

## BBG-1002-2UDX • 3G/HD/SD-SDI Standalone Dual-Channel Up-Down-Cross Converter/ Frame Sync/Audio Embed/De-Embed



The Cobalt® **BBG-1002-2UDX 3G/HD/SD-SDI Standalone Dual-Channel Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed** offers **two independent signal paths** of up/down/cross conversion, frame sync, and audio embedding / de-embedding in a single unit.

The BBG-1002-2UDX provides a high-density standalone unit that offers unprecedented multi-input support and flexibility. Dual independent up/down/cross conversion scalers are specifically designed for broadcast video formats, with full ARC control suitable for conversions to or from 4:3 and 16:9 aspect ratios. 3:2 pulldown optimization allows A-frame to use alignment correlated to received timecode or 6 Hz external input over GPI. AFD processing can detect an incoming AFD code and correspondingly set scaling and ARC to track with AFD. This processor also allows independent custom ARC to be applied for each incoming AFD code, and set the desired AFD code to be inserted on the output, even if there is no code detected on the input. Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted on the output video (with burn-in also available). Various models additionally provide an analog video (CVBS) input, with AES and analog audio audio embedding and de-embedding.

Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair. Bulk and per-channel audio delay controls easily address lip-sync issues. Quality Check option +QC allows failover to alternate inputs based on user-configurable criteria such as black/frozen frame. Included standard is closed captioning absence/presence detection that allows CEA 608/708 and line 21 SD CC absence or presence to be detected, with event actions consisting of GPO, automated alert email actions, or go-to card user presets or other actions.

A convenient input crosspoint can select from up to four SDI inputs to be applied to either of the unit's two processing paths. The input crosspoint allows manual or failover to alternate inputs on loss of input conditions. Option +TTS provides high-quality Text-To-Speech synthesis, directly converting EAS text to digital audio speech with no baseband signal breakouts or add-ons. With option +ANC, the BBG-1002-2UDX offers full VANC/HANC ancillary data packet de-embedding and embedding.

Preset save/load allows saving custom settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. The BBG-1002-2UDX can be remote-controlled using DashBoard™. GPIO allows direct input routing control and status monitoring. The compact standalone form factor allows desktop usage, as well as the 1/3-rack size of the BBG-1002-2UDX allowing 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame).

### FEATURES

Two independent processing paths

Multi-input RP168 clean switch, with manual selection or GPI controlled input selection. Path inputs can also be sourced from opposite path output with no external patching.

Auto-Changeover can be set to invoke failover for basic input loss. Quality Check option (+QC) provides alert actions on criteria such as black/frozen frame, audio silence, and closed-captioning absence. Threshold and hold-off are user configurable.

Up/Down/Cross Conversion with user and AFD, VI, and WSS ARC specifically tailored for broadcast video

Frame Sync with full H/V offset and manual/LOS video pattern generator. Pattern generator for each channel can provide raster/test pattern and patterns for LOS failover

Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format

Advanced audio processing allows routing, gain, delay, and flexible mixing as standard features

Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs

CVBS analog video input and analog/AES embed / de-embed with 4-line Adaptive Comb Filter

Video options include color correction

Low-power/high-density design – less than 18 Watts

Compact footprint – up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.

Remote control/monitoring via DashBoard™ software, OGCP-9000 Remote Control Panel, or Web Browser User Interface

Five year warranty

### OPTIONS

Quality Check (+QC) – Provides failover, alert, or user presets action on criteria such as black/frozen frame, audio silence, and CC absence.

Color Correction (+COLOR) – Full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white/black hard clip, white soft clip, and saturation clip

Ancillary Data Processor (+ANC) – Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data

Text-To-Speech (+TTS) – Provides Text-To-Speech synthesis, directly converting EAS text to digital audio speech with no baseband signal breakouts or add-ons. High-quality Text-To-Speech from Acapela Group.

Clean and Quiet Switching Option (+CQS) – Provides automatic audio muting during switching transitions from one SDI input source to another to provide silence between input switches.

Expanded Delay (+DLY) – Increases frame buffer to provide adjustable audio/video delay buffer capacity to over 9 seconds for SD video, 1.5 seconds for HD video, or 0.8 seconds for 3G video.

SCTE 104 Insertion (+SCTE104) – Provides generation/insertion of SCTE 104 data into baseband SDI. Message send can be triggered from automation GPI or other modes. Full control of splice start, end, and cancel as well as pre-roll offsets.

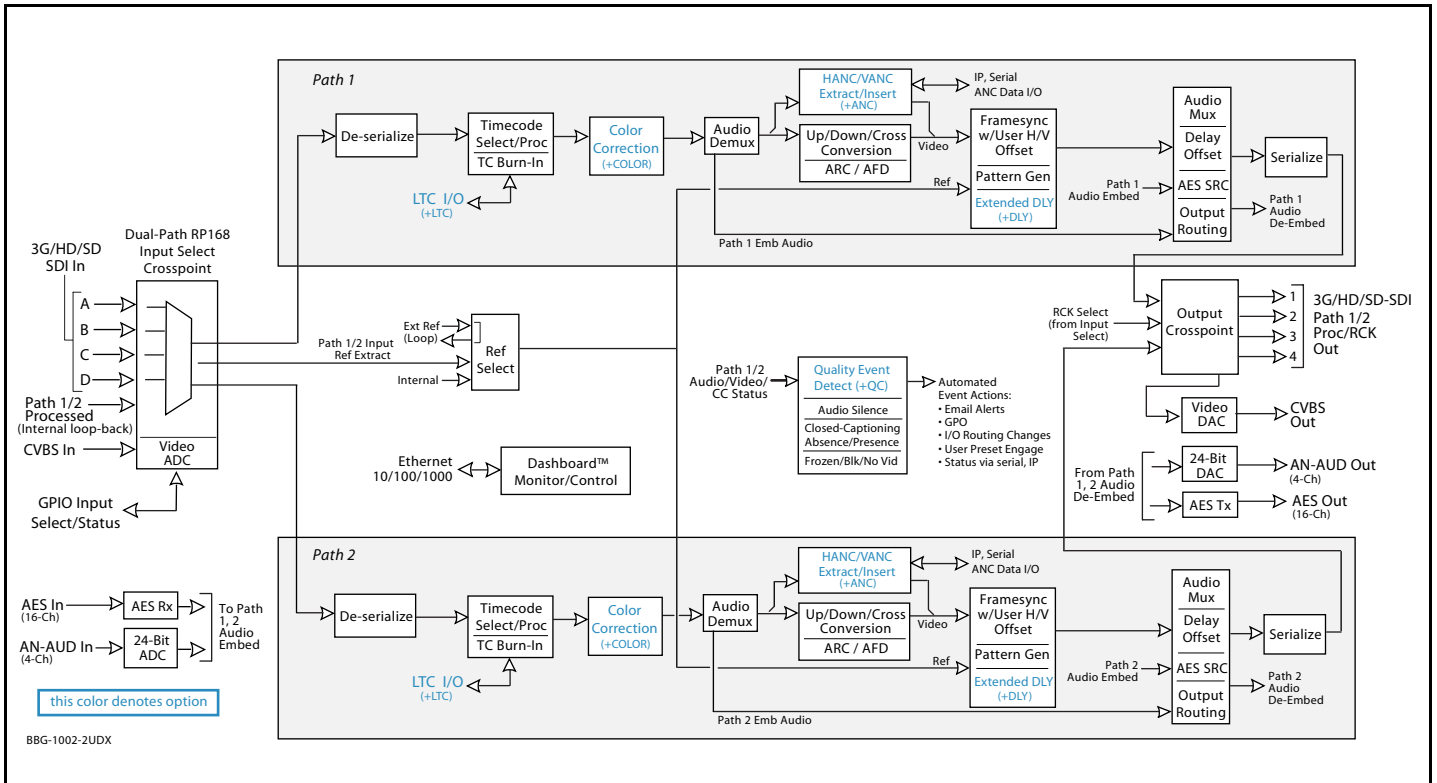
SCTE104 Frame-Accurate SCTE Trigger Insertion Option (+SCTE104-FAST) – Uses Time Stamp data derived from broadcast automation to provide deterministic, frame-accurate Digital Program Insertion (DPI) message embedding into SDI. The linear channel is output with precise metadata marking the beginning and ending of each program and commercial segment, optimizing it for automatic dissemination to CDN and VOD systems.

Audio LTC I/O (+LTC)

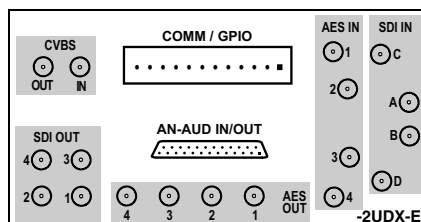
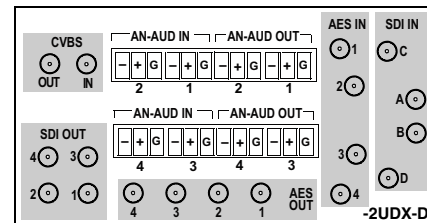
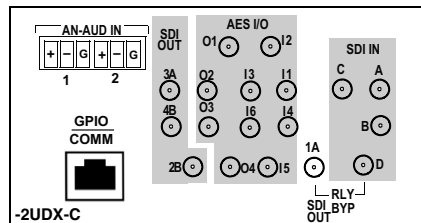
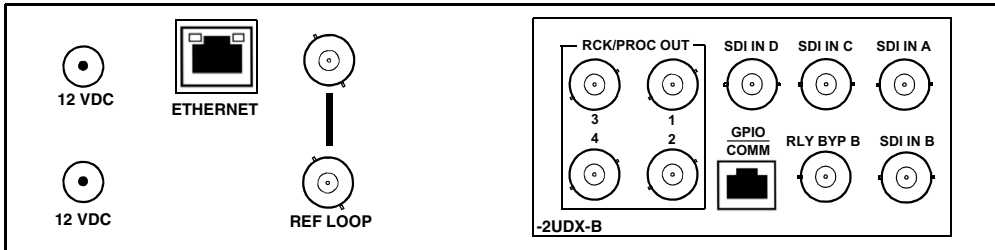
1RU Mounting Tray (supports 3 units) (BBG-1000-TRAY)



**BBG-1002-2UDX • 3G/HD/SD-SDI Standalone Dual-Channel Up-Down-Cross Converter/  
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**Rear Panel**



# BBG-1002-2UDX • 3G/HD/SD-SDI Standalone Dual-Channel Up-Down-Cross Converter/ Frame Sync/Audio Embed/De-Embed

## SPECIFICATIONS

**Note:** Standard I/O capabilities are limited to those shown in Rear Panel diagrams and listed in Ordering Information. Where specifications below list other I/O types and/or complements, some combinations other than shown for standard models may be available as special order. Inquire with Sales for alternative I/O availability.

### Power

< 18 Watts. Power supplied by 12VDC AC adapter, universal input (included).

### SDI Input/Outputs

Up to (4) 75Ω BNC inputs  
 Up to (4) 75Ω BNC outputs (selectable as processed SDI Path 1 or Path 2, or selected input relocked)  
 SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M  
 SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)  
 SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz  
 SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI  
 Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI  
 Minimum Latency (frame sync disabled): SD: 127 pixels (9.4 us); 720p: 330 pixels (4.45 us); 1080i: 271 pixels (3.65 us); 1080p: 361 pixels (2.43 us)

### CVBS Video Input/Outputs

(1) 75Ω BNC input  
 (1) 75Ω BNC output (selectable as Path 1 or Path 2 processed output). CVBS output functional only when selected path is carrying SD-SDI.  
 ADC resolution: 9-bit  
 Sampling frequency: 27 MHz (2x over-sampling)  
 Y/C separation: 4 line Adaptive Comb Filter  
 Freq. Response: ± 0.25 dB to 5.5 MHz  
 SNR: > 50 dB to 5.5 MHz (unweighted)  
 Differential Phase: < 1 degree  
 Differential Gain: < 1%  
 Nonlinearity < 1%

### Discrete Audio Input/Outputs

AES-3id 75Ω inputs (8 pair (16-Ch) max) AES-3id 75Ω outputs (8 pair (16-Ch) max)  
 Input AES SRC Range: 32 to 96 kHz  
 Balanced analog audio inputs (4-Ch max)  
 Balanced analog audio outputs (4-Ch max)  
 (I/O conforms to 0 dBFS = +24 dBu)  
 Analog Output Impedance: < 50 Ω  
 Analog Reference Level: -20 dBFS  
 Analog Nominal Level: +4 dBu  
 Analog Max Output Level: +24 dBu (0 dBFS)  
 Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)  
 Analog SNR: 115 dB (A weighted)  
 Analog Analog THD+N: -96 dB (20 Hz to 10 kHz)  
 Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

### Frame Sync Audio/Video Delay

Max offset: 20 frames  
 Latency (min): 1 frame  
 Option +DLY Delay (3G/HD/SD): >800 msec / >1580 msec / >9000 msec

### ARC

ARC manually configurable (custom) or automatic triggering in full compliance/conformity with AFD (SMPTE 2016), VI (RP186), and WSS triggering. (ARC/AFD settings independent per processing path.)

### User Audio Delay Offset from Video

Bulk delay control: -33 msec to +3000 msec.  
 Per-channel delay controls: -800 msec to +800 msec

### GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port.

### Control/Monitor Interface

Front panel network setup. DashBoard remote control via 10/100/1000 Ethernet port.

### 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

### Physical

Dimensions (WxHxD): 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections.  
 Weight: 6 lb (2.8 kg)

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## ORDERING INFORMATION

**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:

**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

**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)

**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)

**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)

**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)

**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** (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)

### Options and Accessories:

**+ANC** Ancillary Data Processor Option

**+COLOR** Color Correction Option

**+LTC** Audio LTC I/O Option

**+QC** Quality Check Option

**+TTS** Text-To-Speech Option (Acapela Text-To-Speech from Acapela Group™. Fielded units must be returned to Cobalt for installation of speech library SD memory card onto host unit as well as software upload. Please contact Support for more information.)

**+2L-SPAN** Add Spanish-language upgrade (add-on to option +TTS; option +TTS required)

**+CQS** Clean and Quiet Switching Option

**+DLY** Extended Frame Sync Delay Option

**+SCTE104** SCTE 104 Insertion Option

**+SCTE104-FAST** Frame-Accurate SCTE 104 Trigger Insertion Option

**BBG-1000-PS** Redundant Power Supply Module

**BBG-1000-TRAY** 1RU Mounting Tray (supports 3 units)