BBG-1002-UDX

Multi-Input Modular Up-Down-Cross Converter/ Framesync

with Auto-Changeover and Character Burn

Product Manual

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BBG1002UDX-OM (V1.1)

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Congratulations on choosing the Cobalt® BBG-1002-UDX Multi-Input Modular Up-Down-Cross Converter/ Framesync with Auto-Changeover and Character Burn. The BBG-1002-UDX 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-1002-UDX, please contact us at the contact information on the front cover.

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Chapter 1

Introduction

Overview

This manual provides installation and operating instructions for the BBG-1002-UDX Multi-Input Modular Up-Down-Cross Converter/Framesync with Auto-Changeover and Character Burn unit (also referred to herein as the BBG-1002-UDX).

Note: This manual also is applicable for BBG-1002-UDX-AV-EMDE which also accepts and processes CVBS analog, and analog/AES adio inputs and outputs. Differences between these models are noted where applicable. In all other aspects, both versions function identically as described in this manual.

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-1002-UDX.
- **Chapter 2, "Installation"** – Provides instructions for installing the BBG-1002-UDX and setting up its network access.
- **Chapter 3, "Setup/Operating Instructions"** – Provides overviews of operating controls and instructions for using the BBG-1002-UDX.

This chapter contains the following information:

- **Cobalt Reference Guides (p. 1-2)**
- **Manual Conventions (p. 1-2)**
- **Safety Summary (p. 1-3)**
- **BBG-1002-UDX Functional Description (p. 1-4)**
- **Technical Specifications (p. 1-11)**
- **Warranty and Service Information (p. 1-14)**
- **Contact Cobalt Digital Inc. (p. 1-15)**

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-1002-UDX itself. Examples are provided below.

- Device display messages are shown like this:

  BBG-1002-UDX

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

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

- **BBG-1002-UDX** refers to the BBG-1002-UDX Multi-Input Modular Up-Down-Cross Converter/Framesync with Auto-Changeover and Character Burn unit.
- **Frame** refers to the HPF-9000, OG3-FR, 8321, or similar 20-slot frame that houses Cobalt® or other cards.
- **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-1002-UDX and other cards 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 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-1002-UDX FPGA is designed for a normal-range operating temperature around 85° C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within device operating safe parameters, and can be allowed by setting this control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum device protection.**

BBG-1002-UDX Functional Description

Figure 1-1 shows a functional block diagram of the BBG-1002-UDX. The BBG-1002-UDX up/down/cross converter also optionally includes AES/analog audio support and CVBS video I/O. A Quality Check option allows failover to alternate inputs based on user-configurable subjective criteria such as black/frozen frame or audio silence. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even in cases where the input video image is static. The BBG-1002-UDX uses a built-in web server that allows control/monitor over computers or smart devices.

The BBG-1002-UDX also provides ARC processing and 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. Closed captioning from CEA708 to HD formats and line 21 SD closed captioning are available on the processed HD-SD-SDI outputs.

BBG-1002-UDX Input/Output Formats

The BBG-1002-UDX provides the following inputs and outputs:

- **Inputs:**
  - **3G/HD/SD SDI IN A** thru **SDI IN D** – four 3G/HD/SD-SDI inputs (GUI-selectable or basic failover)
- **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.
  - **(BBG-1002-AV-EMDE only)** This models also provides an analog audio input and output pair, and one coaxial AES input and output that allows audio embed/de-embed. This model also provides an CVBS analog video input and output.

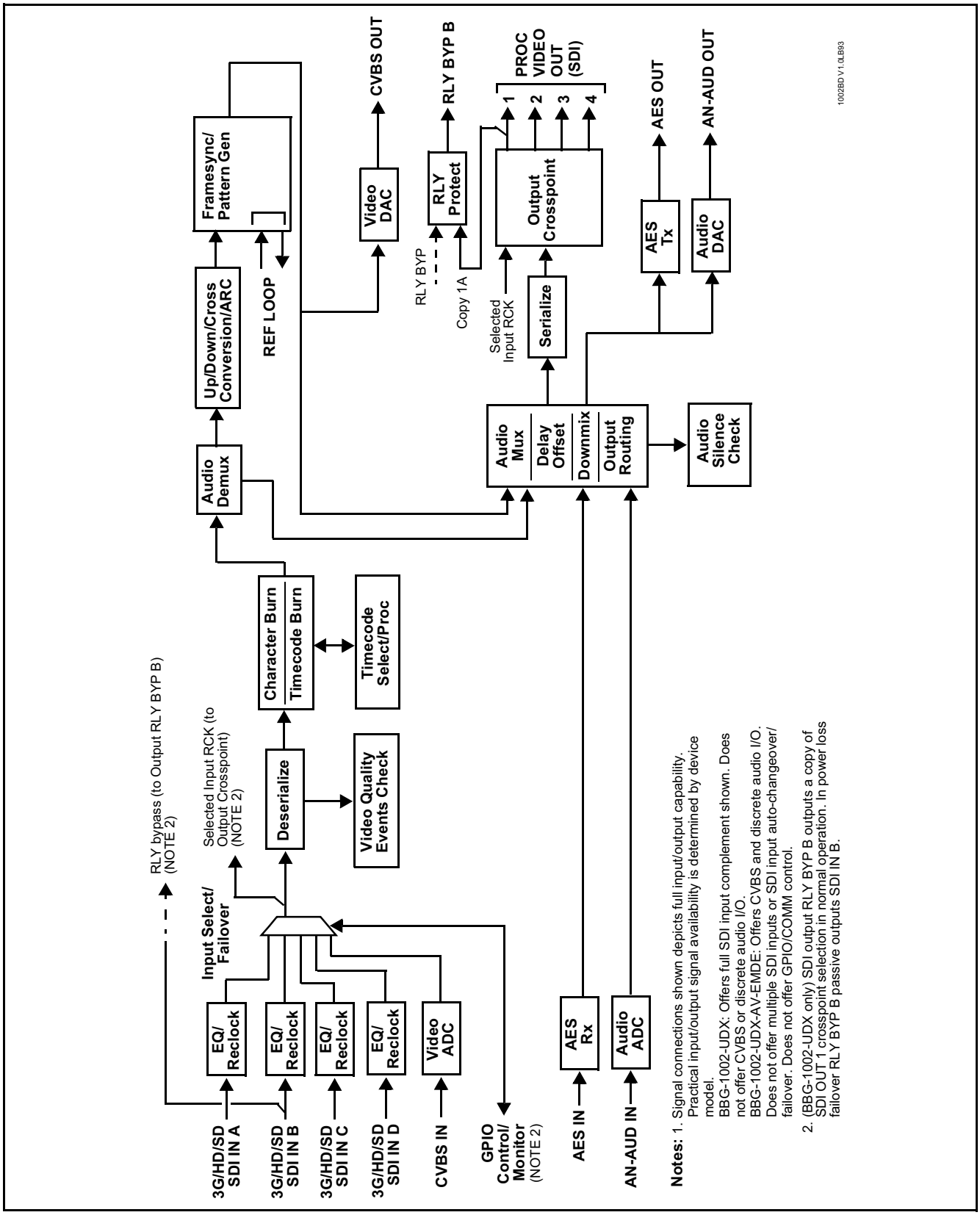

Figure 1-1 BBG-1002-UDX Functional Block Diagram

Video Processor Description

The BBG-1002-UDX features a up/down/cross-convert scaler, frame sync, and user-adjustable aspect ratio control and zoom control. The BBG-1002-UDX video subsystem also provides the functions described below.

Input Video Select/Quality Check Functions

A GUI-based control allows each of the device video inputs to be independently set as 3G/HD/SD-SDI or CVBS SD analog video. Either mode preserves waveform and/or packet-based ancillary data for extraction and usage later in the processing chain.

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 by the device when selected as a choice on the output crosspoint.

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

Timecode Processor

(See Figure 1-2.) This function provides for extraction of timecode data from input video source, and in turn allow individual timecode strings to be embedded and/or burned into the output video. The function can monitor any of the video inputs of the device for supported timecode formats such as ATC_LTC or ATC_VITC for 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.

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.

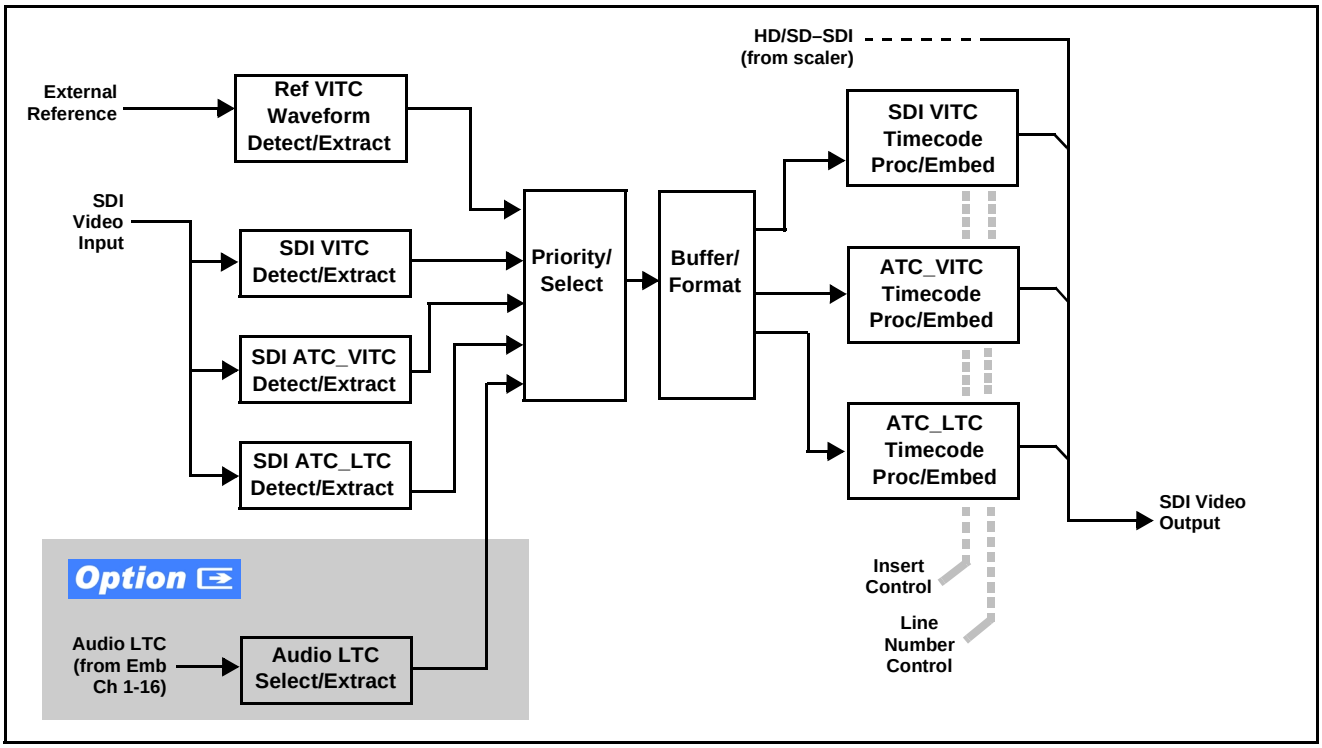

Figure 1-2 Timecode Processor

Frame Sync Function

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

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

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

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

Scaler Function

The scaler function provides up/down/cross-conversion to 3G/HD/SD from multiple broadcast-format standard SD and 3G/HD video formats and multiple frame rates, and cross-conversion between interlaced and progressive formats, with auto-format detect/down-conversion of SMPTE 424M/292M/259M formats.

The scaler function also provides aspect ratio conversion that provides a choice from several standard aspect ratios. User-defined settings allow custom user-defined H and V aspect ratio control. Additionally, “Follow AFD Settings” conversion can be applied. “Follow AFD Settings” sets the output aspect ratio to track with AFD (Active Format Description) settings embedded in the received video signal. Reticule insertion provides safe action area marking as well as other reticule functions and patterns.

Closed Captioning Processor

This function provides support for closed captioning setup. The function allows the selection of the ancillary data line number where the ancillary closed caption data is outputted when the output is HD. When receiving HD-SDI, both CEA 608 and CEA 708 are supported, with CEA 608 and CEA 708 (containing CEA 608 packets) converted to line 21 closed captioning on outputs down-converted to SD.

Y/C Phase Alignment Processor

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

Character/Image Burn-in Functions

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

Video Output Crosspoint

A 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**).

An additional output (**RLY BYP B**) provides a relay-protected output that outputs a copy of **SDI OUT 1** crosspoint selection in normal operation. In power loss failover **RLY BYP B** passive outputs the signal connected to **SDI IN B**.

Audio Processor Description

The audio processor operates as an internal audio router. This function chooses from the following inputs:

- 16 channels of embedded audio from the SDI video input (default 1-to-1 routing to SDI output)
- The processor function provides group enable/disable and de-embedding of the 16-channel embedded audio SDI input.

Note: Discrete audio embed/de-embed described below only on BBG-1002-AV-EMDE.

(See Figure 1-3.) The audio processing subsection is built around a device internal 16-channel bus. This 16-channel bus receives inputs from an input routing crosspoint that routes de-embedded (and discrete AES and analog audio inputs) over the 16-channel device 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 (and discrete AES and analog audio) outputs.

An Input Audio Status display shows the presence and peak level of each input audio channel received by the device. For digital audio inputs, payload is identified (PCM or data such as Dolby® Digital or E), as well as sample rate for discrete AES inputs. Discrete AES inputs can have sample rate conversion applied to align these inputs with the output timing (received sample rates from 32 kHz to 96 kHz are supported). An audio silence check can detect, on any channel, audio that persists below a specified loudness exceeding a configurable time span. This check can propagate an alert to the device Presets function to invoke audio routing and other changes.

As such, the audio subsection provides a full crosspoint between all supported audio inputs and output formats.

(BBG-1002-AV-EMDE only). In addition to SDI embedded audio channel sources, an analog pair input and a coaxial AES input an input audio choices are available. For digital audio inputs, payload is identified (PCM or data such as Dolby® Digital or E), as well as sample rate for discrete AES inputs. Discrete AES inputs can have sample rate conversion applied to align these inputs with the output timing in cases where AES audio is not synchronous with input video. This model also provides an analog audio output pair and a coaxial AES output which can receive any embedded channel.

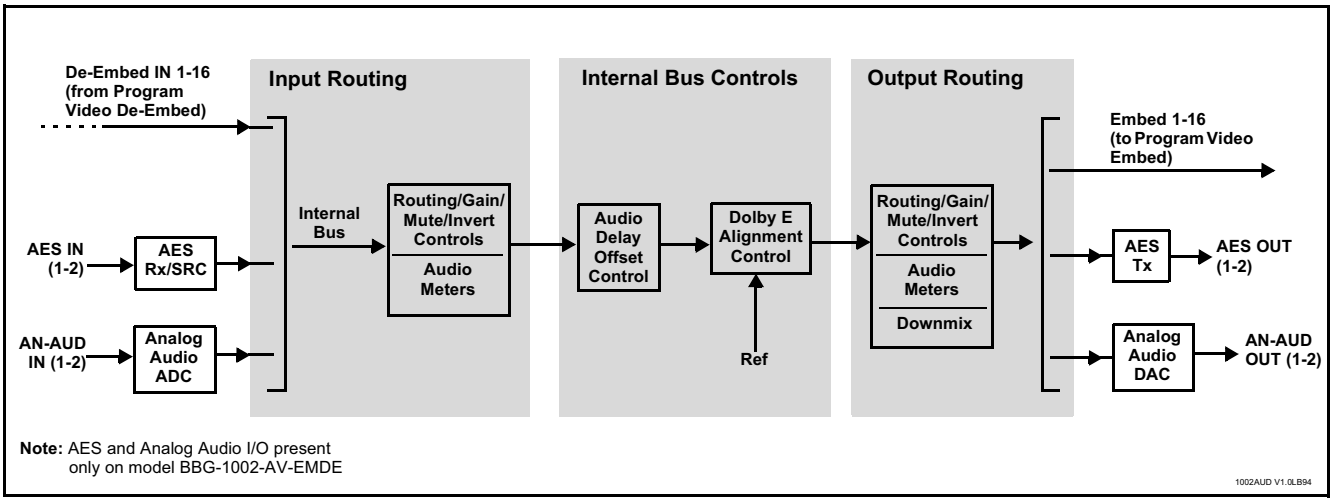

Figure 1-3 Basic Audio Processing Block Diagram

Audio Down Mix Function

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

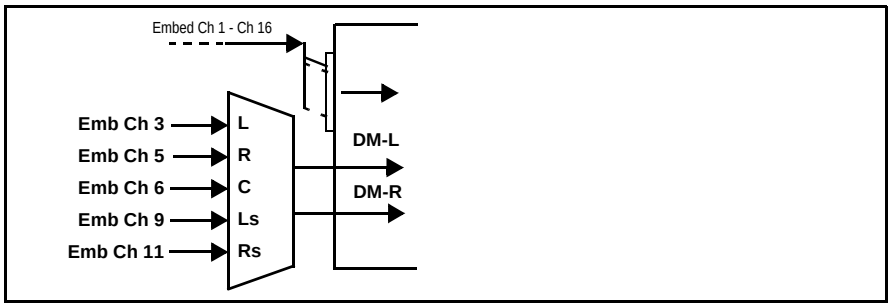

Figure 1-4 Audio Down Mix Functional Block Diagram with Example Sources

User Control Interface

BBG-1002-UDX uses an HTML5 internal web server for control/monitoring communication, which allows control via a web interface with no special or unique application on the client device. Connection to the device to the network media connection is via a standard 10/100/1000 RJ-45 Ethernet connection.

Technical Specifications

Table 1-1 lists the technical specifications for the BBG-1002-UDX Multi-Input Modular Up-Down-Cross Converter/Framesync with Auto-Changeover and Character Burn unit.

Table 1-1 Technical Specifications

Item	Characteristic
Part number, nomenclature	• BBG-1002-UDX Multi-Input Modular Up-Down-Cross Converter/ Framesync with Auto-Changeover and Character Burn • BBG-1002-UDX-AV-EMDE Multi-Input Modular Up-Down-Cross Converter/Framesync with Auto-Changeover and Character Burn with CVBS analog video I/O and analog/AES audio embed/ de-embed
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): Dimesions (WxHxD): Weight:	 32° – 104° F (0° – 40° C) < 95%, non-condensing 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections. 6 lb (2.8 kg)
Ethernet communication	10/100/1000 Mbps Ethernet with Auto-MDIX via HTML5 web interface.
Front-Panel Controls and Indicators	Backlit LCD display and menu navigation keys. Display and controls provide unit status display and full control as an alternate to web GUI control.
Serial Digital Video Input	Number of inputs: 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
Analog Video Input (BBG-1002-UDX-AV-EMDE only)	Number of Inputs: One SD analog CVBS Impedance: 75 Ω

Table 1-1 Technical Specifications — continued

Item	Characteristic
AES Audio Inputs (BBG-1002-UDX-AV-EMDE only)	Standard: SMPTE 276M Number of Inputs: 1 unbalanced; AES-3id Impedance: 75 Ω
Analog Audio Inputs (BBG-1002-UDX-AV-EMDE only)	Number of Inputs: Two balanced using 3-wire removable Phoenix connectors; 0 dBFS => +24 dBu
Input Select/Auto-Changeover Failover (option +QC)	Failover to alternate input on loss of target input. Failover invoked upon LOS and/or (with option +QC) user configurable parametric criteria such as black/frozen frame or audio silence. - Black frame trigger configurable for black intensity threshold and persistence time. - Frozen frame trigger configurable for frozen percentage difference and persistence time.
Post-Processor Serial Digital Video Outputs	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
Analog Video Output (BBG-1002-UDX-AV-EMDE only)	Number of Outputs: One SD analog CVBS Impedance: 75 Ω
Embedded Audio Output	16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

Table 1-1 Technical Specifications — continued

Item	Characteristic
AES Audio Outputs (BBG-1002-UDX-AV-EMDE only)	Standard: SMPTE 276M Number of Outputs: 1 unbalanced; AES-3id Impedance: 75 Ω
Analog Audio Outputs (BBG-1002-UDX-AV-EMDE only)	Number of Outputs: Two balanced using 3-wire removable Phoenix connectors; 0 dBFS => +24 dBu
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/COMM (BBG-1002-UDX only)	(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Warranty and Service Information

Cobalt Digital Inc. Limited Warranty

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

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

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

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

Cobalt Digital Inc. Factory Service Center

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- 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-1002-UDX (p. 2-1)
- Rear Panel Connections (p. 2-2)
- GPIO, Serial (COMM), and Analog Audio Connections (p. 2-4)

Installing the BBG-1002-UDX

Note:
- Where BBG-1002-UDX is to be installed on a 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-1002-UDX in locations marked with stamped “x”. If feet are not affixed, chassis bottom cooling vents will be obscured.
- Where BBG-1002-UDX is to be installed **with** optional frame Mounting Tray BBG-1000-TRAY, **do not** affix adhesive-backed feet.

1. If installing BBG-1002-UDX using optional frame Mounting Tray BBG-1000-TRAY, install BBG-1002-UDX in tray as shown in Figure 2-1.

2. Connect the input and output cables as shown in Rear Panel Connections (p. 2-2).

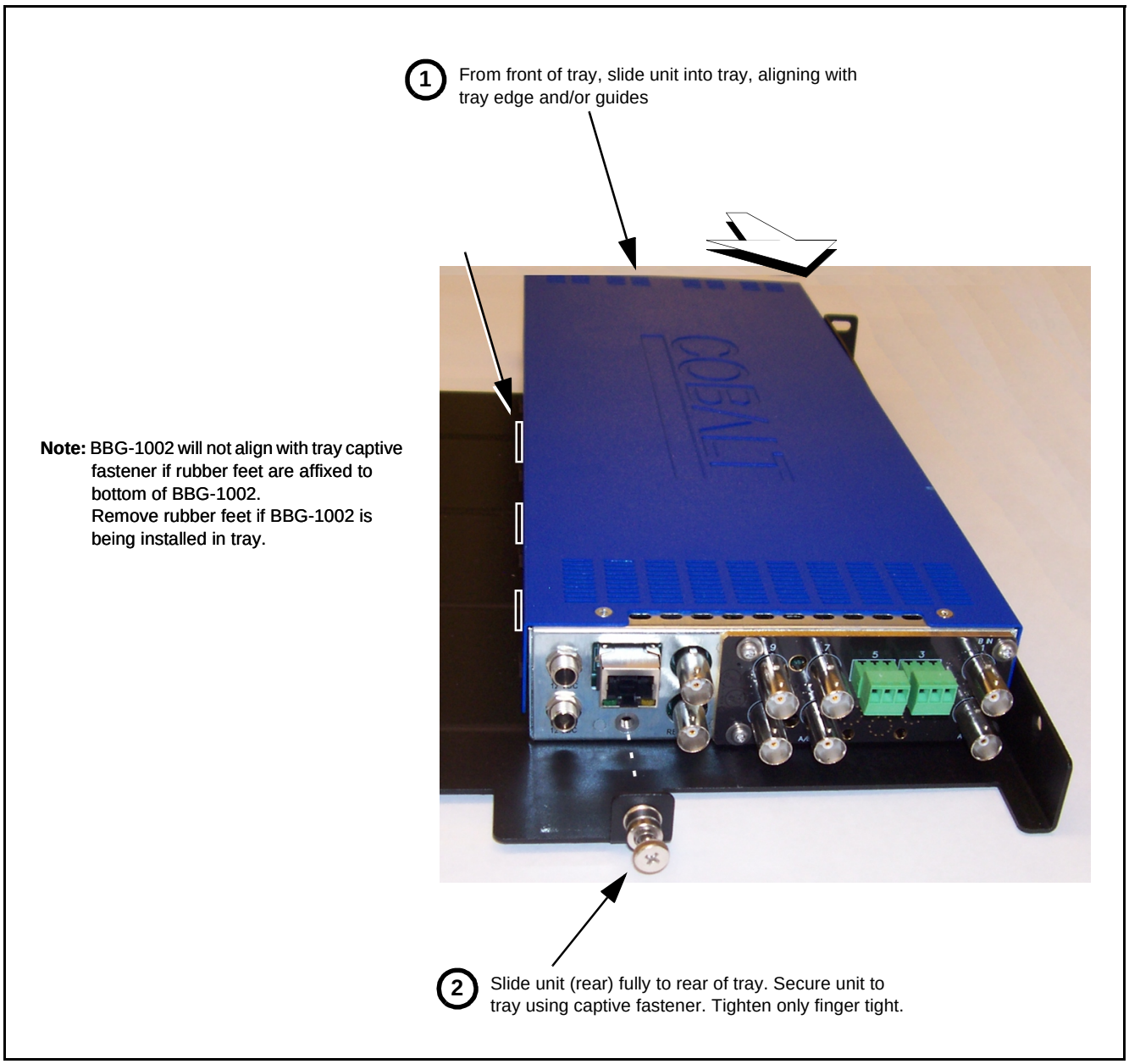


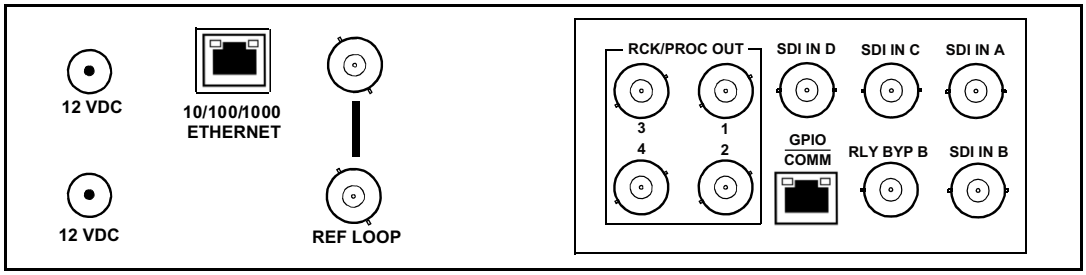
Figure 2-1 Mounting BBG-1002-UDX Using Frame Mounting Tray

Rear Panel Connections

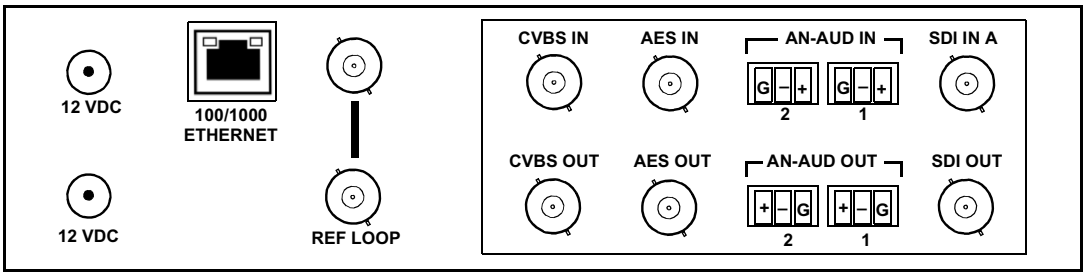
Perform rear panel cable connections as shown in Figure 2-2.

Note:
- The BBG-1002-UDX 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.

BBG-1002-UDX Rear Panel



BBG-1002-UDX-AV-EMDE 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	Looping 75Ω reference connection for connection to house black burst or tri-level reference connections
BBG-1002-UDX 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 card power is lost.
COMM/GPIO	RJ-45 connector that provides the following: - Multi-format serial interface - Two opto-isolated GPI inputs - Two SPST NO GPO relay closure contacts Note: See Figure 2-3 for connector pinouts.
BBG-1002-UDX-AV-EMDE Connectors	
SDI IN A	(1) 3G/HD/SD-SDI video input BNC
CVBS IN	(1) CVBS analog video input BNC
AN-AUD IN 1 / AN-AUD IN 2	(2) Analog balanced audio inputs
AES IN	(1) AES input BNC
SDI OUT	(1) 3G/HD/SD-SDI processed out BNC
CVBS OUT	(1) CVBS analog video output BNC
AN-AUD OUT 1 / AN-AUD OUT 2	(2) Analog balanced audio outputs
AES OUT	(1) AES output BNC

Figure 2-2 BBG-1002-UDX Rear Panel Connectors

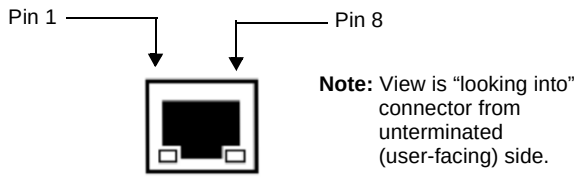
GPIO, Serial (COMM), and Analog Audio Connections

Figure 2-3 shows connections to the card multi-pin terminal block connectors. These connectors are used for card serial comm, GPIO, and balanced analog audio connections.

Note: It is preferable to wire connections to plugs oriented as shown in Figure 2-3 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.

COMM and GPIO Connections (RJ-45 Connector)

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



Balanced Analog Audio Port Connections

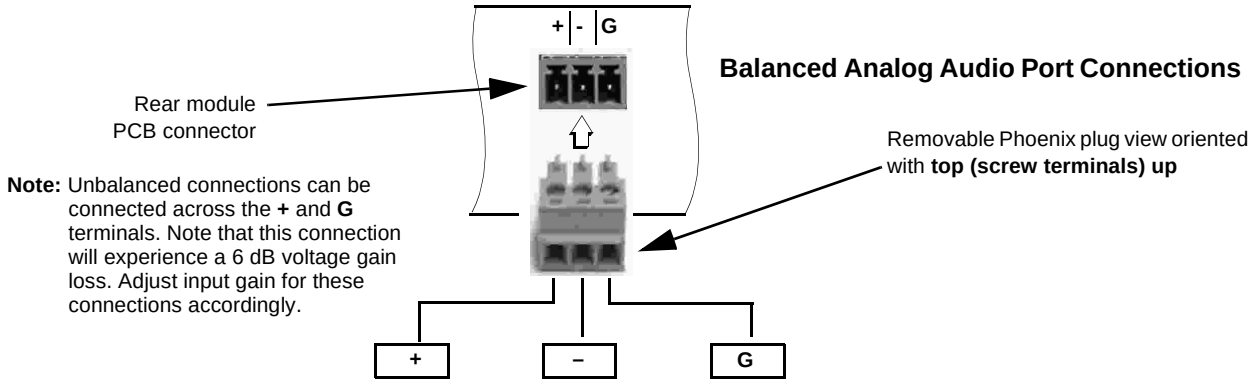


Figure 2-3 COMM, GPIO, and Analog Audio Connector Pinouts

Chapter 3

Setup/Operating Instructions

Overview

This chapter contains the following information:

- BBG-1002 Front Panel Display and Menu-Accessed Control (p. 3-1)
- Connecting BBG-1002 To Your Network (p. 3-3)
- Control and Display Descriptions (p. 3-5)
- Checking BBG-1002-UDX Device Information (p. 3-8)
- Ancillary Data Line Number Locations and Ranges (p. 3-9)
- BBG-1002-UDX Function Menu List and Descriptions (p. 3-10)
- Front Panel User Menus (p. 3-49)
- Troubleshooting (p. 3-51)

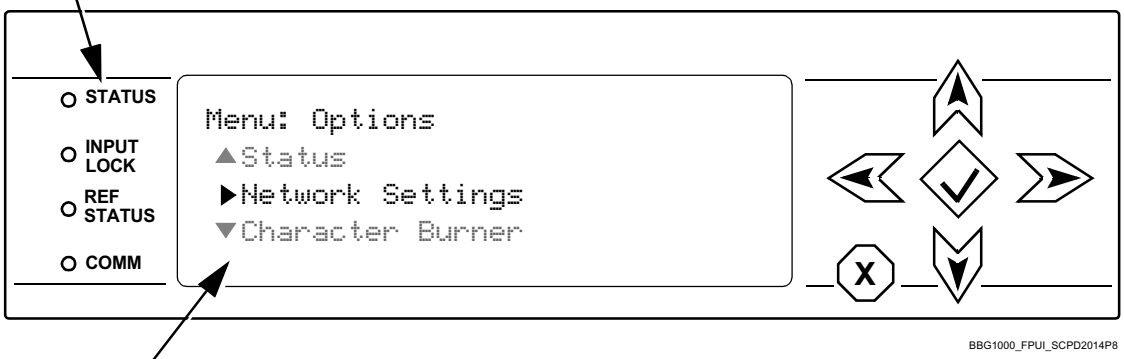
Perform the setup procedures here in the sequence specified. All procedures equally apply to all models unless otherwise noted.

Note:
- Unless otherwise noted, all procedures here are applicable for both the BBG-1002-UDX and BBG-1002-UDX-AV-EMDE. Either model is collectively referred to as “BBG-1002”.
- All instructions here assume BBG-1002 is physically connected to the control physical network as described in Chapter 2. Installation.

BBG-1002 Front Panel Display and Menu-Accessed Control

Figure 3-1 shows and describes the BBG-1002 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.



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

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

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

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

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

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

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

```
IP
                ▲
010.099.011.162
                ▼
```

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

Use the and buttons to navigate to other characters.

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

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

Figure 3-1 BBG-1002 Front Panel Display and Menu Controls

Connecting BBG-1002 To Your Network

BBG-1002 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-1002 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-1002 To Network

1. Power-up BBG-1002 and connect Ethernet cable connection to media. Wait for BBG-1002 to complete booting. When **`Product: BBG-1002`** ... 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`**.

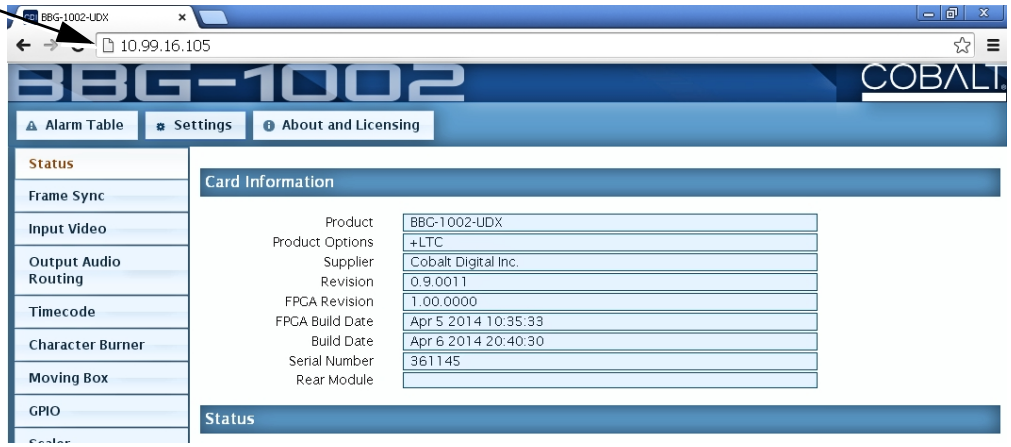
4. Configure the following fields as desired and appropriate for your network connection (examples shown below).

```
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-1002 can now be checked from the front panel by accessing this at any point.

6. At this point, BBG-1002 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-1002



Finding a BBG-1002 Device in DashBoard

(See Figure 3-2) If BBG-1002 is configured with an address within a network also available via DashBoard, a BBG-1002 device appears as a frame entity in the DashBoard Basic Tree View.

Note: BBG-1002 DashBoard remote control is also available by opening the device in DashBoard similar to opening an openGear® card.

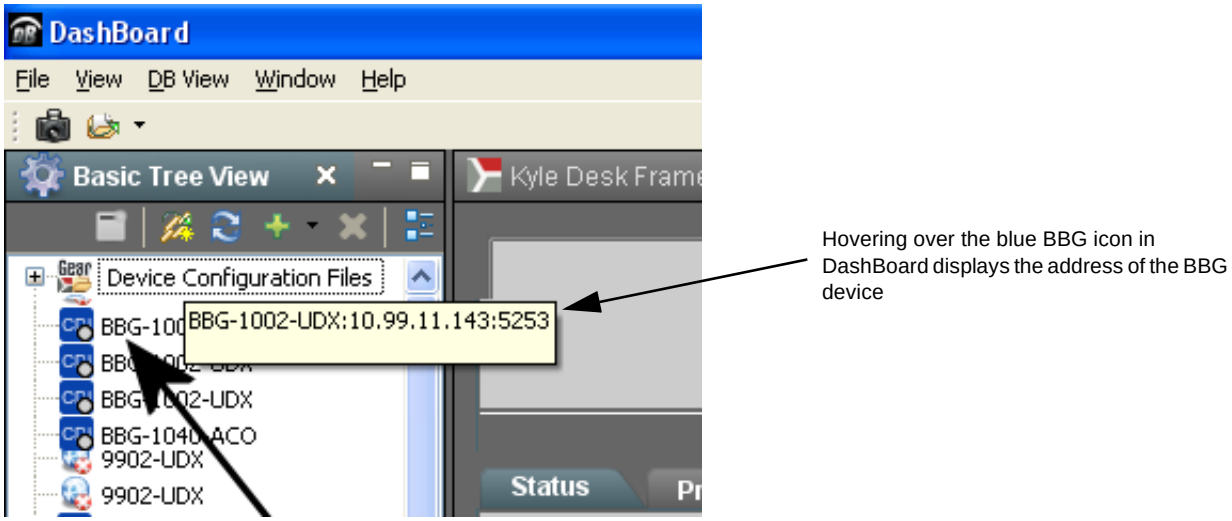


Figure 3-2 Finding BBG-1002 Using DashBoard

Control and Display Descriptions

This section describes the web user interface controls for using the BBG-1002-UDX.

The format in which the BBG-1002-UDX 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-1002-UDX device are organized into function **menus**, which consist of parameter groups as shown below.

Figure 3-3 shows how the BBG-1002-UDX device and its menus are organized, and also provides an overview of how navigation is performed between devices, function menus, and parameters.

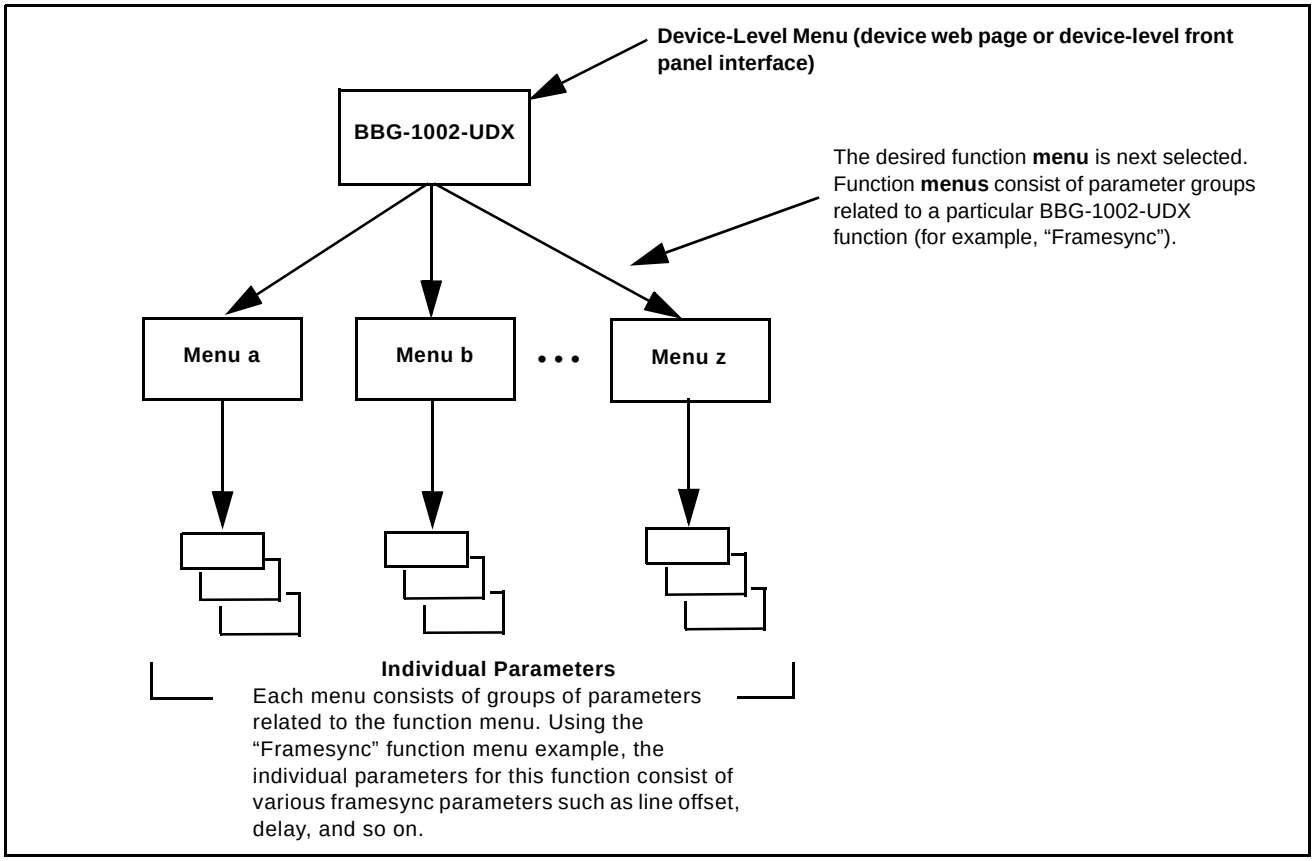
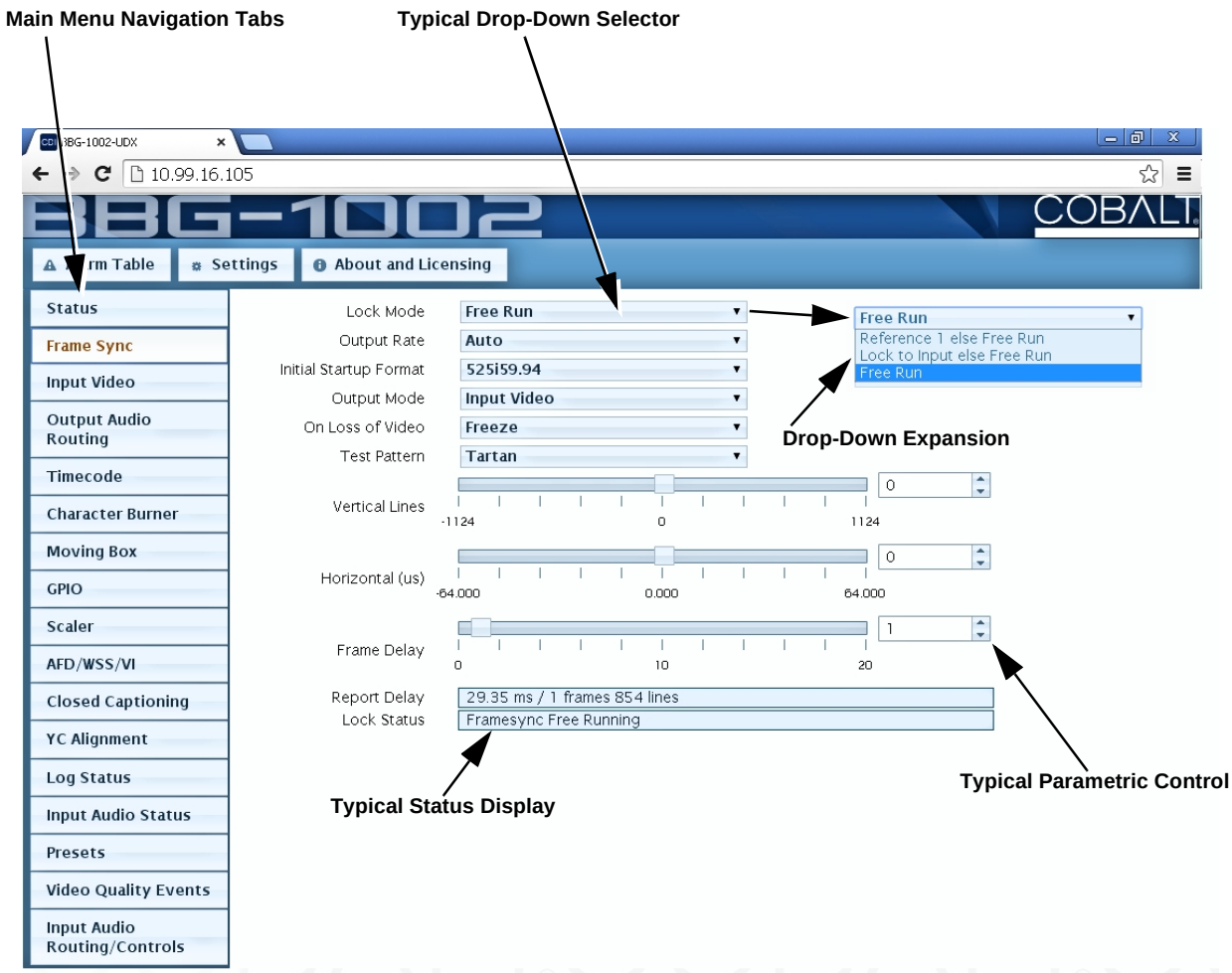


Figure 3-3 Function Submenu/Parameter Submenu Overview

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

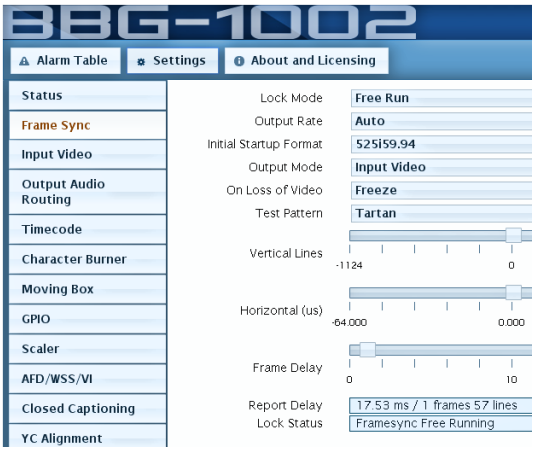
Clicking another main menu tab immediately displays the pane related to the selected main menu tab.

Figure 3-4 Typical Web UI Display and Controls

Display Theme

(See Figure 3-5.) The BBG-1002 user interface theme selection offers light and dark themes suited for various users and environments.

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



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

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

Figure 3-5 Web UI Display Themes

Checking BBG-1002-UDX Device Information

The operating status and software version the BBG-1002-UDX device can be checked by clicking the **Status** main menu tab. Figure 3-6 shows and describes the BBG-1002-UDX 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. 3-51) for corrective action.

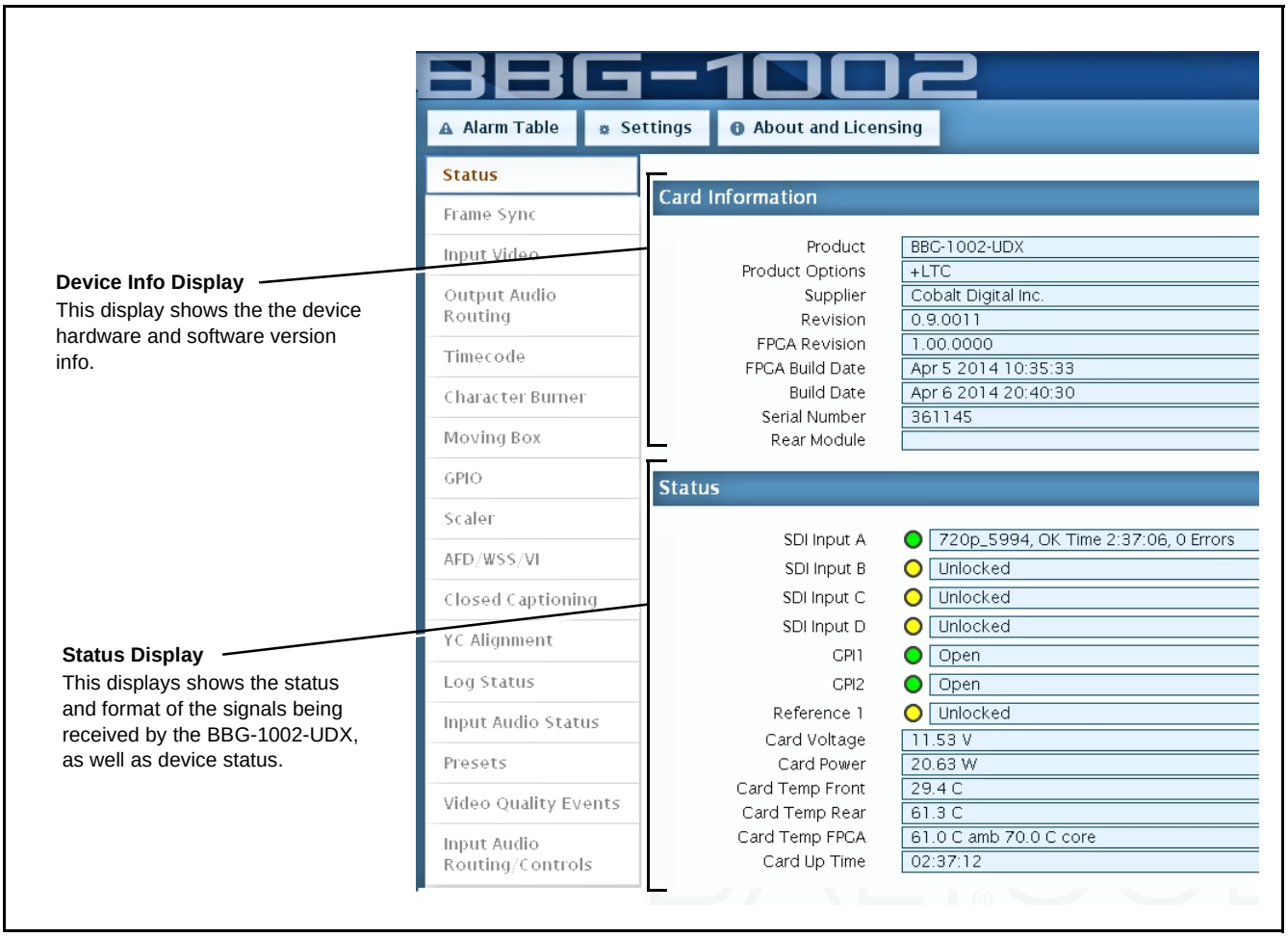


Figure 3-6 BBG-1002-UDX Device Info/Status Utility

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.

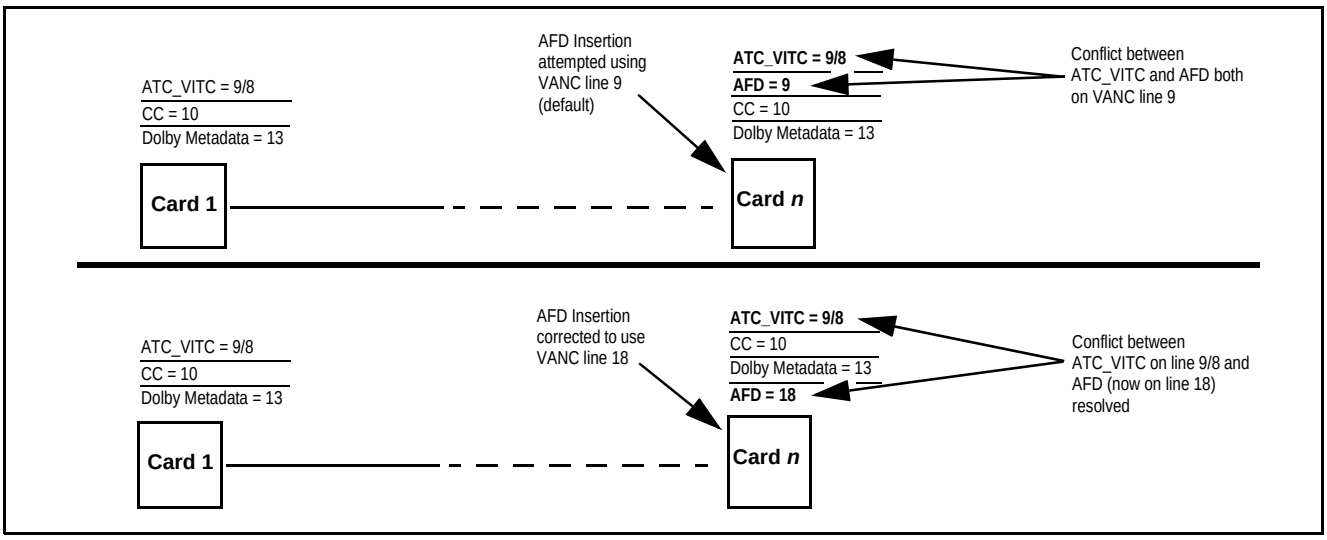


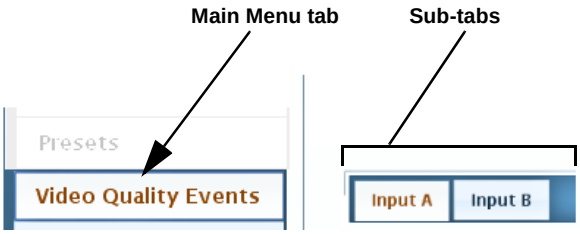
Figure 3-7 Example VANC Line Number Allocation Example

BBG-1002-UDX Function Menu List and Descriptions

Table 3-2 individually lists and describes each BBG-1002-UDX function menu item and its related list selections, controls, and parameters. Where helpful, examples showing usage of a function are also provided.

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

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



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.

Function Main Menu Item	Page	Function Main Menu Item	Page
Input Audio Status	3-11	Closed Captioning	3-33
Input Audio Routing/Controls	3-12	Character Burner	3-34
Input Video Controls	3-15	Moving Box Insertion	3-37
Video Quality Events	3-16	Y/C Alignment Controls	3-38
Framesync	3-17	Output Audio Routing/Controls	3-39
Scaler	3-20	GPIO Controls	3-43
AFD/WSS/VI ARC Controls	3-22	Presets	3-45
Timecode	3-28		

Table 3-2 BBG-1002-UDX Function Submenu List

Input Audio Status	Displays signal status and payload for embedded and discrete audio received by BBG-1002.

Individual signal status and peak level displays for embedded audio input pairs, and AES/analog input pairs (BBG-1002-UDX-AV-EMDE only) as describe below. AES pair status also shows sample rate.

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

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

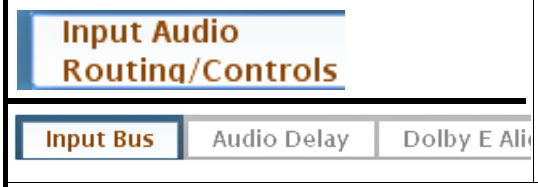
• AES Dolby-encoded inputs that are routed directly to BBG-1002 are directed via a special path that automatically bypasses SRC. However, AES inputs to other destinations (e.g., AES embedding) are first applied through SRC. These paths disable SRC if Dolby-encoded data is detected. To avoid a possible “Dolby noise burst” if an input on these paths changes from PCM to Dolby, it is recommended to set the AES **SRC** control for the pair to **SCR Off** for an AES input that is expected to carry a Dolby signal.

	Status	Peak
Emb 1-2	Present - PCM	-40 dBFS/-35 dBFS
Emb 3-4	Present - PCM	-30 dBFS/-25 dBFS
Emb 5-6	Present - PCM	-15 dBFS/-10 dBFS
Emb 7-8	Present - PCM	-80 dBFS/-80 dBFS
Emb 9-10	Present - PCM	-80 dBFS/-80 dBFS
Emb 11-12	Present - PCM	-80 dBFS/-80 dBFS
Emb 13-14	Present - PCM	-80 dBFS/-80 dBFS
Emb 15-16	Present - PCM	-80 dBFS/-80 dBFS

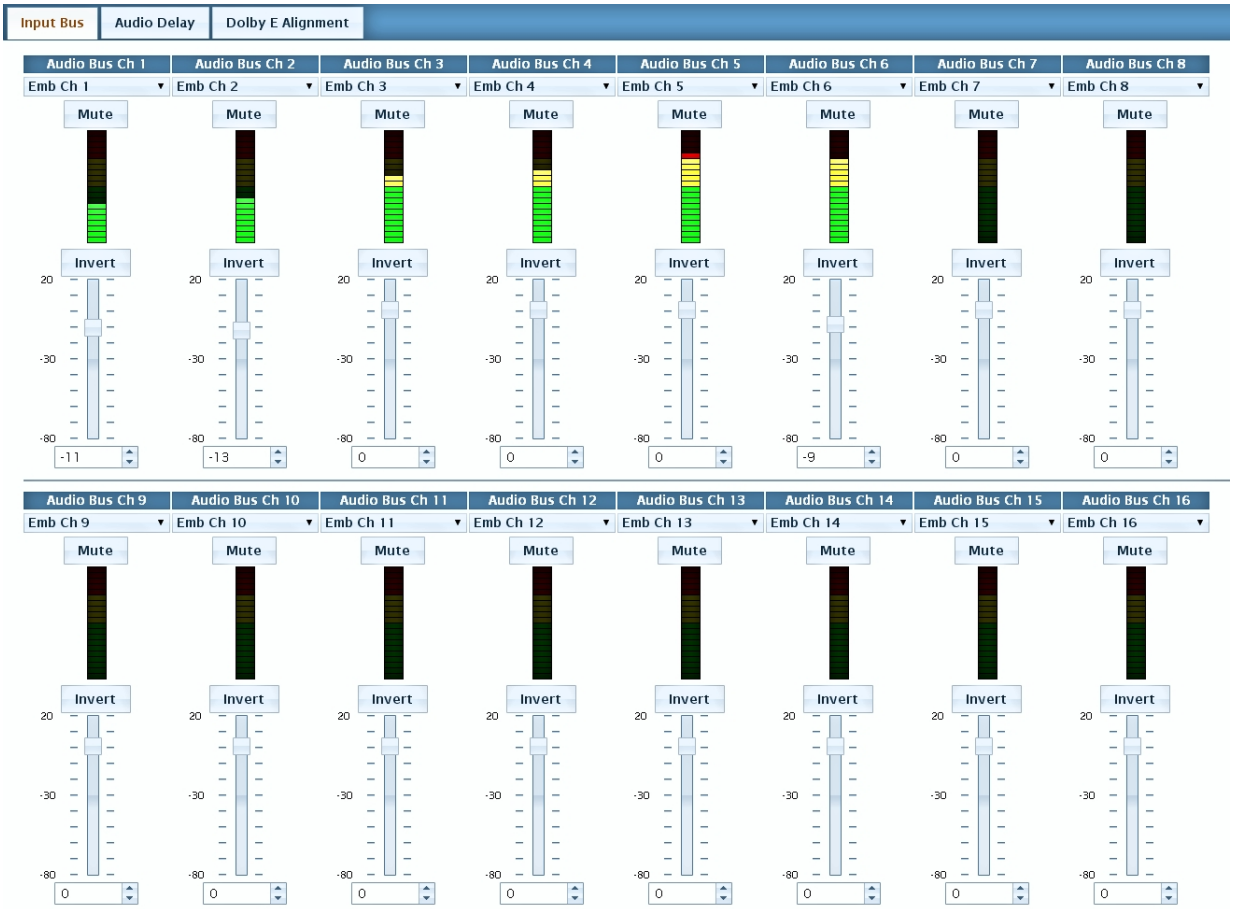
	Status	Peak	SRC
AES 1-2	Present - PCM	-30 dBFS/-25 dBFS	SRC On
AES 3-4	Absent	---/---	SRC On
AES 5-6	Absent	---/---	SRC On
AES 7-8	Absent	---/---	SRC On
AES 9-10	Absent	---/---	SRC On
AES 11-12	Absent	---/---	SRC On
AES 13-14	Absent	---/---	SRC On
AES 15-16	Absent	---/---	SRC On

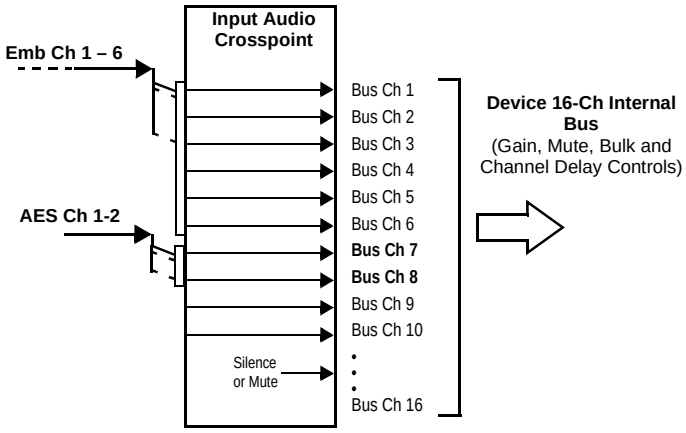
	Peak
Analog 1-2	-80 dBFS/-80 dBFS
Analog 3-4	-80 dBFS/-80 dBFS

Table 3-2 BBG-1002-UDX Function Submenu List — continued



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 direct Emb Ch 1 thru Ch 6 and AES Ch 1 and Ch 2 onto the device internal bus (unused bus channels can be set to Silence or Mute).

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-1002-UDX Function Submenu List — continued

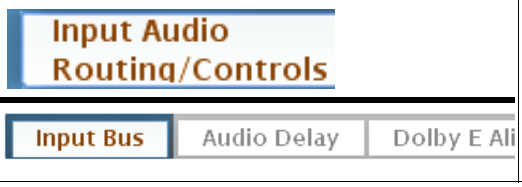
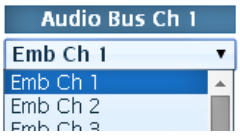
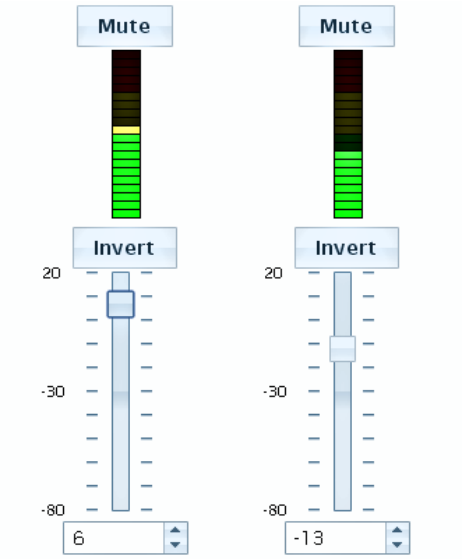
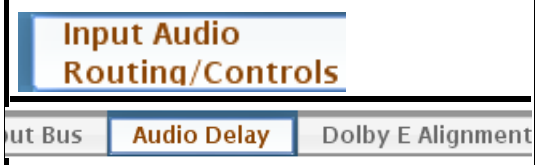
	**(continued)**
Note: • Default factory preset routing routes embedded Ch 1 thru Ch 16 to bus channels Audio Bus Ch 1 thru Ch 16. • **Bus Ch 2** thru **Bus Ch 16** have controls identical to the controls described here for **Bus Ch 1**. Therefore, only the **Bus Ch 1** controls are shown here.	
• **Bus Channel Source** 	Using the **Source** drop-down list, selects the audio input source to be routed to the device bus channel from the following choices: • Embedded input channel 1 thru 16 (**Emb Ch 1** thru **Emb Ch 16**) • **AES Ch1 / AES Ch 2** • **Analog Ch1 / Analog Ch 2** **Note:** AES and analog audio choices appear only on BBG-1002-UDX-AV-EMDE.
• **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 non-PCM data such as Dolby® E or AC-3 can be passed, 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 device 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).

Table 3-2 BBG-1002-UDX Function Submenu List — continued



(continued)

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

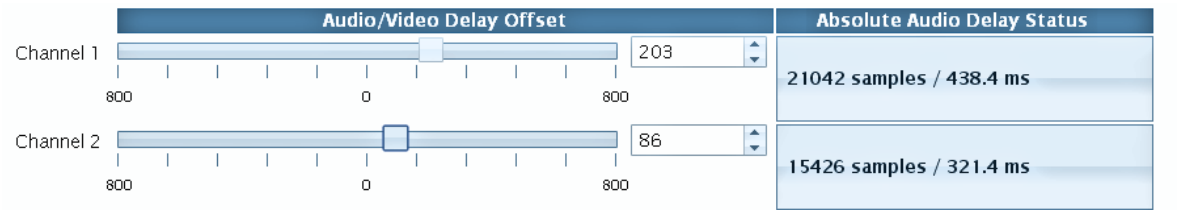
Offset control adds or reduces (offsets) channel audio delay from the matching video delay (audio delay offset setting adds or removes delay in addition to any delay included by other actions). This control is useful for correcting lip sync problems when video and audio paths in the chain experience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

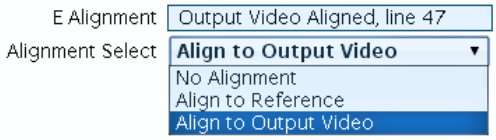
Note: • Maximum advance/delay offset is dependent on video format.

• 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 (either over embedded channels or via AES embedding to the 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 (scaling) 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.

• This control applies only to externally received Dolby E data streams.

Table 3-2 BBG-1002-UDX Function Submenu List — continued

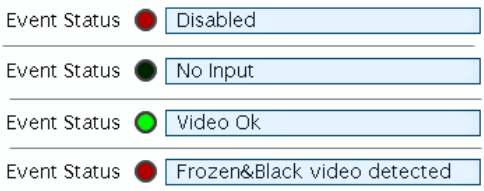
Input Video	Allows manual or failover selection of SDI program video inputs and displays status and raster format of received SDI video.
• **Input Video Source** Input Video Source: SDI A SDI A SDI B SDI C SDI D Failover A to B Failover B to A	Selects the input video source to be applied to the BBG-1002 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. • **CVBS** – selects CVBS input as the program video input (BBG-1002-UDX-AV-EMDE only). **Note:** Failover criteria via this control is simple signal presence.
• **Input Video Status**	Displays input status and audio group presence, along with elapsed time of signal acquire.
SDI A Status: 720p_5994, OK Time 0:14:37, 0 Errors SDI B Status: Unlocked SDI C Status: Unlocked SDI D Status: Unlocked	**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 Status pane.) **Note:** Status display shows maximum device input complement. Input complement is determined by rear I/O module used.

Table 3-2 BBG-1002-UDX Function Submenu List — continued

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.

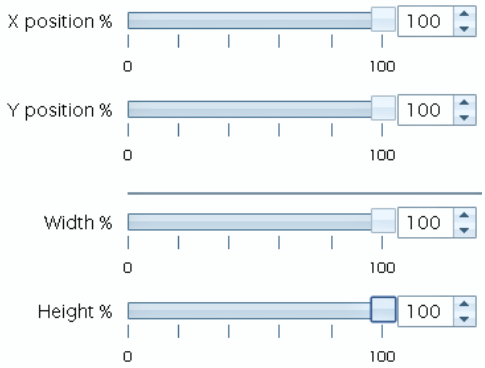
Note: **Input B** has controls identical to the controls described here for **Input A** sub-tab. Therefore, only the **Input A** controls are shown here. Set controls for other inputs using the respective sub-tab.

- **Event Status Indicator**



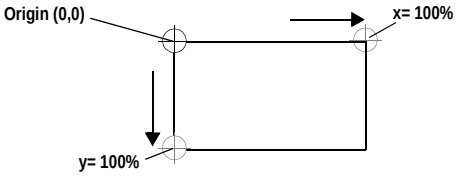
Displays event status (based on criteria set below) for signal condition to be considered OK (green), or signal condition considered to be a quality alert event (red) due the condition exceeding the criteria threshold(s) set below.

- **Position and Width Controls**

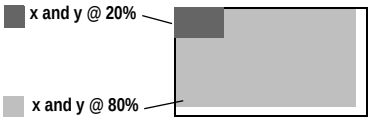


Position and Width controls set the area of concern to be screened by the Quality Event function.

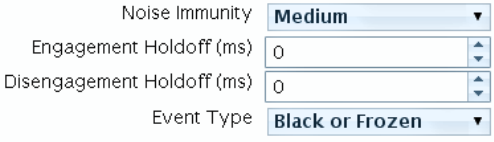
X and Y Position controls set the origin point for the area of concern



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-1002-UDX Function Submenu List — continued

Frame Sync	Provides video frame sync/delay offset control and output control/loss of program video failover selection controls.
• **Lock Mode Select** Lock Mode: **Reference 1 else Free Run** Reference 1 else Free Run Lock to Input else Free Run Free Run	Selects Frame Sync functions from the choices shown to the left and described below. • **Free Run:** Output video is locked to the BBG-1002 internal clock. Output video is **not** locked to external reference. • **Lock to Reference:** Output video is locked to external reference received on the frame reference bus. **Note:** If valid reference is not received, the indication appears in **Status**, 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.
• **Output Rate Select** Output Rate: **Auto** Auto 23.98/29.97/59.94 24/30/60	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** Initial Startup Format: **525i59.94** 525i59.94 720p-59.94/60 1080i-59.94/60 1080p-59.94/60	Selects a synthesized frame sync format/rate to be invoked (from the choices shown to the left) in the time preceding stable lock to external reference. Set this control to that of the intended external reference to help ensure smoothest frame sync locking. This control also sets the BBG-1002 test pattern format where the device's initial output from power-up is the internal pattern instead of program video.
• **Program Video Output Mode Select** Output Mode: **Input Video** Input Video Flat Field Freeze Test Pattern Snow	Provides a convenient location to select between 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 (Black)** – device outputs black 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 synthesized snow multi-color pattern.

Table 3-2 BBG-1002-UDX Function Submenu List — continued

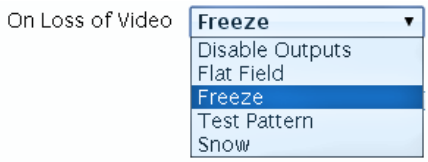
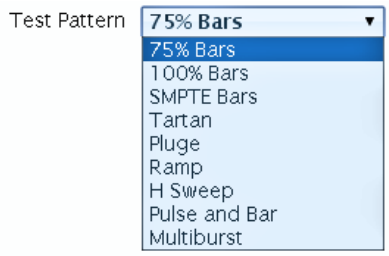
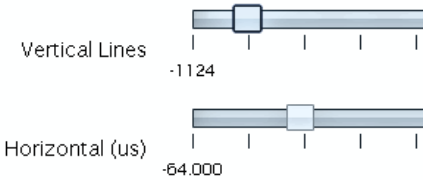
Frame Sync	(continued)
• **Loss of Input Signal Selection** 	In the event of program input video Loss of Signal (LOS), determines action to be taken as follows: • **Disable Outputs:** Disable program video SDI outputs. • **Flat Field (Black)** – go to black flat field on program video output. • **Freeze** – 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 synthesized snow multi-color pattern.
• **Pattern Select** 	Provides a choice of standard technical patterns (shown to the left) when **Test Pattern** is invoked (either by LOS failover or directly by selecting Test Pattern on the Program Video Output Mode Select control).
• **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 device 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 kame certain desired amount of frames are delayed.

Table 3-2 BBG-1002-UDX Function Submenu List — continued

Frame Sync	**(continued)**
• **Video Delay Display** Report Delay 29.63 ms / 1 frames 873 lines	Displays the current input-to-output video delay (in msec units) as well as in terms of Frames/fractional frame (in number of lines).
• **Framesync Lock Status Display** Lock Status Framesync Free Running	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. 3-12) for these controls.	

Table 3-2 BBG-1002-UDX Function Submenu List — continued

Scaler	Provides up/down/cross-converter, aspect ratio controls, and user H/V controls.
• **Scaler Enable Control** Scaler Enable: Scaler Enabled ▼ Scaler Bypassed Scaler Enabled	Enables or disables Scaler function. **Note:** When scaler is disabled, all ancillary data is passed from input to output intact. If the scaler is enabled, ancillary data such as timecode and closed captioning must be set for re-insertion as desired. See Timecode (p. 3-28) and Closed Captioning (p. 3-33) for more information about insertion into scaled output video.
• **Input/Output Video Status** Input Video: 720p_5994 Output Video: 1080p_5994	Displays signal format/status sent to scaler (as a function of Input Video Source settings above), as well as output format/status. If invalid or no signal is present, **none** is displayed.
• **Output Format Selector** Output Format: 1080p - 3G A -50/59.94 ▼ Match Input SD 720p - 50/59.94 1080i - 50/59.94 1080p - 3G A -50/59.94	Provides conversions to broadcast formats as shown to the left.
• **Standard Quick Set Aspect Ratio Conversion Selectors**	Selects between the standard preset Aspect Ratio Conversions (ARC) shown below. **Note:** • A **Scaler follow AFD** control on the **AFD/WSS/VI** tab allows scaler to provide AFD-based ARC. Use this setting if AFD ARC is desired for output video. When **Scaler follow AFD** is enabled, any selection here is overridden. Refer to AFD/WSS/VI ARC Controls (p. 3-22) for more information. • This function is intended for aspect ratio adjustment of a particular signal without AFD considerations. - If ARC is being used on a case-by-case basis for a particular signal, it is easier to use the Scaler ARC tools described here. - If AFD is to be used to set and apply a standard AFD code label for ARC, use **Follow AFD Settings**. Do not perform ARC here; instead, perform ARC as described in the **AFD** function description per AFD/WSS/VI ARC Controls (p. 3-22).

Unity 1.0HV	Pillar Box 0.75H	Center Cut 1.33H	Letter Box 0.75V	Vertical Center Cut 1.33V
Apply	Apply	Apply	Apply	Apply

Table 3-2 BBG-1002-UDX Function Submenu List — continued

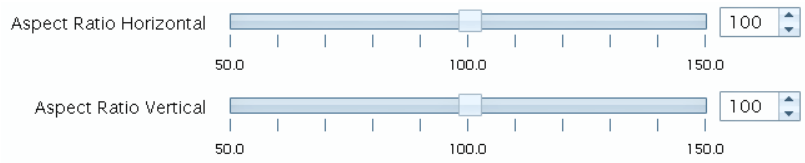
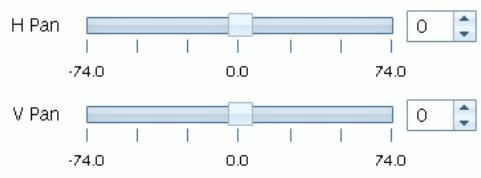
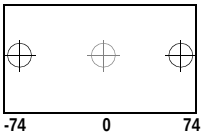
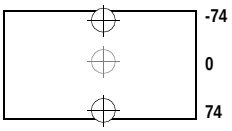
Scaler	**(continued)**
• **User-defined Aspect Ratio Controls**	**Aspect Ratio Horizontal** and **Aspect Ratio Vertical** controls adjust horizontal and vertical zoom percentage. Settings less than (<) 100% provide zoom-out; settings greater than (>) 100% provide zoom-in. (50% to 150% range in 0.1% steps; null = 100.0)
	Although buttons allow standard ARC presets to be applied to output video, for any setting using the **Horizontal** or **Vertical** controls allow user custom settings. Pressing any of the preset buttons restores the ARC to the selected setting and overrides any previous custom settings.
• **H Pan and V Pan Controls** 	**H Pan** control shifts horizontal center of image left (negative settings) or right (positive settings) (-74% to 74% range in 0.1% steps; null = 0.0)  **V Pan** control shifts vertical center of image down (negative settings) or up (positive settings) (-74% to 74% range in 0.1% steps; null = 0.0) 

Table 3-2 BBG-1002-UDX Function Submenu List — continued

Allows assignment of AFD, WSS and/or VI codes to the SDI output video, and allows custom ARC settings to be applied for each code. Also allows translations between WSS, VI, and AFD active ARC formats.

Provides active ARC re-aspecting, resulting in a properly scaled and cropped image area.

Without AFD

NTSC-Coded (4:3) up-converted 1080i Video Signal → **Re-Aspect to 16:9** → **1080i Video Signal with 16:9 uncorrected ARC**

NTSC-Coded image on 16:9 display shows letterbox cropping

Uncompensated up-conversion results in “postage stamp” effect with both letterbox and sidebars visible on 16:9 display

With AFD

NTSC-Coded (4:3) 1080i Video Signal with 1010 AFD Code → **1010 AFD Code Received and Applied to Scaler** → **Re-Aspect to 16:9** → **1080i Video Signal with 16:9 corrected ARC**

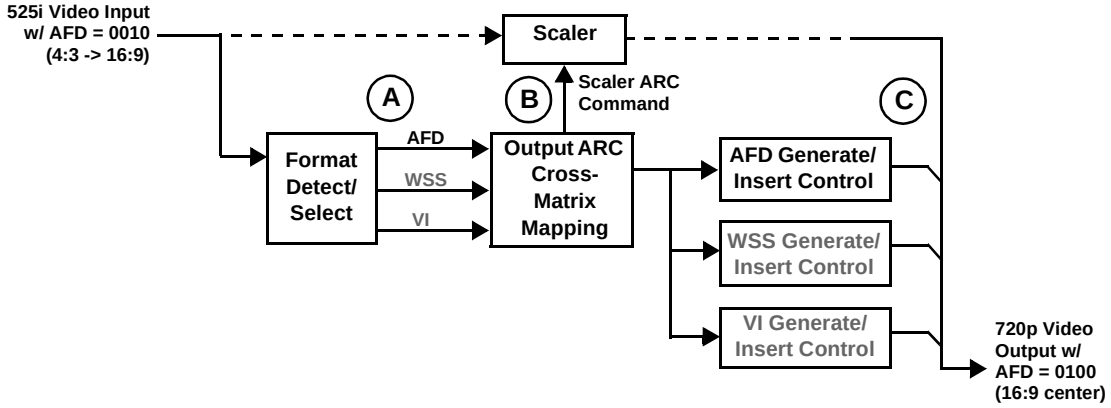
NTSC-Coded image on 16:9 display shows letterbox cropping

AFD Corrected up-conversion/ re-aspect results in intended image area properly visible on 16:9 display

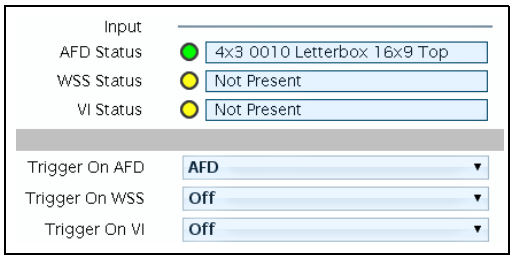
Table 3-2 BBG-1002-UDX Function Submenu List — continued

(continued)

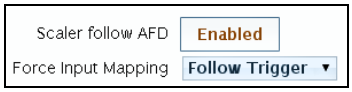
Shown below is an example in which received 525i5994 SDI video is being up-converted to 720p5994. The settings shown in the example below provide for directing the scaler to re-aspect the 4:3 input video to full, centered 16:9 re-aspecting, and mark the output video with the AFD code representing the new re-aspected H/V format.



A Noting that the incoming video contains AFD coding, **Trigger on AFD** is set to **AFD**, with other choices set to **Off**. The settings here allow ARC to trigger only on an AFD-coded input.



B In this example, it is desired to use the H/V re-aspecting inherent in the received video ARC, perform the re-aspecting with no modification, and output an AFD code representing the re-aspecting performed.



As such, **Force Input Mapping** is set to **Follow Trigger**, thereby bypassing the Output ARC Cross-Matrix Map table and directly perform the re-aspecting defined by the received code (in this example, Letterbox 16x9). Also in this example, the scaler is directed to apply the output AFD re-aspecting by setting **Scaler Follow AFD** to **Enabled**.

C In this example, since only AFD is to be outputted, **AFD Output** is set to **Enabled**, with WSS and VI choices set to **Disabled**.

AFD Status shows AFD code now being outputted.

The insertion line number (using its default value here), can be set using the **AFD Output Line** controls (for the progressive format in this example, the Field 1 control serves as the line number control).

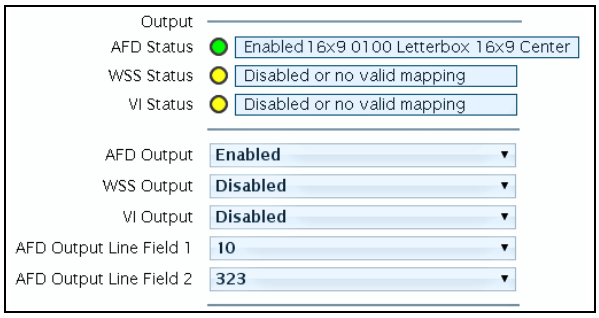


Table 3-2 BBG-1002-UDX Function Submenu List — continued

	AFD/WSS/VI sub-tab provides prioritized and gated input monitoring for AFD, WSS and/or VI formats. Also provides translation between input and output AFD, WSS, and VI ARC formats.
Note: • Line number control available only for AFD format. WSS and VI use fixed line numbers per applicable standards. • Some AFD codes are not supported in WSS and VI formats. Refer to AFD/WSS/VI Translation Matrix on page 3-26 for more information.	
• **Input Format Status Displays** Input AFD Status: 4x3 0010 Letterbox 16x9 Top WSS Status: Not Present VI Status: Not Present	Displays the current status and contents of the three supported ARC formats shown to the left. • If a format is received, the current formatting code and description is displayed (as shown in the example). • If a format is not receiving data, Not Present is displayed.
• **Scaler AFD Enable** Scaler follow AFD: **Enabled**	Enables scaler to apply ARC settings provided by ARC controls in this function. • **Enabled** sets the output aspect ratio to track with AFD settings performed in this tab, overriding any other scaler manual ARC control settings. • **Disabled** allows ARC coding processing performed in this tab, but does not apply ARC settings in scaler. **Note: Scaler follows AFD** functions only when a valid AFD output format is being generated and enabled. The scaler only observes AFD code commands, with the controls on this tab set to generate an AFD-coded output. WSS and/or VI formats must be translated to a supported AFD cross-translation for scaler active ARC to function when using WSS or VI input formats.
• **Input Mapping** Force Input Mapping: **Follow Trigger** Follow Trigger 4x3 Letterbox 16x9 Top 4x3 Letterbox 14x9 Top • • • 16x9 Protect 4x3	When received ARC code is received, applies H/V coding as follows: • **Follow Trigger** – Uses the ARC coding inherent in the received triggering ARC. • **4x3 ARC Codes** – For received triggering formats coded as 4x3, applies the H/V coding selected in this drop-down. • **16x9 ARC Codes** – For received triggering formats coded as 16x9, applies the H/V coding selected in this drop-down. **Note:** Settings performed here can be applied directly to the output video, or the settings applied here can be custom modified if desired for any of the 11 4x3 codes and any of the 11 16x9 codes available here using the **AFD Map** sub-tab. Refer to AFD/WSS/VI Translation Matrix on page 3-26 for more information and coding descriptions.

Table 3-2 BBG-1002-UDX Function Submenu List — continued

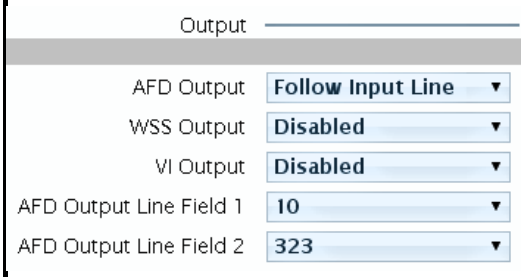
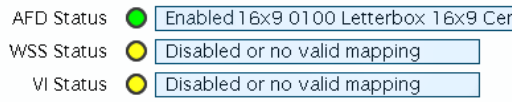
	(continued)
• **Input Triggering Controls** 	Individual ARC format input controls allow accepting or rejecting received ARC formats as follows: • **Trigger on AFD:** • **Off** rejects AFD-coded triggering. • **On** allows trigger on AFD. • **Trigger on WSS:** • **Off** rejects WSS-coded triggering. • **AFD** allows triggering on AFD-coded WSS. • **ETSI** allows triggering on ETSI-coded WSS. • **Trigger on VI:** • **Off** rejects VI-coded triggering. • **AFD** allows triggering on AFD-coded WSS. • **SMPTE** allows triggering on SMPTE-coded WSS. **Note:** If multiple formats are present on the input video, AFD preempts other formats, followed by WSS or VI (as set by the **WSS/VI Priority** control).
• **Output Enable and AFD Line Controls** 	Individual ARC format input controls allow accepting or rejecting received ARC formats as follows: • **AFD Output:** • **Disable** turns off AFD format on output. • **Enable** inserts AFD packet on output, and allows changing line number. • **Follow Input Line** inserts AFD packet on same line as received AFD line number (where applicable). • **WSS Output:** • **Disable** turns off WSS format on output. • **AFD Enabled** inserts AFD-coded WSS on output. • **ETSI Enabled** inserts ETSI-coded WSS on output. • **VI Output:** • **Disable** turns off WSS format on output. • **AFD Enabled** inserts AFD-coded VI on output. • **SMPTE Enabled** inserts SMPTE-coded VI on output. • **AFD Output Line** controls allow selecting the line location of the AFD data within the video signal Ancillary Data space. **Note:** • The device does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data. • For progressive formats, the Field 1 control serves as the line number control.
• **Output Status Displays** 	Displays the current output status, coding, and H/V ratio for AFD, WSS, and VI formats. • If a format is active and enabled (as set with the Output Enable controls), the code and H/V description is displayed. • If a format is not outputting data, Disabled is displayed. **Note:** • The code displayed shows the outputted code. If the code is modified by user settings performed in the **AFD Map** sub-tab, these changes are shown here. Refer to **AFD Map** sub-tab for more information. • As shown in the example, settings that result in invalid mapping across format translations will display Disabled. In these cases, no output is inserted for the format.

Table 3-2 BBG-1002-UDX Function Submenu List — continued

AFD/WSS/VI (continued)

AFD/WSS/VI | AFD Map

AFD/WSS/VI Translation Matrix

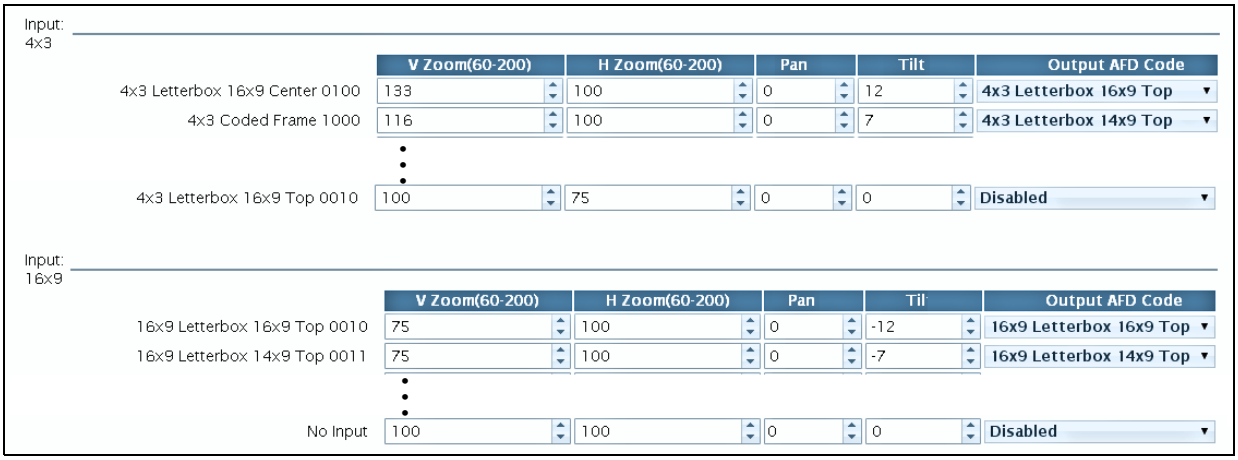
The table below lists valid translations between WSS, VI, and SMPTE 2016 AFD codes for both 4x3 and 16x9-coded frames.

	Input					Output				
	AFD	WSS ETSI 625	WSS ETSI 525	VI	Description	AFD	WSS ETSI 625	WSS ETSI 525	VI	Description
4:3 Coded	0010	4			4x3 Letterbox 16x9 Top	0010	4	0	1 (NTSC) 2 (PAL)	4x3 Letterbox 16x9 Top
	0011	2			4x3 Letterbox 14x9 Top	0011	2	0	1 (NTSC) 2 (PAL)	4x3 Letterbox 14x9 Top
	0100	5	2		4x3 Letterbox 16x9 Center	0100	5	2	1 (NTSC) 2 (PAL)	4x3 Letterbox 16x9 Center
	0101, 0110, 0111				Undefined					
	1000	0	0	0 1 (NTSC) 2 (PAL)	4x3 Coded Frame	1000	0	0	1 (NTSC) 2 (PAL)	4x3 Coded Frame
	1001				4x3 Center	1001	0	0	1 (NTSC) 2 (PAL)	4x3 Center
	1010	3			4x3 16x9 Center	1010	3	2	1 (NTSC) 2 (PAL)	4x3 16x9 Center
	1011	1			4x3 14x9 Center	1011	1	0	1 (NTSC) 2 (PAL)	4x3 14x9 Center
	1100			3, 4, 7	Reserved	1100		0	1 (NTSC) 2 (PAL)	Reserved
	1101	6			4x3 Protect 14x9	1101	6	0	1 (NTSC) 2 (PAL)	4x3 Protect 14x9
	1110				4x3 Letterbox 16x9; Protect 14x9 Center	1110		2	1 (NTSC) 2 (PAL)	4x3 Letterbox 16x9; Protect 14x9 Center
	1111				4x3 Letterbox 16x9; Protect 4x3 Center	1111		2	1 (NTSC) 2 (PAL)	4x3 Letterbox 16x9; Protect 4x3 Center
16:9 Coded	0010				16x9 Letterbox 16x9 Top	0010		1	5 (NTSC) 6 (PAL)	16x9 Letterbox 16x9 Top
	0011				16x9 Letterbox 14x9 Top	0011		1	5 (NTSC) 6 (PAL)	16x9 Letterbox 14x9 Top
	0100				16x9 Letterbox 16x9 Center	0100		1	5 (NTSC) 6 (PAL)	16x9 Letterbox 16x9 Center
	0101, 0110, 0111				Undefined					
	1000	7	1	0 5 (NTSC) 6 (PAL)	16x9 Coded Frame	1000	7	11	5 (NTSC) 6 (PAL)	16x9 Coded Frame
	1001				16x9 4x3 Center	1001		1	5 (NTSC) 6 (PAL)	16x9 4x3 Center
	1010				16x9 Center Protect 16x9	1010	7	1	5 (NTSC) 6 (PAL)	16x9 Center Protect 16x9
	1100				Reserved	1100		1	5 (NTSC) 6 (PAL)	Reserved
	1101				16x9 4x3 Protect 14x9	1101		1	5 (NTSC) 6 (PAL)	16x9 4x3 Protect 14x9
	1110				16x9 Protect 14x9	1110		1	5 (NTSC) 6 (PAL)	16x9 Protect 14x9
	1111				16x9 Protect 4x3	1111		1	5 (NTSC) 6 (PAL)	16x9 Protect 4x3

Note: Shaded cells indicate invalid translation which cannot be used.

Table 3-2 BBG-1002-UDX Function Submenu List — continued

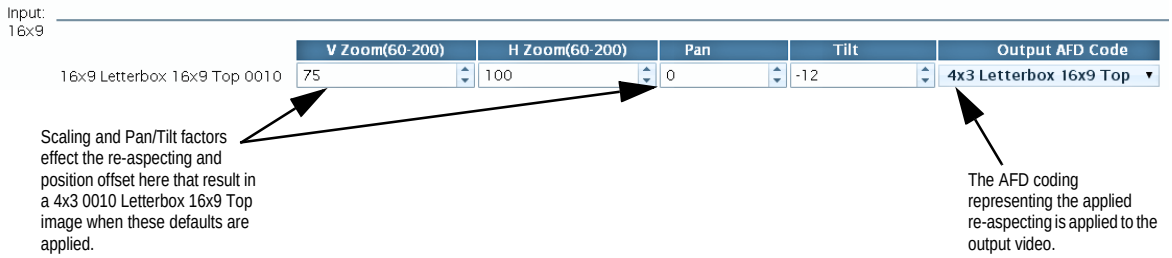
AFD Map sub-tab allows bidirectionally re-aspecting from 4x3 frames to companion 16x9 frames, and allows customizing aspect ratio settings for the AFD codes (and the corresponding WSS and VI translation equivalents) supported by the device.



Provides separate control groups for 4x3 and 16x9 coded input frames allowing custom ARC (as well as pan/tilt) for various coded frames.

By default, each row is set for its companion re-aspected output, along with output AFD code for the companion output (i.e., 4x3 frames get re-aspected to a companion 16x9 re-aspecting and AFD code, and similarly 16x9 frames get re-aspected to a companion 4x3 re-aspecting and AFD code).

In this example, default settings provide the scaling and tilt factors to convert a 16x9-coded 0010 frame to its companion 4x3 0010 Letterbox 16x9 Top frame.

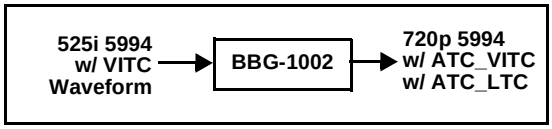


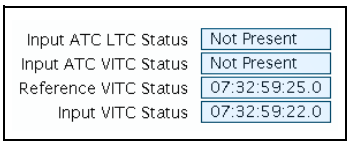
- When the scaler is set to **Scaler follow AFD** any V, H, pan, or tilt custom changes made here are directly applied to the output video.
- To simply output an AFD code (without any re-aspecting to be done by BBG-1002) set the **No Input** row to the desired code to be outputted (in this example, “16x9 4x3 Center”).

Table 3-2 BBG-1002-UDX Function Submenu List — continued

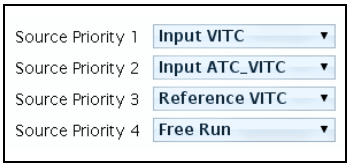
Timecode	Provides timecode data extraction from various sources, and provides formatting and re-insertion controls for inserting the timecode into the output video.

Shown below is an example in which received 525i 5994 SDI video is being up-converted to 720p 5994. 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.



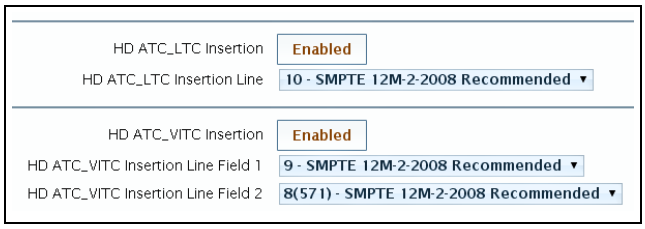


(A) Noting that the incoming video contains VITC waveform timecode data (as shown in the status display), set the Source Priority drop-down lists to include VITC Waveform timecode data (**SDI VITC**) as a choice. This extracts VITC Waveform timecode data from the incoming video.



(B) In this example, it is desired to provide both SDI ATC_VITC and ATC_LTC timecode data in the converted HD output video. As such, set both **HD ATC VITC Insertion** and **HD ATC LTC Insertion** to **Enabled**.

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



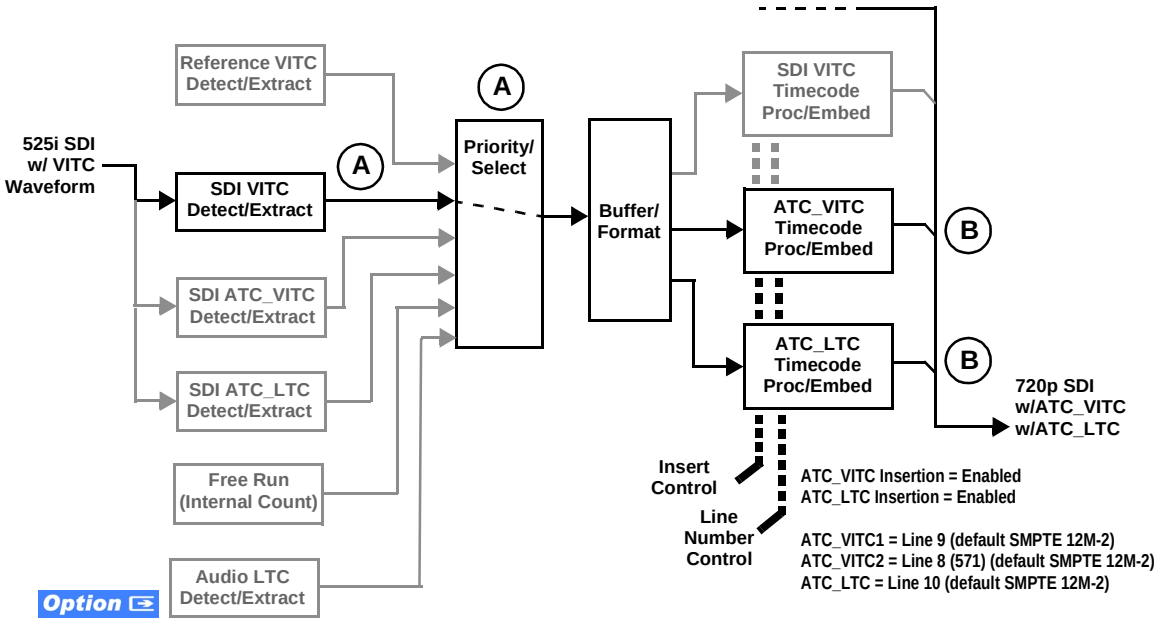


Table 3-2 BBG-1002-UDX Function Submenu List — continued

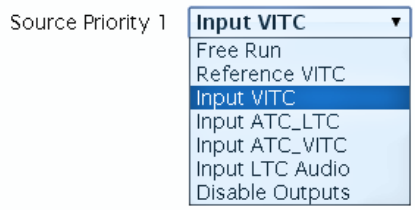
Timecode	**(continued)**
Option **Audio LTC** controls described below only appear on devices with **+LTC** licensed optional feature. This feature allows audio LTC from an audio channel to be used as a timecode source, with conversion to a selected SMPTE 12M format on the output video.	
• **Timecode Source Status Displays** Input ATC LTC Status: Not Present Input ATC VITC Status: 00:38:54:04.1 Field 1 Line 13, Field 2 Line 276 Reference VITC Status: 00:38:54:07.0 Input VITC Status: 00:38:54:04.1	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.
• **Audio LTC Source and Mute Controls** Input LTC Status: 00:39:50:25.0 LTC Input: Embed Ch 8 Mute LTC Audio on Input Loss: Disabled **Option**	(**+LTC** option only) **LTC Input** control selects an input audio channel when audio LTC is to be used as a source. Mute LTC Audio control allows timecode using LTC audio sources to freeze as follows: • When set to **Enabled** and input timecode is lost, timecode insertion is disabled. • When set to **Disabled** and input timecode is lost, timecode output reverts to next priority selection. **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** Incoming ATC Packet Removal: Disabled	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:** When the Scaler is enabled, ATC packets are automatically removed. The Timecode function must be used to re-insert the timecode data into the output video.

Table 3-2 BBG-1002-UDX Function Submenu List — continued

Timecode

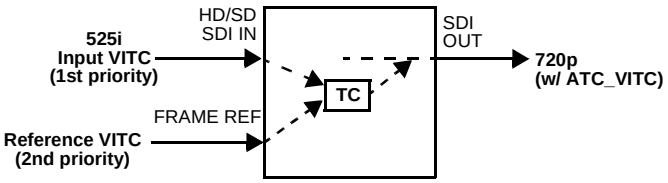
(continued)

- **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.)



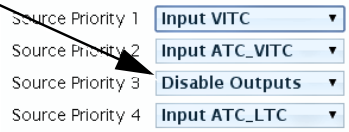
In this example, **Input VITC** 1st priority selection selects SDI VITC (received on SDI input) over reference VITC (received on frame reference) regardless of video input material source to be processed by BBG-1002.

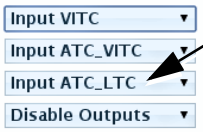
The selected timecode source is embedded on the SDI video output (in this example, 720p) using the selected line number. In this example, if the SDI VITC on the SDI input becomes unavailable, BBG-1002 then uses the reference VITC data received on the frame reference.

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

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.

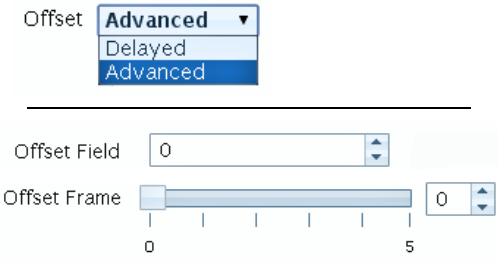
In this example, even though and ATC_LTC could be available to substitute for ATC_VITC not being present, the device will revert to no timecode output since the choice of Disable Output "out-prioritizes" ATC_LTC with these settings.





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-1002-UDX Function Submenu List — continued

Timecode	**(continued)**
• **Output Status Display** Output Status 01:10:52:17.1 (Source: Input ATC_LTC)	Displays the current content and source being used for the timecode data as follows: Output Status 01:10:52:17.1 (Source: Input ATC_LTC) • Output status OK (in this example, ATC_LTC timecode received and outputted). Output Status HD Insertions Disabled • Output disabled (either via priority failover to Disabled, or by Insertion button set to **Disabled**. **Note:** • If timecode is not available from Source Priority selections performed, timecode on output can be set to revert 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
• Option **Audio LTC Output**	Audio LTC output is routed to desired embedded and/or AES audio outputs using the Output Audio Routing/Controls (p. 3-39). 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** SD VITC Waveform Output 1 Line Number 14 SD VITC Waveform Output 2 Line Number 16 SD VITC Waveform Insertion Enabled	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** SD ATC_VITC Insertion Enabled SD ATC Insertion Line 13 - SMPTE 12M-2-2008 Recomm	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-1002-UDX Function Submenu List — continued

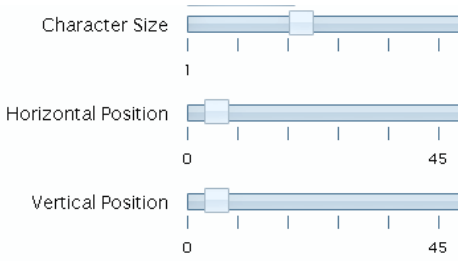
Timecode	(continued)
• HD ATC_LTC Insertion Control HD ATC_LTC Insertion: Enabled HD ATC_LTC Insertion Line: 10 - SMPTE 12M-2-2008 Rec	For HD output, enables or disables ATC_LTC timecode insertion into the output video, and selects the line number for ATC_LTC timecode data.
• HD ATC_VITC Insertion Control HD ATC_VITC Insertion: Enabled HD ATC_VITC Insertion Line Field 1: 9 - SMPTE 12M-2-200 HD ATC_VITC Insertion Line Field 2: 8(571) - SMPTE 12M-	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 ATC_VITC Legacy Support: Enabled	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 Free Run Hours: 7 Free Run Minutes: 0 Free Run Seconds: 0 Apply Free Run Values: Confirm	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-1002-UDX Function Submenu List — continued

Closed Captioning	Provides support for closed captioning setup.
Note: When receiving HD-SDI, both CEA 608 and CEA 708 are supported, with CEA 608 and CEA 708 (containing CEA 608 packets) converted to line 21 closed captioning on outputs down-converted to SD.	
• **Closed Captioning Input Status** Input Status CDP Packet on Line 10	Displays incoming Closed Captioning status as follows: • If closed captioning is present, a message similar to the example shown left is displayed. Also displayed is the VANC line number of the incoming closed captioning packet (or SD waveform-based VANC line number). • 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. • **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 as normal. • The closed captioning function does not support PAL closed captioning standards.
• **Closed Captioning On/Off and HD Insertion Line** Closed Captioning Enabled HD Output Line 9	Turns on or turns off Closed Captioning insertion on the output. **Note:** • Closed captioning is set to standard default line number (line 21) for SD output. • 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. • Closed captioning line may contain active unintended data even if closed captioning is set to **Off**.

Message	Description
Unsupported Frame Rate	Film rate closed-captioning (either as pass-through or up/down conversion) is not supported by the device.
Data Not Present	Packet is marked from closed captioning source external to the device that no data is present.
No Data ID	Packet from closed captioning source external to the device is not properly identified with 0x9669 as the first word of the header (unidentified packet).

Table 3-2 BBG-1002-UDX Function Submenu 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.
• **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 Size/Positioning Controls** 	Sets burn-in size/position attributes as follows: • **Character Size** sets proportional relative sizing. (Range is 0 thru 10) • **Horizontal Position** sets horizontal position (in percentage of offset from left of image area, left justified). (Range is 0 thru 90) • **Vertical Position** sets vertical position (in percentage of offset from top of image area, top justified). (Range is 0 thru 90) **Note:** 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.

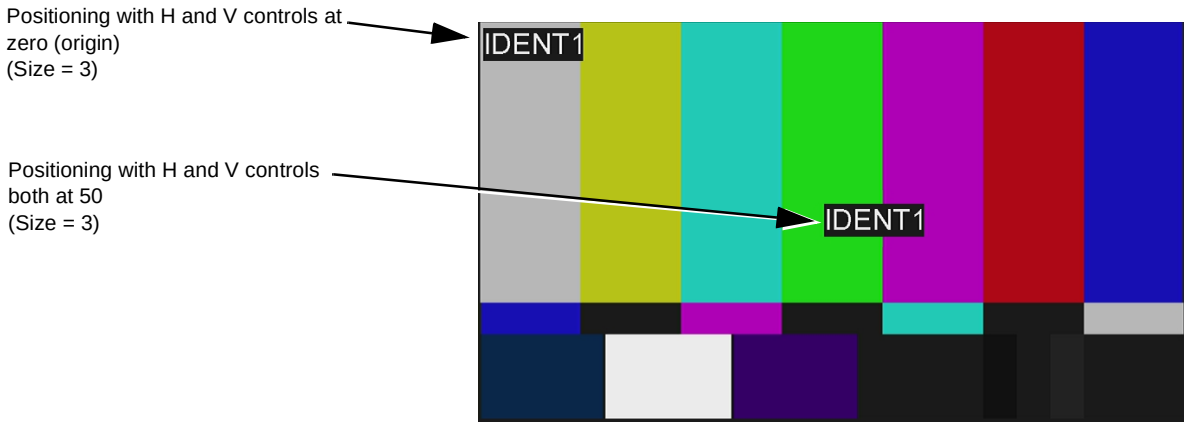


Table 3-2 BBG-1002-UDX Function Submenu List — continued

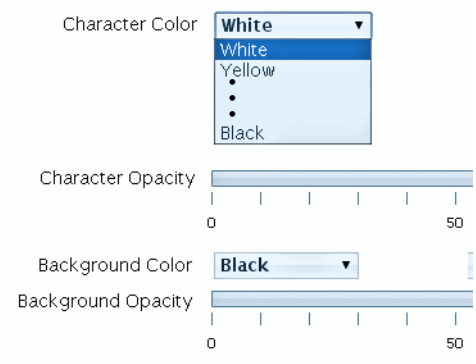
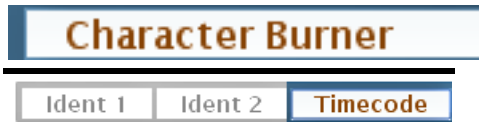
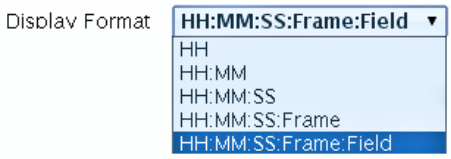
	(continued)
• **Ident Text Character/Background Attributes Controls** 	Provides independent controls for setting the color and opacity of the burn-in text and its background. • **Color** drop-downs set text or background color from multiple choices. • **Opacity** controls set text or background opacity from 0% (least opacity) to 100% (full opacity).
	Provides controls for burn-in of timecode on output video.
• **Output Status Display** Output Status 04:06:19:09.1 (Source: Input ATC_LTC)	Displays the current content and source being used for the timecode data. **Note:** This status display mirrors the same display in the Timecode tab. BBG-1002 must be set to output a timecode (as shown in this display) in order for timecode burn-in to function. See Timecode (p. 3-28) for information on using timecode controls.
• **Timecode Insertion Control** 	Enables or disables timecode burn-in overlay insertion into output video.
• **Timecode Format Display Selector** 	Selects the format of timecode string burn-in overlay insertion into output video from choices shown.

Table 3-2 BBG-1002-UDX Function Submenu List — continued

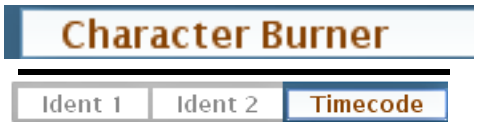
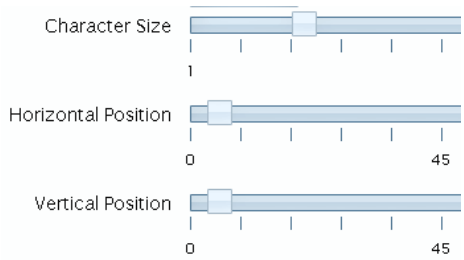
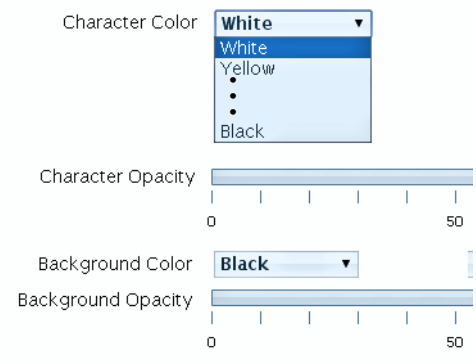
	**(continued)**
• **Timecode Character Size/Positioning Controls** 	Sets burn-in size/position attributes as follows: • **Character Size** sets proportional relative sizing. (Range is 0 thru 10) • **Horizontal Position** sets horizontal position (in percentage of offset from left of image area, left justified). (Range is 0 thru 90) • **Vertical Position** sets vertical position (in percentage of offset from top of image area, top justified). (Range is 0 thru 90) **Note:** 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 that accommodates both HD and SD raster formats if multiple format use is required. Avoiding placing text too close to margins or set larger than necessary helps in making certain text is not cut-off for HD or SD modes.
• **Timecode Character/Background Attributes Controls** 	Provides independent controls for setting the color and opacity of the burn-in timecode string and its background. • **Color** drop-downs set text or background color from multiple choices. • **Opacity** controls set text or background opacity from 0% (least opacity) to 100% (full opacity).

Table 3-2 BBG-1002-UDX Function Submenu 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 or lost.
	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 can be set to insert continuously, or only upon loss of input.
• **Moving Box Insertion Control** Moving Box: Enabled on loss of video Always disabled Always enabled Enabled on loss of video	Selects the rules for moving-box overlay insertion into output video. **Note:** If moving-box 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 moving-box insertion. If this control is set to “Disable Outputs”, no raster or moving-box insertion will be present on the output video under input LOS conditions. See Framesync (p. 3-17) for more information.
• **Moving Box Size Controls** Moving Box Width (%) Moving Box Height (%)	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** Moving Box Horizontal Speed: Fast None Slow Normal Fast Moving Box Vertical Speed: Normal	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.

Table 3-2 BBG-1002-UDX Function Submenu List — continued

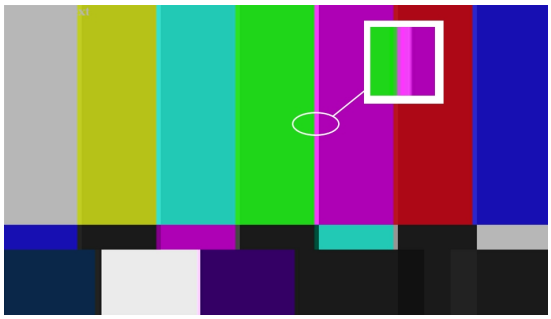
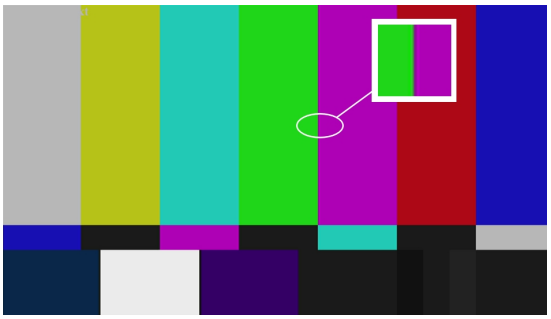
Moving Box	**(continued)**
• **Moving Box Attributes Controls** Moving Box Opacity (%) 0 Moving Box Color: White; White, Yellow, Cyan, Green, Magenta, Red, Blue, Black	Provides independent controls for setting the color and opacity of the moving-box insertion. • **Color** drop-down sets box color from multiple choices shown. • **Opacity** controls sets box opacity from 0% (least opacity) to 100% (full opacity).
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 converter, especially where the Y and chroma paths may experience differing characteristics.	
• **Y/C Alignment Controls** YC Alignment Enable: Enabled C Phase Adjustment Relative to Y: Minus 8; Minus 8, Minus 7, •, •, •, Plus 6, Plus 7	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.

Table 3-2 BBG-1002-UDX Function Submenu List — continued

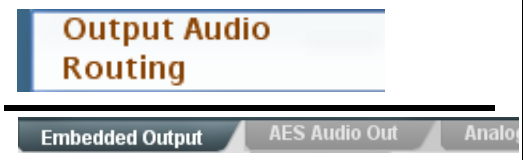
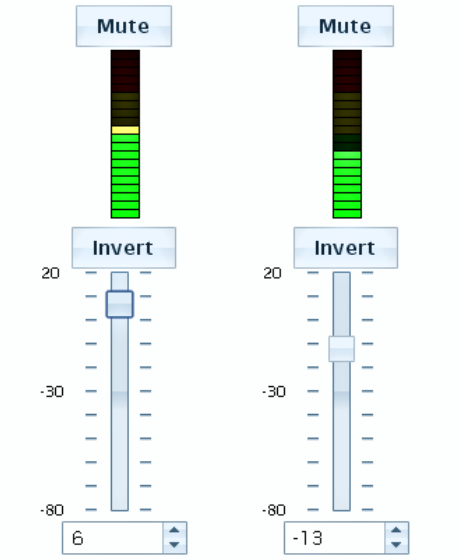
	Provides an audio crosspoint allowing the audio source selection for each embedded audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.
Note: • **Embedded Ch 2** thru **Embedded Ch 16** have controls identical to the **Source**, **Gain**, **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: • **Audio Bus Ch 1** thru **Ch 16** • Built-in Tone generators **Tone 1** thru **Tone 16** (all are -20 dBFS level; freq (Hz) in ascending order are 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k) **Note:** Multiple tone generators, even if set to the same frequency, may not exhibit phase coherence. If identical tones with frequency and phase coherence are required, use a single tone generator (e.g., "TG1") across multiple channels instead of multiple generators set to the same frequency. • ***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-1002 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-1002-UDX Function Submenu List — continued

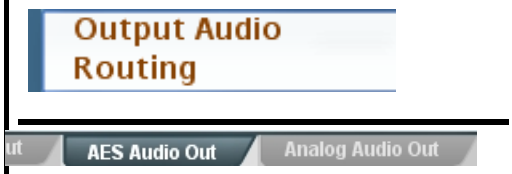
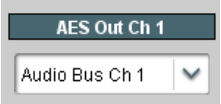
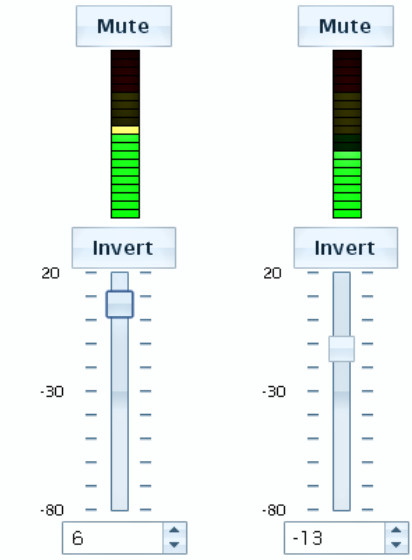
	(BBG-1002-UDX-AV-EMDE only) Provides an audio crosspoint allowing the audio source selection for each AES audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.
Note: • **AES Out Ch 2** has controls identical to the **Source**, **Gain**, **Mute**, and **Invert** controls described here for **AES Out Ch 1**. Therefore, only the **AES Out Ch 1** controls are shown here. • Although de-embedding supports de-embedding to AES channels 1 thru 16 (AES pairs 1 thru 8), current rear module options support output only to pair 1. • For each channel, its source and destination should be considered and appropriately set. Unused destination channels should be set to the **Silence** selection.	
• **AES Output Channel Source** 	Using the **Source** drop-down list, selects the audio input source to be routed to the corresponding AES output channel from the following choices: • **Audio Bus Ch 1** thru **Ch 16** • Built-in Tone generators **Tone 1** thru **Tone 16** (all are -20 dBFS level; freq (Hz) in ascending order are 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k) **Note:** Multiple tone generators, even if set to the same frequency, may not exhibit phase coherence. If identical tones with frequency and phase coherence are required, use a single tone generator (e.g., "TG1") across multiple channels instead of multiple generators set to the same frequency. • *Option* Audio **LTC** • **Downmixer L** • **Downmixer R** **Note:** Although DashBoard controls for de-embedding to AES out channels **AES Out Ch 1** thru **AES Out Ch 16** are present, current rear modules allow only AES pair 1 to be used.
• **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 AES output channel. (-80 to +20 dB range in 1.0 dB steps; unity = 0 dB) **Note:** Although the BBG-1002 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-1002-UDX Function Submenu List — continued

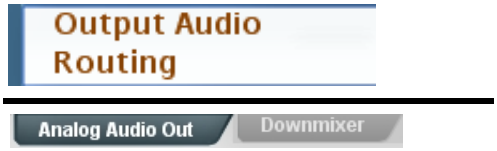
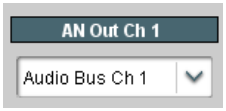
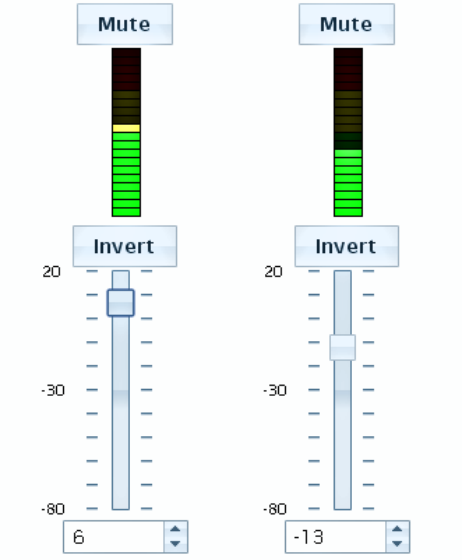
	(BBG-1002-UDX-AV-EMDE only) Provides an audio crosspoint allowing the audio source selection for each analog audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.
• **Analog Output Channel Source** 	Using the **Source** drop-down list, selects the audio input source to be routed to the corresponding analog audio output channel from the following choices: • **Audio Bus Ch 1** thru **Ch 16** • Built-in Tone generators **Tone 1** thru **Tone 16** (all are -20 dBFS level; freq (Hz) in ascending order are 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k) **Note:** Multiple tone generators, even if set to the same frequency, may not exhibit phase coherence. If identical tones with frequency and phase coherence are required, use a single tone generator (e.g., "TG1") across multiple channels instead of multiple generators set to the same frequency. • ***Option*** Audio **LTC** • **Downmixer L** • **Downmixer R** **Note:** Although DashBoard controls for de-embedding to analog out channels **AN Out Ch 1** thru **AN Out Ch 8** are present, current rear modules allow only **AN Out Ch 1** and **AN Out Ch 2** to be used.
• **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 each corresponding destination analog audio out channel. (-80 to +20 dB range in 1.0 dB steps; unity = 0 dB)

Table 3-2 BBG-1002-UDX Function Submenu List — continued

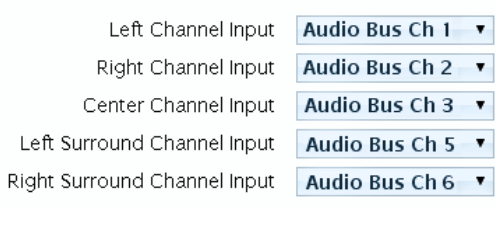
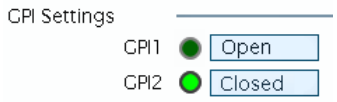
	Provides audio down-mix audio routing selections that multiplexes any five audio channel sources into a stereo pair.
• **Downmixer Source Controls** 	**Left Channel Input** thru **Right Surround Channel Input** select the five audio bus source channels to be used for the downmix. Downmix channels **Downmixer L** and **Downmixer R** are available as sources for embedded, AES, or analog audio 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-1002-UDX Function Submenu List — continued

Provides two independent GPI inputs that can invoke input routing control. GPI inputs can be set to function as edge-trigger individual inputs or in combination as a binary 2-bit word.

Also provides two independent contact pairs (GPO 1 and GPO 2) that can be invoked as a function of input routing.

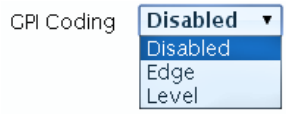
- **GPI Status Indicators**



Status displays for GPI 1 and GPI 2 indicate Open (and "unlit" indicator) for GPI not present on GPI input. Display indicates Closed (and "lit" indicator) when GPI is present.

Note: GPI trigger threshold/type is set using **GPI Coding** drop-down described below. Refer to Specifications in Introduction, Chapter 1 for GPI electrical specifications and limitations.

- **GPI Trigger Coding**



Selects GPI triggering as follows:

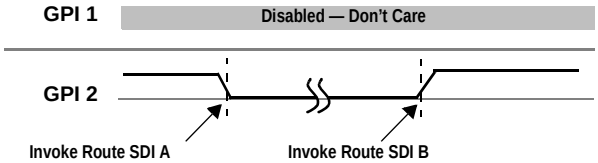
- **Disabled:** GPI conditions on both GPI ports are ignored; no preset is invoked as a result of GPI status. Use this setting as a master disable of GPI functions.
- **Edge** and **Level (Binary):** See the description and examples below.

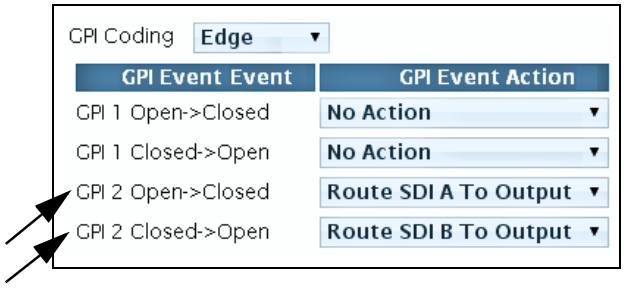
Make certain GPI Trigger Coding is set to **Disabled** if GPI is not to be used. **Selecting Level triggering without controlled GPI inputs may result in inadvertently invoking an unintentional routing.**

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

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

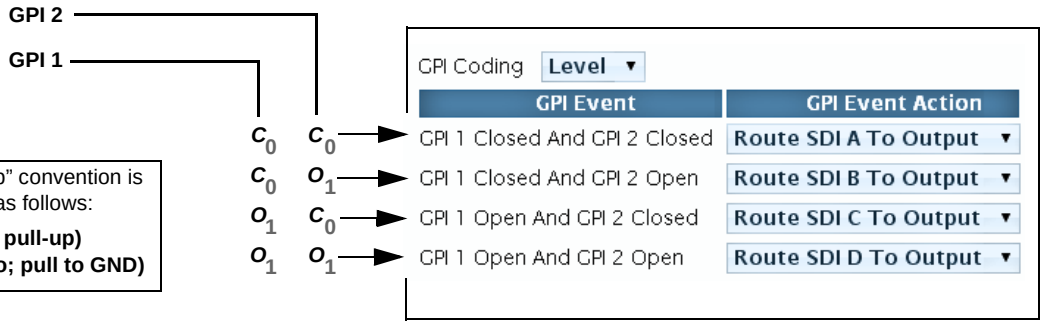
When GPI 2 "opens" (edge trigger going from LO to HI), **Route SDI B** is invoked as selected in the corresponding drop-down.





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

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



Note: "Pull-up" convention is used for GPI as follows:

Open = 1 (hi; pull-up)
Closed = 0 (lo; pull to GND)

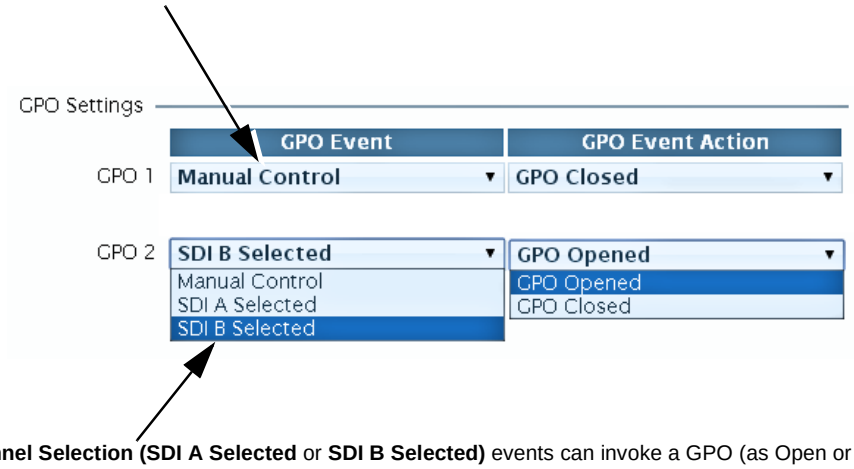
Table 3-2 BBG-1002-UDX Function Submenu List — continued

GPIO	**(continued)**

• **GPO Settings**

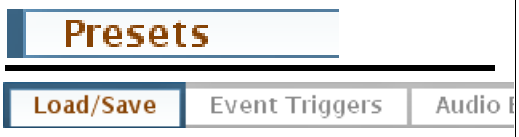
Provides two GPO outputs that can be independently set as manually-invoked engaged, or set to trigger as a function of selected input routing.

• **Manual Control** allows the corresponding GPO Event Action to be invoked immediately (in this example, GPO 1 set to Closed). These manual settings can be saved as part of a preset. Whenever the preset is invoked, any Manual Control settings here will be carried over as part of the preset and in turn applied. (See Presets (p. 3-45) for more information.)



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

Table 3-2 BBG-1002-UDX Function Submenu List — continued



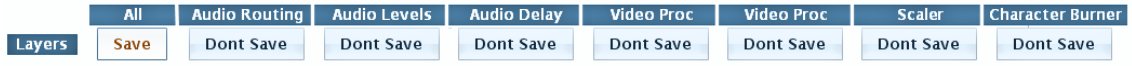
Allows user control settings to be saved in a Preset and then loaded (recalled) as desired, and provides a one-button restore of factory default settings.

Also provides event-based loading allowing a defined preset to be automatically engaged upon various received signal status. Also provides automated Email alerts when an event has occurred.

• 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 device settings, and save and invoke **all** settings when the preset is invoked (loaded).



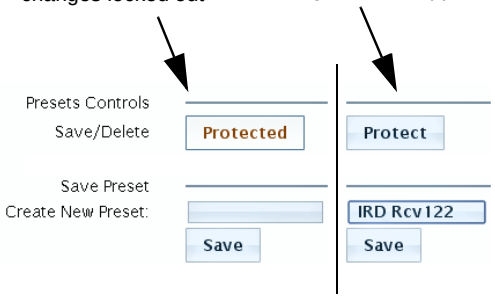
Selecting a layer (in this example, "Audio Routing") will set the preset to **only** "look at" and "touch" audio routing settings and save these settings under the preset. When the preset is invoked (loaded), **only** the audio routing layer is "touched".

Example: Since EAS audio routing can be considered independent of scaler settings, if normal audio routing was set up with a particular scaler setting in effect, and at a later time EAS audio routing is desired to be saved as a preset, selecting **Audio Routing** here limits preset-invoked changes to **only** the audio routing layer, "telling" the preset save/load to not concern itself with scaler settings. In this manner, when the EAS preset is invoked any scaler settings in effect will remain untouched, with only the audio routing changes invoked.

• Preset Enter/Save/Delete

Protected state – changes locked out

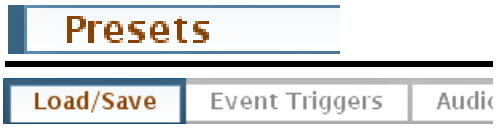
Ready (open) state – changes can be applied



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

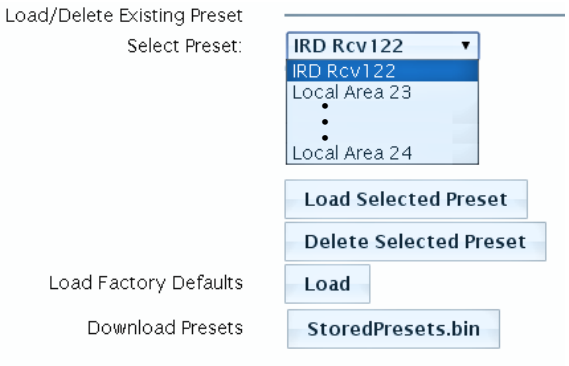
- **Protect (ready):** This state awaits Protected and allows preset Save/Delete button to save or delete current device settings to the selected preset. **Use this setting when writing or editing a preset.**
- **Protected:** Toggle to this setting to lock down all presets from being inadvertently re-saved 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.

Table 3-2 BBG-1002-UDX Function Submenu List — continued



(continued)

- **Preset Save/Load Controls**

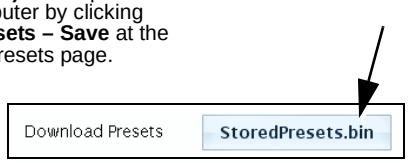


- **Select Preset:** drop-down allows a preset saved above to be selected to be loaded or deleted (in this example, custom preset "IRD Rcv122").
- **Load Selected Preset** button allows loading (recalling) the selected preset. When this button is pressed, the changes called out in the preset are immediately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

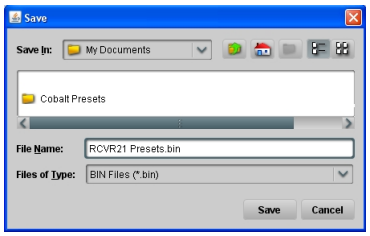
- **Download Presets** saving the preset files to a folder on the connected computer.

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

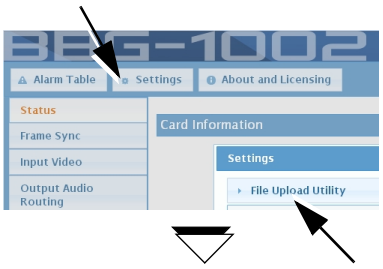


Browse to a desired save location (in this example, *My Documents\Cobalt Presets*).

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

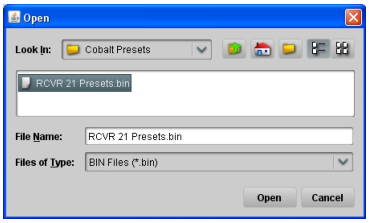


Upload (open) device presets from a network computer by clicking **Settings** and then selecting File Upload Utility.



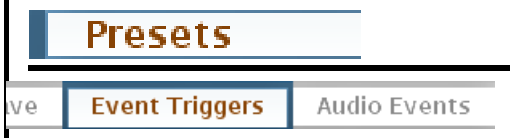
Browse to the location where the file was saved on the computer or drive (in this example, *My Documents\Cobalt Presets*).

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.

Table 3-2 BBG-1002-UDX Function Submenu List — continued



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

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

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

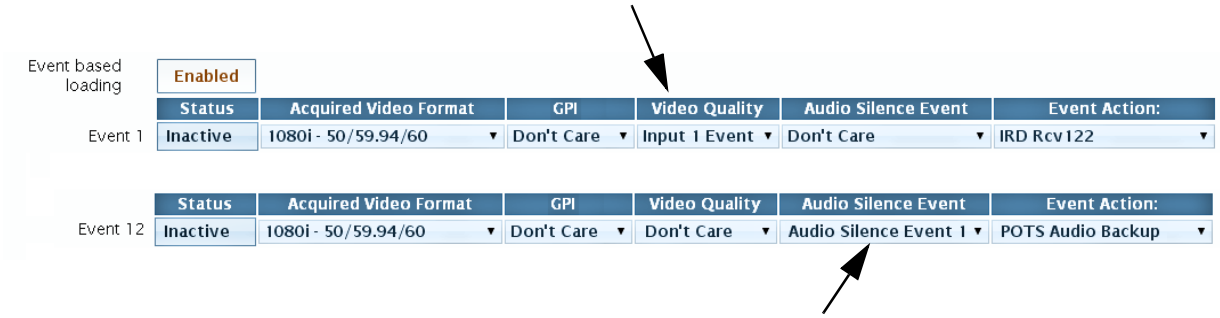
Event triggers allow a variety of event screening criteria, and in turn provide an Event Action "go to" in response to the detected event(s). For each screened criteria, categories can be set as "don't care" or set to specific criteria to broaden or concentrate on various areas of concern.

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

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

In the example here for ***Event 1***, the **Video Quality Events** tab is set to screen for frozen video. When detected, this status can be used here (Video Quality set to "Input A Event Error Detected"). Using the Event Action selector, go-to action of "IRD Rcv 122" can be invoked (which in this example is a user preset that changes BBG-1002 routing to use an alternate IRD).

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



In the example here for ***Event 12***, the **Audio Events** sub-tab can be set to screen for loss of audio. When detected, this status can be used here (Audio Silence Event set to "Audio Silence Event 1"). Using the Event Action selector, go-to action of "POTS Audio Backup" can be invoked (which in this example is a user preset that changes BBG-1002 routing to use an alternate telco audio feed).

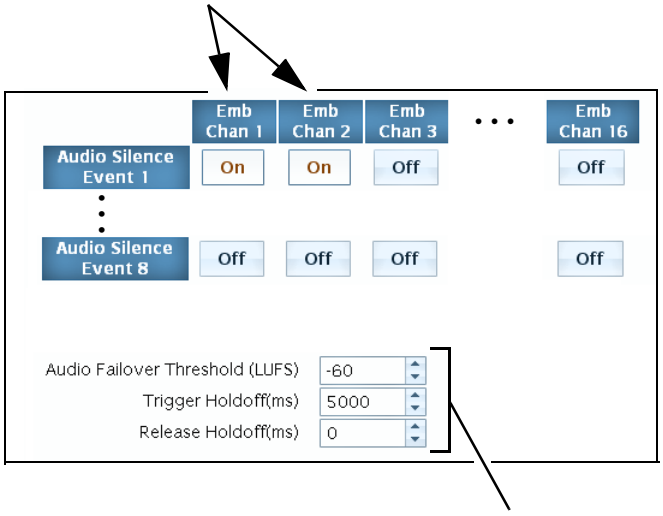
Note:
- Screened conditions are triggered upon start of event. Any event-based setup must be done in advance of the triggering event in order for event to be detected.
- Loss of true conditions does not disengage an event-based triggering. A new set of true conditions must be defined and then occur to transition from one event-based trigger to another.
- Time required to engage an event-based trigger depends upon complexity of the called preset. (For example, a preset that invokes a scaler format change will take longer to engage than a preset involving only an audio routing change.)
- Make certain all definable event conditions that BBG-1002 might be expected to "see" are defined in any of the Event 1 thru Event 32 rows. This makes certain that the device will always have a defined "go-to" action if a particular event occurs. For example, if the device is expected to "see" a 720p5994 stream or as an alternate, a 525i5994 stream, make certain both of these conditions are defined (with your desired go-to presets) in any two of the Event 1 thru Event 32 condition definition rows.
- ***Option*** Video Quality column appears only on BBG-1002 with **+QC** (Quality Check) option.

Table 3-2 BBG-1002-UDX Function Submenu List — continued

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

Checkbox rows allow up to eight separate and independent Audio Silence Events to be defined. Checking an audio channel sets the channel to be screened for audio events indicating persistent silence on the channel.
Channels screened are any received channel embedded onto the audio bus channels, including SDI video embedded audio, or AES or analog audio (BBG-1002-UDX-AV-EMDE only).

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



Event trigger threshold controls set the level and holdoff thresholds.

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

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

Front Panel User Menus

All of the mode and parametric controls available using the web UI (as described in BBG-1002-UDX 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-1002 with no connection to a network required, and is useful where changes need to be done immediately (or in emergency situations) without the benefit of network access. However, the web GUI provides greatly simplified user interfaces as compared to using this menu and the arrow controls. For this reason, it is **strongly recommended** that the web GUI Remote Control be used for all applications other than the most basic cases.

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

Table 3-3 Front Panel User Menus

Menu>Submenu Items	Menu>Submenu Items	Menu>Submenu Items
Status (pg 3-8) 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 3-17) Lock Mode Output Rate Initial Startup Format Output Mode On LOS-- Test Pattern Vert Lines Offset Horiz Offset Frame Delay Report Delay Lock Status	Scaler (pg 3-20) Enb/Bypass Input Video Output Video Output Format Aspect Ratio H Aspect Ratio V H Pan V Pan
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 3-15) Source SDI IN A Status SDI IN B Status SDI IN C Status SDI IN D Status	Presets (pg 3-45) Save/Delete Mode Select Preset Load Selected Preset Delete Selected Preset Load Factory Defaults
Character Burner (pg 3-34) Ident 1* Ident 2* Timecode*	Moving Box (pg 3-37) 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 3-39) 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-1002-UDX and its remote control interface. The BBG-1002-UDX 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-1002-UDX itself and its remote control provide error and failure indications. Depending on how the BBG-1002-UDX 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.

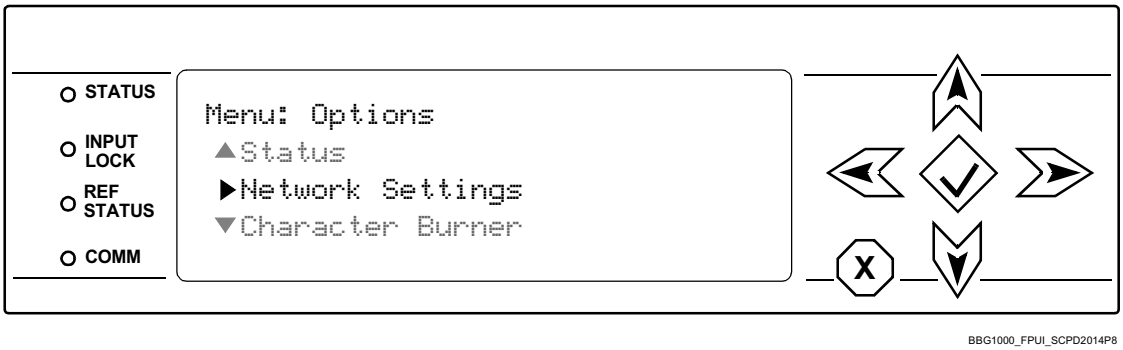
The various BBG-1002-UDX device and remote control error and failure indicators are individually described below.

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. 3-53)
- BBG-1002-UDX Processing Error Troubleshooting (p. 3-54)

BBG-1002-UDX Front Panel Status/Error Indicators and Display

Figure 3-8 shows and describes the BBG-1002-UDX 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.



Item	Function
Alphanumeric Display	Shows device statuses
STATUS LED	Illuminates GREEN indicating BBG-1002-UDX 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-1002-UDX 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 3-8 BBG-1002-UDX 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-1002-UDX, 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-1002-UDX. 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-1002-UDX itself is defective.
	  • If display shows **excessive** power being consumed (see Technical Specifications (p. 1-12) in Chapter 1, “Introduction”), the BBG-1002-UDX 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-1002-UDX 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-1002-UDX Processing Error Troubleshooting

Table 3-5 provides BBG-1002-UDX processing troubleshooting information. If the BBG-1002-UDX 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-1002-UDX is not appropriately set for the type of signal being received by the device.

Note: Where errors are displayed on both the BBG-1002-UDX 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-1002 shows **Unlocked** message in BBG-1002-UDX Card Info pane.	No video input present	Make certain intended video source is connected to appropriate BBG-1002-UDX card video input. Make certain BNC cable connections are OK.
Ancillary data (closed captioning, timecode) not transferred through BBG-1002-UDX	• 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.
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.
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 Presets (p. 3-45) for more information.

Table 3-5 Troubleshooting Processing Errors by Symptom — continued

Symptom	Error/Condition	Corrective Action
Device will not retain user settings, or setting changes or presets spontaneously invoke.	• **GPI Controls** tab **GPI Coding** set to **Level** (binary) with no controlled GPI source connected to GPI inputs	• If GPI is not to be used, make certain **GPI Coding** control on **GPI Controls** tab is set to **Disabled**. (If control is left on Level with no inputs, the pull-up HI logic state on the open inputs will be interpreted as two “HI’s” on the inputs, possibly resulting in an unintentional invoked preset).
	• **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 Presets (p. 3-45) for more information.

In Case of Problems

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

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

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

See Contact Cobalt Digital Inc. (p. 1-15) in Chapter 1, “Introduction“ for contact information.

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