BBG-1040-4x1-CS

3G/HD/SD-SDI Standalone 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control

Product Manual

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BBG1040-4X1CS-OM (V1.2)

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Congratulations on choosing the Cobalt® BBG-1040-4x1-CS 3G/HD/SD-SDI Standalone 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control. The BBG-1040-4x1-CS 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-1040-4x1-CS, please contact us at the contact information on the front cover.

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Table of Contents

Chapter 1

Introduction

Overview

This manual provides installation and operating instructions for the BBG-1040-4x1-CS 3G/HD/SD-SDI Standalone 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control unit (also referred to herein as the BBG-1040-4x1-CS).

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-1040-4x1-CS.
- **Chapter 2, "Installation"** – Provides instructions for installing the BBG-1040-4x1-CS and setting up its network access.
- **Chapter 3, "Setup/Operating Instructions"** – Provides overviews of operating controls and instructions for using the BBG-1040-4x1-CS.

This chapter contains the following information:

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-1040-4x1-CS itself. Examples are provided below.

- Device display messages are shown like this:

  BBG-1040

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

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

- **BBG-1040-4x1-CS** refers to the BBG-1040-4x1-CS 3G/HD/SD-SDI Standalone 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control unit.
- **Frame** refers to the HPF-9000, oGx, OG3-FR, 8321, or similar 20-slot frame that houses Cobalt® or other cards.
- **Device** and/or **Card** refers to a Cobalt® or other card.
- **System** and/or **Video System** refers to the mix of interconnected production and terminal equipment in which the BBG-1040-4x1-CS and other 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: • Do not dispose of this product as unsorted municipal waste. • Collect this product separately. • Use collection and return systems available to you.

Safety and Regulatory Summary

Warnings

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

Cautions

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

CAUTION **This 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-1040-4x1-CS 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.**

EMC Compliance Per Market

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

BBG-1040-4x1-CS Functional Description

Figure 1-1 shows a functional block diagram of the BBG-1040-4x1-CS. The BBG-1040-4x1-CS provides switching on the RP168-specified VBI switch line, and also provides audio cross-fade upon switches to provide video switches free of switching artifacts, and provides quiet audio between switches. User-invoked switches are held and then executed on the next available RP168 VBI switch line.

In addition to a basic signal presence input failover function, a Quality Check option allows failover to alternate inputs based on user-configurable subjective criteria such as black or frozen frame. Two discrete character burn strings and timecode burn 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.

The BBG-1040-4x1-CS also provides timecode/closed-captioning conversion from packet-based timecode formats and CEA608/708 HD formats to HD ATC, SD_ATC, and SD VITC-based (waveform) timecode.

BBG-1040-4x1-CS Input/Output Formats

The BBG-1040-4x1-CS provides the following inputs and outputs:

- **Inputs:**
  - **3G/HD/SD SDI IN A** thru **SDI IN D** – four 3G/HD/SD-SDI inputs. **SDI IN A** or **SDI IN B** can be set to failover to **A** or **B** in absence of opposite channel of this pair.
- **Outputs:**
  - **3G/HD/SD-SDI OUT (1-4)** – four 3G/HD/SD-SDI buffered video outputs. Each output can be independently set as processed output video or selected input video reclocked.
  - **RLY BYP B** –3G/HD/SD-SDI which outputs a copy of **SDI OUT 1** under normal conditions, or passive outputs the SDI input on **SDI IN B** as a relay failover if device power is lost.

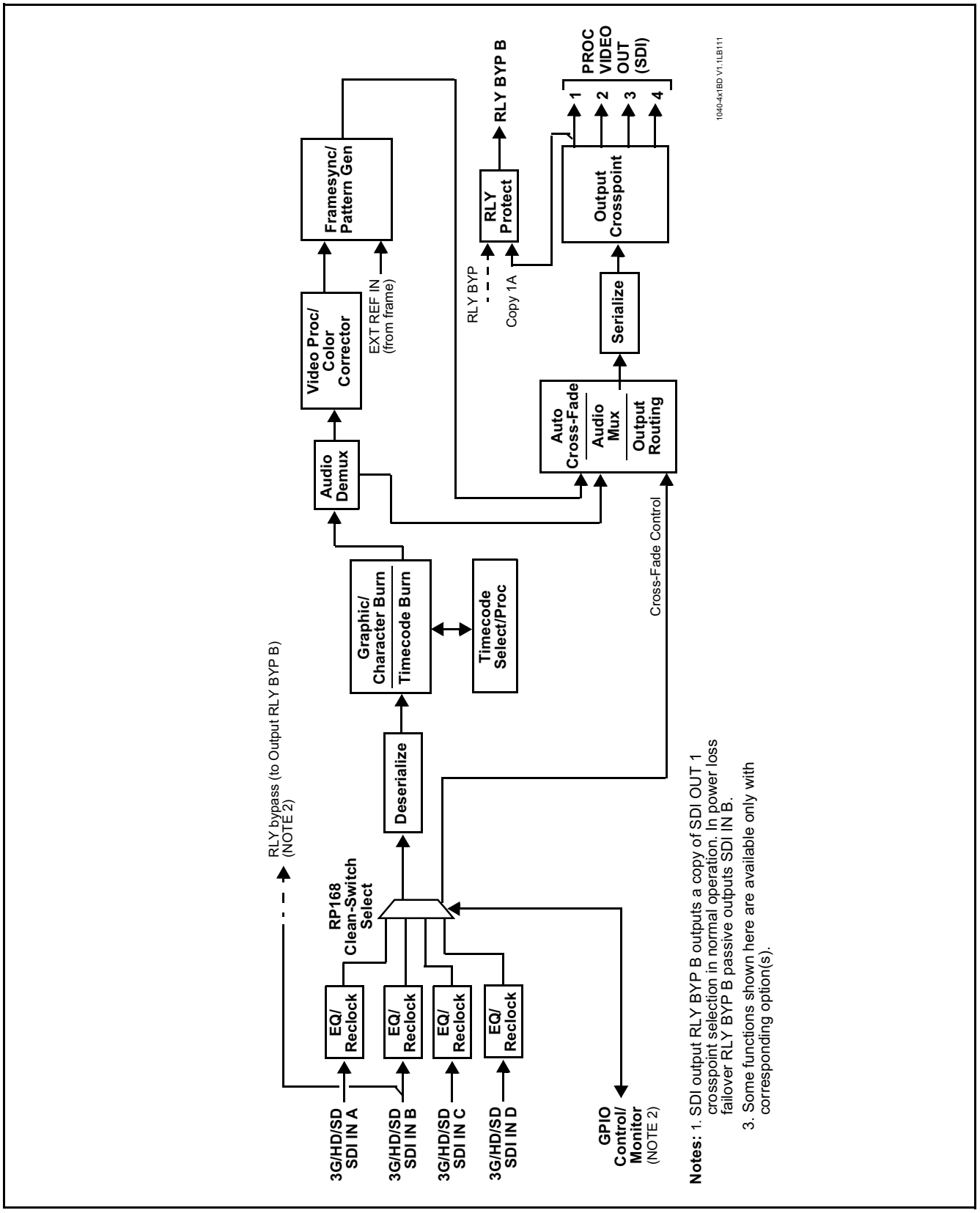

Figure 1-1 BBG-1040-4x1-CS Functional Block Diagram

Video Processor Description

Input Video Select/Quality Check Functions

The input can be selected using DashBoard 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 when selected as a choice on the output crosspoint. Switching on the RP168-specified VBI switch line and audio cross-fade upon switches are provided for manually executed switches (either user remote control or GPI-based) to provide video switches free of switching artifacts, and provides quiet audio between switches. User-invoked switches are held and then executed on the next available RP168 VBI switch line. For LOS failover, switching may occur on an arbitrary line, and clean switching cannot be assured.

The input can be selected using DashBoard manual control, set to failover to an alternate input upon loss of the target input, and can be externally selected via a GPIO interface. An input **Allowed Rasters** and **Allowed Frame Rates** filter allows inputs to be filtered (screened) for only user-allowed raster sizes and frame rates, with unallowed raster/rates being rejected as an input (input unlock). Reclocked copies of any SDI input can be outputted when selected as a choice on the output crosspoint.

Option **(Option +QC)**. Quality Check allows criteria such as black/frozen frame events to propagate an event alert. This alert can be used by the Presets function to invoke video routing changes, GPO, and other actions.

Auto-Changeover Function

(See Figure 1-2.) This function allows logic assert of input select and routing to the **RLY BYP 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 or is removed from the frame.

The **RLY BYP 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 **RLY BYP 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 **RLY BYP OUT**.

Note:
- The device also provides active (DA-driven) outputs **RCK/PROC 1** thru **RCK/PROC 4**. These outputs are independent of the relay failover function and will lose signal in the event of a power loss.
- The above failover uses basic signal presence as failover criteria and is limited to inputs **A** and **B**. Failover using active assessments (Quality Check) can be set to provide failovers using frozen/black frame and other criteria. See Video Quality Events Detect Function (p. 1-11) for more information.
- Clean audio switching is assured only for intentional, controlled switches via user control. Clean audio switching cannot be assured for failover switches.

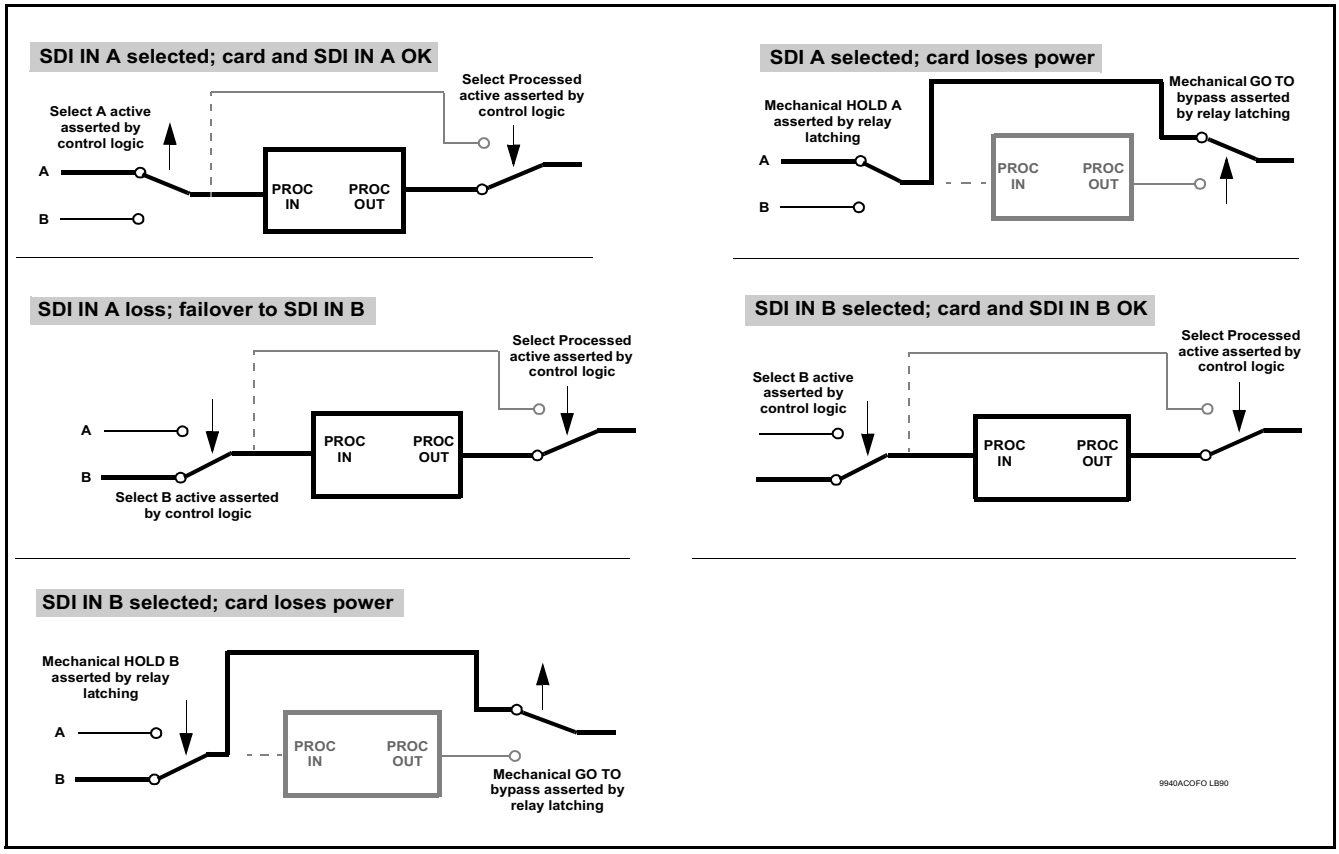

Figure 1-2 Auto-Changeover Function and Signal Flow

Frame Sync Function

This function provides for frame sync control using an external looping reference signal, or 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 the external frame reference source, free-run, or 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 various 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.

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 for supported timecode formats such as ATC_LTC or ATC_VITC for down-conversions to HD, and ATC_VITC or VITC waveform (with selectable odd/even field line number control) for SD SDI or CVBS inputs. Waveform VITC timecode can also be extracted from a reference input and used as the output timecode value. If the preferred format is detected, the preferred format is used; if the preferred format is not detected, other formats (where available) can be used as desired. An internally-generated free-run timecode can be also be embedded on output video if desired.

The function also provides conversion between various timecode formats and provides independent insertion and line number controls for each SDI timecode output format.

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.

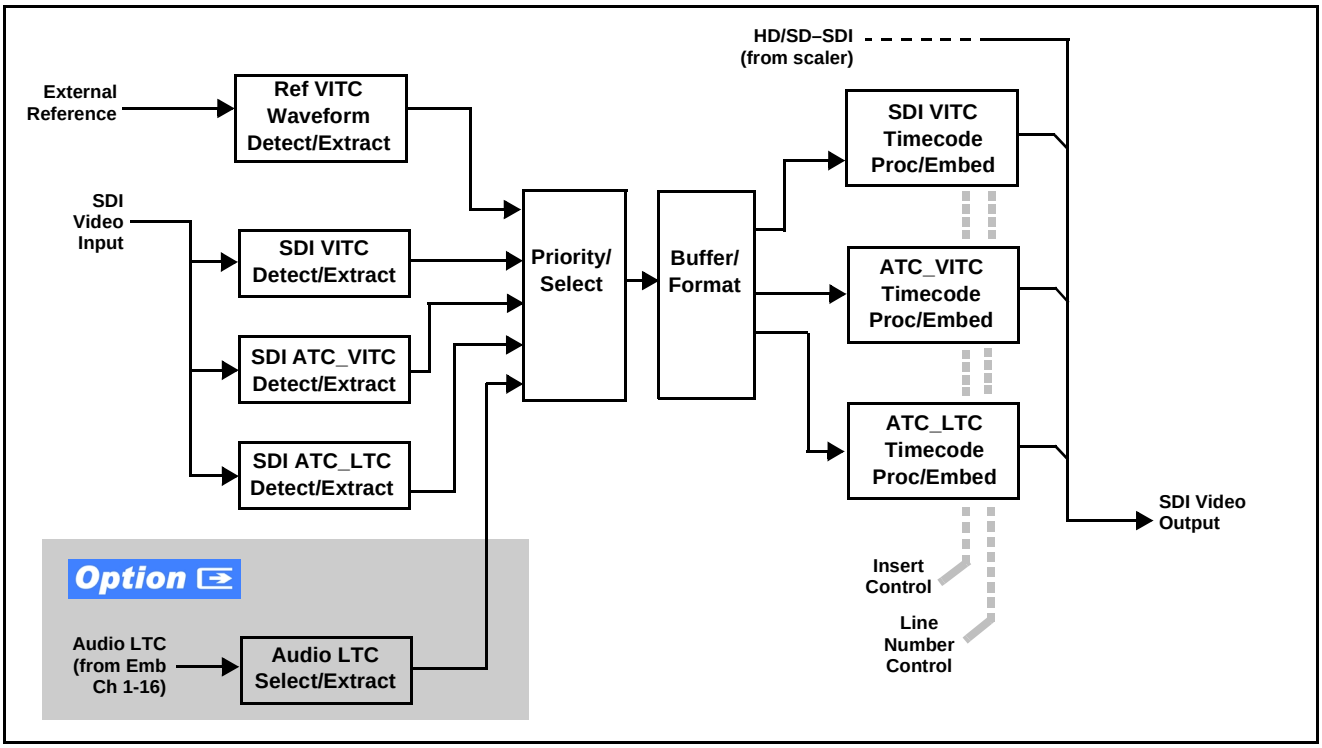

Figure 1-3 Timecode Processor

Option Color Corrector

The color corrector converts the YCbCr SDI input video to the 4:4:4 RGB color space (where the color correction is applied), and then back to YCbCr SDI on the output. Controls are available to adjust each RGB level independently for both white levels (gain) and black levels (offset). Gamma can also be independently adjusted for each RGB channels. Various controls can be ganged to provide adjustment for all three color channels simultaneously.

Character/Image Burn-in Functions

User text 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 Quality Events Detect Function Option

Option **+QC** provides a **Video Quality Events** user interface and an **Event Triggers** user interface for setting an area of concern across the program raster which can be monitored for frozen or black video events. Threshold controls allow setting the sensitivity of the function, while engage and disengage threshold timing controls allow setting how fast the event detection engages and releases when triggered. The **Event Triggers** user interface allows instructing the device as to the action to take upon an event (such as go to a changed signal routing, activate a GPO, send an automated email, or go to a user-defined preset).

An **Event Triggers** user interface can detect Closed Caption Presence and Closed Caption Absence events. The **Event Triggers** user interface in turn allows instructing the device as to the action to take upon an event (such as go to a changed signal routing, activate a GPO, send an automated email, or go to a user-defined preset).

Video Output Crosspoint

A four-output video matrix crosspoint allows independently applying the device processed video output or reclocked input to any of the four device discrete coaxial outputs (**SDI OUT 1** thru **SDI OUT 4**).

Audio Processor Description

The audio processor operates as an internal audio router. This function chooses from 16 channels of embedded audio from the selected program video SDI video input (default 1-to-1 routing to SDI output).

Audio Input/Output Routing and Crosspoints

(See Figure 1-4.) The audio processing subsection is built around an internal 16-channel audio bus. This 16-channel bus receives inputs from an input routing crosspoint that routes de-embedded audio inputs over the 16-channel card bus. Correspondingly, at the output end of the 16-channel bus is an output routing crosspoint that in turn distributes the 16-channel bus signals to embedded audio outputs.

An Input Audio Status display shows the presence and peak level of each input audio channel received by the device. The payload is identified (PCM or data such as Dolby® Digital or E).

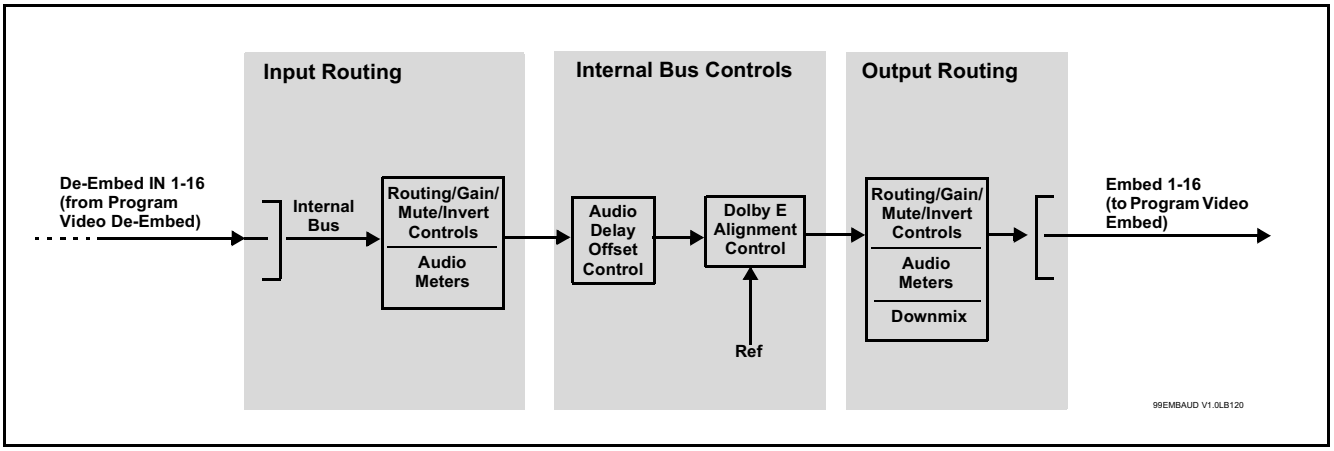

Figure 1-4 Basic Audio Processing Block Diagram

Audio Events Detect Function Option

Option **+QC** provides a **Audio Detect Events** user interface and an **Event Triggers** user interface for checking user-selected channels to detect audio silence conditions. The **Event Triggers** user interface in turn allows instructing the device as to the action to take upon an event (such as go to a changed signal routing, activate a GPO, send an automated email, or go to a user-defined preset).

Audio Clean and Quiet Switching

(See Figure 1-5.) An automatic Audio Clean and Quiet Switching (cross-fade muting) function receives a control signal from the input select function which ducks audio during controlled input video switching transitions to provide silence between input switches. The cross-fade is queued for the next available RP168 switch line following the switch command.

Note:
- Clean audio switching is assured only for intentional, controlled switches via user control. Clean audio switching cannot be assured for failover switches.
- Clean switching requires that both SDI signals (switch from and switch to) be stable and present.
- Clean audio switching function is designed for PCM audio. This function does not assure clean decoded audio when switching from/to Dolby or other non-PCM audio.

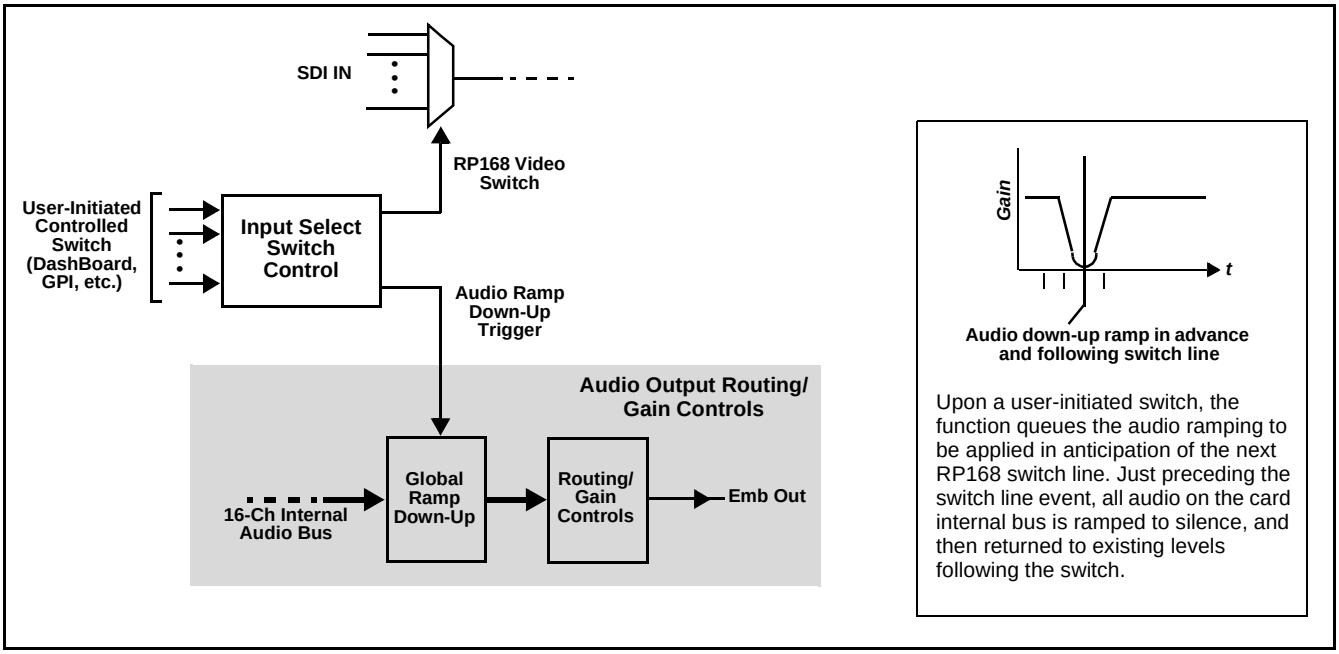

Figure 1-5 Audio Cross-Fade Muting

Control and Data Input/Output Interfaces

GPI Interface

Two independent ground-closure sensing GPI inputs (**GPI 1** and **GPI 2**; each sharing common ground connection as chassis potential) are available. Associated with each GPI user control is a selection of one of 32 user-defined presets in which GPI activation invokes a device control preset. Because the GPI closure invokes a user-defined preset, the resulting setup is highly flexible and totally user-defined. Invoking a user preset to effect a change involves device setup communication limited **only** to the items being changed; the device remains on-line during the setup, and the called preset is rapidly applied.

GPI triggering can be user selected to consider the activity on discrete GPI ports, or combinations of logic states considering both GPI inputs. This flexibility allows multistage, progressive actions to be invoked if desired. Indication is provided showing whenever a GPI input has been invoked.

GPO Interface

Two independent phototransistor non-referenced (floating) contact pairs (**GPO 1/1** and **GPO 2/2**) are available. A GPO can be invoked by setting a GPO to be enabled when a preset is in turn applied (i.e., when a preset is invoked (either manually or via event-based loading), the GPO is correspondingly also activated.

User Control Interface

BBG-1040-4x1-CS 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. The device can also be controlled using DashBoard™ remote control, where it appears as a frame connection.

Technical Specifications

Table 1-1 lists the technical specifications for the BBG-1040-4x1-CS 3G/HD/ SD-SDI Standalone 4x1 Clean and Quiet Bypass Router unit.

Table 1-1 Technical Specifications

Item	Characteristic
Part number, nomenclature	BBG-1040-4x1-CS 3G/HD/SD-SDI Standalone 4x1 Clean and Quiet Bypass Router
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.

Table 1-1 Technical Specifications — continued

Item	Characteristic
Serial Digital Video Input	Number of inputs: Up to (4), with manual select or failover to alternate input. Input B uses relay bypass to output RLY BYP B. 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 Minimum Latency (frame sync disabled): SD: 127 pixels; 9.4 us 720p: 330 pixels; 4.45 us 1040i: 271 pixels; 3.65 us 1040p: 361 pixels; 2.43 us
Post-Processor Serial Digital Video Outputs	Number of Outputs: Four 3G/HD/SD-SDI BNC Impedance: 75 Ω Return Loss: > 15 dB at 5 MHz – 270 MHz Signal Level: 800 mV ± 10% DC Offset: 0 V ± 50 mV Jitter (3G/HD/SD): < 0.3/0.2/0.2 UI
Frame Reference Input	Looping 2-BNC connection. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level” Return Loss: >35 dB up to 5.75 MHz
GPIO	(2) GPI; (2) GPO; opto-isolated GPO Specifications: Max I: 120 mA Max V: 30 V Max P: 120 mW GPI Specifications: GPI LO @ Vin < 1.5 V GPI HI @ Vin > 2.3 V Max Vin: 9 V
Redundant (or spare) AC power supply	BBG-1000-PS

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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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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Chapter 2

Installation

Overview

This chapter contains the following information:

Installing the BBG-1040-4x1-CS

Note:
- Where BBG-1040-4x1-CS 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-1040-4x1-CS in locations marked with stamped “x”. If feet are not affixed, chassis bottom cooling vents will be obscured.
- Where BBG-1040-4x1-CS 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-1040-4x1-CS to be mounted and securely attached to a 1 RU tray that fits into a standard EIA 19” rack mounting location. Install BBG-1040-4x1-CS unit into tray as described and shown here.

1. If installing BBG-1040-4x1-CS using optional frame Mounting Tray BBG-1000-TRAY, install BBG-1040-4x1-CS in tray as shown in Figure 2-1.

2. Connect the input and output cables as shown in Figure 2-3.

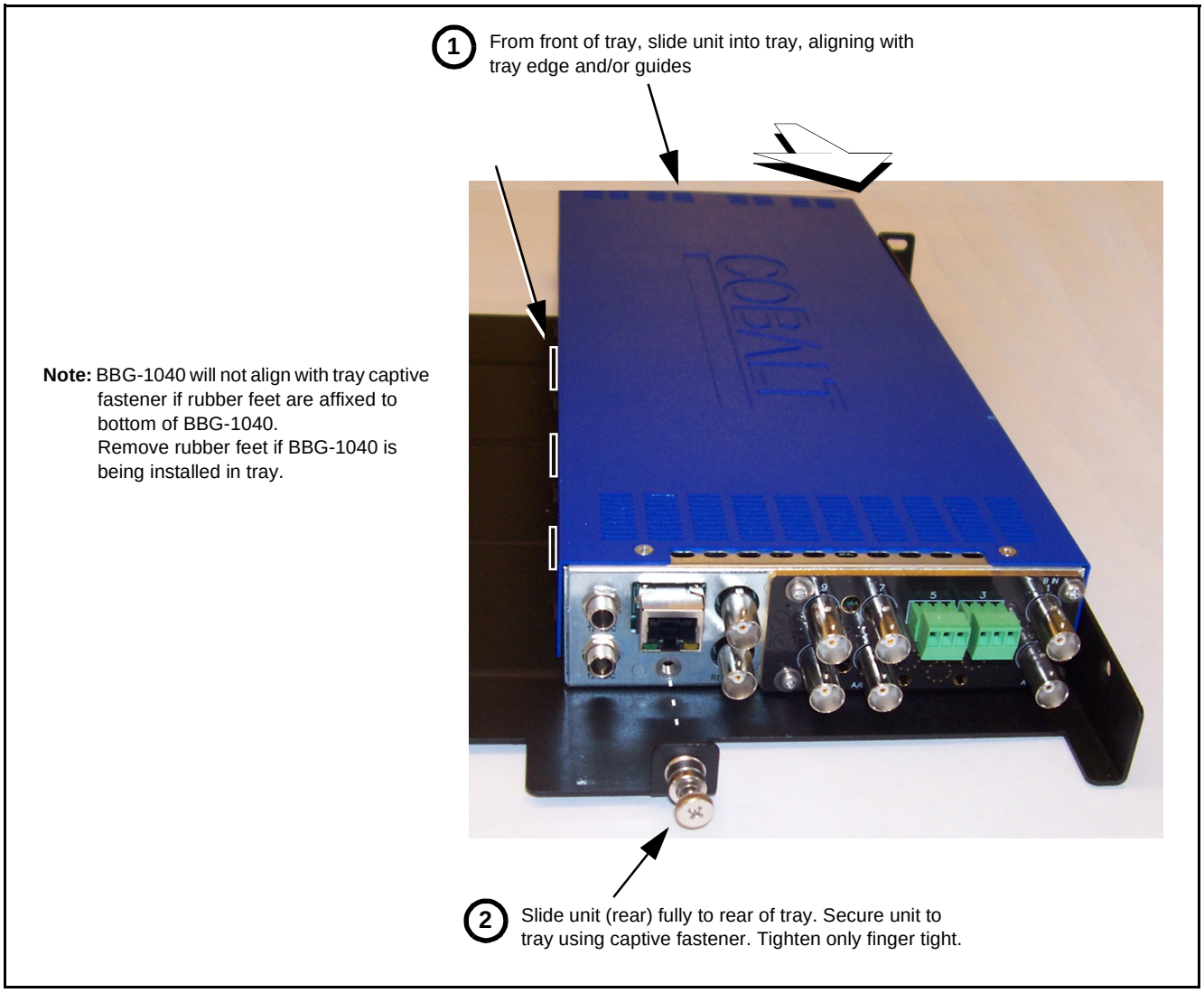


Figure 2-1 Mounting BBG-1040-4x1-CS Using Frame Mounting Tray

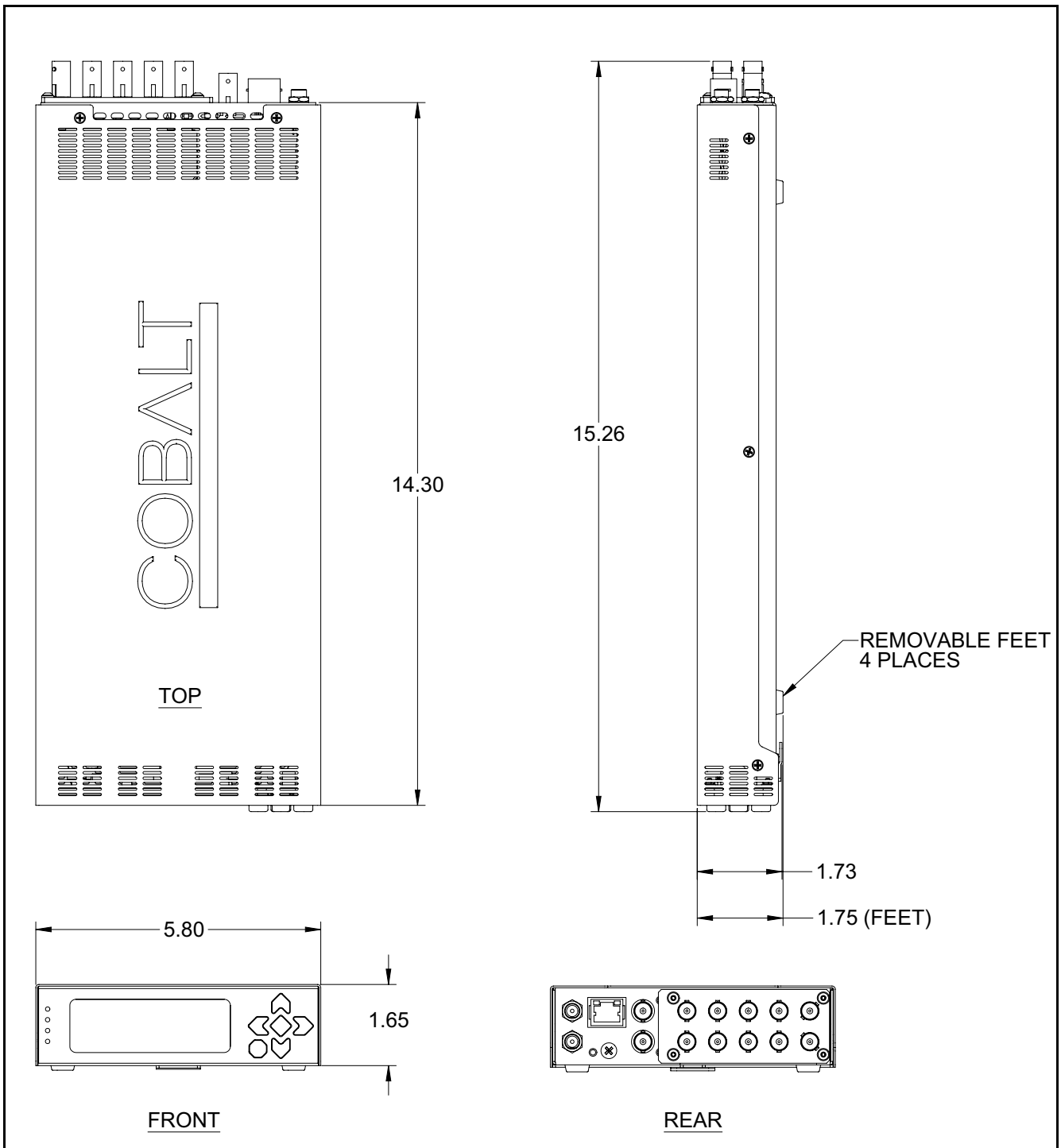
BBG-1040-4x1-CS Unit Dimensions

Figure 2-2 shows the BBG-1040-4x1-CS physical dimensions and mounting details for cases where BBG-1040-4x1-CS 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.

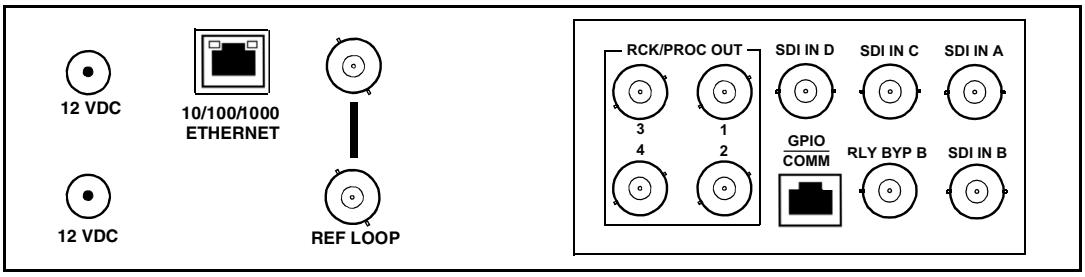
Note:
- The BBG-1040 BNC inputs are internally 75-ohm terminated. It is not necessary to terminate unused BNC video inputs or outputs.
- External frame sync reference signal (if used) must be terminated if a looping (daisy-chain) connection is not used. Unterminated reference connection may result in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



Notes: 1. All dimensions in inches.
2. If BBG-1040 is mounted on flat surface, either rubber feet must be installed, or mounting surface must be open to mate with cooling vents on bottom of BBG-1040 chassis.

Figure 2-2 BBG-1040-4x1-CS Dimensional Details

BBG-1040-4x1-CS Rear Panel



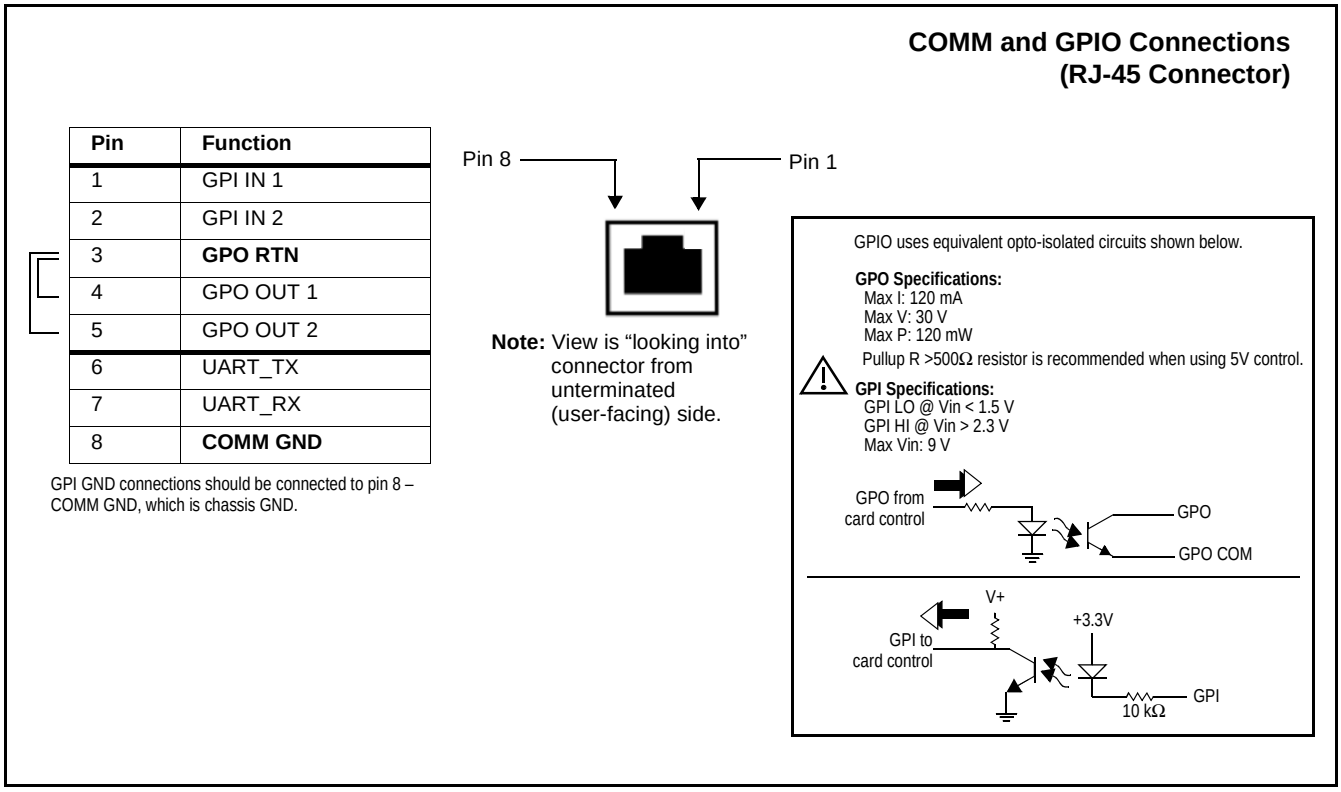
Connector	Function
12 VDC − ⊂ +	Dual DC power IN connectors (diode-isolated). Single AC adapter (supplied) can be connected to either connector. Dual adapters can be connected to provide power redundancy.
10/100/1000 ETHERNET	Gigabit Ethernet control/monitoring connection. Communication activity status is shown by integral status LEDs.
REF LOOP	REF LOOP connectors are NC for this model
Signal Connectors	
SDI IN A thru **SDI IN D**	(4) 3G/HD/SD-SDI video input BNCs
RCK/PROC OUT 1 thru **RCK/PROC OUT 4**	(4) 3G/HD/SD-SDI video output BNC; each GUI selectable as selected-input reclocked or processed out
RLY BYP B	(1) relay-protected SDI processed output BNC. Outputs a copy of SDI OUT 1 under normal conditions, or passive outputs the SDI input on SDI IN B as a relay failover if device power is lost.
COMM/GPIO	RJ-45 connector that provides the following: - Multi-format serial interface - Two opto-isolated GPI inputs - Two phototransistor GPO outputs Note: See Figure 2-4 for connector pinouts.

Figure 2-3 BBG-1040-4x1-CS Rear Panel Connectors

GPIO and Serial (COMM) Connections

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



Pin	Function
1	GPI IN 1
2	GPI IN 2
3	**GPO RTN**
4	GPO OUT 1
5	GPO OUT 2
6	UART_TX
7	UART_RX
8	**COMM GND**

GPI GND connections should be connected to pin 8 – COMM GND, which is chassis GND.

Figure 2-4 COMM / GPIO Connector Pinouts

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Chapter 3

Setup/Operating Instructions

Overview

This chapter contains the following information:

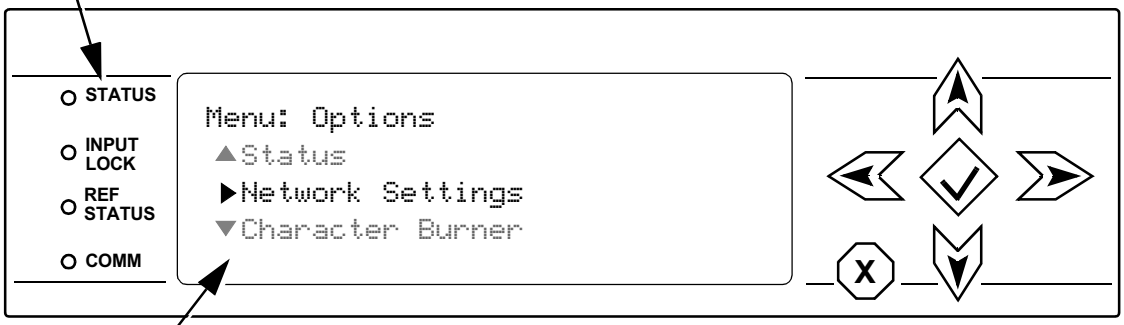
Perform the setup procedures here in the sequence specified. All procedures equally apply to all models unless otherwise noted.

Note: • All instructions here assume BBG-1040-4x1-CS is physically connected to the control physical network as described in Chapter 2. Installation.

BBG-1040-4x1-CS Front Panel Display and Menu-Accessed Control

Figure 3-1 shows and describes the BBG-1040-4x1-CS 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 X 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-1040-4x1-CS Front Panel Display and Menu Controls

Connecting BBG-1040-4x1-CS To Your Network

BBG-1040-4x1-CS ships with network protocol set to DHCP and populates its address with an addressed allocated by your DHCP server. If your network does not have a DHCP server, the BBG-1040-4x1-CS 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-1040-4x1-CS To Network

1. Power-up BBG-1040-4x1-CS and connect Ethernet cable connection to media. Wait for BBG-1040-4x1-CS to complete booting. When **`Product: BBG-1040-4x1-CS`** ... 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`**.

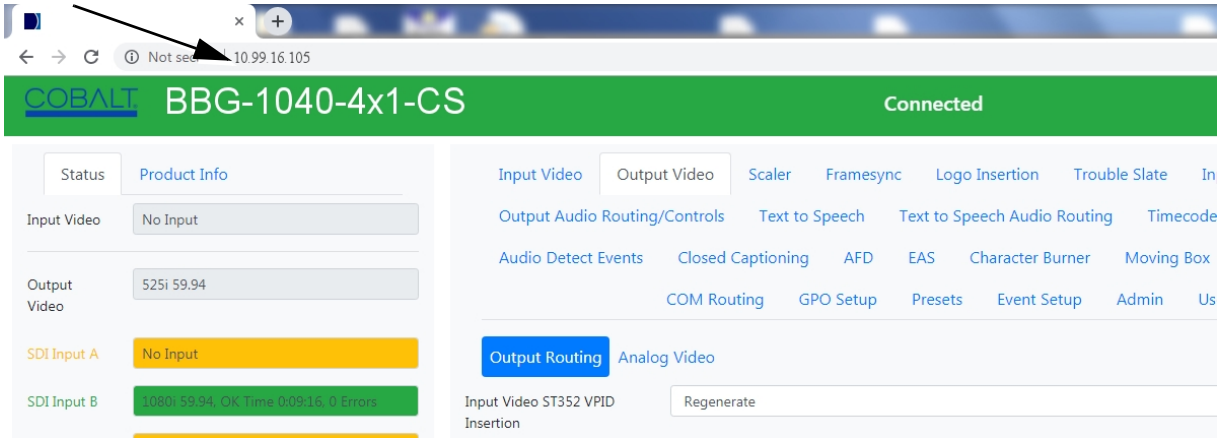
4. Configure the following fields as desired and appropriate for your network connection (examples shown below).

```
Menu: Network Settings
  IP: 10.99.16.105
  Netmask: 255.255.255.0
  Gateway: 10.99.16.1
  Mode: Static
```

5. Press X to commit changes and exit the setup menu.
Note: Current IP address of BBG-1040-4x1-CS can now be checked from the front panel by accessing this at any point.

6. At this point, BBG-1040-4x1-CS 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-1040-4x1-CS



Finding a BBG-1040-4x1-CS Device in DashBoard

(See Figure 3-2) If BBG-1040-4x1-CS is configured with an address within a network also available via DashBoard, a BBG-1040-4x1-CS device appears as a frame entity in the DashBoard Basic Tree View.

Note: BBG-1040-4x1-CS DashBoard remote control is also available by opening the device in DashBoard similar to opening an openGear® card.

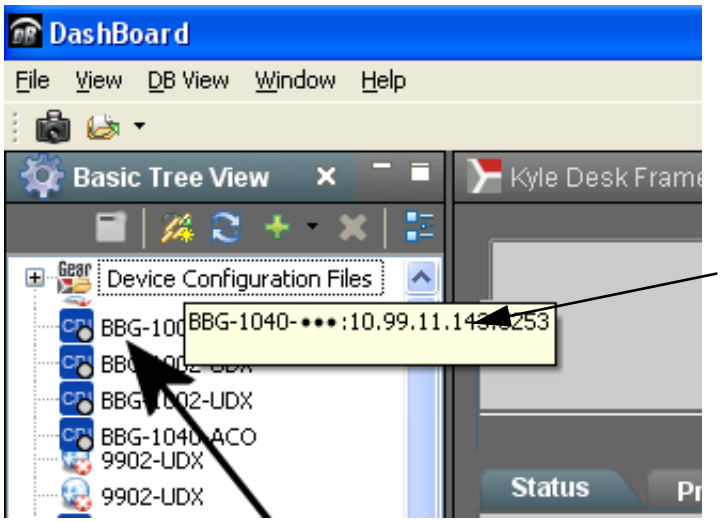


Figure 3-2 Finding BBG-1040-4x1-CS Using DashBoard

Control and Display Descriptions

This section describes the web user interface controls for using the BBG-1040-4x1-CS.

The format in which the BBG-1040-4x1-CS 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-1040-4x1-CS device are organized into function **menus**, which consist of parameter groups as shown below.

Figure 3-3 shows how the BBG-1040-4x1-CS device and its menus are organized, and also provides an overview of how navigation is performed between devices, function menus, and parameters.

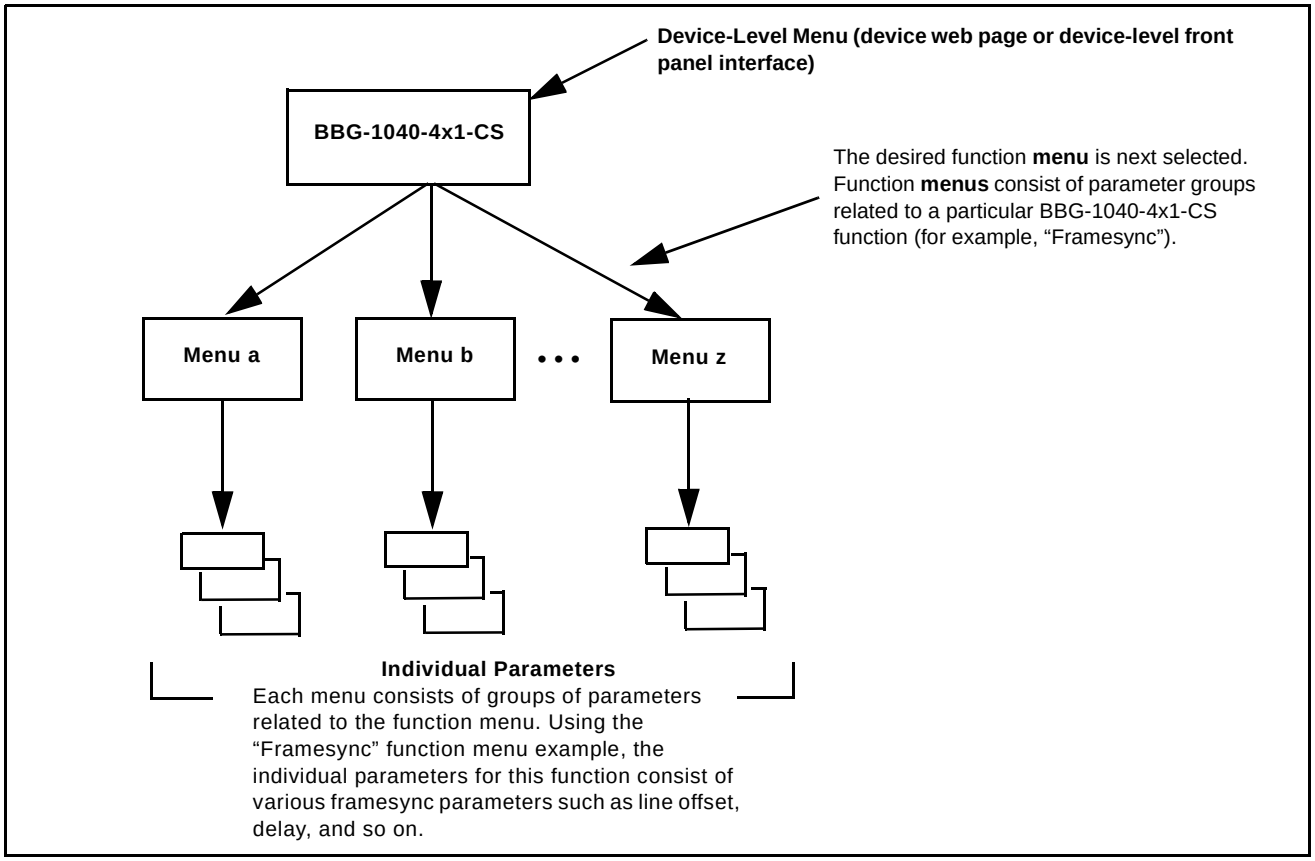


Figure 3-3 Function Submenu/Parameter Submenu Overview

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.

In this example, the **Framesync** 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-1040-4x1-CS user interface theme selection offers light and dark themes suited for various users and environments.

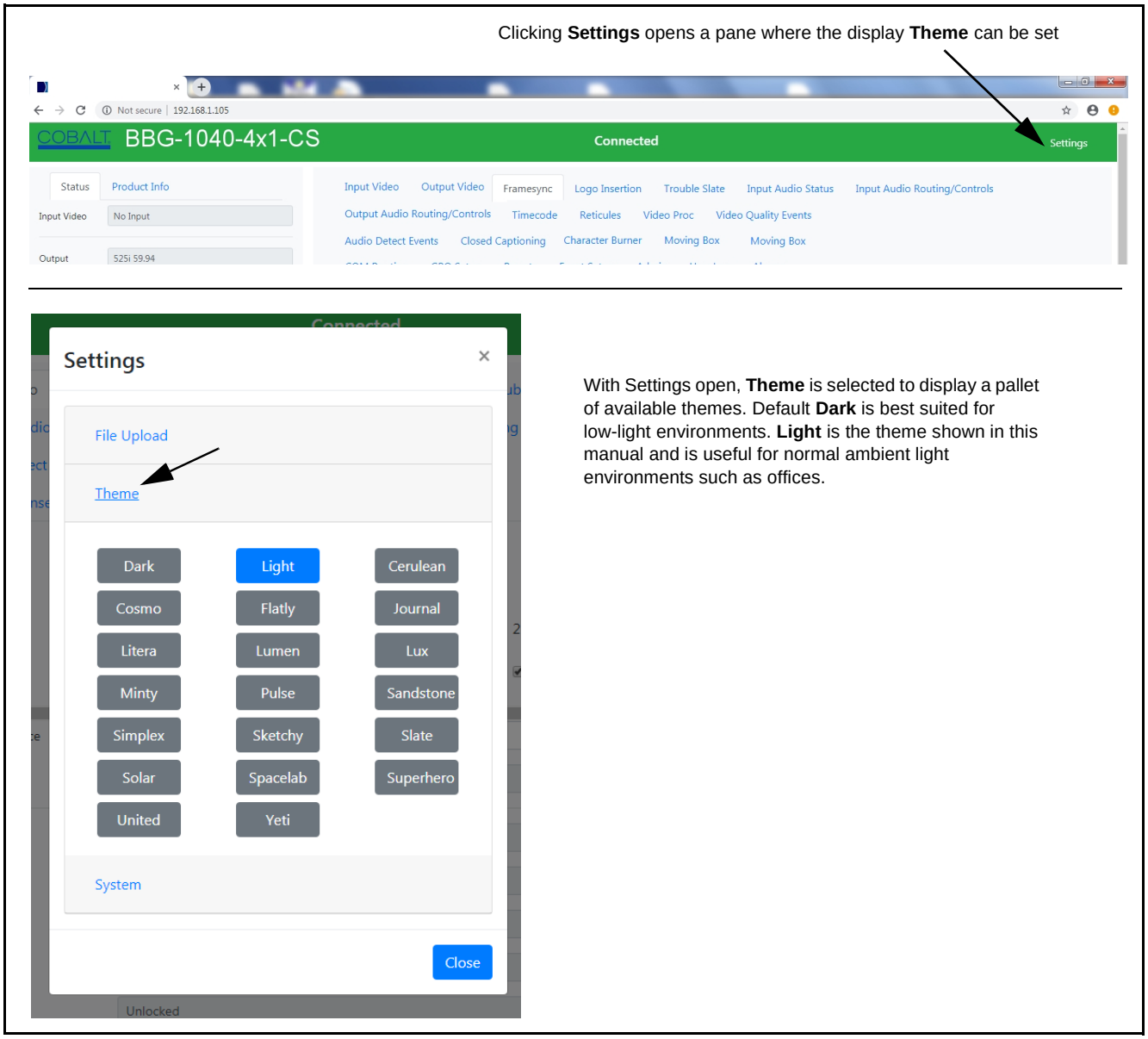


Figure 3-5 Web UI Display Themes

Checking BBG-1040-4x1-CS Device Information

The operating status and software version the BBG-1040-4x1-CS device can be checked by clicking the **Status** main menu tab. Figure 3-6 shows and describes the BBG-1040-4x1-CS 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. 3-59) for corrective action.

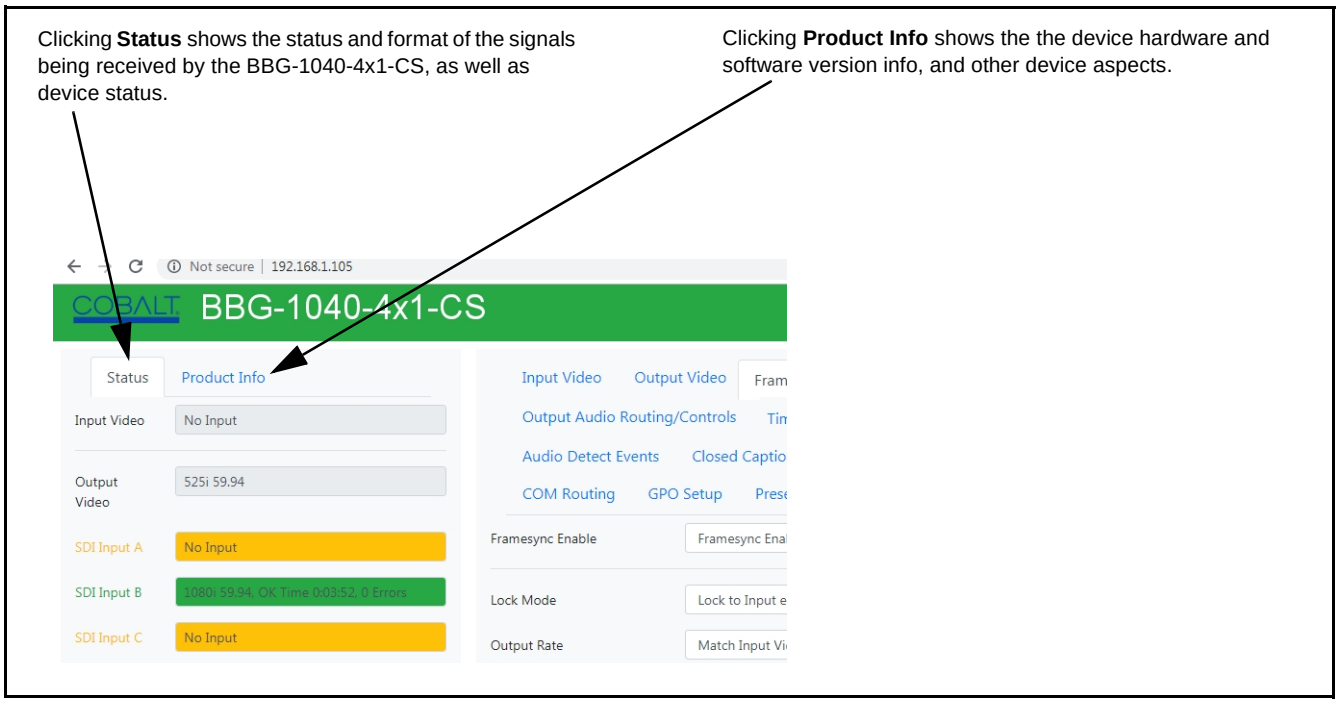


Figure 3-6 BBG-1040-4x1-CS Device Info/Status Utility

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:

1. The device does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.
2. 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.

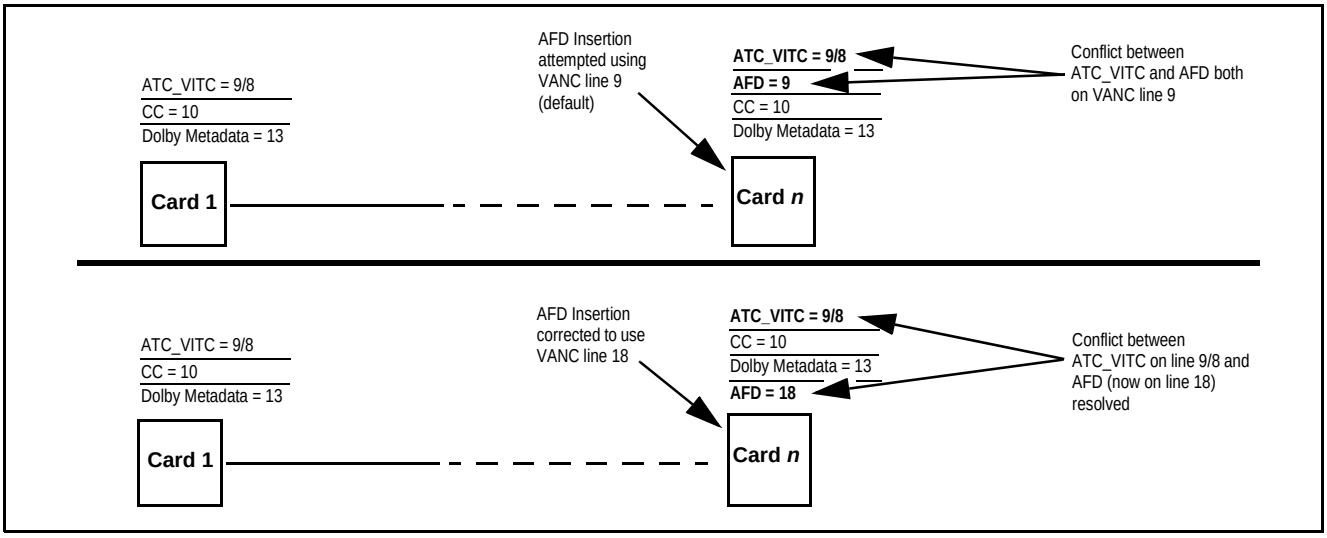


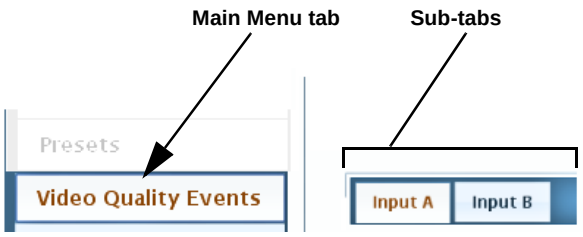
Figure 3-7 Example VANC Line Number Allocation Example

BBG-1040-4x1-CS Function Menu List and Descriptions

Table 3-2 individually lists and describes each BBG-1040-4x1-CS 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.)
- User interface depictions here may show DashBoard UI. Web UI is similar.

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



Some functions use **sub-tabs** to help maintain clarity and organization. In these instances, Table 3-2 shows the ordinate tab along with its sub-tabs. Highlighted sub-tabs indicate that controls described are found by selecting this sub-tab (in this example, the **Input A** sub-tab on the **Video Quality Events** main menu page).

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

Table 3-2 BBG-1040-4x1-CS Function Menu List

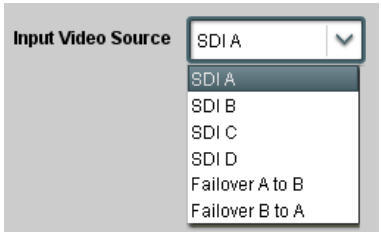
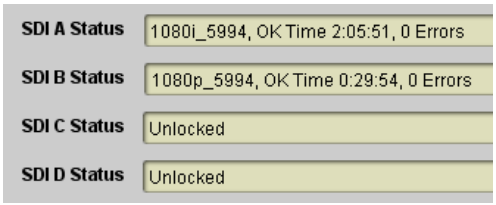
Input Video	Allows manual or failover selection of SDI program video inputs and displays status and raster format of received SDI video.
• Input Video Source 	Selects the input video source to be applied to the device's program video input. • **SDI A** and **SDI B** choices allow forced manual selection of correspondingly **SDI IN A** or **SDI IN B**. • **Failover A to B** sets main path preference of **SDI IN A.** - If **SDI IN A** goes invalid, then **SDI IN B** is selected. - If **SDI IN A** goes valid again, failover automatically reverts to **SDI IN A**. • **Failover B to A** sets main path preference of **SDI IN B.** - If **SDI IN B** goes invalid, then **SDI IN A** is selected. - If **SDI IN B** goes valid again, failover automatically reverts to **SDI IN B**. • **SDI C** and **SDI D** choices allow forced manual selection of correspondingly **SDI IN C** or **SDI IN D** without failover choices. **Note:** • Failover criteria via this control is simple signal presence. • Clean audio switching is assured only for intentional, controlled switches via user control. Clean audio switching cannot be assured for failover switches.
• Input Video Status	Displays input status of each video input, along with elapsed time of signal acquire.
	**SDI A** thru **SDI D Status** show raster/format for all device inputs. If signal is not present or is invalid, **Unlocked** is displayed. (These status indications are also propagated to the Card Info pane.) **Note:** Status display shows maximum input complement. Input complement is determined by rear I/O module used.

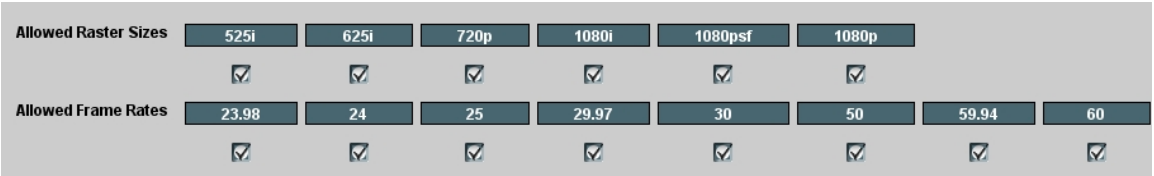
Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

Input Video	**(continued)**

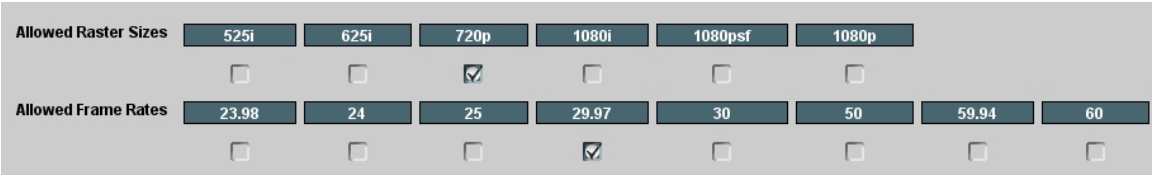
Input SDI Raster Size / Frame Rate Filtering

The controls shown below allow user filtering to exclude selected raster or rate formats from being received by a device input.

Default settings have all raster sizes and frame rates “checked”, thereby providing no filtering (exclusion.)



In the example below, only 720p and 29.97 are checked, filtering allowed input to only be 720p 29.97 (“720p half-rate”).



Note: Rates shown in selector are frame rates and not field rates.

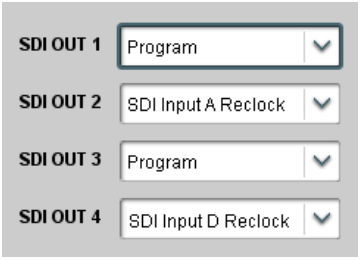
Output Video	Allows selection of each of the four video output coaxial connectors as processed SDI out or reclocked SDI out.
• **Output Video Crosspoint**  	For each SDI output port supported by the device, provides a crosspoint for routing program processed video or selected-input reclocked to an SDI output. In this example, **SDI OUT 1** and **SDI OUT 3** are receiving Program (procesed) video out, with **SDI OUT 2** and **SDI OUT 4** providing various reclocked input video. **Note:** Outputs set to Input Reclocked will pass input SDI regardless of Input SDI Raster Size / Frame Rate Filtering. Input filtering applies only to the device program video path.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

Input Audio Status	Displays signal status and payload for embedded and discrete audio received by the device.

Individual signal status and peak level displays for embedded audio input pairs as described below.

- **Absent:** Indicates embedded channel pair does not contain recognized audio PCM data.
- **Present - PCM:** Indicates embedded channel pair contains recognized audio PCM data.
- **Dolby E:** Indicates embedded channel pair contains Dolby® E encoded data.
- **Dolby Digital:** Indicates embedded channel pair contains Dolby® Digital encoded data.

Note: Dolby status displays occur only for valid Dolby® signals meeting SMPTE 337M standard.

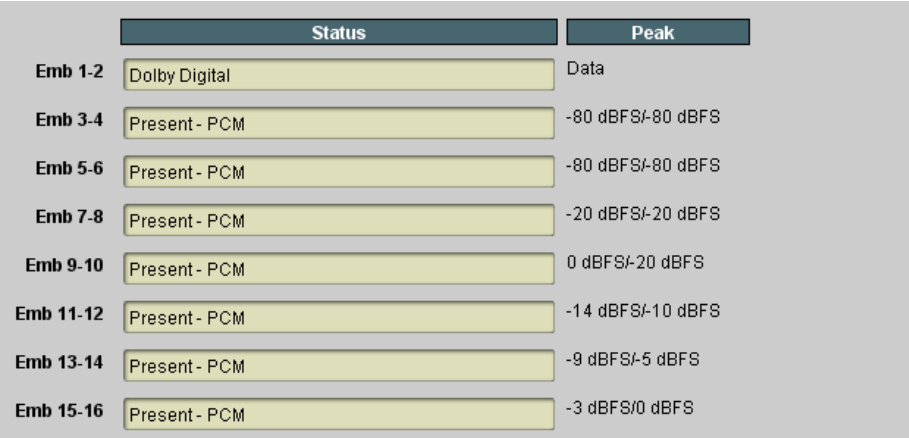
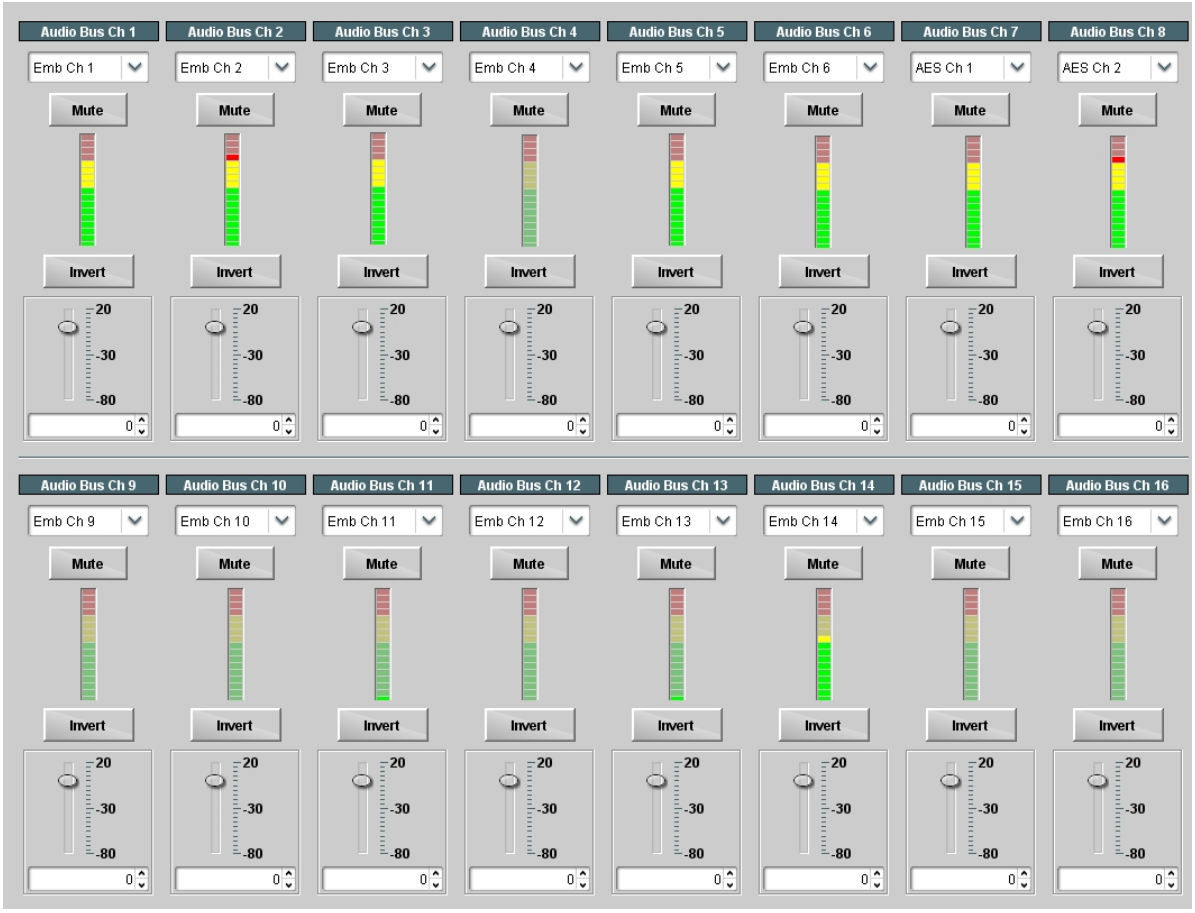


Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

Input Audio Routing/Controls Input Bus | Audio Delay | Dolby E Alignment	Provides audio routing, gain, per-channel/bulk audio delay controls, and audio meters. These controls route selected audio sources onto the device 16-channel internal bus (which is used for all audio processing).



All audio inputs are transferred through the device via the 16-channel Internal Bus (**Bus Ch 1** thru **Bus Ch 16**).

The example above shows various Source selections that route embedded channels onto the internal bus.

Each bus channel provides Gain, Mute, and Invert controls.

The source-to-destination correlation shown here is only an example; **any** of the sources described on the following pages can route to **any** of the internal bus channels.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

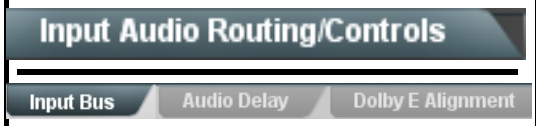
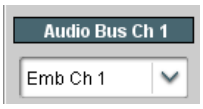
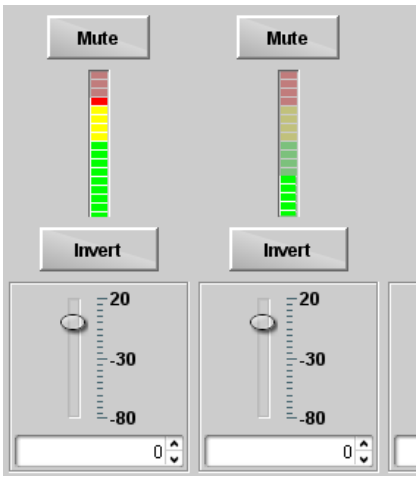
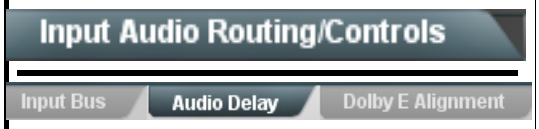
	**(continued)**
Note: • Default factory preset routing routes embedded Ch 1 thru Ch 16 to bus channels Audio Bus Ch 1 thru Ch 16. • **Bus Ch 2** thru **Bus Ch 16** have controls identical to the controls described here for **Bus Ch 1**. Therefore, only the **Bus Ch 1** controls are shown here.	
• **Bus Channel Source** 	Using the **Source** drop-down list, selects the embedded audio input source to be routed to the bus channel.
• **Channel Mute/Phase Invert/Gain Controls and Peak Level Display** 	Provides **Mute** and phase **Invert** channel controls, as well as peak level meter for each output channel. (Meter shows level as affected by Level control.) **Gain** controls allow relative gain (in dB) control for the corresponding destination Embedded Audio Group channel. (-80 to +20 dB range in 1.0 dB steps; unity = 0 dB) **Note:** Although the device 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.
	**Audio Delay** – Provides bulk (all four groups/master) and individual audio bus channel delay offset controls and delay parametric displays.
• **Bulk (Master) Audio/Video Delay Control** 	**Bulk Delay** 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). Large rapid changes in bulk delay (> 500 msec) can result in momentary full-scale noise burst on output processed audio. This burst can damage monitors or other equipment if not considered. Gain on output should be reduced if performing large adjustments to delay.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

(continued)

• **Per-Channel Audio/Video Delay Offset Controls**

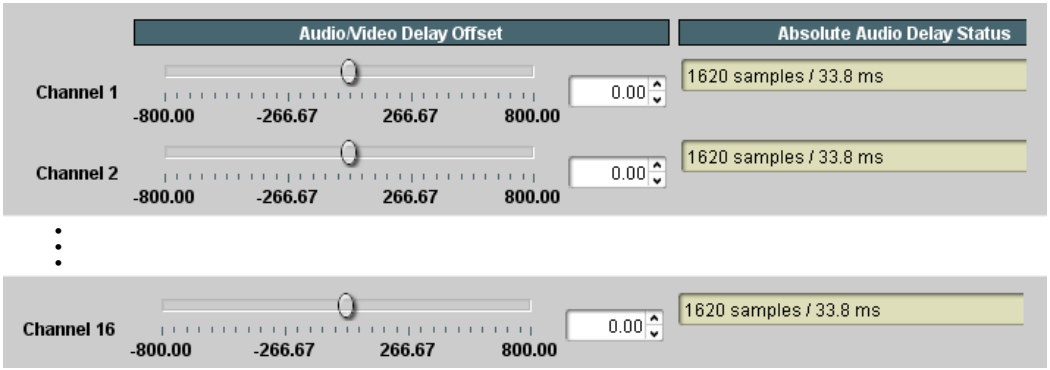
Offset control adds or reduces (offsets) channel audio delay from the matching video delay (audio delay offset setting adds or removes delay in addition to any delay included by other actions). This control is useful for correcting lip sync problems when video and audio paths in the chain experience differing overall delays.

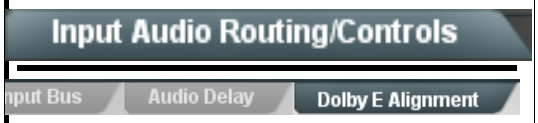
(-800.0 to +800.0 msec range in 0.02 msec steps; null = 0.0 msec)

Delay Status shows current delay from video for the corresponding audio channel.

Note: • Maximum advance/delay offset is dependent on video format.

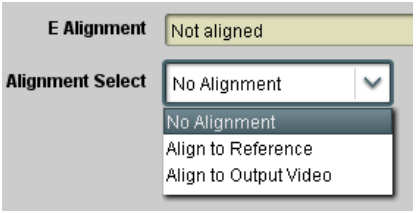
• Where a Dolby pair is present, adjustment of either channel control results in a matching delay setting for the other channel in the pair.





Dolby E Alignment – Provides selectable Dolby E alignment for embedded Dolby E to position the bitstream utilizing the Dolby E "guard band". This helps prevent frame errors that may occur in a bitstream upon switching or editing.

• **Dolby E Embedding Alignment Control**



For incoming Dolby E data routed to the device audio bus, aligns the embedded Dolby data corresponding to selection. Alignment line as a result of selection is shown in **Status** display.

Note: Where a frame reference is available, it is recommended to use the **Align to Reference** selection. This helps ensure that the correct alignment is achieved even if the video is user delayed or output format is changed.

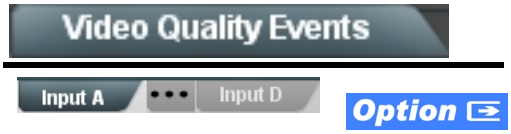
Refer to "Preferred Alignment for Dolby E in HD Systems" (http://www.dolby.com/about/news-events/newsletters-dtvaudio-dolby-e-alignment.html) for more information regarding Dolby E alignment.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

Clean and Quiet Switching allows SDI input selection to be changed from one source to another while ducking audio during controlled input video switching transitions to provide silence between input switches.

Note:
- Clean audio switching is assured only for intentional, controlled switches via user control. Clean audio switching cannot be assured for failover switches.
- Clean switching requires that both SDI signals (switch from and switch to) be stable and present, and of the same SDI format and rate.
- Clean audio switching function is designed for PCM audio. This function does not assure clean decoded audio when switching from/to Dolby or other non-PCM audio.

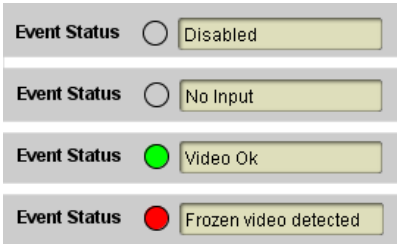
Switching Enabled check box enables Clean and Quiet Switching.
Duration sets the attack and decay ramp intervals (300 msec is recommended for typical use).



(Option **+QC** only) 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.

Note: **Input B** thru **Input D** have 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.

- **Event Status Indicator**



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.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

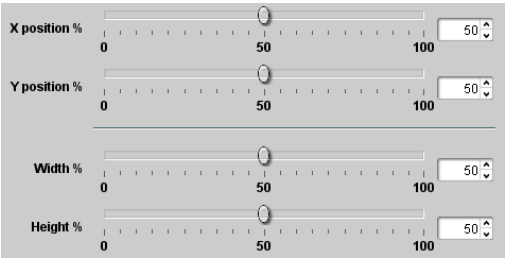
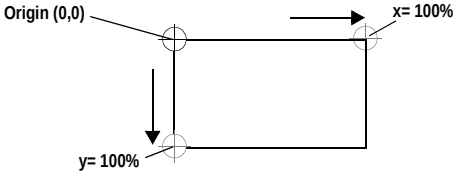
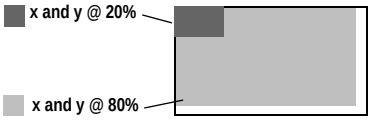
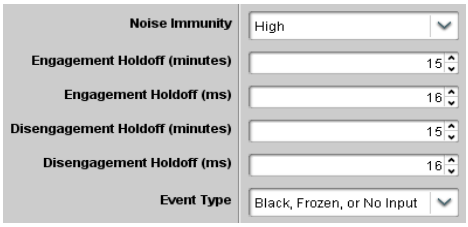
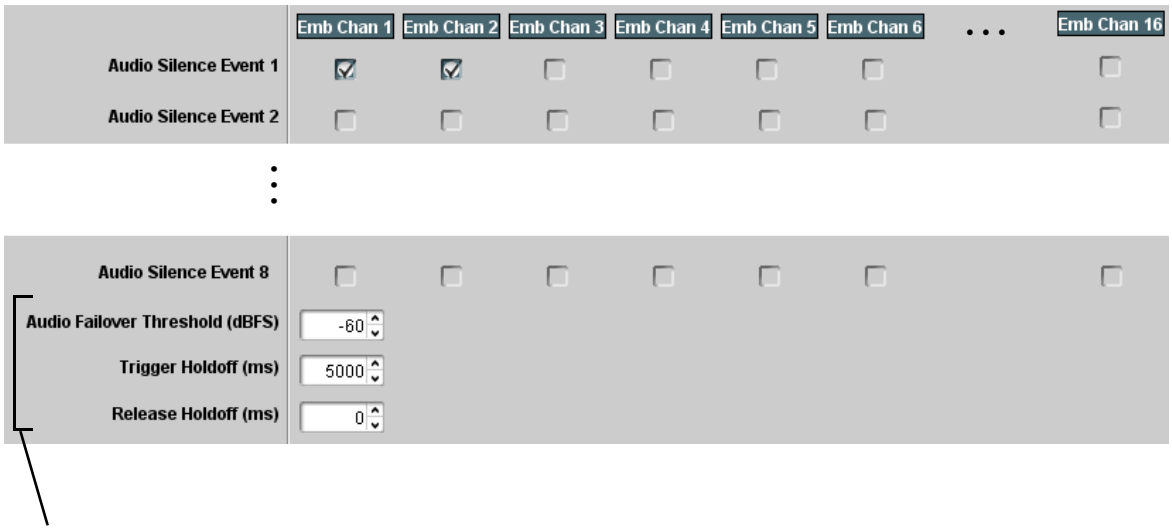
Video Quality Events	**(continued)**
• Position and Width Controls 	Position and Width controls set the area of concern to be screened by the Quality Event function. **X and Y Position** controls set the origin point for the area of concern  **X and Y Width** controls set the size for the area of concern 
• Threshold and Event Type Controls 	Sets the thresholds for black frame and event type to be considered. Also provides holdoff controls for event trigger engagement and disengagement. • **Noise Immunity** sets the relative noise levels that are rejected in the course of black event assessment (Low, Medium, or High). • **Engagement Holdoff** sets the time (in msec) where, when time is exceeded, an event is to be considered a valid alert event. • **Disengagement Holdoff** sets the time (in msec) where, when event time is has ceased, an alert event is cleared. • **Event Type** sets the type of event(s) to be considered by the event screening (Disabled, Frozen frame, Black frame, or either Black or Frozen frame).

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

Audio Silence Events **Option**	(Option **+QC** only) Sets audio level screening and thresholds for audio silence event alerts on embedded audio in. When a silence events occur, the event(s) can be used by the Presets function to invoke input routing or other changes.

Any combination of embedded input channels can be selected to be screened for silence. In the example here, **Audio Silence Event 1** is set to trigger if audio on **both** Emb Ch 1 and Ch 2 fall below the selected threshold for an interval exceeding the selected threshold.

Up to eight independent audio silence events can be set to be screened (with descending priority of consideration from Event 1 down to Event 8). This status here can be propagated to the **Presets > Event Triggers** sub-tab controls to issue a GPO, preset engage, or other command when audio silence events are detected.



- **Audio Failover Threshold** sets the level at which channel content is considered to be silent, and correspondingly also a transition back to an untriggered condition with resumption of audio for the selected embedded channels. If the selected channels maintain levels above the selected **Audio Failover Threshold**, no triggering is invoked.
- **Trigger Holdoff** sets the period of time in which selected channel silence must occur before an Audio Silence Event trigger goes true.
- **Release Holdoff** control sets the time in which the trigger is revoked upon an event false condition.

Note: • Default threshold and holdoff settings shown here are recommended for typical use.
• Checkboxes work as an AND function. Where multiple boxes are checked, a true (trigger) condition is not propagated unless **all** selected channels experience the configured silence criteria. (In the example shown above, **both** Emb Ch 1 and Emb Ch 2 would have to experience silence before a Silence Event was propagated.)

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

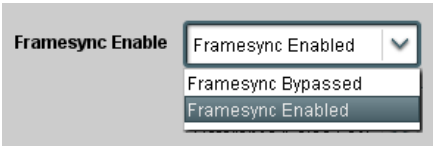
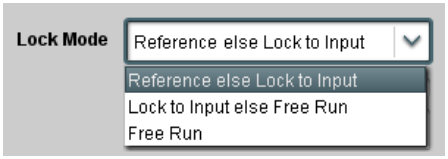
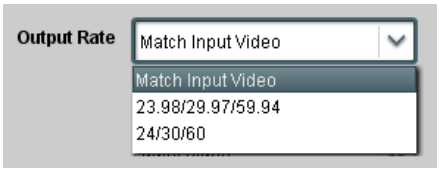
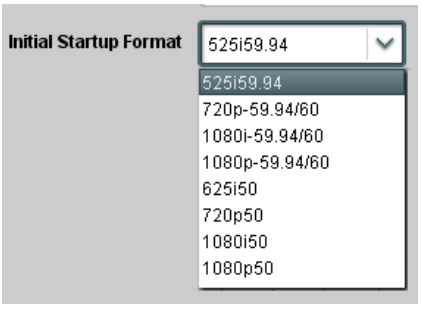
Framesync	Provides video frame sync/delay offset control and output control/loss of program video failover selection controls.
• Framesync Enable/Disable Control 	Provides master enable/disable of all device framesync functions/ controls.
• Lock Mode Select 	Selects Frame Sync functions from the choices shown to the left and described below. • **Lock to Reference:** Output video is locked to external reference received on the device **REF LOOP** input. **Note:** If valid reference is not received, the Card state: Reference Invalid indication appears in the Card Info status portion of DashBoard™, indicating invalid frame sync reference error. • **Lock to Input:** Uses the program video input video signal as the reference standard. **Note:** If **Lock to Input** is used for framesync, any timing instability on the input video will result in corresponding instability on the output video. • **Free Run:** Output video is locked to the device's internal clock. Output video is **not** locked to external reference.
• Output Rate Select 	Allows frame rate to be outputted same as input video, or converted to from the choices shown to the left and described below. • **Auto** – output video frame rate tracks with input video. • **23.98/29.97/59.94** – 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. • **24/30/60** – 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.
• Initial Startup Format Select 	Selects a frame sync format/rate to be invoked (from the choices shown to the left) in the time preceding stable lock to external reference. Set this control to that of the intended external reference to help ensure smoothest frame sync locking. This control also sets the device test pattern format where the device's initial output at power-up is the internal pattern instead of program video.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

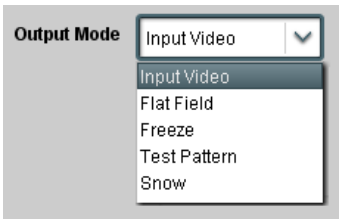
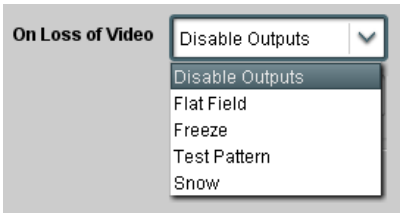
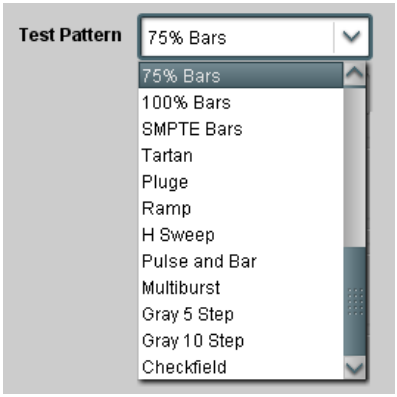
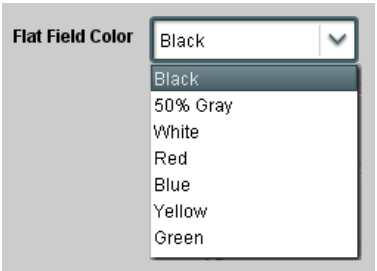
Framesync	**(continued)**
• **Program Video Output Mode Select** 	Provides a convenient location to select between device program video output and other technical outputs from the choices shown to the left and described below. • **Input Video** – device outputs input program video (or loss of signal choices described below). • **Flat Field** – device outputs flat field. • **Freeze** – device outputs last frame having valid SAV and EAV codes. • **Test Pattern** – device outputs standard technical test pattern (pattern is selected using the Pattern drop-down described below). • **Snow** – device outputs snow multi-color pattern.
• **Loss of Input Signal Selection** 	In the event of program input video Loss of Signal (LOS), determines action to be taken as follows: • **Disable Outputs:** Disable program video SDI outputs. • **Flat Field** – go to flat field on program video output. • **Freeze** – go to last frame having valid SAV and EAV codes on program video output. • **Test Pattern** – go to standard technical test pattern on program video output (pattern is selected using the Pattern drop-down described below). • **Snow** – output snow multi-color pattern.
• **Test Pattern Select** 	Provides a choice of standard technical patterns when **Test Pattern** is invoked (either by LOS failover or directly by selecting Test Pattern on the Program Video Output Mode Select control).
• **Flat Field Color Select** 	Provides a choice of flat field colors when **Flat Field** is invoked (either by LOS failover or directly by selecting Flat Field on the Program Video Output Mode Select control).

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

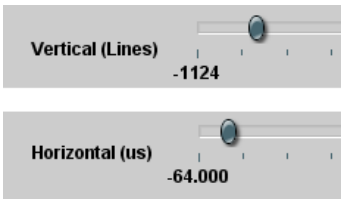
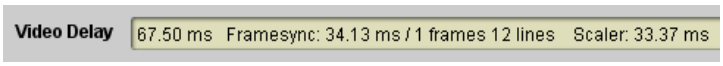
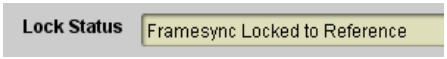
Framesync	**(continued)**
• **Output Video Reference Offset Controls** 	With framesync enabled, provides the following controls for offsetting the output video from the reference: • **Vertical (Lines)** – sets vertical delay (in number of lines of **output video**) between the output video and the frame sync reference. (Positive values provide delay; negative values provide advance) (Range is -1124 thru 1124 lines; null = 0 lines.) • **Horizontal (µs)** – sets horizontal delay (in µs of **output video**) between the output video and the frame sync reference. (Positive values provide delay; negative values provide advance) (Range is -64 thru 64 µsec; null = 0.000 µsec.) **Note:** Offset **advance** is accomplished by hold-off of the reference-directed release of the frame, thereby effectively advancing the program video relative to the reference.
• **Frame Delay Control** 	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. **The operational latency of the frame sync is always between the specified minimum latency and minimum latency plus one frame (not one field).** **Note:** Due to memory limits, the maximum available Minimum Latency Frames is related to the output video format selected. When using this control, be sure to check the **Report Delay** display to make certain desired amount of frames are delayed.
• **Video Delay Display** 	Displays the current input-to-output video delay (in msec units) as well as in terms of Frames/fractional frame (in number of lines). Status display shows total input-to-output video delay, along with itemized framesync and scaler delays.
• **Framesync Lock Status Display** 	Displays the current framesync status and reference source.
Note: Audio timing offset from video is performed using the delay controls on the Input Audio Routing/Controls tab. Refer to Input Audio Routing/Controls (p. 3-14) for these controls.	

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

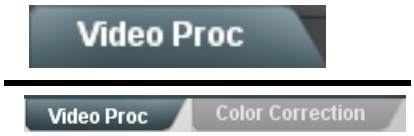
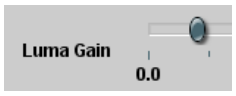
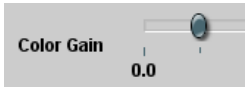
	Provides the following Video Proc and Color Correction parametric controls.
• **Video Proc** 	**Video Proc (Enable/Disable)** provides master on/off control of all Video Proc functions. • When set to **Disable**, Video Proc is bypassed. • When set to **Enable**, currently displayed parameter settings take effect.
• **Reset to Unity** 	**Reset to Unity** provides unity reset control of all Video Proc functions. When Confirm is clicked, a **Confirm?** pop-up appears, requesting confirmation. • Click **Yes** to proceed with the unity reset. • Click **No** to reject unity reset.
• **Luma Gain** 	Adjusts gain percentage applied to Luma (Y channel). (0% to 200% range in 0.1% steps; unity = 100%)
• **Luma Lift** 	Adjusts lift applied to Luma (Y-channel). (-100% to 100% range in 0.1% steps; null = 0.0%)
• **Color Gain** 	Adjusts gain percentage (saturation) applied to Chroma (C-channel). (0% to 200% range in 0.1% steps; unity = 100%)
• **Color Phase** 	Adjusts phase angle applied to Chroma. (-360° to 360° range in 0.1° steps; null = 0°)
• **Gang Luma/Color Gain** 	When set to **On**, changing either the **Luma Gain** or **Color Gain** controls increases or decreases both the Luma and Color gain levels by equal amounts.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

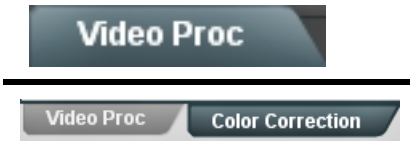
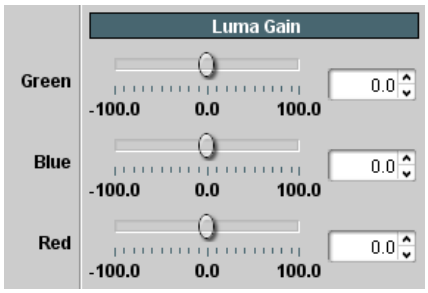
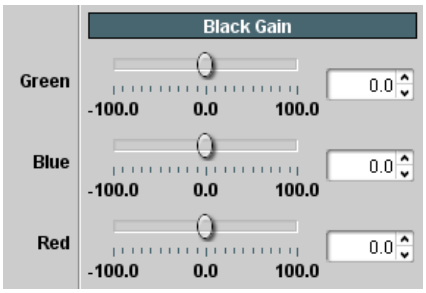
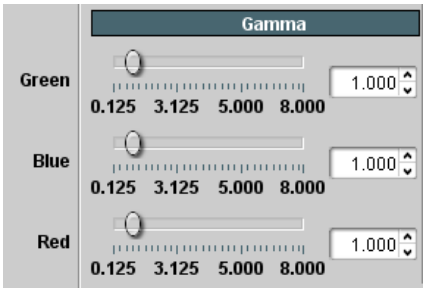
	**Option** Provides color corrector functions for the individual RGB channels for the program video path (option **+COLOR**).
• **Color Corrector** 	**Color Corrector (On/Off)** provides master on/off control of all Color Corrector functions. • When set to **Off**, all processing is bypassed. • When set to **On**, currently displayed parameters settings take effect.
• **Reset to Unity** 	**Reset to Unity** provides unity reset control of all Color Corrector functions. When Confirm is clicked, a **Confirm?** pop-up appears, requesting confirmation. • Click **Yes** to proceed with the unity reset. • Click **No** to reject unity reset.
• **Luma Gain R-G-B controls**  • **Black Gain R-G-B controls**  • **Gamma Factor R-G-B controls** 	Separate red, green, and blue channels controls for Luma Gain, Black Gain, and Gamma curve adjustment. Gain controls provide gain adjustment from 0.0 to 200.0% range in 0.1% steps (unity = 100.0) Gamma controls apply gamma curve adjustment in 0.125 to 8.000 range in thousandths steps (unity = 1.000) Each of the three control groups (Luma, Black, and Gamma have a **Gang Column** button which allows settings to be proportionally changed across a control group by changing any of the group's controls.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

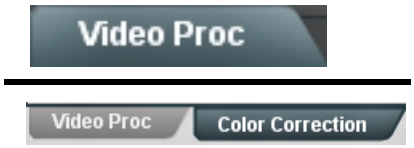
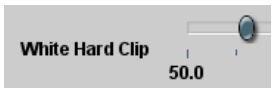
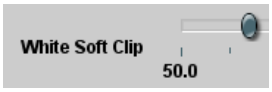
	**(continued)**
• **Black Hard Clip** 	Applies black hard clip (limiting) at specified percentage. (-6.8% to 50.0%; null = -6.8%)
• **White Hard Clip** 	Applies white hard clip (limiting) at specified percentage. (50.0% to 109.1%; null = 109.1%)
• **White Soft Clip** 	Applies white soft clip (limiting) at specified percentage. (50.0% to 109.1%; null = 109.1%)
• **Chroma Saturation Clip** 	Applies chroma saturation clip (limiting) chroma saturation at specified percentage. (50.0% to 160.0%; null = 160.0%)

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

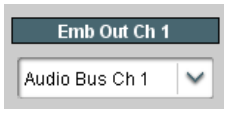
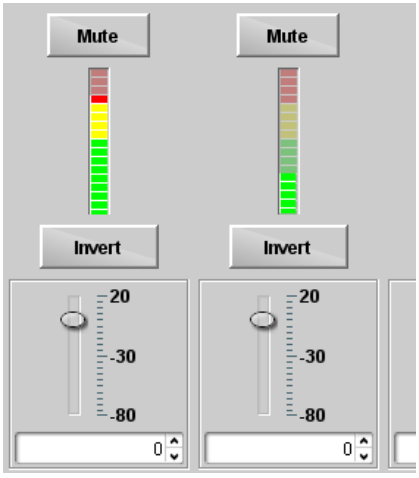
	Provides an audio crosspoint allowing the audio source selection for each embedded audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.
Note: • **Embedded Ch 2** thru **Embedded Ch 16** have controls identical to the **Source**, **Gain**, **Mute**, and **Invert** controls described here for **Embedded Ch 1**. Therefore, only the **Embedded Ch 1** controls are shown here. • For each channel, its source and destination should be considered and appropriately set. Unused destination channels should be set to the **Silence** selection.	
• **Group Enable/Disable Controls** 	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. **Note:** 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.
• **Embedded Output Channel Source** 	Using the drop-down list, selects the audio input source to be embedded in the corresponding embedded output channel from the following choices: • Card **Audio Bus Ch 1** thru **Ch 16** • Built-in Tone generators **Tone *n*** (-20 dBFS level tone generators with *n* being frequencies of 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k) • **Flex Bus A** thru **P** mixer sum node outputs • ***Option*** Audio **LTC** • **Downmixer L** • **Downmixer R**
• **Channel Mute/Phase Invert/Gain Controls and Peak Level Display** 	Provides **Mute** and phase **Invert** channel controls, as well as peak level meter for each output channel. (Meter shows level as affected by Level control.) **Gain** controls allow relative gain (in dB) control for the corresponding destination Embedded Audio Group channel. (-80 to +20 dB range in 1.0 dB steps; unity = 0 dB) **Note:** Although the BBG-1040-4x1-CS 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.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

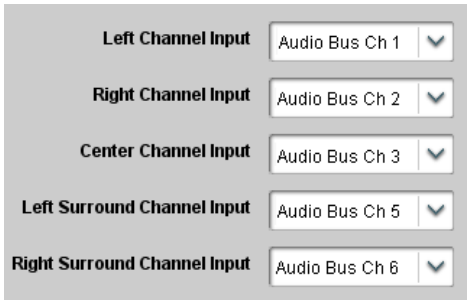
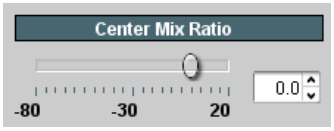
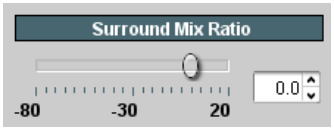
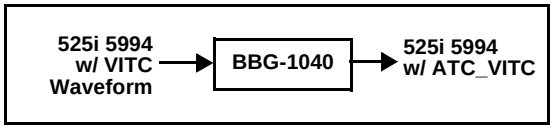
	Provides audio down-mix audio routing selections that multiplexes any five audio channel sources into a stereo pair.
• **Downmixer Source Controls** 	**Left Channel Input** thru **Right Surround Channel Input** select the five audio bus source channels to be used for the downmix. Downmix channels **Downmixer L** and **Downmixer R** are available as sources for embedded outputs using the Channel Source controls described above.
• **Center Mix Ratio Control** 	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. • 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. • 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. (20 dB to -80 dB range in 0 dB steps; default = 0 dB) **Note:** Default setting is recommended to maintain center-channel predominance in downmix representative to that of the original source 5-channel mix.
• **Surround Mix Ratio Control** 	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. • 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. • 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. (20 dB to -80 dB range in 0 dB steps; default = 0 dB) **Note:** Default setting is recommended to maintain surround-channel predominance in downmix representative to that of the original source 5-channel mix.

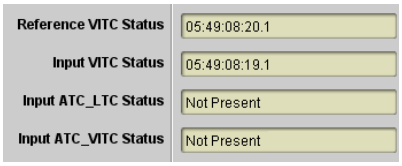
Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

Timecode

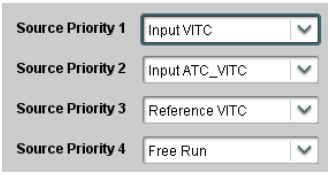
Provides timecode data extraction from various sources, and provides formatting and re-insertion controls for inserting the timecode into the output video.

Shown below is an example in which received 525i 5994 SDI video with VITC waveform timecode is being processed to output ATC_VITC timecode. To re-format and insert the timecode data, the following can be performed using the Timecode function. Each Timecode control is fully described on the pages that follow.



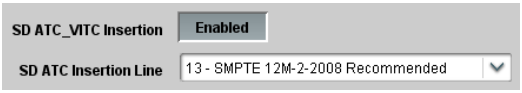


(A) Noting that the incoming video contains VITC waveform timecode data (as shown in the status display), set the Source Priority drop-down lists to include VITC Waveform timecode data (**SDI VITC**) as a choice. This extracts VITC Waveform timecode data from the incoming video.



(B) In this example, it is desired to provide SDI ATC_VITC timecode data in the processed output video. As such, set **SD ATC VITC Insertion** to **Enabled**.

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



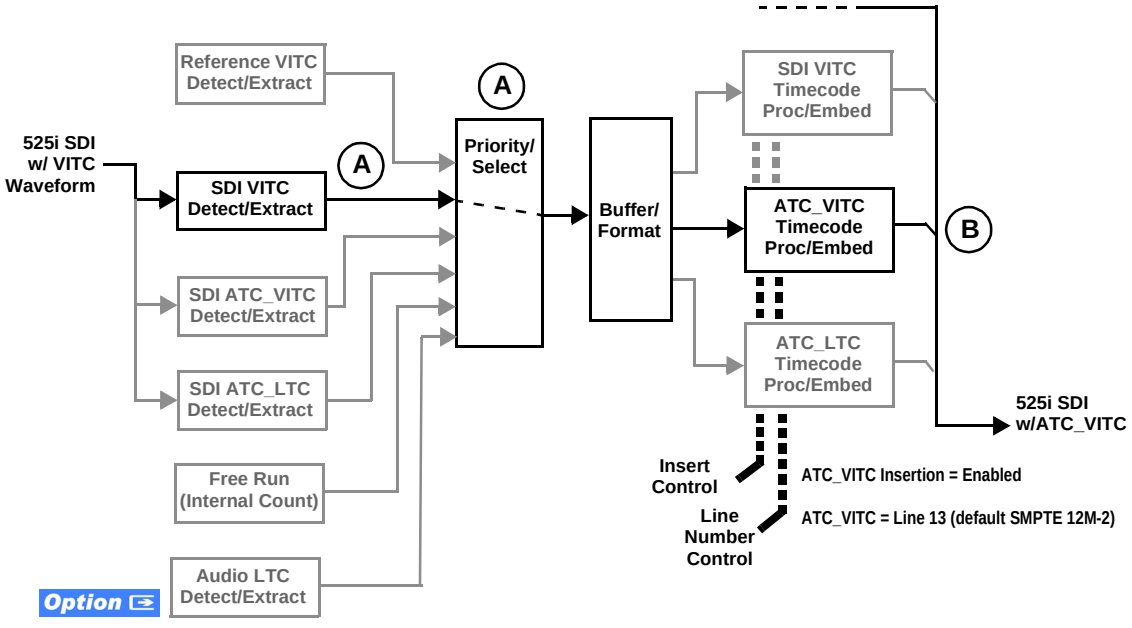


Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

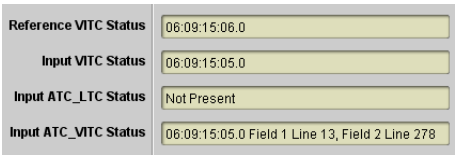
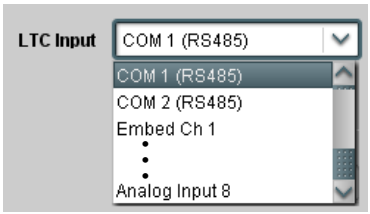
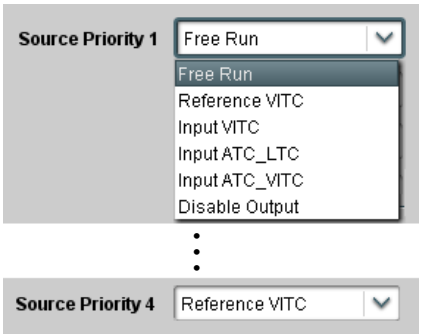
Timecode	**(continued)**
Option **Audio LTC** controls described below only appear on devices with **+LTC** licensed optional feature. This feature allows audio LTC from an audio channel to be used as a timecode source, with conversion to a selected SMPTE 12M format on the output video.	
• **Timecode Source Status Displays** 	Displays the current status and contents of the four supported external timecode formats shown to the left. • If a format is receiving timecode data, the current content (timecode running count and line number) is displayed. • If a format is not receiving timecode data, Not Present is displayed.
• **LTC Input Control** 	Selects source to be used by device to **receive** LTC as listed below. • RS-485 over COM1 or COM 2 • Audio LTC over Emb Ch 1 thru Ch 16 • Audio LTC over AES Ch 1 thru Ch 16 • Audio LTC over Analog audio Ch 1 thru Ch 4 **Note:** • **Audio LTC Source** must be appropriately set for device to receive and process received LTC. • Card audio inputs will not center inputs with DC offset. If input has DC offset, the source may need to be capacitively coupled to remove the offset.
• **Mute LTC Control** 	Allows LTC audio or RS-485 output to mute upon loss of selected timecode inputs. • When set to **Enabled** and input timecode is lost: • RS-485 LTC output goes to frozen state. • Audio LTC output mutes. • When set to **Disabled** and input timecode is lost: • RS-485 LTC output keeps counting, with count value being free-run count. • Audio LTC output is not muted, with count value being free-run count. **Note:** If muting upon loss of a particular input format is desired, set all **Source Priority 1** thru **4** 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.
• **Incoming ATC Packet Removal Control** 	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.) **Note:** Set this control to **Enabled** if Free-Run timecode is to be used. If incoming packets are not removed, output embedded SMPTE timecode may alternate between free-run and embedded SMPTE timecode values.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

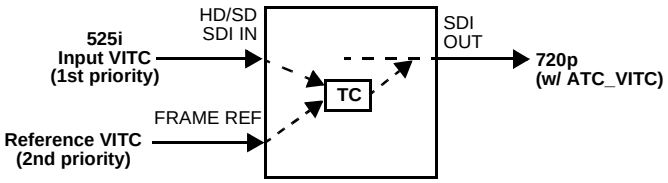
Timecode **(continued)**

• **Source Priority**



Selects the priority assigned to each of the four supported external formats, and internal Free Run in the event the preferred source is unavailable.

Source Priority 1 thru **Source Priority 4** 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.)



In this example, **Input VITC** 1st priority selection selects SDI VITC (received on SDI input) over reference VITC (received on frame reference) regardless of video input material source to be processed by the device.

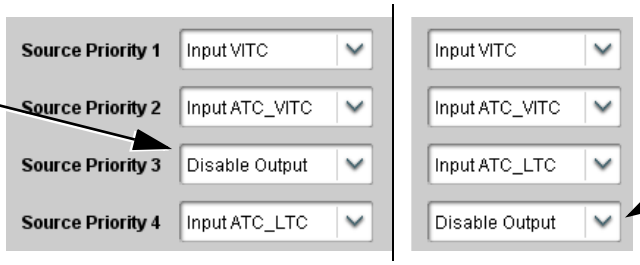
The selected timecode source is embedded on the SDI video output (in this example, 720p) using the selected line number. In this example, if the SDI VITC on the SDI input becomes unavailable, the device then uses the reference VITC data received on the frame reference.

Note: Set Incoming ATC Packet Removal Control to **Enabled** if Free-Run timecode is to be used. If incoming packets are not removed, output embedded SMPTE timecode may alternate between free-run and embedded SMPTE timecode values.

Disable Output setting should be used with care. If Disable Output is selected with alternate intended format(s) set as a lower priority, the device will indeed disable **all** timecode output should the ordinate preferred format(s) become unavailable.

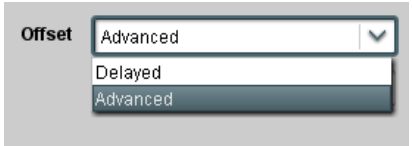
Typically, choices other than Disable should be used if a timecode output is always desired, with Disable only being used to remove all timecode data.

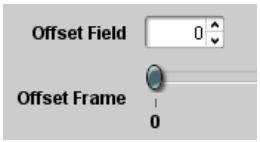
In this example, even though and ATC_LTC could be available to substitute for ATC_VITC not being present, the device will revert to no timecode output since the choice of Disable Output "out-prioritizes" ATC_LTC with these settings.



The choices shown here will allow ATC_LTC to "out-prioritize" Disable Output if ATC_VITC is not available.

• **Offset Controls**





Allows the current timecode count to be advanced or delayed on the output video.

- **Offset Advance** or **Delay** selects offset advance or delay.
- **Offset Field** delays or advances or delays timecode by one field.
- **Offset Frame** delays or advances or delays timecode by up to 5 frames.

Note: Default settings are null, with both controls set at zero as shown.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

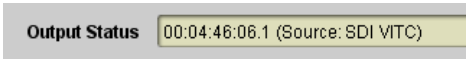
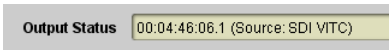
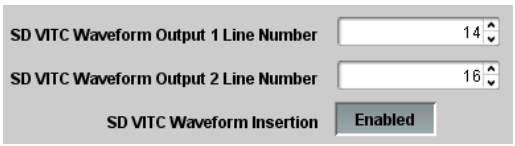
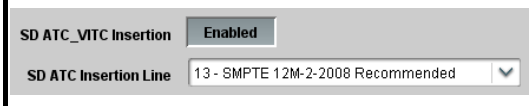
Timecode	(continued)
• **Output Status Display** 	Displays the current content and source being used for the timecode data as follows:  • Output status OK (in this example, SDI VITC timecode received and outputted).  • **Timecode Insertion** button set to **Disabled**; output insertion disabled. **Note:** • If timecode is not available from Source Priority selections performed, timecode on output reverts to Free Run (internal count) mode. • 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: 0.0 Frame 0 0.1 Frame 1 1.0 Frame 2 1.1 Frame 3 • • • 29.1 Frame 59
• **Audio LTC Output** Option	Audio LTC output is routed to desired embedded, AES, or analog audio outputs using the Output Audio Routing/Controls (p. 3-28). Whatever timecode is displayed on the Output Status is converted to audio LTC and available as an LTC audio output.
Note: • 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. • The device does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data.	
• **SD VITC Waveform Insertion Controls** 	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. **Note:** • If only one output line is to be used, set both controls for the same line number. • **SD VITC Waveform Insertion** 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.
• **SD ATC Insertion Control** 	For SD output, enables or disables SD ATC_VITC timecode insertion into the output video, and selects the line number for ATC_VITC.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

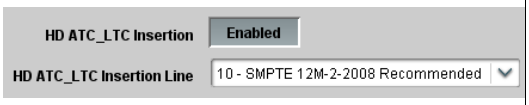
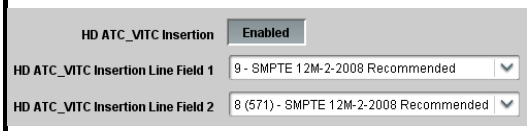
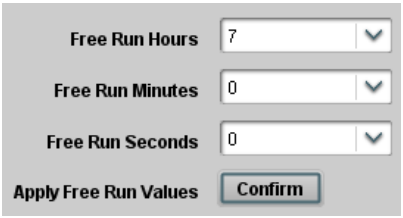
Timecode	(continued)
• **HD ATC_LTC Insertion Control** 	For HD output, enables or disables ATC_LTC timecode insertion into the output video, and selects the line number for ATC_LTC timecode data.
• **HD ATC_VITC Insertion Control** 	For HD output, enables or disables ATC_VITC timecode insertion into the output video, and selects the line number for ATC_VITC1 and ATC_VITC2.
• **ATC_VITC Legacy Support Control** 	When enabled, accommodates equipment requiring ATC_VITC packet in both fields as a “field 1” packet (non-toggling). **Note:** 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.
• **Free Run Timecode Controls** 	Allows an initial (starting) count to be applied to output video timecode when Free Run insertion is enabled. **Note:** • Initialization can only be applied when device is outputting Free Run timecode (as shown by Output Status displaying “Free Run”). • 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.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

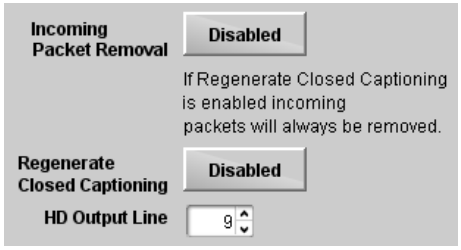
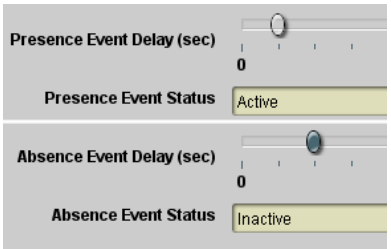
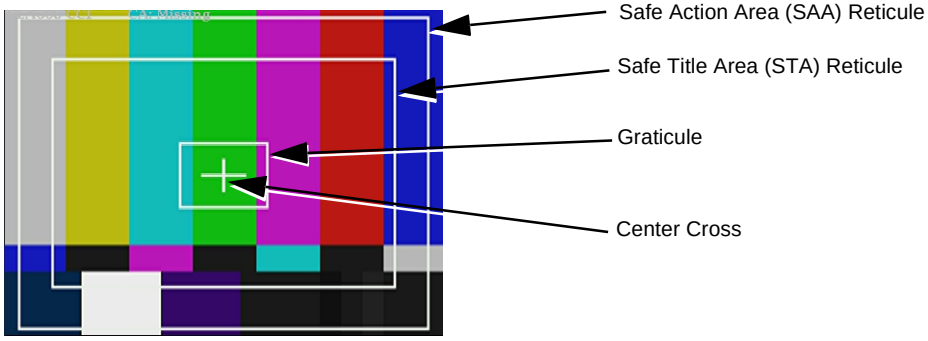
<table>
<tr><td> 
</td><td>Provides support for closed captioning setup. Also provides controls for setting closed captioning absence and presence detection thresholds.</td></tr>
<tr><td>• Closed Captioning Input Status
 
</td><td>Displays incoming Closed Captioning status as follows:
• If closed captioning is present, a message similar to the example shown is displayed.
• If no closed captioning is present in the video signal, Not Present or Disabled is displayed.
Note: • Packet closed captioning status Captioning Rejected Due To message can appear due to the items described below. The closed captioning function assesses cdp_identifier, cdp_frame_rate, ccdata_present, and caption_service_active items contained in the packet header to make the determinations listed below. Refer to CEA-708-B for more information.
<table>
<tr><th>Message</th><th>Description</th></tr>
<tr><td>Unsupported Frame Rate</td><td>Film rate closed-captioning (either as pass-through or up/down conversion) is not supported by the device.</td></tr>
<tr><td>Data Not Present</td><td>Packet is marked from closed captioning source external to the device that no data is present.</td></tr>
<tr><td>No Data ID</td><td>Packet from closed captioning source external to the device is not properly identified with 0x9669 as the first word of the header (unidentified packet).</td></tr>
</table>
• caption service is marked as inactive display indicates bit in packet from upstream source may inadvertently be set as inactive. In this case, closed captioning data (if present) is still processed and passed by the device as normal.
• The closed captioning function does not support PAL closed captioning standards.</td></tr>
<tr><td>• Closed Captioning Remove/Regenerate and HD Insertion Line Controls
 
</td><td>Allows removal of closed captioning packets and regeneration of packets. This is useful where closed captioning must be moved to a different line than that received on.
Note: • Although the output line drop-down will allow any choice within the 9 thru 41 range, 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.
• The device does not check for conflicts on a given line number. Make certain selected line is available and carrying no other data.</td></tr>
<tr><td>• Presence/Absence Check Controls
 
</td><td>Displays CC presence and/or absence event status. This status can be propagated to the Presets > Event Triggers tab controls to issue a device GPO or other command when CC presence/absence events are detected.
Controls for both presence and absence provide for a holdoff time (in seconds) where, when time is exceeded, an event is to be considered a valid alert event.</td></tr>
</table>

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

Allows Safe Action and/or Safe Title overlays and other static markers to be added to the output video image.

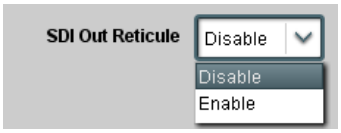
Typical Reticule/Overlay Marker Insertions

The BBG-1040-4x1-CS allows any combination of the reticule/overlay markers to be applied to the output video. Sizing and other characteristics for each type of marker can be set as described below.



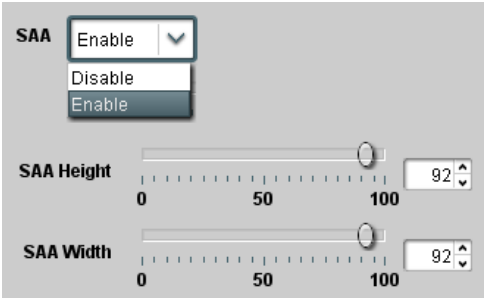
Note:
- Overlay markers using this function are for setup only. When enabled, these markers are embedded in the output video and will appear in the image. Use this function **only** on preview video and not on-air video. Make certain any overlay tools are turned **off** when no longer needed.
- Multiple overlay markers described below can be simultaneously enabled as desired.

• Insertion Master Enable/Disable



Provides independent master enable/disable for processed SDI output.
- When enabled, any combination of reticules or other markers described below can be inserted.
- When disabled, insertion of all reticules or other markers is disabled.

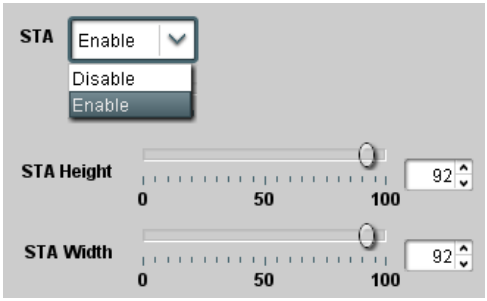
• Safe Action Area (SAA) Controls



- **SAA** provides enable/disable of safe action area graticule insertion.
- **SAA Height** and **SAA Width** control height and width of insertion (from 0% to 100% of 4:3 outputted image area).

Note: Reticule Size control is locked to Custom for this device, with safe action area size control as described above.

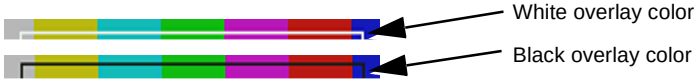
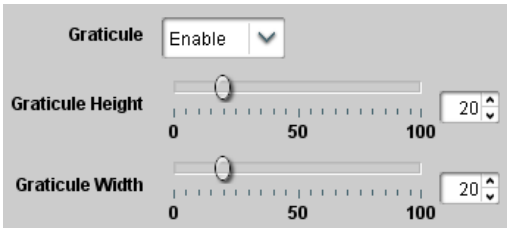
Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

<table>
<tr><td> 
</td><td>(continued)</td></tr>
<tr><td>• Safe Title Area (STA) Controls
 
</td><td>• STA provides enable/disable of safe title area graticule insertion.

• STA Height and STA Width control height and width of insertion (from 0% to 100% of 4:3 outputted image area).</td></tr>
<tr><td>• Overlay Color Controls
 
</td><td>• Overlay Color selects from white, various gray fills, or black colors.

• Inverse Color selects inversion (negative) of current selection.

• Opacity sets the opacity of the overlay for both white/black and inverse color modes.

• Thickness sets the line thickness (in pixels).</td></tr>
<tr><td colspan="2"> 
</td></tr>
<tr><td> 
</td><td>Provides insertion and sizing controls for custom graticules and other markers. Also provides NTSC legacy 4:3 master reticule sizing.</td></tr>
<tr><td colspan="2">Note: Color attributes of markers described below are set using the master Overlay Color Controls described above.</td></tr>
<tr><td>• Graticule Controls
 
</td><td>• Graticule provides enable/disable of user graticule insertion.

• Graticule Height and Width control height and width of insertion (from 0% to 100% of 4:3 outputted image area).</td></tr>
</table>

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

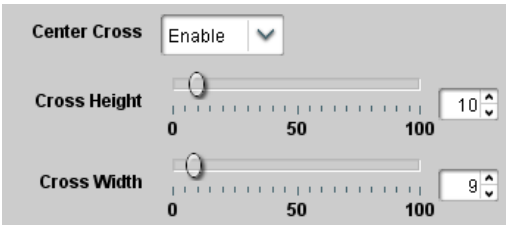
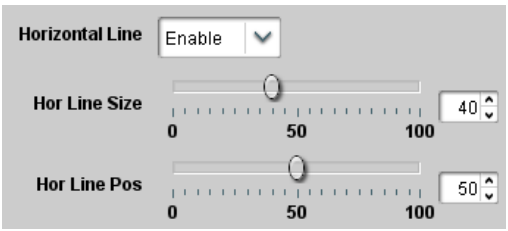
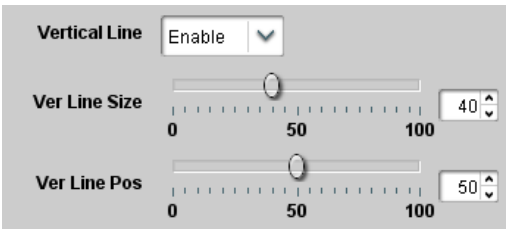
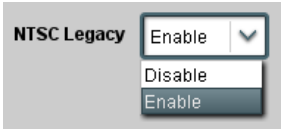
	**(continued)**
• **Center Cross Controls** 	• **Center Cross** provides enable/disable of center cross insertion. • **Cross Height** and **Width** control height of vertical line and width of horizontal line (from 0% to 100% of 4:3 outputted image area).
• **Horizontal Line Controls** 	• **Horizontal Line** provides enable/disable of horizontal line insertion. • **Horizontal Line Size** controls the width of the horizontal line (from 0% to 100% of 4:3 outputted image area). • **Horizontal Line Pos** controls the vertical positioning of the horizontal line (from 0% to 100% of 4:3 outputted image area).
• **Vertical Line Controls** 	• **Vertical Line** provides enable/disable of vertical line insertion. • **Vertical Line Size** controls the height of the vertical line (from 0% to 100% of 4:3 outputted image area). • **Vertical Line Pos** controls the horizontal positioning of the line (from 0% to 100% of 4:3 outputted image area).
• **NTSC Legacy Reticule Fixed Control** 	When set to enable, provides fixed-size safe action area 4:3 reticule suited for CRT-based displays.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

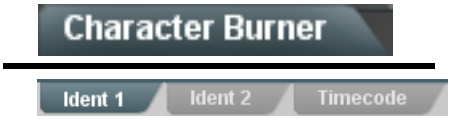
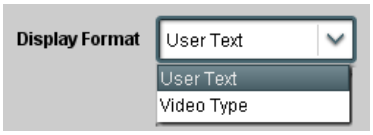
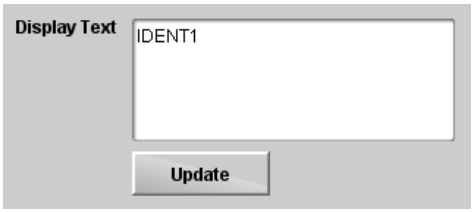
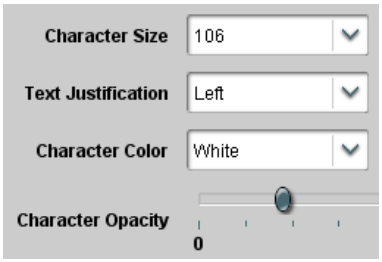
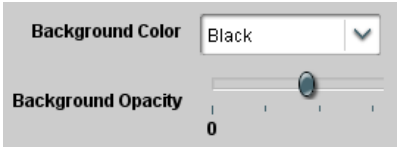
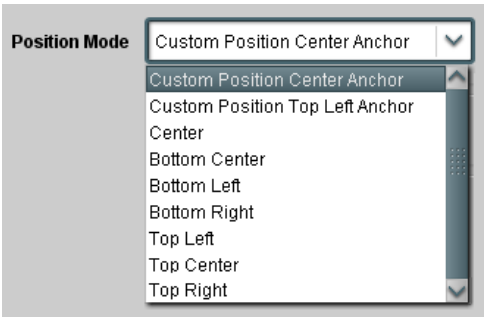
	Provides user-configurable burn-in of up to two text strings and timecode on output video.
Note: Ident 1 and **Ident 2** sub-tabs provide identical, independent controls for inserting two independent text (identification) burn-in overlays on the output video. **Ident 2** has controls identical to the controls described here for Ident 1. Therefore, only the Ident 1 controls are shown here.	
• **Ident Insertion Controls** 	Selects the rules for identification text burn-in overlay insertion into output video. **Note:** If ident text insertion is desired for input LOS conditions, the Framesync **On Loss of Video** control **must** be set to provide a raster (from one of the choices shown) to support the text insertion. If this control is set to "Disable Outputs", no raster or text insertion will be present on the output video under input LOS conditions. See Framesync (p. 3-20) for more information.
• **Display Type (Format) Select** 	Selects the type of data to be displayed as burn-in text from choices shown. • **User text** allows user text to be entered using field described below. • **Video type** inserts an overlay showing the video format of the input being used for processing.
• **Display (Ident) Text Entry Field** 	Dialog entry box that allows entry of desired ident text string. Enter desired text as click Update when done to input the text string. **Note:** • All normal keyboard alphanumeric characters are supported, in addition to ASCII characters (Windows ALT+*nnnn*). • Up to 126 characters can be entered.
• **Ident Text Attributes Controls** 	Sets burn-in size/position attributes as follows: • **Character Size** sets character size (in pixels). • **Text Justification** selects from left, right, or center-aligned justification within the text box overlay. • **Character Color** selects text color. • **Character Opacity** sets text opacity from 0% (least opacity) to 100% (full opacity).
• **Ident Text Background Attributes Controls** 	Provides independent controls for setting the color and opacity of the burn-in text and its background. • **Color** drop-down sets background color from multiple choices. • **Opacity** control sets background opacity from 0% (least opacity) to 100% (full opacity).

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

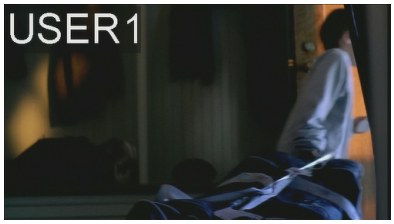
(continued)

• Ident Position Select

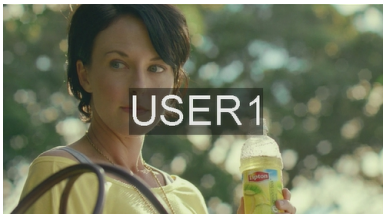


Sets the location of the ident text insertion from choices shown or custom. (When Custom is selected, position is configured using the **Ident Text Positioning Controls** described below.)

Example: Ident 1 text using **Top Left** position

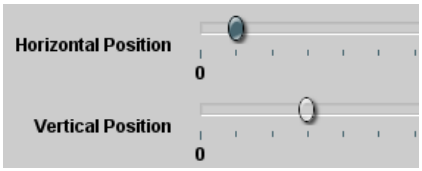


Example: Ident 1 text using **Center** position



Note: For SD usage, burn-ins can impinge on and corrupt line 21 closed-captioning waveform if positioned too close to the upper right of the raster.

• Ident Text Positioning Controls



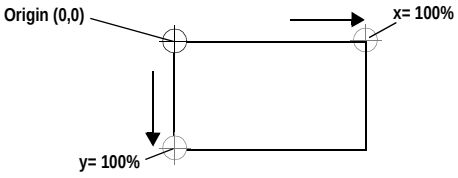
With Custom selected, sets burn-in position attributes as follows:

- **Horizontal Position** sets horizontal position (in percentage of offset from left of image area). (Range is 0 thru 100%)
- **Vertical Position** sets vertical position (in percentage of offset from top of image area, top justified). (Range is 0 thru 100%)

Note:
- Horizontal and Vertical Position controls are functional only when **Custom Position** is selected.
- 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.

Positioning with H and V controls at zero (origin)
(Size = 3)

Positioning with H and V controls both at 50
(Size = 3)



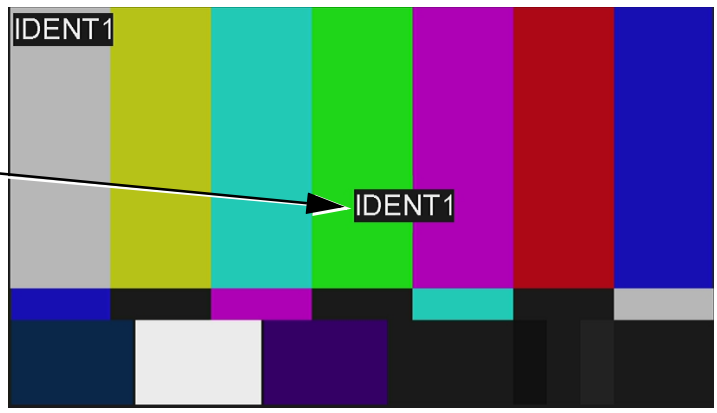


Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

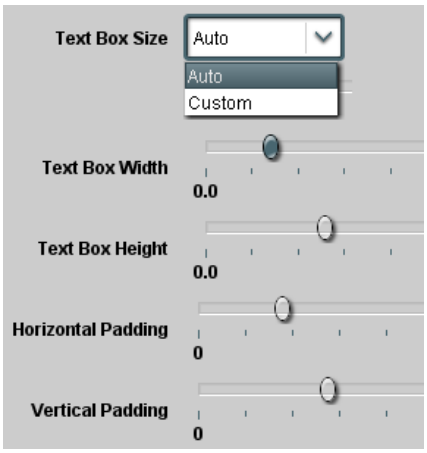
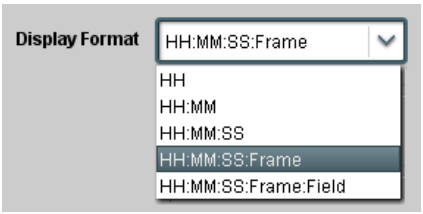
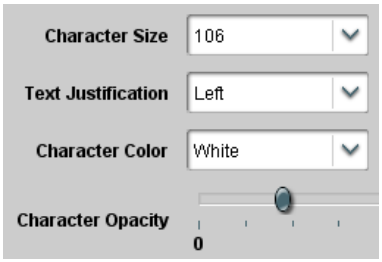
	**(continued)**
• **Text Box Sizing Controls** 	Provides controls for setting the size of the burn-in text background box. • **Auto** allows text box to proportionally size with selected text size. • **Custom** allows override of proportional sizing and allows text V and H dimensions to be set as desired. • **Text Box Width** and **Height** allow manual sizing when set to **Custom**. • **Custom** allows override of proportional sizing and allows text V and H dimensions to be set as desired. • **Horizontal** and **Vertical Padding** allow fine adjustment of V and H dimensions to be set when **Auto** is selected.
• **Text Box Border Enable** 	When set to Enabled, applies a white hairline border to the text box edges.
	Provides controls for burn-in of timecode on output video.
Note: This status display mirrors the same display in the Timecode tab. Device must be set to output a timecode in order for timecode burn-in to function. See Timecode (p. 3-28) for information on using timecode controls.	
• **Timecode Insertion Control** 	Selects the rules for timecode burn-in overlay insertion into output video. **Note:** If timecode insertion is desired for input LOS conditions, the Framesync **On Loss of Video** control **must** be set to provide a raster (from one of the choices shown) to support the timecode insertion. If this control is set to “Disable Outputs”, no raster or timecode insertion will be present on the output video under input LOS conditions. See Framesync (p. 3-20) for more information.
• **Timecode Format Display Selector** 	Selects the format of timecode string burn-in overlay insertion into output video from choices shown.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

(continued)

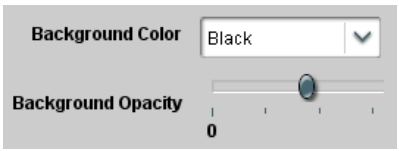
• Timecode Attributes Controls



Sets burn-in size/position attributes as follows:

- **Character Size** sets character size (in pixels).
- **Text Justification** selects from left, right, or center-aligned justification within the text box overlay.
- **Character Color** selects text color.
- **Character Opacity** sets text opacity from 0% (least opacity) to 100% (full opacity).

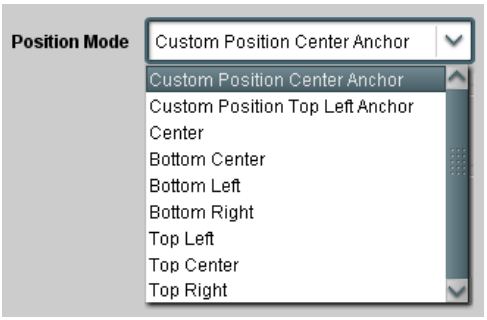
• Timecode Background Attributes Controls



Provides independent controls for setting the color and opacity of the burn-in text and its background.

- **Color** drop-down sets background color from multiple choices.
- **Opacity** control sets background opacity from 0% (least opacity) to 100% (full opacity).

• Timecode Position Select

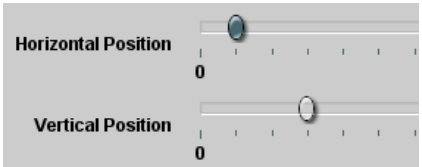


Sets the location of the timecode insertion from choices shown or custom. (When Custom is selected, position is configured using the **Timecode Positioning Controls** described below.)

Example: Timecode burn-in using **Bottom Center** position

Example: Timecode burn-in using **Top Left** position

• Timecode Positioning Controls



With Custom selected, sets burn-in position attributes as follows:

- **Horizontal Position** sets horizontal position (in percentage of offset from left of image area). (Range is 0 thru 100%)
- **Vertical Position** sets vertical position (in percentage of offset from top of image area, top justified). (Range is 0 thru 100%)

Note: • Horizontal and Vertical Position controls are functional only when **Custom Position** is selected.

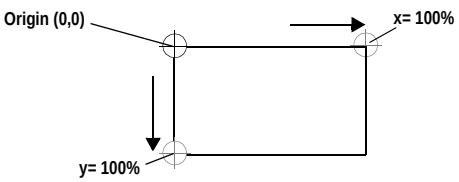
• Character sizing and positioning for a given raster format may not be appropriate for another format (especially if transitioning from HD to SD). Set size and position for a balanced appearance (e.g., do not place text too close to margins or set larger than necessary) that accommodates both HD and SD raster formats if multiple format use is required.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

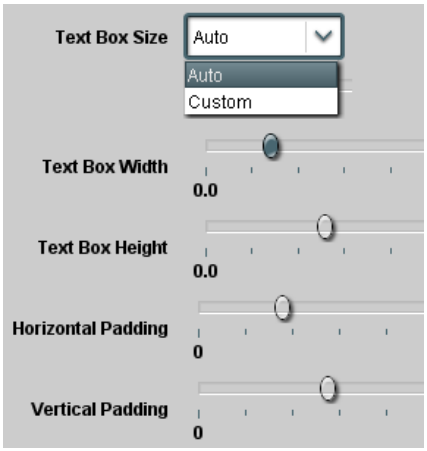
(continued)

Positioning with H and V controls at zero (origin)
(Size = 3)

Positioning with H and V controls both at 50
(Size = 3)



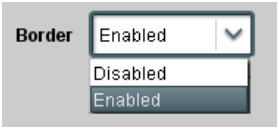
- **Text Box Sizing Controls**



Provides controls for setting the size of the burn-in background box.

- **Auto** allows text box to proportionally size with selected text size.
- **Custom** allows override of proportional sizing and allows text V and H dimensions to be set as desired.
- **Text Box Width** and **Height** allow manual sizing when set to **Custom**.
- **Custom** allows override of proportional sizing and allows text V and H dimensions to be set as desired.
- **Horizontal** and **Vertical Padding** allow fine adjustment of V and H dimensions to be set when **Auto** is selected.

- **Text Box Border Enable**



When set to Enabled, applies a white hairline border to the text box edges.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

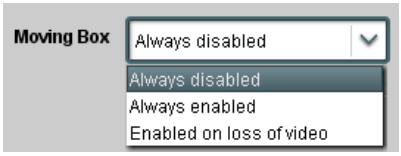
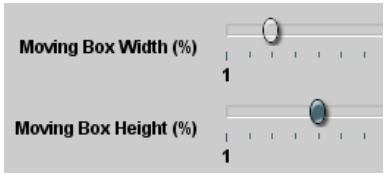
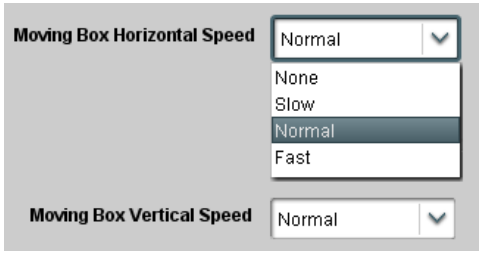
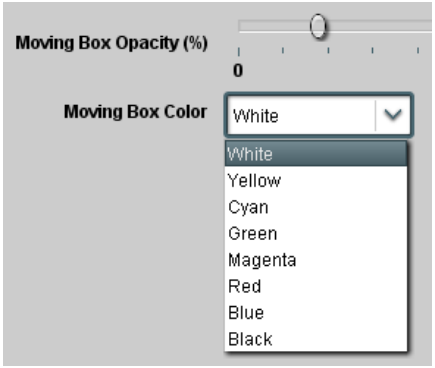
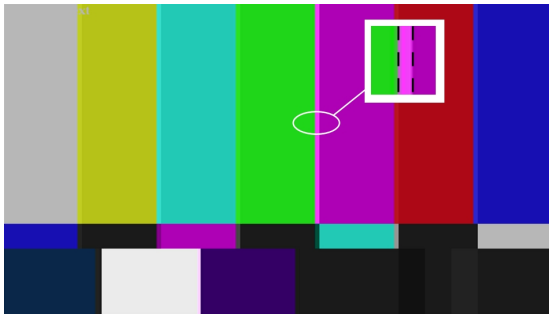
Moving Box	Provides a “moving box” graphic insertion (overlay) on the output video. Moving-box insertion can serve as a dynamic raster confidence check even in cases where the input video image is static.
	Moving-box insertion provides dynamic display even on static video. Attributes such as box size, color, vertical movement speed, and horizontal movement speed are all user configurable.
• **Moving Box Insertion Controls** 	Selects the rules for moving-box overlay insertion into output video. **Note:** Moving box burn-in will not be present on output under input LOS conditions. A raster must be present in order for text to be burned in.
• **Moving Box Size Controls** 	Sets size of box image burn-in as follows: • **Moving Box Width** sets the width (as a percentage of maximum available raster width. (Range is 0% thru 40%) • **Moving Box Height** sets the height (as a percentage of maximum available raster height. (Range is 0% thru 40%) **Note:** 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.
• **Moving Box Speed Controls** 	Sets speed of motion for moving box image burn-in as follows: • **Moving Box Horizontal Speed** sets the X-axis speed from choices shown. • **Moving Box Vertical Speed** sets the Y-axis speed from choices shown.
• **Moving Box Attributes Controls** 	Provides independent controls for setting the color and opacity of the moving-box insertion. • **Color** drop-down sets box color from multiple choices shown. • **Opacity** controls sets box opacity from 0% (least opacity) to 100% (full opacity).

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

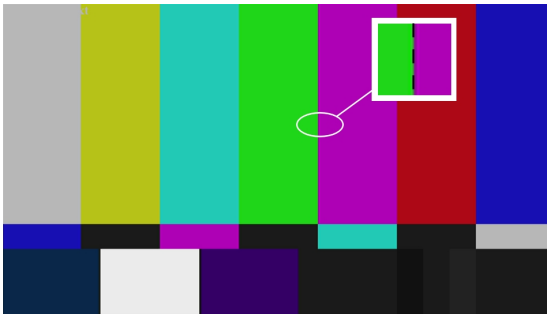
YC Alignment

Provides controls for correcting upstream misalignment of Y and C phase.

SMPTE color bars showing Y/C misalignment (as evidenced by poor transitions at the color borders)

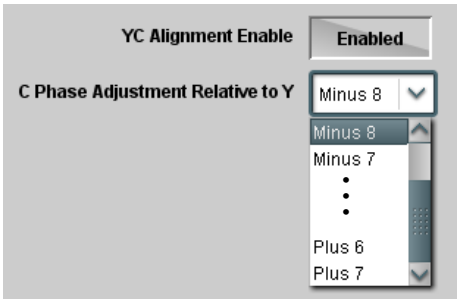


SMPTE color bars showing proper Y/C alignment (as evidenced by crisp transitions at the color borders)



Y/C misalignment is typically introduced by upstream analog-to-digital conversion, especially where the Y and chroma paths may experience differing characteristics.

- **Y/C Alignment Controls**



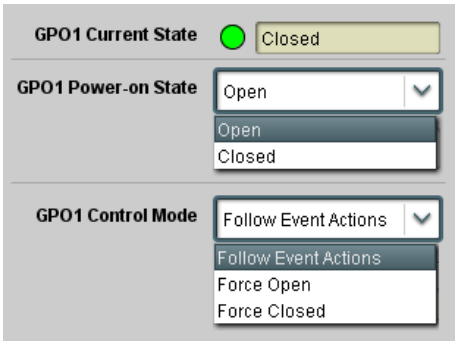
Provides the following Y/C alignment controls:

- **Enable** control turns on alignment.
- **C Phase Adjustment Relative to Y** provides a -8° to +7°phase offset of C phase from Y phase.

GPO Setup

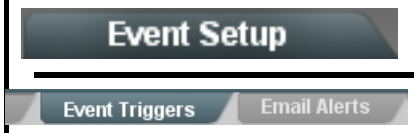
Provides controls for setting up the two GPO's power-up states as well as forced manual or event action triggered.

Note: This tab has identical independent controls for **GPO 1** and **2**. Therefore, only the **GPO 1** controls are described here.



- **Current State** indicates GPO status regardless of any pre-setup.
- **Power-on State** allows the power-up GPO state to be set (initialized) upon power-up
- **Control Mode** allows GPO manual asserted open or closed states, or hands over control to Event Action triggering.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued



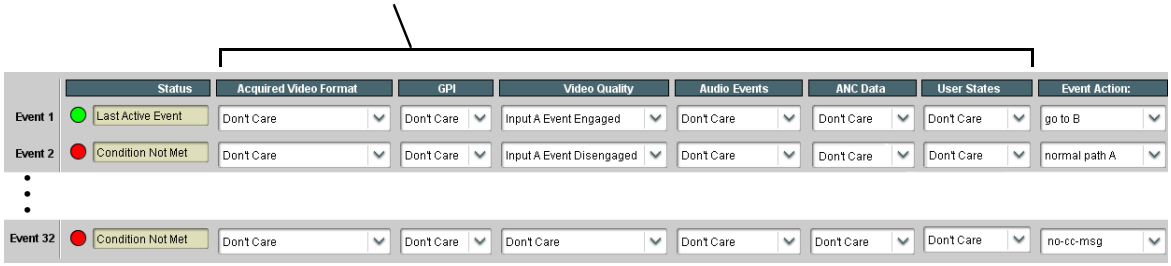
Provides event-based loading allowing a defined action to be automatically engaged upon various received signal status. Actions can be “canned” control commands or user-defined by going to a user preset.

- Event based preset loading is not passive and can result in very significant and unexpected control and signal processing changes if not properly used. If event based presets are not to be used, make certain the **Event Based Loading** button is set to **Disabled**.
- Because event based preset loading can apply 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, although the settings are persistent across power cycles).

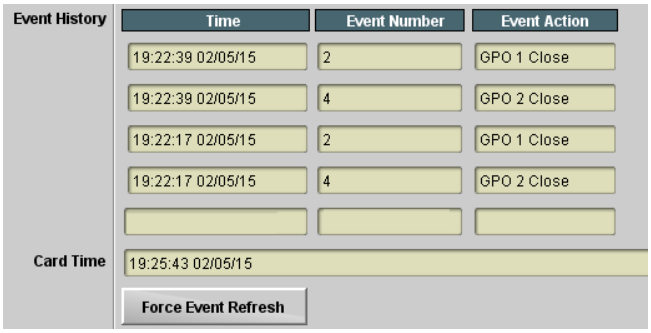
Event triggers allow a variety of event screening criteria, and in turn provide an Event Action “go to” in response to the detected event(s). For each screened criteria, categories can be set as “Don’t Care” or set to specific criteria to broaden or concentrate on various areas of concern.

- The **Event based loading** button serves as a master enable/disable for the function.
- Go-to **Event Actions** can be user-defined presets, “canned” (hard-coded) selections (such as GPO triggers or routing changes), or automated E-mail alert to a respondent (see Email Alerts (p. 3-47) for setting up e-mail alerts).
- Each Event (**Event 1** thru **Event 32**) can be set to screen for any or several Definer criteria as shown in the example below. Up to 32 separate events can be defined.
- Event 1 thru Event 32 are arranged with Event 1 having the highest priority, descending down to Event 32. Where multiple event screening is enabled, lower-priority events are serviced first, with the highest-priority event being the final event serviced and last action taken as well as last item logged in the Event History (see below). This helps ensure that a lower-priority event does not mask detection of higher-priority event(s).
- The **Status** indicator and message shows the activation status of each Event. Green indicator means event is currently engaged.
- Some columns in the DashBoard Event Setup table are present only when certain options are installed (for example, Video Quality column appears only with option **+QC**).

Event Definers
Each event can be uniquely set up for any of the condition types in these columns. Unless set to Don’t Care, all defined conditions will need to be true in order for the Event to be considered active



Note: Event criteria settings in any row comprise an AND function. Where multiple criteria are selected, a true (trigger) condition is not propagated unless **all** specified criteria are true. To independently screen for multiple criteria, rows should be set up where each criteria is screened in its own Event row. Examples of this are shown on the following pages.



The **Event History** log shows any triggered events in groups of five most recent events (newest at the top).

In the example here, log shows Event 2 as the most recent event, and its user-selected action of GPO 1 Close.

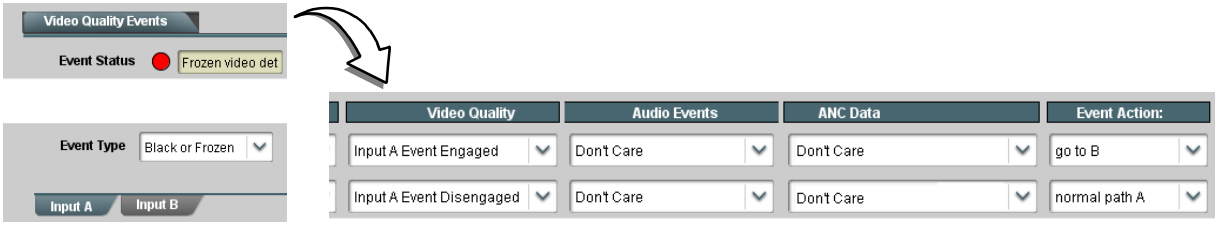
Pressing the **Force Event Refresh** button updates the list.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

(continued)

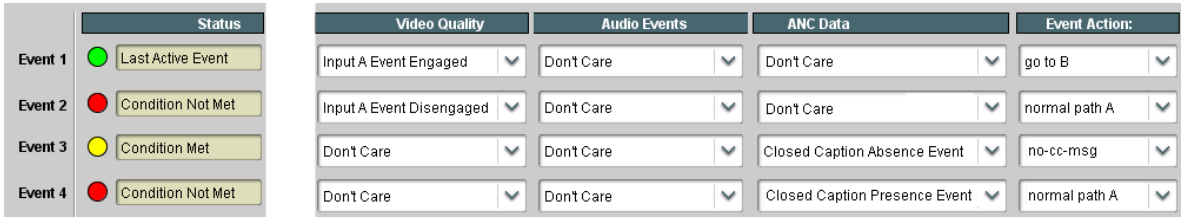
In the example here for Event 1, the **Video Quality Events** tab is set to screen for frozen video on Input A. When detected, this status can be used here (Video Quality set to "Input A Event Engaged" indicating black or frozen video detected). Using the Event Action selector, go-to action of "**go to B**" can be invoked (which in this example is a user preset that changes device routing to use an alternate input source).

Conversely, to go back to the original source, an event could be set up with Video Quality here looking for "Input A Event Disengaged" and in turn invoke an event action returning routing to the original video source (in this example, user preset "**normal path A**").



In the example here, **Event 1** and **Event 3** are respectively set for frozen video and closed captioning absence detection. Using separate Event rows for Video Quality and ANC Data (closed-captioning absence) screening allows these conditions to be independently detected and acted upon with user actions tailored to the event (when either of the conditions are detected, different actions can be taken as selected).

In this example, frozen video calls a preset using an input video routing change, while loss of closed captioning calls a preset to burn a "no CC" message on the raster. Both Events 1 and 3 have corresponding go-to actions to resume normal operation when the event ceases (in this example, a preset "normal path A").



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.

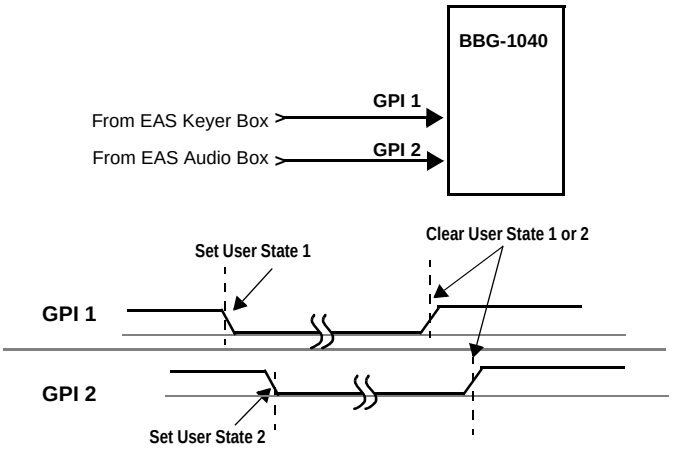
- If a desired user preset does not appear in the Event Action drop-down, press the DashBoard **Refresh** button at the bottom of the page to update the list in the drop-down.
- Loss of true conditions does not disengage an event-based triggering. A new set of true conditions must be defined and then 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 video change will take longer to engage than a preset involving only an audio routing change.)
- Make certain all definable event conditions that the device 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.
- Event Actions defined using user presets must be used with care to prevent conditions that could cause looping or the removal or "override" of desired expected settings. When using presets, the Preset Layer selection should be used such that only required aspects are touched (for the example above, the preset "no-cc-msg" should be set to only touch the character burner layer to invoke a character burn).
- Where multiple event screening is set up, the event you consider to be the highest priority should be set as higher priority than lesser events (as shown in the example above where Video Quality screening trumps CC absence). Also, this prioritization helps ensure that all desired events are screened for before a significant change (such as input video source change) is effected.

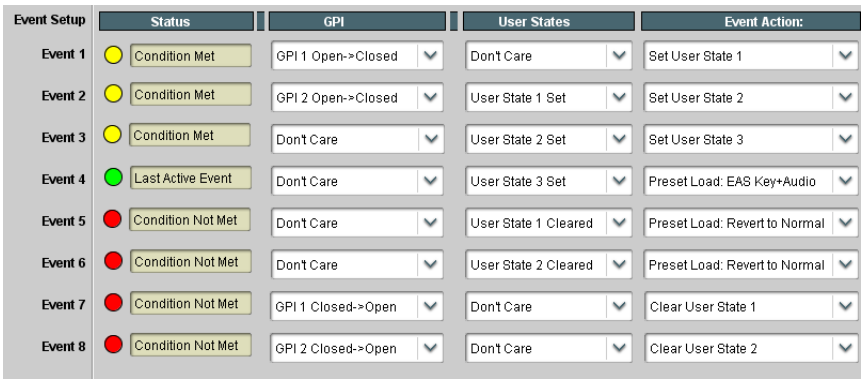
Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

(continued)

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

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





Event Setup	Status	GPI	User States	Event Action:
Event 1	Condition Met	GPI 1 Open->Closed	Don't Care	Set User State 1
Event 2	Condition Met	GPI 2 Open->Closed	User State 1 Set	Set User State 2
Event 3	Condition Met	Don't Care	User State 2 Set	Set User State 3
Event 4	Last Active Event	Don't Care	User State 3 Set	Preset Load: EAS Key+Audio
Event 5	Condition Not Met	Don't Care	User State 1 Cleared	Preset Load: Revert to Normal
Event 6	Condition Not Met	Don't Care	User State 2 Cleared	Preset Load: Revert to Normal
Event 7	Condition Not Met	GPI 1 Closed->Open	Don't Care	Clear User State 1
Event 8	Condition Not Met	GPI 2 Closed->Open	Don't Care	Clear User State 2

GPI 1 (key) cue falling-edge sets user state 1

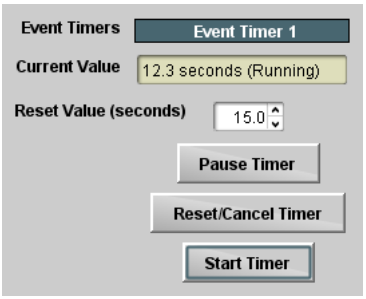
GPI 2 (audio) cue falling-edge sets user state 2

User state 2 (which requires user state 1 being true first) sets state 3, which then invokes a preset to load settings to route EAS key and audio

When either GPI 1 or GPI 2 has a rising-edge trigger (cease EAS), user states 1 or 2 are cleared, thereby clearing user state 3. Either state change calls a preset to revert to normal operation.

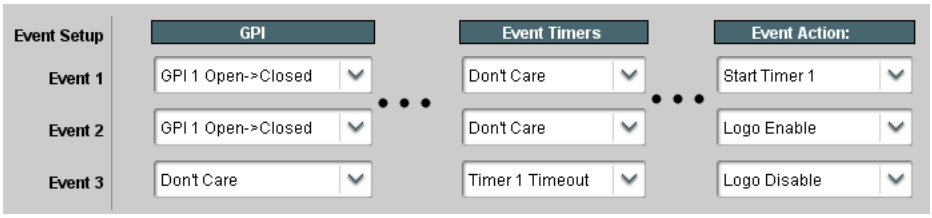
Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

Provides three general-purpose timers that can be triggered to start, pause, reset, or stop upon event actions. The state of each timer, in turn, can also be used to invoke other actions.



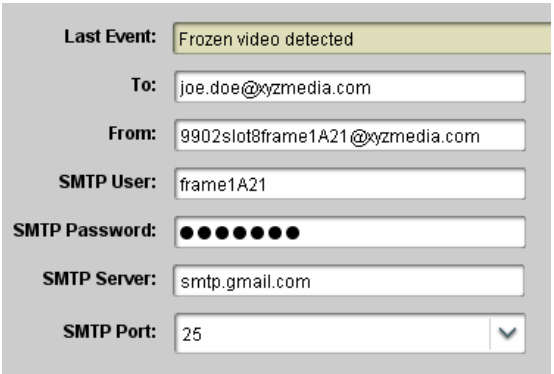
Event Timers 1 thru **3** (Timer 1 shown) can be set with count-down values. The Pause/Reset/Start control here are manual controls. The timers are typically used with automated cues to start and stop the timer(s), as shown below.

in the example here, **Event Timer 1** is used to set a logo insertion disable after a specific amount of elapsed time. A GPI inserts the logo, along with a time started at that time. Upon the timer timeout, a separate action sets logo insertion to Disabled.



Provides setup for automated Email alerts when an event has occurred.

As an Event Action choice on the Events Triggers sub-tab, an Email alert can be sent as a response. Set up email fields as shown in the example below.



When fields are filled-in to specify recipient and sender, and email alert is selected for Event Action on Event Triggers sub-tab page, recipeient receives an email alert upon event, with the triggering event shown (in this example, “frozen video detected”).

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

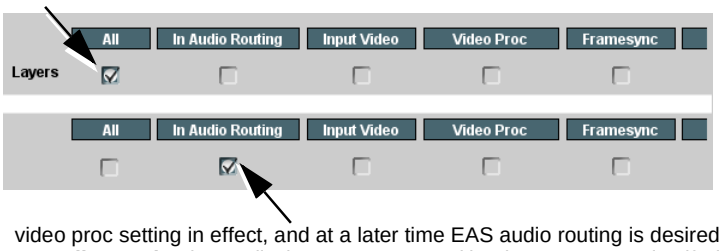
Presets

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.

• Preset Layer Select

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.

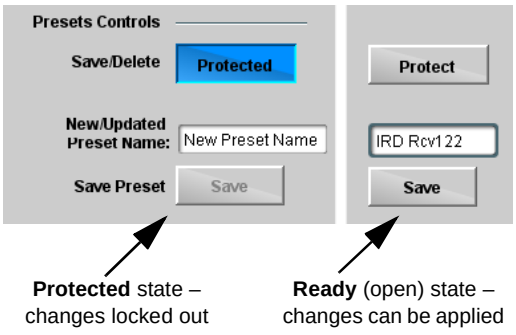
Default **All** setting will "look" at all settings and save all settings to the defined preset with no masking.



Selecting a layer (in the example, "In Audio Routing") will set the preset to **only** "look at" and "touch" audio routing settings and save these settings under the preset. When the preset is loaded (recalled), the device will only "touch" the audio routing layer.

Example: Since EAS audio routing can be considered independent of video proc settings, if normal audio routing was set up with a particular video proc setting in effect, and at a later time EAS audio routing is desired to be saved and invoked as a preset, selecting **In Audio Routing** here tells the preset save and load to not concern itself with video proc settings. In this manner, any video proc settings in effect when the EAS preset is invoked will not affect any video proc settings that might be currently in effect.

• Preset Enter/Save/Delete



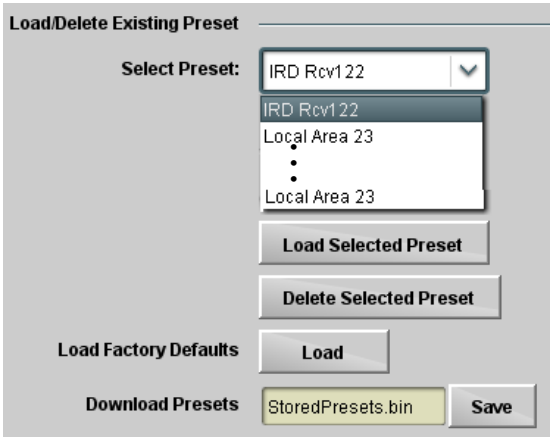
Protected state – changes locked out

Ready (open) state – changes can be applied

Locks and unlocks editing of presets to prevent accidental overwrite as follows:

- **Protect (ready):** This state awaits Protected and allows preset Save/Delete button to save or delete current settings to the selected preset. **Use this setting when writing or editing a preset.**
- **Protected:** Toggle to this setting to lock down all presets from being inadvertently re-saved or deleted. **Use this setting when all presets are as intended.**
- **Create New Preset:** Field for entering user-defined name for the preset being saved (in this example, "IRD Rcv122").
- **Save:** Saves the current device settings under the preset name defined above.

• Preset Save/Load Controls



- **Select Preset:** drop-down allows a preset saved above to be selected to be loaded or deleted (in this example, custom preset "IRD Rcv122").
- **Load Selected Preset** button allows loading (recalling) the selected preset. When this button is pressed, the changes called out in the preset are immediately applied.
- **Delete Selected Preset** button deletes the currently selected preset.
- **Load Factory Defaults** button allows loading (recalling) the factory default preset. When this button is pressed, the changes called out in the preset are immediately applied.

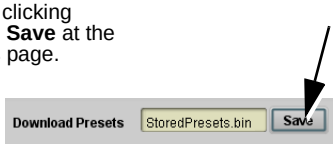
Note: Load Factory Defaults functions with no masking. The Preset Layer Select controls have no effect on this control and will reset **all** layers to factory default.

- **Download Presets** saving the preset files to a folder on the connected computer.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

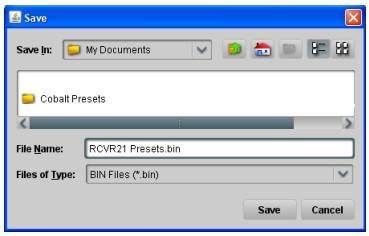
Presets	**(continued)**

Download (save) presets to a network computer by clicking **Download Presets – Save** at the bottom of the Presets page.



Browse to a desired save location (in this example, *My Documents\Cobalt Presets*).

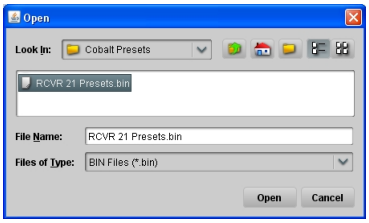
The file can then be renamed if desired (*RCVR21 Presets* in this example) before committing the save.



Upload (open) presets from a network computer by clicking **Upload** at the bottom of DashBoard.

Browse to the location where the file was saved on the computer or drive (in this example, *My Documents\Cobalt Presets*).

Select the desired file and click **Open** to load the file to the device.

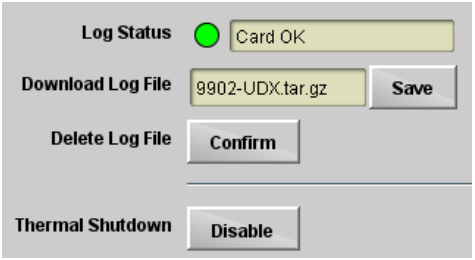


Note: • Preset transfer between device download and file upload is on a **group** basis (i.e., individual presets cannot be downloaded or uploaded separately).

• 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.

Admin	Provides a global operating status and allows a log download for factory engineering support. Also provides controls for selecting and loading firmware upgrade files, and for setting the comm IP address.

• Log Status and Download Controls



- **Log Status** indicates overall internal operating status.
- **Download Log File** allows a operational log file to be saved to a host computer. This log file can be useful in case of an error or in the case of an operational error or condition. The file can be submitted to Cobalt engineering for further analysis.
- **Delete Log File** deletes the currently displayed log file. A second confirmation dialog is displayed to back out of the delete if desired.
- **Thermal Shutdown** enable/disable allows the built-in thermal failover to be defeated. (Thermal shutdown is enabled by default).

CAUTION

The BBG-1040-4X1-CS 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.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

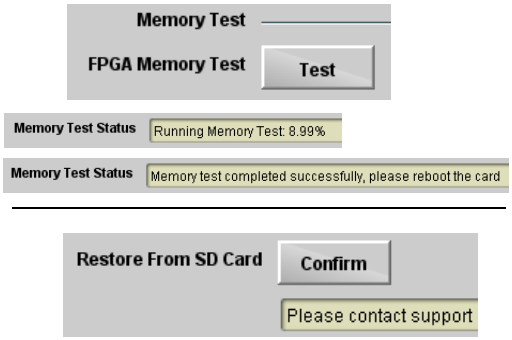
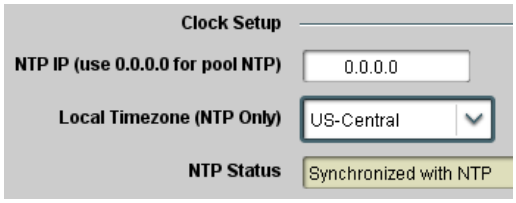
Admin	**(continued)**
• **Card Check and Restore Utilities** 	**Memory Test** allows all cells of the card FPGA memory to be tested. This control should **only** be activated under direction of product support. Exercising the memory test is **not** part of normal device maintenance. **Restore from SD Card** allows card rendered inoperable to be restored using an SD memory card fitted to the card internal SD slot. Product support must be contacted prior to performing this operation. Use of any SD card not supplied by support can corrupt the device.
• **NTP Clock Setup** 	Allows device NTP clock IP source and localization. This is the clock/time device will use for logs and other recorded actions. • **NTP IP** sets the IP address where NTP is to be obtained. • **Local Timezone** sets the recorded time to the localized time. • **NTP Status** shows if time is synced with NTP or if an error exists.

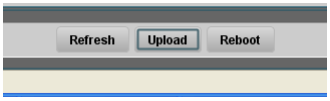
Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

Admin	**(continued)**
• **Firmware Upgrade Controls**	Firmware upgrade controls allow a selected firmware version (where multiple versions can be uploaded to the device's internal memory) to invoke an upgrade to a selected version either instantly, or set to install on the next device reboot (thereby allowing device upgrade downtime to be controlled at a scheduled point in time).

Note: • The web interface allows for much faster file uploads than using the DashBoard interface described below. See Uploading Firmware Using Web Interface and GUI (p. 3-56) for details and instructions.

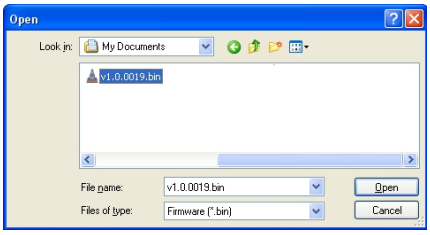
• The page/tab here allows managing multiple firmware versions saved on the device. New upgrade firmware from our web site can always be directly uploaded to the device without using this page. Instructions for firmware downloading to your computer and uploading to the device can be found at the **Support>Firmware Downloads** link at www.cobaltdigital.com.

1. Access a firmware upgrade file from a network computer by clicking **Upload** at the bottom of DashBoard.



2. Browse to the location of the firmware upgrade file (in this example, *My Documents\v1.0.0019.bin*).

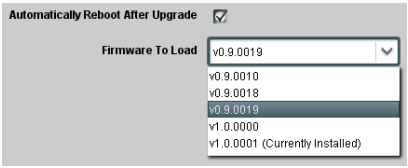
3. Select the desired file and click **Open** to upload the file to the device.



• **Immediate firmware upload.** The device default setting of **Automatically Reboot After Upgrade** checked allow a selected firmware version to be immediately uploaded as follows:

1. Click **Firmware To Load** and select the desired upgrade file to be loaded (in this example, "v1.0.0019").

2. Click **Load Selected Firmware**. The device now reboots and the selected firmware is loaded.



• **Deferred firmware upload.** With **Automatically Reboot After Upgrade** unchecked, firmware upgrade loading is held off until the device is manually rebooted. This allows scheduling a firmware upgrade downtime event until when it is convenient to experience to downtime.

1. Click **Firmware To Load** and select the desired upgrade file to be loaded (in this example, "v1.0.0019"). Note now how the display shows "Installs on Next Reboot".

2. Click **Load Selected Firmware**. The device holds directions to proceed with the upload, and performs the upload only when the device is manually rebooted (by pressing the **Reboot** button).

3. To cancel a deferred upload, press **Cancel Pending Upgrade**. The device reverts to the default settings that allow an immediate upload/upgrade.

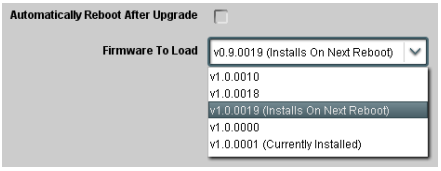


Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

Alarms

Provides controls for setting up controls which screen for and propagate input program video alarms for video, audio, and ancillary data defect conditions.

Conditions and alarm status can be propagated as DashBoard tree-view frame alarms, downloadable .txt files and/or Syslog IP-based alarms.

The **Alarms** tab has several sub-tabs which allow setting up detection and alarm severity/propagation for input program video alarms for video, audio, and ancillary data defect conditions (as described and shown below)

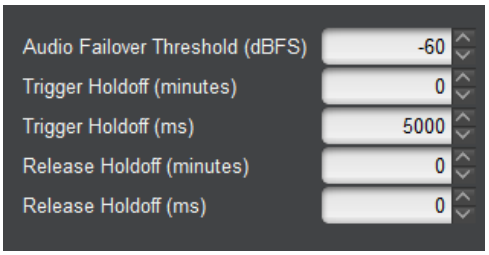
Video Alarm Setup

Video Alarm Setup sub-tab allows setting up screening engagement and disengagement holdoff for frozen and/or black video detection on the device's four SDI inputs (independent for each SDI input). In the default example settings shown here, engagement and disengagement of alarm generation occurs 3000 msec after event detect.

Factory default holdoff settings shown here are recommended for at least initial settings. If holdoff periods are too brief, nuisance alarms may be generated during transitions to and from programs and interstitials.

	Frozen Video Detection Setup			
	Engagement Holdoff (minutes)	Engagement Holdoff (ms)	Disengagement Holdoff (minutes)	Disengagement Holdoff (ms)
SDI Input A	0	3000	0	3000
SDI Input B	0	3000	0	3000
SDI Input C	0	3000	0	3000
SDI Input D	0	3000	0	3000
	Black Video Detection Setup			
	Engagement Holdoff (minutes)	Engagement Holdoff (ms)	Disengagement Holdoff (minutes)	Disengagement Holdoff (ms)
SDI Input A	0	3000	0	3000
SDI Input B	0	3000	0	3000
SDI Input C	0	3000	0	3000
SDI Input D	0	3000	0	3000

Audio Alarm Setup



Audio Alarm Setup sub-tab allows setting up screening trigger threshold, engagement and disengagement holdoff for low or missing audio levels on the device's embedded audio input channels.

- Levels **above** the Failover Threshold are considered normal.
- Levels **below** the Failover Threshold (and exceeding the holdoff) are considered below normal.

Note: Audio channels screened are from the device SDI that is selected for the program video/audio path (for example, if SDI A is selected as the input source on the **Input Video** tab, the 16 embedded channels comprising this video/audio input are screened).

Factory default holdoff and threshold settings shown here are recommended for at least initial settings. If holdoff periods are too brief (or threshold set too high), nuisance alarms may be generated during transitions to and from programs and interstitials, as well as during certain content.

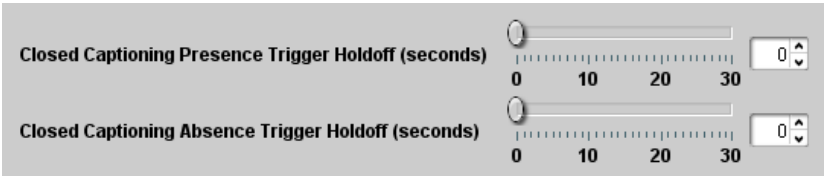
Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

Alarms	(continued)

Ancillary Data Alarm Setup

Ancillary Data Alarm Setup sub-tab allows setting up screening engagement and disengagement holdoff for absence of closed captioning packets.

Note: • Video screened is the device SDI that is selected for the program video/audio path.
• Ancillary data condition detection is functional only for CEA608/708 packet-based closed captioning. This feature does not function for SD line 21 "waveform-based" closed captioning.



Alarm Propagation Tabs

Video, **Audio**, and **Ancillary Data** sub-tabs set alarm propagation attributes, including:
- Logging of alarms and conditions
- Propagation of alarms to the device general Card State/DashBoard frame-based tree-view pane
- Ignore alarm, or set severity as **Warning** (yellow "LED") or **Error** (red "LED")

Each of these sub-tabs is described below.

Video

Video sub-tab independently shows for all four SDI inputs any LOS (loss of signal), frozen, or black conditions triggered for any of the SDI IN A thru SDI IN D inputs.

Condition/Status has LOS, Frozen, and Black status fields for all 4 SDI inputs. Illuminated "LED" indicates that condition is presently occurring. Color of LED is determined by user-set Severity level.

- **Log** (when checked) propagates the alarm to a log file.
- **Alarm** (when checked) propagates the alarm to the Card State and frame-level DashBoard tree-view "LEDs".
- **Severity** selects from Ignore/OK (green "LED"), Warning (yellow "LED"), and Error (red "LED") alarm escalation states.
- **Duration** and **Last Occurence** shows details for each triggered alarm event.

Note: The Log, Alarm, Severity, and Duration/Last Occurrence columns appear on the other alarm sub-tabs and function identically as described here.

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

Alarms	(continued)

Audio

Audio sub-tabs independently show for all 16 embedded channels any missing audio (whether absent due to low level, mute or unlocked status).

Note: Audio screened is the audio associated with the selected device SDI program inputs.

Unused audio channels should, at the minimum, have Severity set to Ignore/OK. If this is not done, nuisance alarms may occur.

Independent rows are present for each of the program path 16 embedded audio channels. Log, Alarm, Severity and Duration/ Last Occurrence controls and status function as described in Video (p. 3-53).

Ancillary Data

Ancillary Data sub-tab shows loss of closed captioning packet presence for program video path.

Note: • Closed captioning screened are the CC packet presence associated with the selected device SDI program inputs.

• Ancillary data condition detection is functional only for CEA608/708 packet-based closed captioning. This feature does not function for SD line 21 “waveform-based” closed captioning.

Row showing program path ANC status. Log, Alarm, Severity and Duration/Last Occurrence controls and status function as described in Video (p. 3-53).

Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

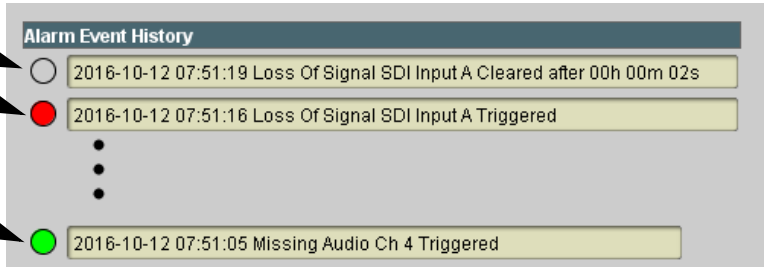
Alarms	(continued)

Alarm Event History shows the eight most-recent alarm events that have been detected (with most-recent at top of list).
The alarm severity (as set using the Severity drop-down for each alarm type) sets the "LED" color shown here.
In addition to alarms directly affecting performance, status such as cleared alarms are also displayed, as well as any actions related to enabling alarm propagation (such as "Logging Enabled" and "Logging Disabled").
All display rows shown here are retained in the overall log and can be downloaded as a .txt file (see Logging below).

Cleared alarms appear as an "open" LED

Alarms configured as **Error** or **Warning** correspondingly appear here as a red "LED" or yellow "LED"

Detected alarms event configured as **Ignore/OK** appear here as a green "LED"

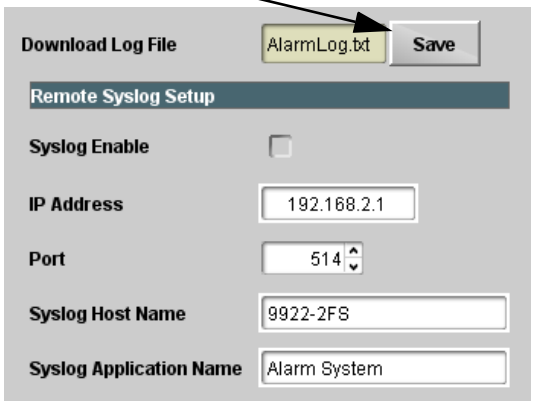


Logging

Logging sub-tab allows downloading of an overall running **AlarmLog.txt** file via DashBoard to a host computer.
This sub-tab also has setup controls for using Syslog IP connection of alarm log data (Linux and Unix).

Clicking **Save** opens a dialog to save the AlarmLog.txt file to a host computer.

Setup controls and fields for Syslog



Note: • Download Log File is performed via DashBoard connection; no external connection is required.
• For Syslog usage, default 514 port assignment is recommended.

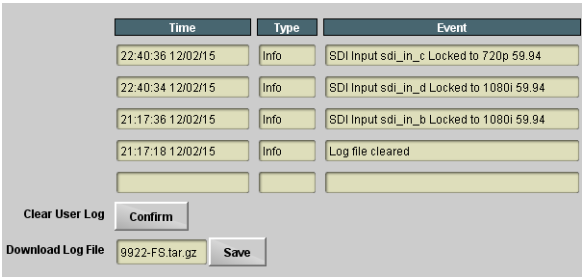
Table 3-2 BBG-1040-4x1-CS Function Menu List — continued

User Log	Automatically maintains a log of user actions and input lock status.

User Log shows input lock and other user conditions (with most recent event at top of list).

Clear User Log clears all entries.

Download Log File opens a browser allowing the log file to be saved on the host machine.



Uploading Firmware Using Web Interface and GUI

Firmware (such as upgrades, option keys, and presets .bin files) can be uploaded to BBG-1040-4X1-CS directly via the web html5 interface without going through DashBoard (see Figure 3-8). In addition to allowing uploads without needing a DashBoard connection, this method transfers files typically much faster than using DashBoard.

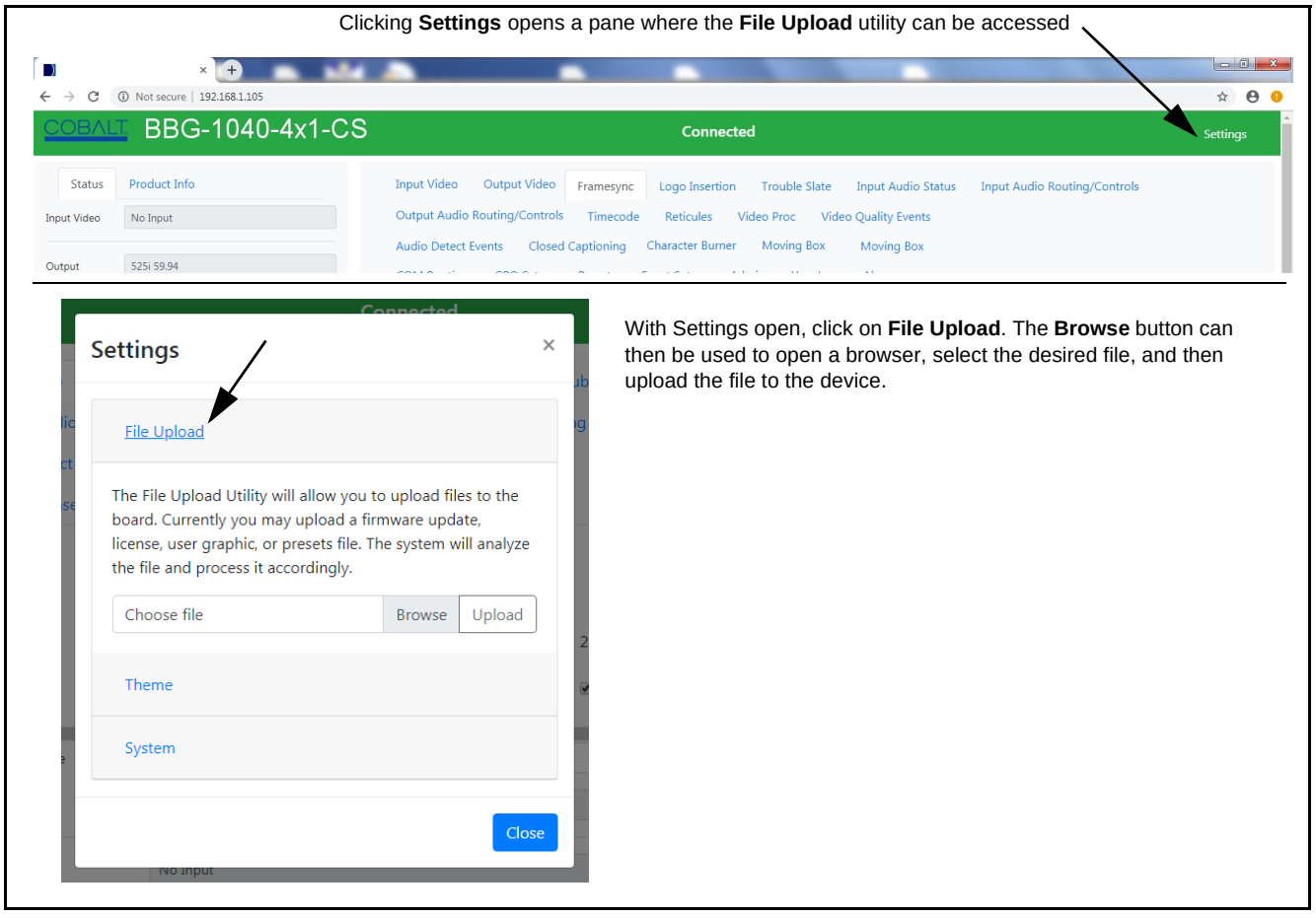


Figure 3-8 Uploads Using Web Interface/GUI

Front Panel User Menus

All of the mode and parametric controls available using the web UI (as described in BBG-1040-4x1-CS 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-1040-4x1-CS 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 or DashBoard 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) Output Video SDI Input A SDI Input B SDI Input C SDI Input D GPI 1 GPI 2 Reference Card Voltage Card Power Card Temp(front) Card Temp (rear) Card Temp (FPGA) Card Up Time Preset Engaged	Framesync (pg 3-20) Lock Mode Output Rate Initial Startup Format Output Mode On LOS-- Test Pattern Vert Lines Offset Horiz Offset Frame Delay Report Delay Lock Status	
Product Info (pg 3-8) Product Product Options Supplier Revision Build Date FPGA Rev FPGA Build Date S/N	GPIO (pg 3-43) GPI1 GPI2 GPI Coding	Timecode (pg 3-28) Ref VITC Status Input VITC Status Input ATC LTC Status Input ATC VITC Status Output Status
Network Settings (pg 3-3) IP Addr Netmask Gateway Mode (DHCP/Stat)	Input Video (pg 3-11) Source SDI IN A Status SDI IN B Status SDI IN C Status SDI IN D Status	Presets (pg 3-48) Save/Delete Mode Select Preset Load Selected Preset Delete Selected Preset Load Factory Defaults
Character Burner (pg 3-37) Ident 1* Ident 2* Timecode*	Moving Box (pg 3-42) Enable Mode Width Height Horiz Speed Vert Speed Opacity Color	
Closed Captioning (pg 3-33) Input Status HD Output Line CC Emb/Dis	Output Audio Routing (pg 3-26) Output Meters 1-8 Output Meters 9-16 Audio Bulk Delay	

Troubleshooting

This section provides general troubleshooting information and specific symptom/corrective action for the BBG-1040-4x1-CS and its remote control interface. The BBG-1040-4x1-CS 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-1040-4x1-CS itself and its remote control provide error and failure indications. Depending on how the BBG-1040-4x1-CS 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.

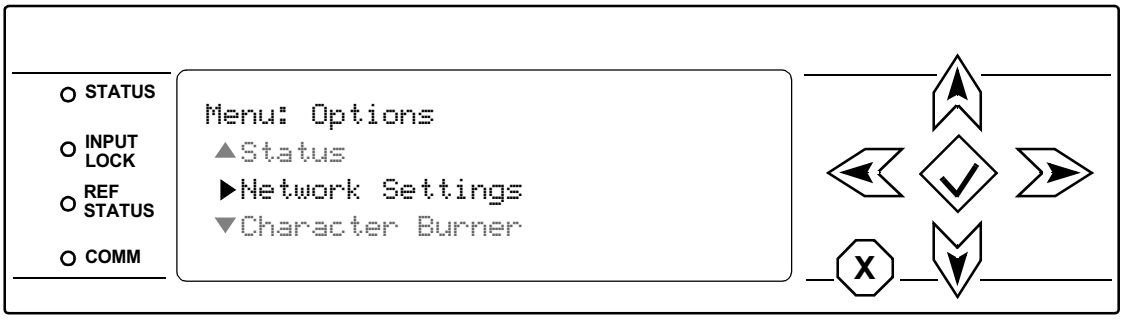
The various BBG-1040-4x1-CS device and remote control error and failure indicators are individually described below.

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. 3-61)
- BBG-1040-4x1-CS Processing Error Troubleshooting (p. 3-62)

BBG-1040-4x1-CS Front Panel Status/Error Indicators and Display

Figure 3-9 shows and describes the BBG-1040-4x1-CS 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.



BBG1000_FPUI_SCPD2014P8

Item	Function
Alphanumeric Display	Shows device statuses
STATUS LED	Illuminates GREEN indicating BBG-1040-4x1-CS 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-1040-4x1-CS 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.
Note: The LEDs listed above are always illuminated under normal conditions. An LED that is not lit indicates an error with the device.	

Figure 3-9 BBG-1040-4x1-CS 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

Verify power presence and characteristics	• On the BBG-1040-4x1-CS, 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.
	• Check the Power Consumed indication for the BBG-1040-4x1-CS. This can be observed using the Status front-panel or web UI pane.
	  • If display shows **no** power being consumed, either the frame power supply, connections, or the BBG-1040-4x1-CS itself is defective.
	  • If display shows **excessive** power being consumed (see Technical Specifications (p. 1-15) in Chapter 1, “Introduction”), the BBG-1040-4x1-CS may be defective.

Check Cable connection secureness and connecting points	Make certain all cable connections are fully secure (including coaxial cable attachment to cable ferrules on BNC connectors). Also, make certain all connecting points are as intended. Make certain the selected connecting points correlate to the intended device inputs and/or outputs. Cabling mistakes are especially easy to make when working with large I/O modules.
Check status indicators and displays	On BBG-1040-4x1-CS 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.
Troubleshoot by substitution	All devices can be hot-swapped, replacing a suspect device with a known-good item.

BBG-1040-4x1-CS Processing Error Troubleshooting

Table 3-5 provides BBG-1040-4x1-CS processing troubleshooting information. If the BBG-1040-4x1-CS 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-1040-4x1-CS is not appropriately set for the type of signal being received by the device.

Note: Where errors are displayed on both the BBG-1040-4x1-CS 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-1040-4x1-CS shows **Unlocked** message in BBG-1040-4x1-CS Info pane.	No video input present	Make certain intended video source is connected to appropriate BBG-1040-4x1-CS video input. Make certain BNC cable connections are OK.
Ancillary data (closed captioning, timecode) not transferred through BBG-1040-4x1-CS	• Control(s) not enabled	• Make certain respective control is set to **On** or **Enabled** (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 **Output Audio Routing/Controls** tab, **Audio Group Enable** control for group 1 thru 4 must be turned on for sources to be embedded into respective embedded channel groups.
Excessive or nuisance input signal quality events in log or Card State status display	Holdoff periods are too brief (or threshold set too high)	If holdoff periods are too brief (or threshold set too sensitive), nuisance alarms may be generated during transitions to and from programs and interstitials, as well as during certain content.
(Option +QC only) Audio silence event not detected or triggered on	Holdoff set too long to detect condition	The **Trigger Holdoff** controls on the **Audio Detect Events** tab allow ignoring silence events unless the event duration exceeds the holdoff setting. Make certain holdoff is set sufficiently low to detect events as desired.
Selected upgrade firmware will not upload	Automatic reboot after upgrade turned off	Device **Presets** > **Automatically Reboot After Upgrade** box unchecked. Either reboot the device manually, or leave this box checked to allow automatic reboot to engage an upgrade upon selecting the upgrade.

Table 3-5 Troubleshooting Processing Errors by Symptom — continued

Symptom	Error/Condition	Corrective Action
SD closed captioning waveform or character rendering is corrupted	Character burner and/or moving box insertions running into line 21	For SD usage, burn-ins can impinge on and corrupt line 21 closed-captioning waveform if positioned too close to the upper right of the raster. Typically, character burn and/or moving box insertions are not intended for content (such as OTA) where CC is required. If CC is present and must be retained, make certain to check CC content if burn-in insertions are enabled and reposition burn-ins to avoid line 21 interference.
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 (**Presets** tab > **Event Triggers** sub-tab) should be set to **Disabled** 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 Event Setup Controls (p. 3-44) for more information.
Device will not retain user settings, or setting changes or presets spontaneously invoke.	**Event Based Loading** sub-tab inadvertently set to trigger on event	If event based loading is not to be used, make certain **Event Based Presets** is disabled (either using master **Enable/Disable** control or through events settings. See Event Setup Controls (p. 3-44) for more information.

In Case of Problems

Recovering Card From SD Memory Card

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

1. (See Figure 3-10.) Make certain the card has the proper SD card installed in the under-card slot. If SD card is **not** installed, contact Product Support to obtain an SD card.

Note: If unit is a BBG-1000 Series device, remove the top cover before proceeding.

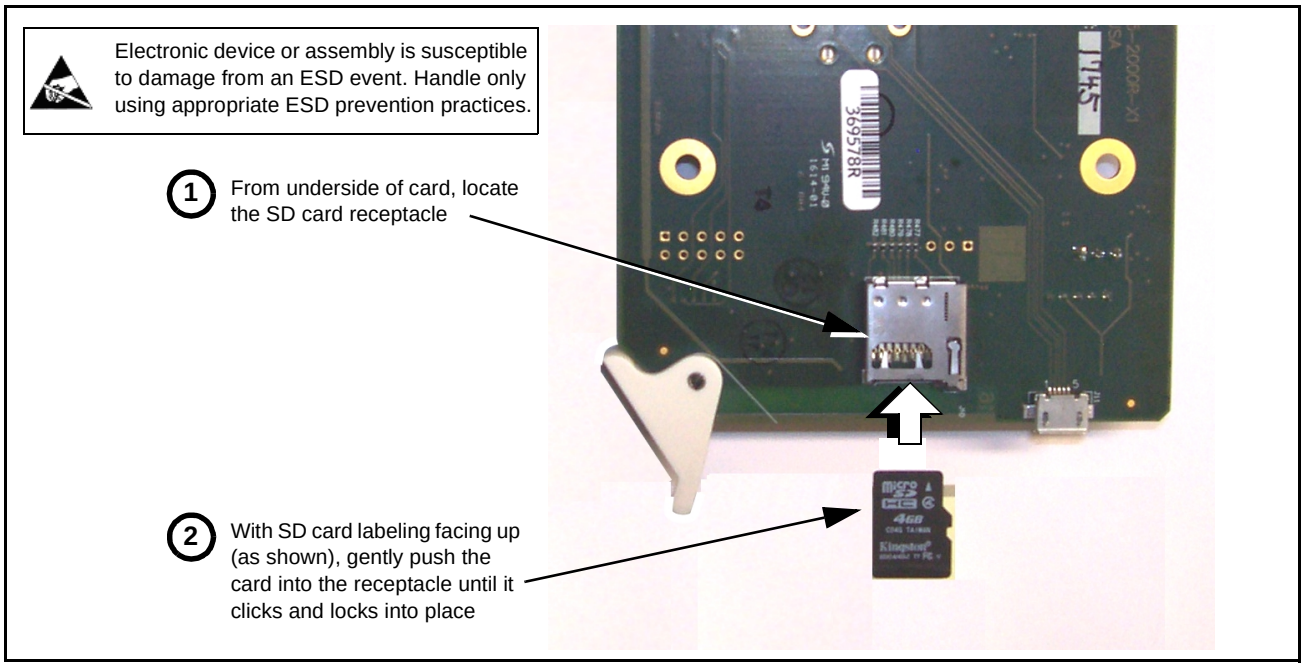


Figure 3-10 SD Card Installation

2. (See Figure 3-11.) With device powered-down, locate the **MMC BOOT** button on the card. Proceed as shown in picture.

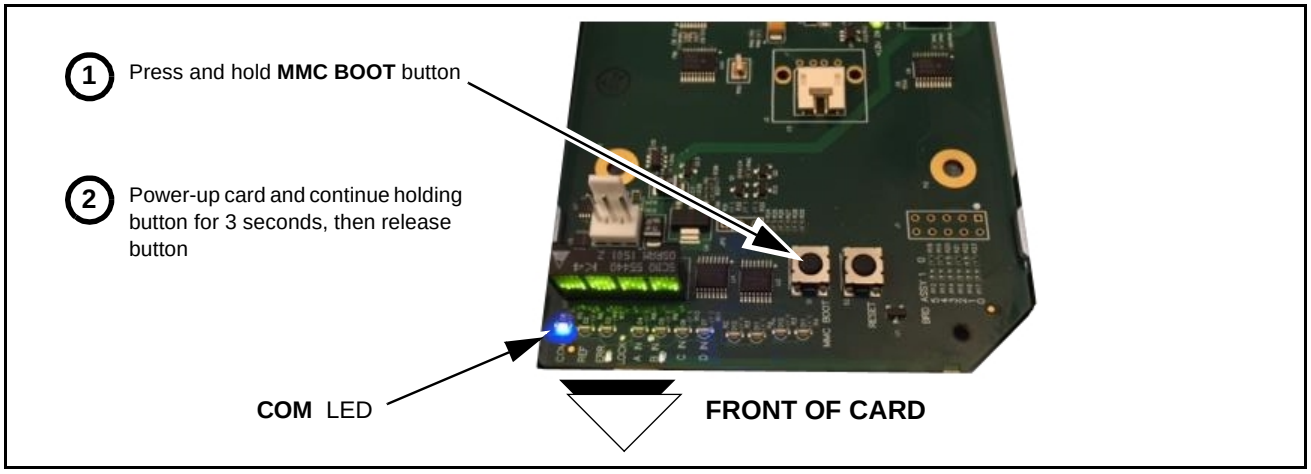


Figure 3-11 MMC Boot Button

3. With button now released, the card will begin reprogramming:
   - **COM** LED illuminates and remains illuminated.
   - When reprogram is complete, **COM** LED turns off, on, and then off again (entire process takes about 1-1/2 minute).
4. Remove power from the card (remove card from slot or power-down BBG-1000 Series unit).

5. Re-apply power to the card. The card/device will display as "***UNLICENSED***" in DashBoard/remote control.
6. In Dashboard or web remote control, go to **Admin** tab and click **Restore from SD Card**. After about 1/2-minute, the card license(s) will be restored and card will be using its most recently installed firmware.
7. Card/device can now be used as normal. On BBG-1000 Series unit, re-install top cover.

Contact and Return Authorization

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

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

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

See Contact Cobalt Digital Inc. (p. 1-17) in Chapter 1, "Introduction" for contact information.

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