can be set as “don’t care” or set to specific criteria to broaden or concentrate on various areas of concern.

The **Event based loading** button serves as a master enable/disable for the function.

Go-to Event Actions can be user-defined presets or hard-coded input video selection changes.

---

In the example here for **Event 1**, the **Video Quality Events** tab is set to screen for frozen video. When detected, this status can be used here (Video Quality set to “Input A Event Error Detected”). Using the Event Action selector, go-to action of “IRD Rcv 122” can be invoked (which in this example is a user preset that changes BBG-1040 routing to use an alternate IRD).

Conversely, to go back to the original source, an event could be set up with Video Quality here looking for “Input A Event Error Cleared” and in turn invoke an event action returning routing to the original video source.

Event based loading

Enabled

|          | Status   | Acquired Video Format | GPI          | Video Quality   | Audio Silence Event     | Event Action:       |
|----------|----------|-----------------------|--------------|-----------------|-------------------------|---------------------|
| Event 1  | Inactive | 1080i - 50/59.94/60 ▼ | Don't Care ▼ | Input 1 Event ▼ | Don't Care ▼            | IRD Rcv 122 ▼       |
| Event 12 | Inactive | 1080i - 50/59.94/60 ▼ | Don't Care ▼ | Don't Care ▼    | Audio Silence Event 1 ▼ | POTS Audio Backup ▼ |

In the example here for **Event 12**, the **Audio Events** sub-tab can be set to screen for loss of audio. When detected, this status can be used here (Audio Silence Event set to “Audio Silence Event 1”). Using the Event Action selector, go-to action of “POTS Audio Backup” can be invoked (which in this example is a user preset that changes BBG-1040 routing to use an alternate telco audio feed).

---

**Note:**


- Screened conditions are triggered upon start of event. Any event-based setup must be done in advance of the triggering event in order for event to be detected.
- Loss of true conditions does not disengage an event-based triggering. A new set of true conditions must be defined and then occur to transition from one event-based trigger to another.
- Time required to engage an event-based trigger depends upon complexity of the called preset. (For example, a preset that invokes a framesync change will take longer to engage than a preset involving only an audio routing change.)
- Make certain all definable event conditions that BBG-1040 might be expected to “see” are defined in any of the Event 1 thru Event 32 rows. This makes certain that the device will always have a defined “go-to” action if a particular event occurs. For example, if the device is expected to “see” a 720p5994 stream or as an alternate, a 525i5994 stream, make certain both of these conditions are defined (with your desired go-to presets) in any two of the Event 1 thru Event 32 condition definition rows.
- **Option**  Video Quality column appears only on BBG-1040 with **+QC** (Quality Check) option.

Table 3-2 BBG-1040-ACO Function Submenu List — continued

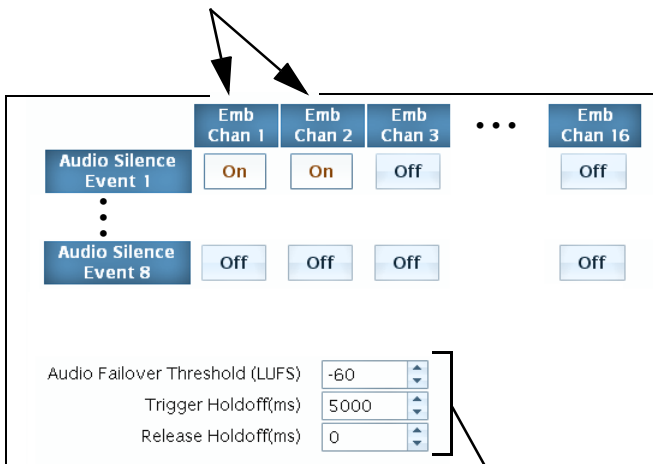
## Presets

### Audio Events

Provides audio silence event screening which can be used in conjunction with the Event Triggers controls described on the previous page.

Checkbox rows allow up to eight separate and independent Audio Silence Events to be defined. Checking an audio channel sets the channel to be screened for audio events indicating persistent silence on the channel. Channels screened are any received channel embedded onto the audio bus channels.

In this example, channels 1 and 2 are set to be screened for audio silence. In this example, if **either** channel 1 or 2 experience silence exceeding the configured threshold, Audio Silence Event 1 becomes active. This event can be used on the **Event Triggers** interface page (described on the previous page) to propagate a device settings change (such as alternate-source audio routing) and/or a user alert.



|                       | Emb Chan 1 | Emb Chan 2 | Emb Chan 3 | ... | Emb Chan 16 |
|-----------------------|------------|------------|------------|-----|-------------|
| Audio Silence Event 1 | On         | On         | Off        |     | Off         |
| ...                   |            |            |            |     |             |
| Audio Silence Event 8 | Off        | Off        | Off        |     | Off         |

Audio Failover Threshold (LUFS) -60

Trigger Holdoff(ms) 5000

Release Holdoff(ms) 0

Event trigger threshold controls set the level and holdoff thresholds.

- **Audio Failover Threshold** sets the threshold (in LUFS) at which content below the threshold is considered as silence.
- **Trigger Holdoff** sets the time allowed for below-threshold content persistence before a silence event is triggered.
- **Release Holdoff** sets the time allowed, when content is noted to be above threshold, that the event trigger is de-activated.

**Note:** Default threshold and holdoff settings shown here are recommended for typical use.

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## Front Panel User Menus

All of the mode and parametric controls available using the web UI (as described in BBG-1040-ACO Function Menu List and Descriptions) are available using the front panel display and arrow navigating buttons. Table 3-3 lists the menu structure and identifiers for these functions, along with page references for detailed information about the functions and its controls.

The front panel menus offers a true standalone means to configure the BBG-1040 with no connection to a network required, and is useful where changes need to be done immediately (or in emergency situations) without the benefit of network access. However, the web GUI provides greatly simplified user interfaces as compared to using this menu and the arrow controls. For this reason, it is **strongly recommended** that the web GUI Remote Control be used for all applications other than the most basic cases.

- Note:**
- When a setting is changed using either the menu described here or the web GUI remote control, settings displayed are the settings as effected by the device itself and reported back to the remote control; the value displayed at any time is the actual value as set on the device.
  - Items other than status displays have an additional submenu where a selection for the item can be made. Some submenu items listed in Table 3-3 have additional nested submenus (denoted by \*). These multiple-level submenus are not listed here; refer to the referenced page number for more information.

**Table 3-3 Front Panel User Menus**

| Menu>Submenu Items                                                                                                                                                                                                                                     | Menu>Submenu Items                                                                                                                                                                                      | Menu>Submenu Items                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Status (pg 3-8)<br>Output Video<br>SDI Input A<br>SDI Input B<br>SDI Input C<br>SDI Input D<br>GPI 1<br>GPI 2<br>Reference<br>Card Voltage<br>Card Power<br>Card Temp(front)<br>Card Temp (rear)<br>Card Temp (FPGA)<br>Card Up Time<br>Preset Engaged | Framesync (pg 3-13)<br>Lock Mode<br>Output Rate<br>Initial Startup Format<br>Output Mode<br>On LOS--<br>Test Pattern<br>Vert Lines Offset<br>Horiz Offset<br>Frame Delay<br>Report Delay<br>Lock Status | Timecode (pg 3-16)<br>Ref VITC Status<br>Input VITC Status<br>Input ATC LTC Status<br>Input ATC VITC Status<br>Output Status      |
| Product Info (pg 3-8)<br>Product<br>Product Options<br>Supplier<br>Revision<br>Build Date<br>FPGA Rev<br>FPGA Build Date<br>S/N                                                                                                                        | GPIO (pg 3-29)<br>GPI1<br>GPI2<br>GPI Coding                                                                                                                                                            | Output Audio Routing<br>(pg 3-26)<br>Output Meters 1-8<br>Output Meters 9-16<br>Audio Bulk Delay                                  |
| Network Settings (pg 3-3)<br>IP Addr<br>Netmask<br>Gateway<br>Mode (DHCP/Stat)                                                                                                                                                                         | Input Video (pg 3-11)<br>Source<br>SDI IN A Status<br>SDI IN B Status<br>SDI IN C Status<br>SDI IN D Status                                                                                             | Presets (pg 3-31)<br>Save/Delete Mode<br>Select Preset<br>Load Selected Preset<br>Delete Selected Preset<br>Load Factory Defaults |
| Character Burner (pg 3-21)<br>Ident 1*<br>Ident 2*<br>Timecode*                                                                                                                                                                                        | Moving Box (pg 3-24)<br>Enable Mode<br>Width<br>Height<br>Horiz Speed<br>Vert Speed<br>Opacity<br>Color                                                                                                 |                                                                                                                                   |

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## Troubleshooting

This section provides general troubleshooting information and specific symptom/corrective action for the BBG-1040-ACO and its remote control interface. The BBG-1040-ACO 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 BBG-1040-ACO itself and its remote control provide error and failure indications. Depending on how the BBG-1040-ACO is being used (i.e., standalone or network controlled through DashBoard™ or a Remote Control Panel), check all available indications in the event of an error or failure condition.

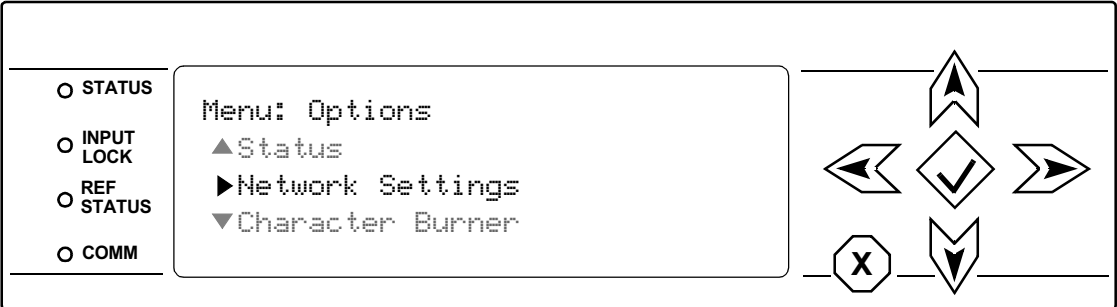
The various BBG-1040-ACO device and remote control error and failure indicators are individually described below.

**Note:** The descriptions below provide general information for the various status and error indicators. For specific failures, also use the appropriate subsection listed below.

- Basic Troubleshooting Checks (p. 3-39)
- BBG-1040-ACO Processing Error Troubleshooting (p. 3-40)

### BBG-1040-ACO Front Panel Status/Error Indicators and Display

Figure 3-8 shows and describes the BBG-1040-ACO front panel indicators and display. These indicators and the display show status and error conditions relating to the device itself and remote (network) communications (where applicable). Because these indicators are part of the device itself and require no external interface, the indicators are particularly useful in the event of communications problems with external devices such as network remote control devices.



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| Item                                                                                                                                          | Function                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Alphanumeric Display                                                                                                                          | Shows device statuses                                                                                                                                                                 |
| STATUS LED                                                                                                                                    | Illuminates GREEN indicating BBG-1040-ACO has successfully powered-up and passed self-tests.                                                                                          |
| INPUT LOCK LED                                                                                                                                | Illuminates GREEN indicating signal presence for currently-selected input video path. Illuminates ORANGE if input video is lost.                                                      |
| REF STATUS LED                                                                                                                                | Illuminates GREEN indicating BBG-1040-ACO is receiving valid reference when set up for framesync operation. Illuminates ORANGE if reference is lost or incompatible with input video. |
| COMM LED                                                                                                                                      | Illuminates GREEN when device is communicating with network connection. Illuminates ORANGE if connection is lost.                                                                     |
| <b>Note:</b> The LEDs listed above are always illuminated under normal conditions. An LED that is not lit indicates an error with the device. |                                                                                                                                                                                       |

Figure 3-8 BBG-1040-ACO Device Edge Status Indicators and Display

## Basic Troubleshooting Checks

Failures of a general nature (affecting many devices and/or functions simultaneously), or gross inoperability errors are best addressed first by performing basic checks before proceeding further. Table 3-4 provides basic system checks that typically locate the source of most general problems. If required and applicable, perform further troubleshooting in accordance with the other troubleshooting tables in this section.

**Table 3-4 Basic Troubleshooting Checks**

| Item                                                           | Checks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Verify power presence and characteristics</b>               | <ul style="list-style-type: none"><li>• On the BBG-1040-ACO, in all cases when power is being properly supplied all indicators should be illuminated. Any device showing no illuminated indicators should be cause for concern.</li><li>• Check the Power Consumed indication for the BBG-1040-ACO. This can be observed using the Status front-panel or web UI pane.<ul style="list-style-type: none"><li>• If display shows <b>no</b> power being consumed, either the frame power supply, connections, or the BBG-1040-ACO itself is defective.</li><li>• If display shows <b>excessive</b> power being consumed (see Technical Specifications (p. 1-10) in Chapter 1, "Introduction"), the BBG-1040-ACO may be defective.</li></ul></li></ul> |
| <b>Check Cable connection secureness and connecting points</b> | Make certain all cable connections are fully secure (including coaxial cable attachment to cable ferrules on BNC connectors). Also, make certain all connecting points are as intended. Make certain the selected connecting points correlate to the intended device inputs and/or outputs. Cabling mistakes are especially easy to make when working with large I/O modules.                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Check status indicators and displays</b>                    | On BBG-1040-ACO front panel and web interface indicators, red indications signify an error condition. If a status indicator signifies an error, proceed to the following tables in this section for further action.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Troubleshoot by substitution</b>                            | All devices can be hot-swapped, replacing a suspect device with a known-good item.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## BBG-1040-ACO Processing Error Troubleshooting

Table 3-5 provides BBG-1040-ACO processing troubleshooting information. If the BBG-1040-ACO exhibits any of the symptoms listed in Table 3-5, follow the troubleshooting instructions provided.

In the majority of cases, most errors are caused by simple errors where the BBG-1040-ACO is not appropriately set for the type of signal being received by the device.

**Note:** Where errors are displayed on both the BBG-1040-ACO and network remote controls, the respective indicators and displays are individually described in this section.

**Table 3-5 Troubleshooting Processing Errors by Symptom**

| Symptom                                                                                                         | Error/Condition                                                      | Corrective Action                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BBG-1040 shows <b>Unlocked</b> message in BBG-1040-ACO Card Info pane.                                          | No video input present                                               | Make certain intended video source is connected to appropriate BBG-1040-ACO card video input. Make certain BNC cable connections are OK.                                                                                                                                                                                                      |
| Ancillary data (closed captioning, timecode) not transferred through BBG-1040-ACO                               | • Control(s) not enabled                                             | • Make certain respective control is set to <b>On</b> or <b>Enabled</b> (as appropriate).                                                                                                                                                                                                                                                     |
|                                                                                                                 | • VANC line number conflict between two or more ancillary data items | • Make certain each ancillary data item to be passed is assigned a unique line number (see Ancillary Data Line Number Locations and Ranges on page 3-9).                                                                                                                                                                                      |
| Audio not processed or passed through device                                                                    | Enable control not turned on                                         | On <b>Output Audio Routing/Controls</b> tab, <b>Audio Group Enable</b> control for group 1 thru 4 must be turned on for sources to be embedded into respective embedded channel groups.                                                                                                                                                       |
| Selected upgrade firmware will not upload                                                                       | Automatic reboot after upgrade turned off                            | Device <b>Presets &gt; Automatically Reboot After Upgrade</b> box unchecked. Either reboot the device manually, or leave this box checked to allow automatic reboot to engage an upgrade upon selecting the upgrade.                                                                                                                          |
| Device does not pass video or audio as expected. Control settings spontaneously changed from expected settings. | Event-based preset inadvertently invoked                             | Event-based preset loading ( <b>Presets</b> tab > <b>Event Triggers</b> sub-tab) should be set to <b>Disabled</b> if this function is not to be used. Read and understand this control description before using these controls to make sure engagement for all expected conditions is considered. See Presets (p. 3-31) for more information. |



**Table 3-5 Troubleshooting Processing Errors by Symptom — continued**

| Symptom                                                                                   | Error/Condition                                                                                                                                                                | Corrective Action                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Device will not retain user settings, or setting changes or presets spontaneously invoke. | <ul style="list-style-type: none"> <li><b>GPI Controls</b> tab <b>GPI Coding</b> set to <b>Level</b> (binary) with no controlled GPI source connected to GPI inputs</li> </ul> | <ul style="list-style-type: none"> <li>If GPI is not to be used, make certain <b>GPI Coding</b> control on <b>GPI Controls</b> tab is set to <b>Disabled</b>. (If control is left on Level with no inputs, the pull-up HI logic state on the open inputs will be interpreted as two “HI’s” on the inputs, possibly resulting in an unintentional invoked preset).</li> </ul> |
|                                                                                           | <ul style="list-style-type: none"> <li><b>Event Based Loading</b> sub-tab inadvertently set to trigger on event</li> </ul>                                                     | <ul style="list-style-type: none"> <li>If event based loading is not to be used, make certain <b>Event Based Presets</b> is disabled (either using master <b>Enable/Disable</b> control or through events settings. See Presets (p. 3-31) for more information.</li> </ul>                                                                                                   |

## 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.

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