
COBALTTM

BBG-1002-2UDX



**3G/HD/SD-SDI Standalone Dual-Channel
Up-Down-Cross Converter / Frame Sync /
Audio Embed/De-Embed**

Product Manual

COBALT[®]

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Congratulations on choosing the Cobalt® BBG-1002-2UDX 3G/HD/SD-SDI Standalone Dual-Channel Up-Down-Cross Converter / Frame Sync / Audio Embed/De-Embed. The BBG-1002-2UDX 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-1002-2UDX, please contact us at the contact information on the front cover.

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Introduction

Overview

This manual provides installation and operating instructions for the BBG-1002-2UDX Standalone 3G/HD/SD-SDI 3G/HD/SD-SDI Dual-Channel Up-Down-Cross Converter / Frame Sync / Audio Embed/ De-Embed unit (also referred to herein as the BBG-1002-2UDX).

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-1002-2UDX.
- **Chapter 2, “Installation”** – Provides instructions for installing the BBG-1002-2UDX in a frame, and optionally installing a BBG-1002-2UDX Rear I/O Module.
- **Chapter 3, “Operating Instructions”** – Provides overviews of operating controls and instructions for using the BBG-1002-2UDX.

This chapter contains the following information:

- **Manual Conventions (p. 1-2)**
- **Safety and Regulatory Summary (p. 1-4)**
- **BBG-1002-2UDX Functional Description (p. 1-5)**
- **Technical Specifications (p. 1-14)**
- **Warranty and Service Information (p. 1-19)**
- **Contact Cobalt Digital Inc. (p. 1-20)**

Cobalt Reference Guides

From the Cobalt® web home page, go to **Support>Reference Documents** for easy to use guides covering network remote control, card firmware updates, example card 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-1002-2UDX itself. Examples are provided below.

- Device display messages are shown like this:

BOOT

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

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

- **BBG-1002-2UDX** refers to the BBG-1002-2UDX Standalone 3G/HD/SD-SDI Dual-Channel Up-Down-Cross Converter / Frame Sync / Audio Embed/De-Embed unit.
- **Frame** refers to the HPF-9000, oGx, OG3-FR, 8321, or similar 20-slot frame that houses Cobalt® or other cards.
- **Device** and/or **Card** refers to a Cobalt® or other card.
- **System** and/or **Video System** refers to the mix of interconnected production and terminal equipment in which the BBG-1002-2UDX and other cards operate.
- Functions and/or features that are available only as an option are denoted in this manual like this:

Option ➞

Most options are covered in this manual. However, if your unit has DashBoard tabs that are not described in this manual it indicates that the optional function/feature is covered in a separate Manual Supplement.

You can download a manual supplement pdf for the option by going to the card's web page and clicking on **Product Downloads**, where you can select from any available option Manual Supplements for the card.

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.



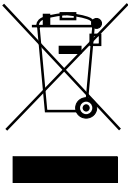
Cautions

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 card only by edges and avoid contact with any connectors or components.
	Symbol (WEEE 2002/96/EC) For product disposal, ensure the following: <ul style="list-style-type: none">• Do not dispose of this product as unsorted municipal waste.• Collect this product separately.• Use collection and return systems available to you.

Safety and Regulatory Summary

Warnings

! WARNING !

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

Cautions

CAUTION

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

CAUTION

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

CAUTION

The BBG-1002-2UDX FPGA is designed for a normal-range operating temperature around 85° C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within device operating safe parameters, and can be allowed by setting this control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum device protection.

EMC Compliance Per Market

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

BBG-1002-2UDX Functional Description

Figure 1-1 shows a functional block diagram of the BBG-1002-2UDX. The BBG-1002-2UDX dual-channel unit provides two independent signal paths (**Path 1** and **Path 2**) of UDX conversion, frame sync, and audio embedding and de-embedding on a single unit. The two paths share an input and output SDI crosspoint to receive and send two discrete SDI inputs and outputs. The BBG-1002-2UDX also includes AES/analog audio support and CVBS video I/O. In addition to a basic signal presence input failover function, a Quality Check option allows failover to alternate inputs based on user-configurable subjective criteria such as black or frozen frame. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even in cases where the input video image is static or lost.

The BBG-1002-2UDX also provides timecode/closed-captioning conversion from packet-based timecode formats and CEA608/708 HD formats to HD ATC, SD_ATC, and SD VITC waveform-based timecode.

BBG-1002-2UDX Input/Output Formats

The BBG-1002-2UDX provides the following inputs and outputs (which can be independently used for Path 1 and/or Path 2):

- **Inputs:**
 - **3G/HD/SD SDI IN A** thru **SDI IN D** – four 3G/HD/SD-SDI inputs. **SDI IN A** or **SDI IN B** can be set to failover to **A** or **B** in absence of opposite channel of this pair.
 - **CVBS IN** – CVBS coaxial analog video input.
 - **AES IN** – BNC (AES-3id, 75Ω) ports as AES input (number of ports dependent on rear I/O module used).
 - **AN-AUD IN** – Four balanced analog audio embed inputs.
- **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.
 - **AES OUT** – BNC (AES-3id, 75Ω) ports as AES outputs (number of ports dependent on rear I/O module used).
 - **AN-AUD OUT** – Four balanced analog audio de-embed outputs.
 - **CVBS OUT** – CVBS coaxial analog video usable with SD video streams.

Note: Input select also allows internal connection from one processing path output to the opposite processing path input. This allows “serial” processing connections without requiring external jumpering on the unit rear panel.

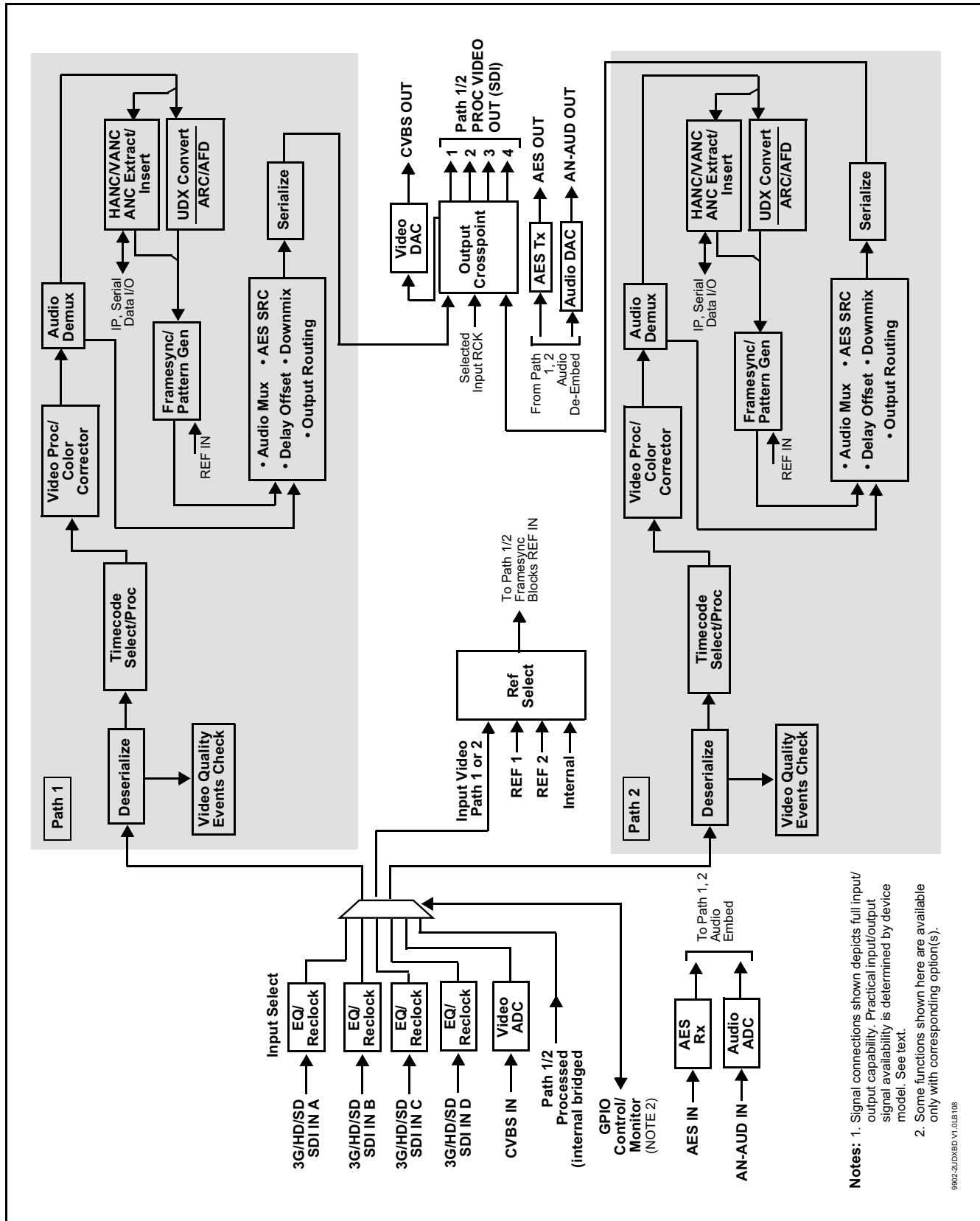


Figure 1-1 BBG-1002-2UDX Functional Block Diagram

Video Processor Description

Note: Unless otherwise noted, the following functions are independently available for Path 1 and Path 2 processing paths.

The BBG-1002-2UDX video subsystem provides the functions described below.

Input Video Select/Quality Check Functions

Used in common as a routing source for both **Path 1/Path 2** is a GUI-based control that allows selecting from up to four 3G/HD/SD-SDI inputs, and a SD CVBS analog video input. This function also allows processed outputs from one path to be routed to the alternate path input. For analog inputs, waveform-based ancillary data is preserved 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. An input **Allowed Rasters** and **Allowed Frame Rates** filter allows inputs to be filtered (screened) for only user-allowed raster sizes and frame rates, with unallowed raster/rates being rejected as an input (input unlock). Reclocked copies of any SDI input can be outputted by the unit when selected as a choice on the output crosspoint.

Option

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

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

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

Option

When licensed with option **+LTC**, this function also can receive, send and translate between audio/RS-485 LTC timecode formats and the VBI formats described above.

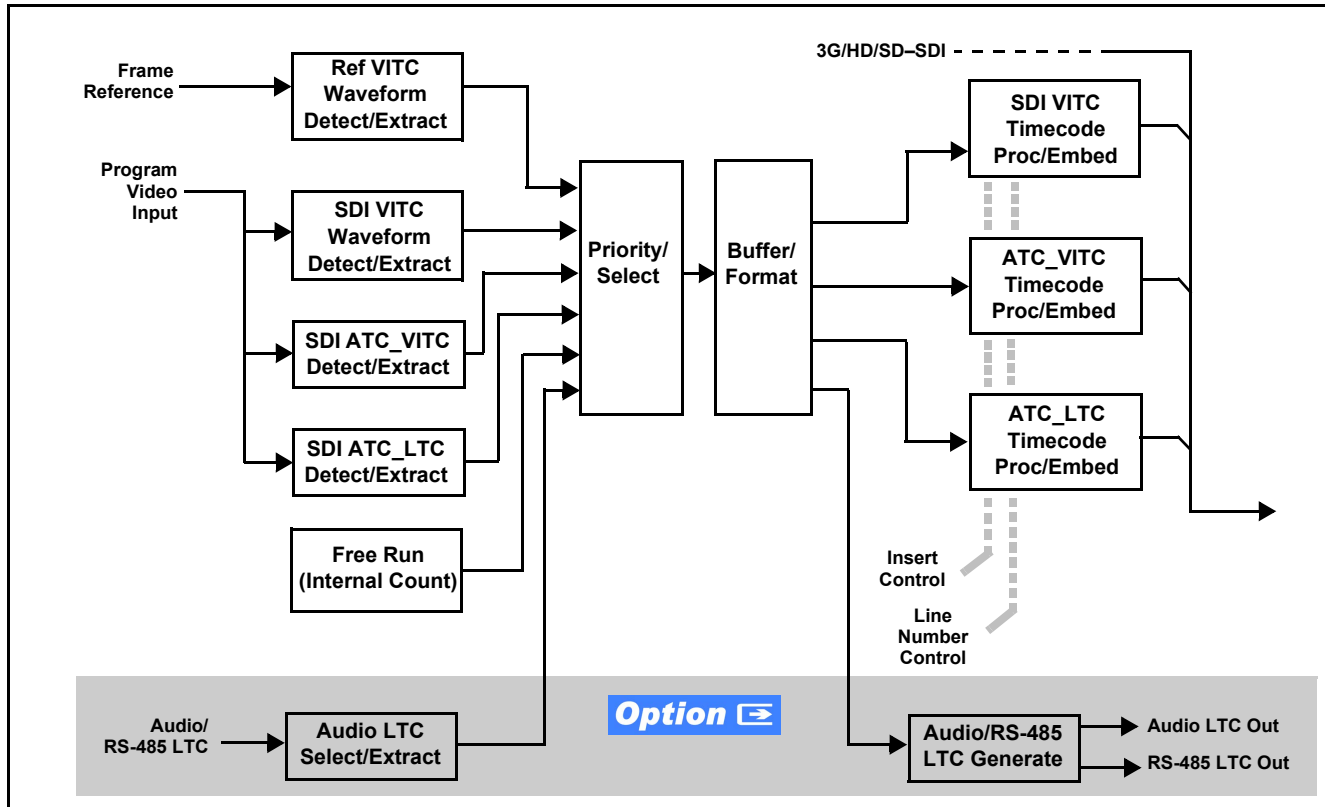


Figure 1-2 Timecode Processor

Frame Sync Function

This function provides for frame sync control using an external reference signal, selected input video, or internal timing 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 external reference source, 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 various standard patterns such as color bars, sweep patterns, and other technical patterns. The test patterns can be applied to the output video upon loss of input or manually inserted at any time.

Scaler Function

The scaler function provides path 1/2 independent up/down/cross-conversion to 3G/HD/SD from multiple 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. Reticule insertion provides safe action area marking as well as other reticule functions and patterns.

The scaler provides special modes that allow de-interlacing to be bypassed in certain cases to reduce processing latency. Also provided are selections to optimize 3:2 pulldown conversion where timecode or other timing references can be relied upon to indicate frame transitions.

Color Corrector **Option**

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

Video Quality Events Detect Function **Option**

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

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

Ancillary Data Processor **Option**

This function provides full VANC/HANC ancillary data de-embedding and embedding for 3G/HD/SD-SDI streams. Direct access to DID and SDID locations allows extraction or insertion of user data such as camera PTZ, SCTE 104, closed-captioning read/insert, GPI/GPO via ANC, or other specialized user payloads. Data can be extracted and inserted within the unit (Bridge mode), or inserted and/or extracted to and from the unit via serial or IP interfaces connecting to external devices/systems. A rear I/O module with a dedicated IP port can be used with the ancillary data processor function for data insertion or extraction via IP.

Video Output Crosspoint

Used in common as a routing source for both **Path 1/Path 2** is a four-output video matrix crosspoint that allows independently applying the unit processed video output, reclocked input, or wings/key-fill previews to any of the four discrete coaxial outputs (**SDI OUT 1** thru **SDI OUT 4**). For an SD output, a CVBS coaxial output is available as a processed video output.

Audio Processor Description

Note: **Path 1** and **Path 2** have individual independent digital audio embed and de-embed banks for each of the processing path's 16-channels of embedded audio. The unit's 16 channels of AES embed/de-embed can be allocated individually to any or either path's embed or de-embed nodes. Similarly, four-channel analog audio can be individually allocated across any or either path's embed or de-embed nodes.

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)
- Up to 16 channels (8 pairs) of discrete AES input¹
- Up to 4 channels of balanced analog audio input

(See Figure 1-3.) The audio processing subsection is built around the card's two internal 16-channel audio buses (Path 1 and Path 2). Each 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 card bus. Correspondingly, at the output end of each 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.

1. Discrete audio I/O channel count is dependent on model.

An Input Audio Status display shows the presence and peak level of each input audio channel received. In addition to SDI embedded audio channel sources, analog and coaxial AES inputs are available as input audio choices. For AES audio inputs, payload is identified (PCM or data such as Dolby® Digital or E). Each AES input pair has independent sample rate converters to align each input pair with video timing to accommodate cases where AES audio is not synchronous with input video (SRC automatically bypassed for non-PCM payloads). As such, the audio subsection provides a full crosspoint between all supported audio inputs and output types.

The audio output crosspoint for each path's embedded output allows embedded channel selection from the respective path's own channels, or channels from the alternate processing path.

Option ➡

Clean and Quiet Switching option **+CQS** allows SDI input selection to be changed from one source to another while ducking audio during controlled input video switching transitions to provide silence between input switches. The cross-fade is queued for the next available RP168 switch line following the switch command.

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

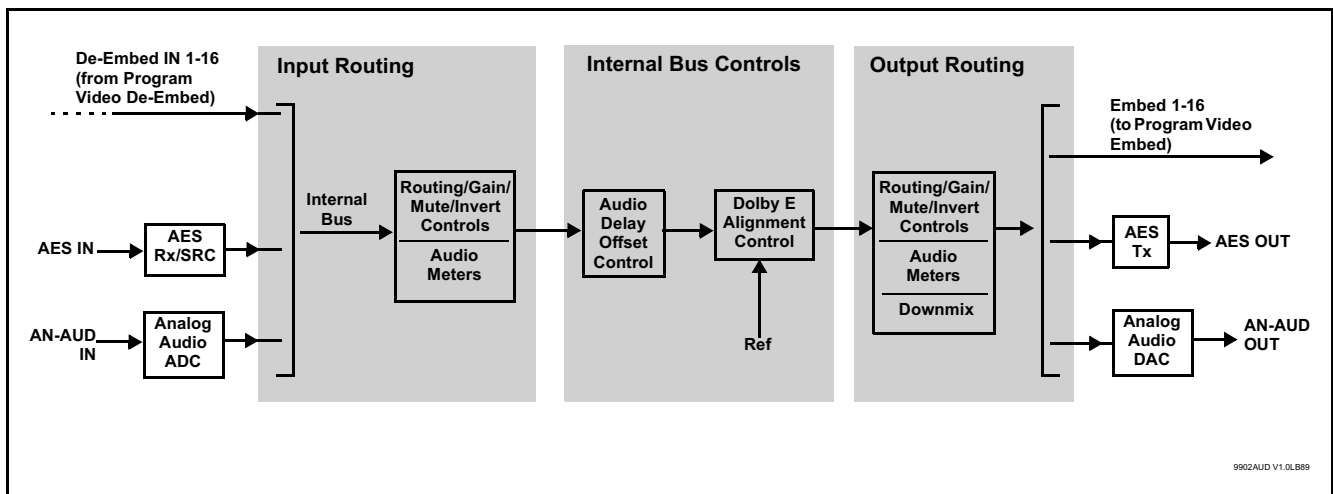


Figure 1-3 Basic Audio Processing Block Diagram

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).

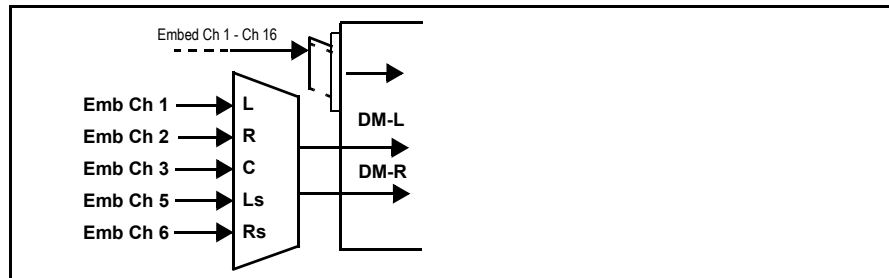


Figure 1-4 Audio Down Mix Functional Block Diagram with Example Sources

Flex Buses

For both input and output nodes before and after the internal buses, flex buses provide flexible-structure mixer in which any of 16 summing nodes (**Flex Mix Bus A** thru **Flex Mix Bus P**) can receive any audio input, thereby allowing several customizable mixing schemes. Similarly, any of the 16 internal bus signals can be applied to an output flex bus mixer. The output flex bus allows cross-sourcing from both **Path 1** and **Path 2** embedded internal Audio Bus sources to the Path 1 and Path 2 discrete output audio crosspoints.

Text-To-Speech Option

Cobalt Digital **+TTS** is a complete 21CVAA digital text-to-speech generation / audio insertion solution for embedded and discrete audio systems.

+TTS interfaces with industry standard Windows Share folder systems to receive non-proprietary text, XML, or similar plain text files, and converts and inserts realistic human-voice audio into user-configured audio channels (typically an SAP channel pair intended for this playout). **+TTS** allows for prioritization based on the organization's discretion (for example, severe weather alerts out-prioritizing school closings). Alert tones are inserted over the main program channels to alert the visually impaired that emergency content is to occur on the SAP channel. Alerts can be played a configurable number of times, and alerts with higher priority can interrupt current lists for breaking news. Once the interrupt message is broadcast, **+TTS** automatically reverts to normal audio programming. Refer to **+TTS** Manual Supplement OPT-TTS-MS for detailed information and installation/setup instructions.

Audio Events Detect Function **Option**

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

Control and Data Input/Output Interfaces

GPI Interface

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

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

GPO Interface

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

Serial (COMM) Ports

The BBG-1002-2UDX is equipped with two, 3-wire serial ports (**COM 1 - Serial Port 1**, **COM 2 - Serial Port 2**). The ports provide for SMPTE 2020 de-embedding to an output port, and provide RS-485 LTC I/O (when licensed with option **+LTC**). Either port can be configured as RS-232 Tx/Rx or RS-422 non-duplexed Tx or Rx.

+SCTE104 Insertion **Option**

Note: Option +SCTE104 is available only for Path1.

Option +SCTE104 provides generation and insertion of SCTE 104 messages into baseband SDI. Message send can be triggered from automation GPI or other event action modes. The option can also execute actions based on SCTE 104 messages received, as well as send triggered SCTE 104 packets to other downstream systems.

The user interface is based on common SCTE 104 operations: Splice Start Normal, Splice Start Intermediate, Splice End Normal, Splice End Intermediate, and Splice Cancel (splice_request_data variants), offering full control of splice start, end, and cancel as well as pre-roll and break duration offsets. (A Manual Supplement is planned for this option. Please check product web page.)

Alarm Function

The unit can be set to monitor input video/audio for input errors such as input LOS, frozen or black frame, loss of reference, closed captioning ancillary data loss, and/or per-channel audio absences. These alarms can be propagated as a general error or warning message, and can be downloaded as basic .txt logs or via a Syslog function.

User setup tables configure the alarm severity escalation as well as trigger holdoff/release and other thresholds as applicable.

User Control Interface

BBG-1002-2UDX uses an HTML5 internal web server for control/monitoring communication, which allows control via a web interface with no special or unique application on the client device. Connection to the device to the network media connection is via a standard 10/100/1000 RJ-45 Ethernet connection. The device can also be controlled using DashBoard™ remote control, where it appears as a frame connection.

Technical Specifications

Table 1-1 lists the technical specifications for the BBG-1002-2UDX Standalone 3G/HD/SD-SDI Dual-Channel Up-Down-Cross Converter / Frame Sync / Audio Embed/De-Embed unit.

Table 1-1 Technical Specifications

Item	Characteristic
Part number, nomenclature	<ul style="list-style-type: none"> • BBG-1002-2UDX 3G/HD/SD-SDI Standalone Dual-Channel Up/Down-Cross Converter / Frame Sync / Audio Embed/ De-Embed, available in the following rear-panel I/O configurations: <ul style="list-style-type: none"> - BBG-1002-2UDX-B (4) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) 3G/HD/SDI Output BNC (with relay bypass failover), (1) GPIO/COMM RJ-45 connector, Gigabit Ethernet, Looping Reference and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply) - BBG-1002-2UDX-C-DIN (4) 3G/HD/SD-SDI Inputs, (2) Balanced Analog Audio Inputs, (6) AES Inputs, (4) 3G/HD/SDI Outputs w/(1) relay protect, (4) AES Outputs, GPIO/COMM (RJ-45 connector). (All coaxial connectors DIN 1.0/2.3), Gigabit Ethernet, Looping Reference and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply) - BBG-1002-2UDX-C-HDBNC (4) 3G/HD/SD-SDI Inputs, (2) Balanced Analog Audio Inputs, (6) AES Inputs, (4) 3G/HD/SDI Outputs w/(1) relay protect, (4) AES Outputs, GPIO/COMM (RJ-45 connector). (All coaxial connectors HD-BNC), Gigabit Ethernet, Looping Reference and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply) - BBG-1002-2UDX-D-DIN (4) 3G/HD/SD-SDI Inputs, (4) Balanced Analog Audio Inputs, (4) AES Inputs, (4) 3G/HD/SDI Outputs, (4) AES Outputs, (4) Balanced Analog Audio Outputs, (1) CVBS Input, (1) CVBS Output. (All coaxial connectors DIN 1.0/2.3), Gigabit Ethernet, Looping Reference and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply) - BBG-1002-2UDX-D-HDBNC (4) 3G/HD/SD-SDI Inputs, (4) Balanced Analog Audio Inputs, (4) AES Inputs, (4) 3G/HD/SDI Outputs, (4) AES Outputs, (4) Balanced Analog Audio Outputs, (1) CVBS Input, (1) CVBS Output. (All coaxial connectors HD-BNC), Gigabit Ethernet, Looping Reference and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply) - BBG-1002-2UDX-E-DIN (4) 3G/HD/SD-SDI Inputs, (4) Balanced Analog Audio Inputs, (4) AES Inputs, (4) 3G/HD/SDI Outputs, (4) AES Outputs, (4) Balanced Analog Audio Outputs, (1) CVBS Input, (1) CVBS Output, GPIO/COMM. (All coaxial connectors DIN 1.0/2.3), Gigabit Ethernet, Looping Reference and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply) - BBG-1002-2UDX-E-HDBNC 3G/HD/SD-SDI Standalone Dual-Channel Up/Down/Cross Converter / Frame Sync / Embed/De-Embed with (4) 3G/HD/SD-SDI Inputs, (4) Balanced Analog Audio Inputs, (4) AES Inputs, (4) 3G/HD/SDI Outputs, (4) AES Outputs, (4) Balanced Analog Audio Outputs, (1) CVBS Input, (1) CVBS Output, GPIO/COMM. (All coaxial connectors HD-BNC), Gigabit Ethernet, Looping Reference and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply)

Table 1-1 Technical Specifications — continued

Item	Characteristic
Power consumption	18 Watts. Power provided by included AC adapter; 100-240 VAC, 50/60 Hz. Second DC power connection allows power redundancy using second (optional) AC adapter.
Installation Density	Up to 3 units per 1RU space
Environmental: Operating temperature: Relative humidity (operating or storage): Dimensions (WxHxD): Weight:	32° – 104° F (0° – 40° C) < 95%, non-condensing 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections. 6 lb (2.8 kg)
Ethernet communication	10/100/1000 Mbps Ethernet with Auto-MDIX via HTML5 web interface
Front-Panel Controls and Indicators	Backlit LCD display and menu navigation keys. Display and controls provide unit status display and full control as an alternate to web GUI control.
Serial Digital Video Input	Number of Inputs: Up to (4), with manual select or failover to alternate input Data Rates Supported: SMPTE 424M, 292M, SMPTE 259M-C Impedance: 75 Ω terminating Return Loss: > 15 dB up to 1.485 GHz > 10 dB up to 2.970 GHz
Analog Video Input	Number of Inputs: One SD analog CVBS Impedance: 75 Ω
AES Audio Inputs	Standard: SMPTE 276M Number of Inputs: Up to 16 unbalanced; AES-3id Impedance: 75 Ω
Analog Audio Inputs	Number of Inputs: Up to four balanced using 3-wire removable Phoenix connectors; 0 dBFS => +24 dBu

Table 1-1 Technical Specifications — continued

Item	Characteristic
Input Select/Auto-Changeover Failover (option +QC)	<p>Failover to alternate input on loss of target input. Failover invoked upon LOS and/or (with option +QC) user configurable parametric criteria such as black/frozen frame or audio silence.</p> <ul style="list-style-type: none"> - Black frame trigger configurable for black intensity threshold and persistence time. - Frozen frame trigger configurable for frozen percentage difference and persistence time.
Post-Processor Serial Digital Video Outputs	<p>Number of Outputs: Four 3G/HD/SD-SDI BNC</p> <p>Impedance: 75 Ω</p> <p>Return Loss: > 15 dB at 5 MHz – 270 MHz</p>
Post-Processor Serial Digital Video Outputs (cont.)	<p>Signal Level: 800 mV \pm 10%</p> <p>DC Offset: 0 V \pm 50 mV</p> <p>Jitter (3G/HD/SD): < 0.3/0.2/0.2 UI</p> <p>Minimum Latency (scaler and frame sync disabled):</p> <ul style="list-style-type: none"> SD: 127 pixels; 9.4 μs 720p: 330 pixels; 4.45 μs 1080i: 271 pixels; 3.65 μs 1080p: 361 pixels; 2.43 μs
Analog Video Output	<p>Number of Outputs: One SD analog CVBS</p> <p>Impedance: 75 Ω</p>
Embedded Audio Output	<p>16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.</p>
AES Audio Outputs	<p>Standard: SMPTE 276M</p> <p>Number of Outputs: Up to 16 unbalanced; AES-3id</p> <p>Impedance: 75 Ω</p>

Table 1-1 Technical Specifications — continued

Item	Characteristic
Analog Audio Outputs	Number of Outputs: Up to four 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	(2) GPI; (2) GPO; opto-isolated GPO Specifications: Max I: 120 mA Max V: 30 V Max P: 120 mW GPI Specifications: GPI LO @ $V_{in} < 1.5\text{ V}$ GPI HI @ $V_{in} > 2.3\text{ V}$ Max V_{in} : 9 V
Redundant (or spare) AC power supply (optional)	BBG-1000-PS

Warranty and Service Information

Cobalt Digital Inc. Limited Warranty

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

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

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

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

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Installation

Overview

This chapter contains the following information:

- Installing the BBG-1002-2UDX (p. 2-1)
- Rear Panel Connections (p. 2-2)
- GPIO, Serial (COMM), and Analog Audio Connections (p. 2-5)

Installing the BBG-1002-2UDX

- Note:**
- Where BBG-1002-2UDX is to be installed on a mounting plate (or regular table or desk surface) **without** optional frame Mounting Tray BBG-1000-TRAY, affix four adhesive-backed rubber feet (supplied) to the bottom of BBG-1002-2UDX in locations marked with stamped “x”. If feet are not affixed, chassis bottom cooling vents will be obscured.
 - Where BBG-1002-2UDX is to be installed **with** optional frame Mounting Tray BBG-1000-TRAY, **do not** affix adhesive-backed feet.

Installing Using BBG-1000-TRAY Optional Mounting Tray

BBG-1000-TRAY allows up to three BBG-1002-2UDX to be mounted and securely attached to a 1 RU tray that fits into a standard EIA 19” rack mounting location. Install BBG-1002-2UDX unit into tray as described and shown here.

1. If installing BBG-1002-2UDX using optional frame Mounting Tray BBG-1000-TRAY, install BBG-1002-2UDX in tray as shown in Figure 2-1.
2. Connect the input and output cables as shown in Figure 2-3.

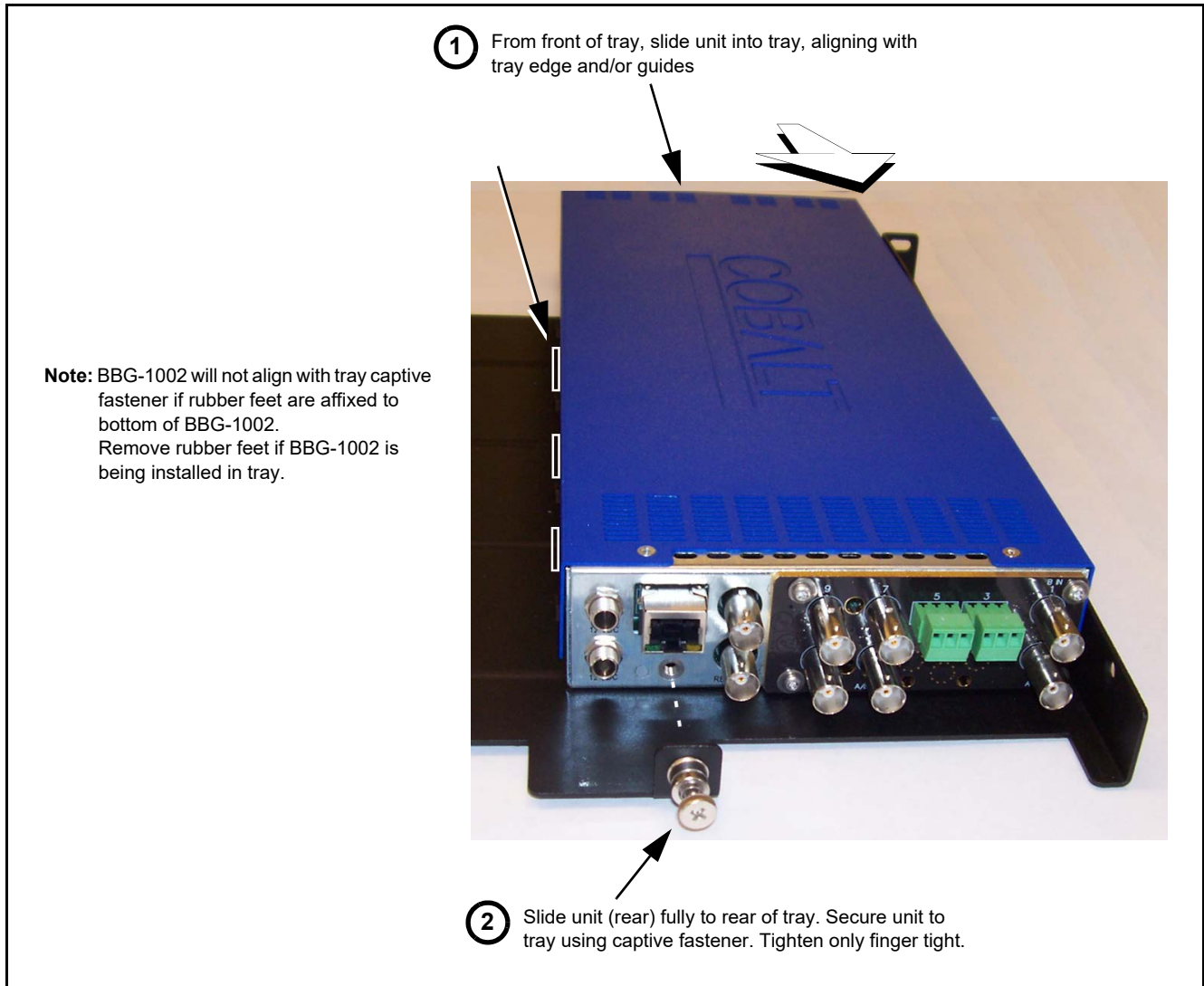


Figure 2-1 Mounting BBG-1002-2UDX Using Frame Mounting Tray

BBG-1002-2UDX Unit Dimensions

Figure 2-2 shows the BBG-1002-2UDX physical dimensions and mounting details for cases where BBG-1002-2UDX will be installed in a location not using the optional **BBG-1000-TRAY** mounting tray.

Rear Panel Connections

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

- Note:**
- The BBG-1002-2UDX coaxial 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.

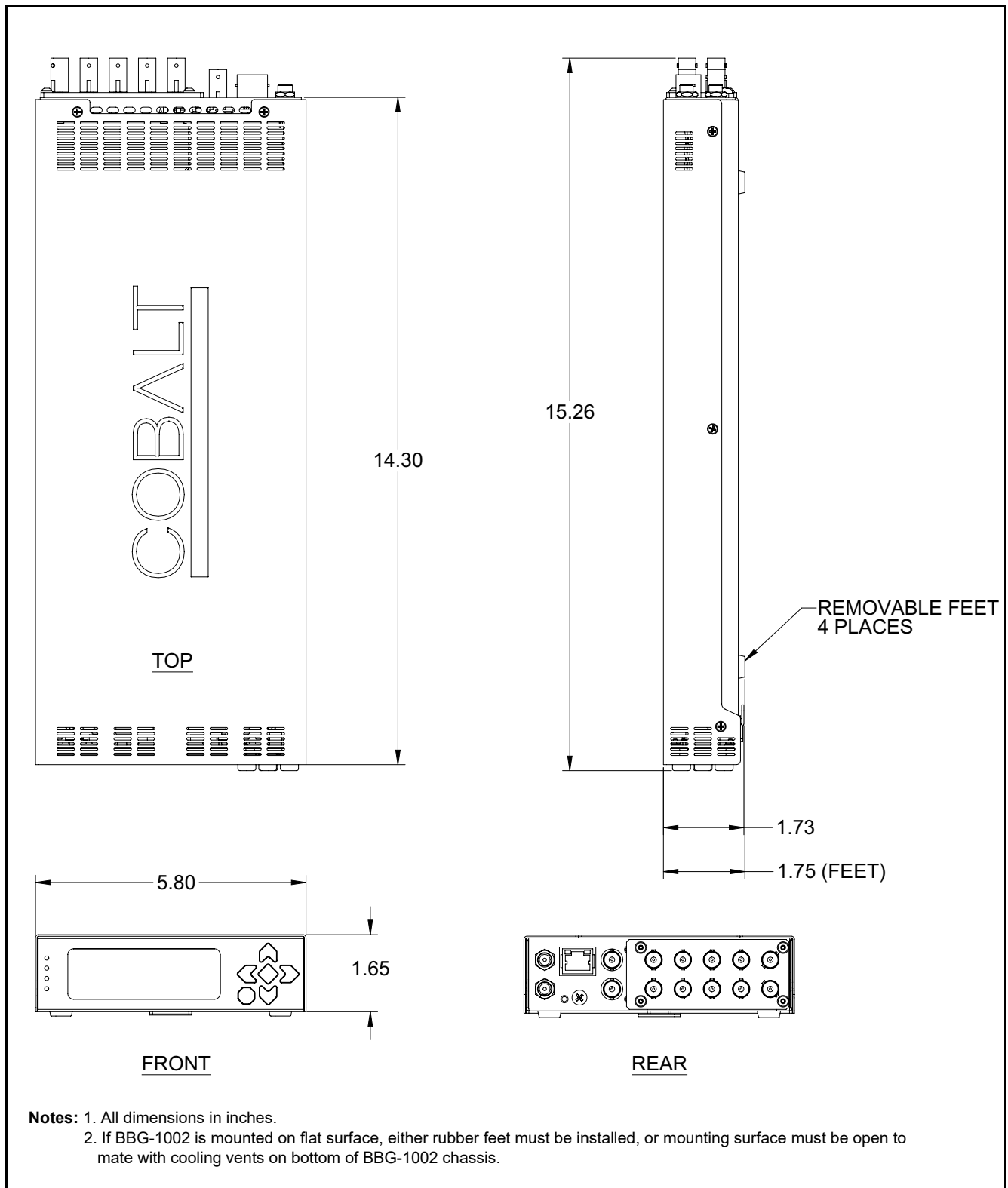
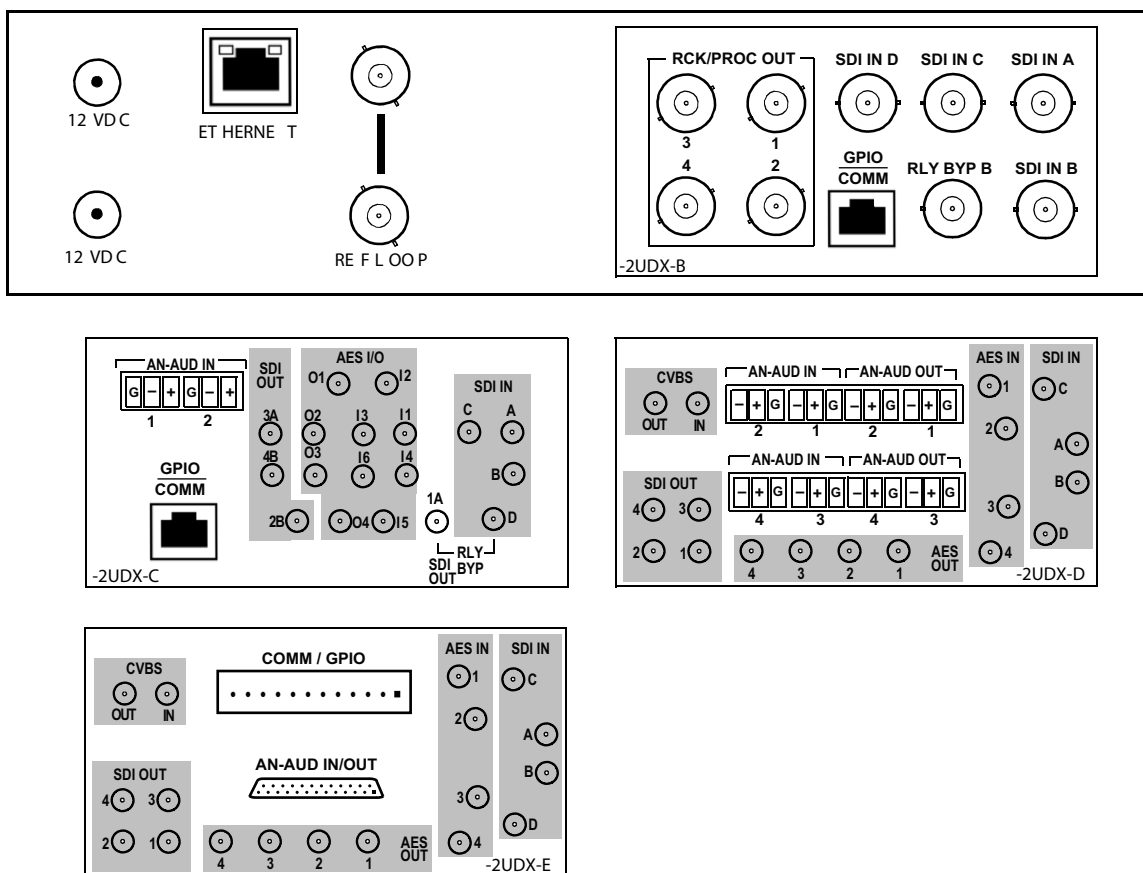


Figure 2-2 BBG-1002-2UDX Dimensional Details

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
Signal Connectors (see diagrams for connector assortments per model)	
SDI IN	3G/HD/SD-SDI video input BNCs
SDI OUT	3G/HD/SD-SDI video output BNCs
CVBS IN	CVBS analog video input BNC
AN-AUD IN	Analog balanced audio inputs
AES IN	AES input BNCs
CVBS OUT	CVBS analog video output BNC
AN-AUD OUT	Analog balanced audio inputs (see diagrams)
AES OUT	AES output BNCs
COMM/GPIO	Multi-pin connector that provides connections/functions as denoted in this figure and Figure 2-4.

Figure 2-3 BBG-1002-2UDX Rear Panel Connectors

GPIO, Serial (COMM), and Analog Audio Connections

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

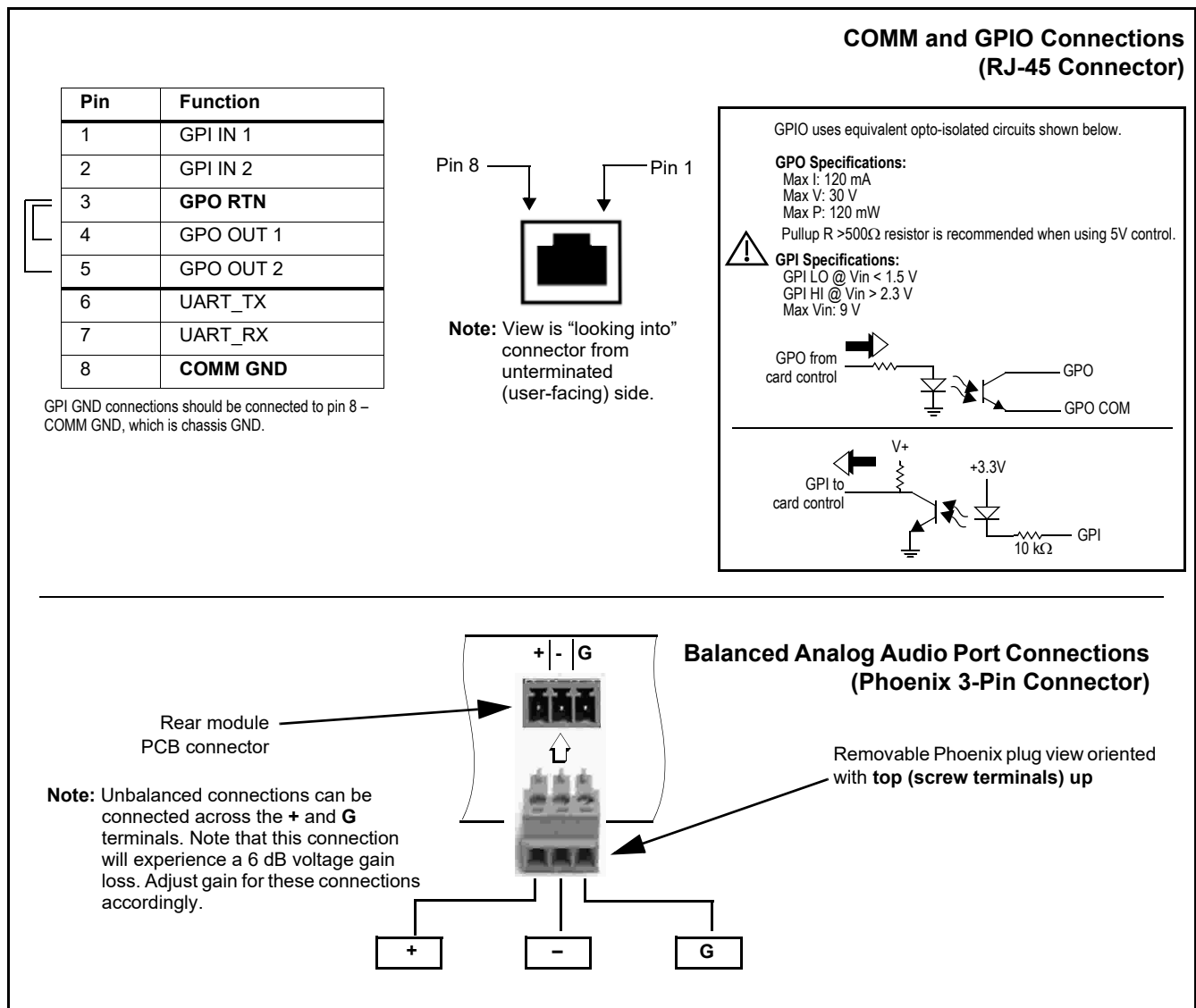
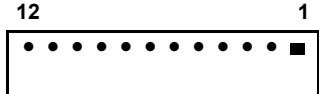
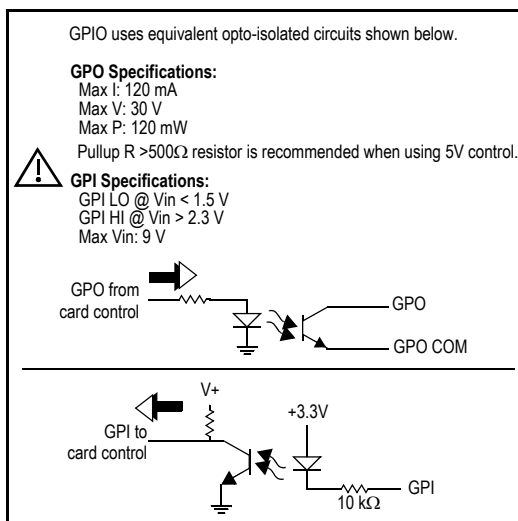


Figure 2-4 COMM, GPIO, and Analog Audio Connector Pinouts

COMM and GPIO Connections (12-Pin Phoenix Connector)

Pin	Function
1	GPI IN 1
2	GPI IN 2
3	GND
4	GND
5	GPO OUT 1
6	GPO OUT 2
7	GPO COM
8	GND
9	COMM A RX 422 (-)
10	COMM B RX 422 (+)
11	COMM A TX 422 (-)
12	COMM B TX 422 (+)

Balanced Analog Audio Port Connections (MicroD Connector)

Pin	Function	Pin	Function
1	OUT 4 (+)	14	OUT 4 (-)
2	GND	15	OUT 3 (+)
3	OUT 3 (-)	16	GND
4	OUT 2 (+)	17	OUT 2 (-)
5	GND	18	OUT 1 (+)
6	OUT 1 (-)	19	GND
7	IN 4 (+)	20	IN 4 (-)
8	GND	21	IN 3 (+)
9	IN 3 (-)	22	GND
10	IN 2 (+)	23	IN 2 (-)
11	GND	24	IN 1 (+)
12	IN 1 (-)	25	GND
13	NC		

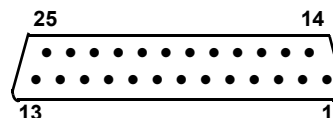


Figure 2-4 COMM, GPIO, and Analog Audio Connector Pinouts (cont.)

Operating Instructions

Overview

If you are already familiar with using DashBoard or a Cobalt Remote Control Panel to control Cobalt cards, please skip to BBG-1002-2UDX Function Menu List and Descriptions (p. 3-10).

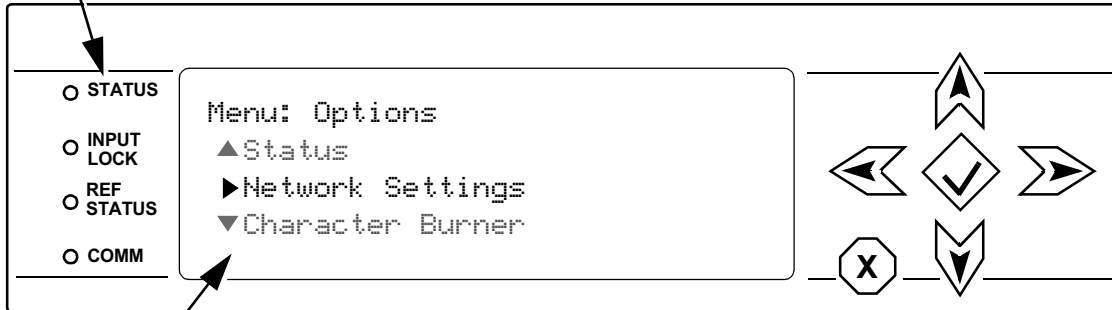
This chapter contains the following information:

- BBG-1002-2UDX Front Panel Display and Menu-Accessed Control (p. 3-1)
- Connecting BBG-1002-2UDX To Your Network (p. 3-3)
- Control and Display Descriptions (p. 3-4)
- Checking BBG-1002-2UDX Device Information (p. 3-8)
- Ancillary Data Line Number Locations and Ranges (p. 3-9)
- BBG-1002-2UDX Function Menu List and Descriptions (p. 3-10)
- Uploading Firmware Using Web Interface and GUI (p. 3-74)
- Troubleshooting (p. 3-75)

BBG-1002-2UDX Front Panel Display and Menu-Accessed Control

Figure 3-1 shows and describes the BBG-1002-2UDX front panel displays and menu-accessed user interface controls. Initial network setup is performed using these controls.

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




BBG1000_FPUI_SCPD2014P8

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


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

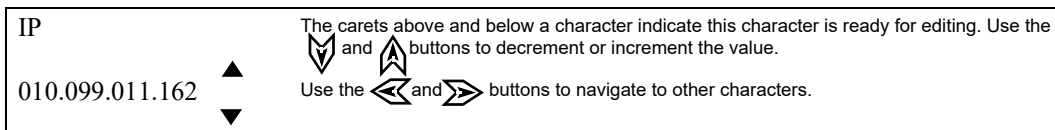
▶ arrows denotes a menu item is accessed to be selected (in the example above, **Network Settings**).


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

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

```
Menu: Network Settings
▶P: 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.



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-1002-2UDX Front Panel Display and Menu Controls

Connecting BBG-1002-2UDX To Your Network

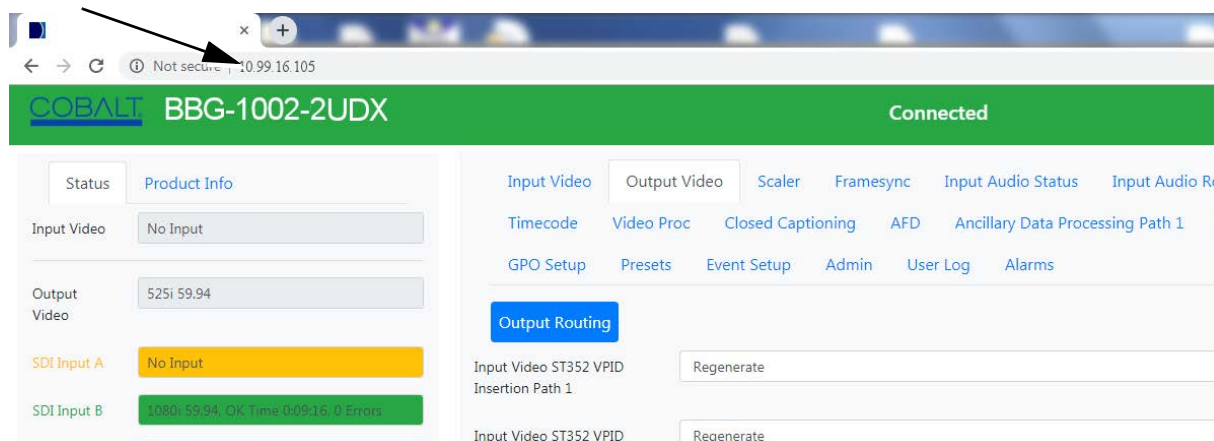
BBG-1002-2UDX ships with network protocol set to DHCP and populates its address with an address allocated by your DHCP server. If your network does not have a DHCP server, the BBG-1002-2UDX address field will be blank, and a static address must then be assigned. All initial network settings are performed 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  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-1002-2UDX Device in DashBoard

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

Note: BBG-1002-2UDX DashBoard remote control is also available by opening the device in DashBoard similar to opening an openGear® card.

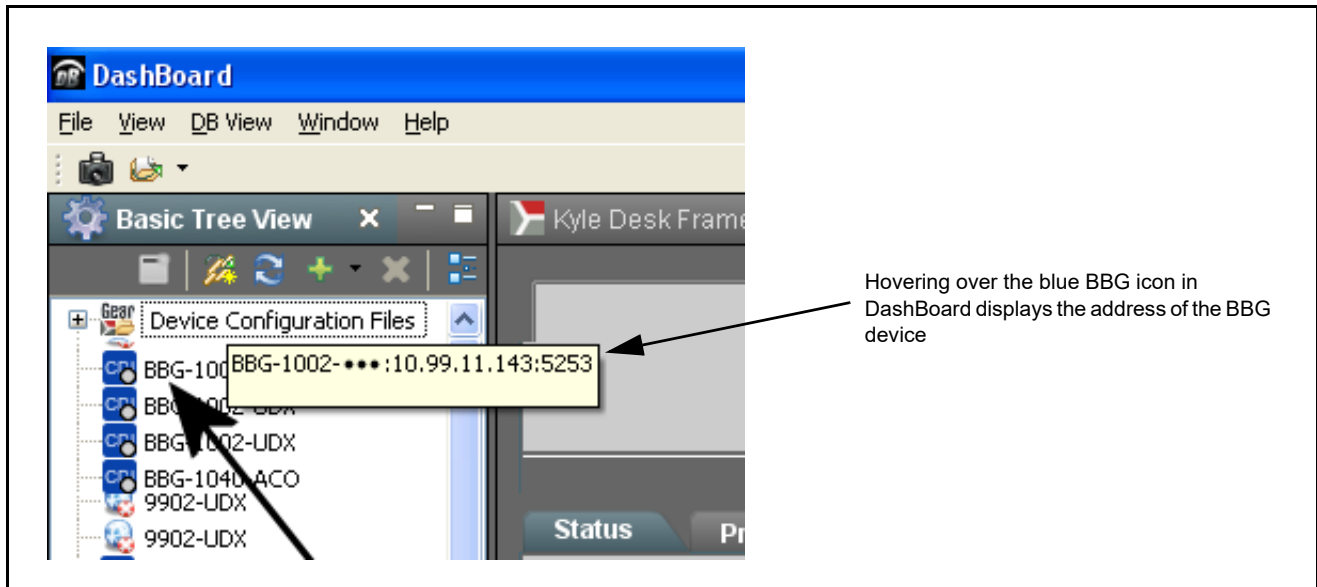


Figure 3-2 Finding BBG-1002-2UDX Using DashBoard

Control and Display Descriptions

This section describes the user interface controls, indicators, and displays for using the BBG-1002-2UDX. The BBG-1002-2UDX functions can be accessed and controlled using any of the user interfaces described here.

The format in which the BBG-1002-2UDX functional controls, indicators, and displays appear and are used varies depending on the user interface being used. Regardless of the user interface being used, access to the BBG-1002-2UDX functions (and the controls, indicators, and displays related to a particular function) follows a general arrangement of Function Menus under which related controls can be accessed (as described in Function Menu/Parameter Overview below).

Note: When a setting is changed, settings displayed on DashBoard™ (or a Remote Control Panel) 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.

Function Menu/Parameter Overview

The functions and related parameters available on the BBG-1002-2UDX are organized into function **menus**, which consist of parameter groups as shown below.

Figure 3-3 shows how the BBG-1002-2UDX and its menus are organized, and also provides an overview of how navigation is performed between devices, function menus, and parameters.

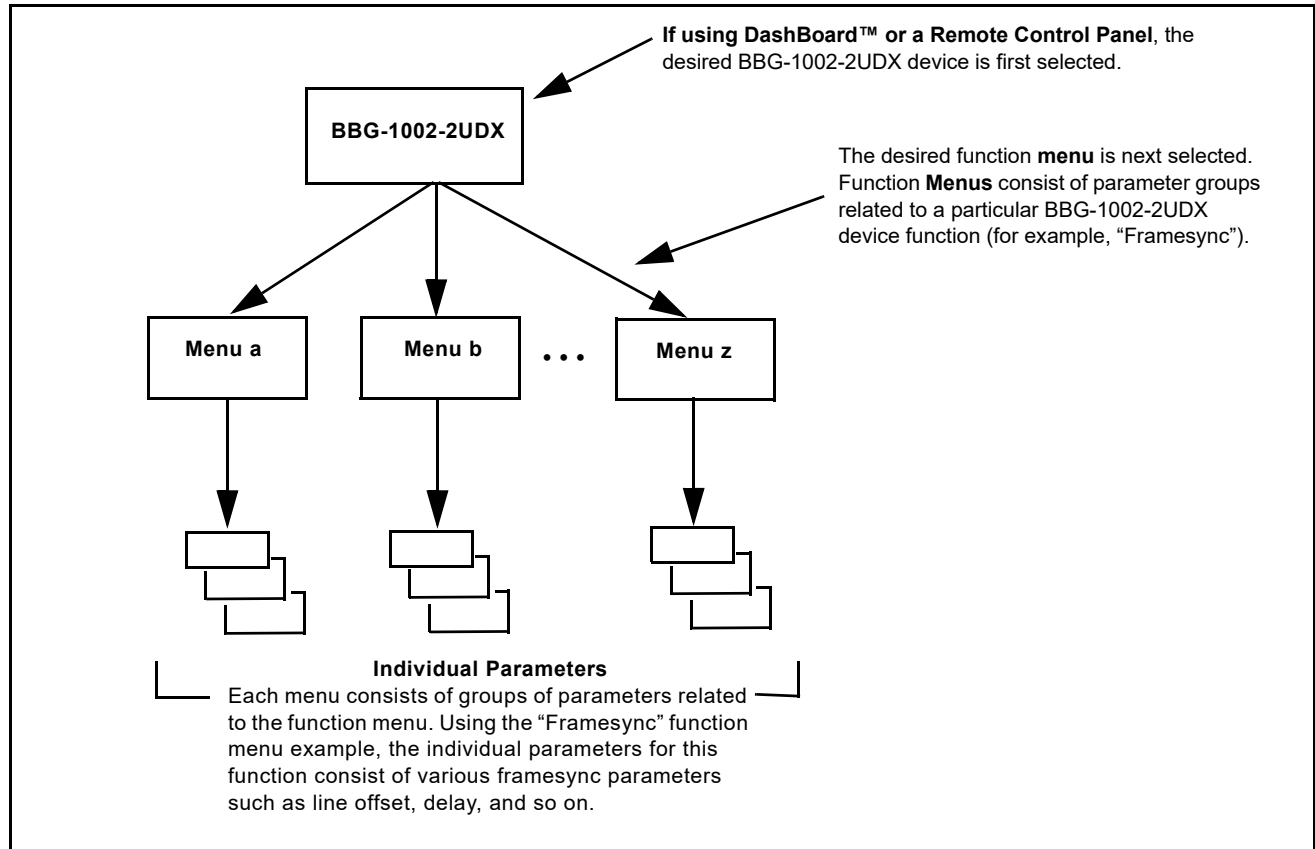


Figure 3-3 Function Menu/Parameter Overview

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.

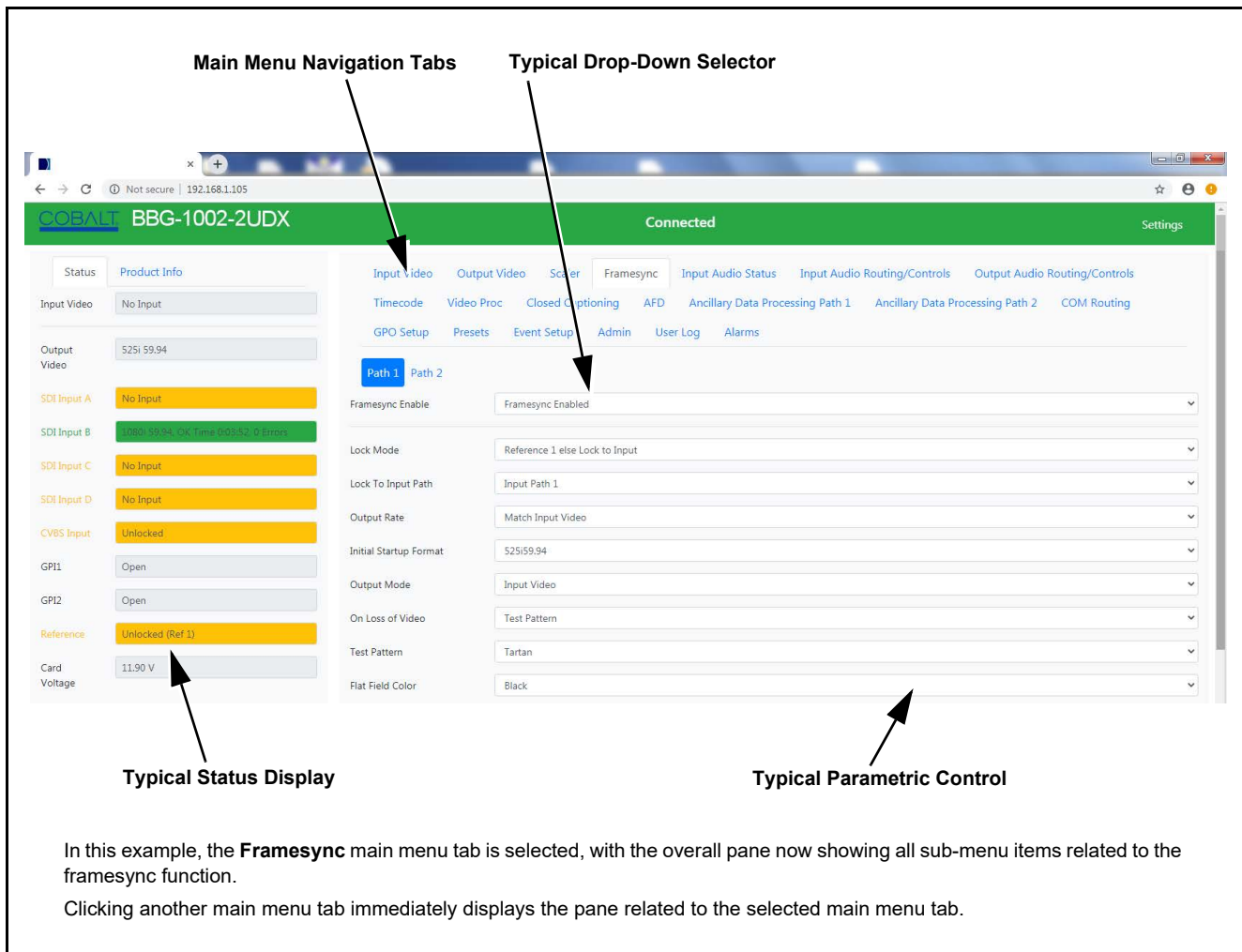


Figure 3-4 Typical Web UI Display and Controls

Display Theme

(See Figure 3-5.) The BBG-1002-2UDX user interface theme selection offers light and dark themes suited for various users and environments.

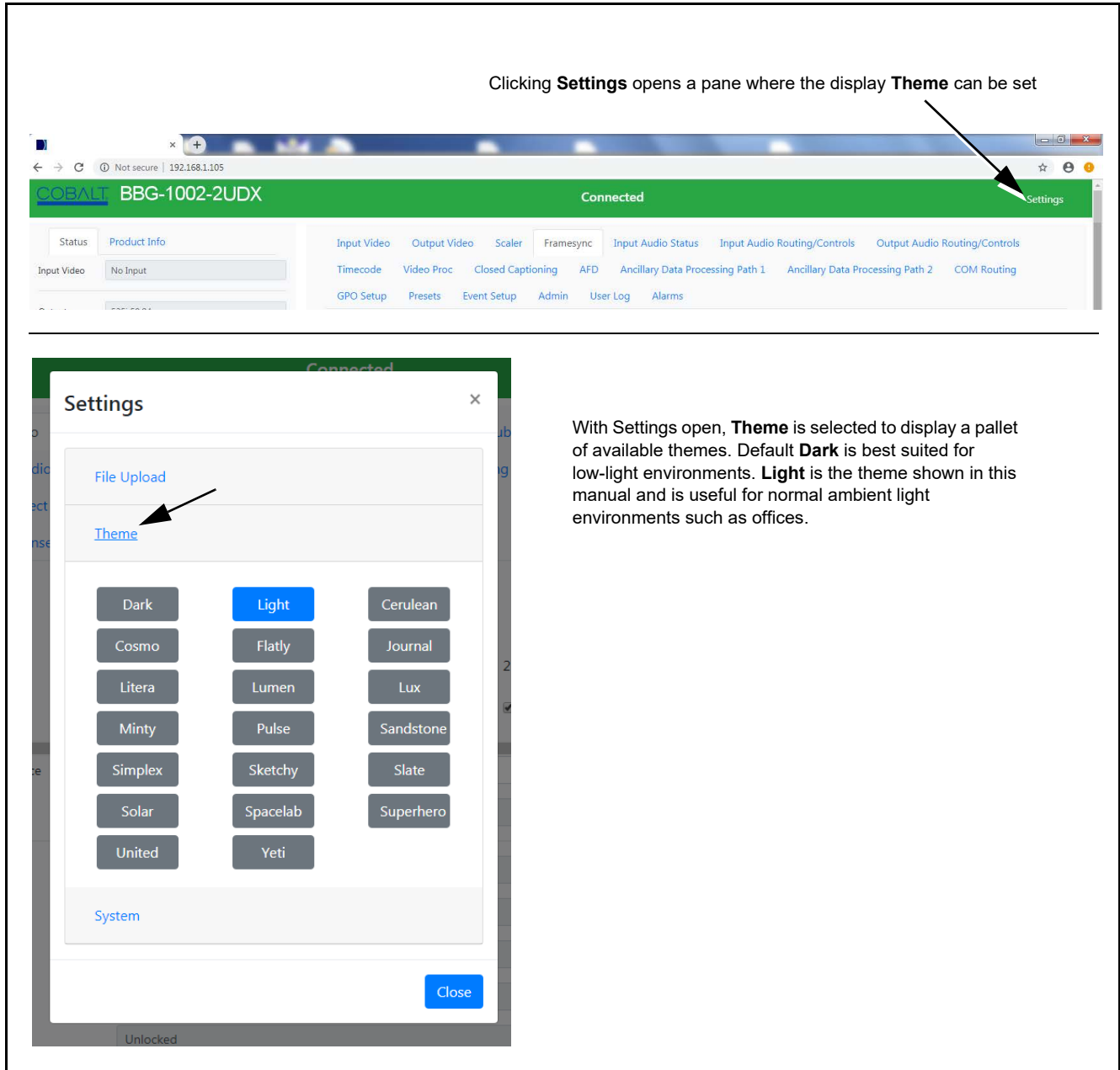


Figure 3-5 Web UI Display Themes

Checking BBG-1002-2UDX Device Information

The operating status and software version the BBG-1002-2UDX device can be checked by clicking the **Status** main menu tab. Figure 3-6 shows and describes the BBG-1002-2UDX 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. 3-75) for corrective action.

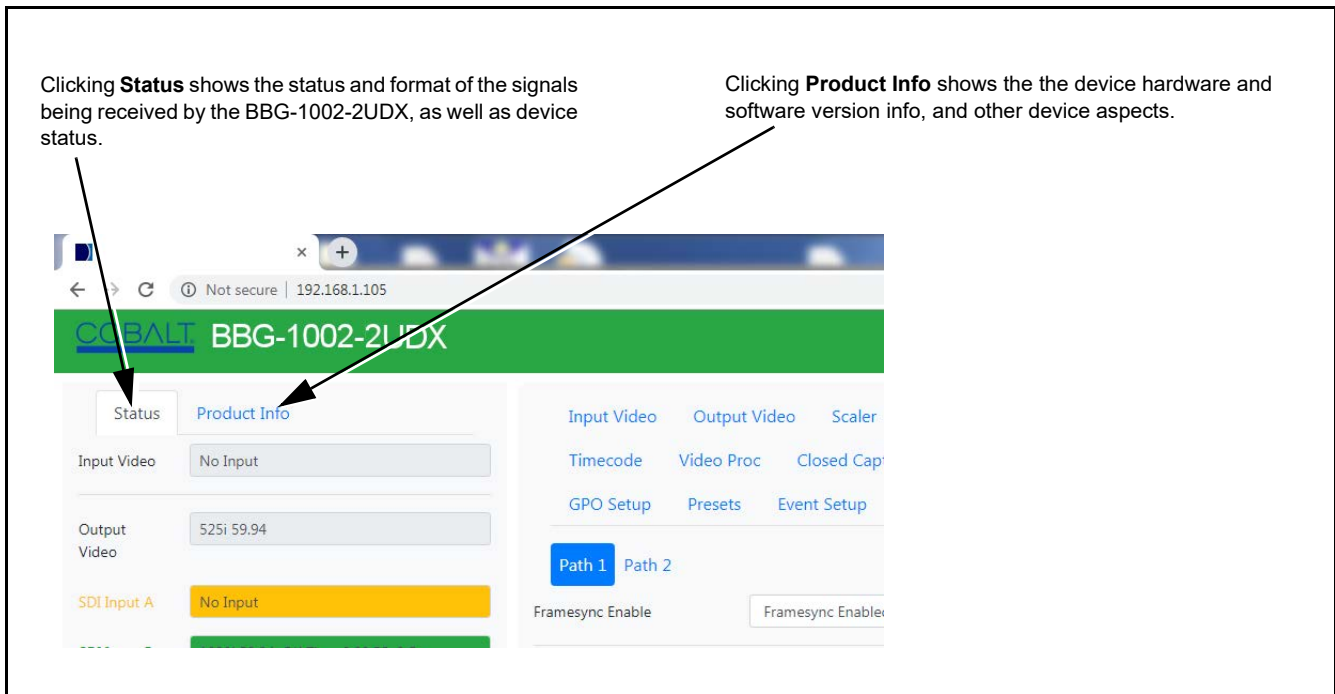


Figure 3-6 BBG-1002-2UDX Device Info/Status Utility

Ancillary Data Line Number Locations and Ranges

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

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

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

Notes:

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

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

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

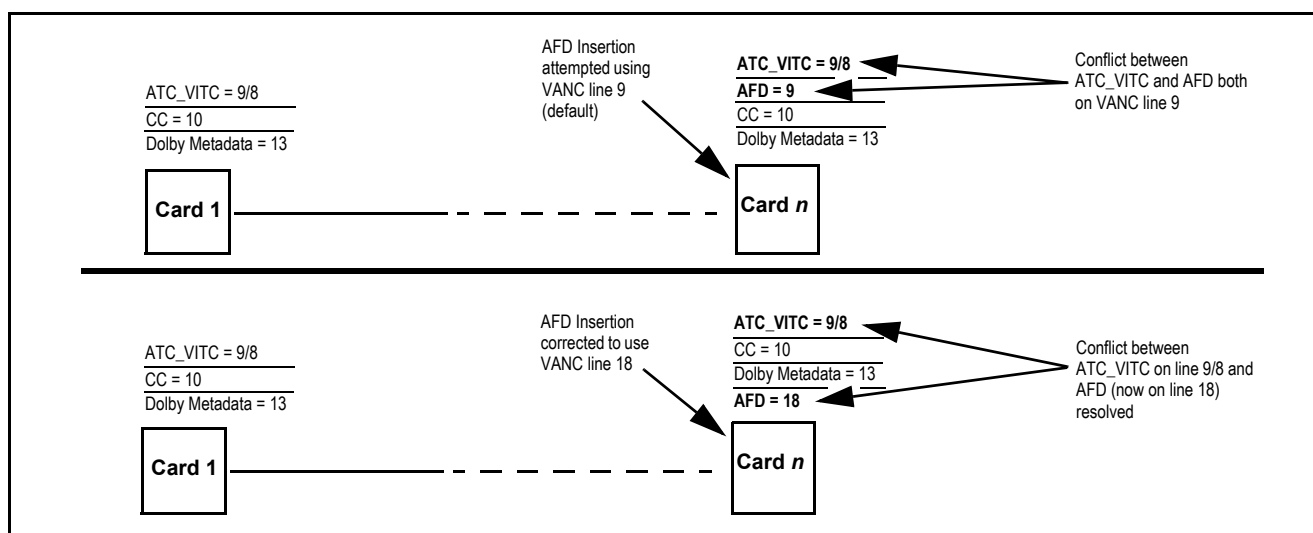




Figure 3-7 Example VANC Line Number Allocation Example

BBG-1002-2UDX Function Menu List and Descriptions

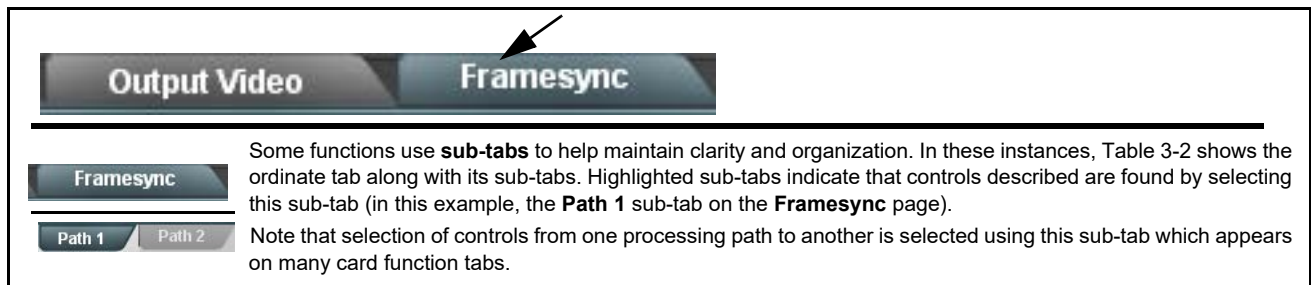
Table 3-2 individually lists and describes each BBG-1002-2UDX function menu and its related list selections, controls, and parameters. Where helpful, examples showing usage of a function are also provided.

Note:  For any DashBoard tabs on device not appearing in this manual, this indicates the function is an option and covered in a separate Manual Supplement. Please refer to device web page Product Downloads for pdf Manual Supplements covering these options.

Note:

- All numeric (scalar) parameters displayed can be changed using the slider controls,  arrows, or by numeric keypad entry in the corresponding numeric field.
- User interface depictions here may show DashBoard UI. Web UI is similar.

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



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

Function Menu Item	Page	Function Menu Item	Page
Input Video Controls	3-11	Reticules	3-43
Output Video Mode Controls	3-12	Wings Insertion	3-46
Scaler	3-14	AFDProcessor Controls	3-47
Framesync	3-18	Moving Box Insertion	3-53
Input Audio Status	3-21	Ancillary Data Proc Controls	3-55
Input Audio Routing/Controls	3-22	COMM Ports Setup Controls	3-58
Video Quality Events	3-27	Presets	3-60
Audio Detect Events Setup Controls	3-28	GPO Setup Controls	3-62
Closed Captioning	3-29	Event Setup Controls	3-63
Video Proc/Color Correction	3-30	Admin	3-67
Output Audio Routing/Controls	3-33	User Log	3-69
Timecode	3-38	Alarms Setup Controls	3-69

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

Input Video

Allows manual or failover selection of SDI program video inputs and displays status and raster format of received SDI video.

• Input Video Source/Status

Path 1 Input Source SDI A

- SDI A
- SDI B
- SDI C
- SDI D
- Path 1 Program
- Path 2 Program
- CVBS
- Failover A to B
- Failover B to A

Path 1 Input Video 720p 59.94, OK Time 0:06:15, 0 Errors

Path 2 Input Source SDI B

Path 2 Input Video 1080i 59.94, OK Time 0:06:44, 0 Errors

Selects the input video source to be applied to the **Path 1** and **Path 2** program video inputs.

Note:

- SDI inputs selected must be used with Rear I/O Module correspondingly equipped with intended input ports.
- Input select also allows internal connection from one processing path output to the opposite processing path input. This allows "serial" or cascaded processing connections without requiring external jumpering on the rear panel. Serial jumpering can, in addition to other functions, provide identical program video output streams with a delay offset between the two streams.
- Care should be taken to make certain an output from a video path is not applied as an input for the same path. Also, if framesync Lock to Input else Free Run is selected, the initial "upstream" path **must** be selected using Lock to Input Path control (for example, if Path 1 cascades to Path 2, this control must be set for Path 1 as lock source).
- Unless upstream locked to same reference, simultaneously-used inputs should be ref locked on this unit using this unit's Frame Sync function (see Framesync (p. 3-18)).

SDI A Status	1080i_5994, OK Time 2:05:51, 0 Errors
SDI B Status	1080p_5994, OK Time 0:29:54, 0 Errors
SDI C Status	Input Format Disabled by User
SDI D Status	Unlocked
CVBS Status	525i_5994

SDI A thru SDI D and CVBS Status show raster/format for all card inputs. If signal is not present or is invalid, **Unlocked** is displayed. (These status indications are also propagated to the Card Info pane.)

Input Format Disabled by User indicates raster size and/or frame rate has been rejected from being passed by card (as described below in Input SDI Raster Size / Frame Rate Filtering).

Input SDI Raster Size / Frame Rate Filtering

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

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

Allowed Raster Sizes	525i	625i	720p	1080i	1080psf	1080p		
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Allowed Frame Rates	23.98	24	25	29.97	30	50	59.94	60
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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

Allowed Raster Sizes	525i	625i	720p	1080i	1080psf	1080p		
	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Allowed Frame Rates	23.98	24	25	29.97	30	50	59.94	60
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

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


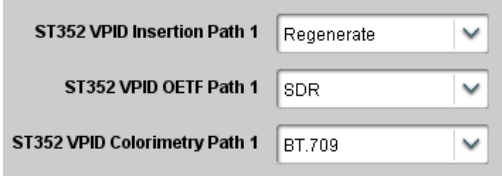

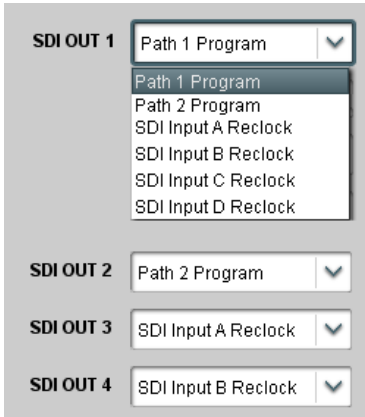
	<p>Allows selection of each of the four video output coaxial connectors as processed SDI out or reclocked SDI out. Also provides CVBS parameter controls and test pattern output controls for CVBS output.</p>
<p>• ST352 VPID Insertion/Pass-Thru Select / Colorimetry Mark Select</p> 	<ul style="list-style-type: none"> • ST 352 VPID Insertion selects from default Regenerate mode and special Pass-Through mode (see below for important usage notes). - Regenerate makes certain ST352 is marked for whatever the device is passing, or if the payload is being modified by the device. (An example of where ST352 would have to be modified would be if the device Framesync is user-set to change the frame rate from 59.94 to 60.) - Pass-Through will extract and preserve the ST352 information from input SDI, and re-insert it on the output regardless of any changes the device has locally done to identifying characteristics carried in the ST352 metadata. <p> In all normal usages, it is recommended to leave this control set to default Regenerate setting. This ensures that downstream devices will "see" ST352 that represents the payload being provided by the device. Pass-Through is only used in highly specialized cases where special ST352 data must be preserved (even if the data may not match the payload).</p> <ul style="list-style-type: none"> • ST 352 VPID OETF selects from SDR, HLG, PQ, or unspecified marking. • ST 352 VPID Colorimetry selects from BT.709 or BT.2020 colorimetry marking. <p>Note: This tab has identical independent controls for Path 1 and 2. Therefore, only the Path 1 controls are shown here.</p>
<p>• Output Video Crosspoint</p> 	<p>For each SDI output port supported by the device, provides a crosspoint for routing Path 1 and Path 2 program processed video or selected-input reclocked to an SDI output. Also selects Path 1 or Path 2 as the source to be used for the analog video (CVBS) output.</p> <p>In this example:</p> <ul style="list-style-type: none"> - SDI OUT 1 set to use Path 1 Program video out - SDI OUT 2 set to use Path 2 Program video out - SDI OUT 3 set to output SDI Input A reclocked copy - SDI OUT 4 set to output SDI Input B reclocked copy <p>Note: Outputs set to Input Reclocked will pass input SDI regardless of Input SDI Raster Size / Frame Rate Filtering. Input filtering applies only to program video paths.</p>

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


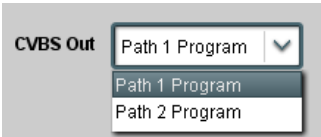


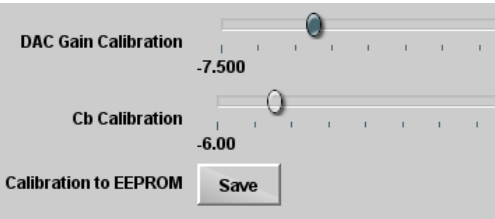
	<p>Provides CVBS output parameter controls and test pattern output controls</p>
<p>• CVBS Output Source Select</p> 	<p>Selects the processing path to be sourced for the CVBS output.</p>
<p>• CVBS Oversampling and Color Controls</p> 	<ul style="list-style-type: none"> • Oversampling enables or disables video DAC oversampling. Oversampling can improve rendering of motion for down-conversions to the CVBS SD analog output. • Color enables or disables chroma content in the CVBS output.
<p>• CVBS Test Pattern Generator Control</p> 	<p>Enables manual insertion (replacement) of CVBS output video to instead output 75% color bars.</p>
<p>• DAC Custom/Cal Offset Controls</p> 	<p>Gain and Cb calibration controls allow custom offsets from factory calibration values. Calibration to EEPROM stores custom offsets.</p> <p>Note: Factory default settings are recommended for typical use.</p>

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


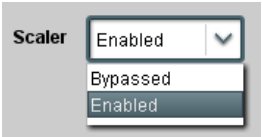
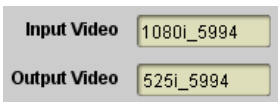
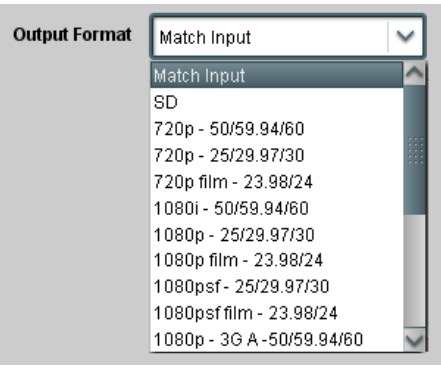
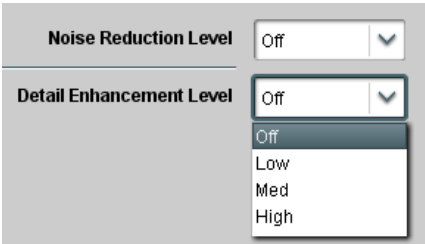
	<p>Provides up/down/cross-converter, aspect ratio controls, and user H/V controls.</p>
<p>Note: Scaler tab has identical independent controls for both Path 1 and Path 2 using the Path 1 / Path 2 sub-tabs. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab.</p>	
<p>• Scaler Enable Control</p> 	<p>Enables or disables Scaler function.</p> <p>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. 3-38) and Closed Captioning (p. 3-29) for more information about insertion into scaled output video.</p>
<p>• Input/Output Video Status</p> 	<p>Displays signal format/status sent to scaler and output format/status. If invalid or no signal is present, No Input is displayed.</p>
<p>• Output Format Selector</p> 	<p>Provides conversions to formats as shown.</p>
<p>• Noise Reduction/Detail Enhancement Controls</p> 	<p>Provides individual Noise Reduction and Detail Enhancement controls for optimizing scaled output where source is not optimum for scaled format.</p>

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


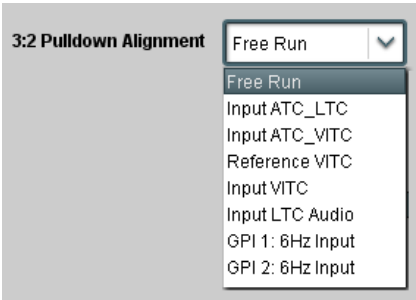
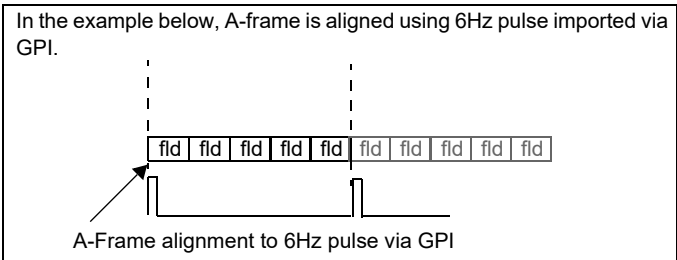
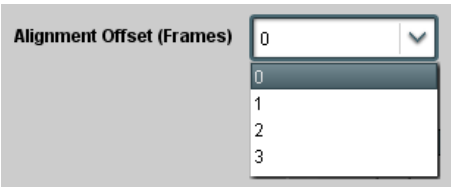
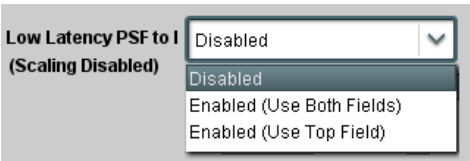
	(continued)
<p>• 3:2 Alignment Optimization Selector</p> 	<p>Provides selection to optimize 3:2 pulldown conversion where timecode or other selections shown are to be relied upon to indicate frame transitions.</p>  <p>Note: If input video timecode or other marker cannot be relied upon for accurate and precise frame marking, leave control set to Free Run.</p>
<p>• Alignment Offset Selector</p> 	<p>Based on alignment selection selected above, offsets A-frame by amount selected.</p>
<p>• Low-Latency PSF to Interlaced Control</p> 	<p>Allows PsF to Interlaced conversions bypassing Scaler ARC and Pan controls to enhance processing latency performance over that available in normal mode.</p> <ul style="list-style-type: none"> • Disabled: This is “normal” setting that locks out the low-latency processing function. Normal scaler processing latency (along with full ARC and pan control) is available with this setting. • Enabled (Use Both Fields): This setting provides a highest-quality low-latency setting, and can be expected to provide an approximate latency of 12 msec for North American frame rates. • Enabled (Use Top Field): This setting provides the lowest available latency with a slight reduction of motion smoothness due to alignment not waiting for both fields. This setting can be expected to provide an approximate latency of 6 msec for North American frame rates. <p>Note: When either low latency mode is enabled, image ARC scaling and/or panning is locked out.</p>

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


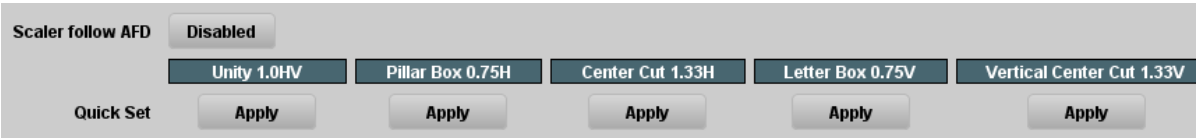
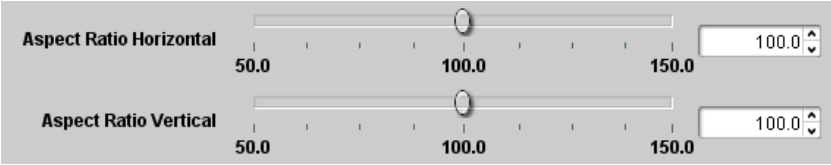
	(continued)
<p>• Standard Quick Set Aspect Ratio Conversion Selectors</p>	<p>Selects between the standard preset Aspect Ratio Conversions (ARC) shown below or scaler follow AFD.</p> <p>Note:</p> <ul style="list-style-type: none"> • The Scaler follow AFD control also appears on the AFD tab and is mutually ganged with the selection performed on either tab. Refer to AFDProcessor Controls (p. 3-47) for more information. • This function is intended for aspect ratio adjustment of a particular signal without AFD considerations. <ul style="list-style-type: none"> - 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 AFDProcessor Controls (p. 3-47). 
<p>• User-defined Aspect Ratio Controls</p>	<p>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.</p> <p>(50% to 150% range in 0.1% steps; null = 100.0)</p>  <p>Buttons allow standard ARC presets to be applied to output video. For any setting, using the Horizontal or Vertical controls allow user custom settings.</p> <p>Pressing any of the preset buttons restores the ARC to the selected setting and overrides any previous custom settings.</p>

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


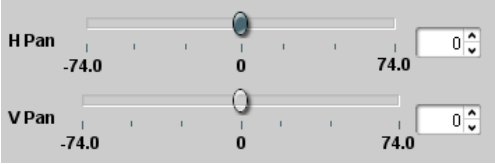
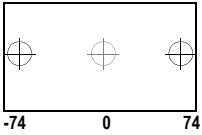
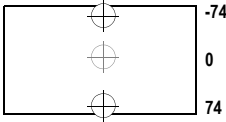
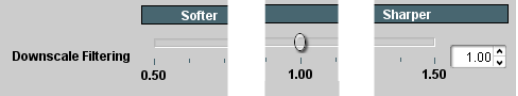
	(continued)
<p>• H Pan and V Pan Controls</p> 	<p>H Pan control shifts horizontal center of image left (negative settings) or right (positive settings)</p> <p>(-74% to 74% range in 0.1% steps; null = 0.0)</p>  <hr/> <p>V Pan control shifts vertical center of image down (negative settings) or up (positive settings)</p> <p>(-74% to 74% range in 0.1% steps; null = 0.0)</p> 
<p>• Downscale Filtering Control</p> 	<p>Adjusts the aggressiveness of sharpening or filtering applied to output video. Optimum setting results in overall perception of increased sharpness, while avoiding pattern noise artifacts.</p> <p>(Range is 0.50 thru 1.50 in 0.01 steps; null = 1.00)</p>

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


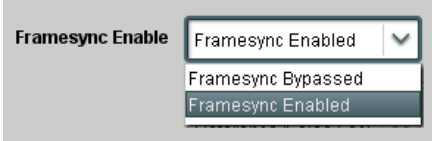
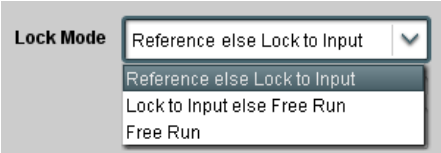


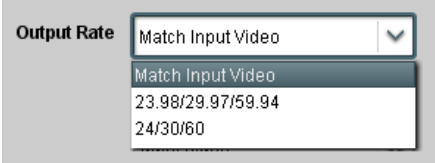
	<p>Provides video frame sync/delay offset control and output control/loss of program video failover selection controls.</p>
<p>Note: Framesync tab has identical independent controls for both Path 1 and Path 2 using the Path 1 / Path 2 sub-tabs. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab.</p>	
<p>• Framesync Enable/Disable Control</p> 	<p>Provides master enable/disable of all device framesync functions/controls.</p>
<p>• Lock Mode Select</p> 	<p>Selects Frame Sync functions from the choices shown to the left and described below.</p> <ul style="list-style-type: none"> • Lock to Reference: Output video is locked to external reference received on the device REF LOOP input. Note: If valid reference is not received, the Card state:  Reference Invalid indication appears in the Card Info status portion of DashBoard™, indicating invalid frame sync reference error. • Free Run: Output video is locked to the device's internal clock. Output video is not locked to external reference. • Lock to Input: Uses the selected program video for the path as the reference standard. Lock To Input Path selects the program video source which is used for ref. Note: If Lock to Input is used for framesync, any timing instability on the input video will result in corresponding instability on the output video. • Free Run: Output video is locked to the device internal clock. Output video is not locked to external reference. <p> • For cases where minimum latency is desired (no framesync), Mode should be set to Lock to Input with Framesync set to Enabled. If Disabled is selected when using dual paths, severe video and audio corruption can occur.</p>
<p>• Output Rate Select</p> 	<p>Allows frame rate to be outputted same as input video, or converted to from the choices shown to the left and described below.</p> <ul style="list-style-type: none"> • 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.

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


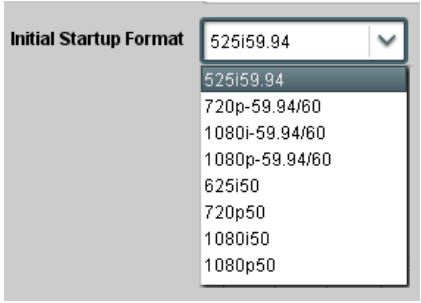
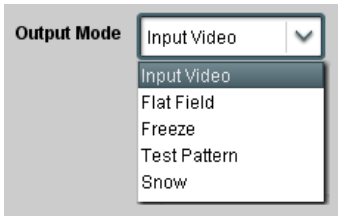
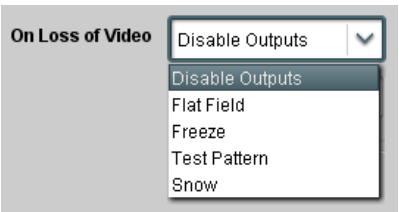
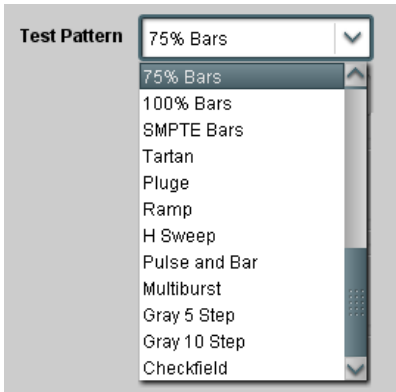
	(continued)
<p>• Initial Startup Format Select</p> 	<p>Selects a frame sync format/rate to be invoked (from the choices shown to the left) in the time preceding stable lock to external reference.</p> <p>Set this control to that of the intended external reference to help ensure smoothest frame sync locking. This control also sets the device test pattern format where the device initial output at power-up is the internal pattern instead of program video.</p>
<p>• Program Video Output Mode Select</p> 	<p>Provides a convenient location to select between program video output and other technical outputs from the choices shown to the left and described below.</p> <ul style="list-style-type: none"> • Input Video – device outputs input program video (or loss of signal choices described below). • Flat Field – 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 snow multi-color pattern.
<p>• Loss of Input Signal Selection</p> 	<p>In the event of program input video Loss of Signal (LOS), determines action to be taken as follows:</p> <ul style="list-style-type: none"> • Disable Outputs: Disable program video SDI outputs. • Flat Field – go to flat field on program video output. • Freeze – go to last frame having valid SAV and EAV codes on program video output. • Test Pattern – go to standard technical test pattern on program video output (pattern is selected using the Pattern drop-down described below). • Snow – output snow multi-color pattern.
<p>• Test Pattern Select</p> 	<p>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).</p>

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


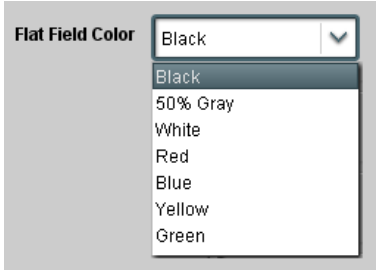
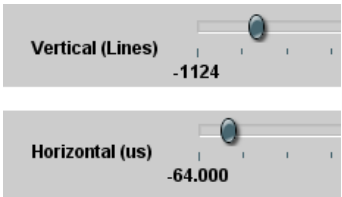

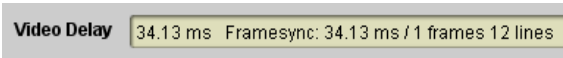
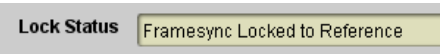
	(continued)
<ul style="list-style-type: none"> • Flat Field Color Select 	<p>Provides a choice of flat field colors when Flat Field is invoked (either by LOS failover or directly by selecting Flat Field on the Program Video Output Mode Select control).</p>
<ul style="list-style-type: none"> • Output Video Reference Offset Controls 	<p>With framesync enabled, provides the following controls for offsetting the output video from the reference:</p> <ul style="list-style-type: none"> • 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.) <p>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.</p>
<ul style="list-style-type: none"> • Frame Delay Control 	<p>When Framesync is enabled, specifies the smallest amount of latency delay (frames held in buffer) allowed by the frame sync. The frame sync will not output a frame unless the specified number of frames are captured in the buffer. The operational latency of the frame sync is always between the specified minimum latency and minimum latency plus one frame (not one field).</p> <p>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 make certain desired amount of frames are delayed.</p>
<ul style="list-style-type: none"> • Video Delay Display 	<p>Displays the current input-to-output video delay (in msec units) as well as in terms of Frames/fractional frame (in number of lines).</p> <p>Status display shows total input-to-output video delay, along with any framesync delay.</p>
<ul style="list-style-type: none"> • Framesync Lock Status Display 	<p>Displays the current framesync status and reference source.</p>
<p>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. 3-22) for these controls.</p>	

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

Input Audio Status

Path 1

Path 2

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

Note: **Input Audio Status** tab has identical independent controls/status displays for both Path 1 and Path 2 using the **Path 1 / Path 2** sub-tabs. Therefore, only the **Path 1** controls are shown here. Access controls and status for other path using the respective sub-tab.

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

- **Absent:** Indicates embedded channel or AES pair does not contain recognized audio PCM data.
- **Present - PCM:** Indicates AES pair or embedded channel 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 device 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	Dolby Digital	Data	
Emb 3-4	Present - PCM	-80 dBFS/-80 dBFS	
Emb 5-6	Present - PCM	-80 dBFS/-80 dBFS	
Emb 7-8	Present - PCM	-20 dBFS/-20 dBFS	
Emb 9-10	Present - PCM	0 dBFS/-20 dBFS	
Emb 11-12	Present - PCM	-14 dBFS/-10 dBFS	
Emb 13-14	Present - PCM	-9 dBFS/-5 dBFS	
Emb 15-16	Present - PCM	-3 dBFS/0 dBFS	
	Status	Peak	SRC
AES 1-2	Dolby E, Line 449	Data	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-1002-2UDX Function Menu List — continued

<div>Input Audio Routing/Controls</div> <div>Input Bus Path 1 Audio Delay Path 1</div>	<p>Provides audio routing, gain, per-channel/bulk audio delay controls, and audio meters. These controls route selected audio sources onto the 16-channel internal bus (which is used for all audio processing).</p>
<p>Note: Input Audio Routing/Controls tab has identical independent controls for both Path 1 and Path 2 using the Path 1 / Path 2 sub-tabs. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab.</p>	
<div data-bbox="203 527 1385 1129"> </div> <div data-bbox="219 1136 256 1157">...</div> <div data-bbox="219 1186 901 1612"> <p>Path 1 Card 16-Ch Internal Bus (Gain, Mute, Bulk and Channel Delay Controls)</p> </div> <div data-bbox="911 1178 1393 1564"> <p>All audio inputs are transferred through the device via each path's 16-channel Internal Bus (Bus Ch 1 thru Bus Ch 16).</p> <p>The example above shows various Source selections that direct Emb Ch 1 thru Ch 6 and AES Ch 1 and Ch 2 onto the internal bus (unused bus channels can be set to Silence or Mute).</p> <p>Each bus channel provides Gain, Mute, and Invert controls.</p> <p>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.</p> </div>	

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

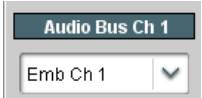
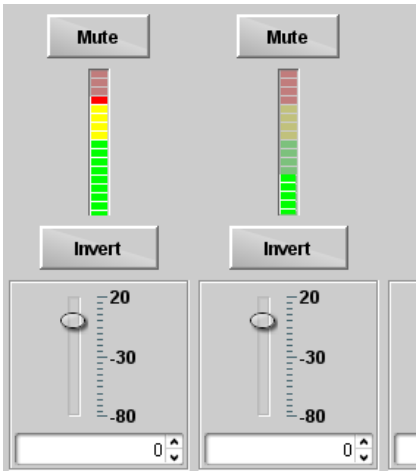
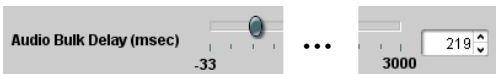

Input Audio Routing/Controls	
Input Bus Path 1	Audio Delay Path 1
(continued)	
<p>Note:</p> <ul style="list-style-type: none"> • Default factory preset routing routes embedded Ch 1 thru Ch 16 to bus channels Audio Bus Ch 1 thru Ch 16. • Bus Ch 2 thru Bus Ch 16 have controls identical to the controls described here for Bus Ch 1. Therefore, only the Bus Ch 1 controls are shown here. 	
<p>• Bus Channel Source</p> 	<p>Using the Source drop-down list, selects the audio input source to be routed to the bus channel from the following choices:</p> <ul style="list-style-type: none"> • Embedded input channel 1 thru 16 (Emb Ch 1 thru Emb Ch 16) • AES input channel 1 thru 16 (AES Ch 1 thru AES Ch 16) • Analog input channel 1 thru 4 (Analog Ch 1 thru Analog Ch 4) • Input Flex Bus summed mix output nodes A thru P (see Input Flex Mix (p. 3-25)) <p>Note:</p> <ul style="list-style-type: none"> • AES pair and analog channel count are dependent on model rear panel. • Embedded channel sources are only the embedded channels associated with the respective path.
<p>• Channel Mute/Phase Invert/Gain Controls and Peak Level Display</p> 	<p>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.)</p> <p>Gain controls allow relative gain (in dB) control for the corresponding destination Embedded Audio Group channel.</p> <p>(-80 to +20 dB range in 1.0 dB steps; unity = 0 dB)</p> <p>Note: Although the device can pass non-PCM data such as Dolby® E or AC-3, setting the gain control to any setting other than default 0 will corrupt Dolby data.</p>
Input Audio Routing/Controls	
Input Bus Path 1	Audio Delay Path 1
Audio Delay Path 1	
<p>• Bulk (Master) Audio/Video Delay Control</p> 	<p>Audio Delay – Provides bulk (all four groups/master) and individual audio bus channel delay offset controls and delay parametric displays.</p> <p>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).</p> <p> Large rapid changes in bulk delay (> 500 msec) can result in momentary full-scale noise burst on output processed audio. This burst can damage monitors or other equipment if not considered. Gain on output should be reduced if performing large adjustments to delay.</p>

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

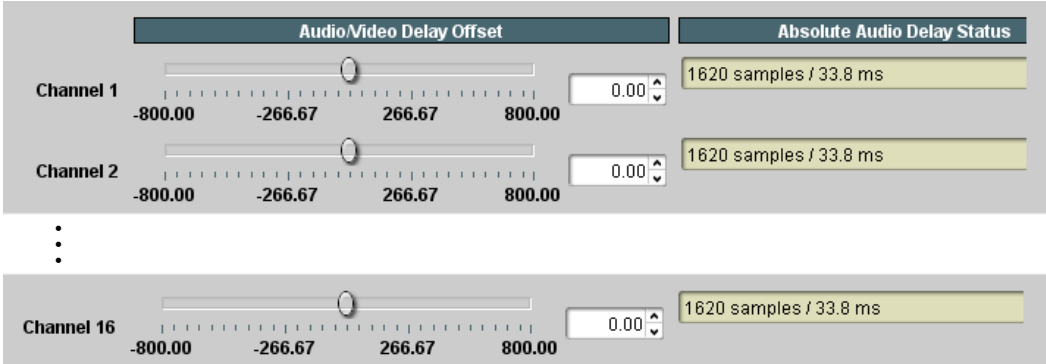
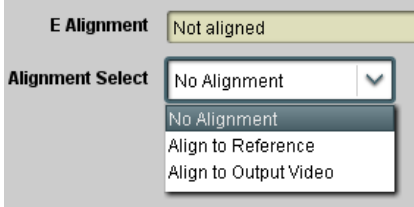
<div>Input Audio Routing/Controls</div> <div>Input Bus Path 1 Audio Delay Path 1</div>	(continued)
<p>• Per-Channel Audio/Video Delay Offset Controls</p> <p>Offset control adds or reduces (offsets) channel audio delay from the matching video delay (audio delay offset setting adds or removes delay in 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.</p> <p>(-800.0 to +800.0 msec range in 0.02 msec steps; null = 0.0 msec)</p> <p>Delay Status shows current delay from video for the corresponding audio channel.</p> <p>Note:</p> <ul style="list-style-type: none"> • 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. 	
<div>Input Audio Routing/Controls</div> <div>Audio Delay Path 1 Dolby E Alignment Path 1</div> <p>• Dolby E Embedding Alignment Control</p> 	<p>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.</p> <p>For incoming Dolby E data routed to the audio bus (either over embedded channels or via AES embedding to the bus), aligns the embedded Dolby E data corresponding to selection. Alignment line as a result of selection is shown in E Alignment status display.</p> <p>Note: Where a frame reference is available, it is recommended to use the Align to Reference selection. This helps ensure that the correct alignment is achieved even if the video is user delayed or output format is changed.</p> <p>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.</p>

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

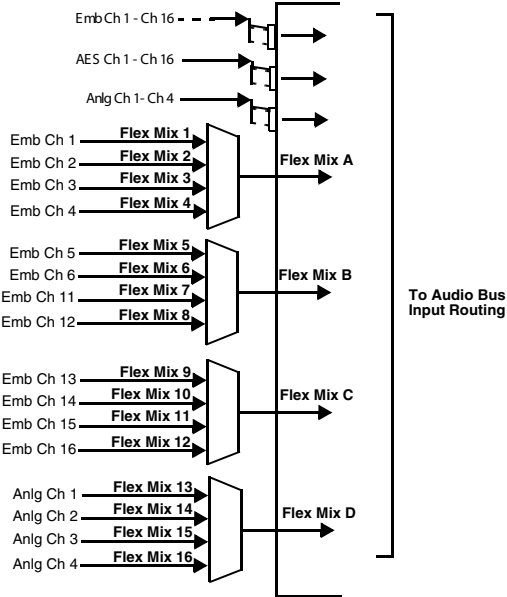
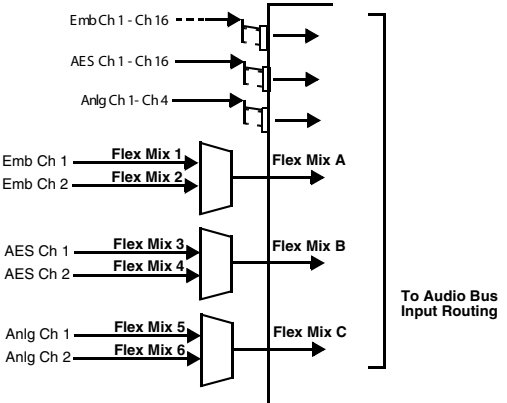
<div>Input Audio Routing/Controls</div>	<p>Input Flex Mix – Provides a 16-channel mixer in which each of the inputs can be mixed onto up to 16 independent output summing nodes. Each input channel has independent gain and mute controls.</p>
<div>Path 1 Flex Mix Path 1</div>	<div> <p>In this example four, 4-input mono mixers are provided by selecting Flex Mixer Bus A for the Flex Mix 1 thru Flex Mix 4 inputs, and Flex Mixer Bus B for the next four inputs, and so on as shown.</p>  </div> <div> <p>In this example three, 2-input mono mixers are provided by selecting Flex Mixer Bus A for the Flex Mix 1 and Flex Mix 2 inputs, and Flex Mixer Bus B for the next two inputs, and so on as shown.</p>  </div>

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

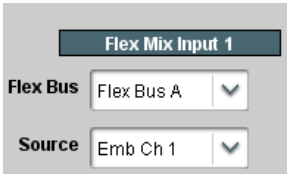
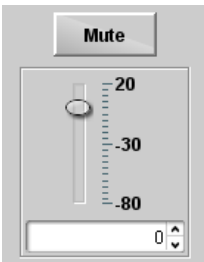

<div>Input Audio Routing/Controls</div> <div>Path 1 Flex Mix Path 1</div>	(continued)
<p>Note:</p> <ul style="list-style-type: none"> Flex Mix input channels Flex Mix 2 thru Flex Mix 16 have controls identical to that described here for Flex Mix 1. Therefore, only the Flex Mix 1 controls are shown here. For each Flex Mix input channel, its source should be considered and appropriately set. Unused input channels should be set to the Silence selection. 	
<p>• Flex Mix Input Channel Source/Bus Assignment</p> 	<p>Using the Source drop-down list, selects the audio input source to be directed to the corresponding bus channel from the choices listed below.</p> <ul style="list-style-type: none"> • Silence • Embed Ch 1 thru Embed Ch 16 • AES Ch 1 thru AES Ch 16 • Analog Ch 1 thru Analog Ch 4 <p>The Flex Bus drop-down selects the bus (A thru P) to which the input is assigned to.</p> <p>Note: See the examples on the previous page showing various types of mixers using multiple flex buses.</p>
<p>• Gain / Mute Control</p> 	<p>Provides relative gain (in dB) control and a channel Mute checkbox.</p> <p>(-80 to +20 dB range in 0.1 dB steps; unity = 0.0 dB)</p>
<div>Input Audio Routing/Controls</div> <div>Clean and Quiet Switching Option</div>	<p>Clean and Quiet Switching (option +CQS only) – Allows SDI input selection to be changed from one source to another while ducking audio during controlled input video switching transitions to provide silence between input switches.</p>
<p>Note:</p> <ul style="list-style-type: none"> Clean audio switching is assured only for intentional, controlled switches via user control. Clean audio switching cannot be assured for failover switches. Clean switching requires that both SDI signals (switch from and switch to) be stable and present, and of the same SDI format and rate. Clean audio switching function is designed for PCM audio. This function does not assure clean decoded audio when switching from/to Dolby or other non-PCM audio. 	
<p>Switching Enabled check box enables Clean and Quiet Switching.</p> <p>Duration sets the attack and decay ramp intervals (300 msec is recommended for typical use).</p> 	

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

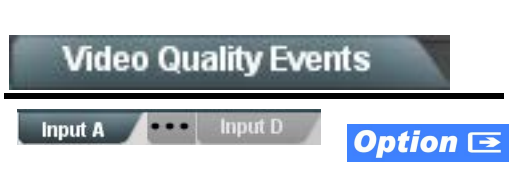
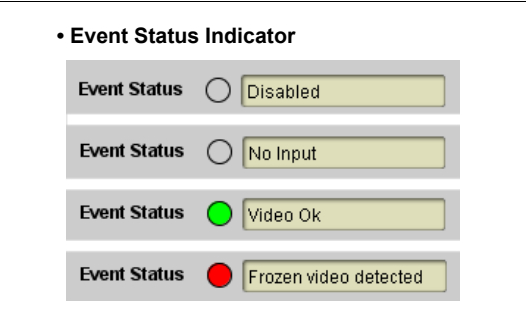
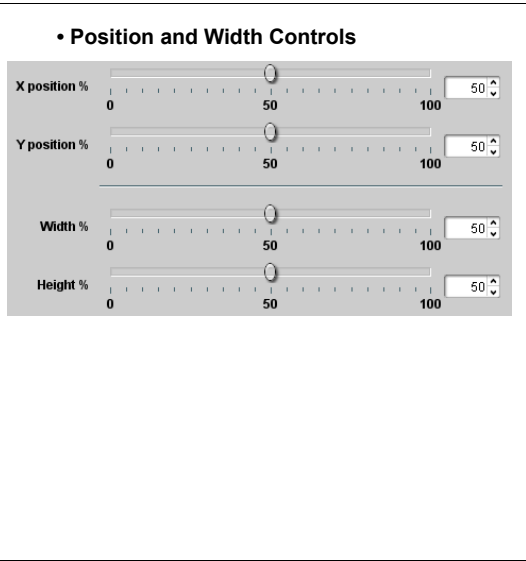
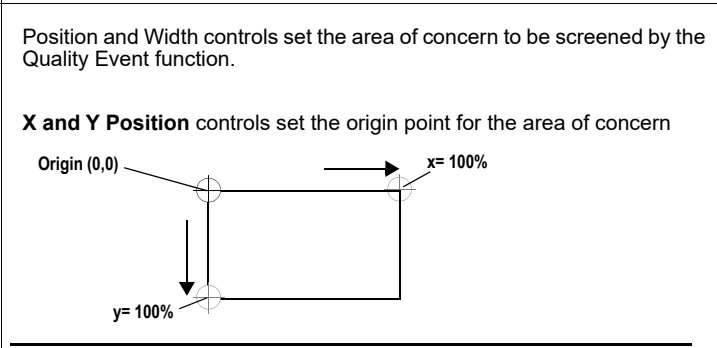
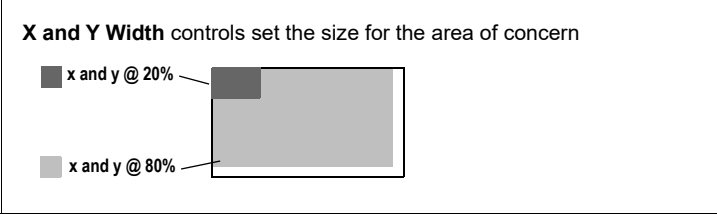
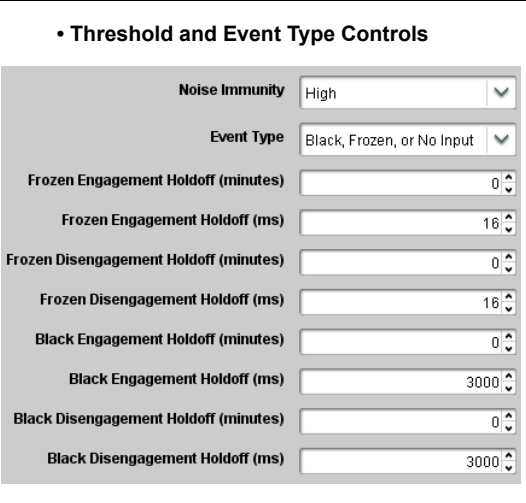
	<p>(Option +QC only) Sets quality check screening and thresholds for video quality event alerts. When a quality events occur, the event(s) can be used by the Events Setup function to invoke input routing or other changes.</p>
<p>Note: Input B thru Input D have controls identical to the controls described here for Input A sub-tab. Therefore, only the Input A controls are shown here. Set controls for other inputs using the respective sub-tab.</p>	
<p>• Event Status Indicator</p> 	<p>Displays event status (based on criteria set below) for signal condition to be considered OK (green), or signal condition considered to be a quality alert event (red) due the condition exceeding the criteria threshold(s) set below.</p>
<p>• Position and Width Controls</p> 	<p>Position and Width controls set the area of concern to be screened by the Quality Event function.</p> <p>X and Y Position controls set the origin point for the area of concern</p>  <p>X and Y Width controls set the size for the area of concern</p> 
<p>• Threshold and Event Type Controls</p> 	<p>Sets the thresholds for black, frozen, and/or no video event type to be considered. Also provides holdoff controls for event trigger engagement and disengagement.</p> <ul style="list-style-type: none"> • Noise Immunity sets the relative noise levels that are rejected in the course of black event assessment (Low, Medium, or High). • Event Type selects the defect events (black, frozen, or no input) to be screened. • Engagement and Disengagement Holdoff controls set the time (in msec) where, when time is exceeded, an event is to be considered a valid alert event, and when event time is has ceased, an alert event is cleared. • Disengagement Holdoff sets the time (in msec) where, when event time is has ceased, an alert event is cleared.

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




	(Option +QC only) Sets audio level screening and thresholds for audio silence/presence event alerts on embedded and/or AES discrete audio in. When an audio events occur, the event(s) can be used by the Events Setup function to invoke input routing or other changes.
	
Note: Currently, Audio Detect is available only for Path 1 embedded audio and AES input audio.	
<p>Any combination of embedded and AES input channels can be selected to be screened for silence or presence. In the example here, Audio Detect Event 1 is set to trigger if audio on any of channels Emb Ch 1 thru Ch 6 fall below the selected threshold for an interval exceeding the selected threshold. Status indicators for each channel show silence (S) / presence (P) status based on the configured thresholds.</p>	
<p>Up to eight independent audio silence/presence events can be set to be screened (with descending priority of consideration from Event 1 down to Event 8). This status here can be propagated to the Events Setup > Event Triggers sub-tab controls to issue a GPO, preset engage, or other command when audio silence events are detected.</p>	
	
<ul style="list-style-type: none"> • Audio Failover Threshold sets the dBFS level at which channel content is considered to be silent, and correspondingly also a transition back to an untriggered condition with resumption of audio for the selected embedded channels. If the selected channels maintain levels above the selected Audio Failover Threshold, no triggering is invoked. • Trigger Holdoff sets the period of time in which selected channel silence must occur before an Audio Silence Event trigger goes true. • Release Holdoff control sets the time in which the trigger is revoked upon an event false condition. <p>Note: • Default threshold and holdoff settings shown here are recommended for typical use.</p> <ul style="list-style-type: none"> • “Don’t Care” setting may be labeled as Don’t Care, DC, or DSBL (disabled). All notations mean ignoring the channel from event triggering. • Selections other than Don’t Care work as an AND function. Where multiple selections are set, a true (trigger) condition is not propagated unless all selected channels experience the configured criteria. (In the example shown above, both channels Emb Ch 1 and Emb Ch 2 need to experience a Silence event for a trigger to be propagated.) 	

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


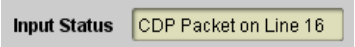
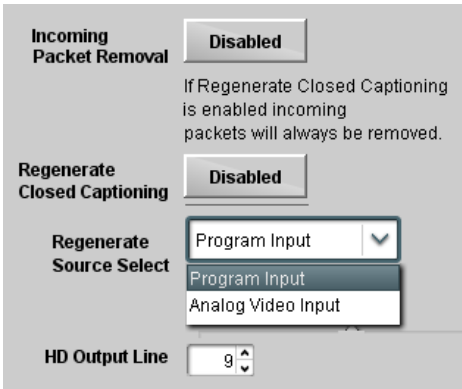
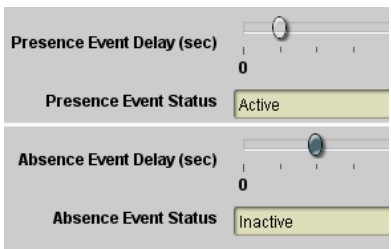
	<p>Provides support for closed captioning setup. Also provides controls for setting closed captioning absence and presence detection thresholds.</p>								
<p>Note:</p> <ul style="list-style-type: none"> • Closed Captioning tab has identical independent controls for both Path 1 and Path 2 using the Path 1 / Path 2 sub-tabs. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab. • SMPTE embedded CC controls and processing are correlated only to the path selected. CC data cannot be transferred from one path stream to another. 									
<p>• Closed Captioning Input Status</p> 	<p>Displays incoming Closed Captioning status as follows:</p> <ul style="list-style-type: none"> • If closed captioning is present, a message similar to the example shown is displayed. • If no closed captioning is present in the video signal, Not Present or Disabled is displayed. 								
<p>Note:</p> <ul style="list-style-type: none"> • Packet closed captioning status Captioning Rejected Due To message can appear due to the items described below. The closed captioning function assesses <i>cdp_identifier</i>, <i>cdp_frame_rate</i>, <i>ccdata_present</i>, and <i>caption_service_active</i> items contained in the packet header to make the determinations listed below. Refer to CEA-708-B for more information. <table border="1" data-bbox="310 766 1382 980"> <thead> <tr> <th>Message</th><th>Description</th></tr> </thead> <tbody> <tr> <td>Unsupported Frame Rate</td><td>Film rate closed-captioning (either as pass-through or up/down conversion) is not supported by the card.</td></tr> <tr> <td>Data Not Present</td><td>Packet is marked from closed captioning source external to the card that no data is present.</td></tr> <tr> <td>No Data ID</td><td>Packet from closed captioning source external to the card is not properly identified with 0x9669 as the first word of the header (unidentified packet).</td></tr> </tbody> </table> <ul style="list-style-type: none"> • caption service is marked as inactive display indicates bit in packet from upstream source may inadvertently be set as inactive. In this case, closed captioning data (if present) is still processed and passed by the device as normal. • The closed captioning function does not support PAL closed captioning standards. 		Message	Description	Unsupported Frame Rate	Film rate closed-captioning (either as pass-through or up/down conversion) is not supported by the card.	Data Not Present	Packet is marked from closed captioning source external to the card that no data is present.	No Data ID	Packet from closed captioning source external to the card is not properly identified with 0x9669 as the first word of the header (unidentified packet).
Message	Description								
Unsupported Frame Rate	Film rate closed-captioning (either as pass-through or up/down conversion) is not supported by the card.								
Data Not Present	Packet is marked from closed captioning source external to the card that no data is present.								
No Data ID	Packet from closed captioning source external to the card is not properly identified with 0x9669 as the first word of the header (unidentified packet).								
<p>• Closed Captioning Remove/Regenerate and HD Insertion Line Controls</p> 	<p>Allows removal of closed captioning packets and regeneration of packets. This is useful where closed captioning must be moved to a different line than that received on.</p> <p>Regenerate Source Select allows sourcing packet CC from incoming SDI program input video, or from line 21 analog CC via the device CVBS input.</p> <p>Note:</p> <ul style="list-style-type: none"> • 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. 								
<p>• Presence/Absence Check Controls</p> 	<p>Displays CC presence and/or absence event status. This status can be propagated to the Presets > Event Triggers tab controls to issue a device GPO or other command when CC presence/absence events are detected.</p> <p>Controls for both presence and absence provide for a holdoff time (in seconds) where, when time is exceeded, an event is to be considered a valid alert event.</p> <p>Note: These controls are present only in conjunction with option +QC.</p>								

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


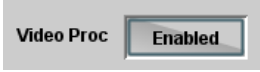

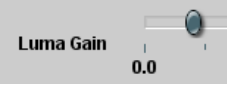

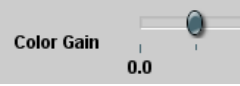


	<p>Provides the following Video Proc and Color Correction parametric controls.</p>
<p>Note: Video Proc tab has identical independent controls for both Path 1 and Path 2 using the Path 1 / Path 2 sub-tabs. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab.</p>	
<p>• Video Proc</p> 	<p>Video Proc (Enable/Disable) provides master on/off control of all Video Proc functions.</p> <ul style="list-style-type: none"> • When set to Disable, Video Proc is bypassed. • When set to Enable, currently displayed parameter settings take effect.
<p>• Reset to Unity</p> 	<p>Reset to Unity provides unity reset control of all Video Proc functions. When Confirm is clicked, a Confirm? pop-up appears, requesting confirmation.</p> <ul style="list-style-type: none"> • Click Yes to proceed with the unity reset. • Click No to reject unity reset.
<p>• Luma Gain</p> 	<p>Adjusts gain percentage applied to Luma (Y channel). (0% to 200% range in 0.1% steps; unity = 100%)</p>
<p>• Luma Lift</p> 	<p>Adjusts lift applied to Luma (Y-channel). (-100% to 100% range in 0.1% steps; null = 0.0%)</p>
<p>• Color Gain</p> 	<p>Adjusts gain percentage (saturation) applied to Chroma (C-channel). (0% to 200% range in 0.1% steps; unity = 100%)</p>
<p>• Color Phase</p> 	<p>Adjusts phase angle applied to Chroma. (-360° to 360° range in 0.1° steps; null = 0°)</p>
<p>• Gang Luma/Color Gain</p> 	<p>When set to On, changing either the Luma Gain or Color Gain controls increases or decreases both the Luma and Color gain levels by equal amounts.</p>

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

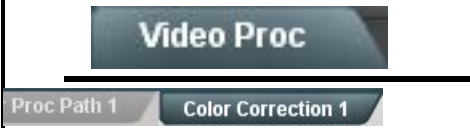



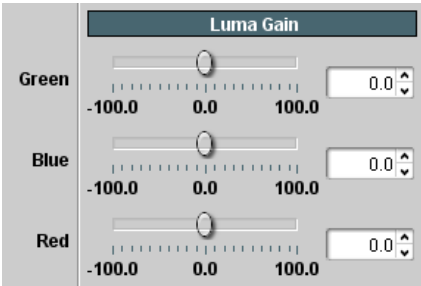
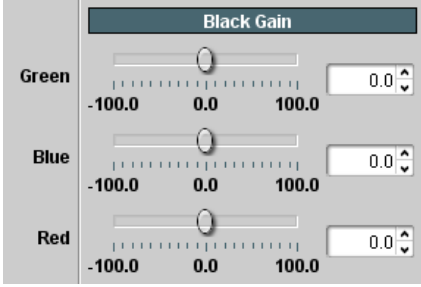
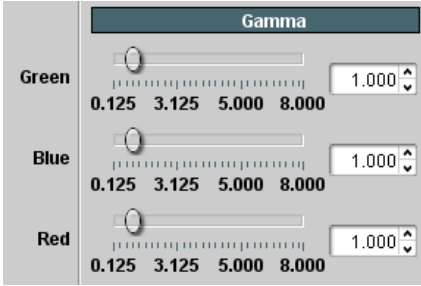
	<div data-bbox="797 302 966 340" data-label="Section-Header"> Option  </div> <p>(Option +COLOR only) Provides color corrector functions for the individual RGB channels for the program video path.</p>
<p>• Color Corrector</p> 	<p>Color Corrector (On/Off) provides master on/off control of all Color Corrector functions.</p> <ul style="list-style-type: none"> • When set to Off, all processing is bypassed. • When set to On, currently displayed parameters settings take effect.
<p>• Reset to Unity</p> 	<p>Reset to Unity provides unity reset control of all Color Corrector functions.</p> <p>When Confirm is clicked, a Confirm? pop-up appears, requesting confirmation.</p> <ul style="list-style-type: none"> • Click Yes to proceed with the unity reset. • Click No to reject unity reset.
<p>• Luma Gain R-G-B controls</p>  <hr/> <p>• Black Gain R-G-B controls</p>  <hr/> <p>• Gamma Factor R-G-B controls</p> 	<p>Separate red, green, and blue channels controls for Luma Gain, Black Gain, and Gamma curve adjustment.</p> <p>Gain controls provide gain adjustment from 0.0 to 200.0% range in 0.1% steps (unity = 100.0)</p> <p>Gamma controls apply gamma curve adjustment in 0.125 to 8.000 range in thousandths steps (unity = 1.000)</p> <p>Each of the three control groups (Luma, Black, and Gamma) have a Gang Column button which allows settings to be proportionally changed across a control group by changing any of the group's controls.</p>

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



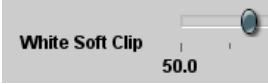

<div>Video Proc</div> <div>Proc Path 1 Color Correction 1</div>	(continued)
<ul style="list-style-type: none"> • Black Hard Clip 	<p>Applies black hard clip (limiting) at specified percentage. (-6.8% to 50.0%; null = -6.8%)</p>
<ul style="list-style-type: none"> • White Hard Clip 	<p>Applies white hard clip (limiting) at specified percentage. (50.0% to 109.1%; null = 109.1%)</p>
<ul style="list-style-type: none"> • White Soft Clip 	<p>Applies white soft clip (limiting) at specified percentage. (50.0% to 109.1%; null = 109.1%)</p>
<ul style="list-style-type: none"> • Chroma Saturation Clip 	<p>Applies chroma saturation clip (limiting) chroma saturation at specified percentage. (50.0% to 160.0%; null = 160.0%)</p>

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



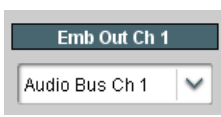


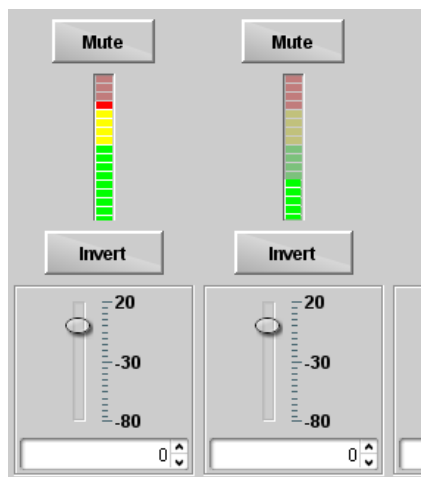
	<p>Provides an audio crosspoint allowing the audio source selection for each embedded audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.</p>
<p>Note:</p> <ul style="list-style-type: none"> • Output Audio tab has identical independent controls for both Embedded Path 1 and Path 2 using the Path 1 / Path 2 sub-tabs. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab. • 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. • Although either path can embed from, and de-embed to, discrete audio interfaces, the embedded channels within a path can only be cross-routed embedded within the respective path's 4-group embedded audio (e.g., Path 1 Emb Ch 1 can not be sourced from Path 2 Emb Ch 1). 	
<p>• Group Enable/Disable Controls</p> 	<p>Allows enable/disable of embedded audio groups 1 thru 4 on program video output to accommodate some legacy downstream systems that may not support all four embedded audio groups.</p> <p>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.</p>
<p>• Embedded Output Channel Source</p> 	<p>Using the drop-down list, selects the audio input source to be embedded in the corresponding embedded output channel from the following choices:</p> <ul style="list-style-type: none"> • Audio Bus Ch 1 thru Ch 16 (Path 1 or 2) • Built-in Tone generators Tone n (-20 dBFS level tone generators with <i>n</i> being frequencies of 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k) • Flex Bus A thru P mixer sum node outputs • Option  Audio LTC (Path 1 or 2) • Downmixer L (Path 1 or 2) • Downmixer R (Path 1 or 2) • Option  Embedded Data L and R (SMPTE 337 non-PCM data embedding with option +ANC) Note: Embedded data pair is pair associated with selected path only.
<p>• Channel Mute/Phase Invert/Gain Controls and Peak Level Display</p> 	<p>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.)</p> <p>Gain controls allow relative gain (in dB) control for the corresponding destination Embedded Audio Group channel.</p> <p>(-80 to +20 dB range in 1.0 dB steps; unity = 0 dB)</p> <p>Note: Although the BBG-1002-2UDX can pass non-PCM data such as Dolby® E or AC-3, setting the gain control to any setting other than default 0 will corrupt Dolby data.</p>

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


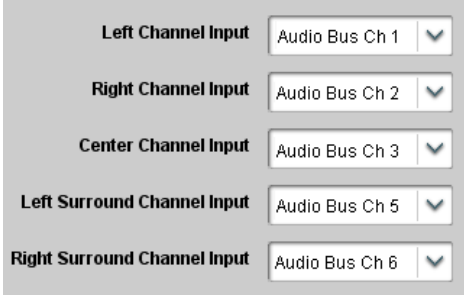
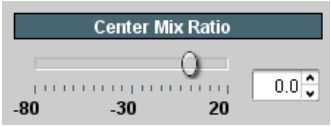
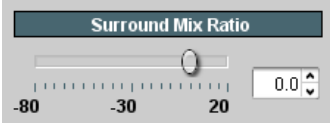
	<p>Provides audio down-mix audio routing selections that multiplexes any five audio channel sources into a stereo pair.</p>
<p>Note:</p> <ul style="list-style-type: none"> • Downmixer sub-tabs offer identical independent controls for both Embedded Path 1 and Path 2. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab. • Downmix L/R channel pair sources are available only within a respective path (e.g., Path 1 downmixed channels can only be sourced from Path 1). 	
<p>• Downmixer Source Controls</p> 	<p>Left Channel Input thru Right Surround Channel Input select the five audio bus source channels to be used for the downmix.</p> <p>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.</p>
<p>• Center Mix Ratio Control</p> 	<p>Adjusts the attenuation ratio of center-channel content from 5-channel source that is re-applied as Lt and Rt content to the DM-L and DM-R stereo mix.</p> <ul style="list-style-type: none"> • 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. <p>(20 dB to -80 dB range in 0 dB steps; default = 0 dB)</p> <p>Note: Default setting is recommended to maintain center-channel predominance in downmix representative to that of the original source 5-channel mix.</p>
<p>• Surround Mix Ratio Control</p> 	<p>Adjusts the attenuation ratio of surround-channel content from 5-channel source that is re-applied as Lo and Ro content to the DM-L and DM-R stereo mix.</p> <ul style="list-style-type: none"> • 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. <p>(20 dB to -80 dB range in 0 dB steps; default = 0 dB)</p> <p>Note: Default setting is recommended to maintain surround-channel predominance in downmix representative to that of the original source 5-channel mix.</p>

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

<div data-bbox="212 233 735 331"> <h2>Output Audio Routing/Controls</h2> </div> <div data-bbox="212 331 735 405"> <h3>Flex Mix</h3> </div>	<p>Output Flex Mix – Provides a 16-channel mixer in which each of the inputs can be mixed onto up to 16 independent output summing nodes. The input sources include audio bus channels from the device two embedded audio paths. Each input channel has independent gain and mute controls.</p>
<p>In this example, audio bus channels 1 thru 8 from each path are summed with the like-channel of the other path. These summed outputs can then be outputted on any of the audio outputs. The output flex bus allows cross-sourcing from both Path 1 and Path 2 embedded internal Audio Bus sources to the Path 1 and Path 2 discrete output audio crosspoints.</p> <div data-bbox="240 594 699 1050"> </div> <div data-bbox="898 569 1437 1043"> </div>	
<p>Note: For each Flex Mix input channel, its source should be considered and appropriately set. Unused input channels should be set to the Silence selection.</p>	
<p>• Flex Bus Input Channel Source/Bus Assignment</p> <div data-bbox="284 1260 647 1423"> </div>	<p>Using the Source drop-down list, selects the audio input source to be directed to the corresponding bus channel from the choices listed below.</p> <ul style="list-style-type: none"> • Silence • Audio Bus Ch 1 thru Ch 16 • Tones (100 Hz thru 16 kHz) • Downmix L or Downmix R <p>The Flex Bus drop-down selects the bus (A thru P) to which the input is assigned to.</p>
<p>• Gain / Mute Control</p> <div data-bbox="279 1518 479 1774"> </div>	<p>Provides relative gain (in dB) control and a channel Mute checkbox. (-80 to +20 dB range in 0.1 dB steps; unity = 0.0 dB)</p>

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


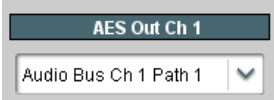


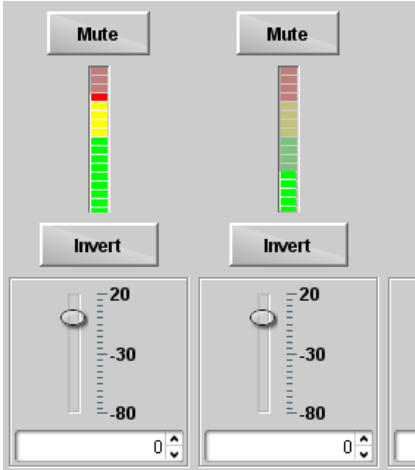
	<p>Provides an audio crosspoint allowing the audio source selection for each AES audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.</p>
<p>Note:</p> <ul style="list-style-type: none"> • AES Out Ch 2 has controls identical to the Source, Gain, Mute, and Invert controls described here for AES Out Ch 1. Therefore, only the AES Out Ch 1 controls are shown here. • For each channel, its source and destination should be considered and appropriately set. Unused destination channels should be set to the Silence selection. 	
<p>• AES Output Channel Source</p> 	<p>Using the drop-down list, selects the audio input source to be embedded in the corresponding embedded output channel from the following choices:</p> <ul style="list-style-type: none"> • Card Audio Bus Ch 1 thru Ch 16 (Path 1 or 2) • Built-in Tone generators Tone n (-20 dBFS level tone generators with <i>n</i> being frequencies of 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k) • Flex Bus A thru P mixer sum node outputs • Option  Audio LTC (Path1 or 2) • Downmixer L (Path1 or 2) • Downmixer R (Path1 or 2) • Option  Embedded Data L and R (Path 1 or 2) (SMPTE 337 non-PCM data embedding with option +ANC)
<p>• Channel Mute/Phase Invert/Gain Controls and Peak Level Display</p> 	<p>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.)</p> <p>Gain controls allow relative gain (in dB) control for the corresponding destination AES output channel.</p> <p>(-80 to +20 dB range in 1.0 dB steps; unity = 0 dB)</p> <p>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.</p>

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

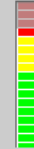
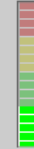
<div data-bbox="215 268 727 321"> Output Audio Routing/Controls </div> <div data-bbox="228 342 618 373"> <div>Analog Audio Out</div> <div>Downmixer</div> </div>	<p>Provides an audio crosspoint allowing the audio source selection for each analog audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.</p>
<p>• Analog Output Channel Source</p> <div data-bbox="280 468 553 573"> <div>AN Out Ch 1</div> <div>Audio Bus Ch 1 Path 1 ▾</div> </div>	<p>Using the drop-down list, selects the audio input source to be embedded in the corresponding embedded output channel from the following choices:</p> <ul style="list-style-type: none"> • Card Audio Bus Ch 1 thru Ch 16 (Path 1 or 2) • Built-in Tone generators Tone <i>n</i> (-20 dBFS level tone generators with <i>n</i> being frequencies of 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k) • Flex Bus A thru P mixer sum node outputs • Option ➡ Audio LTC (Path 1 or 2) • Downmixer L (Path 1 or 2) • Downmixer R (Path 1 or 2)
<p>• Channel Mute/Phase Invert/Gain Controls and Peak Level Display</p> <div data-bbox="272 852 686 1318"> <div> <div>Mute</div>  <div>Invert</div> <div>20 -30 -80</div> <div>0</div> </div> <div> <div>Mute</div>  <div>Invert</div> <div>20 -30 -80</div> <div>0</div> </div> </div>	<p>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.)</p> <p>Gain controls allow relative gain (in dB) control for each corresponding destination analog audio out channel.</p> <p>(-80 to +20 dB range in 1.0 dB steps; unity = 0 dB)</p>

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

<div data-bbox="256 254 605 327" style="background-color: #333; color: white; text-align: center; padding: 5px;">Timecode</div> <div data-bbox="264 338 511 373" style="display: flex; justify-content: space-around; margin-top: 5px;"> Path 1 Path 2 </div>	<p>Provides timecode data extraction from various sources, and provides formatting and re-insertion controls for inserting the timecode into the output video.</p>																
<p>Note:</p> <ul style="list-style-type: none"> • Timecode tab has identical independent controls for both Path 1 and Path 2 using the Path 1 / Path 2 sub-tabs. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab. • SMPTE embedded timecode controls and processing are correlated only to the path selected. Timecode data cannot be transferred from one path stream to another. 																	
<p>Shown below is an example in which received 525i 5994 SDI video with VITC waveform timecode is being processed to output ATC_VITC timecode. To re-format and insert the timecode data, the following can be performed using the Timecode function. Each Timecode control is fully described on the pages that follow.</p> <div data-bbox="228 669 789 791" style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <div style="display: flex; align-items: center; justify-content: space-between;"> <div>525i 5994 w/ VITC Waveform</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">BBG-1002-2UDX</div> <div>525i 5994 w/ ATC_VITC</div> </div> </div> <div data-bbox="805 655 1198 812" style="margin: 10px 0;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Reference VITC Status</td><td>05:49:08:20.1</td></tr> <tr><td>Input VITC Status</td><td>05:49:08:19.1</td></tr> <tr><td>Input ATC_LTC Status</td><td>Not Present</td></tr> <tr><td>Input ATC_VITC Status</td><td>Not Present</td></tr> </table> </div> <div data-bbox="220 831 789 999" style="margin: 10px 0;"> <p>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.</p> </div> <div data-bbox="805 842 1127 1010" style="margin: 10px 0;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Source Priority 1</td><td>Input VITC</td></tr> <tr><td>Source Priority 2</td><td>Input ATC_VITC</td></tr> <tr><td>Source Priority 3</td><td>Reference VITC</td></tr> <tr><td>Source Priority 4</td><td>Free Run</td></tr> </table> </div>		Reference VITC Status	05:49:08:20.1	Input VITC Status	05:49:08:19.1	Input ATC_LTC Status	Not Present	Input ATC_VITC Status	Not Present	Source Priority 1	Input VITC	Source Priority 2	Input ATC_VITC	Source Priority 3	Reference VITC	Source Priority 4	Free Run
Reference VITC Status	05:49:08:20.1																
Input VITC Status	05:49:08:19.1																
Input ATC_LTC Status	Not Present																
Input ATC_VITC Status	Not Present																
Source Priority 1	Input VITC																
Source Priority 2	Input ATC_VITC																
Source Priority 3	Reference VITC																
Source Priority 4	Free Run																
<p>B In this example, it is desired to provide SDI ATC_VITC timecode data in the processed output video. As such, set SD ATC VITC Insertion to Enabled.</p> <p>In the example here, the line numbers are set to the default SMPTE 12M-2-2008 recommended values.</p> <div data-bbox="837 1058 1356 1146" style="margin: 10px 0;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>SD ATC_VITC Insertion</td><td>Enabled</td></tr> <tr><td>SD ATC Insertion Line</td><td>13 - SMPTE 12M-2-2008 Recommended</td></tr> </table> </div> <div data-bbox="241 1220 1365 1829" style="margin: 10px 0;"> </div>		SD ATC_VITC Insertion	Enabled	SD ATC Insertion Line	13 - SMPTE 12M-2-2008 Recommended												
SD ATC_VITC Insertion	Enabled																
SD ATC Insertion Line	13 - SMPTE 12M-2-2008 Recommended																

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



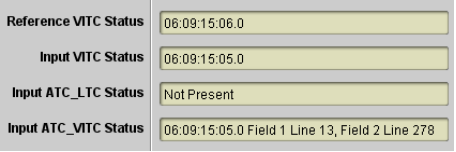
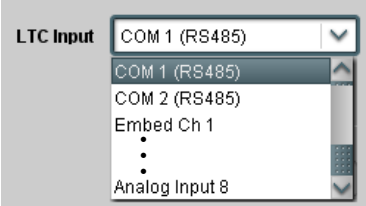


	(continued)
<p>Option  Audio LTC controls described below only appear on devices with +LTC licensed optional feature. This feature allows audio LTC from an audio channel to be used as a timecode source, with conversion to a selected SMPTE 12M format on the output video.</p>	
<p>• Timecode Source Status Displays</p> 	<p>Displays the current status and contents of the four supported external timecode formats shown to the left.</p> <ul style="list-style-type: none"> • 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.
<p>• LTC Input Control</p> 	<p>Selects source to be used by device to receive LTC as listed below.</p> <ul style="list-style-type: none"> • RS-485 over COM1 or COM 2 • Audio LTC over Emb Ch 1 thru Ch 16 • Audio LTC over AES Ch 1 thru Ch 16 • Audio LTC over Analog audio Ch 1 thru Ch 4 <p>Note: • Audio LTC Source must be appropriately set for device to receive and process received LTC.</p> <ul style="list-style-type: none"> • If COM 1 or COM 2 is used for LTC receive, the port function must be set for LTC. See COMM Ports Setup Controls (p. 3-58) for more information. • Device audio inputs will not center inputs with DC offset. If input has DC offset, the source may need to be capacitively coupled to remove the offset. • LTC embedded channel selections are only channels associated with the selected path.
<p>• Mute LTC Control</p> 	<p>Allows LTC audio or RS-485 output to mute upon loss of selected timecode inputs.</p> <ul style="list-style-type: none"> • When set to Enabled and input timecode is lost: <ul style="list-style-type: none"> • RS-485 LTC output goes to frozen state. • Audio LTC output mutes. • When set to Disabled and input timecode is lost: <ul style="list-style-type: none"> • RS-485 LTC output keeps counting, with count value being free-run count. • Audio LTC output is not muted, with count value being free-run count. <p>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.</p>
<p>• Incoming ATC Packet Removal Control</p> 	<p>Enables or disables removal of existing input video ATC timecode packets from the output. This allows removal of undesired existing timecodes from the output, resulting in a “clean slate” where only desired timecodes are then re-inserted into the output. (For example, if both SDI ATC_VITC and ATC_LTC are present on the input video, and only ATC_LTC is desired, using the Removal control will remove both timecodes from the output. The ATC_LTC timecode by itself can then be re-inserted on the output using the other controls discussed here.)</p> <p>Note: Set this control to Enabled if Free-Run timecode is to be used. If incoming packets are not removed, output embedded SMPTE timecode may alternate between free-run and embedded SMPTE timecode values.</p>

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

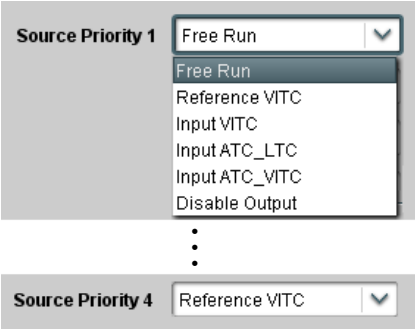
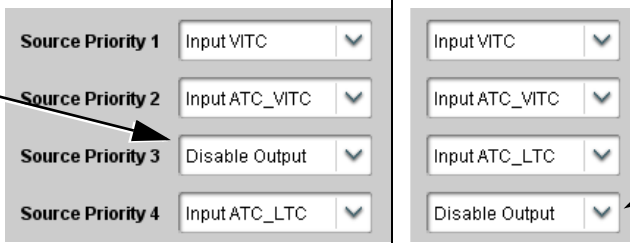
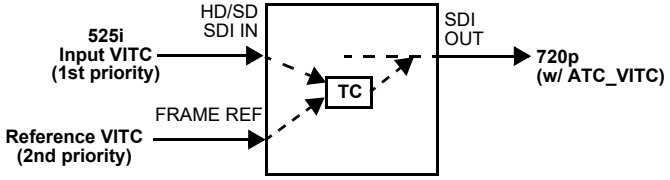
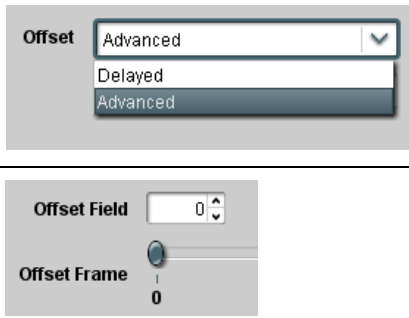
<div>Timecode</div> <div>Path 1 Path 2</div>	(continued)
<p>• Source Priority</p>  <p>Source Priority 1: Free Run</p> <p>Source Priority 4: Reference VITC</p> <p>⚠ Disable Output setting should be used with care. If Disable Output is selected with alternate intended format(s) set as a lower priority, the device will indeed disable all timecode output should the ordinate preferred format(s) become unavailable.</p> <p>Typically, choices other than Disable should be used if a timecode output is always desired, with Disable only being used to remove all timecode data.</p> <p>In this example, even though and ATC_LTC could be available to substitute for ATC_VITC not being present, the device will revert to no timecode output since the choice of Disable Output “out-prioritizes” ATC_LTC with these settings.</p>  <p>The choices shown here will allow ATC_LTC to “out-prioritize” Disable Output if ATC_VITC is not available.</p>	<p>Selects the priority assigned to each of the four supported external formats, and internal Free Run in the event the preferred source is unavailable.</p> <p>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.)</p>  <p>In this example, Input VITC 1st priority selection selects SDI VITC (received on SDI input) over reference VITC (received on frame reference) regardless of video input material source to be processed by the device.</p> <p>The selected timecode source is embedded on the SDI video output (in this example, 720p) using the selected line number. In this example, if the SDI VITC on the SDI input becomes unavailable, the device then uses the reference VITC data received on the frame reference.</p> <p>Note: Set Incoming ATC Packet Removal Control to Enabled if Free-Run timecode is to be used. If incoming packets are not removed, output embedded SMPTE timecode may alternate between free-run and embedded SMPTE timecode values.</p>
<p>• Offset Controls</p> 	<p>Allows the current timecode count to be advanced or delayed on the output video.</p> <ul style="list-style-type: none"> • 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. <p>Note: Default settings are null, with both controls set at zero as shown.</p>

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

<div data-bbox="289 254 639 327">Timecode</div> <div data-bbox="298 338 545 373"> <div>Path 1</div> <div>Path 2</div> </div>	(continued)																
<ul style="list-style-type: none"> • Output Status Display <div data-bbox="240 457 701 512"> <div>Output Status</div> <div>00:04:46:06.1 (Source: SDI VITC)</div> </div>	<p>Displays the current content and source being used for the timecode data as follows:</p> <div data-bbox="776 468 1149 512"> <div>Output Status</div> <div>00:04:46:06.1 (Source: SDI VITC)</div> </div> <ul style="list-style-type: none"> • Output status OK (in this example, SDI VITC timecode received and outputted). <div data-bbox="760 596 1036 640"> <div>Output Status</div> <div>Insertion Disabled</div> </div> <ul style="list-style-type: none"> • Timecode Insertion button set to Disabled; output insertion disabled. <p>Note: • If timecode is not available from Source Priority selections performed, timecode on output reverts to Free Run (internal count) mode.</p> <ul style="list-style-type: none"> • 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: <div data-bbox="850 814 1003 989"> <table> <tr><td>0.0</td><td>Frame 0</td></tr> <tr><td>0.1</td><td>Frame 1</td></tr> <tr><td>1.0</td><td>Frame 2</td></tr> <tr><td>1.1</td><td>Frame 3</td></tr> <tr><td>.</td><td></td></tr> <tr><td>.</td><td></td></tr> <tr><td>.</td><td></td></tr> <tr><td>29.1</td><td>Frame 59</td></tr> </table> </div>	0.0	Frame 0	0.1	Frame 1	1.0	Frame 2	1.1	Frame 3	.		.		.		29.1	Frame 59
0.0	Frame 0																
0.1	Frame 1																
1.0	Frame 2																
1.1	Frame 3																
.																	
.																	
.																	
29.1	Frame 59																
<ul style="list-style-type: none"> • Audio LTC Output <div data-bbox="293 1066 464 1106"> <div>Option</div> <div>➞</div> </div>	<p>Audio LTC output is routed to desired embedded, AES, or analog audio outputs using the Output Audio Routing/Controls (p. 3-33). Whatever timecode is displayed on the Output Status is converted to audio LTC and available as an LTC audio output.</p>																
<p>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.</p> <ul style="list-style-type: none"> • The device does not check for conflicts on a given line number. Make certain the selected line is available and carrying no other data. 																	
<ul style="list-style-type: none"> • SD VITC Waveform Insertion Controls <div data-bbox="220 1373 727 1509"> <div>SD VITC Waveform Output 1 Line Number</div> <div>14</div> <div>SD VITC Waveform Output 2 Line Number</div> <div>16</div> <div>SD VITC Waveform Insertion</div> <div>Enabled</div> </div>	<p>For SD output, enables or disables SD VITC waveform timecode insertion into the output video, and selects the VITC1 and VITC2 line numbers (6 thru 22) where the VITC waveform is inserted.</p> <p>Note: • If only one output line is to be used, set both controls for the same line number.</p> <ul style="list-style-type: none"> • 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. 																
<ul style="list-style-type: none"> • SD ATC Insertion Control <div data-bbox="220 1659 727 1738"> <div>SD ATC_VITC Insertion</div> <div>Enabled</div> <div>SD ATC Insertion Line</div> <div>13 - SMPTE 12M-2-2008 Recommended</div> </div>	<p>For SD output, enables or disables SD ATC_VITC timecode insertion into the output video, and selects the line number for ATC_VITC.</p>																

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


	(continued)
<p>• HD ATC_LTC Insertion Control</p> <p>HD ATC_LTC Insertion <input checked="" type="checkbox"/> Enabled</p> <p>HD ATC_LTC Insertion Line 10 - SMPTE 12M-2-2008 Recommended ▼</p>	<p>For HD output, enables or disables ATC_LTC timecode insertion into the output video, and selects the line number for ATC_LTC timecode data.</p>
<p>• HD ATC_VITC Insertion Control</p> <p>HD ATC_VITC Insertion <input checked="" type="checkbox"/> Enabled</p> <p>HD ATC_VITC Insertion Line Field 1 9 - SMPTE 12M-2-2008 Recommended ▼</p> <p>HD ATC_VITC Insertion Line Field 2 8 (571) - SMPTE 12M-2-2008 Recommended ▼</p>	<p>For HD output, enables or disables ATC_VITC timecode insertion into the output video, and selects the line number for ATC_VITC1 and ATC_VITC2.</p>
<p>• ATC_VITC Legacy Support Control</p> <p>ATC VITC Legacy Support <input type="checkbox"/> Disabled</p>	<p>When enabled, accommodates equipment requiring ATC_VITC packet in both fields as a "field 1" packet (non-toggling).</p> <p>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.</p>
<p>• Free Run Timecode Controls</p> <p>Free Run Hours 7 ▼</p> <p>Free Run Minutes 0 ▼</p> <p>Free Run Seconds 0 ▼</p> <p>Apply Free Run Values <input type="button" value="Confirm"/></p>	<p>Allows an initial (starting) count to be applied to output video timecode when Free Run insertion is enabled.</p> <p>Note:</p> <ul style="list-style-type: none"> • 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-1002-2UDX Function Menu List — continued

<div><div>Reticules</div><div>Reticules Basic Path 1Reticules Advanced Path 2</div></div>	<p>Allows Safe Action and/or Safe Title overlays and other static markers to be added to the output video image.</p>
<p>Note: Reticules tab has identical independent controls for both Path 1 and Path 2 using the Path 1 / Path 2 sub-tabs. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab.</p>	
<p>Typical Reticule/Overlay Marker Insertions</p> <p>The BBG-1002-2UDX allows any combination of the reticule/overlay markers to be applied to the output video. Sizing and other characteristics for each type of marker can be set as described below.</p> <div></div> <p>Note:</p> <ul style="list-style-type: none">• Overlay markers using this function are for setup only. When enabled, these markers are embedded in the output video and will appear in the image. Use this function only on preview video and not on-air video. Make certain any overlay tools are turned off when no longer needed.• Multiple overlay markers described below can be simultaneously enabled as desired.	
<p>• Insertion Master Enable/Disable</p> <div><div>SDI Out Reticule</div><div>Enable</div><div>Analog Out Reticule</div><div>Disable</div><div>Disable</div><div>Enable</div></div>	<p>Provides independent master enable/disable for SDI and CVBS outputs.</p> <ul style="list-style-type: none">• When enabled, any combination of reticules or other markers described below can be inserted.• When disabled, insertion of all reticules or other markers is disabled.
<p>• Safe Action Area (SAA) Controls</p> <div><div>SAA</div><div>Enable</div><div>Disable</div><div>Enable</div><div>SAA Height</div><div>050100</div><div>92</div><div>SAA Width</div><div>050100</div><div>92</div></div>	<ul style="list-style-type: none">• SAA provides enable/disable of safe action area graticule insertion.• SAA Height and SAA Width control height and width of insertion (from 0% to 100% of 4:3 outputted image area). <p>Note: Reticule Size control is locked to Custom for this device, with safe action area size control as described above.</p>

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

<div data-bbox="191 268 505 321" data-label="Section-Header"> <h2>Reticules</h2> </div> <div data-bbox="191 352 695 384" data-label="Text"> <p>Reticules Basic Path 1 Reticules Advanced Path 1</p> </div>	(continued)
<div data-bbox="232 422 550 449" data-label="Section-Header"> <h3>• Safe Title Area (STA) Controls</h3> </div> <div data-bbox="203 464 685 758" data-label="Form"> </div>	<ul style="list-style-type: none"> • STA provides enable/disable of safe title area graticule insertion. • STA Height and STA Width control height and width of insertion (from 0% to 100% of 4:3 outputted image area).
<div data-bbox="232 800 482 827" data-label="Section-Header"> <h3>• Overlay Color Controls</h3> </div> <div data-bbox="185 842 688 1115" data-label="Form"> </div> <div data-bbox="220 1163 915 1247" data-label="Image"> </div>	<ul style="list-style-type: none"> • Overlay Color selects from white, various gray fills, or black colors. • Inverse Color selects inversion (negative) of current selection. • Opacity sets the opacity of the overlay for both white/black and inverse color modes. • Thickness sets the line thickness (in pixels).
<div data-bbox="191 1308 505 1360" data-label="Section-Header"> <h2>Reticules</h2> </div> <div data-bbox="175 1392 561 1423" data-label="Text"> <p>Path 1 Reticules Advanced Path 1</p> </div>	<p>Provides insertion and sizing controls for custom graticules and other markers. Also provides NTSC legacy 4:3 master reticule sizing.</p>
<p>Note: Color attributes of markers described below are set using the master Overlay Color Controls described above.</p>	
<div data-bbox="232 1528 436 1556" data-label="Section-Header"> <h3>• Graticule Controls</h3> </div> <div data-bbox="185 1570 685 1791" data-label="Form"> </div>	<ul style="list-style-type: none"> • Graticule provides enable/disable of user graticule insertion. • Graticule Height and Width control height and width of insertion (from 0% to 100% of 4:3 outputted image area).

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

<div data-bbox="224 268 537 321">Reticules</div> <div data-bbox="207 346 594 380">Path 1 Reticules Advanced Path 1</div>	(continued)
<p>• Center Cross Controls</p> <div data-bbox="224 464 719 684"> <p>Center Cross Enable</p> <p>Cross Height 0 50 100 10</p> <p>Cross Width 0 50 100 9</p> </div>	<ul style="list-style-type: none"> • Center Cross provides enable/disable of center cross insertion. • Cross Height and Width control height of vertical line and width of horizontal line (from 0% to 100% of 4:3 outputted image area).
<p>• Horizontal Line Controls</p> <div data-bbox="224 783 719 1008"> <p>Horizontal Line Enable</p> <p>Hor Line Size 0 50 100 40</p> <p>Hor Line Pos 0 50 100 50</p> </div>	<ul style="list-style-type: none"> • Horizontal Line provides enable/disable of horizontal line insertion. • Horizontal Line Size controls the width of the horizontal line (from 0% to 100% of 4:3 outputted image area). • Horizontal Line Pos controls the vertical positioning of the horizontal line (from 0% to 100% of 4:3 outputted image area).
<p>• Vertical Line Controls</p> <div data-bbox="224 1108 719 1333"> <p>Vertical Line Enable</p> <p>Ver Line Size 0 50 100 40</p> <p>Ver Line Pos 0 50 100 50</p> </div>	<ul style="list-style-type: none"> • Vertical Line provides enable/disable of vertical line insertion. • Vertical Line Size controls the height of the vertical line (from 0% to 100% of 4:3 outputted image area). • Vertical Line Pos controls the horizontal positioning of the line (from 0% to 100% of 4:3 outputted image area).
<p>• NTSC Legacy Reticule Fixed Control</p> <div data-bbox="280 1423 558 1547"> <p>NTSC Legacy Enable</p> </div>	<p>When set to enable, provides fixed-size safe action area 4:3 reticule suited for CRT-based displays.</p>

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


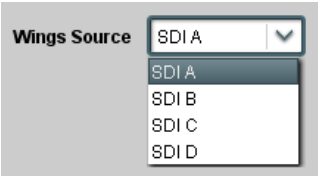


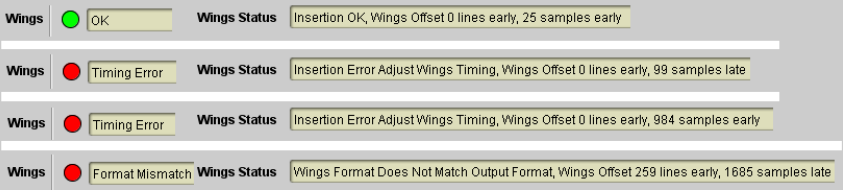
	<p>Provides wings insertion/width controls and displays insertion status.</p>
<p>Note: Wings tab has identical independent controls for both Path 1 and Path 2 using the Path 1 / Path 2 sub-tabs. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab.</p>	
<p>• Wings Source Control</p> 	<p>Selects the SDI input video port to serve as the wings source.</p> <p>Note:</p> <ul style="list-style-type: none"> • SDI inputs selected must be present on rear panel (varies by model). • Other wings input choices sourced from Path 1 and Path 2 program video outputs also are available using this drop-down. These selections are not typically used for normal use. A white paper describing these use cases may be developed in the future that explains the use of special looping alternate-path inputs. In brief, these alternate inputs are useful for providing two identical video paths with a delay offset provided by the second processing path.
<p>• Wings Insertion Enable Control</p> 	<p>Enables or disables wings insertion into the output video.</p> <p>Note: For conditions where wings is not intended to be inserted, make certain this control is set to Disabled.</p>
<p>• Wings Width Mode Control</p> 	<p>Selects wings width control from the choices shown to the left and described below.</p> <ul style="list-style-type: none"> • Manual: Wings L/R width is set using Wings Width manual control (see below). • Follow Scaler: Wings width automatically tracks with Scaler aspect ratio control settings (as configured by Scaler).
<p>• Wings Status Displays</p>	<p>Displays wings timing status as described below.</p> <p>Note:</p> <ul style="list-style-type: none"> • Wings timing is a function of the wings frame sync card/ device. Ideal wings timing is within 0 to 200 samples early of output video timing. Wings timing cannot be controlled on host device wings inserter. • Error in wings timing will result in loss of wings (however, program video image will not be corrupted).
	<p>Wings insertion within target 0-200 samples early</p> <p>Wings insertion late</p> <p>Wings insertion too early</p> <p>Wings video wrong/mismatched format</p>

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

<div data-bbox="237 270 412 323" data-label="Text"> <p>AFD</p> </div> <div data-bbox="237 344 547 375" data-label="Text"> <p>AFD/WSS/VI AFD Map</p> </div>	<p>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.</p> <p>Provides active ARC re-aspecting, resulting in a properly scaled and cropped image area.</p>
<p>Note: AFD tab has identical independent controls for both Path 1 and Path 2 using the Path 1 / Path 2 sub-tabs. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab.</p>	
<div data-bbox="284 625 1398 1688"> <div data-bbox="305 640 472 672" data-label="Section-Header"> <p>Without AFD</p> </div> <div data-bbox="310 762 500 842" data-label="Text"> <p>NTSC-Coded (4:3) up-converted 1080i Video Signal</p> </div> <div data-bbox="347 890 526 997" data-label="Text"> <p>NTSC-Coded image on 16:9 display shows letterbox cropping</p> </div> <div data-bbox="544 903 795 1068" data-label="Image"> </div> <div data-bbox="930 774 1049 827" data-label="Text"> <p>Re-Aspect to 16:9</p> </div> <div data-bbox="1140 762 1346 842" data-label="Text"> <p>1080i Video Signal with 16:9 uncorrected ARC</p> </div> <div data-bbox="912 886 1099 1073" data-label="Text"> <p>Uncompensated up-conversion results in "postage stamp" effect with both letterbox and sidebars visible on 16:9 display</p> </div> <div data-bbox="1110 898 1364 1064" data-label="Image"> </div> <div data-bbox="300 1148 428 1180" data-label="Section-Header"> <p>With AFD</p> </div> <div data-bbox="303 1220 500 1325" data-label="Text"> <p>NTSC-Coded (4:3) 1080i Video Signal with 1010 AFD Code</p> </div> <div data-bbox="347 1396 526 1503" data-label="Text"> <p>NTSC-Coded image on 16:9 display shows letterbox cropping</p> </div> <div data-bbox="544 1409 795 1575" data-label="Image"> </div> <div data-bbox="592 1224 753 1331" data-label="Text"> <p>1010 AFD Code Received and Applied to Scaler</p> </div> <div data-bbox="924 1236 1066 1287" data-label="Text"> <p>Re-Aspect to 16:9</p> </div> <div data-bbox="1136 1224 1343 1304" data-label="Text"> <p>1080i Video Signal with 16:9 corrected ARC</p> </div> <div data-bbox="872 1394 1081 1556" data-label="Text"> <p>AFD Corrected up-conversion/ re-aspect results in intended image area properly visible on 16:9 display</p> </div> <div data-bbox="1089 1415 1341 1579" data-label="Image"> </div> </div>	

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

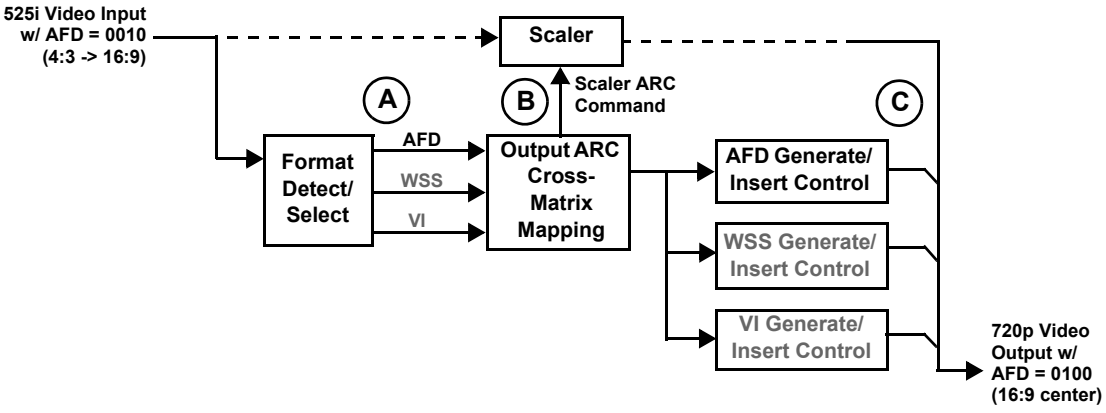
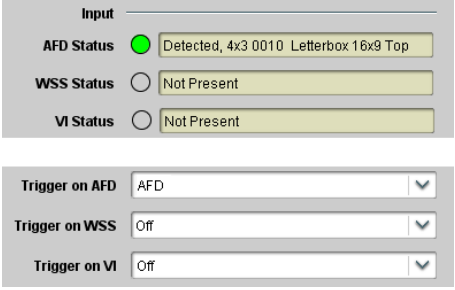

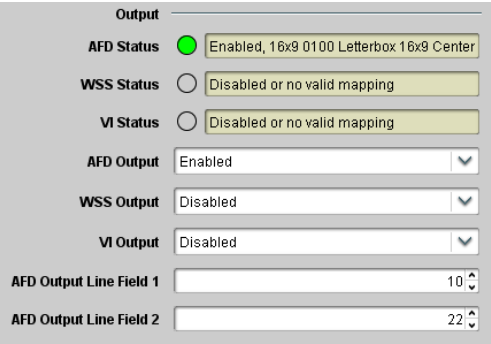
<div data-bbox="256 268 431 319">AFD</div> <div data-bbox="256 352 565 382">AFD/WSS/VI AFD Map</div>	(continued)
<p>Shown below is an example in which received 525i5994 SDI video is being up-converted to 720p5994. The settings shown in the example below provide for directing the scaler to re-aspect the 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.</p>  <p>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.</p>  <p>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.</p> <p>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.</p>  <p>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.</p> <p>AFD Status shows AFD code now being outputted.</p> <p>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).</p> 	

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


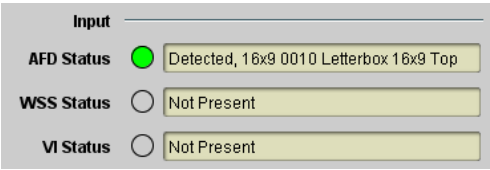

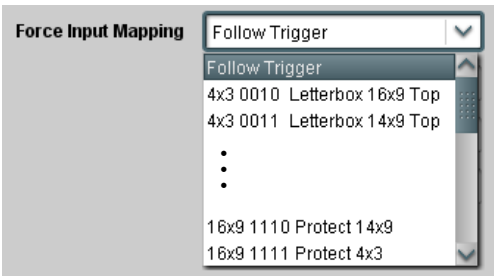
	<p>AFD/WSS/VI sub-tab provides prioritized and gated input monitoring for AFD, WSS and/or VI formats. Also provides translation between input and output AFD, WSS, and VI ARC formats.</p>
<p>Note:</p> <ul style="list-style-type: none"> Line number control available only for AFD format. WSS and VI use 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 3-51 for more information. 	
<p>• Input Format Status Displays</p> 	<p>Displays the current status and contents of the three supported ARC formats shown to the left.</p> <ul style="list-style-type: none"> 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.
<p>• Scaler AFD Enable</p> 	<p>Enables scaler to apply ARC settings provided by ARC controls in this function.</p> <ul style="list-style-type: none"> 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. <p>Note:</p> <ul style="list-style-type: none"> This control also appears on the Scaler tab and is mutually ganged with the selection performed on either tab. 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.
<p>• Input Mapping</p> 	<p>When received ARC code is received, applies H/V coding as follows:</p> <ul style="list-style-type: none"> 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. <p>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 3-51 for more information and coding descriptions.</p>

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

<div style="background-color: #333; color: white; padding: 5px; text-align: center; font-weight: bold;">AFD</div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> AFD/WSS/VI AFD Map </div>	(continued)
<p>• Input Triggering Controls</p> <div style="border: 1px solid #ccc; padding: 10px; margin: 10px 0;"> <p>Trigger on AFD Off ▼</p> <p>Trigger on WSS Off ▼</p> <p>Trigger on VI Off ▼</p> <p>WSS/VI Priority WSS</p> </div>	<p>Individual ARC format input controls allow accepting or rejecting received ARC formats as follows:</p> <ul style="list-style-type: none"> • Trigger on AFD: <ul style="list-style-type: none"> • Off rejects AFD-coded triggering. • On allows trigger on AFD. • Trigger on WSS: <ul style="list-style-type: none"> • Off rejects WSS-coded triggering. • AFD allows triggering on AFD-coded WSS. • ETSI allows triggering on ETSI-coded WSS. • Trigger on VI: <ul style="list-style-type: none"> • Off rejects VI-coded triggering. • AFD allows triggering on AFD-coded WSS. • SMPTE allows triggering on SMPTE-coded WSS. <p>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).</p>
<p>• Output Enable Controls</p> <div style="border: 1px solid #ccc; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">Output </p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;">AFD Output</div> <div style="width: 70%;">Enabled ▼</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;">WSS Output</div> <div style="width: 70%;">Disabled ▼</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;">VI Output</div> <div style="width: 70%;">Disabled ▼</div> </div> </div>	<p>Individual ARC format input controls allow accepting or rejecting received ARC formats as follows:</p> <ul style="list-style-type: none"> • AFD Output: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Disable turns off WSS format on output. • AFD Enabled inserts AFD-coded VI on output. • SMPTE Enabled inserts SMPTE-coded VI on output.
<p>• Output Status Displays</p> <div style="border: 1px solid #ccc; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">Output </p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;">AFD Status ●</div> <div style="width: 70%;">Enabled, 16x9 1111 Protect 4x3</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;">WSS Status ○</div> <div style="width: 70%;">Disabled or no valid mapping</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;">VI Status ●</div> <div style="width: 70%;">Enabled, SMPTE 6 625/50/16x9</div> </div> </div>	<p>Displays the current output status, coding, and H/V ratio for AFD, WSS, and VI formats.</p> <ul style="list-style-type: none"> • 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. <p>Note:</p> <ul style="list-style-type: none"> • 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.
<p>• AFD Output Line Control</p> <div style="border: 1px solid #ccc; padding: 10px; margin: 10px 0;"> <p>AFD Output Line Field 1 10 ▲▼</p> <p>AFD Output Line Field 2 22 ▲▼</p> </div>	<p>Allows selecting the line location of the AFD data within the video signal Ancillary Data space.</p> <p>Note:</p> <ul style="list-style-type: none"> • 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.

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

AFD

AFD/WSS/VI

AFD Map

(continued)

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-1002-2UDX Function Menu List — continued

AFD		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.				
AFD/WSS/VI		AFD Map				
Input: 4x3						
		V Zoom(60-200)	H Zoom(60-200)	Pan	Tilt	Output AFD Code
4x3 Letterbox 16x9 Top 0010		100.0	100.0	0.0	12.5	16x9 0010 Letterbox 16x9 Top
4x3 Letterbox 14x9 Top 0011		116.7	100.0	0.0	7.1	16x9 0011 Letterbox 14x9 Top
⋮						
4x3 Letterbox 16x9 Protect 4x3 1111		133.3	100.0	0.0	0.0	16x9 1111 Protect 4x3
Input: 16x9						
		V Zoom(60-200)	H Zoom(60-200)	Pan	Tilt	Output AFD Code
16x9 Letterbox 16x9 Top 0010		75.0	100.0	0.0	-12.5	4x3 0010 Letterbox 16x9 Top
16x9 Letterbox 14x9 Top 0011		75.0	100.0	0.0	-7.1	4x3 0011 Letterbox 14x9 Top
⋮						
16x9 Protect 4x3 1111		100.0	133.0	0.0	0.0	4x3 1111 Letterbox 16x9 Protect 4x3

Separate control groups for 4x3 and 16x9 coded input frames allow 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.

Input: 16x9						
		V Zoom(60-200)	H Zoom(60-200)	Pan	Tilt	Output AFD Code
16x9 Letterbox 16x9 Top 0010		75.0	100.0	0.0	-12.5	4x3 0010 Letterbox 16x9 Top

Scaling and Pan/Tilt factors effect the re-aspecting and position offset here that result in a 4x3 0010 Letterbox 16x9 Top image when these defaults are applied.

The AFD coding representing the applied re-aspecting is applied to the output video.

- 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 the device) set the **No Input** row to the desired code to be outputted (in this example, "16x9 Letterbox 16x9 Center; 0100").

Output AFD Code	
No Input	16x9 Letterbox 16x9 Center

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

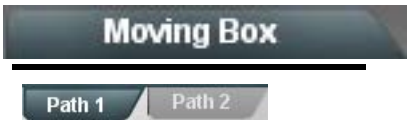
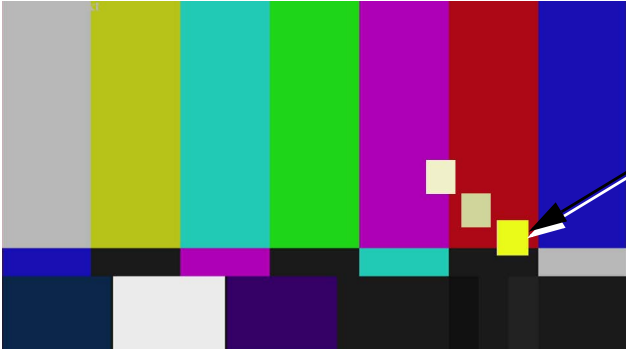


	<p>Provides a “moving box” graphic insertion (overlay) on the output video.</p> <p>Moving-box insertion can serve as a dynamic raster confidence check even in cases where the input video image is static or lost.</p>
<p>Note: Moving Box tab has identical independent controls for both Path 1 and Path 2 using the Path 1 / Path 2 sub-tabs. Therefore, only the Path 1 controls are shown here. Set controls for other path using the respective sub-tab.</p>	
	<p>Moving-box insertion provides dynamic display even on static video. Attributes such as box size, color, vertical movement speed, and horizontal movement speed are all user configurable.</p> <p>Moving box can be set to insert continuously, or only upon loss of input.</p>
<p>• Moving Box Insertion Controls</p> 	<p>Selects the rules for moving-box overlay insertion into output video.</p> <p>Note: If moving-box insertion is desired for input LOS conditions, the Framesync On Loss of Video control for the selected path must be set to provide a raster (from one of the choices shown) to support the moving-box insertion.</p> <p>If this control is set to “Disable Outputs”, no raster or moving-box insertion will be present on the output video under input LOS conditions. See Framesync (p. 3-18) for more information.</p>
<p>• Moving Box Size Controls</p> 	<p>Sets size of box image burn-in as follows:</p> <ul style="list-style-type: none"> • 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%) <p>Note:</p> <ul style="list-style-type: none"> • 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. • For SD usage, moving box can impinge on and corrupt line 21 closed-captioning waveform if positioned too close to the upper right of the raster.

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

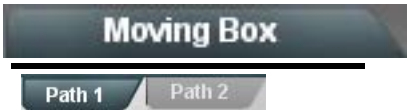
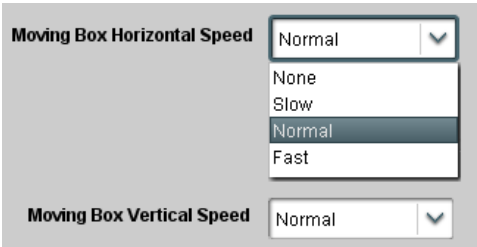
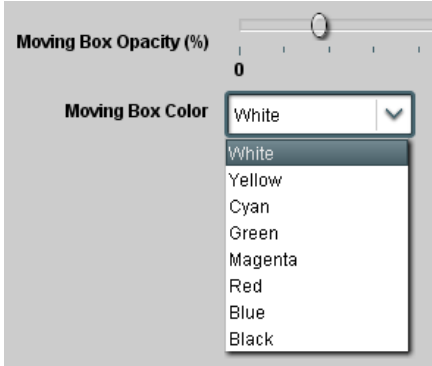
	(continued)
<p>• Moving Box Speed Controls</p> 	<p>Sets speed of motion for moving box image burn-in as follows:</p> <ul style="list-style-type: none"> • Moving Box Horizontal Speed sets the X-axis speed from choices shown. • Moving Box Vertical Speed sets the Y-axis speed from choices shown.
<p>• Moving Box Attributes Controls</p> 	<p>Provides independent controls for setting the color and opacity of the moving-box insertion.</p> <ul style="list-style-type: none"> • Color drop-down sets box color from multiple choices shown. • Opacity controls sets box opacity from 0% (least opacity) to 100% (full opacity).

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


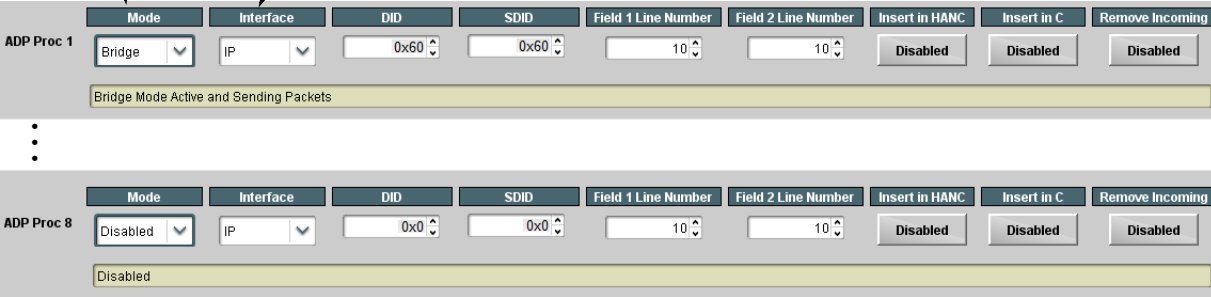
<div>Ancillary Data Processing</div> <div>ADP Routing IP Port Setup</div> <div>Option </div>	<p>Provides controls for VANC/HANC ancillary data de-embedding and embedding to and from program video stream. Data can be extracted and inserted within the device (Bridge mode), or inserted and/or extracted to and from external interfaces via serial or IP interfaces.</p>
<p>Note:</p> <ul style="list-style-type: none"> • Separate Path 1 and Path 2 tabs are provided for this function with identical independent controls for both Path 1 and Path 2. Only the Path 1 controls are shown here. Set controls for other path using the other tab. • Bridge mode ANC extract/insert is standard for both paths on device. Other modes described here are available with option +ANC. 	
<p>Eight individual Ancillary Data Processors (ADPs) provide for insertion, extraction, or bridging ancillary data to and from the program video SDI stream.</p>	
<p>Mode controls select the type of ANC processing:</p> <ul style="list-style-type: none"> • Bridge extracts ANC from the deserialized input video and re-inserts in the output video, thereby allowing full control of specialized ANC packets • Insert and Extract modes respectively allow insertion to the output stream or extraction from the input stream between external interfaces 	<p>Interface controls select either card IP or serial data (COM 1) interface where Mode is set to insertion or extraction</p> <p>Note: COM1 is available for ADP Proc 1 only; all other ADPs use IP only for external import/export insertion/extraction.</p> <p>DID and SDID controls select the desired packet to be handled by the corresponding ANC Data Processor</p> <p>Line Number controls select the VANC location of packet insertion/extraction</p> <p>Insertion controls allow special insertions in HANC or the C-channel, as well as removal of incoming packets</p>
	
<p>In the example above, ADP Proc 1 is set to extract ATC timecode at DID60_h / SDID 60_h. Depending on the interface used to carry the extraction (COM or IP), status is displayed as shown below.</p>	
<div>Extracting 15.0 Kbit/s, dropped 0.0 Kbit</div> <div>Extracting 18.75 Kbit/s, total 125.78 Kbit</div>	<p>When set to extract to COM interface, displays rate and dropped data (if any)</p> <p>When set to extract to IP interface, displays rate and total amount transferred</p>
<p>Note: DashBoard versions 4.1 and earlier display DID and SDID numbers in decimal; newer DashBoard versions display DID and SDID numbers in hexadecimal. Hexadecimal notation is denoted by the "0x" preceding the value.</p>	

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


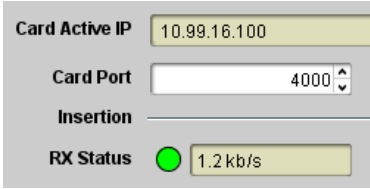
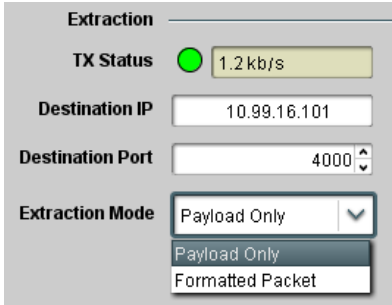
	<p>IP Port Setup sub-tab provides IP setup for UDP IP communications.</p>
<p>• IP Receive Setup/Status</p> 	<p>Shows device receiving IP address/status and sets port as follows:</p> <ul style="list-style-type: none"> • Card Active IP: Shows the device IP address. (IP address is set using Admin tab Networking settings; see Admin on page 3-67). • Card Port: Sets device IP receive port. • Insertion / Rx Status: Shows device IP receive/Rx insertion status. <ul style="list-style-type: none"> - Stopped (with yellow indicator) means no data is being received. - Green indicator means data is being received and inserted. Data rate is also shown.
<p>• Card IP Transmit Setup/Status</p> 	<p>Provides setup for destination IP address and shows device transmit status as follows:</p> <ul style="list-style-type: none"> • Extraction / Tx Status: Shows device extraction from stream to Tx status. <ul style="list-style-type: none"> - Stopped (with yellow indicator) means no data is being sent. - Green indicator means data is being extracted and sent. Data rate is also shown. • Destination IP/Port: Allows setting destination IP address and port. • Extraction Mode: Sets the IP data sent to consist of only payload, or send as formatted packets.

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

Ancillary Data Processing	Data-Over-Audio sub-tab provides controls that allow SMPTE 337/338/339 non-PCM data to be embedded and de-embedded on embedded audio pairs, offering a very convenient self-contained transport within the program stream physical media.
Port Setup Data-Over-Audio Setup	
<p>Shown below is an example setup where serial data is embedded as SMPTE 337 non-PCM data on a sending embedded pair, and then extracted on a receiving pair and converted back to serial data using two cards/devices with the +ANC option.</p>	
<p>A The COM Routing tab and appropriate sub-tab is set to receive serial data, noting bit rate and parity settings to conform to the received serial data. (See COMM Ports Setup Controls (p. 3-58))</p>	<p>C The embedded data pair on the receiving end is then selected using the De-Embed Source select drop-down on the Data-Over-Audio Setup sub-tab (in this example, Emb Pair 4 (channels 7/8) as correspondingly set on the sending card).</p>
<p>B The received serial data is then directed to an embedded audio output channel pair by setting a pair to Embedded Data using the Output Audio Routing/Controls tab (in this example, Emb pair 7/8).</p>	
	<p>D On the COM Routing tab, select Audio Data Extractor to extract and route the received SMPTE 337 data to the desired COM port, noting bit rate, protocol, and parity settings. (See COMM Ports Setup Controls (p. 3-58))</p>
<p>When data is successfully being de-embedded, the status display shows green and indicates the bit rate (bit rate is bit rate configured on sending end; typically SMPTE 337 data transfer is much faster than serial)</p>	
<p>Notes:</p> <ul style="list-style-type: none"> • Embedded channel pair selected must be a standard boundary pair (e.g., 1/2, 3/4 and so on). • SMPTE 337/338/339 embedded pair carrying non-PCM data here is marked as "Non-PCM Data Unknown". Any intermediate devices between the Cobalt sending card/device and the Cobalt receiving card/device will transfer this data intact, as long as these devices can transfer in a bit-accurate manner. Most devices capable of carrying Dolby® streams are capable of this. However, any intermediate devices must have functions such as PCM level controls and SRC disabled. 	

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


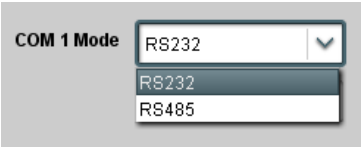
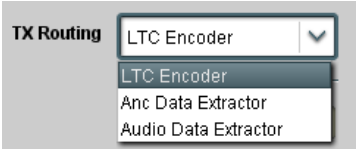

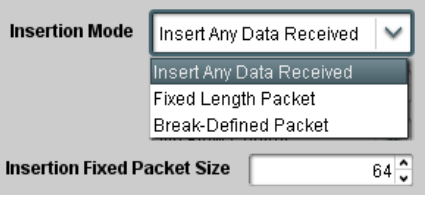
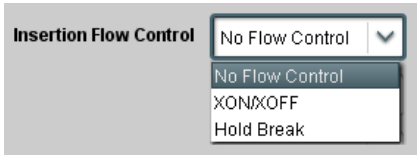
	<p>Provides controls for setting up the two COMM (serial) ports for LTC or ANC functions, and setting comm protocol for each port.</p>
<p>Note:</p> <ul style="list-style-type: none"> • COM 1 and COM 2 sub-tabs provide independent controls for COM1 and COM2. Therefore, only the COM 1 controls are described here. • Controls provided here allow highly detailed setup of serial communications. Control settings must be carefully considered and set appropriately to correspond to both sending and receiving systems. Incorrectly set controls may result in loss of ANC serial comm. • COM 1 and COM 2 are multi-function interfaces and must be set for ANC Data Extractor for port(s) is to be used here. Set the port function as described in COM Routing in COMM Ports Setup Controls (p. 3-58). 	
<p>• COM Mode (Protocol)</p> 	<p>Selects serial comm protocol for the respective port as RS-232 or RS-485.</p> <p>Note: Protocol choices should consider the payload to be carried. Typically, LTC is sent or received using only RS-485 serial protocol.</p>
<p>• COM Port Tx Routing Function</p> 	<p>Selects port function for the respective port as LTC Encoder input or output, or ANC Data Extractor / Audio (SMPTE 337) non-PCM input or output.</p>
<p>• Rx/Tx Status Display</p> 	<p>Shows either no data received/sent, or where transfer is present shows data rate (in kbit/sec).</p>
<p>• Insertion Mode Control</p> 	<p>Where data is being inserted (received), sets the insertion as follows:</p> <ul style="list-style-type: none"> • Insert Any Data Received: Insert all received data with no regard for packet size. • Fixed Length Packet: Sets receive to wait and accumulate <i>n</i>-number of packet bytes (as set using Insertion Fixed Packet Size control) before inserting data. • Break-Defined Packet: Device receiver looks for character-defined break from source being received to define breaks.
<p>• Insertion Flow Control</p> 	<p>Allows communication between device receive and sending source to regulate data receive as follows:</p> <ul style="list-style-type: none"> • No Flow Control: Data is received without buffering or checking to see if data is being received faster than it can be inserted. • XON / XOFF: The device UART Tx will tell the sending source whether it can or cannot accept data at current bit rate. • Hold Break: Device, if close to not being able to accept new data, tells the sending source to hold, and releases this hold when the device is again able to accept new data.

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

<div> <div>COM Routing</div> <div> <div>COM 1 Setup</div> <div>COM 2 Setup</div> </div> </div>	(continued)
<ul style="list-style-type: none"> • Insertion Sync Byte Control <div> <div>Insertion Sync Byte</div> <div> <div>Disabled</div> <div>Disabled</div> <div>Field Number at SOF</div> <div>Ack on Insertion</div> </div> </div>	<p>Allows use of a sync byte from receiver back to sending source to synchronize communication between device receive and sending source as follows:</p> <ul style="list-style-type: none"> • Disabled: No special synchronization. • Field Number at SOF: The device sends a single byte telling sending source when start of field 1 or field 2 is occurring. • Ack on Insertion: Device sends a single byte back to sending source when data has been inserted.
<ul style="list-style-type: none"> • Extraction Mode Control <div> <div>Extraction Mode</div> <div> <div>Payload Only</div> <div>Payload Only</div> <div>Full Anc Data Packet</div> </div> </div>	<p>Where data is being extracted from input video, sets the data to be sent as follows:</p> <ul style="list-style-type: none"> • Payload Only: Sends payload only (for example, for closed captioning this would be only the ASCII character string representing the CC content). • Full Anc Data Packet: Sends the entire packet, including payload, DID, SDID, and any handling or marking characters.
<ul style="list-style-type: none"> • Extraction Flow Control <div> <div>Extraction Flow Control</div> <div> <div>No Flow Control</div> <div>No Flow Control</div> <div>XON/XOFF</div> <div>Hold Break</div> </div> </div>	<p>Allows communication between device transmit and receiving destinations to regulate data receive as follows:</p> <ul style="list-style-type: none"> • No Flow Control: Data is transmitted without buffering or checking to see if data is being transmitted faster than it can be received. • XON / XOFF: The device UART Rx will acknowledge from the receiving system whether it can or cannot accept data at current bit rate. • Hold Break: Device, if receiving notification from the receiving system that it is close to not being able to accept new data, tells the device to hold. Device releases this hold when the receiving system removes the break command, indicating destination is now ready again to accept new data.
<ul style="list-style-type: none"> • Bit Rate/ Parity Gen Control <div> <div>Bit Rate</div> <div> <div>115200</div> </div> <div>Parity</div> <div> <div>Disabled</div> <div>Disabled</div> <div>Odd</div> <div>Even</div> </div> </div>	<p>For both Rx and Tx, sets UART for bit rate and parity as follows:</p> <ul style="list-style-type: none"> • Bit Rate: Sets Tx/Rx bit rate from 1 of 5 speeds ranging from 9600 to 230400 Baud. • Parity: Sets Device Rx to expect odd or even parity from incoming data, and sets device Tx to generate a parity bit to satisfy selected parity. Where parity is set, incoming data not conforming to parity selection is rejected.

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


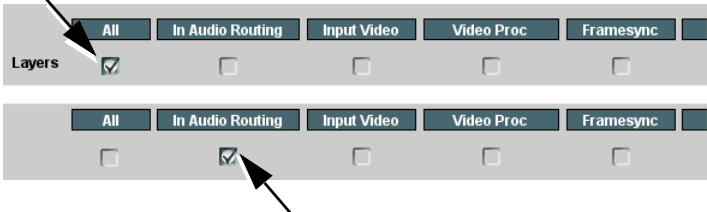
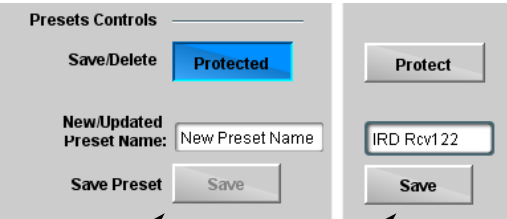
	<p>Allows user control settings to be saved in a Preset and then loaded (recalled) as desired, and provides a one-button restore of factory default settings.</p>
<p>• Preset Layer Select</p> <p>Allows selecting a functional layer (or “area of concern”) that the preset is concerned with. Limiting presets to a layer or area of concern allows for highly specific presets, and masks changing card settings in areas outside of the layer or area of concern.</p> <p>Default All setting will “look” at all card settings and save all settings to the defined preset with no masking.</p>  <p>video proc setting in effect, and at a later time EAS audio routing is desired to be saved and invoked as a preset, selecting In Audio Routing here tells the preset save and load to not concern itself with video proc settings. In this manner, any video proc settings in effect when the EAS preset is invoked will not affect any video proc settings that might be currently in effect.</p>	<p>Selecting a layer (in the example, “In Audio Routing”) will set the preset to only “look at” and “touch” audio routing settings and save these settings under the preset. When the preset is loaded (recalled), the card will only “touch” the audio routing layer.</p> <p>Example: Since EAS audio routing can be considered independent of video proc settings, if normal audio routing was set up with a particular</p>
<p>• Preset Enter/Save/Delete</p>  <p>Protected state – changes locked out</p> <p>Ready (open) state – changes can be applied</p>	<p>Locks and unlocks editing of presets to prevent accidental overwrite as follows:</p> <ul style="list-style-type: none"> • Protect (ready): This state awaits Protected and allows preset Save/Delete button to save or delete current card 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 modified or deleted. Use this setting when all presets are as intended. • New/Updated Preset Name: Field for entering user-defined name for the preset being saved (in this example, “IRD Rcv122”). • Save: Saves the current card settings under the preset name defined above.

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

Presets	(continued)
<p>• Preset Save/Load Controls</p> <p>Load/Delete Existing Preset</p> <p>Select Preset: <input type="text" value="IRD Rcv122"/></p> <p>Load Selected Preset <input type="button" value="Confirm"/></p> <p>Update Selected Preset <input type="button" value="Confirm"/></p> <p>Rename Selected Preset <input type="button" value="Confirm"/></p> <p>Delete Selected Preset <input type="button" value="Confirm"/></p> <p>Delete All Presets <input type="button" value="Confirm"/></p> <p>Load Factory Defaults <input type="button" value="Confirm"/></p> <p>Download Presets <input type="text" value="StoredPresets.bin"/> <input type="button" value="Save"/></p>	<ul style="list-style-type: none"> • 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 (engaging) the selected preset. When this button is pressed, the changes called out in the preset are immediately applied. Note: Controls below that modify or delete presets are grayed-out (inactive) when Save/Delete button is in Protected mode. To use these controls, make certain Protected is not enabled. • Update - Rename - Delete Selected Preset buttons allow selected preset to be updated (take in current custom settings), be renamed, or be deleted. A Confirm prompt appears in all cases. • Delete All Presets button allows a delete of all stored presets. (This is useful if all presets are to be replaced by a new Presets .bin file.) • 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.
<p>Upload Options</p> <p>Delete All Presets on Upload <input type="checkbox"/></p> <p>Delete Duplicate Presets on Upload <input type="checkbox"/></p> <p>Load Saved Settings on Preset Upload <input checked="" type="checkbox"/></p>	<ul style="list-style-type: none"> • Upload Options checkboxes function as follows: • Delete All Presets on Upload clears all stored presets, and then replaces or adds any presets as defined in the uploaded Presets .bin file. (This is useful to establish a "clean slate" and remove any presets that may no longer be desired.) • Delete Duplicate Presets on Upload clears stored presets bearing the same name as currently stored presets. (This avoids dual iterations of same preset name (plain and duplicate using "*" marking), and avoids possibility of "stale" presets no longer desired from appearing as a choice.) • Load Saved Settings on Preset Upload makes certain any local card settings card state is retained following a preset upload. When checked, a preset within the upload is invoked only when specifically selected and invoked. Note: Any combination of checkboxes can be checked or unchecked (enabled or disabled) as desired.

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


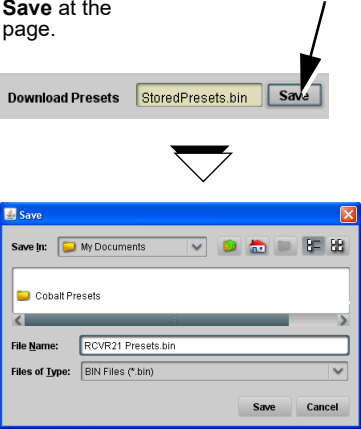
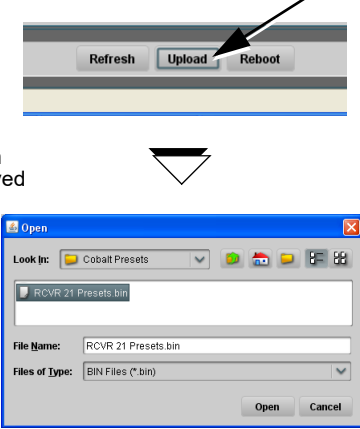

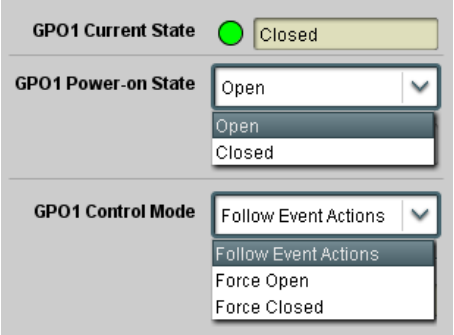
	(continued)
<p>Download (save) card presets to a network computer by clicking Download Presets – Save at the bottom of the Presets page.</p>  <p>Browse to a desired save location (in this example, <i>My Documents\Cobalt Presets</i>).</p> <p>The file can then be renamed if desired (<i>RCVR21 Presets</i> in this example) before committing the save.</p>	<p>Upload (open) card presets from a network computer by clicking Upload at the bottom of DashBoard.</p>  <p>Browse to the location where the file was saved on the computer or drive (in this example, <i>My Documents\Cobalt Presets</i>).</p> <p>Select the desired file and click Open to load the file to the card.</p> <p>Note:</p> <ul style="list-style-type: none"> • Preset transfer between card 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.
	<p>Provides controls for setting up the two GPO's power-up states as well as forced manual or event action triggered.</p>
<p>Note: This tab has identical independent controls for GPO 1 and 2. Therefore, only the GPO 1 controls are described here.</p>	
	<ul style="list-style-type: none"> • Current State indicates GPO status regardless of any pre-setup. • Power-on State allows the power-up GPO state to be set (initialized) upon power-up • Control Mode allows GPO manual asserted open or closed states, or hands over control to Event Action triggering.

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

Event Setup

Event Triggers

Email Alerts

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

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

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

- The **Event-Based Loading** button serves as a master enable/disable for the function.
- Go-to **Event Action**: can be user-defined presets, “canned” (hard-coded) selections (such as GPO triggers or routing changes), or automated E-mail alert to a respondent (see Email Alerts (p. 3-66) for setting up e-mail alerts).
- Each Event (**Event 1** thru **Event 32**) can be set to screen for any or several Definer criteria as shown in the example below. Up to 32 separate events can be defined. In addition to events screened for and triggered here, each Event can be set to trigger from Alarms detected on the Alarms page (see Alarms Setup Controls (p. 3-69)). **Engage Mode** (True/False) allows triggering on an inverse of a condition.
- Event 1 thru Event 32 are arranged with Event 1 having the highest priority, descending down to Event 32. Where multiple event screening is enabled, lower-priority events are serviced first, with the highest-priority event being the final event serviced and last action taken as well as last item logged in the Event History (see below). This helps ensure that a lower-priority event does not mask detection of higher-priority event(s).
- The **Status** indicator and message shows the activation status of each Event. Green indicator means event is currently engaged.
- Some columns in the DashBoard Event Setup table are present only when certain options are installed (for example, Video Quality column appears only with option **+QC**).

Event Definers

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

	Status	Acquired Video Format	GPI	Video Quality	Audio Events	ANC Data	User States	Event Action:
Event 1	● Last Active Event	Don't Care	Don't Care	Input A Event Engaged	Don't Care	Don't Care	Don't Care	go to B
Event 2	● Condition Not Met	Don't Care	Don't Care	Input A Event Disengaged	Don't Care	Don't Care	Don't Care	normal path A
...								
Event 32	● Condition Not Met	Don't Care	Don't Care	Don't Care	Don't Care	Don't Care	Don't Care	no-cc-msg

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

Event History
Time
Event Number
Event Action

19:22:39 02/05/15	2	GPO 1 Close
19:22:39 02/05/15	4	GPO 2 Close
19:22:17 02/05/15	2	GPO 1 Close
19:22:17 02/05/15	4	GPO 2 Close

Card Time
19:25:43 02/05/15

Force Event Refresh

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

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

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

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

Event Setup	(continued)																														
<div style="display: flex; justify-content: space-around; border-bottom: 1px solid black; padding-bottom: 5px;"> Event Triggers Email Alerts </div>																															
<p>In the example here for Event 1, the Video Quality Events tab is set to screen for frozen video on Input A. When detected, this status can be used here (Video Quality set to "Input A Event Engaged" indicating black or frozen video detected). Using the Event Action selector, go-to action of "go to B" can be invoked (which in this example is a user preset that changes device routing to use an alternate input source).</p> <p>Conversely, to go back to the original source, an event could be set up with Video Quality here looking for "Input A Event Disengaged" and in turn invoke an event action returning routing to the original video source (in this example, user preset "normal path A").</p>																															
<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 10px;"> <div style="background-color: #f2f2f2; padding: 2px 5px; font-weight: bold;">Video Quality Events</div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="margin-right: 10px;">Event Status</div> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: red; border-radius: 50%; margin-right: 5px;"></div> <div style="border: 1px solid #ccc; padding: 2px 5px; font-size: 0.9em;">Frozen video det</div> </div> </div> <div style="margin-top: 10px;"> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="margin-right: 10px;">Event Type</div> <div style="border: 1px solid #ccc; padding: 2px 10px; font-size: 0.8em;">Black or Frozen</div> </div> <div style="display: flex; justify-content: space-between; border-top: 1px solid #ccc; padding-top: 5px;"> Input A Input B </div> </div> </div>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #f2f2f2;"> <th style="width: 25%;">Video Quality</th> <th style="width: 25%;">Audio Events</th> <th style="width: 25%;">ANC Data</th> <th style="width: 25%;">Event Action:</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Input A Event Engaged</td> <td>Don't Care</td> <td>Don't Care</td> <td>go to B</td> </tr> <tr> <td style="text-align: left;">Input A Event Disengaged</td> <td>Don't Care</td> <td>Don't Care</td> <td>normal path A</td> </tr> </tbody> </table>	Video Quality	Audio Events	ANC Data	Event Action:	Input A Event Engaged	Don't Care	Don't Care	go to B	Input A Event Disengaged	Don't Care	Don't Care	normal path A																		
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Input A Event Engaged	Don't Care	Don't Care	go to B																												
Input A Event Disengaged	Don't Care	Don't Care	normal path A																												
<p>In the example here, Event 1 and Event 3 are respectively set for frozen video and closed captioning absence detection. Using separate Event rows for Video Quality and ANC Data (closed-captioning absence) screening allows these conditions to be independently detected and acted upon with user actions tailored to the event (when either of the conditions are detected, different actions can be taken as selected).</p> <p>In this example, frozen video calls a preset using an input video routing change, while loss of closed captioning invokes a GPO event. Both Events 1 and 3 have corresponding go-to actions to resume normal operation when the event ceases.</p>																															
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #f2f2f2;"> <th style="width: 10%;"></th> <th style="width: 10%;">Status</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Event 1</td> <td style="text-align: left;"> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: green; border-radius: 50%; margin-right: 5px;"></div> <div style="border: 1px solid #ccc; padding: 2px 5px; font-size: 0.8em;">Last Active Event</div> </div> </td> </tr> <tr> <td style="text-align: left;">Event 2</td> <td style="text-align: left;"> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: red; border-radius: 50%; margin-right: 5px;"></div> <div style="border: 1px solid #ccc; padding: 2px 5px; font-size: 0.8em;">Condition Not Met</div> </div> </td> </tr> <tr> <td style="text-align: left;">Event 3</td> <td style="text-align: left;"> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: yellow; border-radius: 50%; margin-right: 5px;"></div> <div style="border: 1px solid #ccc; padding: 2px 5px; font-size: 0.8em;">Condition Met</div> </div> </td> </tr> <tr> <td style="text-align: left;">Event 4</td> <td style="text-align: left;"> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: red; border-radius: 50%; margin-right: 5px;"></div> <div style="border: 1px solid #ccc; padding: 2px 5px; font-size: 0.8em;">Condition Not Met</div> </div> </td> </tr> </tbody> </table>		Status	Event 1	<div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: green; border-radius: 50%; margin-right: 5px;"></div> <div style="border: 1px solid #ccc; padding: 2px 5px; font-size: 0.8em;">Last Active Event</div> </div>	Event 2	<div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: red; border-radius: 50%; margin-right: 5px;"></div> <div style="border: 1px solid #ccc; padding: 2px 5px; font-size: 0.8em;">Condition Not Met</div> </div>	Event 3	<div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: yellow; border-radius: 50%; margin-right: 5px;"></div> <div style="border: 1px solid #ccc; padding: 2px 5px; font-size: 0.8em;">Condition Met</div> </div>	Event 4	<div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: red; border-radius: 50%; margin-right: 5px;"></div> <div style="border: 1px solid #ccc; padding: 2px 5px; font-size: 0.8em;">Condition Not Met</div> </div>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #f2f2f2;"> <th style="width: 25%;">Video Quality</th> <th style="width: 25%;">Audio Events</th> <th style="width: 25%;">ANC Data</th> <th style="width: 25%;">Event Action:</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Input A Event Engaged</td> <td>Don't Care</td> <td>Don't Care</td> <td>go to B</td> </tr> <tr> <td style="text-align: left;">Input A Event Disengaged</td> <td>Don't Care</td> <td>Don't Care</td> <td>normal path A</td> </tr> <tr> <td style="text-align: left;">Don't Care</td> <td>Don't Care</td> <td>Closed Caption Absence Event</td> <td>GPO 1 Close</td> </tr> <tr> <td style="text-align: left;">Don't Care</td> <td>Don't Care</td> <td>Closed Caption Presence Event</td> <td>GPO 1 Open</td> </tr> </tbody> </table>	Video Quality	Audio Events	ANC Data	Event Action:	Input A Event Engaged	Don't Care	Don't Care	go to B	Input A Event Disengaged	Don't Care	Don't Care	normal path A	Don't Care	Don't Care	Closed Caption Absence Event	GPO 1 Close	Don't Care	Don't Care	Closed Caption Presence Event	GPO 1 Open
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<p>Note:</p> <ul style="list-style-type: none"> Screened conditions are triggered upon start of event. Any event-based setup must be done in advance of the triggering event in order for event to be detected. If a desired user preset does not appear in the Event Action drop-down, press the Dashboard Refresh button at the bottom of the page to update the list in the drop-down. Loss of true conditions does not disengage an event-based triggering. A new set of true conditions must be defined and then occur to transition from one event-based trigger to another. Time required to engage an event-based trigger depends upon complexity of the called preset. (For example, a preset that invokes a video change will take longer to engage than a preset involving only an audio routing change.) Make certain all definable event conditions that the device might be expected to "see" are defined in any of the Event 1 thru Event 32 rows. This makes certain that the device will always have a defined "go-to" action if a particular event occurs. For example, if the device is expected to "see" a 720p5994 stream or as an alternate, a 525i5994 stream, make certain both of these conditions are defined (with your desired go-to presets) in any two of the Event 1 thru Event 32 condition definition rows. Event Actions defined using user presets must be used with care to prevent conditions that could cause looping or the removal or "override" of desired expected settings. When using presets, the Preset Layer selection should be used such that only required aspects are touched. Where multiple event screening is set up, the event you consider to be the highest priority should be set as higher priority than lesser events (as shown in the example above where Video Quality screening trumps CC absence). Also, this prioritization helps ensure that all desired events are screened for before a significant change (such as input video source change) is effected. 																															

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

Event Setup

Event Triggers

Email Alerts

(continued)

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

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

BBG-1002-2UDX

From EAS Keyer Box

GPI 1

From EAS Audio Box

GPI 2

Set User State 1

Clear User State 1 or 2

GPI 1

GPI 2

Set User State 2

Event Setup	Status	GPI	User States	Event Action:	
Event 1	Condition Met	GPI 1 Open->Closed	Don't Care	Set User State 1	GPI 1 (key) cue falling-edge sets user state 1
Event 2	Condition Met	GPI 2 Open->Closed	User State 1 Set	Set User State 2	GPI 2 (audio) cue falling-edge sets user state 2
Event 3	Condition Met	Don't Care	User State 2 Set	Set User State 3	User state 2 (which requires user state 1 being true first) sets state 3, which then invokes a preset to load settings to route EAS key and audio
Event 4	Last Active Event	Don't Care	User State 3 Set	Preset Load: EAS Key+Audio	
Event 5	Condition Not Met	Don't Care	User State 1 Cleared	Preset Load: Revert to Normal	When either GPI 1 or GPI 2 has a rising-edge trigger (cease EAS), user states 1 or 2 are cleared, thereby clearing user state 3. Either state change calls a preset to revert to normal operation.
Event 6	Condition Not Met	Don't Care	User State 2 Cleared	Preset Load: Revert to Normal	
Event 7	Condition Not Met	GPI 1 Closed->Open	Don't Care	Clear User State 1	
Event 8	Condition Not Met	GPI 2 Closed->Open	Don't Care	Clear User State 2	

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


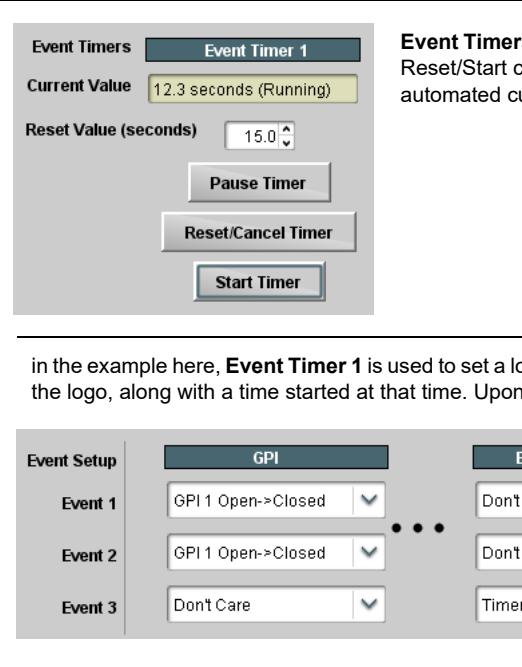
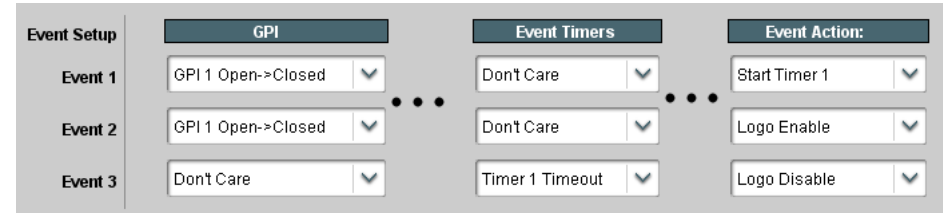
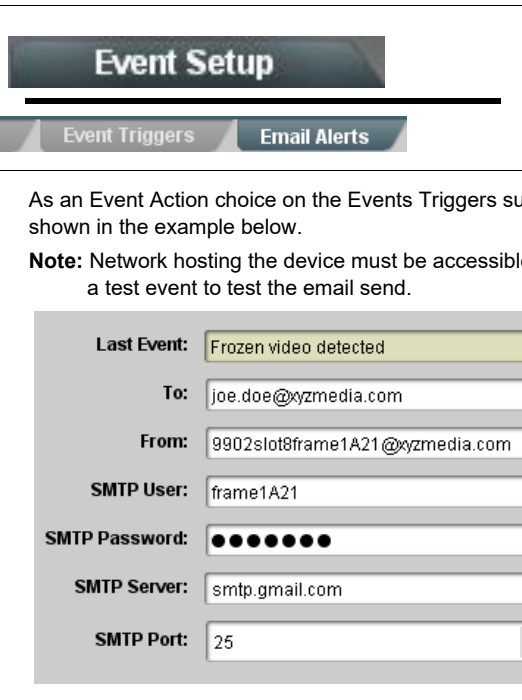
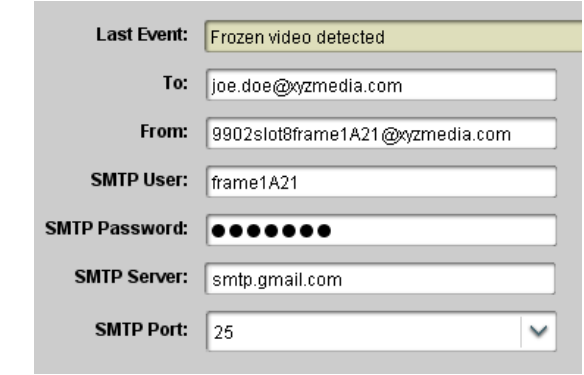
	<p>Provides three general-purpose timers that can be triggered to start, pause, reset, or stop upon event actions. The state of each timer, in turn, can also be used to invoke other actions.</p>
	<p>Event Timers 1 thru 3 (Timer 1 shown) can be set with count-down values. The Pause/Reset/Start control here are manual controls. The timers are typically used with automated cues to start and stop the timer(s), as shown below.</p> <p>in the example here, Event Timer 1 is used to set a logo insertion disable after a specific amount of elapsed time. A GPI inserts the logo, along with a time started at that time. Upon the timer timeout, a separate action sets logo insertion to Disabled.</p> 
	<p>Provides setup for automated Email alerts when an event has occurred.</p> <p>As an Event Action choice on the Events Triggers sub-tab, an Email alert can be sent as a response. Set up email fields as shown in the example below.</p> <p>Note: Network hosting the device must be accessible to email recipient's network. It is recommended to set up and generate a test event to test the email send.</p>  <p>When fields are filled-in to specify recipient and sender, and email alert is selected for Event Action on Event Triggers sub-tab page, recipient receives an email alert upon event, with the triggering event shown (in this example, "frozen video detected").</p>

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

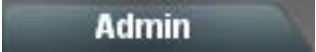
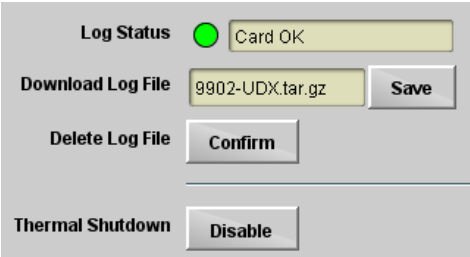
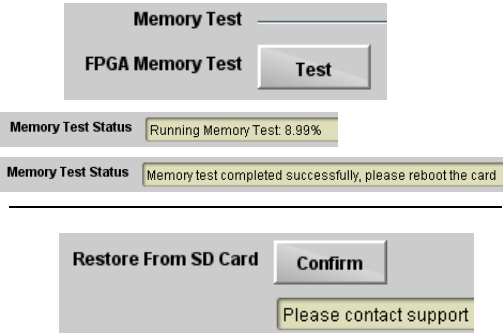


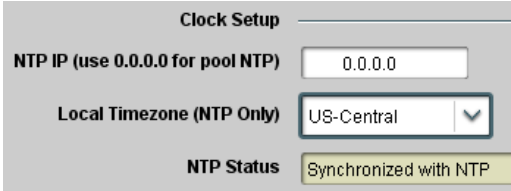
	<p>Provides a global operating status and allows a log download for factory engineering support.</p> <p>Also provides controls for selecting and loading firmware upgrade files, and for setting the comm IP address.</p>
<p>• Log Status and Download Controls</p> 	<ul style="list-style-type: none"> • Log Status indicates overall internal operating status. • Download Log File allows a operational log file to be saved to a host computer. This log file can be useful in case of an error or in the case of an operational error or condition. The file can be submitted to Cobalt engineering for further analysis. • Delete Log File deletes the currently displayed log file. A second confirmation dialog is displayed to back out of the delete if desired. • Thermal Shutdown enable/disable allows the built-in thermal failover to be defeated. (Thermal shutdown is enabled by default). <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>CAUTION</p> <p>The BBG-1002-2UDX 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.</p> </div>
<p>• Card Check and Restore Utilities</p> 	<p>Memory Test allows all cells of the card FPGA memory to be tested.</p>  <p>This control should only be activated under direction of product support. Exercising the memory test is not part of normal device maintenance.</p> <p>Restore from SD Card allows card rendered inoperable to be restored using an SD memory card fitted to the card internal SD slot.</p>  <p>Product support must be contacted prior to performing this operation. Use of any SD card not supplied by support can corrupt the device.</p>
<p>• NTP Clock Setup</p> 	<p>Allows device NTP clock IP source and localization. This is the clock/time device will use for logs and other recorded actions.</p> <ul style="list-style-type: none"> • NTP IP sets the IP address where NTP is to be obtained. • Local Timezone sets the recorded time to the localized time. • NTP Status shows if time is synced with NTP or if an error exists.

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


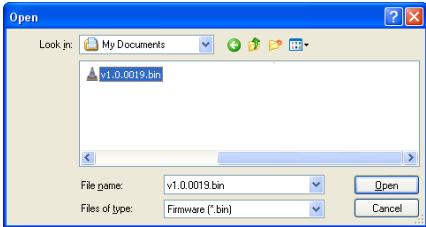
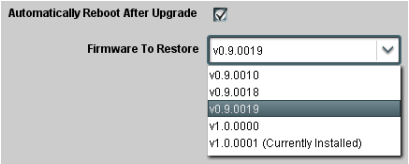
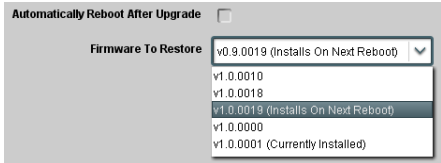
Admin	(continued)
<ul style="list-style-type: none"> • Firmware Upgrade Controls 	<p>Firmware upgrade controls allow a selected firmware version (where multiple versions can be uploaded to the device's internal memory) to invoke an upgrade to a selected version either instantly, or set to install on the next device reboot (thereby allowing device upgrade downtime to be controlled at a scheduled point in time).</p>
<p>Note:</p> <ul style="list-style-type: none"> • The web interface allows for much faster file uploads than using the DashBoard interface described below. See Uploading Firmware Using Web Interface and GUI (p. 3-74) for details and instructions. • The page/tab here allows managing multiple firmware versions saved on the device. New upgrade firmware from our web site can always be directly uploaded to the device without using this page. Instructions for firmware downloading to your computer and uploading to the device can be found at the Support>Firmware Downloads link at www.cobaltdigital.com. 	
<ol style="list-style-type: none"> 1. Access a firmware upgrade file from a network computer by clicking Upload at the bottom of DashBoard. 2. Browse to the location of the firmware upgrade file (in this example, <i>My Documents\v1.0.0019.bin</i>). 3. Select the desired file and click Open to upload the file to the device. 	 
<ul style="list-style-type: none"> • Immediate firmware upload. The device default setting of Automatically Reboot After Upgrade checked allow a selected firmware version to be immediately uploaded as follows: <ol style="list-style-type: none"> 1. Click Firmware To Load and select the desired upgrade file to be loaded (in this example, "v1.0.0019"). 2. Click Load Selected Firmware. The device now reboots and the selected firmware is loaded. 	
<ul style="list-style-type: none"> • Deferred firmware upload. With Automatically Reboot After Upgrade unchecked, firmware upgrade loading is held off until the device is manually rebooted. This allows scheduling a firmware upgrade downtime event until when it is convenient to experience to downtime (uploads typically take about 60 seconds). <ol style="list-style-type: none"> 1. Click Firmware To Load and select the desired upgrade file to be loaded (in this example, "v1.0.0019"). Note now how the display shows "Installs on Next Reboot". 2. Click Load Selected Firmware. The device holds directions to proceed with the upload, and performs the upload only when the device is manually rebooted (by pressing the Reboot button). 3. To cancel a deferred upload, press Cancel Pending Upgrade. The device reverts to the default settings that allow an immediate upload/upgrade. 	

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

<div>User Log</div>	<p>Automatically maintains a log of user actions and input lock status.</p>																		
<p>User Log shows input lock and other user conditions (with most recent event at top of list).</p> <p>Clear User Log clears all entries.</p> <p>Download Log File opens a browser allowing the log file to be saved on the host machine.</p>	<div><table><thead><tr><th>Time</th><th>Type</th><th>Event</th></tr></thead><tbody><tr><td>22:40:36 12/02/15</td><td>Info</td><td>SDI Input sdi_in_c Locked to 720p 59.94</td></tr><tr><td>22:40:34 12/02/15</td><td>Info</td><td>SDI Input sdi_in_d Locked to 1080i 59.94</td></tr><tr><td>21:17:36 12/02/15</td><td>Info</td><td>SDI Input sdi_in_b Locked to 1080i 59.94</td></tr><tr><td>21:17:18 12/02/15</td><td>Info</td><td>Log file cleared</td></tr><tr><td></td><td></td><td></td></tr></tbody></table><div><div>Clear User Log</div><div>Confirm</div><div>Download Log File</div><div>9922-FS.tar.gz</div><div>Save</div></div></div>	Time	Type	Event	22:40:36 12/02/15	Info	SDI Input sdi_in_c Locked to 720p 59.94	22:40:34 12/02/15	Info	SDI Input sdi_in_d Locked to 1080i 59.94	21:17:36 12/02/15	Info	SDI Input sdi_in_b Locked to 1080i 59.94	21:17:18 12/02/15	Info	Log file cleared			
Time	Type	Event																	
22:40:36 12/02/15	Info	SDI Input sdi_in_c Locked to 720p 59.94																	
22:40:34 12/02/15	Info	SDI Input sdi_in_d Locked to 1080i 59.94																	
21:17:36 12/02/15	Info	SDI Input sdi_in_b Locked to 1080i 59.94																	
21:17:18 12/02/15	Info	Log file cleared																	
<div>Alarms</div>	<p>Provides controls for setting up controls which screen for and propagate input program video alarms for video, audio, and ancillary data defect conditions.</p> <p>Conditions and alarm status can be propagated as DashBoard tree-view frame alarms, downloadable .txt files and/or Syslog IP-based alarms.</p>																		

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

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

Video Alarm Setup	Audio Alarm Setup	Ancillary Data Alarm Setup	Logging
Video	Path 1 Audio	Path 2 Audio	Ancillary Data

Video Alarm Setup

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



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

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

Audio Alarm Setup

Audio Failover Threshold (dBFS)	-60
Trigger Holdoff (minutes)	0
Trigger Holdoff (ms)	5000
Release Holdoff (minutes)	0
Release Holdoff (ms)	0

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

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

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



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

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

Alarms

(continued)

Ancillary Data Alarm Setup

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

Note:

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

Closed Captioning Presence Trigger Holdoff (seconds)

Closed Captioning Absence Trigger Holdoff (seconds)

Alarm Propagation Tabs

Video, Audio, and Ancillary Data sub-tabs set alarm propagation attributes, including:

- Logging of alarms and conditions
- Propagation of alarms to the general Card State/DashBoard frame-based tree-view pane
- Ignore alarm, or set severity as **Warning** (yellow “LED”) or **Error** (red “LED”)

Each of these sub-tabs is described below.

Video

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

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

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

Condition Status	Log	Alarm	Severity	Duration	Last Occurrence
Loss Of Signal SDI Input A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Error	00h 00m 23s	07:28:13
⋮					
Frozen Video SDI Input A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Warning	00h 00m 16s	07:23:57
⋮					
Black Video SDI Input A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Warning	Never Triggered	Never Triggered
⋮					
Loss Of Reference	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Error	01h 52m 00s	03:37:57

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

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




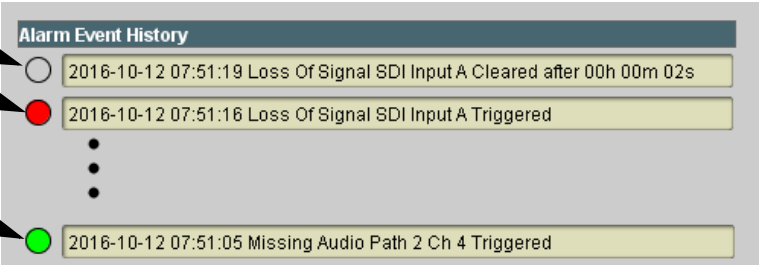
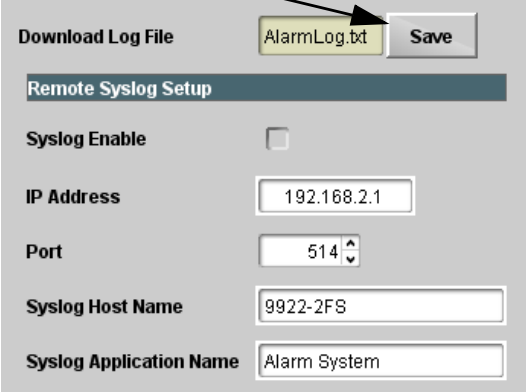
Alarms	(continued)
Path 1 Audio	<p>Audio sub-tabs independently show for all 16 embedded channels (per path) any missing audio (whether absent due to low level, mute or unlocked status).</p> <p>Note:</p> <ul style="list-style-type: none"> • Audio screened is the audio associated with the selected device SDI program inputs. • Path 1 Audio sub-tab is shown. An identical control sub-tab is present for Path 2 Audio (not shown here). <p> Unused audio channels should, at the minimum, have Severity set to Ignore/OK. If this is not done, nuisance alarms may occur.</p>  <p>Independent rows are present for each of the program path 16 embedded audio channels. Log, Alarm, Severity and Duration/Last Occurrence controls and status function as described in Video (p. 3-71).</p>
Ancillary Data	<p>Ancillary Data sub-tab independently shows loss of closed captioning packet presence for both program video paths.</p> <p>Note:</p> <ul style="list-style-type: none"> • Closed captioning screened are the CC packet presence associated with the selected device SDI program inputs. • Ancillary data condition detection is functional only for CEA608/708 packet-based closed captioning. This feature does not function for SD line 21 “waveform-based” closed captioning.  <p>Independent rows are present for both program paths. Log, Alarm, Severity and Duration/Last Occurrence controls and status function as described in Video (p. 3-71).</p>

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

Alarms	(continued)
<p>Alarm Event History shows the eight most-recent alarm events that have been detected (with most-recent at top of list). The alarm severity (as set using the Severity drop-down for each alarm type) sets the “LED” color shown here. In addition to alarms directly affecting performance, status such as cleared alarms are also displayed, as well as any actions related to enabling alarm propagation (such as “Logging Enabled” and “Logging Disabled”). All display rows shown here are retained in the overall log and can be downloaded as a .txt file (see Logging below).</p>	
Cleared alarms appear as an “open” LED	 <p>Alarm Event History</p> <ul style="list-style-type: none"> 2016-10-12 07:51:19 Loss Of Signal SDI Input A Cleared after 00h 00m 02s 2016-10-12 07:51:16 Loss Of Signal SDI Input A Triggered ... 2016-10-12 07:51:05 Missing Audio Path 2 Ch 4 Triggered
Alarms configured as Error or Warning correspondingly appear here as a red “LED” or yellow “LED”	
Detected alarms event configured as Ignore/OK appear here as a green “LED”	
Logging	<p>Logging sub-tab allows downloading of an overall running AlarmLog.txt file via DashBoard to a host computer. This sub-tab also has setup controls for using Syslog IP connection of alarm log data (Linux and Unix).</p>
Setup controls and fields for Syslog	
Clicking Save opens a dialog to save the AlarmLog.txt file to a host computer.	
 <p>Download Log File AlarmLog.txt Save</p> <p>Remote Syslog Setup</p> <p>Syslog Enable <input type="checkbox"/></p> <p>IP Address 192.168.2.1</p> <p>Port 514</p> <p>Syslog Host Name 9922-2FS</p> <p>Syslog Application Name Alarm System</p>	
<p>Note:</p> <ul style="list-style-type: none"> • Download Log File is performed via DashBoard connection; no external connection is required. • For Syslog usage, default 514 port assignment is recommended. 	

Front Panel User Menus

Some of the mode and parametric controls available using the web UI (as described in BBG-1002-2UDX Function Menu List and Descriptions) are available using the front panel display and arrow navigating buttons.

The front panel menus offers a true standalone means to configure the BBG-1002-2UDX 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 or DashBoard remote control be used for all applications other than the most basic cases.

Uploading Firmware Using Web Interface and GUI

Firmware (such as upgrades, option keys, and presets .bin files) can be uploaded to BBG-1002-2UDX directly via the web html5 interface without going through DashBoard (see Figure 3-8). In addition to allowing uploads without needing a DashBoard connection, this method transfers files typically much faster than using DashBoard.

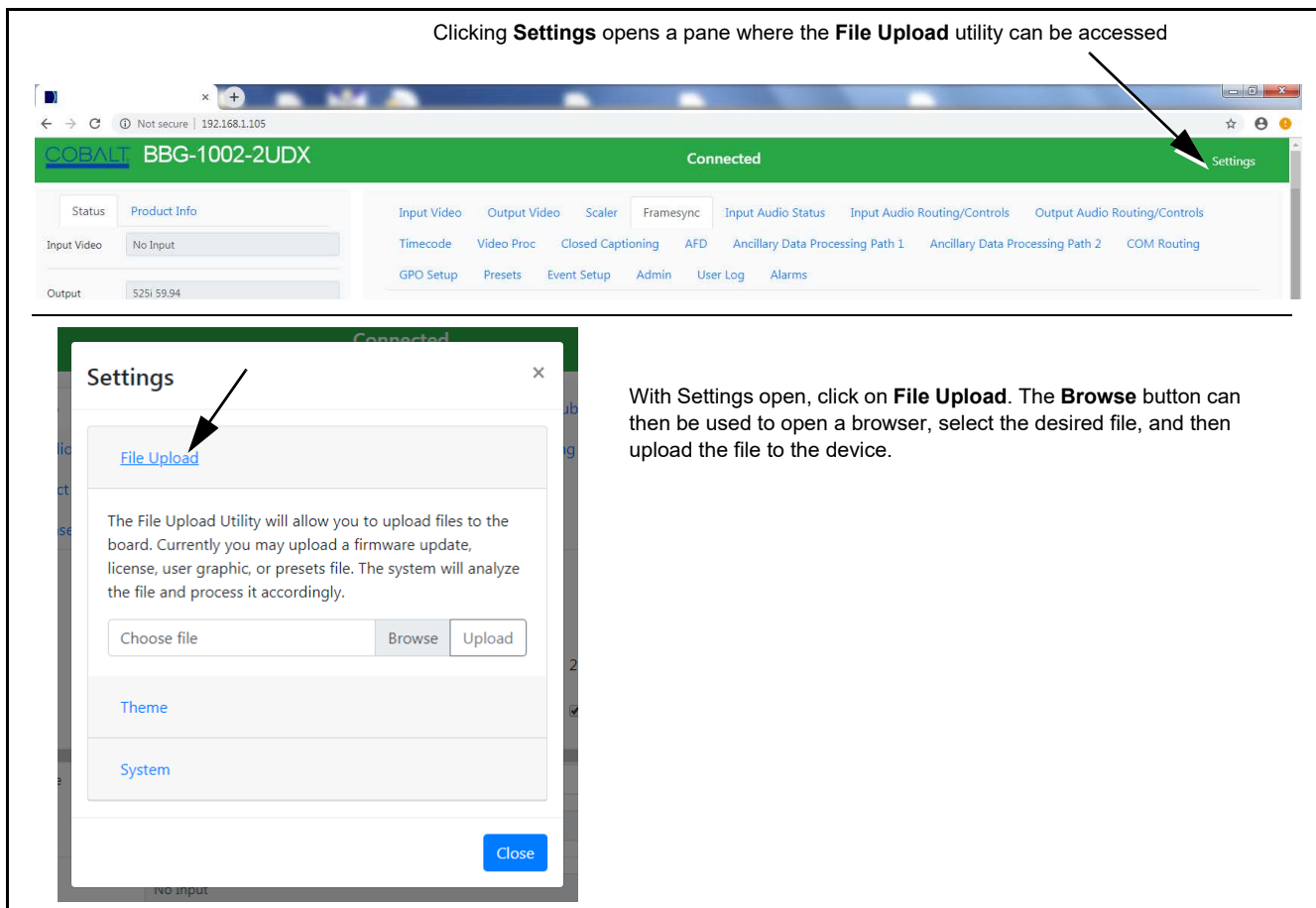


Figure 3-8 Uploads Using Web Interface/GUI

Troubleshooting

This section provides general troubleshooting information and specific symptom/corrective action for the BBG-1002-2UDX and its remote control interface. The BBG-1002-2UDX 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-1002-2UDX itself and its remote control systems all (to varying degrees) provide error and failure indications. Depending on how the BBG-1002-2UDX 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.

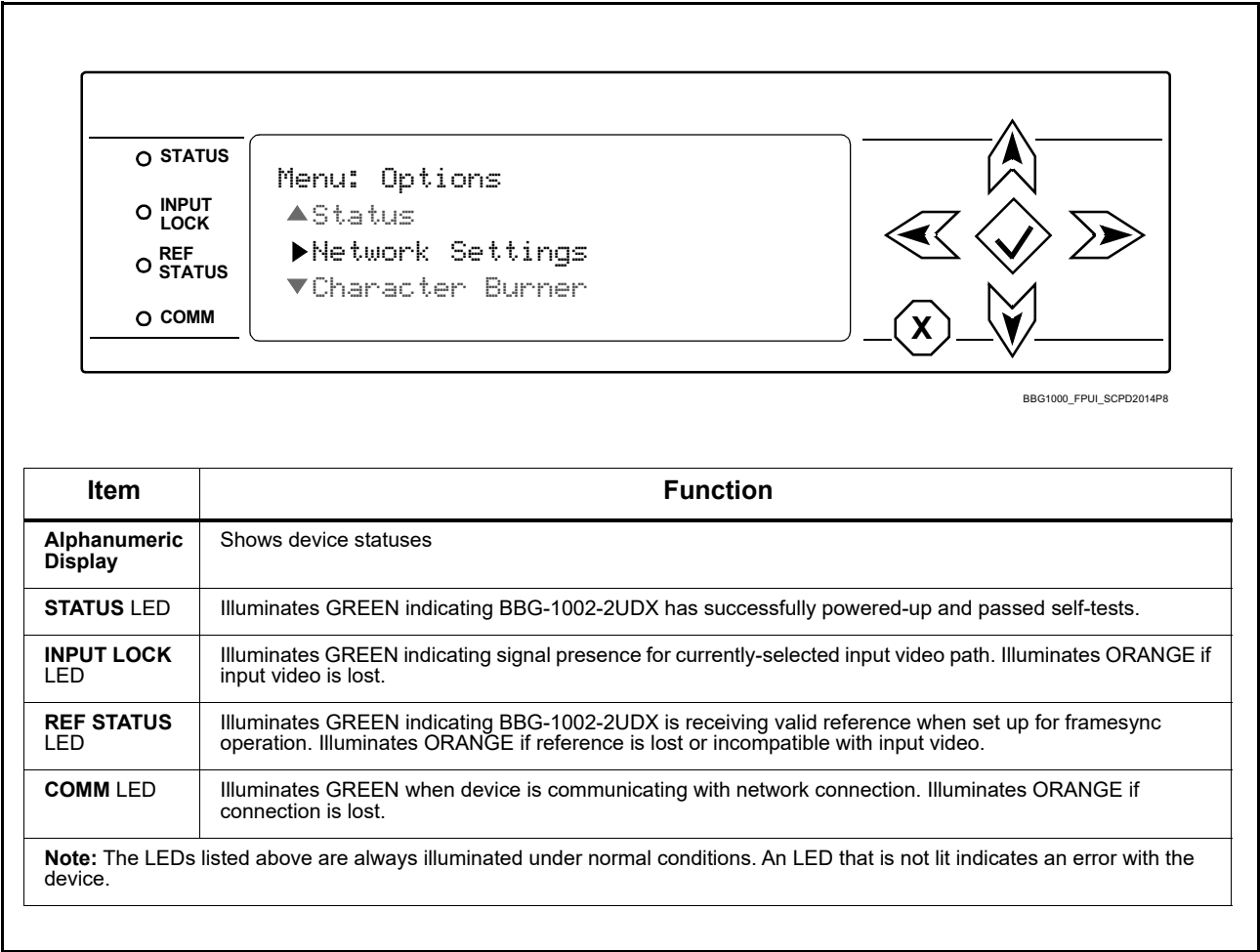
The various BBG-1002-2UDX and remote control error and failure indicators are individually described below.

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. 3-77)
- BBG-1002-2UDX Processing Error Troubleshooting (p. 3-78)
- Troubleshooting Network/Remote Control Errors (p. 3-79)

BBG-1002-2UDX Front Panel Status/Error Indicators and Display

Figure 3-9 shows and describes the BBG-1002-2UDX 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.



Basic Troubleshooting Checks

Failures of a general nature (affecting many cards and/or functions simultaneously), or gross inoperability errors are best addressed first by performing basic checks before proceeding further. Table 3-3 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 3-3 Basic Troubleshooting Checks

Item	Checks
Verify power presence and characteristics	<ul style="list-style-type: none">• On the BBG-1002, 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-1002X. This can be observed using the Status front-panel or web UI pane.<ul style="list-style-type: none">• If display shows no power being consumed, the BBG-1002 itself is defective.• If display shows excessive power being consumed (see Technical Specifications (p. 1-15) in Chapter 1, "Introduction"), the BBG-1002 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-1002-2UDX 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.

BBG-1002-2UDX Processing Error Troubleshooting

Table 3-4 provides BBG-1002-2UDX processing troubleshooting information. If the BBG-1002-2UDX exhibits any of the symptoms listed in Table 3-4, follow the troubleshooting instructions provided.

In the majority of cases, most errors are caused by simple errors where the BBG-1002-2UDX is not appropriately set for the type of signal being received by the device.

Note: The error indications shown below are typical for the corresponding error conditions listed.

Note: Where errors are displayed on both the BBG-1002-2UDX and network remote controls, the respective indicators and displays are individually described in this section.

Table 3-4 Troubleshooting Processing Errors by Symptom

Symptom	Error/Condition	Corrective Action
BBG-1002 shows Unlocked message in BBG-1002-2UDX Info pane.	No video input present	Make certain intended video source is connected to appropriate BBG-1002-2UDX video input. Make certain BNC cable connections are OK.
Ancillary data (closed captioning, timecode) not transferred through BBG-1002-2UDX	• 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).
(Option +QC only) Audio silence event not detected or triggered on	Holdoff set too long to detect condition	The Trigger Holdoff controls on the Audio Detect Events tab allow ignoring silence events unless the event duration exceeds the holdoff setting. Make certain holdoff is set sufficiently low to detect events as desired.
Audio not processed or passed	Enable control not turned on	On Output Audio Routing/Controls tab, Audio Group Enable control for group 1 thru 4 must be turned on for sources to be embedded into respective embedded channel groups.
Excessive or nuisance input signal quality events in log or Card State status display	Holdoff periods are too brief (or threshold set too high)	If holdoff periods are too brief (or threshold set too sensitive), nuisance alarms may be generated during transitions to and from programs and interstitials, as well as during certain content.
Selected upgrade firmware will not upload	Automatic reboot after upgrade turned off	Card Presets > Automatically Reboot After Upgrade box unchecked. Either reboot the device manually, or leave this box checked to allow automatic reboot to engage an upgrade upon selecting the upgrade.

Table 3-4 Troubleshooting Processing Errors by Symptom — continued

Symptom	Error/Condition	Corrective Action
SD closed captioning waveform or character rendering is corrupted	Moving box insertions running into line 21	For SD usage, burn-ins can impinge on and corrupt line 21 closed-captioning waveform if positioned too close to the upper right of the raster. Typically, moving box insertions are not intended for content (such as OTA) where CC is required. If CC is present and must be retained, make certain to check CC content if burn-in insertions are enabled and reposition burn-ins to avoid line 21 interference.
Device does not pass video or audio as expected. Control settings spontaneously changed from expected settings.	Event-based preset inadvertently invoked	Event-based preset loading (Event Setup 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. 3-60) for more information.
Device will not retain user settings, or setting changes or presets spontaneously invoke.	Event Based Loading sub-tab inadvertently set to trigger on event	If event based loading is not to be used, make certain Event Based Presets is disabled (either using master Enable/Disable control or through events settings. See Presets (p. 3-60) for more information.

Troubleshooting Network/Remote Control Errors

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

In Case of Problems

Recovering Card From SD Memory Card

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

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

Note:

- (Option +TTS only) Cards shipped with option +TTS use an SD card for the TTS library in addition to recovery files. If your +TTS-equipped device was received **earlier than December 2015**, your SD may not contain the recovery files. Contact Product Support to obtain the updated SD card containing both TTS library and SD recovery files.
- If unit is a BBG-1000 Series device, remove the top cover before proceeding.

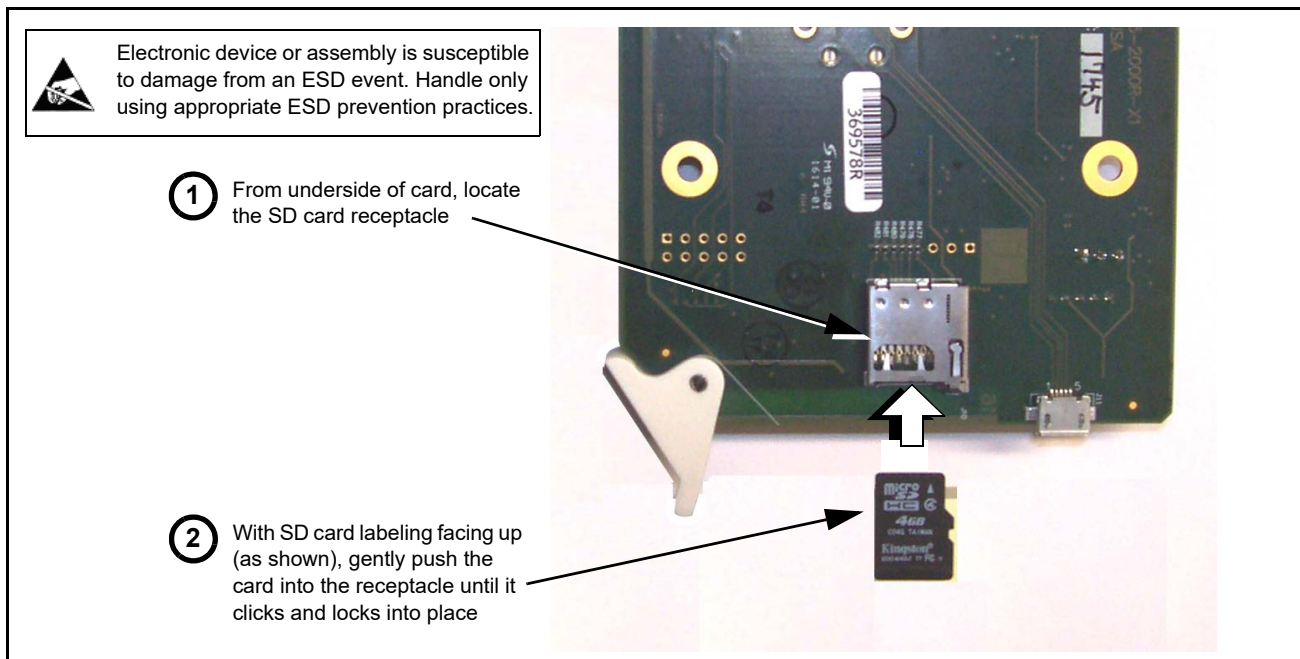


Figure 3-10 SD Card Installation

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

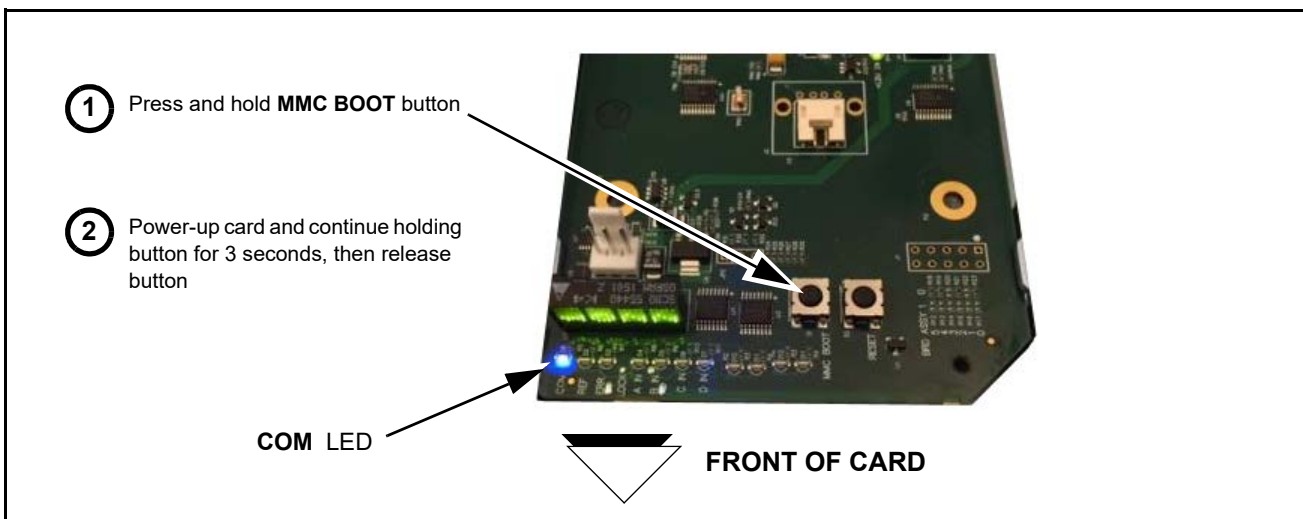


Figure 3-11 MMC Boot Button

3. With button now released, the card will begin reprogramming:
 - **COM LED** illuminates and remains illuminated.
 - When reprogram is complete, **COM LED** turns off, on, and then off again (entire process takes about 1-1/2 minute).

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

Contact and Return Authorization

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

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

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

See Contact Cobalt Digital Inc. (p. 1-20) in Chapter 1, “Introduction“ for contact information.

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