ENGINEERING BEYOND THE SIGNAL

2021-2022 PRODUCT CATALOG

COBALT®

openGear

BBG1000

LMNTS® LOUDNESS MANAGER FOR N TRANSPORT STREAMS

SPOTCHECK®

BLUE BOX

Engineering beyond the signal starts with Innovation.

Cobalt Digital has proudly provided engineering solutions to meet customers' needs since 1997. By speaking and listening closely to end users, Cobalt has developed equipment offering the answer for specific challenges. Our innovative products feature 24/7 service and support and many come with a five-year warranty, vital in today's broadcast industry. Our products are used extensively worldwide in production trucks, and by terrestrial, satellite and cable broadcasters, as well as many government facilities. As we enter our third decade of innovation and service, we reflect on how far the industry has come, and look forward to engineering products for tomorrow's broadcast and beyond.

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The latest openGear™ card-based and standalone BBG-1000 Cobalt products offer broad or highly specific functionality and features. Many features can be added as software-based Options, further leveraging your choice. Use the table below to match our products to your specific processing needs.

openGear

BBG1000

	9902-UDX	9902-2UDX	9903-UDX-ADDA	9922-FS	9922-2FS	9950-EMDE-ANC	9121	9980-CSC-3G	9980-2CSC-3G	9933-EMDE-ADDA	9933-EMDE-75/110	9433-EMDE-ADDA	9433-EMDE-75/110	9940-ACO	9940-4X1-CS	9978-ANC-MON
3G/HD/SD Format Conversion	S	S	S													
Frame Sync	S	S	S	S	S											
AES Audio Embed / De-Embed	S	S	S	S	S					S	S	S	S			
Analog Audio Embed / De-Embed	S	S	S	S	S											
CVBS I/O	S	S	S	S	S											
HD/SD Component Video I/O			S													
Fiber I/O and EO / OE Conversion												S	S			
Color Correction	0	0	0	0	0			S	S							
Text-to-Speech 21CVAA	0			0	0											
Dual-Path Program Video Processing		S		0	S				S							
Wings Insertion	S	S		S	S											
Trouble Slate/Logo Insertion	0	0		0	0									S		
Keying	0			0	0											
Advanced Audio Proc (per-channel and bulk advance/delay, AES SRC, downmix, flexmix)	S	S		S	S											
Audio DSP Features (Loudness Proc, Upmix, Dolby encode/decode)	0	0		0	0											
ANC Embed / De-Embed	0	0	0	0	0	S										
AFD	0	0														
Video-Audio-ANC Quality / Presence Check	0	0		0	0											S
Multi-Input Failover / Relay Bypass	0	0	0	0	0		S							S	S	
MADI Embed / De-Embed																
Also available in BBG-1000 Series Standalone / Desktop Form Factor. These models are identified with "-SA" PN suffix, or by (where applicable) substituting "BBG-10" for "99"" in the part number (example: BBG-1002-UDX is BBG equivalent of openGear card version 9902-UDX).	S	S	S	S	S	S		S	S					S	S	S

S Standard
0 Optional

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BlueBox™ Compact Throwdowns offer not only excellent performance, but also excel to a new level of ease of use and installation practicality. Designed to power from associated equipment using USB, BlueBox provides for a neater, more physically secure and dependable installation than with other interface boxes. Many BlueBox models also include USB remote control/configure using our free BBGConfig. Use the table below to match our products to your specific processing needs.

BLUE BOX

	BBG-DE-AA	BBG-EM-AA	BBG-EMDE-AES75	BBG-EMDE-AES110	BBG-A-TO-S	BBG-S-TO-A	BBG-S-TO-H	BBG-H-TO-S	BBG-F-TO-H	BBG-H-TO-F	BBG-2EO-MK2, 2OE-MK2, EO-MK2, OE-MK2, EOOE-MK2, SFP-SXH	BBG-IP-TO-SDI-10GE, BBG-SDI-TO-IP-10GE	BBG-DA-12G-1x6
AES Audio Embed / De-Embed			S	S									
Analog Audio Embed / De-Embed	S	S			S	S	S	S	S	S			
CVBS I/O					S	S							
HD/SD Component Video I/O					S	S							
Fiber I/O and EO / OE Conversion									S	S	S		
HDMI / SDI / Fiber Conversion							S	S	S	S			
IP/SDI Conversion												S	
3G/HD/SD-SDI Distribution													
12G/3G/HD/SD-SDI Distribution													S

S Standard
O Optional

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VIDEO OPTIONS »

Options allow economical expanded functionality, combining the functions of multiple devices in one unit. Options include audio options such as loudness processing/metering, I/O options, video processing options, and many other features. Using options is like having multiple cards in one card. Adding options adds processing versatility without the expense, complexity, space usage, or accumulated processing latency of multiple cards.

Most options are available as software upgrade uploads which can be ordered on new cards or field-installed on existing cards without removing the card from its frame. To help you readily ascertain availability of options when looking at a product's block diagram, options are shown in block diagrams as light blue. For complete information about any option listed and its applicability for specific products models, please see the model's specific web page. Some cards or models may have options unique to the card model that may not be listed here.

VIDEO OPTIONS

+COLOR – Color Correction Software Option

Provides independent RGB channel controls for luma, black, and gamma. Ultra-fast response time. The color correction feature is perfectly suited for use with Cobalt OGCP-9000/CC Remote Control Panel.

See card/model pages for availability.

+FRC – Frame Rate Conversion Software Option

Provides comprehensive high-quality standards conversion utilizing Cobalt's linear frame rate conversion to convert between virtually any SD/HD/3G format – 25/50, 29.97/30/59.94/60, and 23.98/24 (both film and PsF) from 525/625i to 1080p and anything in-between – with conversion to and from NTSC and PAL available for all input and output formats.

See card/model pages for availability.

+KEYER – Keying Option

Provides keying using independent SDI inputs for key and fill signals. A separate preview SDI output is provided for observing key results before applying to program video output. Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input.

See card/model pages for availability.

+LOGO / +T-SLATE – GRAPHIC INSERTION OPTIONS

Option +LOGO allows uploading of up a user graphics file (such as an ID bug) to the card or device. When loaded, the graphic can be loaded using automated insertion controlled by GPI or other events (such as a GPI insertion signal for periodic station ID).

Option +T-SLATE allows uploading of up to three different user trouble slate graphic file to the card or device. When loaded, any of the graphics can be loaded using automated insertion controlled by GPI or other user-definable events (such as loss of closed captioning, frozen video or other detectable events). Option +T-SLATE offers fully automated insertion for numerous conditions when used in conjunction with +QC Quality Check Option.

See card/model pages for availability.

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QUALITY CHECK/SIGNAL INTEGRITY ASSURANCE AND DEVICE UPGRADE OPTIONS »

QUALITY CHECK/SIGNAL INTEGRITY ASSURANCE OPTIONS

+QC – Quality Check Option

+QC allows failover to alternate inputs based on user-definable criteria such as black/frozen frame or audio silence. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS marker. Closed captioning absence/presence detection 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. Intelligent Event Actions automatic monitoring allows any number of prioritized actions to be carried out when screened signal or programming errors are detected. Please see the respective card pages for more information about these options where available.

See card/model pages for availability.

DEVICE UPGRADE OPTIONS

+3G – Upgrade Software Option

On card purchased as alternate HD/SD model (for example "9901-UDX-HD"), allows upgrade to full 3G/HD/SD-SDI I/O and processing.

See card/model pages for availability.

+FS – Add Frame Sync Software Option

Adds frame sync to device, offering unsurpassed accuracy in audio-video delay (lip sync) management, with glitch-free per-channel audio delay adjustment.

See card/model pages for availability.

+2FS – Add Dual-Channel Frame Sync Software Option

Adds a second independent processing channel. (Makes 9922-FS functionally equivalent to 9922-2FS.)

See card/model pages for availability.

Cobalt Options add processing versatility without the expense, complexity, space usage, or accumulated processing latency of multiple cards.

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ANCILLARY DATA SUPPORT OPTIONS »

ANCILLARY DATA SUPPORT OPTIONS

+SCTE104 / +SCTE104-FAST Software Options
SCTE 104 provides a flexible and easily incorporated segment/interstitial insertion automation solution which can be propagated across the plant via baseband SDI (using the ANC space). 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.

Option +SCTE104-FAST (frame-accurate SCTE trigger) provides functionality available only from Cobalt in the openGear form factor. This software option meets the need to frame-accurately mark the start and stop points of content. Cobalt engineers worked closely with key customers to develop +SCTE104-FAST, providing the unique ability to tie time-stamped information from automation systems to the timecode information contained in the baseband SDI. +SCTE104-FAST provides frame-accurate insertion for deterministic results when the program signal is used in sophisticated downstream video-on-demand (VOD) and commercial insertion systems.

See card/model pages for availability.

+DT – User COM Data Insert/Extract Software Option
Available for certain 9433-series Fiber Optic Transport Embedder / De-Embedders, option +DT offers user serial data insertion and extraction from SDI streams using user accessible DID/SDID locations. This allows serial data handled by the card to be embedded or de-embedded on an unused DID/SDID.

This offers a very convenient self-contained transport within the program stream physical media, greatly simplifying this data transfer workflow.

The software can be ordered with card purchase, or activated later using a downloadable feature key via free DashBoard™ remote control/monitoring software (no need to remove or replace card.)

+ANC – Ancillary Data Processing Option
Option +ANC offers full VANC/HANC ancillary data packet de-embedding and embedding for 3G/HD/SD-SDI streams. The easy to use interface allows direct access to DID and SDID locations to extract or insert 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 card, bypassing the scaler (Bridge mode) and allowing scaling while preserving ANC packets, or inserted and/or extracted to and from external interface via serial or IP interfaces. This allows the card to directly embed ANC packets from external sources such as closed-captioning generators.

See card/model pages for availability.

+LTC – Audio/RS-485 LTC Software Option
Allows bidirectional transfer and conversion between video timecode formats and audio/RS-485 LTC. Audio LTC can be received or sent over various card audio channels. RS-485 LTC can be received or sent via a rear module RS-485 port.

See card/model pages for availability.

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TEXT-TO-SPEECH / EAS AUTOMATION »

TEXT-TO-SPEECH / EAS AUTOMATION OPTIONS

+TTS – Text-To-Speech Option

Cobalt Digital +TTS is a complete 21CVAA text-to-speech generation / audio insertion solution for embedded or discrete audio systems. +TTS is a software option available for many Cobalt card models using the 20-slot openGear® frame architecture (and available for BBG-1000 Series standalone units). Platforms utilizing existing openGear® infrastructure can be 21CVAA-ready with only an easily incorporated option feature upload to the card. For platforms not utilizing an existing openGear® infrastructure, most of our BBG-1000 Series standalone units are available with option +TTS, offering a compact rack-mounted 1RU solution easily integrated into the broadcast workflow.

+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 ducked in on the main program channel 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.

Compatible Cobalt cards and modulars offer the synergy of also providing keyed text scrolls when used in conjunction with option +KEYER."

See card/model pages for availability.

+EAS – Emergency Alert System Text Crawl Generation Option

Option +EAS is the ideal solution for keying Emergency Alert System (EAS) text crawls in the active video and inserting station identification logos.

Serial crawl data from an EAS generator (such as Sage™ or Dasdec™) is transmitted to a Cobalt Digital openGear® card or BBG-1000 series stand-alone unit. The crawl data is held until a GPI is sent from the EAS generator, signaling the creation of the text graphics. The GPI also routes digital or analog emergency audio to the embedded video output. Once the GPI goes back to the resting state, the program audio is routed back to the embedded output. Crawl data is played according to the user-selectable loop counter. User-configurable fill background color and text size control can be correlated to event context severity.

See card/model pages for availability.

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AUDIO DSP OPTIONS »

Our latest +DSP suite of DSP-based audio processing features represents our greatest single-device audio processing capacity. The DSP-based platform supports multiple audio DSP options using a processing core (which supports numerous simultaneous processing engines) that uses license "credits" which allows flexible tailoring of multiple processing function instances.

AUDIO DSP OPTIONS

Dolby® Digital/Digital Plus™ Encoding (ENCD-5.1 / ENCD-2.0)

Provides Dolby® Digital/Digital Plus™ encoding from any combination of audio sources supported by the card (including upmixed and loudness-processed signals). Full metadata support using internally generated or external metadata via SMPTE 2020, or from a same-card decoder. Available in 5.1 or 2.0 versions.

See card/model pages for availability.

Dolby® Decoding

Provides Dolby® Digital/Digital Plus™/E decode from any card digital audio channel pair, with Digital/Digital Plus dynamic range control and full bitstream summary displays.

Dolby® Real-Time Loudness Leveling Loudness Processing (RTLL-5.1 / RTLL-2.0)

Provides full-featured loudness processing, including peak limit, aggressiveness, and dialog intelligence modes. Available in 5.1 or 2.0 versions.

See card/model pages for availability.

Linear Acoustic® UPMAX™ Upmixing (UPMIX-LA)

Featuring Linear Acoustic UPMAX™ technology, the 5.1 upmixer uses any stereo pair accommodated by the card and generates a six-channel 5.1 complement (L, R, C, LFE, Ls, Rs) from the stereo source, thereby allowing legacy stereo programming to adapt to and fully utilize 5.1-channel audio capabilities.

See card/model pages for availability.

For complete information about any option listed and its applicability for specific products models, please see the model's specific web page at CobaltDigital.com.

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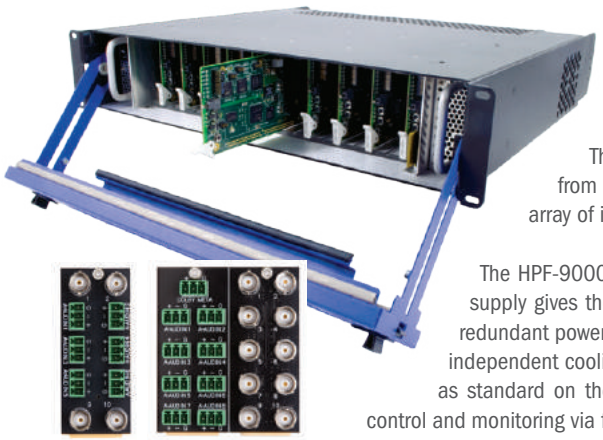
HPF-9000 » HIGH-POWER 20-SLOT FRAME

The HPF-9000 is a 2RU high-density modular frame offering 360 Watts of net (user) available power in a high-capacity 20-slot format. (Maximum card capacity is determined by card model(s) installed and other factors. See 20-Slot Frame Card Capacity and Rear Modules on next page.) High power-density power supplies (single standard, redundant second optional) and engineered cooling/ventilation design allow 10 high-power cards in a frame (10 x 36 W = 360 W), or 20 medium-power cards in a frame (20 x 18 W = 360W). Separate forced-air cooling paths are provided for the card area and the power supply areas. An intelligent fan controller adjusts fan speed with changes in power supply loading and temperature.

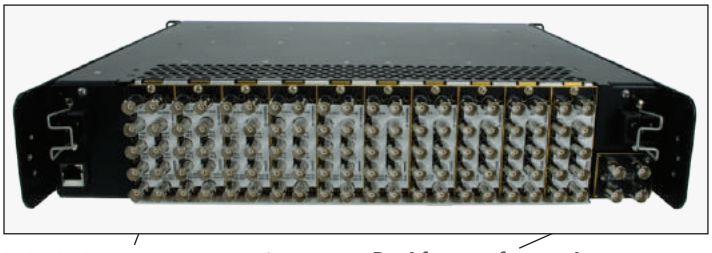


Modular Rear I/O

The HPF-9000 uses the same rear modules as our other 20-slot frames, allowing a seamless transition from current frames to the HPF-9000. These rear modules offer a broad selection for a flexible and wide array of interfaces such as BNC, twisted-pair audio, and fiber.

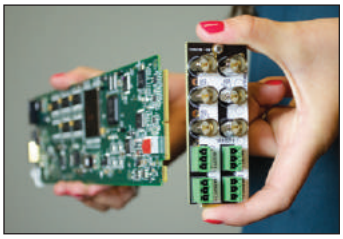
The HPF-9000 can accommodate two front-loaded PSU-9000 power supply modules. Adding a second (optional) supply gives the frame full power redundancy. The PSU-9000 power supply unit is interchangeable as a primary or redundant power supply module, with supplies in either position being hot-swappable. Each power supply contains an independent cooling fan, status LED, and a front-mounted power switch. The HPF-FC Network Controller Card (furnished as standard on the HPF-9000 frame) allows Ethernet connectivity to any number of connections for full multi-point control and monitoring via free DashBoard™ software. Optional SNMP support, for large scale monitoring implementation, is also available.

Hot-swappable power supply (with optional redundant supply) is easily replaced from front of frame



Individual **removable Rear I/O Modules** allow selecting the right connections for each card

Dual frame reference loops allow reference redundancy



Numerous Rear I/O Module choices provide input/output combinations that most suit your needs, including mixed interfaces (such as BNC and balanced analog audio)

» FEATURES

- Highest available power for an openGear-compatible frame (360 Watts net) – 3x the available power of our previous 20-slot frame
- Two independent looping references internally routed to all user card slots
- Power supply is hot-swappable for 24/7 operation
- Power switch/supplies accessible from the front of the frame
- Separate power cords to each power supply for power redundancy
- Network Controller Card (HPF-FC) enables multiple copies of DashBoard™ for seamless remote setup, monitoring, and control. SNMP option can further be added.
- Fan status and error indicator LEDs on front of the frame
- Hinged, pull-away front door panel lowers to allow quick, easy card insertion
- Remote control/monitoring via Ethernet using free DashBoard™ software, or optional OGCP-9000 remote control panel
- Five-year warranty

» ORDERING INFORMATION

HPF-9000-N High-Power 20-Slot Frame - 2RU with fans, cover plates for unused slots.

Includes one PSU-9000 Power Supply Module and MFC-8320-N Network Controller Card. (Network Controller Card allows multiple connection network control through DashBoard™ software or Cobalt OGCP-9000 Remote Control Panel.)

PS-9000 Extra (redundant) HPF-9000 frame power supply

SNMP-HPF9000 Software option for MFC-8320-N card. Provides SNMP (v1 and v2) control and monitoring.

HPF9000-FSB Frame support bracket kit.

Note: Please see "20-Slot Frame Card Capacity and Rear Modules" on pages 12-13dolby for helpful information about practical card capacity, descriptions of available rear module types, and other important considerations.

Note: Maximum cooling performance is obtained when a 1RU space is provided above the frame. Optional high-ventilation rear modules are available to increase airflow where above-frame cooling space is compromised (see "High Ventilation Rear Module" in the following pages for more information). Please contact Cobalt Sales for more information regarding frame build-out where ventilation is less than optimal.

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BBG-1300-FR » 1RU ENCLOSURE FOR OPENGEAR® CARDS

The Cobalt® **BBG-1300-FR** is a 1/3 rack-width 1RU openGear® compatible enclosure frame capable of housing up to 2 cards* as a basic standalone desktop unit, or up to 3 units racked together as a 1RU group for rack mounting. BBG-1300-FR allows openGear® cards to be supported where a full-size 2RU 20-slot openGear® frame is not feasible or required. Just like a full frame, BBG-1300-FR built-in network interface allows DashBoard™ control/monitoring of any openGear® capable card. Looping reference on the BBG-1300-FR unit itself provides card reference support without using reference connections that consume card rear module connector count.

Most cards within the Cobalt product lineup can be housed in the BBG-1300-FR, with a total available power of 60 W. Up to three BBG-1300-FR units can fit onto a single 1RU tray for maximum density where a 2RU frame is not feasible.

A front control panel makes status monitoring and network setup connectivity simple with an LCD display screen. The front rotary knob makes navigation simple and easy to use. SNMP control available.

* 2-card usage requires the use of 2-card split rear I/O module. Split rear I/O modules are not available for all card models.

FEATURES

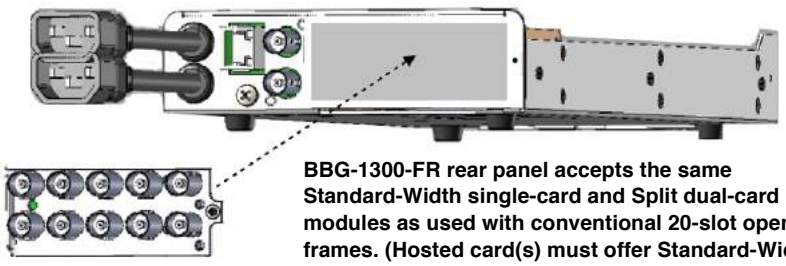
- Provides openGear® card support in a compact package where a full-size 2RU 20-slot openGear® frame is not feasible or required
- High power for latest 4K and IP card solutions
- Full openGear® compatibility supporting openGear-compatible cards as well as latest and legacy 20-slot frame openGear rear modules
- Looping reference internally routed to all user card slots
- Dual power supplies for power redundancy
- Network Controller function enables multiple copies of DashBoard™ for seamless remote setup, monitoring, and control. Network Controller "smart" functionality provides Gigabit Ethernet to both user card slots.
- Front display with rotary knob and buttons for simple and quick control
- Pull-away front door panel allows quick, easy card insertion
- Optional Frame Support Bracket kit provides frame rear support for mobile applications
- Remote control/monitoring via DashBoard™ or SNMP
- Five year warranty

OPTIONS

BBG-1300-TRAY 1-RU Mounting Tray (supports 3 units)

BBG-TRAY-RSB Support Bracket/Rail Kits (see Ordering Info for details)

Front bezel opens to access card slots. Where Split Rear I/O Module can be used, up to 2 openGear® cards can be installed.



BBG-1300-FR rear panel accepts the same Standard-Width single-card and Split dual-card rear modules as used with conventional 20-slot openGear® frames. (Hosted card(s) must offer Standard-Width or Split rear module to be used with BBG-1300-FR.)

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BBG-1300-FR » 1RU ENCLOSURE FOR OPENGEAR® CARDS

SPECIFICATIONS

Note: All specifications are preliminary and subject to change.

AC Line Input
(2) AC IEC inputs 90-264 VAC, 47-63 Hz, 50 W typical (140 W max)
Note: AC power is largely dependent on whether 2 cards are fitted, as well as the power consumption of the hosted card(s).

Available User Card Slots
Two (2) maximum
Note: 2-card loading only possible with compatible Split rear module. Some card models are not available with Split rear modules. See card page for availability.

Available User (Net) Power
60 W (sufficient for latest-generation high-power cards such as 9992 or 9904). Built-in fan cooling for card area and power supplies.

Frame Communication
100/1000 Mbps Ethernet with Auto-MDIX

Frame Reference Input
Single looping 2-BNC connection. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.

Dimensions (WxHxD)
5.7 x 1.4 x 14.7 in (14.5 x 3.6 x 37.4 cm)

Weight
6 lb (2.7 kg)
Note: Empty weight; does not include card(s) or rear module.

ORDERING INFORMATION

BBG-1300-FR 2-Slot openGear® 1RU Enclosure Frame with redundant power and network controller included.

Options and Accessories:

BBG-1300-TRAY 1RU Mounting Tray (supports 3 units)

BBG-TRAY-RSB-L 24-30 Long-Length (24-30 in (61-76 cm)) Support Bracket & Rail Kit For BBG-1300-TRAY

BBG-TRAY-RSB-M 20-24 Medium-Length (20-24 in (51-61 cm)) Support Bracket & Rail Kit For BBG-1300-TRAY

BBG-TRAY-RSB-S 18-20 Short-Length (18-20 in (46-51 cm)) Support Bracket & Rail Kit For BBG-1300-TRAY

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oGx » 20-SLOT OPENGEAR® FRAME

The **oGx** is a 2RU high-density openGear® modular frame offering 600 Watts of total power in a high-capacity 20-slot format. It uses the same form factor and DashBoard™ remote control as our other 20-slot frames and supports all openGear compatible cards and rear I/O modules, but offers significantly more available user power. The oGx is designed to meet the demands of today's most complex IP and hybrid infrastructures, supporting evolving IP and UHD applications.

A new high-power mode allows 23 Watts per slot at full 20-card capacity (460 W user net max). An intelligent fan controller adjusts fan speed with changes in power supply loading and temperature. The single (standard) 600 Watt power supply can fully power a loaded frame, and the addition of a second (optional) supply gives the frame full power redundancy. oGx accommodates 2 front-loaded, hot-swappable power supplies. The split outside location of the power supplies makes installation easy. Each power supply contains an independent cooling fan, status LED, and a front mounted power switch.

In addition to an integrated LCD display that provides frame name, IP address and reports any alarms, the FrameGlow highly-visible programmable RGB LED bar provides “across-the-room” visibilty of any customizable status or frame ID functions, allowing personnel to see frame status/info literally anywhere in the room.

The openGear® 3.0 frame offers optional gigabit Ethernet to every slot within the frame chassis, enhancing communication speed, and connection options to all openGear® cards. The openGear® 3.0 frame provides more communication options and flexibility to openGear® card manufacturers. The 21-port Ethernet switch, built in to the frame's network control card, virtually future-proofs the openGear® 3.0 platform. (Gigabit Ethernet is only available with the Advanced Network Control option.) SNMP (optionally available) is loaded direct to the frame eliminating the need for any external gateways and runs on a separate software port allowing for simultaneous control from both DashBoard and SNMP clients. This is useful in applications where system wide monitoring is performed using SNMP and real-time control is performed using DashBoard.

The oGx uses the same rear I/O modules as our current 20-slot frames, allowing a seamless transition from a current 20-slot frame to the oGx. These rear modules offer a broad selection for a flexible and wide array of interfaces such as coaxial, twisted-pair audio, GPIO, comm, and fiber. Special high-density/high-ventilation rear I/O modules offer even greater packaging density when used with compatible Cobalt® cards.

FEATURES

- 600 Watt power supply with redundancy option. New high-power mode allows 23 W per slot at full 20-card capacity (460 W user net max).
- Full openGear® 3.0 compatibility supporting openGear-compatible cards as well as latest and legacy 20-slot frame openGear rear modules
- Gigabit Ethernet to every slot within the frame (available on frames with Advanced Networking)
- Optional DataSafe network-card stored backup and restore allows swapping of hosted cards with all settings automatically uploaded to the new card - no hassles trying to remember card settings. Settings are restored only when a DataSafe detects same-model card as replacement. (Available with the advanced networking control option.)
- Power supply is hot-swappable for 24/7 operation
- Front LCD display and FrameGlow customizable multi-color, flexible-function lightbar. Wide high-visibility design provides “across-the-room” visibility of any customizable status or frame ID functions.
- Two independent looping references internally routed to all user card slots
- Separate power cords to each power supply for power redundancy
- Network Controller Card enables multiple copies of DashBoard™ for seamless remote setup, monitoring, and control. SNMP option can further be added.
- Fan status and error indicator LEDs on front of the frame
- Hinged, pull-away front door panel lowers to allow quick, easy card insertion
- Remote control/monitoring via Ethernet using free DashBoard™ software, or optional OGCP-9000 remote control panel
- Five year warranty

ORDERING INFORMATION

OGX-FR-C-P openGear® Frame with Cooling

OGX-FR-CN-P openGear® Frame with Cooling and Advanced Networking

OGX-FR-CNS-P openGear® Frame with Cooling, Advanced Networking, and SNMP

PS-OGX Redundant Power Supply

US SALES 800 669-1691 / DIRECT +1 217-344-1243 / SALES@COBALTDIGITAL.COM

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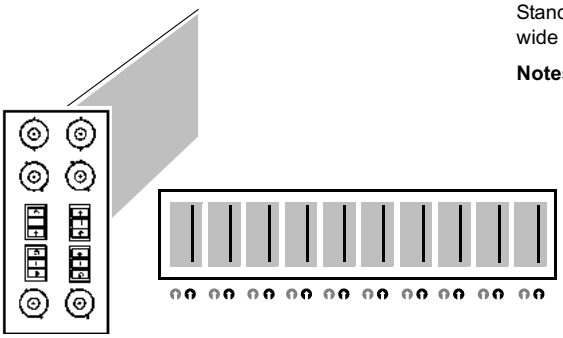
20-SLOT FRAME CARD CAPACITY AND REAR MODULES

Frame card capacity is largely determined by the rear modules that mate a card with its rear panel user connections. For example, when using "split" rear modules, the card capacity in the 20-slot openGear®-compliant 2RU frame is greater than previously possible. 20-slot frames can be fitted with any mix of the rear module types described here, offering connection break-out that suits your requirements while maximizing frame capacity.

Standard-Width Rear Module



1 card per rear module
2 card slots used

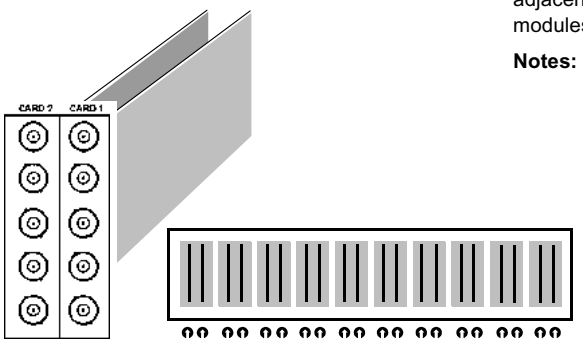
→ **10** cards per frame (max)
10 rear modules per frame (max)

Standard-Width Rear Module occupies 2 card slots and can accommodate BNC and wired connections such as balanced audio and GPIO connections. Standard-width rear modules are available for all Cobalt cards, and offer a wide variety of signals accommodation choices in the smallest space.

Notes:
- Not all slots can be fitted with cards when using a standard-width rear module (for example, when a standard-width module is fitted in the right-most frame position (viewed from rear), first available slot is slot 2, with slot 1 not being available.
- In all cases, maximum frame power budget for user slot total must be considered when planning frame build-out:
  - HPF-9000 Frame: 360W user budget
  - OG3-FR Frame: 300W user budget
  - 8321 Frame: 120W user budget

If necessary, consult Cobalt Sales for assistance in power planning.

Split Rear Module



2 cards per rear module
2 card slots used

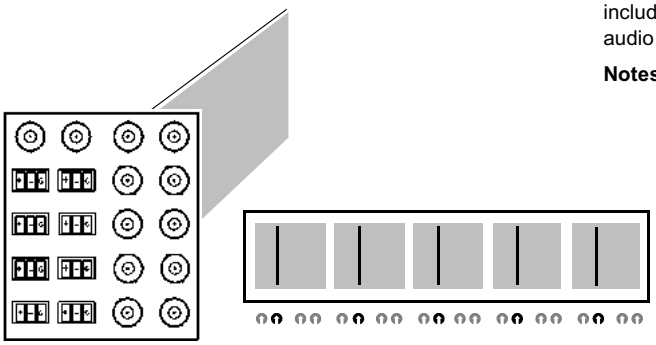
→ **20** cards per frame (max)
10 rear modules per frame (max)

Split Rear Module occupies 2 card slots, but also accommodates 2 card in adjacent slots. In this manner, for a frame fitted entirely with split rear modules, the maximum 20-card frame capacity can be achieved.

Notes:
- Split rear modules are available only for certain Cobalt cards. Consult our catalog, card Product Manual, or our website for availability of rear modules for particular cards.
- Split rear modules may not in all cases support the maximum number of connections offered by a card. (For example, a 9323 card fitted with a split rear module offers two AES ports vs. four available when using a standard rear module. Some cards are available with split rear modules using high-density HD-BNC or DIN 1.0/2.3 connectors which allow more connections than with BNC connectors.)
- In all cases, maximum frame power budget for user slot total must be considered when planning frame build-out:
  - HPF-9000 Frame: 360W user budget
  - OG3-FR Frame: 300W user budget
  - 8321 Frame: 120W user budget

If necessary, consult Cobalt Sales for assistance in power planning.

Double-Width Rear Module



1 card per rear module
4 card slots used

→ **5** cards per frame (max)
5 rear modules per frame (max)

Double-Width Rear Module occupies 4 card slots and can accommodate a very high degree of signal count and types, including multiple BNC and wired connections such as balanced audio and GPIO connections.

Notes:
- Not all slots can be fitted with cards when using a double-width rear module (for example, when a double-width module is fitted in the right-most frame position (viewed from rear), first available slot is slot 2, with slot 1 not being available.
- In all cases, maximum frame power budget for user slot total must be considered when planning frame build-out:
  - HPF-9000 Frame: 360W user budget
  - OG3-FR Frame: 300W user budget
  - 8321 Frame: 120W user budget

If necessary, consult Cobalt Sales for assistance in power planning.

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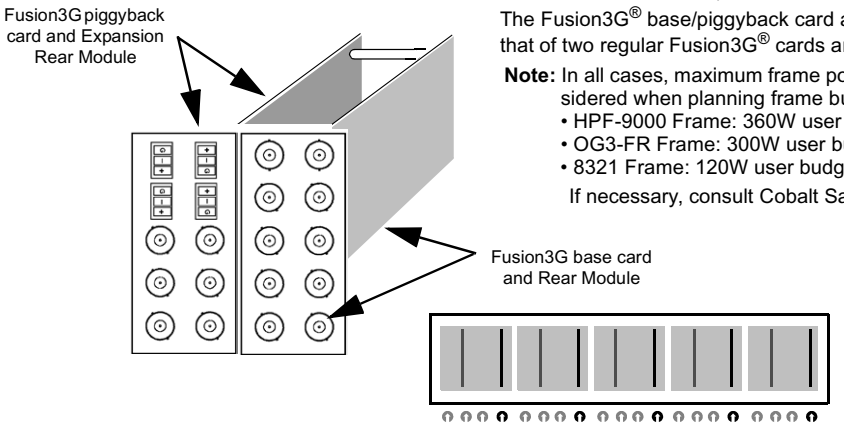
20-SLOT FRAME CARD CAPACITY AND REAR MODULES

Expansion Rear Module

(Fusion3G® only)



An **Expansion Rear Module** is used in conjunction with a Fusion3G® card equipped to provide optional features such as analog audio I/O (which is in turn provided by an Expansion piggyback card factory-installed on the base card when this option is ordered). Expansion Rear Modules are identified with "X" in the part number and **must be used in conjunction with a Base Rear Module.**

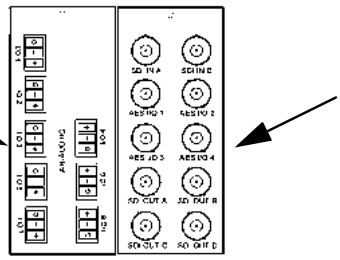
The expansion rear module installs directly to the **left** of the base Rear Module (as shown viewed from rear), and interfaces with the piggyback card.

The Fusion3G® base/piggyback card assembly occupies the space identical to that of two regular Fusion3G® cards and two standard-width rear modules.

Note: In all cases, maximum frame power budget for user slot total must be considered when planning frame build-out:
- HPF-9000 Frame: 360W user budget
- OG3-FR Frame: 300W user budget
- 8321 Frame: 120W user budget

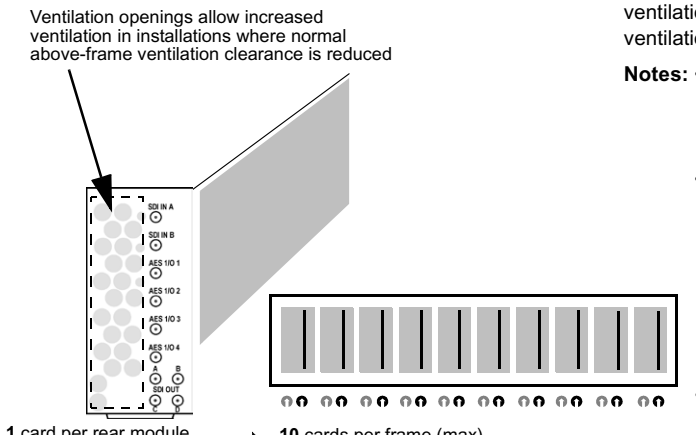
If necessary, consult Cobalt Sales for assistance in power planning.

Expansion Rear Module installs directly to the **left** of base Rear Module, and interfaces with the piggyback card. In this example, an RM20-9901-XC expansion rear module breaks out analog audio connections provided by Option **+ANA** (analog audio option).



RM20-9901-B Rear Module provides connection break-out for base card functions.

High-Ventilation Rear Module



High Ventilation (HV) Rear Module occupies 2 card slots and offers coaxial connections using miniaturized connectors (HDBNC or DIN 1.0/2.3). These rear modules have openings to increase ventilation where the normal recommended above-frame ventilation space (1 RU) cannot be accommodated.

Notes:
- HV (high-ventilation) rear modules are available only for certain Cobalt cards. Consult our catalog, card Product Manual, or our website for availability of high-ventilation rear modules for particular cards.
- (Fusion3G® only) Where a base HV rear module is to be used in conjunction with an expansion rear module, **a companion HV expansion rear module must also be used**. Both base and expansion HV rear modules use card positioning that optimizes air flow across the component surface of the card PCB. Also note that when using an expansion rear module, frame capacity then follows the form as specified in "Expansion Rear Module" above.
- In all cases, maximum frame power budget for user slot total must be considered when planning frame build-out:
  - HPF-9000 Frame: 360W user budget
  - OG3-FR Frame: 300W user budget
  - 8321 Frame: 120W user budget

If necessary, consult Cobalt Sales for assistance in power planning.

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DASHBOARD™ » CONTROL AND MONITORING APPLICATION for openGear

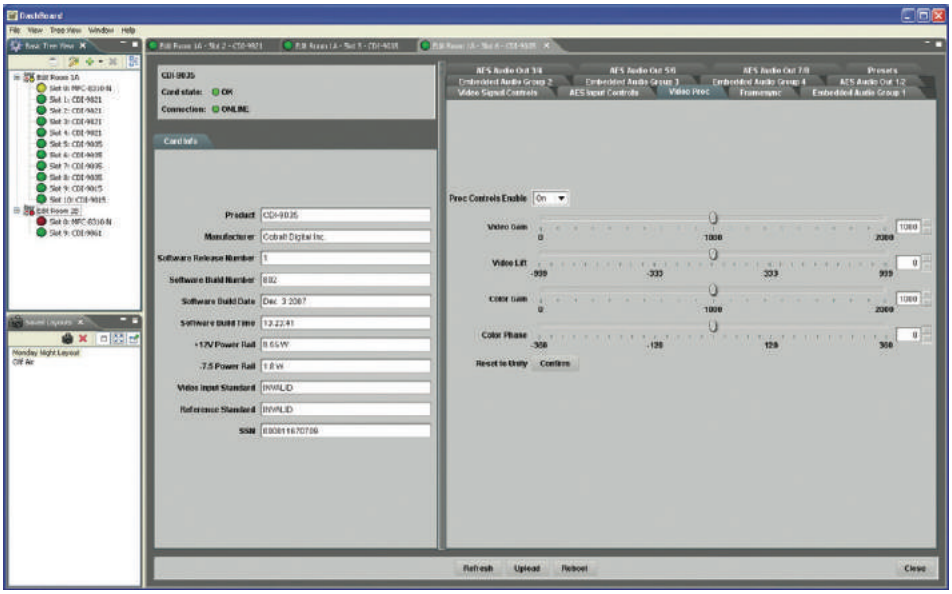
DashBoard™

DashBoard™ is a control / monitoring application for the openGear® platform. It is available at no cost, and works with Windows®, Mac® and Linux®.

DashBoard™ provides a centralized user interface for all populated frame slots, allowing users to view and control all frames and cards on a network with a consistent, easy-to-use graphical interface. Cards define their controllable parameters to DashBoard™, so the control interface is always up to date.

In addition to extensive control and monitoring capabilities with its intuitive GUI, DashBoard™ allows for easily performed card software updates. Software update files can be downloaded from the Cobalt Digital website and then uploaded through DashBoard™.

To communicate with DashBoard™, an openGear® frame must be equipped with the HPF-FC (HPF-9000) or the MFC-8322-S (OG3-FR) frame controller module.



» FEATURES

- Free application can be downloaded at www.cobaltdigital.com/dashboard
- Java based and runs in Windows®, Mac® and Linux®
- Multiple frames can be connected to multiple control and monitoring stations
- Automatic discovery of cards
- Software and firmware updates via ethernet

openGear® is a registered trademark of Ross Video Limited. Dashboard™ is a trademark of Ross Video Limited.

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OG-PC-x86-A » INTEGRAL FRAME-INSTALLED PC for openGear® Frames

The **OG-PC-x86-A Integral Frame-Installed PC for openGear® Frames** is a compact PC which is installed directly in the frame in the form of an openGear-style card with a double-width rear I/O module. The OG-PC-x86-A gets its power from the frame midplane with no external patches or sources. The full-featured PC is the perfect solution for a headless computer where rack space is limited — the OG-PC-x86-A frees-up the installation from wasting space on a separate 1RU server (especially useful for flypack setups). Using the OG-PC-x86-A, special applications of your choice can be conveniently collocated directly in the frame.

The OG-PC-x86-A installs just like other openGear® device. The OG-PC-x86-A is equipped with a rear panel that provides dual GigE, USB 2.0 and 3.0, HDMI, serial, as well as a DisplayPort.

Basic Processing Details

- **Intel® Pentium® N3710**
- **1.6 GHz (2.56 GHz burst)**
- **4-Core**
- **8GB DDR3**

FEATURES

Self-contained compact integrated PC solution – eliminates the need for separate 1RU server in rack

Full-function high-speed PC with optional high-capacity SSD and dual HDD RAID backup availability

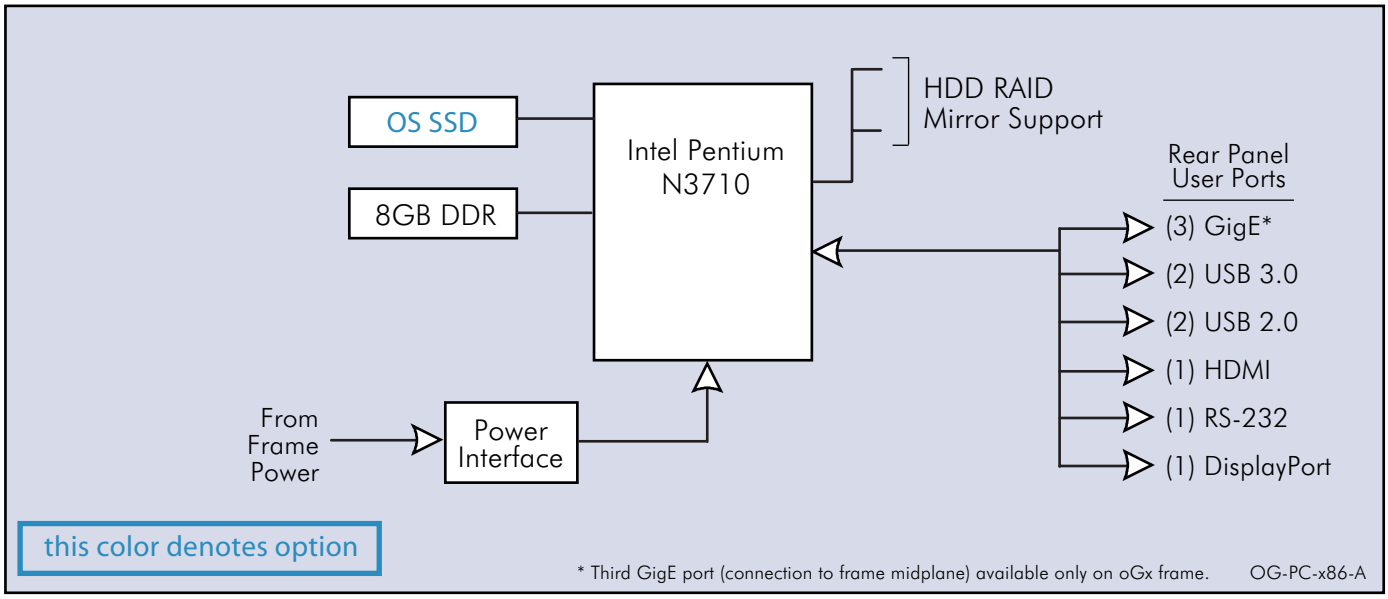
Obtains operating power from frame – no added or external power connections needed

Ruggedized openGear-compliant design. Plugs directly into frame with user ports exposed on rear of unit.

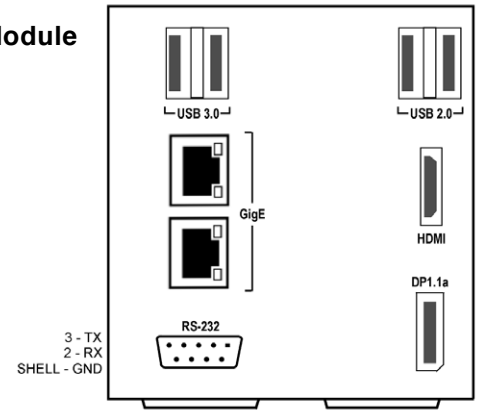
Hardware control features such as power on/off, reset, and sleep are accessible via DashBoard remote control – no need for physical collocation to invoke hard reset or similar actions

Full complement of user ports, including dual GigE and USB, as well as HDMI and DisplayPort

Low power consumption with minimal effect on overall frame power budget



Rear I/O Module



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OG-PC-x86-A » INTEGRAL FRAME-INSTALLED PC for openGear® Frames

SPECIFICATIONS

Processor System
CPU: Intel® Pentium® N3710
Base Frequency: 1.6 GHz (burst to 2.56 GHz)
Core Number: 4
BIOS: AMI UEFI 64 Mbit
Instruction Set: 64 bit
For detailed information on the Intel® N3710 Processor used in this product, please see **Intel Pentium Processor N3710**

Memory
Technology: DDR3L 1600 MHz
Max. Capacity: 8GB

Storage
1x M.2 M-Key SATA (OS SSD specification defined by order option)
2x HDD 2.5in SATA

Display
Intel® HD Graphics 505
HDMI: 1.4b up to 3840 x 2160 at 30 Hz
DisplayPort: 1.1a up to 3840 x 2160 at 30 Hz

Ethernet
Speed: 10/100/1000 Mbps
Connectors: (2) RJ45 on rear I/O panel

Power
Note: Power figures below represent worse-case (all USB ports fully loaded; HDDs (if equipped) spinning). Current draw is distributed across multiple slots using supplied rear I/O module. As such, per-slot power consumption is not exceeded for supported 20-slot frames HPF-9000 and oGx models.
Power Consumption (no RAID HDD options): 48.6 W
Power Consumption (RAID; 1 HDD; typ): 53.6 W
Power Consumption (RAID; 2 HDD; typ): 58.6 W
Power Management: ACPI
Battery: Lithium 3 V / 210 mAH

Environmental
Operational Temperature: 0° to 45° C (32° to 113° F)
Operational Humidity: 40° C (104° F) @ 95% RH Non-Condensing
Non-Operational Temperature: -40° C to 85° C (-40° F to 185° F)

ORDERING INFORMATION

OG-PC-x86-A Integral Frame-Installed PC for openGear® Frames supporting up to two HDDs and one M.2 socket (includes rear I/O module)
(Above base model is base PC for which SSD and OS choices can be added, and a 1TB HHD can be added as described and specified below.)

Options:

-OG-PC-x86-HDD-1TB 1TB Hard Disk Drive for the OG-PC-x86-A openGear® PC. (Two (2) max per OG-PC-x86-A card)

-OG-PC-x86-SSD-128GB 128GB M.2 Solid State Drive without Operating System

-OG-PC-x86-SSD-128GB-WIN10IoT 128GB M.2 SSD with Windows 10 IoT Operating System

-OG-PC-x86-SSD-128GB-WIN7 128GB M.2 SSD with Windows 7 Embedded Operating System

Note: Options or ordering line items denoted as "-" are hardware orderable items (such as drives pre-loaded or unloaded with OS choices).
Note: OG-PC-x86-A can be equipped to support user-added HDDs (up to two). Please contact your sales representative for more information and ordering details.

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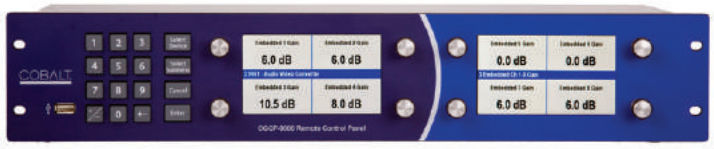
OGCP-9000 » REMOTE CONTROL PANEL FOR OPENGEAR® CARDS



The award-winning OGCP-9000 offers instantly available, simplified card control using individual control knobs that act just like level controls or selector switches. Each control setting is displayed on the adjacent display. The OGCP-9000 works with all Fusion3G® 9900 and COMPASS® 9000 series signal processing cards.

Communication with the openGear® frame occurs over an optimized high-speed openGear® Ethernet control protocol, allowing lightning-fast access. The OGCP-9000 offers instantaneous, real-time adjustments, so operators can manipulate on-air signals with confidence and precision.

An easy to use keypad enables intuitive access with minimal submenus. For any card, only one level of submenus is needed to access all of its functions. Station engineers can configure the panel to restrict availability of specific cards and parameters for operation. Configuration is done through a simple web interface, where configurations can be exported, backed up, and re-imported easily. The OGCP-9000 works seamlessly with DashBoard™ control software--any changes made with either system are instantly reflected on the other.

The control panel is optimized for both bright and low light environments. Two large format, super-bright, wide-angle color LCD screens show sharp and clear text; operators can select either a white or black background. Other features include a fully backlit keypad and user-adjustable LED back light.

Options
Loudness Metering (+LM-P)

» FEATURES

- Simultaneous display and update of 8 parameters
- Real time adjustments, excellent for on-air manipulation
- No deep submenus, all parameters can be accessed quickly
- Completely configurable with password protected web interface
- Save and restore panel configuration with web interface and USB drive
- 10/100 Mbpts Ethernet TCP/IP connection
- Optimized for bright and low light environments
- Seamless integration with DashBoard™ remote control software
- Rugged 2RU rack mounted chassis
- Five-year warranty

» SPECIFICATIONS

Power
9 watts

AC Input
IEC C14 Chassis Plug accepting
90-264 VAC @ 47-63 Hz

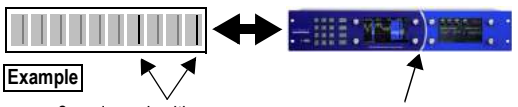
DC Input
12 VDC 1.0 A

Ethernet
10/100 Mbps with Auto-MDIX on RJ45 socket with DC isolation

LCD
500 cd/m2 (nits) of brightness, 300:1 contrast ratio, 120 degree viewing angle

Size
Standard 2RU; 5" depth

To allow you to provision loudness metering on a card-by-card and panel-by-panel basis suiting your needs, host cards and control panels use individual co-licenses. **Co-licenses are required on both the host card(s) and Control Panel(s)**, with card +LM-C co-licenses and panel +LM-P co-licenses comprising the overall option.



» ORDERING INFORMATION

OGCP-9000 2RU Remote Control Panel for Fusion3G®/COMPASS® Cards
(Specify country of destination for power cord)

+LM-P Audio Loudness Metering software co-license for OGCP-9000.
(Each card to be used with loudness metering also requires an individual card co-license (+LM-C). See respective card Ordering Information for availability.)

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9970-QS » 3G/HD/SD-SDI/CVBS EXPANDABLE MULTIVIEWER with Advanced On-Screen Graphics

The Cobalt® **9970-QS 3G/HD/SD-SDI/CVBS Expandable Multiviewer** integrates five discrete 3G/HD/SD-SDI or CVBS inputs onto a single 3G/HD/SD-SDI quint-split output, with each image being flexibly inserted into the output image area.

While the 9970-QS offers unprecedented flexibility, it also offers an unprecedented ease of use. Fully-flexible layouts using one-button template presets or fully customizable layouts using easy to use sizing/positioning custom controls. Custom layouts can be saved to user presets. Any template layout or custom layout changes can be done "on-the-fly" in real time, without tedious setup compiler or layout programs like many other split/multiviewer products.

Multiple 9970-QS cards can be cascaded to provide splits greater than the base quint-split. The 9970-QS PIP5 input can be used in a cascaded chain of 9970-QS cards that provides multiviewer layouts of up to 8x8 (64:1). The QuickSet grid definer precisely and easily sets up a multiviewer grid where columns and rows of each of the cards PIPs are arranged to work together in a cascaded aggregate arrangement. Low-latency processing allows multiple 9970-QS cards to be cascaded without significant accumulated delays within the chain.

Advanced graphics such as user identify text, PiP input video format, audio meter bars, tally/UMD, reticules, and timecode can be burned into any PiP with full user attributes control. CEA 608 Ch1 text strings can serve as user text overlays, allowing direct closed captioning presence/quality compliance checks for up to 5 simultaneous video streams per card. User-configurable Quality Check allows subjective criteria such as black/frozen frame or audio silence events to propagate an on-screen alarm/alert to the output image (such as alert text burn-in or border alert highlighting).

A master output up-down-cross convert scaler provides scale-to HD or 3G SDI formats for the combined multiviewer output, which also includes an HDMI output (with audio embedding) to directly feed a wall monitor. The openGear® card-based form factor of the 9970-QS provides scalable, easily integrated multi-image functions for the 20-slot frame form factor with easy to use DashBoard™ remote control. Each PiP input is provided its own independent timing alignment controls with lock to reference, allowing asynchronous inputs to be directly accommodated. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. Tally can be communicated by GPI, Ethernet, or serial interfaces.

openGear®

DashBoard

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9970-QS » 3G/HD/SD-SDI/CVBS EXPANDABLE MULTIVIEWER with Advanced On-Screen Graphics

FEATURES

Scalable openGear® PiP solution. Card-based form factor provides high density, space-saving economical integration.

Easy, real-time "on the fly" custom layout changes without needing setup compiler or layout programs

Easy to configure PiP sizing and borders. Advanced graphics include audio meters, character burn, and reticules. PiP sizing/splits using one-button templates or easy-to-use, intuitive DashBoard controls. Custom settings can be saved to user presets.

GPI, Ethernet, and serial tally inputs provide dual, per-PiP tally indicators

Closed captioning overlays provide direct closed captioning presence/quality compliance checks for up to 5 simultaneous video streams per card

Cascading Mode and QuickSet grid definer offers easy to set up scalable multiviewer functions (up to 64:1) using multiple cascaded (daisy-chained) 9970-QS cards. Two cards can provide an 8:1 multiviewer, with up to 16 cards providing a 64:1 multiviewer. Single card provides up to 5:1 split, with up to ten 5:1 splits per frame.

Cascade Config provides access to PiP controls for all PiPs from one card. Controls for all PiPs appear universally on each card in the chain. PiP numbers are correlated to your actual PiPs instead of fixed card-based port definers. Cascade Config consolidated control can span card chains within a frame or across multiple frames.

DashBoard Output Preview function provides display of regularly-sampled screen captures in the card DashBoard page. Provides remote-access program video content/presence and multiviewer layout confidence monitoring via the card's DashBoard display without needing collocation with the card or its input or output video signals.

Audio routing directs selected PiP audio to combined-stream outputs. Audio downmixing also provided.

3G/HD/SD-SDI 2x DA and HDMI with audio embed outputs

Wall-clock time burn-in on merged output or within PIPs. NTP sync via IP connection with timezone localization.

Per-PIP audio meter, tally, user text, and timecode overlays

Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p

Fully flexible input compatibility – mixed formats on inputs can be automatically sized and outputted in a combined output scaled to desired broadcast SD/HD/3G output format. Each input automatically detects and sets up for SDI or CVBS input. Supports asynchronous inputs using per-PiP ref lock. Per-PiP independent ARC settings and controls.

User quality criteria (such as frozen/black frame) alert/alarms can be propagated to output image with alarm text and border highlighting

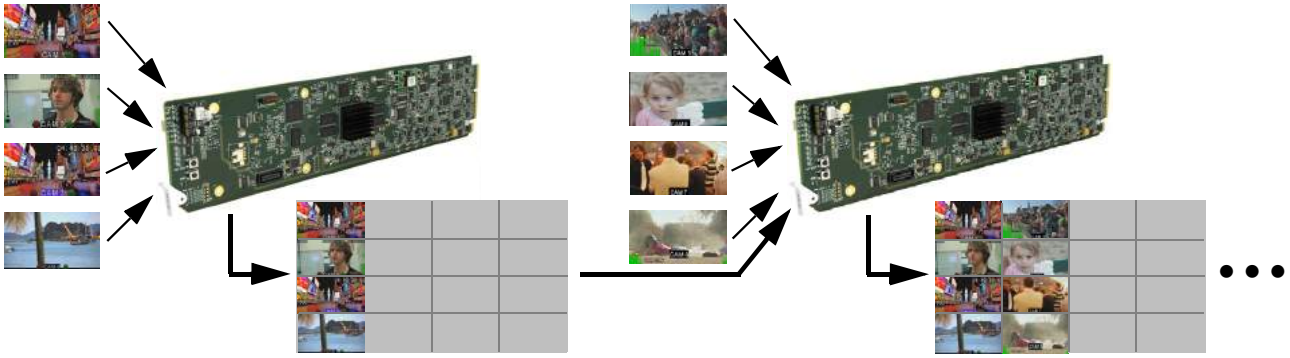
Low-power/high-density design – less than 18 Watts per card

DashBoard™ remote control status monitoring and setup/control

Hot-swappable

Five year warranty

Multiple 9970-QS cards can operate in a **cascading** mode, where four PiP inputs serve as program video inputs, and the PiP 5 input receives the cascading combined layout of a preceding 9970-QS card in a daisy-chain arrangement.



The cascade output (consisting of the four PiP images and a full-size underlay) can be sent to another 9970-QS as a **cascade** input, serving as an underlay which can accept more PiP insertions.

A Quickset grid definer precisely sets up a multiviewer grid where columns and rows of each of the cards PIPs are arranged to work together in a cascaded aggregate arrangement. Simply set for the number of rows and columns desired – the Quickset definer does the rest!

More downstream 9970-QS cards can be added and have its PiPs added next to those furnished from the upstream card cascade. Here, PiP insertions are arranged in columns, although almost any desired grid and arrangement scheme is possible.

Even more cards and PiPs can be added using open adjacent cells in the grid. Grids of up to 8x8 are supported, providing for a 64:1 multiviewer using only 16 cards all within the compact 2RU openGear-standard frame form.

Pressing the Identify PIP button in DashBoard™ instantly correlates each image to its PIP card channel.

The identities are clearly shown for a few seconds, after which the identity overlays automatically cancel.

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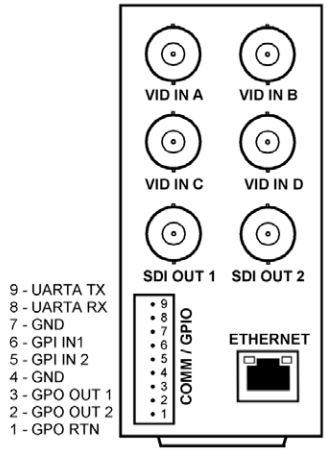
9970-QS » 3G/HD/SD-SDI/CVBS EXPANDABLE MULTIVIEWER with Advanced On-Screen Graphics

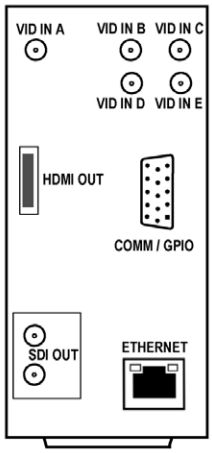


RM20-9970-B

COMM / GPIO PINOUTS

1 - *COM A_RX2 / 422(+)
2 - *COM A_TX2 / 422(+)
3 - COM B_RX2 / 422(+)
4 - GPO OUT1
5 - GND
6 - *COM A_RX1 / 422(-)
7 - *COM A_TX1 / 422(-)
8 - COM B_RX1 / 422(-)
9 - GPI IN5 / GPO OUT 2
10 - GPI IN4
11 - GPI IN1
12 - GPI IN2
13 - GPI IN3
14 - NC
15 - NC

* Port can be GUI-configured as two RS-232 ports (Tx and Rx), or as a full-duplex RS-422 port.

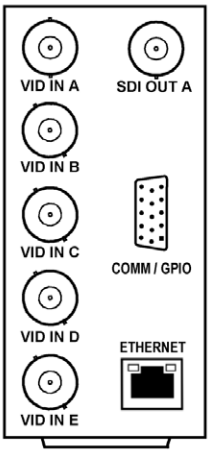


RM20-9970-C-DIN
RM20-9970-C-HDBNC

COMM / GPIO PINOUT

1 - *COM A_RX2 / 422(+)
2 - *COM A_TX2 / 422(+)
3 - COM B_RX2 / 422(+)
4 - GPO OUT1
5 - GND
6 - *COM A_RX1 / 422(-)
7 - *COM A_TX1 / 422(-)
8 - COM B_RX1 / 422(-)
9 - GPI IN5 / GPO OUT 2
10 - GPI IN4
11 - GPI IN1
12 - GPI IN2
13 - GPI IN3
14 - NC
15 - NC

* Port can be GUI-configured as two RS-232 ports (Tx and Rx), or as a full-duplex RS-422 port.

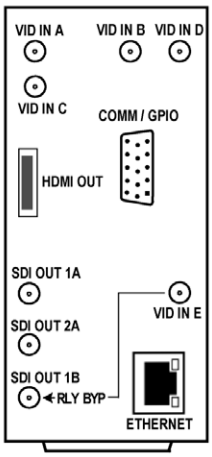


RM20-9970-D

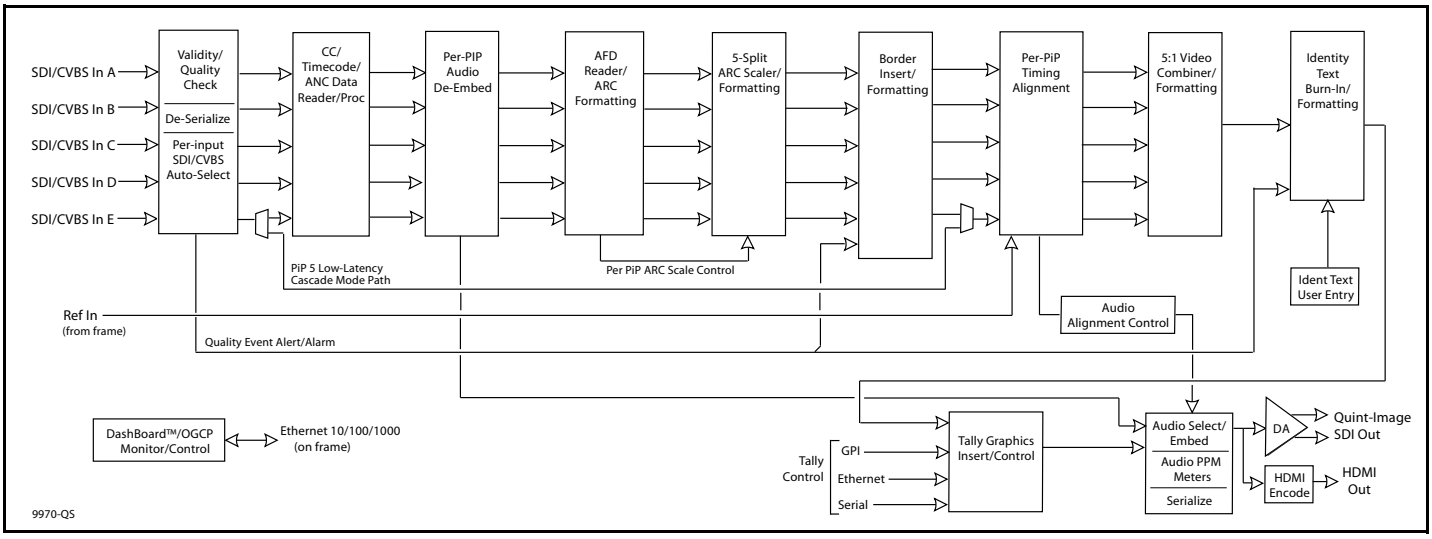
COMM / GPIO PINOUT

1 - *COM A_RX2 / 422(+)
2 - *COM A_TX2 / 422(+)
3 - COM B_RX2 / 422(+)
4 - GPO OUT1
5 - GND
6 - *COM A_RX1 / 422(-)
7 - *COM A_TX1 / 422(-)
8 - COM B_RX1 / 422(-)
9 - GPI IN5 / GPO OUT 2
10 - GPI IN4
11 - GPI IN1
12 - GPI IN2
13 - GPI IN3
14 - NC
15 - NC

* Port can be GUI-configured as two RS-232 ports (Tx and Rx), or as a full-duplex RS-422 port.



RM20-9970-E-DIN
RM20-9970-E-HDBNC



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9970-QS » 3G/HD/SD-SDI/CVBS EXPANDABLE MULTIVIEWER with Advanced On-Screen Graphics

SPECIFICATIONS

Power

< 18 Watts

Video Input/Outputs

Video Inputs: (5) 75Ω BNC; auto-detect/setup for 3G/HD/SD-SDI or CVBS
SDI Outputs: (2) 75Ω BNC (2x DA); user-selectable as 720p, 1080i, or 1080p (3G)
HDMI Output: (1) HDMI output with audio embedding
Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
I/O Latency: Basic PiP Input/Output < 1.5 frames (max). Cascade latency consists of basic PiP I/O latency plus < 2 line added delay.
Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timecode Burn-In

Independent per-PIP burn-in via user controls from input video SMPTE embedded timecode. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size, color, and H/V position.

Text Burn-In

Per-PiP UMD and two user identity text strings (as alternate, automatic PiP input video format can be inserted). Independent insertions controls for enable/disable. User controls for text size, color, and H/V position.

Audio Output

16-ch embedded. Per-PIP select allows routing of PIP input 16-ch embedded audio to combined SDI output. HDMI output tracks with group 1/2 audio as selected for SDI embedded audio output.

Tally Indicators/Inputs

Per-PiP dual tally indicators. GPI , Ethernet, serial per-PiP control. Per-PiP tally lamp position and sizing controls.

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.

ORDERING INFORMATION

9970-QS 3G/HD/SD-SDI/CVBS Expandable Multiviewer with Advanced On-Screen Graphics

RM20-9970-B 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI/CVBS Input BNCs, (2) 3G/HD/SD-SDI Output BNCs (2xDA), COMM/GPIO Port, Ethernet Port

RM20-9970-C-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) 3G/HD/SD-SDI DA Outputs, COMM/GPIO Port (Combined D-connector), HDMI Output, Ethernet Port (all coaxial connectors DIN 1.0/2.3)

RM20-9970-C-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) 3G/HD/SD-SDI DA Outputs, COMM/GPIO Port (Combined D-connector), HDMI Output, Ethernet Port (all coaxial connectors HD-BNC)

RM20-9970-D 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Input BNCs, (1) 3G/HD/SD-SDI Output BNC, COMM/GPIO Port (Combined D-connector), Ethernet Port

RM20-9970-E-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) SDI x2 Outputs (1 with relay bypass protect), COMM/GPIO Port (Combined HD-15 connector), HDMI Output, Ethernet Port (all coaxial connectors DIN 1.0/2.3)

RM20-9970-E-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) SDI x2 Outputs (1 with relay bypass protect), COMM/GPIO Port (Combined HD-15 connector), HDMI Output, Ethernet Port (all coaxial connectors HD-BNC)

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BBG-1070-QS » 3G/HD/SD-SDI/CVBS STANDALONE EXPANDABLE MULTIVIEWER

with Advanced On-Screen Graphics

The Cobalt® **BBG-1070-QS 3G/HD/SD-SDI/CVBS Standalone Expandable Multiviewer with Advanced On-Screen Graphics** integrates five discrete 3G/HD/SD-SDI or CVBS inputs onto a single 3G/HD/SD-SDI quint-split output, with each input image being flexibly inserted into the output image area.

While the BBG-1070-QS offers unprecedented flexibility, it also offers an unprecedented ease of use. Fully-flexible layouts using any of several one-button template presets or fully customizable layouts using easy to use sizing/positioning custom controls. Custom layouts can be saved to user presets. Any template layout or custom layout changes can be done "on-the-fly" in real time, without tedious setup compiler or layout programs like many other split/multiviewer products.

Multiple BBG-1070-QS units can be cascaded to provide splits greater than the base quint-split. The PIP5 input can be used in a cascaded chain of BBG-1070-QS units that provides multiviewer layouts of up to 8x8 (64:1). The QuickSet grid definer precisely and easily sets up a multiviewer grid where columns and rows of each of the PIPs are arranged to work together in a cascaded aggregate arrangement. Low-latency processing allows multiple BBG-1070-QS units to be cascaded without significant accumulated delays within the chain.

Advanced graphics such as user identify text, PiP input video format, audio meter bars, tally/UMD, reticules, and timecode can be burned into any PiP with full user attributes control. CEA 608 Ch1 text strings can serve as user text overlays, allowing direct closed captioning presence/quality compliance checks for up to 5 simultaneous video streams per unit. User-configurable Quality Check allows subjective criteria such as black/frozen frame or audio silence events to propagate an on-screen alarm/alert to the output image (such as alert text burn-in or border alert highlighting). Each PiP input is provided its own independent timing alignment controls with lock to reference, allowing asynchronous inputs to be directly accommodated. An HDMI output (with audio embedding) allows direct feed to a monitor.

The compact standalone form factor allows desktop usage, as well as the 1/3-rack size of the BBG-1070-QS 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).

DashBoard

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BBG-1070-QS » 3G/HD/SD-SDI/CVBS STANDALONE EXPANDABLE MULTIVIEWER

with Advanced On-Screen Graphics

FEATURES

Scalable PiP solution. Single unit provides up to 5:1 split, with up to ten 5:1 splits per frame

Allows easy, real-time "on the fly" custom layout changes without needing setup compiler or layout programs

Easy to configure PiP sizing and borders. Advanced graphics include audio meters, character burn, and reticules. PiP sizing/splits using one-button templates or easy-to-use, intuitive DashBoard™ GUI controls. Custom settings can be saved to user presets.

GPI, Ethernet, and serial tally inputs provide dual, per-PiP tally indicators

Closed captioning overlays provide direct closed captioning presence/quality compliance checks for up to 5 simultaneous video streams per unit

Cascading Mode and QuickSet grid definer offers easy to set up scalable multiviewer functions (up to 64:1) using multiple cascaded (daisy-chained) BBG-1070-QS units. Two units can provide an 8:1 multiviewer.

Cascade Config provides access to PiP controls for all PiPs from one DashBoard device view. Controls for all PiPs appear universally on each BBG-1070-QS in the chain. PiP numbers are correlated to your actual PiPs instead of fixed device-based port definers.

DashBoard Output Preview function provides display of regularly-sampled screen captures in the device DashBoard page. Provides remote-access program video content/presence and multiviewer layout confidence monitoring via the device's DashBoard display without needing collocation with the card or its input or output video signals.

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

3G/HD/SD-SDI and HDMI outputs with audio embed outputs

Per-PIP audio meter, tally, user text, and timecode overlays

Audio routing directs selected PiP audio to combined-stream outputs. Audio downmixing also provided.

Wall-clock time burn-in on merged output or within PIPs. NTP sync via IP connection with timezone localization.

Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p

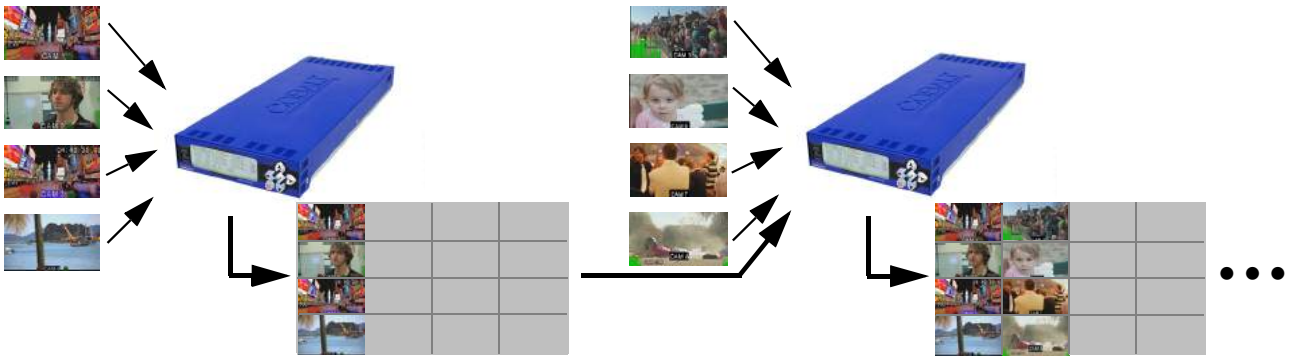
Fully flexible input compatibility – mixed formats on inputs can be automatically sized and outputted in a combined output scaled to desired broadcast SD/HD/3G output format. Each input automatically detects and sets up for SDI or CVBS input. Supports asynchronous inputs using per-PiP ref lock. Per-PiP independent ARC settings and controls.

User quality criteria (such as frozen/black frame) alert/alarms can be propagated to output image with alarm text and border highlighting

Redundant power supply option

Five year warranty

Multiple BBG-1070-QS units can operate in a **cascading** mode, where four PiP inputs serve as program video inputs, and the PiP 5 input receives the cascading combined layout of a preceding BBG-1070-QS unit in a daisy-chain arrangement.



The cascade output (consisting of the four PiP images and a full-size underlay) can be sent to another BBG-1070-QS as a **cascade** input, serving as an underlay which can accept more PiP insertions.

A Quickset grid definer precisely sets up a multiviewer grid where columns and rows of each of the cards PIPs are arranged to work together in a cascaded aggregate arrangement. Simply set for the number of rows and columns desired – the Quickset definer does the rest!

More downstream BBG-1070-QS units can be added and have its PiPs added next to those furnished from the upstream card cascade. Here, PiP insertions are arranged in columns, although almost any desired grid and arrangement scheme is possible.

Even more units and PiPs can be added using open adjacent cells in the grid. Grids of up to 8x8 are supported.

Pressing the Identify PIP button instantly correlates each image to its PIP channel.

The identities are clearly shown for a few seconds, after which the identity overlays automatically cancel.

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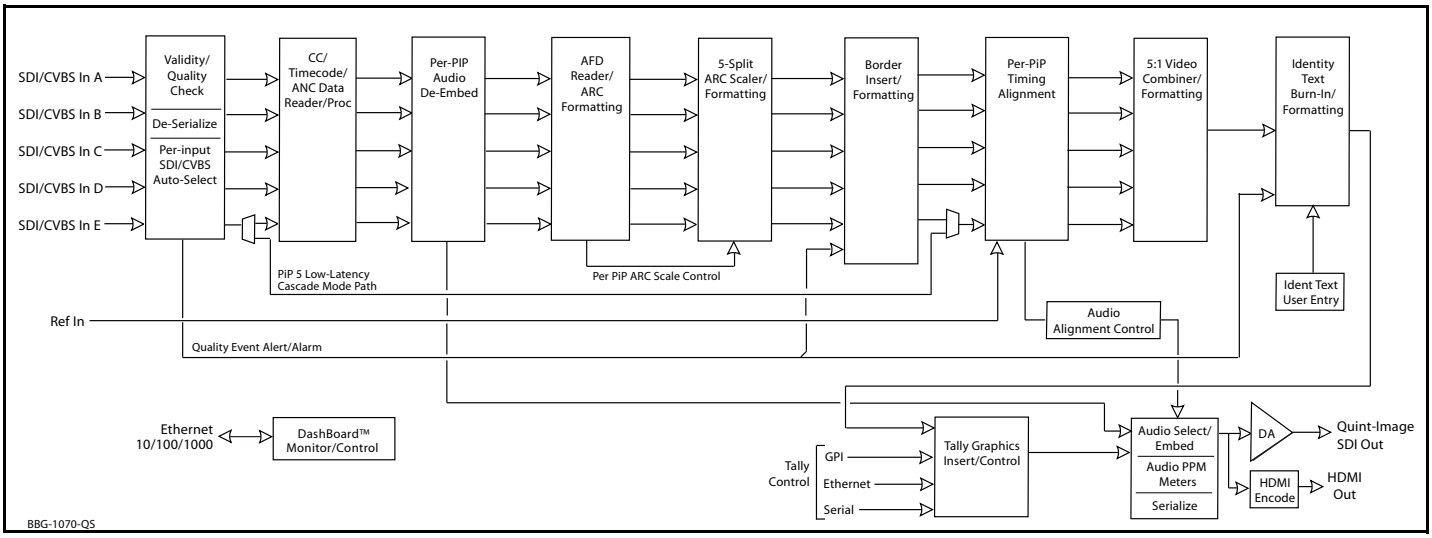
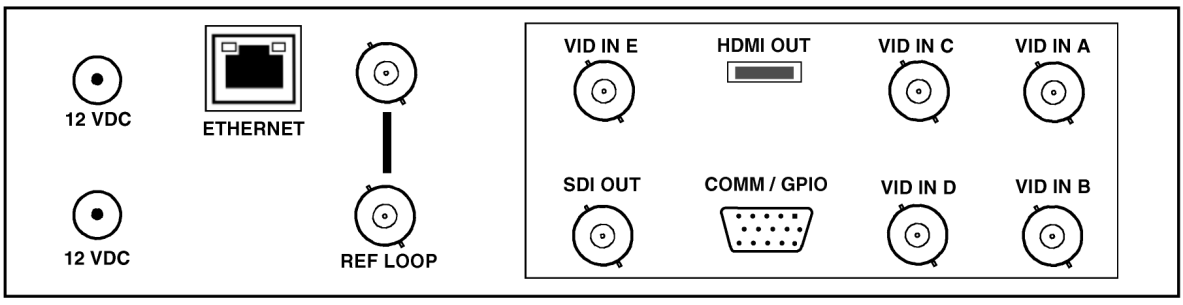
BBG-1070-QS » 3G/HD/SD-SDI/CVBS STANDALONE EXPANDABLE MULTIVIEWER

with Advanced On-Screen Graphics



BBG-1070-QS Rear Panel



COMM / GPIO

1 - *COM A_RX2 / 422(+)
2 - *COM A_TX2 / 422(+)
3 - COM B_RX2 / 422(+)
4 - GPO OUT1
5 - GND
6 - *COM A_RX1 / 422(-)
7 - *COM A_TX1 / 422(-)
8 - COM B_RX1 / 422(-)
9 - GPI IN5
10 - GPI IN4
11 - GPI IN1
12 - GPI IN2
13 - GPI IN3
14 - NC
15 - NC

* Port can be GUI-configured as two RS-232 ports (Tx and Rx), or as a full-duplex RS-422 port.

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BBG-1070-QS » 3G/HD/SD-SDI/CVBS STANDALONE EXPANDABLE MULTIVIEWER

with Advanced On-Screen Graphics

SPECIFICATIONS

Power

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

Video Input/Outputs

Video Inputs: (5) 75Ω BNC; auto-detect/setup for 3G/HD/SD-SDI or CVBS
SDI Outputs: (1) 75Ω BNC; user-selectable as 720p, 1080i, or 1080p (3G)
HDMI Output: (1) HDMI output with audio embedding
Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
I/O Latency: Basic PiP Input/Output < 1.5 frames (max). Cascade latency consists of basic PiP I/O latency plus < 2 line added delay.
Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timecode Burn-In

Independent per-PIP burn-in via user controls from input video SMPTE embedded timecode. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size, color, and H/V position.

Text Burn-In

Per-PiP UMD and two user identity text strings (as alternate, automatic PiP input video format can be inserted). Independent insertions controls for enable/disable. User controls for text size, color, and H/V position.

Audio Output

16-ch embedded. Per-PIP select allows routing of PIP input 16-ch embedded audio to combined SDI output. HDMI output tracks with group 1/2 audio as selected for SDI embedded audio output.

Tally Indicators/Inputs

Per-PiP dual tally indicators. GPI, Ethernet, serial per-PiP tally control. Per-PiP tally lamp position and sizing controls.

Control/Monitor Interface

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

Frame Reference Input

Looping reference input. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.

ORDERING INFORMATION

BBG-1070-QS 3G/HD/SD-SDI/CVBS Standalone Expandable Multiviewer with Advanced On-Screen Graphics (includes one BBG-1000-PS Power Supply)

BBG-1000-PS Redundant Power Supply Module

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

US SALES 800 669-1691 / DIRECT +1 217-344-1243 / SALES@COBALTDIGITAL.COM

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9970-QS-MC » 3G/HD/SD-SDI/CVBS EXPANDABLE MASTER CONTROL MULTIVIEWER

with Advanced On-Screen Graphics

The Cobalt® **9970-QS-MC 3G/HD/SD-SDI/CVBS Expandable Master Control Multiviewer** integrates five discrete 3G/HD/SD-SDI or CVBS inputs onto a single 3G/HD/SD-SDI quint-split output, with each image being flexibly inserted into the output image area.

Based on our award-winning 9970-QS, the 9970-QS-MC is specifically designed for master control applications by providing layout optimization that saves space, and easily implemented QC screening of master control ingest.

The 9970-QS-MC provides the ability to orient and arrange PIPs in columns arranged for a 9x16 “portrait” layout. This allows consumer or professional monitors to be oriented “on-end”, thereby saving wall-width in any area (especially in space-conscious mobile environments). The 9970-QS-MC provides individual per-PIP detection of missing video, black/frozen frame or audio silence events. This detection can propagate an alert to individual QC GPO signals for instant notification of video/audio errors. While the 9970-QS-MC offers unprecedented flexibility, it also offers an unprecedented ease of use. Fully-flexible layouts using one-button template presets or fully customizable layouts using easy to use sizing/positioning custom controls. Custom layouts can be saved to user presets. Any template layout or custom layout changes can be done "on-the-fly" in real time, without tedious setup compiler or layout programs like many other split/multiviewer products.

Multiple 9970-QS-MC cards can be cascaded to provide splits greater than the base quint-split. The 9970-QS-MC PIP5 input can be used in a cascaded chain of 9970-QS-MC cards that provides multiviewer layouts of up to 8x8 (64:1). The QuickSet grid definer precisely and easily sets up a multiviewer grid where columns and rows of each of the cards PIPs are arranged to work together in a cascaded aggregate arrangement. Low-latency processing allows multiple 9970-QS-MC cards to be cascaded without significant accumulated delays within the chain.

A master output up-down-cross convert scaler provides scale-to HD or 3G SDI formats for the combined multiviewer output, which also includes an HDMI output (with audio embedding) to directly feed a consumer wall monitor. The openGear® card-based form factor of the 9970-QS-MC provides scalable, easily integrated multi-image functions for the 20-slot frame form factor with easy to use DashBoard™ remote control. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Scalable openGear® multiviewer master control solution. Card-based form factor provides high density, space-saving economical integration.
- 9x16 “portrait” layout mode allows monitor “on-end” orientation to save wall-width space in master control environments
- Easy, real-time “on the fly” custom layout changes without needing setup compiler or layout programs
- Quality events (such as missing video, frozen/black frame, or audio silence) alert/alarms can be propagated to individual per-PIP GPO (Input A only)
- Easy to configure PIP sizing and borders. Custom settings can be saved to user presets.
- Cascading Mode and QuickSet grid definer offers easy to set up scalable multiviewer functions (up to 64:1) using multiple cascaded (daisy-chained) 9970-QS-MC cards. Two cards can provide an 8:1 multiviewer, with up to 16 cards providing a 64:1 multiviewer. Single card provides up to 5:1 split, with up to ten 5:1 splits per frame.
- 3G/HD/SD-SDI 2x DA and HDMI with audio embed outputs
- DashBoard Output Preview function provides display of regularly-sampled screen captures in the card DashBoard page. Provides remote-access program video content/presence and multiviewer layout confidence monitoring via the card’s DashBoard display without needing collocation with the card or its input or output video signals.
- Audio routing directs selected PIP audio to combined-stream outputs. Audio downmixing also provided.
- Fully flexible input compatibility – mixed formats on inputs can be automatically sized and outputted in a combined output scaled to desired broadcast SD/HD/3G output format. Each input automatically detects and sets up for SDI or CVBS input. Supports asynchronous inputs using per-PIP ref lock. Per-PIP independent ARC settings and controls.
- Low-power/high-density design – less than 18 Watts per card
- DashBoard™ remote control status monitoring and setup/control
- Hot-swappable
- Five year warranty

9x16 Portrait output mode provides space efficiency allowing consumer-size monitors to be positioned on-end. The 9970-QS-MC allows the same cascading as the 9970-QS model, allowing large-scale multiviewer setups using less wall space.

Per-PiP detection of missing video, black/frozen frame, or audio silence events can propagate an alert to individual QC GPO signals for instant detection of video/audio errors.

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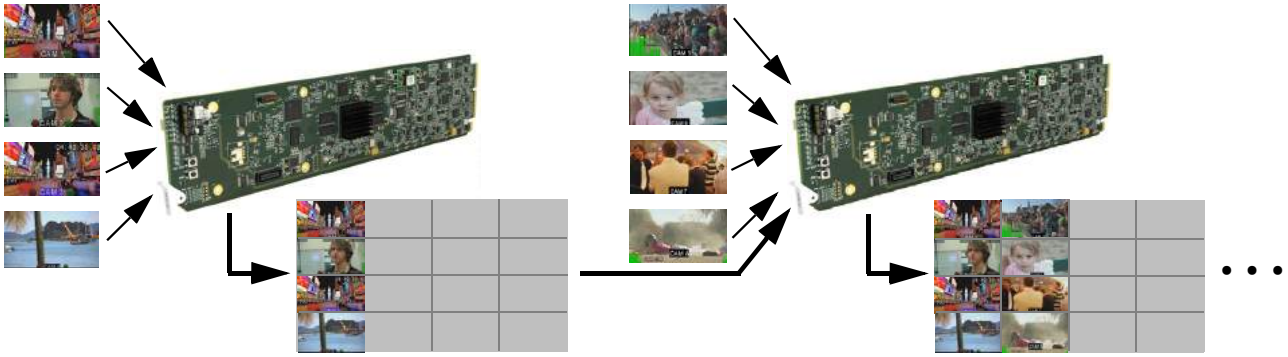
9970-QS-MC » 3G/HD/SD-SDI/CVBS EXPANDABLE MASTER CONTROL MULTIVIEWER

with Advanced On-Screen Graphics

Multiple 9970-QS-MC cards can operate in a **cascading** mode, where four PiP inputs serve as program video inputs, and the PIP5 input receives the cascading combined layout of a preceding 9970 card in a daisy-chain arrangement.

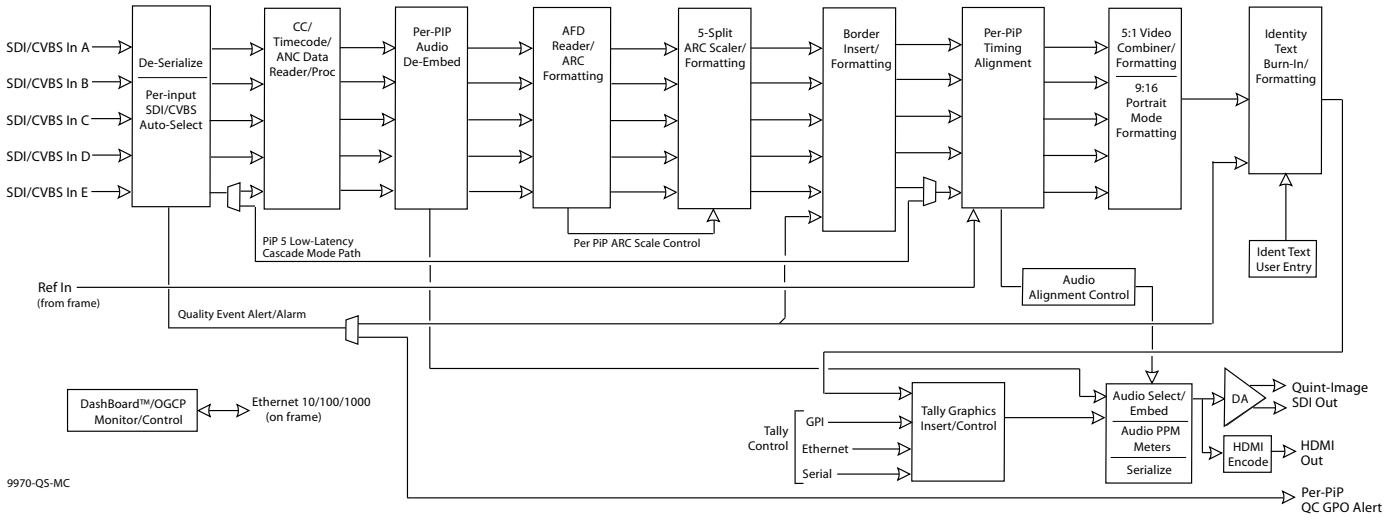


The cascade output (consisting of the four PiP images and a full-size underlay) can be sent to another 9970-QS as a **cascade** input, serving as an underlay which can accept more PiP insertions.

A Quickset grid definer precisely sets up a multiviewer grid where columns and rows of each of the cards PIPs are arranged to work together in a cascaded aggregate arrangement. Simply set for the number of rows and columns desired – the Quickset definer does the rest!

More downstream 9970-QS cards can be added and have its PiPs added next to those furnished from the upstream card cascade. Here, PiP insertions are arranged in columns, although almost any desired grid and arrangement scheme is possible.

Even more cards and PiPs can be added using open adjacent cells in the grid. Grids of up to 8x8 are supported, providing for a 64:1 multiviewer using only 16 cards all within the compact 2RU openGear-standard frame form.



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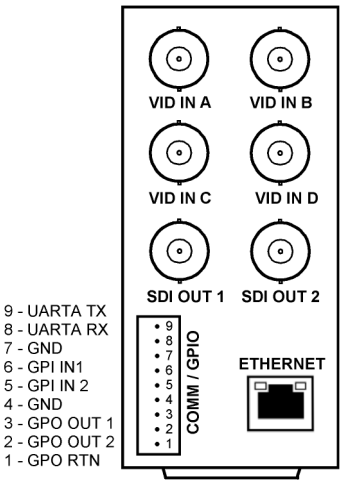
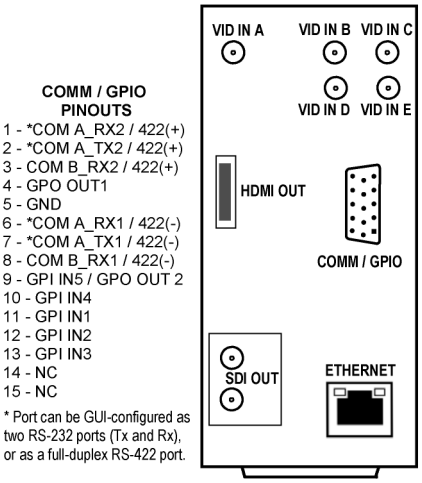
9970-QS-MC » 3G/HD/SD-SDI/CVBS EXPANDABLE MASTER CONTROL MULTIVIEWER

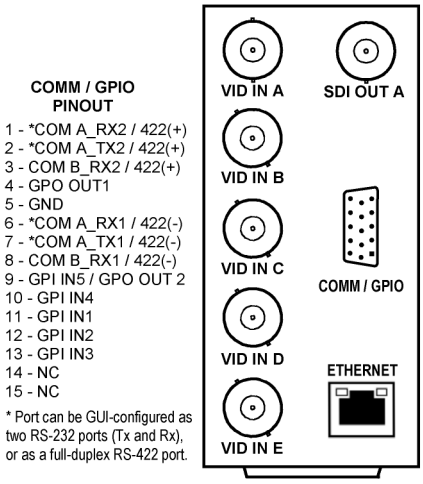
with Advanced On-Screen Graphics



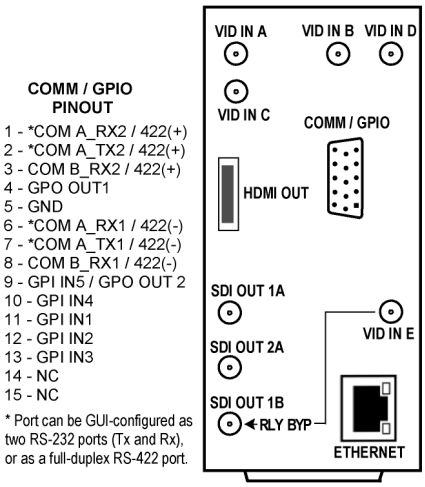
RM20-9970-B



RM20-9970-C-DIN
RM20-9970-C-HDBN



RM20-9970-D



RM20-9970-E-DIN
RM20-9970-E-HDBNC

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9970-QS-MC » 3G/HD/SD-SDI/CVBS EXPANDABLE MASTER CONTROL MULTIVIEWER

with Advanced On-Screen Graphics

SPECIFICATIONS

Power

< 18 Watts

Video Input/Outputs

Video Inputs: (5) 75Ω BNC; auto-detect/setup for 3G/HD/SD-SDI or CVBS. (3G support for Level A only.)
SDI Outputs: (2) 75Ω BNC (2x DA); user-selectable as 720p, 1080i, or 1080p (3G). (9x16 portrait output mode available only for 1080p (3G) output raster.)
HDMI Output: (1) HDMI output with audio embedding
Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M (level A)
I/O Latency: Basic PIP Input/Output < 1.5 frames (max). Cascade latency consists of basic PIP I/O latency plus < 2 line added delay.
Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timecode Burn-In

Independent per-PIP burn-in via user controls from input video SMPTE embedded timecode. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size, color, and H/V position.

Text Burn-In

Per-PIP UMD and two user identity text strings (as alternate, automatic PIP input video format can be inserted). Independent insertions controls for enable/disable. User controls for text size, color, and
H/V position.

Audio Output

16-ch embedded. Per-PIP select allows routing of PIP input 16-ch embedded audio to combined SDI output. HDMI output tracks with group 1/2 audio as selected for SDI embedded audio output.

Tally Indicators/Inputs

Per-PIP dual tally indicators. GPI , Ethernet, serial per-PIP control. Per-PIP tally lamp position and sizing controls.

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.

ORDERING INFORMATION

9970-QS-MC 3G/HD/SD-SDI/CVBS Expandable Master Control Multiviewer with Advanced On-Screen Graphics

RM20-9970-B 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI/CVBS Input BNCs, (2) 3G/HD/SD-SDI Output BNCs (2xDA), COMM/GPIO Port, Ethernet Port

RM20-9970-C-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) 3G/HD/SD-SDI DA Outputs, COMM/GPIO Port (Combined D-connector), HDMI Output, Ethernet Port (all coaxial connectors DIN 1.0/2.3)

RM20-9970-C-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) 3G/HD/SD-SDI DA Outputs, COMM/GPIO Port (Combined D-connector), HDMI Output, Ethernet Port (all coaxial connectors HD-BNC)

RM20-9970-D 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Input BNCs, (1) 3G/HD/SD-SDI Output BNC, COMM/GPIO Port (Combined D-connector), Ethernet Port

RM20-9970-E-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) SDI x2 Outputs (1 with relay bypass protect), COMM/GPIO Port (Combined HD-15 connector), HDMI Output, Ethernet Port (all coaxial connectors DIN 1.0/2.3)

RM20-9970-E-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) SDI x2 Outputs (1 with relay bypass protect), COMM/GPIO Port (Combined HD-15 connector), HDMI Output, Ethernet Port (all coaxial connectors HD-BNC)

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9971-MV6-4K » 12G/6G/3G/HD/SD UHD MULTIVIEWER

The Cobalt® **9971-MV6-4K 12G/6G/3G/HD/SD UHD Multiviewers** suite is Cobalt's next generation of advanced UHD high-capacity channel multiviewers for the openGear® platform. Full-flexibility design accommodates 12G/6G/3G/HD/SD-SDI and UHD1 3840x2160 Square DIvision (SDQS) or Two-Sample Interleave (2SI) quad 3G-SDI based formats as I/O, and can output ST 2082 12G-SDI for single-wire 4K transport. Using 12G-SDI "single-wire" inputs, up to 6 discrete PiP images can be supported. With both 12G-SDI and quad 3G-SDI inputs, the 9971-MV6-4K can downconvert 12G and quad UHD. The **9971-MV6-4H-4K** model directly works with commercial/consumer HDMI signals as both inputs and outputs without any video converter boxes being required. All 9971-MV6-4K models provide up to two HDMI 2.0 outputs for economical 4K video monitoring.

The 9971-MV6-4K suite offers unprecedented ease of setup and also offers an unprecedented ease of use. Fully-flexible layouts using any of several one-button template presets or fully customizable layouts using easy to use sizing/positioning custom controls. Any template layout or custom layout changes can be done "on-the-fly" in real time, without tedious setup or layout programs like many other multiviewer products. Graphical overlay features include user text "burn-in" insertions that can correlate the images displayed with contextual information. Numerous one-button preset layout formats are available, as well as custom layouts as desired. Custom layout and configuration settings can be saved to user presets, allowing the custom settings to be recalled with one click.

The high-density openGear® design allows for up to five 9971-MV6-4K cards to be installed in one 2RU openGear® frame. Card control/monitoring is available via DashBoard user interface or Cobalt's RESTful-based Reflex protocol.

9971-MV6-4K Models:

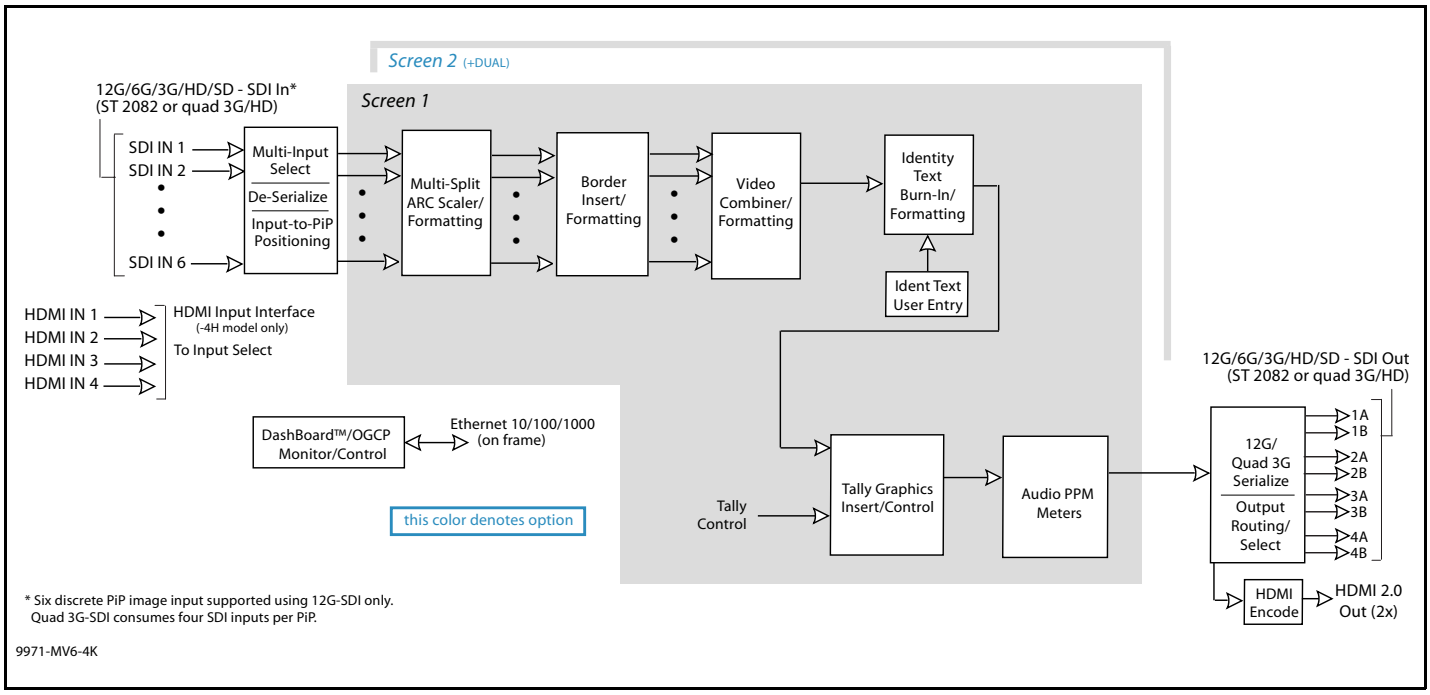
9971-MV6-4K 12G/6G/3G/HD/SD UHD Multiviewer with Six SDI Inputs
9971-MV6-4H-4K 12G/6G/3G/HD/SD UHD Multiviewer with Six SDI Inputs and Four HDMI 2.0 Inputs

FEATURES

- High-density openGear comprehensive UHD multiviewer solution
- Allows easy, real-time "on the fly" custom layout changes without needing setup or layout programs
- Supports Square Division (SDQS) and Two-Sample Interleave (2SI) quad UHD formats
- Easy to configure PiP sizing and borders
- UHD 3840x2160 output raster support
- Remote control/monitoring via Dashboard™ software, OGCP-9000 remote control panels, or Cobalt's RESTful-based Reflex protocol
- Five year warranty

OPTIONS

Dual Screen Option (+DUAL) – Enables dual head output to drive multiple monitors with different layouts. The input and output crosspoints are shared with the two independent screen processors. All functions and layout choices are independently available for both screen processors.



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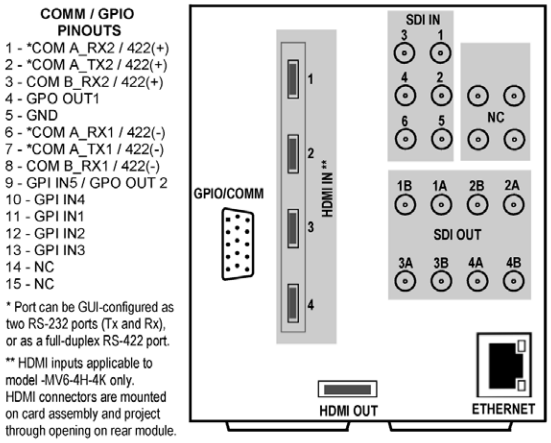
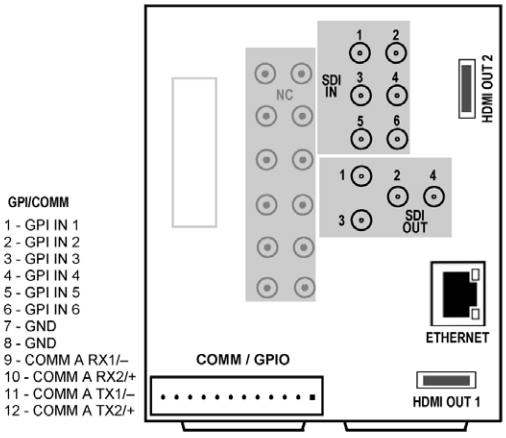
9971-MV6-4K » 12G/6G/3G/HD/SD EXPANDABLE UHD MULTIVIEWER



RM20-9971-B-HDBNC



RM20-9971-C-HDBNC

SPECIFICATIONS

12G/6G/3G/HD/SD-SDI Inputs/Outputs
(6) 75Ω inputs (max)
(8) 75Ω outputs (max)
SDI Formats Supported: SMPTE ST2082-1, ST2082-10, 424M, 292M, SMPTE 259M-C. All inputs/outputs 12G compliant and SDQS/2SI quad 3G compliant.
Return Loss:
> 15 dB up to 1.485 GHz
> 10 dB up to 3 GHz
> 7 dB up to 6 GHz
> 5 dB up to 12 GHz
Input Cable Length:
60m Belden 1694A cable at 11.88 Gbps
120m Belden 1694A cable at 2.97 Gbps
240m Belden 1694A cable at 1.485 Gbps
400m Belden 1694A cable at 270 Mbps
Output Signal Level: 800 mV ± 10%
DC Offset: 0 V ± 50 mV
Rise and Fall Time @ 11.88 Gbps: < 45 ps
Alignment Jitter (12G/3G/HD/SD): < 0.3/0.3/0.2/0.2 UI

HDMI Inputs (model 9971-MV6-4H-4K only)
(4) HDMI 2.0; type C-mini connector

HDMI Output
(2, max) HDMI 2.0 Output; type A standard connector

ORDERING INFORMATION

9971-MV6-4K 12G/6G/3G/HD/SD UHD Multiviewer with Six SDI Inputs

9971-MV6-4H-4K 12G/6G/3G/HD/SD UHD Multiviewer with Six SDI Inputs and Four HDMI 2.0 Inputs

+DUAL Dual Screen Option

RM20-9971-B-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (8) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, GPIO/COMM (HD-15 connector), HDMI 2.0 Output (type A standard), 10/100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

Note: RM20-9971-B rear module, when fitted to model 9971-MV6-4H-4K has four (4) HDMI inputs (type C mini). These inputs reside on the card assembly and project through a cutout on the rear module. The connectors are **not** part of the rear module assembly.

RM20-9971-C-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (4) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, GPIO/COMM, (2) HDMI 2.0 Output (type A standard), 10/100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

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9971-MV18-4K » 12G/6G/3G/HD/SD 18-INPUT UHD MULTIVIEWER

The Cobalt® **9971-MV18-4K 12G/6G/3G/HD/SD 18-Input UHD Multiviewer** is part of Cobalt's next generation of advanced UHD high-capacity channel multiviewers for the openGear® platform. Full-flexibility design accommodates 12G/6G/3G/HD/SD-SDI and UHD1 3840x2160 Square DIvision (SDQS) or Two-Sample Interleave (2SI) quad 3G-SDI based formats as I/O, and can output ST 2082 12G-SDI for single-wire 4K transport. Using 12G-SDI "single-wire" inputs, up to 18 discrete PiP images can be supported. With both 12G-SDI and quad 3G-SDI inputs, the 9971-MV18-4K can downconvert 12G and quad UHD. The 9971-MV18-4K provides up to two HDMI 2.0 outputs for economical 4K video monitoring.

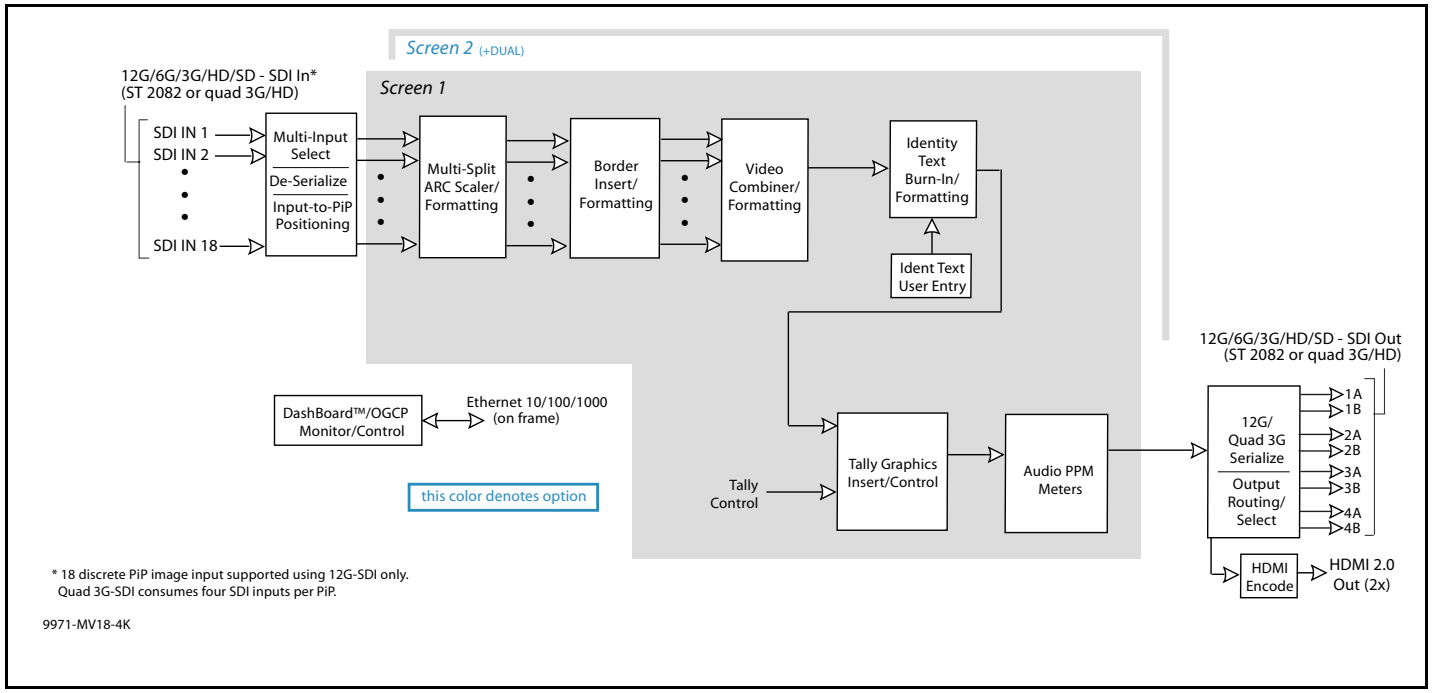
The 9971-MV18-4K suite offers unprecedented ease of setup and also offers an unprecedented ease of use. Fully-flexible layouts using any of several one-button template presets or fully customizable layouts using easy to use sizing/positioning custom controls. Any template layout or custom layout changes can be done "on-the-fly" in real time, without tedious setup or layout programs like many other multiviewer products. Graphical overlay features include user text "burn-in" insertions that can correlate the images displayed with contextual information. Numerous preset layout formats are available, as well as custom layouts as desired. The high-density openGear® design allows for up to five 9971-MV18-4K cards to be installed in one 2RU openGear® frame. Card control/monitoring is available via DashBoard user interface, or Cobalt's RESTful-based Reflex protocol.

FEATURES

- High-density openGear comprehensive UHD multiviewer solution
- Allows easy, real-time "on the fly" custom layout changes without needing setup or layout programs
- Supports Square Division (SDQS) and Two-Sample Interleave (2SI) quad UHD formats
- Easy to configure PiP sizing and borders
- UHD 3840x2160 output raster support
- Remote control/monitoring via Dashboard™ software, OGCP-9000 remote control panels, or Cobalt's RESTful-based Reflex protocol
- Five year warranty

OPTIONS

Dual Screen Option (+DUAL) – Enables dual head output to drive multiple monitors with different layouts. The input and output crosspoints are shared with the two independent screen processors. All functions and layout choices are independently available for both screen processors.



* 18 discrete PiP image input supported using 12G-SDI only.
Quad 3G-SDI consumes four SDI inputs per PiP.

9971-MV18-4K

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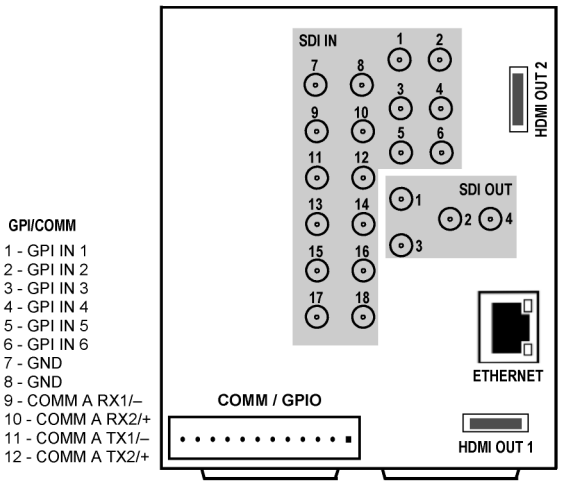
9971-MV18-4K » 12G/6G/3G/HD/SD 18-INPUT UHD MULTIVIEWER



RM20-9971-D-HDBNC

SPECIFICATIONS

12G/6G/3G/HD/SD-SDI Inputs/Outputs

(18) 75Ω inputs (max)
(4) 75Ω outputs (max)
SDI Formats Supported: SMPTE ST2082-1, ST2082-10, 424M, 292M, SMPTE 259M-C. All inputs/outputs 12G compliant and SDQS/2SI quad 3G compliant.
Return Loss:
> 15 dB up to 1.485 GHz
> 10 dB up to 3 GHz
> 7 dB up to 6 GHz
> 5 dB up to 12 GHz
Input Cable Length:
60m Belden 1694A cable at 11.88 Gbps
120m Belden 1694A cable at 2.97 Gbps
240m Belden 1694A cable at 1.485 Gbps
400m Belden 1694A cable at 270 Mbps
Output Signal Level: 800 mV ± 10%
DC Offset: 0 V ± 50 mV
Rise and Fall Time @ 11.88 Gbps: < 45 ps
Alignment Jitter (12G/3G/HD/SD): < 0.3/0.3/0.2/0.2 UI

HDMI Output

(2, max) HDMI 2.0 Output; type A standard connector

ORDERING INFORMATION

9971-MV18-4K 12G/6G/3G/HD/SD 18-Input UHD Multiviewer

+DUAL Dual Screen Option

RM20-9971-D-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (18) 12G/6G/3G/HD/SD/SD-SDI Inputs, (4) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, GPIO/COMM, (2) HDMI 2.0 Output (type A standard), 10/100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

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9902-UDX » 3G/HD/SD UP-DOWN-CROSS CONVERTER/FRAME SYNC/ AUDIO EMBED/DE-EMBED with Multi-Input Auto-Changeover

The Cobalt® **9902-UDX 3G/HD/SD Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed** with Multi-Input Auto-Changeover provides a high-density card-based solution that offers unprecedented multi-input support and flexibility.

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. It 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. Option +EAS provides EAS crawl burn-ins directly from industry standard EAS devices such as Sage™.

Quality Check option +QC allows failover to alternate inputs based on user-configurable criteria such as black/frozen frame or audio silence. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. With option +T-SLATE, import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS/quality event marker. A moving-box insertion can serve as a dynamic raster confidence check even when the input video image is static.

The up/down/cross convert scaler is specifically designed for broadcast video progressive and interlaced 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 to track with AFD. Linear Frame Rate Conversion option +FRC allows conversion between virtually any SD/HD/3G format – from 525/625i to 1080p and anything in-between – with conversion to and from NTSC and PAL available for all input and output formats. The 9902-UDX also provides analog CVBS video inputs and outputs, and AES/analog audio embedding and de-embedding.

Preset save/load allows saving custom card 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. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

- Multi-input, with manual selection or intelligent Auto-Changeover failover
- Closed-captioning absence detection and flagging, with GPO, automated alert email, go-to user preset, or other actions
- Auto-Changeover can be set to invoke failover for basic input loss.
- Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static
- Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)
- Frame Sync with full H/V offset and manual/LOS video pattern generator
- 3:2 pulldown optimization allows A-frame alignment correlated to received timecode or 6 Hz external input over GPI
- Up/Down/Cross Conversion with user and AFD, VI, and WSS ARC specifically tailored for broadcast video
- Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format
- Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs
- CVBS analog video I/O and analog/AES embed / de-embed available
- Video options include color correction, and keying Supports import of user trouble slate graphic file for LOS failover insertion
- Low-power/high-density design – less than 18 Watts per card
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- 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.
- 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.
- Key/Fill Keyer (+KEYER) – Provides keying using independent SDI inputs for key and fill signals. A separate preview SDI output is provided for observing key results before applying to program video output. Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input.
- 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.
- Trouble Slate Import (+T-SLATE) – Allows uploading of up to three different user trouble slate graphic file to card, with automated insertion controlled by GPI or other events.
- Logo Insertion (+LOGO) – Allows uploading of user logo graphic file to card, with automated insertion controlled by GPI or other events.
- 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.
- Linear Frame Rate Conversion (+FRC) – Provides comprehensive high-quality standards conversion utilizing Cobalt's linear frame rate conversion to convert between virtually any SD/HD/3G format.
- Audio LTC (+LTC)
- 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.
- 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.
- Emergency Alert System Text Crawl Generation (+EAS) – Provides a single-card solution for keying Emergency Alert System (EAS) text crawls in the active video and inserting station identification logos. Compatible with Sage™, Dasdec™, and other EAS crawl generators, with automated control insertion via presence of crawl data or GPI.
- Extended Frame Sync Delay (+DLY)
- Ancillary Data Processor (+ANC) – Provides full user VANC/HANC packet insertion/ extraction access to DID/SDID ancillary data, with insert/extract to and from IP, RS-232/RS-422 serial, and GPIO external interfaces. Bridge mode can be set to preserve special/custom ANC packages when card scaler is enabled.

acapela group
Acapela Text-To-Speech from Acapela Group™

openGear®

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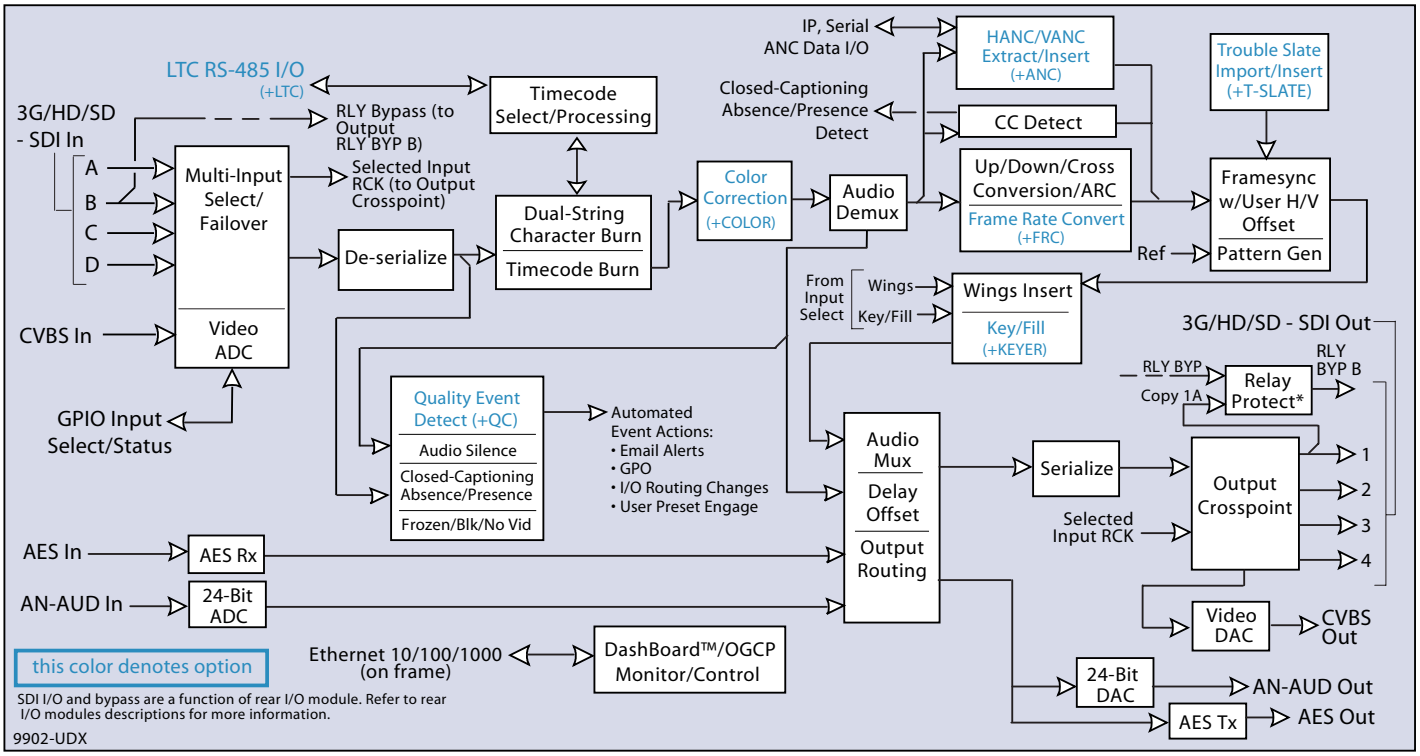
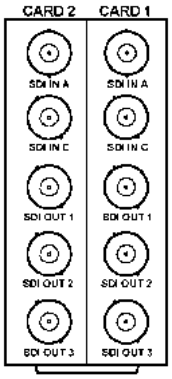
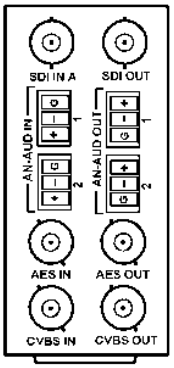
9902-UDX » 3G/HD/SD UP-DOWN-CROSS CONVERTER/FRAME SYNC/ AUDIO EMBED/DE-EMBED with Multi-Input Auto-Changeover

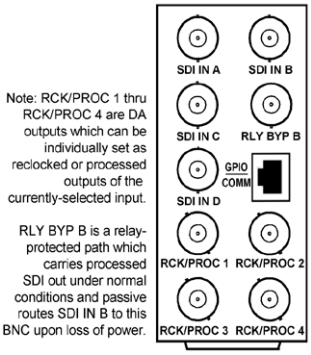




RM20-9902-A/S



RM20-9902-B



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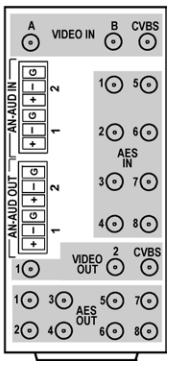
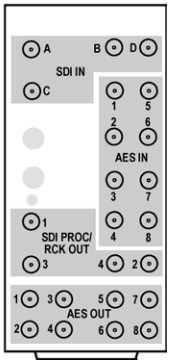
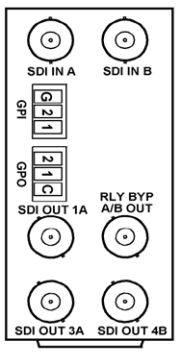


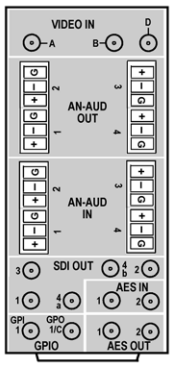
RM20-9902-D-DIN
RM20-9902-D-HDBNC



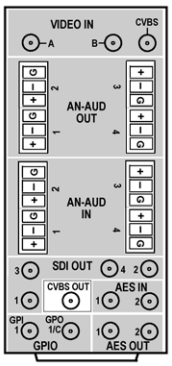
RM20-9902-E-DIN
RM20-9902-E-HDBNC



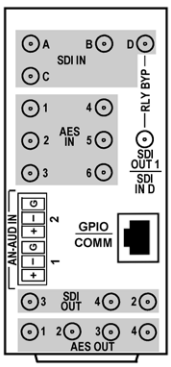
RM20-9902-F



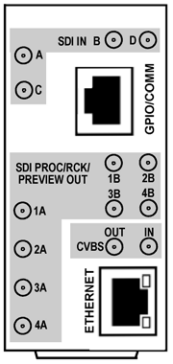
RM20-9902-H-DIN
RM20-9902-H-HDBNC



RM20-9902-J-DIN
RM20-9902-J-HDBNC



RM20-9902-K-DIN
RM20-9902-K-HDBNC



RM20-9902-L-DIN
RM20-9902-L-HDBNC

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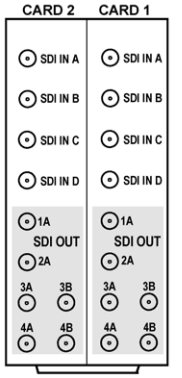
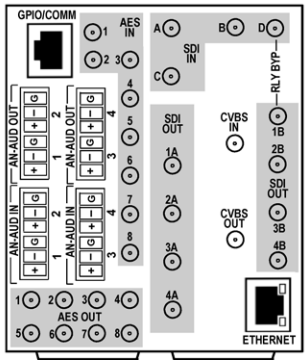
9902-UDX » 3G/HD/SD UP-DOWN-CROSS CONVERTER/FRAME SYNC/ AUDIO EMBED/DE-EMBED with Multi-Input Auto-Changeover



RM20-9902-M/S-DIN
RM20-9902-M/S-HDBNC



RM20-9902-N-DIN
RM20-9902-N-HDBNC

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Input/Outputs

Up to (4) 75Ω BNC inputs
Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)
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 and scaler 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)
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

CVBS Video Input/Outputs

(1) 75Ω BNC input
(1) 75Ω BNC output. CVBS can be upconverted to any supported SDI format; all formats can be downconverted to CVBS.
ADC resolution/sampling: 10-bit; 4x oversampling
DAC resolution/sampling: 10-bit; 16x oversampling
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)

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9902-UDX » 3G/HD/SD UP-DOWN-CROSS CONVERTER/FRAME SYNC/ AUDIO EMBED/DE-EMBED with Multi-Input Auto-Changeover

SPECIFICATIONS (cont.)

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.

User Audio Delay Offset from Video

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

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.

ORDERING INFORMATION

9902-UDX 3G/HD/SD Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed with Multi-Input Auto-Changeover

RM20-9902-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNC, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per each Card 1 / Card 2 connector bank)

RM20-9902-B 20-Slot Frame Rear I/O Module (Standard-Width) (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Input BNC, (2) Balanced Analog Audio Inputs, (1) AES Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Processed Out BNC, (2) Balanced Analog Audio Outputs, (1) AES Output BNC

RM20-9902-C 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) 3G/HD/SDI Output BNC (with relay bypass failover), GPIO/COMM RJ-45 connector

RM20-9902-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9902-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC.)

RM20-9902-E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9902-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC.)

RM20-9902-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as processed or reclocked of selected input, (2) GPI, (2) GPO

RM20-9902-H-DIN 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9902-H-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9902-J-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9902-J-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

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9902-UDX » 3G/HD/SD UP-DOWN-CROSS CONVERTER/FRAME SYNC/ AUDIO EMBED/DE-EMBED with Multi-Input Auto-Changeover

ORDERING INFORMATION (cont.)

RM20-9902-K-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO/COMM RJ-45 connector (All coaxial connectors DIN1.0/2.3)

RM20-9902-K-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO/COMM RJ-45 connector (All coaxial connectors HD-BNC)

RM20-9902-L-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9902-L-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors HD-BNC)

RM20-9902-M/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors DIN1.0/2.3)

RM20-9902-M/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors HD-BNC)

RM20-9902-N-DIN 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect) , (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors DIN1.0/2.3.)

RM20-9902-N-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect) , (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

Options:

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer Option

+QC Quality Check Option

+CQS Clean and Quiet Switching Option

+FRC Linear Frame Rate Conversion Option

+LTC Audio LTC I/O Option

+TTS Text-To-Speech Option (Acapela Text-To-Speech from Acapela Group™. Installation requires option upload and installation of speech library SD memory card onto host card. Pre-loaded SD card and instructions provided.)

+DLY Extended Frame Sync Delay Option

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

+EAS Emergency Alert System Text Crawl Generation Option

+T-SLATE User Trouble Slate Graphic Import Option

+LOGO Logo Insertion Option

+SCTE104 SCTE 104 Insertion Option

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

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BBG-1002-UDX » 3G/HD/SD-SDI STANDALONE UP-DOWN-CROSS CONVERTER/FRAME SYNC/ AUDIO EMBED/DE-EMBED with Multi-Input Auto-Changeover

The Cobalt® **BBG-1002-UDX 3G/HD/SD-SDI Standalone Up-Down-Cross Converter/Frame Sync/Audio Embed-De-Embed with Multi-Input Auto-Changeover** provides a high-density standalone unit that offers unprecedented multi-input support and flexibility.

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. It 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. Option **+EAS** provides EAS crawl burn-ins directly from industry standard EAS devices such as Sage™.

Quality Check option **+QC** allows failover to alternate inputs based on user-configurable subjective criteria such as black/frozen frame. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. With option **+T-SLATE**, import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS/quality event marker. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even when the input video image is static. Included standard is closed captioning absence/presence detection for CEA 608/708 and line 21 SD closed captioning.

The up/down/cross convert scaler is specifically designed for broadcast video progressive and interlaced 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 to track with AFD. Linear Frame Rate Conversion option **+FRC** allows conversion between virtually any SD/HD/3G format – from 525/625i to 1080p and anything in-between – with conversion to and from NTSC and PAL available for all input and output formats. The BBG-1002-UDX also provides analog CVBS video inputs and outputs, and AES/analog audio embedding and de-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-UDX 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-UDX 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

- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Multi-input, with manual selection or intelligent Auto-Changeover failover
- Closed-captioning absence detection and flagging, with GPO, automated alert email, go-to user preset, or other actions
- Auto-Changeover can be set to invoke failover for basic input loss. Quality Check option (**+QC**) provides failover on subjective criteria such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.
- Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static
- Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)
- Frame Sync with full H/V offset and manual/LOS video pattern generator
- 3:2 pulldown optimization allows A-frame alignment correlated to received timecode or 6 Hz external input over GPI
- Option **+TTS** provides Text-To-Speech synthesis, directly converting EAS text to high-quality digital audio speech with no baseband signal breakouts or add-on units
- Up/Down/Cross Conversion with user and AFD, VI, and WSS ARC specifically tailored for broadcast video
- Supports import of user trouble slate graphic file for LOS failover insertion
- Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format
- Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs
- CVBS analog video I/O and analog/AES embed / de-embed available
- Video options include CGMS support, color correction, and keying
- Option **+ANC** adds full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, closed captioning, and other specialized user payloads. Multi-mode setup includes Bridge mode (device internal path with scaler bypass bridging) or Insert/Extract modes for insert/ extract to or from IP/serial external interfaces. SMPTE 337 embed/de-embed allows serial user data to be embedded and de-embedded over unused embedded audio pairs.
- Supports import of user trouble slate graphic file for LOS failover insertion
- 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

acapela group
Acapela Text-To-Speech from Acapela Group™

DashBoard

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BBG-1002-UDX » 3G/HD/SD-SDI STANDALONE UP-DOWN-CROSS CONVERTER/FRAME SYNC/ AUDIO EMBED/DE-EMBED with Multi-Input Auto-Changeover

OPTIONS

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

Key/Fill Keyer (**+KEYER**) – Provides keying using independent SDI inputs for key and fill signals. A separate preview SDI output is provided for observing key results before applying to program video output. Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input.

Extended Frame Sync 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.

Trouble Slate Import (**+T-SLATE**) – Allows uploading of up to three different user trouble slate graphic file to the BBG unit, with automated insertion controlled by GPI or other events.

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.

Linear Frame Rate Conversion (**+FRC**) – Provides comprehensive high-quality standards conversion utilizing Cobalt's linear frame rate conversion to convert between virtually any SD/HD/3G format.

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

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.

Ancillary Data Processor (**+ANC**). Provides full user VANC/HANC packet insertion/extraction access to DID/ SDID ancillary data, with insert/extract to and from IP, RS-232/RS-422 serial, and GPIO external interfaces. Bridge mode can be set to preserve special/custom ANC packages when scaler is enabled. SMPTE 337 embed/ de-embed allows serial user data to be embedded and de-embedded over unused embedded audio pairs.

Logo Insertion Option (**+LOGO**) – Allows uploading of user logo graphic file to BBG unit, with automated insertion controlled by GPI or other events.

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.

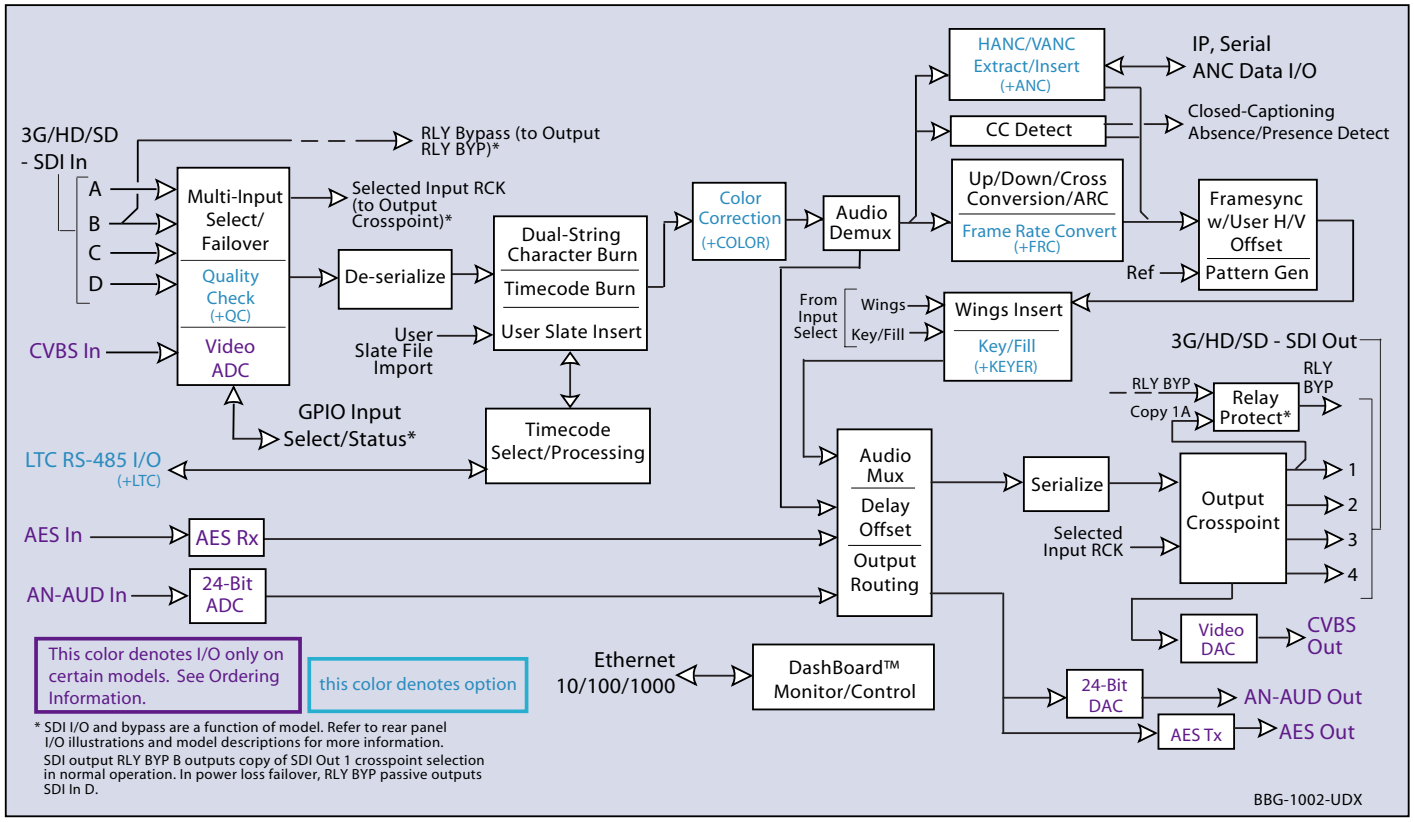
Emergency Alert System Text Crawl Generation (**+EAS**) – Provides a single-device solution for keying Emergency Alert System (EAS) text crawls in the active video and inserting station identification logos. Compatible with Sage™, Dasdec™, and other EAS crawl generators, with automated control insertion via presence of crawl data or GPI.

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.

Audio LTC I/O (**+LTC**)

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

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



* SDI I/O and bypass are a function of model. Refer to rear panel I/O illustrations and model descriptions for more information.
SDI output RLY BYP B outputs copy of SDI Out 1 crosspoint selection in normal operation. In power loss failover, RLY BYP passive outputs SDI In D.

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BBG-1002-UDX » 3G/HD/SD-SDI STANDALONE UP-DOWN-CROSS CONVERTER/FRAME SYNC/ AUDIO EMBED/DE-EMBED with Multi-Input Auto-Changeover

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of model. See rear panel illustrations for I/O complements offered.

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 IN or IN RCK)
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
Minimum Latency (scaler and 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. CVBS can be upconverted to any supported SDI format; all formats can be downconverted to CVBS.
ADC resolution/sampling: 10-bit; 4x oversampling
DAC resolution/sampling: 10-bit; 16x oversampling
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

(1) AES-3id 75Ω BNC input
(1) AES-3id 75Ω BNC output
(2) Balanced analog audio inputs
(2) Balanced analog audio outputs
I/O conforms to 0 dBFS = +24 dBu

Input Select/Auto-Changeover Failover

Manual selection (forced) of any input.
· Failover to alternate input on loss of target input. Failover invoked upon LOS and/or (with option +QC) user configurable parametric criteria such as black/frozen frame or audio silence.
- Black frame trigger configurable for black intensity threshold and persistence time.
- Frozen frame trigger configurable for frozen percentage difference and persistence time.
- Audio silence trigger configurable for dBFS floor threshold and persistence time.
· Relay bypass SDI IN B to RLY BYP B upon loss of power.

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.

User Audio Delay Offset from Video

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

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

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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BBG-1002-UDX » 3G/HD/SD-SDI STANDALONE UP-DOWN-CROSS CONVERTER/FRAME SYNC/ AUDIO EMBED/DE-EMBED with Multi-Input Auto-Changeover

ORDERING INFORMATION

BBG-1002-UDX 3G/HD/SD-SDI Stand-alone Up/Down/Cross Converting Frame Sync and Embedded Audio Proc with (4) 3G/HD/SD-SDI Input BNCs w/ (1) Relay Protect), (4) 3G/HD/SDI Output BNCs, GPIO/COMM (RJ-45 connector), (1) Gigabit Ethernet, Looping Reference and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply)

BBG-1002-UDX-B 3G/HD/SD-SDI Stand-alone Up/Down/Cross Converting Frame Sync and Audio Embedder/De-Embedder with (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Input BNC, (1) AES Input BNC, (2) Balanced Analog Inputs, (1) 3G/HD/SDI Output BNC, (1) CVBS Output BNC, (1) AES Output BNC, (2) Balanced Analog Audio Outputs, (1) Gigabit Ethernet, Looping Reference I/O and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply)

BBG-1002-UDX-C 3G/HD/SD-SDI Stand-alone Up/Down/Cross Converting Frame Sync and Audio Embedder/De-Embedder with (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Video In BNC, (2) AES In BNCs, (2) Balanced Analog Audio Inputs, (1) 3G/HD/SDI Output BNC, (1) CVBS Video Out BNC), (2) AES Out BNCs, (2) Balanced Analog Audio Outputs, (1) Gigabit Ethernet, Looping Reference I/O and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply)

BBG-1002-UDX-D-DIN 3G/HD/SD-SDI Stand-alone Up/Down/Cross Converting Frame Sync and Audio Embedder/De-Embedder with (4) 3G/HD/SD-SDI Inputs, (2) Balanced Analog Audio In, (6) AES Inputs, (4) 3G/HD/SDI Outputs w/ (1) relay protect, (4) AES Outputs, GPIO/COMM (RJ-45 connector) (1) Gigabit Ethernet, Looping Reference and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply; All coaxial connectors DIN 1.0/2.3)

BBG-1002-UDX-D-HDBNC 3G/HD/SD-SDI Stand-alone Up/Down/Cross Converting Frame Sync and Audio Embedder/De-Embedder with (4) 3G/HD/SD-SDI Inputs, (2) Balanced Analog Audio In, (6) AES Inputs, (4) 3G/HD/SDI Outputs w/ (1) relay protect, (4) AES Outputs, GPIO/COMM (RJ-45 connector) (1) Gigabit Ethernet, Looping Reference and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply; all coaxial connectors HDBNC)

Options and Accessories:

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer Option

+FRC Linear Frame Rate Conversion Option

+LTC Audio LTC I/O Option

+QC Quality Check Option

+CQS Clean and Quiet Switching 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)

+EAS Emergency Alert System Text Crawl Generation Option

+T-SLATE User Trouble Slate Graphic Import Option

+LOGO Logo Insertion 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)

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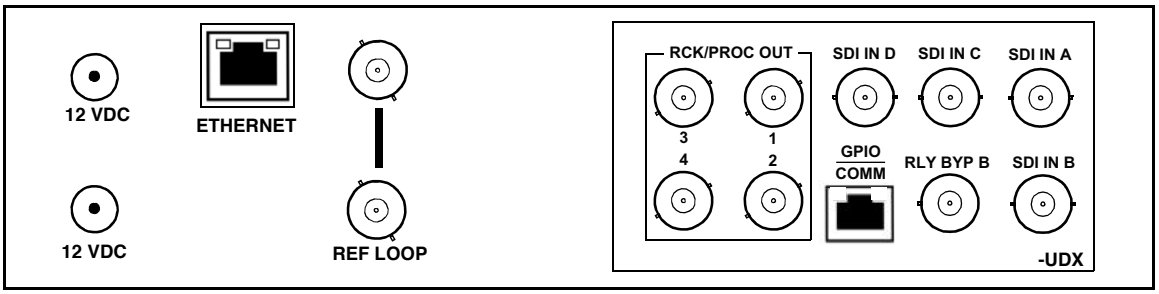
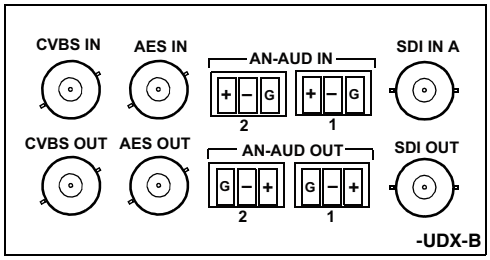
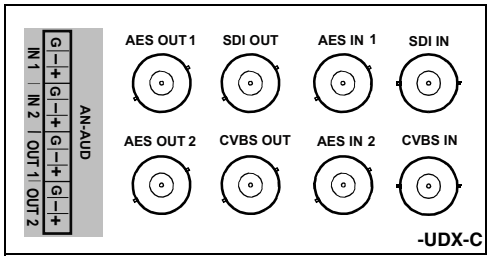
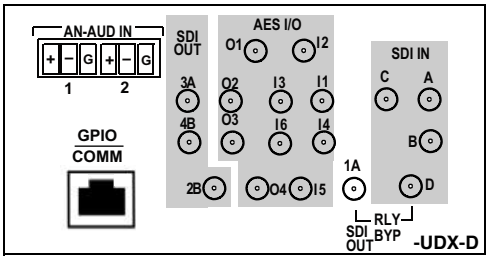
BBG-1002-UDX » 3G/HD/SD-SDI STANDALONE UP-DOWN-CROSS CONVERTER/FRAME SYNC/ AUDIO EMBED/DE-EMBED with Multi-Input Auto-Changeover

Rear Panel









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9902-2UDX » 3G/HD/SD-SDI DUAL-CHANNEL UP-DOWN-CROSS CONVERTER / FRAME SYNC / AUDIO EMBED/DE-EMBED

The Cobalt® **9902-2UDX 3G/HD/SD-SDI 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 openGear® card. Using our HPF-9000 20-slot frame, this provides up to 40 channels of processing in a single frame. The 9902-2UDX represents a new level of openGear packaging density!

The 9902-2UDX provides high-density that offers unprecedented multi-input support and flexibility. Dual independent up/down/cross convert 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. 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. Analog video (CVBS) input, with AES and analog audio audio embedding and de-embedding is also supported.

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 9902-2UDX 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. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

- 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
- 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
- Video options include color correction
- CVBS analog video input and analog/AES embed / de-embed with 4-line Adaptive Comb Filter
- Pattern generator for each channel can provide raster/test pattern and patterns for LOS failover insertion
- Low-power/high-density design – less than 18 Watts per card
- Remote control/monitoring via DashBoard™ software or OGCP-9000 Remote Control Panel
- 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 (+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)

acapela group
Acapela Text-To-Speech from Acapela Group™

openGear®

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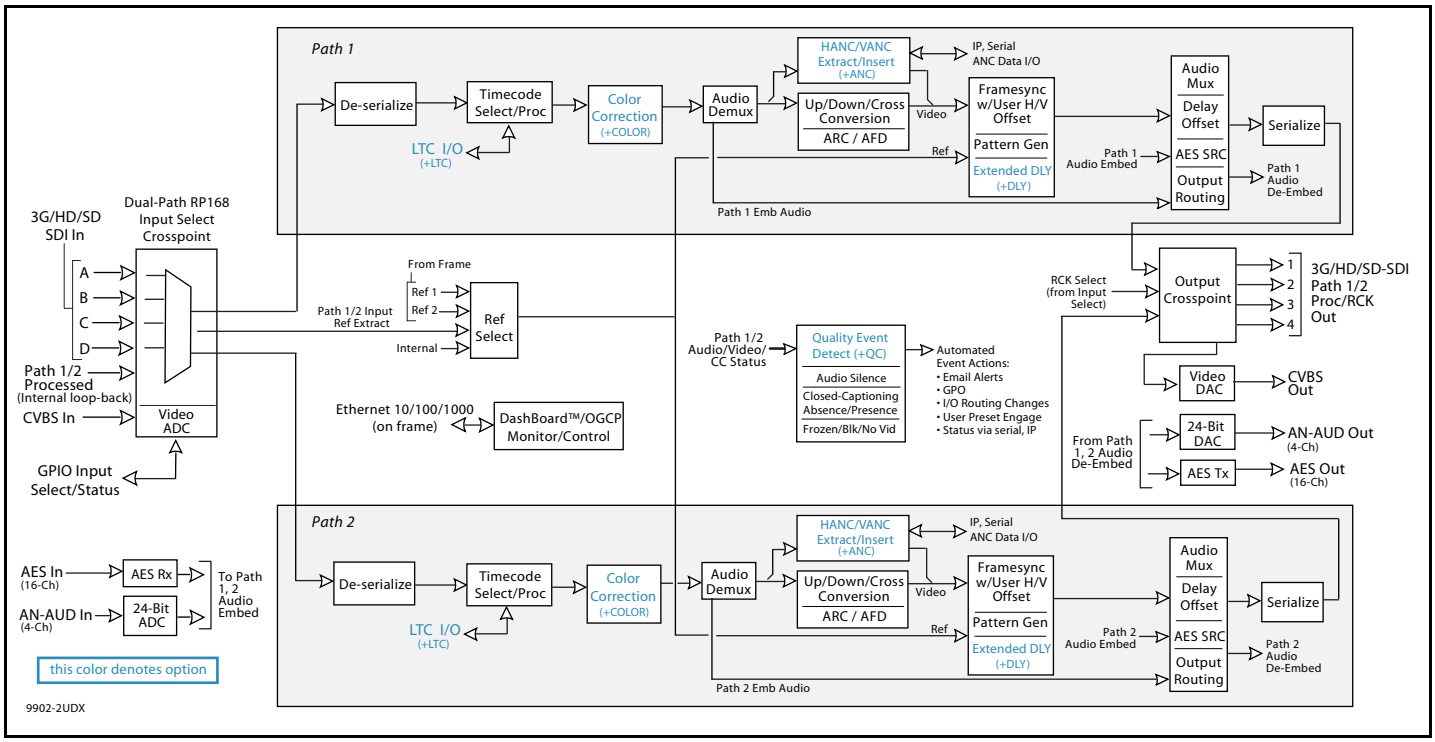
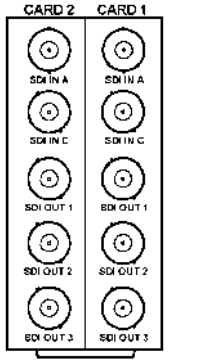
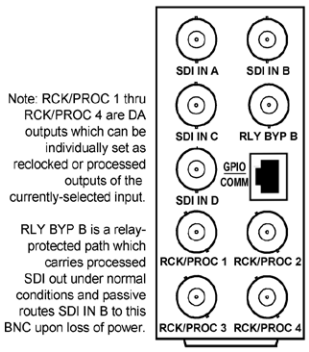
9902-2UDX » 3G/HD/SD-SDI DUAL-CHANNEL UP-DOWN-CROSS CONVERTER / FRAME SYNC / AUDIO EMBED/DE-EMBED

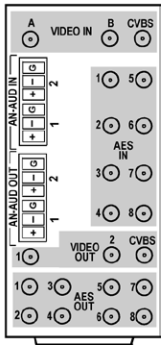




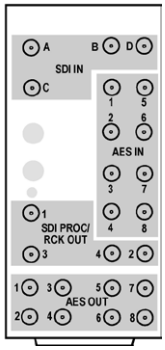
RM20-9902-2UDX-A/S



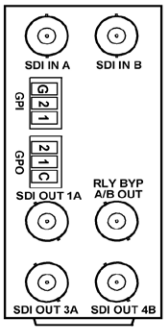
RM20-9902-2UDX-C



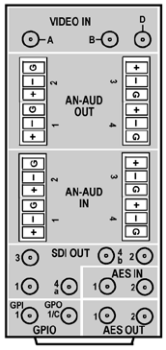
RM20-9902-2UDX-D- (DIN / HDBNC)



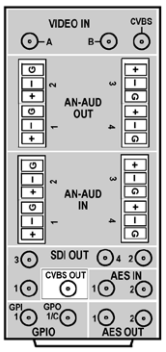
RM20-9902-2UDX-E- (DIN HDBNC)



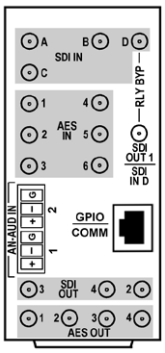
RM20-9902-2UDX-F



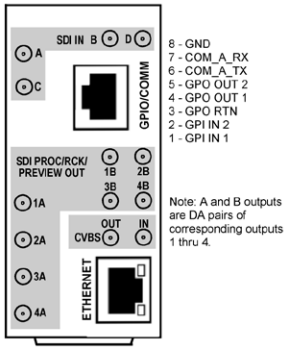
RM20-9902-2UDX-H- (DIN / HDBNC)



RM20-9902-2UDX-J- (DIN / HDBNC)



RM20-9902-2UDX-K (DIN / HDBNC)



RM20-9902-2UDX-L- (DIN / HDBNC)

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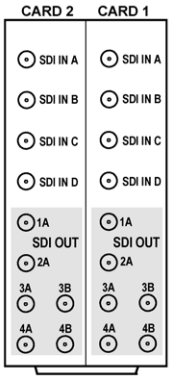
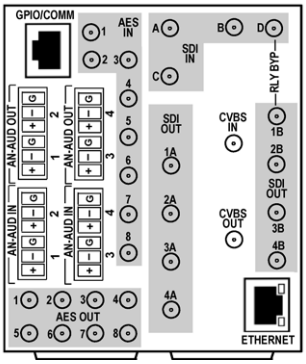
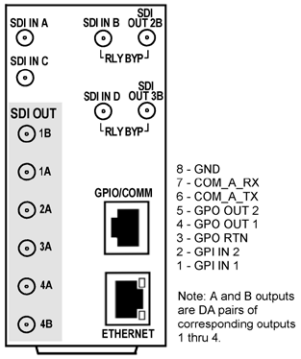
9902-2UDX » 3G/HD/SD-SDI DUAL-CHANNEL UP-DOWN-CROSS CONVERTER / FRAME SYNC / AUDIO EMBED/DE-EMBED



RM20-9902-2UDX-M/S-
(DIN / HDBNC)



RM20-9902-2UDX-N-
(DIN / HDBNC)



RM20-9902-2UDX-P-
(DIN / HDBNC)

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

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 reclocked)
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)
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

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 THD+N: -96 dB (20 Hz to 10 kHz)
Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

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9902-2UDX » 3G/HD/SD-SDI DUAL-CHANNEL UP-DOWN-CROSS CONVERTER / FRAME SYNC / AUDIO EMBED/DE-EMBED

SPECIFICATIONS (cont.)

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. All connections via rear module RJ-45 GPIO/COMM jack.

Frame Reference Input

(2) reference from frame bus or selected program video ref sources. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.
Return Loss: >35 dB up to 5.75 MHz

ORDERING INFORMATION

9902-2UDX 3G/HD/SD-SDI Dual-Channel Up-Down-Cross Converter / Frame Sync / Audio Embed/De-Embed

RM20-9902-2UDX-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNC, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per each Card 1 / Card 2 connector bank)

RM20-9902-2UDX-C 20-Slot Frame Rear I/O Module (Standard Width) (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

RM20-9902-2UDX-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3)

RM20-9902-2UDX-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC)

RM20-9902-2UDX- E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3)

RM20-9902-2UDX-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC)ORD INFO

RM20-9902-2UDX-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as Processed or Reclocked of selected input, (2) GPI, (2) GPO

RM20-9902-2UDX-H-DIN 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9902-2UDX-H-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9902-2UDX-J-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9902-2UDX-J-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9902-2UDX-K-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO/COMM RJ-45 connector (All coaxial connectors DIN1.0/2.3)

RM20-9902-2UDX-K-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO/COMM RJ-45 connector (All coaxial connectors HD-BNC)

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9902-2UDX » 3G/HD/SD-SDI DUAL-CHANNEL UP-DOWN-CROSS CONVERTER / FRAME SYNC / AUDIO EMBED/DE-EMBED

ORDERING INFORMATION (cont.)

RM20-9902-2UDX-L-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9902-2UDX-L-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors HD-BNC)

RM20-9902-2UDX-M/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors DIN1.0/2.3)

RM20-9902-2UDX-M/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors HD-BNC)

RM20-9902-2UDX-N-DIN 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors DIN1.0/2.3.)

RM20-9902-2UDX-N-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

RM20-9902-2UDX-P-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs (2 with independent relay bypass), (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9902-2UDX-P-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs (2 with independent relay bypass), (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors HD-BNC)

Options:

+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™. Installation requires option upload and installation of speech library SD memory card onto host card. Pre-loaded SD card and instructions provided.)

+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

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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 convert 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
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- 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.
- 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
- Up/Down/Cross Conversion with user and AFD, VI, and WSS ARC specifically tailored for broadcast video
- 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**)

DashBoard

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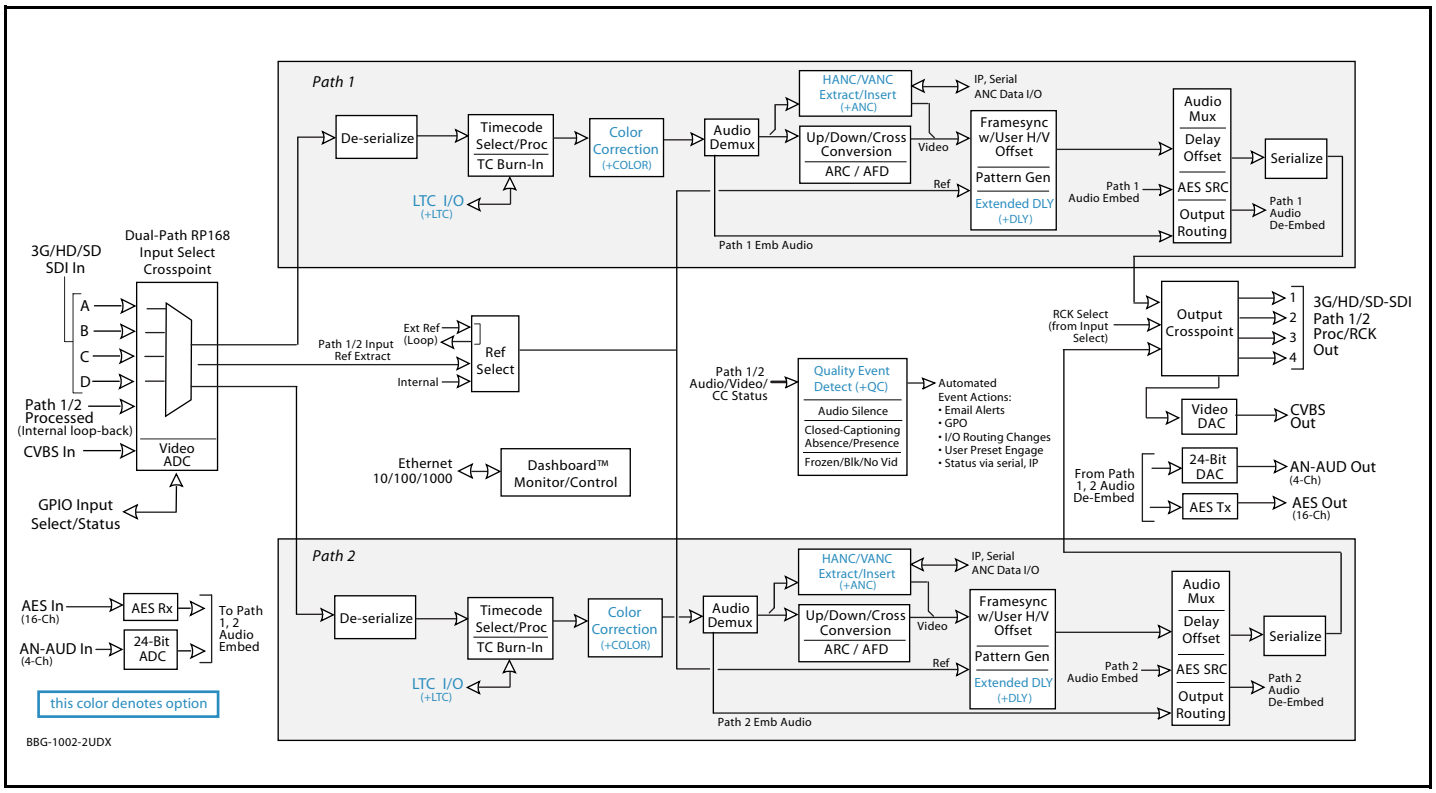
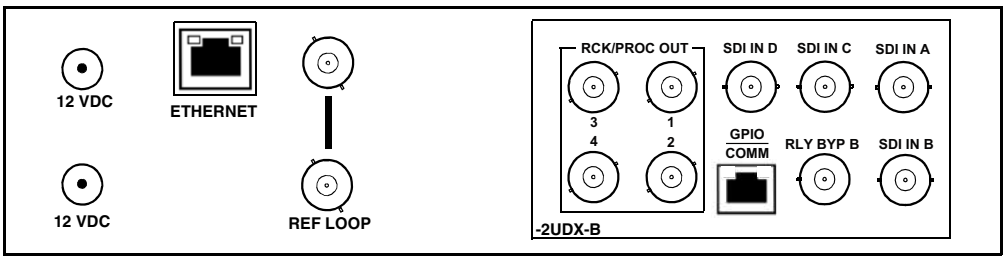
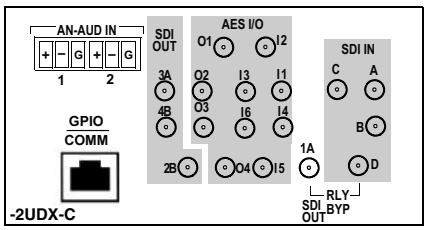
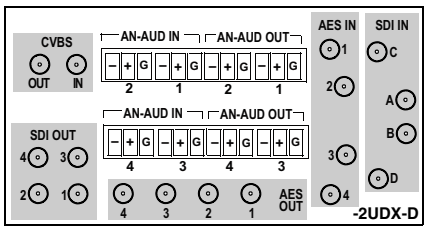
BBG-1002-2UDX » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL UP-DOWN-CROSS CONVERTER / FRAME SYNC / AUDIO EMBED/DE-EMBED

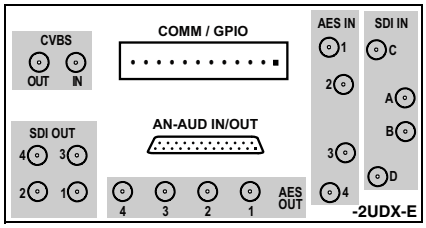


Rear Panel









acapela group

Acapela Text-To-Speech from Acapela Group™

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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 reclocked)
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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BBG-1002-2UDX » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL UP-DOWN-CROSS CONVERTER / FRAME SYNC / AUDIO EMBED/DE-EMBED

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)

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9903-UDX-ADDA » 3G/HD/SD-SDI UNIVERSAL FORMAT CONVERTER with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Frame Sync, AES and Analog Audio Embedding / De-Embedding

The Cobalt® **9903-UDX-ADDA 3G/HD/SD-SDI Universal Format Converter** with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Frame Sync, AES and Analog Audio Embedding / De-Embedding provides a high-density card-based solution that offers unprecedented multi-input support, flexibility, and ease of use and integration for SDI and analog video and discrete audio. Frame sync provides glitch-free audio upon frame sync events, with video/audio offsets user configurable. 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.

With option +ANC, the 9903-UDX-ADDA offers full VANC/HANC ancillary data packet de-embedding and embedding for 3G/HD/SD-SDI streams. The easy to use interface allows direct access to DID and SDID locations to extract or insert 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 card, bypassing the scaler (Bridge mode), or inserted and/or extracted to and from external interface via serial or IP interfaces.

Multiple SDI input ports allow selection from multiple input sources with failover. Both CVBS and component analog video is supported both as inputs and outputs.

The up/down/cross convert scaler is specifically designed for broadcast video formats, with full ARC control suitable for conversions to or from 4:3 and 16:9 aspect ratios. Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode.

Preset save/load allows saving custom card 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. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

- Multi-input, with failover switching
- Universal I/O support – analog CVBS and component inputs and outputs, as well as analog and AES audio embed/de-embed. 10-bit processing with 5-line adaptive comb filtered SD Y/C separation.
- Frame Sync with full H/V offset and manual/LOS video pattern generator
- Up/Down/Cross Conversion with user and AFD, VI, and WSS ARC specifically tailored for broadcast video
- Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC
- Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs
- Option +ANC adds full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, closed captioning, and other specialized user payloads. Multi-mode setup includes Bridge mode (card internal path with scaler bypass bridging) or Insert/Extract modes for insert/extract to or from IP/serial external interfaces.
- Available color correction option
- Low-power/high-density design – less than 13 Watts per card
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Five year warranty

OPTIONS

- Audio LTC I/O (+LTC)
- Ancillary Data Processor (+ANC) – Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data, with insert/extract to and from IP, RS-232/RS-422 serial, and GPIO external interfaces. Bridge mode can be set to preserve special/custom ANC packages when card scaler is enabled.
- Color Correction (+COLOR) – Full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip
- SCTE 104 Insertion Option (+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.

openGear®

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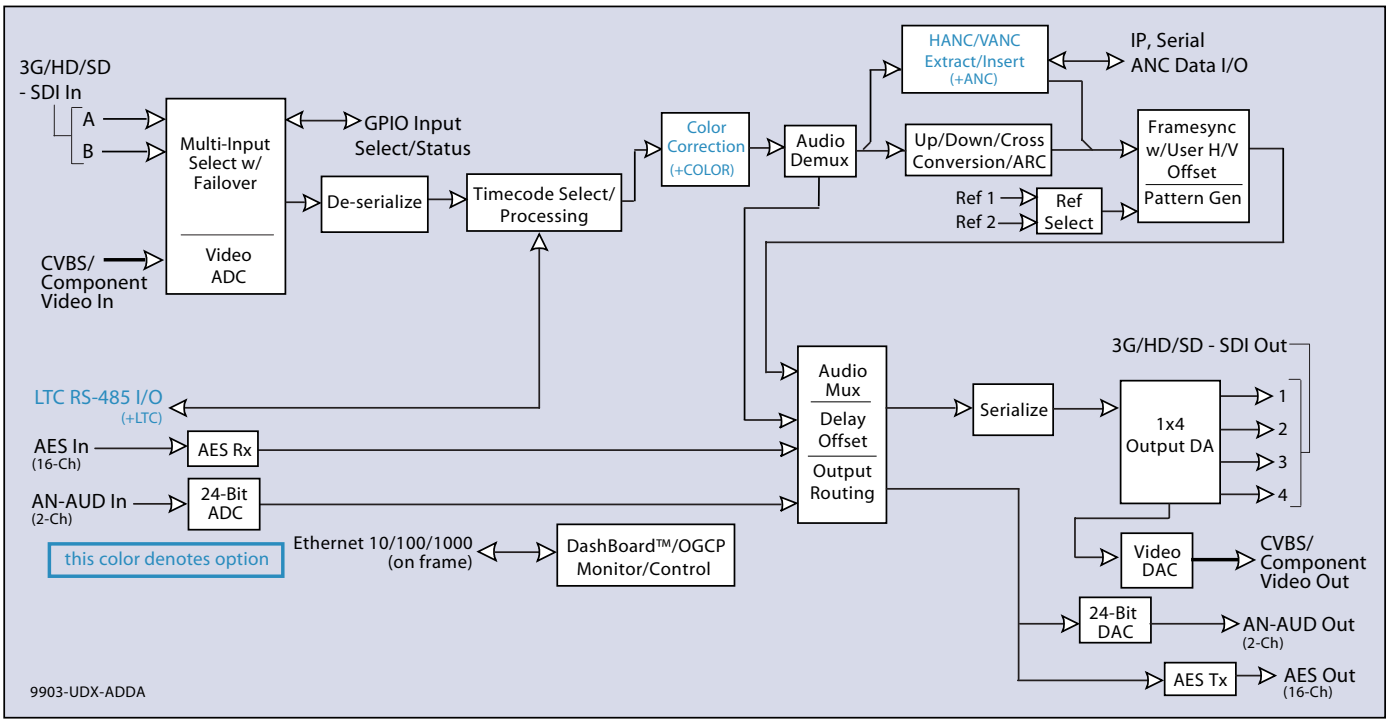
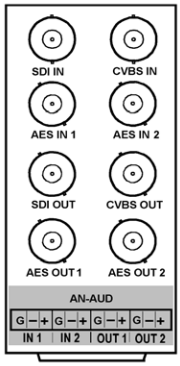
9903-UDX-ADDA » 3G/HD/SD-SDI UNIVERSAL FORMAT CONVERTER with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Frame Sync, AES and Analog Audio Embedding / De-Embedding





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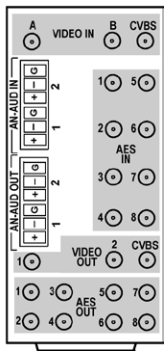
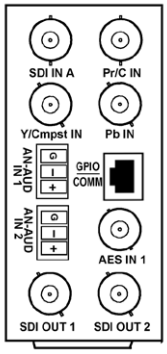
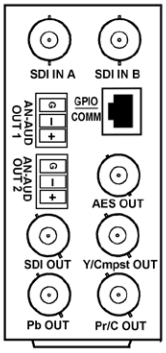


RM20-9903-D-DIN
RM20-9903-D-HDBNC



RM20-9903-E



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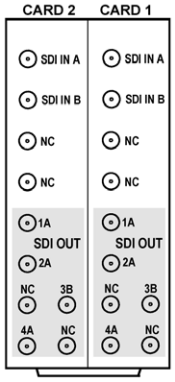
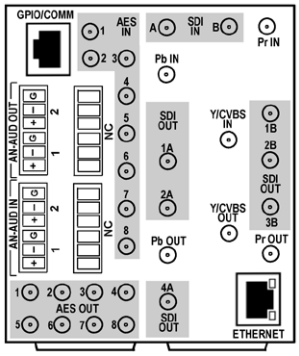


RM20-9903-G/S-DIN
RM20-9903-G/S-HDBNC



RM20-9903-H-DIN
RM20-9903-H-HDBNC

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9903-UDX-ADDA » 3G/HD/SD-SDI UNIVERSAL FORMAT CONVERTER with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Frame Sync, AES and Analog Audio Embedding / De-Embedding

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 13 Watts

SDI Input/Outputs

Up to (2) 75Ω BNC inputs
Up to (4) 75Ω BNC outputs
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
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Analog Video Input/Outputs

(1) 75Ω BNC CVBS input
(1) 75Ω BNC CVBS output. CVBS can be upscaled to any supported SDI format; all SDI formats can be downconverted to CVBS.
(3) 75Ω BNC Component Video inputs (Y, Cb, Cr)
(3) 75Ω BNC Component Video outputs (Y, Cb, Cr)
ADC resolution: 10-bit
Sampling frequency: 54 MHz (4x over-sampling SD)
SD Y/C separation: 5-line Adaptive Comb Filter
SD Freq. Response: ± 0.25 dB to 5.5 MHz
SD SNR: > 55 dB to 5.5 MHz (unweighted)
Differential Phase: < 1 degree
Differential Gain: < 1%
Nonlinearity < 1%
HD Freq. Response: Y 30 MHz., PbPr 15 MHz
HD SNR: > 55 dB to 30 MHz (unweighted)

Discrete Audio Input/Outputs

(8) AES-3id 75Ω BNC input
(8) AES-3id 75Ω BNC output
(2) Balanced analog audio inputs
(2) Balanced analog audio outputs
I/O conforms to 0 dBFS = +24 dBu
Analog Input Impedance: >10 kΩ
Analog Reference Level: -20 dBFS
Analog Nominal Level: +4 dBu
Analog Input Clip Level: +24 dBu (0 dBFS)
Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)
Analog SNR: 115 dB (A weighted)
Analog THD+N: -96 dB (20 Hz to 10 kHz)
Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

ARC

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

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.
Return Loss: >35 dB up to 5.75 MHz

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9903-UDX-ADDA » 3G/HD/SD-SDI UNIVERSAL FORMAT CONVERTER with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Frame Sync, AES and Analog Audio Embedding / De-Embedding

ORDERING INFORMATION

9903-UDX-ADDA 3G/HD/SD-SDI Universal Format Converter with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Frame Sync, AES and Analog Audio Embedding / De-Embedding

RM20-9903-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Input BNC, (2) Balanced Analog Audio Inputs, (2) AES Input BNCs, (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Video Out BNC, (2) Balanced Analog Audio Outputs, (2) AES Output BNCs

RM20-9903-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3)

RM20-9903-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC)

RM20-9903-E 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, Component/CVBS Video In BNCs, (1) AES In BNC, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Output BNCs, (1) GPIO/COMM RJ-45 connector

RM20-9903-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, Component/CVBS Video Out BNCs, (1) AES Out BNC, (2) Balanced Analog Audio Outputs, (1) 3G/HD/SD-SDI Output BNC, (1) GPIO/COMM RJ-45 connector

RM20-9903-G/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors DIN1.0/2.3)

RM20-9903-G/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors HD-BNC)

RM20-9903-H-DIN 20-Slot Frame Rear I/O Module (Double Width) (2) 3G/HD/SD-SDI Inputs, (1) Component/CVBS Video In, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (6) 3G/HD/SD-SDI Outputs, (1) Component/CVBS Video Out, (8) AES Outputs, (2) Balanced Analog Audio Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9903-H-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (2) 3G/HD/SD-SDI Inputs, (1) Component/CVBS Video In, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (6) 3G/HD/SD-SDI Outputs, (1) Component/CVBS Video Out, (8) AES Outputs, (2) Balanced Analog Audio Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC)

+LTC Audio LTC I/O Option

+COLOR Color Correction Option

+ANC Ancillary Data Processor

+SCTE104 SCTE 104 Insertion Option

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

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BBG-1003-UDX-ADDA » 3G/HD/SD-SDI STANDALONE UNIVERSAL FORMAT CONVERTER/FRAME SYNC with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Frame Sync, AES and Analog Audio Embedding / De-Embedding

The Cobalt® **BBG-1003-UDX-ADDA 3G/HD/SD-SDI Standalone Universal Format Converter/Frame Sync** with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Frame Sync, AES and Analog Audio Embedding / De-Embedding provides a high-density standalone solution that offers unprecedented multi-input support, flexibility, and ease of use and integration for SDI and analog video and discrete audio. Frame sync provides glitch-free audio upon frame sync events, with video/audio offsets user configurable. 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.

With option **+ANC**, the BBG-1003-UDX-ADDA offers full VANC/HANC ancillary data packet de-embedding and embedding for 3G/HD/SD-SDI streams. The easy to use interface allows direct access to DID and SDID locations to extract or insert 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, bypassing the scaler (Bridge mode), or inserted and/or extracted to and from external interface via serial or IP interfaces.

Multiple SDI input ports allow selection from multiple input sources with failover. Both CVBS and component analog video is supported both as inputs and outputs.

The up/down/cross convert scaler is specifically designed for broadcast video formats, with full ARC control suitable for conversions to or from 4:3 and 16:9 aspect ratios. Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode.

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-1003-UDX-ADDA 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-1003-UDX-ADDA 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

- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Multi-input, with failover switching
- Universal I/O support – analog CVBS and component inputs and outputs, as well as analog and AES audio embed/de-embed. 10-bit processing with 5-line adaptive comb filtered SD Y/C separation.
- Frame Sync with full H/V offset and manual/LOS video pattern generator
- Up/Down/Cross Conversion with user and AFD, VI, and WSS ARC specifically tailored for broadcast video
- Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC
- Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs
- Option **+ANC** adds full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, closed captioning, and other specialized user payloads. Multi-mode setup includes Bridge mode (device internal path with scaler bypass bridging) or Insert/Extract modes for insert/extract to or from IP/serial external interfaces.
- Available color correction option
- Low-power/high-density design – less than 13 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

- Audio LTC I/O (**+LTC**)
- Ancillary Data Processor (**+ANC**) – Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data, with insert/extract to and from IP, RS-232/RS-422 serial, and GPIO external interfaces. Bridge mode can be set to preserve special/custom ANC packages when scaler is enabled.
- Color Correction (**+COLOR**) – Full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip
- SCTE 104 Insertion Option (**+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.
- 1RU Mounting Tray (supports 3 units) (**BBG-1000-TRAY**)
- Redundant Power Supply Module (**BBG-1000-PS**)

DashBoard

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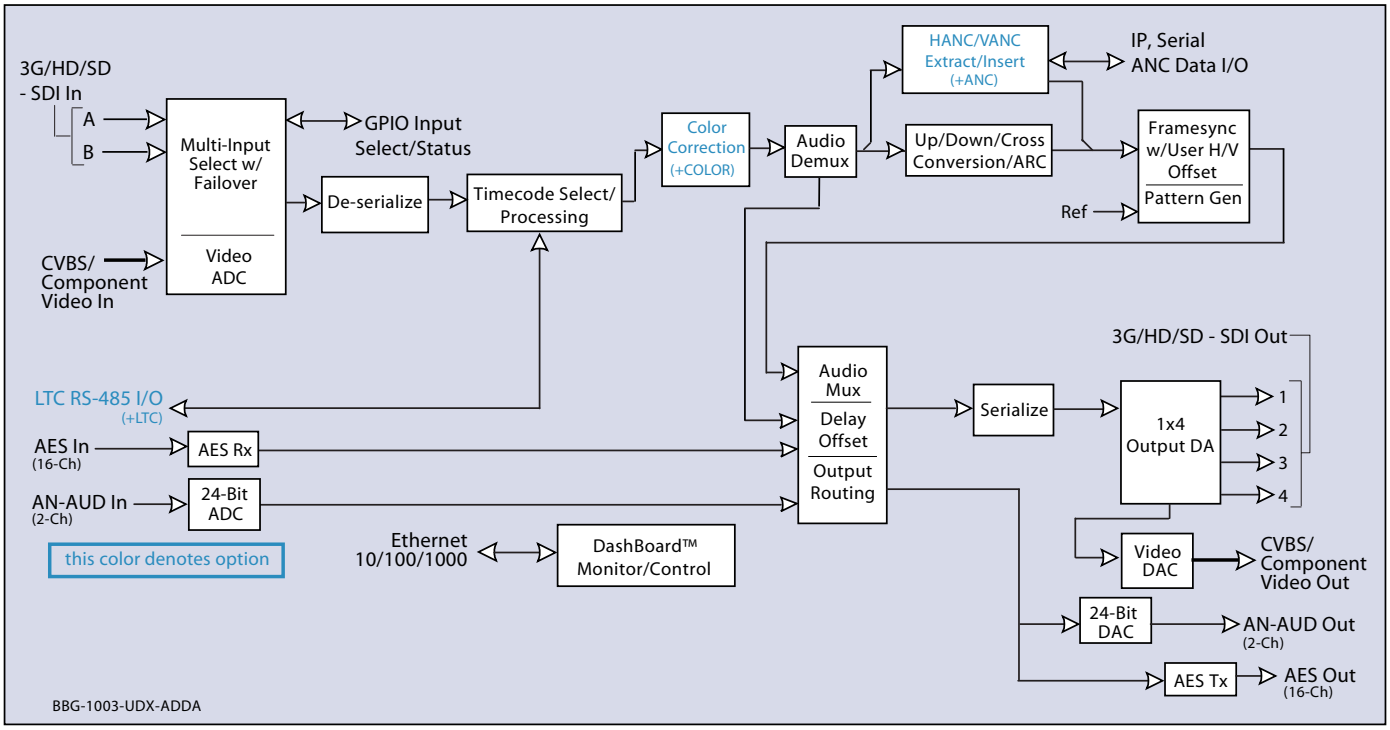
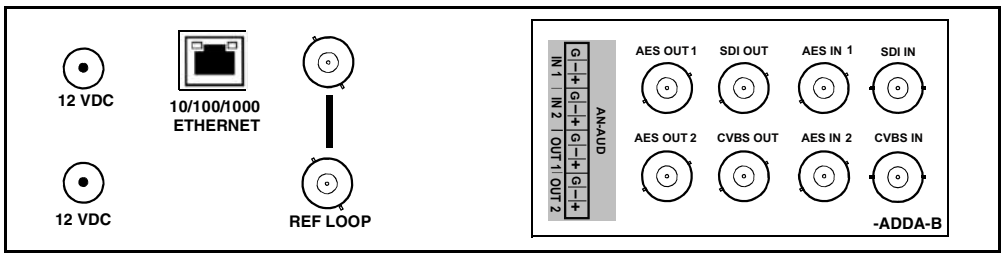
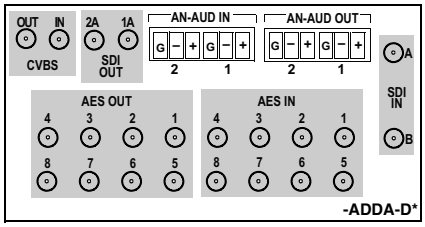
BBG-1003-UDX-ADDA » 3G/HD/SD-SDI STANDALONE UNIVERSAL FORMAT CONVERTER/FRAME SYNC with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Frame Sync, AES and Analog Audio Embedding / De-Embedding



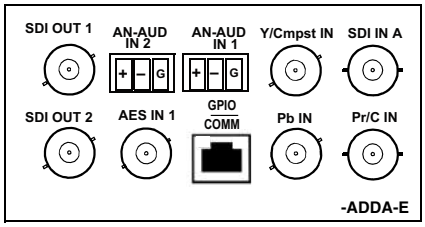
Rear Panel

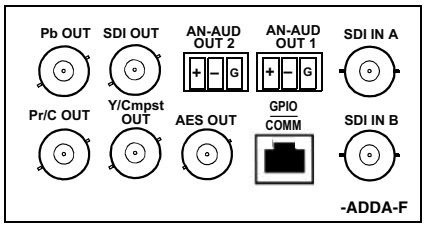


* -D model available as -DIN (DIN 1.0/2.3 connectors) or -HDBNC (HD-BNC connectore)



-E model is analog video IN, AN-AUD IN, AES IN model.
-F model is analog video OUT, AN-AUD OUT, AES OUT model.
See Ordering Info,





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BBG-1003-UDX-ADDA » 3G/HD/SD-SDI STANDALONE UNIVERSAL FORMAT CONVERTER/FRAME SYNC with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Frame Sync, AES and Analog Audio Embedding / De-Embedding

SPECIFICATIONS

Power

< 13 Watts. Power supplied by 12VDC AC adapter, universal input (included).

SDI Input/Outputs

Up to (2) 75Ω BNC inputs
Up to (4) 75Ω BNC outputs
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
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Analog Video Input/Outputs

(1) 75Ω BNC CVBS input
(1) 75Ω BNC CVBS output. CVBS can be upscaled to any supported SDI format; all SDI formats can be downconverted to CVBS.
75Ω BNC Component Video inputs (Y, Cb, Cr)
75Ω BNC Component Video outputs (Y, Cb, Cr)
ADC resolution: 10-bit
Sampling frequency: 54 MHz (4x over-sampling SD)
SD Y/C separation: 5-line Adaptive Comb Filter
SD Freq. Response: ± 0.25 dB to 5.5 MHz
SD SNR: > 55 dB to 5.5 MHz (unweighted)
Differential Phase: < 1 degree
Differential Gain: < 1%
Nonlinearity < 1%
HD Freq. Response: Y 30 MHz., PbPr 15 MHz
HD SNR: > 55 dB to 30 MHz (unweighted)

Discrete Audio Input/Outputs

(8) AES-3id 75Ω BNC input
(8) AES-3id 75Ω BNC output
(2) Balanced analog audio inputs
(2) Balanced analog audio outputs
I/O conforms to 0 dBFS = +24 dBu
Analog Input Impedance: >10 kΩ
Analog Reference Level: -20 dBFS
Analog Nominal Level: +4 dBu
Analog Input Clip Level: +24 dBu (0 dBFS)
Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)
Analog SNR: 115 dB (A weighted)
Analog THD+N: -96 dB (20 Hz to 10 kHz)
Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

ARC

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

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

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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BBG-1003-UDX-ADDA » 3G/HD/SD-SDI STANDALONE UNIVERSAL FORMAT CONVERTER/FRAME SYNC with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Frame Sync, AES and Analog Audio Embedding / De-Embedding

ORDERING INFORMATION

BBG-1003-UDX-ADDA 3G/HD/SD-SDI Standalone Universal Format Converter/Frame Sync with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Frame Sync, AES and Analog Audio Embedding / De-Embedding available in the following rear-panel I/O configurations:

BBG-1003-UDX-ADDA-B (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Input BNC, (2) Balanced Analog Audio Inputs, (2) AES Input BNCs, (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Out BNC, (2) Balanced Analog Audio Outputs, (2) AES Output BNCs

BBG-1003-UDX-ADDA-D-DIN (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3)

BBG-1003-UDX-ADDA-D-HDBNC (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC)

BBG-1003-UDX-ADDA-E (1) 3G/HD/SD-SDI Input BNC, Component/CVBS In BNCs, (1) AES In BNC, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Output BNCs, (1) GPIO/COMM RJ-45 connector

BBG-1003-UDX-ADDA-F (2) 3G/HD/SD-SDI Input BNCs, Component/CVBS Out BNCs, (1) AES Out BNC, (2) Balanced Analog Audio Outputs, (1) 3G/HD/SD-SDI Output BNC, (1) GPIO/COMM RJ-45 connector

Options and Accessories:

+LTC Audio LTC I/O Option

+COLOR Color Correction Option

+ANC Ancillary Data Processor 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)

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9902-UDX-DSP » 3G/HD/SD-SDI UP-DOWN-CROSS CONVERTER / FRAME SYNC / AUDIO EMBED/DE-EMBED with DSP Audio Options Support

The Cobalt® **9902-UDX-DSP 3G/HD/SD-SDI Up-Down-Cross Converter / Frame Sync / Audio Embed/De-Embed** with DSP Audio Options Support provides a high-density card-based solution that offers unprecedented multi-input support and flexibility. The 9902-UDX-DSP offers a DSP-based platform that supports multiple audio DSP options. When optioned with various audio processing options, the DSP-based processing core (which supports numerous simultaneous processing engines) uses license "credits" which allows flexible tailoring of multiple proc function instances. The 9902-UDX-DSP provides much more flexibility than other audio processors that used fixed processing assets (for example, this flexibility allows "trading" credits for more Dolby encoders while backing out of loudness processors or other engine assets).

The up/down/cross convert scaler is specifically designed for broadcast video progressive and interlaced 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 to track with AFD. The 9902-UDX-DSP also provides analog CVBS video inputs and outputs, and AES/analog audio embedding and de-embedding.

Audio proc options include Dolby® Real-Time Loudness Leveling automatic loudness processing, Dolby® encode/decode, and Linear Acoustic® UPMAX™ automatic upmixing. DSP options can be ordered with new-card purchase, or field-installed as software option upgrades without removing the card from its frame. Included as standard features are downmixing, flex mixing, and full AES and balanced analog audio embed/de-embed. Also included standard is bulk and per-channel audio delay controls that easily address lip-sync issues. 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.

Preset save/load allows saving custom card 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. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

- DSP-based platform supports multiple audio DSP options, with multiple instances available using allocatable license "credits" – our largest DSP capacity
- Up/Down/Cross Conversion with user and AFD, VI, and WSS ARC specifically tailored for broadcast video
- Dolby encoding/decoding, Dolby Real-Time Loudness Leveling (RTLL) loudness leveling with full parametric control setup, and Linear Acoustic UPMAX™ DSP audio options available
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Full audio crosspoint with 5.1-to-stereo downmix and flex mixing available for all audio outputs
- Auto Adjust feature helps assure lip sync by assessing and alerting where DSP processing requires matching video delay
- CVBS analog video I/O and analog/AES embed / de-embed available
- Moving-box/motion insertion serves as a dynamic raster confidence check even in cases where the input video image is static. Dual-string character/timecode burn-in.
- High-density design
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- Five year warranty

OPTIONS

- Dolby® Real-Time Loudness Leveling Automatic Loudness Processing Options (**+DSP-RTLL**) – Provides advanced loudness processing with comprehensive parametric controls. Available as surround 5.1 and stereo 2.0. (See Ordering Information for full details)
- Dolby® Encoder Options (**+DSP-ENCD**) – Available as 5.1 and 2.0 Dolby Digital/Digital Plus Encode. (See Ordering Information for full details.)
- Dolby® Decoder Options (**+DSP-DEC**) – Provides Dolby Digital, Digital Plus, and E decode
- Linear Acoustic® UPMAX™ Upmixing (**+DSP-UPMIX-LA**) – Provides automatic 2.0-to-5.1 Linear Acoustic® UPMAX™ upmixing
- Quality Check Option (**+QC**) – Provides failover, alert, or user presets action on criteria such as black/frozen frame, audio silence, and CC absence
- Clean & Quiet Switching Option (**+CQS**) – Provides automatic audio ramp-down and up during input switching events
- Text-To-Speech Option (**+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.
- Emergency Alert System Text Crawl Generation Option (**+EAS**) – Provides a single-card solution for keying Emergency Alert System (EAS) text crawls in the active video and inserting station identification logos. Compatible with Sage™, Dasdec™, and other EAS crawl generators, with automated control insertion via presence of crawl data or GPI.
- Add Extended Delay Option (**+DLY**)
- 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
- Trouble Slate Import (**+T-SLATE**) – Allows uploading of up to three different user trouble slate graphic file to card, with automated insertion controlled by GPI or other events
- Logo Insertion (**+LOGO**) – Allows uploading of user logo graphic file to card, with automated insertion controlled by GPI or other events
- Ancillary Data Processor Option (**+ANC**) – Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data, with insert/extract to and from IP and GPIO external interfaces
- SCTE104 Frame-Accurate SCTE Trigger Insertion Option (**+SCTE104-FAST**) Provides deterministic, frame-accurate Digital Program Insertion (DPI) message embedding into SDI, optimizing it for automatic dissemination to CDN and VOD systems
- Audio LTC I/O Option (**+LTC**)

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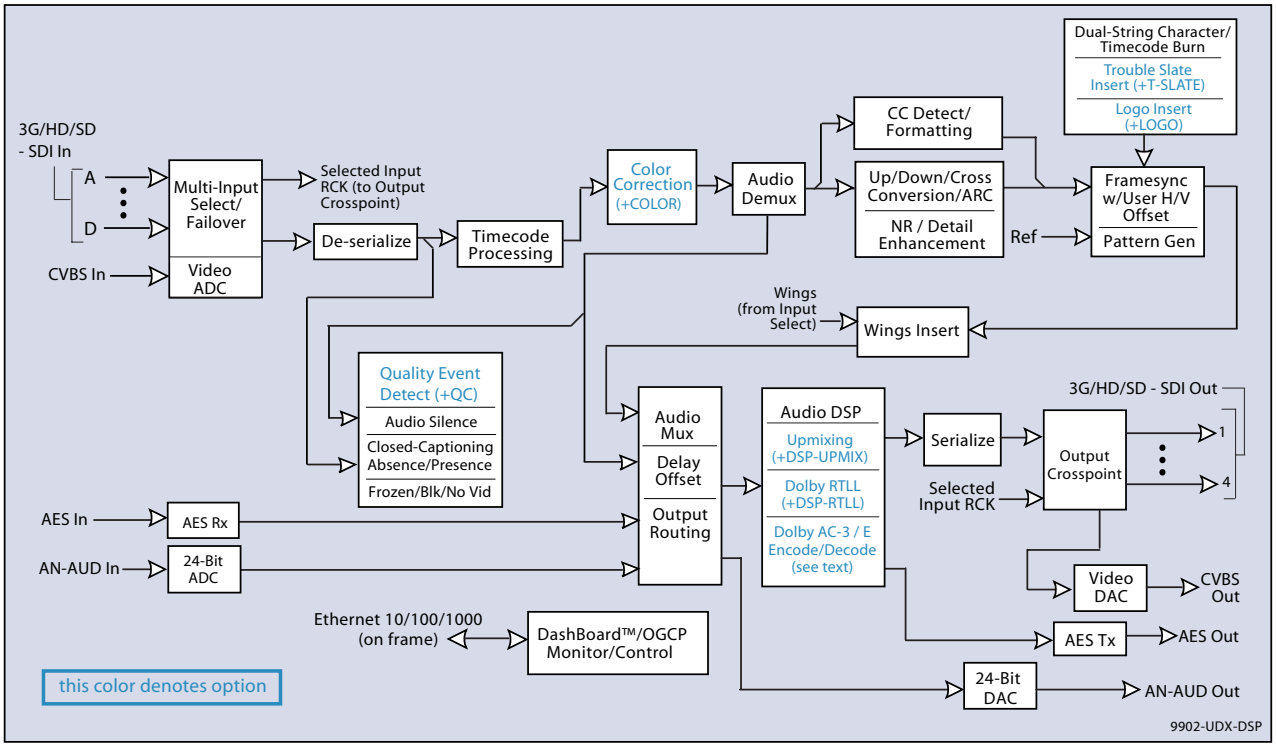
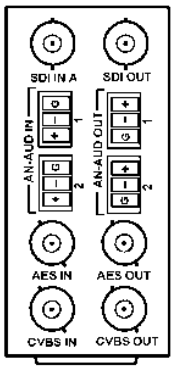
9902-UDX-DSP » 3G/HD/SD-SDI UP-DOWN-CROSS CONVERTER / FRAME SYNC / AUDIO EMBED/DE-EMBED with DSP Audio Options Support

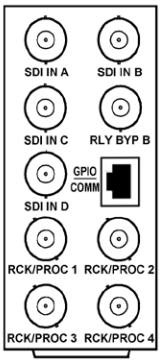




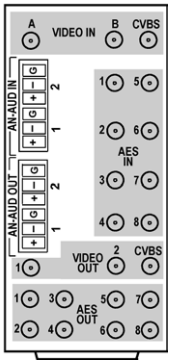
RM20-9902-B

Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input.

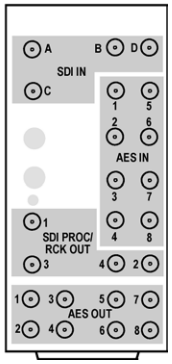
RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.



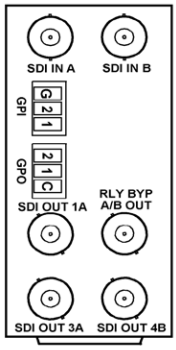
RM20-9902-C



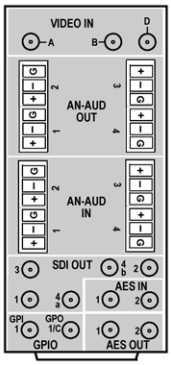
RM20-9902-D-DIN
RM20-9902-D-HDBNC



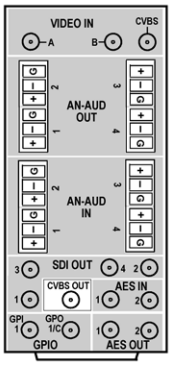
RM20-9902-E-DIN
RM20-9902-E-HDBNC



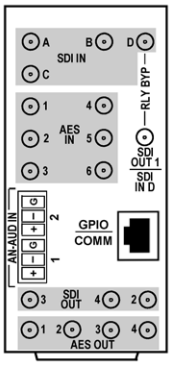
RM20-9902-F



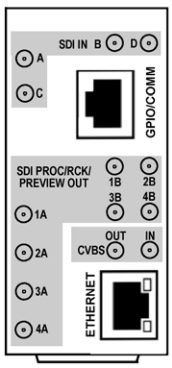
RM20-9902-H-DIN
RM20-9902-H-HDBNC



RM20-9902-J-DIN
RM20-9902-J-HDBNC



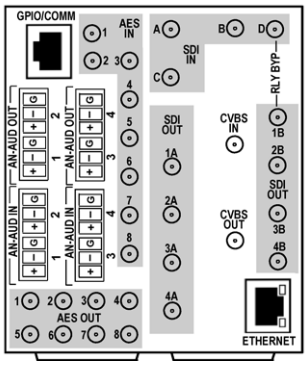
RM20-9902-K-DIN
RM20-9902-K-HDBNC



8 - GND
7 - COM_A_RX
6 - COM_A_TX
5 - GPO OUT 2
4 - GPO OUT 1
3 - GPO RTN
2 - GPI IN 2
1 - GPI IN 1

Note: A and B outputs are DA pairs of corresponding outputs 1 thru 4.

RM20-9902-L-DIN
RM20-9902-L-HDBNC



RM20-9902-N-DIN
RM20-9902-N-HDBNC

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9902-UDX-DSP » 3G/HD/SD-SDI UP-DOWN-CROSS CONVERTER / FRAME SYNC / AUDIO EMBED/DE-EMBED with DSP Audio Options Support

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

24 Watts (includes +DSP options)

SDI Input/Outputs

Up to (4) 75Ω BNC inputs
Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)
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 and scaler 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)
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

CVBS Video Input/Outputs

(1) 75Ω BNC input
(1) 75Ω BNC output. CVBS can be upconverted to any supported SDI format; all formats can be downconverted to CVBS.
ADC resolution/sampling: 10-bit; 4x oversampling
DAC resolution/sampling: 10-bit; 16x oversampling
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 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.

User Audio Delay Offset from Video

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

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

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9902-UDX-DSP » 3G/HD/SD-SDI UP-DOWN-CROSS CONVERTER / FRAME SYNC / AUDIO EMBED/DE-EMBED with DSP Audio Options Support

SPECIFICATIONS (cont.)

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.

ORDERING INFORMATION

9902-UDX-DSP 3G/HD/SD-SDI Up-Down-Cross Converter / Frame Sync / Audio Embed/De-Embed with DSP Audio Options Support

Note: On this DSP-equipped card, an adjacent card **will not** fit into the immediately adjacent slot to the front-of-frame **right**. (For example, if DSP-equipped card is in slot 8, an adjacent card will not fit in slot 9. This would be the case of an adjacent card that installs into an odd frame slot, or the case where a Split Rear Module serves two cards in the adjacent odd/even slot pairs (in this example slots 9/10)).

RM20-9902-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Video Input BNC, (2) Balanced Analog Audio Inputs, (1) AES Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Output BNC, (1) AES Output BNC, (2) Balanced Analog Audio Outputs

RM20-9902-C 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (8) AES I/O BNCs (I/O switch selectable), (1) 3G/HD/SD-SDI Output BNC

RM20-9902-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3)

RM20-9902-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC)

RM20-9902-E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3)

RM20-9902-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC)

RM20-9902-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as Processed or Reclocked of selected input, (2) GPI, (2) GPO

RM20-9902-H-DIN 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3)

RM20-9902-H-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC)

RM20-9902-J-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3)

RM20-9902-J-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC)

RM20-9902-K-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO RJ-45 connector (All coaxial connectors DIN1.0/2.3)

RM20-9902-K-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO RJ-45 connector (All coaxial connectors HD-BNC)

RM20-9902-L-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9902-L-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors HD-BNC)

RM20-9902-N-DIN 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO RJ-45 connector, 100/1000 BaseT Ethernet Port
(All coaxial connectors DIN1.0/2.3)

RM20-9902-N-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO RJ-45 connector, 100/1000 BaseT Ethernet Port
(All coaxial connectors HD-BNC)

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9902-UDX-DSP » 3G/HD/SD-SDI UP-DOWN-CROSS CONVERTER / FRAME SYNC / AUDIO EMBED/DE-EMBED with DSP Audio Options Support

ORDERING INFORMATION (cont.)

Options:

+DSP-RTLL-5.1 Dolby® RTLL™ 5.1-Channel Loudness Processor Option
+DSP-RTLL-2.0 Dolby® RTLL™ Stereo Loudness Processor Option
+DSP-ENCD-5.1 Dolby® Digital/Digital Plus 5.1 Encoder
+DSP-ENCD-2.0 Dolby® Digital/Digital Plus 2.0 Encoder
+DSP-DEC Dolby® Decoder
+DSP-UPMIX-LA Linear Acoustic® UPMAX™ 2.0-to-5.1 Upmixer
+ANC Ancillary Data Processor Option
+COLOR Color Correction Option
+T-SLATE User Trouble Slate Graphic Import Option
+LOGO Logo Insertion Option
+SCTE104 SCTE 104 Insertion Option
+SCTE104-FAST Frame-Accurate SCTE 104 Trigger Insertion Option
+DLY Extended Frame Sync Delay Option
+LTC Audio LTC I/O Option
+CQS Clean & Quiet Switching Option
+QC Quality Check Option
+TTS Text-To-Speech Option (Acapela Text-To-Speech from Acapela Group™. Installation requires option upload and installation of speech library SD memory card onto host card. Pre-loaded SD card and instructions provided.)
+2L-SPAN Add Spanish-language upgrade (add-on to option +TTS; option +TTS required)
+EAS Emergency Alert System Text Crawl Generation Option

US SALES 800 669-1691 / DIRECT +1 217-344-1243 / SALES@COBALTDIGITAL.COM

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BBG-1002-UDX-DSP » 3G/HD/SD-SDI STANDALONE UP-DOWN-CROSS CONVERTER/ FRAME SYNC/ AUDIO EMBED-DE-EMBED with DSP Audio Options Support

The Cobalt® **BBG-1002-UDX-DSP 3G/HD/SD-SDI Standalone Up-Down-Cross Converter/Frame Sync/Audio Embed-De-Embed with DSP Audio Options Support** provides a high-density standalone solution that offers unprecedented multi-input support and flexibility. The BBG-1002-UDX-DSP offers a DSP-based platform that supports multiple **+DSP** audio options. When optioned with various audio processing options, the DSP-based processing core (which supports numerous simultaneous processing engines) uses license "credits" which allows flexible tailoring of multiple proc function instances. The BBG-1002-UDX-DSP provides much more flexibility than other audio processors that used fixed processing assets (for example, this flexibility allows "trading" credits for more Dolby encoders while backing out of loudness processors or other engine assets).

Audio proc +DSP options include Dolby® Real-Time Loudness Leveling automatic loudness processing, Dolby® encode/decode, and Linear Acoustic® UPMAX™ automatic upmixing. DSP options can be ordered with new-card purchase, or field-installed as software option upgrades without disconnecting the unit. Included as standard features are downmixing, flex mixing, and full AES and balanced analog audio embed/de-embed. Also included standard is bulk and per-channel audio delay controls that easily address lip-sync issues. 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. Quality Check option **+QC** checks for and acts upon user-configurable criteria such as black/frozen frame, audio silence or CC absence.

The up/down/cross convert scaler is specifically designed for broadcast video progressive and interlaced 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 to track with AFD. The BBG-1002-UDX-DSP also provides analog CVBS video inputs and outputs, and AES/analog audio embedding and de-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-UDX-DSP 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-UDX-DSP 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

- DSP-based platform supports multiple audio DSP options, with multiple instances available using allocatable license "credits" – our largest DSP capacity
- Dolby encoding/decoding, Dolby Real-Time Loudness Levelling (RTLL) loudness levelling with full parametric control setup, and Linear Acoustic UPMAX™ DSP audio options available
- Auto Adjust feature helps assure lip sync by assessing and alerting where DSP processing requires matching video delay
- Full audio crosspoint with 5.1-to-stereo downmix (standard) available for all audio outputs
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- CVBS analog video I/O and analog/AES embed / de-embed available
- Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static. Dual-string character/timecode burn-in.
- Advanced audio processing allows routing, gain, smooth delay, and flexible mixing as standard features
- Option **+TTS** provides Text-To-Speech synthesis, directly converting EAS text to high-quality digital audio speech with no baseband signal breakouts or add-on units
- Up/Down/Cross Conversion with user and AFD, VI, and WSS ARC specifically tailored for broadcast video
- Supports import of user trouble slate graphic file for LOS failover insertion
- 3:2 pulldown optimization allows A-frame alignment correlated to received timecode or 6 Hz external input over GPI
- Option **+ANC** adds full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, closed captioning, and other specialized user payloads. SMPTE 337 embed/de-embed allows serial user data to be embedded and de-embedded over unused embedded audio pairs.
- 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

acapela group
Acapela Text-To-Speech from Acapela Group™

DashBoard

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BBG-1002-UDX-DSP » 3G/HD/SD-SDI STANDALONE UP-DOWN-CROSS CONVERTER/ FRAME SYNC/ AUDIO EMBED-DE-EMBED with DSP Audio Options Support

OPTIONS

Dolby® Real-Time Loudness Levelling Automatic Loudness Processing Options (**+DSP-RTLL**) – Provides advanced loudness processing with comprehensive parametric controls. Available as surround 5.1 and stereo 2.0. (See Ordering Information for full details.)

Dolby® Encoder Options (**+DSP-ENCD**) – Available as 5.1 and 2.0 Dolby Digital and Digital Plus Encode. (See Ordering Information for full details.)

Dolby® Decoder Options (**+DSP-DEC**) – Provides Dolby Digital, Digital Plus, and E Decode.

Linear Acoustic® UPMAX™ Upmixing (**+DSP-UPMIX-LA**) – Provides automatic 2.0-to-5.1 Linear Acoustic® UPMAX™ upmixing.

Linear Frame Rate Conversion (**+FRC**) – Provides comprehensive high-quality standards conversion utilizing Cobalt's linear frame rate conversion to convert between virtually any SD/HD/3G format.

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

Clean & Quiet Switching Option (**+CQS**) – Provides automatic audio ramp-down and up during input switching events.

Text-To-Speech Option (**+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.

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.

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.

Trouble Slate Import (**+T-SLATE**) – Allows uploading of up to three different user trouble slate graphic file to card, with automated insertion controlled by GPI or other events.

Add Extended Delay Option (**+DLY**)

Audio LTC I/O (**+LTC**)

Logo Insertion (**+LOGO**) – Allows uploading of user logo graphic file to card, with automated insertion controlled by GPI or other events.

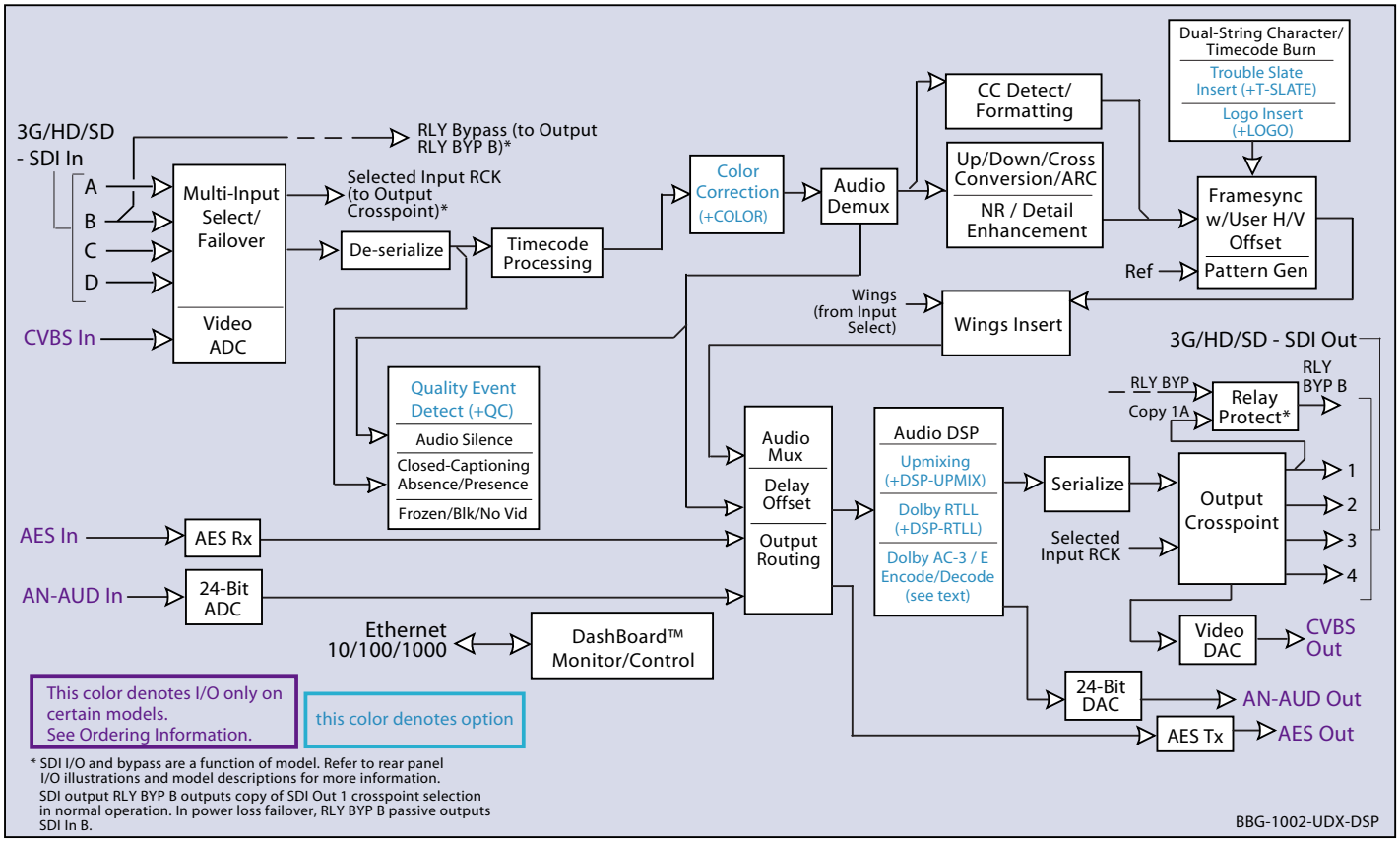
Emergency Alert System Text Crawl Generation (**+EAS**) – Provides a single-device solution for keying Emergency Alert System (EAS) text crawls in the active video and inserting station identification logos. Compatible with Sage™, Dasdec™, and other EAS crawl generators, with automated control insertion via presence of crawl data or GPI.

Ancillary Data Processor Option (**+ANC**) – Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data, with insert/extract to and from IP and GPIO external interfaces.

SCTE104 Frame-Accurate SCTE Trigger Insertion Option (**+SCTE104-FAST**) Provides deterministic, frame-accurate Digital Program Insertion (DPI) message embedding into SDI, optimizing it for automatic dissemination to CDN and VOD systems.

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

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



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BBG-1002-UDX-DSP » 3G/HD/SD-SDI STANDALONE UP-DOWN-CROSS CONVERTER/ FRAME SYNC/ AUDIO EMBED-DE-EMBED with DSP Audio Options Support

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of model. See rear panel illustrations for I/O complements offered.

Power

24 Watts (includes +DSP options). 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 IN or IN RCK)
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 and scaler 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. CVBS can be upconverted to any supported SDI format; all formats can be downconverted to CVBS.
ADC resolution/sampling: 10-bit; 4x oversampling
DAC resolution/sampling: 10-bit; 16x oversampling
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 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.

User Audio Delay Offset from Video

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

Timecode/Text Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position. (2) independent text strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear panel RJ-45 GPIO/COMM jack (where equipped).

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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BBG-1002-UDX-DSP » 3G/HD/SD-SDI STANDALONE UP-DOWN-CROSS CONVERTER/ FRAME SYNC/ AUDIO EMBED-DE-EMBED with DSP Audio Options Support

ORDERING INFORMATION

BBG-1002-UDX-DSP 3G/HD/SD-SDI Standalone Up-Down-Cross Converter/Frame Sync/Audio Embed-De-Embed with DSP Audio Options Support with (4) 3G/HD/SD-SDI Input BNCs w/ (1) Relay Protect), (4) 3G/HD/SDI Output BNCs, GPIO/COMM (RJ-45 connector), (1) Gigabit Ethernet, Looping Reference and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply)

BBG-1002-UDX-DSP-B 3G/HD/SD-SDI Standalone Up-Down-Cross Converter/Frame Sync/Audio Embed-De-Embed with DSP Audio Options Support with (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Input BNC, (1) AES Input BNC, (2) Balanced Analog Inputs, (1) 3G/HD/SDI Output BNC, (1) CVBS Output BNC, (1) AES Output BNC, (2) Balanced Analog Audio Outputs, (1) Gigabit Ethernet, Looping Reference I/O and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply)

BBG-1002-UDX-DSP-C 3G/HD/SD-SDI Standalone Up-Down-Cross Converter/Frame Sync/Audio Embed-De-Embed with DSP Audio Options Support with (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Video In BNC, (2) AES In BNCs, (2) Balanced Analog Audio Inputs, (1) 3G/HD/SDI Output BNC, (1) CVBS Video Out BNC), (2) AES Out BNCs, (2) Balanced Analog Audio Outputs, (1) Gigabit Ethernet, Looping Reference I/O and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply)

BBG-1002-UDX-DSP-D-DIN 3G/HD/SD-SDI Standalone Up-Down-Cross Converter/Frame Sync/Audio Embed-De-Embed with DSP Audio Options Support with (4) 3G/HD/SD-SDI Inputs, (2) Balanced Analog Audio In, (6) AES Inputs, (4) 3G/HD/SDI Outputs w/ (1) relay protect, (4) AES Outputs, GPIO/COMM (RJ-45 connector) (1) Gigabit Ethernet, Looping Reference and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply; All coaxial connectors DIN 1.0/2.3)

BBG-1002-UDX-DSP-D-HDBNC 3G/HD/SD-SDI Standalone Up-Down-Cross Converter/Frame Sync/Audio Embed-De-Embed with DSP Audio Options Support with (4) 3G/HD/SD-SDI Inputs, (2) Balanced Analog Audio In, (6) AES Inputs, (4) 3G/HD/SDI Outputs w/ (1) relay protect, (4) AES Outputs, GPIO/COMM (RJ-45 connector) (1) Gigabit Ethernet, Looping Reference and Redundant DC Power Inputs (includes one BBG-1000-PS Power Supply; all coaxial connectors HDBNC)

Options and Accessories:

+DSP-RTLL-5.1 Dolby® RTLL™ 5.1-Channel Loudness Processor Option

+DSP-RTLL-2.0 Dolby® RTLL™ Stereo Loudness Processor Option

+DSP-ENCD-5.1 Dolby® Digital/Digital Plus 5.1 Encoder

+DSP-ENCD-2.0 Dolby® Digital/Digital Plus 2.0 Encoder

+DSP-DEC Dolby® Decoder

+DSP-UPMIX-LA Linear Acoustic® UPMAX™ 2.0-to-5.1 Upmixer

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+T-SLATE User Trouble Slate Graphic Import Option

+LOGO Logo Insertion Option

+FRC Linear Frame Rate Conversion Option

+SCTE104 SCTE 104 Insertion Option

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

+DLY Extended Frame Sync Delay Option

+LTC Audio LTC I/O Option

+CQS Clean & Quiet Switching Option

+QC Quality Check Option

+TTS Text-To-Speech Option (Acapela Text-To-Speech from Acapela Group™. Installation requires option upload and installation of speech library SD memory card onto host card. Pre-loaded SD card and instructions provided.)

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

+EAS Emergency Alert System Text Crawl Generation Option

BBG-1000-PS Redundant Power Supply Module

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

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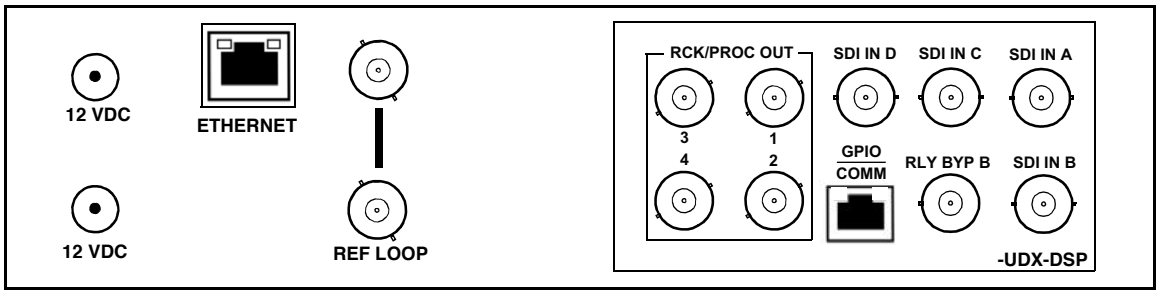
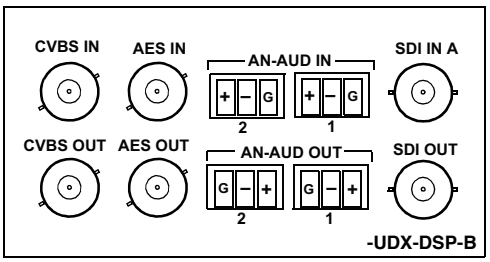
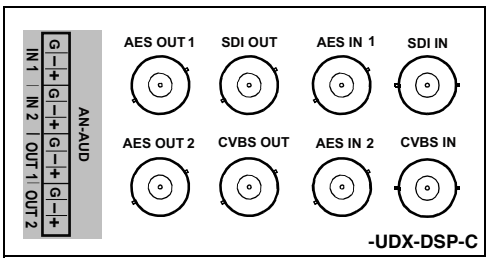
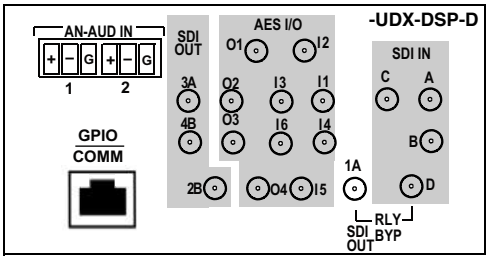
BBG-1002-UDX-DSP » 3G/HD/SD-SDI STANDALONE UP-DOWN-CROSS CONVERTER/ FRAME SYNC/ AUDIO EMBED-DE-EMBED with DSP Audio Options Support

Rear Panel









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9902-UDX-DSP-CI » 3G/HD/SD-SDI/CVBS CHANNEL INTEGRATOR — UDX/FRAME SYNC

with Video Optimization, Advanced Audio DSP Features, and SFP I/O Options

The Cobalt® **9902-UDX-DSP-CI Channel Integrator** provides a comprehensive signal conversion and processing feature set designed to condition ingest Analog and Digital Audio and Video signals to meet comprehensive output requirements.

The 9902-UDX-DSP-CI Channel Integrator provides a powerful, high-density 3G/HD/SD-SDI/CVBS Up/Down/Cross Converter-Frame Sync and Embedder/De-Embedder platform with support for the following optional features:

- **Linear Frame Rate Standards Conversion Option**
- **RGB Color Correction Option**
- **Trouble Slate Insertion Option**
- **Logo Generator Option**
- **External SFP Cage Hardware Option**
- **HDMI, Fiber, IP ST2110, ST2022-6 SFP Options**
- **Emergency Alert Crawl Generator Option**
- **Text-To-Speech Generator Option**
- **Real-Time Loudness Leveling (RTLL) Loudness Processing Options**
- **Dolby® Encode/Decode Options**
- **Stereo to Surround Sound Upmixing Option**

Along with the extensive list of features and options, the 9902-UDX-DSP-CI offers comprehensive high-quality standards conversion utilizing Cobalt's linear frame rate conversion to convert between virtually **any** SD/HD/3G format – 25/50, 29.97/30/59.94/60, and 23.98/24 (both film and PsF) from 525/625i to 1080p and anything in-between – with conversion to and from NTSC and PAL available for all input and output formats (see next page for full conversion matrix). This broad flexibility makes the 9902-UDX-DSP-CI perfect for international signal aggregators and distributors in the Cable, DBS, and OTT markets.

I/O Capabilities

In addition to accepting and providing 3G/HD/SD-SDI I/O and CVBS I/O, the 9902-UDX-DSP-CI accommodates a wide array of baseband I/O, including:

- Externally-accessible SFP cage option allows flexible added I/O, including fiber, HDMI, and IP.
- Accepts up to 16 channels (8 pairs) of discrete unbalanced AES (AES-3id) embed/de-embed. Per-pair SRC can be applied to consumer (non-professional) digital audio sources to synchronize to 48 kHz video.
- Full audio crosspoint between embedded channels, balanced analog I/O and AES I/O.

As content delivery platforms evolve, conversion and processing systems need to be as comprehensive and cost effective as possible. Content providers/aggregators are tasked with receiving various signal types and standards and formatting them to the exact video, audio and metadata configuration needed on a per channel basis, and need an easy to deploy means of integrating and optimizing the components that comprise a modern broadcast. Designed to address these evolving needs in the densest foot print possible, the 9902-UDX-DSP-CI Channel Integrator provides the signal conversion and processing tool set needed to conform analog and digital audio and video signals and their associated metadata to meet sophisticated channel delivery requirements.

Flexibility and advanced video processing including broadcast quality Up/Down/Cross conversion with Noise Reduction and Detail Enhancement makes the 9902-UDX-DSP-CI perfect for rentals and international signal aggregators and distributors in all Lmarkets. The Channel Integrator is offered with a wide range of rear I/O options and can be configured with a SFP I/O port option which adds support for either HDMI, fiber optic, or IP (SMPTE 2110 or SMPTE 2022-6).

FEATURES

- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- High-density openGear comprehensive signal integration solution
- Optionally accepts SMPTE resolution and frame rate signals via HDMI allowing for computer and consumer A/V sources to be ingested
- DSP-based platform supports multiple audio DSP options, with multiple instances available using allocatable license "credits" – our largest DSP capacity
- Auto Adjust feature helps assure lip sync by assessing and alerting where DSP processing requires matching video delay
- Frame Sync provides audio/video offsets as desired
- Noise Reduction and Detail Enhancement provide image quality optimization
- Supports SNMP and Cobalt's Reflex (JSON) Protocols
- Up/Down/Cross Conversion with user and AFD, VI, and WSS ARC specifically tailored for broadcast video
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- Five year warranty

OPTIONS

Note: Options or ordering line items denoted as "-" are hardware-based options/items. These options are available as factory-installed only on new product, or product returned to Cobalt for factory installation.

- Option **-CI-SFP** provides externally-accessible SFP cage allowing flexibly added I/O, including fiber I/O, and HDMI (See Ordering Information for SFP types available)
- Quality Check Option (**+QC**) provides failover, alert, or user presets action on criteria such as black/frozen frame, audio silence, and CC absence
- Trouble Slate Option (**+T-SLATE**) allows uploading of up to three different user trouble slate graphic file to card, with automated insertion controlled by screened user-selectable events (such as LOS or frozen/black frame)
- Logo Insertion Option (**+LOGO**) provides insertion for branding local or destination branding requirements
- Linear Frame Rate Conversion Option (**+FRC**)
- Clean & Quiet Switching Option (**+CQS**) – Provides automatic audio ramp-down and up during input switching events
- Key/Fill Keyer Option (**+KEYER**)
- Emergency Alert System Text Crawl Generation Option (**+EAS**)
- Extended Frame Sync Delay Option (**+DLY**)
- Color Correction Option (**+COLOR**) provides full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip
- Audio LTC I/O Option (**+LTC**)
- 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
- Upmixing Option (**+DSP-UPMIX-LA**) provides high-quality Linear Acoustic® UPMAX™ 2.0-to-5.1 upmixing
- Dolby Options (**+DSP-ENC** and **+DSP-DEC**) provide numerous Dolby encode and decode options (See Ordering Information for more info)
- 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 (**+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.
- Loudness Processing Options (**+DSP-RTTL**) provide numerous Dolby Real-Time Loudness Leveling loudness processing options (See Ordering Information for more info)

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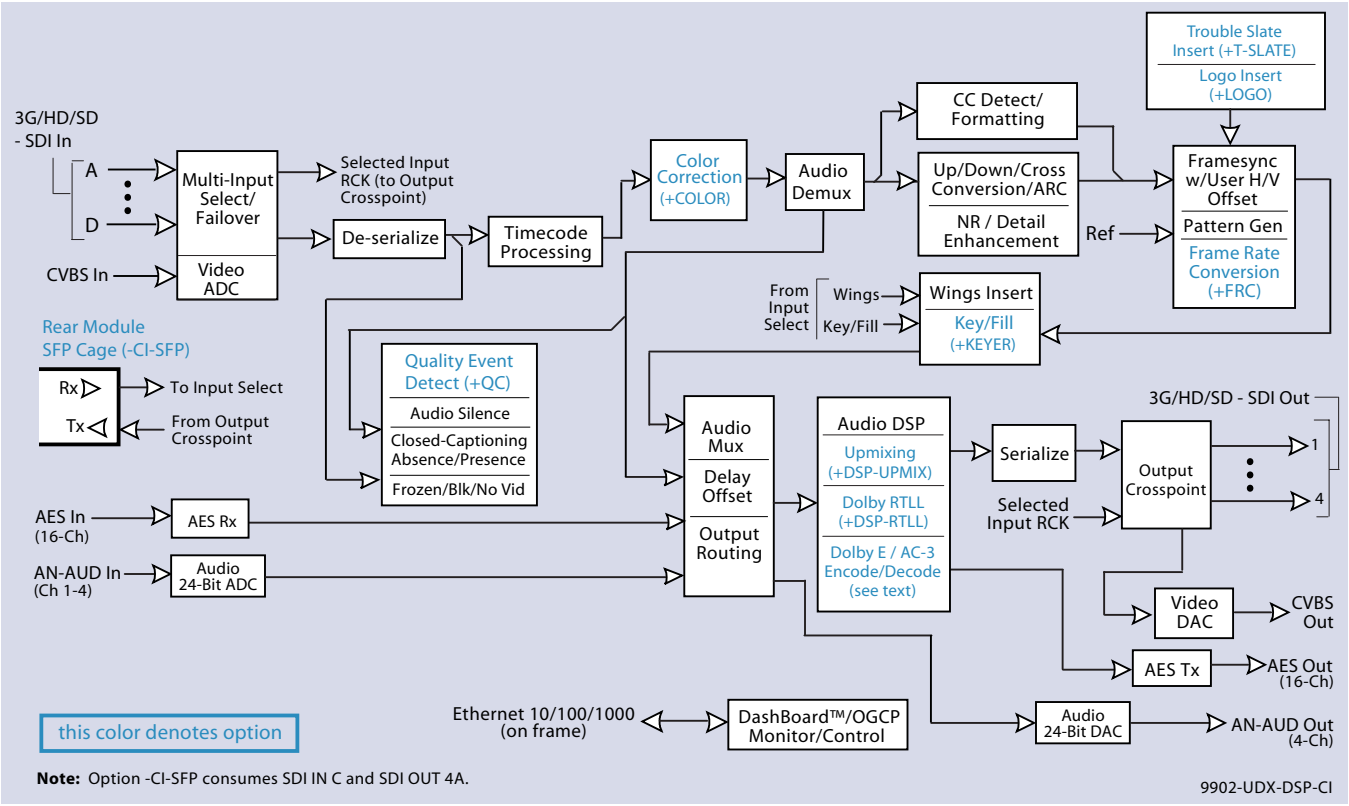
9902-UDX-DSP-CI » 3G/HD/SD-SDI/CVBS CHANNEL INTEGRATOR — UDX/FRAME SYNC

with Video Optimization, Advanced Audio DSP Features, and SFP I/O Options



Note: Option -CI-SFP consumes SDI IN C and SDI OUT 4A.

Outputs → / Inputs ↓	525i 59.94	625i 50	720p 23.98	720p 24	720p 25	720p 29.97	720p 30	720p 50	720p 59.94	720p 60	1080i 50	1080i 59.94	1080i 60	1080PsF 23.98	1080PsF 24	1080PsF 25	1080PsF 29.97	1080PsF 30	1080PsF 23.98	1080p 24	1080p 25	1080p 29.97	1080p 30	1080p 50	1080p 59.94	1080p 60
525i 59.94	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
625i 50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
720p 23.98	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
720p 24	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
720p 25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
720p 29.97	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
720p 30	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
720p 50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
720p 59.94	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
720p 60	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080i 50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080i 59.94	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080i 60	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080PsF 23.98	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080PsF 24	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080PsF 25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080PsF 29.97	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080PsF 30	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080p 23.98	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080p 24	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080p 25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080p 29.97	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080p 30	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080p 50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080p 59.94	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1080p 60	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Standards Conversion Table

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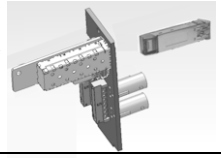
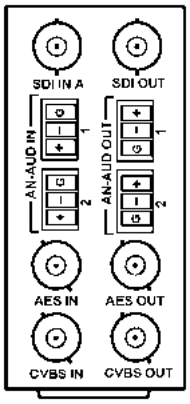
9902-UDX-DSP-CI » 3G/HD/SD-SDI/CVBS CHANNEL INTEGRATOR — UDX/FRAME SYNC

with Video Optimization, Advanced Audio DSP Features, and SFP I/O Options

Externally-accessible SFP cage (Option -CI-SFP) on the card Rear Module allows allows flexible added I/O (including fiber, HDMI, and IP encap/de-encap) as well as repurposing by simply swapping SFP modules as desired

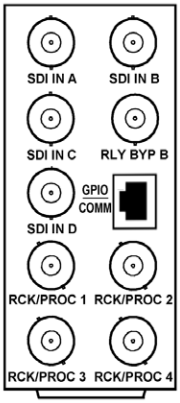




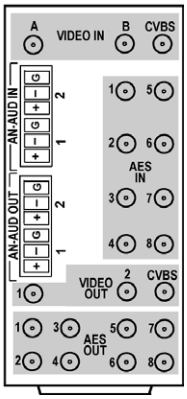
RM20-9902-UDX-DSP-CI-B

Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input.

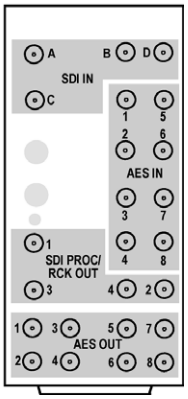
RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.



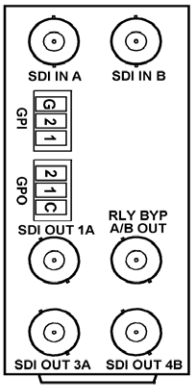
RM20-9902-UDX-DSP-CI-C



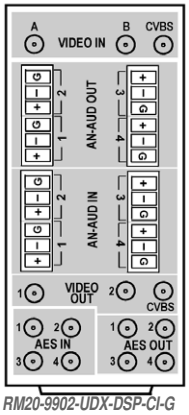
RM20-9902-UDX-DSP-CI-D-
(DIN / HD-BNC)



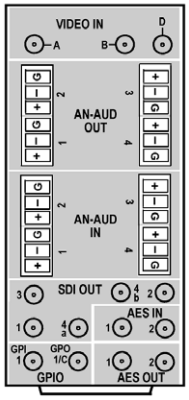
RM20-9902-UDX-DSP-CI-E
(DIN / HD-BNC)



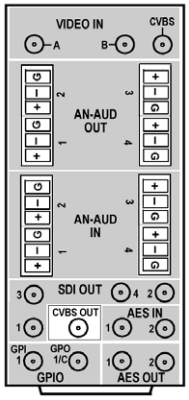
RM20-9902-UDX-DSP-CI-F



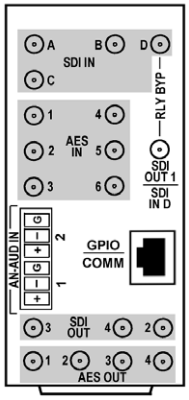
RM20-9902-UDX-DSP-CI-G
(DIN / HD-BNC)



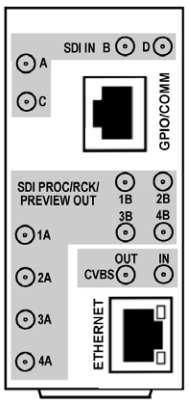
RM20-9902-UDX-DSP-CI-H
(DIN / HD-BNC)



RM20-9902-UDX-DSP-CI-J
(DIN / HD-BNC)



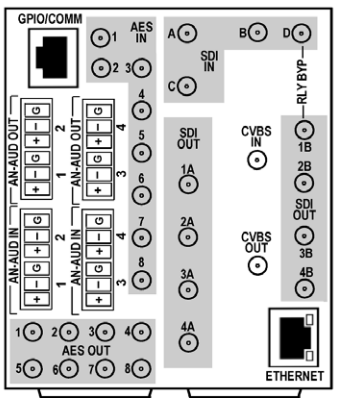
RM20-9902-UDX-DSP-CI-K
(DIN / HD-BNC)



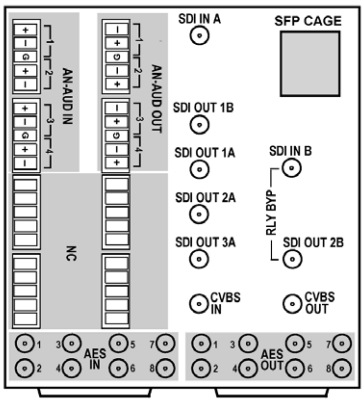
8 - GND
7 - COM_A_RX
6 - COM_A_TX
5 - GPO OUT 2
4 - GPO OUT 1
3 - GPO RTN
2 - GPI IN 2
1 - GPI IN 1

Note: A and B outputs are DA pairs of corresponding outputs 1 thru 4.

RM20-9902-UDX-DSP-CI-L
(DIN / HD-BNC)



RM20-9902-UDX-DSP-CI-N
(DIN / HD-BNC)



RM20-9902-UDX-DSP-CI-P
(DIN / HD-BNC)

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9902-UDX-DSP-CI » 3G/HD/SD-SDI/CVBS CHANNEL INTEGRATOR — UDX/FRAME SYNC

with Video Optimization, Advanced Audio DSP Features, and SFP I/O Options

SPECIFICATIONS

Power

24 Watts (including +DSP options)
Add 3 Watts for option -CI-SFP

SDI Input/Outputs

(4) 75Ω inputs (max)
(5) 75Ω outputs (max) (1 with relay bypass protect)
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 (scaler and 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. CVBS can be upconverted to any supported SDI format; all inputs can be downconverted to CVBS.
CVBS ADC resolution: 10-bit
CVBS ADC sampling: 4x over-sampling
CVBS DAC resolution: 10-bit
CVBS DAC sampling: 16x 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)

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.

User Audio Delay Offset from Video

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

Audio Conversion Format

48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs. Analog audio I/O conforms to +24 dBu <=> 0 dBFS.

Note: Fiber specifications are typical, and only applicable for card fitted with optional Tx or Rx (as applicable) fiber SFP module. Specifications subject to change.

Fiber Transmit Output (typ. with fiber Tx SFP)

LC connector
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)

Fiber Receive Input (typ. with fiber Rx SFP)

LC connector
Receive Sensitivity: -23 dBm; 1260 to 1620 nm (with internal power meter status display)

HDMI Input (typ. with HDMI-to-SDI HDMI SFP)

(1) HDMI 1.4 Input; type D-micro connector; DVI-D compliant input (limited to SMPTE HD formats).

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9902-UDX-DSP-CI » 3G/HD/SD-SDI/CVBS CHANNEL INTEGRATOR — UDX/FRAME SYNC

with Video Optimization, Advanced Audio DSP Features, and SFP I/O Options

SPECIFICATIONS (cont.)

HDMI Output (typ. with SDI-to-HDMI SFP)

(1) HDMI 1.4 Output; type D-micro connector; DVI-D compliant input (limited to SMPTE HD formats).

Analog Audio Specifications

4-ch inputs; 4-ch outputs
Input Impedance: > 10kΩ
Reference Level: -20 dBFS
Nominal Level: +4 dBu
Input Clip Level: +24 dBu (0 dBFS)
Freq. Response: ±0.2 dB (20 Hz to 20 kHz)
SNR: 115 dB (A weighted)
THD+N: -96 dB (20 Hz to 10 kHz)
Crosstalk: -106 dB (20 Hz to 20 kHz)
Output Impedance: < 50Ω
Max. Output Level: +24 dBu (0 dBFS)
(I/O conforms to 0 dBFS = +24 dBu)

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.

ORDERING INFORMATION

9902-UDX-DSP-CI 3G/HD/SD-SDI/CVBS Channel Integrator – UDX/Frame Sync and Embedder/De-Embedder with Video Optimization, Advanced Audio DSP Features, and SFP I/O Options

Options:

Note: Options denoted as "**+**" are software-based options which are available on new product when ordered or can be customer field-installed as a software upload upgrade. Options or ordering line items denoted as "**-**" are hardware orderable items (such as SFP and expansion modules). These options are available as factory-installed only on new product, or product returned to Cobalt for factory installation.

+COLOR Color Correction Option

+QC Quality Check Option

+FRC Linear Frame Rate Conversion Option

+LTC Audio LTC I/O Option

+DLY Extended Frame Sync Delay Option

+SCTE104 SCTE 104 Insertion Option

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

+T-SLATE User Trouble Slate Graphic Import Option

+LOGO Logo Insertion Option

+KEYER Key/Fill Keyer Option

+TTS Text-To-Speech Option (Acapela Text-To-Speech from Acapela Group™. Installation requires option upload and installation of speech library SD memory card onto host card. Pre-loaded SD card and instructions provided.)

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

+EAS Emergency Alert System Text Crawl Generation Option

+CQS Clean & Quiet Switching Option

+DSP-RTLL-5.1 Dolby® Real-Time Loudness Leveling 5.1-Channel Surround Sound Loudness Processor

+DSP-RTLL-2.0 Dolby® Real-Time Loudness Leveling 2.0-Channel Stereo Loudness Processor

+DSP-ENCD-5.1 Dolby® Digital / Digital Plus 5.1 Encoder

+DSP-ENCD-2.0 Dolby® Digital / Digital Plus 2.0 Encoder

+DSP-DEC Dolby® E / Dolby® Digital / Dolby® Digital Plus Decoder

+DSP-UPMIX-LA Linear Acoustic UPMAX™ 2.0-to-5.1 Upmixer

US SALES 800 669-1691 / DIRECT +1 217-344-1243 / SALES@COBALTDIGITAL.COM

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9902-UDX-DSP-CI » 3G/HD/SD-SDI/CVBS CHANNEL INTEGRATOR — UDX/FRAME SYNC

with Video Optimization, Advanced Audio DSP Features, and SFP I/O Options

ORDERING INFORMATION (cont.)

-CI-SFP Adds daughter card supporting externally-accessible SFP cage; orderable as new option or field upgrade.
Note: To support SFP option(s), this option is required in addition to desired specific SFP options below. Option can only be used with rear module RM20-9902-UDX-DSP-CI-P-DIN or RM20-9902-UDX-DSP-CI-P-HDBNC.

-SFP-EO 3G/HD/SD-SDI/ASI/MADI Video SFP Optical, Single Transmitter, Medium Haul, 1310nm

-SFP-OE 3G/HD/SD-SDI/ASI/MADI Video SFP Optical, Single Receiver, Medium Haul

-SFP-EOOE 3G/HD/SD-SDI/ASI/MADI Video SFP Optical, Transceiver, Medium Haul, 1310nm

-SFP-EO-CWDM-WX 3G/HD/SD-SDI/ASI/MADI Video SFP Optical, Single Transmitter, Long Haul. Specify CWDM Wavelength in place of -WX (see table below)

-SFP-EOOE-CWDM-WX 3G/HD/SD-SDI/ASI/MADI Video SFP Optical, Transceiver, Long Haul. Specify CWDM Wavelength in place of -WX (see table below)

In "WX" places in part number, substitute code for wavelengths in each place as listed below:

-27: 1270nm -29: 1290nm -31: 1310nm
-33: 1330nm -35: 1350nm -37: 1370nm
-39: 1390nm -41: 1410nm -43: 1430nm
-45: 1450nm -47: 1470nm -49: 1490nm
-51: 1510nm -53: 1530nm -55: 1550nm
-57: 1570nm -59: 1590nm -61: 1610nmm
(Example: SFP-EO-CWDM-27 has 1270 nm FIBER OUT CWDM wavelength)

-SFP-H-TO-S HDMI/DVI To SDI Video SFP Converter, Single Receiver, Type D with retention clip
(**Note:** The H-to-S SFP module used here supports **8-bit input only**.)

-SFP-S-TO-H SDI To HDMI/DVI Video SFP Converter, Single Transmitter, Type D with retention clip

-SFP-IP-SWD Software-Defined EmSFP 2110 or 2022-6 Encap/De-Encap 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for cards using SFP type **-SPF-IP-SWD**:

+ADD-SFP-2SDI-TO-IP-2022-6 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2022-6

+ADD-SFP-2SDI-TO-IP-2110 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2110

+ADD-SFP-IP-TO-2SDI-2022-6 SFP Software License; Dual-Channel De-Encapsulator IP-2022-6-to-2SDI

+ADD-SFP-IP-TO-2SDI-2110 SFP Software License; Dual-Channel De-Encapsulator IP-2110-to-2SDI

+ADD-SFP-IP-TO-SDI-2022-6 SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-SDI

+ADD-SFP-IP-TO-SDI-2110 SFP Software License; Single-Channel De-Encapsulator IP-2110-to-SDI

+ADD-SFP-SDI-TO-IP-2022-6 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2022-6

+ADD-SFP-SDI-TO-IP-2110 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2110

Rear I/O Modules:

RM20-9902-UDX-DSP-CI-B 20-Slot Frame Rear I/O Module (Standard-Width) (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Input BNC, (2) Balanced Analog Audio Inputs, (1) AES Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Processed Out BNC, (2) Balanced Analog Audio Outputs, (1) AES Output BNC

RM20-9902-UDX-DSP-CI-C 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) 3G/HD/SDI Output BNC (with relay bypass failover), GPIO/COMM RJ-45 connector

RM20-9902-UDX-DSP-CI-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9902-UDX-DSP-CI-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC.)

RM20-9902-UDX-DSP-CI-E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9902-UDX-DSP-CI-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC.)

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9902-UDX-DSP-CI » 3G/HD/SD-SDI/CVBS CHANNEL INTEGRATOR — UDX/FRAME SYNC

with Video Optimization, Advanced Audio DSP Features, and SFP I/O Options

ORDERING INFORMATION (cont.)

RM20-9902-UDX-DSP-CI-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as processed or reclocked of selected input, (2) GPI, (2) GPO

RM20-9902-UDX-DSP-CI-G-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) SDI/CVBS Input, (4) AES Inputs, (4) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (4) AES Outputs, (4) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9902-UDX-DSP-CI-G-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) SDI/CVBS Input, (4) AES Inputs, (4) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (4) AES Outputs, (4) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC.)

RM20-9902-UDX-DSP-CI-H-DIN 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9902-UDX-DSP-CI-H-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9902-UDX-DSP-CI-J-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9902-UDX-DSP-CI-J-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9902-UDX-DSP-CI-K-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO/COMM RJ-45 connector (All coaxial connectors DIN1.0/2.3)

RM20-9902-UDX-DSP-CI-K-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO/COMM RJ-45 connector (All coaxial connectors HD-BNC)

RM20-9902-UDX-DSP-CI-L-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9902-UDX-DSP-CI-L-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors HD-BNC)

RM20-9902-UDX-DSP-CI-N-DIN 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors DIN1.0/2.3.)

RM20-9902-UDX-DSP-CI-N-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

Note: Rear module RM20-9902-UDX-DSP-CI-P-DIN or RM20-9902-UDX-DSP-CI-P-HDBNC is required if option -CI-SFP is ordered.

RM20-9902-UDX-DSP-CI-P-DIN 20-Slot Frame Rear I/O Module (Double-Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (4) Balanced Analog Audio Inputs, (8) AES-3id AES Inputs, (1) SFP cage receptacle (valid with option -CI-SFP), (5) 3G/HD/SD-SDI Outputs (relay bypass for SDI IN B – SDI OUT 2B path), (1) CVBS Output, (4) Balanced Analog Audio Outputs, (8) AES-3id AES Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9902-UDX-DSP-CI-P-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (4) Balanced Analog Audio Inputs, (8) AES-3id AES Inputs, (1) SFP cage receptacle (valid with option -CI-SFP), (5) 3G/HD/SD-SDI Outputs (relay bypass for SDI IN B – SDI OUT 2B path), (1) CVBS Output, (4) Balanced Analog Audio Outputs, (8) AES-3id AES Outputs (All coaxial connectors HD-BNC.)

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Acapela Text-To-Speech from Acapela Group™

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9902-UDX-FS » 3G/HD/SD-SDI DUAL-CHANNEL – PATH 1 UDX / PATH 2 FRAME SYNC

with Audio Embed/De-Embed

The Cobalt® **9902-UDX-FS 3G/HD/SD-SDI Dual-Channel – Path 1 UDX / Path 2 Frame Sync** with Audio Embed/De-Embed offers **two independent signal paths**: one path of full up/down/cross conversion, frame sync, and audio embedding /de-embedding, and the other path economically offering frame sync and audio embedding / de-embedding – all in a single openGear® card. Using our HPF-9000 20-slot frame, this provides up to 40 channels of processing in a single frame. The 9902-UDX-FS is another new Cobalt model representing a new level of openGear packaging density!

The 9902-UDX-FS provides high-density that offers unprecedented multi-input support and flexibility. The up/down/cross convert scaler is specifically designed for broadcast video formats, with full ARC control suitable for conversions to or from 4:3 and 16:9 aspect ratios. 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. Analog video (CVBS) input, with AES and analog audio audio embedding and de-embedding is also supported and can work with either of the card's two processing channels.

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 9902-UDX-FS 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. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

- 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 (Path 1) 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
- 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
- Video options include color correction
- Upgrade option +UDX-FS-to-2UDX converts path 2 to full UDX/Frame Sync
- CVBS analog video input and analog/AES embed / de-embed with 4-line Adaptive Comb Filter
- Pattern generator for each channel can provide raster/test pattern and patterns for LOS failover insertion
- Low-power/high-density design – less than 18 Watts per card
- Remote control/monitoring via DashBoard™ software or OGCP-9000 Remote Control Panel
- 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 & Quiet Switching Option (+CQS) – Provides automatic audio ramp-down and up during input switching events
- Add Path 2 UDX (+UDX-FS-to-2UDX) – Converts path 2 to full UDX/Frame Sync
- 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 (+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)

acapela group
Acapela Text-To-Speech from Acapela Group™

openGear®

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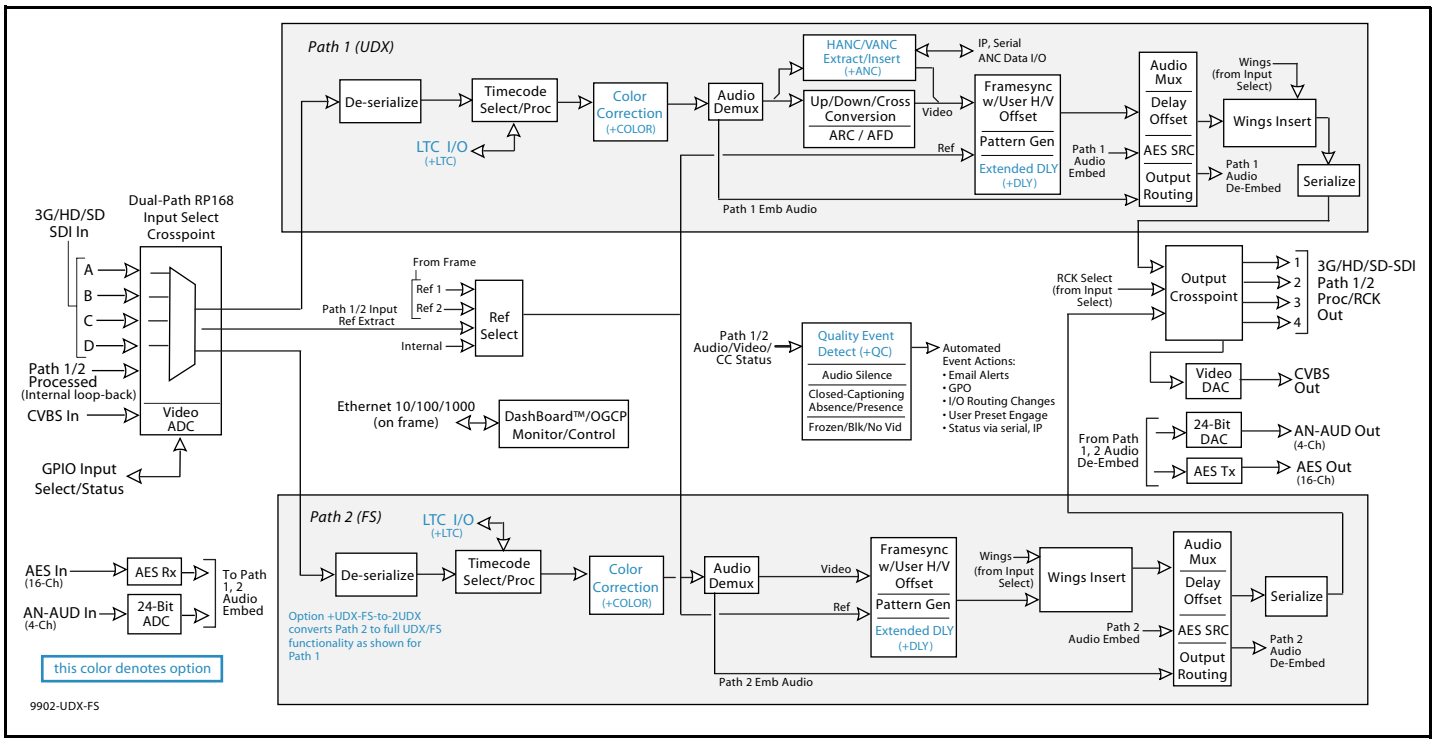
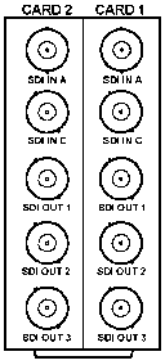
9902-UDX-FS » 3G/HD/SD-SDI DUAL-CHANNEL – PATH 1 UDX / PATH 2 FRAME SYNC

with Audio Embed/De-Embed





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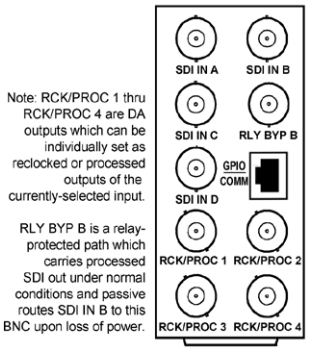

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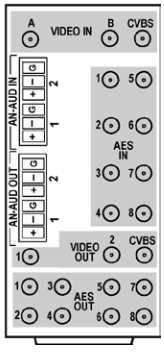

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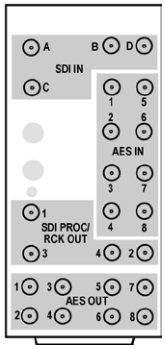
(DIN / HDBNC)



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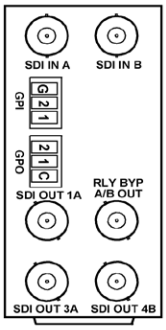

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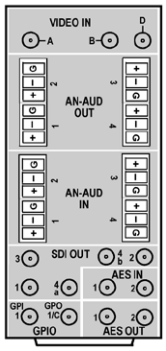

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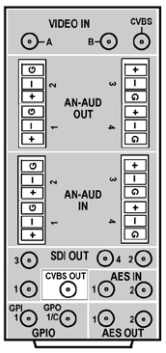

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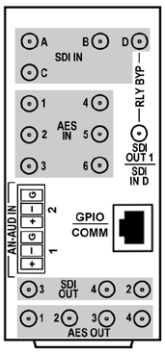

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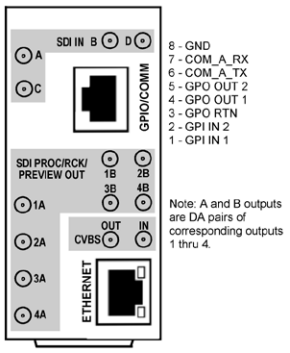

RM20-9902-UDX-FS-L
(DIN / HDBNC)

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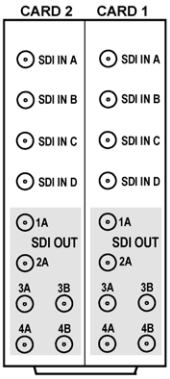
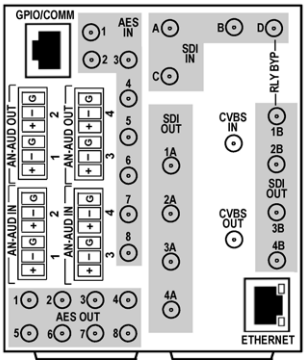
9902-UDX-FS » 3G/HD/SD-SDI DUAL-CHANNEL – PATH 1 UDX / PATH 2 FRAME SYNC

with Audio Embed/De-Embed



RM20-9902-UDX-FS-M/S
(DIN / HDBNC)



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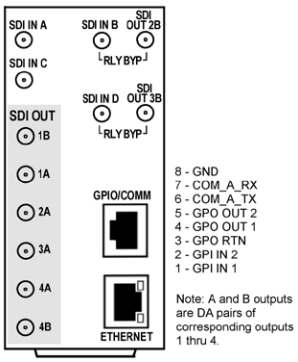
(DIN / HDBNC)



RM20-9902-UDX-FS-P
(DIN / HDBNC)

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

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 reclocked)
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 (scaler and 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)
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

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 THD+N: -96 dB (20 Hz to 10 kHz)
Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

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9902-UDX-FS » 3G/HD/SD-SDI DUAL-CHANNEL – PATH 1 UDX / PATH 2 FRAME SYNC

with Audio Embed/De-Embed

SPECIFICATIONS (cont.)

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

User Audio Delay Offset from Video

Bulk delay control: -33 msec to +3000 msec.
Per-channel delay controls: -800 msec to +800 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 available only on UDX processing path.)

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Frame Reference Input

(2) reference from frame bus or selected program video ref sources. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.
Return Loss: >35 dB up to 5.75 MHz

ORDERING INFORMATION

9902-UDX-FS 3G/HD/SD-SDI Dual-Channel – Path 1 UDX / Path 2 Frame Sync with Audio Embed/De-Embed

RM20-9902-UDX-FS-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNC, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per each Card 1 / Card 2 connector bank)

RM20-9902-UDX-FS-C 20-Slot Frame Rear I/O Module (Standard Width) (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

RM20-9902-UDX-FS-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3)

RM20-9902-UDX-FS-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC)

RM20-9902-UDX-FS- E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3)

RM20-9902-UDX-FS-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC)ORD INFO

RM20-9902-UDX-FS-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/ Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as Processed or Reclocked of selected input, (2) GPI, (2) GPO

RM20-9902-UDX-FS-H-DIN 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9902-UDX-FS-H-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9902-UDX-FS-J-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9902-UDX-FS-J-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9902-UDX-FS-K-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO/COMM RJ-45 connector (All coaxial connectors DIN1.0/2.3)

RM20-9902-UDX-FS-K-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO/COMM RJ-45 connector (All coaxial connectors HD-BNC)

US SALES 800 669-1691 / DIRECT +1 217-344-1243 / SALES@COBALTDIGITAL.COM

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9902-UDX-FS » 3G/HD/SD-SDI DUAL-CHANNEL – PATH 1 UDX / PATH 2 FRAME SYNC

with Audio Embed/De-Embed

ORDERING INFORMATION (cont.)

RM20-9902-UDX-FS-L-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9902-UDX-FS-L-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors HD-BNC)

RM20-9902-UDX-FS-M/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors DIN1.0/2.3)

RM20-9902-UDX-FS-M/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors HD-BNC)

RM20-9902-UDX-FS-N-DIN 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors DIN1.0/2.3.)

RM20-9902-UDX-FS-N-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

RM20-9902-UDX-FS-P-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs (2 with independent relay bypass), (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9902-UDX-FS-P-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs (2 with independent relay bypass), (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors HD-BNC)

Options:

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+LTC Audio LTC I/O Option

+QC Quality Check Option

+CQS Clean & Quiet Switching Option

+UDX-FS-to-2UDX Add Path 2 UDX Option

+TTS Text-To-Speech Option (Acapela Text-To-Speech from Acapela Group™. Applicable only for Path 2 (frame sync) path. Installation requires option upload and installation of speech library SD memory card onto host card. Pre-loaded SD card and instructions provided.)

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

+DLY Extended Frame Sync Delay Option

+SCTE104 SCTE 104 Insertion Option

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

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BBG-1002-UDX-FS » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL – PATH 1 UDX / PATH 2 FRAME SYNC with Audio Embed/De-Embed

The Cobalt® **BBG-1002-UDX-FS 3G/HD/SD-SDI Standalone Dual-Channel – Path 1 UDX / Path 2 Frame Sync** with Audio Embed/De-Embed offers **two independent signal paths**: one path of full up/down/cross conversion, frame sync, and audio embedding /de-embedding, and the other path economically offering frame sync and audio embedding /de-embedding. The BBG-1002-UDX-FS is another new Cobalt model representing a new level of standalone packaging density!

The BBG-1002-UDX-FS provides high-density that offers unprecedented multi-input support and flexibility. The up/down/cross convert scaler is specifically designed for broadcast video formats, with full ARC control suitable for conversions to or from 4:3 and 16:9 aspect ratios. 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. Analog video (CVBS) input, with AES and analog audio audio embedding and de-embedding is also supported and can work with either of the unit's two processing channels.

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 device 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-UDX-FS 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. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. 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 units to a standard 19" frame).

FEATURES

- 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.
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- 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 (Path 1) with user and AFD,
- 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
- 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
- Upgrade option **+UDX-FS-to-2UDX** converts path 2 to full UDX/Frame Sync
- CVBS analog video input and analog/AES embed / de-embed with 4-line Adaptive Comb Filter
- Pattern generator for each channel can provide raster/test pattern and patterns for LOS failover insertion
- 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
- Add Path 2 UDX (**+UDX-FS-to-2UDX**) – Converts path 2 to full UDX/Frame Sync
- 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 (**+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**)
- Redundant Power Supply Module (**BBG-1000-PS**)

DashBoard

US SALES 800 669-1691 / DIRECT +1 217-344-1243 / SALES@COBALTDIGITAL.COM

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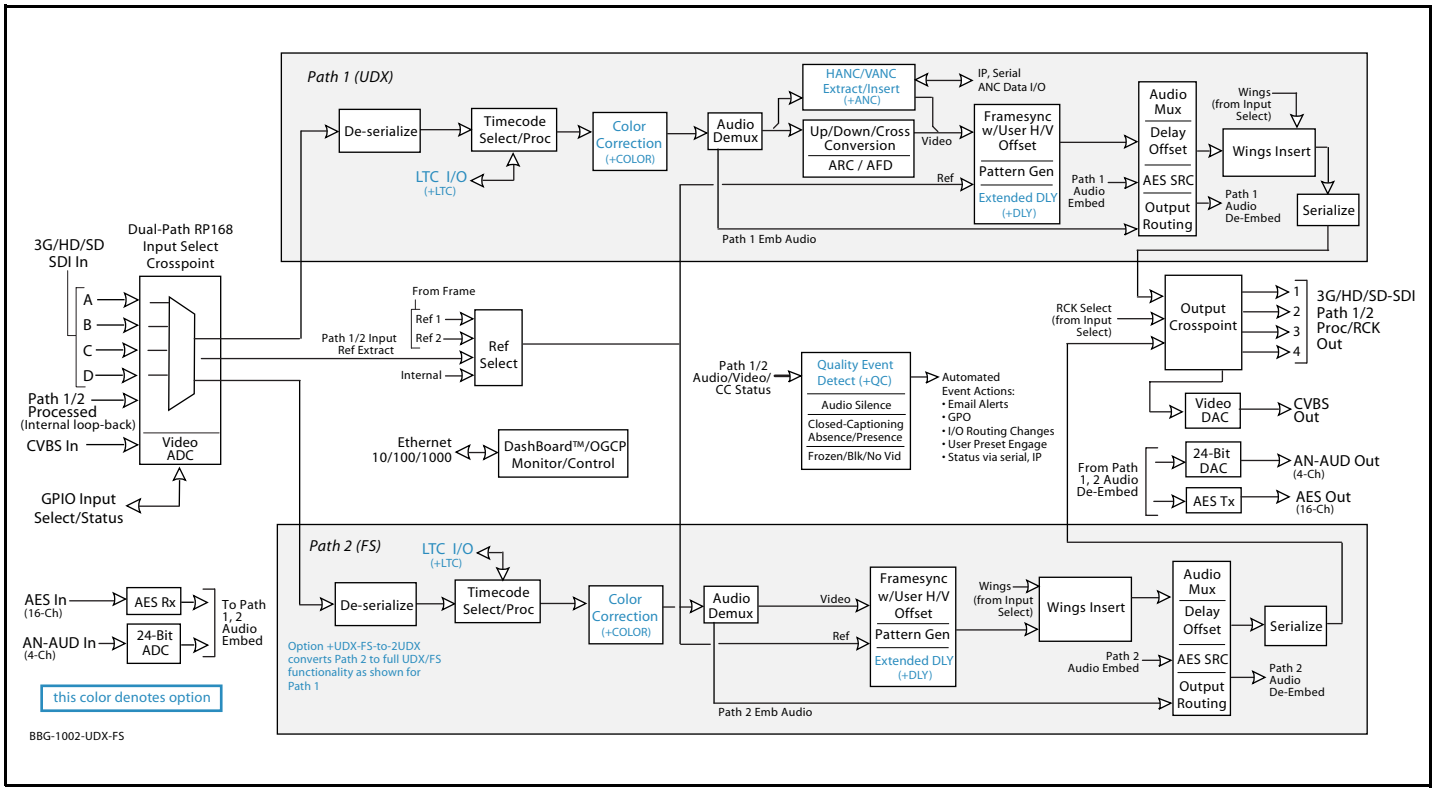
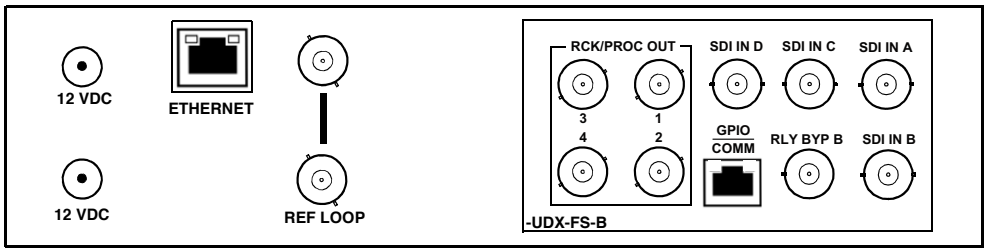
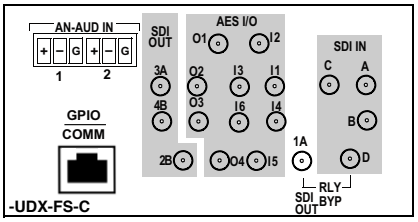
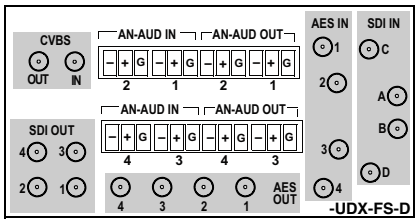
BBG-1002-UDX-FS » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL – PATH 1 UDX / PATH 2 FRAME SYNC with Audio Embed/De-Embed



Rear Panel







acapela group

Acapela Text-To-Speech from Acapela Group™

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BBG-1002-UDX-FS » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL – PATH 1 UDX / PATH 2 FRAME SYNC with 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 reclocked)
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 (scaler and 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 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

User Audio Delay Offset from Video

Bulk delay control: -33 msec to +3000 msec.
Per-channel delay controls: -800 msec to +800 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 available only on UDX processing path.)

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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BBG-1002-UDX-FS » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL – PATH 1 UDX / PATH 2 FRAME SYNC with Audio Embed/De-Embed

ORDERING INFORMATION

BBG-1002-UDX-FS 3G/HD/SD-SDI Standalone Dual-Channel – Path 1 UDX / Path 2 Frame Sync available in the following rear-panel I/O configurations:

BBG-1002-UDX-FS-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-UDX-FS-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-UDX-FS-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-UDX-FS-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-UDX-FS-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)

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

+UDX-FS-to-2UDX Add Path 2 UDX 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)

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BBG-1002-2UDX-DI » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL DE-INTERLACING UP-DOWN-CROSS-CONVERTER / FRAME SYNC

The Cobalt® **BBG-1002-2UDX-DI 3G/HD/SD-SDI Standalone Dual-Channel De-interlacing Up-Down-Cross-Converter / Frame Sync** offers **two independent signal paths** of up/down/cross conversion (including independent per-path de-interlacing) and frame sync in a single unit.

The BBG-1002-2UDX-DI provides high-density that offers unprecedented multi-input support and flexibility. Dual independent up/down/cross convert 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. 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. Bulk and per-channel audio delay controls easily address lip-sync issues.

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. With option **+ANC**, the BBG-1002-2UDX-DI 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-DI 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-DI 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

- Independent Up/Down/Cross Conversion with independent de-interlacing for each path
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- 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.
- 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
- 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

- 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
- 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.
- Audio LTC I/O (**+LTC**)
- 1RU Mounting Tray (supports 3 units) (**BBG-1000-TRAY**)

DashBoard

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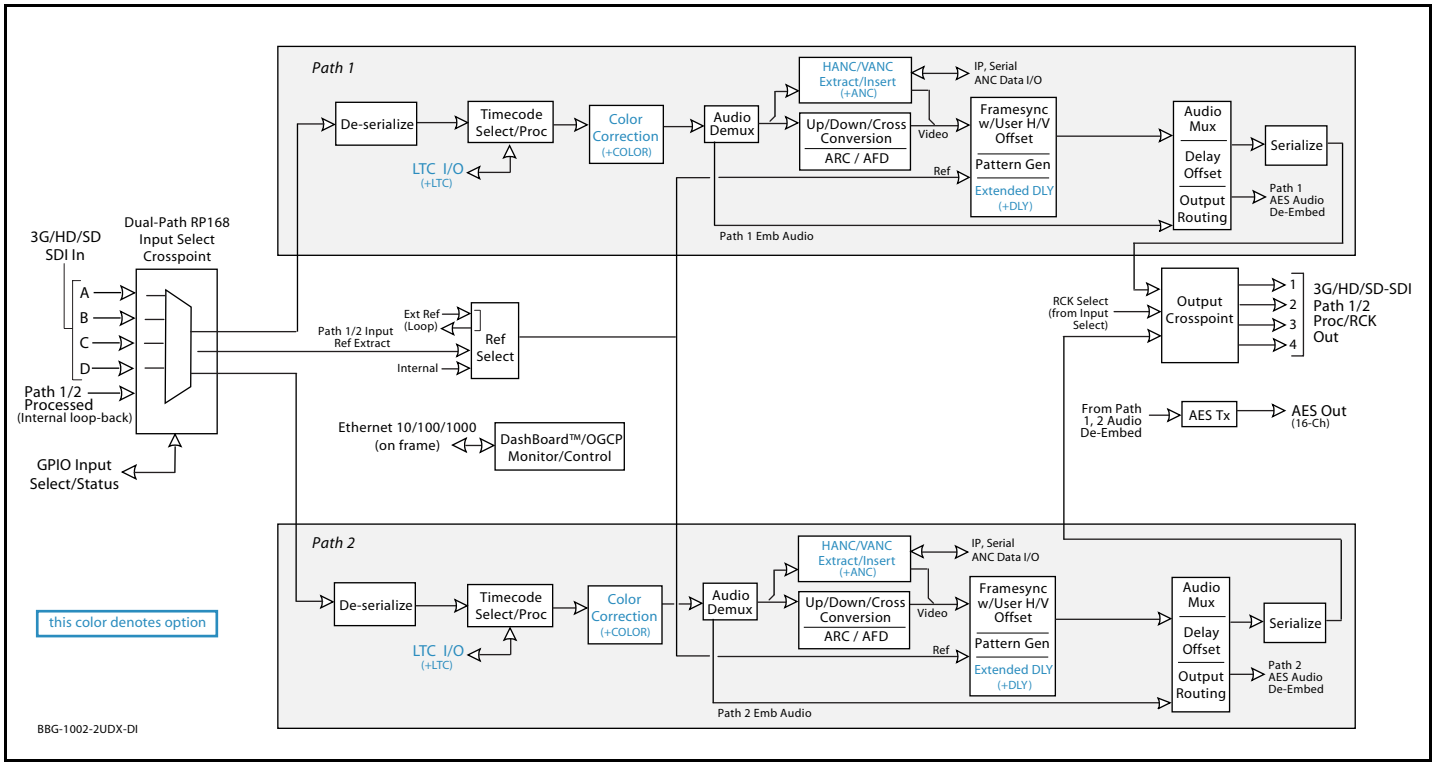
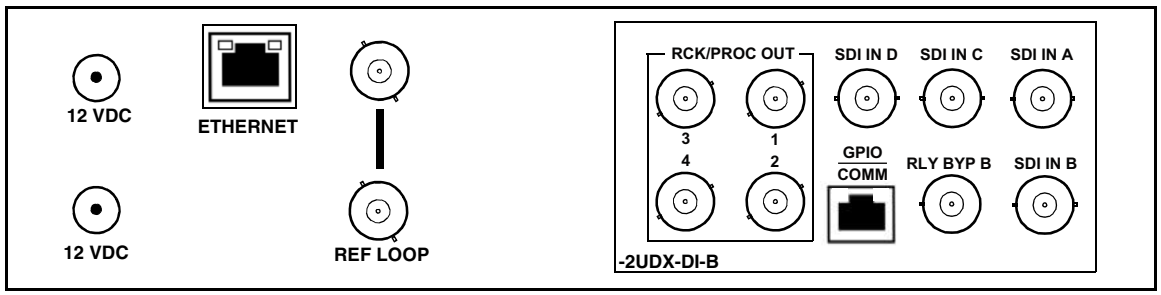
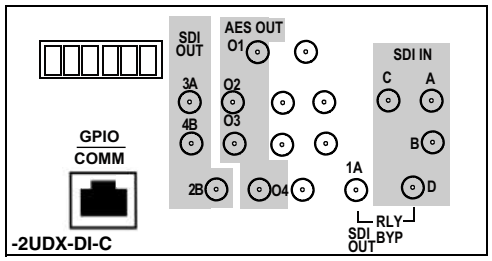
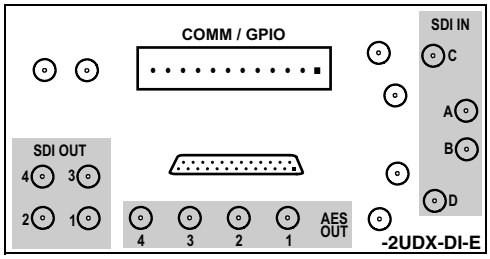
BBG-1002-2UDX-DI » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL DE-INTERLACING UP-DOWN-CROSS-CONVERTER / FRAME SYNC



Rear Panel







Note: Some rear panels for various models shown here are equipped with connectors for signals not supported by this device (such as multi-wire balanced audio connections, CVBS I/O, and AES IN). These connections (shown unlabeled here) are N/C when used with the respective device.

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BBG-1002-2UDX-DI » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL DE-INTERLACING UP-DOWN-CROSS-CONVERTER / FRAME SYNC

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 reclocked)
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)

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

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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BBG-1002-2UDX-DI » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL DE-INTERLACING UP-DOWN-CROSS-CONVERTER / FRAME SYNC

ORDERING INFORMATION

BBG-1002-2UDX-DI 3G/HD/SD-SDI Standalone Dual-Channel De-interlacing Up-Down-Cross-Converter / Frame Sync available in the following rear-panel I/O configurations:

BBG-1002-2UDX-DI-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-DI-C-DIN (4) 3G/HD/SD-SDI 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-DI-C-HDBNC (4) 3G/HD/SD-SDI 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-DI-E-DIN (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SDI Outputs, (4) AES Outputs, 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-DI-E-HDBNC (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SDI Outputs, (4) AES Outputs, 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

+CQS Clean and Quiet Switching Option

+DLY Extended Frame Sync Delay Option

BBG-1000-PS Redundant Power Supply Module

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

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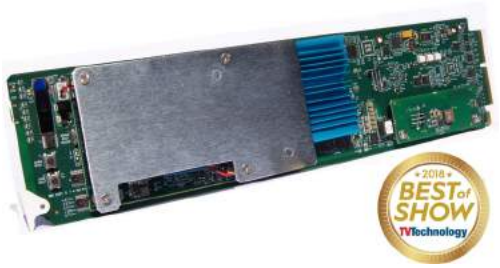
9904-UDX-4K » 12G/6G/3G/HD/SD UHD UP/DOWN/CROSS CONVERTER / FRAME SYNC / EMBED/DE-EMBED AUDIO PROCESSOR



The Cobalt® **9904-UDX-4K 12G/6G/3G/HD/SD UHD Up/Down/Cross Converter/Frame Sync/Embed/De-Embed Audio Processor** is Cobalt's next generation of advanced scaler/frame synchronizers for the openGear® platform. The 9904-UDX-4K upconverts 12G/6G/3G/HD/SD to either UHD1 3840x2160 Square DIvision Multiplex (SDM) or Two-Sample Interleave (2SI) quad 3G-SDI based formats, or can output ST 2082 12G-SDI for single-wire 4K transport. With both 12G-SDI and quad 3G-SDI inputs, the 9904-UDX-4K can downconvert 12G and quad UHD. The 9904-UDX-4K provides an HDMI 2.0 output for economical 4K video monitoring. The 9904-UDX-4K offers numerous options, including SDR-to-HDR conversion and color correction.

The 9904-UDX-4K-IP model offers the same functionality as the 9904-UDX-4K SDI-based model, but additionally also provides dual 10GigE ports providing support for the emerging uncompressed video/audio/data over IP standards.

The 9904-UDX-4K-DSP model provides the same functionality as the 9904-UDX-4K SDI-based model, and also offers a DSP-based platform that supports multiple audio DSP options, including Dolby® Real-Time Loudness Leveling automatic loudness processing, Dolby® E/D/D+ encode/decode, and Linear Acoustic® UPMAX™ automatic upmixing.

The high-density openGear® design allows for up to five 9904-UDX-4K cards to be installed in one 2RU openGear® frame. Card control/monitoring is available via DashBoard user interface, or Cobalt's RESTful-based Reflex protocol.

Alternate Models:

9904-UDX-4K-IP 12G/6G/3G/HD/SD UHD Up/Down/Cross Converter/Frame Sync/Embed/De-Embed Audio Processor with Dual 10GigE IP Ports

9904-UDX-4K-DSP 12G/6G/3G/HD/SD UHD Up/Down/Cross Converter/Frame Sync with DSP Advanced Sudio Processing

openGear®

FEATURES

- High-density openGear comprehensive UHD UDX solution
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Full up/down conversion between HD/3G, ST 2082 12G-SDI single-wire, and SDQS/2SI quad 3G-SDI based formats, with ST 2082 12G-SDI single-wire and quad 3G UHD available at both input and output
- Supports Square Division Multiplex (SDM) and Two-Sample Interleave (2SI) quad UHD
- 12G-SDI and quad 3G frame sync and user delay
- Supports Cobalt's Reflex (JSON) Protocols
- Noise Reduction and Detail Enhancement provide image quality optimization
- Remote control/monitoring via Dashboard™ software, OGCP-9000 remote control panels, or Cobalt's RESTful-based Reflex protocol
- Hot-swappable
- Five year warranty

OPTIONS

SDR/HDR Conversion Options (**+HDR-TCHCLR-4K**, **+HDR-TCHCLR**) – Provides real-time intelligent HDR conversion powered by Technicolor®. Contains SDR-to-HDR, HDR-to-SDR, and HDR-to-HDR conversion with dynamic metadata creation. Technicolor toolkits include SL-HDR encode, SL-HDR decode, and ITM Intelligent Tone Management.

3D LUT Options (**+3DLUT-PRO-4K**, **+3DLUT-PRO**) – 3D LUT (Lookup Table) options provide 33 LUT mapping between 10-bit RGB and HDR color spaces.

3D LUT Option (**+3D-LUT-BBC**) – Licensed product developed by the BBC, provides BBC 3D LUTS as optional SDR-to-HDR and HDR-to-SDR profiles.

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

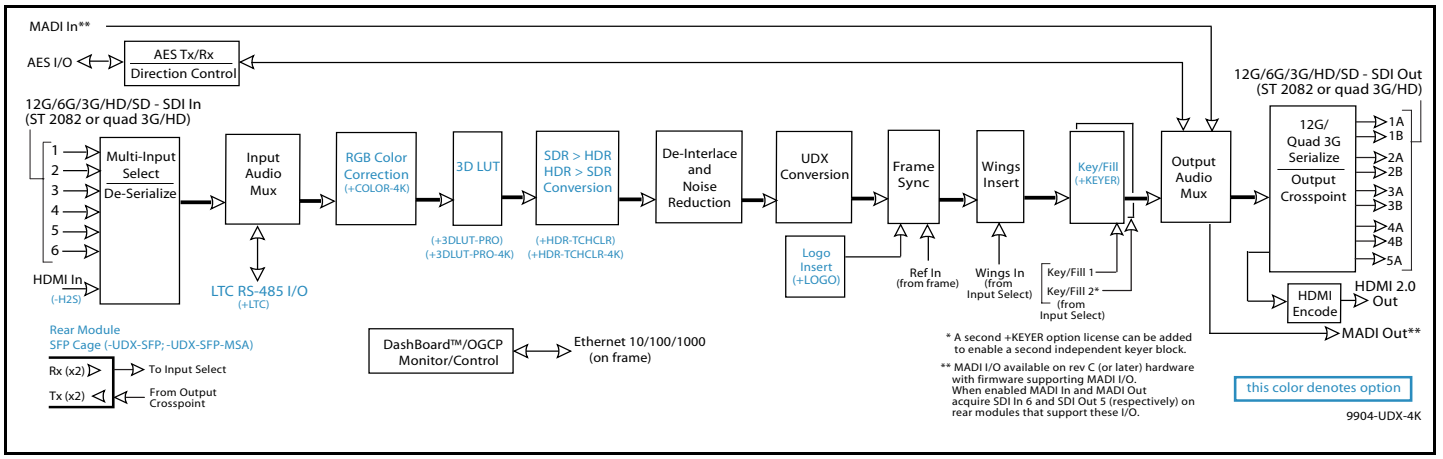
Logo Insertion Option (**+LOGO**) – Provides file-based insertion for branding local or destination branding/ID requirements.

Color Correction Options (**+COLOR-4K**, **+COLOR**) – Provides full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.

Key/Fill Keyer Option (**+KEYER**) – Provides keying using SDI inputs for key and fill signals. Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input. (A second **+KEYER** option license can be added to enable a second independent keyer block.)

-UDX-SFP Options – Adds daughter card supporting externally-accessible dual SFP cage. (See Ordering Information for SFP types available, descriptions, and further info.)

-H2S Option – Adds daughter card supporting externally-accessible HDMI input



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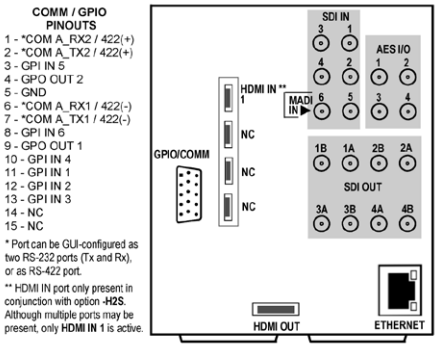
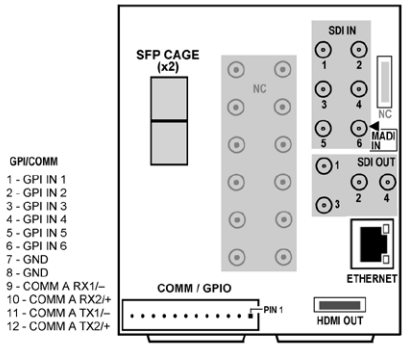
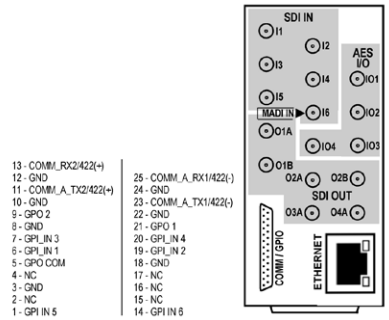
9904-UDX-4K » 12G/6G/3G/HD/SD UHD UP/DOWN/CROSS CONVERTER / FRAME SYNC / EMBED/DE-EMBED AUDIO PROCESSOR



RM20-9904-B-HDBNC



RM20-9904-C-HDBNC



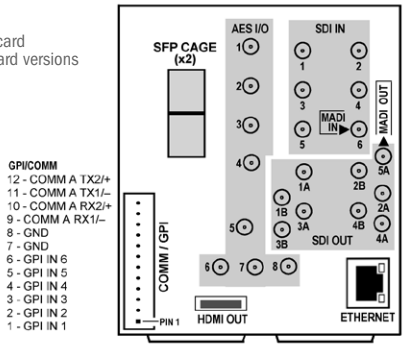
RM20-9904-D-HDBNC

Note: MADI I/O is available on rev C (or later) hardware with firmware supporting MADI I/O. When enabled MADI In and MADI Out acquire SDI In 6 and SDI Out 5 (respectively) on rear modules that support these I/O. Rear modules that support MADI I/O show the MADI port locations that are SDI IN 6 and SDI OUT 5 alternatives (as shown in illustrations here).

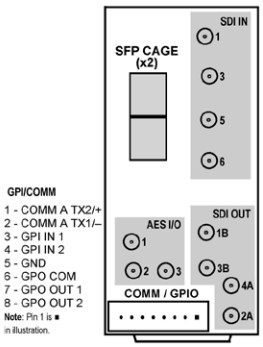
Note: Due to the alignment of the 9904 card and the -D rear module, the combination of the card and rear module will consume the adjacent odd frame slot in addition to the even slot occupied by the card.

Note: This rear module cannot be installed in frame slots 19/20 location. The 9904-UDX card, when installation is attempted, will clash/interfere with the frame network controller card.

Note: (8) AES ports supported on card hardware rev -E and later. Earlier card versions support (4) AES ports (max).

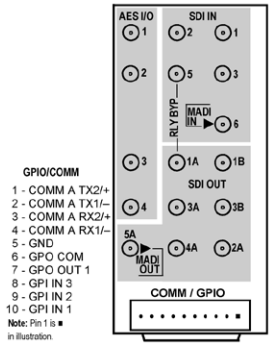


RM20-9904-F-HDBNC



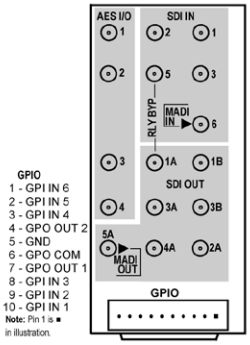
RM20-9904-G-HDBNC

Note: Mates to card in **odd** slot.



RM20-9904-H-HDBNC

Note: 12G signals over relay bypass path stipulates maximum cable length not to exceed 10m for **total** of both input **and** output cable lengths.



RM20-9904-J-HDBNC

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9904-UDX-4K » 12G/6G/3G/HD/SD UHD UP/DOWN/CROSS CONVERTER / FRAME SYNC / EMBED/DE-EMBED AUDIO PROCESSOR

SPECIFICATIONS

12G/6G/3G/HD/SD-SDI Input/Outputs
(6) 75Ω inputs (max)
(8) 75Ω outputs (max)
SDI Formats Supported: SMPTE ST2082-1,10, 424M, 292M, SMPTE 259M-C. All inputs/outputs 12G compliant and SDQS/2SI quad 3G compliant.
Return Loss:
> 15 dB up to 1.485 GHz
> 10 dB up to 3 GHz
> 7 dB up to 6 GHz
> 5 dB up to 12 GHz
Input Cable Length:
45m Belden 1694A cable at 11.88 Gbps / 120m Belden 1694A cable at 2.97 Gbps /
240m Belden 1694A cable at 1.485 Gbps / 400m Belden 1694A cable at 270 Mbps
Output Signal Level: 800 mV ± 10%
DC Offset: 0 V ± 50 mV
Rise and Fall Time @ 11.88 Gbps: < 45 ps
Alignment Jitter (12G/3G/HD/SD): < 0.3/0.3/0.2/0.2 UI

Frame Sync Audio/VIdeo Delay
Max offset: 20 frames
Latency (min): 1 frame

User Audio Delay Offset from Video
Bulk delay control: -33 msec to +3000 msec.
Per-channel delay controls: -800 msec to +800 msec

AES Audio Inputs/Outputs
(8) AES-3id 75Ω coaxial ports (max); port direction assignable as inputs or outputs in groups of 4 ports.
Note: Hardware rev –E and later has 8 AES ports; earlier versions have 4 port max.

MADI Audio Inputs/Outputs
(2) 75Ω coaxial ports (max)
Note: Not all rear modules support full MADI I/O. MADI I/O is a function of Rear Module used and is available only on card with on rev C (or later) hardware with firmware supporting MADI I/O. See Rear Module illustrations for specific information.

HDMI Output
HDMI 2.0 Output; type A standard connector

HDMI Input (Option -H2S only)
HDMI 2.0 Input; mini connector

GPIO
(6) GPI (max); (2) GPO (max)
Note: GPIO max capacity is a function of Rear Module used. See Rear Module illustrations for specific information.

Frame Reference Input
(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”

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9904-UDX-4K » 12G/6G/3G/HD/SD UHD UP/DOWN/CROSS CONVERTER / FRAME SYNC / EMBED/DE-EMBED AUDIO PROCESSOR

ORDERING INFORMATION

9904-UDX-4K 12G/6G/3G/HD/SD UHD Up/Down/Cross Converter/Frame Sync/Embed/De-Embed Audio Processor

Rear Modules:

Note: • MADI I/O is available on rev C (or later) hardware with firmware supporting MADI I/O. When enabled MADI In and MADI Out acquire SDI In 6 and SDI Out 5 (respectively) on rear modules that support these I/O. Rear modules that support MADI I/O show the MADI port locations that are SDI IN 6 and SDI OUT 5 alternatives. Rear modules that support MADI are identified below as **MADI Compatible**.

• Rear modules with SFP access do not come standard with any SFP functionality. Appropriate SFP option must be provisioned for rear module SFP functionality.

RM20-9904-B-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (8) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (4) AES I/O (User Selectable), GPIO/COMM, HDMI 2.0 Output (type A standard connector), 100/1000 BaseT Ethernet Port. **MADI Compatible.** (All coaxial connectors HD-BNC.)

RM20-9904-C-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (4) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, GPI/COMM, HDMI 2.0 Output (type A standard connector), (2) SFP cage receptacles (when used in conjunction with option –UDX-SFP or -UDX-SFP-MSA), 100/1000 BaseT Ethernet Port. **MADI Compatible.** (All coaxial connectors HD-BNC.)

RM20-9904-D-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (6) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (4) AES I/O, GPIO/COMM, 100/1000 BaseT Ethernet Port. **MADI Compatible.** (All coaxial connectors HD-BNC.)

RM20-9904-F-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (9) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (8) AES I/O, GPI/COMM, HDMI 2.0 Output (type A standard connector), (2) SFP cage receptacles (when used in conjunction with option –UDX-SFP or -UDX-SFP-MSA), 100/1000 BaseT Ethernet Port. **MADI Compatible.** (All coaxial connectors HD-BNC.)

RM20-9904-G-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 12G/6G/3G/HD/SD/SD-SDI Inputs, (4) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (3) AES I/O, (2) SFP cage receptacles (when used in conjunction with option –UDX-SFP or -UDX-SFP-MSA), GPIO/COMM (All coaxial connectors HD-BNC.) (**Note:** Mates to card in odd frame slot.)

RM20-9904-H-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (5) 12G/6G/3G/HD/SD/SD-SDI Inputs, (7) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs (one 3G/HD/SDI Output with relay bypass failover), (4) AES I/O, GPIO/COMM **MADI Compatible** (All coaxial connectors HD-BNC.) (**Note:** Mates to card in odd frame slot.)

RM20-9904-J-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (5) 12G/6G/3G/HD/SD/SD-SDI Inputs, (7) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs (one 3G/HD/SDI Output with relay bypass failover), (4) AES I/O, GPIO **MADI Compatible** (All coaxial connectors HD-BNC.) (**Note:** Mates to card in odd frame slot.)

Options:

Note: • Options denoted as **"+"** are **software-based** options which are available on new product when ordered or can be customer field-installed as a software upload upgrade.
• Options or ordering line items denoted as "-" are **hardware-based** options/items. These options are available as factory-installed only on new product, or product returned to Cobalt for factory installation.

+HDR-TCHCLR-4K 4K SDR/HDR Conversion Option (This option includes SL-HDR encode, SL-HDR decode, and ITM Intelligent Tone Management.)

+HDR-TCHCLR SDR/HDR Conversion Option (This option includes SL-HDR encode, SL-HDR decode, and ITM Intelligent Tone Management.)

+3DLUT-PRO-4K 3D LUT 4K Option (compatible with up-mapping to HDR and processing for down-conversions to HD SDR color space)

+3DLUT-PRO 3D LUT Option (compatible with processing for down-conversions to HD SDR color space)

+3D-LUT-BBC BBC 3DLUT Option (Requires +3D-LUT-PRO or +3D-LUT-PRO-4K option to also be present to support this option)

+COLOR-4K 4K Color Correction Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer (Alpha) Option (Additional second option license enables a second independent keyer block.)

+LOGO Logo Insertion Option

+LTC Audio LTC I/O Option

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9904-UDX-4K » 12G/6G/3G/HD/SD UHD UP/DOWN/CROSS CONVERTER / FRAME SYNC / EMBED/DE-EMBED AUDIO PROCESSOR

ORDERING INFORMATION (cont.)

-H2S Adds daughter card supporting externally-accessible HDMI input port; orderable as new option. **Note:** To support HDMI input option -H2S, this option is required in addition to card fitted with rear module (such as RM20-9904-B-HDBNC) that allows access to the daughter card-located HDMI input connector.

-UDX-SFP-MSA Adds daughter card supporting externally-accessible dual MSA SFP cage; orderable as new option. **Note:** To support SFP option(s), this option is required in addition to desired specific SFP options below. The SFP modules listed below are available for the 9904-UDX-4K card when also fitted with SFP option -UDX-SFP-MSA.
- **-UDX-SFP-MSA-2S** is required where **2-slot** ("Standard-Width") rear module (such as RM20-9904-G-HDBNC) is to be fitted with SFP option.
- **-UDX-SFP-MSA-4S** is required where **4-slot** ("Double-Width") rear module (such as RM20-9904-C-HDBNC or RM20-9904-F-HDBNC) is to be fitted with SFP option.

Rear modules RM20-9904-C-HDBNC, RM20-9904-F-HDBNC, or RM20-9904-G-HDBNC and option -UDX-SFP-MSA-2S or -UDX-SFP-MSA-4S are purchased and available separately.

-SFP-EOOE-MSA-12G 12G/6G/3G/HD/SD-SDI UHD Transceiver (LC female connectors)

-SFP-EO-MSA-12G 12G/6G/3G/HD/SD-SDI UHD Transmitter (LC female connector)

-SFP-OE-MSA-12G 12G/6G/3G/HD/SD-SDI UHD Receiver (LC female connector)

-SFP-EOOE-MSA Single-Channel Video Optical Transceiver (LC female connectors)

-SFP-EO-MSA Single-Channel Video Optical Transmitter (LC female connector)

-SFP-OE-MSA Single-Channel Video Optical Receiver (LC female connector)

-SFP-IP-SWD-MSA Software-Defined MSA SFP 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for cards using SFP type -SPF-IP-SWD-MSA (Up to 3 software licenses can be added to the -SFP-IP-SWD-MSA, but only 1 license can be active at a time):

+ADD-SFP-IP-TO-SDI-2022-6 SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-SDI
+ADD-SFP-IP-TO-SDI-2110 SFP Software License; Single-Channel De-Encapsulator IP-2110-to-SDI
+ADD-SFP-SDI-TO-IP-2022-6 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2022-6
+ADD-SFP-SDI-TO-IP-2110 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2110

-UDX-SFP Adds daughter card supporting externally-accessible dual SFP cage; orderable as new option. **Note:** To support SFP option(s), this option is required in addition to desired specific SFP options below. The SFP modules listed below are available for the 9904-UDX-4K card when also fitted with SFP option -UDX-SFP.
- **-UDX-SFP-2S** is required where **2-slot** ("Standard-Width") rear module (such as RM20-9904-G-HDBNC) is to be fitted with SFP option.
- **-UDX-SFP-4S** is required where **4-slot** ("Double-Width") rear module (such as RM20-9904-C-HDBNC or RM20-9904-F-HDBNC) is to be fitted with SFP option.

Rear modules RM20-9904-C-HDBNC, RM20-9904-F-HDBNC, or RM20-9904-G-HDBNC and option -UDX-SFP-2S or -UDX-SFP-4S are purchased and available separately.

-SFP-EOOE-12G 12G/6G/3G/HD/SD-SDI UHD Transceiver (LC female connectors)

-SFP-EO-12G 12G/6G/3G/HD/SD-SDI UHD Transmitter (LC female connector)

-SFP-OE-12G 12G/6G/3G/HD/SD-SDI UHD Receiver (LC female connector)

-SFP-2EO-12G 12G/6G/3G/HD/SD-SDI UHD Dual Transmitter (LC female connector)

-SFP-2OE-12G 12G/6G/3G/HD/SD-SDI UHD Dual Receiver (LC female connector)

-SFP-EOOE Single-Channel Video Optical Transceiver (LC female connectors)

-SFP-EO Single-Channel Video Optical Transmitter (LC female connector)

-SFP-OE Single-Channel Video Optical Receiver (LC female connector)

-SFP-2EO Dual-Channel Video Optical Transmitter (LC female connector)

-SFP-2OE Dual-Channel Video Optical Receiver (LC female connector)

-SFP-IP-SWD Software-Defined EmSFP; 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for cards using SFP type -SPF-IP-SWD (Up to 3 software licenses can be added to the -SFP-IP-SWD, but only 1 license can be active at a time):

+ADD-SFP-2SDI-TO-IP-2022-6 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2022-6
+ADD-SFP-2SDI-TO-IP-2110 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2110
+ADD-SFP-IP-TO-2SDI-2022-6 SFP Software License; Dual-Channel De-Encapsulator IP-2022-6-to-2SDI
+ADD-SFP-IP-TO-2SDI-2110 SFP Software License; Dual-Channel De-Encapsulator IP-2110-to-2SDI
+ADD-SFP-IP-TO-SDI-2022-6 SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-SDI
+ADD-SFP-IP-TO-SDI-2110 SFP Software License; Single-Channel De-Encapsulator IP-2110-to-SDI
+ADD-SFP-SDI-TO-IP-2022-6 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2022-6
+ADD-SFP-SDI-TO-IP-2110 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2110

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9904-UDX-4K-DSP » 12G/6G/3G/HD/SD UHD UP/DOWN/CROSS CONVERTER / FRAME SYNC with Advanced Audio Processing

The Cobalt® **9904-UDX-4K-DSP 12G/6G/3G/HD/SD UHD Up/Down/Cross Converter/Frame Sync with DSP Advanced Audio Processing** is Cobalt's next generation of advanced scaler/frame sync for the openGear® platform.

The 9904-UDX-4K-DSP upconverts 12G/6G/3G/HD/SD to either UHD1 3840x2160 Square DIvision Multiplex (SDM) or Two-Sample Interleave (2SI) quad 3G-SDI based formats, or can output ST 2082 12G-SDI for single-wire 4K transport. With both 12G-SDI and quad 3G-SDI inputs, the 9904-UDX-4K can downconvert 12G and quad UHD. The 9904-UDX-4K provides an HDMI 2.0 output for economical 4K video monitoring. The 9904-UDX-4K-DSP offers numerous options, including SDR-to-HDR conversion and color correction.

The 9904-UDX-4K-DSP offers a DSP-based platform that supports multiple advanced audio DSP options, including Dolby® Real-Time Loudness Leveling automatic loudness processing, Dolby® E/D/D+ encode/decode, and Linear Acoustic® UPMAX™ automatic upmixing. Embedded audio and metadata are properly delayed and re-embedded to match any video processing delay, with full adjustment available for audio/video offset.

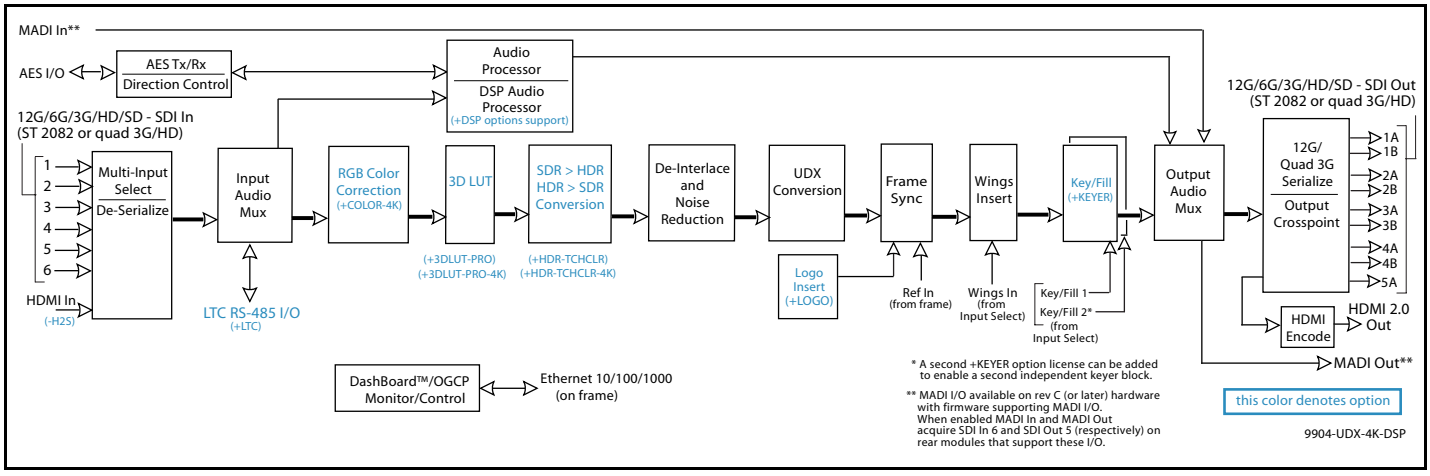
The high-density openGear® design allows for up to five 9904-UDX-4K-DSP cards to be installed in one 2RU openGear® frame. Card control/monitoring is available via DashBoard user interface or Cobalt's RESTful-based Reflex protocol.

FEATURES

- High-density openGear comprehensive UHD UDX solution
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Full up/down conversion between HD/3G, ST 2082 12G-SDI single-wire, and SDQS/2SI quad 3G-SDI based formats, with ST 2082 12G-SDI single-wire and quad 3G UHD available at both input and output
- Supports Square Division Multiplex (SDM) and Two-Sample Interleave (2SI) quad UHD formats
- 12G-SDI and quad 3G frame sync and user delay
- DSP-based platform supports multiple audio DSP options, with multiple instances available using allocatable license "credits"
- Dolby encoding/decoding, Dolby Real-Time Loudness Leveling (RTLL) loudness leveling with full parametric control setup, and Linear Acoustic UPMAX™ upmixing DSP audio options available
- Supports Cobalt's Reflex (JSON) Protocols
- Full embedded audio processing with user delay offset and AES I/O
- Noise Reduction and Detail Enhancement provide image quality optimization
- Remote control/monitoring via Dashboard™ software, OGCP-9000 remote control panels, or Cobalt's RESTful-based Reflex protocol
- Hot-swappable
- Five year warranty

OPTIONS

- SDR/HDR Conversion Options (**+HDR-TCHCLR-4K**, **+HDR-TCHCLR**) – Provides real-time intelligent HDR conversion powered by Technicolor®. Contains SDR-to-HDR, HDR-to-SDR, and HDR-to-HDR conversion with dynamic metadata creation. Technicolor toolkits include SL-HDR encode, SL-HDR decode, and ITM Intelligent Tone Management.
- 3D LUT Options (**+3DLUT-PRO-4K**, **+3DLUT-PRO**) – 3D LUT (Lookup Table) options provide 33 cube LUT mapping between 10-bit RGB and HDR color spaces.
- 3D LUTS Option (**+3D-LUT-BBC**)– Licensed product developed by the BBC, provides BBC 3D LUT as optional SDR-to-HDR and HDR-to-SDR profiles.
- Audio LTC I/O Option (**+LTC**)
- Logo Insertion Option (**+LOGO**) – Provides file-based insertion for branding local or destination branding/ID requirements.
- Dolby® / Linear Acoustic® DSP Audio Options (**+DSP**) (See Ordering Information for details)
- Color Correction Options (**+COLOR-4K**, **+COLOR**) – Provides full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.
- Key/Fill Keyer Option (**+KEYER**) – Provides keying using SDI inputs for key and fill signals. Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input. (A second **+KEYER** option license can be added to enable a second independent keyer block.)
- **-H2S** Option – Adds daughter card supporting externally-accessible HDMI input



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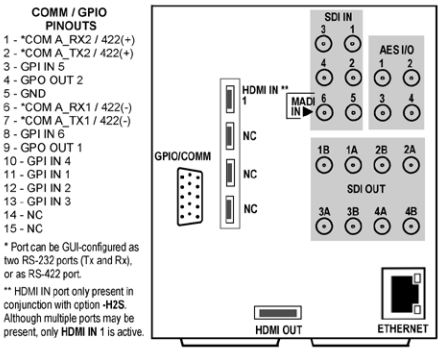
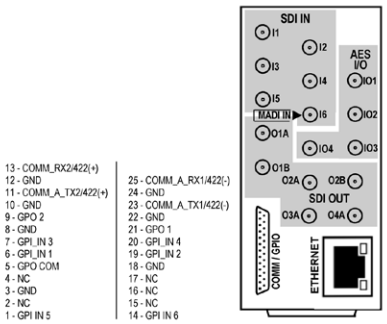
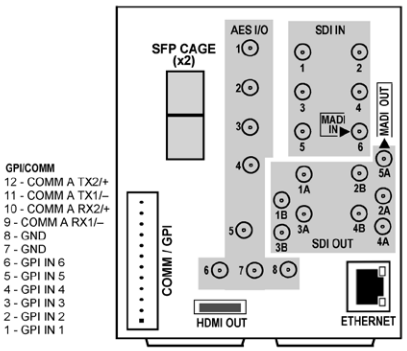
9904-UDX-4K-DSP » 12G/6G/3G/HD/SD UHD UP/DOWN/CROSS CONVERTER / FRAME SYNC with Advanced Audio Processing



RM20-9904-B-HDBNC

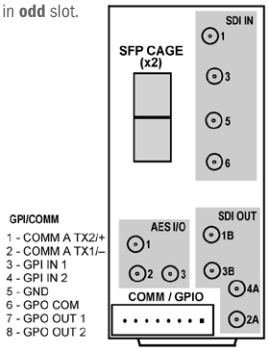


RM20-9904-D-HDBNC



RM20-9904-F-HDBNC

Note: Mates to card in **odd** slot.



RM20-9904-G-HDBNC

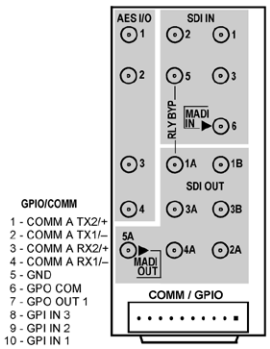
Note: Due to the alignment of the 9904 card and the -D rear module, the combination of the card and rear module will consume the adjacent odd frame slot in addition to the even slot occupied by the card.

Note: This rear module cannot be installed in frame slots 19/20 location. The 9904-UDX card, when installation is attempted, will clash/interfere with the frame network controller card.

Note: (8) AES ports supported on card hardware rev -E and later. Earlier card versions support (4) AES ports (max).

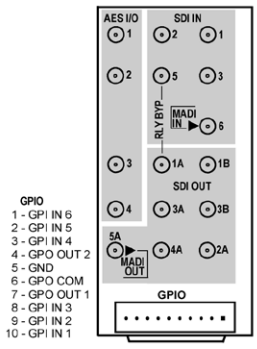
Note: MADI I/O is available on rev C (or later) hardware with firmware supporting MADI I/O. When enabled MADI In and MADI Out acquire SDI In 6 and SDI Out 5 (respectively) on rear modules that support these I/O. Rear modules that support MADI I/O show the MADI port locations that are SDI IN 6 and SDI OUT 5 alternates (as shown in illustrations above).

Note: 9904-UDX-4K-DSP model does not support SFP ports. SFPs are not supported nor present when using rear modules that show SFP presence on this card model.



RM20-9904-H-HDBNC

Note: 12G signals over relay bypass path stipulates maximum cable length not to exceed 10m for **total** of both input **and** output cable lengths.



RM20-9904-J-HDBNC

openGear

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9904-UDX-4K-DSP » 12G/6G/3G/HD/SD UHD UP/DOWN/CROSS CONVERTER / FRAME SYNC with Advanced Audio Processing

SPECIFICATIONS

12G/6G/3G/HD/SD-SDI Input/Outputs
(6) 75Ω inputs (max)
(8) 75Ω outputs (max)
SDI Formats Supported: SMPTE ST2082-1,10, 424M, 292M, SMPTE 259M-C. All inputs/outputs 12G compliant and SDQS/2SI quad 3G compliant.
Return Loss:
> 15 dB up to 1.485 GHz
> 10 dB up to 3 GHz
> 7 dB up to 6 GHz
> 5 dB up to 12 GHz
Input Cable Length:
45m Belden 1694A cable at 11.88 Gbps
120m Belden 1694A cable at 2.97 Gbps
240m Belden 1694A cable at 1.485 Gbps
400m Belden 1694A cable at 270 Mbps
Output Signal Level: 800 mV ± 10%
DC Offset: 0 V ± 50 mV
Rise and Fall Time @ 11.88 Gbps: < 45 ps
Alignment Jitter (12G/3G/HD/SD): < 0.3/0.3/0.2/0.2 UI

Frame Sync Audio/VIdeo Delay
Max offset: 20 frames
Latency (min): 1 frame

User Audio Delay Offset from Video
Bulk delay control: -33 msec to +3000 msec.
Per-channel delay controls: -800 msec to +800 msec

AES Audio Inputs/Outputs
(8) AES-3id 75Ω coaxial ports (max); port direction assignable as inputs or outputs in groups of 4 ports.
Note: Hardware rev –E and later has 8 AES ports; earlier versions have 4 port max.

MADI Audio Inputs/Outputs
(2) 75Ω coaxial ports (max)
Note: Not all rear modules support full MADI I/O. MADI I/O is a function of Rear Module used and is available only on card with on rev C (or later) hardware with firmware supporting MADI I/O. See Rear Module illustrations for specific information.

HDMI Output
HDMI 2.0 Output; type A standard connector

HDMI Input (Option -H2S only)
HDMI 2.0 Input; mini connector

GPIO
(6) GPI (max); (2) GPO (max)
Note: GPIO max capacity is a function of Rear Module used. See Rear Module illustrations for specific information.

Frame Reference Input
(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”

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9904-UDX-4K-DSP » 12G/6G/3G/HD/SD UHD UP/DOWN/CROSS CONVERTER / FRAME SYNC with Advanced Audio Processing

ORDERING INFORMATION

9904-UDX-4K-DSP 12G/6G/3G/HD/SD UHD Up/Down/Cross Converter/Frame Sync with DSP Advanced Audio Processing

Rear Modules:

Note: • MADI I/O is available on rev C (or later) hardware with firmware supporting MADI I/O. When enabled MADI In and MADI Out acquire SDI In 6 and SDI Out 5 (respectively) on rear modules that support these I/O. Rear modules that support MADI I/O show the MADI port locations that are SDI IN 6 and SDI OUT 5 alternatives. Rear modules that support MADI are identified below as **MADI Compatible**.

• 9904-UDX-4K-DSP model does not support SFP ports. SFPs are not supported nor present when using rear modules that show SFP presence on this card model.

RM20-9904-B-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (8) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (4) AES I/O (User Selectable), GPIO/COMM, HDMI 2.0 Output (type A standard connector), 100/1000 BaseT Ethernet Port **MADI Compatible.** (All coaxial connectors HD-BNC.)

RM20-9904-D-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (6) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (4) AES I/O, GPIO/COMM, 100/1000 BaseT Ethernet Port **MADI Compatible.** (All coaxial connectors HD-BNC.)

RM20-9904-F-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (9) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (8) AES I/O, GPI/COMM, HDMI 2.0 Output (type A standard connector), 100/1000 BaseT Ethernet Port **MADI Compatible.** (All coaxial connectors HD-BNC.)

RM20-9904-G-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 12G/6G/3G/HD/SD/SD-SDI Inputs, (4) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (3) AES I/O, GPIO/COMM (All coaxial connectors HD-BNC.) (**Note:** Mates to card in odd frame slot.)

RM20-9904-H-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (5) 12G/6G/3G/HD/SD/SD-SDI Inputs, (7) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs (one 3G/HD/SDI Output with relay bypass failover), (4) AES I/O, GPIO/COMM **MADI Compatible** (All coaxial connectors HD-BNC.) (**Note:** Mates to card in odd frame slot.)

RM20-9904-J-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (5) 12G/6G/3G/HD/SD/SD-SDI Inputs, (7) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs (one 3G/HD/SDI Output with relay bypass failover), (4) AES I/O, GPIO **MADI Compatible** (All coaxial connectors HD-BNC.) (**Note:** Mates to card in odd frame slot.)

Options:

Note: • Options denoted as **"+"** are **software-based** options which are available on new product when ordered or can be customer field-installed as a software upload upgrade.

• Options or ordering line items denoted as "**-**" are **hardware-based** options/items. These options are available as factory-installed only on new product, or product returned to Cobalt for factory installation.

+HDR-TCHCLR-4K 4K SDR/HDR Conversion Option (This option includes SL-HDR encode, SL-HDR decode, and ITM Intelligent Tone Management.)

+HDR-TCHCLR SDR/HDR Conversion Option (This option includes SL-HDR encode, SL-HDR decode, and ITM Intelligent Tone Management.)

+3DLUT-PRO-4K 3D LUT 4K Option

+3DLUT-PRO 3D LUT Option

+3D-LUT-BBC BBC 3DLUT Option (Requires +3D-LUT-PRO or +3D-LUT-PRO-4K option to also be present to support this option)

+COLOR-4K 4K Color Correction Option

+COLOR Color Correction Option

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9904-UDX-4K-DSP » 12G/6G/3G/HD/SD UHD UP/DOWN/CROSS CONVERTER / FRAME SYNC with Advanced Audio Processing

ORDERING INFORMATION (cont.)

+KEYER Key/Fill Keyer (Alpha) Option (Additional second option license enables a second independent keyer block.)

+LOGO Logo Insertion Option

+LTC Audio LTC I/O Option

+DSP-RTLL-5.1 Dolby® Real-Time Loudness Leveling 5.1-Channel Surround Sound Loudness Processor

+DSP-RTLL-2.0 Dolby® Real-Time Loudness Leveling 2.0-Channel Stereo Loudness Processor

+DSP-ENCD-5.1 Dolby® Digital / Digital Plus 5.1 Encoder

+DSP-ENCD-2.0 Dolby® Digital / Digital Plus 2.0 Encoder

+DSP-DEC Dolby® E / Dolby® Digital / Dolby® Digital Plus Decoder

+DSP-UPMIX-LA Linear Acoustic UPMAX™ 2.0-to-5.1 Upmixer

-H2S Adds daughter card supporting externally-accessible HDMI input port; orderable as new option. **Note:** To support HDMI input option -H2S, this option is required in addition to card fitted with rear module (such as RM20-9904-B-HDBNC) that allows access to the daughter card-located HDMI input connector.

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9904-UDX-4K-IP » 12G/6G/3G/HD/SD UHD UP/DOWN/CROSS CONVERTER/FRAME SYNC

with Dual 10GigE IP Ports

The Cobalt® **9904-UDX-4K-IP 12G/6G/3G/HD/SD UHD Up/Down/Cross Converter/Frame Sync with Dual 10GigE IP Ports** is Cobalt's next generation of advanced scaler/frame synchronizers for the openGear® platform.

The 9904-UDX-4K-IP upconverts 12G/6G/3G/HD/SD to either UHD1 3840x2160 Square DIvision Multiplex (SDM) or Two-Sample Interleave (2SI) quad 3G-SDI based formats, or can output ST 2082 12G-SDI for single-wire 4K transport. With both 12G-SDI and quad 3G-SDI inputs, the 9904-UDX-4K can downconvert 12G and quad UHD. The 9904-UDX-4K provides an HDMI 2.0 output for economical 4K video monitoring. The 9904-UDX-4K-IP offers numerous options, including SDR-to-HDR conversion and color correction.

The 9904-UDX-4K-IP can provide dual 10GigE ports providing support for the emerging uncompressed video/audio/data over IP standards.

The high-density openGear® design allows for up to five 9904-UDX-4K-IP cards to be installed in one 2RU openGear® frame. Card control/monitoring is available via DashBoard user interface or Cobalt's RESTful-based Reflex protocol.

openGear

FEATURES

- High-density openGear comprehensive UHD UDX solution
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Full up/down conversion between HD/3G, ST 2082 12G-SDI single-wire, and SDQS/2SI quad 3G-SDI based formats, with ST 2082 12G-SDI single-wire and quad 3G UHD available at both input and output
- Supports Square Division Multiplex (SDM) and Two-Sample Interleave (2SI) quad UHD formats
- 12G-SDI and quad 3G frame sync and user delay
- Supports Cobalt's Reflex (JSON) Protocols
- Noise Reduction and Detail Enhancement provide image quality optimization
- Remote control/monitoring via Dashboard™ software, OGCP-9000 remote control panels, or Cobalt's RESTful-based Reflex protocol
- Hot-swappable
- Five year warranty

OPTIONS

SDR/HDR Conversion Options (**+HDR-TCHCLR-4K**, **+HDR-TCHCLR**) – Provides real-time intelligent HDR conversion powered by Technicolor®. Contains SDR-to-HDR, HDR-to-SDR, and HDR-to-HDR conversion with dynamic metadata creation. Technicolor toolkits include SL-HDR encode, SL-HDR decode, and ITM Intelligent Tone Management.

3D LUT Options (**+3DLUT-PRO-4K**, **+3DLUT-PRO**) – 3D LUT (Lookup Table) options provide 33 cube LUT mapping between 10-bit RGB and HDR color spaces.

3D LUT Option (**+3D-LUT-BBC**) – Licensed product developed by the BBC, provides BBC 3D LUTS as optional SDR-to-HDR and HDR-to-SDR profiles.

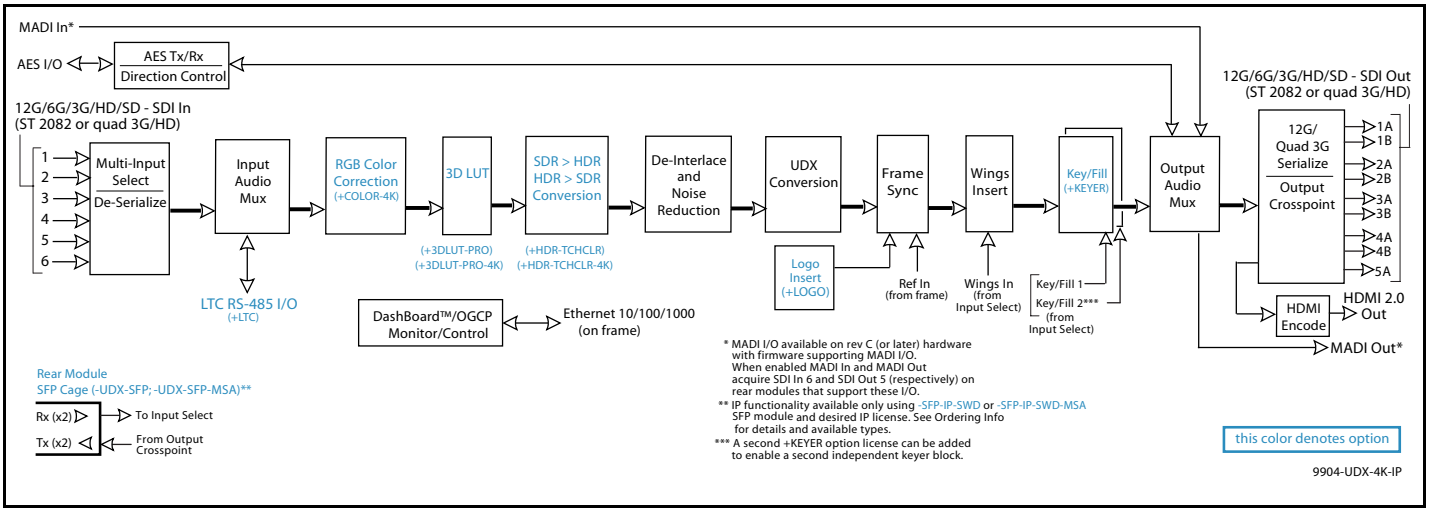
Logo Insertion Option (**+LOGO**) – Provides file-based insertion for branding local or destination branding/ID requirements.

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

Color Correction Options (**+COLOR-4K**, **+COLOR**) – Provides full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.

Key/Fill Keyer Option (**+KEYER**) – Provides keying using SDI inputs for key and fill signals. Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input. (A second **+KEYER** option license can be added to enable a second independent keyer block.)

-UDX-SFP Options – Adds daughter card supporting externally-accessible dual SFP cage. (See Ordering Information for SFP types available, descriptions, and further info.)



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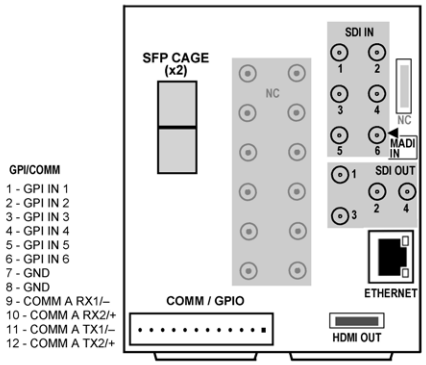
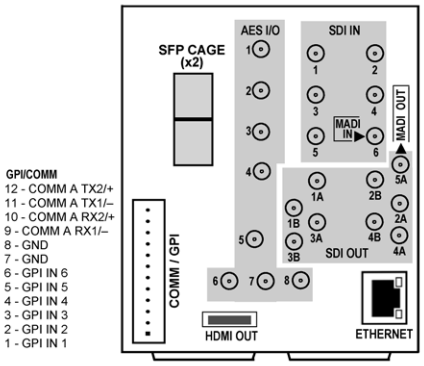
9904-UDX-4K-IP » 12G/6G/3G/HD/SD UHD UP/DOWN/CROSS CONVERTER/FRAME SYNC

with Dual 10GigE IP Ports

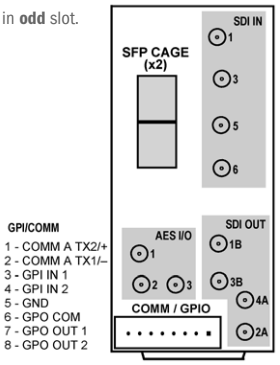


RM20-9904-C-HDBNC



RM20-9904-F-HDBNC

Note: Mates to card in **odd** slot.



RM20-9904-G-HDBNC

Note: MADI I/O is available on rev C (or later) hardware with firmware supporting MADI I/O. When enabled MADI In and MADI Out acquire SDI In 6 and SDI Out 5 (respectively) on rear modules that support these I/O. Rear modules that support MADI I/O show the MADI port locations that are SDI IN 6 and SDI OUT 5 alternatives (as shown in illustrations here).

SPECIFICATIONS

12G/6G/3G/HD/SD-SDI Input/Outputs
(6) 75Ω inputs (max)
(8) 75Ω outputs (max)
SDI Formats Supported: SMPTE ST2082-1,10, 424M, 292M, SMPTE 259M-C. All inputs/outputs 12G compliant and SDQS/2SI quad 3G compliant.
Return Loss:
> 15 dB up to 1.485 GHz
> 10 dB up to 3 GHz
> 7 dB up to 6 GHz
> 5 dB up to 12 GHz
Input Cable Length:
45m Belden 1694A cable at 11.88 Gbps
120m Belden 1694A cable at 2.97 Gbps
240m Belden 1694A cable at 1.485 Gbps
400m Belden 1694A cable at 270 Mbps
Output Signal Level: 800 mV ± 10%
DC Offset: 0 V ± 50 mV
Rise and Fall Time @ 11.88 Gbps: < 45 ps
Alignment Jitter (12G/3G/HD/SD): < 0.3/0.3/0.2/0.2 UI

Frame Sync Audio/VIdeo Delay
Max offset: 20 frames
Latency (min): 1 frame

User Audio Delay Offset from Video
Bulk delay control: -33 msec to +3000 msec.
Per-channel delay controls: -800 msec to +800 msec

AES Audio Inputs/Outputs
(8) AES-3id 75Ω coaxial ports (max); port direction assignable as inputs or outputs in groups of 4 ports.
Note: Hardware rev –E and later has 8 AES ports; earlier versions have 4 port max.

MADI Audio Inputs/Outputs
(2) 75Ω coaxial ports (max)
Note: Not all rear modules support full MADI I/O. MADI I/O is a function of Rear Module used and is available only on card with on rev C (or later) hardware with firmware supporting MADI I/O. See Rear Module illustrations for specific information.

HDMI Output
HDMI 2.0 Output; type A standard connector

IP ST 2022-6 Interface
(2) 10GigE multi-mode optical Tx/Rx interface; female LC duplex connectors

GPIO
(6) GPI (max); (2) GPO (max)
Note: GPIO max capacity is a function of Rear Module used. See Rear Module illustrations for specific information.

Frame Reference Input
(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”

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9904-UDX-4K-IP » 12G/6G/3G/HD/SD UHD UP/DOWN/CROSS CONVERTER/FRAME SYNC

with Dual 10GigE IP Ports

ORDERING INFORMATION

9904-UDX-4K-IP 12G/6G/3G/HD/SD UHD Up/Down/Cross Converter/Frame Sync with Dual 10GigE IP Ports

Rear Modules:

Note: • MADI I/O is available on rev C (or later) hardware with firmware supporting MADI I/O. When enabled MADI In and MADI Out acquire SDI In 6 and SDI Out 5 (respectively) on rear modules that support these I/O. Rear modules that support MADI I/O show the MADI port locations that are SDI IN 6 and SDI OUT 5 alternatives. Rear modules that support MADI are identified below as **MADI Compatible**.

• Rear modules with SFP access do not come standard with any SFP functionality. Appropriate SFP option must be provisioned for rear module SFP functionality.

RM20-9904-C-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (4) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, GPI/COMM, HDMI 2.0 Output (type A standard connector), (2) SFP cage receptacles, 100/1000 BaseT Ethernet Port **MADI Compatible.** (All coaxial connectors HD-BNC.)

RM20-9904-F-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (9) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (8) AES I/O, GPI/COMM, HDMI 2.0 Output (type A standard connector), (2) SFP cage receptacles, 100/1000 BaseT Ethernet Port **MADI Compatible.** (All coaxial connectors HD-BNC.)

RM20-9904-G-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 12G/6G/3G/HD/SD/SD-SDI Inputs, (4) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (3) AES I/O, GPIO/COMM (All coaxial connectors HD-BNC.) (**Note:** Mates to card in odd frame slot.)

Options:

Note: • Options denoted as **"+"** are **software-based** options which are available on new product when ordered or can be customer field-installed as a software upload upgrade.
• Options or ordering line items denoted as "-" are **hardware-based** options/items. These options are available as factory-installed only on new product, or product returned to Cobalt for factory installation.

+HDR-TCHCLR-4K 4K SDR/HDR Conversion Option (This option includes SL-HDR encode, SL-HDR decode, and ITM Intelligent Tone Management.)

+HDR-TCHCLR SDR/HDR Conversion Option (This option includes SL-HDR encode, SL-HDR decode, and ITM Intelligent Tone Management.)

+3DLUT-PRO-4K 3D LUT 4K Option (compatible with up-mapping to HDR and processing for down-conversions to HD SDR color space)

+3DLUT-PRO 3D LUT Option (compatible with processing for down-conversions to HD SDR color space)

+3D-LUT-BBC BBC 3DLUT Option (Requires +3D-LUT-PRO or +3D-LUT-PRO-4K option to also be present to support this option)

+COLOR-4K 4K Color Correction Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer (Alpha) Option (Additional second option license enables a second independent keyer block.)

+LOGO Logo Insertion Option

+LTC Audio LTC I/O Option

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9904-UDX-4K-IP » 12G/6G/3G/HD/SD UHD UP/DOWN/CROSS CONVERTER/FRAME SYNC

with Dual 10GigE IP Ports

-UDX-SFP-MSA Adds daughter card supporting externally-accessible dual SFP cage.

Note:

- To support SFP option(s) below, card must be fitted with rear module (such as RM20-9904-C-HDBNC, RM20-9904-F-HDBNC, or RM20-9904-G) that supports SFP plug-in modules.
- This daughter card included standard on 9904-UDX-4K-IP model, but needs to be specified at purchase to support MSA-type SFP below.
- **-UDX-SFP-MSA-2S** is required where **2-slot** ("Standard-Width") rear module (such as RM20-9904-G-HDBNC) is to be fitted with SFP option.
- **-UDX-SFP-MSA-4S** is required where **4-slot** ("Double-Width") rear module (such as RM20-9904-C-HDBNC or RM20-9904-F-HDBNC) is to be fitted with SFP option.

Rear modules RM20-9904-C-HDBNC, RM20-9904-F-HDBNC, or RM20-9904-G-HDBNC and option -UDX-SFP-MSA-2S or -UDX-SFP-MSA-4S are available separately.

-SFP-IP-SWD-MSA Software-Defined MSA SFP 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for cards using SFP type -SPF-IP-SWD-MSA (Up to 3 software licenses can be added to the -SFP-IP-SWD-MSA, but only 1 license can be active at a time):

+ADD-SFP-IP-T0-SDI-2022-6 SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-SDI

+ADD-SFP-IP-T0-SDI-2110 SFP Software License; Single-Channel De-Encapsulator IP-2110-to-SDI

+ADD-SFP-SDI-T0-IP-2022-6 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2022-6

+ADD-SFP-SDI-T0-IP-2110 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2110

-UDX-SFP Adds daughter card supporting externally-accessible dual SFP cage.

Note:

- To support SFP option(s) below, card must be fitted with rear module (such as RM20-9904-C-HDBNC, RM20-9904-F-HDBNC, or RM20-9904-G) that supports SFP plug-in modules.
- This daughter card included standard on 9904-UDX-4K-IP model, but needs to be specified at purchase to support SFP below.
- **-UDX-SFP-2S** is required where **2-slot** ("Standard-Width") rear module (such as RM20-9904-G-HDBNC) is to be fitted with SFP option.
- **-UDX-SFP-4S** is required where **4-slot** ("Double-Width") rear module (such as RM20-9904-C-HDBNC or RM20-9904-F-HDBNC) is to be fitted with SFP option.

Rear modules RM20-9904-C-HDBNC, RM20-9904-F-HDBNC, or RM20-9904-G-HDBNC and option -UDX-SFP-2S or -UDX-SFP-4S are available separately.

-SFP-IP-SWD Software-Defined EmSFP; 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for cards using SFP type -SPF-IP-SWD (Up to 3 software licenses can be added to the -SFP-IP-SWD, but only 1 license can be active at a time):

+ADD-SFP-2SDI-T0-IP-2022-6 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2022-6

+ADD-SFP-2SDI-T0-IP-2110 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2110

+ADD-SFP-IP-T0-2SDI-2022-6 SFP Software License; Dual-Channel De-Encapsulator IP-2022-6-to-2SDI

+ADD-SFP-IP-T0-2SDI-2110 SFP Software License; Dual-Channel De-Encapsulator IP-2110-to-2SDI

+ADD-SFP-IP-T0-SDI-2022-6 SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-SDI

+ADD-SFP-IP-T0-SDI-2110 SFP Software License; Single-Channel De-Encapsulator IP-2110-to-SDI

+ADD-SFP-SDI-T0-IP-2022-6 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2022-6

+ADD-SFP-SDI-T0-IP-2110 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2110

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9905-MPx » 3G/HD/SD QUAD-PATH UP/DOWN/CROSS CONVERTER / FRAME SYNC / EMBED/DE-EMBED AUDIO PROCESSOR

The Multi-Path **9905-MPx 3G/HD/SD Quad-Path Up/Down/Cross Converter/Frame Sync/Embed/De-Embed Audio Processor** is a Cobalt® next-generation advanced scaler/frame synchronizer for the openGear® platform. The 9905-MPx provides **four independent signal paths** of UDX / frame sync / audio embedding and de-embedding on a single open-Gear® card. Using our HPF-9000 20-slot frame, this provides up to 24 channels (6 cards) of processing in a single frame. The 9905-MPx represents a new level of openGear packaging density!

The 9905-MPx provides high-density that offers unprecedented multi-input support and flexibility. Independent up/down/cross convert 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. Discrete AES and MADI audio audio embedding/routing/mixing/de-embedding to any of four processing paths is supported. Standard 3D LUT feature and available color correction provide accommodation of SDR and HDR processing for downstream HDR systems.

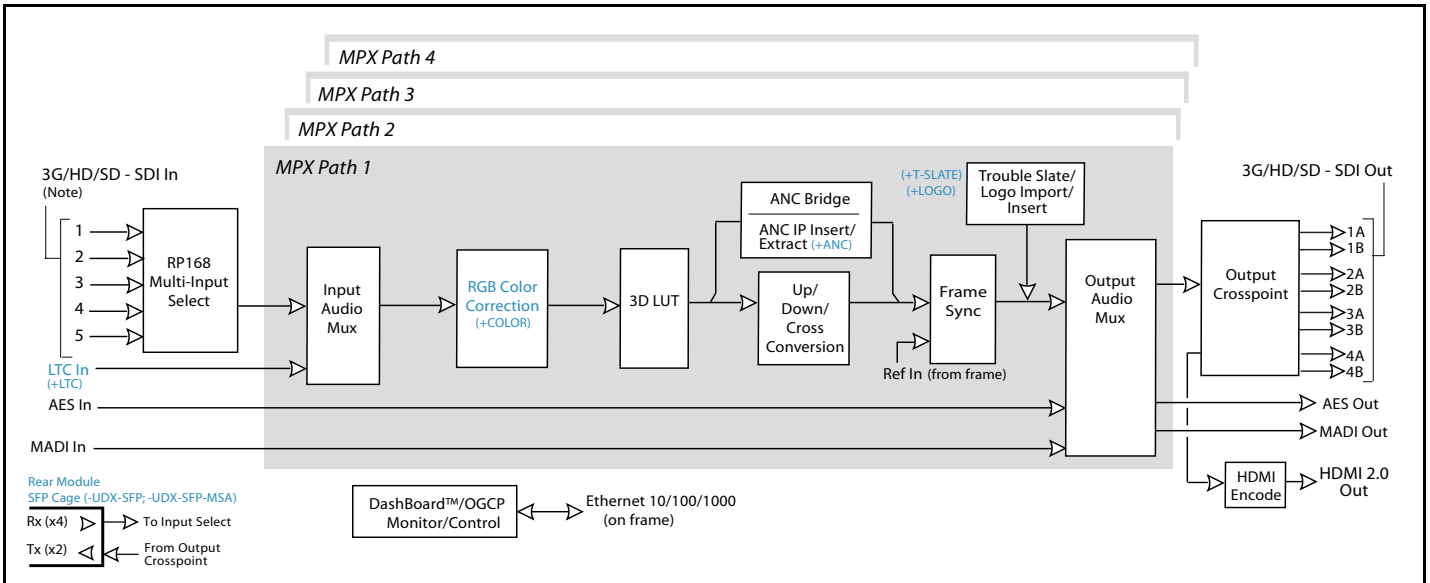
Card control/monitoring is available via DashBoard user interface or Cobalt's RESTful-based Reflex protocol. The 9905-MPx can be software-converted to a 4K Quad-Link Input SDM/2SI 4K UDX/Frame Sync card with an option software license.

FEATURES

- Multi-Path design offers four independent UDX /frame sync paths (channels) per card
- Flexible AES and MADI embed/de-embed for each path
- Up/Down/Cross Conversion with user ARC control. 3D-LUT is standard feature for all paths.
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Independent four-path ANC bridging, including timecode and closed-captioning processing
- Noise Reduction and Detail Enhancement provide image quality optimization
- Remote control/monitoring via Dashboard™ software, OGCP-9000 remote control panels or Cobalt's RESTful-based Reflex protocol
- Five year warranty

OPTIONS

- Color Correction (**+COLOR**) – Provides full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.
- Logo Insertion (**+LOGO**) – Allows uploading of user logo graphic file to card, with automated insertion controlled by GPI or other events
- Trouble Slate Import (**+T-SLATE**) – Allows uploading of up to three different user trouble slate graphic file to card, with automated insertion controlled by GPI or other events
- Clean & Quiet Switching (**+CQS**) – Provides automatic audio ramp-down and up during input switching events for noise-free audio between input switches
- BBC LUTS (**+3D-LUT-BBC**) – Licensed product developed by the BBC, provides BBC 3D LUTS for SDR-to-HDR and HDR-to-SDR
- Serial-To-Embedded Audio LTC In (**+LTC**)
- ANC IP Insert/Extract (**+ANC**) (Internal ANC Bridge is standard)
- Software-Defined Convert Card to 4K Quad-Link Input SDM/2SI 4K UDX/Frame Sync (**+2K-TO-4K-9905**) – Software-defined option license that converts card to Quad-Link Input SDM/2SI 4K UDX/Frame Sync model
- **-UDX-SFP** Options – Adds daughter card supporting externally-accessible dual SFP cage. (See Ordering Information for SFP types available, descriptions, and further info.)



Note: Inputs can be selected from up to 5 discrete SDI inputs. Multiple simultaneous path processing is available with MPX Paths 2 thru 4 offering same features/functions as shown for MPX Path 1.

Note: Max fiber connectivity limited to combination of Rx and Tx fiber ports used/available.

this color denotes option

9905-MPx

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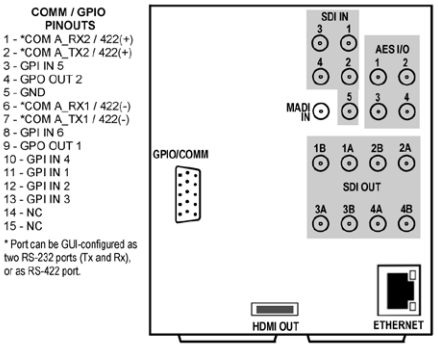
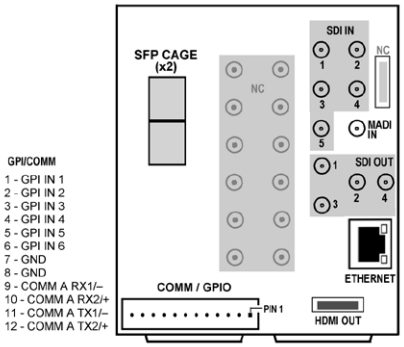
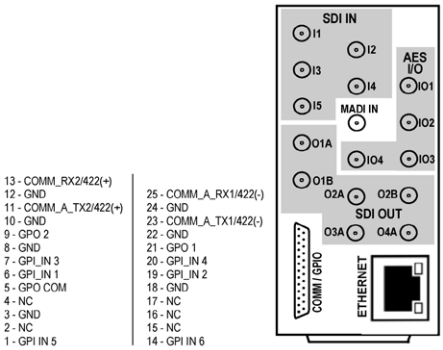
9905-MPx » 3G/HD/SD QUAD-PATH UP/DOWN/CROSS CONVERTER / FRAME SYNC / EMBED/DE-EMBED AUDIO PROCESSOR



RM20-9905-B-HDBNC



RM20-9905-C-HDBNC

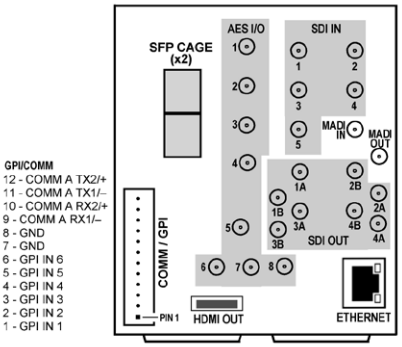


RM20-9905-D-HDBNC

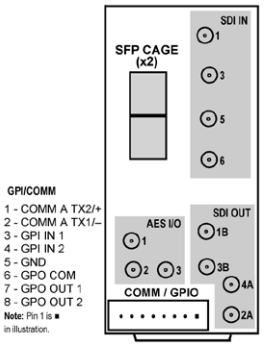
Note: Rear modules with SFP access do not come standard with any SFP functionality. Appropriate SFP option must be provisioned for rear module SFP functionality.

Note: Due to the alignment of the 9905-MPx card and the -D rear module, the combination of the card and rear module will consume the adjacent odd frame slot in addition to the even slot occupied by the card.

Note: This rear module cannot be installed in frame slots 19/20 location. The 9905-MPx card, when installation is attempted, will clash/interfere with the frame network controller card.

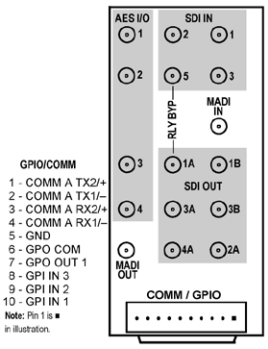


RM20-9905-F-HDBNC



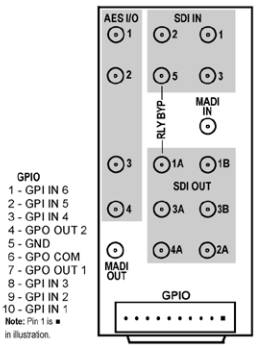
RM20-9905-G-HDBNC

Note: Mates to card in **odd** slot.



RM20-9905-H-HDBNC

Note: 12G signals over relay bypass path stipulates maximum cable length not to exceed 10m for **total** of both input **and** output cable lengths.



RM20-9905-J-HDBNC

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9905-MPx » 3G/HD/SD QUAD-PATH UP/DOWN/CROSS CONVERTER / FRAME SYNC / EMBED/DE-EMBED AUDIO PROCESSOR

SPECIFICATIONS

3G/HD/SD-SDI Input/Outputs
(4) 75Ω inputs (max); (4) inputs can be simultaneously routed to the four UDX/FS paths.
(2x4) 75Ω outputs (max)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
Return Loss:
> 15 dB up to 1.485 GHz
> 10 dB up to 3 GHz
Input Cable Length:
120m Belden 1694A cable at 2.97 Gbps
240m Belden 1694A cable at 1.485 Gbps
400m Belden 1694A cable at 270 Mbps
Output Signal Level: 800 mV ± 10%
DC Offset: 0 V ± 50 mV
Alignment Jitter (3G/HD/SD): < 0.3/0.2/0.2 UI

Frame Sync Audio/Video Delay
Max offset: 20 frames
Latency (min): 1 frame

User Audio Delay Offset from Video
Bulk delay control: -33 msec to +3000 msec
Per-channel delay controls: -800 msec to +800 msec

AES Audio Inputs/Outputs
(8) AES-3id 75Ω coaxial ports (max); port direction assignable as inputs or outputs in groups of 4 ports.

MADI Audio Inputs/Outputs
(2) 75Ω coaxial ports (max)
Note: Not all rear modules support full MADI I/O. MADI I/O is a function of Rear Module used. See Rear Module illustrations for specific information.

HDMI Output
HDMI 2.0 Output; type A standard connector. Crosspoint-selectable program source as Path 1, 2, 3, or 4.

GPIO
(6) GPI (max); (2) GPO (max)
Note: GPIO max capacity is a function of Rear Module used. See Rear Module illustrations for specific information.

Frame Reference Input
(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”

Frame Loading (Max. recommended number of 9905 cards supported per Frame Model)
· OG3 Frame: (5) cards
· HPF-9000 Frame: (5) cards
· oGx Frame: (7) cards
Note: In all cases, it is recommended to leave a 1RU gap above the frame and set frame Network Controller Card to run the frame cooling fans at full (max.) speed.

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9905-MPx » 3G/HD/SD QUAD-PATH UP/DOWN/CROSS CONVERTER / FRAME SYNC / EMBED/DE-EMBED AUDIO PROCESSOR

ORDERING INFORMATION

9905-MPx 3G/HD/SD Quad-Path Up/Down/Cross Converter/Frame Sync/Embed/De-Embed Audio Processor

Rear Modules:

Note: Rear modules with SFP access do not come standard with any SFP functionality. Appropriate SFP option must be provisioned for rear module SFP functionality.

RM20-9905-B-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (5) 3G/HD/SD/SD-SDI Inputs, (8) 3G/HD/SD/SD-SDI Processed Outputs, (4) AES I/O (User Selectable), (1) MADI Input, GPIO/COMM, HDMI 2.0 Output (type A standard connector), 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

RM20-9905-C-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (5) 3G/HD/SD/SD-SDI Inputs, (4) 3G/HD/SD/SD-SDI Processed Outputs, (1) MADI Input, GPI/COMM, HDMI 2.0 Output (type A standard connector), (2) SFP cage receptacles (when used in conjunction with option –UDX-SFP or -UDX-SFP-MSA), 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

RM20-9905-D-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD/SD/SD-SDI Inputs, (6) 3G/HD/SD/SD-SDI Processed Outputs, (4) AES I/O, (1) MADI Input, GPIO/COMM, 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

RM20-9905-F-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (5) 3G/HD/SD/SD-SDI Inputs, (8) 3G/HD/SD/SD-SDI Processed Outputs, (8) AES I/O, (1) MADI Input, (1) MADI Output, GPI/COMM, HDMI 2.0 Output (type A standard connector), (2) SFP cage receptacles (when used in conjunction with option –UDX-SFP or -UDX-SFP-MSA), 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

RM20-9905-G-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD/SD/SD-SDI Inputs, (4) 3G/HD/SD/SD-SDI Processed Outputs, (3) AES I/O, (2) SFP cage receptacles (when used in conjunction with option –UDX-SFP or -UDX-SFP-MSA), GPIO/COMM (All coaxial connectors HD-BNC.) (**Note:** Mates to card in odd frame slot.)

RM20-9905-H-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD/SD/SD-SDI Inputs, (6) 3G/HD/SD/SD-SDI Processed Outputs (one 3G/HD/SDI Output with relay bypass failover), (4) AES I/O, (1) MADI Input, (1) MADI Output, GPIO/COMM (All coaxial connectors HD-BNC.) (**Note:** Mates to card in odd frame slot.)

RM20-9905-J-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD/SD/SD-SDI Inputs, (6) 3G/HD/SD/SD-SDI Processed Outputs (one 3G/HD/SDI Output with relay bypass failover), (4) AES I/O, (1) MADI Input, (1) MADI Output, GPIO (All coaxial connectors HD-BNC.) (**Note:** Mates to card in odd frame slot.)

Options:

Note:
- Options denoted as **"+"** are **software-based** options which are available on new product when ordered or can be customer field-installed as a software upload upgrade. Unless otherwise noted, software options are per-card based. Options which are **per-path** based are identified as such.
- Options or ordering line items denoted as "**-**" are **hardware-based** options/items. These options are available as factory-installed only on new product, or product returned to Cobalt for factory installation.

+3D-LUT-BBC BBC 3D LUTS Option

+COLOR Color Correction Option (**per-path** based)

+LTC RS-485 Serial-To-Embedded Audio LTC In Option

+ANC IP ANC Insert/Extract Option (**per-path** based)

+LOGO Logo Insertion Option (**per-path** based)

+T-SLATE Trouble Slate Insertion Option (**per-path** based)

+CQS Clean & Quiet Switching Option

+2K-TO-4K-9905 Software-Defined Convert Card to 4K Quad-Link Input SDM/2SI 4K UDX/Frame Sync Option

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9905-MPx » 3G/HD/SD QUAD-PATH UP/DOWN/CROSS CONVERTER / FRAME SYNC / EMBED/DE-EMBED AUDIO PROCESSOR

ORDERING INFORMATION (cont.)

-UDX-SFP-MSA Adds daughter card supporting externally-accessible dual MSA SFP cage; orderable as new option. **Note:** To support SFP option(s), this option is required in addition to desired specific SFP options below. The SFP modules listed below are available for the 9905-MPx card when also fitted with SFP option -UDX-SFP-MSA.

- **-UDX-SFP-MSA-2S** is required where **2-slot** ("Standard-Width") rear module (such as RM20-9905-G-HDBNC) is to be fitted with SFP option.
- **-UDX-SFP-MSA-4S** is required where **4-slot** ("Double-Width") rear module (such as RM20-9905-C-HDBNC or RM20-9905-F-HDBNC) is to be fitted with SFP option.

Rear modules RM20-9905-C-HDBNC, RM20-9905-F-HDBNC, or RM20-9905-G-HDBNC and option -UDX-SFP-MSA-2S or -UDX-SFP-MSA-4S are purchased and available separately.

-SFP-EOOE-MSA-12G 12G/6G/3G/HD/SD-SDI UHD Transceiver (LC female connectors)

-SFP-EO-MSA-12G 12G/6G/3G/HD/SD-SDI UHD Transmitter (LC female connector)

-SFP-OE-MSA-12G 12G/6G/3G/HD/SD-SDI UHD Receiver (LC female connector)

-SFP-EOOE-MSA Single-Channel Video Optical Transceiver (LC female connectors)

-SFP-EO-MSA Single-Channel Video Optical Transmitter (LC female connector)

-SFP-OE-MSA Single-Channel Video Optical Receiver (LC female connector)

-SFP-IP-SWD-MSA Software-Defined MSA SFP 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for cards using SFP type -SPF-IP-SWD-MSA (Up to 3 software licenses can be added to the -SFP-IP-SWD-MSA, but only 1 license can be active at a time):

+ADD-SFP-IP-TO-SDI-2022-6 SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-SDI
+ADD-SFP-IP-TO-SDI-2110 SFP Software License; Single-Channel De-Encapsulator IP-2110-to-SDI
+ADD-SFP-SDI-TO-IP-2022-6 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2022-6
+ADD-SFP-SDI-TO-IP-2110 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2110

-UDX-SFP Adds daughter card supporting externally-accessible dual SFP cage; orderable as new option. **Note:** To support SFP option(s), this option is required in addition to desired specific SFP options below. The SFP modules listed below are available for the 9905-MPx card when also fitted with SFP option -UDX-SFP.

- **-UDX-SFP-2S** is required where **2-slot** ("Standard-Width") rear module (such as RM20-9905-G-HDBNC) is to be fitted with SFP option.
- **-UDX-SFP-4S** is required where **4-slot** ("Double-Width") rear module (such as RM20-9905-C-HDBNC or RM20-9905-F-HDBNC) is to be fitted with SFP option.

Rear modules RM20-9905-C-HDBNC, RM20-9905-F-HDBNC, or RM20-9905-G-HDBNC and option -UDX-SFP-2S or -UDX-SFP-4S are purchased and available separately.

-SFP-EOOE-12G 12G/6G/3G/HD/SD-SDI UHD Transceiver (LC female connectors)

-SFP-EO-12G 12G/6G/3G/HD/SD-SDI UHD Transmitter (LC female connector)

-SFP-OE-12G 12G/6G/3G/HD/SD-SDI UHD Receiver (LC female connector)

-SFP-2EO-12G 12G/6G/3G/HD/SD-SDI UHD Dual Transmitter (LC female connector)

-SFP-2OE-12G 12G/6G/3G/HD/SD-SDI UHD Dual Receiver (LC female connector)

-SFP-EOOE Single-Channel Video Optical Transceiver (LC female connectors)

-SFP-EO Single-Channel Video Optical Transmitter (LC female connector)

-SFP-OE Single-Channel Video Optical Receiver (LC female connector)

-SFP-2EO Dual-Channel Video Optical Transmitter (LC female connector)

-SFP-2OE Dual-Channel Video Optical Receiver (LC female connector)

-SFP-IP-SWD Software-Defined EmSFP; 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for cards using SFP type -SPF-IP-SWD (Up to 3 software licenses can be added to the -SFP-IP-SWD, but only 1 license can be active at a time):

+ADD-SFP-2SDI-TO-IP-2022-6 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2022-6
+ADD-SFP-2SDI-TO-IP-2110 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2110
+ADD-SFP-IP-TO-2SDI-2022-6 SFP Software License; Dual-Channel De-Encapsulator IP-2022-6-to-2SDI
+ADD-SFP-IP-TO-2SDI-2110 SFP Software License; Dual-Channel De-Encapsulator IP-2110-to-2SDI
+ADD-SFP-IP-TO-SDI-2022-6 SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-SDI
+ADD-SFP-IP-TO-SDI-2110 SFP Software License; Single-Channel De-Encapsulator IP-2110-to-SDI
+ADD-SFP-SDI-TO-IP-2022-6 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2022-6
+ADD-SFP-SDI-TO-IP-2110 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2110

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9501-DCDA-3G » DOWN-CONVERTER/DA with 3G/HD/SD-SDI Input, Reclocking, SD-SDI and Analog Video/Audio Outputs

The **9501-DCDA-3G** provides 3G/HD-to-SD down-conversion with ARC and has versatility in providing up to four SD-SDI and/or analog composite outputs as well as up to four reclocked SDI input copies. The space-saving design of the 9501-DCDA-3G provides for high density, allowing two cards to be collocated in adjacent slots and served by a single, standard width "split" rear module. Up to 20 of the 9501-DCDA cards can be installed in a 20-slot frame.

The card can pass SD signals with re-aspect, if needed. AFD processing can detect an incoming AFD code and correspondingly set scaling 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. Analog audio outputs can be de-embedded from selected embedded audio channels. The 9501-DCDA can rate-convert 23.98 frame video to 59.94 fields, move progressive to interlace and is equipped with extensive user programmable reticule overlays. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS.

The data path is 10-bit with 12-bit analog encoding. Full proc control allows adjustment of luma gain, luma lift, color gain, and color phase. Preset save/load allows saving custom card settings while allowing one-button revert to factory settings.

Preset save/load allows saving custom card 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. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access over a standard Ethernet network.

Alternate Base Model

- **9501-DCDA-HD** Down-Converter/DA with HD/SD-SDI Input, Reclocking, SD-SDI and Analog Video/Audio Outputs

FEATURES

- Low power/high-density design allows up to 20 cards per frame; less than 18 Watts per card
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Built-in x4 DAs for both reclocked and processed outputs
- Dual SDI inputs with manual GUI select and basic failover function
- Economical solution for 3G/HD down-conversion to legacy SD monitoring systems. HD version further economizes for environments requiring only HD/SD support (field upgradeable to 3G with software license upload if later desired).
- Auto-format detect/down-conversion of SMPTE 424M/292/259M formats
- Down-conversion scaling includes user-configurable ARC and AFD-controlled ARC
- Full embedded audio control with selectable downmix and analog audio de-embed
- Color framing preserved on CVBS outputs for all conversions
- User DashBoard output selection flexibly allows SDI or CVBS outputs on four processed-output BNCs
- Dual independent text/character burn-in insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover/LOS conditions)
- Full timecode and CEA 708 / CEA 608 conversion to SD VITC timecode and closed-captioning. Option **+LTC** allows bidirectional transfer between embedded video timecode formats and audio LTC.
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- Five year warranty

OPTIONS

- 3G Software Option Upgrade (**+3G**) – Upgrades 9501-DCDA-HD card to 9501-DCDA-3G functionality/specifications.
- Color Correction (**+COLOR**) – Provides independent RGB channel controls for luma, black, and gamma. Ultra-fast response time. The color correction feature is perfectly suited for use with Cobalt OGCP-9000/CC Remote Control Panel.
- Frame Sync Software Option (**+FS**) – Adds frame sync to 9501-DCDA-3G card. Provides full vertical and horizontal offset and frame delay controls. Glitch-free handling of embedded audio when a frame is dropped or duplicated.
- Audio LTC Software Option (**+LTC**) – Offers bidirectional transfer and conversion between video timecode formats and audio LTC. Audio LTC can be received or sent over various card audio channels.
- Extended Frame Sync Delay Option (**+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. (Add-on to option +FS; option +FS required)

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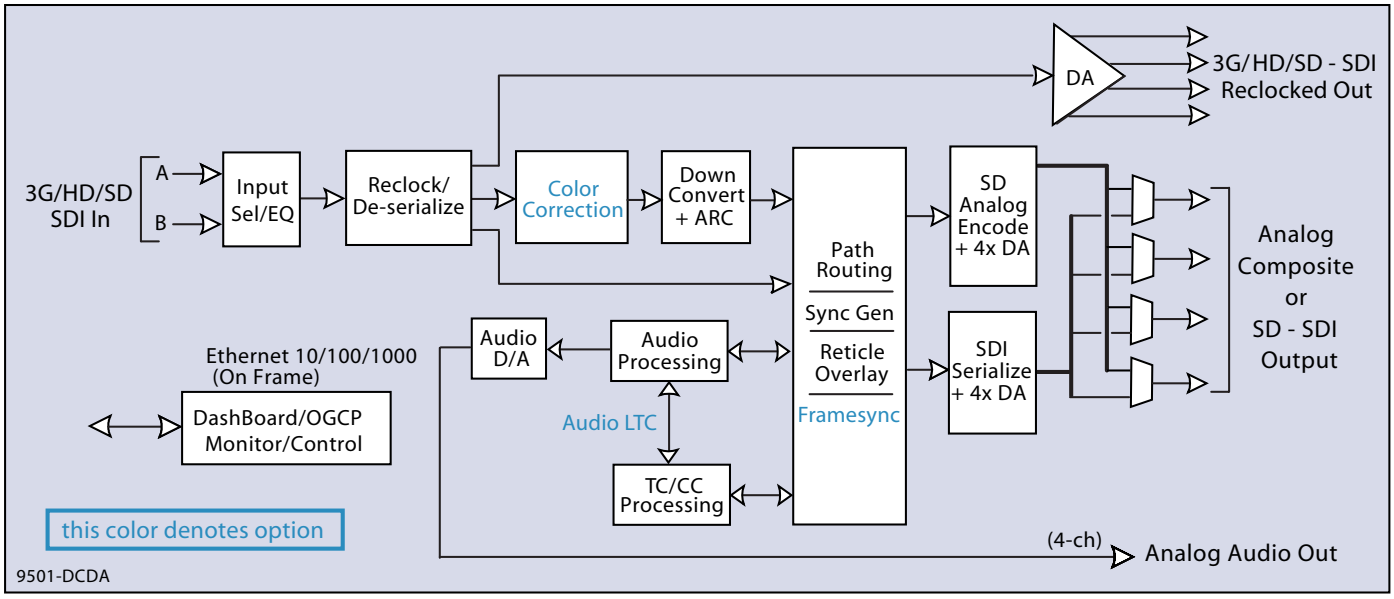
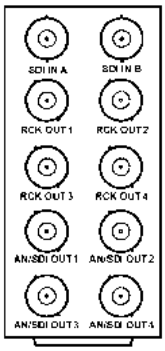
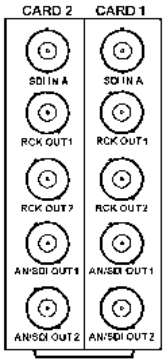
9501-DCDA-3G » DOWN-CONVERTER/DA with 3G/HD/SD-SDI Input, Reclocking, SD-SDI and Analog Video/Audio Outputs





RM20-9501-A



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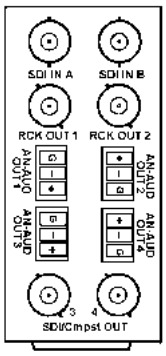
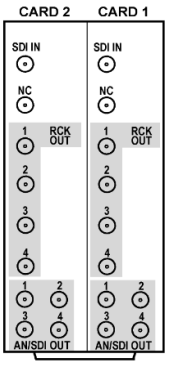
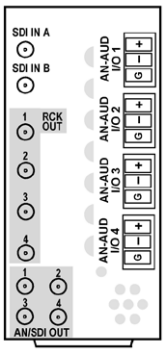


Note: Although this rear module offers only two SDI/Cmpst OUT BNCs, the two outputs on the rear module correlate to card output channels 3 and 4.

RM20-9501-B



RM20-9501-C/S-DIN
RM20-9501-C/S-HDBNC



RM20-9501-F-DIN
RM20-9501-F-HDBNC

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9501-DCDA-3G » DOWN-CONVERTER/DA with 3G/HD/SD-SDI Input, Reclocking, SD-SDI and Analog Video/Audio Outputs

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 18 Watts

SDI Input
Number of Inputs: (2) 3G/HD/SD-SDI BNCs. GUI-selectable.
Standards: SMPTE 259M, 292M, 424M (9501-DCDA-3G only)
Supported Formats: 1080p59.94,50,29.97, 24, 23.98, 1080i59.94,50, 720p59.94,50,29.97, 24, 23.98, 625I, 525i
Cable Length, Minimum, 3G/HD/SD (Belden 1694A): 120m / 180m / 360m
Return Loss: 15 dB up to 1.485 GHz, 10 dB up to 2.970 GHz

Video Outputs
Number of Outputs: (4) dedicated reclocked output BNCs. Up to 4 processed SD-SDI (or CVBS output) BNCs. GUI-selectable.
SDI Signal Level: 800 mV nominal
SDI Return Loss: >15 dB up to 1.485 GHz, >10 dB up to 2.970 GHz
SDI Jitter: SD: < 0.2 UI
SDI Embedded Audio: 16-Ch

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

Reference Video Input
Number of Inputs: (2) looping (openGear® frame)
Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

Analog Audio Output
Number of Outputs: 4-Ch (max) balanced using 3-wire Phoenix connectors
Maximum Output Level: +24 dBu @ 0 dBFS
DAC Resolution: 24-bit

ORDERING INFORMATION

9501-DCDA-3G Down-Converter/DA with 3G/HD/SD-SDI Input, Reclocking, SD-SDI and Analog Video/Audio Outputs

9501-DCDA-HD Down-Converter/DA with HD/SD-SDI Input, Reclocking, SD-SDI and Analog Video/Audio Outputs

RM20-9501-A 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Reclocked Output BNCs, (4) Output BNCs (GUI-selectable as SD-SDI and/or Analog CVBS)

RM20-9501-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) 3G/HD/SD-SDI Input BNC, (2) HD/SD-SDI Reclocked Output BNCs, (2) Output BNCs (GUI-selectable as SD-SDI and/or Analog CVBS) (connections are per card)

RM20-9501-B 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (2) 3G/HD/SD-SDI Reclocked Output BNCs, (2) Output BNCs (GUI-selectable as SD-SDI and/or Analog CVBS), (4) Analog Audio Outputs

RM20-9501-C/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNCs, (4) HD/SD-SDI Reclocked Outputs, (4) Outputs (GUI-selectable as SD-SDI and/or Analog CVBS) (connections are per card; all connectors DIN1.0/2.3)

RM20-9501-C/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNCs, (4) HD/SD-SDI Reclocked Outputs, (4) Outputs (GUI-selectable as SD-SDI and/or Analog CVBS) (connections are per card; all connectors HD-BNC)

RM20-9501-F-DIN 20-Slot Frame Rear I/O Module (Standard Width, Hi-Density) (2) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Reclocked Outputs, (4) Outputs (GUI-selectable as SD-SDI and/or Analog CVBS), (4) Analog Audio Outputs (all coaxial connectors DIN1.0/2

RM20-9501-F-HDBNC 20-Slot Frame Rear I/O Module (Standard Width, Hi-Density) (2) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Reclocked Outputs, (4) Outputs (GUI-selectable as SD-SDI and/or Analog CVBS), (4) Analog Audio Outputs (all coaxial connectors HD-BNC)

+3G Software license upgrade for 9501-DCDA-HD card. Upgrades card to 9501-DCDA-3G functionality/specifications.

+COLOR Color Correction Software Option

+FS Frame Sync Software Option

+DLY Extended Frame Sync Delay Option (add-on to option +FS; option +FS required)

+LTC Audio LTC Option

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9502-DCDA-3G » DOWN-CONVERTER/DA with 3G/HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking

The **9502-DCDA-3G** provides 3G/HD-to-SD down-conversion with ARC and has versatility in providing up to four HD/SD-SDI processed outputs as well as up to four reclocked SDI input copies selectable from two SDI inputs. The space-saving design of the 9502-DCDA provides for high density, allowing two cards to be collocated in adjacent slots and served by a single, standard width "split" rear module. Up to 20 of the 9502-DCDA cards can be installed in a 20-slot frame.

The card can pass SD signals with re-aspect, if needed. AFD processing can detect an incoming AFD code and correspondingly set scaling 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. Using a 10-bit video path, the 9502-DCDA can rate-convert 23.98 frame video to 59.94 fields, move progressive to interlace and is equipped with extensive user programmable reticule overlays. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Full proc control allows adjustment of white level, black level, color gain, and color phase.

Factory presets enable a return to factory settings. The 9502 offers 3G down-conversion to 1080i, 720p, or SD-SDI. AES audio outputs can be de-embedded from selected embedded audio channels.

Preset save/load allows saving custom card 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. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access over a standard Ethernet network.

Alternate Base Model

- **9502-DCDA-HD** Downconverter/DA with HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking

FEATURES

- Low power/high-density design allows up to 20 cards per frame; less than 18 Watts per card
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Economical solution for 3G/HD downconversion to legacy SD monitoring systems. HD version further economizes for environments requiring only HD/SD support (field upgradeable to 3G with software license upload if later desired).
- Full timecode and CEA 708 / CEA 608 conversion to SD VITC timecode and closed-captioning. Option **+LTC** allows bidirectional transfer between embedded video timecode formats and audio LTC.
- Down-conversion scaling includes user-configurable ARC and AFD-controlled ARC
- Auto-format detect/down-conversion of SMPTE 424M/292/259M formats
- Full embedded audio processing with selectable downmix and AES audio de-embed. Dolby passthru on downconversions.
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- Five year warranty

OPTIONS

- 3G Software Option Upgrade (**+3G**) – Upgrades 9502-DCDA-HD card to 9502-DCDA-3G functionality/specifications.
- Color Correction (**+COLOR**) – Provides independent RGB channel controls for luma, black, and gamma. Ultra-fast response time. The color correction feature is perfectly suited for use with Cobalt OGCP-9000/CC Remote Control Panel.
- Frame Sync Software Option (**+FS**) – Adds frame sync to 9502-DCDA-3G card. Provides full vertical and horizontal offset and frame delay controls. Glitch-free handling of embedded audio when a frame is dropped or duplicated.
- Extended Frame Sync Delay Option (**+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. (Add-on to option +FS; option +FS required)
- Audio LTC Software Option (**+LTC**) – Offers bidirectional transfer and conversion between video timecode formats and audio LTC. Audio LTC can be received or sent over various card audio channels.

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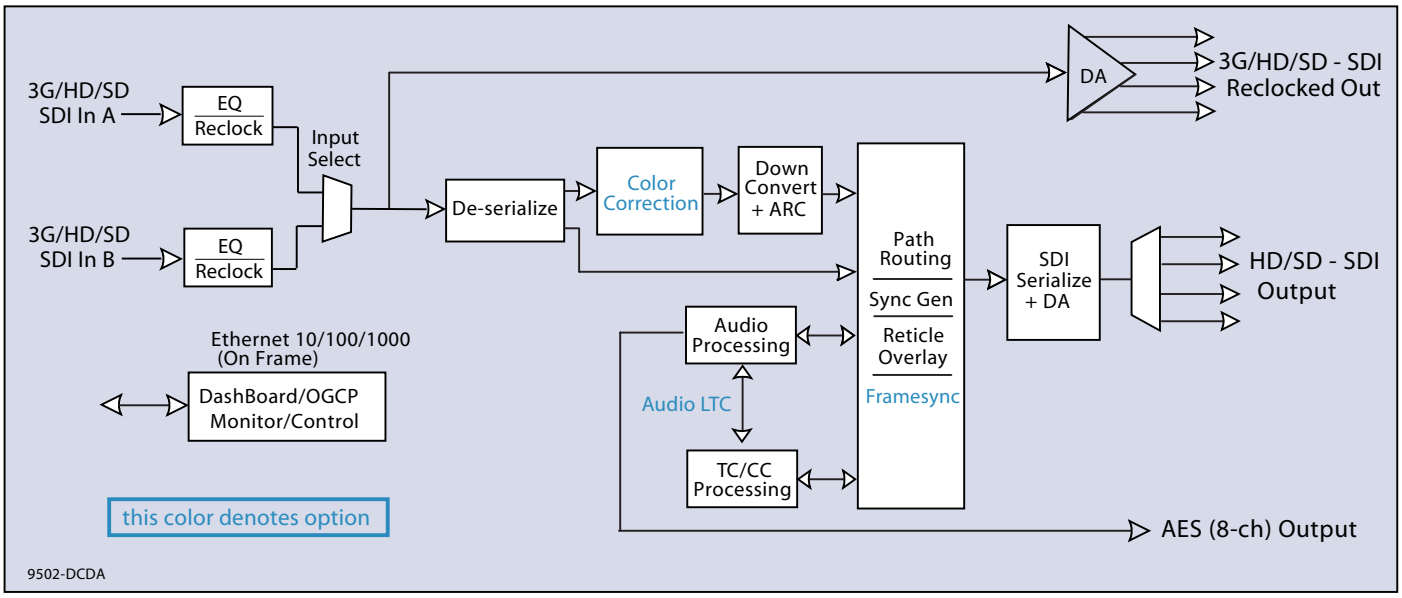
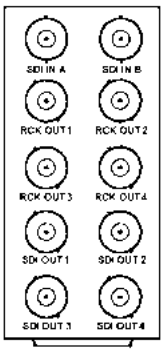
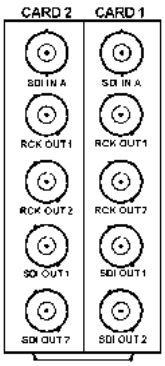
9502-DCDA-3G » DOWN-CONVERTER/DA with 3G/HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking

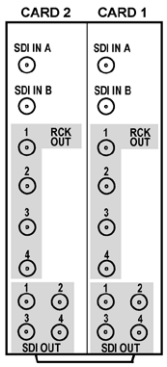




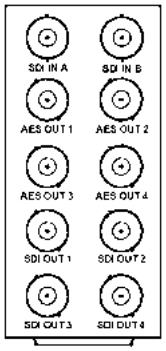
RM20-9502-A



RM20-9502-A/S



RM20-9502-C/S-DIN
RM20-9502-C/S-HDBNC



RM20-9502-F

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9502-DCDA-3G » DOWN-CONVERTER/DA with 3G/HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 18 Watts

SDI Input
Number of Inputs: 2
Standards: SMPTE 259M, 292M, 424M (9502-DCDA-3G only)
Supported Formats:
1080p59.94,50,29.97, 25, 24, 23.98
1080i59.94,50
625i50, 525i59.94
Cable Length, Minimum, 3G/HD/SD (Belden 1694A): 120m / 180m / 360m
Return Loss: 15 dB up to 1.485 GHz, 10 dB up to 2.970 GHz

Video Outputs
Number of Outputs: (4) dedicated reclocked output BNCs Up to 4 processed HD/SD-SDI
SDI Signal Level: 800 mV nominal
SDI Return Loss: >15 dB up to 1.485 GHz, >10 dB up to 2.970 GHz
SDI Jitter: SD: < 0.2 UI
SDI Embedded Audio: 16-Ch

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

Reference Video Input
Number of Inputs: (2) looping (openGear® frame)
Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

AES Output
Number of Outputs: 8-Ch (max) unbalanced (AES-3id)
Impedance: 75 Ω
Sample Rate: 48 kHz
Resolution: 24-bit

ORDERING INFORMATION

9502-DCDA-3G Down-Converter/DA with 3G/HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking

9502-DCDA-HD Down-Converter/DA with HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking

RM20-9502-A 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Reclocked Output BNCs, (4) HD/SD-SDI Processed Output BNCs

RM20-9502-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) 3G/HD/SD-SDI Input BNC, (2) HD/SD-SDI Reclocked Output BNCs, (2) HD/SD-SDI Processed Output BNCs (connections are per card)

RM20-9502-C/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Inputs, (4) HD/SD-SDI Reclocked Outputs, (4) HD/SD-SDI Processed Outputs (connections are per card; all connectors DIN1.0/2.3)

RM20-9502-C/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Inputs, (4) HD/SD-SDI Reclocked Outputs, (4) HD/SD-SDI Processed Outputs (connections are per card; all connectors HD-BNC)

RM20-9502-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (4) Video HD/SD-SDI Processed Output BNCs, (4) AES Audio Output BNCs

+3G Software license upgrade for 9502-DCDA-HD card. Upgrades card to 9502-DCDA-3G functionality/specifications.

+COLOR Color Correction Software Option

+FS Frame Sync Software Option

+DLY Extended Frame Sync Delay Option (add-on to option +FS; option +FS required)

+LTC Audio LTC Option

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9902-DC-4K » QUAD SDI/2SI-INPUT UHD BROADCAST DOWNCONVERTER with Optional Frame Sync

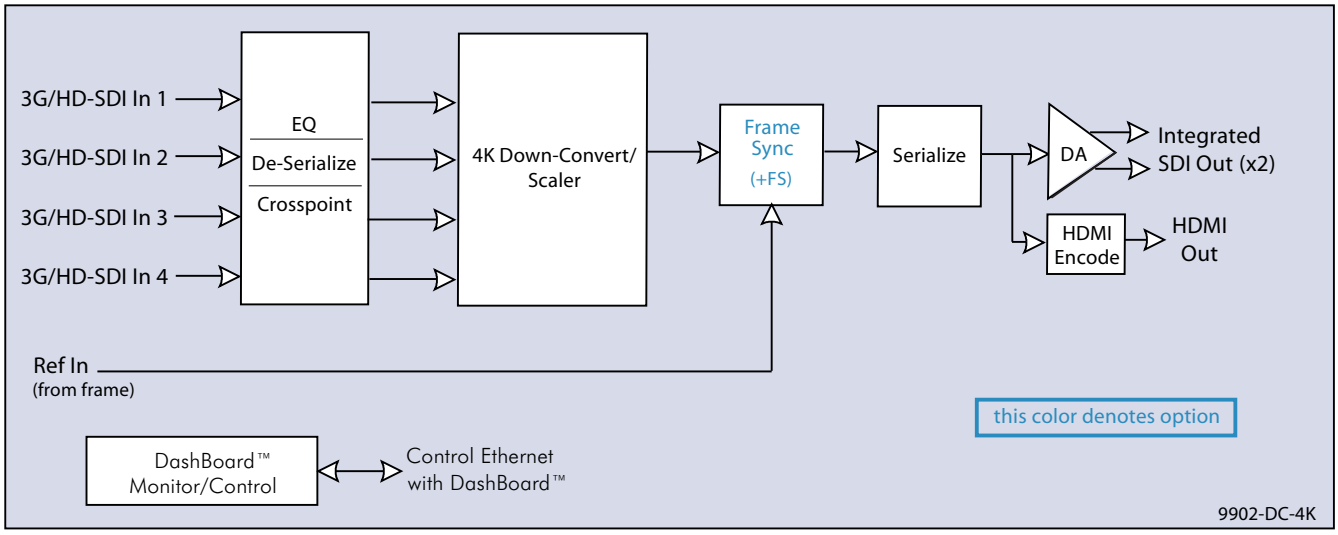
The **9902-DC-4K Quad SDI/2SI-Input UHD Broadcast Downconverter with Optional Frame Sync** provides an easily integrated openGear® solution for converting 4K UHD quadrant-division and 2SI (two-sample interleave) content into 3G/HD-SDI. Easy to use DashBoard configuration and monitoring provides for easy setup.

The 9902-DC-4K precisely combines four quadrant-divided or 2SI individual SDI feeds into a combined SDI image directly suitable for broadcast production usage or monitoring purposes. An HDMI output is also furnished which is directly usable by a monitor.

The openGear® card-based form-factor and high-density design allows up to 10, 9902-DC-4K cards to be fitted to a 20-slot frame. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Scalable solution for 4K UHDTV down-conversion/integration to SDI for cinema and sports production
- Compatible with 4K Four-Quadrant or 4K Two-Sample Interleaved (2SI) modes
- openGear® card-based form factor provides easy, compact, and economical integration
- Flexible downconvert output provides 3G/HD/SD-SDI output
- Input crosspoint allows quadrant inputs to be easily re-arranged without changing connections
- Low-power/high-density design – less than 18 Watts per card
- HDMI output allows direct feed to monitors
- Option **+FS** adds Frame Sync. Provides full vertical and horizontal offset and frame delay controls.
- DashBoard™ remote control status monitoring and setup/control
- Five year warranty



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9902-DC-4K » QUAD SDI/2SI-INPUT UHD BROADCAST DOWNCONVERTER with Optional Frame Sync

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 18 Watts

Video Inputs/Outputs
Video Inputs: (4) 3G/HD-SDI 75Ω BNC
SDI Output: (2) 3G/HD-SDI 75Ω BNCs (2x DA)
HDMI Output: (1) HDMI output
Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

ORDERING INFORMATION

9902-DC-4K Quad SDI/2SI-Input UHD Broadcast Downconverter with Optional Frame Sync

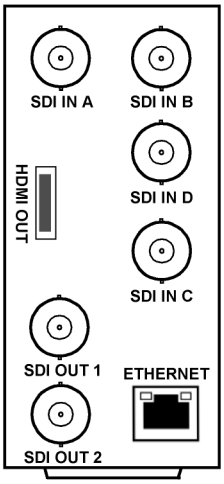
RM20-9902DC4K-B 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Input BNCs, (2) 3G-SDI Output BNCs (2x DA), (1) HDMI Output, (1) 100/1000 BaseT Ethernet Control Port

RM20-9902DC4K-C 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Input BNCs, (2) 3G-SDI Output BNCs (2x DA), (1) COMM/GPIO Port, (1) 100/1000 BaseT Ethernet Control Port

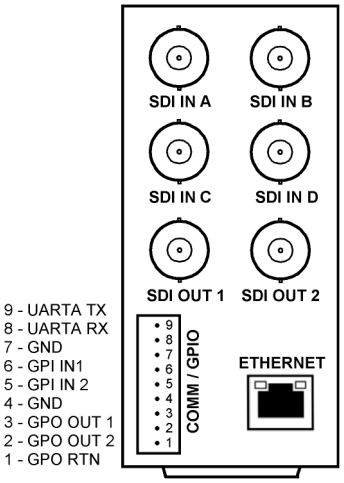
Options:

+FS Add Frame Sync Option

+LTC Audio LTC I/O Option



RM20-9902DC4K-B



RM20-9902DC4K-C

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BBG-1002-DC-4K » STANDALONE QUAD SDI/2SI-INPUT UHD BROADCAST DOWNCONVERTER

with Optional Frame Sync

The **BBG-1002-DC-4K Standalone Quad SDI/2SI-Input UHD Broadcast Downconverter with Optional Frame Sync** provides an easily integrated standalone solution for converting 4K UHD quadrant-division and 2SI (two-sample interleave) content into 3G/HD/SD-SDI. Easy to use DashBoard configuration and monitoring provides for easy setup.

The BBG-1002-DC-4K precisely combines four quadrant-divided or 2SI individual SDI feeds into a combined SDI image directly suitable for broadcast production usage or monitoring purposes. The combined SDI output can be scaled to 3G/HD-SDI. An HDMI output allows direct use with monitors. The BBG-1002-DC-4K can be remote-controlled using DashBoard™.

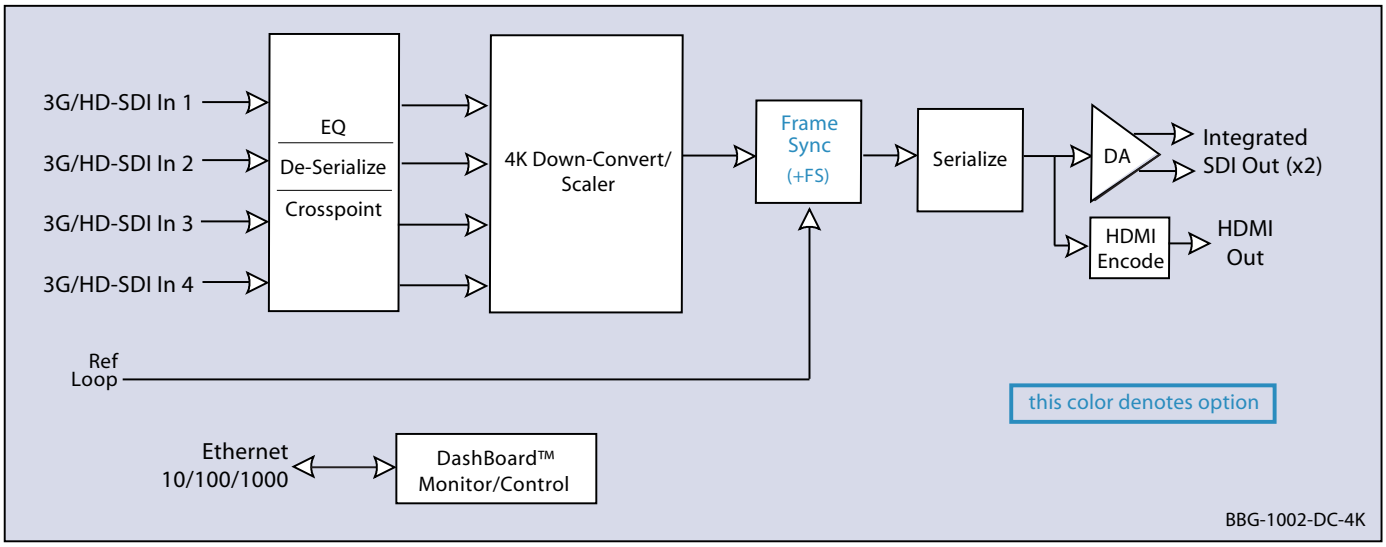
The compact standalone form factor allows desktop usage, as well as the 1/3-rack size of the BBG-1002-DC-4K allowing 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame).

FEATURES

- Scalable solution for 4K UHDTV down-conversion/ integration to SDI for cinema and sports production
- Compatible with 4K Four-Quadrant or 4K Two-Sample Interleaved (2SI) modes
- Input crosspoint allows quadrant inputs to be easily re-arranged without changing connections
- Redundant power supply option
- Compact footprint – up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.
- HDMI output allows direct feed to monitors
- Remote control/monitoring via DashBoard software or Web Browser User Interface
- Low-power/high-density design – less than 13 Watts
- Five year warranty

OPTIONS

- Add Frame Sync. Provides full vertical and horizontal offset and frame delay controls (+FS)
- Audio LTC I/O (+LTC)
- 1RU Mounting Tray (supports 3 units) (BBG-1000-TRAY)
- Redundant Power Supply Module (BBG-1000-PS)



DashBoard

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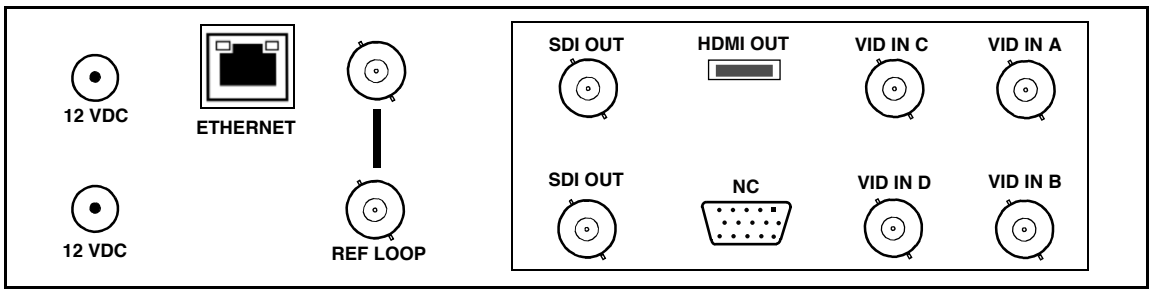
BBG-1002-DC-4K » STANDALONE QUAD SDI/2SI-INPUT UHD BROADCAST DOWNCONVERTER

with Optional Frame Sync

Rear Panel Layout



SPECIFICATIONS

Power

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

Video Input/Outputs

Video Inputs: (4) 3G/HD-SDI 75Ω BNC
SDI Output: (2) 3G/HD-SDI 75Ω BNCs (2x DA)
HDMI Output: (1) HDMI output
Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

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)

ORDERING INFORMATION

BBG-1002-DC-4K Standalone Quad SDI/2SI-Input UHD Broadcast Downconverter with Optional Frame Sync

+FS Add Frame Sync Option

+LTC Audio LTC I/O Option

BBG-1000-PS Redundant Power Supply Module

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

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9922-FS » 3G/HD/SD-SDI FRAME SYNC with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O

The Cobalt® **9922-FS 3G/HD/SD-SDI Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/ De-Embedding, and CVBS I/O** offers frame sync, and advanced audio and ancillary data support, plus many other powerful features. Frame sync can select from multiple reference inputs, with failover to alternate selected sources. Full audio support includes per-channel audio delay. Option **+2FS** adds a second independent processing path, offering two independent signal paths on a single openGear® card, with both paths providing independent frame sync and audio embedding / de-embedding.

Advanced frame sync features include per-channel audio delay and audio/video offset. 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.

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. Option **+EAS** provides EAS crawl burn-ins directly from industry standard EAS devices such as Sage™.

Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. With option **+T-SLATE**, import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS/quality event marker. A moving-box insertion can serve as a dynamic raster confidence check even when the input video image is static. Included standard is closed captioning absence/presence detection for CEA 608/708 and line 21 SD closed captioning.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Multi-input RP168 clean switch, with manual selection or GPI controlled input selection
- Closed-captioning absence detection
- Auto-Changeover can be set to invoke failover for basic input loss.
- Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static
- Frame Sync with full H/V offset and manual/LOS video pattern generator
- Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)
- 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
- Option **+ANC** adds full user VANC/HANC packet insertion/ extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, closed captioning, and other specialized user payloads. SMPTE 337 embed/de-embed allows serial user data to be embedded and de-embedded over unused embedded audio pairs.
- Video options include color correction and keying
- CVBS analog video I/O and analog/AES embed / de-embed available
- Option **+TTS** provides Text-To-Speech synthesis, directly converting EAS text to high-quality digital audio speech with no baseband signal breakouts or add-on units
- Pattern generator can provide raster/test pattern and patterns for LOS failover insertion
- Low-power/high-density design – less than 18 Watts per card
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- Five year warranty

OPTIONS

- Dual-Channel Option (**+2FS**) – Adds a second independent processing path, offering two independent signal paths of frame sync / audio embedding and de-embedding on a single open-Gear® card. (Upgrades card to full 9922-2FS functionality and specifications.)
- Quality Check (**+QC**) – Provides failover, alert, or user presets action on criteria such as black/frozen frame, audio silence, and CC absence.
- Trouble Slate Import (**+T-SLATE**) – Allows uploading of up to three different user trouble slate graphic file to card, with automated insertion controlled by GPI or other events.
- Logo Insertion (**+LOGO**) – Allows uploading of user logo graphic file to card, with automated insertion controlled by GPI or other events.
- 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
- 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.
- Emergency Alert System Text Crawl Generation Option (**+EAS**) – Provides a single-card solution for keying Emergency Alert System (EAS) text crawls in the active video and inserting station identification logos. Compatible with Sage™, Dasdec™, and other EAS crawl generators.
- Color Correction (**+COLOR**) – Full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip
- Key/Fill Keyer (**+KEYER**)
- Audio LTC I/O (**+LTC**)
- Extended Frame Sync 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.

acapela group
Acapela Text-To-Speech from Acapela Group™

openGear®

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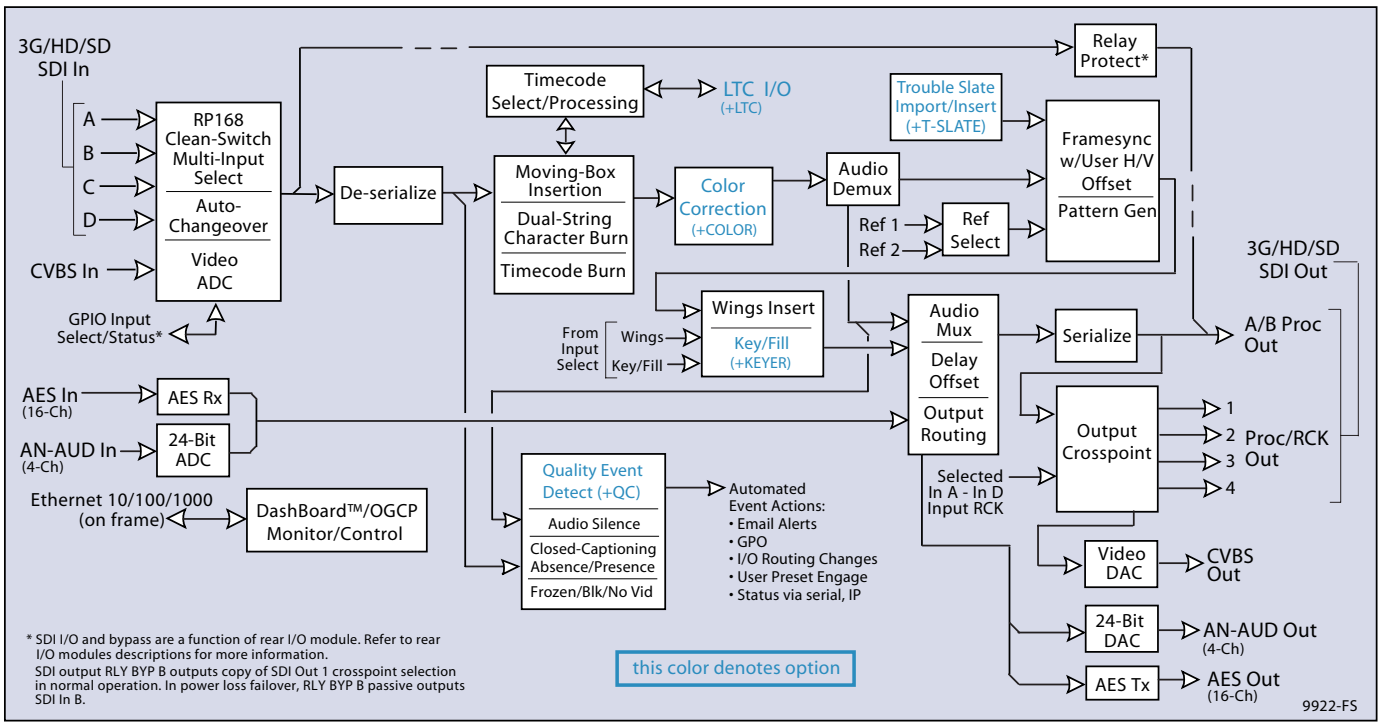
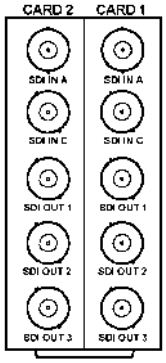
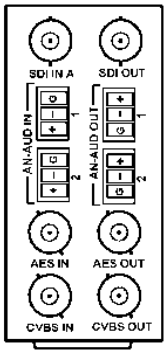
9922-FS » 3G/HD/SD-SDI FRAME SYNC with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O

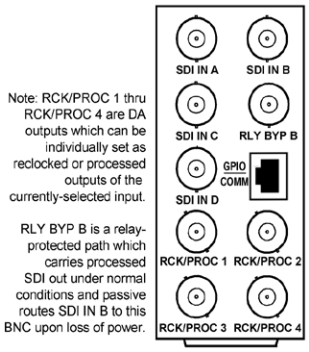




RM20-9922-FS-A/S



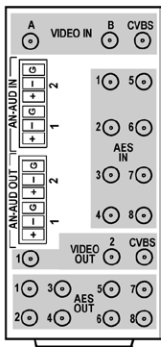
RM20-9922-FS-B



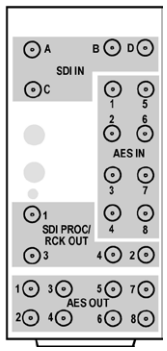
Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input.

RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.

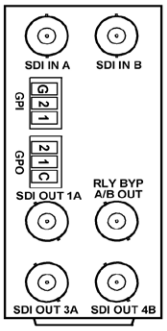
RM20-9922-FS-C



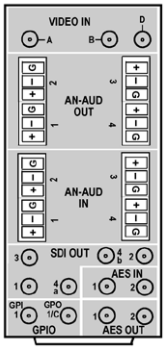
RM20-9922-FS-D-
(DIN / HDBNC)



RM20-9922-FS-E-
(DIN HDBNC)



RM20-9922-FS-F



RM20-9922-FS-H-
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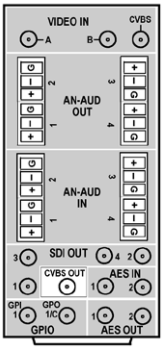
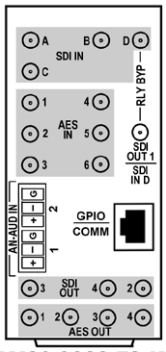
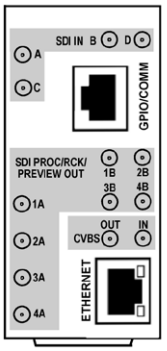


RM20-9922-FS-J-
(DIN / HDBNC)



RM20-9922-FS-K
(DIN / HDBNC)



8 - GND
7 - COM_A_RX
6 - COM_A_TX
5 - GPO OUT 2
4 - GPO OUT 1
3 - GPO RTN
2 - GPI IN 2
1 - GPI IN 1

Note: A and B outputs are DA pairs of corresponding outputs 1 thru 4.

RM20-9922-FS-L-
(DIN / HDBNC)

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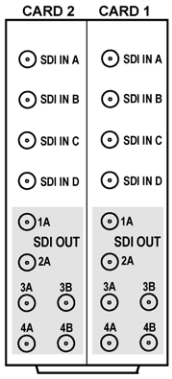
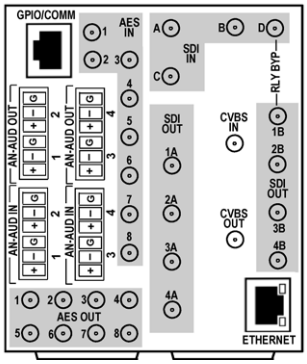


RM20-9922-2FS-M/S-
(DIN / HDBNC)



RM20-9922-2FS-N-
(DIN / HDBNC)

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Input/Outputs

Up to (4) 75Ω BNC inputs
Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)
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)
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

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 THD+N: -96 dB (20 Hz to 10 kHz)
Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

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9922-FS » 3G/HD/SD-SDI FRAME SYNC with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O

SPECIFICATIONS (cont.)

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

User Audio Delay Offset from Video

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

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.
Return Loss: >35 dB up to 5.75 MHz

ORDERING INFORMATION

9922-FS 3G/HD/SD-SDI Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O

RM20-9922-FS-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNC, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per each Card 1 / Card 2 connector bank)

RM20-9922-FS-B 20-Slot Frame Rear I/O Module (Standard-Width) (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Input BNC, (2) Balanced Analog Audio Inputs, (1) AES Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Processed Out BNC, (2) Balanced Analog Audio Outputs, (1) AES Output BNC

RM20-9922-FS-C 20-Slot Frame Rear I/O Module (Standard Width) (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

RM20-9922-FS-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3)

RM20-9922-FS-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC)

RM20-9922-FS- E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3)

RM20-9922-FS-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC)

RM20-9922-FS-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as Processed or Reclocked of selected input, (2) GPI, (2) GPO

RM20-9922-FS-H-DIN 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9922-FS-H-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9922-FS-J-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9922-FS-J-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9922-FS-K-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO/COMM RJ-45 connector (All coaxial connectors DIN1.0/2.3)

RM20-9922-FS-K-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO/COMM RJ-45 connector (All coaxial connectors HD-BNC)

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9922-FS » 3G/HD/SD-SDI FRAME SYNC with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O

ORDERING INFORMATION (cont.)

RM20-9922-FS-L-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9922-FS-L-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors HD-BNC)

RM20-9922-FS-M/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors DIN1.0/2.3)

RM20-9922-FS-M/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors HD-BNC)

RM20-9922-FS-N-DIN 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect) , (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors DIN1.0/2.3.)

RM20-9922-FS-N-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

Options:

+2FS Add Dual-Channel Option

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer Option

+LTC Audio LTC I/O Option

+CQS Clean and Quiet Switching Option

+QC Quality Check Option

+TTS Text-To-Speech Option (Acapela Text-To-Speech from Acapela Group™. Installation requires option upload and installation of speech library SD memory card onto host card. Pre-loaded SD card and instructions provided.)

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

+EAS Emergency Alert System Text Crawl Generation Option

+DLY Extended Frame Sync Delay Option

+T-SLATE User Trouble Slate Graphic Import Option

+LOGO Logo Insertion Option

+SCTE104 SCTE 104 Insertion Option

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

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9922-FS-DSP » 3G/HD/SD-SDI FRAME SYNC with Audio/Video Processing, DSP Audio Support, Audio Embed/De-Embed and CVBS I/O

The Cobalt® **9922-FS-DSP 3G/HD/SD-SDI Frame Sync with Audio/Video Processing, DSP Audio Support, Audio Embed/De-Embed and CVBS I/O** provides a high-density card-based solution that offers unprecedented multi-input support and flexibility. The 9922-FS-DSP offers a DSP-based platform that supports multiple audio DSP options. When optioned with various audio processing options, the DSP-based processing core (which supports numerous simultaneous processing engines) uses license "credits" which allows flexible tailoring of multiple proc function instances. The 9922-FS-DSP provides much more flexibility than other audio processors that used fixed processing assets (for example, this flexibility allows "trading" credits for more Dolby encoders while backing out of loudness processors or other engine assets).

Audio proc options include Dolby® Real-Time Loudness Leveling automatic loudness processing, Dolby® encode/decode, and Linear Acoustic® UPMAX™ automatic upmixing. DSP options can be ordered with new-card purchase, or field-installed as software option upgrades without removing the card from its frame. Included as standard features are downmixing, flex mixing, and full AES and balanced analog audio embed/de-embed. Also included standard is bulk and per-channel audio delay controls that easily address lip-sync issues. Advanced frame sync features include per-channel audio delay, audio/video offset, and output rate conversion to and from 23.98/29.97/59.94 to 24/30/60 frame rates. Frame sync can select from multiple reference inputs, with failover to alternate selected sources.

An input crosspoint with RP168 clean switching can select from up to four SDI inputs. The input crosspoint allows manual selection of input via remote control or GPIO, or failover to alternate inputs on loss of input conditions. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. With option **+T-SLATE**, import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS/quality event marker. A moving-box insertion can serve as a dynamic raster confidence check even when the input video image is static. Quality Check option **+QC** checks for and acts upon user-configurable criteria such as black/frozen frame, audio silence or CC absence.

Preset save/load allows saving custom card 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. GPIO allows direct input routing control and status monitoring.

FEATURES

- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- DSP-based platform supports multiple audio DSP options, with multiple instances available using allocatable license "credits" – our largest DSP capacity
- Dolby encoding/decoding, Dolby Real-Time Loudness Leveling (RTLL) loudness leveling with full parametric control setup, and Linear Acoustic UPMAX™ DSP audio options available
- Auto Adjust feature helps assure lip sync by assessing and alerting where DSP processing requires matching video delay
- Full audio crosspoint with 5.1-to-stereo downmix/flex mix available for all audio outputs
- Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static. Dual-string character/timecode burn-in.
- Advanced audio processing allows routing, gain, smooth delay, and flexible mixing as standard features
- CVBS analog video I/O and analog/AES embed / de-embed available
- High-density design
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- Five year warranty

OPTIONS

- Dolby® Real-Time Loudness Leveling Automatic Loudness Processing Options (**+DSP-RTLL**) – Provides advanced loudness processing with comprehensive parametric controls. Available as surround 5.1 and stereo 2.0. (See Ordering Information for full details)
- Dolby® Encoder Options (**+DSP-ENCD**) – Available as 5.1 and 2.0 Dolby Digital/Digital Plus Encode. (See Ordering Information for full details.)
- Dolby® Decoder Options (**+DSP-DEC**) – Provides Dolby Digital, Digital Plus, and E decode
- Linear Acoustic® UPMAX™ Upmixing (**+DSP-UPMIX-LA**) – Provides automatic 2.0-to-5.1 Linear Acoustic® UPMAX™ upmixing
- Quality Check Option (**+QC**) – Provides failover, alert, or user presets action on criteria such as black/frozen frame, audio silence, and CC absence
- Clean & Quiet Switching Option (**+CQS**) – Provides automatic audio ramp-down and up during input switching events
- Text-To-Speech Option (**+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.
- Add Extended Delay Option (**+DLY**)
- 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
- Trouble Slate Import (**+T-SLATE**) – Allows uploading of up to three different user trouble slate graphic file to card, with automated insertion controlled by GPI or other events
- Logo Insertion (**+LOGO**) – Allows uploading of user logo graphic file to card, with automated insertion controlled by GPI or other events
- Ancillary Data Processor Option (**+ANC**) – Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data, with insert/extract to and from IP and GPIO external interfaces
- SCTE104 Frame-Accurate SCTE Trigger Insertion Option (**+SCTE104-FAST**) Provides deterministic, frame-accurate Digital Program Insertion (DPI) message embedding into SDI, optimizing it for automatic dissemination to CDN and VOD systems
- Audio LTC I/O Option (**+LTC**)

acapela LINEAR ACOUSTIC DOLBY openGear

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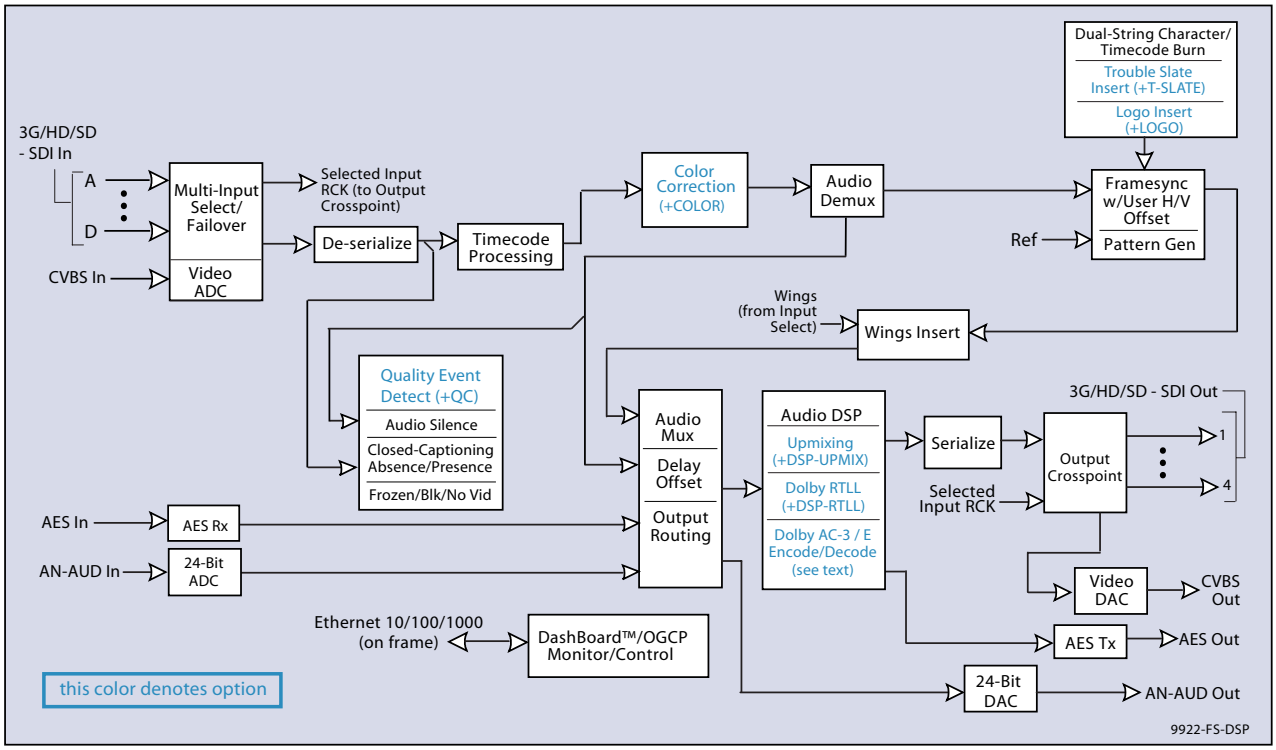
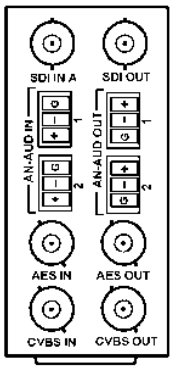
9922-FS-DSP » 3G/HD/SD-SDI FRAME SYNC with Audio/Video Processing, DSP Audio Support, Audio Embed/De-Embed and CVBS I/O

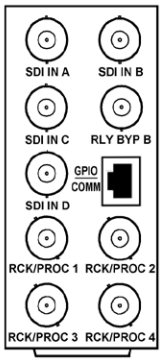




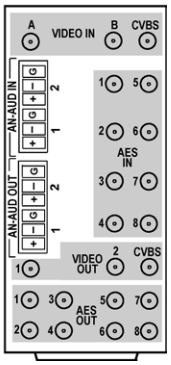
RM20-9922-B

Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input.

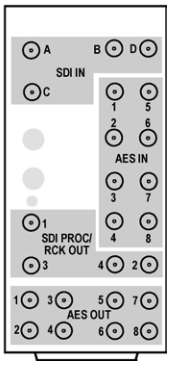
RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.



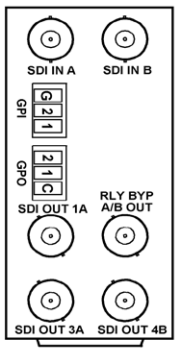
RM20-9922-C



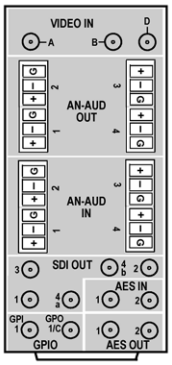
RM20-9922-D-DIN
RM20-9922-D-HDBNC



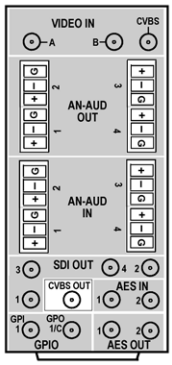
RM20-9922-E-DIN
RM20-9922-E-HDBNC



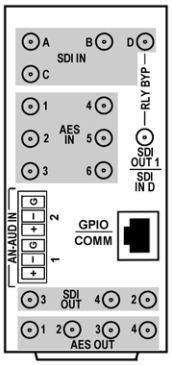
RM20-9922-F



RM20-9922-H-DIN
RM20-9922-H-HDBNC



RM20-9922-J-DIN
RM20-9922-J-HDBNC



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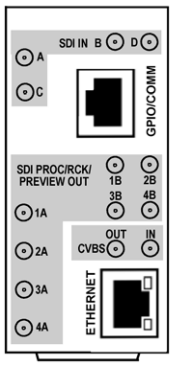
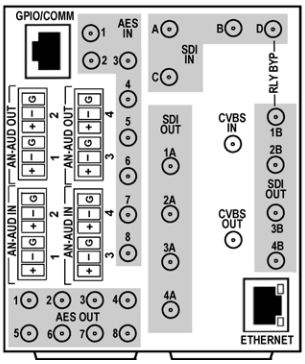


8 - GND
7 - COM_A_RX
6 - COM_A_TX
5 - GPO OUT 2
4 - GPO OUT 1
3 - GPO RTN
2 - GPI IN 2
1 - GPI IN 1

Note: A and B outputs are DA pairs of corresponding outputs 1 thru 4.

RM20-9922-L-DIN
RM20-9922-L-HDBNC



RM20-9922-N-DIN
RM20-9922-N-HDBNC

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9922-FS-DSP » 3G/HD/SD-SDI FRAME SYNC with Audio/Video Processing, DSP Audio Support, Audio Embed/De-Embed and CVBS I/O

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

<24 Watts (includes +DSP options)

SDI Input/Outputs

Up to (4) 75Ω BNC inputs
Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)
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)
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

CVBS Video Input/Outputs

(1) 75Ω BNC input
(1) 75Ω BNC output. CVBS can be upconverted to any supported SDI format; all formats can be downconverted to CVBS.
ADC resolution/sampling: 10-bit; 4x oversampling
DAC resolution/sampling: 10-bit; 16x oversampling
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 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.

User Audio Delay Offset from Video

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

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

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9922-FS-DSP » 3G/HD/SD-SDI FRAME SYNC with Audio/Video Processing, DSP Audio Support, Audio Embed/De-Embed and CVBS I/O

SPECIFICATIONS (cont.)

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.

ORDERING INFORMATION

9922-FS-DSP 3G/HD/SD-SDI Frame Sync with Audio/Video Processing, DSP Audio Support, Audio Embed/De-Embed and CVBS I/O

Note: On this DSP-equipped card, an adjacent card **will not** fit into the immediately adjacent slot to the front-of-frame **right**. (For example, if DSP-equipped card is in slot 8, an adjacent card will not fit in slot 9. This would be the case of an adjacent card that installs into an odd frame slot, or the case where a Split Rear Module serves two cards in the adjacent odd/even slot pairs (in this example slots 9/10)).

RM20-9922-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Video Input BNC, (2) Balanced Analog Audio Inputs, (1) AES Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Output BNC, (1) AES Output BNC, (2) Balanced Analog Audio Outputs

RM20-9922-C 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (8) AES I/O BNCs (I/O switch selectable), (1) 3G/HD/SD-SDI Output BNC

RM20-9922-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3)

RM20-9922-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC)

RM20-9922-E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3)

RM20-9922-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC)

RM20-9922-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as Processed or Reclocked of selected input, (2) GPI, (2) GPO

RM20-9922-H-DIN 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3)

RM20-9922-H-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC)

RM20-9922-J-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3)

RM20-9922-J-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC)

RM20-9922-K-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO RJ-45 connector (All coaxial connectors DIN1.0/2.3)

RM20-9922-K-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO RJ-45 connector (All coaxial connectors HD-BNC)

RM20-9922-L-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9922-L-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors HD-BNC)

RM20-9922-N-DIN 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO RJ-45 connector, 100/1000 BaseT Ethernet Port
(All coaxial connectors DIN1.0/2.3)

RM20-9922-N-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO RJ-45 connector, 100/1000 BaseT Ethernet Port
(All coaxial connectors HD-BNC)

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9922-FS-DSP » 3G/HD/SD-SDI FRAME SYNC with Audio/Video Processing, DSP Audio Support, Audio Embed/De-Embed and CVBS I/O

ORDERING INFORMATION (cont.)

Options:

+DSP-RTLL-5.1 Dolby® RTLL™ 5.1-Channel Loudness Processor Option

+DSP-RTLL-2.0 Dolby® RTLL™ Stereo Loudness Processor Option

+DSP-ENCD-5.1 Dolby® Digital/Digital Plus 5.1 Encoder

+DSP-ENCD-2.0 Dolby® Digital/Digital Plus 2.0 Encoder

+DSP-DEC Dolby® Decoder

+DSP-UPMIX-LA Linear Acoustic® UPMAX™ 2.0-to-5.1 Upmixer

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+T-SLATE User Trouble Slate Graphic Import Option

+LOGO Logo Insertion Option

+SCTE104 SCTE 104 Insertion Option

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

+DLY Extended Frame Sync Delay Option

+LTC Audio LTC I/O Option

+CQS Clean & Quiet Switching Option

+QC Quality Check Option

+TTS Text-To-Speech Option (Acapela Text-To-Speech from Acapela Group™. Installation requires option upload and installation of speech library SD memory card onto host card. Pre-loaded SD card and instructions provided.)

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

US SALES 800 669-1691 / DIRECT +1 217-344-1243 / SALES@COBALTDIGITAL.COM

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BBG-1022-FS » 3G/HD/SD-SDI STANDALONE FRAME SYNC with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O

The Cobalt® **BBG-1022-FS 3G/HD/SD-SDI Standalone Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O** offers frame sync, and advanced audio and ancillary data support, plus many other powerful features. Full audio support includes per-channel audio delay. Option **+2FS** adds a second independent processing path, offering two signal paths on a single unit, with both paths providing independent frame sync and audio embedding / de-embedding.

Advanced frame sync features include per-channel audio delay and audio/video delay offset. Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Bulk and per-channel audio delay controls easily address lip-sync issues.

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. Option **+EAS** provides EAS crawl burn-ins directly from industry standard EAS devices such as Sage™.

A convenient input crosspoint allows manual selection or failover to alternate inputs on loss of input conditions. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. With option **+T-SLATE**, import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS/quality event marker. A moving-box insertion can serve as a dynamic raster confidence check even when the input video image is static. Included standard is closed captioning absence/presence detection for CEA 608/708 and line 21 SD closed captioning.

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-1022-FS can be remote-controlled using DashBoard™. The compact standalone form factor allows desktop usage, as well as the 1/3-rack size of the BBG-1022-FS 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

- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Multi-input RP168 clean switch
- Closed-captioning absence detection
- Auto-Changeover can be set to invoke failover for basic input loss.
- Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static
- Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)
- CVBS analog video I/O and analog/AES embed / de-embed available
- Frame Sync with full H/V offset and manual/LOS video pattern generator
- 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
- Option **+TTS** provides Text-To-Speech synthesis, directly converting EAS text to high-quality digital audio speech with no baseband signal breakouts or add-on units
- Pattern generator can provide raster/test pattern and patterns for LOS failover insertion
- 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.
- Uses DashBoard remote control (device appears as single-card frame)
- Five year warranty

OPTIONS

Dual-Channel Option (**+2FS**) – Adds a second independent processing path, offering two independent signal paths of frame sync / audio embedding and de-embedding on a single unit. (Upgrades device to full BBG-1022-2FS functionality and specifications.)

Ancillary Data Processor (**+ANC**) – Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data, with insert/extract to and from IP, RS-232/RS-422 serial, and GPIO external interfaces. SMPTE 337 embed/de-embed allows serial user data to be embedded and de-embedded over unused embedded audio pairs.

Trouble Slate Import (**+T-SLATE**) – Allows uploading of up to three different user trouble slate graphic file to the BBG unit, with automated insertion controlled by GPI or other events.

Logo Insertion (**+LOGO**) – Allows uploading of user logo graphic file to BBG unit, with automated insertion controlled by GPI or other events.

Key/Fill Keyer (**+KEYER**)

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.

Emergency Alert System Text Crawl Generation Option (**+EAS**) – Provides a single-device solution for keying Emergency Alert System (EAS) text crawls.

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

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

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.

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**)

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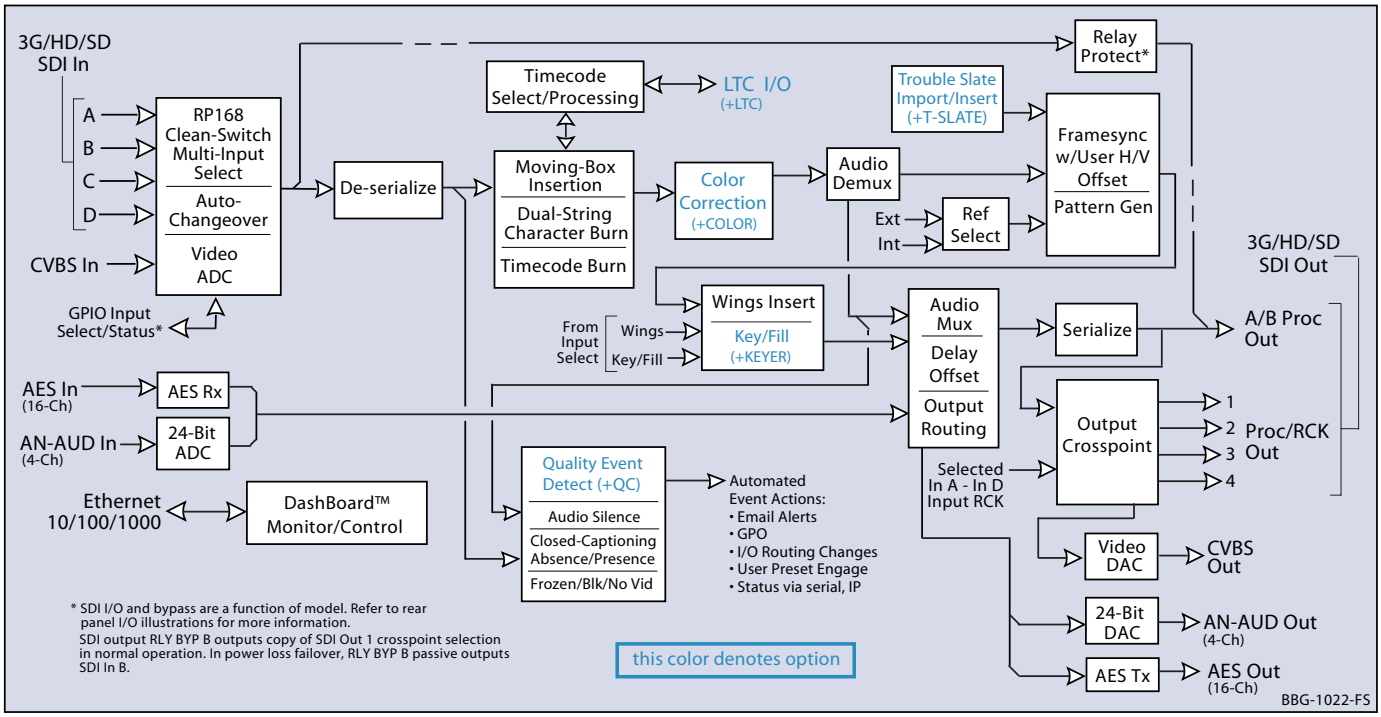
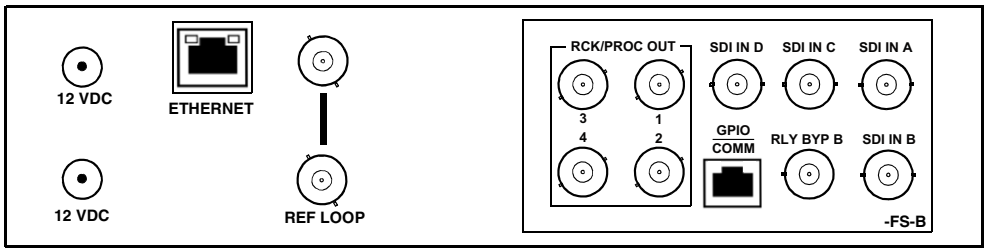
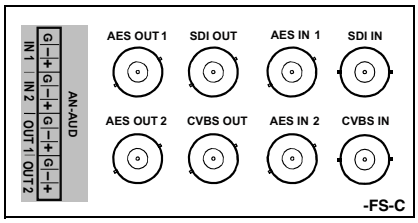
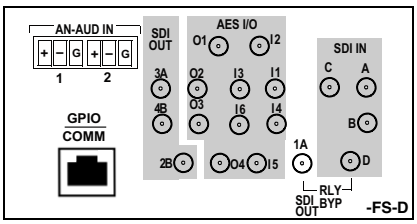
BBG-1022-FS » 3G/HD/SD-SDI STANDALONE FRAME SYNC with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O



Rear Panel







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BBG-1022-FS » 3G/HD/SD-SDI STANDALONE FRAME SYNC with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O

SPECIFICATIONS

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 IN or IN RCK)
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. 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 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

User Audio Delay Offset from Video

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

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

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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BBG-1022-FS » 3G/HD/SD-SDI STANDALONE FRAME SYNC with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O

ORDERING INFORMATION

BBG-1022-FS 3G/HD/SD-SDI Standalone Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O available in the following rear-panel I/O configurations:

BBG-1022-FS-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-1022-FS-C (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Video In BNC, (2) AES In BNCs, (2) Balanced Analog Audio Inputs, (1) 3G/HD/SDI Output BNC, (1) CVBS Video Out BNC), (2) AES Out BNCs, (2) Balanced Analog Audio Outputs

BBG-1022-FS-D-DIN ((4) 3G/HD/SD-SDI Inputs, (2) Balanced Analog Audio In, (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-1022-FS-D-HDBNC (4) 3G/HD/SD-SDI Inputs, (2) Balanced Analog Audio In, (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)

Options and Accessories:

+2FS Add Dual-Channel Option

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer Option

+LTC Audio LTC I/O Option

+CQS Clean and Quiet Switching 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)

+EAS Emergency Alert System Text Crawl Generation Option

+T-SLATE User Trouble Slate Graphic Import Option

+LOGO Logo Insertion 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)

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BBG-1022-FS-DSP » 3G/HD/SD-SDI STANDALONE FRAME SYNC

with Audio/Video Processing,DSP Audio Support, Audio Embed/De-Embed and CVBS I/O

The Cobalt® **BBG-1022-FS-DSP 3G/HD/SD-SDI Standalone Frame Sync with Audio/Video Processing, DSP Audio Support, Audio Embed/De-Embed and CVBS I/O** offers frame sync, and advanced audio and ancillary data support, plus many other powerful features. The 9922-FS-DSP offers a DSP-based platform that supports multiple audio DSP options. When optioned with various audio processing options, the DSP-based processing core (which supports numerous simultaneous processing engines) uses license "credits" which allows flexible tailoring of multiple proc function instances. The 9922-FS-DSP provides much more flexibility than other audio processors that used fixed processing assets (for example, this flexibility allows "trading" credits for more Dolby encoders while backing out of loudness processors or other engine assets).

Audio proc options include Dolby® Real-Time Loudness Leveling automatic loudness processing, Dolby® encode/decode, and Linear Acoustic® UPMAX™ automatic upmixing. Included as standard features are downmixing, flex mixing, and full AES and balanced analog audio embed/de-embed. Also included standard is bulk and per-channel audio delay controls that easily address lip-sync issues.

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. Advanced frame sync features include per-channel audio delay, audio/video offset, and output rate conversion to and from 23.98/29.97/59.94 to 24/30/60 frame rates.

A convenient input crosspoint with RP168 clean switching can select from up to four SDI inputs. The input crosspoint allows manual selection of input via remote control or GPIO, or failover to alternate inputs on loss of input conditions. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. With option **+T-SLATE**, import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS/quality event marker. A moving-box insertion can serve as a dynamic raster confidence check even when the input video image is static. Included standard is closed captioning absence/presence detection for CEA 608/708 and line 21 SD closed captioning. Quality Check option **+QC** checks for and acts upon user-configurable criteria such as black/frozen frame, audio silence or CC absence.

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-1022-FS-DSP can be remote-controlled using DashBoard™. The compact standalone form factor allows desktop usage, as well as the 1/3-rack size of the BBG-1022-FS-DSP 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

- DSP-based platform supports multiple audio DSP options, with multiple instances available using allocatable license "credits" – our largest DSP capacity
- Dolby encoding/decoding, Dolby Real-Time Loudness Leveling (RTLL) loudness leveling with full parametric control setup, and Linear Acoustic UPMAX™ DSP audio options available. Auto Adjust feature helps assure lip sync by assessing and alerting where DSP processing requires matching video delay.
- Full audio crosspoint with 5.1-to-stereo downmix (standard) available for all audio outputs
- CVBS analog video I/O and analog/AES embed / de-embed available
- Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static. Dual-string character/timecode burn-in.
- Compact footprint – up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Uses DashBoard remote control (device appears as single-card frame)
- Five year warranty

OPTIONS

Dolby® Real-Time Loudness Leveling Automatic Loudness Processing Options (**+DSP-RTLL**) – Provides advanced loudness processing with comprehensive parametric controls. Available as surround 5.1 and stereo 2.0. (See Ordering Information for full details)

Dolby® Encoder Options (**+DSP-ENCD**) – Available as 5.1 and 2.0 Dolby Digital/Digital Plus Encode. (See Ordering Information for full details.)

Dolby® Decoder Options (**+DSP-DEC**) – Provides Dolby Digital, Digital Plus, and E decode

Linear Acoustic® UPMAX™ Upmixing (**+DSP-UPMIX-LA**) – Provides automatic 2.0-to-5.1 Linear Acoustic® UPMAX™ upmixing

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

Clean & Quiet Switching Option (**+CQS**) – Provides automatic audio ramp-down and up during input switching events

Text-To-Speech Option (**+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.

Add Extended Delay Option (**+DLY**)

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

Trouble Slate Import (**+T-SLATE**) – Allows uploading of up to three different user trouble slate graphic file to card, with automated insertion controlled by GPI or other events

Logo Insertion (**+LOGO**) – Allows uploading of user logo graphic file to card, with automated insertion controlled by GPI or other events

Ancillary Data Processor Option (**+ANC**) – Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data, with insert/extract to and from IP and GPIO external interfaces

SCTE104 Frame-Accurate SCTE Trigger Insertion Option (**+SCTE104-FAST**) Provides deterministic, frame-accurate Digital Program Insertion (DPI) message embedding into SDI, optimizing it for automatic dissemination to CDN and VOD systems

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

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

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

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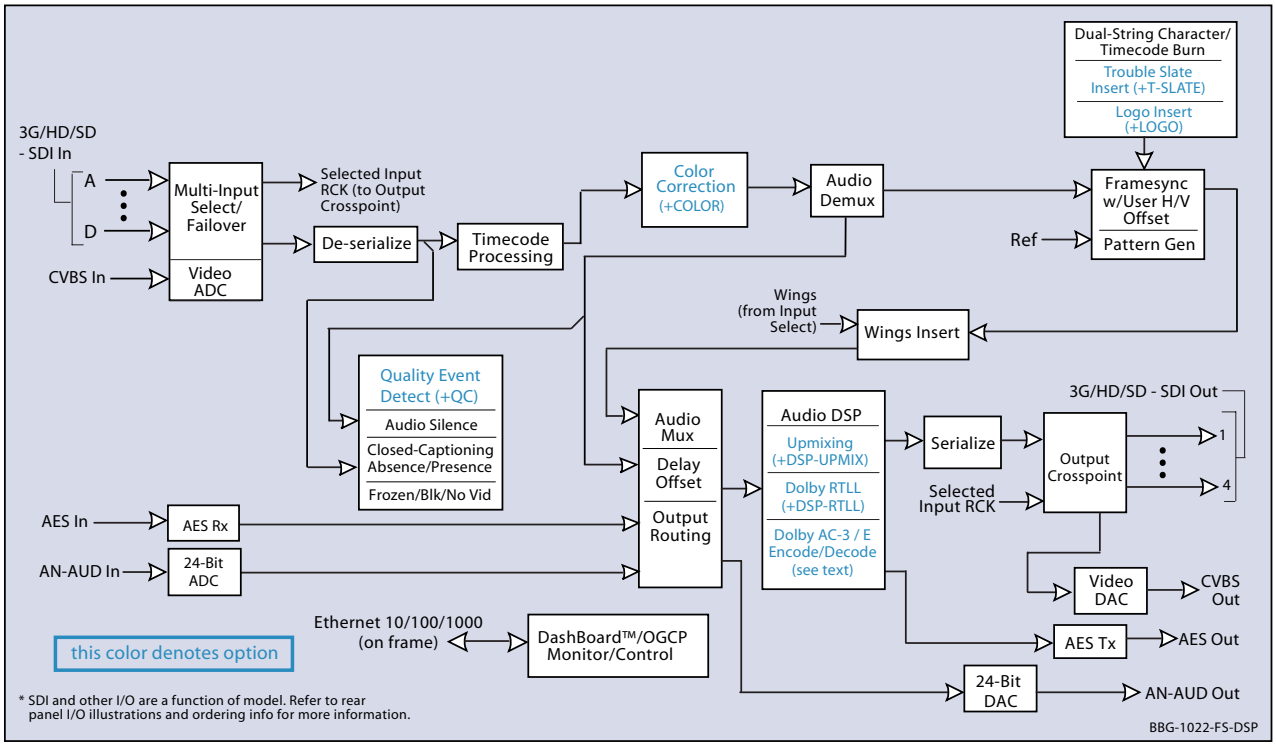
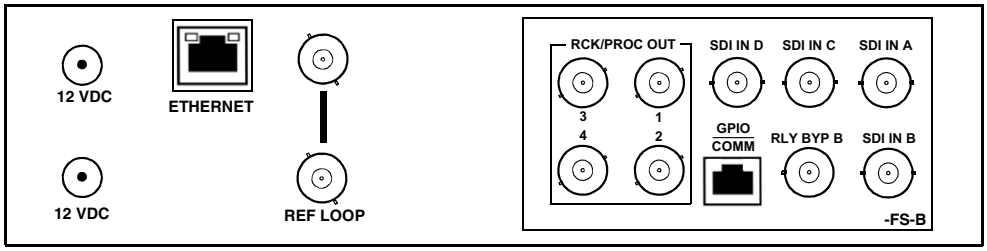
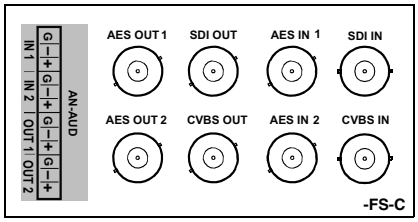
BBG-1022-FS-DSP » 3G/HD/SD-SDI STANDALONE FRAME SYNC

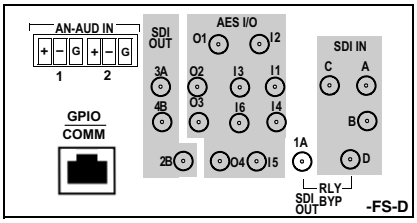
with Audio/Video Processing,DSP Audio Support, Audio Embed/De-Embed and CVBS I/O



Rear Panel







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BBG-1022-FS-DSP » 3G/HD/SD-SDI STANDALONE FRAME SYNC

with Audio/Video Processing,DSP Audio Support, Audio Embed/De-Embed and CVBS I/O

SPECIFICATIONS

Power

< 24 Watts (including DSP options). 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 IN or IN RCK)
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. 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 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

User Audio Delay Offset from Video

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

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

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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BBG-1022-FS-DSP » 3G/HD/SD-SDI STANDALONE FRAME SYNC

with Audio/Video Processing,DSP Audio Support, Audio Embed/De-Embed and CVBS I/O

ORDERING INFORMATION

BBG-1022-FS-DSP 3G/HD/SD-SDI Standalone Frame Sync with Audio/Video Processing, DSP Audio Support, Audio Embed/De-Embed and CVBS I/O available in the following rear-panel I/O configurations:

BBG-1022-FS-DSP-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-1022-FS-DSP-C (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Video In BNC, (2) AES In BNCs, (2) Balanced Analog Audio Inputs, (1) 3G/HD/SDI Output BNC, (1) CVBS Video Out BNC), (2) AES Out BNCs, (2) Balanced Analog Audio Outputs

BBG-1022-FS-DSP-D-DIN ((4) 3G/HD/SD-SDI Inputs, (2) Balanced Analog Audio In, (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-1022-FS-DSP-D-HDBNC (4) 3G/HD/SD-SDI Inputs, (2) Balanced Analog Audio In, (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)

Options and Accessories:

+DSP-RTLL-5.1 Dolby® RTLL™ 5.1-Channel Loudness Processor Option

+DSP-RTLL-2.0 Dolby® RTLL™ Stereo Loudness Processor Option

+DSP-ENCD-5.1 Dolby® Digital/Digital Plus 5.1 Encoder

+DSP-ENCD-2.0 Dolby® Digital/Digital Plus 2.0 Encoder

+DSP-DEC Dolby® Decoder

+DSP-UPMIX-LA Linear Acoustic® UPMAX™ 2.0-to-5.1 Upmixer

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+T-SLATE User Trouble Slate Graphic Import Option

+LOGO Logo Insertion Option

+SCTE104 SCTE 104 Insertion Option

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

+DLY Extended Frame Sync Delay Option

+LTC Audio LTC I/O Option

+CQS Clean & Quiet Switching Option

+QC Quality Check Option

+TTS Text-To-Speech Option (Acapela Text-To-Speech from Acapela Group™. Installation requires option upload and installation of speech library SD memory card onto host card. Pre-loaded SD card and instructions provided.)

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

BBG-1000-PS Redundant Power Supply Module

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

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9922-2FS » 3G/HD/SD-SDI DUAL-CHANNEL FRAME SYNC

with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O

The award-winning Cobalt® **9922-2FS 3G/HD/SD-SDI Dual-Channel Frame Sync** with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O offers **two independent signal paths** of frame sync / audio embedding and de-embedding on a single open-Gear® card. Using our HPF-9000 20-slot frame, this provides up to 40 channels of processing in a single frame. The 9922-2FS represents a new level of openGear packaging density!

Advanced frame sync features include per-channel audio delay, audio/video offset, and output rate conversion to and from 23.98/29.97/59.94 to 24/30/60 frame rates. 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.

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.

A convenient input crosspoint with RP168 clean switching can select from up to four SDI inputs to be applied to either of the card's two processing paths. The input crosspoint allows manual selection of input via remote control or GPIO, or failover to alternate inputs on loss of input conditions. For each path, two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. With option **+T-SLATE**, import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS/quality event marker. Moving-box insertion can serve as a dynamic raster confidence check even when the input video image is static. Included standard is closed captioning absence/presence detection for CEA 608/708 and line 21 SD closed captioning.

The space-saving design of the 9922-2FS provides for high density, allowing two cards to be collocated in adjacent slots and served by a single, standard width "split" rear module. This provides four video paths per each pair of slots, readily providing 20 channels of processing in only 10 slots. Two independent paths with fully independent user delays is perfect for setting up path delays for key/fill video. Preset save/load allows saving custom card 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. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

- Multi-input RP168 clean switch Path inputs can also be sourced from opposite path output with no external patching.
- Closed-captioning absence detection
- Auto-Changeover can be set to invoke failover for basic input loss.
- Moving-box insertion serves as a dynamic raster confidence check even in cases where the input video image is static
- Advanced audio processing allows routing, gain, delay, and flexible mixing as standard features
- Frame sync with full H/V offset and manual/LOS video pattern generator
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Per-path dual independent burn-in text string insertion allows condition-based insertion
- Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC
- Option **+TTS** provides Text-To-Speech synthesis, directly converting EAS text to high-quality digital audio speech with no baseband signal breakouts or add-on units
- Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs
- CVBS analog video I/O and analog/AES embed / de-embed with 4-line Adaptive Comb Filter
- Pattern generator for each channel can provide raster/ test pattern and patterns for LOS failover insertion
- Low-power/high-density design – less than 18 Watts per card – hot swappable
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- 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.

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.

Emergency Alert System Text Crawl Generation Option (**+EAS**) – Provides a single-card solution for keying Emergency Alert System (EAS) text crawls in the active video and inserting station identification logos. Compatible with Sage™, Dasdec™, and other EAS crawl generators, with automated control insertion via presence of crawl data or GPI.

Trouble Slate Import (**+T-SLATE**) – Allows uploading of up to three different user trouble slate graphic file to card, with automated insertion controlled by GPI or other events.

Logo Insertion (**+LOGO**) – Allows uploading of user logo graphic file to card, with automated insertion controlled by GPI or other events

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

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.

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

Expanded Frame Sync 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.

Key/Fill Keyer (**+KEYER**)

Audio LTC I/O (**+LTC**)

acapela

openGear

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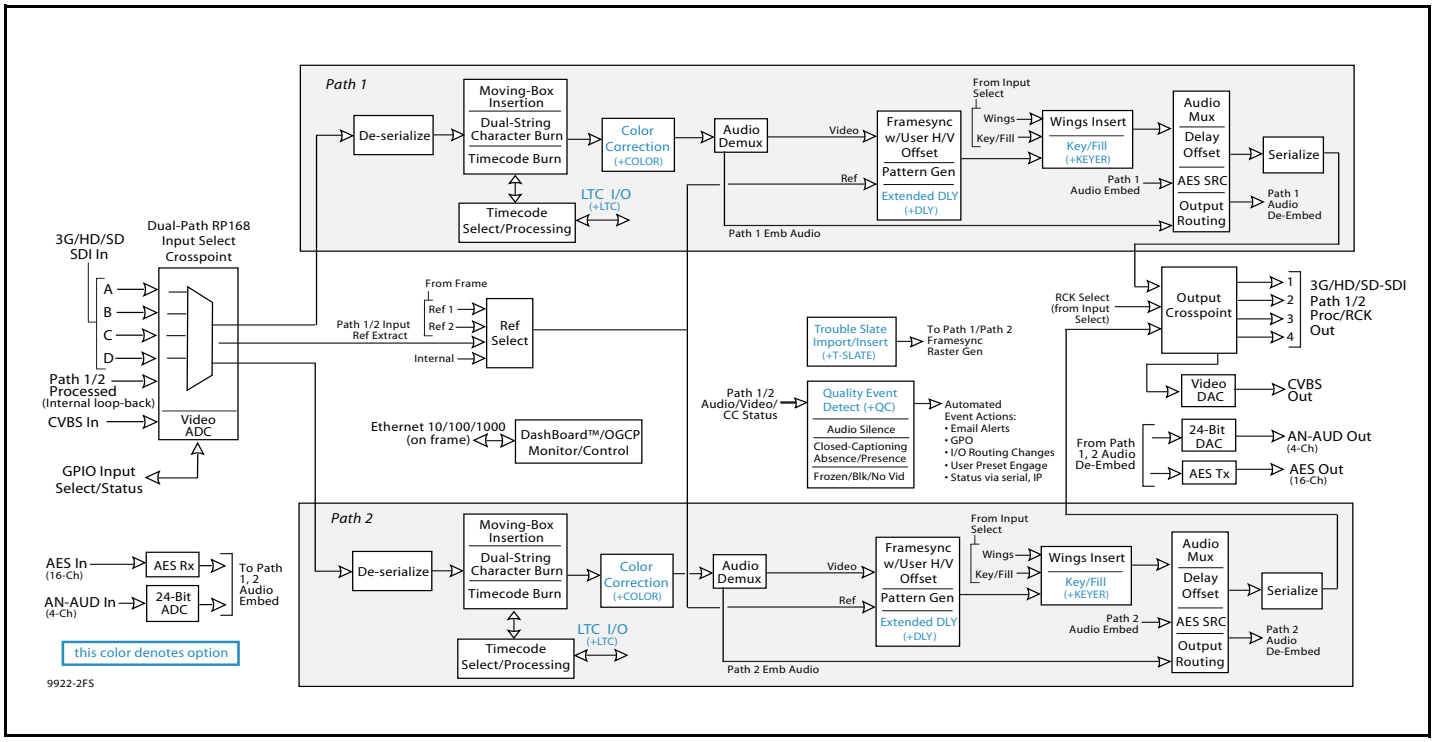
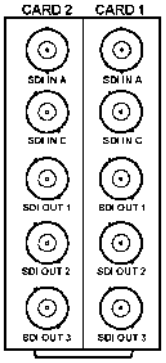
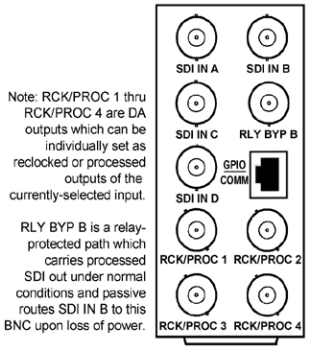
9922-2FS » 3G/HD/SD-SDI DUAL-CHANNEL FRAME SYNC

with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O

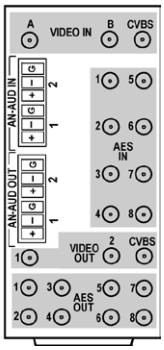




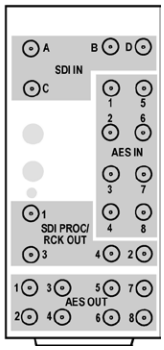
RM20-9922-2FS-AIS



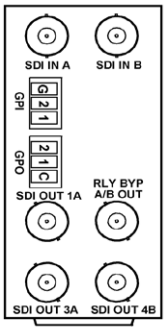
RM20-9922-2FS-C



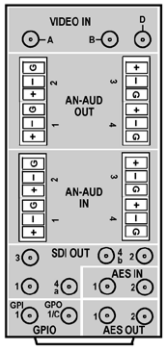
RM20-9922-2FS-D- (DIN / HDBNC)



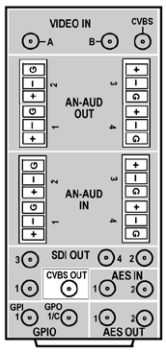
RM20-9922-2FS-E- (DIN HDBNC)



RM20-9922-2FS-F



RM20-9922-2FS-H- (DIN / HDBNC)



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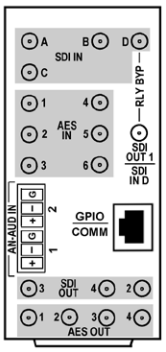

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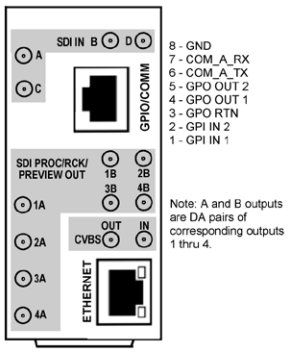

RM20-9922-2FS-L- (DIN / HDBNC)

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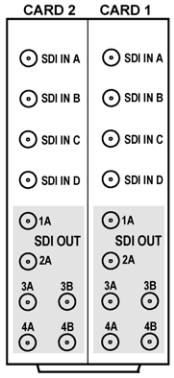
9922-2FS » 3G/HD/SD-SDI DUAL-CHANNEL FRAME SYNC

with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O



RM20-9922-2FS-M/S-
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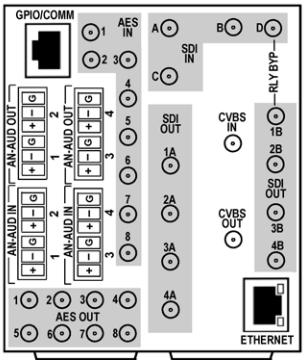
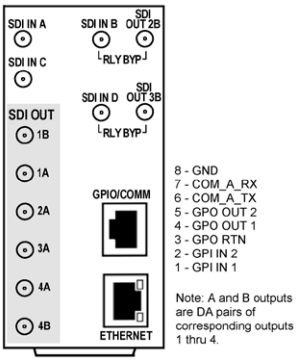


RM20-9922-2FS-N-
(DIN / HDBNC)



RM20-9922-2FS-P-
(DIN / HDBNC)

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

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 reclocked)
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)
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

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)

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9922-2FS » 3G/HD/SD-SDI DUAL-CHANNEL FRAME SYNC

with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O

SPECIFICATIONS (cont.)

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

User Audio Delay Offset from Video

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

Timecode Insertion/Burn-In

Per-path burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings per path supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Frame Reference Input

(2) reference from frame bus or selected program video ref sources. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.
Return Loss: >35 dB up to 5.75 MHz

ORDERING INFORMATION

9922-2FS 3G/HD/SD-SDI Dual-Channel Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O

RM20-9922-2FS-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNC, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per each Card 1 / Card 2 connector bank)

RM20-9922-2FS-C 20-Slot Frame Rear I/O Module (Standard Width) (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

RM20-9922-2FS-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3)

RM20-9922-2FS-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC)

RM20-9922-2FS- E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3)

RM20-9922-2FS-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC)

RM20-9922-2FS-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as Processed or Reclocked of selected input, (2) GPI, (2) GPO

RM20-9922-2FS-H-DIN 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9922-2FS-H-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9922-2FS-J-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9922-2FS-J-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9922-2FS-K-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO/COMM RJ-45 connector (All coaxial connectors DIN1.0/2.3)

RM20-9922-2FS-K-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO/COMM RJ-45 connector (All coaxial connectors HD-BNC)

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9922-2FS » 3G/HD/SD-SDI DUAL-CHANNEL FRAME SYNC

with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O

ORDERING INFORMATION (cont.)

RM20-9922-2FS-L-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9922-2FS-L-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors HD-BNC)

RM20-9922-2FS-M/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors DIN1.0/2.3)

RM20-9922-2FS-M/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors HD-BNC)

RM20-9922-2FS-N-DIN 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect) , (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors DIN1.0/2.3.)

RM20-9922-2FS-N-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect) , (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

RM20-9922-2FS-P-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs (2 with independent relay bypass), (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9922-2FS-P-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs (2 with independent relay bypass), (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors HD-BNC)

Options:

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+DLY Extended Delay Option

+KEYER Key/Fill Keyer Option

+LTC Audio LTC I/O Option

+CQS Clean and Quiet Switching Option

+QC Quality Check Option

+TTS Text-To-Speech Option (Acapela Text-To-Speech from Acapela Group™. Installation requires option upload and installation of speech library SD memory card onto host card. Pre-loaded SD card and instructions provided.)

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

+EAS Emergency Alert System Text Crawl Generation Option

+DLY Extended Frame Sync Delay Option

+T-SLATE User Trouble Slate Graphic Import Option

+LOGO Logo Insertion Option

+SCTE104 SCTE 104 Insertion Option

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

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BBG-1022-2FS » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL FRAME SYNC

with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O

The Cobalt® **BBG-1022-2FS 3G/HD/SD-SDI Standalone Dual-Channel Frame Sync** with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O offers **two independent signal paths** of frame sync / audio embedding and de-embedding in a single unit.

Advanced frame sync features include per-channel audio delay, audio/video offset, and output rate conversion to and from 23.98/29.97/29.94 to 24/30/60 frame rates. Frame sync can select from multiple reference inputs, with failover to alternate selected sources. Each path can independently use either of two frame references or internal reference.

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.

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. For each path, two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. With option +T-SLATE, import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS/quality event marker. Moving-box insertion can serve as a dynamic raster confidence check even when the input video image is static. Included standard is closed captioning absence/presence detection for CEA 608/708 and line 21 SD closed captioning. 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-1022-2FS 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-1022-2FS 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-1022-2FS 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. 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
- Moving-box insertion serves as a dynamic raster confidence check even in cases where the input video image is static
- 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 insertion.
- Per-path dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)
- 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 I/O and analog/AES embed / de-embed
- Video options include color correction and keying
- 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.
- Key/Fill Keyer (+KEYER) – Provides keying using independent SDI inputs for key and fill signals.
- 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.
- Emergency Alert System Text Crawl Generation Option (+EAS) – Provides a single-device solution for keying Emergency Alert System (EAS) text crawls in the active video and inserting station identification logos. Compatible with Sage™, Dasdec™, and other EAS crawl generators, with automated control insertion via presence of crawl data or GPI.
- Trouble Slate Import Option (+T-SLATE) – Allows uploading of up to three different user trouble slate graphic file to the BBG unit, with automated insertion controlled by GPI or other events.
- Logo Insertion Option (+LOGO) – Allows uploading of user logo graphic file to BBG unit, with automated insertion controlled by GPI or other events.
- 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)
- Redundant Power Supply Module (BBG-1000-PS)
- 1RU Mounting Tray (supports 3 units) (BBG-1000-TRAY)

DashBoard

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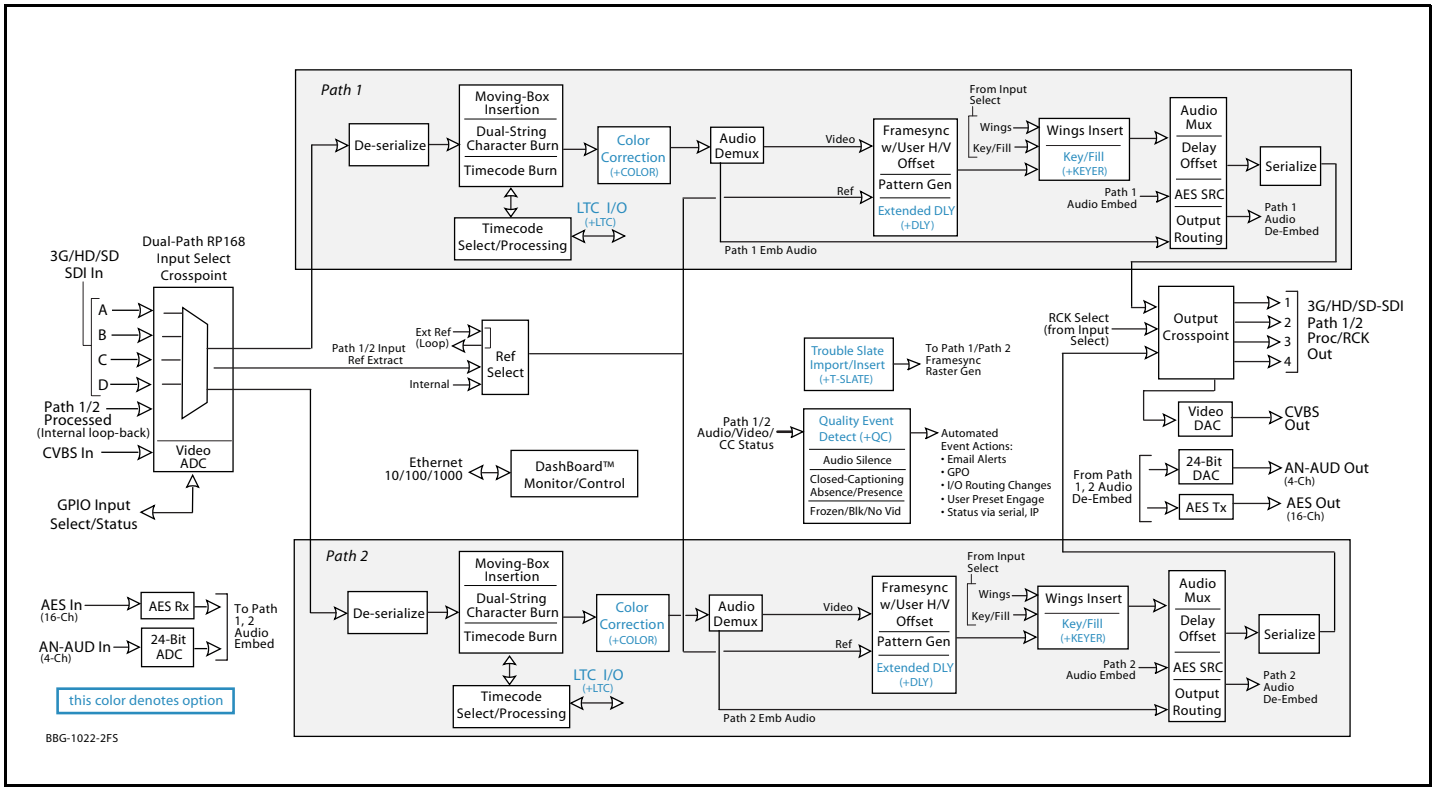
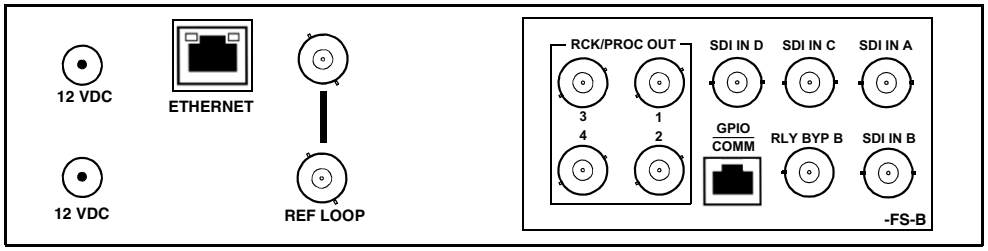
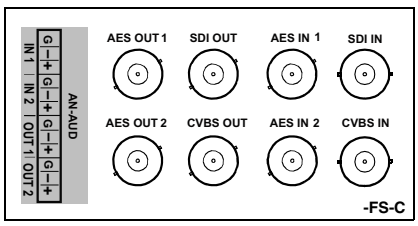
BBG-1022-2FS » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL FRAME SYNC

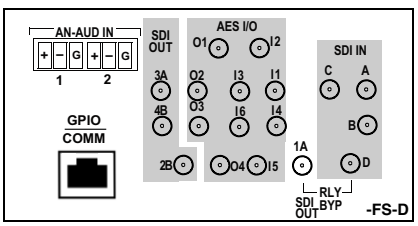
with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O



Rear Panel







acapela group
Acapela Text-To-Speech from Acapela Group™

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BBG-1022-2FS » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL FRAME SYNC

with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O

SPECIFICATIONS

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 reclocked)
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

User Audio Delay Offset from Video

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

Text Burn-In

(2) independent strings per path supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

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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BBG-1022-2FS » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL FRAME SYNC

with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O

ORDERING INFORMATION

BBG-1022-2FS 3G/HD/SD-SDI Standalone Dual-Channel Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O available in the following rear-panel I/O configurations:

BBG-1022-2FS-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-1022-2FS-C (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Video In BNC, (2) AES In BNCs, (2) Balanced Analog Audio Inputs, (1) 3G/HD/SDI Output BNC, (1) CVBS Video Out BNC), (2) AES Out BNCs, (2) Balanced Analog Audio Outputs

BBG-1022-2FS-D-DIN (4) 3G/HD/SD-SDI Inputs, (2) Balanced Analog Audio In, (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-1022-2FS-D-HDBNC (4) 3G/HD/SD-SDI Inputs, (2) Balanced Analog Audio In, (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)

Options and Accessories:

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer Option

+LTC Audio LTC I/O Option

+CQS Clean and Quiet Switching 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)

+EAS Emergency Alert System Text Crawl Generation Option

+DLY Extended Frame Sync Delay Option

+T-SLATE User Trouble Slate Graphic Import Option

+LOGO Logo Insertion 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)

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9934-AUD-PRO-DSP » 3G/HD/SD-SDI ADVANCED AUDIO PROCESSOR

with DSP Audio Options Support and Full Embed/De-Embed

The Cobalt® **9934-AUD-PRO-DSP 3G/HD/SD-SDI Advanced Audio Processor with DSP Audio Options Support and Full Embed/De-Embed** provides a DSP-based platform that supports multiple audio DSP options. When optioned with various diverse audio processing options, the DSP-based processing core (which supports numerous simultaneous processing engines) uses license "credits" which allows flexible tailoring of multiple proc function instances. In this manner, the 9934-AUD-PRO-DSP provides much more flexibility than other audio processors that used fixed processing assets (for example, this flexibility allows "trading" credits for more Dolby encoders while backing out of loudness processors or other engine assets).

Audio proc options include Dolby® Real-Time Loudness Leveling automatic loudness processing, Dolby® encode/decode, and Linear Acoustic® UPMAX™ automatic upmixing. DSP options can be ordered with new-card purchase, or field-installed as software option upgrades without removing the card from its frame. Included as standard features are downmixing, flex mixing, and full AES and balanced analog audio embed/de-embed.

Also included standard is bulk and per-channel audio delay controls that easily address lip-sync issues. 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. The 9934-AUD-PRO-DSP is available with numerous options that expand its function well beyond audio DSP and embed/de-embed to maximize frame processing density and system economy. Quality Check option **+QC** allows failover to alternate inputs or other actions based on user-configurable criteria such as black/frozen frame, audio silence or CC absence. The 9934-AUD-PRO-DSP also provides analog CVBS video inputs and outputs, and analog audio embedding and de-embedding.

Preset save/load allows saving custom card 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. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- DSP-based platform supports multiple audio DSP options, with multiple instances available using allocatable license "credits"
- Dolby encoding/decoding, Dolby Real-Time Loudness Leveling (RTLL) loudness leveling with full parametric control setup, and Linear Acoustic UPMAX™ DSP audio options available
- Auto Adjust feature helps assure lip sync by assessing and alerting where DSP processing requires matching video delay
- Full audio crosspoint with 5.1-to-stereo downmix / flexmix available for all audio outputs
- CVBS analog video I/O and analog/AES embed / de-embed available
- High-density design
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- Five year warranty

OPTIONS

Dolby® Real-Time Loudness Leveling Automatic Loudness Processing Options (**+DSP-RTLL**) – Provides advanced loudness processing with comprehensive parametric controls. Available as surround 5.1 and stereo 2.0. (See Ordering Information for full details)

Dolby® Encoder Options (**+DSP-ENC**) – Available as 5.1 and 2.0 Dolby Digital and Digital Plus Encode. (See Ordering Information for full details.)

Dolby® Decoder Options (**+DSP-DEC**) – Provides Dolby Digital, Digital Plus, and E Decode

Linear Acoustic® UPMAX™ Upmixing (**+DSP-UPMIX-LA**) – Provides automatic 2.0-to-5.1 Linear Acoustic® UPMAX™ upmixing

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

Logo Insertion Option (**+LOGO**) – Allows uploading of user logo graphic file to card, with automated insertion controlled by GPI or other events.

Text-To-Speech Option (**+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.

Emergency Alert System Text Crawl Generation Option (**+EAS**) – Provides a single-card solution for keying Emergency Alert System (EAS) text crawls in the active video and inserting station identification logos. Compatible with Sage™, Dasdec™, and other EAS crawl generators, with automated control insertion via presence of crawl data or GPI.

Clean and Quiet Switching Option (**+CQS**) – Provides silence between input switches from one SDI input source to another

Add Frame Sync Option (**+FS**)

Add Extended Delay Option (**+DLY**) (Available only in conjunction with option +FS)

Add Up/Down/Cross Converter Option (**+UDX**)

Ancillary Data Processor Option (**+ANC**) – Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data, with insert/extract to and from IP and GPIO external interfaces.

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

LINEAR ACOUSTIC® DOLBY openGear®

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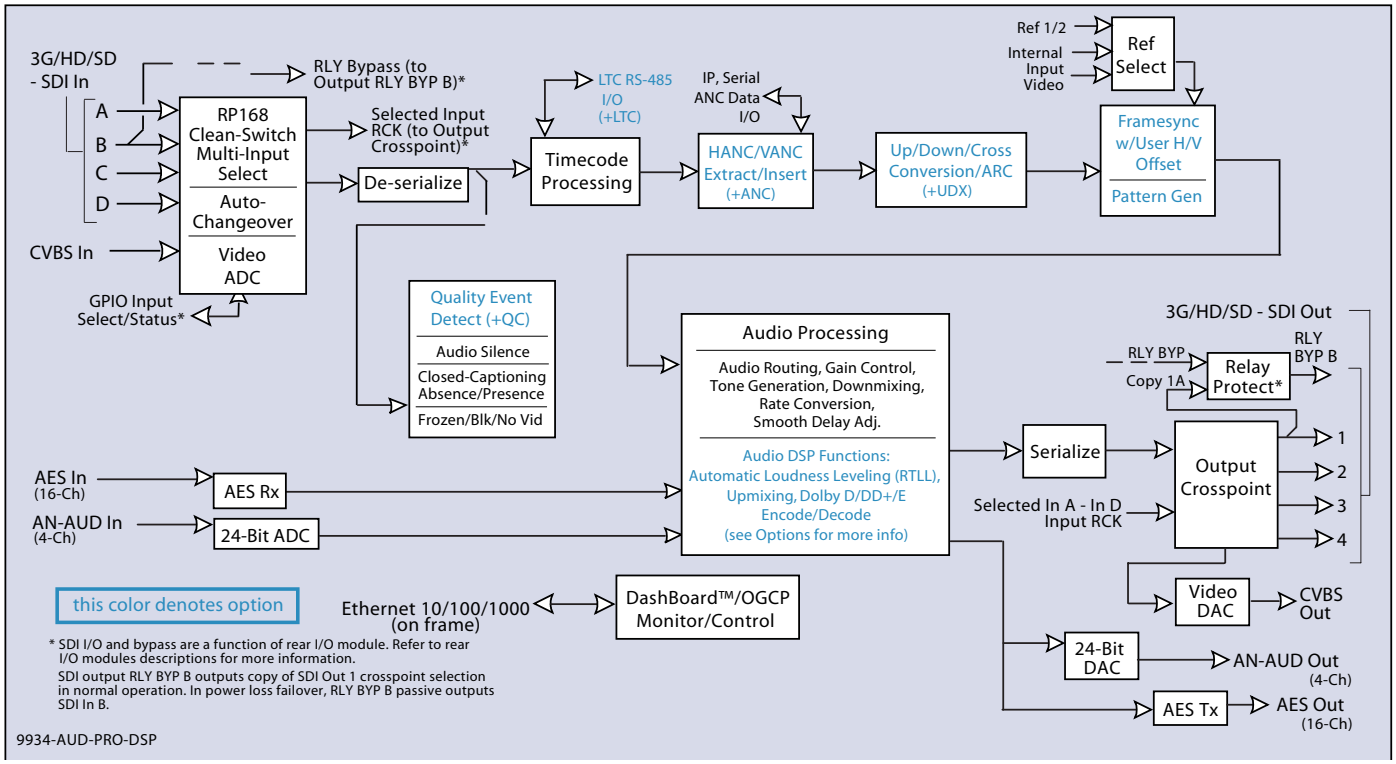
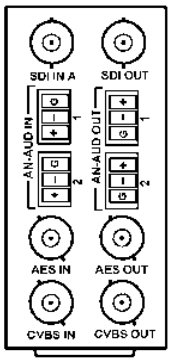
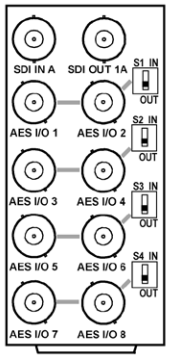
9934-AUD-PRO-DSP » 3G/HD/SD-SDI ADVANCED AUDIO PROCESSOR

with DSP Audio Options Support and Full Embed/De-Embed





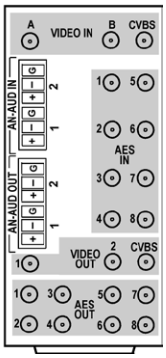
RM20-9934-B



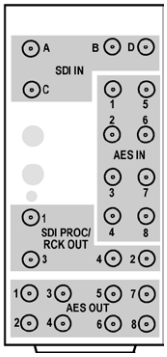
Switches S1 thru S4 set AES BNC pairs (4-ch groups) as Input (embed) or Output (de-embed).

S1 - AES BNC 1-2
S2 - AES BNC 3-4
S3 - AES BNC 5-6
S4 - AES BNC 7-8

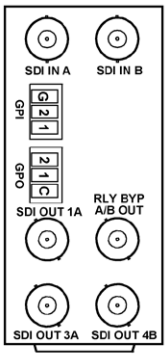
RM20-9934-C



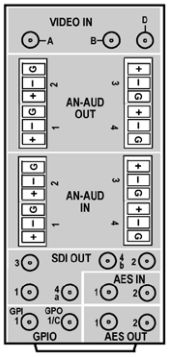
RM20-9934-D-DIN
RM20-9934-D-HDBNC



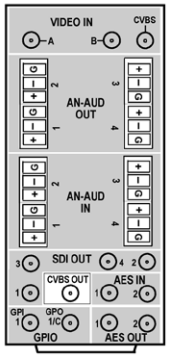
RM20-9934-E-DIN
RM20-9934-E-HDBNC



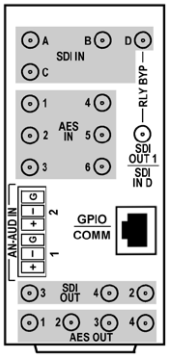
RM20-9934-F



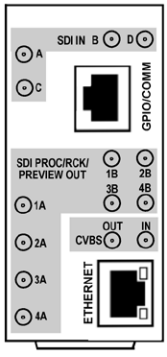
RM20-9934-H-DIN
RM20-9934-H-HDBNC



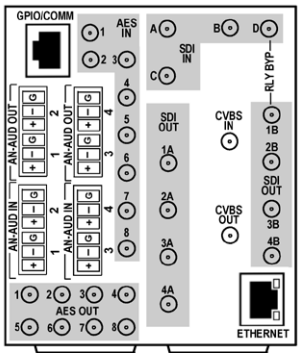
RM20-9934-J-DIN
RM20-9934-J-HDBNC



RM20-9934-K-DIN
RM20-9934-K-HDBNC



RM20-9934-L-DIN
RM20-9934-L-HDBNC



RM20-9934-N-DIN
RM20-9934-N-HDBNC

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9934-AUD-PRO-DSP » 3G/HD/SD-SDI ADVANCED AUDIO PROCESSOR

with DSP Audio Options Support and Full Embed/De-Embed

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

24 Watts (includes +DSP options)

SDI Inputs/Outputs

Up to (4) 75Ω BNC inputs
Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)
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:
SD: 127 pixels; 9.4 us
720p: 330 pixels; 4.45 us
1080i: 271 pixels; 3.65 us
1080p: 361 pixels; 2.43 us
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

CVBS Video Input/Outputs

(1) 75Ω BNC input
(1) 75Ω BNC output. CVBS output functional only when selected processed signal 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 THD+N: -96 dB (20 Hz to 10 kHz)
Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

Frame Sync Audio/Video Delay (option +FS)

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

User Audio Delay Offset from Video

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

GPIO

(2) GPI; (2) GPO

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9934-AUD-PRO-DSP » 3G/HD/SD-SDI ADVANCED AUDIO PROCESSOR

with DSP Audio Options Support and Full Embed/De-Embed

ORDERING INFORMATION

9934-AUD-PRO-DSP 3G/HD/SD-SDI Advanced Audio Processor with DSP Audio Options Support and Full Embed/De-Embed

Note: On this DSP-equipped card, an adjacent card **will not** fit into the immediately adjacent slot to the front-of-frame **right**. (For example, if DSP-equipped card is in slot 8, an adjacent card will not fit in slot 9. This would be the case of an adjacent card that installs into an odd frame slot, or the case where a Split Rear Module serves two cards in the adjacent odd/even slot pairs (in this example slots 9/10)).

RM20-9934-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Video Input BNC, (2) Balanced Analog Audio Inputs, (1) AES Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Output BNC, (1) AES Output BNC, (2) Balanced Analog Audio Outputs

RM20-9934-C 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (8) AES I/O BNCs (I/O switch selectable), (1) 3G/HD/SD-SDI Output BNC

RM20-9934-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9934-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC.)

RM20-9934-E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9934-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC.)

RM20-9934-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as Processed or Reclocked of selected input, (2) GPI, (2) GPO

RM20-9934-H-DIN 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9934-H-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9934-J-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9934-J-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9934-K-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO RJ-45 connector (All coaxial connectors DIN1.0/2.3)

RM20-9934-K-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO RJ-45 connector (All coaxial connectors HD-BNC)

RM20-9934-L-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9934-L-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors HD-BNC)

RM20-9934-N-DIN 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors DIN1.0/2.3.)

RM20-9934-N-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

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9934-AUD-PRO-DSP » 3G/HD/SD-SDI ADVANCED AUDIO PROCESSOR

with DSP Audio Options Support and Full Embed/De-Embed

ORDERING INFORMATION (cont.)

Options:

+DSP-RTLL-5.1 Dolby® RTLL™ 5.1-Channel Loudness Processor Option
+DSP-RTLL-2.0 Dolby® RTLL™ Stereo Loudness Processor Option
+DSP-ENCD-5.1 Dolby® Digital/Digital Plus 5.1 Encoder
+DSP-ENCD-2.0 Dolby® Digital/Digital Plus 2.0 Encoder
+DSP-DEC Dolby® Decoder
+DSP-UPMIX-LA Linear Acoustic® UPMAX™ 2.0-to-5.1 Upmixer
+LOGO Logo Insertion Option
+ANC Ancillary Data Processor Option
+FS Add Frame Sync Option
+DLY Extended Frame Sync Delay Option (available only in conjunction with option +FS)
+UDX Add Up/Down/Cross Converter Option
+LTC Audio LTC I/O Option
+QC Quality Check Option
+CQS Clean and Quiet Switching Option
+TTS Text-To-Speech Option (Acapela Text-To-Speech from Acapela Group™. Installation requires option upload and installation of speech library SD memory card onto host card. Pre-loaded SD card and instructions provided.)
+2L-SPAN Add Spanish-language upgrade (add-on to option +TTS; option +TTS required)
+EAS Emergency Alert System Text Crawl Generation Option

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BBG-1034-AUD-PRO-DSP » 3G/HD/SD-SDI STANDALONE ADVANCED AUDIO PROCESSOR

with DSP Audio Options Support and Full Embed/De-Embed

The Cobalt® **BBG-1034-AUD-PRO-DSP Standalone 3G/HD/SD-SDI Advanced Audio Processor with DSP Audio Options Support and Full Embed/De-Embed** provides a DSP-based platform that supports multiple audio DSP options. When optioned with various diverse audio processing options, the DSP-based processing core (which supports numerous simultaneous processing engines) uses license "credits" which allows flexible tailoring of multiple proc function instances. In this manner, the BBG-1034-AUD-PRO-DSP provides much more flexibility than other audio processors that used fixed processing assets (for example, this flexibility allows "trading" credits for more Dolby encoders while backing out of loudness processors or other engine assets).

Audio proc options include Dolby® Real-Time Loudness Leveling automatic loudness processing, Dolby® encode/decode, and Linear Acoustic® UPMAX™ automatic upmixing. DSP options can be ordered with new-device purchase, or field-installed as software option upgrades. Included as standard features are downmixing, flex mixing, and full AES and balanced analog audio embed/de-embed.

Also included standard is bulk and per-channel audio delay controls that easily address lip-sync issues. 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. Numerous other options are available to maximize processing density and system economy.

Quality Check option **+QC** allows failover to alternate inputs or other actions based on user-configurable criteria such as black/frozen frame, audio silence or CC absence. The BBG-1034-AUD-PRO-DSP also provides analog CVBS video inputs and outputs, and analog audio embedding and de-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-1034-AUD-PRO-DSP can be remote-controlled using DashBoard™. The compact standalone form factor allows desktop usage, as well as the 1/3-rack size of the BBG-1034-AUD-PRO-DSP 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

- DSP-based platform supports multiple audio DSP options, with multiple instances available using allocatable license "credits"
- Dolby encoding/decoding, Dolby Real-Time Loudness Leveling (RTLL) loudness leveling with full parametric control setup, and Linear Acoustic UPMAX™ DSP audio options available
- Auto Adjust feature helps assure lip sync by assessing and alerting where DSP processing requires matching video delay
- Advanced audio processing allows routing, gain, smooth delay, and flexible mixing as standard features
- Full audio crosspoint with 5.1-to-stereo downmix (standard) available for all audio outputs
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- CVBS analog video I/O and analog/AES embed / de-embed available
- Option **+TTS** provides Text-To-Speech synthesis, directly converting EAS text to high-quality digital audio speech with no baseband signal breakouts or add-on units
- 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 or Web Browser User Interface
- Five year warranty

OPTIONS

Dolby® Real-Time Loudness Leveling Automatic Loudness Processing Options (**+DSP-RTLL**) – Provides advanced loudness processing with comprehensive parametric controls. Available as surround 5.1 and stereo 2.0. (See Ordering Information for full details.)

Dolby® Encoder Options (**+DSP-ENC**) – Available as 5.1 and 2.0 Dolby Digital and Digital Plus Encode. (See Ordering Information for full details.)

Dolby® Decoder Options (**+DSP-DEC**) – Provides Dolby Digital, Digital Plus, and E Decode

Linear Acoustic® UPMAX™ Upmixing (**+DSP-UPMIX-LA**) – Provides automatic 2.0-to-5.1 Linear Acoustic® UPMAX™ upmixing

Logo Insertion Option (**+LOGO**) – Allows uploading of user logo graphic file to card, with automated insertion controlled by GPI or other events.

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

Text-To-Speech Option (**+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.

Emergency Alert System Text Crawl Generation Option (**+EAS**) – Provides a single-device solution for keying Emergency Alert System (EAS) text crawls in the active video and inserting station identification logos. Compatible with Sage™, Dasdec™, and other EAS crawl generators, with automated control insertion via presence of crawl data or GPI.

Clean and Quiet Switching Option (**+CQS**) – Provides silence between input switches from one SDI input source to another

Add Frame Sync Option (**+FS**)

Add Extended Delay Option (**+DLY**) (Available only in conjunction with option +FS)

Add Up/Down/Cross Converter Option (**+UDX**)

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

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

acapela LINEAR ACOUSTIC DOLBY DashBoard

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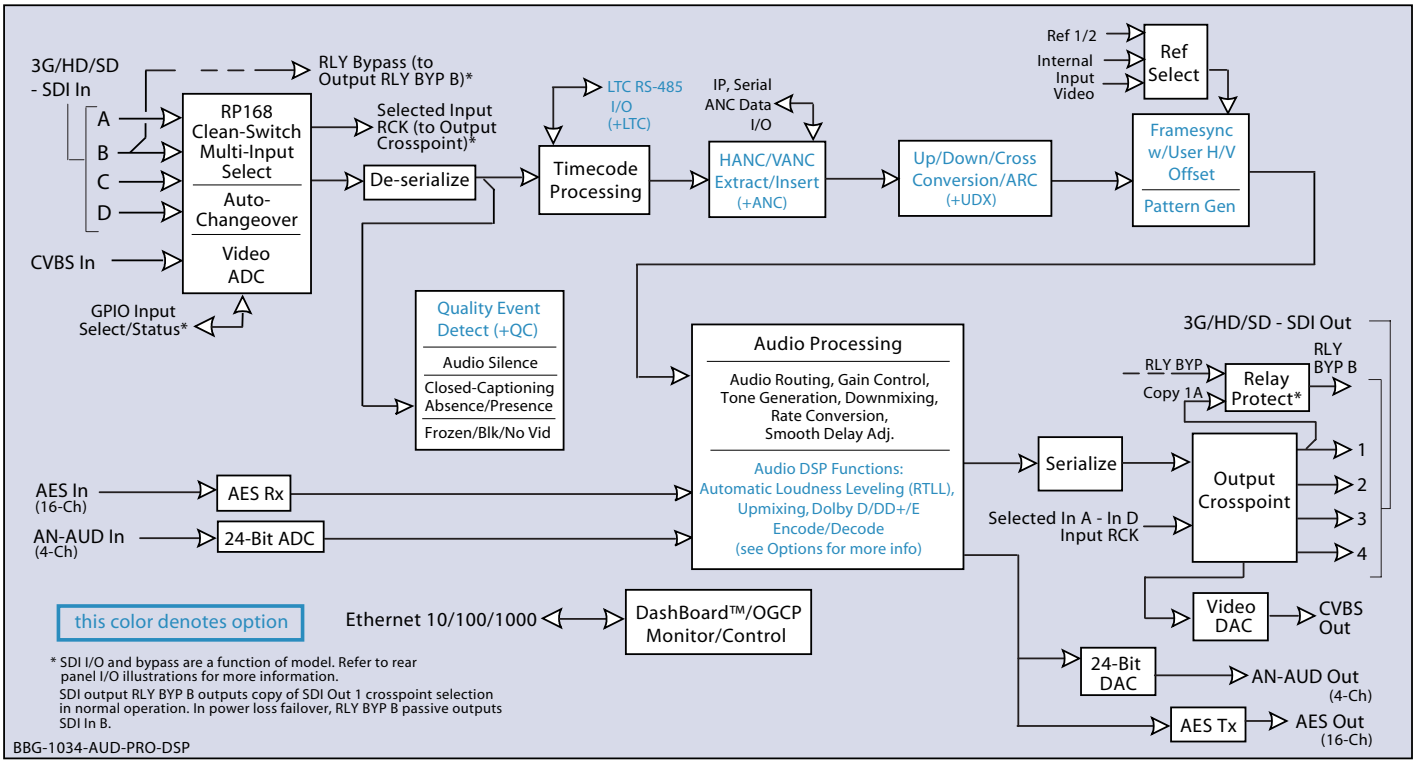
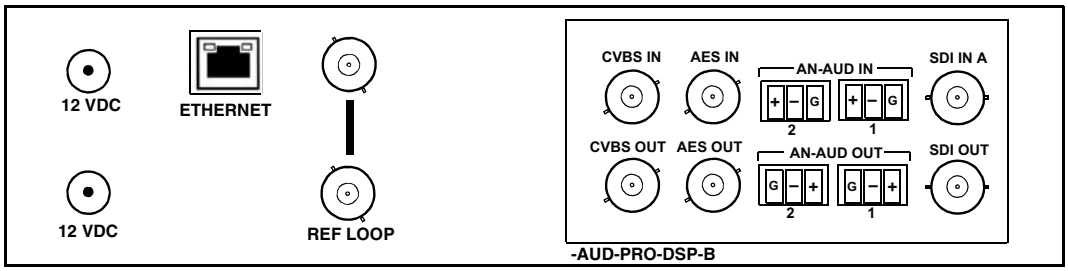
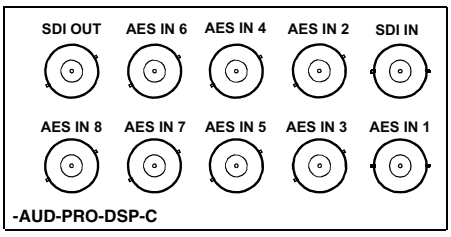
BBG-1034-AUD-PRO-DSP » 3G/HD/SD-SDI STANDALONE ADVANCED AUDIO PROCESSOR

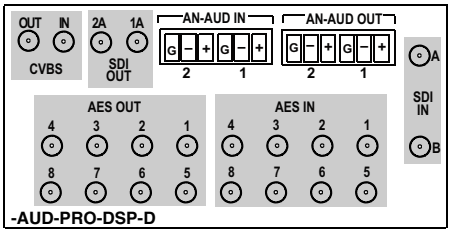
with DSP Audio Options Support and Full Embed/De-Embed

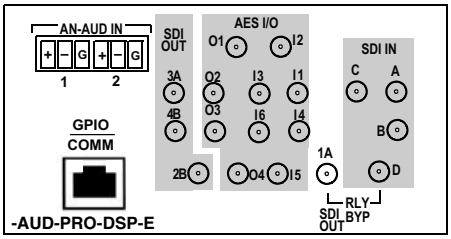


Rear Panel









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BBG-1034-AUD-PRO-DSP » 3G/HD/SD-SDI STANDALONE ADVANCED AUDIO PROCESSOR

with DSP Audio Options Support and Full Embed/De-Embed

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of model. See Ordering Information for details.

Power

24 Watts (includes +DSP options). Power supplied by 12VDC AC adapter, universal input (included).

SDI Inputs/Outputs

Up to (4) 75Ω BNC inputs
Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)
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:
SD: 127 pixels; 9.4 us
720p: 330 pixels; 4.45 us
1080i: 271 pixels; 3.65 us
1080p: 361 pixels; 2.43 us
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

CVBS Video Input/Outputs

(1) 75Ω BNC input
(1) 75Ω BNC output. CVBS output functional only when selected processed signal 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 THD+N: -96 dB (20 Hz to 10 kHz)
Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

Frame Sync Audio/Video Delay (option +FS)

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

User Audio Delay Offset from Video

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

GPIO

(2) GPI; (2) GPO

Control/Monitor Interface

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

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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BBG-1034-AUD-PRO-DSP » 3G/HD/SD-SDI STANDALONE ADVANCED AUDIO PROCESSOR

with DSP Audio Options Support and Full Embed/De-Embed

ORDERING INFORMATION

BBG-1034-AUD-PRO-DSP 3G/HD/SD-SDI Standalone Advanced Audio Processor with DSP Audio Options Support and Full Embed/De-Embed, available in the following rear-panel I/O configurations:

BBG-1034-AUD-PRO-DSP-B (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Video Input BNC, (1) AES Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Output BNC, (1) AES Output BNC

BBG-1034-AUD-PRO-DSP-C (1) 3G/HD/SD-SDI Input BNC, (8) AES Input BNCs, (1) 3G/HD/SD-SDI Output BNC

BBG-1034-AUD-PRO-DSP-D-DIN (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3.)

BBG-1034-AUD-PRO-DSP-D-HDBNC (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC.)

BBG-1034-AUD-PRO-DSP-E-DIN (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (4) AES Outputs, (2) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) GPIO RJ-45 connector (All coaxial connectors DIN1.0/2.3.)

BBG-1034-AUD-PRO-DSP-E-HDBNC (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (4) AES Outputs, (2) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) GPIO RJ-45 connector (All coaxial connectors HD-BNC.)

Options and Accessories:

+DSP-RTLL-5.1 Dolby® RTLL™ 5.1-Channel Loudness Processor Option

+DSP-RTLL-2.0 Dolby® RTLL™ Stereo Loudness Processor Option

+DSP-ENCD-5.1 Dolby® Digital/Digital Plus 5.1 Encoder

+DSP-ENCD-2.0 Dolby® Digital/Digital Plus 2.0 Encoder

+DSP-DEC Dolby® Decoder

+DSP-UPMIX-LA Linear Acoustic® UPMAX™ 2.0-to-5.1 Upmixer

+LOGO Logo Insertion Option

+ANC Ancillary Data Processor Option

+FS Add Frame Sync Option

+DLY Extended Frame Sync Delay Option (available only in conjunction with option +FS)

+UDX Add Up/Down/Cross Converter Option

+QC Quality Check Option

+CQS Clean and Quiet Switching 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)

+EAS Emergency Alert System Text Crawl Generation Option

+LTC Audio LTC I/O Option

BBG-1000-PS Redundant Power Supply Module

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

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+DSP » DSP-BASED DOLBY® ENCODE/DECODE, LOUDNESS PROCESSING, AND UPMIXING AUDIO OPTIONS

Our latest **+DSP** suite of DSP-based audio processing features represents our greatest single-device audio proc capacity. The DSP-based platform supports multiple audio DSP options using a processing core (which supports numerous simultaneous processing engines) that uses license "credits" which allows flexible tailoring of multiple proc function instances. In this manner, the +DSP option provides much more flexibility than other audio processor packages that used fixed processing assets (for example, this flexibility allows "trading" credits for more Dolby encoders while backing out of loudness processors or other engine assets).

Audio proc options include Dolby® Real-Time Loudness Leveling automatic loudness processing, Dolby® encode/decode, and Linear Acoustic® UPMAX™ automatic upmixing. DSP options can be ordered with new-card purchase, or field-installed as software option upgrades.

Multiple instances of Dolby encoding, loudness processing, and upmixing can be supported on the same card.

- **Dolby® Digital/Digital Plus™ Encoding (ENCD-5.1 / ENCD-2.0)** – Provides Dolby® Digital/Digital Plus™ encoding from any combination of audio sources supported by the card (including upmixed and loudness-processed signals). Full metadata support using internally generated or external metadata via SMPTE 2020, or from a same-card decoder. Available in 5.1 or 2.0 versions.
- **Dolby® Decoding** – Provides Dolby® Digital/Digital Plus™/E decode from any card digital audio channel pair, with Digital/Digital Plus dynamic range control and full bitstream summary displays.
- **Dolby® Real-Time Loudness Leveling Loudness Processing (RTLL-5.1 / RTLL-2.0)** – Provides full-featured loudness processing, including peak limit, aggressiveness, and dialog intelligence modes. Available in 5.1 or 2.0 versions.
- **Linear Acoustic® UPMAX™ Upmixing (UPMIX-LA)** – Featuring Linear Acoustic UPMAX™ technology, the 5.1 upmixer uses any stereo pair accommodated by the card and generates a six-channel 5.1 complement (L, R, C, LFE, Ls, Rs) from the stereo source, thereby allowing legacy stereo programming to adapt to and fully utilize 5.1-channel audio capabilities.

FEATURES

DSP-based platform supports multiple audio DSP options, with multiple instances available using allocatable license "credits"

Dolby D/D+ encoding and D/D+/E decoding options, with multiple encoders/decoders enabled on the same card/device

Dolby Real-Time Loudness Leveling (RTLL) loudness leveling with full parametric control setup, with multiple loudness processors enabled on the same card/device

Linear Acoustic UPMAX™ DSP audio option available, with multiple upmixers enabled on the same card/device

Provides up to eight processing engines that can be set as Dolby encoders/decoders, loudness processors, or upmixers as desired. Multiple-instance functionality supports multiple-stream audio such as SAP and multi-language.

OPTIONS

Dolby® Encoder Options (**+DSP-ENC**) – Available as Dolby Digital/Digital Plus™

Dolby® Decoder Options (**+DSP-DEC**) – Provides Dolby Digital, Digital Plus, and E decode

Dolby® Real-Time Loudness Leveling Automatic Loudness Processing Options (**+DSP-RTLL**) – Provides advanced loudness processing with comprehensive parametric controls. Available as surround 5.1 and stereo 2.0. (See Ordering Information for full details.)

Linear Acoustic® UPMAX™ Upmixing (**+DSP-UPMIX-LA**) – Provides automatic 2.0-to-5.1 Linear Acoustic® UPMAX™ upmixing

ORDERING INFORMATION

Note: DSP options are supported only on certain latest-revision card and BBG-1000 models that are factory-equipped for DSP support (identified with **-DSP** in their part numbers). Available now are openGear models 9934-AUD-PRO, 9902-UDX-DSP, and 9902-UDX-DSP-CI, as well as standalone models BBG-1034-AUD-PRO and BBG-1002-UDX-DSP which support all options listed here.

+DSP-RTLL-5.1 Dolby® RTLL™ 5.1-Channel Loudness Processor Option

+DSP-RTLL-2.0 Dolby® RTLL™ Stereo Loudness Processor Option

+DSP-ENCD-5.1 Dolby® Digital/Digital Plus 5.1 Encoder

+DSP-ENCD-2.0 Dolby® Digital/Digital Plus 2.0 Encoder

+DSP-DEC Dolby® Decoder

+DSP-UPMIX-LA Linear Acoustic® UPMAX™ 2.0-to-5.1 Upmixer

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9980-CSC-3G » 3G/HD/SD-SDI RGB COLOR SPACE CORRECTOR / FRAME SYNC

with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

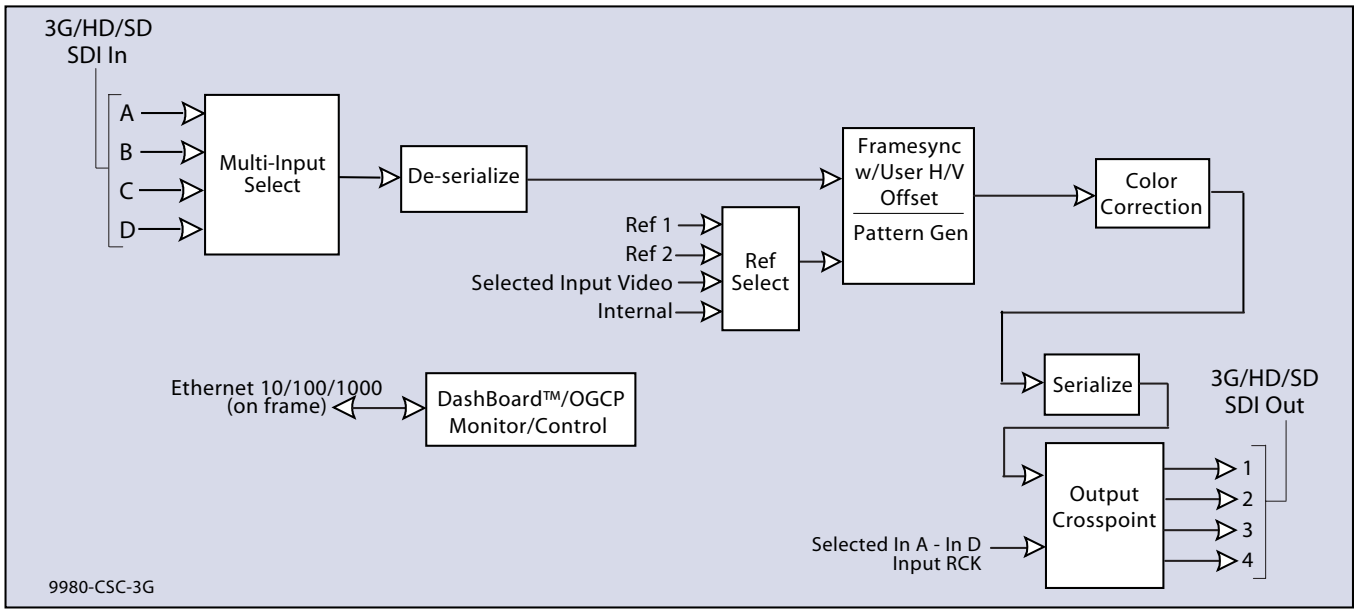
The Cobalt® **9980-CSC-3G 3G/HD/SD-SDI RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support** provides a high-density card-based solution that includes an advanced frame sync/pattern generator in addition to a full-featured SD/HD/3G color corrector. The 9980-CSC-3G offers RGB-space color correction with YCbCr proc features with RGB processing controls providing full offset, gain and gamma adjustments. The YCbCr proc controls provide lift, gain, saturation, phase, white clip (hard and soft), black clip, and color saturation clip.

The built-in pattern generator (which provides calibrated 75% or 100% color bars among other patterns) preceding the color correction block allows setting custom calibration offsets to compensate for on-set monitor/camera colorimetry, with the custom settings saved to a preset, resulting in one-button recall of monitor/camera calibration settings. Any custom settings can be saved to user presets for instant recall via DashBoard or our intuitive OGCP-9000/CC Color Correction Remote Control Panel.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern while not changing any other processing settings or aspects. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

- Full RGB color corrector (offset, gain, gamma)
- Frame Sync with full H/V offset and manual/LOS video pattern generator. Color corrector preceded by pattern generator allows custom offset calibrations for on-set monitor/camera colorimetry characteristics.
- Passes entire YCbCr gamut in unity gain configuration
- 10-bit gamma LUT
- Extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip
- Phase preserved when applying saturation clip
- One button bypass of color correction for comparison purposes
- Low-power/high-density design – less than 18 Watts per card
- Remote control/monitoring via DashBoard™ software or OGCP-9000/CC remote control panel. Award-winning OGCP-9000/CC Remote Control Panel provides fast and intuitive color correction control.
- Hot-swappable
- Five year warranty



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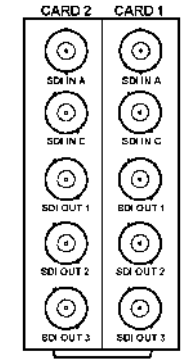
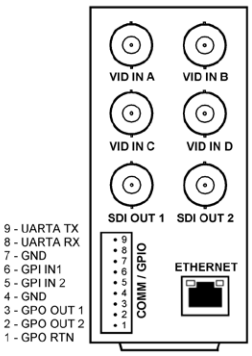
9980-CSC-3G » 3G/HD/SD-SDI RGB COLOR SPACE CORRECTOR / FRAME SYNC

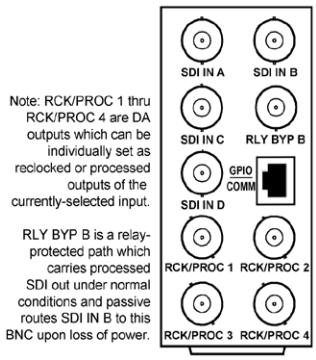
with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support



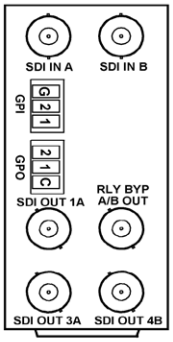
RM20-9980-A/S



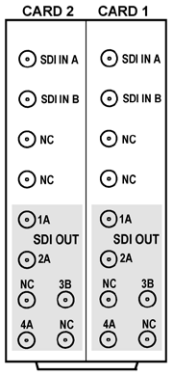
RM20-9980-B



RM20-9980-C



RM20-9980-F



RM20-9980-G/S-DIN
RM20-9908-G/S-HDBNC

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 18 Watts

SDI Input/Outputs
Up to (4) 75Ω BNC inputs
Up to (4) 75Ω BNC outputs
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
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Frame Sync Audio/Video Delay
Max offset: 20 frames
Latency (min): 1 frame

Frame Reference Input
(2) reference from frame bus. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level".
Return Loss: >35 dB up to 5.75 MHz

RGB Color Correction
RGB Black Adjust: -100% to 100% in 0.1% steps
RGB White Adjust: 0% to 200% in 0.1% steps
RGB Gamma Control: 0.125 to 8.0 in 0.001 steps

YCbCr Processing Amp
White Adjust (Gain): 0 to 200% in 0.1% steps
Black Adjust (Lift): -100% to 100% in 0.1% steps
C Gain (Saturation): 0% to 200% in 0.1% steps
Color Phase: -360° to + 360° in 0.1 degree steps

YCbCr Clip
Y Black hard clip (values limited at or above): -6.8% to 50% in 0.1% steps
Y White hard clip (values limited at or below): 50% to 109.1% in 0.1% steps
Y White soft clip (values rolled off at): 50% to 109.1% in 0.1% steps
CbCr Saturation clip (values limited at or below): 50% to 160% in 0.1% steps

ORDERING INFORMATION

9980-CSC-3G 3G/HD/SD-SDI RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

RM20-9980-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNC, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per each Card 1 / Card 2 connector bank)

RM20-9980-B 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Input BNCs, (2) 3G/HD/SD-SDI Output BNCs , COMM/GPIO Port, Ethernet Port

RM20-9980-C 20-Slot Frame Rear I/O Module (Standard Width) (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

RM20-9980-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as Processed or Reclocked of selected input, (2) GPI, (2) GPO

RM20-9980-G/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors DIN1.0/2.3)

RM20-9980-G/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors HD-BNC)

OGCP-9000/CC 2RU Remote Control Panel for Color Correction (Specify country of destination for power cord)

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BBG-1080-CSC-3G » 3G/HD/SD-SDI STANDALONE RGB COLOR SPACE CORRECTOR / FRAME SYNC

with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

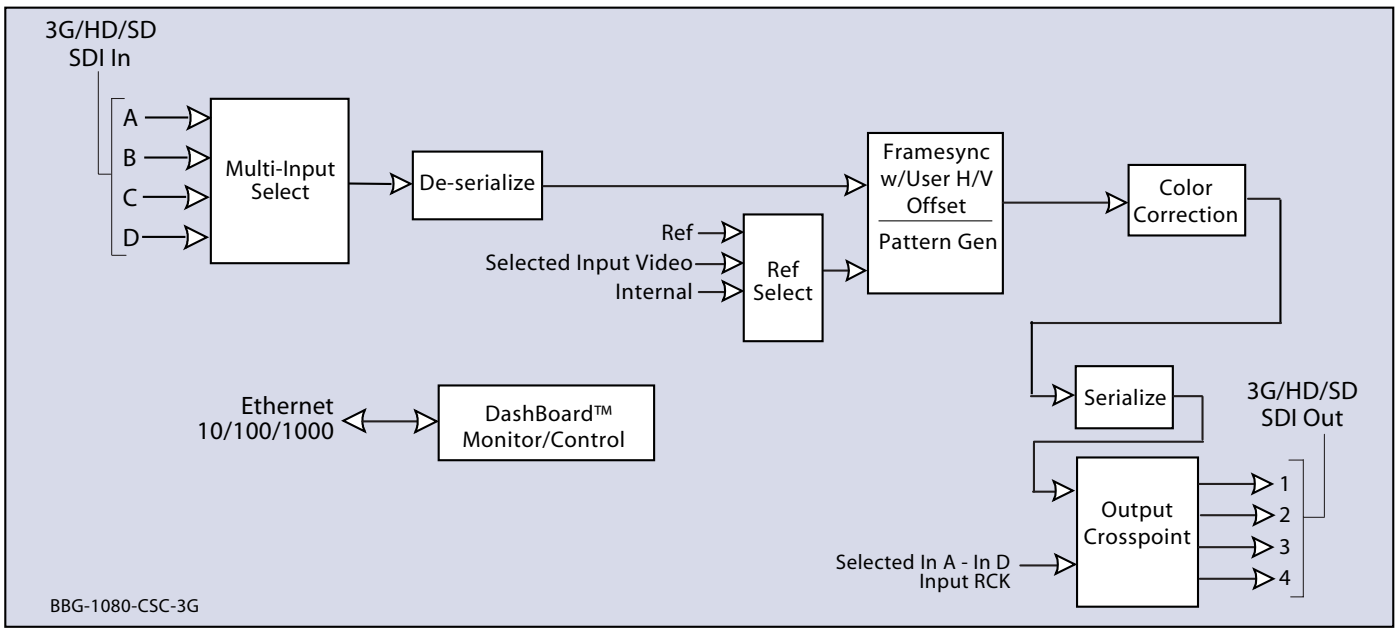
The Cobalt® **BBG-1080-CSC-3G 3G/HD/SD-SDI Standalone RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support** provides a high-density standalone solution that includes an advanced frame sync/pattern generator in addition to a full-featured SD/HD/3G color corrector. The BBG-1080-CSC-3G offers RGB-space color correction with YCbCr proc features with RGB processing controls providing full offset, gain and gamma adjustments. The YCbCr proc controls provide lift, gain, saturation, phase, white clip (hard and soft), black clip, and color saturation clip.

The built-in pattern generator preceding the color correction block allows patterns (such as 75% or 100% bars) to be pre-emphasized or de-emphasized by the color corrector to match on-set camera colorimetry, with the custom settings saved to a preset, resulting in one-button recall of monitor/camera calibration settings. Any custom settings can be saved to user presets for instant recall via DashBoard or our intuitive OGCP-9000/CC Color Correction Remote Control Panel.

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-1080-CSC-3G can be remote-controlled using DashBoard™. The compact standalone form factor allows desktop usage, as well as the 1/3-rack size of the BBG-1080-CSC 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

- Full RGB color corrector (offset, gain, gamma)
- Frame Sync with full H/V offset and manual/LOS video pattern generator. Pattern generator in front of color corrector provides custom offset calibrations for on-set monitor/camera characteristics calibrated settings
- Passes entire YCbCr gamut in unity gain configuration
- 10-bit gamma LUT
- Extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip
- Phase preserved when applying saturation clip
- One button bypass of color correction for comparison purposes
- 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.
- Uses DashBoard remote control (device appears as single-card frame)
- Five year warranty



DashBoard

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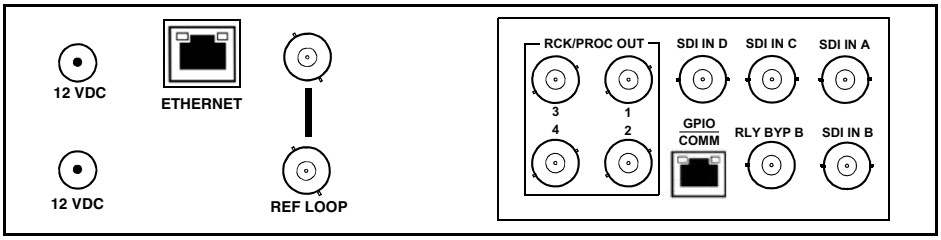
BBG-1080-CSC-3G » 3G/HD/SD-SDI STANDALONE RGB COLOR SPACE CORRECTOR / FRAME SYNC

with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

Rear Panel



Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input. RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.

SPECIFICATIONS

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
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)

Frame Sync Delay

Max offset: 20 frames
Latency (min): 1 frame

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

RGB Color Correction

RGB Black Adjust (one per primary): -100% to 100% in 0.1% steps
RGB White Adjust (one per primary): 0% to 200% in 0.1% steps
RGB Gamma Control (one per primary): 0.125 to 8.0 in 0.001 steps

YCbCr Processing Amp

White Adjust (Gain): 0 to 200% in 0.1% steps
Black Adjust (Lift): -100% to 100% in 0.1% steps
C Gain (Saturation): 0% to 200% in 0.1% steps
Color Phase: -360° to + 360° in 0.1 degree steps

YCbCr Clip

Y Black hard clip (values limited at or above): -6.8% to 50% in 0.1% steps
Y White hard clip (values limited at or below): 50% to 109.1% in 0.1% steps
Y White soft clip (values rolled off at): 50% to 109.1% in 0.1% steps
CbCr Saturation clip (values limited at or below): 50% to 160% in 0.1% steps

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected.
RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Control/Monitor Interface

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

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)

ORDERING INFORMATION

BBG-1080-CSC-3G 3G/HD/SD-SDI Standalone RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

BBG-1000-PS Redundant Power Supply Module

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

OGCP-9000/CC 2RU Remote Control Panel for Color Correction (Specify country of destination for power cord)

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9980-2CSC-3G » 3G/HD/SD-SDI DUAL-CHANNEL RGB COLOR SPACE CORRECTOR / FRAME SYNC

with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

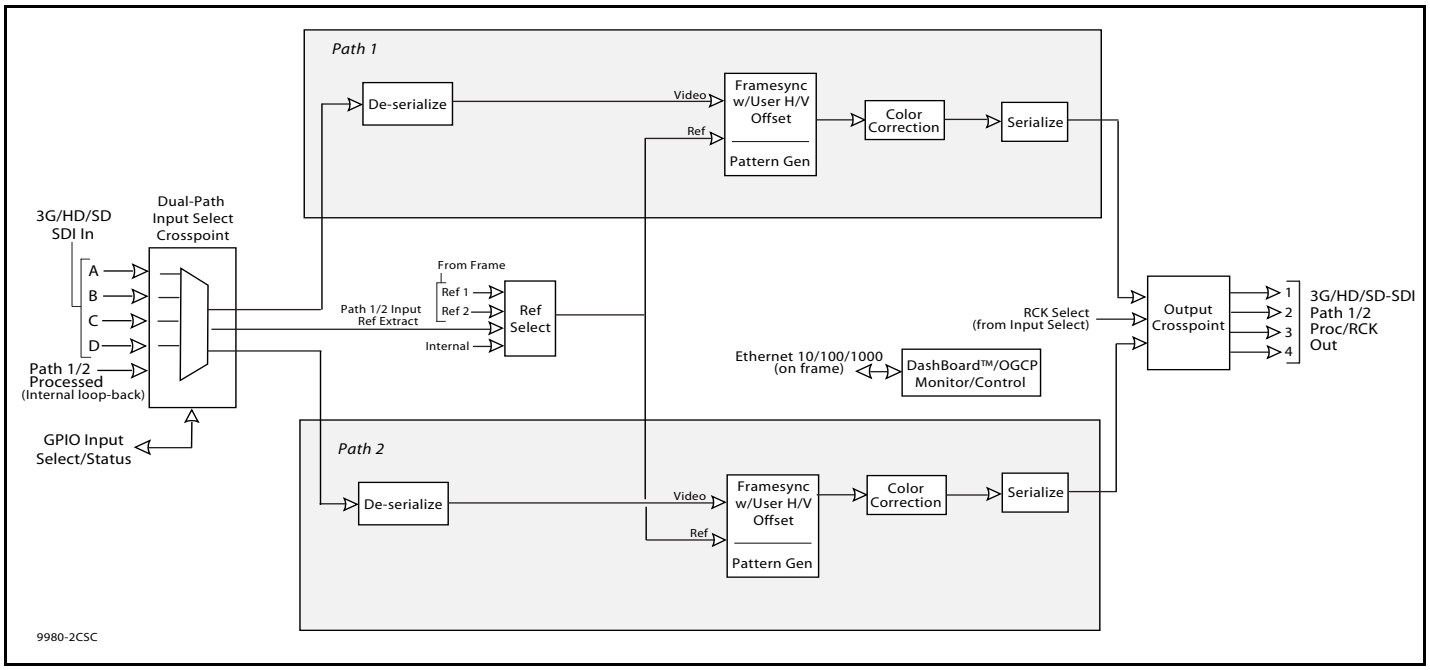
The Cobalt® **9980-2CSC-3G 3G/HD/SD-SDI Dual-Channel RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support** offers two independent signal paths of color correction/frame sync on a single open-Gear® card. Using our HPF-9000 20-slot frame, this provides up to 40 channels of processing in a single frame. The 9980-2CSC-3G offers dual independent RGB-space color correction channels with YCbCr proc features with RGB processing controls providing full offset, gain and gamma adjustments. The YCbCr proc controls provide lift, gain, saturation, phase, white clip (hard and soft), black clip, and color saturation clip.

Two independent built-in pattern generators (which provide calibrated 75% or 100% color bars among other patterns) preceding the color correction blocks allow setting custom calibration offsets to compensate for on-set monitor/camera colorimetry, with the custom settings saved to a preset, resulting in one-button recall of monitor/camera calibration settings. Any custom settings can be saved to user presets for instant recall via DashBoard or our intuitive OGCP-9000/CC Color Correction Remote Control Panel. The space-saving design of the 9980-2CSC provides for high density, allowing two cards to be collocated in adjacent slots and served by a single, standard width "split" rear module. This provides four video paths per each pair of slots, readily providing 20 channels of processing in only 10 slots.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern while not changing any other processing settings or aspects. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

- Two independent processing paths per card – 20 channels of processing in only 10 slots
- Full dual-channel independent RGB color correction (offset, gain, gamma)
- Dual Frame Sync with full H/V offset and manual/LOS video pattern generator. Color corrector preceded by pattern generator allows custom offset calibrations for on-set monitor/camera colorimetry characteristics.
- Passes entire YCbCr gamut in unity gain configuration
- Extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip
- Phase preserved when applying saturation clip
- One button bypass of color correction for comparison purposes
- Low-power/high-density design – less than 18 Watts per card
- Remote control/monitoring via DashBoard™ software or OGCP-9000/CC remote control panel. Award-winning OGCP-9000/CC Remote Control Panel provides fast and intuitive color correction control.
- Hot-swappable
- Five year warranty



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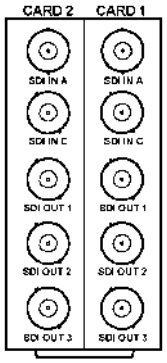
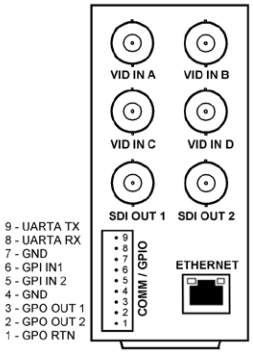
9980-2CSC-3G » 3G/HD/SD-SDI DUAL-CHANNEL RGB COLOR SPACE CORRECTOR / FRAME SYNC

with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support



RM20-9980-A/S



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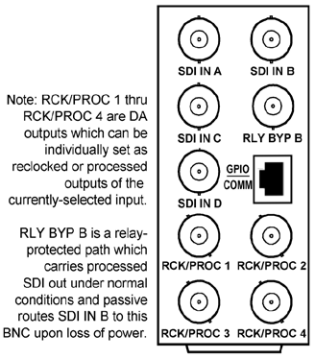

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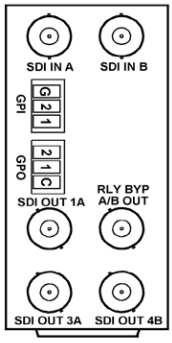

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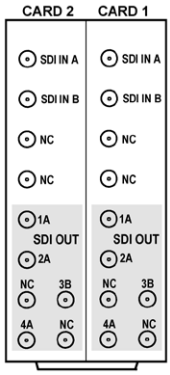
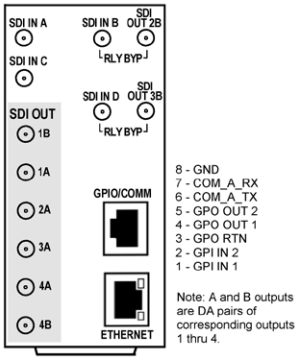


RM20-9980-G/S-DIN
RM20-9980-G/S-HDBNC



RM20-9980-H-DIN
RM20-9980-H-HDBNC

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Input/Outputs

Up to (4) 75Ω BNC inputs
Up to (4) 75Ω BNC outputs
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
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Frame Sync Audio/Video Delay

Max offset: 20 frames
Latency (min): 1 frame

User Audio Delay Offset from Video

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

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.
Return Loss: >35 dB up to 5.75 MHz

RGB Color Correction (individual controls per proc channel)

RGB Black Adjust (one per primary): -100% to 100% in 0.1% steps
RGB White Adjust (one per primary): 0% to 200% in 0.1% steps
RGB Gamma Control (one per primary): 0.125 to 8.0 in 0.001 steps

YCbCr Processing Amp

White Adjust (Gain): 0 to 200% in 0.1% steps
Black Adjust (Lift): -100% to 100% in 0.1% steps
C Gain (Saturation): 0% to 200% in 0.1% steps
Color Phase: -360° to + 360° in 0.1 degree steps

YCbCr Clip

Y Black hard clip (values limited at or above): -6.8% to 50% in 0.1% steps
Y White hard clip (values limited at or below): 50% to 109.1% in 0.1% steps
Y White soft clip (values rolled off at): 50% to 109.1% in 0.1% steps
CbCr Saturation clip (values limited at or below): 50% to 160% in 0.1% steps

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9980-2CSC-3G » 3G/HD/SD-SDI DUAL-CHANNEL RGB COLOR SPACE CORRECTOR / FRAME SYNC

with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

ORDERING INFORMATION

9980-2CSC-3G 3G/HD/SD-SDI Dual-Channel RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

RM20-9980-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNC, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per each Card 1 / Card 2 connector bank)

RM20-9980-B 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Input BNCs, (2) 3G/HD/SD-SDI Output BNCs , COMM/GPIO Port, Ethernet Port

RM20-9980-C 20-Slot Frame Rear I/O Module (Standard Width) (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

RM20-9980-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as Processed or Reclocked of selected input, (2) GPI, (2) GPO

RM20-9980-G/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors DIN1.0/2.3)

RM20-9980-G/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors HD-BNC)

RM20-9980-H-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs (2 with independent relay bypass), (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9980-H-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs (2 with independent relay bypass), (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors HD-BNC)

OGCP-9000/CC 2RU Remote Control Panel for Color Correction (Specify country of destination for power cord)

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BBG-1080-2CSC-3G » 3G/HD/SD-SDI DUAL-CHANNEL STANDALONE RGB COLOR SPACE CORRECTOR / FRAME SYNC

with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

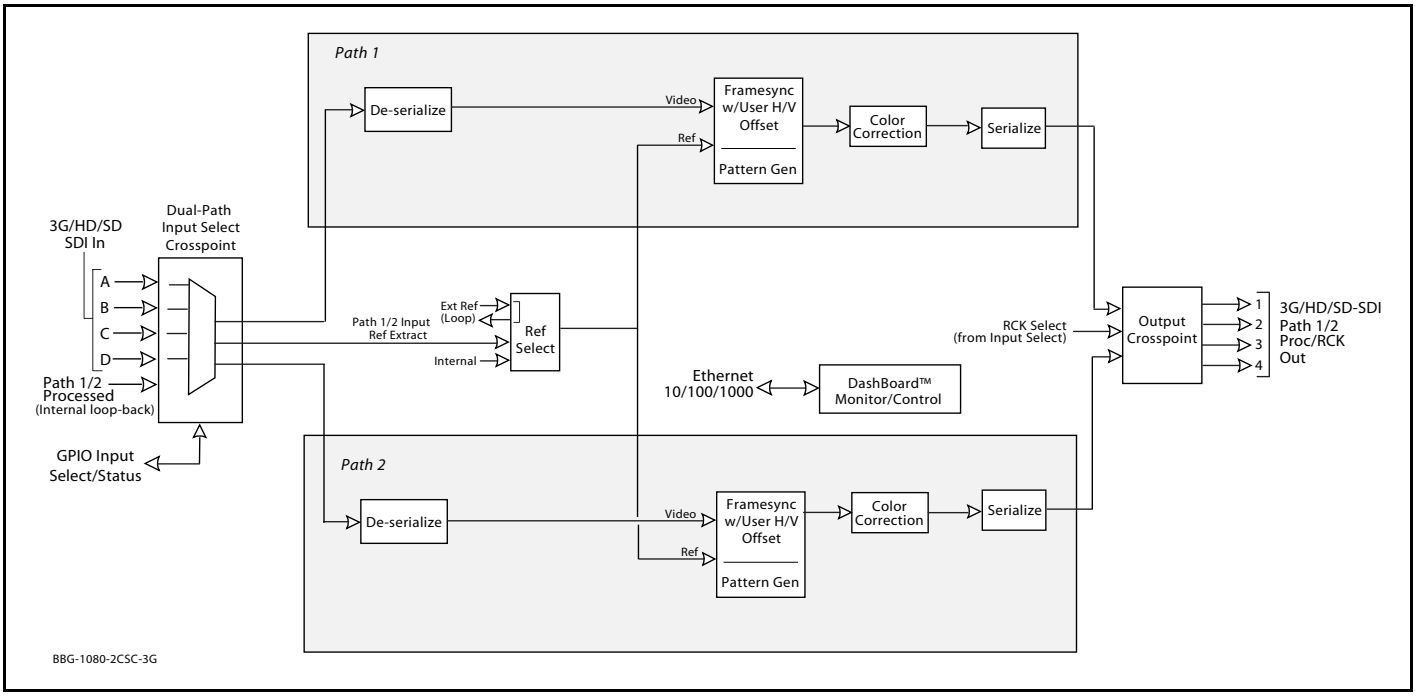
The Cobalt® **BBG-1080-2CSC-3G 3G/HD/SD-SDI Dual-Channel Standalone RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support** offers **two independent signal paths of color correction/frame sync** in a standalone unit.

The BBG-1080-2CSC-3G offers dual independent RGB-space color correction channels with YCbCr proc features with RGB processing controls providing full offset, gain and gamma adjustments. The YCbCr proc controls provide lift, gain, saturation, phase, white clip (hard and soft), black clip, and color saturation clip. Two independent built-in pattern generators (which provide calibrated 75% or 100% color bars among other patterns) preceding the color correction blocks allow setting custom calibration offsets to compensate for on-set monitor/camera colorimetry, with the custom settings saved to a preset, resulting in one-button recall of monitor/camera calibration settings. Any custom settings can be saved to user presets for instant recall via DashBoard or our intuitive OGCP-9000/CC Color Correction Remote Control Panel.

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-1080-2CSC-3G 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-1080-2CSC 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
- Full dual-channel independent RGB color correction (offset, gain, gamma)
- Dual Frame Sync with full H/V offset and manual/LOS video pattern generator. Color corrector preceded by pattern generator allows custom offset calibrations for on-set monitor/camera colorimetry characteristics.
- Passes entire YCbCr gamut in unity gain configuration
- 10-bit gamma LUT. Extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip
- Phase preserved when applying saturation clip
- One button bypass of color correction for comparison purposes
- 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.
- Uses DashBoard remote control (device appears as single-card frame)
- Five year warranty



DashBoard

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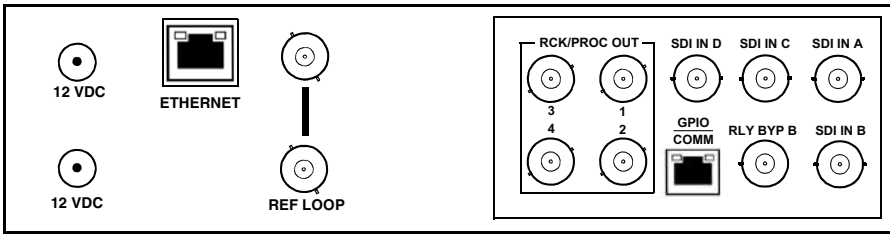
BBG-1080-2CSC-3G » 3G/HD/SD-SDI DUAL-CHANNEL STANDALONE RGB COLOR SPACE CORRECTOR / FRAME SYNC

with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

Rear Panel



Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input. RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.

SPECIFICATIONS

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
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)

Frame Sync Audio/Video Delay
Max offset: 20 frames
Latency (min): 1 frame

User Audio Delay Offset from Video
Bulk delay control: -33 msec to +3000 msec.
Per-channel delay controls: -800 msec to +800 msec

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

RGB Color Correction
RGB Black Adjust (one per primary): -100% to 100% in 0.1% steps
RGB White Adjust (one per primary): 0% to 200% in 0.1% steps
RGB Gamma Control (one per primary): 0.125 to 8.0 in 0.001 steps

YCbCr Processing Amp
White Adjust (Gain): 0 to 200% in 0.1% steps
Black Adjust (Lift): -100% to 100% in 0.1% steps
C Gain (Saturation): 0% to 200% in 0.1% steps
Color Phase: -360° to + 360° in 0.1 degree steps

YCbCr Clip
Y Black hard clip (values limited at or above): -6.8% to 50% in 0.1% steps
Y White hard clip (values limited at or below): 50% to 109.1% in 0.1% steps
Y White soft clip (values rolled off at): 50% to 109.1% in 0.1% steps
CbCr Saturation clip (values limited at or below): 50% to 160% in 0.1% steps

GPIO/COMM
(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected.
RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

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

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)

ORDERING INFORMATION

BBG-1080-2CSC-3G 3G/HD/SD-SDI Dual-Channel Standalone RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

BBG-1000-PS Redundant Power Supply Module

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

OGCP-9000/CC 2RU Remote Control Panel for Color Correction (Specify country of destination for power cord)

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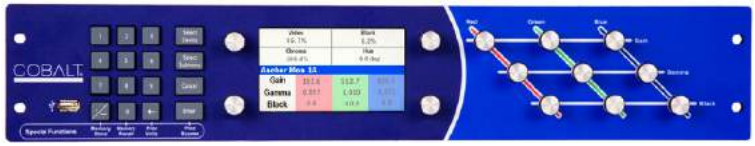
OGCP-9000/CC » COLOR CORRECTOR REMOTE CONTROL PANEL FOR OPENGEAR® CARDS



The **OGCP-9000/CC** is a remote control panel designed with special emphasis for the Color Corrector models, and models equipped with +COLOR option.

Communication with the openGear™ frame occurs over the optimized high-speed Ethernet control protocol, allowing lightning-fast access. The OGCP-9000/CC offers instantaneous, real-time adjustments, so operators can manipulate on-air signals with confidence and precision.

Rotary controls allow direct access to gain, gamma and black for each of the RGB channels, in addition to YCbCr proc controls. An easy to use keypad enables intuitive access with minimal submenus. Cards use only one level of submenus to access all of its functions. The control panel is optimized for both bright and low light environments. A large format, super-bright, wide-angle color LCD screen shows sharp and clear text; operators can select either a white or black background. Other features include a fully backlit keypad and user-adjustable LED back light.

Station engineers can configure the panel to restrict availability of specific cards and parameters for operation. Configuration is done through a simple web interface, where configurations can be exported, backed up, and re-imported easily. The OGCP-9000/CC works seamlessly with DashBoard™ control software. Any changes made with either system are instantly reflected on the other.

FEATURES

- Real time adjustments, excellent for on-air manipulation
- No deep submenus – all parameters can be accessed quickly
- 10/100 Mbps Ethernet TCP/IP connection
- Save and restore panel configuration with web interface
- Completely configurable with password protected web interface
- Optimized for bright and low light environments
- Seamless integration with DashBoard™ control software
- Rugged 2RU rack mounted chassis
- Low-power/high-density design – less than 18 Watts per card
- Five year warranty

SPECIFICATIONS

Power
9 Watts

AC Power
IEC C14 Chassis Plug accepting 90-264 VAC @ 47-63 Hz

DC Power
12 VDC 1.0 A

Ethernet
10/100 Mbps with Auto-MDIX on RJ45 socket with DC isolation

LCD
500 cd/m2 (nits) of brightness, 300:1 contrast ratio, 120 degree viewing angle

Size
Standard 2 RU; 5" depth

ORDERING INFORMATION

OGCP-9000/CC 2RU Color Correction Remote Control Panel (Specify country of destination for power cord)

9980-CSC-3G 3G/HD/SD-SDI RGB Color Space Corrector / Framesync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

9980-2CSC-3G 3G/HD/SD-SDI Dual-Channel RGB Color Space Corrector / Framesync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

+COLOR Color Correction option software upgrade; software can be ordered with card purchase, or activated later using a downloadable feature key via free DashBoard™ remote control/monitoring software (no need to remove or replace card.) Available for numerous Cobalt openGear® and BBG-1000 products. (See option **+COLOR** or individual product pages for availability.)

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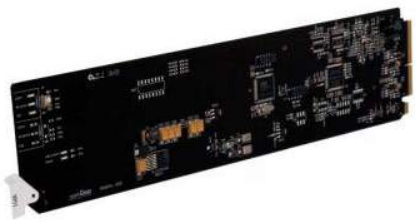
9930ADC-AES75-RG » 75-OHM (UNBALANCED) 4-CHANNEL ANALOG-TO-2-PAIR AES AUDIO CONVERTER with Remote Gain Control



The **9930ADC-AES75-RG 75-Ohm (Unbalanced) 4-Channel Analog-To-2-Pair AES Audio Converter with Remote Gain Control** is a broadcast-quality Analog-To-Digital Converter (ADC) that converts four professional-level balanced analog audio inputs to a pair of AES-3id outputs. Each AES output is available over a 2x1 distribution amplifier.

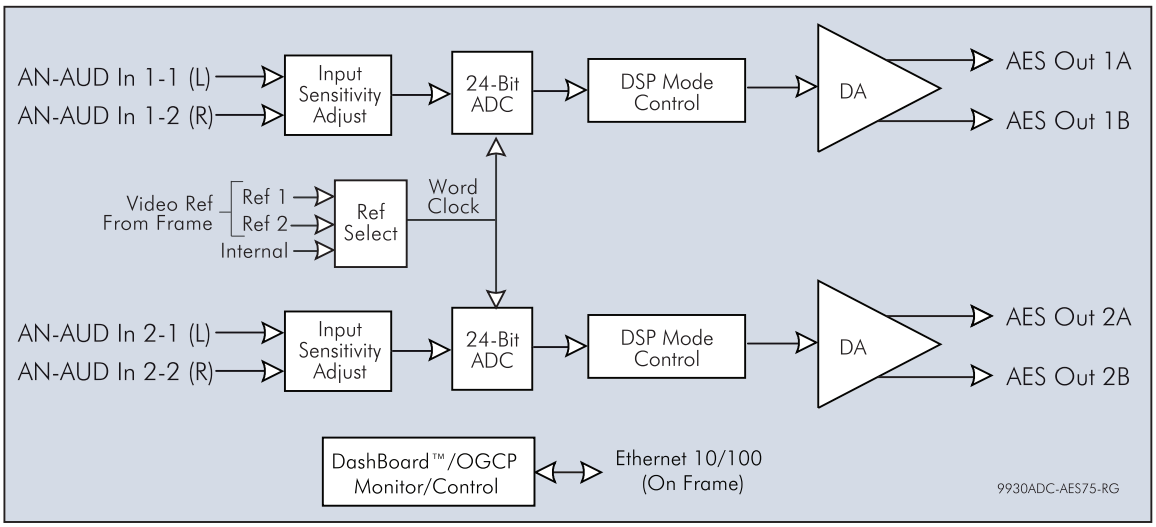
The 9930ADC-AES75-RG supports audio sampling frequencies from 32kHz to 96kHz using AES (DARS) reference, video black reference, or 48kHz internal reference (the AES sampling rate is determined by the reference selected). The 9930ADC-AES75-RG supports full 24 dBu input levels for outputs up to 0 dBFS digital.

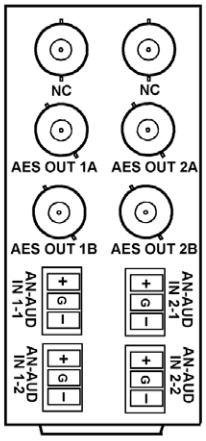
A built-in DSP allows mono-mix and L/R-only outputs. Input sensitivity trim for both pairs of analog inputs allows the input ADC to be tailored to professional as well as consumer levels, thereby maximizing ADC performance for any input level.

The space-saving design and very low power consumption of the 9930ADC-AES75-RG provides for high density installation.

FEATURES

- High-density design accommodates two analog input pairs
- 2x1 DA outputs provided for each AES output
- Full remote control of operating mode and input sensitivity control
- Convenient input sensitivity trim optimizes ADC performance for various input levels. Control available via DIP or remote control
- Multiple DSP modes – stereo/pass-thru, mono mix, L/R only outputs
- Supports audio sampling frequencies from 32 kHz to 96 kHz
- Selectable card switch control or DashBoard™ remote control (usable with DashBoard™ and Cobalt OGCP-9000 remote control panels)
- Hot-swappable
- Five year warranty





Note:
- -1 and -2 analog audio inputs correlate to stereo designations L and R, respectively.
- + G - orientation on connectors varies from that on other Cobalt products. Make certain connections are as shown here.

RM20-9930ADC75-B

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9930ADC-AES75-RG » 75-OHM (UNBALANCED) 4-CHANNEL ANALOG-TO-2-PAIR AES AUDIO CONVERTER with Remote Gain Control

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
- < 3.8 Watts

Analog Audio Inputs
- Number of Inputs: (4; 2 stereo pairs), balanced
- Impedance: >20 kΩ
- Nominal Input Level: +4 dB
- Connector Type: WECO® 3-pin removable

Reference Input
- Signal (from frame): REF 1, REF 2 supplying AES3-id, DARS, or Video Black ref
- Internal Reference: 48 kHz

Performance
- Quantization: 24-bit
- Frequency Response: ±0.5 dB (20 Hz to 20 kHz)
- Jitter: <5 ns
- S/N: -114 dB unweighted
- S/N (at –20 dBFS): -118 dB (“A” weighted)
- THD+N: <-110 dB (0.002%)
- Separation: >100 dB

AES Outputs
- Number of Outputs: (4; two 1x2 DA), unbalanced AES-3id BNC (available as stereo, pass-thru, mono-mixed, or L/R only)
- Impedance: 75 Ω
- Return Loss: -25 dB
- Sample Freq. Range: 32 kHz to 69 kHz (per ref received)
- Rise/Fall Times: 30 ns
- Output Level: 1.0 Vp-p ±10%

ORDERING INFORMATION

9930ADC-AES75-RG 75-Ohm (Unbalanced) 4-Channel Analog-To-2-Pair AES Audio Converter with Remote Gain Control

RM20-9930ADC75-B 20-Slot Frame Rear I/O Module (Standard Width) (4) Balanced Analog Audio In, (4) AES Audio Out BNCs (two 2x1 DA)

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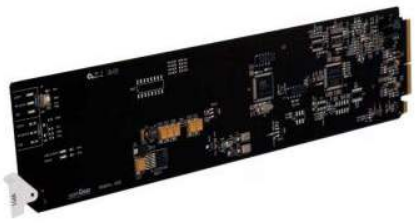
9930DAC-AES75-RG » 75-OHM (UNBALANCED) 2-PAIR AES-TO-4-CHANNEL ANALOG AUDIO CONVERTER with Remote Gain Control



The **9930DAC-AES75-RG 75-Ohm (Unbalanced) 2-Pair AES-To-4-Channel Analog Audio Converter with Remote Gain Control** is a broadcast-quality AES Digital-To-Analog Converter (DAC) that provides four professional-level balanced analog audio outputs. It also provides a 2x1 reclocked distribution amplifier for each AES input channel.

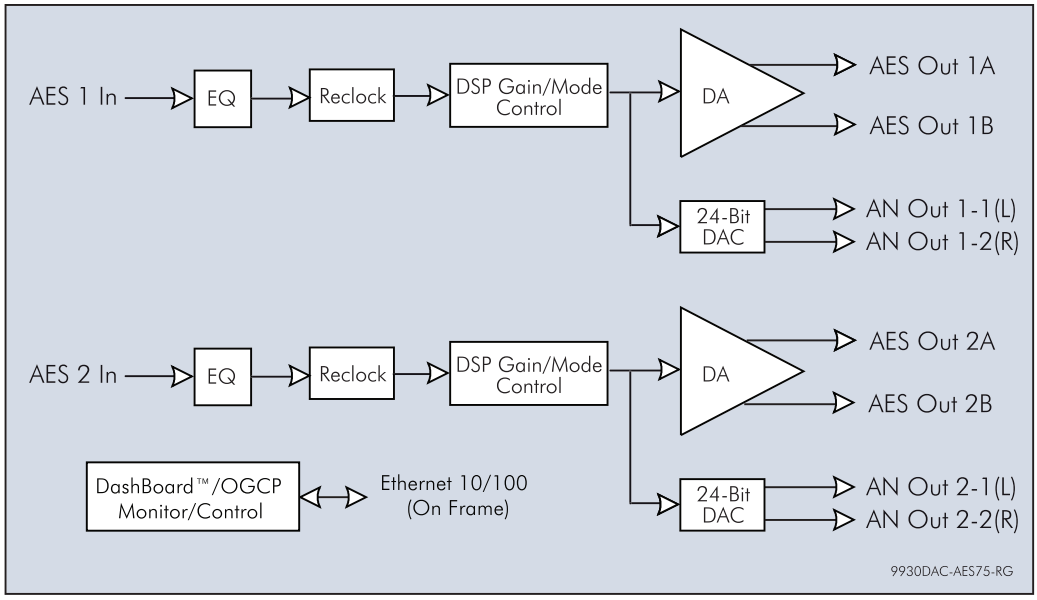
The 9930DAC-AES75-RG supports audio sampling frequencies from 32kHz to 96kHz. Cable equalization and reclocking techniques enable the 9930DAC-AES75-RG to recover the incoming digital audio signal reliably.

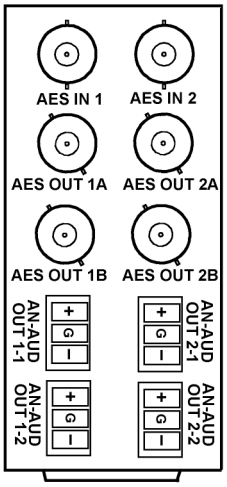
A built-in DSP allows mono-mix and L/R-only outputs. The DSP attenuation function allows overall gain (stereo ganged) trim (offset) via DashBoard™ remote control.

The space-saving design and very low power consumption of the 9930DAC-AES75-RG provides for high density installation.

FEATURES

- High-density design accommodates two AES inputs, allowing up to four analog outputs
- Also provides 2x1 reclocked DA outputs for each AES input
- Full remote control of operating mode and gain control
- Convenient DSP gain trim via DIP or remote control
- Multiple DSP modes – stereo/pass-thru, mono mix, L/R only outputs
- Supports audio sampling frequencies from 32 kHz to 96 kHz
- Selectable card switch control or DashBoard™ remote control (usable with DashBoard™ and Cobalt OGCP-9000 remote control panels)
- Hot-swappable
- Five year warranty





RM20-9930DAC75-B

Note:
- **-1 and -2 analog audio outputs correlate to stereo designations L and R, respectively.**
- **+ G - orientation on connectors varies from that on other Cobalt products. Make certain connections are as shown here.**

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9930DAC-AES75-RG » 75-OHM (UNBALANCED) 2-PAIR AES-TO-4-CHANNEL ANALOG AUDIO CONVERTER with Remote Gain Control

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 7.5 Watts

AES Input
Number of Inputs: (2), unbalanced AES-3id BNC
Impedance: 75 Ω
Input Level: 0.2 – 7 Vp-p

Performance
Sampling Rates: 32 kHz to 96 kHz
Resolution: 24-bit
Jitter: < 5 ns

Analog Output
Number of Outputs: (4) max (two stereo pairs). Available as stereo, mono-mixed, or L/R only.
Connector Type: WECO® removable 3-pin modular
Impedance: 60 Ω balanced
Maximum Output Level: +24 dBu
Frequency Response: ±0.2dB, 20 Hz to 20 kHz
Noise (unweighted): -86 dBu, 20 Hz to 20 kHz
THD+N: < 0.02%
Stereo Separation: >90 dB (20 Hz to 20 kHz)

ORDERING INFORMATION

9930DAC-AES75-RG 75-Ohm (Unbalanced) 2-Pair AES-To-4-Channel Analog Audio Converter with Remote Gain Control

RM20-9930DAC75-B 20-Slot Frame Rear I/O Module (Standard Width) (2) AES Audio In BNCs, (4) Reclocked AES Audio Out BNCs, (4) Balanced Analog Audio Out

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BBG-A-TO-S » HD/SD ANALOG COMPONENT/COMPOSITE-TO-HD/SD-SDI with Audio Embedder

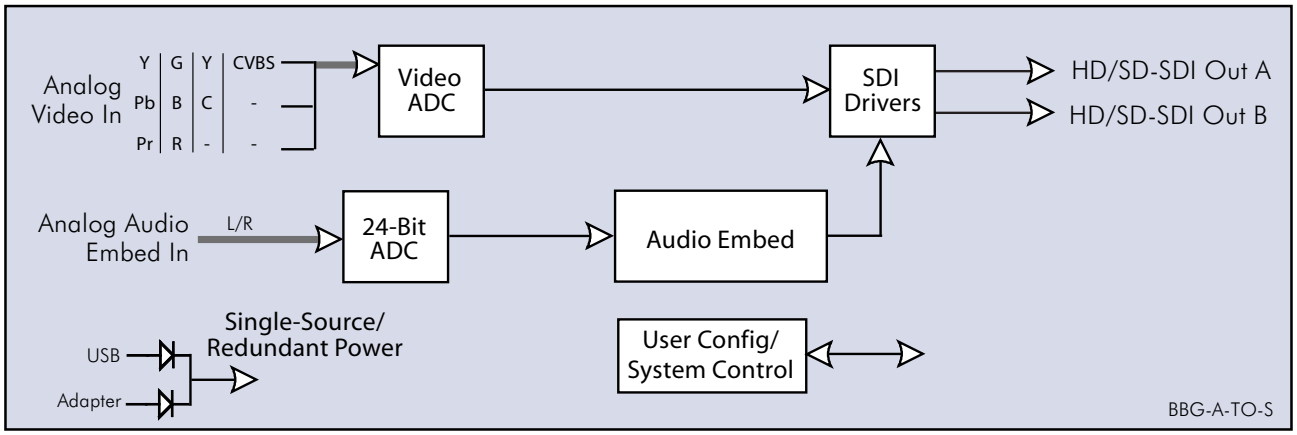
BlueBox™ offers excellent performance, and excels to a new level of ease of use and installation practicality.

The Blue Box **BBG-A-TO-S** can power directly via USB to get its power from video monitors or other equipment. Blue Box Analog to SDI offers CVBS SD or component SD/HD conversion to SDI using high-quality 12-bit A/D conversion, with SD line 21 closed-captioning passed onto the converted stream.

Full support of multiple analog standards such as SMPTE, Betacam™, MII, RGB, and S-video (Y/C) is provided. A stereo analog audio pair can be embedded onto embedded audio channels 1/2 with full 24-bit resolution.

FEATURES

- Compact size and low weight design easily affixes directly to camera or host device chassis
- High-quality 12-bit A/D conversion of NTSC/PAL YPbPr, RGB or S-Video/CVBS SD video to SMPTE 259M or SMPTE 292M
- Passes line 21 closed-captioning for analog-to-SD-SDI conversions
- Stereo analog audio input embedding to embedded audio pair on SDI output
- Small rugged portable standalone package ideal for portable installations
- Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.
- 2x SDI DA output
- Rugged construction backed with a five-year warranty



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BBG-A-TO-S » HD/SD ANALOG COMPONENT/COMPOSITE-TO-HD/SD-SDI with Audio Embedder

SPECIFICATIONS

Standards Supported
SMPTE 259M, 292M

Inputs
- YPbPr, RGB, Y/C, CVBS analog video (75Ω BNCs)
- (2) analog audio (unbalanced consumer RCA)
- DC power (via USB or adapter)

Outputs
(2) SDI (75Ω BNCs)

Audio Conversion Format
48 kHz sampling, 24-bit

Power Source
Power-sourced directly from host equipment USB port. Converter can also be powered using corded AC adapter (included)

Power
5-16 VDC, 2.4 W

DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
32°F to 122°F
(0°C to 50°C)

ORDERING INFORMATION

BBG-A-TO-S BlueBox™ Analog-to-SDI HD/SD Analog Component/Composite-to-HD/SD-SDI with Audio Embedder Converter Unit

BBG-MB Mounting Bracket

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BBG-S-TO-A » HD/SD-SDI-TO-HD/SD ANALOG COMPONENT/COMPOSITE with Audio De-Embedder

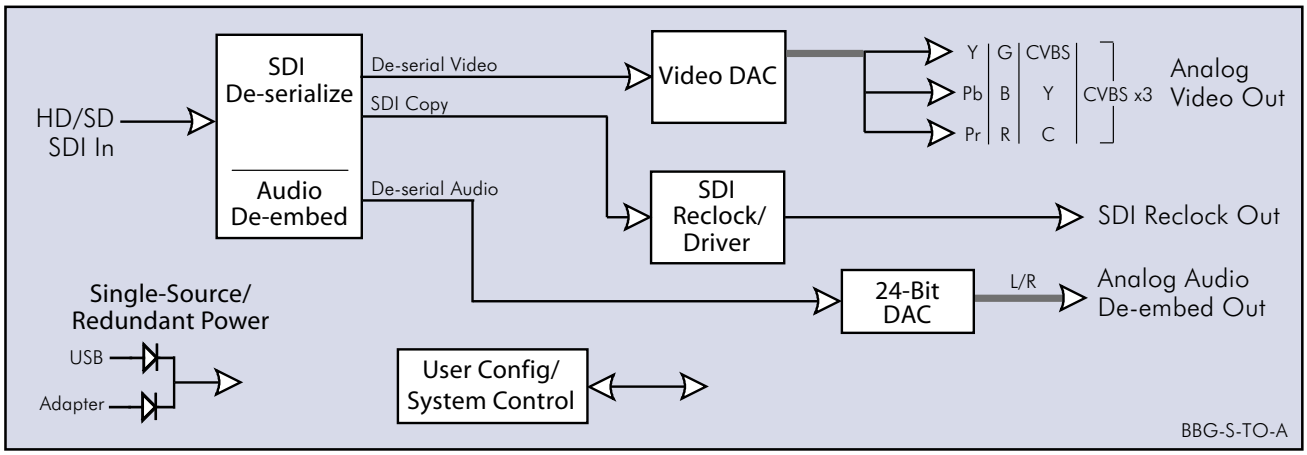
BlueBox™ offers excellent performance, and excels to a new level of ease of use and installation practicality.

The Blue Box **BBG-S-TO-A** can power directly via USB to get its power from video monitors or other equipment. Blue Box SDI to Analog passes line 21 closed-captioning for SD conversions, and can be set to provide to provide SMPTE, Betacam™, MII, or RGB component outputs using an easy to use DIP switch. S-video or 3x DA CVBS output modes are also provided for SD streams.

Group 1 and 2 stereo pairs can be de-embedded from SDI and outputted via an analog audio output line-level pair.

FEATURES

- Rugged construction backed with a five-year warranty
- Passes line 21 closed-captioning for SD-SDI to analog conversions
- De-embedding from selectable embedded pair to stereo analog audio outputs
- Offers conversions to several component and composite standards
- SDI input copy output allows converter to provide SDI pass-thru
- Compact size and low weight design easily affixes directly to camera or host device chassis
- Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.



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BBG-S-TO-A » HD/SD-SDI-TO-HD/SD ANALOG COMPONENT/COMPOSITE with Audio De-Embedder

SPECIFICATIONS

Standards Supported
SMPTE 259M, 292M

Inputs
SDI (75Ω BNC)
DC power (via USB or adapter)

Outputs
YPbPr, RGB, Y/C, or CVBS analog video (75Ω BNCs)
SDI reclocked input copy (75Ω BNC)
(2) analog audio (unbalanced consumer RCA)

Audio Conversion Format
48 kHz sampling, 24-bit

Power
5-16 VDC, 2.4 W

DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
-13°F to 149°F
(-25°C to 65°C)

ORDERING INFORMATION

BBG-S-TO-A HD/SD-SDI-to-HD/SD Analog Component/Composite with Audio De-Embedder Converter Unit

BBG-MB Mounting Bracket

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9915DA-1x16-12G » 12G/6G/3G/HD/SD-SDI 1X16 RECLOCKING DISTRIBUTION AMPLIFIER

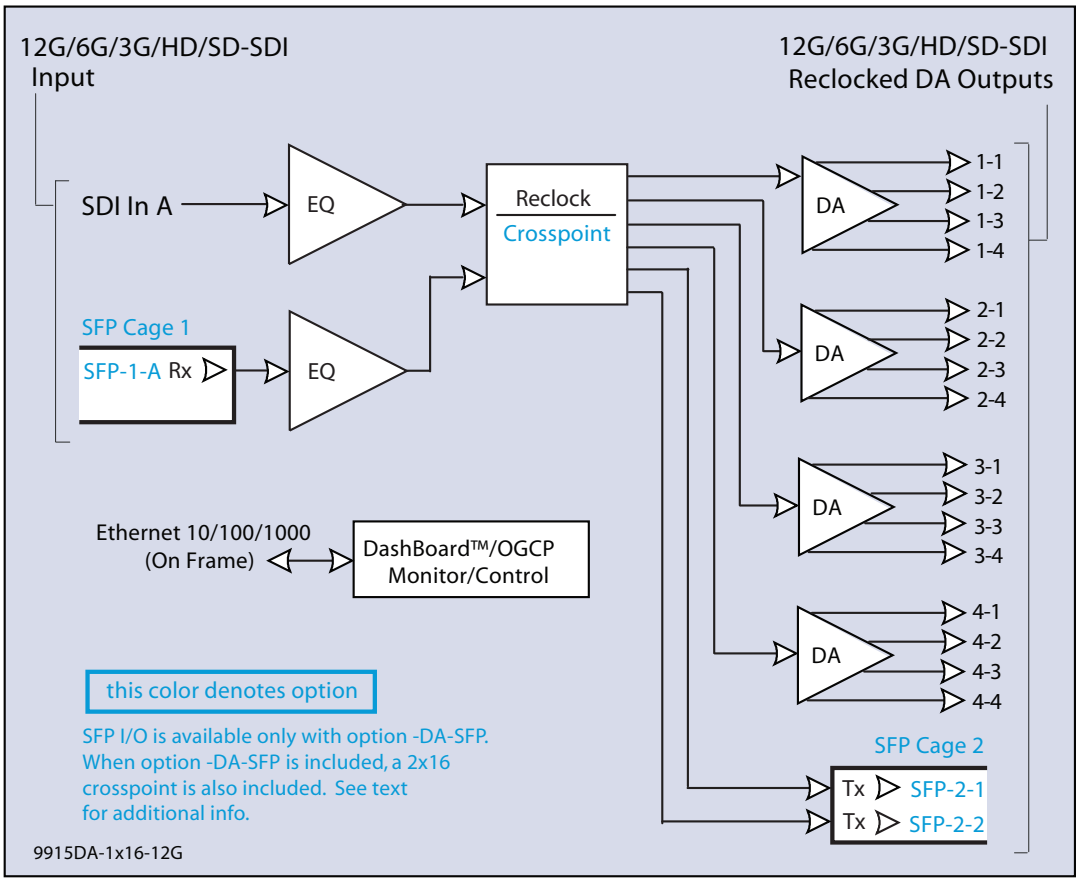
The Cobalt® **9915DA-1x16-12G** 12G/6G/3G/HD/SD-SDI 1x16 Reclocking Distribution Amplifier supports an input channel which is distributed to 16 DA outputs. The 9915DA-1x16-12G also, as an option, can support an SFP-based fiber input and fiber DA outputs.

As demand for 4K continues to rise, distribution of 12G-SDI signals within a rackspace becomes increasingly important. The 9915DA-1x16-12G allows for copper runs of up to 45 meters, reaching most equipment within a rack room or truck.

Up to 10 of the 9915DA-1x16-12G cards can be installed in a frame to provide 10 channels of input, with distribution to up to 160 outputs. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Full support of 12G/6G/3G/HD/SD-SDI and ASI/DVB
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Input data rate auto-detection for all industry-standard data rates
- One-card solution for distribution of 8K/4K content over 12G-SDI interfaces
- Card display and DashBoard status input lock indicators
- Hot-swappable
- Five year warranty



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9915DA-1x16-12G » 12G/6G/3G/HD/SD-SDI 1X16 RECLOCKING DISTRIBUTION AMPLIFIER

OPTIONS

-DA-SFP Adds daughter card to support two externally-accessible SFP cages to the 9915DA-1x16-12G card

Note: When option -DA-SFP is included, a second input (fiber OE) is in turn added to the card. As such, this exposes a full 2x16 crosspoint that allows both the coax and fiber inputs to be independently and simultaneously routed to various card outputs.

-SFP-OE-12G SFP Optical UHD Single Receiver

-SFP-EO-12G SFP Optical UHD Single Transmitter

-SFP-2EO-12G SFP Optical UHD Dual Transmitter

-SFP-OE SFP Optical Single Receiver

-SFP-EO SFP Optical Single Transmitter

-SFP-2EO SFP Optical Dual Transmitter

-SFP-H-TO-S SFP HDMI-to-HD/SD-SDI Receiver

-SFP-S-TO-H SFP HD/SD-SDI-to-HDMI Transmitter

-SFP-EO-CWDM SFP Optical Single CWDM Transmitter (see Ordering Info for wavelengths and corresponding ordering codes)

-SFP-2EO-CWDM SFP Optical Dual CWDM Transmitter (see Ordering Info for wavelengths and corresponding ordering codes)

-SFP-IP-SWD Software-Defined EmSFP; 2110 or 2022-6 Encapsulator/De-Encapsulator (See Ordering Info for full descriptions and details.)

SPECIFICATIONS

Note: All specifications are preliminary and subject to change. Inputs/outputs are a function of rear I/O module used.

Power
< 10 Watts

12G / 6G / 3G / 1.5G / 270M Serial Digital Interface Input/Output
(1) 75Ω HDBNC Connector Input (max). (16) 75Ω HDBNC Connectors Output (max).
SDI Formats Supported: SMPTE ST2082-1,10, 424M, 292M, SMPTE 259M-C. All inputs/outputs 12G compliant and SDQS/2SI quad 3G compliant.

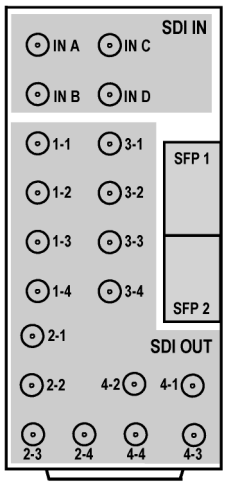
Coaxial Receive Performance (Cable Length; Belden 4694)
50m/70m/150m/180m (12G/6G/3G/HD)

Fiber Transmit Output (typ. with optional fiber Tx SFP)
LC connector Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)

Fiber Receive Input (typ. with optional fiber Rx SFP)
LC connector
Receive Sensitivity: -23 dBm; 1260 to 1620 nm

Note: On 9915DA-1x16-12G model, SFP cage 1 supports only Rx (OE) type SFPs. SFP cage 2 supports only Tx (EO) type SFPs. (See Ordering Information.)

Notes:
1. (Applicable only where -SFP option are offered.) **SFP 1** and **SFP 2** details show SFP receptacle cage locations. SFP receptacle cage is included factory-installed on rear module (Plug-in SFP modules are available with respective options).
2. All four **SDI IN A** thru **SDI IN D** are functional only when mated to quad input card models. Dual and single card models omit **SDI IN D** as NC, and progressively omit **SDI IN C** and **SDI IN B** as NC.



RM20-9915-A-HDBNC

ORDERING INFORMATION

9915DA-1x16-12G 12G/6G/3G/HD/SD-SDI 1x16 Reclocking Distribution Amplifier

Rear Modules:

RM20-9915-A-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 12G/6G/3G/HD/SD-SDI Input (IN B thru IN D NC), (16) 12G/6G/3G/HD/SD-SDI Outputs (all coaxial connectors HD-BNC)

Note: SFP modules, when inserted into rear module SFP receptacles, can dimensionally extend past the right "boundary" of the rear module. In rare cases, this can present interference issues if a rear module to the right of SFP rear module also has adjacent large-footprint connectors that can extend across the rear module boundary. Plan frame buildout accordingly in these cases.

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9915DA-1x16-12G » 12G/6G/3G/HD/SD-SDI 1X16 RECLOCKING DISTRIBUTION AMPLIFIER

ORDERING INFORMATION – cont.

Options (Hardware-based):

-DA-SFP Adds daughter card to support two externally-accessible SFP cages to the 9915DA-1x16-XPT-12G card

Note: When option **-DA-SFP** is included, a second input (fiber OE) is in turn added to the card. As such, this exposes a full 2x16 crosspoint that allows both the coax and fiber inputs to be independently and simultaneously routed to various card outputs.

-SFP-OE-12G 12G/6G/3G/HD/SD-SDI UHD Single Receiver SFP Module; 1260 nm - 1620 nm; type LC connector

-SFP-EO-12G 12G/6G/3G/HD/SD-SDI UHD Single Transmitter SFP Module; 1310 nm; type LC connector

-SFP-2EO-12G 12G/6G/3G/HD/SD-SDI UHD Dual Transmitter SFP Module; 1310 nm; type LC connector

-SFP-OE 3G/HD/SD-SDI Single Receiver SFP Module; 1260 nm - 1620 nm; type LC connector

-SFP-EO 3G/HD/SD-SDI Single Transmitter SFP Module; 1310 nm; type LC connector

-SFP-2EO 3G/HD/SD-SDI Dual Transmitter SFP Module; 1310 nm; type LC connectors

-SFP-H-TO-S HDMI-to-HD/SD-SDI Receiver SFP Module

-SFP-S-TO-H SFP HD/SD-SDI-to-HDMI Transmitter SFP Module

-SFP-EO-CWDM-WX Single CWDM Transmitter SFP Module; type LC connector

-SFP-2EO-CWDM-WX Dual CWDM Transmitter SFP Module; type LC connectors

Use fiber wavelength codes below for CWDM SFPs when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1370, 1390, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610. In "WX" places in part number, substitute code for wavelengths in each place as listed below:

-27: 1270nm -29: 1290nm -31: 1310nm
-33: 1330nm -35: 1350nm -37: 1370nm
-39: 1390nm -41: 1410nm -43: 1430nm
-45: 1450nm -47: 1470nm -49: 1490nm
-51: 1510nm -53: 1530nm -55: 1550nm
-57: 1570nm -59: 1590nm -61: 1610nm

(Example: -SFP-EO-CWDM-27 has 1270 nm Tx wavelength)

-SFP-IP-SWD Software-Defined EmSFP; 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for cards using SFP type -SPF-IP-SWD (Up to 3 software licenses can be added to the -SFP-IP-SWD, but only 1 license can be active at a time):

+ADD-SFP-2SDI-TO-IP-2022-6 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2022-6
+ADD-SFP-2SDI-TO-IP-2110 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2110
+ADD-SFP-IP-TO-SDI-2022-6 SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-SDI
+ADD-SFP-IP-TO-SDI-2110 SFP Software License; Single-Channel De-Encapsulator IP-2110-to-SDI
+ADD-SFP-SDI-TO-IP-2022-6 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2022-6
+ADD-SFP-SDI-TO-IP-2110 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2110

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9915DA-2x16-XPT-12G » 12G/6G/3G/HD/SD DUAL-CHANNEL MULTI-RATE RECLOCKING DA

with x4 Output Crosspoint

The Cobalt® **9915DA-2x16-XPT-12G** 12G/6G/3G/HD/SD Dual-Channel Multi-Rate Reclocking DA with x4 Output Crosspoint supports two input channels which can be crosspoint-routed to up to 16 DA outputs.

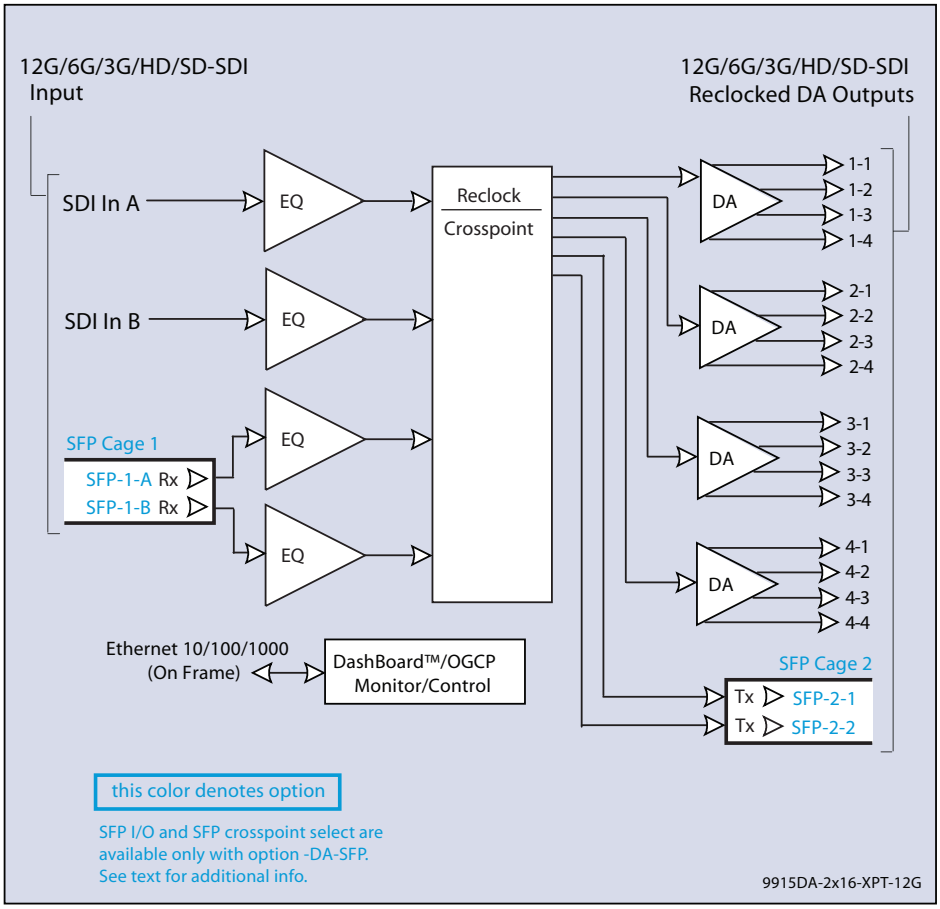
As demand for 4K continues to rise, distribution of 12G-SDI signals within a rackspace becomes increasingly important. The 9915DA allows for copper runs of up to 45 meters, reaching most equipment within a rack room or truck. For longer runs, the optional optical inputs and outputs allow the 9915DA to connect distribution from zones of much greater distances.

The extremely flexible crosspoint (which is user-configurable via DashBoardTM GUI remote control) allows dual 1x8, single 1x16 and other routing possibilities. Any of the two input channels can be distributed or duplicated across four groups of 1x4 DAs. The dual-input capacity provides a one-card solution for distribution of 8K quad-link content over 12G-SDI interfaces. A failover function allows going to secondary backup inputs should the primary input lose lock.

Up to 10 of the 9915DA-2x16-XPT-12G cards can be installed in a frame to provide 20 channels of input, with distribution to up to 160 outputs. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Flexible output crosspoint allows card to function as dual-channel 1x8, single-channel 1x16, or numerous other routings with reclocking DA
- Full support of 12G/6G/3G/HD/SD-SDI and ASI/DVB
- Input data rate auto-detection for all industry-standard data rates
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Added fiber inputs/outputs via optional SFPs
- One-card solution for distribution of 4K/8K content over 12G-SDI interfaces
- Card display and DashBoard status input lock indicators
- Failover provides backup to selected secondary inputs if primary input loses lock, Available for both coax and (optional) fiber inputs.
- Hot-swappable
- Five year warranty



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9915DA-2x16-XPT-12G » 12G/6G/3G/HD/SD DUAL-CHANNEL MULTI-RATE RECLOCKING DA

with x4 Output Crosspoint

OPTIONS

-DA-SFP Adds daughter card to support two externally-accessible SFP cages to the 9915DA-2x16-12G card

-SFP-0E-12G SFP Optical UHD Single Receiver

-SFP-20E-12G SFP Optical UHD Dual Receiver

-SFP-E0-12G SFP Optical UHD Single Transmitter

-SFP-2E0-12G SFP Optical UHD Dual Transmitter

-SFP-0E SFP Optical Single Receiver

-SFP-20E SFP Optical Dual Receiver

-SFP-E0 SFP Optical Single Transmitter

-SFP-2E0 SFP Optical Dual Transmitter

-SFP-E00E SFP Optical Transceiver

-SFP-H-T0-S SFP HDMI-to-HD/SD-SDI Receiver

-SFP-S-T0-H SFP HD/SD-SDI-to-HDMI Transmitter

-SFP-E0-CWDM SFP Optical Single CWDM Transmitter (see Ordering Info for wavelengths and corresponding ordering codes)

-SFP-2E0-CWDM SFP Optical Dual CWDM Transmitter (see Ordering Info for wavelengths and corresponding ordering codes)

-SFP-IP-SWD Software-Defined EmSFP; 2110 or 2022-6 Encapsulator/De-Encapsulator (See Ordering Info for full descriptions and details.)

SPECIFICATIONS

Note: All specifications are preliminary and subject to change. Inputs/outputs are a function of rear I/O module used. Fiber specifications are typical, and only applicable for card fitted with optional Tx or Rx (as applicable) fiber SFP module.

Power
< 10 Watts

12G / 6G / 3G / 1.5G / 270M Serial Digital Interface Input/Output
(2) 75Ω HDBNC Connectors Input (max). (16) 75Ω HDBNC Connectors Output (max).
SDI Formats Supported: SMPTE ST2082-1,10, 424M, 292M, SMPTE 259M-C. All inputs/outputs 12G compliant and SDQS/2SI quad 3G compliant.

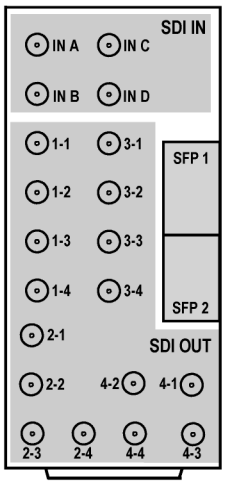
Coaxial Receive Performance (Cable Length; Belden 4694)
50m/70m/150m/180m (12G/6G/3G/HD)

Fiber Transmit Output (typ. with optional fiber Tx SFP)
LC connector
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)

Fiber Receive Input (typ. with optional fiber Rx SFP)
LC connector
Receive Sensitivity: -23 dBm; 1260 to 1620 nm

Note: On 9915DA-2x16-12G model, SFP cage 1 supports only Rx (OE) type SFPs. SFP cage 2 supports only Tx (EO) type SFPs. (See Ordering Information.)

Notes:
1. (Applicable only where -SFP option are offered.) **SFP 1** and **SFP 2** details show SFP receptacle cage locations. SFP receptacle cage is included factory-installed on rear module (Plug-in SFP modules are available with respective options).
2. All four **SDI IN A** thru **SDI IN D** are functional only when mated to quad input card models. Dual and single card models omit **SDI IN D** as NC, and progressively omit **SDI IN C** and **SDI IN B** as NC.



RM20-9915-A-HDBNC

ORDERING INFORMATION

9915DA-2x16-XPT-12G 12G/6G/3G/HD/SD-SDI Dual-Channel Multi-Rate Reclocking DA with x4 Output Crosspoint

Rear Modules:

RM20-9915-A-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 12G/6G/3G/HD/SD-SDI Inputs, (16) 12G/6G/3G/HD/SD-SDI Outputs (All coaxial connectors HD-BNC)
Note: SFP modules, when inserted into rear module SFP receptacles, can dimensionally extend past the right "boundary" of the rear module. In rare cases, this can present interference issues if a rear module to the right of SFP rear module also has adjacent large-footprint connectors that can extend across the rear module boundary. Plan frame buildout accordingly in these cases.

Options (Hardware-based):

-DA-SFP Adds daughter card to support two externally-accessible SFP cages to the 9915DA-2x16-XPT-12G card

-SFP-0E-12G 12G/6G/3G/HD/SD-SDI UHD Single Receiver SFP Module; 1260 nm - 1620 nm; type LC connector

-SFP-20E-12G 12G/6G/3G/HD/SD-SDI UHD Dual Receiver SFP Module; 1260 nm - 1620 nm; type LC connector

-SFP-E0-12G 12G/6G/3G/HD/SD-SDI UHD Single Transmitter SFP Module; 1310 nm; type LC connector

-SFP-2E0-12G 12G/6G/3G/HD/SD-SDI UHD Dual Transmitter SFP Module; 1310 nm; type LC connector

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9915DA-2x16-XPT-12G » 12G/6G/3G/HD/SD DUAL-CHANNEL MULTI-RATE RECLOCKING DA

with x4 Output Crosspoint

ORDERING INFORMATION – cont.

-SFP-0E 3G/HD/SD-SDI Single Receiver SFP Module; 1260 nm - 1620 nm; type LC connector

-SFP-20E 3G/HD/SD-SDI Dual Receiver SFP Module; 1260 nm - 1620 nm; type LC connectors

-SFP-E0 3G/HD/SD-SDI Single Transmitter SFP Module; 1310 nm; type LC connector

-SFP-2E0 3G/HD/SD-SDI Dual Transmitter SFP Module; 1310 nm; type LC connectors

-SFP-E00E 3G/HD/SD-SDI Transceiver SFP Module; 1260 nm - 1620 nm; type LC connectors

-SFP-H-T0-S HDMI-to-HD/SD-SDI Receiver SFP Module

-SFP-S-T0-H SFP HD/SD-SDI-to-HDMI Transmitter SFP Module

-SFP-E0-CWDM-WX Single CWDM Transmitter SFP Module; type LC connector

-SFP-2E0-CWDM-WX Dual CWDM Transmitter SFP Module; type LC connectors

Use fiber wavelength codes below for CWDM SFPs when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1370, 1390, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610. In "WX" places in part number, substitute code for wavelengths in each place as listed below:

-27: 1270nm -29: 1290nm -31: 1310nm
-33: 1330nm -35: 1350nm -37: 1370nm
-39: 1390nm -41: 1410nm -43: 1430nm
-45: 1450nm -47: 1470nm -49: 1490nm
-51: 1510nm -53: 1530nm -55: 1550nm
-57: 1570nm -59: 1590nm -61: 1610nm

(Example: -SFP-EO-CWDM-27 has 1270 nm Tx wavelength)

-SFP-IP-SWD Software-Defined EmSFP; 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for cards using SFP type -SPF-IP-SWD (Up to 3 software licenses can be added to the -SFP-IP-SWD, but only 1 license can be active at a time):

+ADD-SFP-2SDI-T0-IP-2022-6 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2022-6
+ADD-SFP-2SDI-T0-IP-2110 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2110
+ADD-SFP-IP-T0-2SDI-2022-6 SFP Software License; Dual-Channel De-Encapsulator IP-2022-6-to-2SDI
+ADD-SFP-IP-T0-2SDI-2110 SFP Software License; Dual-Channel De-Encapsulator IP-2110-to-2SDI
+ADD-SFP-IP-T0-SDI-2022-6 SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-SDI
+ADD-SFP-IP-T0-SDI-2110 SFP Software License; Single-Channel De-Encapsulator IP-2110-to-SDI
+ADD-SFP-SDI-T0-IP-2022-6 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2022-6
+ADD-SFP-SDI-T0-IP-2110 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2110

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9915DA-4x16-XPT-12G » 12G/6G/3G/HD/SD QUAD-CHANNEL MULTI-RATE RECLOCKING DA

with x4 Output Crosspoint

The Cobalt® **9915DA-4x16-XPT-12G** 12G/6G/3G/HD/SD Quad-Channel Multi-Rate Reclocking DA with x4 Output Crosspoint supports four input channels which can be crosspoint-routed to up to 16 DA outputs.

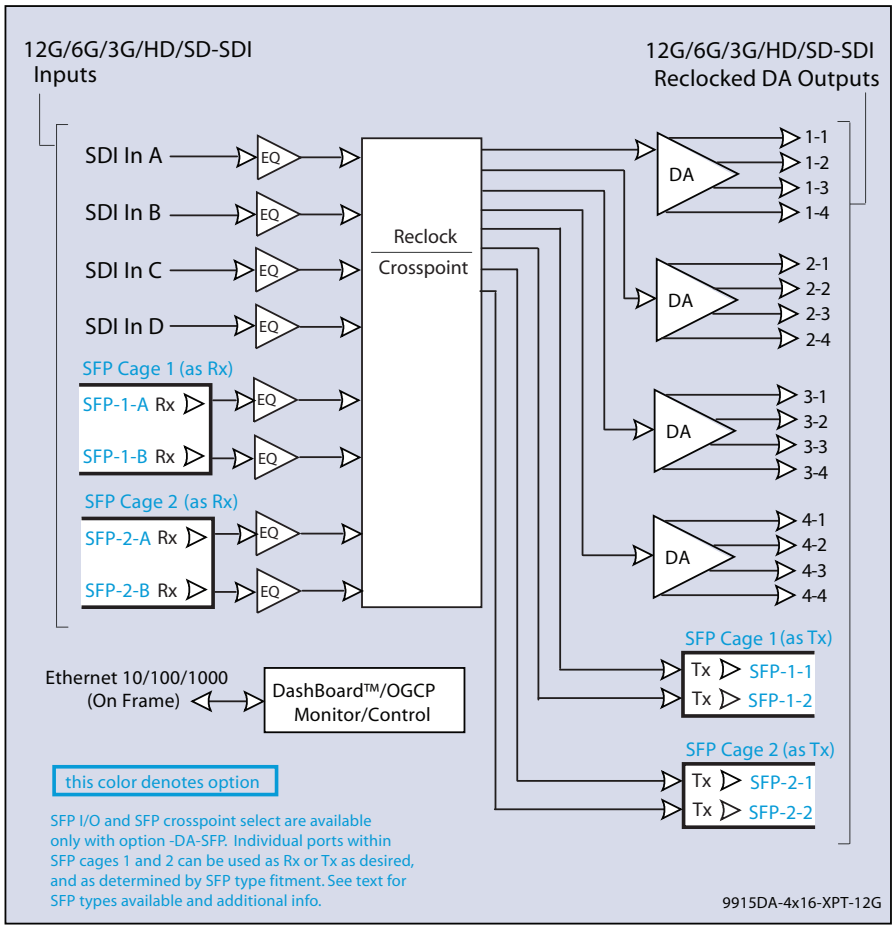
As demand for 4K continues to rise, distribution of 12G-SDI signals within a rackspace becomes increasingly important. The 9915DA allows for copper runs of up to 45 meters, reaching most equipment within a rack room or truck. For longer runs, the optional optical inputs and outputs allow the 9915DA to connect distribution from zones of much greater distances.

The extremely flexible crosspoint (which is user-configurable via DashBoardTM GUI remote control) allows quad 1x4, dual 1x8, single 1x16 and other routing possibilities. Any of the four input channels can be distributed or duplicated across four groups of 1x4 DAs. The quad-input capacity provides a one-card solution for distribution of 8K quad-link content over 12G-SDI interfaces. A failover function allows going to secondary backup inputs should the primary input lose lock.

Up to 10 of the 9915DA-4x16-XPT-12G cards can be installed in a frame to provide 40 channels of input, with distribution to up to 160 outputs. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Flexible output crosspoint allows card to function as quad-channel 1x4, dual-channel 1x8, single-channel 1x16, or other numerous routings with reclocking DA
- Input data rate auto-detection for all industry-standard data rates
- Full support of 12G/6G/3G/HD/SD-SDI and ASI/DVB
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Added fiber inputs/outputs via optional SFPs
- One-card solution for distribution of 4K/8K content over 12G-SDI interfaces
- Card display and DashBoard status input lock indicators
- Failover provides backup to selected secondary inputs if primary input loses lock, Available for both coax and (optional) fiber inputs.
- Hot-swappable
- Five year warranty



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9915DA-4x16-XPT-12G » 12G/6G/3G/HD/SD QUAD-CHANNEL MULTI-RATE RECLOCKING DA

with x4 Output Crosspoint

OPTIONS

-DA-SFP Adds daughter card to support two externally-accessible SFP cages to the 9915DA-2x16-12G card

-SFP-0E-12G SFP Optical UHD Single Receiver

-SFP-20E-12G SFP Optical UHD Dual Receiver

-SFP-E0-12G SFP Optical UHD Single Transmitter

-SFP-2E0-12G SFP Optical UHD Dual Transmitter

-SFP-E00E-12G SFP Optical UHD Transceiver

-SFP-0E SFP Optical Single Receiver

-SFP-20E SFP Optical Dual Receiver

-SFP-E0 SFP Optical Single Transmitter

-SFP-2E0 SFP Optical Dual Transmitter

-SFP-E00E SFP Optical Transceiver

-SFP-H-T0-S SFP HDMI-to-HD/SD-SDI Receiver

-SFP-S-T0-H SFP HD/SD-SDI-to-HDMI Transmitter

-SFP-E0-CWDM SFP Optical Single CWDM Transmitter (see Ordering Info for wavelengths and corresponding ordering codes)

-SFP-2E0-CWDM SFP Optical Dual CWDM Transmitter (see Ordering Info for wavelengths and corresponding ordering codes)

-SFP-IP-SWD Software-Defined EmSFP; 2110 or 2022-6 Encapsulator/De-Encapsulator (See Ordering Info for full descriptions and details.)

SPECIFICATIONS

Note: All specifications are preliminary and subject to change. Inputs/outputs are a function of rear I/O module used. Fiber specifications are typical, and only applicable for card fitted with optional Tx or Rx (as applicable) fiber SFP module.

Power
< 10 Watts

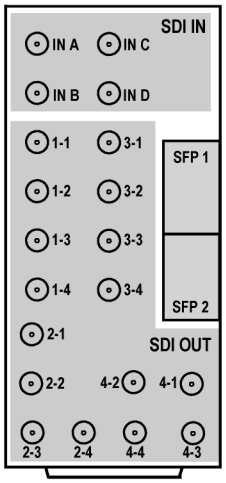
12G / 6G / 3G / 1.5G / 270M Serial Digital Interface Input/Output
(4) 75Ω HDBNC Connectors Input (max). (16) 75Ω HDBNC Connectors Output (max).
SDI Formats Supported: SMPTE ST2082-1,10, 424M, 292M, SMPTE 259M-C. All inputs/outputs 12G compliant and SDQS/2SI quad 3G compliant.

Coaxial Receive Performance (Cable Length; Belden 4694)
50m/70m/150m/180m (12G/6G/3G/HD)

Fiber Transmit Output (typ. with optional fiber Tx SFP)
LC connector
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)

Fiber Receive Input (typ. with optional fiber Rx SFP)
LC connector
Receive Sensitivity: -23 dBm; 1260 to 1620 nm

Notes:
1. (Applicable only where -SFP option are offered.) **SFP 1** and **SFP 2** details show SFP receptacle cage locations. SFP receptacle cage is included factory-installed on rear module (Plug-in SFP modules are available with respective options).
2. All four **SDI IN A** thru **SDI IN D** are functional only when mated to quad input card models. Dual and single card models omit **SDI IN D** as NC, and progressively omit **SDI IN C** and **SDI IN B** as NC.



RM20-9915-A-HDBNC

ORDERING INFORMATION

9915DA-4x16-XPT-12G 12G/6G/3G/HD/SD-SDI Quad-Channel Multi-Rate Reclocking DA with x4 Output Crosspoint

Rear Modules:

RM20-9915-A-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 12G/6G/3G/HD/SD-SDI Inputs, (16) 12G/6G/3G/HD/SD-SDI Outputs (All coaxial connectors HD-BNC)

Note: SFP modules, when inserted into rear module SFP receptacles, can dimensionally extend past the right "boundary" of the rear module. In rare cases, this can present interference issues if a rear module to the right of SFP rear module also has adjacent large-footprint connectors that can extend across the rear module boundary. Plan frame buildout accordingly in these cases.

Options (Hardware-based):

-DA-SFP Adds daughter card to support two externally-accessible SFP cages to the 9915DA-4x16-XPT-12G card

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9915DA-4x16-XPT-12G » 12G/6G/3G/HD/SD QUAD-CHANNEL MULTI-RATE RECLOCKING DA

with x4 Output Crosspoint

ORDERING INFORMATION – cont.

-SFP-0E-12G 12G/6G/3G/HD/SD-SDI UHD Single Receiver SFP Module; 1260 nm - 1620 nm; type LC connector

-SFP-20E-12G 12G/6G/3G/HD/SD-SDI UHD Dual Receiver SFP Module; 1260 nm - 1620 nm; type LC connector

-SFP-E0-12G 12G/6G/3G/HD/SD-SDI UHD Single Transmitter SFP Module; 1310 nm; type LC connector

-SFP-2E0-12G 12G/6G/3G/HD/SD-SDI UHD Dual Transmitter SFP Module; 1310 nm; type LC connector

-SFP-E00E-12G 12G/6G/3G/HD/SD-SDI UHD Transceiver SFP Module; 1310 nm Tx / 1260 nm - 1620 nm Rx; type LC connector

-SFP-0E 3G/HD/SD-SDI Single Receiver SFP Module; 1260 nm - 1620 nm; type LC connector

-SFP-20E 3G/HD/SD-SDI Dual Receiver SFP Module; 1260 nm - 1620 nm; type LC connectors

-SFP-E0 3G/HD/SD-SDI Single Transmitter SFP Module; 1310 nm; type LC connector

-SFP-2E0 3G/HD/SD-SDI Dual Transmitter SFP Module; 1310 nm; type LC connectors

-SFP-E00E 3G/HD/SD-SDI Transceiver SFP Module; 1260 nm - 1620 nm; type LC connectors

-SFP-H-TO-S HDMI-to-HD/SD-SDI Receiver SFP Module

-SFP-S-TO-H SFP HD/SD-SDI-to-HDMI Transmitter SFP Module

-SFP-E0-CWDM-WX Single CWDM Transmitter SFP Module; type LC connector

-SFP-2E0-CWDM-WX Dual CWDM Transmitter SFP Module; type LC connectors

Use fiber wavelength codes below for CWDM SFPs when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1370, 1390, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610. In "WX" places in part number, substitute code for wavelengths in each place as listed below:

-27: 1270nm -29: 1290nm -31: 1310nm
-33: 1330nm -35: 1350nm -37: 1370nm
-39: 1390nm -41: 1410nm -43: 1430nm
-45: 1450nm -47: 1470nm -49: 1490nm
-51: 1510nm -53: 1530nm -55: 1550nm
-57: 1570nm -59: 1590nm -61: 1610nm

(Example: -SFP-E0-CWDM-27 has 1270 nm Tx wavelength)

-SFP-IP-SWD Software-Defined EmSFP; 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for cards using SFP type -SPF-IP-SWD (Up to 3 software licenses can be added to the -SFP-IP-SWD, but only 1 license can be active at a time):

+ADD-SFP-2SDI-TO-IP-2022-6 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2022-6
+ADD-SFP-2SDI-TO-IP-2110 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2110
+ADD-SFP-IP-TO-2SDI-2022-6 SFP Software License; Dual-Channel De-Encapsulator IP-2022-6-to-2SDI
+ADD-SFP-IP-TO-2SDI-2110 SFP Software License; Dual-Channel De-Encapsulator IP-2110-to-2SDI
+ADD-SFP-IP-TO-SDI-2022-6 SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-SDI
+ADD-SFP-IP-TO-SDI-2110 SFP Software License; Single-Channel De-Encapsulator IP-2110-to-SDI
+ADD-SFP-SDI-TO-IP-2022-6 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2022-6
+ADD-SFP-SDI-TO-IP-2110 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2110

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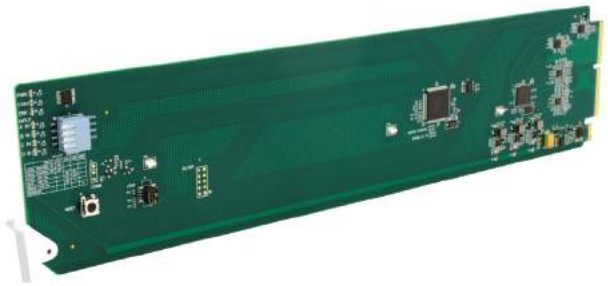
9910DA-1Q-3G » 3G/HD/SD/ASI SINGLE-CHANNEL MULTI-RATE DA



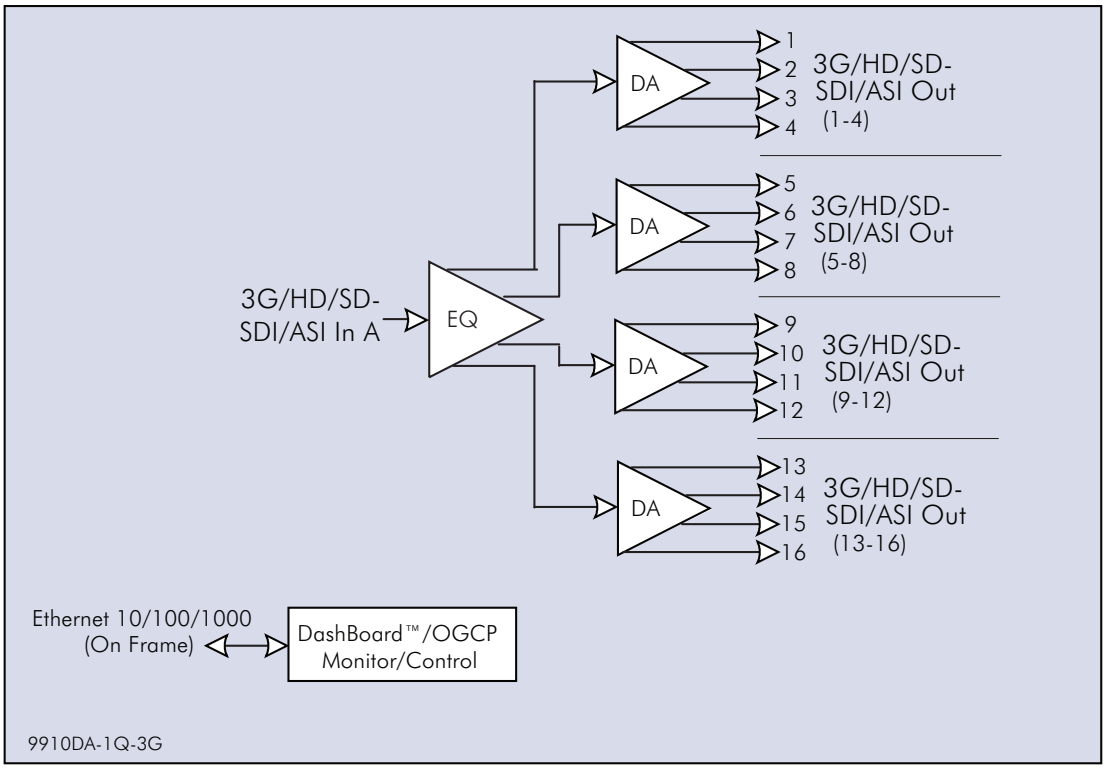
The Cobalt® **9910DA-1Q-3G 3G/HD/SD/ASI Single-Channel Multi-Rate DA (Non-Reclocking)** supports one input channel which can be distributed to up to 16 DA outputs. The 9910DA-1Q-3G is multi-rate and supports SDI and ASI/DVB on all inputs and outputs with non-inverting outputs.

Excellent receive performance allows receive EQ for up to 120m 3G and 160m HD cable length (1694A). Card edge and DashBoard™ remote status monitoring indicates input lock. Up to 10 of the 9910DA-1Q-3G cards can be installed in a frame to provide distribution of up to 160 outputs.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Full support of 3G/HD/SD-SDI and ASI/DVB
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Excellent receive performance – EQ allows 1694A cable lengths up to 120m (3G) / 160m (HD) / 400m (SD)
- Input data rate auto-detection for all industry-standard data rates
- Card edge and DashBoard™ status and individual input lock indicators
- All outputs are non-inverting – ASI can be outputted on any output
- Hot-swappable
- Five year warranty



openGear

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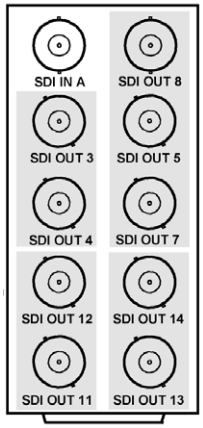
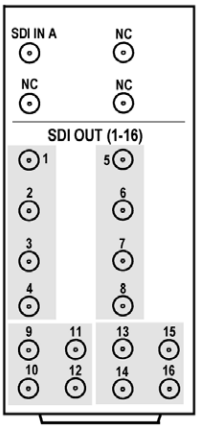
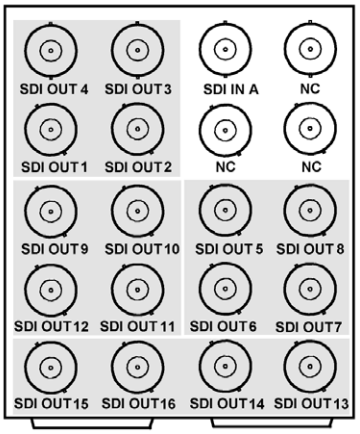
9910DA-1Q-3G » 3G/HD/SD/ASI SINGLE-CHANNEL MULTI-RATE DA



RM20-9910-1Q-D



RM20-9910-1Q-B-DIN
RM20-9910-1Q-B-HDBNC



RM20-9910-1Q-E

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 3 Watts

3G/HD/SD-SDI / ASI Inputs
(1) 75Ω coaxial inputs (A)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Receive Performance (Cable Length; Belden 1694A)
3 Gbps: 120m
1.485 Gbps: 160m
143-360 Mbps: 400m

3G/HD/SD-SDI / ASI Outputs
75Ω coaxial outputs (16 total).
Signal Level: 800 mV nominal
Return Loss: >15 dB at 5 MHz - 1.485 GHz
Jitter (wideband): HD < 0.2 UI

ORDERING INFORMATION

9910DA-1Q-3G 3G/HD/SD/ASI Single-Channel Multi-Rate DA (Non-Reclocking)

RM20-9910-1Q-A 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI/ASI Input BNC, (8) 3G/HD/SD-SDI/ASI Output BNCs

RM20-9910-1Q-B-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI/ASI Inputs, (16) 3G/HD/SD-SDI/ASI Outputs (DIN 1.0/2.3) (High Density)

RM20-9910-1Q-B-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI/ASI Inputs, (16) 3G/HD/SD-SDI/ASI Outputs (HDBNC) (High Density)

RM20-9910-1Q-E 20-Slot Frame Rear I/O Module (Double Width) (1) 3G/HD/SD-SDI/ASI Input BNC, (16) 3G/HD/SD-SDI/ASI Output BNCs

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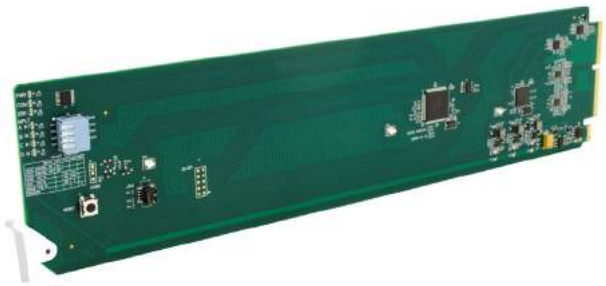
9910DA-1Q-3G-RCK » 3G/HD/SD/ASI SINGLE-CHANNEL MULTI-RATE RECLOCKING DA



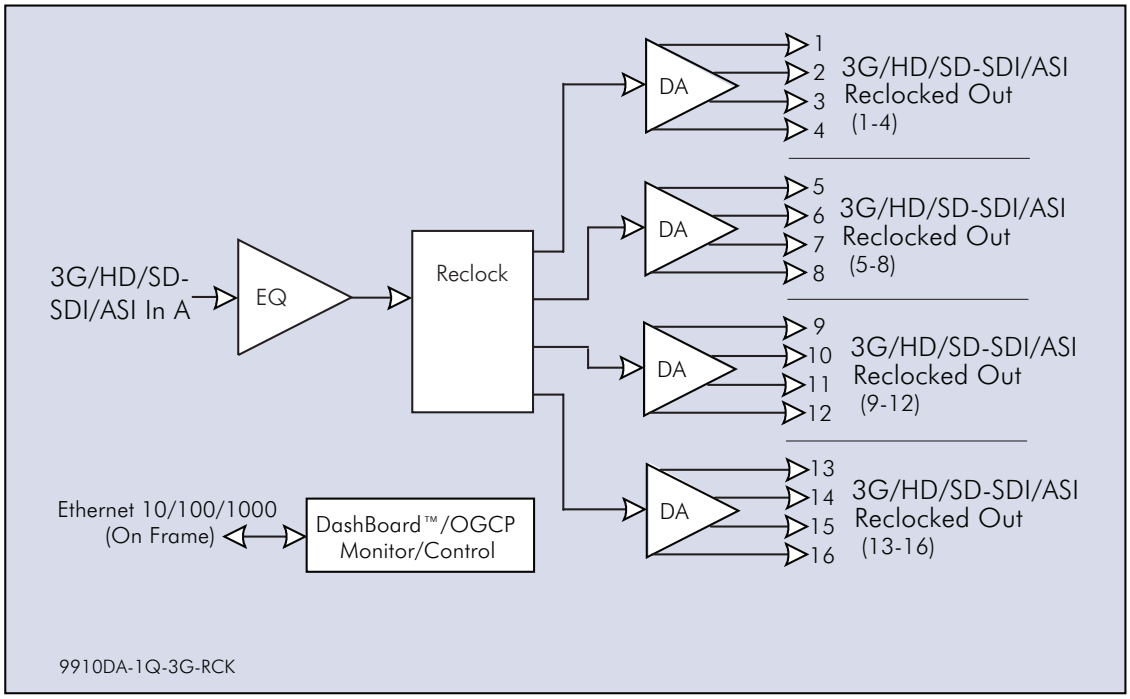
The Cobalt® **9910DA-1Q-3G-RCK 3G/HD/SD/ASI Single-Channel Multi-Rate Reclocking DA** supports one input channel which can be distributed to up to 16 DA outputs. The 9910DA-1Q-3G-RCK is multi-rate with user enable/disable reclocking, and supports SDI and ASI/DVB on all inputs and outputs with non-inverting outputs.

Excellent receive performance allows receive EQ for up to 120m 3G and 160m HD cable length (1694A). Card edge and DashBoard™ remote status monitoring indicates input lock. Up to 10 of the 9910DA-1Q-3G-RCK cards can be installed in a frame to provide distribution of up to 160 outputs.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Full support of 3G/HD/SD-SDI and ASI/DVB
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Excellent receive performance – EQ allows 1694A cable lengths up to 120m (3G) / 160m (HD) / 400m (SD)
- Reclocking can be enabled or disabled for input
- Input data rate auto-detection for all industry-standard data rates
- All outputs are non-inverting – ASI can be outputted on any output
- Card edge and DashBoard™ status and individual input lock indicators
- Hot-swappable
- Five year warranty



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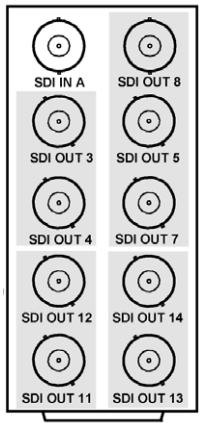
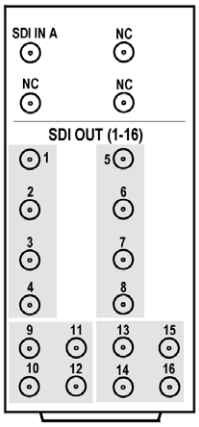
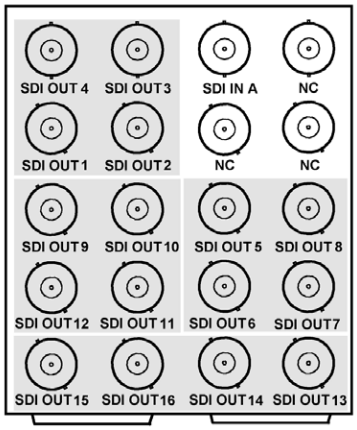
9910DA-1Q-3G-RCK » 3G/HD/SD/ASI SINGLE-CHANNEL MULTI-RATE RECLOCKING DA



RM20-9910-1Q-D



RM20-9910-1Q-B-DIN
RM20-9910-1Q-B-HDBNC



RM20-9910-1Q-E

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 3 Watts

3G/HD/SD-SDI / ASI Inputs
(1) 75Ω coaxial inputs (A)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Receive Performance (Cable Length; Belden 1694A)
3 Gbps: 120m
1.485 Gbps: 160m
143-360 Mbps: 400m

3G/HD/SD-SDI / ASI Outputs
75Ω coaxial outputs (16 total).
Signal Level: 800 mV nominal
Return Loss: >15 dB at 5 MHz - 1.485 GHz
Jitter (wideband): HD < 0.2 UI

ORDERING INFORMATION

9910DA-1Q-3G-RCK 3G/HD/SD/ASI Single-Channel Multi-Rate Reclocking DA

RM20-9910-1Q-A 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI/ASI Input BNC, (8) 3G/HD/SD-SDI/ASI Output BNCs

RM20-9910-1Q-B-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI/ASI Inputs, (16) 3G/HD/SD-SDI/ASI Outputs (DIN 1.0/2.3) (High Density)

RM20-9910-1Q-B-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI/ASI Inputs, (16) 3G/HD/SD-SDI/ASI Outputs (HDBNC) (High Density)

RM20-9910-1Q-E 20-Slot Frame Rear I/O Module (Double Width) (1) 3G/HD/SD-SDI/ASI Input BNC, (16) 3G/HD/SD-SDI/ASI Output BNCs

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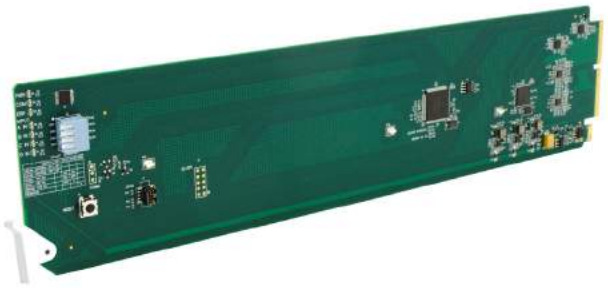
9910DA-2Q-3G » 3G/HD/SD/ASI DUAL-CHANNEL MULTI-RATE DA

with x4 Output Crosspoint (Non-Reclocking)



The Cobalt® **9910DA-2Q-3G 3G/HD/SD/ASI Dual-Channel Multi-Rate DA with x4 Output Crosspoint (Non-Reclocking)** supports two input channels which can be crosspoint-routed to any of 16 DA outputs. The 9910DA-2Q-3G is multi-rate and supports SDI and ASI/DVB on all inputs and outputs with non-inverting outputs.

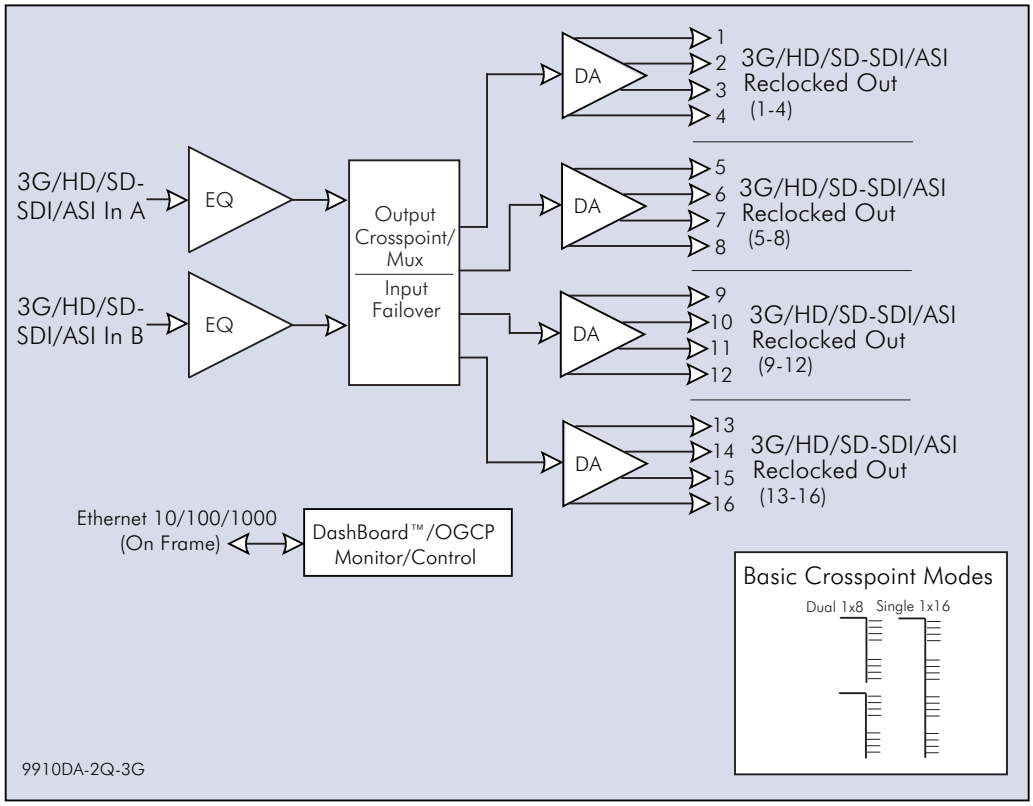
The extremely flexible crosspoint (which is user-configurable via DashBoard™ GUI remote control) allows dual 1x8 or single 1x16 routing possibilities. Any of the two input channels can be distributed or duplicated across four groups of 1x4 DAs, and either of the two inputs can be set to use an alternate failover input upon loss of signal.

Excellent receive performance allows receive EQ for up to 120m 3G and 160m HD cable length (1694A). Card edge and DashBoard™ remote status monitoring indicates input lock for each input channel. Up to 10 of the 9910DA-2Q-3G cards can be installed in a frame to provide 20 channels of input, with distribution to up to 160 outputs.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Full support of 3G/HD/SD-SDI and ASI/DVB
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Flexible output crosspoint allows card to function as dual-channel 1x8 or single-channel 1x16 DA
- Excellent receive performance – EQ allows 1694A cable lengths up to 120m (3G) / 160m (HD) / 400m (SD)
- Failsafe mode automatically switches to selected secondary input on loss of primary input
- Input data rate auto-detection for all industry-standard data rates
- All outputs are non-inverting – ASI can be outputted on any output
- Card edge and DashBoard™ status and individual input lock indicators
- Hot-swappable
- Five year warranty



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9910DA-2Q-3G » 3G/HD/SD/ASI DUAL-CHANNEL MULTI-RATE DA

with x4 Output Crosspoint (Non-Reclocking)

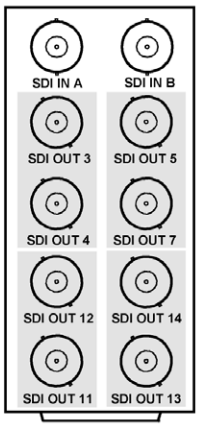
Rear I/O Module output designations here correlate to output numbers for four DA quadrants as shown in the card block diagram. As such, SDI outputs within a quadrant group can only be sourced from a particular input at one time (for example, if the card is set to feed SDI IN A to quadrant SDI Out (1-4), the rear module outputs 1 thru 4 will all output SDI IN A). Dissimilar inputs cannot be routed within a quadrant group (for example, SDI OUT 1 sourced from SDI IN A and SDI OUT 2 sourced from SDI IN B).

Note: When this rear module is used DashBoard or local control should only be set to use SDI IN A and/or SDI IN B. Either of these inputs can be routed to any of the output quadrant groupings shown (grouping shown in shaded areas).

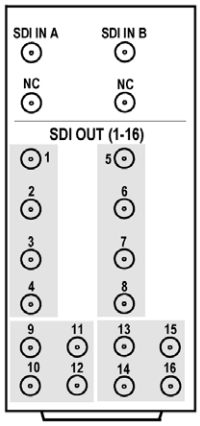
When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

The outputs shown here are all that is available using this rear module, with these outputs being a reduced subset of the maximum 16 available outputs. (For example, this rear module offers a reduced subset of DA quadrant SDI Out (1-4) (shown in the block diagram) consisting of SDI OUT 3 and SDI OUT 4 only.)

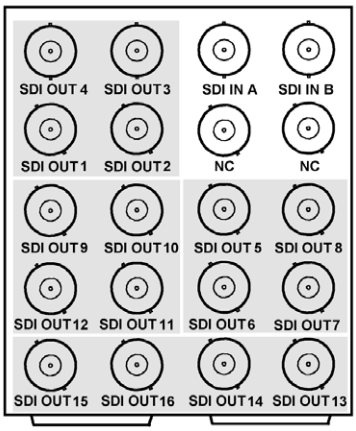
See Product Manual for more information.



RM20-9910-2Q-A



RM20-9910-2Q-B-DIN
RM20-9910-2Q-B-HDBNC



RM20-9910-2Q-E

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 3 Watts

3G/HD/SD-SDI / ASI Inputs
(2) 75Ω coaxial inputs (A and B)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Receive Performance (Cable Length; Belden 1694A)
3 Gbps: 120m
1.485 Gbps: 160m
143-360 Mbps: 400m

3G/HD/SD-SDI / ASI Outputs
75Ω coaxial outputs (16 total). Each group of 4 outputs can be crosspoint connected to inputs A or B.
Signal Level: 800 mV nominal
Return Loss: >15 dB at 5 MHz - 1.485 GHz
Jitter (wideband): HD < 0.2 UI

ORDERING INFORMATION

9910DA-2Q-3G 3G/HD/SD/ASI Dual-Channel Multi-Rate DA with x4 Output Crosspoint (Non-Reclocking)

RM20-9910-2Q-A 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI/ASI Input BNC, (8) 3G/HD/SD-SDI/ASI Output BNCs

RM20-9910-2Q-B-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI/ASI Inputs, (16) 3G/HD/SD-SDI/ASI Outputs (DIN 1.0/2.3) (High Density)

RM20-9910-2Q-B-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI/ASI Inputs, (16) 3G/HD/SD-SDI/ASI Outputs (HDBNC) (High Density)

RM20-9910-2Q-E 20-Slot Frame Rear I/O Module (Double Width) (2) 3G/HD/SD-SDI/ASI Input BNC, (16) 3G/HD/SD-SDI/ASI Output BNCs

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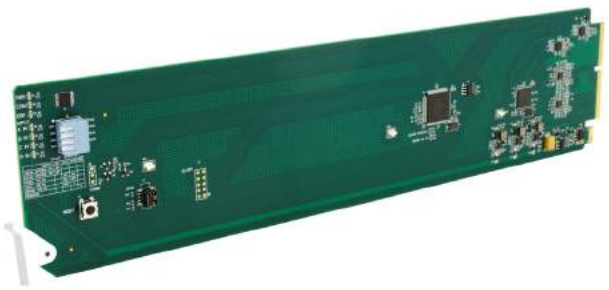
9910DA-2Q-3G-RCK » 3G/HD/SD/ASI DUAL-CHANNEL MULTI-RATE RECLOCKING DA

with x4 Output Crosspoint



The Cobalt® **9910DA-2Q-3G-RCK 3G/HD/SD/ASI Dual-Channel Multi-Rate Reclocking DA with x4 Output Crosspoint** supports two input channels which can be crosspoint-routed to any of 16 DA outputs. The 9910DA-2Q-3G-RCK is multi-rate with user enable/disable reclocking, and supports SDI and ASI/DVB on all inputs and outputs with non-inverting outputs.

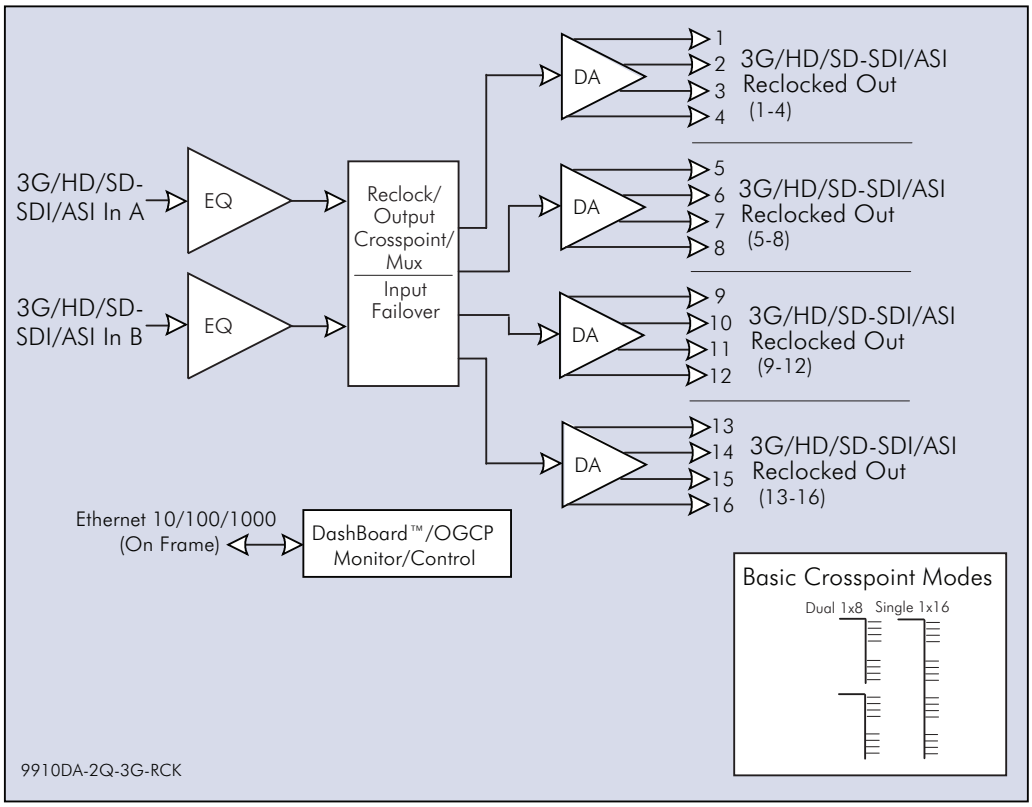
The extremely flexible crosspoint (which is user-configurable via DashBoard™ GUI remote control) allows dual 1x8 or single 1x16 and other routing possibilities. Any of the two input channels can be distributed or duplicated across four groups of 1x4 DAs, and either of the two inputs can be set to use an alternate failover input upon loss of signal.

Excellent receive performance allows receive EQ for up to 120m 3G and 160m HD cable length (1694A). Card edge and DashBoard™ remote status monitoring indicates input lock for each input channel. Up to 10 of the 9910DA-2Q-3G-RCK cards can be installed in a frame to provide 20 channels of input, with distribution to up to 160 outputs.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Full support of 3G/HD/SD-SDI and ASI/DVB
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Reclocking can be enabled or disabled for each input channel
- Excellent receive performance – EQ allows 1694A cable lengths up to 120m (3G) / 160m (HD) / 400m (SD)
- Flexible output crosspoint allows card to function as dual-channel 1x8 or single-channel 1x16 reclocking DA
- Failsafe mode automatically switches to selected secondary input on loss of primary input
- Input data rate auto-detection for all industry-standard data rates
- All outputs are non-inverting – ASI can be outputted on any output
- Card edge and DashBoard™ status and individual input lock indicators
- Hot-swappable
- Five year warranty



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9910DA-2Q-3G-RCK » 3G/HD/SD/ASI DUAL-CHANNEL MULTI-RATE RECLOCKING DA

with x4 Output Crosspoint

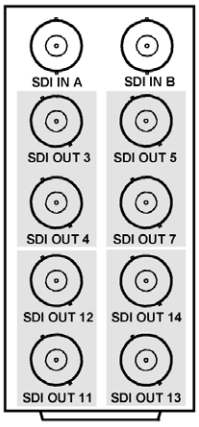
Rear I/O Module output designations here correlate to output numbers for four DA quadrants as shown in the card block diagram. As such, SDI outputs within a quadrant group can only be sourced from a particular input at one time (for example, if the card is set to feed SDI IN A to quadrant SDI Out (1-4), the rear module outputs 1 thru 4 will all output SDI IN A). Dissimilar inputs cannot be routed within a quadrant group (for example, SDI OUT 1 sourced from SDI IN A and SDI OUT 2 sourced from SDI IN B).

Note: When this rear module is used DashBoard or local control should only be set to use SDI IN A and/or SDI IN B. Either of these inputs can be routed to any of the output quadrant groupings shown (grouping shown in shaded areas).

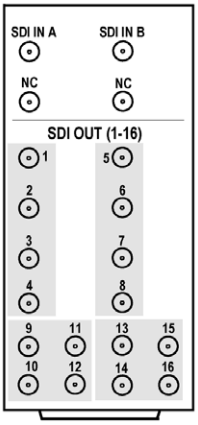
When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

The outputs shown here are all that is available using this rear module, with these outputs being a reduced subset of the maximum 16 available outputs. (For example, this rear module offers a reduced subset of DA quadrant SDI Out (1-4) (shown in the block diagram) consisting of SDI OUT 3 and SDI OUT 4 only.)

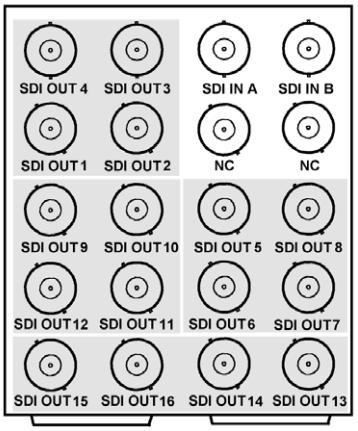
See Product Manual for more information.



RM20-9910-2Q-A



RM20-9910-2Q-B-DIN
RM20-9910-2Q-B-HDBNC



RM20-9910-2Q-E

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 3 Watts

3G/HD/SD-SDI / ASI Inputs
(2) 75Ω coaxial inputs (A and B)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Receive Performance (Cable Length; Belden 1694A)
3 Gbps: 120m
1.485 Gbps: 160m
143-360 Mbps: 400m

3G/HD/SD-SDI / ASI Outputs
75Ω coaxial outputs (16 total). Each group of 4 outputs can be crosspoint connected to inputs A or B.
Signal Level: 800 mV nominal
Return Loss: >15 dB at 5 MHz - 1.485 GHz
Jitter (wideband): HD < 0.2 UI

ORDERING INFORMATION

9910DA-2Q-3G-RCK 3G/HD/SD/ASI Dual-Channel Multi-Rate Reclocking DA with x4 Output Crosspoint

RM20-9910-2Q-A 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI/ASI Input BNC, (8) 3G/HD/SD-SDI/ASI Output BNCs

RM20-9910-2Q-B-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI/ASI Inputs, (16) 3G/HD/SD-SDI/ASI Outputs (DIN 1.0/2.3) (High Density)

RM20-9910-2Q-B-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI/ASI Inputs, (16) 3G/HD/SD-SDI/ASI Outputs (HDBNC) (High Density)

RM20-9910-2Q-E 20-Slot Frame Rear I/O Module (Double Width) (2) 3G/HD/SD-SDI/ASI Input BNC, (16) 3G/HD/SD-SDI/ASI Output BNCs

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9910DA-4Q-3G » 3G/HD/SD/ASI QUAD-CHANNEL MULTI-RATE DA

with x4 Output Crosspoint (Non-Reclocking)

The Cobalt® **9910DA-4Q-3G 3G/HD/SD/ASI Quad-Channel Multi-Rate DA with x4 Output Crosspoint (Non-Reclocking)** supports four input channels which can be crosspoint-routed to any of 16 DA outputs. The 9910DA-4Q-3G is multi-rate, and supports SDI and ASI/DVB on all inputs and outputs with non-inverting outputs. The quad-input capacity provides a one-card solution for distribution of 4K quadrant-division content over 3G/HD/SD-SDI interfaces.

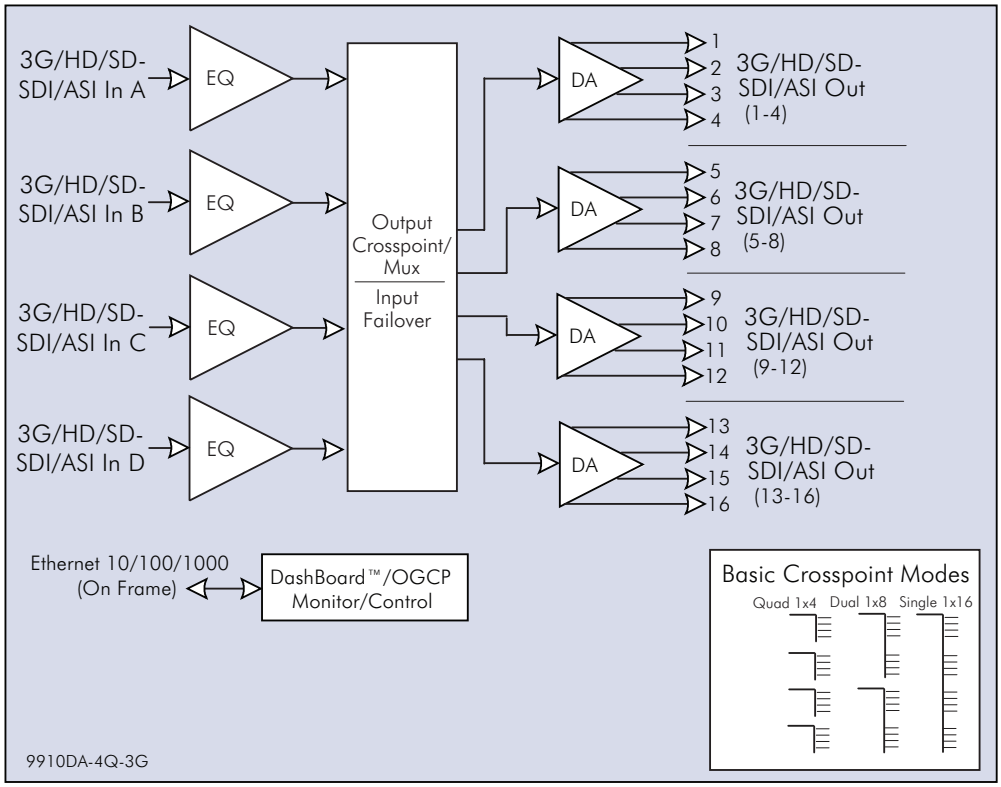
The extremely flexible crosspoint (which is user-configurable via DashBoard™ GUI remote control) allows quad 1x4, dual 1x8, single 1x16 and other routing possibilities (such as dual 1x4 plus a single 1x8). Any of the four input channels can be distributed or duplicated across four groups of 1x4 DAs, and any of the four inputs can be set to use an alternate failover input upon loss of signal.

Excellent receive performance allows receive EQ for up to 120m 3G and 160m HD cable length (1694A). Card edge and DashBoard™ remote status monitoring indicates input lock for each input channel. Up to 10 of the 9910DA-4Q-3G cards can be installed in a frame to provide 40 channels of input, with distribution to up to 160 outputs.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Full support of 3G/HD/SD-SDI and ASI/DVB
- One-card solution for distribution of 4K quadrant-division content over 3G/HD/SD-SDI interfaces
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Excellent receive performance – EQ allows 1694A cable lengths up to 120m (3G) / 160m (HD) / 400m (SD)
- Flexible output crosspoint allows card to function as quad-channel 1x4, dual-channel 1x8, or single-channel 1x16 DA
- Failsafe mode automatically switches to selected secondary input on loss of primary input
- Input data rate auto-detection for all industry-standard data rates
- All outputs are non-inverting – ASI can be outputted on any output
- Card edge and DashBoard™ status and individual input lock indicators
- Hot-swappable
- Five year warranty



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9910DA-4Q-3G » 3G/HD/SD/ASI QUAD-CHANNEL MULTI-RATE DA

with x4 Output Crosspoint (Non-Reclocking)

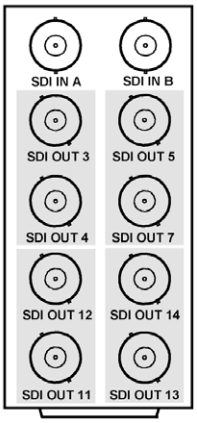
Rear I/O Module output designations here correlate to output numbers for four DA quadrants as shown in the card block diagram (for example, SDI OUT 3 in diagrams below is tied to (driven from) DA quadrant "SDI Out (1-4)" in the block diagram; SDI OUT 5 in diagrams below is tied to (driven from) DA quadrant "SDI Out (5-8)" in the block diagram). As such, SDI outputs within a quadrant group can only be sourced from a particular input at one time (for example, if the card is set to feed SDI IN A to quadrant SDI Out (1-4), the rear module outputs 1 thru 4 will all output SDI IN A). Dissimilar inputs cannot be routed within a quadrant group (for example, SDI OUT 1 sourced from SDI IN A and SDI OUT 2 sourced from SDI IN B).

Note: When this rear module is used DashBoard or local control should only be set to use SDI IN A and/or SDI IN B. Either of these inputs can be routed to any of the output quadrant groupings shown (grouping shown in shaded areas).

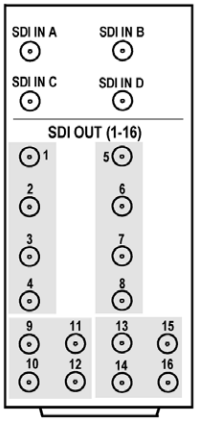
When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

The outputs shown here are all that is available using this rear module, with these outputs being a reduced subset of the maximum 16 available outputs. (For example, this rear module offers a reduced subset of DA quadrant SDI Out (1-4) (shown in the block diagram) consisting of SDI OUT 3 and SDI OUT 4 only.)

See Product Manual for more information.



RM20-9910-4Q-A



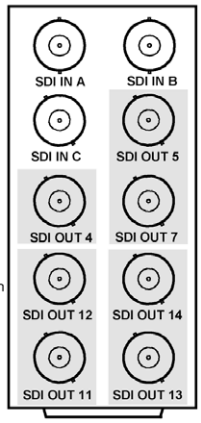
RM20-9910-4Q-B-DIN
RM20-9910-4Q-B-HDBNC

Note: When this rear module is used DashBoard or local control should only be set to use SDI IN A, SDI IN B and/or SDI IN C. Any of these inputs can be routed to any of the output quadrant groupings shown (groupings shown in shaded areas).

When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

The outputs shown here are all that is available using this rear module, with these outputs being a reduced subset of the maximum 16 available outputs. (For example, this rear module offers a reduced subset of DA quadrant SDI Out (5-8) (shown in the block diagram) consisting of SDI OUT 5 and SDI OUT 7 only.)

See Product Manual for more information.



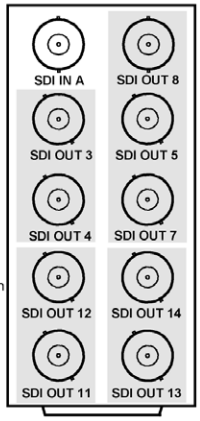
RM20-9910-4Q-C

Note: When this rear module is used DashBoard or local control should only be set to use SDI IN A. This input can be routed to any of the output quadrant groupings shown (grouping shown in shaded areas).

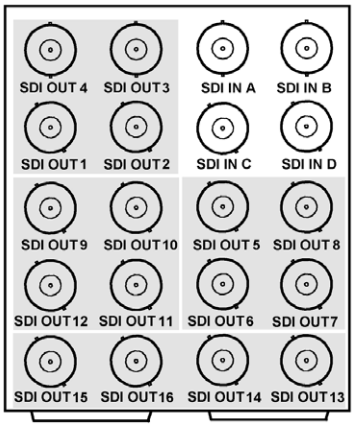
When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

The outputs shown here are all that is available using this rear module, with the outputs being a reduced subset of the maximum available 16 outputs. (For example, this rear module offers a reduced subset of DA quadrant SDI Out (1-4) (shown in the block diagram) consisting of SDI OUT 3 and SDI OUT 4 only.)

See Product Manual for more information.



RM20-9910-4Q-D



RM20-9910-4Q-E

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9910DA-4Q-3G » 3G/HD/SD/ASI QUAD-CHANNEL MULTI-RATE DA

with x4 Output Crosspoint (Non-Reclocking)

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 3 Watts

3G/HD/SD-SDI / ASI Inputs

(4) 75Ω coaxial inputs (A thru D)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Receive Performance (Cable Length; Belden 1694A)

3 Gbps: 120m
1.485 Gbps: 160m
143-360 Mbps: 400m

3G/HD/SD-SDI / ASI Outputs

(4x4) 75Ω coaxial outputs (16 total). Each group of 4 outputs can be crosspoint connected to inputs A thru D.
Signal Level: 800 mV nominal
Return Loss: >15 dB at 5 MHz - 1.485 GHz
Jitter (wideband): HD < 0.2 UI

ORDERING INFORMATION

9910DA-4Q-3G 3G/HD/SD/ASI Quad-Channel Multi-Rate DA with x4 Output Crosspoint (Non-Reclocking)

RM20-9910-4Q-A 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI/ASI Input BNC, (8) 3G/HD/SD-SDI/ASI Output BNCs

RM20-9910-4Q-B-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI/ASI Inputs, (16) 3G/HD/SD-SDI/ASI Outputs (DIN 1.0/2.3)

RM20-9910-4Q-B-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI/ASI Inputs, (16) 3G/HD/SD-SDI/ASI Outputs (HDBNC)

RM20-9910-4Q-C 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI/ASI Input BNC, (7) 3G/HD/SD-SDI/ASI Output BNCs

RM20-9910-4Q-D 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI/ASI Input BNC, (9) 3G/HD/SD-SDI/ASI Output BNCs

RM20-9910-4Q-E 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI/ASI Input BNC, (16) 3G/HD/SD-SDI/ASI Output BNCs

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9910DA-4Q-3G-RCK » 3G/HD/SD/ASI QUAD-CHANNEL MULTI-RATE RECLOCKING DA

with x4 Output Crosspoint

The Cobalt® **9910DA-4Q-3G-RCK 3G/HD/SD/ASI Quad-Channel Multi-Rate Reclocking DA with x4 Output Crosspoint** supports four input channels which can be crosspoint-routed to any of 16 DA outputs. The 9910DA-4Q-3G-RCK is multi-rate with user enable/disable reclocking, and supports SDI and ASI/DVB on all inputs and outputs with non-inverting outputs. The quad-input capacity provides a one-card solution for distribution of 4K quadrant-division content over 3G/HD/SD-SDI interfaces.

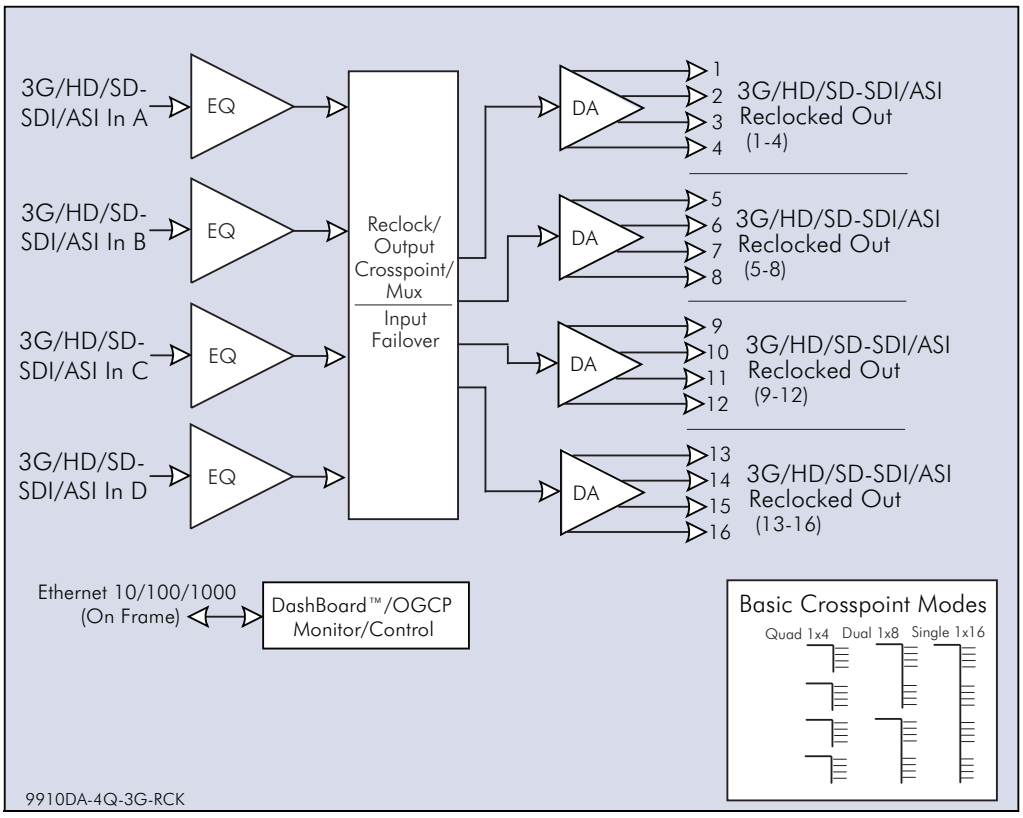
The extremely flexible crosspoint (which is user-configurable via DashBoard™ GUI remote control) allows quad 1x4, dual 1x8, single 1x16 and other routing possibilities. Any of the four input channels can be distributed or duplicated across four groups of 1x4 DAs, and any of the four inputs can be set to use an alternate failover input upon loss of signal.

Excellent receive performance allows receive EQ for up to 120m 3G and 160m HD cable length (1694A). Card edge and DashBoard™ remote status monitoring indicates input lock for each input channel. Up to 10 of the 9910DA-4Q-3G-RCK cards can be installed in a frame to provide 40 channels of input, with distribution to up to 160 outputs.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Full support of 3G/HD/SD-SDI and ASI/DVB
- Reclocking can be enabled or disabled for each input channel
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- One-card solution for distribution of 4K quadrant-division content over 3G/HD/SD-SDI interfaces
- Excellent receive performance – EQ allows 1694A cable lengths up to 120m (3G) / 160m (HD) / 400m (SD)
- Flexible output crosspoint allows card to function as quad-channel 1x4, dual-channel 1x8, or single-channel 1x16 reclocking DA
- Failsafe mode automatically switches to selected secondary input on loss of primary input
- Input data rate auto-detection for all industry-standard data rates
- All outputs are non-inverting – ASI can be outputted on any output
- All outputs are non-inverting – ASI can be outputted on any output
- Card edge and DashBoard™ status and individual input lock indicators
- Hot-swappable
- Five year warranty



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9910DA-4Q-3G-RCK » 3G/HD/SD/ASI QUAD-CHANNEL MULTI-RATE RECLOCKING DA

with x4 Output Crosspoint

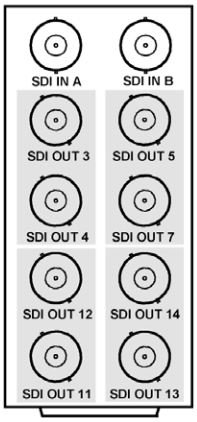
Rear I/O Module output designations here correlate to output numbers for four DA quadrants as shown in the card block diagram (for example, SDI OUT 3 in diagrams below is tied to (driven from) DA quadrant "SDI Out (1-4)" in the block diagram; SDI OUT 5 in diagrams below is tied to (driven from) DA quadrant "SDI Out (5-8)" in the block diagram). As such, SDI outputs within a quadrant group can only be sourced from a particular input at one time (for example, if the card is set to feed SDI IN A to quadrant SDI Out (1-4), the rear module outputs 1 thru 4 will all output SDI IN A). Dissimilar inputs cannot be routed within a quadrant group (for example, SDI OUT 1 sourced from SDI IN A and SDI OUT 2 sourced from SDI IN B).

Note: When this rear module is used DashBoard or local control should only be set to use SDI IN A and/or SDI IN B. Either of these inputs can be routed to any of the output quadrant groupings shown (grouping shown in shaded areas).

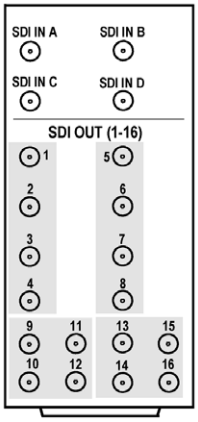
When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

The outputs shown here are all that is available using this rear module, with these outputs being a reduced subset of the maximum 16 available outputs. (For example, this rear module offers a reduced subset of DA quadrant SDI Out (1-4) (shown in the block diagram) consisting of SDI OUT 3 and SDI OUT 4 only.)

See Product Manual for more information.



RM20-9910-4Q-A



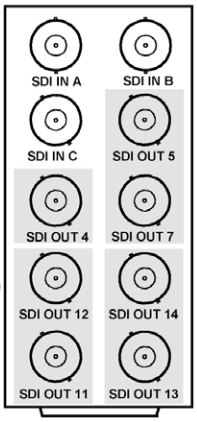
RM20-9910-4Q-B-DIN
RM20-9910-4Q-B-HDBNC

Note: When this rear module is used DashBoard or local control should only be set to use SDI IN A, SDI IN B and/or SDI IN C. Any of these inputs can be routed to any of the output quadrant groupings shown (groupings shown in shaded areas).

When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

The outputs shown here are all that is available using this rear module, with these outputs being a reduced subset of the maximum 16 available outputs. (For example, this rear module offers a reduced subset of DA quadrant SDI Out (5-8) (shown in the block diagram) consisting of SDI OUT 5 and SDI OUT 7 only.)

See Product Manual for more information.



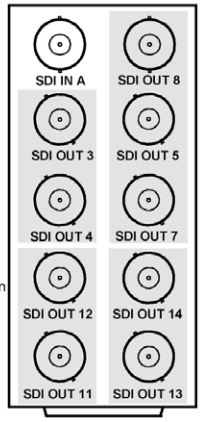
RM20-9910-4Q-C

Note: When this rear module is used DashBoard or local control should only be set to use SDI IN A. This input can be routed to any of the output quadrant groupings shown (grouping shown in shaded areas).

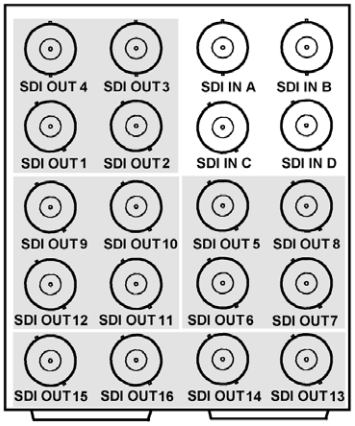
When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

The outputs shown here are all that is available using this rear module, with the outputs being a reduced subset of the maximum available 16 outputs. (For example, this rear module offers a reduced subset of DA quadrant SDI Out (1-4) (shown in the block diagram) consisting of SDI OUT 3 and SDI OUT 4 only.)

See Product Manual for more information.



RM20-9910-4Q-D



RM20-9910-4Q-E

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9910DA-4Q-3G-RCK » 3G/HD/SD/ASI QUAD-CHANNEL MULTI-RATE RECLOCKING DA

with x4 Output Crosspoint

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 3 Watts

3G/HD/SD-SDI / ASI Inputs

(4) 75Ω coaxial inputs (A thru D)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Receive Performance (Cable Length; Belden 1694A)

3 Gbps: 120m
1.485 Gbps: 160m
143-360 Mbps: 400m

3G/HD/SD-SDI / ASI Outputs

(4x4) 75Ω coaxial outputs (16 total). Each group of 4 outputs can be crosspoint connected to inputs A thru D.
Signal Level: 800 mV nominal
Return Loss: >15 dB at 5 MHz - 1.485 GHz
Jitter (wideband): HD < 0.2 UI

ORDERING INFORMATION

9910DA-4Q-3G-RCK 3G/HD/SD/ASI Quad-Channel Multi-Rate Reclocking DA with x4 Output Crosspoint

RM20-9910-4Q-A 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI/ASI Input BNC, (8) 3G/HD/SD-SDI/ASI Output BNCs

RM20-9910-4Q-B-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI/ASI Inputs, (16) 3G/HD/SD-SDI/ASI Outputs (DIN 1.0/2.3) (High Density)

RM20-9910-4Q-B-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI/ASI Inputs, (16) 3G/HD/SD-SDI/ASI Outputs (HDBNC) (High Density)

RM20-9910-4Q-C 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI/ASI Input BNC, (7) 3G/HD/SD-SDI/ASI Output BNCs

RM20-9910-4Q-D 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI/ASI Input BNC, (9) 3G/HD/SD-SDI/ASI Output BNCs

RM20-9910-4Q-E 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI/ASI Input BNC, (16) 3G/HD/SD-SDI/ASI Output BNCs

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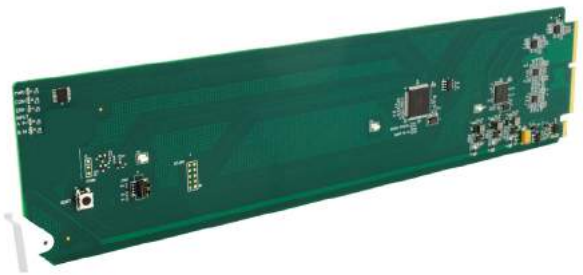
9911DA-8-BPX » DUAL-INPUT 3G/HD/SD-SDI / ASI 1X8 DISTRIBUTION AMPLIFIER

and Bypass Protection Switch with Passive Relay Protected Output



The Cobalt® **9911DA-8-BPX Dual-Input 3G/HD/SD-SDI / ASI 1x8 Distribution Amplifier and Bypass Protection Switch with Passive Relay Protected Output** provides 1x8 distribution of 3G/HD/SD-SDI and ASI signals with a passive relay path to provide a failover output in case of loss of power. All outputs are non-inverting and usable for ASI. Either of two inputs can be routed to the eight card DA outputs. Inputs are equalized and reclocked.

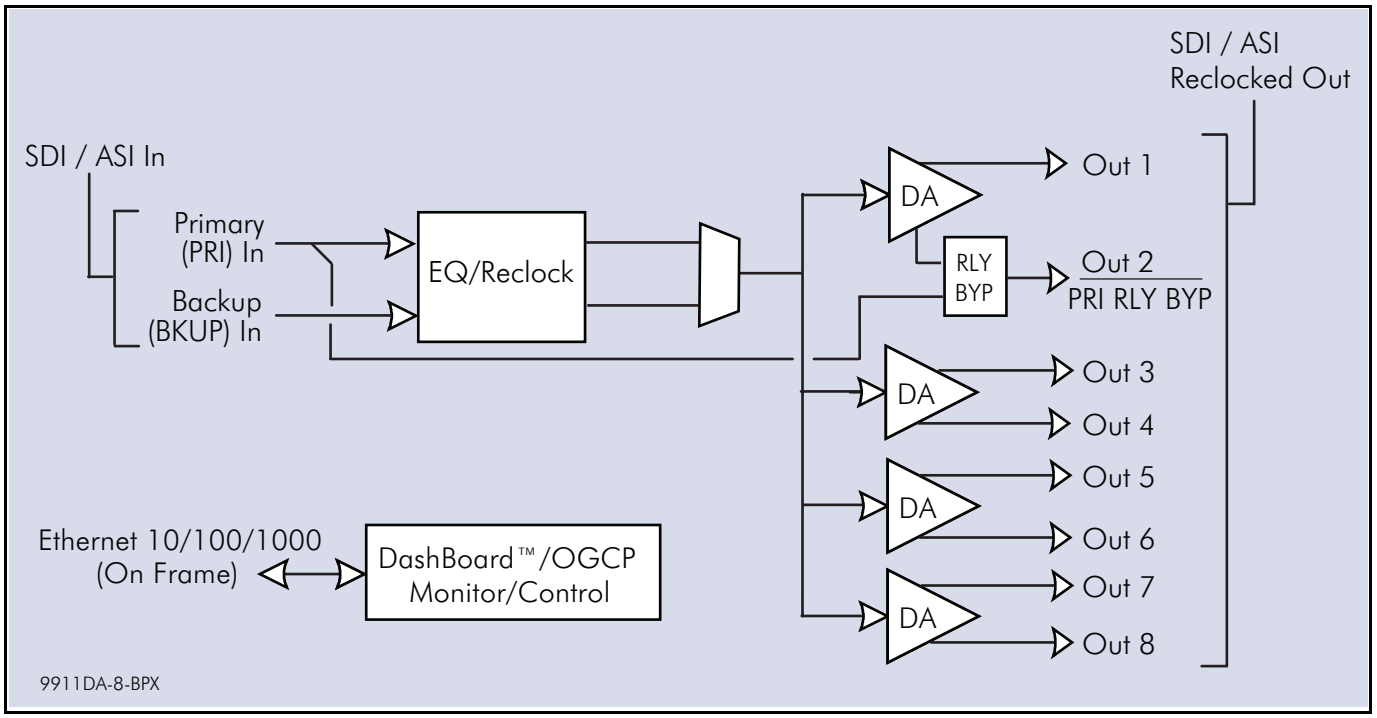
A Primary input is power-loss relay protected. A Backup secondary input can feed the DA outputs should signal absence be detected on the primary input. SNMP support can propagate notice if secondary input failover has been invoked.

Excellent receive performance allows receive EQ for up to 120m 3G and 160m HD cable length (1694A). Card edge and DashBoard™ remote status monitoring indicates input lock for each input channel. Up to 10 of the 9911DA-8-BPX cards can be installed in a frame.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- 3G/HD/SD-SDI and ASI compatible on all inputs and outputs
- Simple relay routing signal path maintains full signal integrity. Rear-module located bypass relay maintains signal path even if card/power is lost.
- Failsafe mode automatically switches to Backup secondary input on loss of primary input
- Excellent receive performance – EQ allows 1694A cable lengths up to 120m (3G) / 160m (HD) / 400m (SD)
- Excellent receive performance – EQ allows 1694A cable lengths up to 120m (3G) / 160m (HD) / 400m (SD)
- SNMP support propagates notice if secondary input failover has been invoked.
- All outputs are non-inverting – ASI can be outputted on any output
- Input data rate auto-detection for all industry-standard data rates
- Card edge and DashBoard™ status and individual input lock indicators
- Hot-swappable
- Five year warranty



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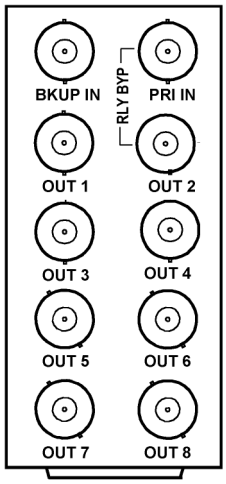
9911DA-8-BPX » DUAL-INPUT 3G/HD/SD-SDI / ASI 1X8 DISTRIBUTION AMPLIFIER

and Bypass Protection Switch with Passive Relay Protected Output



RM20-9911DA-A

PRI IN is DA Primary input, and is card loss-of-power relay protected.

BKUP IN is DA Backup (secondary) input, and can be source to DA inputs upon signal loss on PRI IN input.

SPECIFICATIONS

Power

<6 Watts

3G/HD/SD-SDI / ASI Inputs

Number of inputs: 2
Impedance: 75Ω
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Receive Performance (Cable Length; Belden 1694A)

3 Gbps: 120m
1.485 Gbps: 160m
143-360 Mbps: 400m

3G/HD/SD-SDI / ASI Outputs

Number of DA outputs: 8
213Mbit/s maximum ASI TS bit-rate per port
Impedance: 75Ω

ORDERING INFORMATION

9911DA-8-BPX Dual-Input 3G/HD/SD-SDI / ASI 1x8 Distribution Amplifier and Bypass Protection Switch with Passive Relay Protected Output

RM20-9911DA-A 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI / ASI Input BNCs, (8) 3G/HD/SD-SDI / ASI Output BNCs. Relay bypass for PRI IN – OUT 2 path.

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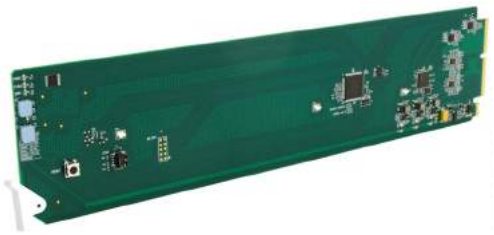
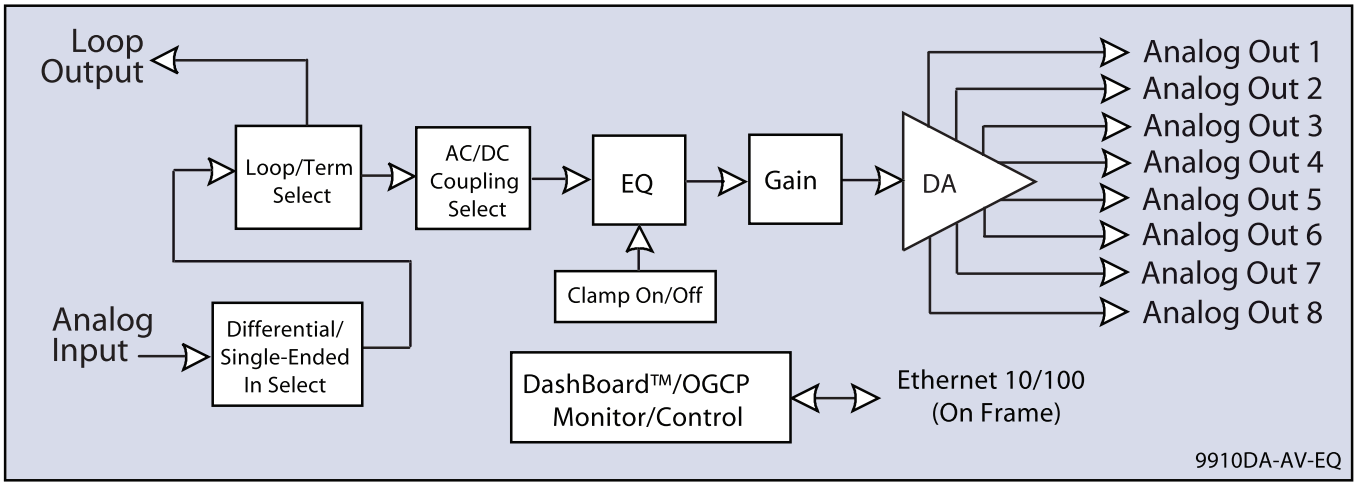
9910DA-AV-EQ » ANALOG VIDEO DISTRIBUTION AMPLIFIER WITH EQ

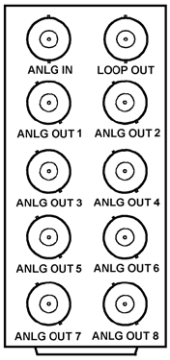


The Cobalt® **9910DA-AV-EQ Analog Video Distribution Amplifier with EQ** provides 1x8 distribution with one analog input and eight 75Ω analog outputs. Card jumpers allow setting the input as differential (floating ground) or single-ended, AC or DC coupled, and Hi-Z looping input or on-card 75Ω terminated. Trim controls located on the front of the card allow EQ adjustment and gain control. The card can be accessed using DashBoard™ remote control for status monitoring. Status monitoring shows the video format of the input signal.

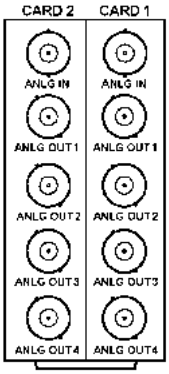
FEATURES

- Multi-mode input provides differential or single-ended input and hi-Z looping or card-terminated operation
- Signal path can be set as DC or AC coupled
- User adjustable EQ and gain with easily accessible controls on front of card edge. EQ optimizes performance for input cable lengths exceeding 1000 ft (300m).
- User-selectable input clamping (none, fast, or slow clamping selectable)
- Remote monitoring via DashBoard™ software or OGCP-9000 Remote Control Panel. Card Status display shows presence and video format (e.g., 525i, 720p, 1080i) of input signal.
- Hot-swappable
- Five year warranty

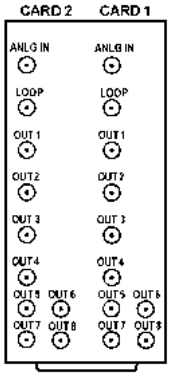




RM20-9910AV-B



RM20-9910AV-A/S



RM20-9910AV-BS-DIN
RM20-9910AV-BS-DIN

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9910DA-AV-EQ » ANALOG VIDEO DISTRIBUTION AMPLIFIER WITH EQ

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
2 Watts

Analog Video Input
Number of inputs: (1)
(Compatible with any NTSC or PAL black-burst or tri-level analog video format.)
Impedance: User selectable as hi-Z looping or card-terminated 75Ω
Level: 1 Vp-p, nominal
Return Loss: 46 dB @ 3.58 MHz
Input modes: User selectable as differential/single-ended and AC or DC coupled

Analog Video Outputs
Number of DA outputs: up to (8)
Impedance: 75Ω
Level: 1 Vp-p, nominal
Looping Output: (1)

Performance
Frequency response: >0.05 dB @ 3.58 MHz
Differential Gain: >0.15% @ 3.58 MHz
Differential Phase: >0.15° @ 3.58 MHz
S/N: >60 dB; 5 MHz BW

ORDERING INFORMATION

9910DA-AV-EQ Analog Video Distribution Amplifier with EQ

RM20-9910AV-B 20-Slot Frame Rear I/O Module (Standard Width) (1) Analog Video Input BNC, (8) Analog DA Output BNCs, (1) Input Loop Output BNC

RM20-9910AV-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) Analog Video Input BNC, (4) Analog DA Output BNCs (connections are per card)

RM20-9910AV-B/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) Analog Video Input, (8) Analog DA Outputs, (1) Input Loop Output (connections are per card; all connectors are DIN 1.0/2.3)

RM20-9910AV-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) Analog Video Input, (8) Analog DA Outputs, (1) Input Loop Output (connections are per card; all connectors are HD-BNC)

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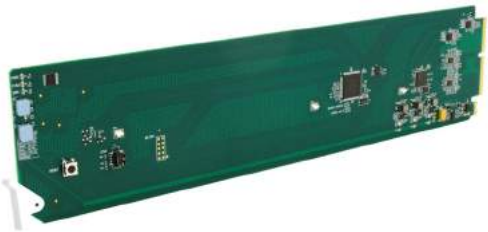
9910DA-AV » ANALOG VIDEO DISTRIBUTION AMPLIFIER



The Cobalt® **9910DA-AV Analog Video Distribution Amplifier** provides 1x8 distribution with one analog input and eight 75Ω analog outputs. Card jumpers allow setting the input as differential (floating ground) or single-ended, and Hi-Z looping input or on-card 75O terminated. A trim control located on the front of the card allows gain control. The card can be accessed using DashBoard™ remote control for status monitoring. Status monitoring shows the video format of the input signal.

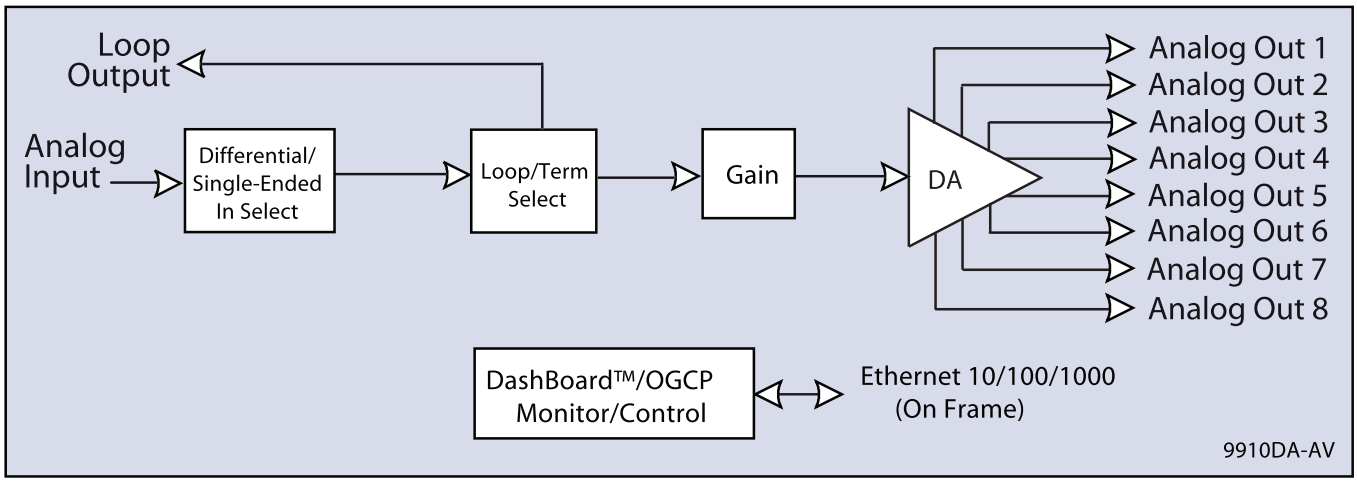
FEATURES

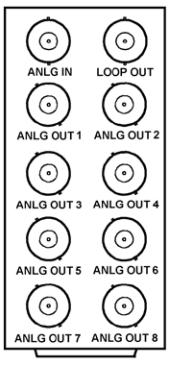
Multi-mode input provides differential or single-ended input and hi-Z looping or card-terminated operation

Remote monitoring via DashBoard™ software or OGCP-9000 Remote Control Panel. Card Status display shows presence and video format (e.g., 525i, 720p, 1080i) of input signal.

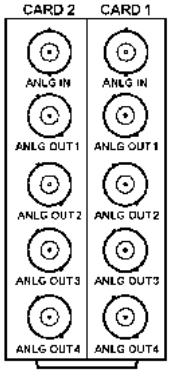
Hot-swappable

Five year warranty

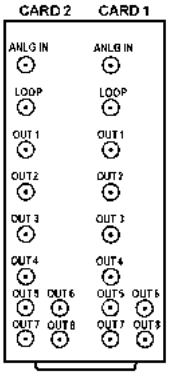




RM20-9910AV-B



RM20-9910AV-A/S



RM20-9910AV-BS-DIN
RM20-9910AV-BS-DIN

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9910DA-AV » ANALOG VIDEO DISTRIBUTION AMPLIFIER

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
2 Watts

Analog Video Input
Number of inputs: (1)
(Compatible with any NTSC or PAL black-burst or tri-level analog video format.)
Impedance: User selectable as hi-Z looping or card-terminated 75Ω
Level: 1 Vp-p, nominal
Return Loss: 46 dB @ 3.58 MHz
Input modes: User selectable as differential/single-ended and AC or DC coupled

Analog Video Outputs
Number of DA outputs: up to (8)
Impedance: 75Ω
Level: 1 Vp-p, nominal
Looping Output: (1)

Performance
Frequency response: >0.05 dB @ 3.58 MHz
Differential Gain: >0.15% @ 3.58 MHz
Differential Phase: >0.15° @ 3.58 MHz
S/N: >60 dB; 5 MHz BW

ORDERING INFORMATION

9910DA-AV Analog Video Distribution Amplifier

RM20-9910AV-B 20-Slot Frame Rear I/O Module (Standard Width) (1) Analog Video Input BNC, (8) Analog DA Output BNCs, (1) Input Loop Output BNC

RM20-9910AV-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) Analog Video Input BNC, (4) Analog DA Output BNCs (connections are per card)

RM20-9910AV-B/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) Analog Video Input, (8) Analog DA Outputs, (1) Input Loop Output (connections are per card; all connectors are DIN 1.0/2.3)

RM20-9910AV-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) Analog Video Input, (8) Analog DA Outputs, (1) Input Loop Output (connections are per card; all connectors are HD-BNC)

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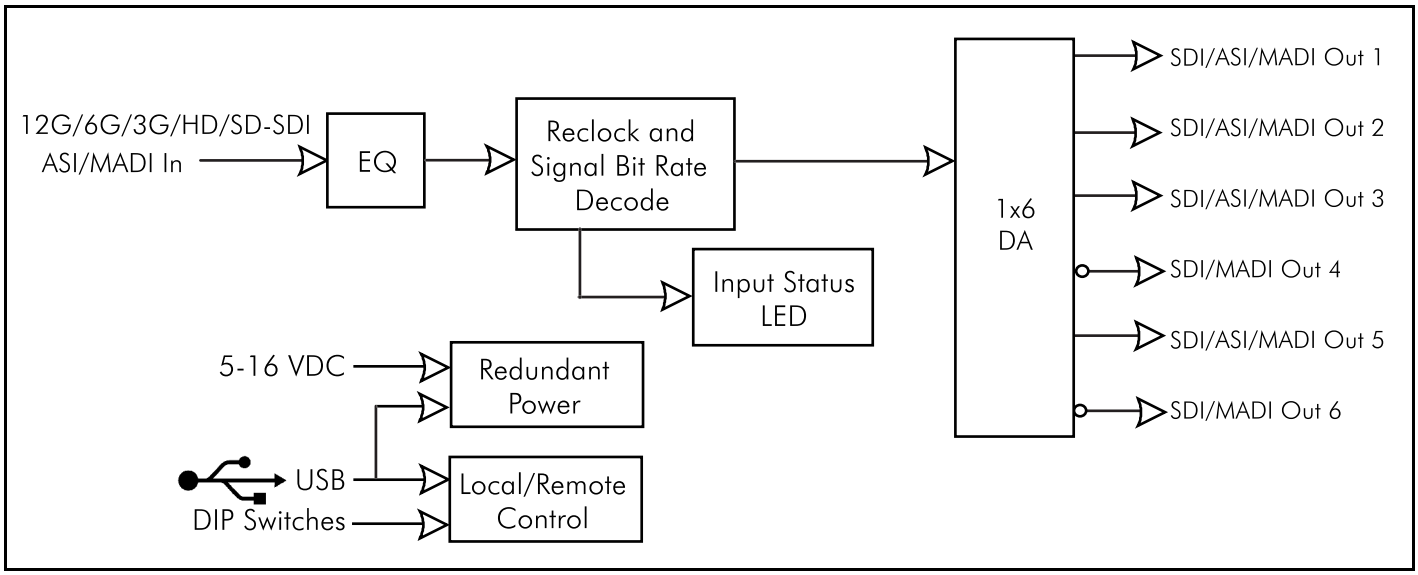
BBG-DA-12G-1x6 » 12G/6G/3G/HD/SD-SDI / ASI / MADI RECLOCKING DISTRIBUTION AMPLIFIER with Input Status LED

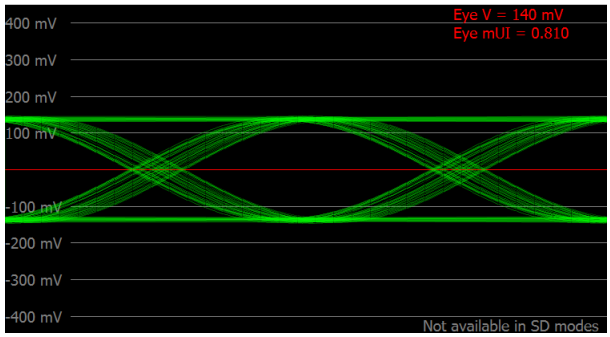
The **BBG-DA-12G-1x6** is a 12G/6G/3G/HD/SD-SDI / ASI / MADI multi-rate distribution amplifier that features an input status LED. The unit is fully automatic and supports SMPTE 2082-1 (12G), 424M (3G), 292M and 259M SDI video signals as well as ASI and MADI, and is equipped with one input and six reclocked SDI outputs. (Reclocking for 12G/6G/3G/HD/SD-SDI and MADI inputs; all other bit rates are non-reclocking.) The unit supports 1x4 ASI distribution using its non-inverting outputs.

Various settings can be configured using the device DIP switches or by using the intuitive **BBGConfig** UI application that communicates with BBG-DA-12G-1x6 over a PC's USB port. When configured using the BBGConfig UI app, the USB connection can be removed with all settings held in non-volatile device memory.

FEATURES

- Six 12G/6G/3G/HD/SD equalized and reclocked outputs
- 1x4 ASI distribution capability
- Input status LED indicator
- Configurable using device DIP switches or BBGConfig USB UI remote control
- Auto-reclock for SMPTE 2082-1, 424M, 292M, 259M, and MADI
- BBGConfig USB UI offers eye pattern display, showing real-time input signal condition/timing stability/jitter
- Small rugged portable standalone package ideal for portable installations. Optional BBG-MB mounting bracket provides rigid, secure mounting to mounting surfaces.
- Rugged construction backed with a five-year warranty





BBGConfig USB UI provides eye pattern display, showing real-time input signal condition/timing stability/jitter

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BBG-DA-12G-1x6 » 12G/6G/3G/HD/SD-SDI / ASI / MADI RECLOCKING DISTRIBUTION AMPLIFIER with Input Status LED

SPECIFICATIONS

Power

<2 Watts; 5-16 VDC (compatible with Power Supply PS4 (North America) or PS5 (International). (See Ordering Information for details.)

12G/6G/3G/HD/SD-SDI / ASI / MADI Inputs

Number of inputs: 1
Impedance: 75Ω
SDI Formats Supported: SMPTE 2082-1, 424M, 292M, 259M
Other Formats Supported: ASI, MADI

Receive Performance; Equalized (Cable Length; Belden 1694A)

12 Gbps: 80m
3 Gbps: 160m
1.485 Gbps: 180m
143-360 Mbps: 400m

12G/6G/3G/HD/SD-SDI / ASI / MADI Outputs

Number of DA outputs: 6
Signal Level: 800 mV +/- 10%
DC Offset: 0.0V +/- 0.5V
Jitter 12 Gbps:
  Alignment (<100 kHz) Jitter: < 0.3 UI
  Timing (<10 Hz) Jitter: < 8 UI
Jitter 6 Gbps:
  Alignment (<100 kHz) Jitter: < 0.3 UI
  Timing (<10 Hz) Jitter: < 4 UI
Jitter 3 Gbps:
  Alignment (<100 kHz) Jitter: < 0.3 UI
  Timing (<10 Hz) Jitter: < 2 UI
Jitter 1.5 Gbps:
  Alignment (<100 kHz) Jitter: < 0.2 UI
  Timing (<10 Hz) Jitter: < 1 UI
Jitter 270 Mbps:
  Alignment (<1 kHz) Jitter: < 0.2 UI
  Timing (<10 Hz) Jitter: < 0.2 UI
Impedance: 75Ω

Dimensions (WxHxD)

5.8" x 2.9" x 1.1" (including connector projections)
(147 x 74 x 28 mm)

ORDERING INFORMATION

BBG-DA-12G-1x6 12G/6G/3G/HD/SD-SDI / ASI / MADI Reclocking Distribution Amplifier with Input Status LED

BBG-MB Mounting Bracket (see Product Downloads for downloading installation instruction sheet)

Note: Device includes one PS4 Power Supply (AC adapter). Power supplies listed below are for replacement or spares purposes:
- **PS4** Universal Power Supply, UL/CSA. Input: 100-240V, 60/50 Hz. Output: 5 VDC @ 12 Watts
- **PS5** Universal Power Supply, IEC Connector, CE/UL/CSA. Input: 100-240V, 60/50 Hz. Output: 5V, 2A (International Power Supply. Specify country of destination.)

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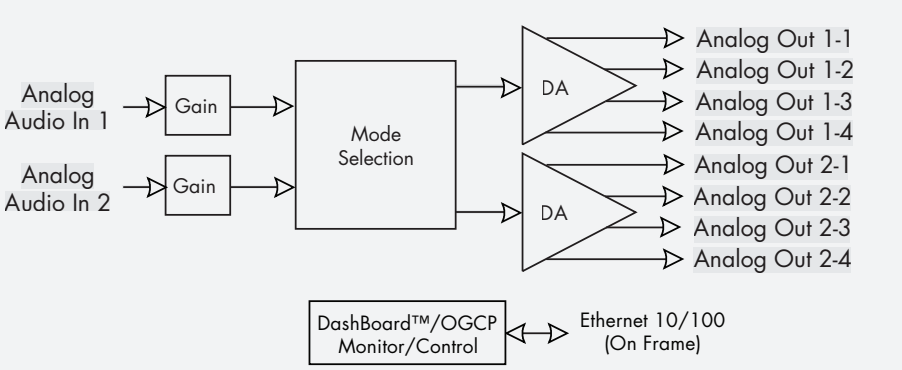
9241 » ANALOG AUDIO DISTRIBUTION AMPLIFIER

The 9241 is an analog audio distribution amplifier with up to eight low-impedance outputs designed for broadcast use. It can be used as either a mono or two-channel (stereo) audio DA. The 9241 can provide eight copies of a single (mono) input signal or four copies each of a two (stereo) inputs.

The 9241 can also sum two channels for creating a mono mix. It can also detect dead-air silence and set an alarm when no audio is present.

» FEATURES

- Handles mono or stereo signals
- Has summing capability
- Silence detection
- Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panel
- Five year warranty



» SPECIFICATIONS

Electrical

Power:	3 watts

Analog Audio Input

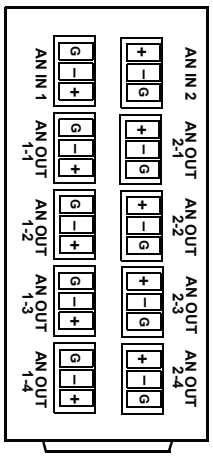
Number of inputs:	2 balanced
Impedance:	>20 kΩ balanced
Max Level:	+27.5 dBu
Common Mode Rejection:	>80 dB, 20 Hz to 20 kHz

Performance

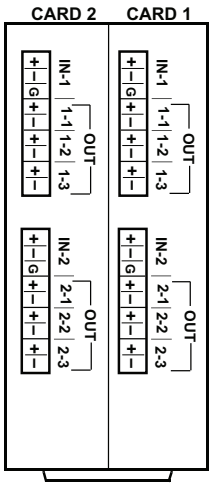
Freq. Response:	>0.1 dB at 20 Hz to 20 kHz
Gain:	-14 dB to +18 dB cont. variable
Harmonic Dist:	<0.01%
SNR:	> 95 dBu

Analog Audio Output

Number of Outputs:	8
Impedance:	60 Ω balanced
Max Level:	+26 dBu

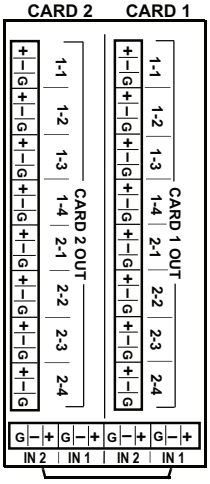


RM20-9241-B



Note: Outputs 2-1 thru 2-3 are outputs 1-4 thru 1-6 when card used in mono DA or mono mix DA mode.

RM20-9241-C/S



Note: Outputs 2-1 thru 2-4 are outputs 1-5 thru 1-8 when card used in mono DA or mono mix DA mode.

RM20-9241-D/S

openGear DashBoard

» ORDERING INFORMATION

9241 Analog Audio Distribution Amplifier, 1 X 8 Mono or 1 X 4 Stereo, with Summing Control

RM20-9241-B 20-Slot Frame Rear I/O Module (Standard Width) 2 Differential Analog Audio In, 8 Differential Analog Audio Outs

RM20-9241-C/S 20-Slot Frame Rear I/O Module (Split) Dual 1x3 Differential Analog Audio I/O

RM20-9241-D/S 20-Slot Frame Rear I/O Module (Split) Dual 1x4 Differential Analog Audio I/O

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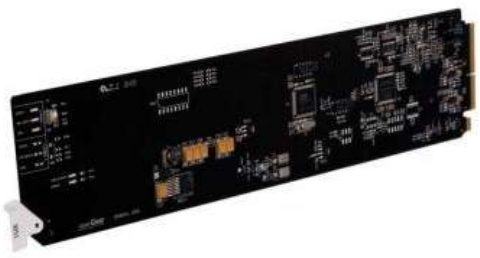
9242 » ANALOG AUDIO DISTRIBUTION AMPLIFIER with Remote Gain Control

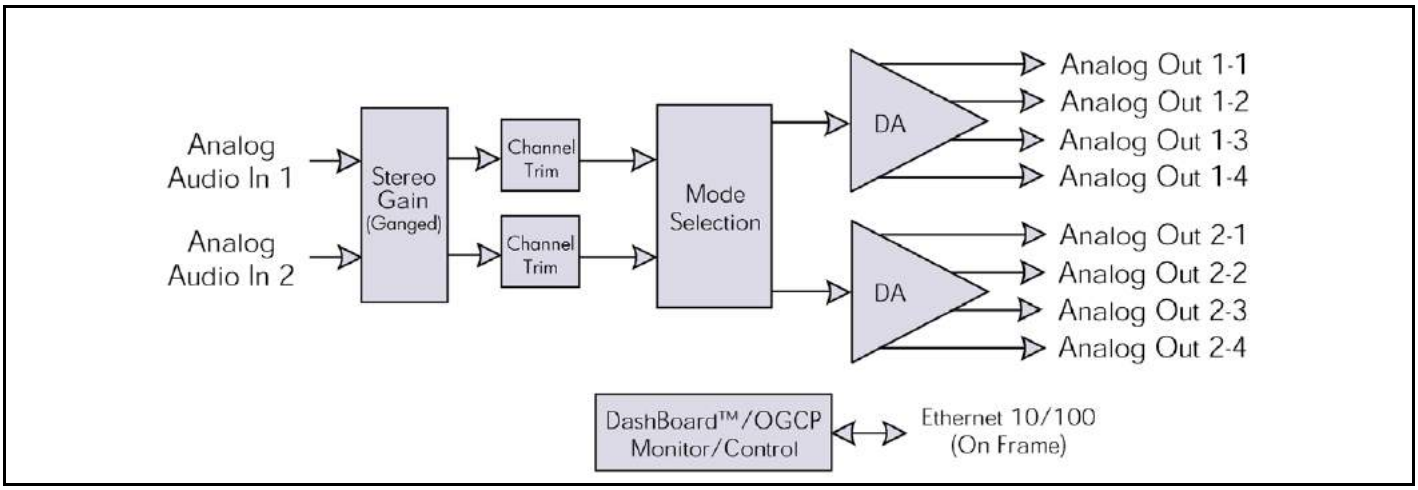


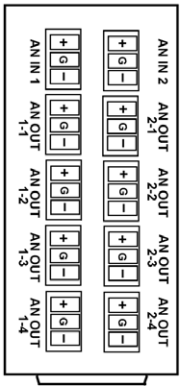
The **9242 Analog Audio Distribution Amplifier with Remote Gain Control** is a broadcast-quality balanced analog audio DA with stereo 2x4, mono 1x8, and stereo sum L+R x 8 selectable output modes. Unlike most analog audio DAs, the 9242 electronic attenuators allow overall gain (stereo ganged) and per-channel trim (offset) via DashBoard™ remote control.

The space-saving design and very low power consumption of the 9242 provides for high density, allowing two cards to be collocated in adjacent slots and served by a single, standard-width "split" rear module.

FEATURES

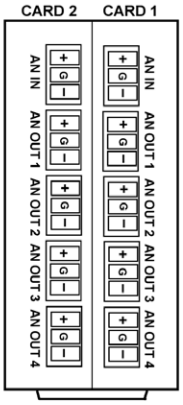
- Full remote control of operating mode and gain control
- Multiple modes — stereo 2x4, mono 1x8, and stereo sum L+R x 8 outputs
- Full broadcast-grade balanced signal capability with 27.5 dBu maximum input level support. Low-impedance outputs.
- Selectable card switch control or DashBoard™ remote control (usable with DashBoard™ and Cobalt OGCP-9000 remote control panels)
- Remote monitoring via DashBoard™ software or OGCP-9000 Remote Control Panel
- Hot-swappable
- Five year warranty





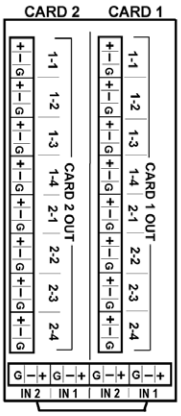
Note: + / G / - orientation on connectors varies from that on other Cobalt products. Make certain hookup is as shown here.

RM20-9242-B



Note: + / G / - orientation on connectors varies from that on other Cobalt products. Make certain hookup is as shown here.

RM20-9242-C/S



Note: Outputs 2-1 thru 2-4 are outputs 1-5 thru 1-8 when card used in mono DA or mono mix DA mode. Screened connection info on PCB may be incorrect. Always use this diagram when making connections.

RM20-9242-D/S

openGear®

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9242 » ANALOG AUDIO DISTRIBUTION AMPLIFIER with Remote Gain Control

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 5 Watts

Analog Audio Input
Number of Inputs: (2) balanced
Impedance: > 20 kΩ, balanced
Maximum Input Level: +27.5 dBu
Connector Type: WECO® removable modular

Performance
Gain: -15 dB to +15 dB
Frequency Response: 20 – 20 kHz ±0.1 dB
Noise: < -85 dBu, 10 – 22 kHz at unity gain
Harmonic Distortion: < 0.01%

Analog Audio Outputs
Number of Outputs: (8) balanced; available as stereo 2x4, mono 1x8, and stereo sum L+R x 8 outputs
Impedance: 60 Ω, balanced
Output Isolation: > 60 dB
Connector Type: WECO® removable modular

ORDERING INFORMATION

9910DA-AV-EQ Analog Audio Distribution Amplifier with Remote Gain Control

RM20-9242-B 20-Slot Frame Rear I/O Module (Standard Width) (2) Balanced Analog Audio In, (8) Balanced Analog Audio Out

RM20-9242-C/S 20-Slot Frame Rear I/O Module (Split) Dual 1x4 Balanced Analog Audio I/O (connections are per card)

RM20-9242-D/S 20-Slot Frame Rear I/O Module (Split) Dual 1x4 Differential Analog Audio I/O (connections are per card)

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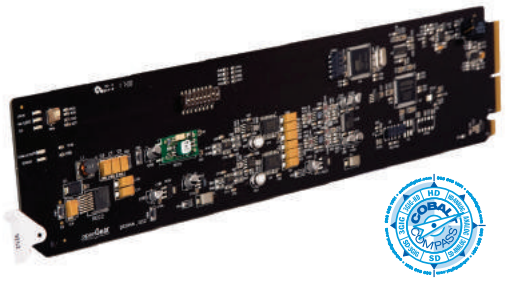
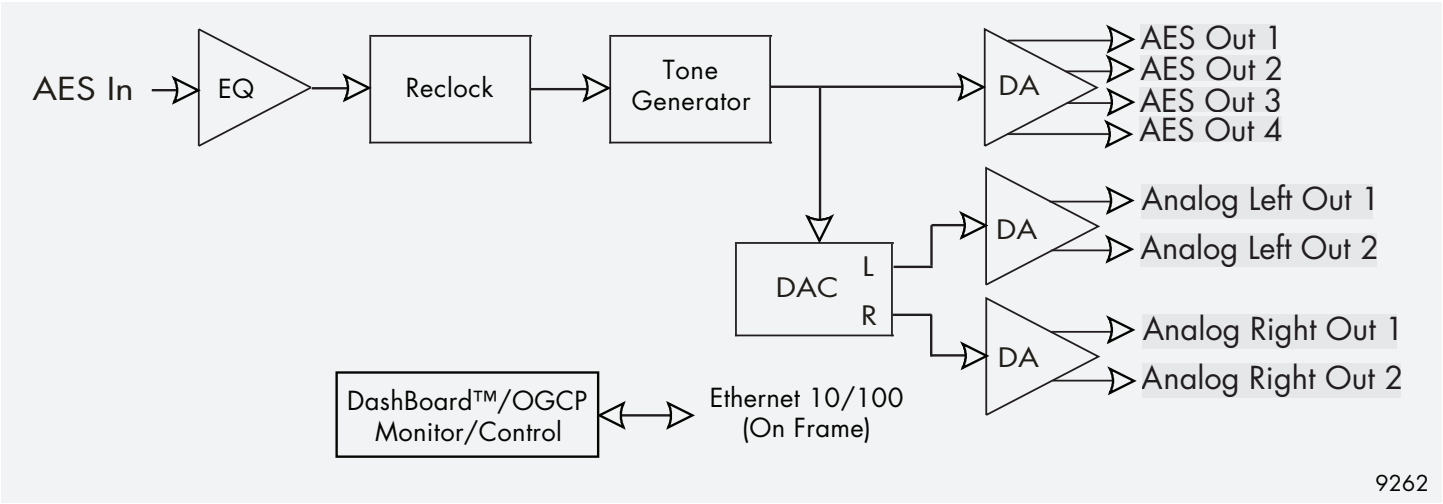
9262 » STEREO AES TO ANALOG AUDIO D/A CONVERTER



The 9262 features digital-to-analog audio conversion with AES/EBU signal distribution. It supports audio sampling frequencies from 30 kHz to 192 kHz, and converts the incoming AES digital audio signal to a stereo balanced analog audio signal pair using 24-bit conversion. Cable equalization and reclocking techniques enable the 9262 to reliably recover the incoming digital audio signal.

» FEATURES

- 24-bit audio conversion
- Supports audio sampling frequencies from 30 kHz to 192 kHz
- Cable equalization and data reclocking on incoming AES/EBU signal
- Remote control/monitoring via DashBoard™ software
- Five year warranty



» SPECIFICATIONS

Electrical

Power:	4 watts

AES Input

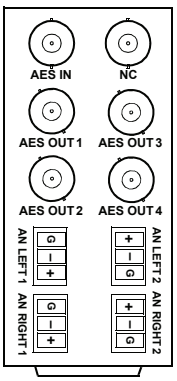
Number of inputs:	1 unbalanced (2 Ch)
Impedance:	75 Ω
Resolution:	24-bit
Level:	0.2 - 7 Vp-p
Sample rate:	30 kHz to 192 kHz

AES Output

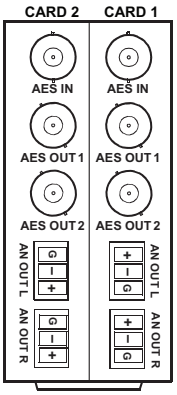
Number of outputs:	4 unbalanced
Impedance:	75 Ω
Resolution:	24-bit
Level:	1 Vp-p
Sample rate:	30 kHz to 192 kHz
Jitter:	<5 ns

Analog Audio Output

Number of Outputs:	4
Impedance:	60 Ω balanced
Freq. Response:	+/-0.2 dB at 20 Hz to 20 kHz
Max Level:	+24 dBu
THD+N:	<0.01%
Noise:	-84 dBu at 20 Hz to 20 kHz



RM20-9262-B



RM20-9262-B/S

openGear DashBoard

» ORDERING INFORMATION

9262 AES/EBU Digital to Stereo Analog Audio Converter

RM20-9262-B 20-Slot Frame Rear I/O Module (Standard Width) 1 AES Input BNC, 4 AES Reclocked Output BNCs, 4 Analog Audio Outputs

RM20-9262-B/S 20-Slot Frame Rear I/O Module (Split) Dual AES Input, 2 AES Outputs per card, 2 Analog Outputs (Stereo Pair) per card

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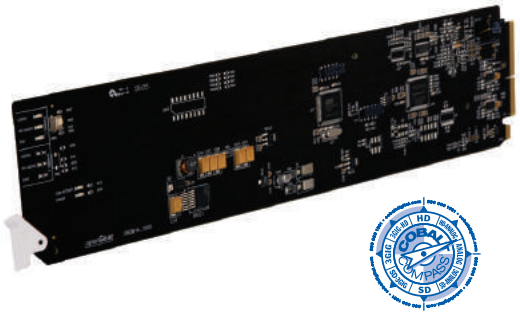
9253 » 1X9 MADI AUDIO DISTRIBUTION AMPLIFIER

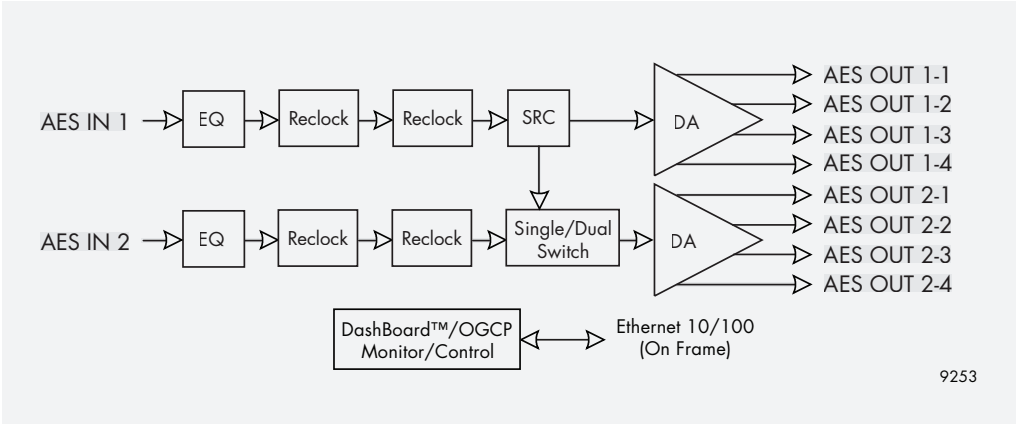


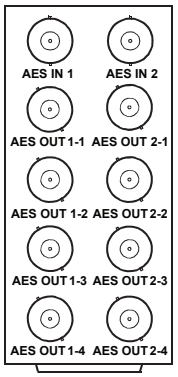
The 9253 is a dual AES/EBU distribution amplifier, providing four copies of each incoming signal. The card supports audio sampling frequencies from 30 kHz to 192 kHz. It can also be used as a 1x8 distribution amplifier, providing eight outputs that are sample rate converted. Cable equalization and reclocking techniques enable the 9253 to reliably recover the incoming digital audio signal.

The 9253 has two 75 Ω unbalanced AES inputs and four 75 Ω unbalanced AES outputs per AES input. The card can be monitored for status using DashBoard™ remote control software.

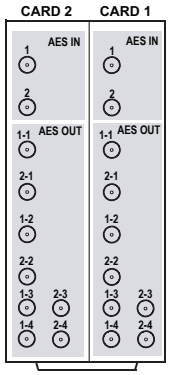
» FEATURES

- Supports audio sampling frequencies from 30 kHz to 192 kHz
- Cable equalization and data reclocking on AES inputs
- Configurable as dual 1x4 or 1x8 distribution amplifier
- Remote monitoring via DashBoard™ software
- Five-year warranty





RM20-9253-A



RM20-9253-B/S

» SPECIFICATIONS

Electrical

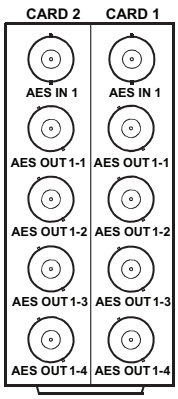
Power:	4 watts

AES Input

Number of Inputs:	2 unbalanced BNC (2 Ch per BNC)
Impedance:	75 Ω
Resolution:	24-bit
Level:	0.2 - 7 Vp-p
Sample Rate:	30 kHz to 192 kHz

AES Output

Number of Outputs:	8 unbalanced BNC (2 Ch per BNC)
Impedance:	75 Ω
Resolution:	24-bit
Level:	1 Vp-p
Sample Rate:	30 kHz to 192 kHz
Jitter:	<5 ns



Note: Because input AES IN 2 cannot be used with this rear module, card should be set to 1x8 mode instead of 2x4 mode Using 2x4 mode with this rear module will result in IN2 error indication.

RM20-9253-A/S

» ORDERING INFORMATION

9253 2 X 4 AES/EBU Reclocking Distribution Amplifier, 75 Ohm, Unbalanced

RM20-9253-A 20-Slot Frame Rear I/O Module (Standard Width) 2 AES Inputs, 8 AES Outputs

RM20-9253-A/S 20-Slot Frame Rear I/O Module (Split) AES IN 1 Input BNC, 4 AES DA Output BNCs (AES OUT 1-1 thru AES OUT 1-4)

RM20-9253-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split, High Density) 2 AES Inputs, 8 AES Outputs(Per card; all connectors HD-BNC)

RM20-9253-B/S-DIN 20-Slot Frame Rear I/O Module (Split, High Density) 2 AES Inputs, 8 AES Outputs (Per card; all connectors DIN1.0/2.3)

openGear DashBoard

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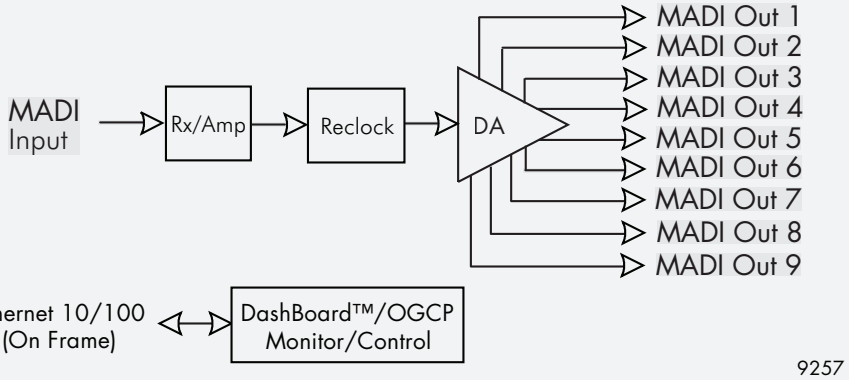
9257 » 1X9 MADI AUDIO DISTRIBUTION AMPLIFIER

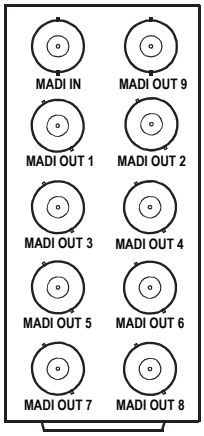
The 9257 provides an award-winning card-based solution for distribution of AES10 MADI signals. The card supports sampling frequencies up to 96 kHz, with a 64-channel payload supported at the industry standard 48 kHz sampling rate (all other sampling rates specified as valid per AES10-2003 are also supported at various payload capacities). Utilizing the openGear® open-architecture platform, the 9257 offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface. Up to 20 of the 9257 cards can be installed in a 20-Slot frame.

The 9257 can reliably equalize up to 250m of 1694A, and offers DashBoard™ display and alarm for input signal status and LOS alarms. The card is available with several Rear I/O Module choices that offer BNC, DIN1.0/2.3, or HD-BNC connectors. Full user remote and card-edge monitor/control allows full card status and control access locally or across a standard Ethernet network.

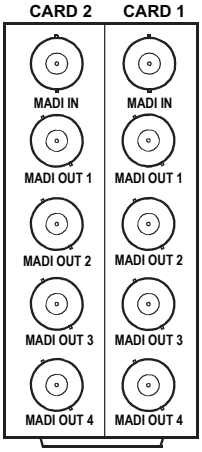
» FEATURES

- Card-based design allows scalability, with up to 20 input channels per frame
- Specifically designed and optimized for AES10 MADI interface
- Remote control/monitoring via DashBoard™ software
- Low power/high-density design; only 3.3 Watts per card
- Up to 250m 1694A receive EQ capability
- Five-year warranty

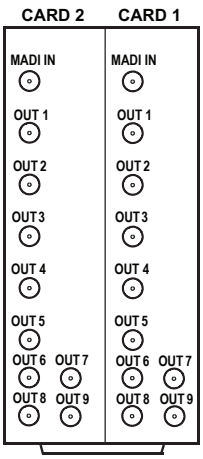




RM20-9257-A



RM20-9257-A/S



RM20-9257-B/S

» SPECIFICATIONS

Electrical

Power:	3.3 watts

MADI (AES10-2003) Input

Number of Inputs:	1
Impedance:	75 Ω
Data Rate:	125 Mbps
Level:	0.15 - 0.6 Vp-p

MADI (AES10-2003) Outputs

Number of Outputs:	9 (max.)
Impedance:	75 Ω
Level:	0.3 - 0.6 Vp-p
Jitter:	0.1 UI

» ORDERING INFORMATION

9257 1x9 MADI (AES10-2003) Audio Distribution Amplifier

RM20-9257-A 20-Slot Frame Rear I/O Module (Standard Width) 1 MADI Input BNC, 9 MADI Output BNCs

RM20-9257-A/S 20-Slot Frame Rear I/O Module (Split) Dual MADI Input BNC, 4 MADI Output BNCs per card

RM20-9257-B/S-DIN 20-Slot Frame Rear I/O Module (Split) Dual MADI Input (DIN1.0/2.3), 9 MADI Outputs (All connectors DIN1.0/2.3) per card

RM20-9257-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split) Dual MADI Input (HD-BNC), 9 MADI Outputs (All connectors HD-BNC) per card

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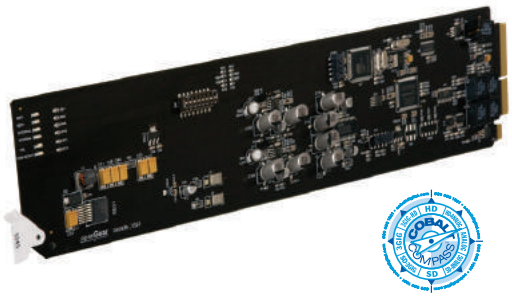
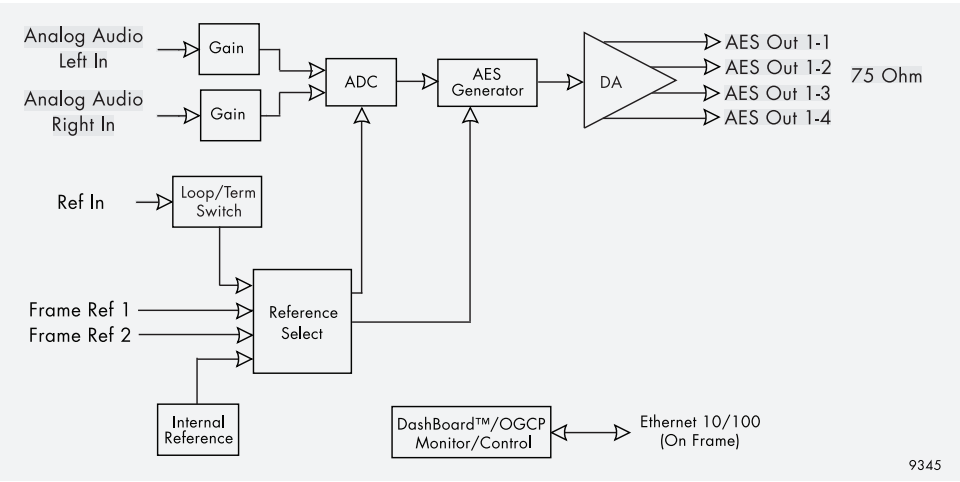
9345 » STEREO ANALOG AUDIO TO AES A/D CONVERTER

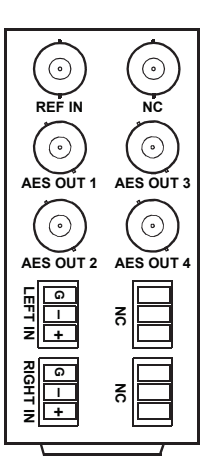


The 9345 is an analog-to-AES digital audio converter, providing A/D audio conversion and AES signal distribution. The card supports audio sampling frequencies from 30 kHz to 192 kHz, and converts the incoming stereo analog audio signal to an AES digital audio signal using 24-bit conversion.

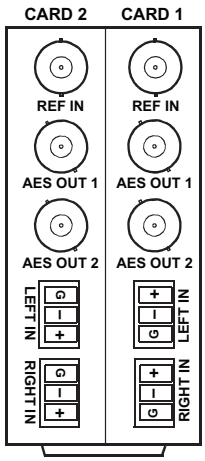
» FEATURES

- Internal clock generates audio sampling frequencies from 32 kHz to 192 kHz
- Can synchronize to frame, external or internally generated reference signals
- 24-bit audio conversion
- Remote control/monitoring via DashBoard™ software
- Five-year warranty





RM20-9345-B



RM20-9345-B/S

» SPECIFICATIONS

Electrical

Power:	4 watts

Analog Audio Input

Number of Inputs:	2 balanced
Impedance:	>20 kΩ balanced
Signal Level:	up to +24 dBu
Freq. Response:	+/-0.2 dB at 20 Hz to 20 kHz
THD+N:	<0.01%
Noise:	-84 dBu at 20 Hz to 20 kHz

AES Output

Number of Outputs:	4 unbalanced
Impedance:	75 Ω
Resolution:	24-bit
Level:	1 Vp-p
Sample rate:	30 kHz to 192 kHz
Jitter:	<5 ns

» ORDERING INFORMATION

9345 Stereo Analog to AES/EBU Digital Audio Converter

RM20-9345-B 20-Slot Frame Rear I/O Module (Standard Width) 2 Balanced Analog Audio In, 4 AES Output BNCs, 1 Reference Input BNC

RM20-9345-B/S 20-Slot Frame Rear I/O Module (Split) 2 Balanced Analog Audio In, 2 AES Output BNCs, 1 Reference Input BNC (per card)

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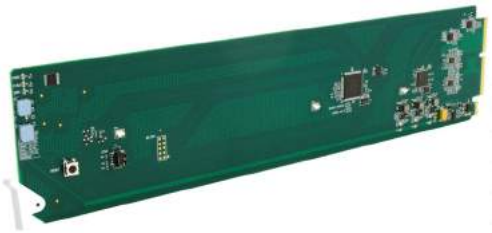
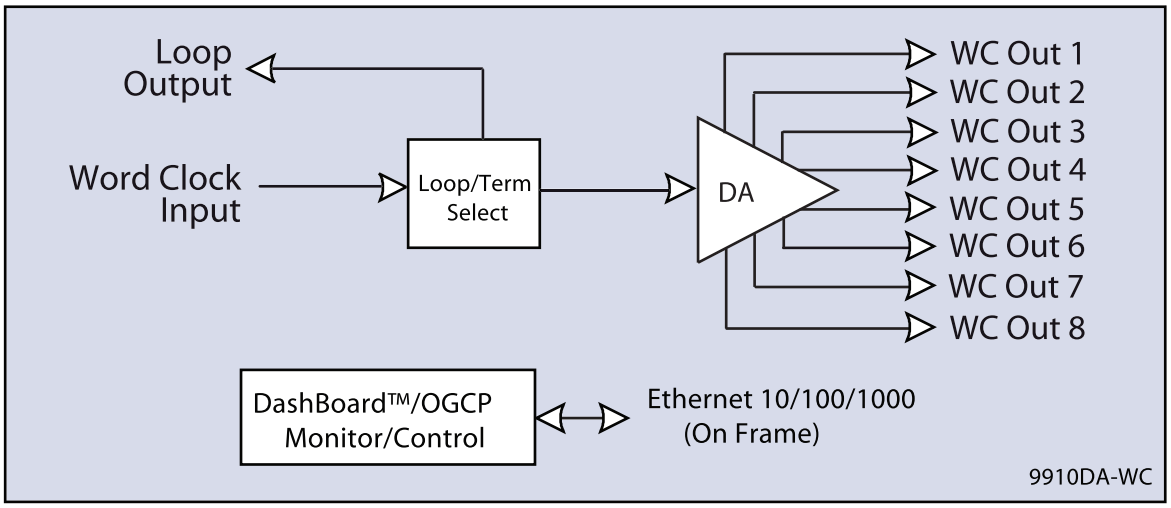
9910DA-WC » AUDIO WORD CLOCK DISTRIBUTION AMPLIFIER

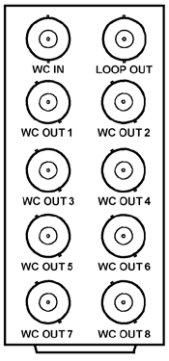


The Cobalt® **9910DA-WC Audio Word Clock Distribution Amplifier** provides 1x8 distribution with one word clock input and eight 75Ω word clock outputs. Card jumpers allow setting the input as Hi-Z looping input or on-card 75Ω terminated. The card can be accessed using DashBoard™ remote control for status monitoring.

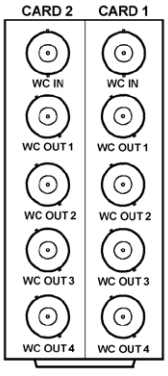
FEATURES

- Multi-mode input provides hi-Z looping or card-terminated operation
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Five year warranty

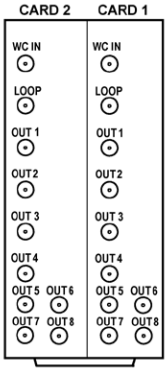




RM20-9910WC-B



RM20-9910WC-A/S



RM20-9910WC-BS-DIN
RM20-9910WC-BS-DIN

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9910DA-WC » AUDIO WORD CLOCK DISTRIBUTION AMPLIFIER

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
2 Watts

Word Clock Input
Number of inputs: (1)
Impedance: User selectable as hi-Z looping or card-terminated 75Ω
Sensitivity: 200 mV

Word Clock Outputs
Number of DA outputs: up to (8)
Impedance: 75Ω
Level: 10 Vp-p square wave (unterminated), 5 Vp-p square wave (terminated into 75Ω)
Looping Output: (1)

ORDERING INFORMATION

9910DA-WC Audio Word Clock Distribution Amplifier

RM20-9910WC-B 20-Slot Frame Rear I/O Module (Standard Width) (1) Word Clock Input BNC, (8) Word Clock DA Output BNCs, (1) Input Loop Output BNC

RM20-9910WC-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) Word Clock Input BNC, (4) Word Clock DA Output BNCs (connections are per each Card 1 / Card 2 connector bank)

RM20-9910WC-B/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) Word Clock Input, (8) Word Clock DA Outputs, (1) Input Loop Output (connections are per each Card 1 / Card 2 connector bank; all connectors are DIN 1.0/2.3)

RM20-9910WC-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) Word Clock Input, (8) Word Clock DA Outputs, (1) Input Loop Output ((connections are per each Card 1 / Card 2 connector bank; all connectors are HD-BNC)

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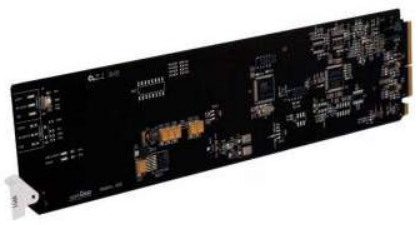
9913DA-AES75-RG » 75-OHM (UNBALANCED) AES DISTRIBUTION AMPLIFIER

with Remote Gain Control



The **9913DA-AES75-RG 75-Ohm (Unbalanced) AES Distribution Amplifier with Remote Gain Control** is a broadcast-quality AES distribution amplifier that provides up to eight copies of the input AES-3id signal. A transformer-coupled input helps prevent ground loop and other grounding-related problems.

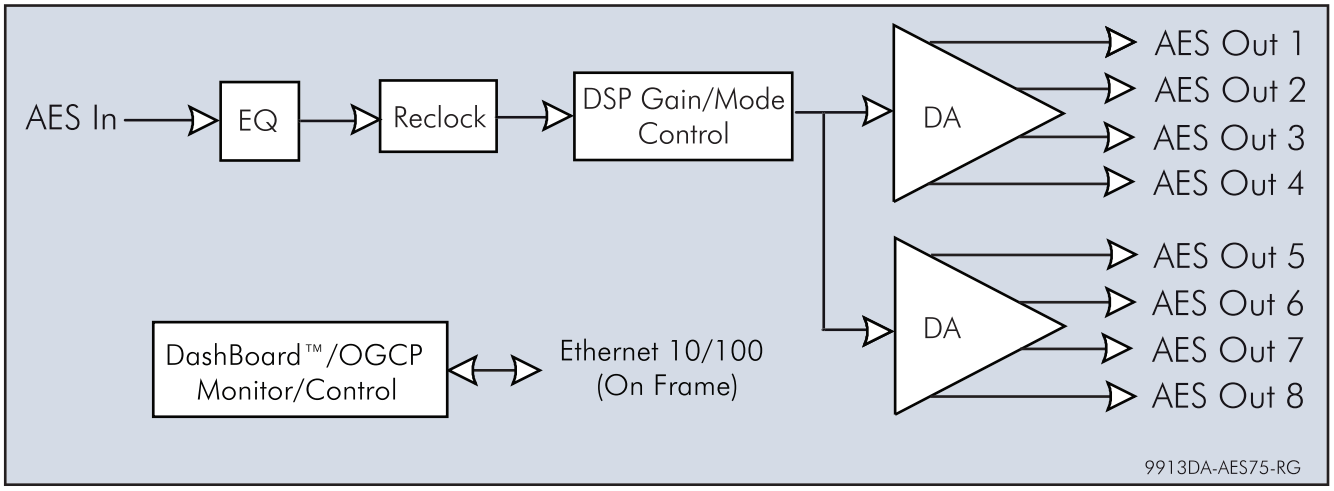
The 9913DA-AES75-RG supports audio sampling frequencies from 32kHz to 96kHz. Cable equalization and reclocking techniques enable the 9913DA-AES75-RG to recover the incoming digital audio signal reliably. The 9913DA-AES75-RG also includes built-in loudness measurement, with ITU1770 LKFS loudness measurement displayed in DashBoard.

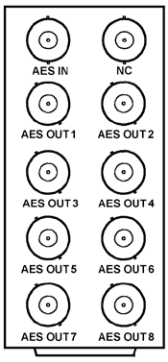
A built-in DSP allows mono-mix and L/R-only outputs (these functions can be locked out for Dolby® signal processing). The DSP attenuation function allows overall gain (stereo ganged) trim (offset) via DashBoard™ remote control.

The space-saving design and very low power consumption of the 9913DA-AES75-RG provides for high density, allowing two cards to be collocated in adjacent slots and served by a single, standard-width "split" rear module.

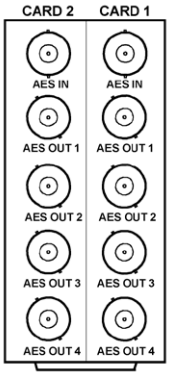
FEATURES

- Full remote control of operating mode and gain control
- Multiple DSP modes – stereo/pass-thru, mono mix, L/R only outputs
- Transformer-coupled input prevents ground loop issues and other ground-related problems
- Convenient DSP gain trim via DIP or remote control (gain disable for Dolby/non-PCM usage)
- DashBoard LKFS loudness display (10-second averaging)
- Selectable card switch control or DashBoard™ remote control (usable with DashBoard™ and Cobalt OGCP-9000 remote control panels)
- Hot-swappable
- Five year warranty





RM20-9913DA75-A



RM20-9913DA75-AIS

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9913DA-AES75-RG » 75-OHM (UNBALANCED) AES DISTRIBUTION AMPLIFIER

with Remote Gain Control

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 2.2 Watts

AES Input
Number of Inputs: (1), unbalanced AES-3id (transformer-coupled)
Impedance: 75 Ω
Maximum Input Level: +27.5 dBu

Performance
Sampling Rates: 32 kHz to 96 kHz
Signal Level: 0.2 – 7 Vp-p
Resolution: 24-bit
Output Jitter: < 5 ns

AES Output
Number of Outputs: (8) max, unbalanced AES-3id (available as stereo, pass-thru, mono-mixed, or L/R only)
Impedance: 75 Ω
Return Loss: -25 dB

ORDERING INFORMATION

9913DA-AES75-RG 75-Ohm (Unbalanced) AES Distribution Amplifier with Remote Gain Control

RM20-9913DA75-A 20-Slot Frame Rear I/O Module (Standard Width) (1) AES Audio In BNC, (8) AES Audio Out BNCs

RM20-9913DA75-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) AES Audio In BNC, (4) AES Audio Out BNCs (connections are per card)

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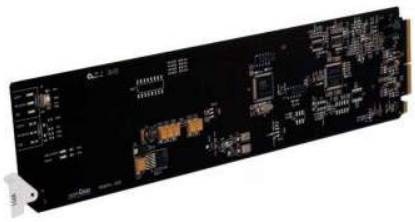
9913DA-AES110-RG » 110-OHM (BALANCED) AES/EBU DISTRIBUTION AMPLIFIER

with Remote Gain Control



The **9913DA-AES110-RG 110-Ohm (Balanced) AES/EBU Distribution Amplifier with Remote Gain Control** is a broadcast-quality AES distribution amplifier that provides up to eight copies of the input AES/EBU signal. A transformer-coupled input helps prevent ground loop and other grounding-related problems.

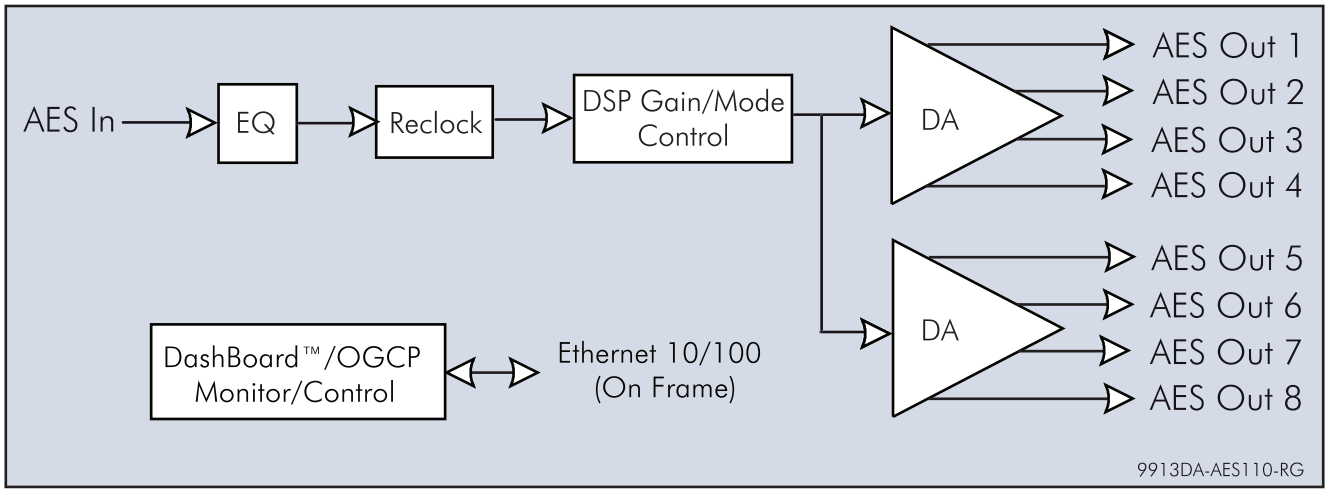
The 9913DA-AES110-RG supports audio sampling frequencies from 32kHz to 96kHz. Cable equalization and reclocking techniques enable the 9913DA-AES110-RG to recover the incoming digital audio signal reliably. The 9913DA-AES110-RG also includes built-in loudness measurement, with ITU1770 LKFS loudness measurement displayed in DashBoard.

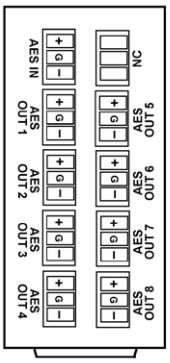
A built-in DSP allows mono-mix and L/R-only outputs (these functions can be locked out for Dolby® signal processing). The DSP attenuation function allows overall gain (stereo ganged) trim (offset) via DashBoard™ remote control.

The space-saving design and very low power consumption of the 9913DA-AES110-RG provides for high density, allowing two cards to be collocated in adjacent slots and served by a single, standard-width “split” rear module.

FEATURES

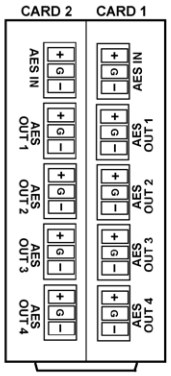
- Full remote control of operating mode and gain control
- Multiple DSP modes – stereo/pass-thru, mono mix, L/R only outputs
- Transformer-coupled input prevents ground loop issues and other ground-related problems
- Convenient DSP gain trim via DIP or remote control (gain disable for Dolby/non-PCM usage)
- DashBoard LKFS loudness display (10-second averaging)
- Selectable card switch control or DashBoard™ remote control (usable with DashBoard™ and Cobalt OGCP-9000 remote control panels)
- Hot-swappable
- Five year warranty





Note: + / G / - orientation on connectors varies from that on other Cobalt products. Make certain hookup is as shown here.

RM20-9913DA110-B



Note: + / G / - orientation on connectors varies from that on other Cobalt products. Make certain hookup is as shown here.

RM20-9913DA110-B/S

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9913DA-AES110-RG » 110-OHM (BALANCED) AES/EBU DISTRIBUTION AMPLIFIER

with Remote Gain Control

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 2.2 Watts

AES Input

Number of Inputs: (1), balanced AES/EBU (transformer coupled)
Impedance: 110 Ω, balanced
Maximum Input Level: +27.5 dBu
Connector Type: WECO® removable modular
Equalization: 2000ft (650m) over 110 Ω, twisted-pair cable

Performance

Sampling Rates: 32 kHz to 96 kHz
Signal Level: 0.2 – 7 Vp-p
Resolution: 24-bit
Output Jitter: < 5 ns

AES Output

Number of Outputs: (8) max, balanced AES/EBU (available as stereo, pass-thru, mono-mixed, or L/R only)
Impedance: 110 Ω balanced
Return Loss: -25 dB
Connector Type: WECO® removable modular

ORDERING INFORMATION

9913DA-AES110-RG 110-Ohm (Balanced) AES/EBU Distribution Amplifier with Remote Gain Control

RM20-9913DA110-B 20-Slot Frame Rear I/O Module (Standard Width) (1) AES Audio In, (8) AES Audio Out (all connectors 3-terminal)

RM20-9913DA110-B/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) AES Audio In, (4) AES Audio Out (all connectors 3-terminal; connections are per card)

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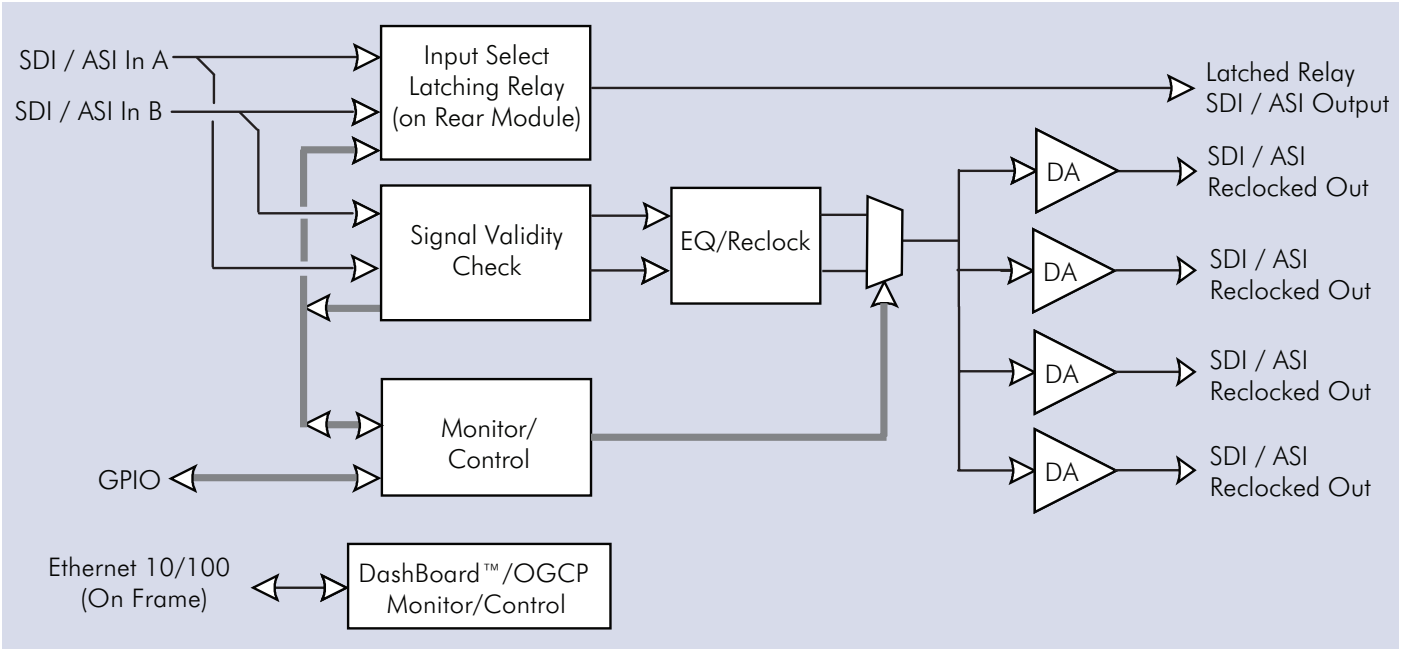
9121 » 3G/HD/SD-SDI / ASI REDUNDANCY SWITCH

The 9121 3G/HD/SD-SDI / ASI Redundancy Switch allows manual or failover changeover control between two SDI or ASI sources to a common SDI or ASI output. Output routing uses latching relay routing to retain the selected I/O path even if the card/frame is powered down or the card is removed from its slot. Switchover can be manually activated or be set to provide intelligent automatic failover based on GPI or signal validity.

The 9121 is very straightforward in operation in that the signal path is via a direct (passive) relay path output (the selected input is also available via non-relay coupled 4x DA drivers). The entire signal package is kept intact with no modification of the signal.

FEATURES

- Automatically provides passive-path switchover protection to alternate SDI/ASI stream in case of signal loss
- Simple relay routing signal path maintains full signal integrity. Rear-module located latching relays maintain signal path even if card/power is lost.
- Alternate non-relay 4x DA output (with reclock enable/disable) also provided
- Selectable input switchover with automatic failover on loss of input, or manual switchover using DashBoard remote control or GPI
- 3G/HD/SD-SDI and ASI compatible on all inputs and outputs
- DashBoard™ signal status monitoring of both active and alternate inputs. Card log page shows a history of recent routing events (whether manually or auto-failover invoked).
- Five year warranty



openGear

DashBoard

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9121 » 3G/HD/SD-SDI / ASI REDUNDANCY SWITCH

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 6 Watts

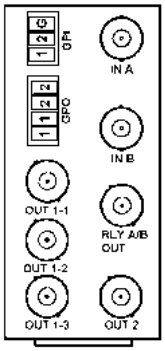
Switchover Triggering
Selectable automatic failover upon loss of valid SMPTE 424M, 292M, or 259M formatted signal. Manual switchover using DashBoard remote control or GPI.

3G/HD/SD-SDI / ASI Inputs
Number of inputs: 2
Standards (SDI):
3G-SDI (SMPTE 424M)
HD-SDI (SMPTE 292M)
SD-SDI (SMPTE 259M)
Impedance: 75Ω

SDI/ASI Outputs
Number of outputs:
(1) 75Ω BNC Latching relay direct from selected input A or B
(4) 75Ω BNC Reclocked via mux from selected input A or B
213Mbit/s maximum ASI TS bit-rate per port

GPI
Two independent inputs
Independent edge-triggered on H/L transition
Connector: 3-terminal Phoenix; GPI-1/GPI-2/COM

GPO
Two, independent non-referenced opto-isolated upon configurable true condition(s).
Connector: 4-terminal Phoenix; GPO-1/GPO-2



RM20-9121-B

ORDERING INFORMATION

9121 3G/HD/SD-SDI / ASI Redundancy Switch

RM20-9121-B 20-Slot Frame Rear I/O Module (Standard Width) Dual SDI/ASI Input BNCs, Relay SDI/ASI Output BNC, 4 SDI/ASI Reclockable Output BNCs, 2 GPI, 2 GPO

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9940-ACO » 3G/HD/SD-SDI MULTI-INPUT INTELLIGENT AUTO-CHANGEOVER SWITCH

with Optional Trouble Slate Inserter

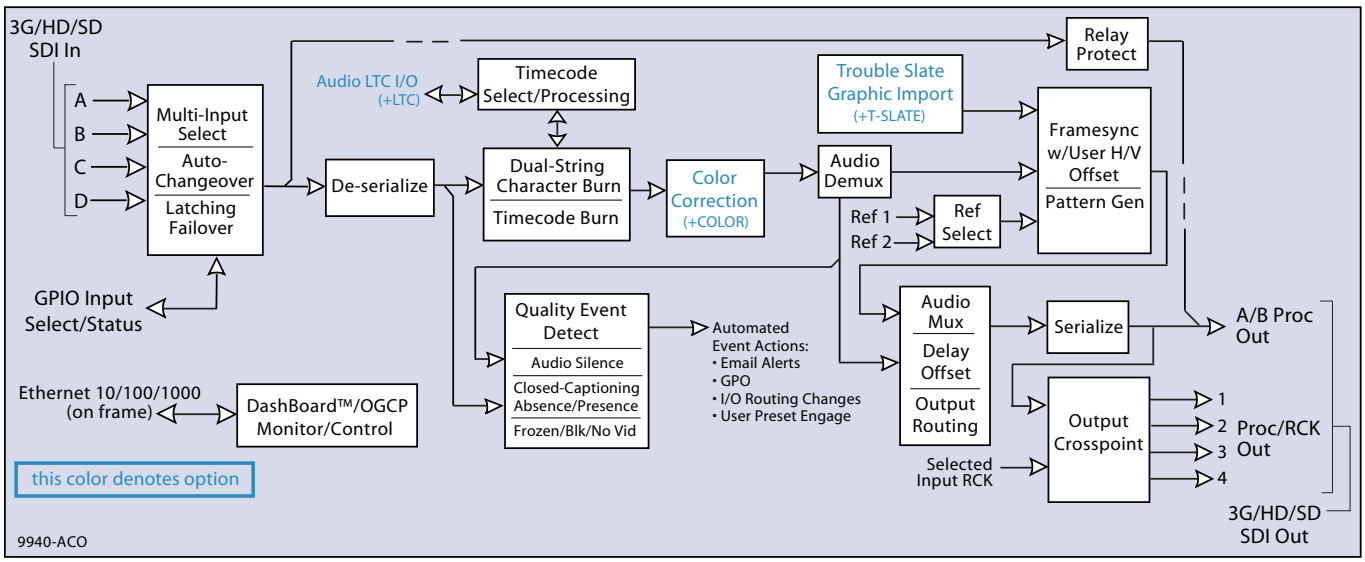
The Cobalt® **9940-ACO 3G/HD/SD-SDI Multi-Input Intelligent Auto-Changeover Switch with Optional Trouble Slate Inserter** allows manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions as well as user-configurable Video Quality Event intelligent assessments such as black/frozen frame or audio silence. Also included standard is closed captioning absence/presence detection for CEA 608/708 and line 21 SD closed captioning. Video Quality or Closed-Captioning event status can independently be propagated for each event type as GPO, automated alert email, input routing changes, or card user presets you can configure to provide any number of special actions such as routing changes or burn-in text alert messages. A user trouble slate graphic file can be uploaded to the card, which in turn can be automatically inserted in active video if any Video Quality Event triggered errors occur.

Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Any of several standard test patterns can be inserted as an input LOS marker. A moving-box insertion can serve as a dynamic raster confidence check even when the input video image is static. Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video.

Preset save/load allows saving custom card 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. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

- Multi-input, with manual selection or Intelligent Auto-Changeover failover. Latching relay bypass retains manual or failover input-to-output routing even in the event of power failure.
- Intelligent Auto-Changeover can be set to invoke failover or alerts for basic input loss as well as intelligent failover/alert based on black/frozen frame or audio silence. Threshold and hold-off are user configurable.
- Video Quality and Closed-Captioning Absence detection and flagging with GPO, automated alert email, input auto-changeover, or engage custom user preset actions
- Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static
- Optional Clean and Quiet Switching provides automatic audio muting during switching transitions from one SDI input source to another to provide silence between input switches
- Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)
- Optional User Trouble Slate Graphic Import allows trouble slate to be displayed upon user-selectable input error conditions (such as CC or audio loss, or frozen frame)
- Frame Sync with full H/V offset and manual/LOS video pattern generator
- Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format
- Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs
- Low-power/high-density design – less than 18 Watts per card
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- Five year warranty



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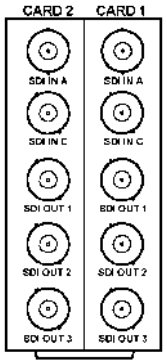
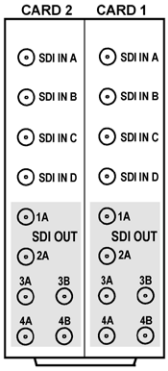
9940-ACO » 3G/HD/SD-SDI MULTI-INPUT INTELLIGENT AUTO-CHANGEOVER SWITCH

with Optional Trouble Slate Inserter



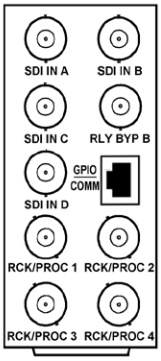
RM20-9940-A/S



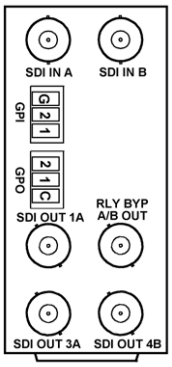
RM20-9940-B/S-DIN
RM20-9940-B/S-HDBNC

Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input.

RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.



RM20-9940-C



RM20-9940-F

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 18 Watts

SDI Input/Outputs
Up to (4) 75Ω BNC inputs
Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)
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
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)

Input Select/Auto-Changeover Failover
Manual selection (forced) of any input.
· 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.
· Relay bypass SDI IN B to RLY BYP B upon loss of power.

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

Frame Reference Input
(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level”.

ORDERING INFORMATION

9940-ACO 3G/HD/SD-SDI Multi-Input Intelligent Auto-Changeover Switch with Optional Trouble Slate Inserter

RM20-9940-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNC, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per Card 1 and Card 2 connector banks)

RM20-9940-B/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors DIN1.0/2.3)

RM20-9940-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors HD-BNC)

RM20-9940-C 20-Slot Frame Rear I/O Module (Standard Width) (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

RM20-9940-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as processed or reclocked of selected input, (2) GPI, (2) GPO

+T-SLATE User Trouble Slate Graphic Import Option

+CQS Clean and Quiet Switching Option

+COLOR Color Correction Option

+LTC Audio LTC I/O Option

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BBG-1040-ACO » 3G/HD/SD-SDI STANDALONE MULTI-INPUT INTELLIGENT AUTO-CHANGEOVER SWITCH with Optional Trouble Slate Inserter

The Cobalt® **BBG-1040-ACO 3G/HD/SD-SDI Standalone Multi-Input Intelligent Auto-Changeover Switch with Optional Trouble Slate Inserter** allows manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions as well as user-configurable Video Quality Event intelligent assessments such as black/frozen frame or audio silence. Also Included standard is closed captioning absence/presence detection for CEA 608/708 and line 21 SD closed captioning. Video Quality or Closed-Captioning event status can independently be propagated for each event type as GPO, automated alert email, input routing changes, or card user presets you can configure to provide any number of special actions such as routing changes or burn-in text alert messages. A user trouble slate graphic file can be uploaded to the unit, which in turn can be automatically inserted in active video if any Video Quality Event triggered errors occur.

Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Any of several standard test patterns can be inserted as an input LOS marker. A moving-box insertion can serve as a dynamic raster confidence check even when the input video image is static. Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video.

The BBG-1040-ACO 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-1040-ACO 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

- Multi-input, with manual selection or Intelligent Auto-Changeover failover. Latching relay bypass retains manual or failover input-to-output routing even in the event of power failure.
- Intelligent Auto-Changeover can be set to invoke failover or alerts for basic input loss as well as intelligent failover/alert based on black/frozen frame or audio silence. Threshold and hold-off are user configurable.
- Video Quality and Closed-Captioning Absence detection and flagging with GPO, automated alert email, input auto-changeover, or engage custom user preset actions
- Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)
- Optional user trouble slate graphic import allows trouble slate to be displayed upon user-selectable input error conditions (such as CC or audio loss, or frozen frame)
- Moving-box/motion insertion enable serves as a dynamic raster confidence check even when the input video image is static
- Frame Sync with full H/V offset and manual/LOS video pattern generator. Frame sync can also convert raster format between 29.97/59.94 and 30/60 formats. Rear-panel looping reference connectors.
- Full audio crosspoint with delay control available for all audio outputs
- Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format
- Remote control/monitoring via DashBoard™ software, OGCP-9000 Remote Control Panel, or Web Browser User Interface
- Redundant power supply option
- Compact footprint – up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.
- Five year warranty

OPTIONS

- User Trouble Slate Graphic Import (+T-SLATE) – Allows uploading of up to three different user trouble slate graphic file to card, with automated insertion controlled by GPI or other events
- Color Corrector (+COLOR) – Provides full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip
- Clean and Quiet Switching (+CQS) – Provides automatic audio muting during switching transitions from one SDI input source to another to provide silence between input switches
- Audio LTC I/O (+LTC)
- 1RU Mounting Tray (supports 3 units) (BBG-1000-TRAY)
- Redundant Power Supply Module (BBG-1000-PS)

DashBoard

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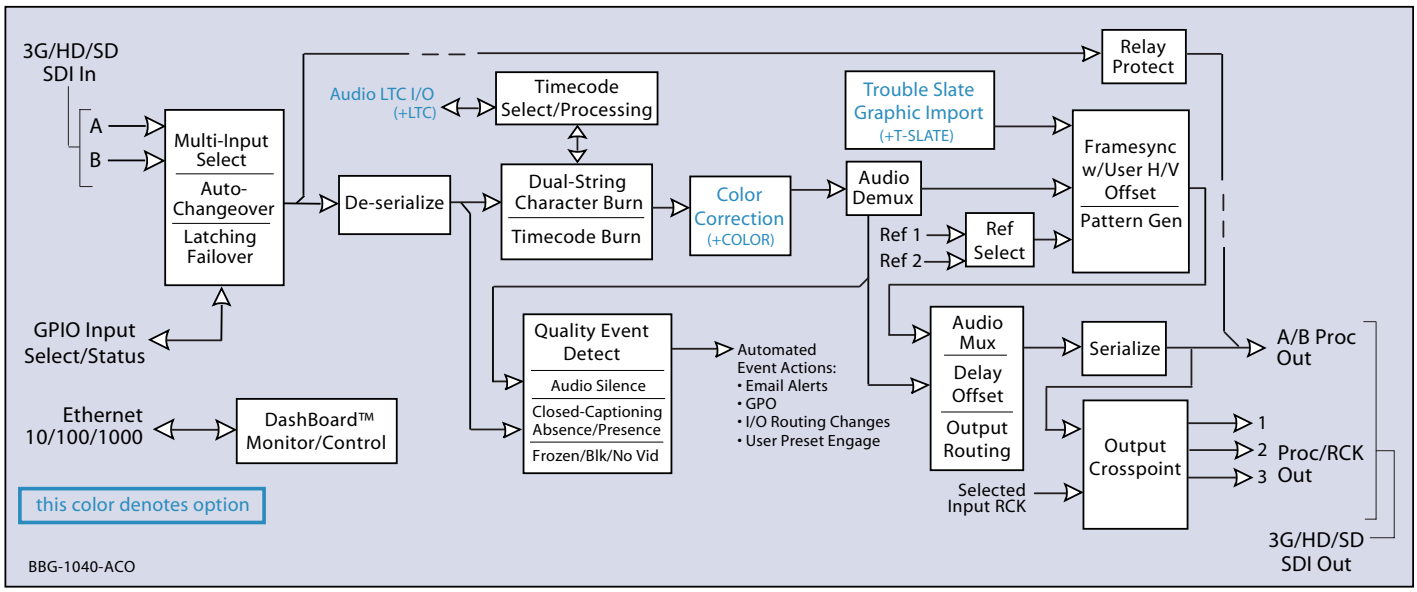
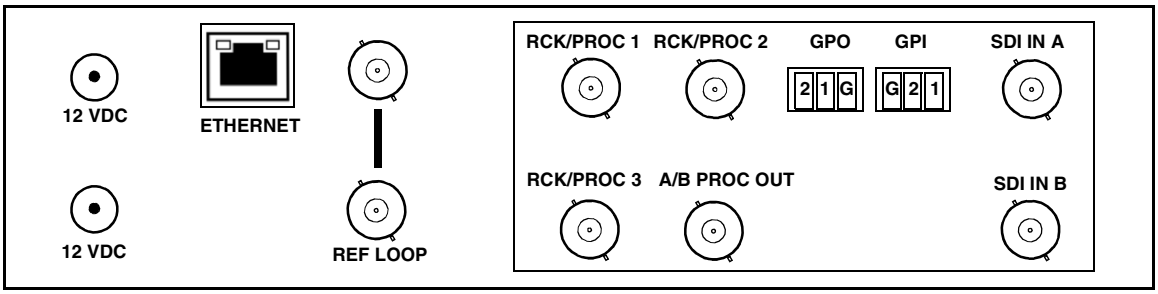
BBG-1040-ACO » 3G/HD/SD-SDI STANDALONE MULTI-INPUT INTELLIGENT AUTO-CHANGEOVER SWITCH with Optional Trouble Slate Inserter





Note: A/B PROC OUT is the card processed output which uses either input SDI IN A or SDI IN B. This output uses relay latching to retain selected routing in the event of power loss regardless of whether a selection was manually invoked or by a unit-detected failover (for example, if an auto-changeover from A to B was invoked while active, routing of input B to this output is retained in the event of power loss).

RCK/PROC 1 thru **RCK/PROC 3** are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input. These outputs are **not** relay-equipped and will lose signal in the event of power loss.

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BBG-1040-ACO » 3G/HD/SD-SDI STANDALONE MULTI-INPUT INTELLIGENT AUTO-CHANGEOVER SWITCH with Optional Trouble Slate Inserter

SPECIFICATIONS

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 IN or IN RCK)
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:
SD: 127 pixels; 9.4 us
720p: 330 pixels; 4.45 us
1080i: 271 pixels; 3.65 us
1080p: 361 pixels; 2.43 us

Input Select/Auto-Changeover Failover

Manual selection (forced) of any input via DashBoard or GPI.
Failover to alternate input on loss of target input. Failover invoked upon LOS or user configurable parametric criteria such as black/frozen frame or audio silence.
Relay latching for manually or failover selected path retains routing in loss of power conditions.

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Audio Output

16-ch embedded.User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Downmix output available for any output channel pair. Master delay control; range of -33 msec to +3000 msec.

GPIO

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected.

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)

ORDERING INFORMATION

BBG-1040-ACO 3G/HD/SD-SDI Standalone Multi-Input Intelligent Auto-Changeover Switch with Optional Trouble Slate Inserter (includes one BBG-1000-PS Power Supply)

Options and Accessories:

+T-SLATE Uset Trouble Slate Graphic Import Option

+COLOR Color Correction Option

+CQS Clean and Quiet Switching Option

+LTC Audio LTC I/O Option

BBG-1000-PS Redundant Power Supply Module

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

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9940-4x1-CS » 3G/HD/SD-SDI 4X1 CLEAN AND QUIET BYPASS ROUTER

with Relay-Protected Input and GPIO Monitoring / Control

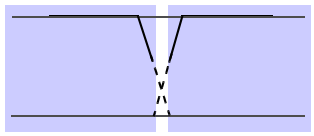
The Cobalt® **9940-4x1-CS 3G/HD/SD-SDI 4x1 Clean and Quiet Bypass Router** with Relay-Protected Input and GPIO Monitoring / Control provides Clean & Quiet routing in a high-density card-based openGear® solution. The Clean & Quiet routing not only provides switching on the RP168-specified VANC switch line, but also provides audio cross-fade upon switches to provide video switches free of switching artifacts, and provides dead-quiet audio between switches.

Multiple SDI input ports allow manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions. Also included standard is closed captioning absence/presence detection for CEA 608/708 and line 21 SD closed captioning. Option **+QC** provides user-configurable Video Quality Event intelligent assessments such as black/frozen frame or audio silence. Video Quality or Closed-Captioning event status can independently be propagated for each event type as GPO, automated alert email, input routing changes, or card user presets you can configure to provide any number of special actions such as routing changes or burn-in text alert messages.

Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Any of several standard test patterns can be inserted as an input LOS marker. A moving-box insertion can serve as a dynamic raster confidence check even when the input video image is static. Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video.

Preset save/load allows saving custom card 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. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

Quiet Cross-Fade pulls audio to floor and gracefully reverts to normal level during input routing changes



FEATURES

- Clean & Quiet Routing ensures program video switches free from video artifacts and audio clicks or pops
- Multi-input, with manual selection or intelligent Auto-Changeover failover
- Closed-captioning absence detection
- 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.
- Input selection and status can be propagated via GPIO, serial, or IP interfaces
- Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static
- Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)
- Video options include color correction
- Low-power/high-density design – less than 18 Watts per card
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- 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 hard clip, white soft clip, black hard clip, and saturation clip
- Audio LTC I/O (**+LTC**)

openGear®

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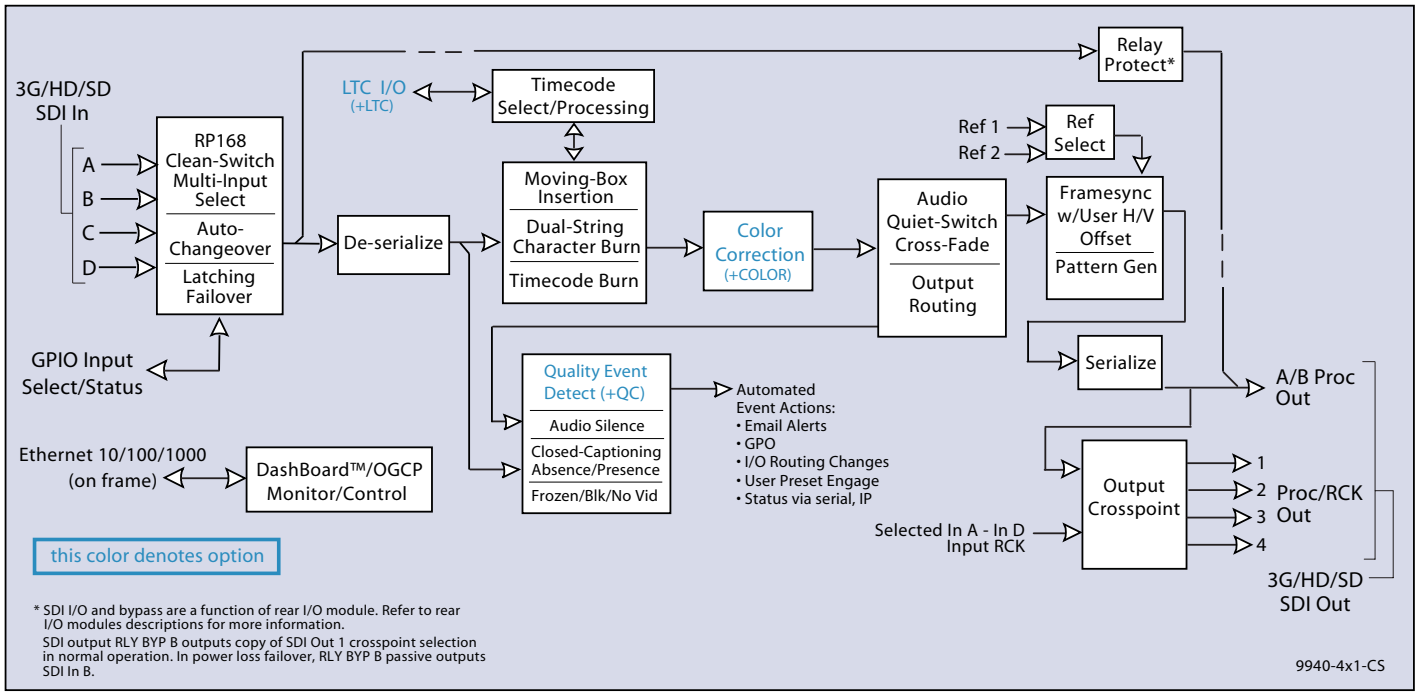
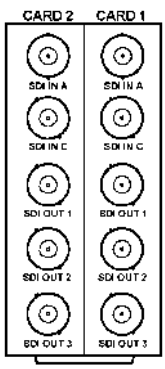
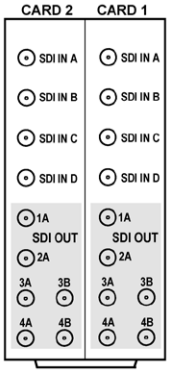
9940-4x1-CS » 3G/HD/SD-SDI 4X1 CLEAN AND QUIET BYPASS ROUTER

with Relay-Protected Input and GPIO Monitoring / Control

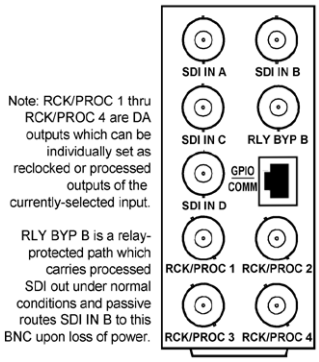




RM20-9940-A/S



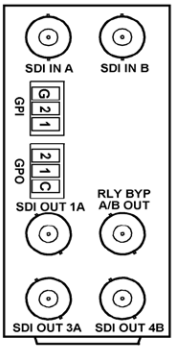
RM20-9940-B/S-DIN
RM20-9940-B/S-HDBNC



Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input.

RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.

RM20-9940-C



RM20-9940-F

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9940-4x1-CS » 3G/HD/SD-SDI 4X1 CLEAN AND QUIET BYPASS ROUTER

with Relay-Protected Input and GPIO Monitoring / Control

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Input/Outputs

Up to (4) 75Ω BNC inputs
Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)
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)

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

GPIO/COMM

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

ORDERING INFORMATION

9940-4X1-CS 3G/HD/SD-SDI 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control

RM20-9940-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNCs, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per each Card 1 / Card 2 connector bank)

RM20-9940-B/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors DIN1.0/2.3)

RM20-9940-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (6) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors HD-BNC)

RM20-9940-C 20-Slot Frame Rear I/O Module (Standard Width) (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

RM20-9940-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs, (2) GPI, (2) GPO

+QC Quality Check Option

+COLOR Color Correction Option

+LTC Audio LTC I/O Option

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BBG-1040-4x1-CS » 3G/HD/SD-SDI STANDALONE 4X1 CLEAN AND QUIET BYPASS ROUTER

with Relay-Protected Input and GPIO Monitoring / Control

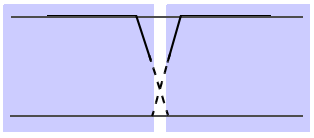
The Cobalt® **BBG-1040-4x1-CS 3G/HD/SD-SDI Standalone 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control** provides Clean & Quiet routing in a high-density standalone solution. The Clean & Quiet routing not only provides switching on the RP168-specified VANC switch line, but also provides audio cross-fade upon switches to provide video switches free of switching artifacts, and provides dead-quiet audio between switches.

Multiple SDI input ports allow manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions. Also included standard is closed captioning absence/presence detection for CEA 608/708 and line 21 SD closed captioning. Option +QC provides user-configurable Video Quality Event intelligent assessments such as black/frozen frame or audio silence. Video Quality or Closed-Captioning event status can independently be propagated for each event type as GPO, automated alert email, input routing changes, or user presets you can configure to provide any number of special actions such as routing changes or burn-in text alert messages.

Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Any of several standard test patterns can be inserted as an input LOS marker. A moving-box insertion can serve as a dynamic raster confidence check even when the input video image is static. Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video.

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-1040-4x1-CS can be remote-controlled using DashBoard™. The compact standalone form factor allows desktop usage, as well as the 1/3-rack size of the BBG-1040-4x1-CS 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).

Quiet Cross-Fade pulls audio to floor and gracefully reverts to normal level during input routing changes



FEATURES

- Clean & Quiet Routing ensures program video switches free from video artifacts and audio clicks or pops
- Multi-input, with manual selection or intelligent Auto-Changeover failover
- Closed-captioning absence detection
- 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.
- Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static
- Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)
- Input selection and status can be propagated via GPIO, serial, or IP interfaces
- 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 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 hard clip, white soft clip, black hard clip, and saturation clip
- Audio LTC I/O (+LTC)

DashBoard

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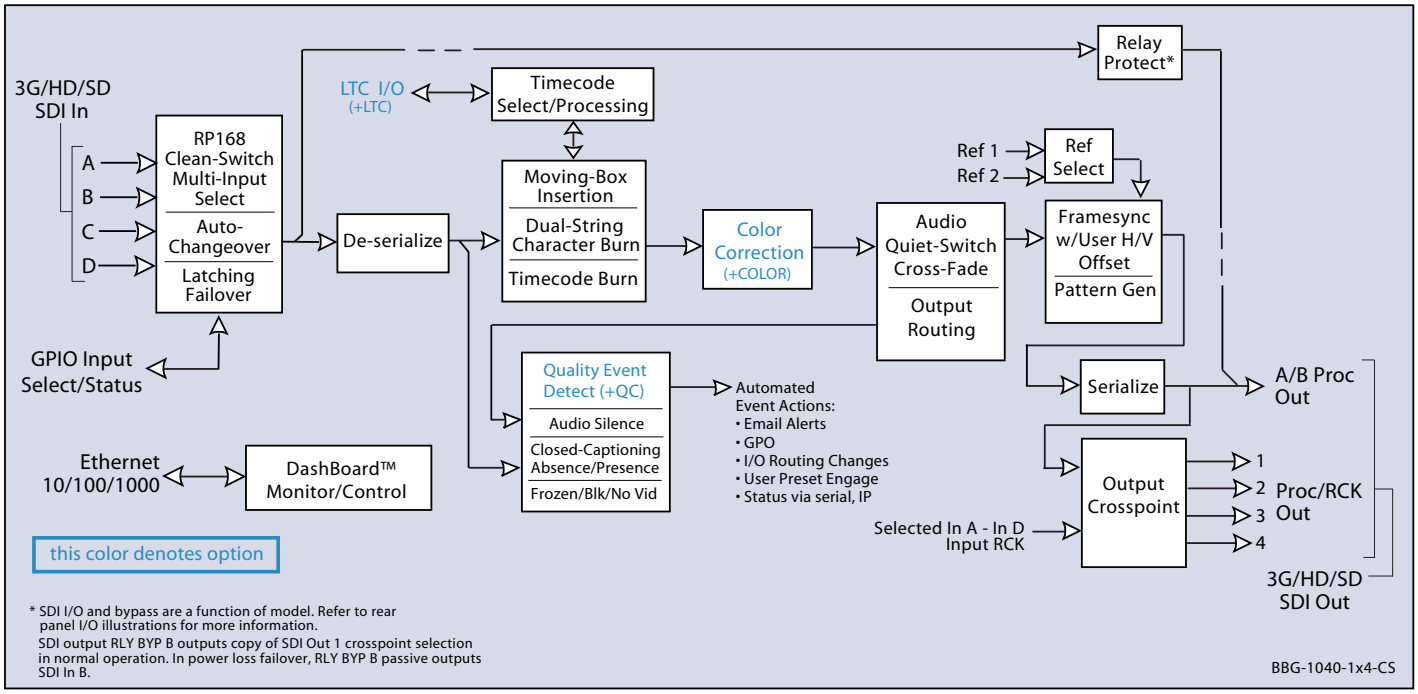
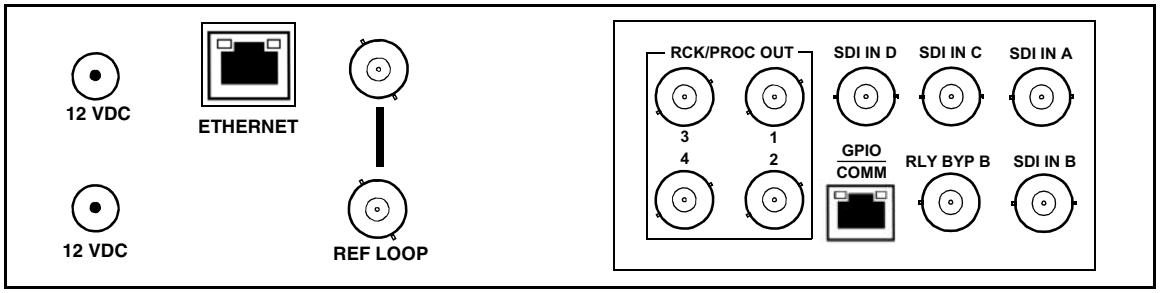
BBG-1040-4x1-CS » 3G/HD/SD-SDI STANDALONE 4X1 CLEAN AND QUIET BYPASS ROUTER

with Relay-Protected Input and GPIO Monitoring / Control



Rear Panel



Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input. RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.

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BBG-1040-4x1-CS » 3G/HD/SD-SDI STANDALONE 4X1 CLEAN AND QUIET BYPASS ROUTER

with Relay-Protected Input and GPIO Monitoring / Control

SPECIFICATIONS

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 IN or IN RCK)
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
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Control/Monitor Interface

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

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)

ORDERING INFORMATION

BBG-1040-4X1-CS 3G/HD/SD-SDI Standalone 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control

Options and Accessories:

+COLOR Color Correction Option

+QC Quality Check Option

+LTC Audio LTC I/O Option

BBG-1000-PS Redundant Power Supply Module

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

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9992-DEC » AVC / MPEG-2 SOFTWARE DEFINED BROADCAST DECODER

The Cobalt® **9992-DEC AVC/MPEG-2 Software Defined Broadcast Decoder** is a broadcast-grade multi-standard decoder designed to meet the most stringent requirements for today's broadcasters. It supports MPEG-2 and AVC (H.264), with resolution optionally up to 4K, as well as offering a full complement of audio decoding capabilities. The 9992-DEC is an industry standard openGear® card module and provides an ideal platform for transitioning to state-of-the-art decoding capabilities.

FEATURES

Future-Proof – The 9992-DEC Decoder supports MPEG-2, MPEG-4 AVC (H.264) and (optionally) HEVC (H.265), so it can be deployed today and upgraded as your needs change.

Industry Standard Form-Factor – The 9992-DEC is offered in the industry-standard openGear format, and is compatible with existing deployed openGear frames.

High Density – The 9992-DEC supports a 1080p60 input stream (two independent streams with +AVC option), or (optionally) a single UHD 4Kp60 input stream. One openGear frame can support up to 10 cards, for a total of 20 HD or 10 UHD 4K channels.

Full Audio Support – The 9992-DEC supports MPEG-1 Layer II, AAC-LC, HE-AAC, Dolby AC-3/EAC-3 and LPCM (SMPTE-302M), as well as Dolby AC-3/EAC-3 pass-thru. With an optional audio board, the decoder can support up to 16 audio channels with each video service.

Ultra Low Latency – Low latency modes available

Base Unit Features –

Support for one decode channel up to 1080p60

Support for MPEG-2 and MPEG-4 AVC (H.264)

Support for 4:2:0 8-bit/10-bit decoding

Full ancillary data support

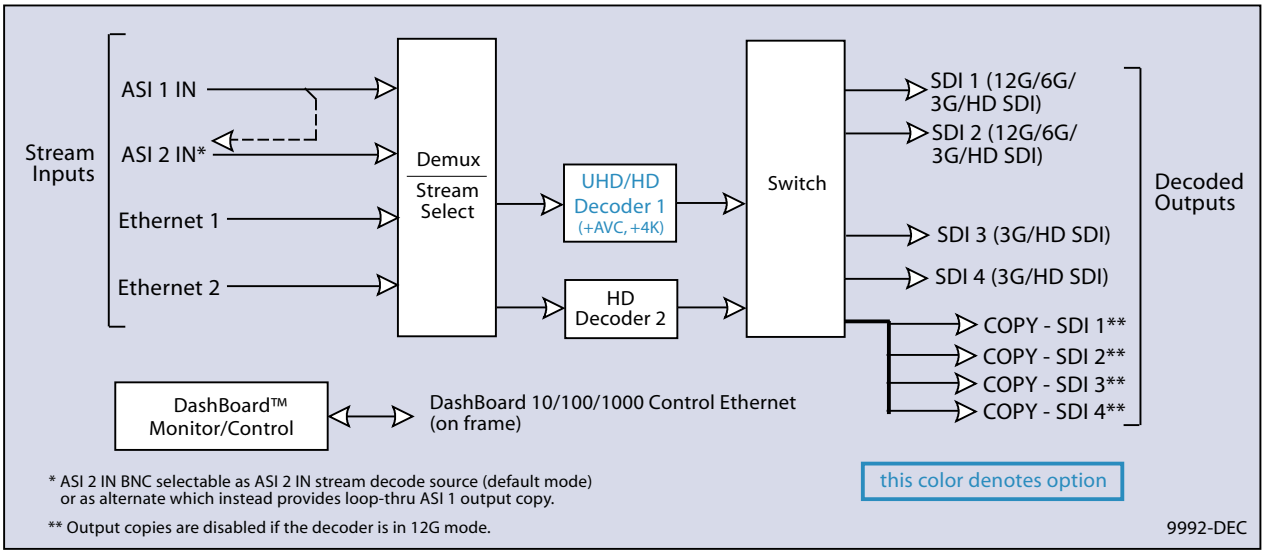
Support for 4 stereo pairs (8 audio channels) in any combination of MPEG-1 Layer II, AAC-LC, and HE-AAC (v1/v2) modes

Supports UDP, RTP, HLS, and RTMP (Client mode). Other protocols available as options.

Remote control/monitoring via Dashboard™ software

Five-year warranty

openGear



SOFTWARE LICENSABLE OPTIONS

+HEVC-DEC Enables HEVC decoding on one AVC encode engine (up to 2 licenses max per unit).

+AVC-DEC Additional 1080p60 decoder channel with MPEG-2, MPEG-4 AVC, HEVC (up to one additional channel, for a total of 2 channels per unit). Includes support for two additional stereo pairs in MPEG-1 Layer II, AAC-LC, and HE-AAC (v1/v2) modes.

+4K-DEC 4K support. Requires +AVC-DEC and +HEVC-DEC license on card.

+422 4:2:2 decoding support (per unit)

+DEC-2.0 Dolby Digital/Dolby Digital Plus stereo audio decoding license

+DEC-5.1 Dolby Digital/Dolby Digital Plus 5.1 Surround Sound audio decoding license

+DEC-5.1 Dolby Digital/Dolby Digital Plus 5.1 Surround Sound audio decoding license

+FEC-DEC Add SMPTE-2022 support (per unit)

+GENLOCK Add Genlock support (license is per channel)

+MP1L2-AAC-DEC MPEG-1 Layer II, AAC-LC, and HE-AAC audio decoding per pair. Three AAC licenses can be combined to allow one 5.1 surround decode.

+RIST/ARQ-DEC RIST RTP/ARQ support (per unit)

+RIST/ENCRP-DEC RIST Encryption/Authentication Support (per unit). (Requires the +RIST/ARQ-DEC license to also be present on the encoder.)

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9992-DEC » AVC / MPEG-2 SOFTWARE DEFINED BROADCAST DECODER

SPECIFICATIONS

Inputs

(2) DVB-ASI inputs
(2) Gigabit Ethernet ports for IP input, supporting the following protocols:
- UDP unicast/multicast
- RTP unicast/multicast with optional SMPTE-2022 FEC
- HTTP Live Streaming
- RTMP (Server or Client; limited to H.264 only)
- RIST for contribution over the Internet

Optional SMPTE-2110 baseband video over IP turnaround*
* Future release availability

Outputs

(2) SDI outputs each supporting 12G-SDI, 3G-SDI, HD-SDI and SD-SDI
(2) SDI outputs each supporting 3G-SDI, HD-SDI and SD-SDI
Support for all standard frame rates (interlaced and progressive): 23.98, 24, 25, 29.97, 30, 50, 59.94, 60

Video Post-Processing

Support for up/down/cross conversion of output video (independent of incoming stream)*
Conversion between interlaced and progressive
Frame rate conversion
High Dynamic Range (HDR) support*
* Future release availability

Video Decoding

Decoding Standards:
- MPEG-2
- MPEG-4 AVC (H.264)
- HEVC (H.265) (Option)

Support for one 1080p60 decode session (dual 1080p60 decode session support optional)
Support for UHD decoding (option) in AVC and HEVC modes (Maximum resolution 3840x2160p60)
Support for 4:2:0 and 4:2:2 (option) color spaces in all modes
Support for 8-bit / 10-bit decoding in all modes
Low latency decoding supported

Audio Decoding

Decoding Standards:
- MPEG-1 Layer II
- AAC-LC
- HE-AAC (v1/v2)
- Dolby AC-3 / EAC-3
- LPCM (SMPTE-302M)
- Dolby AC-3/EAC-3 pass-thru support

(5.1-Surround decoding available for AAC-LC, HE-AAC, Dolby AC-3 and Dolby EAC-3; subject to licensing)
Maximum number of channels supported (subject to licensing):
- MPEG-1 Layer II: 16 stereo pairs (32 audio channels)
- Dolby AC-3: 16 stereo pairs (32 audio channels)
- Dolby EAC-3: 8 stereo pairs (16 audio channels)
- AAC-LC: 8 stereo pairs (16 audio channels)
- HE-AAC (v1/v2) 8 stereo pairs (16 audio channels)

Optional support for 5.1 Surround Sound decoding, in AAC and Dolby modes.
Optional audio module: increases the capacity to 32 stereo pairs (64 audio channels), allowing full 16-channel support for the four HD inputs, in all compression modes*
* Future release availability

Ancillary Data Support

Closed-Captioning: SMPTE-334M (EIA-608 and EIA-708 supported), Line 21 (SD sources)
OP-47/SMPTE RDD-08 teletext subtitles*
AFD: SMPTE-2016, Line 20/22 WSS (SD sources)
SCTE-35 to SCTE-104 conversion
SMPTE-2038 generic ancillary data transport (timecode, KLV, etc.)
* Future release availability

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9992-DEC » AVC / MPEG-2 SOFTWARE DEFINED BROADCAST DECODER

BASE MODEL ORDERING INFORMATION

Note: For Software Options and Upgrades, as well as Hardware Options, please see the respective Options sections listed above.

9992-DEC Single-channel AVC / MPEG-2 Software Defined Broadcast Decoder (includes (1) +AVC and (2) +MP1L2-AAC licenses)

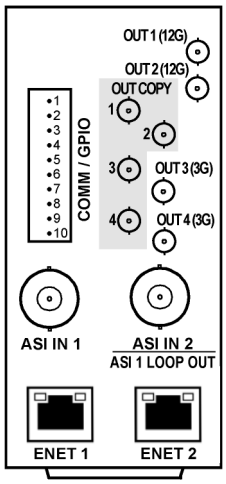
RM20-9992-DEC-B 20-Slot Frame Rear I/O Module (Standard-Width) (2) ASI Input BNCs, (2) GigE Ethernet Media Ports, (2) 12G/6G/3G/HD-SD-SDI Coaxial Outputs, (2) 3G/HD/SD-SDI Coaxial Outputs, (4) Output Copy Coaxial Outputs, COMM/GPIO Port (All SDI coaxial connectors HD-BNC. See Notes in illustration regarding port functions and limitations.)

1 - GPI 1
2 - GPI 2
3 - GPO 1
4 - GPO 2
5 - GPO COM
6 - GND
7 - RS232-A RX / 422 RX(-)
8 - RS232-B RX / 422 RX(+)
9 - RS232-A TX / 422 TX(-)
10 - RS232-B TX / 422 TX(+)

Note: Output ports marked as "(12G)" can output 12G and lower SDI media.
Output ports marked as "(3G)" are compatible only with 3G or lower SDI media.

Note: ASI IN 2 BNC can be DashBoard selected to function as an ASI copy of ASI IN 1.

Note: OUT COPY ports are disabled when card is in 12G mode.



RM20-9992-DEC-B-HDBNC

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9992-DEC-4K-HEVC » 4K / AVC / MPEG-2 SOFTWARE DEFINED BROADCAST DECODER

with Single-Channel 4K or Dual-Channel 2K Video Paths

The Cobalt® **9992-DEC-4K-HEVC 4K/AVC/MPEG-2 Software Defined Broadcast Decoder** with Single-Channel 4K or Dual-Channel 2K Video Paths is a broadcast-grade multi-standard decoder designed to meet the most stringent requirements for today's broadcasters. It supports MPEG-2, AVC (H.264) and HEVC (H.265), with resolution up to 4K, and a full complement of audio decoding capabilities. The 9992-DEC-4K-HEVC is an industry standard openGear® card module and provides an ideal platform for transitioning to state-of-the-art decoding capabilities.

FEATURES

Future-Proof – The 9992-DEC-4K-HEVC Decoder supports MPEG-2, MPEG-4 AVC (H.264) and HEVC (H.265), so it can be deployed today as well as tomorrow.

Industry Standard Form-Factor – The 9992-DEC-4K-HEVC is offered in the industry-standard openGear format, and is compatible with existing deployed openGear frames.

High Density – The 9992-DEC-4K-HEVC supports up to two independent 1080p60 input streams, or a single UHD 4Kp60 input stream. One openGear frame can support up to 10 cards, for a total of 20 HD or 10 UHD 4K channels.

Full Audio Support – The 9992-DEC-4K-HEVC supports MPEG-1 Layer II, AAC-LC, HE-AAC, Dolby AC-3/EAC-3 and LPCM (SMPTE-302M), as well as Dolby AC-3/EAC-3 pass-thru. With an optional audio board, the decoder can support up to 16 audio channels with each video service.

Ultra Low Latency – Low latency modes available

Base Unit Features –

Support for two decode channels up to 1080p60, or one 4K channel

Support for MPEG-2, MPEG-4 AVC (H.264), and HEVC (H.265)

Support for 4:2:0 8-bit/10-bit decoding

Supports UDP and RTP. Other protocols available as options.

Full ancillary data support

Support for 4 stereo pairs (8 audio channels) in any combination of MPEG-1 Layer II, AAC-LC, and HE-AAC (v1/v2) modes

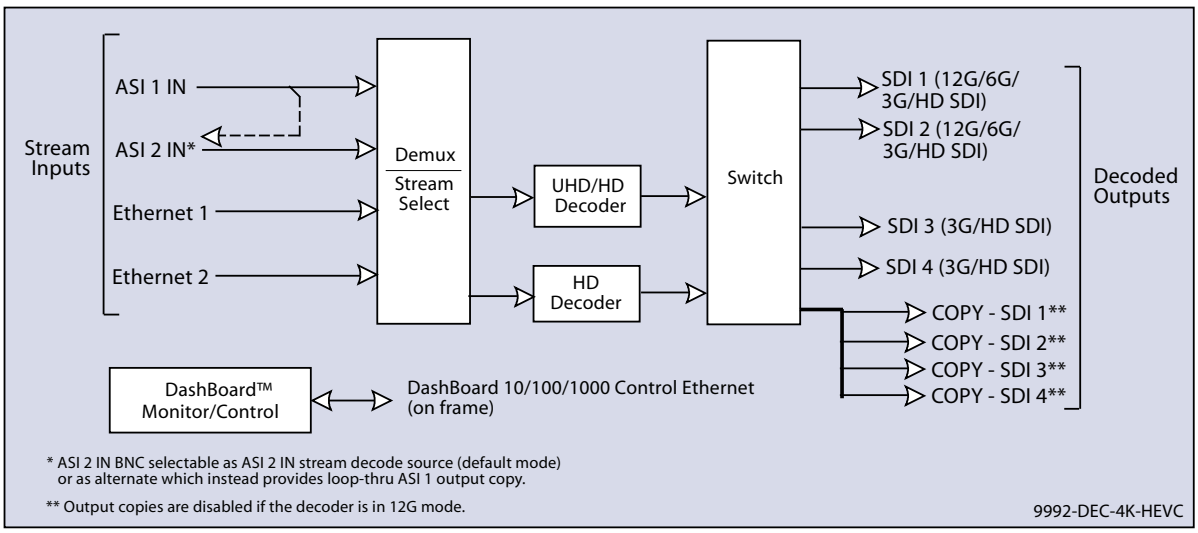
Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p

Remote control/monitoring via Dashboard™ software

Hot-swappable

openGear

Five-year warranty



SOFTWARE LICENSABLE OPTIONS

+DEC-2.0 Dolby Digital/Dolby Digital Plus stereo audio decoding license

+DEC-5.1 Dolby Digital/Dolby Digital Plus 5.1 Surround Sound audio decoding license

+MP1L2-AAC-DEC MPEG-1 Layer II, AAC-LC, and HE-AAC audio decoding per pair. Three AAC licenses can be combined to allow one 5.1 surround decode.

+GENLOCK Add Genlock support (license is per channel)

+FEC-DEC Add SMPTE-2022 support (per unit)

+DEC-RTMP-SVR RTMP Server License Option

+TSMON – Adds continuous monitoring of current transport stream being decoded. Provides a list of all PIDs available in the transport stream, their current individual bit rates, and keeps numerical track of any continuity counter errors. Can also be configured to watch up to 8 PIDs and issue an alarm if PID disappears for a configurable amount of time. (If SNMP is available, this alarm is also provided as a trap.) (License is **per channel**)

+422 4:2:2 decoding support (per unit)

+RIST/ARQ-DEC RIST RTP/ARQ support (per unit)

+RIST/ENCRP-DEC RIST Encryption/Authentication Support (per unit). (Requires the +RIST/ARQ-DEC license to also be present on the decoder.)

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9992-DEC-4K-HEVC » 4K / AVC / MPEG-2 SOFTWARE DEFINED BROADCAST DECODER

with Single-Channel 4K or Dual-Channel 2K Video Paths

SPECIFICATIONS

Inputs

(2) DVB-ASI inputs
(2) Gigabit Ethernet ports for IP input, supporting the following protocols:
- UDP unicast/multicast
- RTP unicast/multicast with optional SMPTE-2022 FEC
- HTTP Live Streaming
- RIST for contribution over the Internet

Optional SMPTE-2110 baseband video over IP turnaround*
* Future release availability

Outputs

(2) SDI outputs each supporting 12G-SDI, 3G-SDI, HD-SDI and SD-SDI
(2) SDI outputs each supporting 3G-SDI, HD-SDI and SD-SDI
Support for all standard frame rates (interlaced and progressive): 23.98, 24, 25, 29.97, 30, 50, 59.94, 60

Video Post-Processing

Support for up/down/cross conversion of output video (independent of incoming stream)*
Conversion between interlaced and progressive
Frame rate conversion
High Dynamic Range (HDR) support*
* Future release availability

Video Decoding

Decoding Standards:
- MPEG-2
- MPEG-4 AVC (H.264)
- HEVC (H.265)

Support for two independent 1080p60 decode sessions
Support for UHD decoding in AVC and HEVC modes (Maximum resolution 3840x2160p60)
Support for 4:2:0 and 4:2:2 (option) color spaces in all modes
Support for 8-bit / 10-bit decoding in all modes
Low latency decoding supported

Audio Decoding

Decoding Standards:
- MPEG-1 Layer II
- AAC-LC
- HE-AAC (v1/v2)
- Dolby AC-3 / EAC-3
- LPCM (SMPTE-302M)
- Dolby AC-3/EAC-3 pass-thru support

(5.1-Surround decoding available for AAC-LC, HE-AAC, Dolby AC-3 and Dolby EAC-3; subject to licensing)
Maximum number of channels supported (subject to licensing):
- MPEG-1 Layer II: 16 stereo pairs (32 audio channels)
- Dolby AC-3: 16 stereo pairs (32 audio channels)
- Dolby EAC-3: 8 stereo pairs (16 audio channels)
- AAC-LC: 8 stereo pairs (16 audio channels)
- HE-AAC (v1/v2) 8 stereo pairs (16 audio channels)

Optional support for 5.1 Surround Sound decoding, in AAC and Dolby modes.
Optional audio module: increases the capacity to 32 stereo pairs (64 audio channels), allowing full 16-channel support for the four HD inputs, in all compression modes*
* Future release availability

Ancillary Data Support

Closed-Captioning: SMPTE-334M (EIA-608 and EIA-708 supported), Line 21 (SD sources)
OP-47/SMPTE RDD-08 teletext subtitles*
AFD: SMPTE-2016, Line 20/22 WSS (SD sources)
SCTE-35 to SCTE-104 conversion
SMPTE-2038 generic ancillary data transport (timecode, KLV, etc.)
* Future release availability

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9992-DEC-4K-HEVC » 4K / AVC / MPEG-2 SOFTWARE DEFINED BROADCAST DECODER

with Single-Channel 4K or Dual-Channel 2K Video Paths

ORDERING INFORMATION

Note: For Software Options and Upgrades, as well as Hardware Options, please see the respective Options sections listed above.

9992-DEC-4K-HEVC 4K/AVC/MPEG-2 Software Defined Broadcast Decoder with Single-Channel 4K or Dual-Channel 2K Video Paths

Option Licenses:

+422 Add 4:2:2 decoding support (per unit)
+DEC-2.0 Dolby Digital/Dolby Digital Plus stereo audio decoding license
+DEC-5.1 Dolby Digital/Dolby Digital Plus 5.1 Surround Sound audio decoding license
+FEC-DEC Add SMPTE-2022 support (per unit)
+DEC-RTMP-SVR RTMP Server License Option
+TSMON – Adds transport stream continuous monitoring
+GENLOCK Add Genlock support (license is per channel)
+MP1L2-AAC-DEC MPEG-1 Layer II, AAC-LC, and HE-AAC audio decoding per pair
+RIST/ARQ-DEC Add RIST RTP/ARQ support (per unit)
+RIST/ENCRP-DEC Add RIST Encryption/Authentication Support (per unit). (Requires the +RIST/ARQ-DEC license to also be present on the decoder.)

Rear I/O Modules:

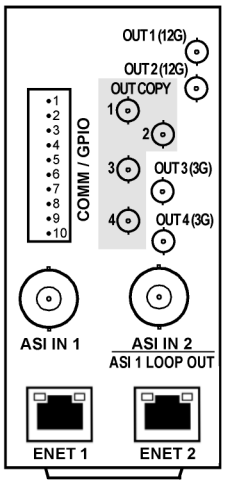
RM20-9992-DEC-B 20-Slot Frame Rear I/O Module (Standard-Width) (2) ASI Input BNCs, (2) GigE Ethernet Media Ports, (2) 12G/6G/3G/HD-SD-SDI Coaxial Outputs, (2) 3G/HD/SD-SDI Coaxial Outputs, (4) Output Copy Coaxial Outputs, COMM/GPIO Port (All SDI coaxial connectors HD-BNC. See Notes in illustration regarding port functions and limitations.)

1 - GPI 1
2 - GPI 2
3 - GPO 1
4 - GPO 2
5 - GPO COM
6 - GND
7 - RS232-A RX / 422 RX(-)
8 - RS232-B RX / 422 RX(+)
9 - RS232-A TX / 422 TX(-)
10 - RS232-B TX / 422 TX(+)

Note: Output ports marked as "(12G)" can output 12G and lower SDI media. Output ports marked as "(3G)" are compatible only with 3G or lower SDI media.

Note: ASI IN 2 BNC can be DashBoard selected to function as an ASI copy of ASI IN 1.

Note: OUT COPY ports are disabled when card is in 12G mode.



RM20-9992-DEC-B-HDBNC

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9992-2DEC » DUAL UPGRADEABLE AVC / MPEG-2 SOFTWARE DEFINED BROADCAST DECODER

The Cobalt® **9992-2DEC Dual Upgradeable AVC/MPEG-2 Software Defined Broadcast Decoder** is a broadcast-grade multi-standard decoder designed to meet the most stringent requirements for today's broadcasters. It supports two channels of MPEG-2 and AVC (H.264) decoding, with resolution optionally up to 4K over a single channel, and offers a full complement of audio decoding capabilities. The 9992-2DEC is an industry standard openGear® card module and provides an ideal platform for transitioning to state-of-the-art decoding capabilities.

FEATURES

Future-Proof – The 9992-2DEC Decoder supports MPEG-2, MPEG-4 AVC (H.264) and (optionally) HEVC (H.265), so it can be deployed today and upgraded as your needs change.

Industry Standard Form-Factor – The 9992-2DEC is offered in the industry-standard openGear format, and is compatible with existing deployed openGear frames.

High Density – The 9992-2DEC supports two independent 1080p60 input streams, or (optionally) a single UHD 4Kp60 input stream. One openGear frame can support up to 10 cards, for a total of 20 HD channels standard, or optionally 10 UHD 4K channels.

Full Audio Support – The 9992-2DEC supports MPEG-1 Layer II, AAC-LC, HE-AAC, Dolby AC-3/EAC-3 and LPCM (SMPTE-302M), as well as Dolby AC-3/EAC-3 pass-thru. With an optional audio board, the decoder can support up to 16 audio channels with each video service.

Ultra Low Latency – Low latency modes available

Base Unit Features –

Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p

Support for two decode channels up to 1080p60

Support for MPEG-2 and MPEG-4 AVC (H.264)

Support for 4:2:0 8-bit/10-bit decoding

Full ancillary data support

Support for 4 stereo pairs (8 audio channels) per decode channel in any combination of MPEG-1 Layer II, AAC-LC, and HE-AAC (v1/v2) modes

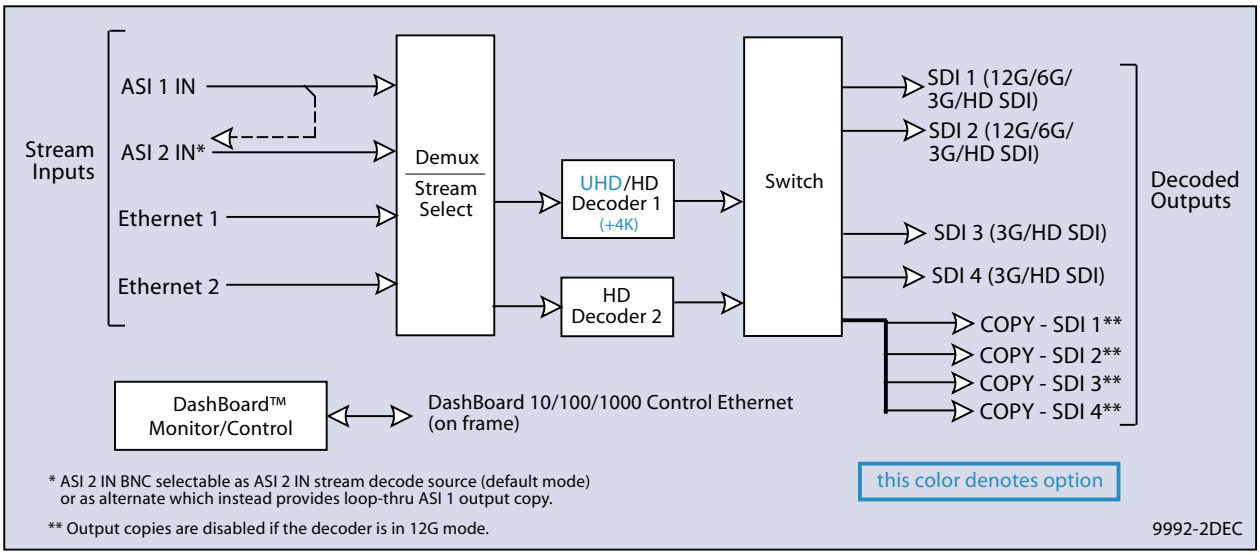
Supports UDP and RTP. Other protocols available as options.

Remote control/monitoring via Dashboard™ software

Hot-swappable

Five-year warranty

openGear



SOFTWARE LICENSABLE OPTIONS

+HEVC-DEC Enables HEVC decoding on one AVC encode engine (up to 2 licenses max per unit).

+4K-DEC 4K support. Requires +HEVC-DEC license on card.

+422 4:2:2 decoding support (per unit)

+DEC-2.0 Dolby Digital/Dolby Digital Plus stereo audio decoding license

+DEC-5.1 Dolby Digital/Dolby Digital Plus 5.1 Surround Sound audio decoding license

+GENLOCK Add Genlock support (license is **per channel**)

+FEC-DEC Add SMPTE-2022 support (per unit)

+DEC-RTMP-SVR RTMP Server License Option

+TSMON – Adds continuous monitoring of current transport stream being decoded. Provides a list of all PIDs available in the transport stream, their current individual bit rates, and keeps numerical track of any continuity counter errors. Can also be configured to watch up to 8 PIDs and issue an alarm if PID disappears for a configurable amount of time. (If SNMP is available, this alarm is also provided as a trap.) (License is **per channel**)

+MP1L2-AAC-DEC MPEG-1 Layer II, AAC-LC, and HE-AAC audio decoding per pair. Three AAC licenses can be combined to allow one 5.1 surround decode.

+RIST/ARQ-DEC RIST RTP/ARQ support (per unit)

+RIST/ENCRP-DEC RIST Encryption/Authentication Support (per unit). (Requires the +RIST/

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9992-2DEC » DUAL UPGRADEABLE AVC / MPEG-2 SOFTWARE DEFINED BROADCAST DECODER

SPECIFICATIONS

Inputs

(2) DVB-ASI inputs
(2) Gigabit Ethernet ports for IP input, supporting the following protocols:
- UDP unicast/multicast
- RTP unicast/multicast with optional SMPTE-2022 FEC
- HTTP Live Streaming
- RIST for contribution over the Internet

Optional SMPTE-2110 baseband video over IP turnaround*
* Future release availability

Outputs

(2) SDI outputs each supporting 12G-SDI, 3G-SDI, HD-SDI and SD-SDI
(2) SDI outputs each supporting 3G-SDI, HD-SDI and SD-SDI
Support for all standard frame rates (interlaced and progressive): 23.98, 24, 25, 29.97, 30, 50, 59.94, 60

Video Post-Processing

Support for up/down/cross conversion of output video (independent of incoming stream)*
Conversion between interlaced and progressive
Frame rate conversion
High Dynamic Range (HDR) support*
* Future release availability

Video Decoding

Decoding Standards:
- MPEG-2
- MPEG-4 AVC (H.264)
- HEVC (H.265) (Option)

Support for up to two independent 1080p60 decode sessions
Support for UHD decoding (option) in AVC and HEVC modes (Maximum resolution 3840x2160p60)
Support for 4:2:0 and 4:2:2 (option) color spaces in all modes
Support for 8-bit / 10-bit decoding in all modes
Low latency decoding supported

Audio Decoding

Decoding Standards:
- MPEG-1 Layer II
- AAC-LC
- HE-AAC (v1/v2)
- Dolby AC-3 / EAC-3
- LPCM (SMPTE-302M)
- Dolby AC-3/EAC-3 pass-thru support

(5.1-Surround decoding available for AAC-LC, HE-AAC, Dolby AC-3 and Dolby EAC-3; subject to licensing)
Maximum number of audio channels supported (subject to licensing):
- MPEG-1 Layer II: 16 stereo pairs (32 audio channels)
- Dolby AC-3: 16 stereo pairs (32 audio channels)
- Dolby EAC-3: 8 stereo pairs (16 audio channels)
- AAC-LC: 8 stereo pairs (16 audio channels)
- HE-AAC (v1/v2) 8 stereo pairs (16 audio channels)

Optional support for 5.1 Surround Sound decoding, in AAC and Dolby modes.
Optional audio module: increases the capacity to 32 stereo pairs (64 audio channels), allowing full 16-channel support for the four HD inputs, in all compression modes*
* Future release availability

Ancillary Data Support

Closed-Captioning: SMPTE-334M (EIA-608 and EIA-708 supported), Line 21 (SD sources)
OP-47/SMPTE RDD-08 teletext subtitles*
AFD: SMPTE-2016, Line 20/22 WSS (SD sources)
SCTE-35 to SCTE-104 conversion
SMPTE-2038 generic ancillary data transport (timecode, KLV, etc.)
* Future release availability

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9992-2DEC » DUAL UPGRADEABLE AVC / MPEG-2 SOFTWARE DEFINED BROADCAST DECODER

ORDERING INFORMATION

Note: For Software Options and Upgrades, as well as Hardware Options, please see the respective Options sections listed above.

9992-2DEC Dual Upgradeable AVC / MPEG-2 Software Defined Broadcast Decoder (includes (2) +AVC and (4) +MP1L2-AAC licenses)

Option Licenses:

+HEVC-DEC Enable HEVC decoding on one AVC encode engine (up to 2 licenses max per unit).
+4K-DEC Add 4K support. Requires +HEVC-DEC license on card.
+422 Add 4:2:2 decoding support (per unit)
+DEC-2.0 Dolby Digital/Dolby Digital Plus stereo audio decoding license
+DEC-5.1 Dolby Digital/Dolby Digital Plus 5.1 Surround Sound audio decoding license
+FEC-DEC Add SMPTE-2022 support (per unit)
+DEC-RTMP-SVR RTMP Server License Option
+TSMON – Adds transport stream continuous monitoring
+GENLOCK Add Genlock support (license is per channel)
+MP1L2-AAC-DEC MPEG-1 Layer II, AAC-LC, and HE-AAC audio decoding per pair
+RIST/ARQ-DEC Add RIST RTP/ARQ support (per unit)
+RIST/ENCRP-DEC Add RIST Encryption/Authentication Support (per unit). (Requires the +RIST/ARQ-DEC license to also be present on the decoder.)

Rear I/O Modules:

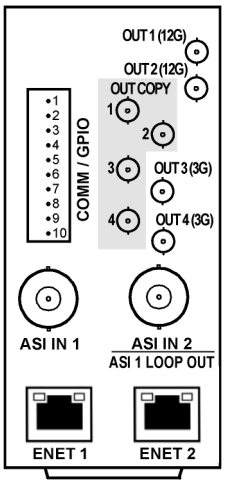
RM20-9992-DEC-B 20-Slot Frame Rear I/O Module (Standard-Width) (2) ASI Input BNCs, (2) GigE Ethernet Media Ports, (2) 12G/6G/3G/HD-SD-SDI Coaxial Outputs, (2) 3G/HD/SD-SDI Coaxial Outputs, (4) Output Copy Coaxial Outputs, COMM/GPIO Port (All SDI coaxial connectors HD-BNC. See Notes in illustration regarding port functions and limitations.)

1 - GPI 1
2 - GPI 2
3 - GPO 1
4 - GPO 2
5 - GPO COM
6 - GND
7 - RS232-A RX / 422 RX(-)
8 - RS232-B RX / 422 RX(+)
9 - RS232-A TX / 422 TX(-)
10 - RS232-B TX / 422 TX(+)

Note: Output ports marked as "(12G)" can output 12G and lower SDI media. Output ports marked as "(3G)" are compatible only with 3G or lower SDI media.

Note: ASI IN 2 BNC can be DashBoard selected to function as an ASI copy of ASI IN 1.

Note: OUT COPY ports are disabled when card is in 12G mode.



RM20-9992-DEC-B-HDBNC

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9992-ENC » HEVC UPGRADEABLE AVC / MPEG2 SOFTWARE DEFINED BROADCAST ENCODER

The Cobalt® **9992-ENC HEVC Upgradeable AVC / MPEG2 Software Defined Broadcast Encoder** is an upgradeable broadcast-grade encoder designed to meet the most stringent requirements for today's broadcasters. Software-defined upgradeable to add multiple channels (up to four), the 9992-ENC is also upgradeable to add HEVC video encoding technology that provides a dramatic compression efficiency improvement over previous video compression standards, while also supporting existing MPEG-2 and MPEG-4 AVC. The 9992-ENC is an industry standard openGear® card and provide an ideal platform for transitioning to state-of-the-art encoding capabilities.

FEATURES

Future-Proof – The 9992-ENC software-defined architecture supports MPEG-2, MPEG-4 AVC (H.264) and HEVC (H.265) with an optional license, so it can be deployed today and upgraded as your needs change.

Industry Standard Form-Factor – The 9992-ENC is offered in the industry-standard openGear format, and is compatible with existing deployed openGear frames.

High Density – The 9992-ENC can be licensed to support up to four independent 1080p60 input signals, or a single UHD 4Kp60 input signal. One openGear frame can support up to 10 cards, for a total of 40 HD or 10 4K channels.

Full Audio Support – The 9992-ENC supports MPEG-1 Layer II, AAC-LC, HE-AAC, LPCM (SMPTE-302M) and Dolby AC-3/EAC-3 (optional license).

Base Unit Features –

Support for one encode channel up to 1080p60

Support for MPEG-2 and MPEG-4 AVC (H.264)

Support for 4:2:0 8-bit/10-bit encoding

All network protocols (RIST and SMPTE-2022 FEC available with corresponding Options)

Full ancillary data support

Support for 2 stereo pairs (4 audio channels) in any combination of MPEG-1 Layer II, AAC-LC, and HE-AAC (v1/v2) modes

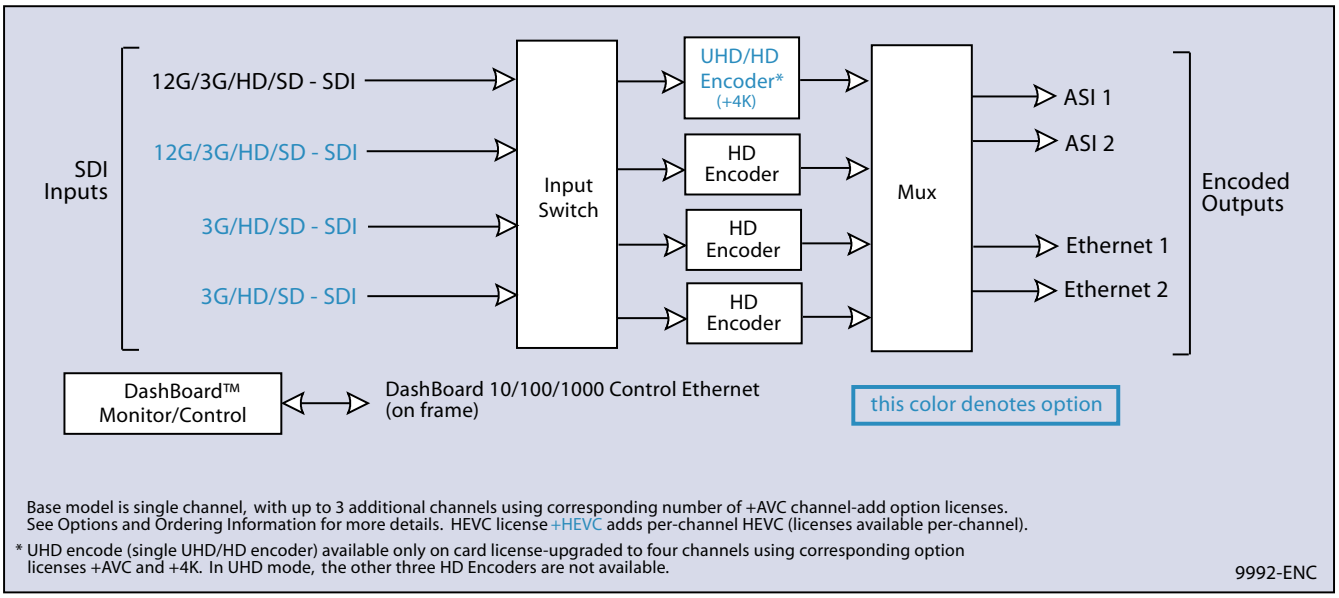
Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p

Remote control/monitoring via Dashboard™ software

Hot-swappable

Five-year warranty

openGear



Base model is single channel, with up to 3 additional channels using corresponding number of +AVC channel-add option licenses. See Options and Ordering Information for more details. HEVC license +HEVC adds per-channel HEVC (licenses available per-channel).

* UHD encode (single UHD/HD encoder) available only on card license-upgraded to four channels using corresponding option licenses +AVC and +4K. In UHD mode, the other three HD Encoders are not available.

9992-ENC

SOFTWARE LICENSABLE OPTIONS

+AVC Additional 1080p60 encoder channel with MPEG-2 and MPEG-4 AVC (up to three additional channels, for a total of four channels per unit). Each license includes two +MP1L2-AAC licenses.

+HEVC Enables HEVC encoding (per channel; up to four +HEVC licenses may be applied to a single unit; when running in HEVC mode all encoders must be in HEVC mode).

+4K Enables 4K encoding. (Requires all four encoding engines are licensed.)

+MP1L2-AAC MPEG-1 Layer II, AAC-LC, and HE-AAC audio encoding per pair. Three AAC licenses can be combined to allow one 5.1 surround encode.

+ULL Adds support for HEVC Ultra-Low Latency support (per unit). Encoder latency is 10ms for the common frame rates. (In this mode, the maximum encoder capacity is one 4K or two HD streams.)

+ENCD-2.0 Dolby Digital/Dolby Digital Plus stereo audio encoding license.

+ENCD-5.1 Dolby Digital/Dolby Digital Plus 5.1 Surround Sound audio encoding license.

+RIST/ARQ-ENC RIST RTP/ARQ support (transport stream based option; only one license needed per unit).

+RIST/ENCRP-ENC RIST Encryption/Authentication Support (per unit). (Requires the +RIST/ARQ-ENC license to be also present on the encoder.)

+SMPTE2022 Add SMPTE-2022 support (per unit). Provides one FEC insertion per device Ethernet port (transport stream based option; only one license needed per unit).

+422 Adds 4:2:2 encoding support (transport stream based option; only one license needed per unit).

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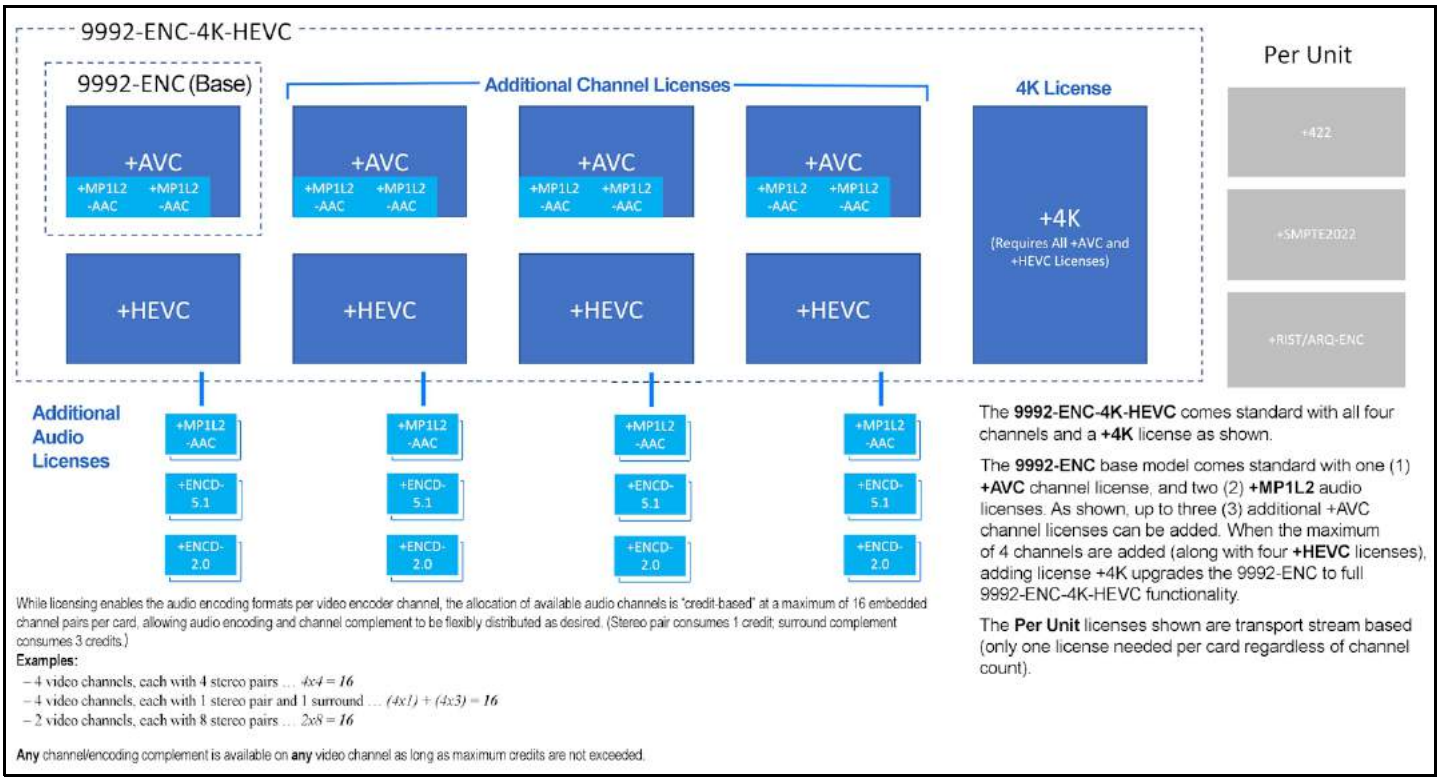
9992-ENC » HEVC UPGRADEABLE AVC / MPEG2 SOFTWARE DEFINED BROADCAST ENCODER



SPECIFICATIONS

Inputs

(2) SDI inputs each supporting 12G-SDI, 3G-SDI, HD-SDI and SD-SDI
(2) SDI inputs each supporting 3G-SDI, HD-SDI and SD-SDI
Support for all standard frame rates (interlaced and progressive): 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
Optional support for SMPTE-2110 baseband video over IP inputs*
* Future release availability.

Note: Although two 12G/3G/HD/SD-SDI inputs are present, only one input can be used at a time to route to the maximum-available single UHD encoder engine.
Note: UHD encode (single UHD/HD encoder) available only on 9992-ENC-4K-HEVC encoder model or models license-upgraded to +4K. In UHD mode, the other three HD encoder channels are not available.

Outputs

(2) DVB-ASI outputs
(2) Gigabit Ethernet ports for IP output, supporting the following protocols:
- UDP unicast/multicast
- RTP unicast/multicast with optional SMPTE-2022 FEC
- HTTP Live Streaming (local or remote server)
- RTMP (limited to H.264 only)

Integrated multiplexer creates MPTS over IP or over DVB-ASI
Support for DVB table generation
Support for PSIP table generation*
Optional SMPTE-2110 baseband video over IP turnaround*
* Future release availability.

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9992-ENC » HEVC UPGRADEABLE AVC / MPEG2 SOFTWARE DEFINED BROADCAST ENCODER

Video Pre-Processing

Support for arbitrary down-scaling input video, extending down to 320x240
Support for up-scaling input video*
Interlaced to progressive conversion
Progressive to interlaced conversion*
Frame rate conversion
Basic noise reduction filter and spatial filter
Enhanced pre-processing filters*
High Dynamic Range (HDR) support*
* Future release availability.

Video Encoding

Encoding Standards:
- MPEG-2
- MPEG-4 AVC (H.264)
- HEVC (H.265)

Support for up to four independent 1080p60 encode sessions(1)
Support for UHD encoding in AVC and HEVC modes (Maximum resolution 4096x2160p60)
Maximum bit rates:
- UHD (4K) encoding: 150 Mb/s
- HD encoding: 40 Mb/s(2)

Support for 4:2:0 and 4:2:2 color spaces in all modes
Support for 8-bit / 10-bit encoding in all modes
Full control of GOP size and structure
Advanced compression controls available
(1) All encode sessions must use the same standard; mixed-standard encoding is not supported.
(2) The first HD channel can be as high as 150 Mb/s.

Audio Encoding

Encoding Standards:
- MPEG-1 Layer II
- AAC-LC
- HE-AAC (v1/v2)
- Dolby AC-3
- Dolby EAC-3
- LPCM (SMPTE-302M)
- Dolby AC-3/EAC-3 pass-through support

(5.1-Surround encoding available for AAC-LC, HE-AAC, Dolby AC-3 and Dolby EAC-3; subject to licensing)
Maximum number of channels supported (subject to licensing):
- MPEG-1 Layer II: 16 stereo pairs (32 audio channels)
- Dolby AC-3: 16 stereo pairs (32 audio channels)
- Dolby EAC-3: 8 stereo pairs (16 audio channels)
- AAC-LC: 8 stereo pairs (16 audio channels)
- HE-AAC (v1/v2) 8 stereo pairs (16 audio channels)

Optional support for 5.1 Surround Sound encoding, in AAC and Dolby modes. Three stereo licenses are required to enable one 5.1 surround encode.
Optional audio module: increases the capacity to 32 stereo pairs (64 audio channels), allowing full 16-channel support for the four HD inputs, in all compression modes*
* Future release availability.

Ancillary Data Support

Closed-Captioning: SMPTE-334M (EIA-608 and EIA-708 supported), Line 21 (SD sources)
OP-47/SMPTE RDD-08 teletext subtitles*
AFD: SMPTE-2016, Line 20/22 WSS (SD sources)
SCTE-104 to SCTE-35 conversion
SMPTE-2038 generic ancillary data transport (timecode, KLV, etc.)
* Future release availability.

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9992-ENC » HEVC UPGRADEABLE AVC / MPEG2 SOFTWARE DEFINED BROADCAST ENCODER

ORDERING INFORMATION

9992-ENC HEVC Upgradeable AVC / MPEG2 Software Defined Broadcast Encoder. Single-channel; expandable to up to four channels using +AVC licenses. Per-channel HEVC upgradeable using +HEVC licenses.)

Option Licenses:

+AVC Additional 1080p60 encoder channel

+HEVC HEVC encoding license (per channel)

+4K 4K encoder license

+MP1L2-AAC MPEG-1 Layer II, AAC-LC, and HE-AAC audio encoding license (each license adds one encoded pair)

+ENCD-2.0 Dolby Digital/Dolby Digital Plus stereo audio encoding license (each license adds one encoded pair)

+ENCD-5.1 Dolby Digital/Dolby Digital Plus 5.1 Surround Sound audio encoding license (each license adds one encoded pair)

+RIST/ARQ-ENC RIST RTP/ARQ support license (per unit)

+RIST/ENCRP-ENC RIST Encryption/Authentication support license (per unit). (Requires the +RIST/ARQ-ENC license to also be present on the encoder.)

+SMPTE2022 Add SMPTE-2022 support license (per unit)

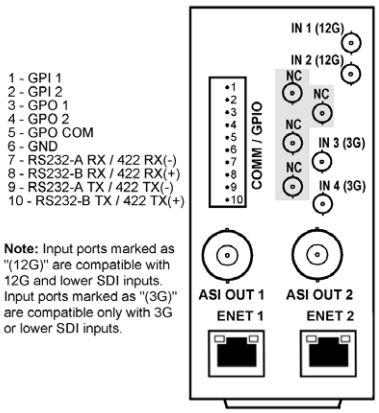
+422 4:2:2 encoding support license (per unit)

+ULL HEVC Ultra-Low Latency support license (per unit)

Note: The 9992-ENC is also available factory-configured as fully-featured 4K ready model **9992-ENC-4K-HEVC**. Please see 9992-ENC-4K-HEVC web page for more details.

Rear I/O Modules:

RM20-9992-ENC-B-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (2) 12G/6G/3G/HD-SD-SDI Coaxial Inputs, (2) 3G/HD/SD-SDI Coaxial Outputs, (2) ASI Coaxial Outputs, (2) GigE Ethernet Media Ports, COMM/GPIO Port (All SDI coaxial connectors HD-BNC.) (**Note:** Mates to card in **odd** slot.)



RM20-9992-ENC-B-HDBNC

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9992-ENC-4K-HEVC » 4K HEVC / AVC / MPEG2 SOFTWARE DEFINED BROADCAST ENCODER

with Single-Channel 4K or Quad-Channel 2K Video Paths

The Cobalt® **9992-ENC-4K-HEVC 4K HEVC / AVC / MPEG2 Software Defined Broadcast Encoder** is a multi-channel broadcast-grade encoder designed to meet the most stringent requirements for today's broadcasters. Our HEVC video encoding technology provides a dramatic compression efficiency improvement over previous video compression standards, while also supporting existing MPEG-2 and MPEG-4 AVC. The 9992-ENC-4K-HEVC is an industry standard openGear® card and provide an ideal platform for transitioning to state-of-the-art encoding capabilities.

FEATURES

Future-Proof – Software-defined architecture supports MPEG-2, MPEG-4 AVC (H.264) and HEVC (H.265). Additional audio licenses available using optional licenses.

Industry Standard Form-Factor – The 9992-ENC-4K-HEVC is offered in the industry-standard openGear format, and is compatible with existing deployed openGear frames.

High Density – Supports up to four independent 1080p60 input signals, or a single UHD 4Kp60 input signal. One openGear frame can support up to 10 cards, for a total of 40 HD or 10 UHD 4K channels.

Full Audio Support – The 9992-ENC-4K-HEVC supports MPEG-1 Layer II, AAC-LC, HE-AAC, LPCM (SMPTE-302M) and Dolby AC-3/EAC-3 (optional license).

Base Unit Features –

Support for one 4K encode channel or up to four encode channels up to 1080p60

Support for MPEG-2 and MPEG-4 AVC (H.264)

Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p

HEVC encoding

Support for 4:2:0 8-bit/10-bit encoding

Full ancillary data support

Support for 2 stereo pairs (4 audio channels) in any combination of MPEG-1 Layer II, AAC-LC, and HE-AAC (v1/v2) modes

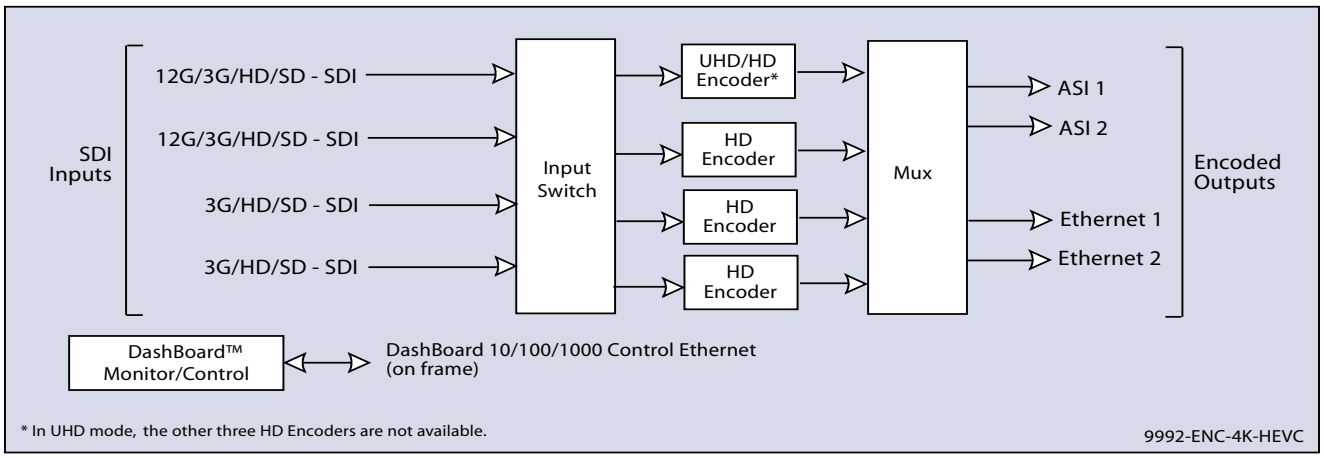
All network protocols (RIST and SMPTE-2022 FEC available with corresponding Options)

Remote control/monitoring via Dashboard™ software

Hot-swappable

Five-year warranty

openGear



SOFTWARE LICENSABLE OPTIONS

+MP1L2-AAC Additional MPEG-1 Layer II, AAC-LC, and HE-AAC audio encoding per pair. Three AAC licenses can be combined to allow one 5.1 surround encode.

+ENCD-2.0 Dolby Digital/Dolby Digital Plus stereo audio encoding license.

+ENCD-5.1 Dolby Digital/Dolby Digital Plus 5.1 Surround Sound audio encoding license.

+ULL Adds support for HEVC Ultra-Low Latency support (per unit). Encoder latency is 10ms for the common frame rates. (In this mode, the maximum encoder capacity is one 4K or two HD streams.)

+RIST/ARQ-ENC RIST RTP/ARQ support (transport stream based option; only one license needed per unit).

+RIST/ENCRP-ENC RIST Encryption/Authentication Support (per unit). (Requires the +RIST/ARQ-ENC license to be also present on the encoder.)

+SMPTE2022 Add SMPTE-2022 support. Provides one FEC insertion per device Ethernet port (transport stream based option; only one license needed per unit).

+422 Adds 4:2:2 encoding support (transport stream based option; only one license needed per unit).

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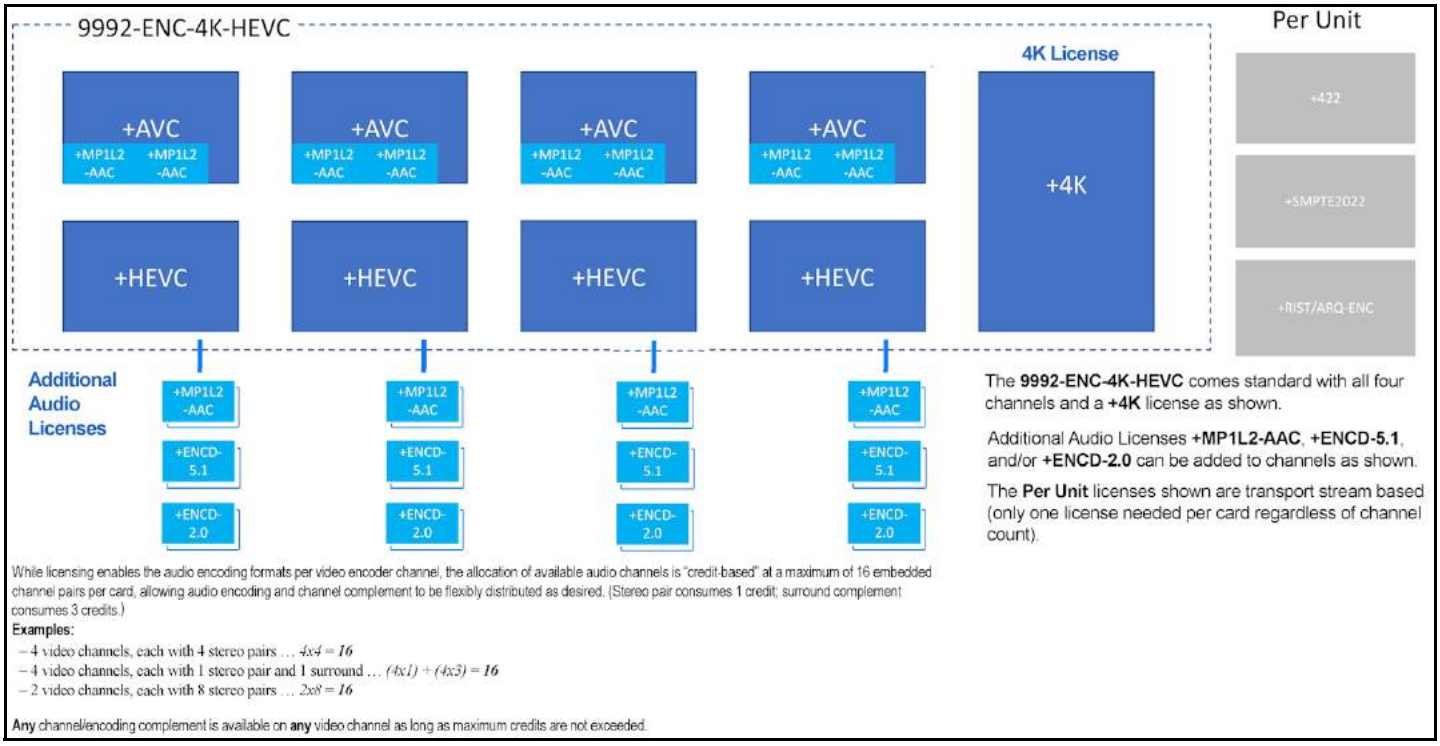
9992-ENC-4K-HEVC » 4K HEVC / AVC / MPEG2 SOFTWARE DEFINED BROADCAST ENCODER

with Single-Channel 4K or Quad-Channel 2K Video Paths



SPECIFICATIONS

Inputs

(2) SDI inputs each supporting 12G-SDI, 3G-SDI, HD-SDI and SD-SDI
(2) SDI inputs each supporting 3G-SDI, HD-SDI and SD-SDI
Support for all standard frame rates (interlaced and progressive): 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
Optional support for SMPTE-2110 baseband video over IP inputs*
* Future release availability.

Note: Although two 12G/3G/HD/SD-SDI inputs are present, only one input can be used at a time to route to the maximum-available single UHD encoder engine.
Note: In UHD mode, the other three HD encoder channels are not available.

Outputs

(2) DVB-ASI outputs
(2) Gigabit Ethernet ports for IP output, supporting the following protocols:
- UDP unicast/multicast
- RTP unicast/multicast with optional SMPTE-2022 FEC
- HTTP Live Streaming (local or remote server)
- RTMP (limited to H.264 only)
- Cobalt's RTP/ARQ for contribution over the Internet

Integrated multiplexer creates MPTS over IP or over DVB-ASI
Support for DVB table generation
Support for PSIP table generation*
Optional SMPTE-2110 baseband video over IP turnaround*
* Future release availability.

Video Pre-Processing

Support for arbitrary down-scaling input video, extending down to 320x240
Support for up-scaling input video*
Interlaced to progressive conversion
Progressive to interlaced conversion*
Frame rate conversion
Basic noise reduction filter and spatial filter
Enhanced pre-processing filters*
High Dynamic Range (HDR) support*
* Future release availability.

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9992-ENC-4K-HEVC » 4K HEVC / AVC / MPEG2 SOFTWARE DEFINED BROADCAST ENCODER

with Single-Channel 4K or Quad-Channel 2K Video Paths

Video Encoding

Encoding Standards:
- MPEG-2
- MPEG-4 AVC (H.264)
- HEVC (H.265)

Support for up to four independent 1080p60 encode sessions(1)
Support for UHD encoding in AVC and HEVC modes (Maximum resolution 4096x2160p60)
Maximum bit rates:
- UHD (4K) encoding: 150 Mb/s
- HD encoding: 40 Mb/s(2)

Support for 4:2:0 and 4:2:2 color spaces in all modes
Support for 8-bit / 10-bit encoding in all modes
Full control of GOP size and structure
Advanced compression controls available

(1) All encode sessions must use the same standard; mixed-standard encoding is not supported.
(2) The first HD channel can be as high as 150 Mb/s.

Audio Encoding

Encoding Standards:
- MPEG-1 Layer II
- AAC-LC
- HE-AAC (v1/v2)
- Dolby AC-3
- Dolby EAC-3
- LPCM (SMPTE-302M)
- Dolby AC-3/EAC-3 pass-through support

(5.1-Surround encoding available for AAC-LC, HE-AAC, Dolby AC-3 and Dolby EAC-3; subject to licensing)
Maximum number of channels supported (subject to licensing):
- MPEG-1 Layer II: 16 stereo pairs (32 audio channels)
- Dolby AC-3: 16 stereo pairs (32 audio channels)
- Dolby EAC-3: 8 stereo pairs (16 audio channels)
- AAC-LC: 8 stereo pairs (16 audio channels)
- HE-AAC (v1/v2) 8 stereo pairs (16 audio channels)

Optional support for 5.1 Surround Sound encoding, in AAC and Dolby modes. Three stereo licenses are required to enable one 5.1 surround encode.
Optional audio module: increases the capacity to 32 stereo pairs (64 audio channels), allowing full 16-channel support for the four HD inputs, in all compression modes*

* Future release availability.

Ancillary Data Support

Closed-Captioning: SMPTE-334M (EIA-608 and EIA-708 supported), Line 21 (SD sources)
OP-47/SMPTE RDD-08 teletext subtitles*
AFD: SMPTE-2016, Line 20/22 WSS (SD sources)
SCTE-104 to SCTE-35 conversion
SMPTE-2038 generic ancillary data transport (timecode, KLV, etc.)

* Future release availability.

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9992-ENC-4K-HEVC » 4K HEVC / AVC / MPEG2 SOFTWARE DEFINED BROADCAST ENCODER

with Single-Channel 4K or Quad-Channel 2K Video Paths

ORDERING INFORMATION

9992-ENC-4K-HEVC 4K HEVC / AVC / MPEG2 Software Defined Broadcast Encoder with Single-Channel 4K or Quad-Channel 2K Video Paths

Option Licenses:

+MP1L2-AAC MPEG-1 Layer II, AAC-LC, and HE-AAC audio encoding license (each license adds one encoded pair)

+ENCD-2.0 Dolby Digital/Dolby Digital Plus stereo audio encoding license (each license adds one encoded pair)

+ENCD-5.1 Dolby Digital/Dolby Digital Plus 5.1 Surround Sound audio encoding license (each license adds one encoded pair)

+RIST/ARQ-ENC RIST RTP/ARQ support (per unit)

+RIST/ENCRP-ENC RIST Encryption/Authentication support license (per unit). (Requires the +RIST/ARQ-ENC license to also be present on the encoder.)

+SMPTE2022 Add SMPTE-2022 support (per unit)

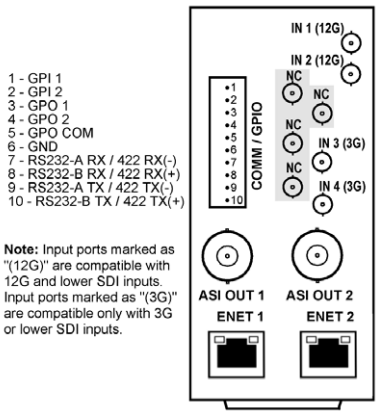
+422 4:2:2 encoding support license (per unit)

+ULL HEVC Ultra-Low Latency support license (per unit)

Note: 9992-ENC is also available in an upgradeable basic single-channel version (up to 1080p60); upgradeable to full 9992-ENC-4K-HEVC with progressive licensing. For info on **9992-ENC** HEVC Upgradeable AVC / MPEG2 Software Defined Broadcast Encoder model, please see 9992-ENC web page for more details.

Rear I/O Modules:

RM20-9992-ENC-B-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (2) 12G/6G/3G/HD-SD-SDI Coaxial Inputs, (2) 3G/HD/SD-SDI Coaxial Inputs, (2) ASI Coaxial Outputs, (2) GigE Ethernet Media Ports, COMM/GPIO Port (All SDI coaxial connectors HD-BNC.) (**Note:** Mates to card in **odd** slot.)



RM20-9992-ENC-B-HDBNC

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BBG-IP-TO-SDI-10GE-2022 » SMPTE ST 2022-6/7 TO 3G/HD/SD-SDI DE-ENCAPSULATOR

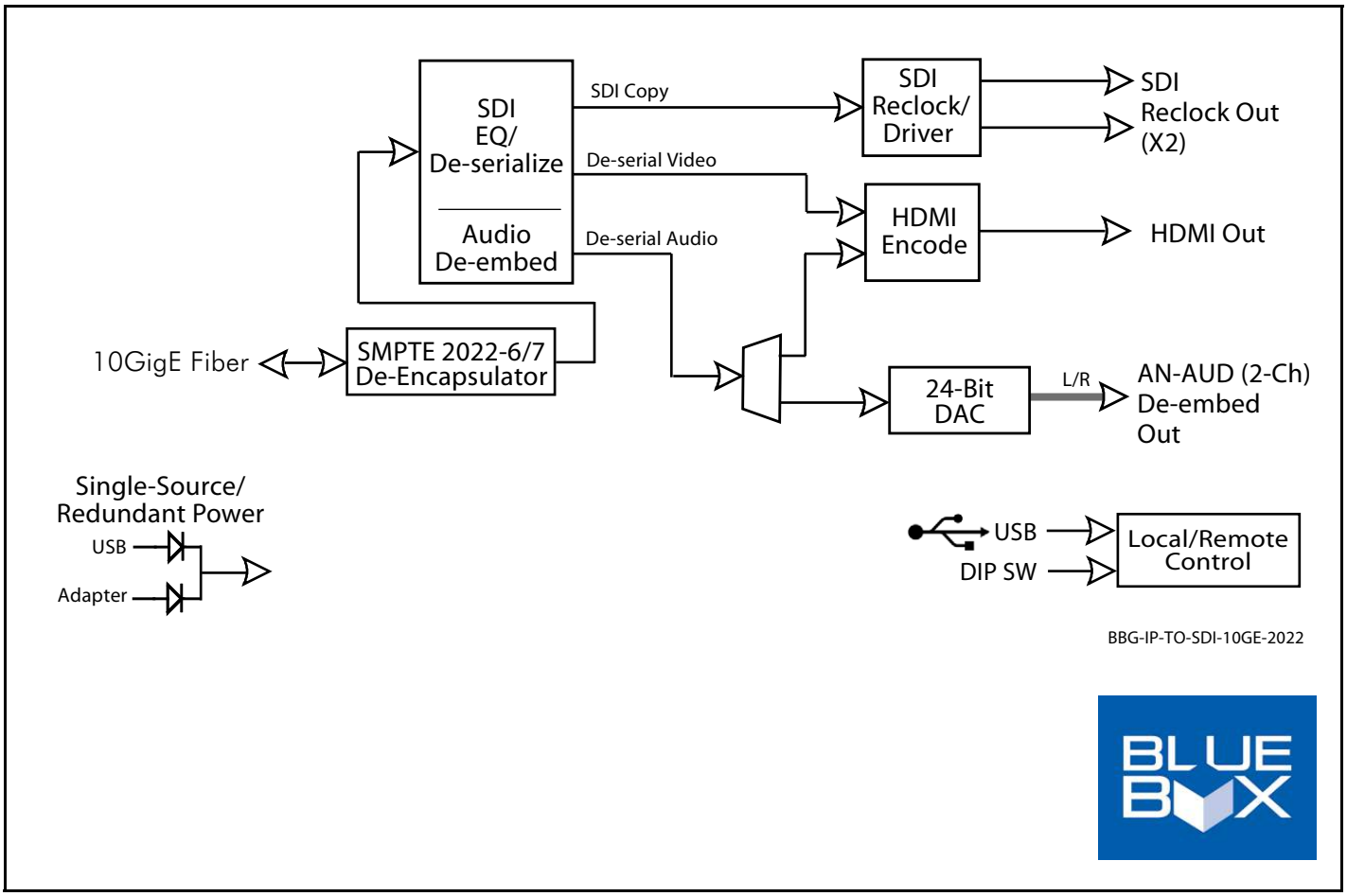
with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs

The Blue Box **BBG-IP-TO-SDI-10GE-2022** SMPTE ST 2022-6/7 To 3G/HD/SD-SDI De-Encapsulator with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs is a part of the Blue Box Group™ of compact, rugged, and portable converter boxes. BBG-IP-TO-SDI-10GE-2022 offers a compact throwdown unit that provides the flexibility of IP-to-SDI de-encapsulation as well as providing an HDMI output, two reclocked SDI coax outputs, and a convenience analog stereo de-embed monitor pair with built-in Lt/Rt downmixer. The 10GigE host connection can be used directly with 10GigE video switches and routers. BBG-IP-TO-SDI-10GE-2022 can support ST 2022-6, or receive a copy of the intended SDI output for ST 2022-7 seamless protection switching over the network.

BBG-IP-TO-SDI-10GE-2022 can be configured using the device DIP switches or by using an intuitive GUI application that communicates with BBG-IP-TO-SDI-10GE-2022 over a PC's USB port. The GUI app allows dynamic configuration control, status display, and other advanced control functions not commonly found on "throwdown" packages. When configured using the GUI app, the USB connection can be removed with all settings held in non-volatile device memory.

FEATURES

- ST 2022-6/7 (HBRMT), ST 424, ST 292, and ST 259 compliant
- Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.
- Stereo analog audio monitoring output with Lt/Rt downmixer
- Configurable using device DIP switches or USB GUI remote control offering dynamic configuration control, status display, and other advanced control functions not commonly found on “throwdown” packages
- Compact size and low weight design easily affixes directly to camera or host device chassis
- Rugged construction backed with a five-year warranty



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BBG-IP-TO-SDI-10GE-2022 » SMPTE ST 2022-6/7 TO 3G/HD/SD-SDI DE-ENCAPSULATOR

with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs

SPECIFICATIONS

Standards Supported
SMPTE 259M, 292M, 424M, ST 2022-6 (HBRMT), ST 2022-7, ST 424, ST 292, and ST 259

Inputs/Outputs
(1) GigE Fiber I/O; Multi-Mode; LC connectors
(2) 3G/HD/SD-SDI 75Ω BNC outputs
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)
(1) HDMI output (HDMI 1.4a compliant). HDMI output can be set as DVI-D (limited to SMPTE HD formats).
(1) Stereo analog audio out (L/R unbalanced pair via 3.5mm TRS jack)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format
48 kHz sampling, 24-bit
8-Ch HDMI from SDI groups 1 and 2

Power Source
Power-sourced directly from host equipment USB port. Converter can also be powered using corded AC adapter (included)

Power
5-16 VDC, 5W

DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

USB Port
Mini-USB (used for power source, USB remote control connection, and firmware upgrade upload to device)

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
32°F to 122°F
(0°C to 50°C)

ORDERING INFORMATION

BBG-IP-TO-SDI-10GE-2022 SMPTE ST 2022-6/7 To 3G/HD/SD-SDI De-Encapsulator with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs

BBG-MB Mounting Bracket (see Product Downloads for downloading installation instruction sheet)

Note: The USB GUI application available for BBG-IP-TO-SDI-10GE is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. The application is not required for device usage where only DIP switch configuration is desired.

Currently, this application is available for only the following operating systems:

- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

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BBG-IP-TO-SDI-10GE-2110 » SMPTE ST 2110 TO 3G/HD/SD-SDI DE-ENCAPSULATOR

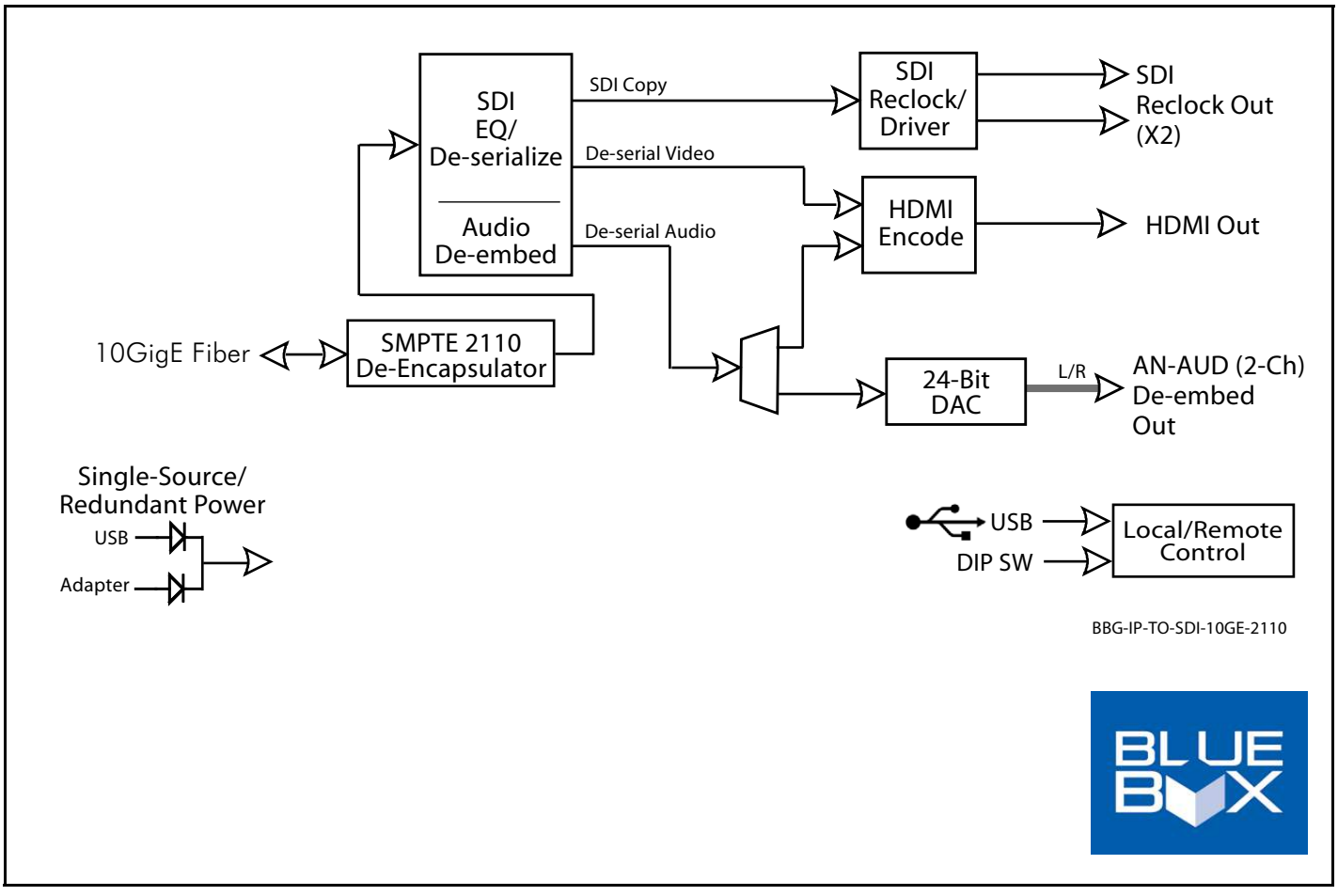
with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs

The Blue Box **BBG-IP-TO-SDI-10GE-2110** SMPTE ST 2110 To 3G/HD/SD-SDI De-Encapsulator with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs is a part of the Blue Box Group™ of compact, rugged, and portable converter boxes. BBG-IP-TO-SDI-10GE-2110 offers a compact throwdown unit that provides the flexibility of IP-to-SDI de-encapsulation as well as providing an HDMI output, two reclocked SDI coax outputs, and a convenience analog stereo de-embed monitor pair with built-in Lt/Rt downmixer. The 10GigE host connection can be used directly with 10GigE video switches and routers. BBG-IP-TO-SDI-10GE-2110 supports 2110 video (part 20), audio (part 30), and ancillary data (part 40) as well as timing (part 21).

BBG-IP-TO-SDI-10GE-2110 can be configured using the device DIP switches or by using an intuitive GUI application that communicates with BBG-IP-TO-SDI-10GE-2110 over a PC's USB port. The GUI app allows dynamic configuration control, status display, and other advanced control functions not commonly found on "throwdown" packages. When configured using the GUI app, the USB connection can be removed with all settings held in non-volatile device memory.

FEATURES

- ST 2110, ST 424, ST 292, and ST 259 compliant
- Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.
- Stereo analog audio monitoring output with Lt/Rt downmixer
- Configurable using device DIP switches or USB GUI remote control offering dynamic configuration control, status display, and other advanced control functions not commonly found on “throwdown” packages
- Compact size and low weight design easily affixes directly to camera or host device chassis
- Rugged construction backed with a five-year warranty



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BBG-IP-TO-SDI-10GE-2110 » SMPTE ST 2110 TO 3G/HD/SD-SDI DE-ENCAPSULATOR

with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs

SPECIFICATIONS

Standards Supported
SMPTE 259M, 292M, 424M, ST 2110, ST 424, ST 292, and ST 259

Inputs/Outputs
(1) GigE Fiber I/O; Multi-Mode; LC connectors
(2) 3G/HD/SD-SDI 75Ω BNC outputs
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)
(1) HDMI output (HDMI 1.4a compliant). HDMI output can be set as DVI-D (limited to SMPTE HD formats).
(1) Stereo analog audio out (L/R unbalanced pair via 3.5mm TRS jack)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format
48 kHz sampling, 24-bit
8-Ch HDMI from SDI groups 1 and 2

Power Source
Power-sourced directly from host equipment USB port. Converter can also be powered using corded AC adapter (included)

Power
5-16 VDC, 5W

DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

USB Port
Mini-USB (used for power source, USB remote control connection, and firmware upgrade upload to device)

Dimensions (WxHxD)
5.5” x 3” x 1” (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
32°F to 122°F
(0°C to 50°C)

ORDERING INFORMATION

BBG-IP-TO-SDI-10GE-2110 SMPTE ST 2110 To 3G/HD/SD-SDI De-Encapsulator with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs

BBG-MB Mounting Bracket (see Product Downloads for downloading installation instruction sheet)

Note: The USB GUI application available for BBG-IP-TO-SDI-10GE is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. The application is not required for device usage where only DIP switch configuration is desired.

Currently, this application is available for only the following operating systems:

- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

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BBG-SDI-TO-IP-10GE-2022 » 3G/HD/SD-SDI TO SMPTE 2022-6/7 ENCAPSULATOR

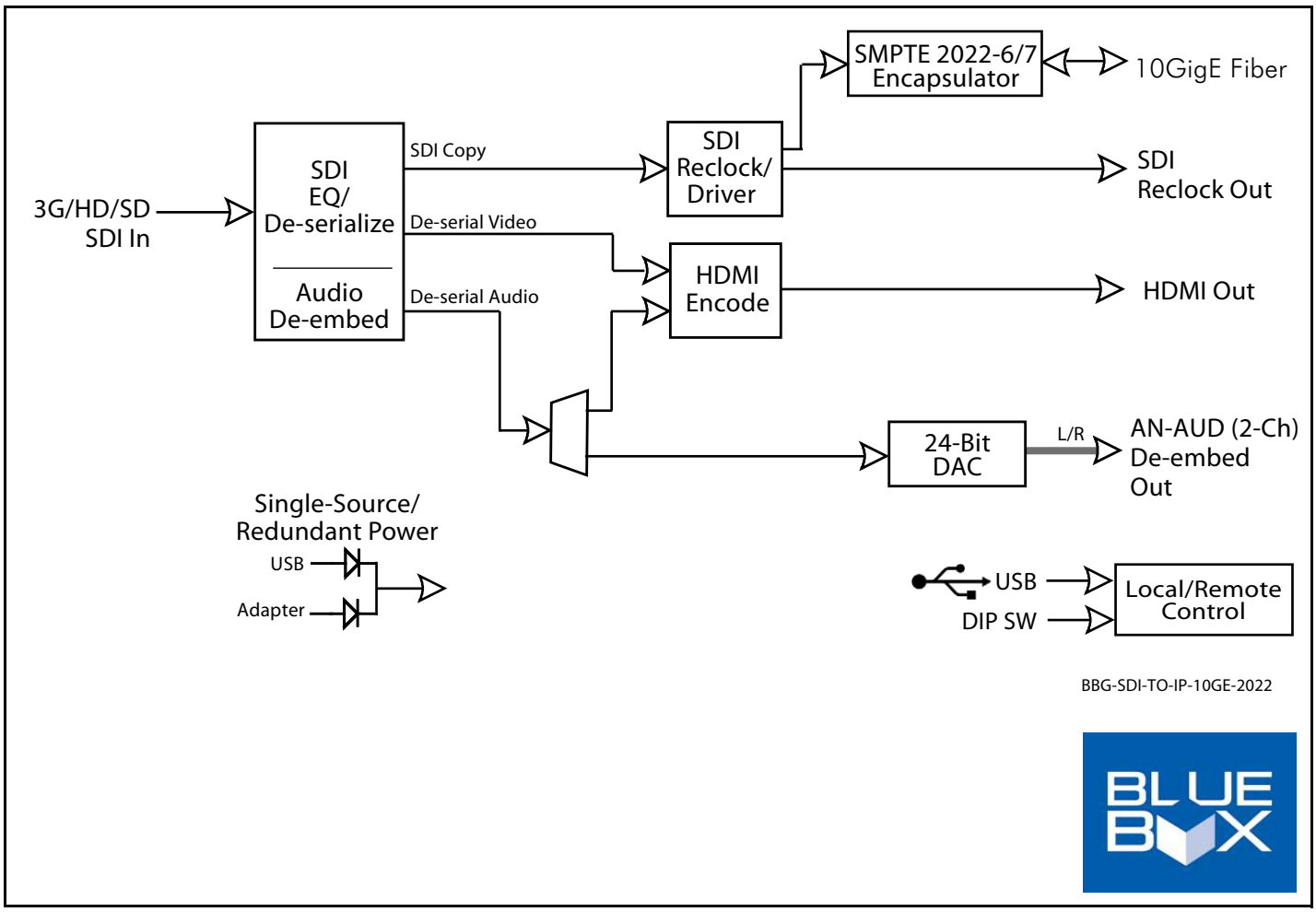
with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs

The Blue Box **BBG-SDI-TO-IP-10GE-2022** 3G/HD/SD-SDI To SMPTE 2022-6/7 Encapsulator with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs is a part of the Blue Box Group™ of compact, rugged, and portable converter boxes. BBG-SDI-TO-IP-10GE-2022 offers a compact throwdown unit that provides the flexibility of SDI-to-IP encapsulation as well as providing an HDMI output, a reclocked SDI coax output, and a convenience analog stereo de-embed monitor pair with built-in Lt/Rt downmixer. The 10GigE port can be used directly with 10GigE video switches and routers. ST 2022-6 is supported as well as ST 2022-7 seamless protection switching over the network.

BBG-SDI-TO-IP-10GE-2022 can be configured using the device DIP switches or by using an intuitive GUI application that communicates with BBG-SDI-TO-IP-10GE over a PC's USB port. The GUI app allows dynamic configuration control, status display, and other advanced control functions not commonly found on "throwdown" packages. When configured using the GUI app, the USB connection can be removed with all settings held in non-volatile device memory.

FEATURES

- ST 2022-6 (HBRMT), ST 2022-7, ST 424, ST 292, and ST 259 compliant
- Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.
- Stereo analog audio monitoring output with Lt/Rt downmixer
- Configurable using device DIP switches or USB GUI remote control offering dynamic configuration control, status display, and other advanced control functions not commonly found on “throwdown” packages
- Compact size and low weight design easily affixes directly to camera or host device chassis
- Rugged construction backed with a five-year warranty



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BBG-SDI-TO-IP-10GE-2022 » 3G/HD/SD-SDI TO SMPTE 2022-6/7 ENCAPSULATOR

with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs

SPECIFICATIONS

Standards Supported
SMPTE 259M, 292M, 424M, ST 2022-6 (HBRMT), ST 2022-7, ST 424, ST 292, and ST 259

Inputs/Outputs
(1) 3G/HD-SD-SDI 75Ω BNC input
(1) GigE Fiber I/O; Multi-Mode; LC connectors
(1) 3G/HD/SD-SDI 75Ω BNC reclocked output
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)
(1) HDMI output (HDMI 1.4a compliant). HDMI output can be set as DVI-D (limited to SMPTE HD formats).
(1) Stereo analog audio out (L/R unbalanced pair via 3.5mm TRS jack)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format
48 kHz sampling, 24-bit
8-Ch HDMI from SDI groups 1 and 2

Power Source
Power-sourced directly from host equipment USB port. Converter can also be powered using corded AC adapter (included).

Power
5-16 VDC, 5W

DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

USB Port
Mini-USB (used for power source, USB remote control connection, and firmware upgrade upload to device)

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
32°F to 122°F
(0°C to 50°C)

ORDERING INFORMATION

BBG-SDI-TO-IP-10GE-2022 3G/HD/SD-SDI To SMPTE ST 2022-6/7 Encapsulator with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs

BBG-MB Mounting Bracket (see Product Downloads for downloading installation instruction sheet)

Note: The USB GUI application available for BBG-SDI-TO-IP-10GE is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. The application is not required for device usage where only DIP switch configuration is desired.

Currently, this application is available for only the following operating systems:

- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

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BBG-SDI-TO-IP-10GE-2110 » 3G/HD/SD-SDI TO SMPTE 2110 ENCAPSULATOR

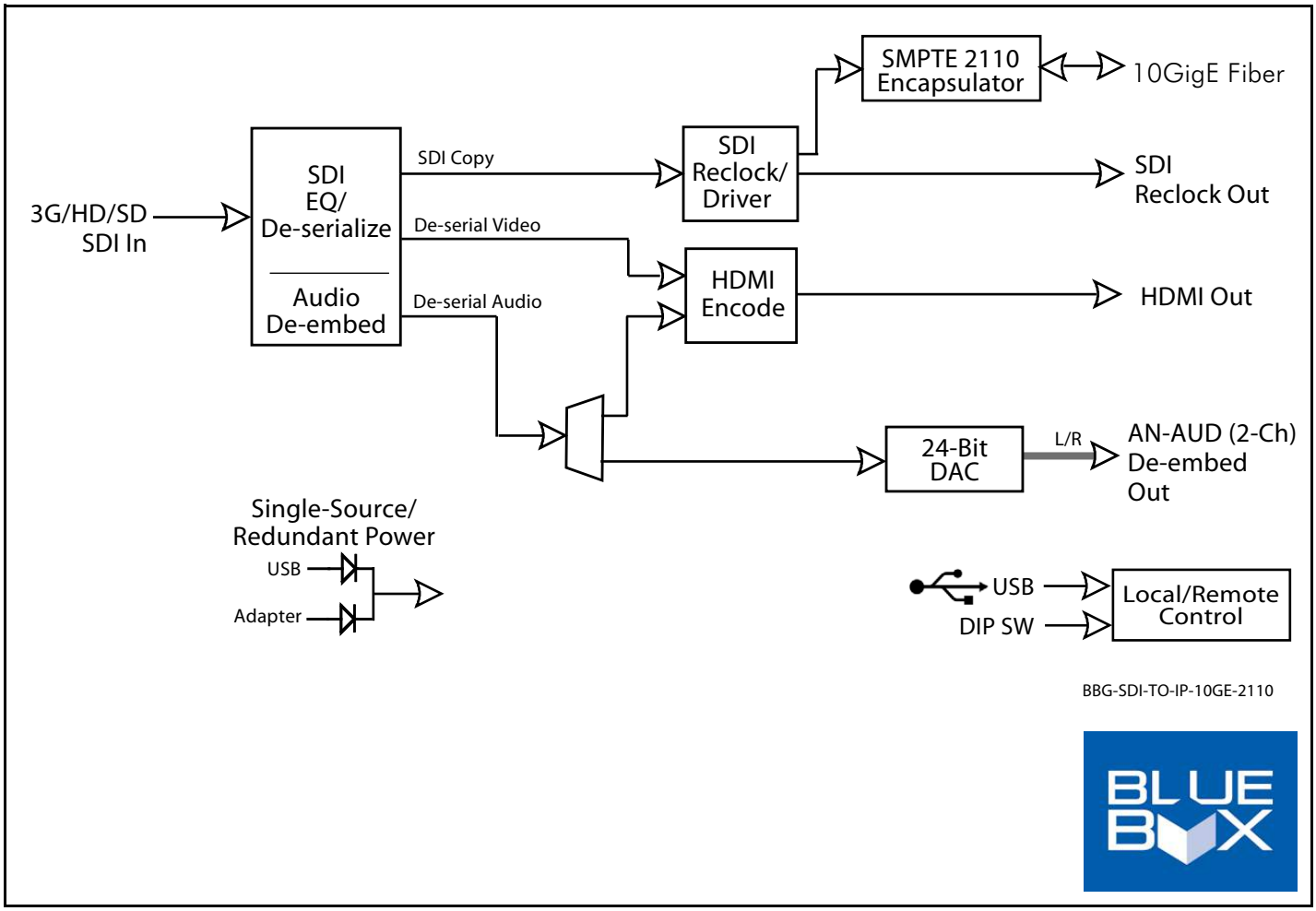
with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs

The Blue Box **BBG-SDI-TO-IP-10GE-2110** 3G/HD/SD-SDI To SMPTE 2110 Encapsulator with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs is a part of the Blue Box Group™ of compact, rugged, and portable converter boxes. BBG-SDI-TO-IP-10GE-2110 offers a compact throwdown unit that provides the flexibility of SDI-to-IP encapsulation as well as providing an HDMI output, a reclocked SDI coax output, and a convenience analog stereo de-embed monitor pair with built-in Lt/Rt downmixer. The 10GigE port can be used directly with 10GigE video switches and routers. BBG-SDI-TO-IP-10GE-2110 provides support of 2110 video (part 20), audio (part 30), and ancillary data (part 40) as well as timing (part 21).

BBG-SDI-TO-IP-10GE-2110 can be configured using the device DIP switches or by using an intuitive GUI application that communicates with BBG-SDI-TO-IP-10GE over a PC's USB port. The GUI app allows dynamic configuration control, status display, and other advanced control functions not commonly found on "throwdown" packages. When configured using the GUI app, the USB connection can be removed with all settings held in non-volatile device memory.

FEATURES

- ST 2110, ST 424, ST 292, and ST 259 compliant
- Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.
- Stereo analog audio monitoring output with Lt/Rt downmixer
- Configurable using device DIP switches or USB GUI remote control offering dynamic configuration control, status display, and other advanced control functions not commonly found on “throwdown” packages
- Compact size and low weight design easily affixes directly to camera or host device chassis
- Rugged construction backed with a five-year warranty



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BBG-SDI-TO-IP-10GE-2110 » 3G/HD/SD-SDI TO SMPTE 2110 ENCAPSULATOR

with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs

SPECIFICATIONS

Standards Supported
SMPTE 259M, 292M, 424M, ST 2110, ST 424, ST 292, and ST 259

Inputs/Outputs
(1) 3G/HD-SD-SDI 75Ω BNC input
(1) GigE Fiber I/O; Multi-Mode; LC connectors
(1) 3G/HD/SD-SDI 75Ω BNC reclocked output
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)
(1) HDMI output (HDMI 1.4a compliant). HDMI output can be set as DVI-D (limited to SMPTE HD formats).
(1) Stereo analog audio out (L/R unbalanced pair via 3.5mm TRS jack)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format
48 kHz sampling, 24-bit
8-Ch HDMI from SDI groups 1 and 2

Power Source
Power-sourced directly from host equipment USB port. Converter can also be powered using corded AC adapter (included).

Power
5-16 VDC, 5W

DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

USB Port
Mini-USB (used for power source, USB remote control connection, and firmware upgrade upload to device)

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
32°F to 122°F
(0°C to 50°C)

ORDERING INFORMATION

BBG-SDI-TO-IP-10GE-2110 3G/HD/SD-SDI To SMPTE ST 2110 Encapsulator with SDI, HDMI, and Stereo Analog Audio Monitoring Outputs

BBG-MB Mounting Bracket (see Product Downloads for downloading installation instruction sheet)

Note: The USB GUI application available for BBG-SDI-TO-IP-10GE is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. The application is not required for device usage where only DIP switch configuration is desired.

Currently, this application is available for only the following operating systems:

- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

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9220 » BIDIRECTIONAL ASI/MPTS GATEWAY

The **9220 Bidirectional ASI/IP Gateway** can receive transport streams over ASI and transmit streams over IP, or receive transport streams over IP and transmit streams over ASI. Utilizing the openGear® open-architecture control/monitoring platform, the 9220 can be remotely controlled and monitored with the free, easy-to-use DashBoard™ setup and control operator interface.

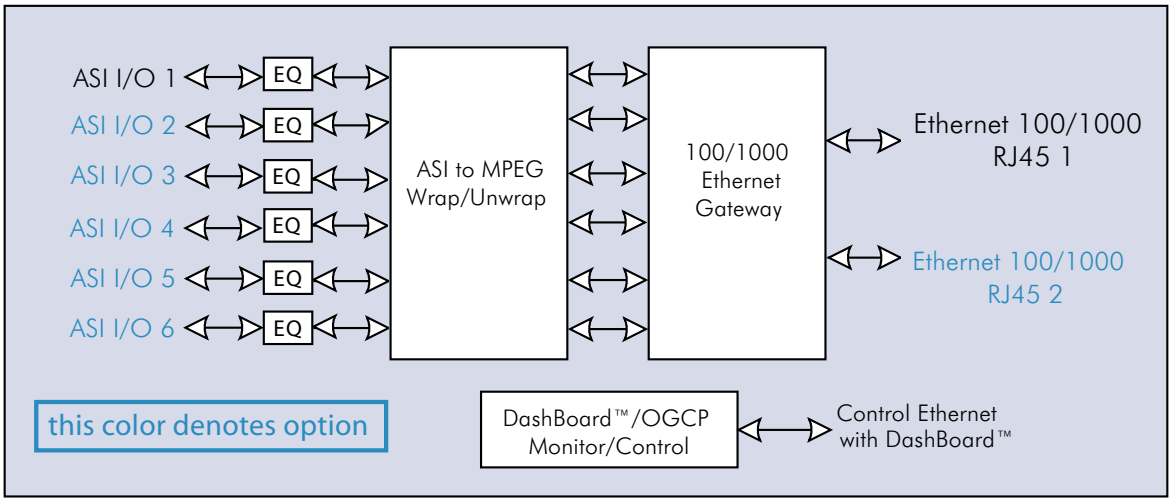
It features up to 6 ASI ports, individually configurable as inputs or outputs. With option +TS, the 9220 can support up to six ASI/IP bidirectional conversions simultaneously (standard support with no additional licenses supports one ASI/IP bidirectional gateway). The 9220 can be used to facilitate seamless plant distribution/contribution over IP. It also includes advanced redundancy protection features, allowing for automatic failover if the primary signal disappears. The 9220 supports both unicast and multicast, with IGMP V1, V2 and V3. DashBoard™ remote control allows easy centralized control and monitoring access.

FEATURES

- Compact self-contained form with built-in AC power supply
- Up to six ASI inputs/outputs supported (standard supports one ASI/IP gateway with up to five additional with corresponding +TS licensing)
- Bidirectional ASI/IP encapsulation or de-encapsulation
- 1x Gigabit Ethernet IP interface
- Optional 2x Gigabit IP interface
- Multicast IGMP v1, v2, and v3 support
- Easy integration and control/monitoring via DashBoard remote control
- Hot-swappable
- Five year warranty

OPTIONS

- +TS – Additional ASI or IP Transport Stream Output
- +GBE – Second Activated Gigabit Ethernet Port



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9220 » BIDIRECTIONAL ASI/MPTS GATEWAY

SPECIFICATIONS

DVB-ASI Input/Output

Number of ports: 6 (max) bi-directional, 75Ω BNC DVB-ASI
213Mbit/s maximum ASI TS bit-rate per port

Network I/O

Number of ports: (2) 100/1000Base-T RJ-45
IPv4, IPv6, UDP, and RTP
900Mbit/s usable GbE per Rx port
900Mbit/s usable GbE per Tx port
600Mbit/s maximum processing per card
213Mbit/s maximum ASI TS bitrate per port

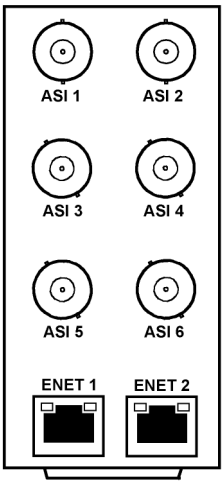
ORDERING INFORMATION

9220 Bidirectional ASI/MPTS Gateway

+TS Optional Additional ASI or IP Transport Stream Output. License is per added transport stream exiting the gateway, either IP or ASI-based (example: 1 added transport stream as ASI and 1 added transport stream as IP requires 2 added licenses).

+GBE Optional Activated Second Gigabit Ethernet Port

RM20-9220-B 20-Slot Frame Rear I/O Module (Standard Width) (6) ASI Input/Output BNCs (software configurable), (2) Gigabit Ethernet Ports



RM20-9220-B

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9223-S » SINGLE-CHANNEL 3G/HD/SD MPEG-4 ENCODER

The **9223-S Single-Channel 3G/HD/SD MPEG-4 Encoder** provides a card-based solution for distribution of MPEG-4 encoding. Utilizing the openGear® open-architecture platform, the 9223-S offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface. Up to 10 of the 9223 cards can be installed in a 20-slot frame, offering distribution delivery of up to 10 channels in a single frame, using less than 150W total, for reduced operating expenses. In addition to SD/HD-SDI inputs, the 9223-S provides the flexibility of supporting SD analog composite video and an analog audio stereo pair per input channel (using MPEG-1 Layer II audio encoding as standard).

The 9223-S offers the latest advances in video compression that delivers excellent video quality at very low bit rates. Unique encoding designs allow delivery of multiple HD and SD video services simultaneously. In addition to ASI outputs, the 9223 provides Ethernet outputs, supporting full-duplex 100 Mb/s and 1 Gb/s operation. Input video auto-detect mode allows encoding to automatically configure an output that correspond to the input, with resolution and frame rate same as input, and scaling set to same as input or other applicable choices.

When using the Ethernet output, the 9223-S supports the traditional UDP/RTP/SPMTE 2022 FEC protocols, as well as the HTTP Live Streaming protocol for transmitting live video over the Internet. Using HTTP Live Streaming, the 9223-S can transmit broadcast-quality video to mobile phones (Apple and Android 4.0 supported), tablets, and a variety of consumer set-top boxes (such as the Amino A140 and the Roku Player).

RTMP support allows direct publishing of real-time, live content to Adobe® Media Servers or any other servers, web sites and CDNs with RTMP ingress, such as Justin.tv, UStream, LiveStream and Akamai. Publish professional-quality real-time SD/HD content to Internet viewers (including some critical features not available in PC-based software encoders) such as ancillary data support (closed-captioning, AFD) and SD-SDI/HD-SDI video inputs with embedded audio support – all in broadcast-grade video quality. SMPTE-2038 processing allows inserting generic ancillary data packets in the transport stream, with frame accuracy. Up to four DID/SDID pairs can be supported.

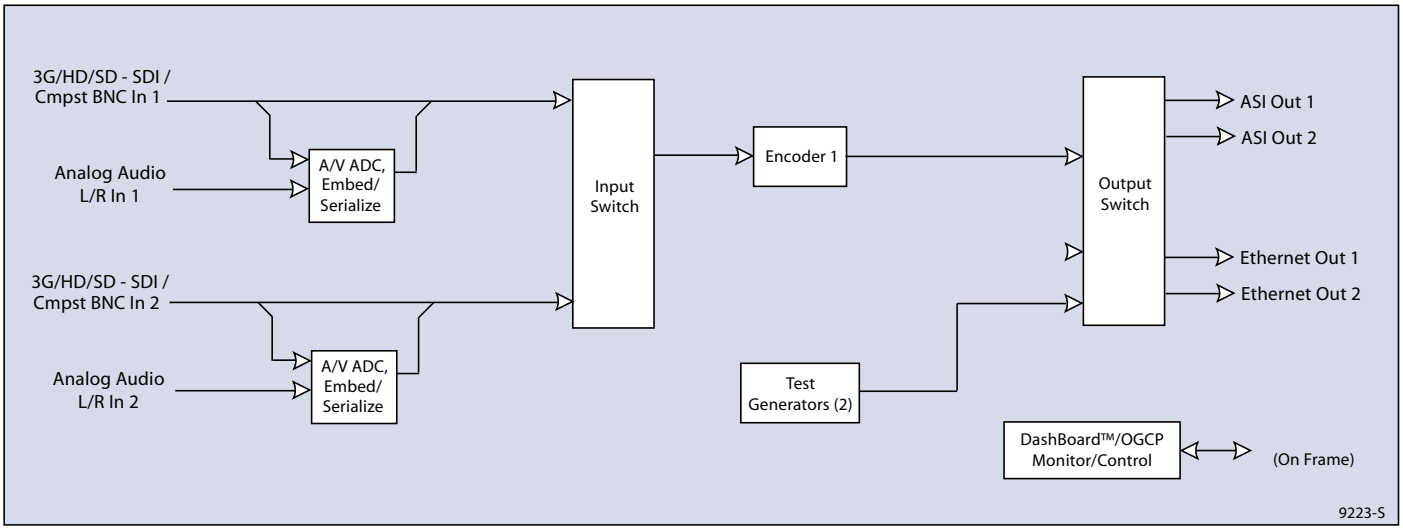
Full user remote monitor/control allows full card status and control access across a standard Ethernet network. Status monitoring is also available at card edge. 9223 encoders are also available in dual encoding channel configuration (some 9223-S models can be upgraded to dual-channel; see Options and Ordering Information). For 9223 dual-channel encoder models information, please see **9223-D Dual-Channel 3G/HD/SD MPEG-4 Encoders** web page.

FEATURES

- Card-based design allows scalability, from 1 channels to 10 channels per frame
- Input video auto-detect mode automatically configures output to correspond to input frame rate and scaling
- Low power/high-density design; only 6 Watts per card
- DVB-ASI and Ethernet outputs
- Full support of CEA-608 and CEA-708 closed captioning and PMT information. Closed-captioning filtering allows filtering to allow and use only SMPTE-334M and/or CEA-708 closed captioning.
- SCTE 104 to SCTE 35 conversion
- Support for inserting generic ancillary data packets in the transport stream using SMPTE-2038, with frame accuracy. Up to four DID/SDID pairs can be supported.
- License-based options allow tailoring functionality as needed, with upgrades available if later desired
- Built-in video/audio ADC and embedder allows direct use with SD composite video and audio analog sources
- RTMP support for publishing to Adobe® Media Server, availing SDI content to Internet viewers
- HTTP Live Streaming protocol allows viewing by Apple® and Android™ 3.0 (or higher) devices
- Optional support for additional audio pairs
- Optional RTP/ARQ support
- Built-in Packet Test Generators allow pre-validation of transport
- Multiple pre-defined control templates provide automatic setup of popular contribution-to-distribution schemes
- Remote control/monitoring via DashBoard™ software
- Hot-swappable
- Five year warranty

OPTIONS

Please see Ordering Information



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9223-S » SINGLE-CHANNEL 3G/HD/SD MPEG-4 ENCODER

SPECIFICATIONS

Power
6W

3G/HD/SD-SDI Inputs
Number of inputs: (2), each configurable as:
3G-SDI (SMPTE 424M)
HD-SDI (SMPTE 292M)
SD-SDI (SMPTE 259M) with EDH
Composite analog video (PAL/NTSC)

Audio Inputs Supported
Embedded SDI, AC-3 (optional)
(2) L/R pairs (max) of analog audio embed

Video Encoding
HD Video:
MPEG-4 AVC High profile at level 4.2 (HP@L4.2)
MPEG-4 AVC High profile at level 4.0 (HP@L4.0)
CBR, VBR
2Mbps to 30Mbps (configurable)
SD Video:
MPEG-4 AVC Main profile at level 3.0 (MP@L3.0)
CBR, VBR
1.5Mbps to 10 Mbps (configurable)

Audio Encoding
MPEG-1 layer II, 1 stereo pair base (Dolby® pass-thru)
MPEG-4 AAC-LC up to 2 pairs
Lip sync adjustment

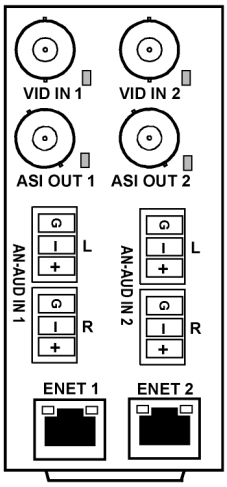
Video Resolution Supported
HD: 1920 x 1080p 60/50/30/29.97/25
1080 x 1920/1440i 30/29.97/25
1280 x 720/960/640p 59.94/50/30/29.97/25
SD: 576 x 720/528i 29.97fps
576 x 720/528i 25fps

Video Pre-Processing
Advanced adaptive spatial filtering
Closed Captions CEA 608B and CEA-708C
WSS/AFD

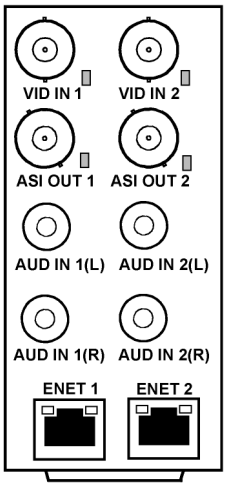
ASI Outputs
Number of outputs: (2) 75Ω BNC DVB-ASI
213Mbit/s maximum ASI TS bit-rate per port

Ethernet
Number of control/monitor connections: (2) redundant 10/100Base-T RJ-45
Number of transport outputs: (2) 100/1000Base-T RJ-45 ports, auto-negotiate or fixed speed
IPv4, IPv6, UDP, RTP
SMPTE 2022 ProMPEG FEC CoP3, 'Forward Error Correction' (Row and Column)

Regulatory Compliance
CE: CE marked in accordance with 93/68/EEC (22/07/03) Directive
UL: UL approval
US FCC: Part 15
EMC: EN55022, EN55024, EN6100-3-2



RM20-9223-B



RM20-9223-U

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9223-S » SINGLE-CHANNEL 3G/HD/SD MPEG-4 ENCODER

ORDERING INFORMATION

9223-S Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD

9223-S-HD-I Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080i

9223-S-HD-P Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080p

9223-A8-S Single-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD. Support for 4 audio pairs (8-ch).

9223-A8-S-HD-I Single-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD/HD up to 1080i. Support for 4 audio pairs (8-ch).

9223-A8-S-HD-P Single-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD/HD up to 1080p. Support for 4 audio pairs (8-ch).

RM20-9223-B 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI/SD BNC Composite In, (2) DVB-ASI BNC Out, (4) Balanced Analog Audio In, (2) 100/1000Base-T RJ-45 Ethernet

RM20-9223-U 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI/SD BNC Composite In, (2) DVB-ASI BNC Out, (4) Unbalanced Analog Audio RCA In, (2) 100/1000Base-T RJ-45 Ethernet

Options:

Note: - Although the –A8 versions support eight channels, encoding is not designed for phase coherency between PCM pairs (i.e., using six available channels to carry 5.1 PCM surround-sound).
- Add Encoder Second Channel options cannot be used with -A8 (8-channel audio) models.
- 9223-A8 models come standard with maximum audio channel capacity. +2A option cannot be added to these models.
- Unless indicated as program channel or audio channel pair license, licenses below are **card-based** licenses and require **only one license per card**.
- RTMP and HLS modes can only use stereo encoding.
- Options denoted as "+" are software-based options which can be fitted on new product at ordering or field-installed as a software upload upgrade. Options denoted as "-" are hardware-based options which are factory-installed upon ordering, or factory-installed by returning fielded product to Cobalt for option installation.

-SD-HD-I Upgrade License; Upgrade (1) SD Channel to HD up to 1080i

-SD-HD-P Upgrade License; Upgrade (1) SD Channel to HD up to 1080p

-HD-I-HD-P Upgrade License; Upgrade (1) HD 1080i Channel to HD 1080p

+RTP/ARQ Automatic Repeat Request License

+UP-AAC AAC Audio License; Add (1) AAC-LC Stereo Channel

-SD Add Encoder Second Channel H.264 SD

-HD-I Add Encoder Second Channel H.264 SD/HD (up to 1080i)

-HD-P Add Encoder Second Channel H.264 SD/HD (up to 1080p)

-PIP Encoder 2nd channel H.264 low resolution PIP option

+RIST/ARQ-ENC Automatic Repeat Request License, Error Correction Assigned For Live Video Over IP / Internet Based on the Reliable Internet Streaming Transport (RIST) Standard

+2A Additional Audio Pair License

+SMPTE2022 SMPTE 2022 FEC License

— Audio Capacity (Base and with Audio Add Option Licenses +2A or +UP-AAC) —

Base – (1) standard MP1L2 encoding license on 1 PID
Add PIDs:
– Can have 2 audio PIDs total (1 additional +2A license or 1 additional +UP-AAC license).
– Can expand up to 4 audio PIDs with +PIP license (3 additional +2A and/or 2 additional +UP-AAC licenses)

Note: 9223-S-A8 models come standard with 4 x MP1L2 stereo encoders for full eight channels of audio support in a single ordering option.

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9223-D » DUAL-CHANNEL 3G/HD/SD MPEG-4 ENCODER

The **9223-D Dual-Channel 3G/HD/SD MPEG-4 Encoders** provide a card-based solution for distribution of MPEG-4 encoding. Utilizing the openGear® open-architecture platform, the 9223-D offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface. Up to 10 of the 9223-D cards can be installed in a 20-slot frame, offering distribution delivery of up to 20 individual or simulcast channels in a single frame, using less than 150W total, for reduced operating expenses. In addition to SD/HD-SDI inputs, the 9223-D provides the flexibility of supporting SD analog composite video and an analog audio stereo pair per input channel (using MPEG-1 Layer II audio encoding as standard).

The 9223-D offers the latest advances in video compression that delivers excellent video quality at very low bit rates. Unique encoding designs allow delivery of multiple HD and SD video services simultaneously. In addition to two ASI outputs, the 9223-D provides two Ethernet outputs, supporting full-duplex 100 Mb/s and 1 Gb/s operation. Input video auto-detect mode allows encoding to automatically configure an output that correspond to the input, with resolution and frame rate same as input, and scaling set to same as input or other applicable choices.

When using the Ethernet output, the 9223-D supports the traditional UDP/RTP/SPMTE 2022 FEC protocols, as well as the HTTP Live Streaming protocol for transmitting live video over the Internet. Using HTTP Live Streaming, the 9223-D can transmit broadcast-quality video to mobile phones (Apple and Android 4.0 supported), tablets, and a variety of consumer set-top boxes (such as the Amino A140 and the Roku Player).

RTMP support allows direct publishing of real-time, live content to Adobe® Media Servers or any other servers, web sites and CDNs with RTMP ingress, such as Justin.tv, UStream, LiveStream and Akamai. Publish professional-quality real-time SD/HD content to Internet viewers (including some critical features not available in PC-based software encoders) such as ancillary data support (closed-captioning, AFD) and SD-SDI/HD-SDI video inputs with embedded audio support – all in broadcast-grade video quality. SMPTE-2038 processing allows inserting generic ancillary data packets in the transport stream, with frame accuracy. Up to four DID/SDID pairs can be supported. Full user remote monitor/control allows full card status and control access across a standard Ethernet network. Status monitoring is also available at card edge.

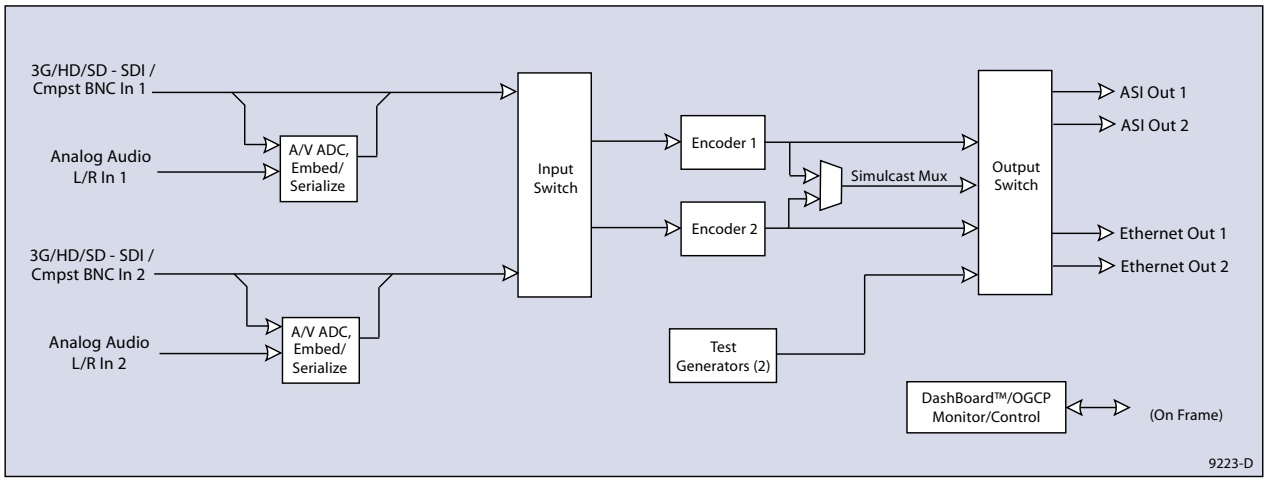
9223 encoders are also available in single encoding channel configuration. For 9223 single-channel encoder models information, please see **9223-S Single-Channel 3G/HD/SD MPEG-4 Encoders** web page.

FEATURES

- Card-based design allows scalability, from 2 channels to 20 channels per frame
- Input video auto-detect mode automatically configures output to correspond to input frame rate and scaling
- Low power/high-density design; only 6 Watts per card
- DVB-ASI and Ethernet outputs
- Full support of CEA-608 and CEA-708 closed captioning and PMT information. Closed-captioning filtering allows filtering to allow and use only SMPTE-334M and/or CEA-708 closed captioning.
- SCTE 104 to SCTE 35 conversion
- Support for inserting generic ancillary data packets in the transport stream using SMPTE-2038, with frame accuracy. Up to four DID/SDID pairs can be supported.
- License-based options allow tailoring functionality as needed, with upgrades available if later desired
- Built-in video/audio ADC and embedder allows direct use with SD composite video and audio analog sources
- RTMP support for publishing to Adobe® Media Server, availing SDI content to Internet viewers
- Optional support for additional audio pairs
- HTTP Live Streaming protocol allows viewing by Apple® and Android™ 3.0 (or higher) devices
- Multi-angle support allows creation of transport streams with two synchronized video PIDs
- Optional RTP/ARQ support
- Built-in Packet Test Generators allow pre-validation of transport
- Multiple pre-defined control templates provide automatic setup of popular contribution-to-distribution schemes
- Remote control/monitoring via DashBoard™ software
- Hot-swappable
- Five year warranty

OPTIONS

Please see Ordering Information



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9223-D » DUAL-CHANNEL 3G/HD/SD MPEG-4 ENCODER

SPECIFICATIONS

Power
6W

3G/HD/SD-SDI Inputs
Number of inputs: (2) each configurable as:
3G-SDI (SMPTE 424M)
HD-SDI (SMPTE 292M)
SD-SDI (SMPTE 259M) with EDH
Composite analog video (PAL/NTSC)

Audio Inputs Supported
Embedded SDI, AC-3 (optional)
(2) L/R pairs (max) of analog audio embed

Video Encoding
Dual-channel HD Video:
MPEG-4 AVC High profile at level 4.2 (HP@L4.2)
MPEG-4 AVC High profile at level 4.0 (HP@L4.0)
CBR, VBR
2Mbps to 30Mbps (configurable)
Dual-channel SD Video:
MPEG-4 AVC Main profile at level 3.0 (MP@L3.0)
CBR, VBR
1.5Mbps to 10 Mbps (configurable)

Audio Encoding
MPEG-1 layer II, up to 2 stereo pairs base (Dolby® pass-thru)
MPEG-4 AAC-LC up to 2 pairs
Lip sync adjustment

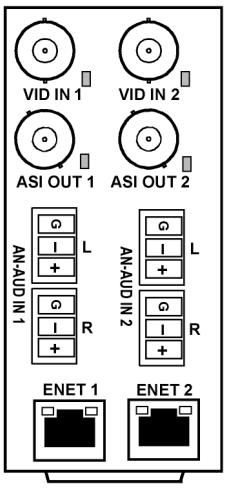
Video Resolution Supported
HD: 1920 x 1080p 60/50/30/29.97/25
1080 x 1920/1440i 30/29.97/25
1280 x 720/960/640p 59.94/50/30/29.97/25
SD: 576 x 720/528i 29.97fps
576 x 720/528i 25fps

Video Pre-Processing
Advanced adaptive spatial filtering
Closed Captions CEA 608B and CEA-708C
WSS/AFD

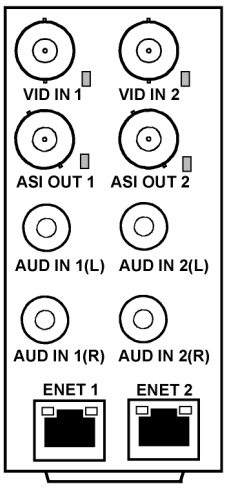
ASI Outputs
Number of outputs: (2) 75Ω BNC DVB-ASI
213Mbit/s maximum ASI TS bit-rate per port

Ethernet
Number of control/monitor connections: (2) redundant 10/100Base-T RJ-45
Number of transport outputs: (2) 100/1000Base-T RJ-45
ports, auto-negotiate or fixed speed
IPv4, IPv6, UDP, RTP
SMPTE 2022 ProMPEG FEC CoP3, 'Forward Error
Correction' (Row and Column)

Regulatory Compliance
CE: CE marked in accordance with 93/68/EEC
(22/07/03) Directive
UL: UL approval
US FCC: Part 15
EMC: EN55022, EN55024, EN6100-3-2



RM20-9223-B



RM20-9223-U

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9223-D » DUAL-CHANNEL 3G/HD/SD MPEG-4 ENCODER

ORDERING INFORMATION

9223-D Dual-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD

9223-D-HD-I Dual-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD/HD up to 1080i

9223-D-HD-P Dual-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD/HD up to 1080p

RM20-9223-B 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI/SD BNC Composite In, (2) DVB-ASI BNC Out, (4) Balanced Analog Audio In, (2) 100/1000Base-T RJ-45 Ethernet

RM20-9223-U 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI/SD BNC Composite In, (2) DVB-ASI BNC Out, (4) Unbalanced Analog Audio RCA In, (2) 100/1000Base-T RJ-45 Ethernet

Options:

Note: - Unless indicated as program channel or audio channel pair license, licenses below are **card-based** licenses and require **only one license per card**.
- Options denoted as "+" are software-based options which can be fitted on new product at ordering or field-installed as a software upload upgrade. Options denoted as "-" are hardware-based options which are factory-installed upon ordering, or factory-installed by returning fielded product to Cobalt for option installation.

-D-SD-HD-I Upgrade License; Upgrade (1) SD Channel to HD up to 1080i

-D-SD-HD-P Upgrade License; Upgrade (1) SD Channel to HD up to 1080p

-D-HD-I-HD-P Upgrade License; Upgrade (1) HD 1080i Channel to HD 1080p

+RIST/ARQ-ENC Automatic Repeat Request License, Error Correction Assigned For Live Video Over IP / Internet Based on the Reliable Internet Streaming Transport (RIST) Standard

+UP-AAC AAC Audio License; Add (1) AAC-LC Stereo Channel

+2A Additional Audio Pair License

+SMPTE2022 SMPTE 2022 FEC License

— Audio Capacity (Base and with Audio Add Option Licenses +2A or +UP-AAC) —

Base – (2) standard MP1L2 encoding licenses on 2 PIDs.
Add PIDs:
– Can have 4 audio PIDs total (2 additional +2A licenses or 2 additional +UP-AAC licenses).

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BBG-1123-ENC » SINGLE-CHANNEL 3G/HD/SD MPEG-4 STANDALONE ENCODER UNIT

The **BBG-1123-ENC** provides a compact form-factor standalone unit for distribution of MPEG-4 encoding. Utilizing the openGear® open-architecture control/monitoring platform, the BBG-1123-ENC can be remotely controlled and monitored with the free, easy-to-use DashBoard™ setup and control operator interface. (When connected to your network, the BBG-1123-ENC appears in DashBoard just like any other device.) The BBG-1123-ENC includes dual redundant 10/100/1000 Mb/s Ethernet ports for control. Low-profile packaging fits 1 RU installations.

The BBG-1123-ENC offers the latest advances in video compression that delivers excellent video quality at very low bit rates. Unique encoding designs allow delivery of multiple HD and SD video services simultaneously. In addition to SD/HD-SDI/3G-SDI inputs, the BBG-1123-ENC provides the flexibility of supporting SD analog composite video and one pair of analog stereo audio per channel (using MPEG-1 Layer II audio encoding as standard). The BBG-1123-ENC features two ASI outputs, as well as two simultaneous transport Ethernet outputs, supporting full-duplex 100 Mb/s and 1 Gb/s operation. Input video auto-detect mode allows encoding to automatically configure an output that correspond to the input, with resolution and frame rate same as input, and scaling set to same as input or other applicable choices.

When using the Ethernet output, the BBG-1123-ENC supports the traditional UDP/RTP/SPMTE 2022 FEC protocols, as well as the HTTP Live Streaming protocol for transmitting live video over the Internet. Using HTTP Live Streaming, the BBG-1123-ENC can transmit broadcast-quality video to mobile phones (Apple and Android 4.0 supported), tablets, and a variety of consumer set-top boxes (such as the Amino A140 and the Roku Player).

RTMP support allows direct publishing of real-time, live content to Adobe® Media Servers or any other servers, web sites and CDNs with RTMP ingress, such as Justin.tv, UStream, LiveStream and Akamai. Publish professional-quality real-time SD/HD content to Internet viewers (including some critical features not available in PC-based software encoders) such as ancillary data support (closed-captioning, AFD) and SD-SDI/HD-SDI video inputs with embedded audio support – all in broadcast-grade video quality. SMPTE-2038 processing allows inserting generic ancillary data packets in the transport stream, with frame accuracy. Up to four DID/SDID pairs can be supported. Full user remote monitor/control allows full device status and control access across a standard Ethernet network.

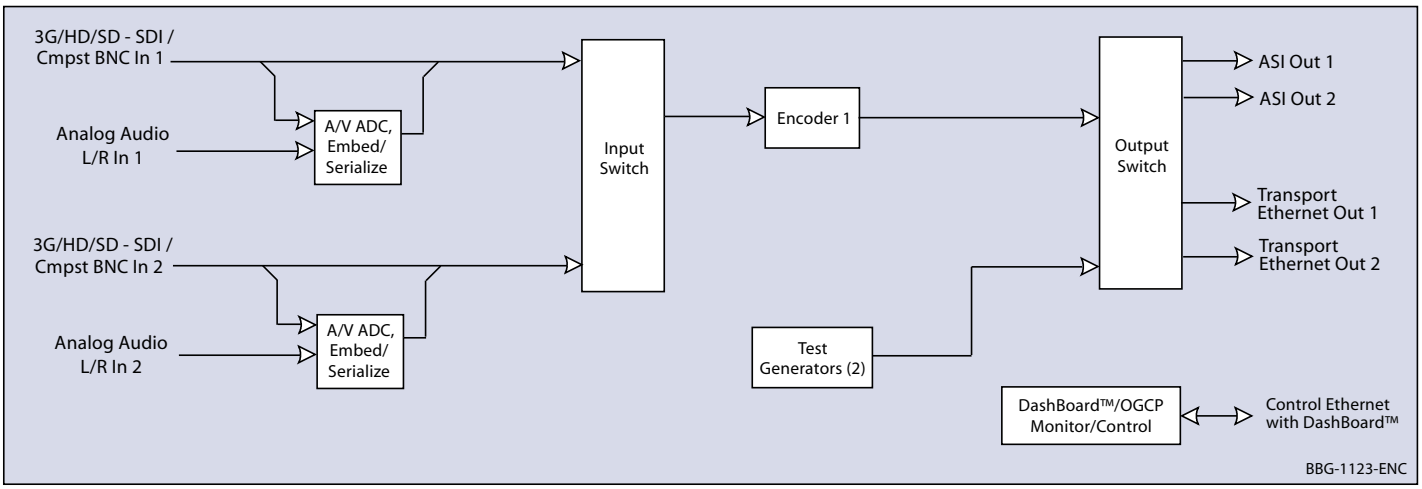
BBG-1123-ENC encoders are also available in dual encoding channel configuration (some BBG-1123-ENC models can be upgraded to dual-channel; see Options and Ordering Information). For BBG-1123-ENC dual-channel encoder models information, please see **BBG-1123-ENC2 Dual-Channel 3G/HD/SD MPEG-4 Standalone Encoder Units** web page.

FEATURES

- Compact self-contained form with built-in AC power supply. Up to 3 units can be installed in a 1RU tray.
- Input video auto-detect mode automatically configures output to correspond to input frame rate and scaling
- DVB-ASI and Ethernet outputs
- Full support of CEA-608 and CEA-708 closed captioning and PMT information. Closed-captioning filtering allows filtering to allow and use only SMPTE-334M and/or CEA-708 closed captioning.
- Optional RTP/ARQ support
- License-based options allow tailoring functionality as
- Built-in video/audio ADC and embedder allows direct use with SD composite video and audio analog sources
- Support for inserting generic ancillary data packets in the transport stream using SMPTE-2038, with frame accuracy. Up to four DID/SDID pairs can be supported.
- Optional support for additional audio pairs per encoded output
- Built-in Packet Test Generators allow pre-validation of transport
- SCTE 104 to SCTE 35 conversion
- HTTP Live Streaming protocol allows viewing by Apple®
- Multiple pre-defined control templates provide automatic setup of popular contribution-to-distribution schemes
- Ethernet remote control/monitoring via free DashBoard™ software. Advanced front panel display/user interface allows initial and basic configuration setup without needing connection to external network or remote control.
- RTMP support for publishing to Adobe® Media Server, availing SDI content to Internet viewers
- Dual-redundant internal power supplies
- Five year warranty

OPTIONS

Please see Ordering Information



DashBoard

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BBG-1123-ENC » SINGLE-CHANNEL 3G/HD/SD MPEG-4 STANDALONE ENCODER UNIT

SPECIFICATIONS

Power
100-250 VAC, 47-63 Hz, 12W

3G/HD/SD-SDI Inputs
Number of inputs: 2, each configurable as:
3G-SDI (SMPTE 424M)
HD-SDI (SMPTE 292M)
SD-SDI (SMPTE 259M) with EDH
Composite analog video (PAL/NTSC)

Audio Inputs Supported
Embedded SDI, AC-3 (optional)
(2) L/R pairs (max) of analog audio embeds

Video Encoding
HD Video:
MPEG-4 AVC High profile at level 4.2 (HP@L4.2)
MPEG-4 AVC High profile at level 4.0 (HP@L4.0)
CBR, VBR
2Mbps to 30Mbps (configurable)
SD Video:
MPEG-4 AVC Main profile at level 3.0 (MP@L3.0)
CBR, VBR
1.5Mbps to 10 Mbps (configurable)

Audio Encoding
MPEG-1 layer II, up to 2 stereo pairs base (Dolby® pass-thru)
MPEG-4 AAC-LC up to 2 pairs
Lip sync adjustment

Video Resolution Supported
HD: 1920 x 1080p 60/50/30/29.97/25
1080 x 1920/1440i 30/29.97/25
1280 x 720/960/640p 59.94/50/30/29.97/25
SD: 576 x 720/528i 29.97fps
576 x 720/528i 25fps

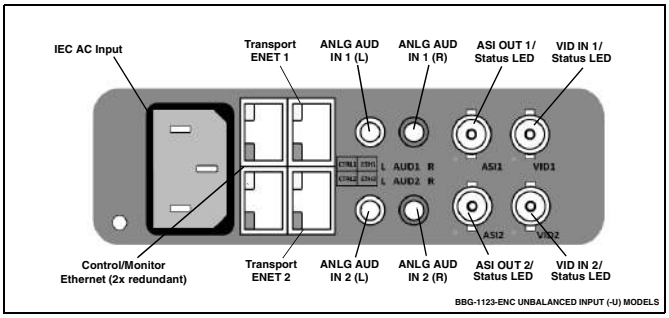
Video Pre-Processing
Advanced adaptive spatial filtering
Closed Captions CEA 608B and CEA-708C
WSS/AFD

ASI Outputs
Number of outputs: 2, 75Ω BNC DVB-ASI
213Mbit/s maximum ASI TS bit-rate per port

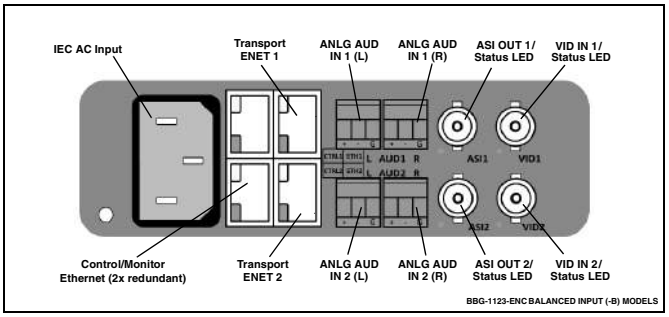
Ethernet
Number of control/monitor connections: 2, redundant 10/100Base-T RJ-45
Number of transport outputs: 2, 100/1000Base-T RJ-45 ports, auto-negotiate or fixed speed
IPv4, IPv6, UDP, RTP
SMPTE 2022 ProMPEG FEC CoP3, 'Forward Error Correction' (Row and Column)

Regulatory Compliance
CE: CE marked in accordance with 89/336/EEC, 72/23/EEC and 1999/5/EEC Directive
UL: UL approval
US FCC: Part 15
EMC: EN55022, EN55024, EN6100-3-2
Safety: IEC60950
RoHS: 2011/65/EU
WEEE: 2012/19/EU

Physical
Dimensions (WxDxH): 5.8 x 14 x 1.7 in (14.6 x 35.6 x 4.4 cm) (including component projection)
Operating Temperature/Humidity: 32°F to 122°F (0°C to 50°C); 5% to 95% non-condensing



BBG-1123-ENC UNBALANCED INPUT (-U) MODELS



BBG-1123-ENC BALANCED INPUT (-B) MODELS

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BBG-1123-ENC » SINGLE-CHANNEL 3G/HD/SD MPEG-4 STANDALONE ENCODER UNIT

ORDERING INFORMATION

Note: All models are available with unbalanced (RCA) analog audio inputs or balanced 3-wire (Phoenix connector) analog audio inputs. Use –U suffix on part number for unbalanced-input unit (example: "BBG-1123-ENC-U"). Use –B suffix on part number for balanced-input unit (example: "BBG-1123-ENC-B").

BBG-1123-ENC Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD

BBG-1123-ENC-HD-I Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080i

BBG-1123-ENC-HD-P Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080p

BBG-1123-ENC-A8 Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD. Support for 4 audio pairs (8-ch).

BBG-1123-ENC-A8-HD-I Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080i. Support for 4 audio pairs (8-ch).

BBG-1123-ENC-A8-HD-P Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080p. Support for 4 audio pairs (8-ch).

Options and Accessories:

Note:
- Although the –A8 versions support eight channels, encoding is not designed for phase coherency between PCM pairs (i.e., using six available channels to carry 5.1 PCM surround-sound).
- Add Encoder Second Channel options cannot be used with -A8 (8-channel audio) models.
- BBG-1123-ENC-A8 models come standard with maximum audio channel capacity. +2A option cannot be added to these models.
- Unless indicated as program channel or audio channel pair license, licenses below are **device-based** licenses and require **only one license per unit**.
- RTMP and HLS modes can only use stereo encoding.
- Options denoted as "+" are software-based options which can be fitted on new product at ordering or field-installed as a software upload upgrade. Options denoted as "-" are hardware-based options which are factory-installed upon ordering, or factory-installed by returning fielded product to Cobalt for option installation.

-SD-HD-I-SA Upgrade License; Upgrade (1) SD Channel to HD up to 1080i

-SD-HD-P-SA Upgrade License; Upgrade (1) SD Channel to HD up to 1080p

-HD-I-HD-P-SA Upgrade License; Upgrade (1) HD 1080i Channel to HD 1080p

+UP-AAC AAC Audio License; Add (1) AAC-LC Stereo Channel

-SD-SA Add Encoder Second Channel H.264 SD

-HD-I-SA Add Encoder Second Channel H.264 SD/HD (up to 1080i)

-HD-P-SA Add Encoder Second Channel H.264 SD/HD (up to 1080p)

-PIP Encoder 2nd channel H.264 low resolution PIP option

+RIST/ARQ-ENC Automatic Repeat Request License, Error Correction Assigned For Live Video Over IP / Internet Based on the Reliable Internet Streaming Transport (RIST) Standard

+2A-SA Additional Audio Pair License

+SMPTE2022 SMPTE 2022 FEC License

BBG-1100-TRAY 1RU Rack-Mount Tray (supports up to 3 BBG-1100 units)

— Audio Capacity (Base and with Audio Add Option Licenses +2A or +UP-AAC) —

Base – (1) standard MP1L2 encoding license on 1 PID
Add PIDs:
– Can have 2 audio PIDs total (1 additional +2A license or 1 additional +UP-AAC license).
– Can expand up to 4 audio PIDs with +PIP license (3 additional +2A and/or 2 additional +UP-AAC licenses)

Note: BBG-1123-ENC-A8 models come standard with 4 x MP1L2 stereo encoders for full eight channels of audio support in a single ordering option.

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BBG-1123-ENC2 » DUAL-CHANNEL 3G/HD/SD MPEG-4 STANDALONE ENCODER UNIT

The **BBG-1123-ENC2** provides a compact form-factor standalone unit for distribution of MPEG-4 encoding. Utilizing the openGear® open-architecture control/monitoring platform, the BBG-1123-ENC2 can be remotely controlled and monitored with the free, easy-to-use DashBoard™ setup and control operator interface. (When connected to your network, the BBG-1123-ENC2 appears in DashBoard just like any other device.) The BBG-1123-ENC2 includes dual redundant 10/100/1000 Mb/s Ethernet ports for control. Low-profile packaging fits 1 RU installations.

The BBG-1123-ENC2 offers the latest advances in video compression that delivers excellent video quality at very low bit rates. Unique encoding designs allow delivery of multiple HD and SD video services simultaneously. In addition to two ASI outputs, the BBG-1123-ENC2 provides two Ethernet outputs, supporting full-duplex 100 Mb/s and 1 Gb/s operation. Input video auto-detect mode allows encoding to automatically configure an output that correspond to the input, with resolution and frame rate same as input, and scaling set to same as input or other applicable choices.

When using the Ethernet output, the BBG-1123-ENC2 supports the traditional UDP/RTP/SPMTE 2022 FEC protocols, as well as the HTTP Live Streaming protocol for transmitting live video over the Internet. Using HTTP Live Streaming, the BBG-1123-ENC2 can transmit broadcast-quality video to mobile phones (Apple and Android 4.0 supported), tablets, and a variety of consumer set-top boxes (such as the Amino A140 and the Roku Player).

RTMP support allows direct publishing of real-time, live content to Adobe® Media Servers or any other servers, web sites and CDNs with RTMP ingress, such as Justin.tv, UStream, LiveStream and Akamai. Publish professional-quality real-time SD/HD content to Internet viewers (including some critical features not available in PC-based software encoders) such as ancillary data support (closed-captioning, AFD) and SD-SDI/HD-SDI video inputs with embedded audio support – all in broadcast-grade video quality. SMPTE-2038 processing allows inserting generic ancillary data packets in the transport stream, with frame accuracy. Up to four DID/SDID pairs can be supported. Full user remote monitor/control allows full device status and control access across a standard Ethernet network.

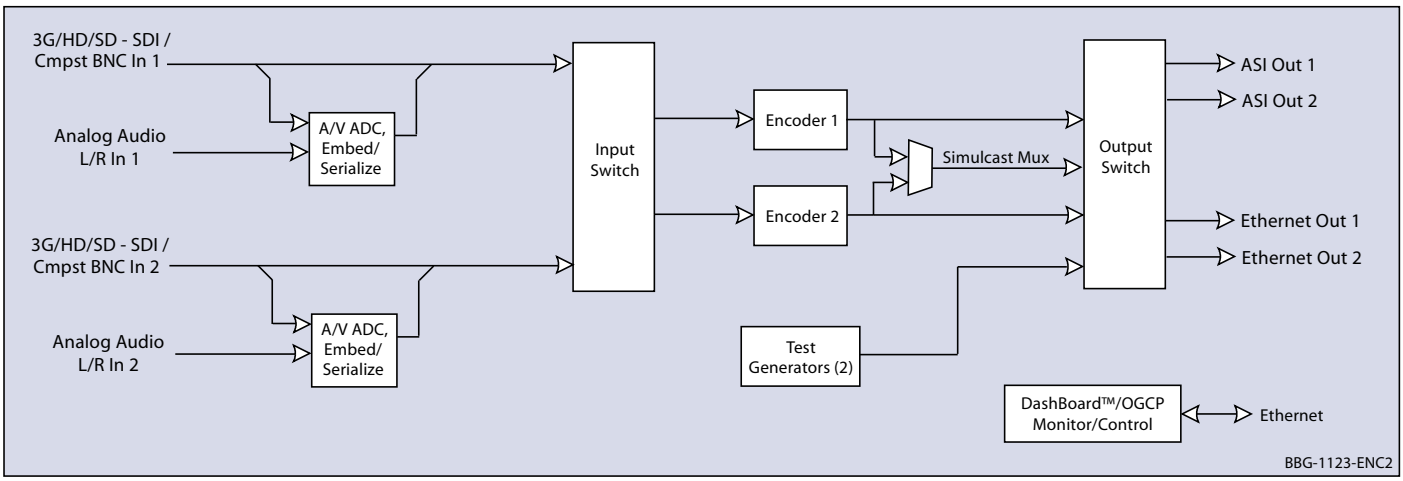
BBG-1123-ENC encoders are also available in single encoding channel configuration. For BBG-1123-ENC single-channel encoder models information, please see **BBG-1123-ENC Single-Channel 3G/HD/SD MPEG-4 Encoder Units** web page.

FEATURES

- Compact self-contained form with built-in AC power supply. Up to 3 units can be installed in a 1RU tray.
- Input video auto-detect mode automatically configures output to correspond to input frame rate and scaling
- DVB-ASI and Ethernet outputs
- Full support of CEA-608 and CEA-708 closed captioning and PMT information. Closed-captioning filtering allows filtering to allow and use only SMPTE-334M and/or CEA-708 closed captioning.
- Optional RTP/ARQ support
- License-based options allow tailoring functionality as needed, with upgrades available if later desired
- Support for inserting generic ancillary data packets in the transport stream using SMPTE-2038, with frame accuracy. Up to four DID/SDID pairs can be supported.
- Built-in video/audio ADC and embedder allows direct use with SD composite video and audio analog sources
- Optional support for additional audio pairs per encoded output
- Built-in Packet Test Generators allow pre-validation of transport
- HTTP Live Streaming protocol allows viewing by Apple® and Android™ 3.0 (or higher) devices
- SCTE 104 to SCTE 35 conversion
- Multi-angle support allows creation of transport streams with two synchronized video PIDs
- Multiple pre-defined control templates provide automatic setup of popular contribution-to-distribution schemes
- Ethernet remote control/monitoring via free DashBoard™ software. Advanced front panel display/user interface allows initial and basic configuration setup without needing connection to external network or remote control.
- RTMP support for publishing to Adobe® Media Server, availing SDI content to Internet viewers
- Dual-redundant internal power supplies
- Five year warranty

OPTIONS

Please see Ordering Information



DashBoard

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BBG-1123-ENC2 » DUAL-CHANNEL 3G/HD/SD MPEG-4 STANDALONE ENCODER UNIT

SPECIFICATIONS

Power
100-250 VAC, 47-63 Hz, 12W

3G/HD/SD-SDI Inputs
Number of inputs: 2, each configurable as:
3G-SDI (SMPTE 424M)
HD-SDI (SMPTE 292M)
SD-SDI (SMPTE 259M) with EDH
Composite analog video (PAL/NTSC)

Audio Inputs Supported
Embedded SDI, AC-3 (optional)
(2) L/R pairs (max) of analog audio embeds

Video Encoding
Dual-channel HD Video:
MPEG-4 AVC High profile at level 4.2 (HP@L4.2)
MPEG-4 AVC High profile at level 4.0 (HP@L4.0)
CBR, VBR
2Mbps to 30Mbps (configurable)
Dual-channel SD Video:
MPEG-4 AVC Main profile at level 3.0 (MP@L3.0)
CBR, VBR
1.5Mbps to 10 Mbps (configurable)

Audio Encoding
MPEG-1 layer II, up to 2 stereo pairs base (Dolby® pass-thru)
MPEG-4 AAC-LC up to 2 pairs
Lip sync adjustment

Video Resolution Supported
HD: 1920 x 1080p 60/50/30/29.97/25
1080 x 1920/1440i 30/29.97/25
1280 x 720/960/640p 59.94/50/30/29.97/25
SD: 576 x 720/528i 29.97fps
576 x 720/528i 25fps

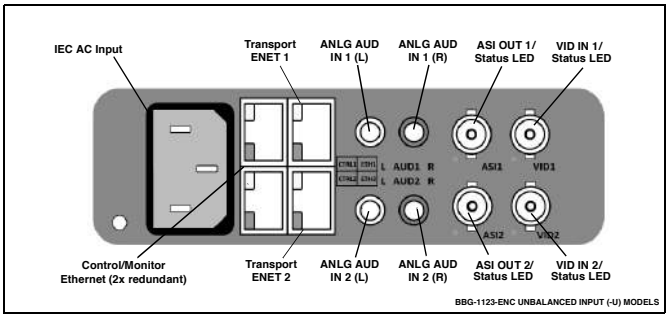
Video Pre-Processing
Advanced adaptive spatial filtering
Closed Captions CEA 608B and CEA-708C
WSS/AFD

ASI Outputs
Number of outputs: 2, 75Ω BNC DVB-ASI
213Mbit/s maximum ASI TS bit-rate per port

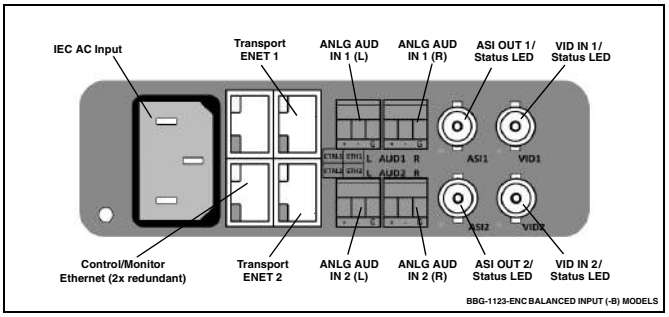
Ethernet
Number of control/monitor connections: 2, redundant 10/100Base-T RJ-45
Number of transport outputs: 2, 100/1000Base-T RJ-45 ports, auto-negotiate or fixed speed
IPv4, IPv6, UDP, RTP
SMPTE 2022 ProMPEG FEC CoP3, 'Forward Error Correction' (Row and Column)

Regulatory Compliance
CE: CE marked in accordance with 89/336/EEC, 72/23/EEC and 1999/5/EEC Directive
UL: UL approval
US FCC: Part 15
EMC: EN55022, EN55024, EN6100-3-2
Safety: IEC60950
RoHS: 2011/65/EU
WEEE: 2012/19/EU

Physical
Dimensions (WxDxH): 5.8 x 14 x 1.7 in (14.6 x 35.6 x 4.4 cm) (including component projection)
Operating Temperature/Humidity: 32°F to 122°F (0°C to 50°C); 5% to 95% non-condensing



BBG-1123-ENC UNBALANCED INPUT (-U) MODELS



BBG-1123-ENC BALANCED INPUT (-B) MODELS

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BBG-1123-ENC2 » DUAL-CHANNEL 3G/HD/SD MPEG-4 STANDALONE ENCODER UNIT

ORDERING INFORMATION

Note: All models are available with unbalanced (RCA) analog audio inputs or balanced 3-wire analog audio inputs. Use –U suffix on part number for unbalanced-input unit (example: "BBG-1123-ENC2-U"). Use –B suffix on part number for balanced-input unit (example: "BBG-1123-ENC2-B").

BBG-1123-ENC2 Dual-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD

BBG-1123-ENC2-HD-I Dual-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080i

BBG-1123-ENC2-HD-P Dual-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080p

Options and Accessories:

Note: - Unless indicated as program channel or audio channel pair license, licenses below are **device-based** licenses and require **only one license per unit**.
- Options denoted as "+" are software-based options which can be fitted on new product at ordering or field-installed as a software upload upgrade. Options denoted as "-" are hardware-based options which are factory-installed upon ordering, or factory-installed by returning fielded product to Cobalt for option installation.

-D-SD-HD-I-SA Upgrade License; Upgrade (1) SD Channel to HD up to 1080i

-D-SD-HD-P-SA Upgrade License; Upgrade (1) SD Channel to HD up to 1080p

-D-HD-I-HD-P-SA Upgrade License; Upgrade (1) HD 1080i Channel to HD 1080p

+RIST/ARQ-ENC Automatic Repeat Request License, Error Correction Assigned For Live Video Over IP / Internet Based on the Reliable Internet Streaming Transport (RIST) Standard

+UP-AAC-SA AAC Audio License; Add (1) AAC-LC Stereo Channel

+2A-SA Additional Audio Pair License

+SMPTE2022 SMPTE 2022 FEC License

BBG-1100-TRAY 1 RU Rack Mount Tray (supports up to three BBG-1100 units)

— Audio Capacity (Base and with Audio Add Option Licenses +2A or +UP-AAC) —

Base – (2) standard MP1L2 encoding licenses on 2 PIDs.
Add PIDs:
– Can have 4 audio PIDs total (2 additional +2A licenses or 2 additional +UP-AAC licenses).

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9990-TRX-MPEG » MULTI-STANDARD BROADCAST TRANSCODER

The **9990-TRX-MPEG Multi-Standard Broadcast Transcoder** offers a powerful transcoding solution combining IPTV, professional broadcast, enterprise video delivery, and streaming video environments, making it ideally suited for content repurposing, edge transcoding, and video distribution network bandwidth optimization.

The 9990-TRX-MPEG is a full-featured quad-channel video transcoder using the latest advances in video compression technology to ensure excellent video quality at low bit rates. Simultaneous support of DVB-ASI, broadcast over IP, MPEG-DASH Streaming, and HTTP Live Streaming allows content to be freely distributed over virtually any video network.

The 9990-TRX-MPEG provides transcoding of two video services (channels) using either MPEG-2 or MPEG-4 AVC codecs in SD format and the output of MPEG-1 Layer II services. The single program can be outputted over ASI and IP interfaces individually or simultaneously. License options allow easy scalability via easy to install software uploads without removing or powering-down the card.

The openGear® card form factor and DashBoard™ remote control makes for easy integration into existing terminal equipment environments.

openGear

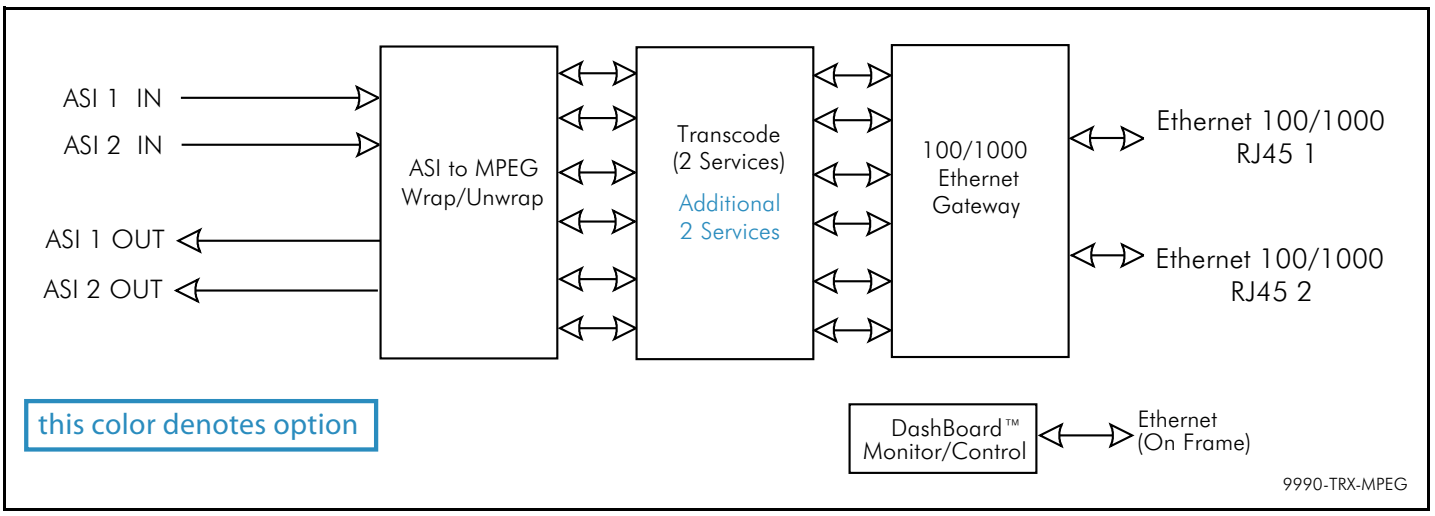
FEATURES

- Dual-channel multi-standard HD/SD transcoding standard – scalable for additional transcoding using software licenses as simple downloads
- Supports MPEG-1 Layer II, AAC, and Dolby® AC-3 audio inputs
- Full, future-proof "any-to-any" multi-standard codec support – adapts services from both MPEG-2 and MPEG-4 AVC systems
- Low-power, high-density design; <14 Watts – up to 10 cards per frame
- IP transmission using unicast or multicast
- Gigabit Ethernet and DVB-ASI input/outputs
- Audio pass-through
- VBI and closed-captioning pass-through
- Easy integration and control/monitoring via DashBoard remote control
- Hot-swappable
- Five year warranty

OPTIONS

+TRX2 – Adds two transcoding licenses

+TRXDDEC – Dolby® decoding license (per video service (channel))



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9990-TRX-MPEG » MULTI-STANDARD BROADCAST TRANSCODER

SPECIFICATIONS

Power
14 Watts

Inputs/Outputs
2x 100/1000Base-T RJ-45 ports, auto-negotiate or fixed speed
2x DVB-ASI input ports, BNC 75Ω
2x DVB-ASI output ports, BNC 75Ω
213Mbit/s maximum ASI TS bit-rate per port
Ethernet
Number of Ports: See Rear Module Options
Cable Type: Standard straight-thru CAT-5e
Connector Type: RJ-45
Network Transport Protocols
UDP/IP (Unicast and Multicast)
RTP/IP (Unicast and Multicast)
RTMP (Flash)
HTTP Live Streaming (HLS): populates an external web server through FTP or SFTP
Direct HTTP Streaming: encodes directly to an HTTP connection. Automatically generates web pages with a video window for all supported modes (VLC plug-in required)

Transcode Modes
Multi-codec capable
MPEG-2 to MPEG-4 AVC
MPEG-4 AVC to MPEG-2
SD/HD MPEG-2 to MPEG-2 and AVC to AVC re-encode
- format conversion
- rate reduction

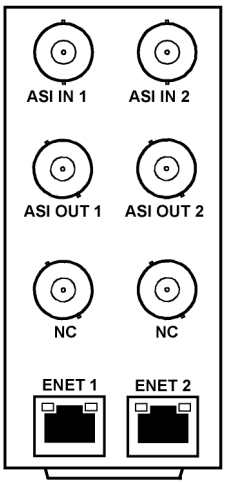
Video Processing
Integrated downconversion
- HD to SD
- Sub-SD resolutions
Adaptive deinterlacer
Frame rate reduction
AFD handling
Closed captions and VBI passthrough
Video Transcoding
Input:
MPEG-4 AVC HP @ L4.0, HP @ L4.2 (HD)
MPEG-4 AVC MP @ L3.0 (SD)
MPEG-2 HP @ HL (HD)
MPEG-2 MP @ ML (SD)
Output:
MPEG-4 AVC HP @ L4.0, HP @ L4.2 (HD)
MPEG-4 AVC MP @ L3.0 (SD)
MPEG-2 HP @ HL (HD)
MPEG-2 MP @ ML (SD)
CBR & VBR
1.5Mbps to 10 Mbps (profile dependent)

Video Formats
Input:
1080 x 1920p 60/50
1080 x 1920/1440i 25 29.97/30
720 x 1280/960 50/59.94
960 x 540 25/29.97
480 x 720/704/640/528 29.97
576 x 720/704/640/528 25
640x480, 480x270, 320x240, 320x180

Video Formats (cont.)
Output:
1080 x 1920p 60/50
1080 x 1920/1440i 25 29.97/30
720 x 1280/960 50/59.94
960 x 540 25/29.97
480 x 720/704/640/528 29.97
576 x 720/704/640/528 25
640x480, 480x270, 320x240, 320x180
29.97, 25, 15, 12.5, 7.5, 6.25 frames/sec

Audio Transcoding
Input:
MPEG-1 layer II stereo
MPEG-4 AAC-LC stereo and 5.1
MPEG-4 HE-AAC 5.1
Dolby AC-3 stereo, 5.1, 7.1
Output:
MPEG-1 layer II
MPEG-4 AAC-LC
Pass-through
Conversion:
5.1 -> 5.1, 2.0

Management
10/100/1000Base-T Ethernet (RJ-45)
Configuration import/export
Visual fault indicator
SNMP v1,v2
Datasafe™ automated card configuration
Accurate bit rate control



RM20-9990-TRX-B

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9990-TRX-MPEG » MULTI-STANDARD BROADCAST TRANSCODER

ORDERING INFORMATION

9990-TRX-MPEG	Multi-Standard Broadcast Transcoder
RM20-9990TRX-B	20-Slot Frame Rear I/O Module (Standard Width) (2) ASI Input BNCs, (2) ASI Output BNCs, (2) Gigabit Transport Ethernet ports
RM20-9223-U	20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI/SD BNC Composite In, (2) DVB-ASI BNC Out, (4) Unbalanced Analog Audio RCA In, (2) 100/1000Base-T RJ-45 Ethernet

Options:

+TRX2	Add Transcoding License. Adds transcoding for two additional services.
+TRXDDEC	Dolby® decoding license (per video service (channel))

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9990-ENC-H264-IP » HD/SD-SDI/CVBS (SINGLE-CHANNEL) H.264 ENCODER WITH STREAMING IP OUTPUT with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

The **9990-ENC-H264-IP HD/SD-SDI/CVBS H.264 Encoder with Streaming IP Output** provides a card-based solution for distribution of MPEG-4 encoding. The encoder is **designed specifically for distribution**, with cost savings of offering only streaming IP instead of IP and DVB-ASI which is not needed for distribution. The 9990-ENC-H264-IP is perfectly suited for IP video distribution over the Internet or over a dedicated IP link. Utilizing the openGear® open-architecture platform, the 9990-ENC-H264-IP offers easy-to-use DashBoard™ setup and control operator interface. Up to 10 of the cards can be installed in a 20-slot frame, using less than 150W total, for reduced operating expenses. In addition to HD/SD-SDI inputs, the 9990-ENC-H264-IP provides the flexibility of supporting SD analog composite video and an analog audio stereo pair per input channel.

The 9990-ENC-H264-IP offers the latest advances in video compression that delivers excellent video quality at very low bit rates. Unique encoding designs allow delivery of multiple HD and SD video services simultaneously. The 9990-ENC-H264-IP provides two Ethernet outputs, supporting full-duplex 100 Mb/s and 1 Gb/s operation. Input video auto-detect mode allows encoding to automatically configure an output that correspond to the input, with resolution and frame rate same as input, and scaling set to same as input or other applicable choices. SMPTE-2038 processing allows inserting generic ancillary data packets in the transport stream, with frame accuracy. Up to four DID/SDID pairs can be supported.

Using HTTP Live Streaming, the 9990-ENC-H264-IP can transmit broadcast-quality video to mobile phones (Apple and Android 4.0 supported) and tablets.

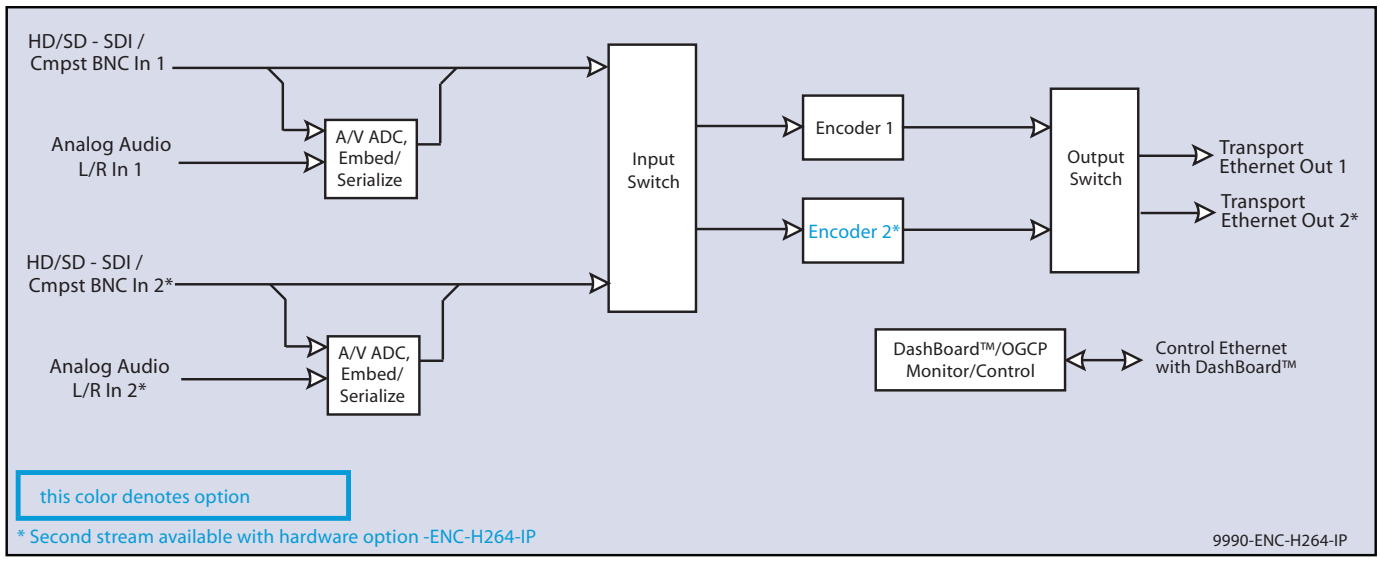
Full user remote monitor/control allows full card status and control access across a standard Ethernet network. Status monitoring is also available at card edge.

FEATURES

- Card-based design allows scalability, from 1 channel to 20 channels per frame
- Input video auto-detect mode automatically configures output to correspond to input frame rate and scaling or convert formats using built-in UDX scaler
- Low power/high-density design
- Built-in video/audio ADC and embedder allows direct use with SD composite video and audio analog sources
- Full support of CEA-608 and CEA-708 closed captioning. Closed-captioning filtering allows filtering to allow and use only SMPTE-334M and/or CEA-708 closed captioning.
- Support for inserting generic ancillary data packets in the transport stream using SMPTE-2038, with frame accuracy. Up to four DID/SDID pairs can be supported.
- SCTE 104 to SCTE 35 conversion
- RTMP support for publishing to Adobe® Media Server, availing SDI content to Internet viewers. Streams to CDNs, Akamai, Ustream, YouTube, Wowza Cloud service and many others
- HTTP Live Streaming protocol allows viewing by Apple® and Android™ 3.0 (or higher) devices
- Remote control/monitoring via DashBoard™ software
- Hot-swappable
- Five year warranty

OPTIONS

Please see **Ordering Information** for descriptions and details.



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9990-ENC-H264-IP » HD/SD-SDI/CVBS (SINGLE-CHANNEL) H.264 ENCODER WITH STREAMING IP OUTPUT with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Electrical
Power: 6 Watts

Processing Channels
(1) channel
(Second additional channel available with option -ENC-H264-IP)

HD/SD-SDI Input
(1) input/channel; each configurable as:
HD-SDI (SMPTE 292M)
SD-SDI (SMPTE 259M) with EDH
Composite analog video (PAL/NTSC)

Audio Inputs Supported
Embedded SDI (1 pair/channel)
Unbalanced or balanced stereo audio pair (see Ordering Information)

Video Encoding
MPEG-4 AVC High profile at level 4.2 (HP@L4.2)
MPEG-4 AVC High profile at level 4.0 (HP@L4.0)
CBR & VBR
2Mbps to 12Mbps (configurable)
SD Video:
MPEG-4 AVC Main profile at level 3.0 (MP@L3.0)
CBR & VBR
1.5Mbps to 10 Mbps (configurable)

Audio Encoding
MPEG-4 AAC-LC
Lip sync adjustment

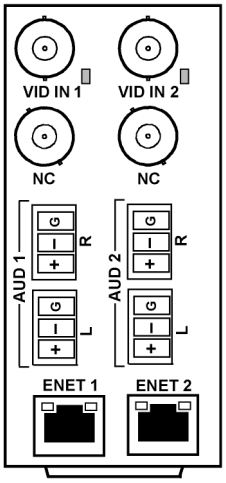
Video Resolution Supported
HD: 1920 x 1080p 60/50/30/29.97/25
1080 x 1920/1440i 30/29.97/25
1280 x 720/960/640p 59.94/50/30/29.97/25
SD: 576 x 720/528i 29.97fps
576 x 720/528i 25fps

Video Pre-Processing
Closed Captions CEA 608B and CEA-708C
WSS/AFD

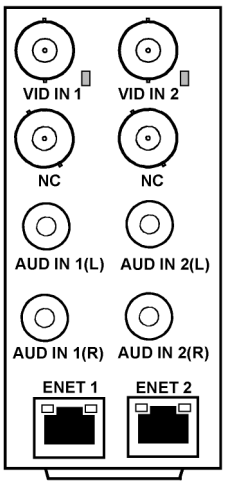
Management and Control
10/100Base-T Ethernet
Configuration Import/Export
Audible/visual fault warning
In-band and out-of-band control
SNMP v1, v2
Datasafe automated card configuration
Accurate bit rate control
Startup to streaming in seconds

Ethernet Outputs
Number of outputs: (2) 100/1000Base-T RJ-45 ports, auto-negotiate or fixed speed
IPv4, IPv6, UDP

Regulatory Compliance
CE: CE marked in accordance with 93/68/EEC (22/07/03) Directive
UL: UL approval
US FCC: Part 15
EMC: EN55022, EN55024, EN6100-3-2



RM20-9990-ENC-B



RM20-9990-ENC-U

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9990-ENC-H264-IP » HD/SD-SDI/CVBS (SINGLE-CHANNEL) H.264 ENCODER WITH STREAMING IP OUTPUT with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

ORDERING INFORMATION

9990-ENC-H264-IP HD/SD-SDI/CVBS (Single Channel) H.264 Encoder with Streaming IP Output with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

RM20-9990-ENC-B 20-slot Frame Rear I/O Module (Standard Width), (2) 3G/HD/SD-SDI/SD BNC Composite In, (4) Balanced Analog Audio In, (2) 100/1000Base-T RJ-45 Ethernet

RM20-9990-ENC-U 20-slot Frame Rear I/O Module (Standard Width), (2) 3G/HD/SD-SDI/SD BNC Composite In, (4) RCA Unbalanced Analog Audio In, (2) 100/1000Base-T RJ-45 Ethernet

Note:

- Options denoted as "+" are software-based options which are available on new product when ordered or can be customer field-installed as a software upload upgrade.
- Options or ordering line items denoted as "-" are hardware-based options/items. These options are available as factory-installed only on new product, or product returned to Cobalt for factory installation.

Options (Hardware-Based)

-ENC-H264-IP Add Encoder Second Channel Option (hardware factory-installed option applicable for single-channel card 9990-ENC-H264-IP)

Options (Software-Based)

+IP-TO-BROADCAST-OG Upgrade a 9990-ENC-H264-IP (single-channel model) to the 9223-S-HD-P (single-channel model) plus one +AAC license

+IP-TO-BROADCAST-Dual-OG Upgrade a dual-channel optioned card to the 9223-D-HD-P (dual-channel model) plus two +AAC licenses

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9990-ENC2-H264-IP » HD/SD-SDI/CVBS (DUAL-CHANNEL) H.264 ENCODER WITH STREAMING IP OUTPUTS with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

The **9990-ENC2-H264-IP HD/SD-SDI/CVBS H.264 Encoder with Streaming IP Outputs** provide a card-based solution for distribution of MPEG-4 encoding. The encoder is **designed specifically for distribution**, with cost savings of offering only streaming IP instead of IP and DVB-ASI which is not needed for distribution. The 9990-ENC2-H264-IP is perfectly suited for IP video distribution over the Internet or over a dedicated IP link. Utilizing the openGear® open-architecture platform, the 9990-ENC2-H264-IP offers easy-to-use DashBoard™ setup and control operator interface. Up to 10 of the cards can be installed in a 20-slot frame, offering distribution delivery of up to 20 individual or simulcast channels in a single frame, using less than 150W total, for reduced operating expenses. In addition to HD/SD-SDI inputs, the 9990-ENC2-H264-IP provides the flexibility of supporting SD analog composite video and an analog audio stereo pair per input channel.

The 9990-ENC2-H264-IP offers the latest advances in video compression that delivers excellent video quality at very low bit rates. Unique encoding designs allow delivery of multiple HD and SD video services simultaneously. The 9990-ENC2-H264-IP provides two Ethernet outputs, supporting full-duplex 100 Mb/s and 1 Gb/s operation. Input video auto-detect mode allows encoding to automatically configure an output that correspond to the input, with resolution and frame rate same as input, and scaling set to same as input or other applicable choices. SMPTE-2038 processing allows inserting generic ancillary data packets in the transport stream, with frame accuracy.

Up to four DID/SDID pairs can be supported. Using HTTP Live Streaming, the 9990-ENC2-H264-IP can transmit broadcast-quality video to mobile phones (Apple and Android 4.0 supported) and tablets.

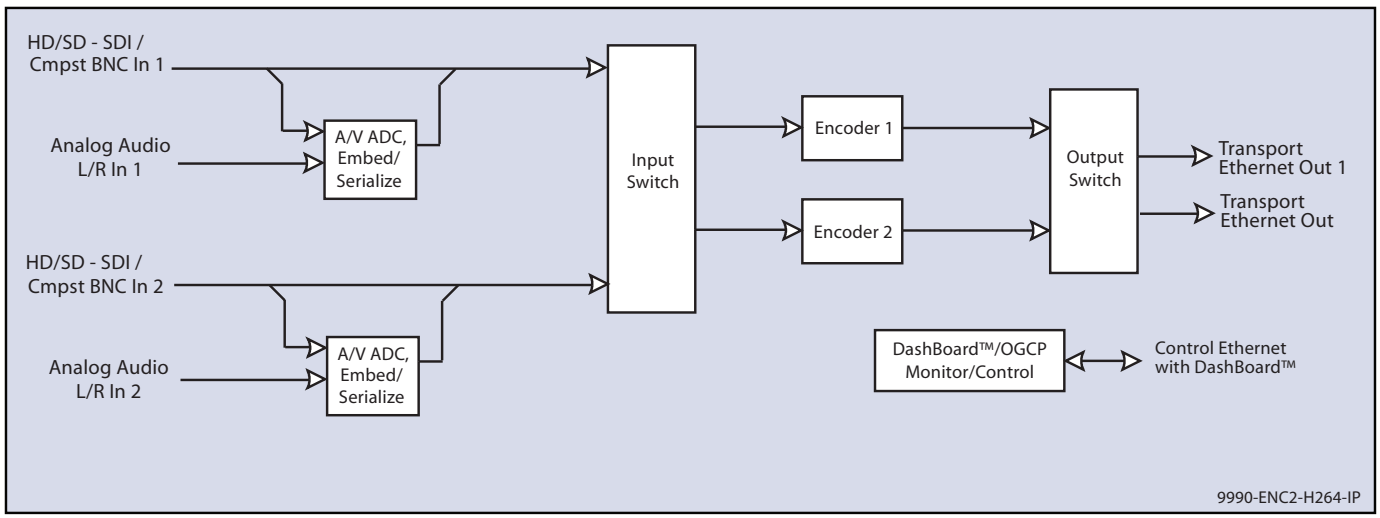
Full user remote monitor/control allows full card status and control access across a standard Ethernet network. Status monitoring is also available at card edge.

FEATURES

- Card-based design allows scalability, from 1 channel to 20 channels per frame
- Input video auto-detect mode automatically configures output to correspond to input frame rate and scaling or convert formats using built-in UDX scaler
- Low power/high-density design
- Built-in video/audio ADC and embedder allows direct use with SD composite video and audio analog sources
- Full support of CEA-608 and CEA-708 closed captioning. Closed-captioning filtering allows filtering to allow and use only SMPTE-334M and/or CEA-708 closed captioning.
- Support for inserting generic ancillary data packets in the transport stream using SMPTE-2038, with frame accuracy. Up to four DID/SDID pairs can be supported.
- SCTE 104 to SCTE 35 conversion
- RTMP support for publishing to Adobe® Media Server, availing SDI content to Internet viewers. Streams to CDNs, Akamai, Ustream, YouTube, Wowza Cloud service and many others
- HTTP Live Streaming protocol allows viewing by Apple® and Android™ 3.0 (or higher) devices
- Remote control/monitoring via DashBoard™ software
- Hot-swappable
- Five year warranty

OPTIONS

Please see **Ordering Information** for descriptions and details.



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9990-ENC2-H264-IP » HD/SD-SDI/CVBS (DUAL-CHANNEL) H.264 ENCODER WITH STREAMING IP OUTPUTS with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Electrical
Power: 6 Watts

Processing Channels
(2) channels

HD/SD-SDI Input
(1) input/channel; each configurable as:
HD-SDI (SMPTE 292M)
SD-SDI (SMPTE 259M) with EDH
Composite analog video (PAL/NTSC)

Audio Inputs Supported
Embedded SDI (1 pair/channel)
Unbalanced or balanced stereo audio pair (see Ordering Information)

Video Encoding
MPEG-4 AVC High profile at level 4.2 (HP@L4.2)
MPEG-4 AVC High profile at level 4.0 (HP@L4.0)
CBR & VBR
2Mbps to 12Mbps (configurable)
SD Video:
MPEG-4 AVC Main profile at level 3.0 (MP@L3.0)
CBR & VBR
1.5Mbps to 10 Mbps (configurable)

Audio Encoding
MPEG-4 AAC-LC
Lip sync adjustment

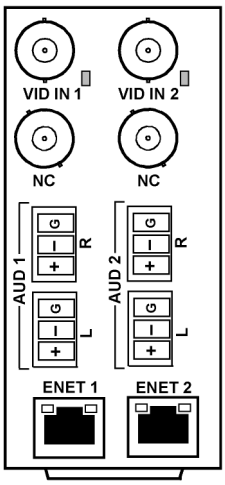
Video Resolution Supported
HD: 1920 x 1080p 60/50/30/29.97/25
1080 x 1920/1440i 30/29.97/25
1280 x 720/960/640p 59.94/50/30/29.97/25
SD: 576 x 720/528i 29.97fps
576 x 720/528i 25fps

Video Pre-Processing
Closed Captions CEA 608B and CEA-708C
WSS/AFD

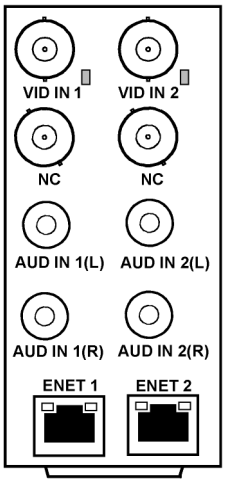
Management and Control
10/100Base-T Ethernet
Configuration Import/Export
Audible/visual fault warning
In-band and out-of-band control
SNMP v1, v2
Datasafe automated card configuration
Accurate bit rate control
Startup to streaming in seconds

Ethernet Outputs
Number of outputs: (2) 100/1000Base-T RJ-45 ports, auto-negotiate or fixed speed
IPv4, IPv6, UDP

Regulatory Compliance
CE: CE marked in accordance with 93/68/EEC (22/07/03) Directive
UL: UL approval
US FCC: Part 15
EMC: EN55022, EN55024, EN6100-3-2



RM20-9990-ENC-B



RM20-9990-ENC-U

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9990-ENC2-H264-IP » HD/SD-SDI/CVBS (DUAL-CHANNEL) H.264 ENCODER WITH STREAMING IP OUTPUTS with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

ORDERING INFORMATION

9990-ENC2-H264-IP HD/SD-SDI/CVBS (Dual-Channel) H.264 Encoder with Streaming IP Outputs with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

RM20-9990-ENC-B 20-slot Frame Rear I/O Module (Standard Width), (2) 3G/HD/SD-SDI/SD BNC Composite In, (4) Balanced Analog Audio In, (2) 100/1000Base-T RJ-45 Ethernet

RM20-9990-ENC-U 20-slot Frame Rear I/O Module (Standard Width), (2) 3G/HD/SD-SDI/SD BNC Composite In, (4) RCA Unbalanced Analog Audio In, (2) 100/1000Base-T RJ-45 Ethernet

Note:

- Options denoted as "+" are software-based options which are available on new product when ordered or can be customer field-installed as a software upload upgrade.
- Options or ordering line items denoted as "-" are hardware-based options/items. These options are available as factory-installed only on new product, or product returned to Cobalt for factory installation.

Options (Software-Based)

+IP-TO-BROADCAST-Dual-OG Upgrade a 9990-ENC2-H264-IP (dual-channel model) to the 9223-D-HD-P (dual-channel model) plus two +AAC licenses

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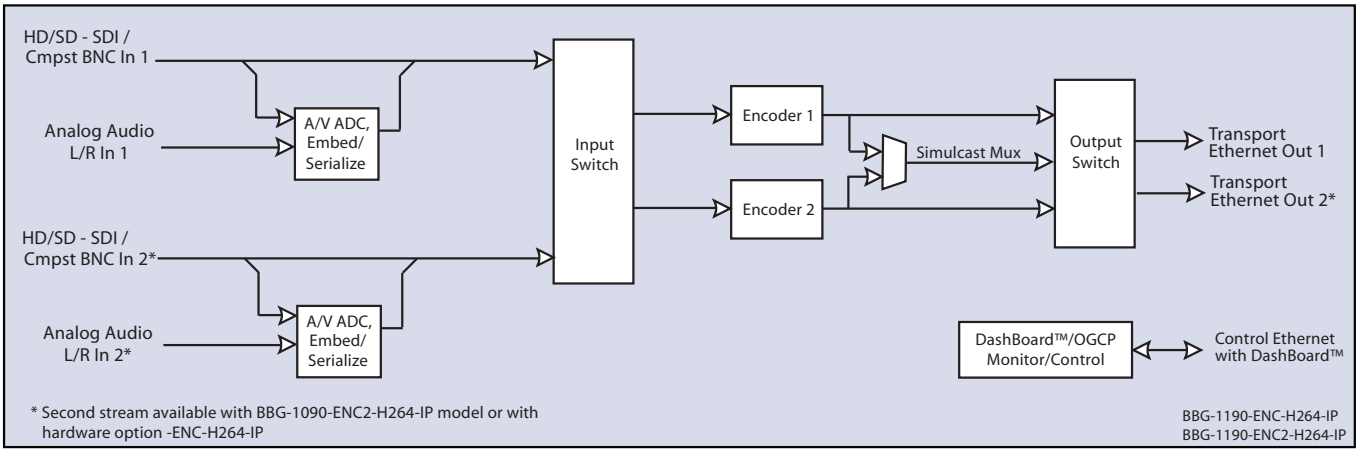
BBG-1190-ENC-H264-IP » HD/SD-SDI/CVBS H.264 STANDALONE ENCODER WITH STREAMING IP OUTPUT with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

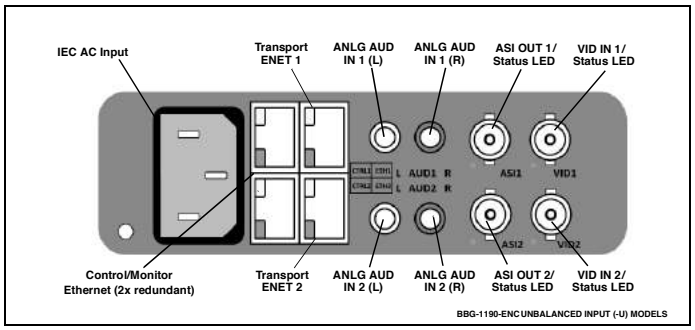
The **BBG-1190-ENC-H264-IP** provides a compact form-factor standalone unit for distribution of MPEG-4 encoding. These encoders are specifically for distribution, with cost savings of offering only streaming IP instead of IP and DVB-ASI which is not needed for distribution. The BBG-1190-ENC-H264-IP is perfectly suited for IP video distribution over the Internet or over a dedicated IP link. Utilizing the openGear® open-architecture platform, the BBG-1190-ENC-H264-IP offers easy-to-use DashBoard™ setup and control operator interface. In addition to HD/SD-SDI inputs, the BBG-1190-ENC-H264-IP provides the flexibility of supporting SD analog composite video and an analog audio stereo pair per input channel. Low-profile packaging fits 1 RU installations.

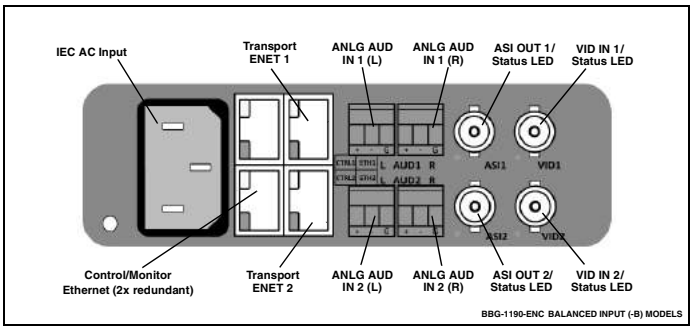
The BBG-1190-ENC-H264-IP offers the latest advances in video compression that delivers excellent video quality at very low bit rates. Unique encoding designs allow delivery of multiple HD and SD video services simultaneously. The BBG-1190-ENC-H264-IP provides two Ethernet outputs, supporting full-duplex 100 Mb/s and 1 Gb/s operation. Input video auto-detect mode allows encoding to automatically configure an output that correspond to the input, with resolution and frame rate same as input, and scaling set to same as input or other applicable choices. SMPTE-2038 processing allows inserting generic ancillary data packets in the transport stream, with frame accuracy. Up to four DID/SDID pairs can be supported. Using HTTP Live Streaming, the BBG-1190-ENC-H264-IP can transmit broadcast-quality video to mobile phones (Apple and Android 4.0 supported) and tablets. Full user remote monitor/control allows full card status and control access across a standard Ethernet network.

FEATURES

- Compact self-contained form with built-in AC power supply. Up to 3 units can be installed in a 1RU tray.
- Input video auto-detect mode automatically configures output to correspond to input frame rate and scaling or convert formats using built-in UDX scaler
- Built-in video/audio ADC and embedder allows direct use with SD composite video and audio analog sources
- Full support of CEA-608 and CEA-708 closed captioning. Closed-captioning filtering allows filtering to allow and use only SMPTE-334M and/or CEA-708 closed captioning.
- SCTE 104 to SCTE 35 conversion
- HTTP Live Streaming protocol allows viewing by Apple® and Android™ 3.0 (or higher) devices
- RTMP support for publishing to Adobe® Media Server, availing SDI content to Internet viewers. Streams to CDNs, Akamai, Ustream, YouTube, Wowza Cloud service and many others
- Remote control/monitoring via DashBoard™ software. Advanced front panel display/user interface allows initial and basic configuration setup without needing connection to external network or remote control.
- Dual-redundant internal power supplies
- Five year warranty







DashBoard

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BBG-1190-ENC-H264-IP » HD/SD-SDI/CVBS H.264 STANDALONE ENCODER WITH STREAMING IP OUTPUT with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

SPECIFICATIONS

Electrical
Power: 100-250 VAC, 47-63 Hz, 12W

Processing Channels
9990-ENC-H264-IP: (1) channel
9990-ENC2-H264-IP: (2) channels

HD/SD-SDI Input
(1) input/channel; each configurable as:
HD-SDI (SMPTE 292M)
SD-SDI (SMPTE 259M) with EDH
Composite analog video (PAL/NTSC)

Audio Inputs Supported
Embedded SDI (1 pair/channel)
Unbalanced or balanced stereo audio pair (see Ordering Information)

Video Encoding
MPEG-4 AVC High profile at level 4.2 (HP@L4.2)
MPEG-4 AVC High profile at level 4.0 (HP@L4.0)
CBR & VBR
2Mbps to 12Mbps (configurable)
SD Video:
MPEG-4 AVC Main profile at level 3.0 (MP@L3.0)
CBR & VBR
1.5Mbps to 10 Mbps (configurable)

Audio Encoding
MPEG-4 AAC-LC
Lip sync adjustment

Video Resolution Supported
HD: 1920 x 1080p 60/50/30/29.97/25
1080 x 1920/1440i 30/29.97/25
1280 x 720/960/640p 59.94/50/30/29.97/25
SD: 576 x 720/528i 29.97fps
576 x 720/528i 25fps

Video Pre-Processing
Closed Captions CEA 608B and CEA-708C
WSS/AFD

Management and Control
10/100Base-T Ethernet
Configuration Import/Export
Audible/visual fault warning
In-band and out-of-band control
SNMP v1, v2
Datasafe automated card configuration
Accurate bit rate control
Startup to streaming in seconds

Ethernet Outputs
Number of outputs: (2) 100/1000Base-T RJ-45 ports, auto-negotiate or fixed speed
IPv4, IPv6, UDP

Regulatory Compliance
CE: CE marked in accordance with 89/336/EEC, 72/23/EEC and 1999/5/EEC Directive
UL: UL approval
US FCC: Part 15
EMC: EN55022, EN55024, EN6100-3-2
Safety: IEC60950
RoHS: 2011/65/EU
WEEE: 2012/19/EU

Physical
Dimensions (WxDxH): 5.8 x 14 x 1.7 in (14.6 x 35.6 x 4.4 cm) (including component projection)
Operating Temperature/Humidity: 32°F to 122°F (0°C to 50°C); 5% to 95% non-condensing

ORDERING INFORMATION

BBG-1190-ENC2-H264-IP-B HD/SD-SDI/CVBS (Dual Channel) H.264 Encoder with Streaming IP Output with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP - Balanced Analog Audio Input

BBG-1190-ENC2-H264-IP-U HD/SD-SDI/CVBS (Dual Channel) H.264 Encoder with Streaming IP Output with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP - Unbalanced Analog Audio Input

BBG-1190-ENC-H264-IP-B HD/SD-SDI/CVBS (Single Channel) H.264 Encoder with Streaming IP Output with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP - Balanced Analog Audio Input

BBG-1190-ENC-H264-IP-U HD/SD-SDI/CVBS (Single Channel) H.264 Encoder with Streaming IP Output with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP - Unbalanced Analog Audio Input

Note:
- Options denoted as "+" are software-based options which are available on new product when ordered or can be customer field-installed as a software upload upgrade.
- Options or ordering line items denoted as "-" are hardware-based options/items. These options are available as factory-installed only on new product, or product returned to Cobalt for factory installation.

Options (Software-Based)

+IP-TO-BROADCAST-SA Upgrade a BBG-1190-ENC-H264-IP (single-channel model) to single-channel model BBG-1190-ENC-HD-P plus one +AAC license

+IP-TO-BROADCAST-Dual-SA Upgrade a BBG-1190-ENC2-H264-IP (dual-channel model) to dual-channel model BBG-1190-ENC2-HD-P plus two +AAC licenses

Options (Hardware-Based and Accessories):

-ENC-H264-IP Add Encoder Second Channel Option (applicable for single-channel model BBG-1190-ENC-H264-IP)

BBG-1100-TRAY 1 RU Rack Mount Tray (supports up to 3 BBG-1100 series units)

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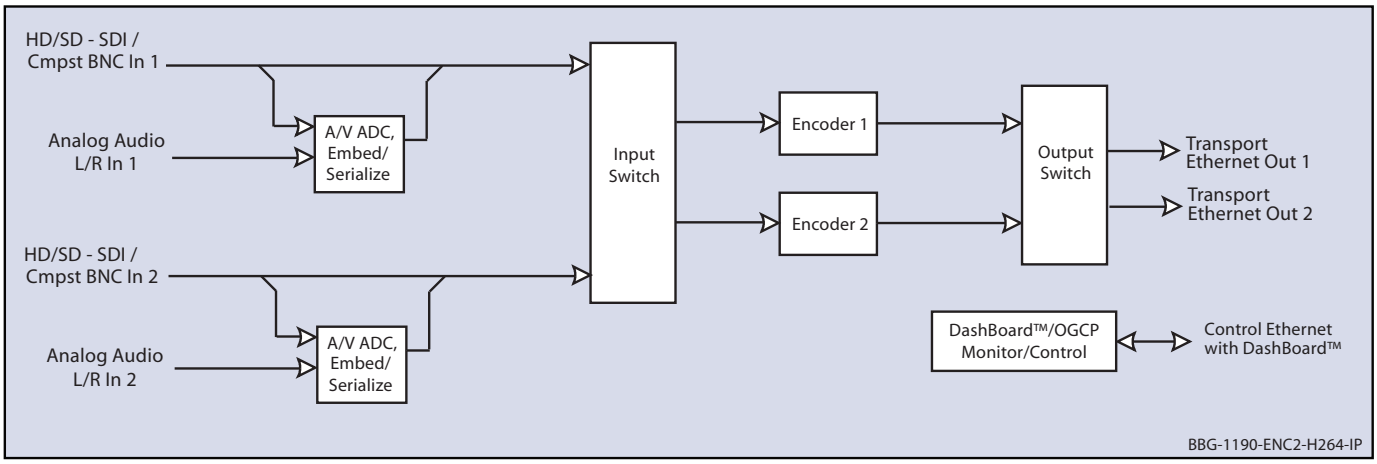
BBG-1190-ENC2-H264-IP » HD/SD-SDI/CVBS H.264 STANDALONE ENCODER (DUAL CHANNEL) WITH STREAMING IP OUTPUTS with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

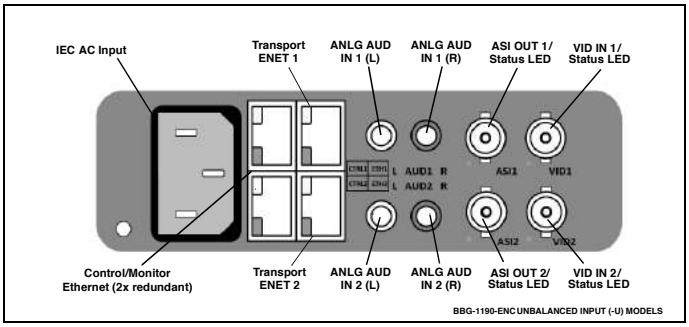
The **BBG-1190-ENC2-H264-IP** encoder provides a compact form-factor standalone unit for distribution of MPEG-4 encoding. These encoder is **designed specifically for distribution**, with cost savings of offering only streaming IP instead of IP and DVB-ASI which is not needed for distribution. The BBG-1190-ENC2-H264-IP is perfectly suited for IP video distribution over the Internet or over a dedicated IP link. Utilizing the openGear® open-architecture platform, the BBG-1190-ENC2-H264-IP offers easy-to-use DashBoard™ setup and control operator interface. The advanced front panel display/user interface also allows initial and basic configuration setup without needing a computer or connection to remote control. Low-profile packaging fits 1 RU installations.

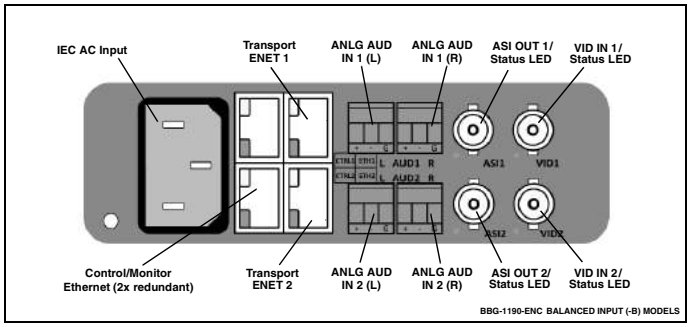
The BBG-1190-ENC2-H264-IP offers the latest advances in video compression that delivers excellent video quality at very low bit rates. Unique encoding designs allow delivery of multiple HD and SD video services simultaneously. The BBG-1190-ENC2-H264-IP provides two Ethernet outputs, supporting full-duplex 100 Mb/s and 1 Gb/s operation. Input video auto-detect mode allows encoding to automatically configure an output that correspond to the input, with resolution and frame rate same as input, and scaling set to same as input or other applicable choices. SMPTE-2038 processing allows inserting generic ancillary data packets in the transport stream, with frame accuracy. Up to four DID/SDID pairs can be supported. Using HTTP Live Streaming, the BBG-1190-ENC2-H264-IP can transmit broadcast-quality video to mobile phones (Apple and Android 4.0 supported) and tablets. Full user remote monitor/control allows full card status and control access across a standard Ethernet network.

FEATURES

- Compact self-contained form with built-in AC power supply. Up to 3 units can be installed in a 1RU tray.
- Input video auto-detect mode automatically configures output to correspond to input frame rate and scaling or convert formats using built-in UDX scaler
- Built-in video/audio ADC and embedder allows direct use with SD composite video and audio analog sources
- Full support of CEA-608 and CEA-708 closed captioning. Closed-captioning filtering allows filtering to allow and use only SMPTE-334M and/or CEA-708 closed captioning.
- SCTE 104 to SCTE 35 conversion
- Support for inserting generic ancillary data packets in the transport stream using SMPTE-2038, with frame accuracy. Up to four DID/SDID pairs can be supported.
- HTTP Live Streaming protocol allows viewing by Apple® and Android™ 3.0 (or higher) devices
- RTMP support for publishing to Adobe® Media Server, availing SDI content to Internet viewers. Streams to CDNs, Akamai, Ustream, YouTube, Wowza Cloud service and many others.
- Remote control/monitoring via DashBoard™ software. Initial and basic setup without connection to external network or remote control via front panel UI.
- Dual-redundant internal power supplies
- Five year warranty







DashBoard

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BBG-1190-ENC2-H264-IP » HD/SD-SDI/CVBS H.264 STANDALONE ENCODER (DUAL CHANNEL) WITH STREAMING IP OUTPUTS with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

SPECIFICATIONS

Electrical
Power: 100-250 VAC, 47-63 Hz, 14 W

Processing Channels
(2) channels

HD/SD-SDI Input
(1) input/channel; each configurable as:
HD-SDI (SMPTE 292M)
SD-SDI (SMPTE 259M) with EDH
Composite analog video (PAL/NTSC)

Audio Inputs Supported
Embedded SDI (1 pair/channel)
Unbalanced or balanced stereo audio pair (see Ordering Information)

Audio Encoding
MPEG-4 AAC-LC
Lip sync adjustment

Video Resolution Supported
HD: 1920 x 1080p 60/50/30/29.97/25
1080 x 1920/1440i 30/29.97/25
1280 x 720/960/640p 59.94/50/30/29.97/25
SD: 576 x 720/528i 29.97fps
576 x 720/528i 25fps

Video Encoding
MPEG-4 AVC High profile at level 4.2 (HP@L4.2)
MPEG-4 AVC High profile at level 4.0 (HP@L4.0)
CBR & VBR
2Mbps to 12Mbps (configurable)
SD Video:
MPEG-4 AVC Main profile at level 3.0 (MP@L3.0)
CBR & VBR
1.5Mbps to 10 Mbps (configurable)

Video Pre-Processing
Closed Captions CEA 608B and CEA-708C
WSS/AFD

Management and Control
10/100Base-T Ethernet
Configuration Import/Export
Audible/visual fault warning
In-band and out-of-band control
SNMP v1, v2
Datasafe automated card configuration
Accurate bit rate control
Startup to streaming in seconds

Ethernet Outputs
Number of outputs: (2) 100/1000Base-T RJ-45 ports, auto-negotiate or fixed speed
IPv4, IPv6, UDP

Regulatory Compliance
CE: CE marked in accordance with 89/336/EEC, 72/23/EEC and 1999/5/EEC Directive
UL: UL approval
US FCC: Part 15
EMC: EN55022, EN55024, EN6100-3-2
Safety: IEC60950
RoHS: 2011/65/EU
WEEE: 2012/19/EU

Physical
Dimensions (WxDxH): 5.8 x 14 x 1.7 in (14.6 x 35.6 x 4.4 cm) (including component projection)
Operating Temperature/Humidity: 32°F to 122°F (0°C to 50°C); 5% to 95% non-condensing

ORDERING INFORMATION

BBG-1190-ENC2-H264-IP-B HD/SD-SDI/CVBS H.264 Standalone Encoder (Dual-Channel) with Streaming IP Output with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP – Balanced Analog Audio Input

BBG-1190-ENC2-H264-IP-U HD/SD-SDI/CVBS H.264 Standalone Encoder (Dual-Channel) with Streaming IP Outputs with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP – Unbalanced Analog Audio Input

Note:
- Options denoted as "+" are software-based options which are available on new product when ordered or can be customer field-installed as a software upload upgrade.
- Options or ordering line items denoted as "-" are hardware-based options/items. These options are available as factory-installed only on new product, or product returned to Cobalt for factory installation.

Options (Software-Based)

+IP-TO-BROADCAST-Dual-SA Upgrade a BBG-1190-ENC2-H264-IP (dual-channel model) to dual-channel model BBG-1190-ENC2-HD-P plus two +AAC licenses

Options (Accessories):

BBG-1100-TRAY 1 RU Rack Mount Tray (supports up to 3 BBG-1100 series units)

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9990-DEC-MPEG » MPEG4 AVC and MPEG2 DECODER with ASI and IP Inputs and SDI Outputs

The Cobalt® **9990-DEC-MPEG MPEG4 AVC and MPEG2 Decoder** with ASI and IP Inputs and SDI Outputs provides a high performance real-time MPEG-2 and MPEG-4 SD and HD video decoding openGear® solution. Its design is practically future-proof and decodes traditional video formats such as UDP and RTP (MPEG Transport Stream) as well as Internet and Mobile formats such as RTMP (Adobe® Flash) and HLS (Apple® HTTP Live Streaming).

The 9990-DEC-MPEG supports newer cameras that output RTMP and security cameras that output RTSP. Its high-density, low power design saves on operating expenses, with up to 10 cards installed in a 20-slot openGear® frame.

IP and DVB-ASI input streams are supported, with outputs as ASI, DVB-ASI, SDI, and CVBS (for SD streams) using MPEG4 AVC or MPEG2 decoding. The 9990-DEC-MPEG can decode from several audio codecs and provides Dolby® pass-thru. SMPTE-2038 processing allows de-embedding SMPTE-2038 generic ancillary data packets.

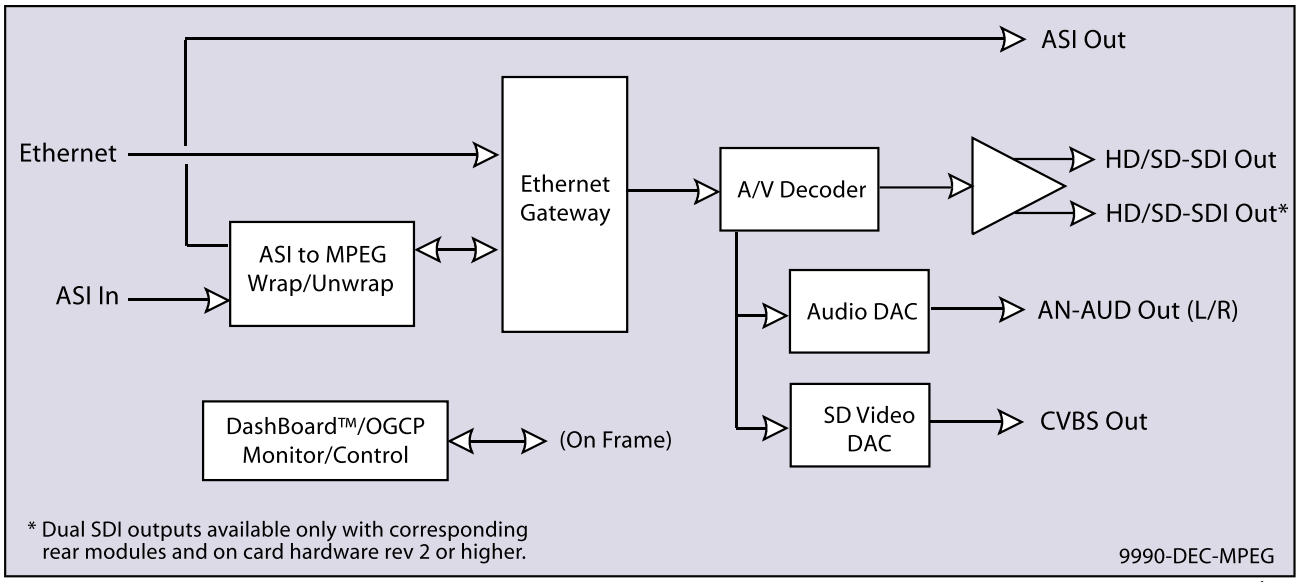
Full user DashBoard™ remote control allows full status and control access locally or across a standard Ethernet network. A complete SNMP MIB is also included.

FEATURES

- Comprehensive MPEG decoding solution – MPEG4 AVC and MPEG2 to ASI, SDI, and CVBS with built-in audio codecs. Up to two DA SDI BNC outputs. Convenience IP output also.
- IP reception of unicast or multicast
- DVB-ASI Turnaround to IP and ASI with SPTS Splitting
- MPEG-1 Layer II, AAC -LC, AAC-HE, E-AC-3 and AC-3 audio codecs standard (Dolby pass-thru; Dolby decode option available)
- Supports RTMP and RTSP sources
- SMPTE-2038 processing allows de-embedding of SMPTE-2038 generic ancillary data packets
- Support for RTP/ARQ interoperability with **+RTP/ARQ** Cobalt Encoder option. (Decoder **+ARQ** license included standard.)
- Support for selecting desired video PID in multi-angle streams
- Several options available for scalable configuring
- SNMP MIB included
- Low-power/high-density design
- Remote control/monitoring via Dashboard™ software
- Hot-swappable
- Five year warranty

OPTIONS

- Dolby® Decode License (**+DEC-DDEC**) – Allows Dolby audio to be decoded as SDI embedded PCM audio or analog audio output
- SMPTE 2022 Forward Error Correction License (**+FEC-DEC**)
- Automatic Repeat Request, Error Correction Assigned For Live Video Over IP / Internet Based on the Reliable Internet Streaming Transport (RIST) Standard.(**+RIST/ARQ-DEC**)
- Genlock License (**+GENLOCK**)
- RTMP Server License Option (**+DEC-RTMP-SVR**)
- IP IN License (**+IP-IN**) – Enables IP Port and IP Protocols for IP-to-SDI conversion
- Monitoring License (**+TSMON**) – Adds continuous monitoring of current transport stream being decoded. Provides a list of all PIDs available in the transport stream, their current individual bit rates, and keeps numerical track of any continuity counter errors. Can also be configured to watch up to 8 PIDs and issue an alarm if PID disappears for a configurable amount of time. (If SNMP is available, this alarm is also provided as a trap.)
- RTMP Server License Option (**+DEC-RTMP-SVR**)
- RIST Encryption/Authentication Support (per unit). (Requires the +RIST/ARQ-DEC license to also be present on the decoder.) (**+RIST/ENCRP-DEC**)
- IP Out License (**+IP-OUT**) – ASI-to-IP conversion option (If host card has **+FEC-DEC** license, card will also be able to generate FEC on the output stream)



openGear®

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9990-DEC-MPEG » MPEG4 AVC and MPEG2 DECODER with ASI and IP Inputs and SDI Outputs

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 8 Watts

Inputs
(1) DVB-ASI 75Ω BNC
(1) IP; 1000Base-T RJ-45
Gen lock (from frame ref 1/2)

Outputs
Up to (2) HD/SD-SDI 75Ω BNC (4:2:2 10-bit; dual SDI outputs available only on Rev 2 or higher hardware))
(1) CVBS 75Ω BNC
(1) DVB-ASI 75Ω BNC
(1) HDMI
(2) Analog Audio Out L/R (balanced 3-pin terminals or unbal RCA depending on rear module used)

Network Transport Protocols
UPD (Unicast or Multicast)
RTP (Unicast or Multicast)
RTMP (Adobe Flash)
RTSP (Security Camera)
SMPTE 2022 Pro-MPEG-FEC
ARQ
HTTP Live Streaming (HLS) client

Video Resolution
3G:
1920 x 1080p – 50/59.94/60
HD:
1920 x 1080i - 50/59.94/60
720 x 1280p - 50/59.94
SD:
480 x 720 - 29.97
576 x 720 - 25

Video Codec Supported
MPEG-2
H.264 4:2:0 High Profile

Audio Codec Supported/Processing
MPEG-1 Layer 2 (mp2)
AAC-LC
HE-AAC
AC-3, E-AC-3 (Dolby® pass-thru)

ORDERING INFORMATION

9990-DEC-MPEG MPEG4 AVC and MPEG2 Decoder with ASI and IP Inputs and SDI Outputs

RM20-9990DEC-B 20-Slot Frame Rear I/O Module (Standard Width) (1) RJ-45 Ethernet connector, (1) ASI Input BNC, (1) ASI Output BNC, (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Output BNC, (1) HDMI Output, (2) Balanced Analog Audio Outputs

RM20-9990DEC-C 20-Slot Frame Rear I/O Module (Standard Width) (1) RJ-45 Ethernet connector, (1) ASI Input BNC, (1) ASI Output BNC, (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Output BNC, (1) HDMI Output, (2) Unbalanced Analog Audio Outputs (RCA)

RM20-9990DEC-D 20-Slot Frame Rear I/O Module (Standard Width) (1) RJ-45 Ethernet connector, (1) ASI Input BNC, (1) ASI Output BNC, (2) 3G/HD/SD-SDI Output BNC, (1) CVBS Output BNC, (2) Balanced Analog Audio Outputs (RM20-9990DEC-D compatible only with rev 2 or higher card hardware)

RM20-9990DEC-E 20-Slot Frame Rear I/O Module (Standard Width) (1) RJ-45 Ethernet connector, (1) ASI Input BNC, (1) ASI Output BNC, (2) 3G/HD/SD-SDI Output BNC, (1) CVBS Output BNC, (2) Unbalanced Analog Audio Outputs (RCA) (RM20-9990DEC-E compatible only with rev 2 or higher card hardware)

+DEC-DDEC Dolby® Decode License Option

+FEC-DEC SMPTE 2022 Forward Error Correction License Option

+GENLOCK Genlock License Option

+DEC-RTMP-SVR RTMP Server License Option

+IP-IN IP iN License Option

+IP-OUT ASI-to-IP Conversion License Option

+TSMON Monitoring License Option

+ **DEC-RTMP-SVR** RTMP Server License Option

+RIST/ARQ-DEC Automatic Repeat Request License, Error Correction Assigned For Live Video Over IP / Internet Based on the Reliable Internet Streaming Transport (RIST) Standard

+RIST/ENCRP-DEC RIST Encryption/Authentication Support (per unit). (Requires the +RIST/ARQ-DEC license to also be present on the decoder.)

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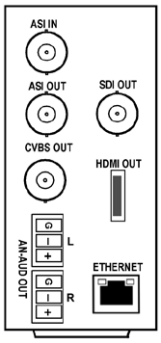
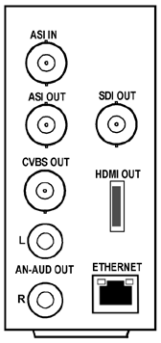
9990-DEC-MPEG » MPEG4 AVC and MPEG2 DECODER with ASI and IP Inputs and SDI Outputs



RM20-9990DEC-B



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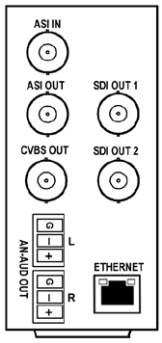

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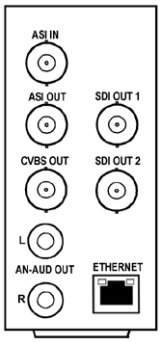

RM20-9990DEC-E

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BBG-1190-DEC-MPEG » STANDALONE MPEG4 AVC AND MPEG2 DECODER

with ASI and IP Inputs and SDI Outputs

The Cobalt® **BBG-1190-DEC-MPEG Standalone MPEG4 AVC and MPEG2 Decoder** with ASI and IP Inputs and SDI Outputs provides a high performance real-time MPEG-2 and MPEG-4 SD and HD video decoding solution. Its design is practically future proof and decodes traditional video formats such as UDP and RTP (MPEG Transport Stream) as well as Internet and Mobile formats such as RTMP (Adobe® Flash) and HLS (Apple® HTTP Live Streaming).

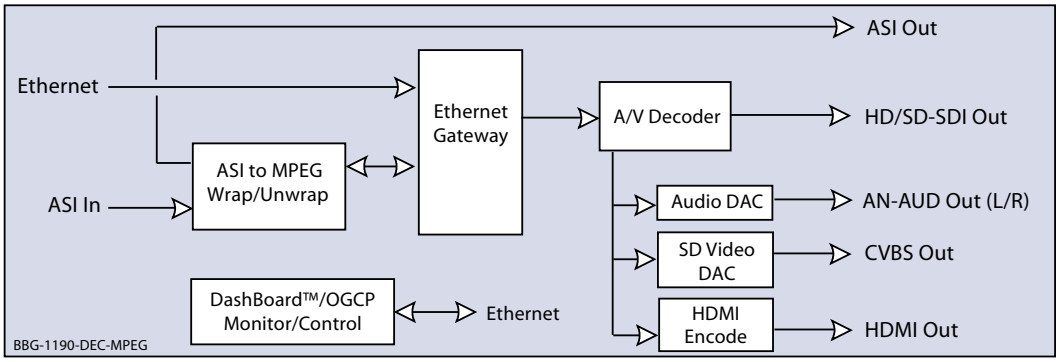
The BBG-1190-DEC-MPEG supports newer cameras that output RTMP and security cameras that output RTSP. Its low power design saves on operating expenses. IP and DVB-ASI input streams are supported, with outputs as ASI, DVB-ASI, SDI, HDMI, and CVBS (for SD streams) using MPEG4 AVC or MPEG2 decoding. The BBG-1190-DEC-MPEG can decode from several audio codecs and provides Dolby® pass-thru. SMPTE-2038 processing allows de-embedding SMPTE-2038 generic ancillary data packets. Low-profile packaging fits 1 RU installations. Full user DashBoard™ remote control allows full status and control access locally or across a standard Ethernet network. A complete SNMP MIB is also included.

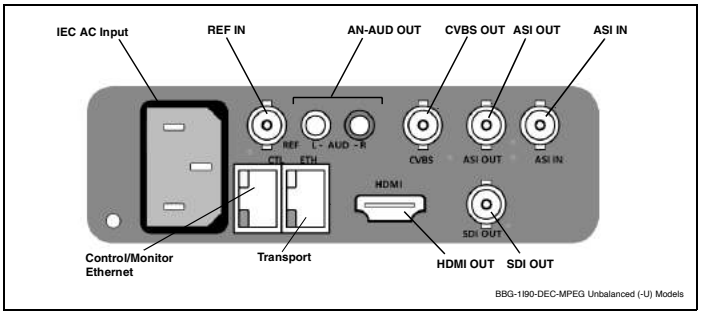
FEATURES

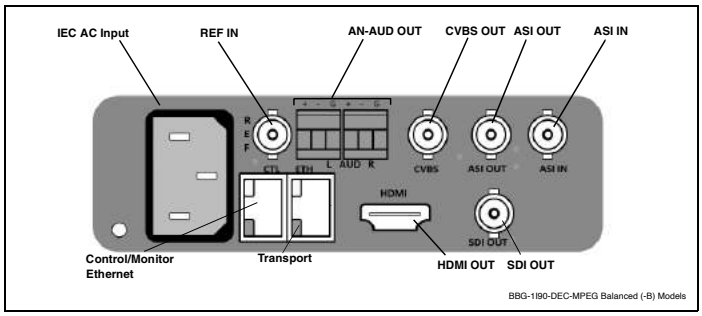
- Comprehensive MPEG decoding solution – MPEG4 AVC and MPEG2 to ASI, SDI, HDMI and CVBS with built-in audio codecs. Convenience IP output also.
- IP reception of unicast or multicast
- DVB-ASI Turnaround to IP and ASI with SPTS Splitting
- Supports RTMP and RTSP sources
- MPEG-1 Layer II, AAC -LC, AAC-HE, E-AC-3 and AC-3 audio codecs standard (Dolby pass-thru; Dolby decode option available)
- SMPTE-2038 processing allows de-embedding of SMPTE-2038 generic ancillary data packets
- SCTE-35 to SCTE-104 conversion
- Support for RTP/ARQ interoperability with **+RTP/ARQ** Cobalt Encoder option. (Decoder **+ARQ** license included standard.)
- Support for selecting desired video PID in multi-angle streams.
- SNMP MIB included
- Low-power/high-density design – less than 14 Watts
- Dual-redundant internal power supplies
- Remote control/monitoring via Dashboard™ software. Advanced front panel display/user interface allows initial and basic configuration setup without needing connection to external network or remote control.
- Five year warranty

OPTIONS

- Dolby® Decode License (**+DEC-DDEC**) – Allows Dolby audio to be decoded as SDI embedded PCM audio or analog audio output
- SMPTE 2022 Forward Error Correction License (**+FEC-DEC**)
- IP In License (**+IP-IN**) - Enables IP Port and IP Protocols for IP-to-SDI conversion
- Automatic Repeat Request, Error Correction Assigned For Live Video Over IP / Internet Based on the Reliable Internet Streaming Transport (RIST) Standard (**+RIST/ARQ-DEC**)
- Genlock License (**+GENLOCK**)
- RTMP Server License Option (**+DEC-RTMP-SVR**)
- IP License (**+IP**)
- Monitoring License (**+TSMON**) – Adds continuous monitoring of current transport stream being decoded. Provides a list of all PIDs available in the transport stream, their current individual bit rates, and keeps numerical track of any continuity counter errors. Can also be configured to watch up to 8 PIDs and issue an alarm if PID disappears for a configurable amount of time. (If SNMP is available, this alarm is also provided as a trap.)
- RTMP Server License (**+DEC-RTMP-SVR**)
- RIST Encryption/Authentication Support (per unit). (Requires the +RIST/ARQ-DEC license to also be present on the decoder.) (**+RIST/ENCRP-DEC**)
- ASI-to-IP conversion option (**+IP-OUT**)
- Mounting Tray (holds up to three BBG-1100 series units) (**BBG-1100-TRAY**)







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BBG-1190-DEC-MPEG » STANDALONE MPEG4 AVC AND MPEG2 DECODER

with ASI and IP Inputs and SDI Outputs

SPECIFICATIONS

Power
100-250 VAC, 47-63 Hz, 8 Watts max.

Inputs
(1) DVB-ASI 75Ω BNC
(1) IP; 1000Base-T RJ-45

Outputs
(1) HD/SD-SDI 75Ω BNC (4:2:2 10-bit)
(1) CVBS 75Ω BNC
(1) DVB-ASI 75Ω BNC
(1) HDMI
(2) Analog Audio Out L/R (balanced 3-pin terminals or unbal RCA depending on model)

Network Transport Protocols
UDP (Unicast or Multicast)
RTP (Unicast or Multicast)
RTMP Client or Server (Adobe Flash)
RTSP (Security Camera)
SMPTE 2022 Pro-MPEG-FEC
ARQ
HTTP Live Streaming (HLS) client

Video Resolution
3G:
1920 x 1080p – 50/59.94/60
HD:
1920 x 1080i - 50/59.94/60
720 x 1280p - 50/59.94
SD:
480 x 720 - 29.97
576 x 720 - 25

Video Codec Supported
MPEG-2
H.264 4:2:0 High Profile

Audio Codec Supported/Processing
MPEG-1 Layer 2 (mp2)
AAC-LC
HE-AAC
AC-3, E-AC-3 (Dolby® pass-thru)

Regulatory Compliance
CE: CE marked in accordance with 89/336/EEC, 72/23/EEC and 1999/5/EEC Directive
UL: UL approval
US FCC: Part 15
EMC: EN55022, EN55024, EN6100-3-2
Safety: IEC60950
RoHS: 2011/65/EU
WEEE: 2012/19/EU

Physical
Dimensions (WxDxH): 5.8 x 14 x 1.7 in (14.6 x 35.6 x 4.4 cm) (including component projection)
Operating Temperature/Humidity: 32°F to 122°F (0°C to 50°C); 5% to 95% non-condensing

ORDERING INFORMATION

BBG-1190-DEC-MPEG Standalone MPEG4 AVC and MPEG2 Decoder with ASI and IP Inputs and SDI Outputs, available in the following rear-panel I/O configurations:
BBG-1190-DEC-MPEG-B Balanced analog audio outputs
BBG-1190-DEC-MPEG-U Unbalanced (RCA) analog audio outputs

+DEC-DDEC Dolby® Decode License Option

+FEC-DEC SMPTE 2022 Forward Error Correction License Option

+GENLOCK Genlock License Option

+DEC-RTMP-SVR RTMP Server License Option

+IP-IN IP In License Option

+IP-OUT SPTS Stream Splitting License Option

+TSMON Monitoring License Option

+DEC-RTMP-SVR RTMP Server License Option

+RIST/ARQ-DEC Automatic Repeat Request License, Error Correction Assigned For Live Video Over IP / Internet Based on the Reliable Internet Streaming Transport (RIST) Standard

+RIST/ENCRP-DEC RIST Encryption/Authentication Support (per unit). (Requires the +RIST/ARQ-DEC license to also be present on the decoder.)

BBG-1100-TRAY 1 RU Rack Mount Tray (supports up to 3 BBG-1100 series units)

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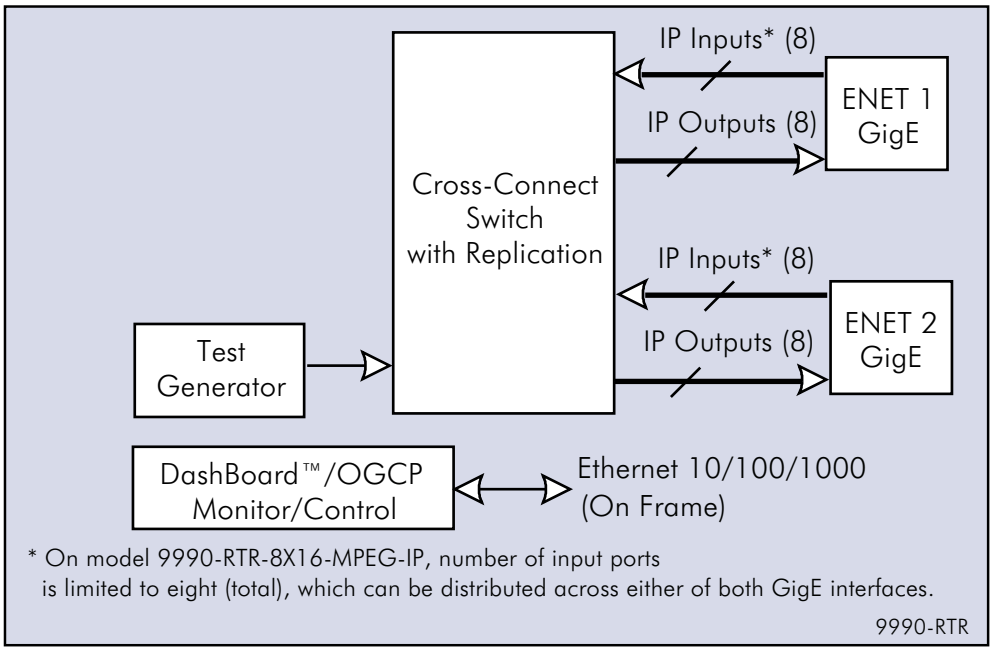
9990-RTR-MPEG-IP » STREAMING IP (MPEG2-TS) RECLOCKING DISTRIBUTION AMPLIFIER AND ROUTER

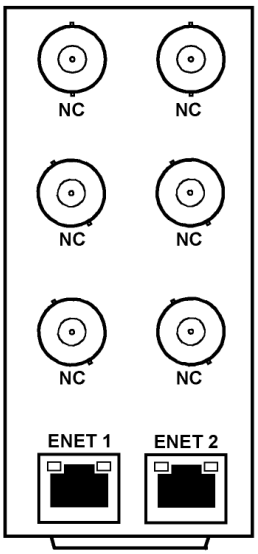
The **9990-RTR-MPEG-IP** offers a flexible card-based solution for providing distribution copies of unicast or multicast IP streams. Unicast streams, by design, have only one destination and cannot easily be monitored by test equipment. To solve this, the 9990-RTR-MPEG-IP provides copies that can easily be sent to multiple destinations for monitoring or other purposes. With the 9990-RTR-MPEG-IP, the originating UDP/RTP stream can be replicated to reach its intended destination, as well as providing ample copies for monitoring or other purposes.

Using its two 1GigE RJ-45 ports, the 9990-RTR-MPEG-IP supports up to 16 inputs, and up to 16 outputs. Each input can be replicated up to eight times. The 9990-RTR-MPEG-IP also includes advanced redundancy protection features, allowing for automatic failover if the primary signal disappears. De-jittering and reclocking features help ensure reliable operation in all conditions and actually "cleans up" inputs with jittery IPGs. Utilizing the openGear® open-architecture control/monitoring platform, the 9990-RTR-MPEG-IP can be remotely controlled and monitored with the free, easy-to-use DashBoard™ setup and control operator interface.

FEATURES

- Card-based design allows scalability of up to 10 cards per frame
- Economical card-based solution provides distribution copies of unicast or multicast IP streams
- Up to 16x16 inputs and outputs using two 1GigE Ethernet ports
- De-jittering and reclocking features help ensure reliable operation – even with jittery sources
- Easy integration and control/monitoring via DashBoard™ remote control
- Five year warranty





RM20-9990-RTR-B

openGear®

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9990-RTR-MPEG-IP » STREAMING IP (MPEG2-TS) RECLOCKING DISTRIBUTION AMPLIFIER AND ROUTER

SPECIFICATIONS

Power
12W

Routing Capacity
Model 9990-RTR-8X16-MPEG-IP: 8 inputs available for routing to up to 16 outputs. Outputs can be on either or both GigE ports.
Model 9990-RTR-16X16-MPEG-IP: 16 inputs available for routing to up to 16 outputs. Outputs can be on either or both GigE ports.
Note: For all models, the two GigE ports each are limited to 8 inputs and 8 outputs per port. Also, replication limit is 8 (i.e., a given input can be replicated only up to 8 copies).

Network I/O
Number of ports: (2) 1GigE RJ-45
IPv4, IPv6, UDP, and RTP
900 Mb/s usable GbE per Rx port
900 Mb/s usable GbE per Tx port
2 Gb/s maximum processing per card
Note: SMPTE-2022 FEC is not supported. FEC packets are discarded at the input and not generated at the output.

Regulatory Compliance
CE: CE marked in accordance with 93/68/EEC (22/07/03) Directive
UL: UL approval
US FCC: Part 15
EMC: EN55022, EN55024, EN6100-3-2

ORDERING INFORMATION

9990-RTR-8X16-MPEG-IP 8x16 Streaming IP (MPEG2-TS) Reclocking Distribution Amplifier and Router

9990-RTR-16X16-MPEG-IP 16x16 Streaming IP (MPEG2-TS) Reclocking Distribution Amplifier and Router

RM20-9990-RTR-B 20-Slot Frame Rear I/O Module (Standard Width) (2) GigE RJ-45 Ethernet
Note: BNC connectors on rear module are not used for this model and are all NC.

+9990RTR-16X16 Upgrades 9990-RTR-8X16-MPEG-IP to model 9990-RTR-16X16-MPEG-IP (adds 8 inputs for a total available of 16 inputs)

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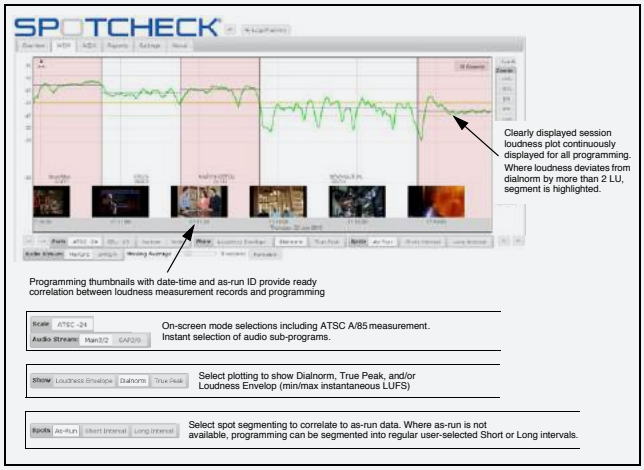
SPOTCHECK® » TRANSPORT STREAM COMPLIANCE MONITOR

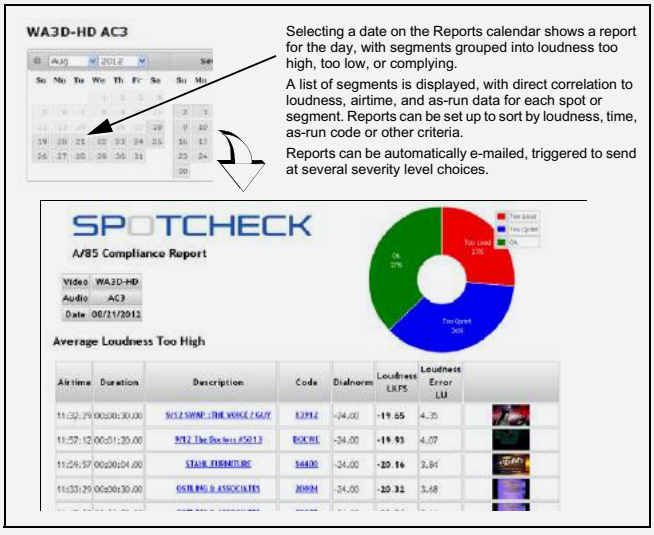
SpotCheck® provides easy to use, no-guesswork, automatic A/85 loudness measurement and access to all audio loudness records. Because SpotCheck® monitors an IP, ASI, or a transmitted over-the-air MPEG stream at the transmit (emission) encode point, SpotCheck® measures and logs loudness for all programming emanating from the facility.

Segments can be searched using date – time with the intuitive display of loudness plots along with date-time-stamped thumbnails of the actual corresponding programming, or can be queried and correlated with the facility as-run automation list. SpotCheck® readily pinpoints any segments that are out of CALM A/85 compliance, and conversely helps in documenting compliance should an erroneous complaint appear.

Options allow even more transport stream/programming analysis. Option QUALITYCHECK checks for the presence of CEA708/608 closed-captioning, as well as the string content text, and also can detect transport communication errors as well as frozen/black frame and audio silence, with Alert Manager sending these alerts to your designated personnel as simple e-mails. Option AIRCHECK provides easily managed lo-res proxy downloads of user-selected transport stream segments that can be sent and viewed over e-mail to recipients with common smart devices and media players.

Easy to use web user interface provides for easy setup and use. Requiring no breakout from the MPEG stream and not affecting the emission stream in any way, SpotCheck® provides an easily integrated, facility-based, superior solution for loudness records and compliance verification.





SPOTCHECK®

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SPOTCHECK® » TRANSPORT STREAM COMPLIANCE MONITOR

» FEATURES

Automated 24/7 loudness measurement and logging for every programming segment sent as emission. Full CALM compliant logging and record access.

Easy data search by date/time range and as-run data allows rapid and no-hassle pinpointing to any programming segment

Support for sending loudness alert e-mails to multiple personnel. User-defined multiple-level severity escalation.

Straightforward display of actual loudness plot and clear OK/non-compliant tagging of programming segments – no tedious lists or spreadsheets to analyze

Full compatibility with MPTS and SPTS streams

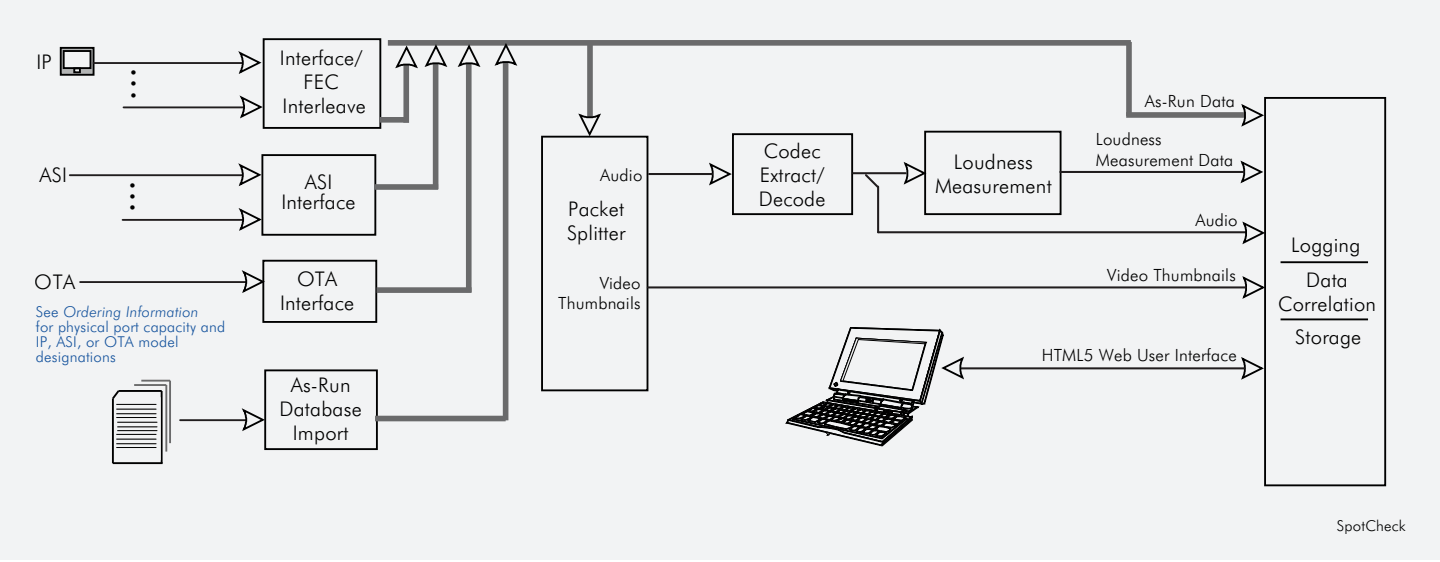
Direct GigE MPEG, ASI, or OTA interface. No complicated external breakout of signals.

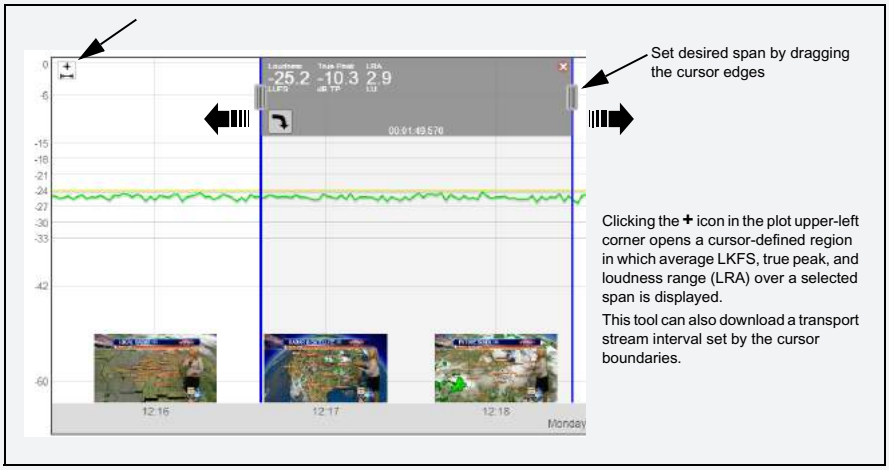
Automatically accounts for program loudness, dialnorm, and DRC effect on audio – no interpretation of readings or loudness metadata needed

Three year warranty with extension options available

Robust product support – upgrades and enhancements field-installed via firmware upload from our Support web page

Cobalt Support Network feature provides, where desired, a direct VPN connection between your SpotCheck unit and our engineering support





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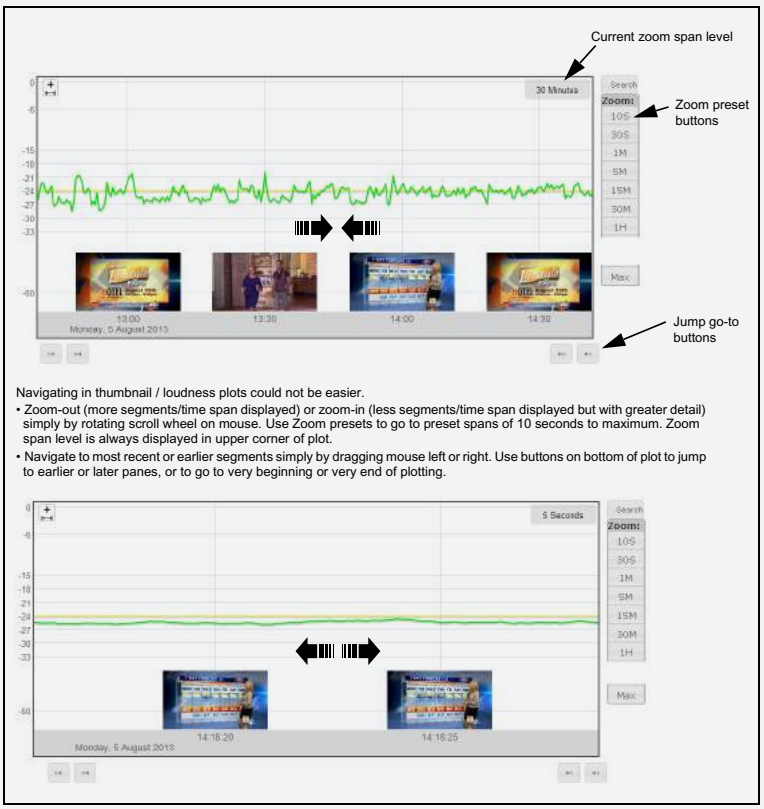
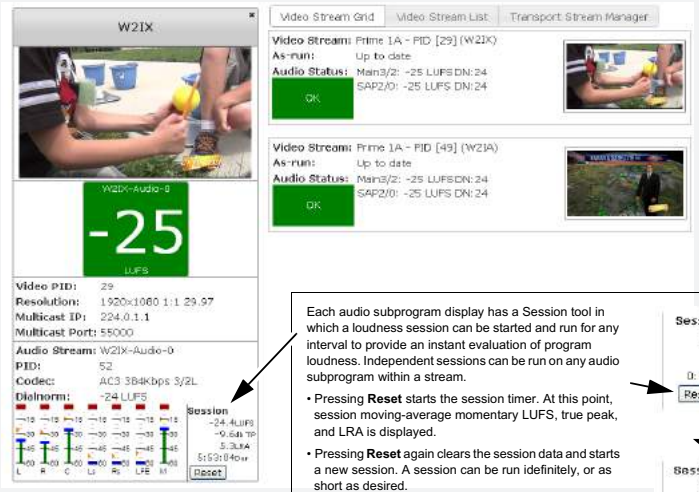
SPOTCHECK® » TRANSPORT STREAM COMPLIANCE MONITOR



Navigating in thumbnail / loudness plots could not be easier.

- Zoom-out (more segments/time span displayed) or zoom-in (less segments/time span displayed but with greater detail) simply by rotating scroll wheel on mouse. Use Zoom presets to go to preset spans of 10 seconds to maximum. Zoom span level is always displayed in upper corner of plot.
- Navigate to most recent or earlier segments simply by dragging mouse left or right. Use buttons on bottom of plot to jump to earlier or later panes, or to go to very beginning or very end of plotting.

Transport Manager **Video Streams Grid** and **Video Streams List** show all programs and status/details within a transport stream. Clicking on a program opens a streaming thumbnail display showing status and real-time per-channel audio levels and details.



Each audio subprogram display has a Session tool in which a loudness session can be started and run for any interval to provide an instant evaluation of program loudness. Independent sessions can be run on any audio subprogram within a stream.

- Pressing **Reset** starts the session timer. At this point, session moving-average momentary LUFS, true peak, and LRA is displayed.
- Pressing **Reset** again clears the session data and starts a new session. A session can be run idefinitely, or as short as desired.

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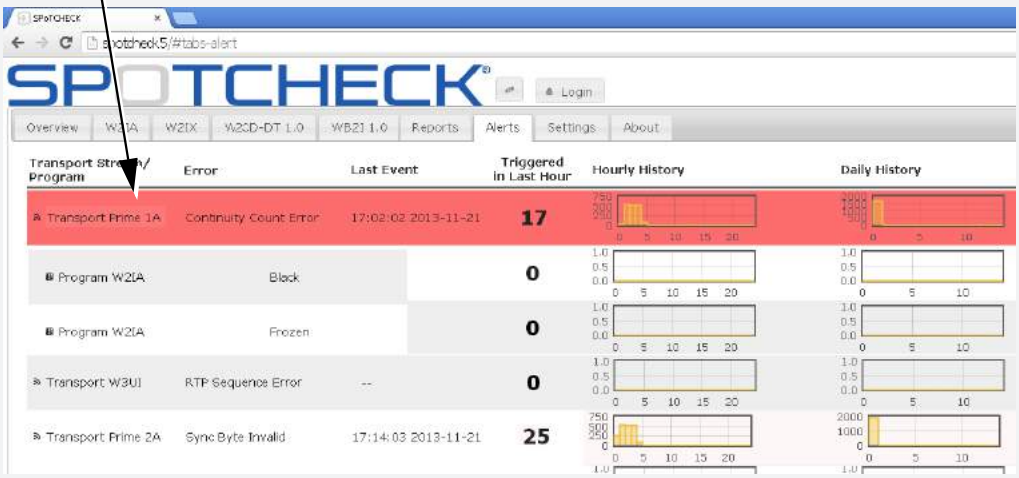
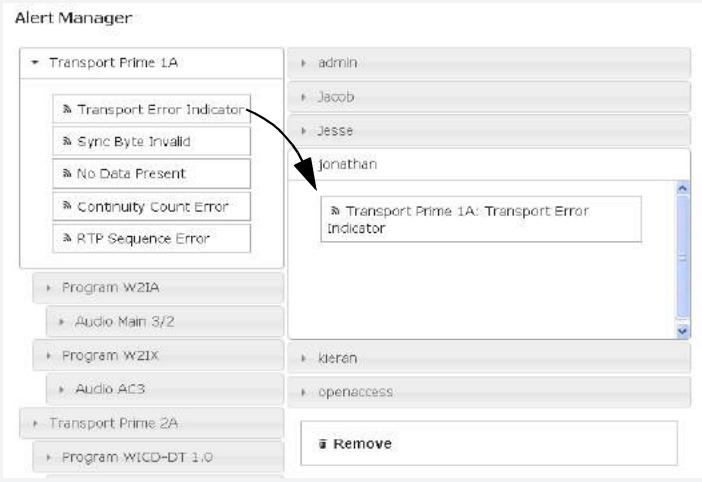
SPOTCHECK® » TRANSPORT STREAM COMPLIANCE MONITOR

Option **QUALITYCHECK** detects transport communication errors as well as frozen/black frame and audio silence. It also checks for the presence of CEA708/608 closed-captioning.

At the moment an error occurs, the error display row highlights in red (then fades to the normal background color after a few seconds). This is useful for real-time monitoring and pinpointing troubleshooting of transport streams or programs experiencing problems.





QUALITYCHECK Alert Manager allows transport and program error notification to be forwarded as e-mail to SpotCheck users by simply dragging the error notification into the user's mailbox.

Presence of CEA708 and/or CEA608 packets is indicated by the yellow **(CC) 708** or **(CC) 608** bands just above the thumbnail images. Zooming in tighter displays the closed-captioning text (which can be copied and pasted into a text file if desired).

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SPOTCHECK® » TRANSPORT STREAM COMPLIANCE MONITOR

» SPECIFICATIONS

Physical

SpotCheck-1000
- Power: 120/240 VAC, 50/60 Hz, 200 W (max)
- Size: 1RU
- Depth required: 24 in (61 cm) minimum

SpotCheck-2000
- Power: 120/240 VAC, 50/60 Hz, 350 W (max)
- Size: 1RU
- Depth required: 24 in (61 cm) minimum

Transport Interface

SpotCheck-IP:	GigE (1000 Base-T) via RJ-45
SpotCheck-ASI:	ASI, 75Ω BNC input
SpotCheck-OTA:	8VSB (RF), female F-connector input

See Ordering Information for port complements and other information.

Loudness Measurement

ATSC A/85 –24 LKFS

Formats Supported

Transport:	MPEG over IP or ASI, UDP, RTP, SMPTE 2022, FEC wrappers
Multicast:	Supports IPV4 multicast and IGMPv2 multicast management
Audio Codecs Supported:	Dolby® Digital (AC-3), Dolby® Digital Plus (E-AC-3)
Video Codecs Supported:	MPEG2
As-run import:	Imports as-run data from common automation systems via Windows Share or drop/drag into program as-run folders

Control/Monitor Interface

HTML5 web browser via dedicated 10/100/1000 Ethernet port.

Storage Capacity (per SpotCheck® Unit)

SpotCheck-1000, SpotCheck-2000
- 12 months

» ORDERING INFORMATION

SPOTCHECK®-1000-IP ATSC A/85 Compliance Monitor for IP Transport Streams. 1 Control IP Port, 1 Media IP Port. Includes one license of SPOTCHECK-LICENSE-AUDIO-FULL. Maximum capacity of four programs. 12-month analysis storage.

SPOTCHECK®-1000-ASI ATSC A/85 Compliance Monitor for ASI Transport Streams - 1 Control IP Port, 1 ASI Input Port. Includes one license of SPOTCHECK-LICENSE-AUDIO-FULL. Maximum capacity of four programs. 12-month analysis storage.

SPOTCHECK®-1000-OTA ATSC A/85 Compliance Monitor for OTA Transport Streams - 1 Control IP Port, 1 RF Input for over-the-air reception. Includes one license of SPOTCHECK-LICENSE-AUDIO-FULL. Maximum capacity of four programs. 12-month analysis storage.

SPOTCHECK®-2000 ATSC A/85 Compliance Monitor for IP Transport Streams - 1 Control IP Port, 5 Media IP Ports (ASI support available using option OPT-ASI; 1 ASI port max.). Includes four licenses of SPOTCHECK-LICENSE-AUDIO-FULL. Maximum capacity of 16 programs. 1RU. PSU redundancy. Dual power RAID hard drive configuration. 12-month analysis storage.

OPT-ASI Adds a 75Ω BNC ASI input and setup interface to any SpotCheck model.

OPT-OTA Adds an RF OTA input and setup interface to any SpotCheck model.

» ADDITIONAL PROGRAM LICENSES

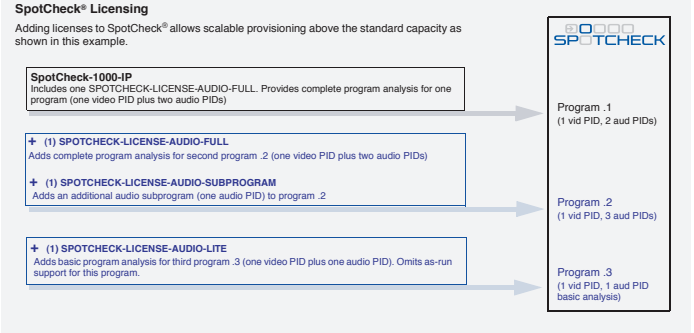
SPOTCHECK®-LICENSE-AUDIO-FULL Complete program analysis for one program (1 video PID plus 2 audio PIDs). Each optional additional license adds complete analysis for one program.

SPOTCHECK®-LICENSE-AUDIO-LITE Program analysis for one program (1 video PID plus 1 audio PID), but omits As-Run support.

SPOTCHECK®-LICENSE-AUDIO-SUBPROGRAM Adds an additional audio subprogram (one audio PID, such as DVS or SAP) to a FULL or LITE program license. (Available only in conjunction with an already-provisioned SpotCheck®-LICENSE-AUDIO-FULL or SpotCheck®-LICENSE-AUDIO-LITE program license.)

SPOTCHECK®-LICENSE-QUALITYCHECK Adds CEA 708/608 presence detect and stream/program quality checks. (Option is available on a unit basis (one license (max.); adds QUALITYCHECK to entire unit, with all transport streams accommodated).

SPOTCHECK®-LICENSE-AIRCHECK Adds transport stream lo-res proxy download. (Option is available on a per-program basis).



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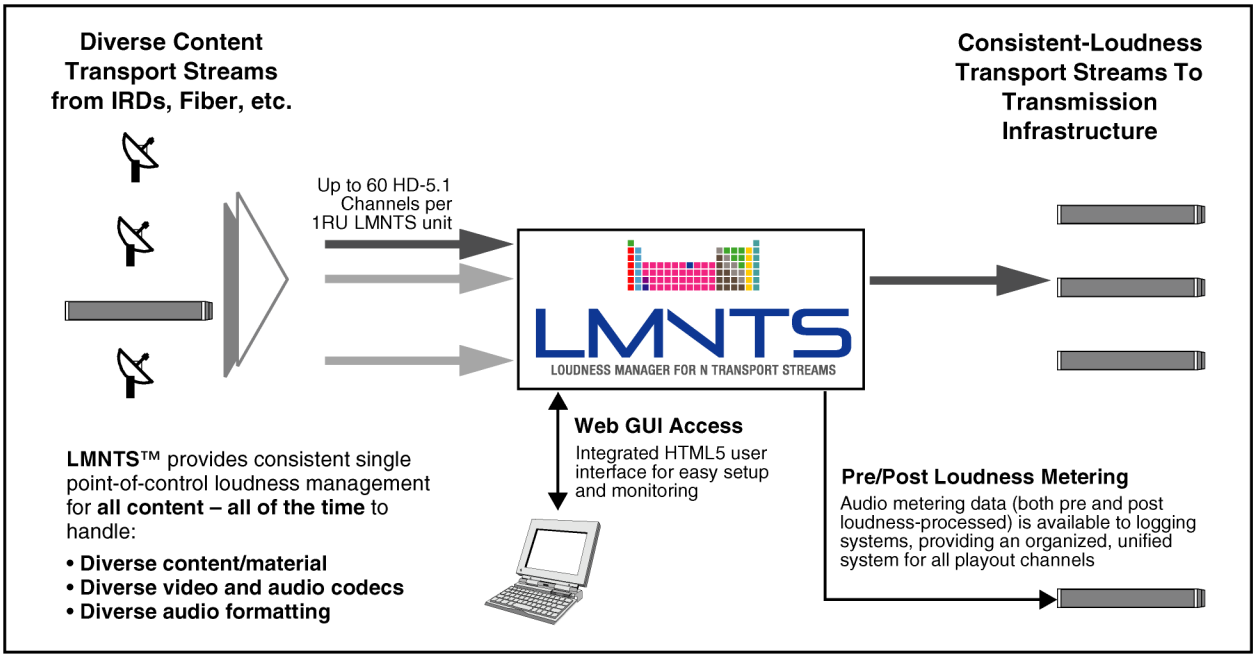
LMNTS® » TRANSPORT STREAM LOUDNESS PROCESSOR

PICK HIT BroadcastEngineering 2012

TVTechnology STAR 2012 SUPERIOR TECHNOLOGY AWARD RECIPIENT

LMNTS (Loudness Management for n-Transport Streams) is a first in comprehensive transport-based loudness processing. LMNTS represents a new level in multi-stream loudness processing integration ease, economy, confidence, and consistency. Operating at the MPEG transport layer, LMNTS provides a practical loudness management solution for MVPD operators without the need or complexity of external codecs transferring between baseband and MPEG interfaces.



Using unique depacketing/repacketing processing and decode/re-encode, LMNTS extracts and decodes audio codec packets from the program stream, performs high-quality PCM loudness processing, and then re-encodes and re-packets the audio with its stream. An ASI option provides additional ASI transport stream support. Physically, all data connection to LMNTS is via GigE IP or ASI interfaces using an industry-standard IT hardware platform with no intermediary breakouts.

Because LMNTS uses the same high-quality Linear Acoustic® Aeromax™ loudness processing for each stream, perfect loudness consistency is assured for all programming passing through the system. For AC-3 streams, LMNTS can accommodate varying received loudness and dialnorm, and repackage the audio using consistent loudness and consistent re-authored dialnorm for perfect loudness matching for all programming.

LMNTS is fully scalable, with licenses available to progressively add the number of audio programs accommodated.

LMNTS®
LOUDNESS MANAGER FOR N TRANSPORT STREAMS

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LMNTS® » TRANSPORT STREAM LOUDNESS PROCESSOR

FEATURES

Unmatched integration ease and practicality for multi-stream head-end loudness processing. Directly interfaces with GigE-based playout servers.

Integrated HTML5 user interface for easy setup and local or remote monitoring

ASI option provides ASI transport stream processing

Low delay latency (500 msec)

Consistent, uniformly controlled loudness processing across all program channels (including interstitials). Loudness processing performed in PCM domain.

Post-processed AC-3 is re-encoded using re-authored matching dialnorm across all programming

Full compatibility with MPTS and SPTS streams

Integrated video/audio delay re-alignment compensates for any internal processing delays

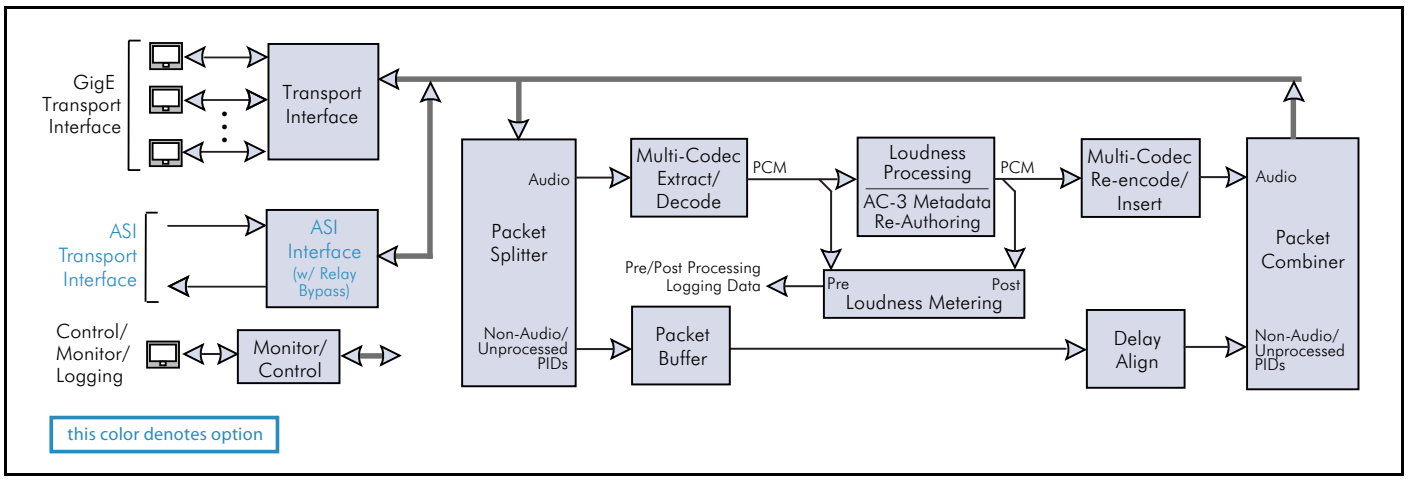
Transparent processing maintains payload size and video/audio quality. No added re-compression or de-compression.

Three year warranty with extension options available

OPTIONS

ASI Transport I/O Interface (LMNTS-OPT-ASI-1x1) Adds an ASI I/O BNC pair (with relay bypass protection). Capacity for various models is as follows:

- LMNTS-500: Supports up to (2) ASI options (second ASI interface card installed deletes (2) IP media ports).
- LMNTS-1000: Supports up to (2) ASI options (second ASI interface card installed deletes (2) IP media ports).
- LMNTS-2000: Supports up to (7) ASI options (second ASI interface card installed deletes (2) IP media ports).



SPECIFICATIONS

Physical

LMNTS-500
Power: 120/240 VAC, 50/60 Hz, 350 W (max)
Size: 1RU
Depth required: 24 in (61 cm) minimum

LMNTS-1000
Power: 120/240 VAC, 50/60 Hz, 550 W (max)
Size: 1RU
Depth required: 24 in (61 cm) minimum

LMNTS-2000
Power: 120/240 VAC, 50/60 Hz, 750 W (max)
Size: 2RU
Depth required: 24 in (61 cm) minimum

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LMNTS® » TRANSPORT STREAM LOUDNESS PROCESSOR

SPECIFICATIONS (cont.)

Capacity

LMNTS-500
Data throughput: (3) GigE (1000 Base-T) RJ-45 Media Ports
Channel capacity: Up to 10 surround audio PIDs; up to 25 stereo audio PIDs (see Note below)
Processing latency delay: 500 msec

LMNTS-1000
Data throughput: (5) GigE (1000 Base-T) RJ-45 Media Ports
Channel capacity: Up to 60 surround audio PIDs; up to 100 stereo audio PIDs (see Note below)
Processing latency delay: 500 msec

LMNTS-2000
Data throughput: (5) GigE (1000 Base-T) RJ-45 Media Ports
Channel capacity: Up to 100 surround audio PIDs; up to 140 stereo audio PIDs (see Note below)
Processing latency delay: 500 msec

Note: Channel capacities above are typical maximum capacities. Practical capacity is a function of licenses added. Capacity is based on processing "credits". For example on LMNTS-500, 100 credits are available for which each surround PID consumes 10 credits, and each stereo PID consumes 4 credits. Any combination of stereo and surround PIDs can be supported, noting the total available processing credits. For any of the models listed above, a Cobalt Sales Manager can assist you in determining the maximum processing capacity to support your requirements.

Control/Monitoring

HTML5 web browser via dedicated 10/100/1000 Ethernet port

Interface

IP Transport: GigE (1000 Base-T) via RJ-45
ASI Transport (Optional; LMNTS-OPT-ASI-1X1): ASI I/O, 75Ω BNCs with relay bypass

Format Supported

Transport: MPEG over IP or ASI, UDP, RTP
Multicast: Supports IPV4 multicast and IGMPV2/V3 multicast management
Audio Codecs: Dolby® Digital (AC-3), Dolby® Digital Plus(TM) (E-AC-3), MPEG 1 Layer 2, AAC
Video Codecs: Supports all video codecs; video passed without alterations

ORDERING INFORMATION

LMNTS-500 Transport Stream Loudness Processor, 1RU, (10) 5.1-channel capacity, (25) 2.0-channel capacity. 1 Control IP Port, 3 Media IP Ports.

LMNTS-1000 Transport Stream Loudness Processor, 1RU, (60) 5.1-channel capacity, (100) 2.0-channel capacity. 1 Control IP Port, 5 Media IP Ports.

LMNTS-2000 Transport Stream Loudness Processor, 2RU, (100) 5.1-channel capacity, (140) 2.0-channel capacity. 1 Control IP Port, 5 Media IP Ports.

Note: Channel capacities listed above for all models are typical max. Refer to Specifications for more details.

LMNTS-OPT-ASI-1X1 Adds one ASI input and output to any LMNTS unit

LMNTS-LICENSE-E-AC-3-SURROUND Loudness processing license for one stream (one PID) of 5.1 (surround) Dolby Digital Plus (EAC-3). Can also be used to process Dolby Digital (AC-3)

LMNTS-LICENSE-E-AC-3-STEREO Loudness processing license for one stream (one PID) of 2.0 (stereo) Dolby Digital Plus (EAC-3). Can also be used to process Dolby Digital (AC-3)

LMNTS-LICENSE-AC-3-SURROUND Loudness processing license for one stream (one PID) of 5.1 (surround) Dolby Digital (AC-3)

LMNTS-LICENSE-AC-3-STEREO Loudness processing license for one stream (one PID) of 2.0 (stereo) Dolby Digital (AC-3)

LMNTS-LICENSE-AAC-SURROUND Loudness processing license for one stream (one PID) of 5.1 (surround) AAC-LC or HE-AACv1

LMNTS-LICENSE-AAC-STEREO Loudness processing license for one stream (one PID) of 2.0 (stereo) AAC-LC or HE-AACv1

LMNTS-LICENSE-MP1L2 Loudness processing license for one stream (one PID) of MPEG 1 Layer II

Note: A 5.1 (surround) license can be used to process a 2.0 (stereo) stream of the same codec type.

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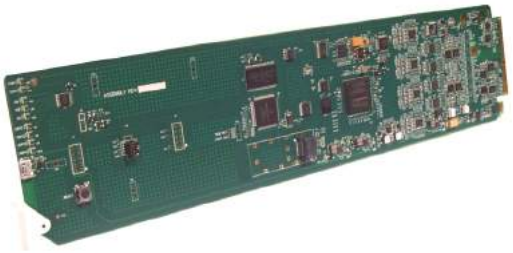
9933-EMDE-ADDA » 3G/HD/SD-SDI 16-CHANNEL AES / 8-CHANNEL ANALOG AUDIO EMBEDDER / DE-EMBEDDER



The Cobalt® **9933-EMDE-ADDA 3G/HD/SD-SDI 16-Channel AES / 8-Channel Analog Audio Embedder / De-Embedder** offers full-flexibility AES and analog audio embedding/de-embedding in a basic, economical, high-efficiency openGear® card.

The 9933-EMDE-ADDA provides full 16-channel embed / de-embed between AES, 8-channel analog audio, and all four groups of embedded audio. 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. Analog embed/de-embed conforms with professional balanced audio at 0 dBFS to pro 24 dBu levels using full 24-bit conversion.

Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p

16-channel AES support and 8-channel analog audio support in one card. Individual per-pair embedding or de-embedding. Provides four-group SDI embed/de-embed and cross-conversions between analog and AES discrete audio.

DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.

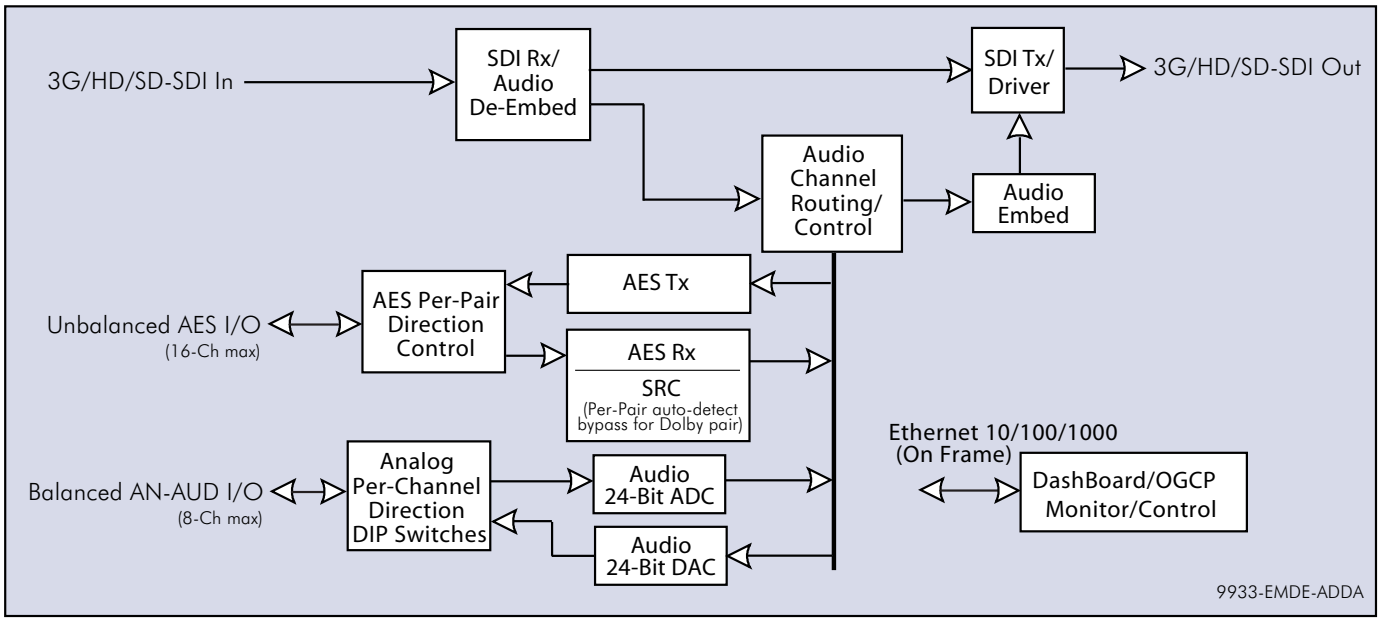
Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair.

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

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Hot-swappable

Five year warranty



openGear®

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9933-EMDE-ADDA » 3G/HD/SD-SDI 16-CHANNEL AES / 8-CHANNEL ANALOG AUDIO EMBEDDER / DE-EMBEDDER

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
<18 Watts

SDI Inputs/Outputs
(1) 75Ω BNC input
(1) 75Ω BNC output
SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format
48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs. Analog audio I/O conforms to +24 dBu <=> 0 dBFS.

Analog Audio Specifications
Input Impedance: >10 kΩ
Reference Level: -20 dBFS
Nominal Level: +4 dBu
Input Clip Level: +24 dBu (0 dBFS)
Freq. Response: ±0.2 dB (20 Hz to 20 kHz)
SNR: 115 dB (A weighted)
THD+N: -96 dB (20 Hz to 10 kHz)
Crosstalk: -106 dB (20 Hz to 20 kHz)
Output Impedance: < 50 Ω
Max.Output Level: +24 dBu (0 dBFS)

Discrete Audio Input/Output
(8) Unbalanced AES (AES-3id; 75Ω) with per-pair port direction controls
(8) Balanced Analog Audio with per-channel port direction switches

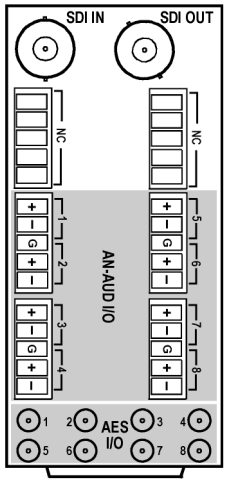
ORDERING INFORMATION

9933-EMDE-ADDA 3G/HD/SD-SDI 16-Channel AES / 8-Channel Analog Audio Embedder / De-Embedder

RM20-9933EMDE-B-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (8) Balanced Analog Audio I/O, 8 Unbalanced AES I/O (coaxial; DIN 1.0/2.3)

RM20-9933EMDE-B-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (8) Balanced Analog Audio I/O, 8 Unbalanced AES I/O (coaxial; HD-BNC)

Note: Rear module(s) have been available in two manufacturing versions (with correspondingly different MPN numbers). New cards with SN: 450452R or greater use the current/latest rear module version. Earlier-version and latest-version rear modules and cards are mutually incompatible. Manufacturing Part Number (MPN) is screened on the rear module PCB. See card web page for more information.



RM20-9933EMDE-B-DIN
RM20-9933EMDE-B-HDBNC

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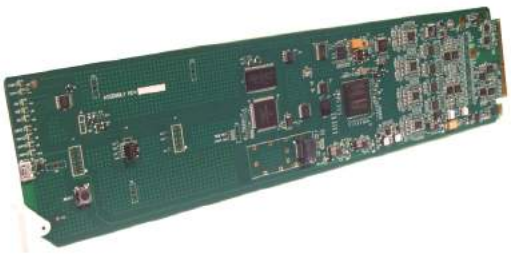
9933-EMDE-75/110 » 3G/HD/SD-SDI 16-CHANNEL UNBALANCED/BALANCED AES EMBEDDER / DE-EMBEDDER



The Cobalt® **9933-EMDE-75/110 3G/HD/SD-SDI 16-Channel Unbalanced/Balanced AES Embedder / De-Embedder** offers full-flexibility AES embedding/de-embedding for unbalanced and balanced AES in a basic, economical, high-efficiency openGear® card. More than only a basic embedder/de-embedder, the 9933-EMDE-75/110 offers the flexibility of AES balun functions as well as fully flexible AES embedding/de-embedding.

The 9933-EMDE-75/110 provides full 16-channel embed / de-embed between both unbalanced and balanced AES and all four groups of embedded audio. 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.

Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p

16-channel AES support for both balanced and unbalanced. Individual per-pair embedding or de-embedding. Can be used to provide cross-balun I/O as well as 4-group embed/de-embed.

DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.

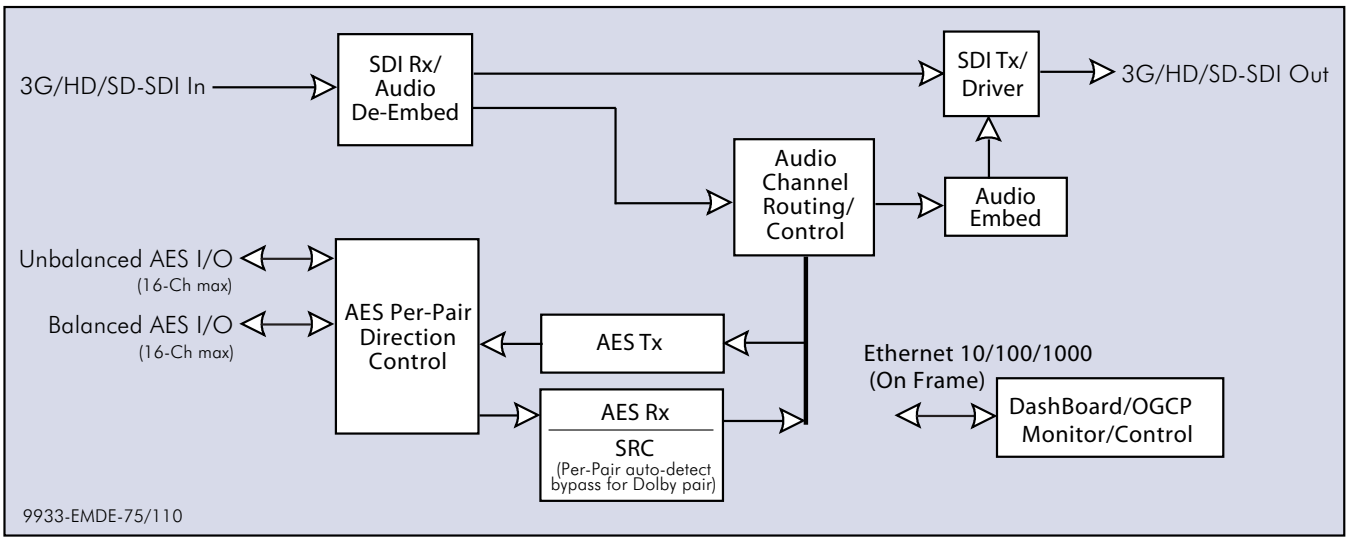
Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair.

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

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Hot-swappable

Five year warranty



openGear®

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9933-EMDE-75/110 » 3G/HD/SD-SDI 16-CHANNEL UNBALANCED/BALANCED AES EMBEDDER / DE-EMBEDDER

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

<18 Watts

SDI Inputs/Outputs

(1) 75Ω BNC input
(1) 75Ω BNC output
SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format

48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs.

AES Audio Input/Output

(8) Unbalanced AES (AES-3id; 75Ω) with per-pair port direction controls
(8) Balanced AES (AES/EBU; 110Ω) with per-pair port direction controls

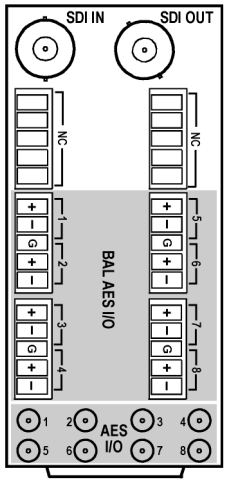
ORDERING INFORMATION

9933-EMDE-75/110 3G/HD/SD-SDI 16-Channel Unbalanced/Balanced AES Embedder / De-Embedder

RM20-9933EMDE-A-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (8) Balanced AES Audio I/O, (8) Unbalanced AES I/O (coaxial; DIN1.0/2.3)

RM20-9933EMDE-A-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (8) Balanced AES Audio I/O, (8) Unbalanced AES I/O (coaxial; HD-BNC)

Note: Rear module(s) have been available in two manufacturing versions (with correspondingly different MPN numbers). New cards with SN: 450452R or greater use the current/latest rear module version. Earlier-version and latest-version rear modules and cards are mutually incompatible. Manufacturing Part Number (MPN) is screened on the rear module PCB. See card web page for more information.



RM20-9933EMDE-A-DIN
RM20-9933EMDE-A-HDBNC

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BBG-DE-AA » 3G/HD/SD ANALOG AUDIO DE-EMBEDDER

BlueBox™ offers excellent performance, and excels to a new level of ease of use and installation practicality. The BlueBox™ **BBG-DE-AA 3G/HD/SD Analog Audio De-Embedder** provides de-embedding to professional balanced audio at 0 dBFS to pro 24 dBu levels using full 24-bit conversion.

De-embed selection can be configured using the device DIP switches or by using an intuitive GUI application that communicates with BBG-DE-AA over a PC's USB port. The GUI app allows dynamic configuration control, status display, audio meters, tone generators, and other advanced control functions not commonly found on "throwdown" packages. When configured using the GUI app, the USB connection can be removed with all settings held in non-volatile device memory.

FEATURES

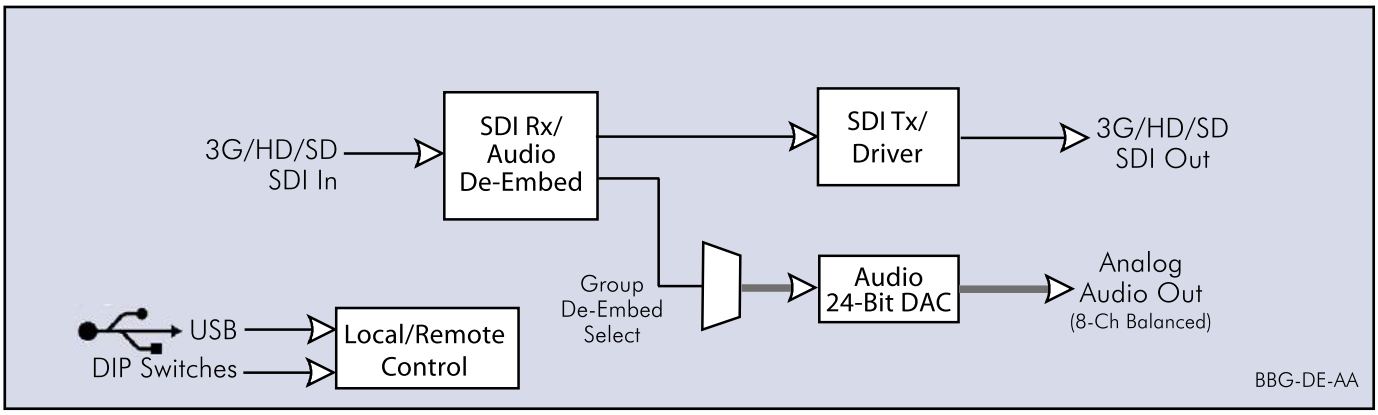
Eight balanced analog audio outputs with user-selectable direct de-embedding of groups 1 thru 4. DB-25 connector provides compact footprint. Balanced analog audio outputs can utilize direct connection to standard DB-25 connectors, or by using accessory DB-25/XLR breakout cable (available separately).

Configurable using device DIP switches or USB GUI remote control offering dynamic configuration control, status display, audio meters, tone generators, and other advanced control functions not commonly found on "throwdown" packages. USB GUI audio meters provide ready assessment of content presence and line-up.

Balanced audio de-embed with full 0 dBFS to 24 dBu 24-bit conversion

Small rugged portable standalone package ideal for portable installations. Compact size and low weight design easily affixes directly to host device chassis.

Rugged construction backed with a five-year warranty



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BBG-DE-AA » 3G/HD/SD ANALOG AUDIO DE-EMBEDDER

SPECIFICATIONS

Power
5-16 VDC, <5 W (AC adapter included)

DC Power Connector
Coaxial locking connector (for use with supplied Cobalt power adapter)

USB Port
Mini-USB (used for USB remote control connection and firmware upgrade upload to device)

Standards/Data Rates Supported
SMPTE 292M, 259M, 424M

Inputs/Outputs
3G/HD/SD-SDI In (75Ω BNC)
8-channel balanced analog audio output via DB-25 connector and XLR breakout adapter (available separately)
3G/HD/SD-SDI Out (75Ω BNC)

Audio Conversion Format
48 kHz sampling, 24-bit. Supports outputs up to 24 dBu.

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

ORDERING INFORMATION

BBG-DE-AA 3G/HD/SD Analog Audio De-Embedder (includes PS4 Power Supply AC adapter)

BBG-CA-110-XLRM DB-25 Male-to-8 XLR Male Connector Breakout Cable

BBG-MB Mounting Bracket

Note: The USB GUI application available for BBG-DE-AA is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. The application is not required for device usage where only DIP switch configuration is desired.

Currently, this application is available for only the following operating systems:

- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

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BBG-EM-AA » 3G/HD/SD ANALOG AUDIO EMBEDDER

BlueBox™ offers excellent performance, and excels to a new level of ease of use and installation practicality. The BlueBox™ **BBG-EM-AA 3G/HD/SD Analog Audio Embedder** provides embedding from professional balanced audio at pro 24 dBu to 0 dBFS to levels using full 24-bit conversion.

Embed selection can be configured using the device DIP switches or by using an intuitive GUI application that communicates with BBG-EM-AA over a PC's USB port. The GUI app allows dynamic configuration control, status display, audio meters, tone generators, and other advanced control functions not commonly found on "throwdown" packages. When configured using the GUI app, the USB connection can be removed with all settings held in non-volatile device memory.

FEATURES

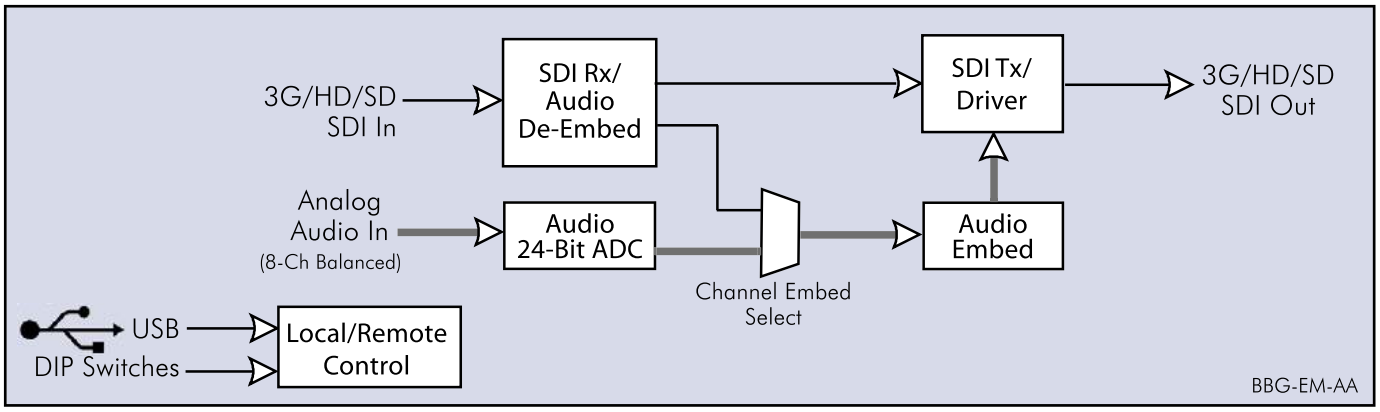
Eight balanced analog audio inputs with user-selectable direct embedding to groups 1 thru 4. DB-25 connector provides compact footprint. Balanced analog audio inputs can utilize direct connection to standard DB-25 connectors, or by using accessory DB-25/XLR breakout cable (available separately).

Configurable using device DIP switches or USB GUI remote control offering dynamic configuration control, status display, audio meters, tone generators, and other advanced control functions not commonly found on "throwdown" packages. USB GUI audio meters provide ready assessment of content presence and line-up.

Balanced audio embed with full 24 dBu-to-0 dBFS 24-bit conversion

Small rugged portable standalone package ideal for portable installations. Compact size and low weight design easily affixes directly to host device chassis.

Rugged construction backed with a five-year warranty



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BBG-EM-AA » 3G/HD/SD ANALOG AUDIO EMBEDDER

SPECIFICATIONS

Power
5-16 VDC, <5 W (AC adapter included)

DC Power Connector
Coaxial locking connector (for use with supplied Cobalt power adapter)

USB Port
Mini-USB (used for USB remote control connection and firmware upgrade upload to device)

Standards/Data Rates Supported
SMPTE 292M, 259M, 424M

Inputs/Outputs
3G/HD/SD-SDI In (75Ω BNC)
8-channel balanced analog audio input via DB-25 connector and XLR breakout adapter (available separately)
3G/HD/SD-SDI Out (75Ω BNC)

Audio Conversion Format
48 kHz sampling, 24-bit. Supports outputs up to 24 dBu.

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

ORDERING INFORMATION

BBG-EM-AA 3G/HD/SD Analog Audio Embedder (includes PS4 Power Supply AC adapter)

BBG-CA-110-XLRF DB-25 Male-to-8 XLR Female Connector Breakout Cable

BBG-MB Mounting Bracket

Note: The USB GUI application available for BBG-EM-AA is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. The application is not required for device usage where only DIP switch configuration is desired.

Currently, this application is available for only the following operating systems:

- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

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BBG-EMDE-AES75 » 3G/HD/SD AES AUDIO EMBEDDER/DE-EMBEDDER – AES-3id 75Ω (BNC)

BlueBox™ offers excellent performance, and excels to a new level of ease of use and installation practicality. The BlueBox™ **BBG-EMDE-AES75** 3G/HD/SD AES Audio Embedder/De-Embedder provides full 16-channel embed and de-embed between AES and all four groups of embedded audio. Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with device 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.

Embed/de-embed selection can be configured using the device DIP switches or by using an intuitive GUI application that communicates with BBG-EMDE-AES over a PC's USB port. The GUI app allows dynamic configuration control, status display, audio meters, tone generators, and other advanced control functions not commonly found on "throwdown" packages. When configured using the GUI app, the USB connection can be removed with all settings held in non-volatile device memory.

FEATURES

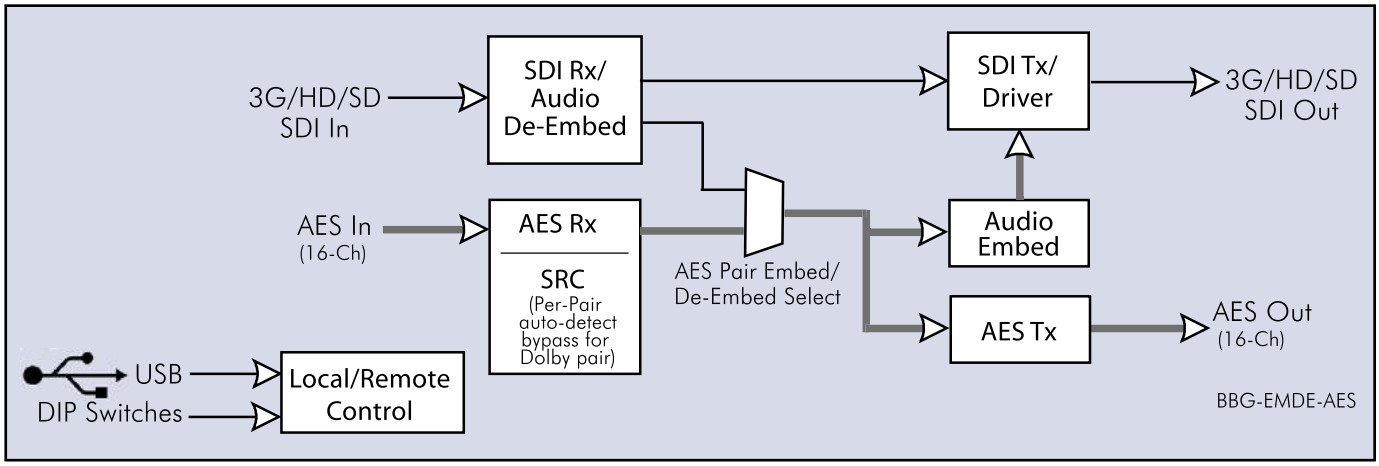
8-pair (16-channel) AES support. Individual per-pair embedding or de-embedding. Multi-pin AES I/O connector provides compact footprint. AES I/O can utilize direct connection to standard HD-15 connectors, or by using accessory BNC breakout cable (available separately).

Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with device 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.

Configurable using device DIP switches or USB GUI remote control offering dynamic configuration control, status display, audio meters, tone generators, and other advanced control functions not commonly found on "throwdown" packages. USB GUI audio meters provide ready assessment of content presence and line-up.

Small rugged portable standalone package ideal for portable installations. Compact size and low weight design easily affixes directly to host device chassis.

Rugged construction backed with a five-year warranty



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BBG-EMDE-AES75 » 3G/HD/SD AES AUDIO EMBEDDER/DE-EMBEDDER – AES-3ID 75Ω (BNC)

SPECIFICATIONS

Power
5-16 VDC, <5 W (AC adapter included)

DC Power Connector
Coaxial locking connector (for use with supplied Cobalt power adapter)

USB Port
Mini-USB (used for USB remote control connection and firmware upgrade upload to device)

Standards/Data Rates Supported
SMPTE 292M, 259M, 424M

Inputs/Outputs
3G/HD/SD-SDI In (75Ω BNC)
8-pair AES-3id
AES I/O via HD-15 connector and AES BNC breakout adapter (available separately)
3G/HD/SD-SDI Out (75Ω BNC)

Audio Conversion Format
48 kHz sampling, 24-bit. Supports outputs up to 24 dBu.

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

ORDERING INFORMATION

BBG-EMDE-AES75 3G/HD/SD AES Audio Embedder/De-Embedder; AES-3id 75Ω (BNC) AES I/O (includes PS4 Power Supply AC adapter)

BBG-CA-75-BNCF HD-15 Male-to-8 BNC Female Connector Breakout Cable (for use with model BBG-EMDE-AES75)

BBG-MB Mounting Bracket

Note: The USB GUI application available for BBG-EMDE-AES75 is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. The application is not required for device usage where only DIP switch configuration is desired.

Currently, this application is available for only the following operating systems:

- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

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BBG-EMDE-AES110 » 3G/HD/SD AES AUDIO EMBEDDER/DE-EMBEDDER – AES/EBU 110Ω (XLR)

BlueBox™ offers excellent performance, and excels to a new level of ease of use and installation practicality. The BlueBox™ **BBG-EMDE-AES110** 3G/HD/SD AES Audio Embedder/De-Embedder provides full 16-channel embed and de-embed between AES and all four groups of embedded audio. Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with device 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.

Embed/de-embed selection can be configured using the device DIP switches or by using an intuitive GUI application that communicates with BBG-EMDE-AES over a PC's USB port. The GUI app allows dynamic configuration control, status display, audio meters, tone generators, and other advanced control functions not commonly found on "throwdown" packages. When configured using the GUI app, the USB connection can be removed with all settings held in non-volatile device memory.

FEATURES

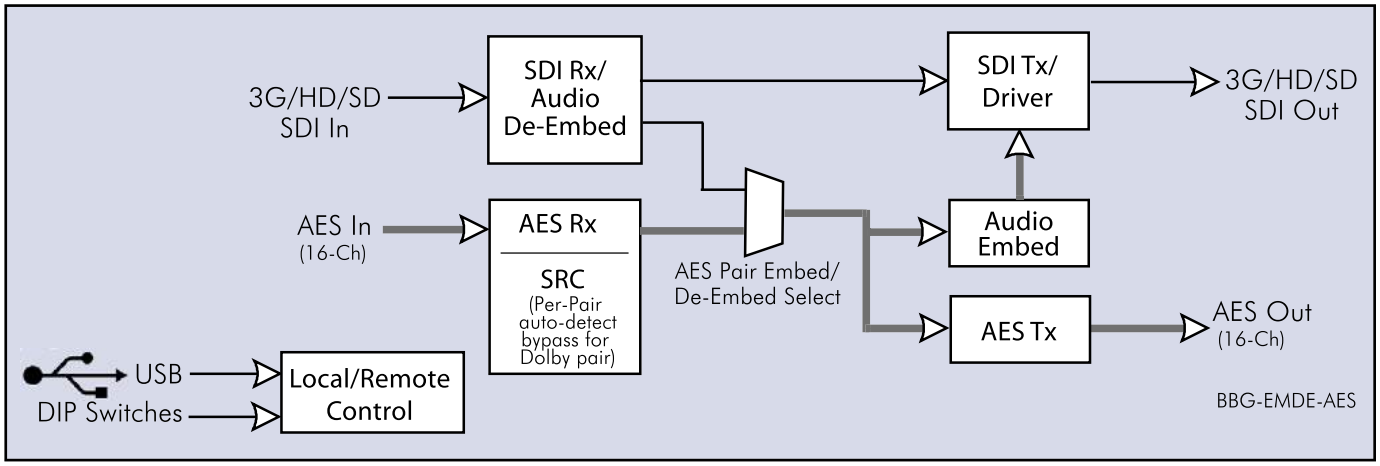
8-pair (16-channel) AES support. Individual per-pair embedding or de-embedding. Multi-pin AES I/O connector provides compact footprint. AES I/O can utilize direct connection to standard DB-25 connectors, or by using accessory XLR breakout cable (available separately).

Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with device 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.

Configurable using device DIP switches or USB GUI remote control offering dynamic configuration control, status display, audio meters, tone generators, and other advanced control functions not commonly found on "throwdown" packages. USB GUI audio meters provide ready assessment of content presence and line-up.

Small rugged portable standalone package ideal for portable installations. Compact size and low weight design easily affixes directly to host device chassis.

Rugged construction backed with a five-year warranty



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BBG-EMDE-AES110 » 3G/HD/SD AES AUDIO EMBEDDER/DE-EMBEDDER – AES/EBU 110Ω (XLR)

SPECIFICATIONS

Power
5-16 VDC, <5 W (AC adapter included)

DC Power Connector
Coaxial locking connector (for use with supplied Cobalt power adapter)

USB Port
Mini-USB (used for USB remote control connection and firmware upgrade upload to device)

Standards/Data Rates Supported
SMPTE 292M, 259M, 424M

Inputs/Outputs
3G/HD/SD-SDI In (75Ω BNC)
8-pair AES/EBU (110Ω balanced)
AES I/O via DB-25 connector and AES XLR breakout adapter (available separately)
3G/HD/SD-SDI Out (75Ω BNC)

Audio Conversion Format
48 kHz sampling, 24-bit. Supports outputs up to 24 dBu.

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

ORDERING INFORMATION

BBG-EMDE-AES110 3G/HD/SD AES Audio Embedder/De-Embedder; AES/EBU 110Ω (XLR) AES I/O (includes PS4 Power Supply AC adapter)

BBG-CA-110-XLRF DB-25 Male-to-8 XLR Female Connector Breakout Cable (for use with model BBG-EMDE-AES110)

BBG-MB Mounting Bracket

Note: The USB GUI application available for BBG-EMDE-AES110 is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. The application is not required for device usage where only DIP switch configuration is desired.

Currently, this application is available for only the following operating systems:

- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

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9950-EMDE-ANC » 3G/HD/SD-SDI ANCILLARY DATA EMBEDDER/DE-EMBEDDER

The **9950-EMDE-ANC 3G/HD/SD-SDI Ancillary Data Embedder/De-Embedder** offers full VANC/HANC ancillary data de-embedding and embedding for 3G/HD/SD-SDI streams. The easy to use user interface allows direct access to DID and SDID locations to extract or insert user data such as camera PTZ, SCTE 104, closed-captioning read/insert, GPI/GPO via ANC, or other specialized user payloads.

Data insertion and extraction is via serial or IP interfaces. Easy to use DashBoard control provides for easy setup and configuration. The openGear® card-based form-factor and high-density design allows up to ten 9950-EMDE-ANC cards to be fitted to a 20-slot frame. The standard rear I/O module offers SDI I/O and data interface connections, as well as a relay-protected SDI copy output.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

Full insertion/extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, closed captioning, GPI/GPO via ANC, and other specialized user payloads. HANC/VANC data interchange between SDI and GPIO, serial, and IP/Ethernet interfaces.

(Option +SCTE104) – SCTE 104 Insertion 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.

Full user VANC/HANC access

SMPTE 337 embed/de-embed allows serial user data to be embedded and de-embedded over unused embedded audio pairs.

Low latency pass-thru for all 3G/HD/SD-SDI payloads

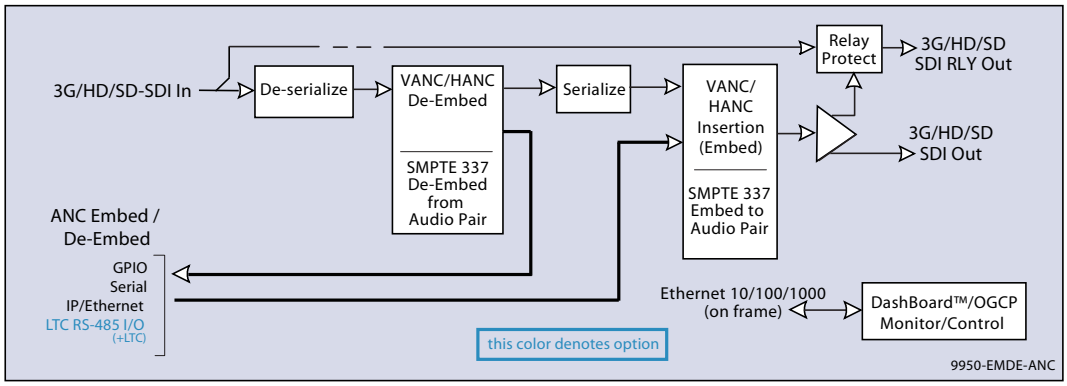
(Option +LTC) – Provides LTC embed to SDI from embedded audio or external RS-485 LTC sources. Also provides de-embed from SDI of timecode as embedded audio LTC or RS-485 LTC.

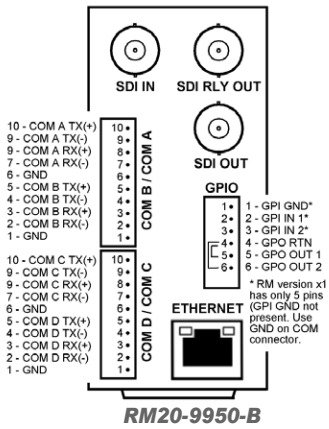
Latching relay protect SDI output provides input SDI bypass backup even in the event of power failure

(Option +SCTE104-FAST) SCTE104 Frame-Accurate SCTE Trigger Insertion 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.

DashBoard™ remote control status monitoring and setup/control.

Five year warranty





SPECIFICATIONS

Power

<18 Watts

SDI Input/Output

Number of Inputs: (1) 3G/HD/SD-SDI 75? BNC
Standards: SMPTE 259M, 292M, 424M
Supported Formats:
1080p60, 59.94, 50, 29.97, 25, 24, 23.98
1080i60, 59.94, 50
720p60, 59.94, 50, 29.97, 25, 24, 23.98
625i50, 525i59.94
Return Loss: 15 dB up to 1.485 GHz, 10 dB up to 2.970 GHz
Number of Outputs: (1) 3G/HD/SD-SDI 75? BNC
SDI Signal Level: 800 mV nominal
SDI Return Loss: >15 dB up to 1.485 GHz, >10 dB up to 2.970 GHz

Reference Video Input

Number of Inputs: (2) reference from frame bus. SMPTE 170M/318 "Black Burst", SMPTE 274M/296M "Tri-level"
Return Loss: >35 dB up to 5.75 MHz

ORDERING INFORMATION

9950-EMDE-ANC 3G/HD/SD-SDI Ancillary Data Embedder/De-Embedder

RM20-9950-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Processed Output BNC, (1) 3G/HD/SD-SDI Processed Output BNC w/ Relay Failover Protect, (4) RS-485 Serial Tx/Rx Ports, (2) GPIO, (1) 10/100/1000 Ethernet Data I/O Port

+SCTE104 SCTE 104 Insertion Option

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

+LTC Audio/RS-485 LTC Embed/De-Embed Option

openGear®

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BBG-1050-EMDE-ANC » 3G/HD/SD-SDI STANDALONE ANCILLARY DATA EMBEDDER/DE-EMBEDDER

The **BBG-1050-EMDE-ANC 3G/HD/SD-SDI Standalone Ancillary Data Embedder/De-Embedder** offers full VANC/HANC ancillary data de-embedding and embedding for 3G/HD/SD-SDI streams. The easy to use user interface allows direct access to DID and SDID locations to extract or insert user data such as camera PTZ, SCTE 104, closed-captioning read/insert, GPI/GPO via ANC, or other specialized user payloads.

Data insertion and extraction is via serial or IP interfaces. Easy to use DashBoard control provides for easy setup and configuration. The compact standalone form factor allows desktop usage, as well as the 1/3-rack size of the BBG-1050-EMDE-ANC 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

Full insertion/extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, closed captioning, GPI/GPO via ANC, and other specialized user payloads. HANC/VANC data interchange between SDI and GPIO, serial, and IP/Ethernet interfaces.

(Option +SCTE104) – SCTE 104 Insertion 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.

Full user VANC/HANC access

SMPTE 337 embed/de-embed allows serial user data to be embedded and de-embedded over unused embedded audio pairs.

Low latency pass-thru for all 3G/HD/SD-SDI payloads

(Option +LTC) – Provides LTC embed to SDI from embedded audio or external RS-485 LTC sources. Also provides de-embed from SDI of timecode as embedded audio LTC or RS-485 LTC.

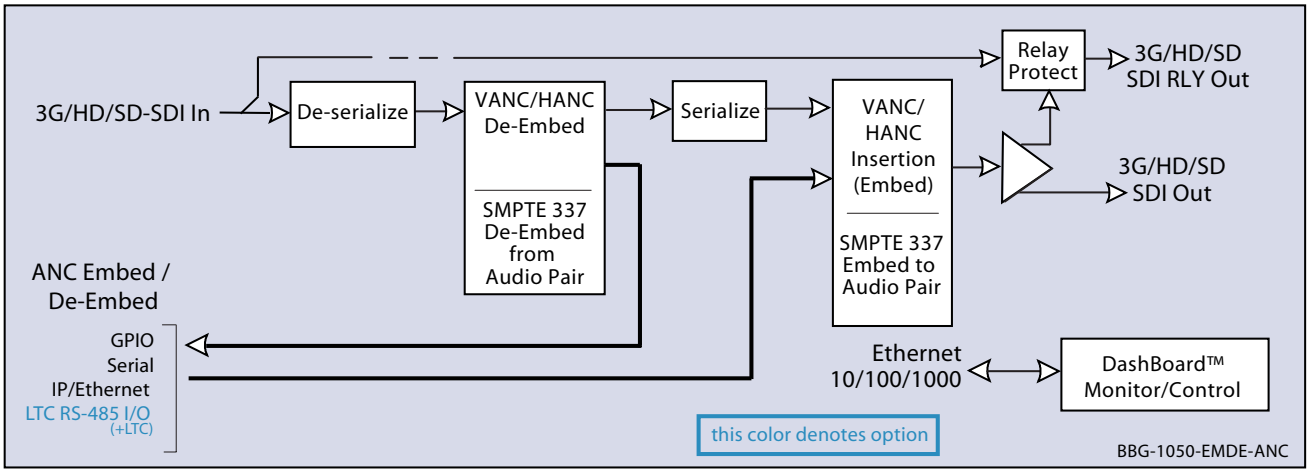
SCTE104 Frame-Accurate SCTE Trigger Insertion Option (+SCTE104-FAST) – Uses Time Stamp data derived from broadcast automation to provide deterministic, frame-accurate Digital Program Insertion (DPI) message embedding into SDI. The linear channel is output with precise metadata marking the beginning and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

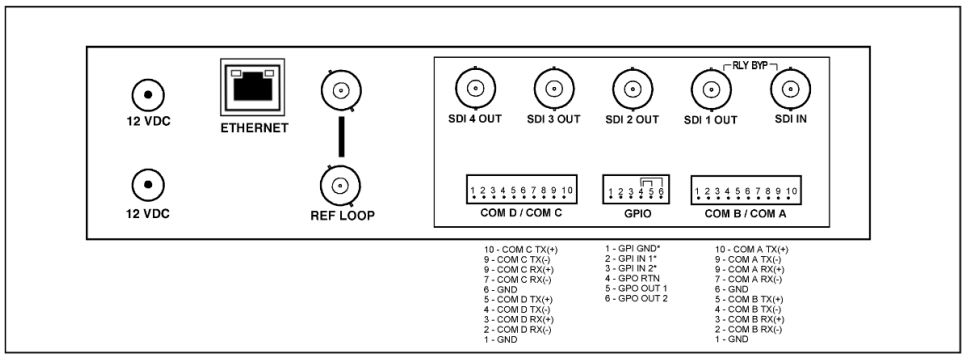
Latching relay protect SDI output provides input SDI bypass backup even in the event of power failure

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

Uses DashBoard remote control (device appears as single-card frame)

Five year warranty





Rear Panel

DashBoard

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BBG-1050-EMDE-ANC » 3G/HD/SD-SDI STANDALONE ANCILLARY DATA EMBEDDER/DE-EMBEDDER

SPECIFICATIONS

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

SDI Input/Output
Number of Inputs: (1) 3G/HD/SD-SDI 75Ω BNC
Standards: SMPTE 259M, 292M, 424M
Supported Formats:
1080p60, 59.94, 50, 29.97, 25, 24, 23.98
1080i60, 59.94, 50
720p60, 59.94, 50, 29.97, 25, 24, 23.98
625i50, 525i59.94
Return Loss: 15 dB up to 1.485 GHz, 10 dB up to 2.970 GHz
Number of Outputs: (1) 3G/HD/SD-SDI 75Ω BNC
SDI Signal Level: 800 mV nominal
SDI Return Loss: >15 dB up to 1.485 GHz, >10 dB up to 2.970 GHz

Reference Video Input
Looping 2-BNC connection. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level"
Return Loss: >35 dB up to 5.75 MHz

ORDERING INFORMATION

BBG-1050-EMDE-ANC 3G/HD/SD-SDI Standalone Ancillary Data Embedder/ De-Embedder

+SCTE104 SCTE 104 Insertion Option

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

+LTC Audio/RS-485 LTC Embed/De-Embed Option

BBG-1000-PS Redundant Power Supply Module

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

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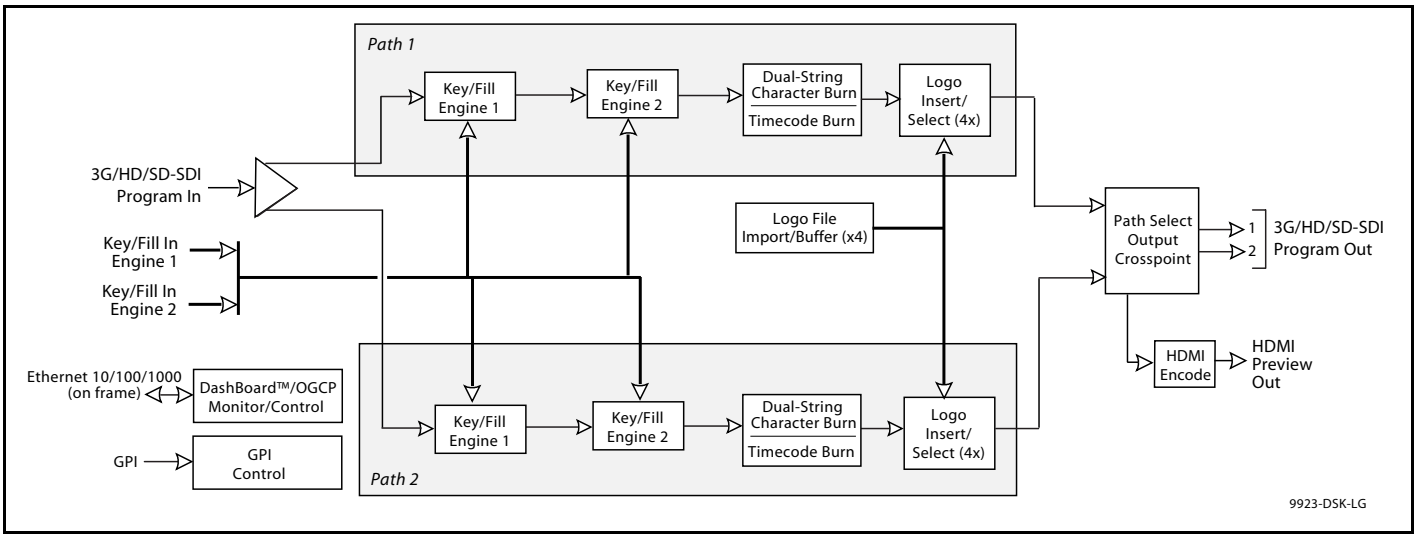
9923-DSK-LG » 3G/HD/SD-SDI Downstream Keyer with Dual Key/Fill Paths and Logo Insertion

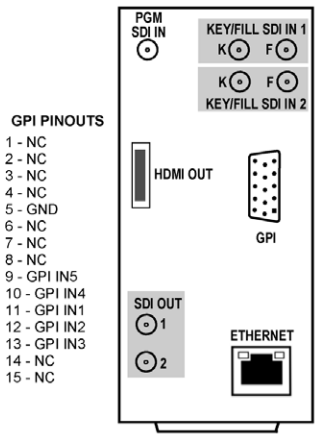
The Cobalt® **9923-DSK-LG 3G/HD/SD-SDI Downstream Keyer with Dual Key/Fill Paths and Logo Insertion** card provides flexible SDI downstream keying and logo insertion. The single program video input can be directed to either or both of two key/fill/logo insertion paths, allowing changing from one key/fill/insertion scheme to another in an instant. The openGear® form factor card can also store up to four logo graphic files which can be flexibly inserted into either key/fill path. Two key/fill paths can be outputted simultaneously, with each path using uniquely different key/fill and logo insertions as desired. For each path, two discrete character burn strings and timecode can be inserted on output video.

The 9923-DSK-LG is a perfect solution for flexible multi-market program branding and keyed character generator crawl insertion.

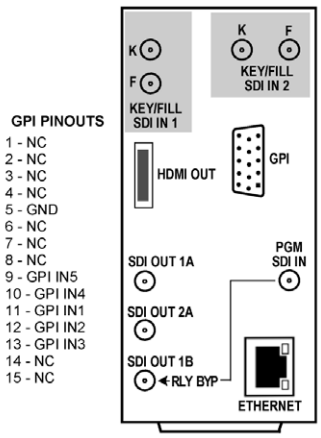
FEATURES

- Dual independent key/fill engines and two processing paths allow changing from one key/fill/insertion scheme to another in an instant.
- On-card memory stores logo/ID bug graphic files, with independent logo insertion on each key/fill path
- Supports 3G/HD/SD-SDI inputs as program and key/fill
- Convenient HDMI Preview Output allows preview of path 1 or path 2 outputs
- Per-path dual independent burn-in text string and timecode insertion
- Remote control/monitoring via Dashboard™ remote control and GPI
- Hot-swappable
- High-density openGear form factor – up to 10 cards per 20-slot frame
- Five year warranty





RM20-9923-DSK-LG-C-DIN
RM20-9923-DSK-LG-C-HDBNC



RM20-9923-DSK-LG-E-DIN
RM20-9923-DSK-LG-E-HDBNC

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9923-DSK-LG » 3G/HD/SD-SDI Downstream Keyer with Dual Key/Fill Paths and Logo Insertion

SPECIFICATIONS

Power

< 18 Watts

Video Input/Outputs

Video Inputs: (1) 3G/HD/SD-SDI Program Video SDI In; (2) 3G/HD/SD-SDI Key/Fill pair SDI In; all 75Ω
SDI Outputs: (2) 3G/HD/SD-SDI Program Video + Key/Fill SDI Out; 75Ω
HDMI Output: (1) HDMI output/preview (video only)
Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Audio Output

16-ch embedded

ORDERING INFORMATION

9923-DSK-LG 3G/HD/SD-SDI Downstream Keyer with Dual Key/Fill Paths and Logo Insertion

RM20-9923-DSK-LG-C-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Program Video Input, (4) 3G/HD/SD-SDI Key/Fill Video Inputs (2 key/fill pairs), (2) 3G/HD/SD-SDI Program Video Outputs (user selectable as path 1 or path 2 key/fill program outputs), (1) HDMI/DVI Preview Output, (1) GPIO Port (HD-15), Ethernet Port (all coaxial connectors DIN1.0/2.3)

RM20-9923-DSK-LG-C-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Program Video Input, (4) 3G/HD/SD-SDI Key/Fill Video Inputs (2 key/fill pairs), (2) 3G/HD/SD-SDI Program Video Outputs (user selectable as path 1 or path 2 key/fill program outputs), (1) HDMI/DVI Preview Output, (1) GPIO Port (HD-15), Ethernet Port (all coaxial connectors HD-BNC)

RM20-9923-DSK-LG-E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Program Video Input (relay protected), (4) 3G/HD/SD-SDI Key/Fill Video Inputs (2 key/fill pairs), (3) 3G/HD/SD-SDI Program Video Outputs (user selectable as path 1 or path 2 key/fill program outputs; 1 with relay bypass protect), (1) HDMI/DVI Preview Output, (1) GPIO Port (HD-15), Ethernet Port (all coaxial connectors DIN1.0/2.3)

RM20-9923-DSK-LG-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Program Video Input (relay protected), (4) 3G/HD/SD-SDI Key/Fill Video Inputs (2 key/fill pairs), (3) 3G/HD/SD-SDI Program Video Outputs (user selectable as path 1 or path 2 key/fill program outputs; 1 with relay bypass protect), (1) HDMI/DVI Preview Output, (1) GPIO Port (HD-15), Ethernet Port (all coaxial connectors HD-BNC)

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BBG-1023-DSK-LG » 3G/HD/SD-SDI Standalone Downstream Keyer

with Dual Key/Fill Paths and Logo Insertion

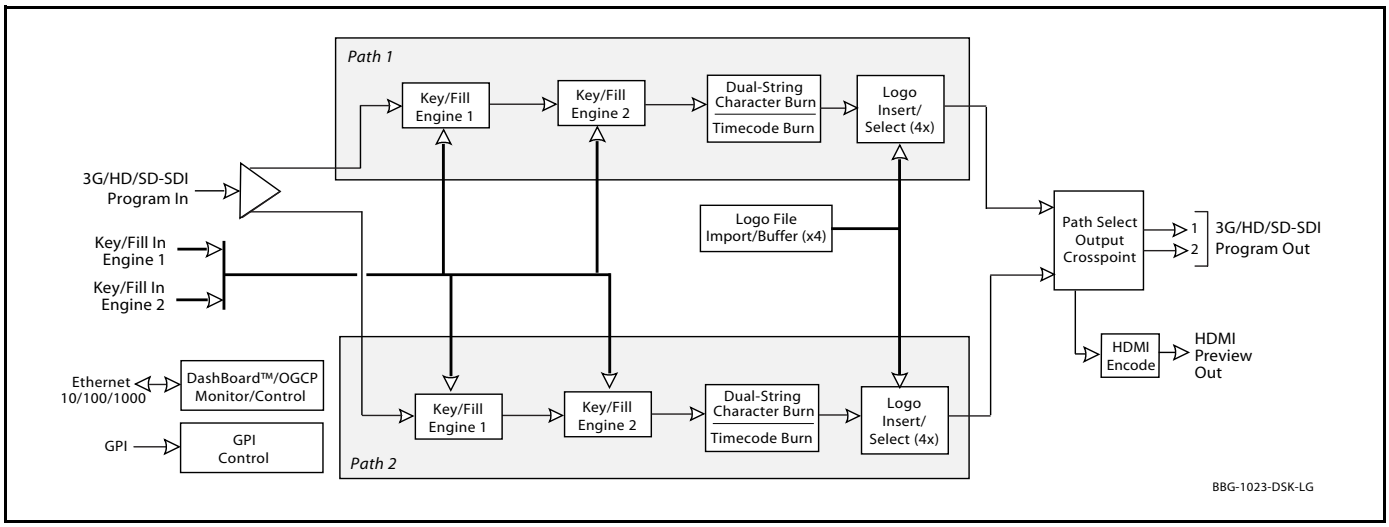
The Cobalt® **BBG-1023-DSK-LG 3G/HD/SD-SDI Standalone Downstream Keyer with Dual Key/Fill Paths and Logo Insertion** provides flexible SDI downstream keying and logo insertion. The single program video input can be directed to either or both of two key/fill/logo insertion paths, allowing changing from one key/fill/insertion scheme to another in an instant. The device can also store up to four logo graphic files which can be flexibly inserted into either key/fill path. Two key/fill paths can be outputted simultaneously, with each path using uniquely different key/fill and logo insertions as desired. For each path, two discrete character burn strings and timecode can be inserted on output video.

The BBG-1023-DSK-LG is a perfect solution for flexible multi-market program branding and keyed character generator crawl insertion.

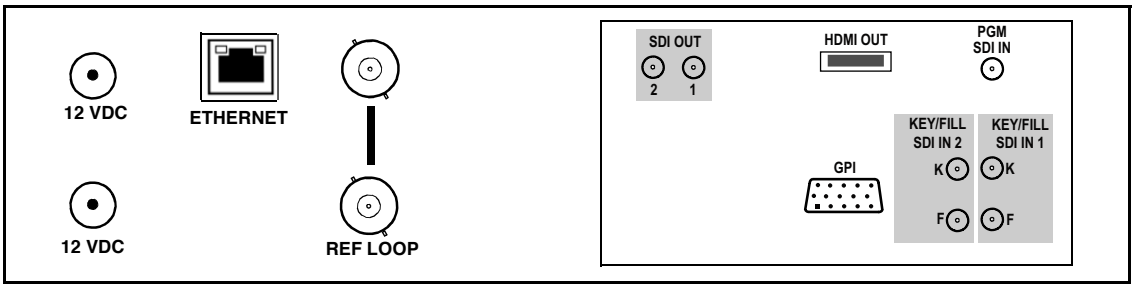
The compact standalone form factor allows desktop usage, as well as the 1/3-rack size of the BBG-1023-DSK-LG allowing 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame).

FEATURES

- Dual independent key/fill engines and two processing paths allow changing from one key/fill/insertion scheme to another in an instant.
- On-card memory stores logo/ID bug graphic files, with independent logo insertion on each key/fill path
- Supports 3G/HD/SD-SDI inputs as program and key/fill
- Convenient HDMI Preview Output allows preview of path 1 or path 2 outputs
- Per-path dual independent burn-in text string and timecode insertion
- Remote control/monitoring via DashBoard™ software, OGCP-9000 Remote Control Panel, GPI, or Web Browser User Interface
- Redundant power supply option
- Compact footprint – up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.
- Five year warranty



Rear Panel



DashBoard

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BBG-1023-DSK-LG » 3G/HD/SD-SDI Standalone Downstream Keyer

with Dual Key/Fill Paths and Logo Insertion

SPECIFICATIONS

Power

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

Video Input/Outputs

Video Inputs: (1) 3G/HD/SD-SDI Program Video SDI In; (2) 3G/HD/SD-SDI Key/Fill pair SDI In; all 75Ω
SDI Outputs: (2) 3G/HD/SD-SDI Program Video + Key/Fill SDI Out; 75Ω
HDMI Output: (1) HDMI output/preview (video only)
Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Audio Output

16-ch embedded

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)

ORDERING INFORMATION

BBG-1023-DSK-LG 3G/HD/SD-SDI Standalone Downstream Keyer with Dual Key/Fill Paths and Logo Insertion, available in the following rear-panel I/O configurations:

BBG-1023-DSK-LG-C-DIN (1) 3G/HD/SD-SDI Program Video Input, (4) 3G/HD/SD-SDI Key/Fill Video Inputs (2 key/fill pairs), (2) 3G/HD/SD-SDI Program Video Outputs (user selectable as path 1 or path 2 key/fill program outputs), (1) HDMI/DVI Preview Output, (1) GPIO Port (HD-15), (all coaxial connectors DIN1.0/2.3)

BBG-1023-DSK-LG-C-HDBNC (1) 3G/HD/SD-SDI Program Video Input, (4) 3G/HD/SD-SDI Key/Fill Video Inputs (2 key/fill pairs), (2) 3G/HD/SD-SDI Program Video Outputs (user selectable as path 1 or path 2 key/fill program outputs), (1) HDMI/DVI Preview Output, (1) GPIO Port (HD-15), (all coaxial connectors HD-BNC)

Accessories:

BBG-1000-PS Redundant Power Supply Module

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

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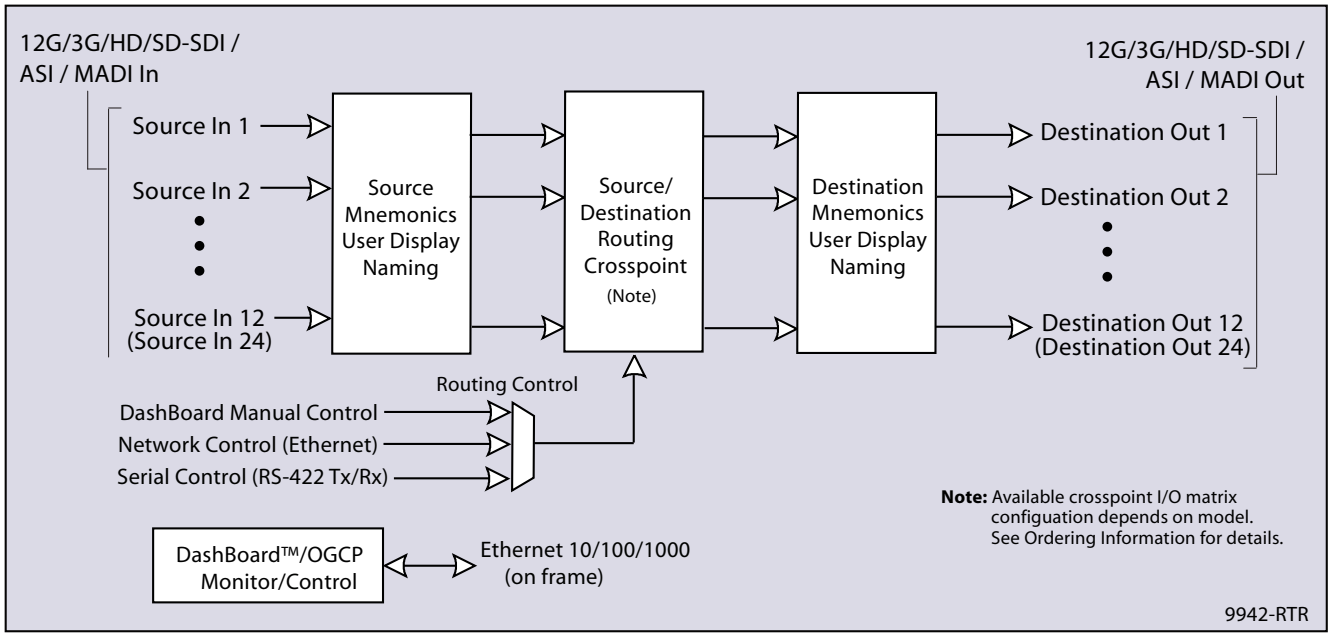
9942-RTR Series » 12G/3G/HD/SD-SDI/ASI/MADI ROUTERS for openGear® Systems

Cobalt introduces the **9942-RTR** series of SDI/ASI /MADI routers for the openGear® form factor. Using the openGear platform, the 9942-RTR series provides a high-density card-based solution that offers unprecedented flexibility and ease of use and integration that makes it an **exclusive** within the openGear platform.

In addition to standard DashBoard™ support, The 9942-RTR series offer a built-in Ethernet port for IP-based protocols such as Cobalt's ReFLEX and SW-P-08. The 9942-RTR series also offer serial and GPIO interfaces. The 9942-RTR series is available in 24x24 and 12x12 sizes.

DashBoard user matrix provides easy to use manual routing setup. Routing setups can be saved as presets, allowing one-button engage with DashBoard or OGCP-9000 Remote Control Panel. Full user DashBoard™ and Remote Control Panel remote control allows full setup, status, and local control across a standard Ethernet network.



FEATURES

- Exclusive openGear card-based scalable router solution
- Design specifically optimized for 12G support
- High-density design in openGear form offers compact 2RU solution
- RP-168 reference-based switching
- Direct interface compatibility with openGear®, Cobalt Reflex, SW-P-08, and Sierra Video (serial) protocols. Direct compatibility with DNF, PESA PNET, and LAWO SNAP panels (and other panels conforming with supported protocols).
- Supports software upgrades allowing expanded functionality without removing cards and minimal disruption
- DashBoard™ remote control status monitoring and setup/control
- Hot-swappable
- Five year warranty

9942-RTR Models

- **9942-RTR-12x12-12G** 12G/3G/HD/SD-SDI / ASI / MADI 12x12 Router
- **9942-RTR-24x24-12G** 12G/3G/HD/SD-SDI / ASI / MADI 24x24 Router

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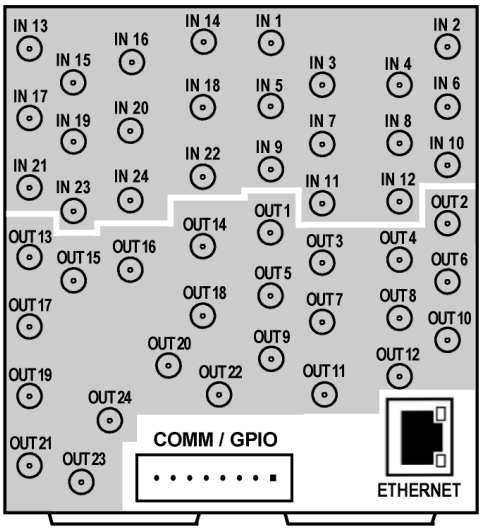
9942-RTR Series » 12G/3G/HD/SD-SDI/ASI/MADI ROUTERS for openGear® Systems



1 - COM_TX2 / 422(+)
2 - COM_TX1 / 422(-)
3 - COM_RX2 / 422(+)
4 - COM_RX1 / 422(-)
5 - GND
6 - GPO_CMN
7 - GPO OUT 1
8 - GPI IN 1

RM20-9942-24x24-A-HDBNC

Note: RM20-9942-24x24-A-HDBNC is compatible with 9942-RTR-12x12-12G and 9942-RTR-24x24-12G models. When used with the 12x12 model, **IN 13** thru **IN 24** and **OUT 13** thru **OUT 24** ports are NC.

ORDERING INFORMATION

9942-RTR-12x12-12G 12G/3G/HD/SD-SDI / ASI / MADI 12x12 Router

9942-RTR-24x24-12G 12G/3G/HD/SD-SDI / ASI / MADI 24x24 Router (Expected Availability Q4 2020)

RM20-9942-24X24-A-HDBNC 20-Slot Frame Rear I/O Module (Double Width). (24) SDI/ASI/MADI coaxial inputs, (24) SDI/ASI/MADI coaxial outputs, COMM/GPIO connector, 100/1000 BaseT Ethernet Port (All coaxial connectors HDBNC.)

US SALES 800 669-1691 / DIRECT +1 217-344-1243 / SALES@COBALTDIGITAL.COM
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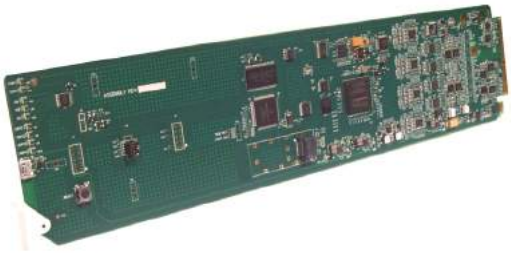
9433-EMDE-75/110-EOOE » 3G/HD/SD-SDI FIBER-OPTIC TRANSCEIVER

with 16-Channel Unbalanced/Balanced AES Embed / De-Embed



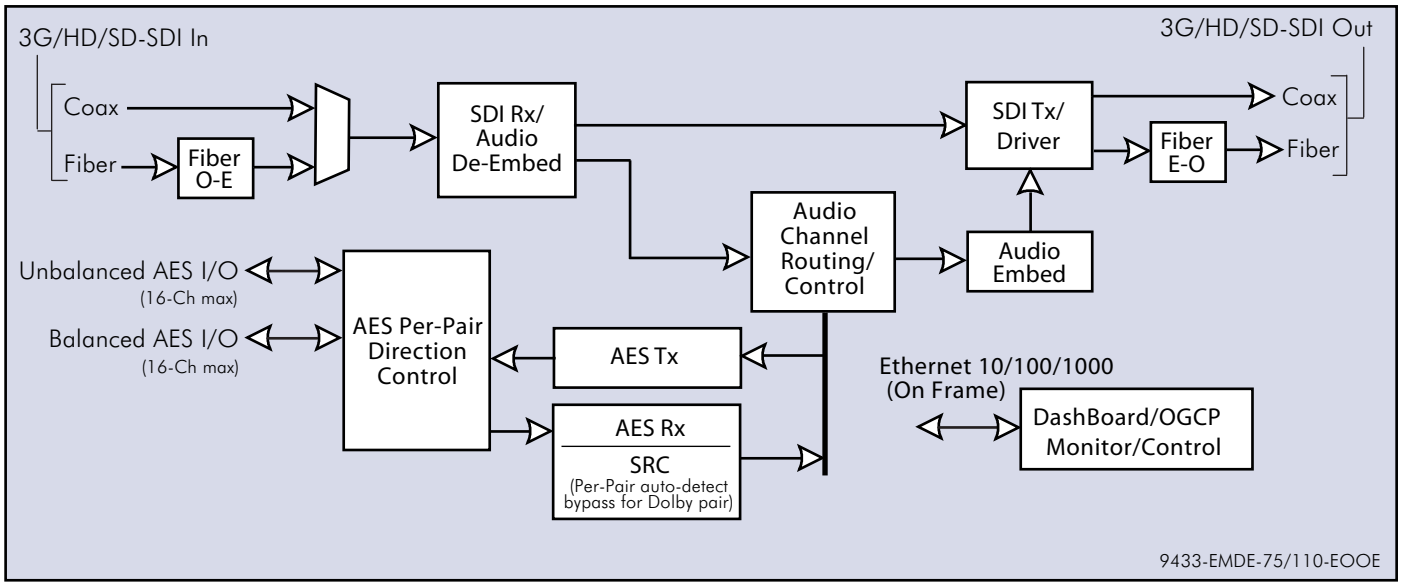
The Cobalt® **9433-EMDE-75/110-EOOE 3G/HD/SD-SDI Fiber-Optic Transceiver** with 16-Channel Unbalanced/Balanced AES Embed / De-Embed offers full-flexibility AES embedding/de-embedding for unbalanced and balanced AES with the built-in versatility of both coaxial and fiber SDI I/O in a basic, economical, high-efficiency openGear® card. More than only a basic embedder/de-embedder, the 9433-EMDE-75/110-EOOE offers the flexibility of SDI/Fiber EO – OE transceive as well as providing AES balun functions and fully flexible embedding/de-embedding.

The 9433-EMDE-75/110-EOOE provides full 16-channel embed / de-embed between both unbalanced and balanced AES and all four groups of embedded audio. 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. Fully error-free pathological pattern operation is fully compatible with professional fiber video interfaces. The 9433-EMDE-75/110-EOOE is available with numerous CWDM wavelengths that allow the card to be used with CWDM systems. Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Versatile EO - OE fiber transceiver with fiber and coax as both inputs and outputs
- 16-channel AES support for both balanced and unbalanced. Individual per-pair embedding or de-embedding. Can be used to provide cross-balun I/O as well as 4-group embed/de-embed.
- DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.
- Low-power/high-density design – less than 18 Watts per card
- Available with CWDM wavelength divisions allowing use in CWDM systems
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- Five year warranty



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9433-EMDE-75/110-E00E » 3G/HD/SD-SDI FIBER-OPTIC TRANSCEIVER

with 16-Channel Unbalanced/Balanced AES Embed / De-Embed

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

<18 Watts

SDI/Fiber Inputs/Outputs

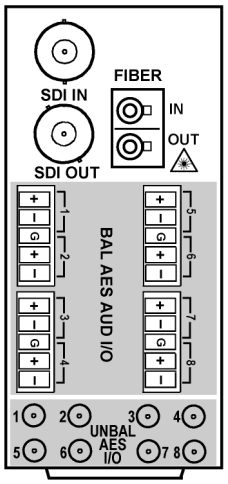
(1) 75Ω BNC inputs
(1) 75Ω BNC output
SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI
(1) Fiber input; LC connector
(1) Fiber output; LC connector
Fiber Wavelength, Tx: 1310 nm
Fiber Rx Sensitivity: -23 dBm; 1260 to 1620 nm
Fiber Tx Power: -5.0 dBm (min)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format

48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs.

AES Audio Input/Output

(8) Unbalanced AES (AES-3id; 75Ω) with per-pair port direction controls
(8) Balanced AES (AES/EBU; 110Ω) with per-pair port direction controls



RM20-9433EMDE-EOOE-A-DIN
RM20-9433EMDE-EOOE-A-HDBNC

ORDERING INFORMATION

9433-EMDE-75/110-E00E 3G/HD/SD-SDI Fiber-Optic Transceiver with 16-Channel Unbalanced/Balanced AES Embed / De-Embed

9433-EMDE-75/110-E00E-CWDM-WX 3G/HD/SD-SDI Fiber-Optic Transceiver with 16-Channel Unbalanced/Balanced AES Embed / De-Embed with Fiber Optic CWDM I/O

Use fiber wavelength codes below for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1370, 1390, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610.

In "WX" places in part number, substitute code for wavelengths in each place as listed below:

-27: 1270nm **-29:** 1290nm **-31:** 1310nm
-33: 1330nm **-35:** 1350nm **-37:** 1370nm
-39: 1390nm **-41:** 1410nm **-43:** 1430nm
-45: 1450nm **-47:** 1470nm **-49:** 1490nm
-51: 1510nm **-53:** 1530nm **-55:** 1550nm
-57: 1570nm **-59:** 1590nm **-61:** 1610nm

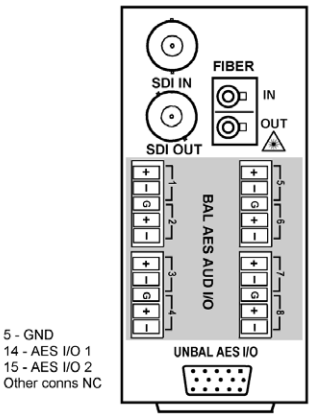
(Example: 9433-EMDE-75/110-E00E-CWDM-27 has 1270 nm FIBER OUT wavelength)

RM20-9433EMDE-E00E-A-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Input, (1) Fiber Output (LC connectors), (8) Balanced AES Audio I/O, (8) Unbalanced AES I/O (coaxial; DIN 1.0/2.3)

RM20-9433EMDE-E00E-A-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Input, (1) Fiber Output (LC connectors), (8) Balanced AES Audio I/O, (8) Unbalanced AES I/O (coaxial; HD-BNC)

RM20-9433EMDE-E00E-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Input, (1) Fiber Output (LC connectors), (8) Balanced AES Audio I/O, Unbalanced AES I/O (via HD-15 connector)

Note: Rear module(s) have been available in two manufacturing versions (with correspondingly different MPN numbers). New cards with SN: 450452R or greater use the current/latest rear module version. Earlier-version and latest-version rear modules and cards are mutually incompatible. Manufacturing Part Number (MPN) is screened on the rear module PCB. See card web page for more information.



RM20-9433EMDE-E00E-B

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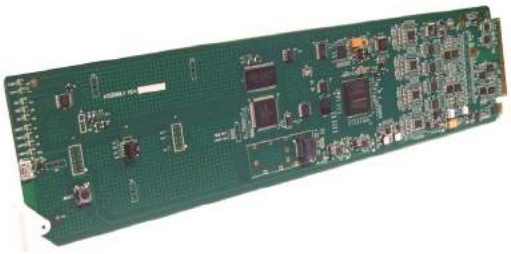
9433-EMDE-75/110-EO » 3G/HD/SD-SDI FIBER-OPTIC EO TRANSMITTER

with 16-Channel Unbalanced/Balanced AES Embed / De-Embed



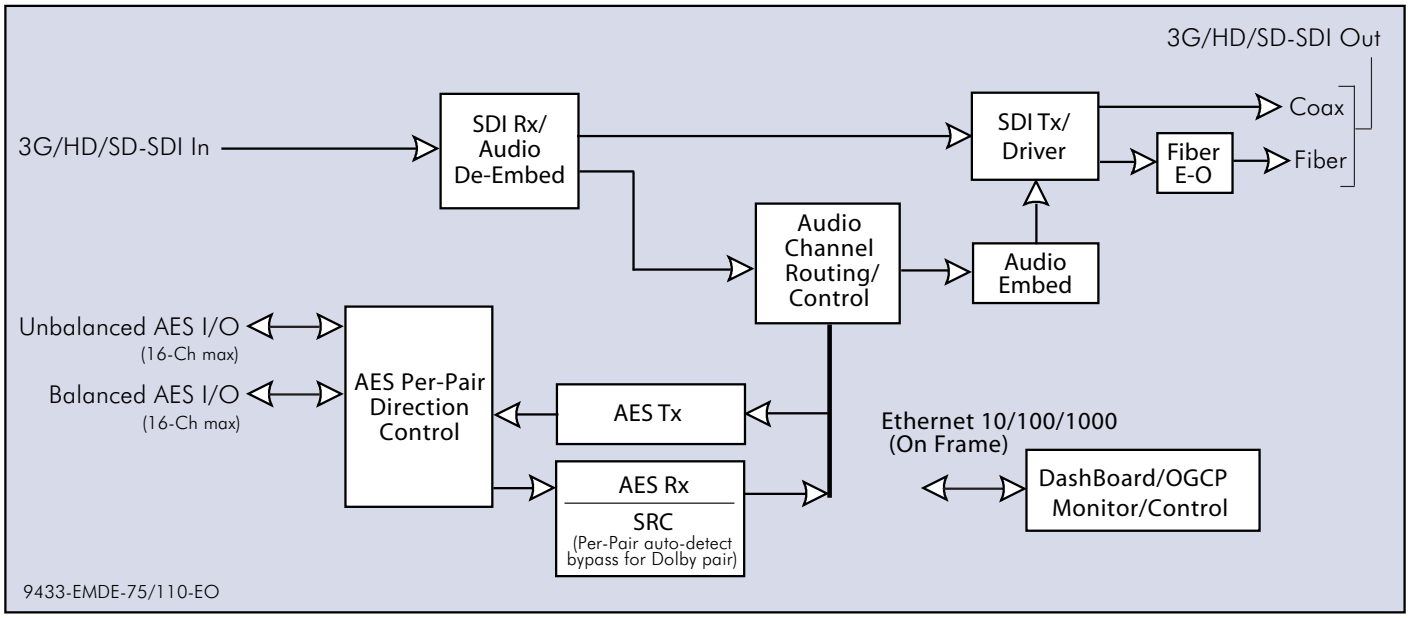
The Cobalt® **9433-EMDE-75/110-EO 3G/HD/SD-SDI Fiber-Optic EO Transmitter** with 16-Channel Unbalanced/Balanced AES Embed / De-Embed offers full-flexibility AES embedding/de-embedding for unbalanced and balanced AES with SDI-to-fiber EO in a basic, economical, high-efficiency openGear® card. More than only a basic embedder/de-embedder, the 9433-EMDE-75/110-EO offers the flexibility of SDI-to-fiber EO as well as providing AES balun functions and fully flexible embedding/de-embedding.

The 9433-EMDE-75/110-EO provides full 16-channel embed / de-embed between both unbalanced and balanced AES and all four groups of embedded audio. 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. Fully error-free pathological pattern operation is fully compatible with professional fiber video interfaces. The 9433-EMDE-75/110-EO is available with numerous CWDM wavelengths that allow the card to be used with CWDM systems.

Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- EO fiber transmitter with fiber and coax as outputs
- 16-channel AES support for both balanced and unbalanced. Individual per-pair embedding or de-embedding. Can be used to provide cross-balun I/O as well as 4-group embed/de-embed.
- DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.
- Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with 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.
- Low-power/high-density design – less than 18 Watts per card
- Available with CWDM wavelength divisions allowing use in CWDM systems
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- Five year warranty



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9433-EMDE-75/110-EO » 3G/HD/SD-SDI FIBER-OPTIC EO TRANSMITTER

with 16-Channel Unbalanced/Balanced AES Embed / De-Embed

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

<18 Watts

SDI/Fiber Inputs/Outputs

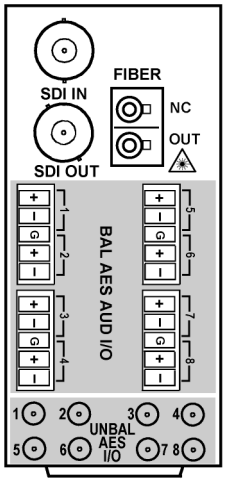
(1) 75Ω BNC inputs
(1) 75Ω BNC output
SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI
(1) Fiber output; LC connector
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format

48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs.

AES Audio Input/Output

(8) Unbalanced AES (AES-3id; 75Ω) with per-pair port direction controls
(8) Balanced AES (AES/EBU; 110Ω) with per-pair port direction controls



RM20-9433EMDE-EO-A-DIN
RM20-9433EMDE-EO-A-HDBNC

ORDERING INFORMATION

9433-EMDE-75/110-EO 3G/HD/SD-SDI Fiber-Optic EO Transmitter with 16-Channel Unbalanced/Balanced AES Embed / De-Embed

9433-EMDE-75/110-EO-CWDM-WX 3G/HD/SD-SDI Fiber-Optic EO Transmitter with 16-Channel Unbalanced/Balanced AES Embed / De-Embed with Fiber Optic CWDM I/O

Use fiber wavelength codes below for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1370, 1390, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610.

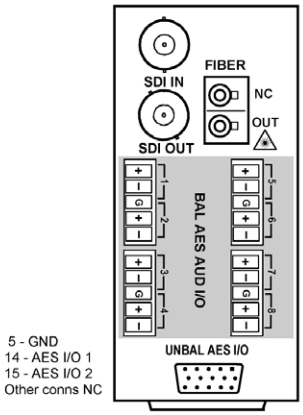
-27: 1270nm **-29:** 1290nm **-31:** 1310nm
-33: 1330nm **-35:** 1350nm **-37:** 1370nm
-39: 1390nm **-41:** 1410nm **-43:** 1430nm
-45: 1450nm **-47:** 1470nm **-49:** 1490nm
-51: 1510nm **-53:** 1530nm **-55:** 1550nm
-57: 1570nm **-59:** 1590nm **-61:** 1610nm
(Example: 9433-EMDE-75/110-CWDM-27 has 1270 nm FIBER OUT CWDM wavelength)

RM20-9433EMDE-EO-A-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Output (LC connector), (8) Balanced AES Audio I/O, (8) Unbalanced AES I/O (coaxial; DIN 1.0/2.3)

RM20-9433EMDE-EO-A-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Output (LC connector), (8) Balanced AES Audio I/O, (8) Unbalanced AES I/O (coaxial; HD-BNC)

RM20-9433EMDE-EO-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Output (LC connector), (8) Balanced AES Audio I/O, Unbalanced AES I/O (via HD-15 connector)

Note: Rear module(s) have been available in two manufacturing versions (with correspondingly different MPN numbers). New cards with SN: 450452R or greater use the current/latest rear module version. Earlier-version and latest-version rear modules and cards are mutually incompatible. Manufacturing Part Number (MPN) is screened on the rear module PCB. See card web page for more information.



RM20-9433EMDE-EO-B

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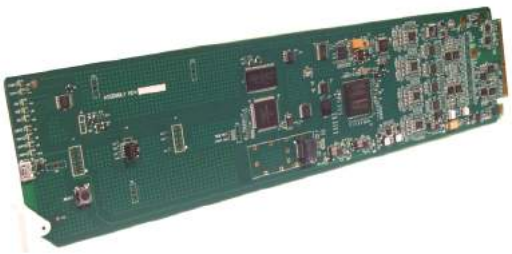
9433-EMDE-75/110-OE » 3G/HD/SD-SDI FIBER-OPTIC OE RECEIVER

with 16-Channel Unbalanced/Balanced AES Embed / De-Embed



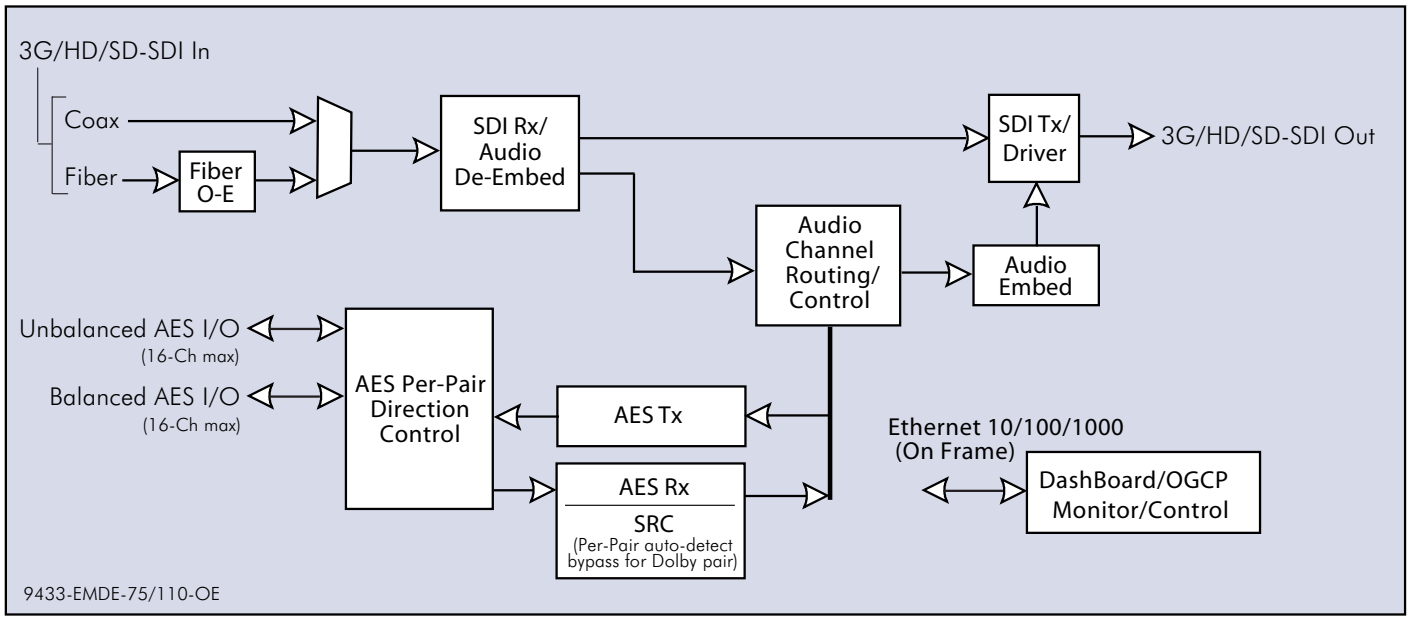
The Cobalt® **9433-EMDE-75/110-OE 3G/HD/SD-SDI Fiber-Optic OE Receiver with 16-Channel Unbalanced/Balanced AES Embed / De-Embed** offers full-flexibility AES embedding/de-embedding for unbalanced and balanced AES with the built-in versatility of both coaxial and fiber SDI inputs in a basic, economical, high-efficiency openGear® card. More than only a basic embedder/de-embedder, the 9433-EMDE-75/110-OE offers the flexibility of fiber-to-SDI OE as well as providing AES balun functions and fully flexible embedding/de-embedding.

The 9433-EMDE-75/110-OE provides full 16-channel embed / de-embed between both unbalanced and balanced AES and all four groups of embedded audio. 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. Fully error-free pathological pattern operation is fully compatible with professional fiber video interfaces. Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- OE fiber receiver with fiber and coax as inputs
- 16-channel AES support for both balanced and unbalanced. Individual per-pair embedding or de-embedding. Can be used to provide cross-balun I/O as well as 4-group embed/de-embed.
- DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.
- Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with 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.
- Low-power/high-density design – less than 18 Watts per card
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- Five year warranty



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9433-EMDE-75/110-OE » 3G/HD/SD-SDI FIBER-OPTIC OE RECEIVER

with 16-Channel Unbalanced/Balanced AES Embed / De-Embed

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

<18 Watts

SDI/Fiber Inputs/Outputs

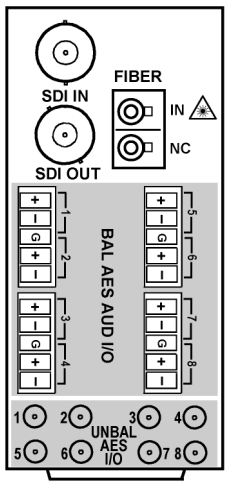
(1) 75Ω BNC inputs
(1) 75Ω BNC output
SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI
(1) Fiber input; LC connector
Receive Sensitivity: -23 dBm; 1260 to 1620 nm
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format

48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs.

AES Audio Input/Output

(8) Unbalanced AES (AES-3id; 75Ω) with per-pair port direction controls
(8) Balanced AES (AES/EBU; 110Ω) with per-pair port direction controls



RM20-9433EMDE-OE-A-DIN
RM20-9433EMDE-OE-A-HDBNC

ORDERING INFORMATION

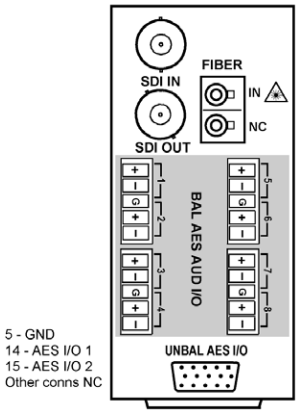
9433-EMDE-75/110-OE 3G/HD/SD-SDI Fiber-Optic OE Receiver with 16-Channel Unbalanced/Balanced AES Embed / De-Embed

RM20-9433EMDE-OE-A-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Input (LC connector), (8) Balanced AES Audio I/O, (8) Unbalanced AES I/O (coaxial; DIN 1.0/2.3)

RM20-9433EMDE-OE-A-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Input (LC connector), (8) Balanced AES Audio I/O, (8) Unbalanced AES I/O (coaxial; HD-BNC)

RM20-9433EMDE-OE-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Input, (LC connector), (8) Balanced AES Audio I/O, Unbalanced AES I/O (via HD-15 connector)

Note: Rear module(s) have been available in two manufacturing versions (with correspondingly different MPN numbers). New cards with SN: 450452R or greater use the current/latest rear module version. Earlier-version and latest-version rear modules and cards are mutually incompatible. Manufacturing Part Number (MPN) is screened on the rear module PCB. See card web page for more information.



RM20-9433EMDE-OE-B

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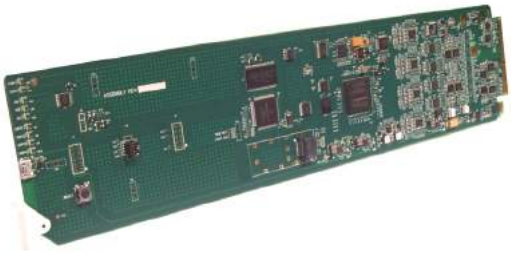
9433-EMDE-ADDA-EOOE » 3G/HD/SD-SDI FIBER-OPTIC TRANSCEIVER

with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed



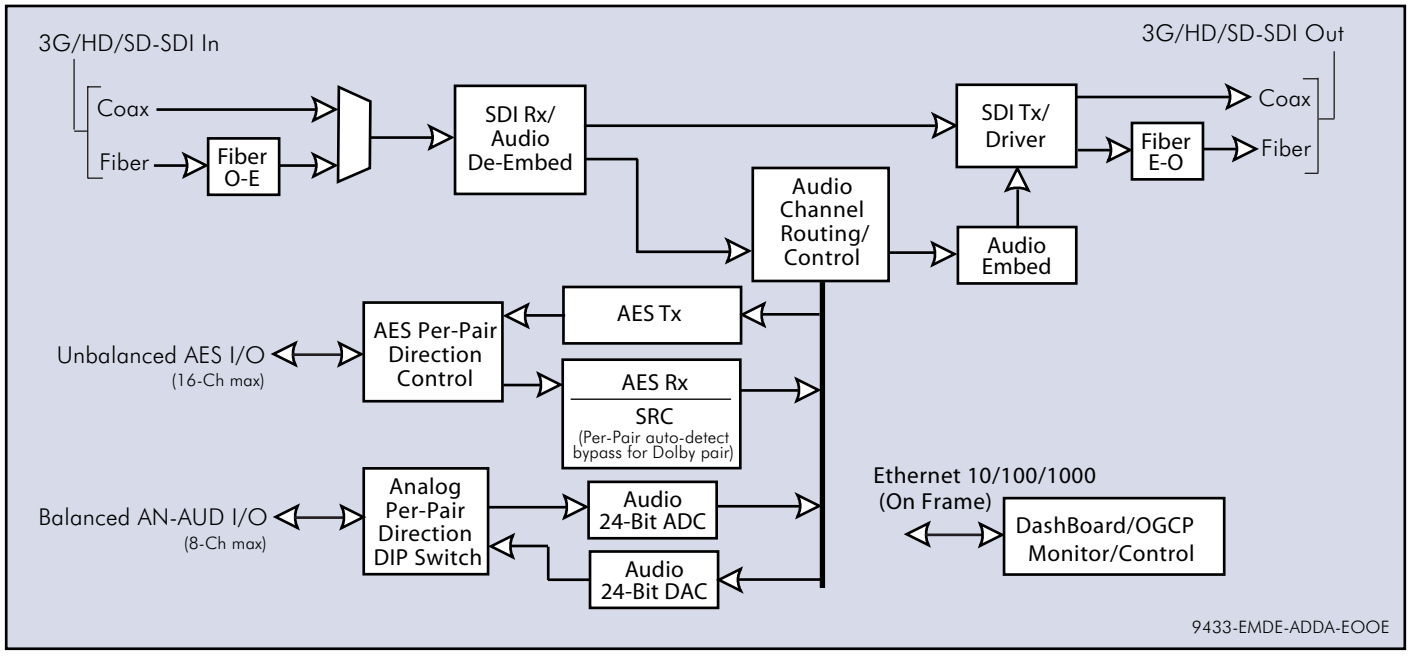
The Cobalt® **9433-EMDE-ADDA-EOOE 3G/HD/SD-SDI Fiber-Optic Transceiver** with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed offers full-flexibility AES and analog audio embedding/de-embedding with the built-in versatility of both coaxial and fiber SDI I/O in a basic, economical, high-efficiency openGear® card. More than only a basic embedder/de-embedder, the 9433-EMDE-ADDA-EOOE offers the flexibility of SDI/Fiber EO – OE transceive as well as providing fully flexible AES and analog audio embedding/de-embedding.

The 9433-EMDE-ADDA-EOOE provides full 16-channel embed / de-embed between AES, 8-channel analog audio, and all four groups of embedded audio. 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. Analog embed/de-embed conforms with professional balanced audio at 0 dBFS to pro 24 dBu levels using full 24-bit conversion. Fully error-free pathological pattern operation is fully compatible with professional fiber video interfaces. The 9433-EMDE-ADDA-EOOE is available with numerous CWDM wavelengths that allow the card to be used with CWDM systems. Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Versatile EO - OE fiber transceiver with fiber and coax as both inputs and outputs
- 16-channel AES support and 8-channel analog audio support in one card. Individual per-pair embedding or de-embedding. Provides four-group SDI embed/de-embed and cross-conversions between analog and AES discrete audio.
- DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.
- Low-power/high-density design – less than 18 Watts per card
- Available with CWDM wavelength divisions allowing use in CWDM systems
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- Five year warranty



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9433-EMDE-ADDA-E00E » 3G/HD/SD-SDI FIBER-OPTIC TRANSCEIVER

with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

<18 Watts

SDI/Fiber Inputs/Outputs

(1) 75Ω BNC inputs
(1) 75Ω BNC output
SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI
(1) Fiber input; LC connector
(1) Fiber output; LC connector
Fiber Wavelength, Tx: 1310 nm
Receive Sensitivity: -23 dBm; 1260 to 1620 nm
Tx Power: -5.0 dBm (min)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format

48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs. Analog audio I/O conforms to +24 dBu <=> 0 dBFS.

Analog Audio Specifications

Input Impedance: >10 kΩ
Reference Level: -20 dBFS
Nominal Level: +4 dBu
Input Clip Level: +24 dBu (0 dBFS)
Freq. Response: ±0.2 dB (20 Hz to 20 kHz)
SNR: 115 dB (A weighted)
THD+N: -96 dB (20 Hz to 10 kHz)
Crosstalk: -106 dB (20 Hz to 20 kHz)
Output Impedance: < 50 Ω
Max. Output Level: +24 dBu (0 dBFS)

Discrete Audio Input/Output

(8) Unbalanced AES (AES-3id; 75Ω) with per-pair port direction controls
(8) Balanced Analog Audio with per-pair port direction controls

ORDERING INFORMATION

9433-EMDE-ADDA-E00E 3G/HD/SD-SDI Fiber-Optic Transceiver with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed

9433-EMDE-ADDA-E00E-CWDM-WX 3G/HD/SD-SDI Fiber-Optic Transceiver with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed with Fiber Optic CWDM I/O

Use fiber wavelength codes below for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1370, 1390, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610.

In "WX" places in part number, substitute code for wavelengths in each place as listed below:

-27: 1270nm **-29:** 1290nm **-31:** 1310nm **-33:** 1330nm **-35:** 1350nm **-37:** 1370nm
-39: 1390nm **-41:** 1410nm **-43:** 1430nm **-45:** 1450nm **-47:** 1470nm **-49:** 1490nm
-51: 1510nm **-53:** 1530nm **-55:** 1550nm **-57:** 1570nm **-59:** 1590nm **-61:** 1610nm

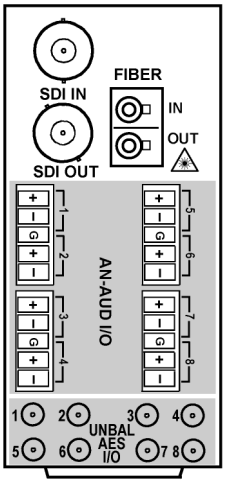
(Example: 9433-EMDE-ADDA-E00E-27 has 1270 nm FIBER OUT wavelength)

RM20-9433EMDE-E00E-C-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Input, (1) Fiber Output (LC connectors), (8) Balanced Analog Audio I/O, (8) Unbalanced AES I/O (coaxial; DIN 1.0/2.3)

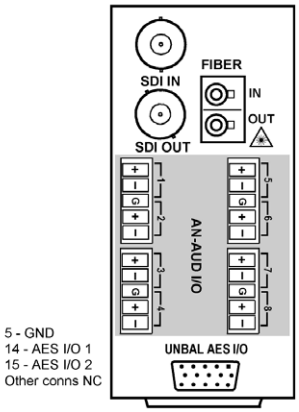
RM20-9433EMDE-E00E-C-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Input, (1) Fiber Output (LC connectors), (8) Balanced Analog Audio I/O, (8) Unbalanced AES I/O (coaxial; HD-BNC)

RM20-9433EMDE-E00E- D 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Input, (1) Fiber Output (LC connectors), (8) Balanced Analog Audio I/O, Unbalanced AES I/O (via HD-15 connector)

Note: Rear module(s) have been available in two manufacturing versions (with correspondingly different MPN numbers). New cards with SN: 450452R or greater use the current/latest rear module version. Earlier-version and latest-version rear modules and cards are mutually incompatible. Manufacturing Part Number (MPN) is screened on the rear module PCB. See card web page for more information.



RM20-9433EMDE-E00E-C-DIN
RM20-9433EMDE-E00E-C-HDBNC



RM20-9433EMDE-E00E-D

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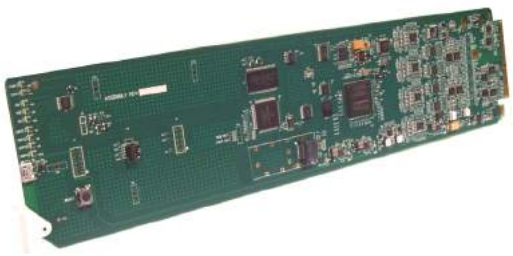
9433-EMDE-ADDA-EO » 3G/HD/SD-SDI FIBER-OPTIC EO TRANSMITTER

with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed



The Cobalt® **9433-EMDE-ADDA-EO 3G/HD/SD-SDI Fiber-Optic EO Transmitter** with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed offers full-flexibility AES and analog audio embedding/de-embedding with SDI-to-fiber EO in a basic, economical, high-efficiency openGear® card. More than only a basic embedder/de-embedder, the 9433-EMDE-ADDA-EO offers the flexibility of SDI-to-fiber EO as well as providing fully flexible AES and analog audio embedding/de-embedding.

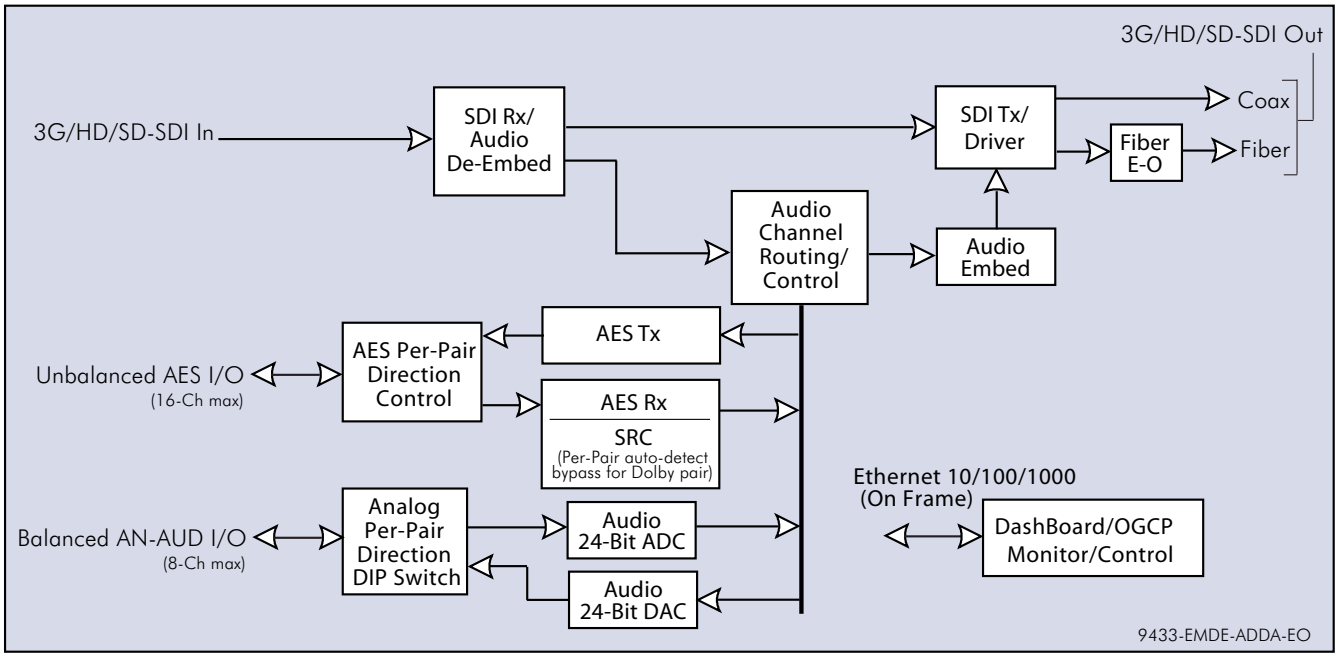
The 9433-EMDE-ADDA-EO provides full 16-channel embed / de-embed between AES, 8-channel analog audio, and all four groups of embedded audio. Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair. Analog embed/de-embed conforms with professional balanced audio at 0 dBFS to pro 24 dBu levels using full 24-bit conversion. Fully error-free pathological pattern operation is fully compatible with professional fiber video interfaces. The 9433-EMDE-ADDA-EO is available with numerous CWDM wavelengths that allow the card to be used with CWDM systems.

Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- EO fiber transmitter with fiber and coax as outputs
- 16-channel AES support and 8-channel analog audio support in one card. Individual per-pair embedding or de-embedding. Provides four-group SDI embed/de-embed and cross-conversions between analog and AES discrete audio.
- DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.
- Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with 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.
- Low-power/high-density design – less than 18 Watts per card
- Available with CWDM wavelength divisions allowing use in CWDM systems
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- Five year warranty



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9433-EMDE-ADDA-EO » 3G/HD/SD-SDI FIBER-OPTIC EO TRANSMITTER

with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

<18 Watts

SDI/Fiber Inputs/Outputs

(1) 75Ω BNC input
(1) 75Ω BNC output
SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI
(1) Fiber output; LC connector
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format

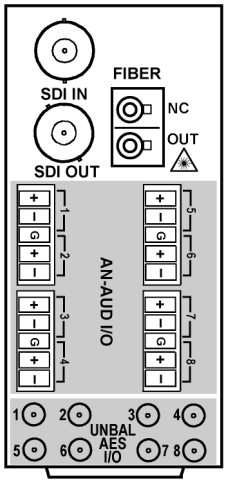
48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs. Analog audio I/O conforms to +24 dBu <=> 0 dBFS.

Analog Audio Specifications

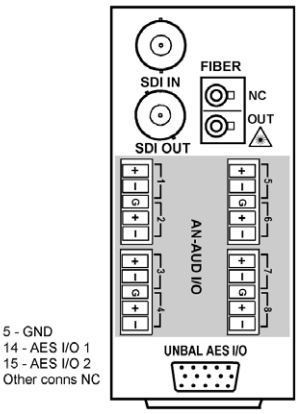
Input Impedance: >10 kΩ
Reference Level: -20 dBFS
Nominal Level: +4 dBu
Input Clip Level: +24 dBu (0 dBFS)
Freq. Response: ±0.2 dB (20 Hz to 20 kHz)
SNR: 115 dB (A weighted)
THD+N: -96 dB (20 Hz to 10 kHz)
Crosstalk: -106 dB (20 Hz to 20 kHz)
Output Impedance: < 50 Ω
Max. Output Level: +24 dBu (0 dBFS)

Discrete Audio Input/Output

(8) Unbalanced AES (AES-3id; 75Ω) with per-pair port direction controls
(8) Balanced Analog Audio with per-pair port direction controls



RM20-9433EMDE-EO-C-DIN
RM20-9433EMDE-EO-C-HDBNC



RM20-9433EMDE-EO-D

ORDERING INFORMATION

9433-EMDE-ADDA-EO 3G/HD/SD-SDI Fiber-Optic Transceiver with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed

9433-EMDE-ADDA-EO-CWDM-WX 3G/HD/SD-SDI Fiber-Optic Transceiver with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed with Fiber Optic CWDM I/O

Use fiber wavelength codes below for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1370, 1390, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610.

In "WX" places in part number, substitute code for wavelengths in each place as listed below:

-27: 1270nm **-29:** 1290nm **-31:** 1310nm
-33: 1330nm **-35:** 1350nm **-37:** 1370nm
-39: 1390nm **-41:** 1410nm **-43:** 1430nm
-45: 1450nm **-47:** 1470nm **-49:** 1490nm
-51: 1510nm **-53:** 1530nm **-55:** 1550nm
-57: 1570nm **-59:** 1590nm **-61:** 1610nm

(Example: 9433-EMDE-ADDA-EO-CWDM-27 has 1270 nm FIBER OUT wavelength)

RM20-9433EMDE-EO-C-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Output (LC connectors), (8) Balanced Analog Audio I/O, (8) Unbalanced AES I/O (coaxial; DIN 1.0/2.3)

RM20-9433EMDE-EO-C-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Output (LC connectors), (8) Balanced Analog Audio I/O, (8) Unbalanced AES I/O (coaxial; HD-BNC)

RM20-9433EMDE-EO-D 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Output (LC connectors), (8) Balanced Analog Audio I/O, Unbalanced AES I/O (via HD-15 connector)

Note: Rear module(s) have been available in two manufacturing versions (with correspondingly different MPN numbers). New cards with SN: 450452R or greater use the current/latest rear module version. Earlier-version and latest-version rear modules and cards are mutually incompatible. Manufacturing Part Number (MPN) is screened on the rear module PCB. See card web page for more information.

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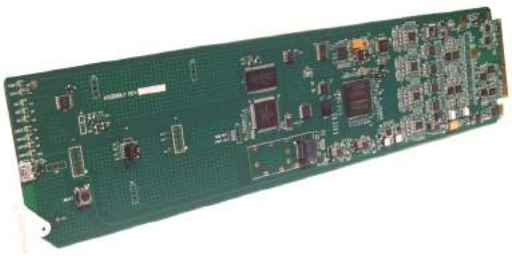
9433-EMDE-ADDA-OE » 3G/HD/SD-SDI FIBER-OPTIC OE RECEIVER

with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed



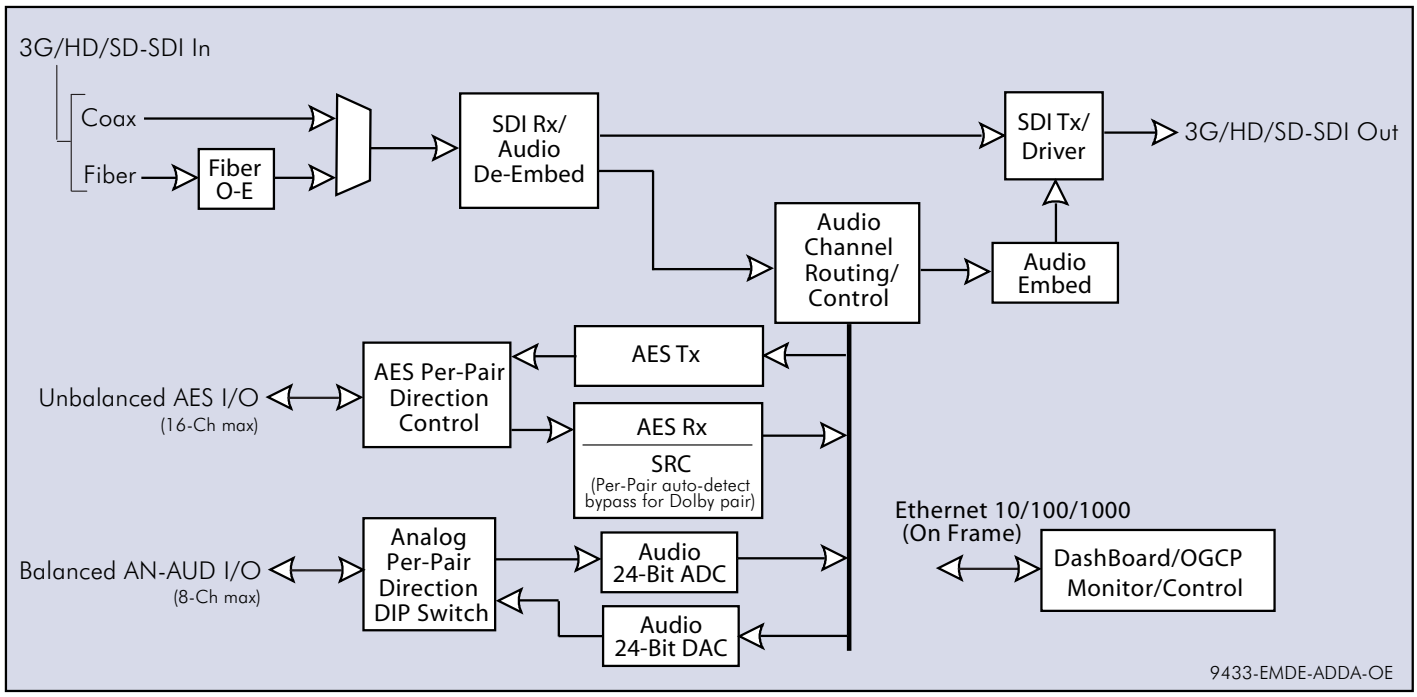
The Cobalt® **9433-EMDE-ADDA-OE 3G/HD/SD-SDI Fiber-Optic OE Receiver** with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed offers full-flexibility AES and analog audio embedding/de-embedding with the built-in versatility of both coaxial and fiber SDI inputs in a basic, economical, high-efficiency openGear® card. More than only a basic embedder/de-embedder, the 9433-EMDE-ADDA-OE offers the flexibility of fiber to-SDI OE receive as well as providing fully flexible AES and analog audio embedding/de-embedding.

The 9433-EMDE-ADDA-OE provides full 16-channel embed / de-embed between AES, 8-channel analog audio, and all four groups of embedded audio. 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. Analog embed/de-embed conforms with professional balanced audio at 0 dBFS to pro 24 dBu levels using full 24-bit conversion. Fully error-free pathological pattern operation is fully compatible with professional fiber video interfaces. Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- OE fiber receiver with fiber and coax as inputs
- 16-channel AES support and 8-channel analog audio support in one card. Individual per-pair embedding or de-embedding. Provides four-group SDI embed/de-embed and cross-conversions between analog and AES discrete audio.
- DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.
- Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with 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.
- Low-power/high-density design – less than 18 Watts per card
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Hot-swappable
- Five year warranty



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9433-EMDE-ADDA-OE » 3G/HD/SD-SDI FIBER-OPTIC OE RECEIVER

with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

<18 Watts

SDI/Fiber Inputs/Outputs

(1) 75Ω BNC inputs
(1) 75Ω BNC output
SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI
(1) Fiber input; LC connector
Receive Sensitivity: -23 dBm; 1260 to 1620 nm
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format

48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs. Analog audio I/O conforms to +24 dBu <=> 0 dBFS.

Analog Audio Specifications

Input Impedance: >10 kΩ
Reference Level: -20 dBFS
Nominal Level: +4 dBu
Input Clip Level: +24 dBu (0 dBFS)
Freq. Response: ±0.2 dB (20 Hz to 20 kHz)
SNR: 115 dB (A weighted)
THD+N: -96 dB (20 Hz to 10 kHz)
Crosstalk: -106 dB (20 Hz to 20 kHz)
Output Impedance: < 50 Ω
Max. Output Level: +24 dBu (0 dBFS)

Discrete Audio Input/Output

(8) Unbalanced AES (AES-3id; 75Ω) with per-pair port direction controls
(8) Balanced Analog Audio with per-pair port direction controls

ORDERING INFORMATION

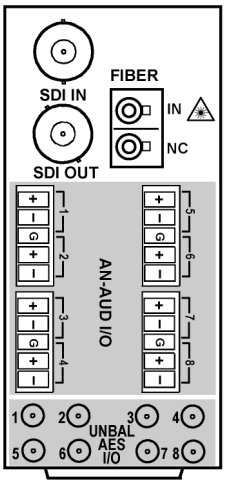
9433-EMDE-ADDA-OE 3G/HD/SD-SDI Fiber-Optic OE Receiver with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed

RM20-9433EMDE-OE-C-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Input (LC connector), (8) Balanced Analog Audio I/O, (8) Unbalanced AES I/O (coaxial; DIN 1.0/2.3)

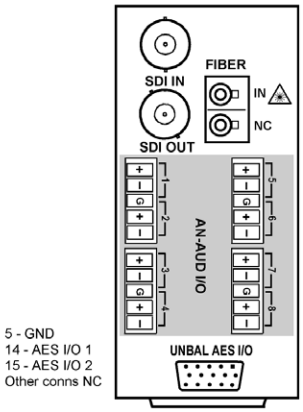
RM20-9433EMDE-OE-C-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Input (LC connector), (8) Balanced Analog Audio I/O, (8) Unbalanced AES I/O (coaxial; HD-BNC)

RM20-9433EMDE-OE- D 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Input, (8) Balanced Analog Audio I/O, Unbalanced AES I/O (via HD-15 connector)

Note: Rear module(s) have been available in two manufacturing versions (with correspondingly different MPN numbers). New cards with SN: 450452R or greater use the current/latest rear module version. Earlier-version and latest-version rear modules and cards are mutually incompatible. Manufacturing Part Number (MPN) is screened on the rear module PCB. See card web page for more information.



RM20-9433EMDE-OE-C-DIN
RM20-9433EMDE-OE-C-HDBNC



RM20-9433EMDE-OE-D

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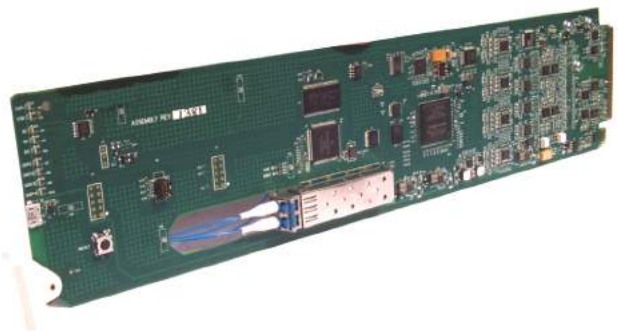
9410DA-EO » 3G/HD/SD-SDI / ASI / MADI FIBER EO TRANSPORT/DISTRIBUTION AMPLIFIER

with Full-Flexibility Crosspoint



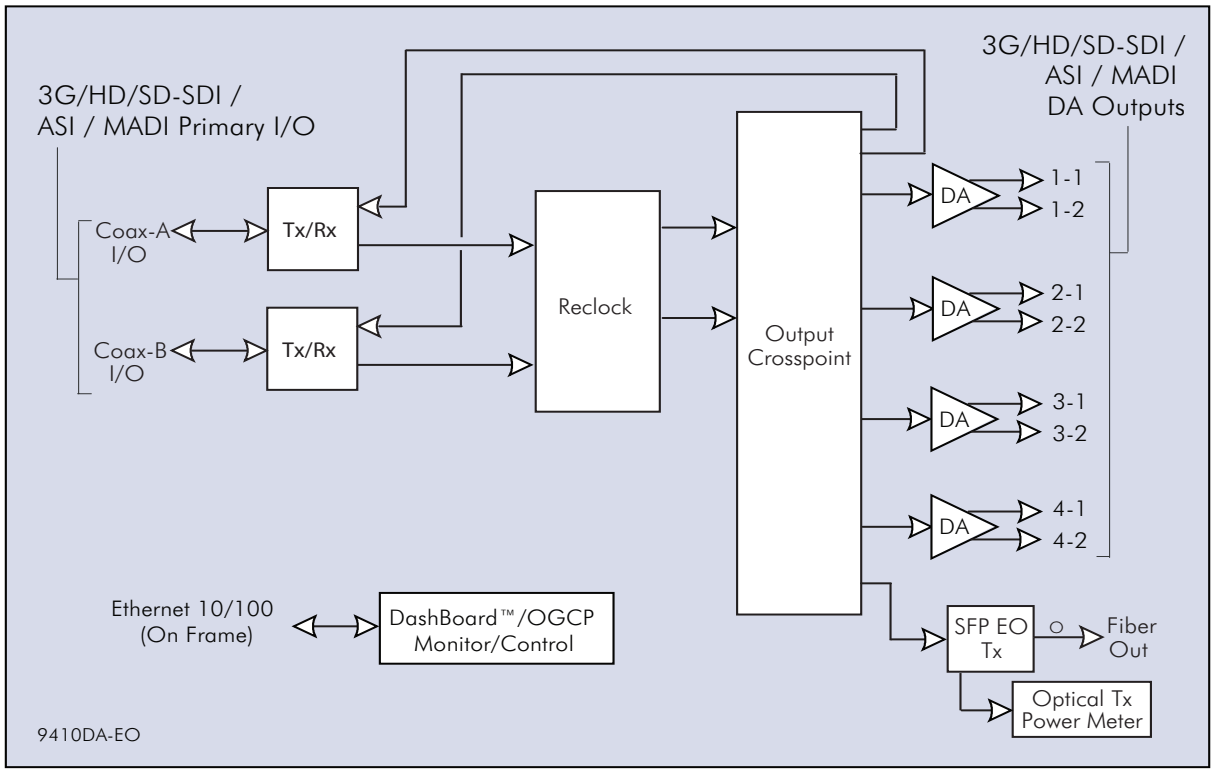
The Cobalt® **9410DA-EO 3G/HD/SD-SDI / ASI / MADI Fiber EO Transport/Distribution Amplifier with Full-Flexibility Crosspoint** provides a card-based solution for high-density conversion from coax to fiber, as well as coaxial distribution. The 9410DA-EO is multi-rate, and supports SDI and ASI/DVB on all inputs and outputs with non-inverting outputs.

An SFP-based EO converter provides state-of-the-art fiber performance, power consumption, and compactness. A crosspoint (which is user-configurable via DashBoard™ GUI remote control) allows the card to apply any of the card inputs to various coax DA outputs as well as a fiber output. Up to 9 flexibly-sourced coaxial DA outputs are available per each card.

Using a high-density low-power design along with a high-density split rear module, up to 20 cards can be installed in a frame, providing 20 channels of EO conversion as well as up to 180 coaxial DA outputs. Excellent receive performance allows coaxial receive EQ for up to 110m 3G, 180m HD, and 360m SD cable length (1694A). Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Full support of 3G/HD/SD-SDI and ASI/DVB
- Fully-flexible coaxial crosspoint/DA provides up to 9 copies per card. Crosspoint can select from any card input.
- Excellent coax receive performance – EQ allows 1694A cable lengths up to 110m (3G) / 180m (HD) / 360m (SD)
- SFP-based EO converter provides state-of-the-art fiber performance, power consumption, and compactness.
- Automatic reclocking for all SDI data rates (auto-bypass for non-SDI data rates)
- Optical Tx power status field allows optical transmit confidence assessment
- All outputs are non-inverting – ASI can be outputted on any output
- DashBoard™ status and full remote control
- Five year warranty



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9410DA-EO » 3G/HD/SD-SDI / ASI / MADI FIBER EO TRANSPORT/DISTRIBUTION AMPLIFIER

with Full-Flexibility Crosspoint

SPECIFICATIONS

Note: Inputs/outputs are a function of rear I/O module used. Specifications subject to change.

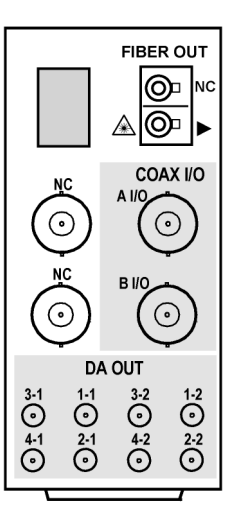
Power
< 10 Watts

3G/HD/SD-SDI / ASI / MADI Inputs/Outputs (Coaxial Primary)
(2) 75Ω BNC input/outputs max (A-I/O and B-I/O)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

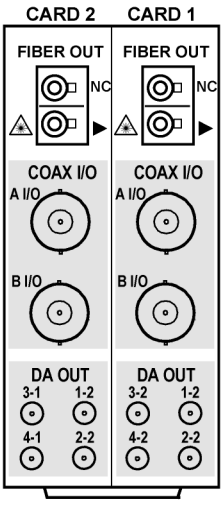
Coaxial Receive Performance (Cable Length; Belden 1694A)
SDI Receive Cable Length (1694A): 110m/180m/360m (3G/HD/SD)

Fiber Transmit Output
(1) Fiber output; LC connector
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)

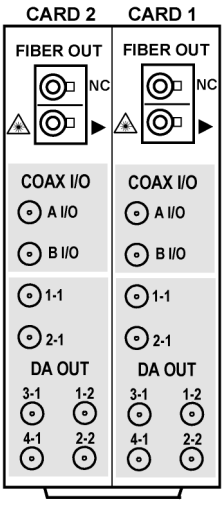
3G/HD/SD-SDI / ASI / MADI Outputs (DA Outputs)
Four, 1x2 75Ω BNC outputs (8 total, max). Each DA pair can receive any primary or opposite-channel DA signal.
Signal Level: 800 mV nominal
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI



RM20-9410DA-EO-D-DIN|HDBNC



RM20-9410DA-EO-D/S-DIN|HDBNC



RM20-9410DA-EO-E/S-DIN|HDBNC

ORDERING INFORMATION

9410DA-EO 3G/HD/SD-SDI / ASI / MADI Fiber EO Transport/Distribution Amplifier with Full-Flexibility Crosspoint

9410DA-EO-CWDM-WX 3G/HD/SD-SDI / ASI / MADI Fiber EO Transport/Distribution Amplifier with Full-Flexibility Crosspoint (CWDM)

Use fiber wavelength codes below for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1370, 1390, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610.

In "WX" places in part number, substitute code for wavelengths in each place as listed below:
-27: 1270nm -29: 1290nm -31: 1310nm
-33: 1330nm -35: 1350nm -37: 1370nm
-39: 1390nm -41: 1410nm -43: 1430nm
-45: 1450nm -47: 1470nm -49: 1490nm
-51: 1510nm -53: 1530nm -55: 1550nm
-57: 1570nm -59: 1590nm -61: 1610nmm
(Example: 9410DA-EO-CWDM-27 has 1270 nm FIBER OUT CWDM wavelength)

RM20-9410-EO-D-DIN 20-Slot Frame Rear I/O Module (Standard-Width). (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) Fiber out (LC connector), (8) DA coaxial outputs (DA output connectors are DIN1.0/2.3) (**Note:** Mates to card in **odd** frame slot.) (**Note:** This rear module supersedes -B model (which is discontinued).

RM20-9410-EO-D-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width). (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) Fiber out (LC connector), (8) DA coaxial outputs (DA output connectors are HD-BNC) (**Note:** Mates to card in **odd** frame slot.) (**Note:** This rear module supersedes -B model (which is discontinued).

RM20-9410DA-EO-D/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (1) Fiber out (LC connector), (4) DA coaxial outputs (connections are per card; DA output connectors are DIN1.0/2.3) (**Note:** This rear module supersedes -B/S model (which is discontinued).

RM20-9410DA-EO-D/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (1) Fiber out (LC connector), (4) DA coaxial outputs (connections are per card; DA output connectors are HD-BNC) (**Note:** This rear module supersedes -B/S model (which is discontinued).

RM20-9410DA-EO-E/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (1) Fiber out (LC connector), (6) DA coaxial outputs (connections are per card; coaxial connectors are DIN1.0/2.3) (**Note:** This rear module supersedes -C/S model (which is discontinued).

RM20-9410DA-EO-E/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (1) Fiber out (LC connector), (6) DA coaxial outputs (connections are per card; coaxial connectors are HD-BNC) (**Note:** This rear module supersedes -C/S model (which is discontinued).

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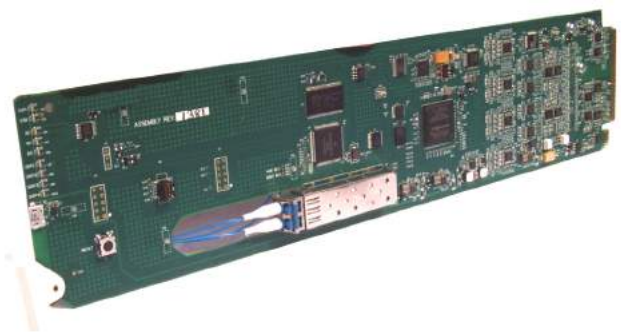
9410DA-OE » 3G/HD/SD-SDI / ASI / MADI FIBER OE TRANSPORT/DISTRIBUTION AMPLIFIER

with Full-Flexibility Crosspoint



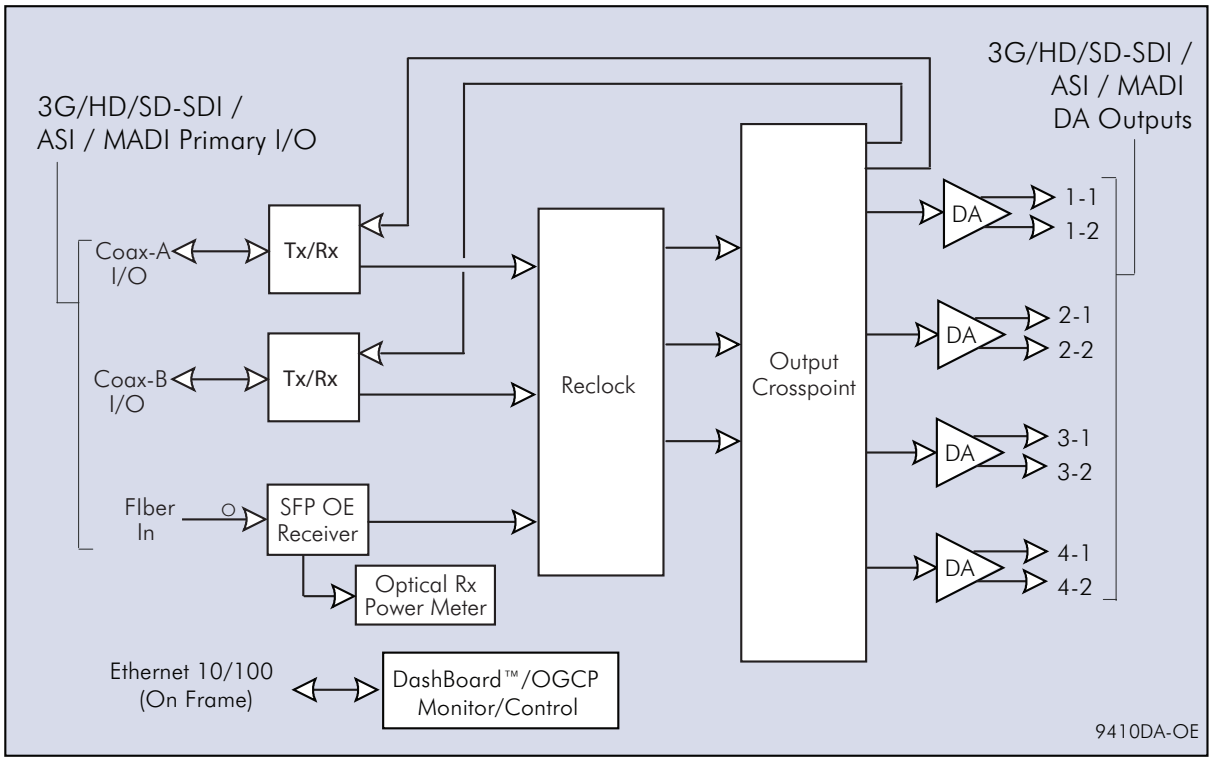
The Cobalt® **9410DA-OE 3G/HD/SD-SDI / ASI / MADI Fiber OE Transport/Distribution Amplifier with Full-Flexibility Crosspoint** provides a card-based solution for high-density conversion from fiber to coax, as well as coaxial distribution. The 9410DA-OE is multi-rate, and supports SDI and ASI/DVB on all inputs and outputs with non-inverting outputs.

An SFP-based OE converter provides state-of-the-art fiber performance, power consumption, and compactness. A crosspoint (which is user-configurable via DashBoard™ GUI remote control) allows the card to apply any of the card inputs to various coax DA outputs. Up to 10 flexibly-sourced coaxial DA outputs are available per each card.

Using a high-density low-power design along with a high-density split rear module, up to 20 cards to be installed in a frame, providing 20 channels of OE fiber conversion as well as up to 200 coaxial DA outputs. Excellent receive performance allows receive EQ for up to 110m 3G, 180m HD, and 360m SD cable length (1694A). Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Full support of 3G/HD/SD-SDI and ASI/DVB
- Fully-flexible coaxial crosspoint/DA provides up to 10 copies per card. Crosspoint can select from any card input.
- Excellent coax receive performance – EQ allows 1694A cable lengths up to 110m (3G) / 180m (HD) / 360m (SD)
- Input user selectable as fiber or coaxial
- SFP-based OE converter provides state-of-the-art fiber performance, power consumption, and compactness.
- Automatic reclocking for all SDI data rates (auto-bypass for non-SDI data rates)
- Optical Rx receive power status field allows optical receive assessment
- All outputs are non-inverting – ASI can be outputted on any output
- DashBoard™ status and full remote control
- Five year warranty



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9410DA-OE » 3G/HD/SD-SDI / ASI / MADI FIBER OE TRANSPORT/DISTRIBUTION AMPLIFIER

with Full-Flexibility Crosspoint

SPECIFICATIONS

Note: Inputs/outputs are a function of rear I/O module used. Specifications subject to change.

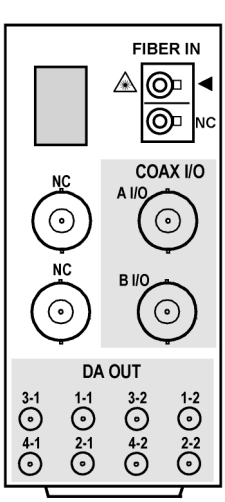
Power
< 10 Watts

3G/HD/SD-SDI / ASI / MADI Inputs/Outputs (Coaxial Primary)
(2) 75Ω BNC input/outputs max (A-I/O and B-I/O)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

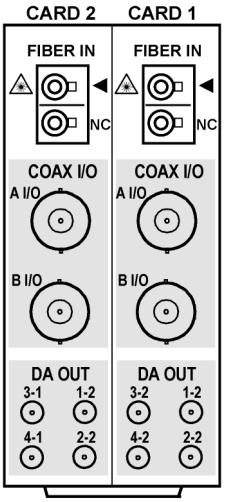
Coaxial Receive Performance (Cable Length; Belden 1694A)
SDI Receive Cable Length (1694A): 110m/180m/360m (3G/HD/SD)

Fiber Receive Input
(1) Fiber input; LC connector
Receive Sensitivity: -23 dBm; 1260 to 1620 nm (with internal power meter status display)

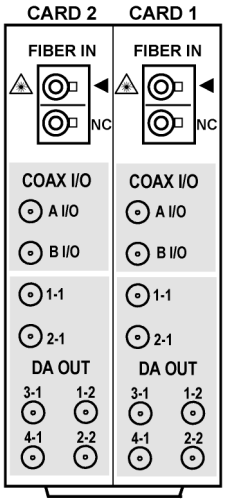
3G/HD/SD-SDI / ASI / MADI Outputs (DA Outputs)
Four, 1x2 75Ω BNC outputs (8 total, max). Each DA pair can receive any primary or opposite-channel DA signal.
Signal Level: 800 mV nominal
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI



RM20-9410DA-OE-D-DIN/HDBNC



RM20-9410DA-OE-D/S-DIN/HDBNC



RM20-9410DA-OE-E/S-DIN/HDBNC

ORDERING INFORMATION

9410DA-OE 3G/HD/SD-SDI / ASI / MADI Fiber OE Transport/Distribution Amplifier with Full-Flexibility Crosspoint

RM20-9410-OE-D-DIN 20-Slot Frame Rear I/O Module (Standard-Width). (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) Fiber in (LC connector), (8) DA coaxial outputs (DA output connectors are DIN1.0/2.3) (**Note:** Mates to card in **odd** frame slot.) (**Note:** This rear module supersedes -B model (which is discontinued).

RM20-9410-OE-D-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width). (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) Fiber in (LC connector), (8) DA coaxial outputs (DA output connectors are HD-BNC) (**Note:** Mates to card in **odd** frame slot.) (**Note:** This rear module supersedes -B model (which is discontinued).

RM20-9410DA-OE-D/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (1) Fiber in (LC connector), (4) DA coaxial outputs (connections are per card; DA output connectors are DIN1.0/2.3) (**Note:** This rear module supersedes -B/S model (which is discontinued).

RM20-9410DA-OE-D/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (1) Fiber in (LC connector), (4) DA coaxial outputs (connections are per card; DA output connectors are HD-BNC) (**Note:** This rear module supersedes -B/S model (which is discontinued).

RM20-9410DA-OE-E/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (1) Fiber in (LC connector), (6) DA coaxial outputs (connections are per card; coaxial connectors are DIN1.0/2.3) (**Note:** This rear module supersedes -C/S model (which is discontinued).

RM20-9410DA-OE-E/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (1) Fiber in (LC connector), (6) DA coaxial outputs (connections are per card; coaxial connectors are HD-BNC) (**Note:** This rear module supersedes -C/S model (which is discontinued).

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9410DA-2EO » 3G/HD/SD-SDI / ASI / MADI FIBER DUAL EO TRANSPORT/ DISTRIBUTION AMPLIFIER with Full-Flexibility Crosspoints

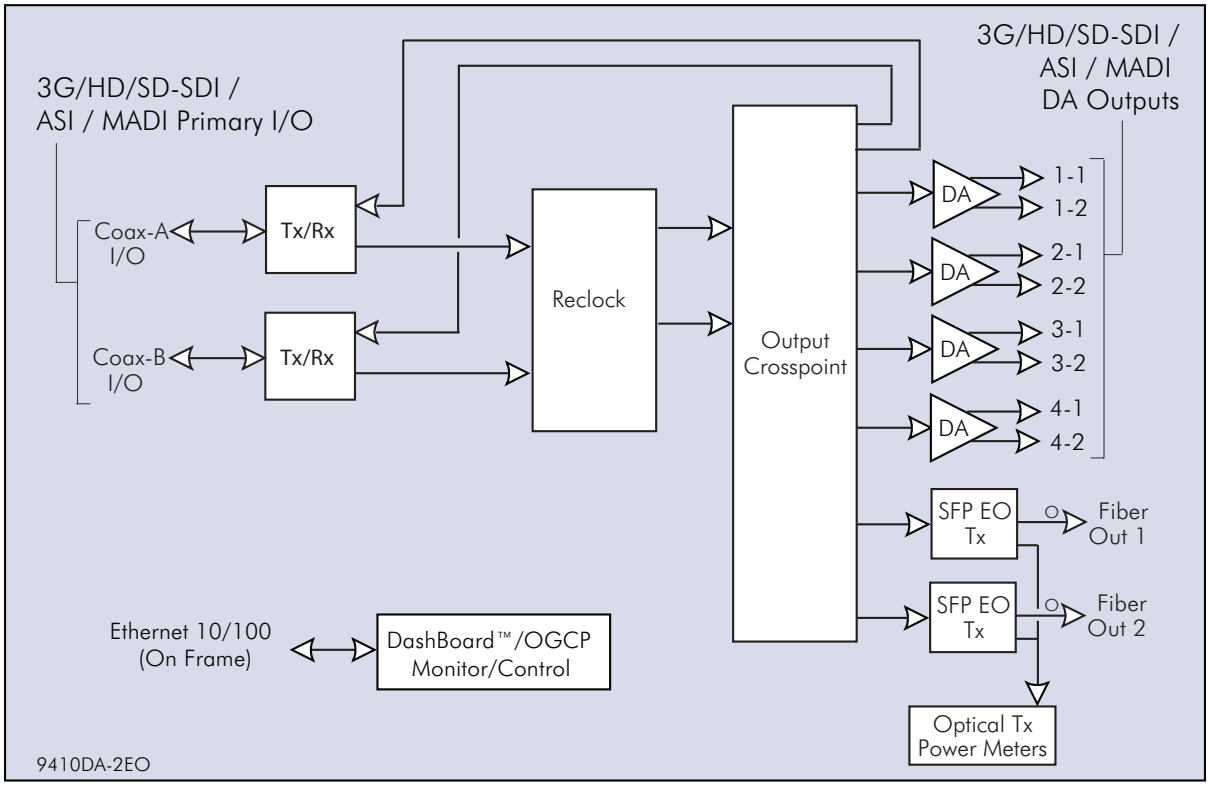
The Cobalt® **9410DA-2EO 3G/HD/SD-SDI / ASI / MADI Fiber Dual EO Transport/Distribution Amplifier with Full-Flexibility Crosspoint** provides a card-based solution for high-density conversion from coax to fiber (with two independent EO channels), as well as coaxial distribution. The 9410DA-2EO is multi-rate, and supports SDI and ASI/DVB on all inputs and outputs with non-inverting outputs.

SFP-based EO converters provide state-of-the-art fiber performance, power consumption, and compactness. A crosspoint (which is user-configurable via DashBoard™ GUI remote control) allows the card to apply any of the card inputs to various coax DA outputs as well as two independent fiber output channels. Up to 9 flexibly-sourced coaxial DA outputs are available per each card.

Using a high-density low-power design along with a high-density split rear module, up to 20 cards can be installed in a frame, providing 40 channels of EO conversion as well as up to 180 coaxial DA outputs. Excellent receive performance allows coaxial receive EQ for up to 110m 3G, 180m HD, and 360m SD cable length (1694A). Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Dual independent coax-to-fiber channels. Fiber outputs can be sourced from any card coaxial input.
- Full support of 3G/HD/SD-SDI and ASI/DVB
- Fully-flexible coaxial crosspoint/DA provides up to 9 copies per card. Crosspoint can select from any card input.
- Excellent coax receive performance – EQ allows 1694A cable lengths up to 110m (3G) / 180m (HD) / 360m (SD)
- SFP-based EO converters provide state-of-the-art fiber performance, power consumption, and compactness.
- Automatic reclocking for all SDI data rates (auto-bypass for non-SDI data rates)
- Optical Tx power status fields allow optical transmit confidence assessment
- All outputs are non-inverting – ASI can be outputted on any output
- DashBoard™ status and full remote control
- Five year warranty



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9410DA-2EO » 3G/HD/SD-SDI / ASI / MADI FIBER DUAL EO TRANSPORT/ DISTRIBUTION AMPLIFIER with Full-Flexibility Crosspoints

SPECIFICATIONS

Note: Inputs/outputs are a function of rear I/O module used. Specifications subject to change.

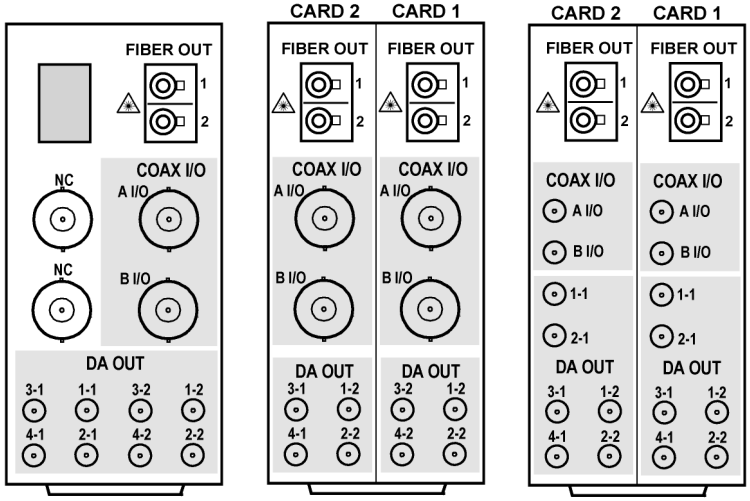
Power
< 10 Watts

3G/HD/SD-SDI / ASI / MADI Inputs/Outputs (Coaxial Primary)
(2) 75Ω BNC input/outputs max (A-I/O and B-I/O)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Coaxial Receive Performance (Cable Length; Belden 1694A)
SDI Receive Cable Length (1694A): 110m/180m/360m (3G/HD/SD)

Fiber Transmit Output
(2) Fiber outputs (independent paths from card crosspoint); LC connectors
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)

3G/HD/SD-SDI / ASI / MADI Outputs (DA Outputs)
Four, 1x2 75Ω BNC outputs (8 total, max). Each DA pair can receive any primary or opposite-channel DA signal.
Signal Level: 800 mV nominal
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI



RM20-9410DA-2EO-D-DIN/HDBNC *RM20-9410DA-2EO-D/S-DIN/HDBNC* *RM20-9410DA-2EO-E/S-DIN/HDBNC*

ORDERING INFORMATION

9410DA-2EO 3G/HD/SD-SDI / ASI / MADI Fiber Dual EO Transport/Distribution Amplifier with Full-Flexibility Crosspoint

9410DA-2EO-CWDM-WXWX 3G/HD/SD-SDI / ASI / MADI Fiber Dual EO Transport/Distribution Amplifier with Full-Flexibility Crosspoint (CWDM)

Use fiber wavelength codes below for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1370, 1390, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610.

In "WX" places in part number, substitute code for wavelengths in each place as listed below. First set of codes sets wavelength for FIBER OUT 1; 2nd set of codes sets wavelength for FIBER OUT 2:
-27: 1270nm -29: 1290nm -31: 1310nm
-33: 1330nm -35: 1350nm -37: 1370nm
-39: 1390nm -41: 1410nm -43: 1430nm
-45: 1450nm -47: 1470nm -49: 1490nm
-51: 1510nm -53: 1530nm -55: 1550nm
-57: 1570nm -59: 1590nm -61: 1610nmm
(Example: 9410DA-2EO-CWDM--2733 has 1270 nm FIBER OUT 1 and 1330 nm FIBER OUT 2 CWDM wavelengths)

RM20-9410-2EO-D-DIN 20-Slot Frame Rear I/O Module (Standard-Width). (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (2) Fiber out (LC connectors), (8) DA coaxial outputs (DA output connectors are DIN1.0/2.3) (**Note:** Mates to card in **odd** frame slot.) (**Note:** This rear module supersedes -B model (which is discontinued).

RM20-9410-2EO-D-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width). (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (2) Fiber out (LC connectors), (8) DA coaxial outputs (DA output connectors are HD-BNC) (**Note:** Mates to card in **odd** frame slot.) (**Note:** This rear module supersedes -B model (which is discontinued).

RM20-9410DA-2EO-D/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (2) Fiber out (LC connectors), (4) DA coaxial outputs (connections are per card; DA output connectors are DIN1.0/2.3) (**Note:** This rear module supersedes -B/S model (which is discontinued).

RM20-9410DA-2EO-D/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (2) Fiber out (LC connectors), (4) DA coaxial outputs (connections are per card; DA output connectors are HD-BNC) (**Note:** This rear module supersedes -B/S model (which is discontinued).

RM20-9410DA-2EO-E/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (2) Fiber out (LC connectors), (6) DA coaxial outputs (connections are per card; coaxial connectors are DIN1.0/2.3) (**Note:** This rear module supersedes -C/S model (which is discontinued).

RM20-9410DA-2EO-E/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (2) Fiber out (LC connectors), (6) DA coaxial outputs (connections are per card; coaxial connectors are HD-BNC) (**Note:** This rear module supersedes -C/S model (which is discontinued).

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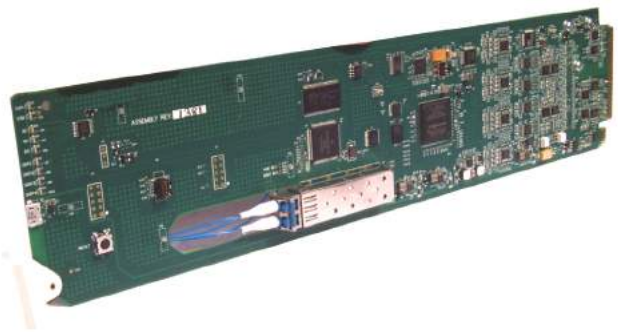
9410DA-20E » 3G/HD/SD-SDI / ASI / MADI FIBER DUAL OE TRANSPORT/ DISTRIBUTION AMPLIFIER with Full-Flexibility Crosspoints



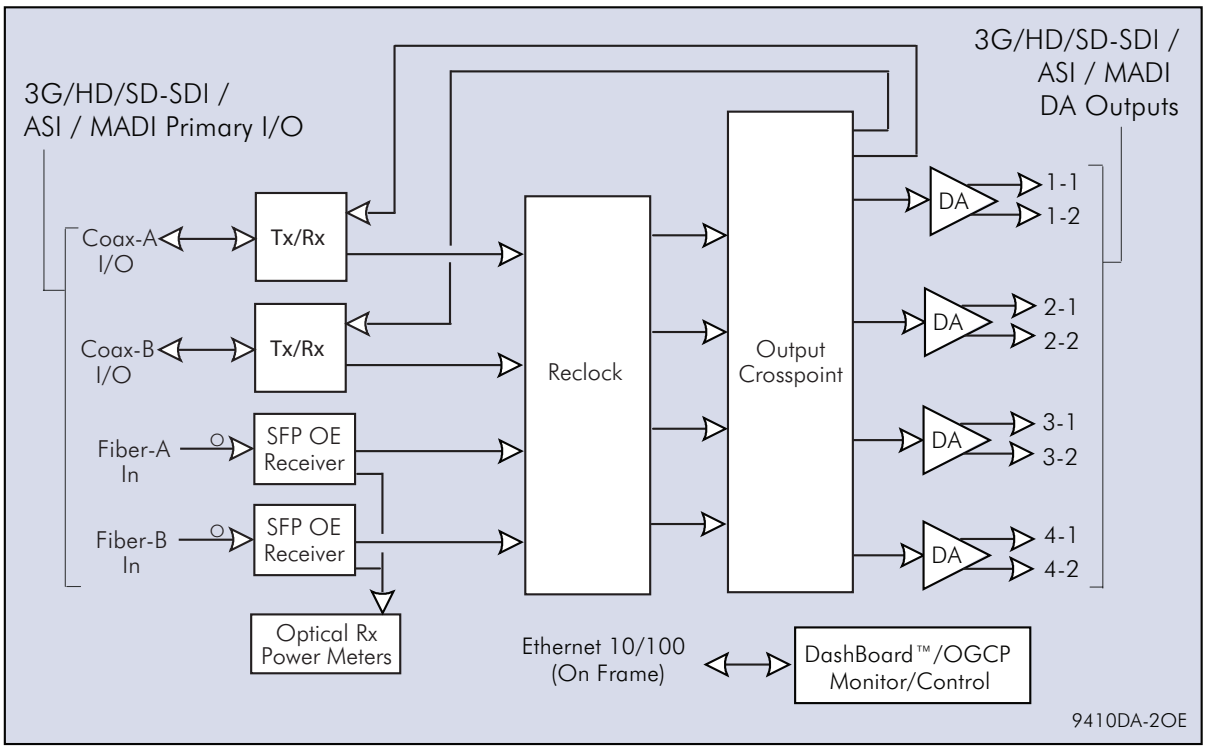
The Cobalt® **9410DA-20E 3G/HD/SD-SDI / ASI / MADI Fiber Dual OE Transport/Distribution Amplifier with Full-Flexibility Crosspoint** provides a card-based solution for high-density conversion from fiber to coax (with two independent OE channels), as well as coaxial distribution. The 9410DA-20E is multi-rate, and supports SDI and ASI/DVB on all inputs and outputs with non-inverting outputs.

SFP-based OE converters provide state-of-the-art fiber performance, power consumption, and compactness. A crosspoint (which is user-configurable via DashBoard™ GUI remote control) allows the card to apply any of the card inputs to various coax DA outputs as well as two independent fiber input channels. Up to 10 flexibly-sourced coaxial DA outputs are available per each card.

Using a high-density low-power design along with a high-density split rear module, up to 20 cards can be installed in a frame, providing 40 channels of OE fiber conversion as well as up to 200 coaxial DA outputs. Excellent receive performance allows receive EQ for up to 110m 3G, 180m HD, and 360m SD cable length (1694A). Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Dual independent fiber-to-coax input channels. Fiber inputs can serve as source for any card coaxial outputs.
- Full support of 3G/HD/SD-SDI and ASI/DVB
- Fully-flexible coaxial crosspoint/DA provides up to 10 copies per card. Crosspoint can select from any card input.
- Excellent coax receive performance – EQ allows 1694A cable lengths up to 110m (3G) / 180m (HD) / 360m (SD)
- Input user selectable as fiber or coaxial
- SFP-based OE converters provide state-of-the-art fiber performance, power consumption, and compactness.
- Automatic reclocking for all SDI data rates (auto-bypass for non-SDI data rates)
- Optical Rx receive power status fields allow optical receive assessment
- All outputs are non-inverting – ASI can be outputted on any output
- DashBoard™ status and full remote control
- Five year warranty



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9410DA-20E » 3G/HD/SD-SDI / ASI / MADI FIBER DUAL OE TRANSPORT/ DISTRIBUTION AMPLIFIER with Full-Flexibility Crosspoints

SPECIFICATIONS

Note: Inputs/outputs are a function of rear I/O module used. Specifications subject to change.

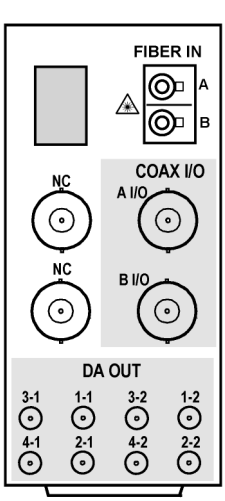
Power
< 10 Watts

3G/HD/SD-SDI / ASI / MADI Inputs/Outputs (Coaxial Primary)
(2) 75Ω BNC input/outputs max (A-I/O and B-I/O)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

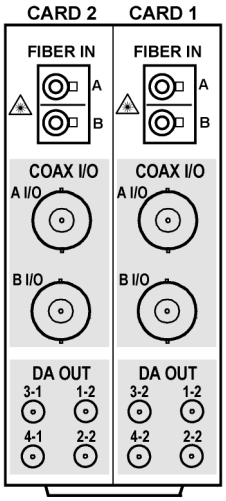
Coaxial Receive Performance (Cable Length; Belden 1694A)
SDI Receive Cable Length (1694A): 110m/180m/360m (3G/HD/SD)

Fiber Receive Input
(2) Fiber input; LC connectors
Receive Sensitivity: -23 dBm; 1260 to 1620 nm (with internal power meter status display)

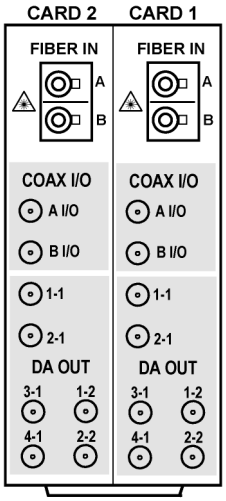
3G/HD/SD-SDI / ASI / MADI Outputs (DA Outputs)
Four, 1x2 75Ω BNC outputs (8 total, max). Each DA pair can receive any primary or opposite-channel DA signal.
Signal Level: 800 mV nominal
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI



RM20-9410DA-2OE-D-DIN/HDBNC



RM20-9410DA-2OE-D/S-DIN/HDBNC



RM20-9410DA-2OE-E/S-DIN/HDBNC

ORDERING INFORMATION

9410DA-20E 3G/HD/SD-SDI / ASI / MADI Fiber Dual OE Transport/Distribution Amplifier with Full-Flexibility Crosspoint

RM20-9410-20E-D-DIN 20-Slot Frame Rear I/O Module (Standard-Width). (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (2) Fiber in (LC connectors), (8) DA coaxial outputs (DA output connectors are DIN1.0/2.3) (**Note:** Mates to card in **odd** frame slot.) (**Note:** This rear module supersedes -B model (which is discontinued).

RM20-9410-20E-D-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width). (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (2) Fiber in (LC connectors), (8) DA coaxial outputs (DA output connectors are HD-BNC) (**Note:** Mates to card in **odd** frame slot.) (**Note:** This rear module supersedes -B model (which is discontinued).

RM20-9410DA-20E-D/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (2) Fiber in (LC connectors), (4) DA coaxial outputs (connections are per card; DA output connectors are DIN1.0/2.3) (**Note:** This rear module supersedes -B/S model (which is discontinued).

RM20-9410DA-20E-D/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (2) Fiber in (LC connectors), (4) DA coaxial outputs (connections are per card; DA output connectors are HD-BNC) (**Note:** This rear module supersedes -B/S model (which is discontinued).

RM20-9410DA-20E-E/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (2) Fiber in (LC connectors), (6) DA coaxial outputs (connections are per card; coaxial connectors are DIN1.0/2.3) (**Note:** This rear module supersedes -C/S model (which is discontinued).

RM20-9410DA-20E-E/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (2) Fiber in (LC connectors), (6) DA coaxial outputs (connections are per card; coaxial connectors are HD-BNC) (**Note:** This rear module supersedes -C/S model (which is discontinued).

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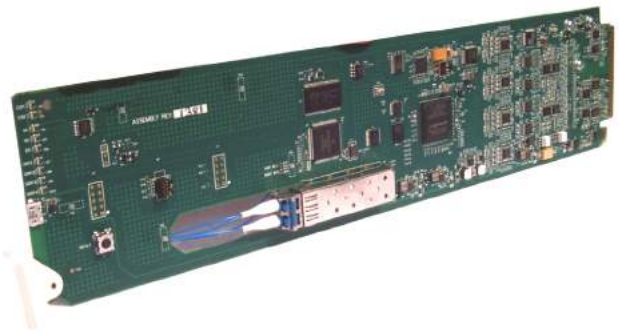
9410DA-EOOE » 3G/HD/SD-SDI / ASI / MADI FIBER EOOE TRANSPORT/ DISTRIBUTION AMPLIFIER with Full-Flexibility Crosspoint



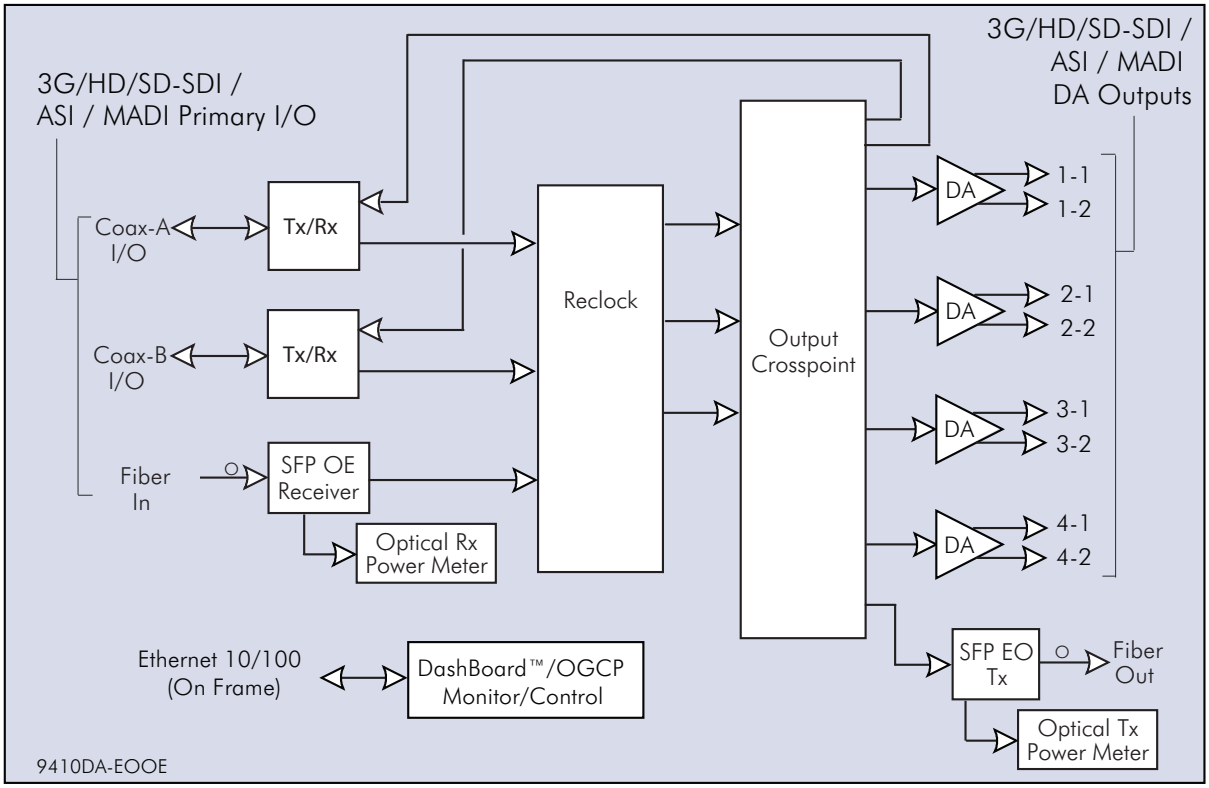
The Cobalt® **9410DA-EOOE 3G/HD/SD-SDI / ASI / MADI Fiber EOOE Transport/Distribution Amplifier with Full-Flexibility Crosspoint** provides a card-based solution for high-density conversion between coax and fiber, as well as coaxial distribution. The 9410DA-EOOE is multi-rate, and supports SDI and ASI/DVB on all inputs and outputs with non-inverting outputs.

SFP-based EO and OE converters provide state-of-the-art fiber performance, power consumption, and compactness. A crosspoint (which is user-configurable via DashBoard™ GUI remote control) allows the card to apply any of the card inputs to various coax DA outputs as well as a fiber output. Up to 10 flexibly-sourced coaxial DA outputs are available per each card. Because the card's fiber input and output can be linked to any channel handled by the card, independent EO and OE paths are available with true independent EOOE transceiver operation.

Using a high-density low-power design along with a high-density split rear module, up to 20 cards can be installed in a frame, providing 20 channels of EO and OE conversion as well as up to 200 coaxial DA outputs. Excellent receive performance allows coaxial receive EQ for up to 110m 3G, 180m HD, and 360m SD cable length (1694A). Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

- Full support of 3G/HD/SD-SDI and ASI/DVB
- Fully-flexible coaxial crosspoint/DA provides up to 10 copies per card. Crosspoint can select from any card input.
- Independent fiber receiver and transmitters can be linked to any card channel, offering full EOOE transceiver operation
- Excellent coax receive performance – EQ allows 1694A cable lengths up to 110m (3G) / 180m (HD) / 360m (SD)
- SFP-based EO/OE converters provide state-of-the-art fiber performance, power consumption, and compactness
- Automatic reclocking for all SDI data rates (auto-bypass for non-SDI data rates)
- All outputs are non-inverting – ASI can be outputted on any output
- Optical Tx and Rx power status fields allow optical Tx/Rx confidence assessment
- DashBoard™ status and full remote control
- Five year warranty



openGear

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9410DA-EOOE » 3G/HD/SD-SDI / ASI / MADI FIBER EOOE TRANSPORT/ DISTRIBUTION AMPLIFIER with Full-Flexibility Crosspoint

SPECIFICATIONS

Note: Inputs/outputs are a function of rear I/O module used.
Specifications subject to change.

Power
< 10 Watts

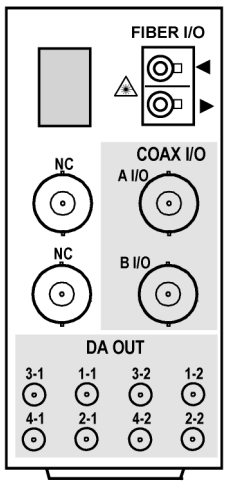
3G/HD/SD-SDI / ASI / MADI Inputs/Outputs (Coaxial Primary)
(2) 75Ω BNC input/outputs max (A-I/O and B-I/O)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Coaxial Receive Performance (Cable Length; Belden 1694A)
SDI Receive Cable Length (1694A): 110m/180m/360m (3G/HD/SD)

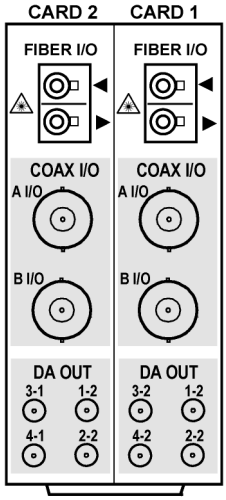
Fiber Transmit Output
(1) Fiber output; LC connector
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)

Fiber Receive Input
(1) Fiber input; LC connector
Receive Sensitivity: -23 dBm; 1260 to 1620 nm (with internal power meter status display)

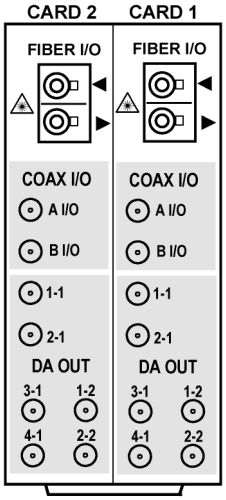
3G/HD/SD-SDI / ASI / MADI Outputs (DA Outputs)
Four, 1x2 75Ω BNC outputs (8 total, max). Each DA pair can receive any primary or opposite-channel DA signal.
Signal Level: 800 mV nominal
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI



RM20-9410DA-EOOE-D-DIN|HDBNC



RM20-9410DA-EOOE-D|S-DIN|HDBNC



RM20-9410DA-EOOE-E|S-DIN|HDBNC

ORDERING INFORMATION

9410DA-EOOE 3G/HD/SD-SDI / ASI / MADI Fiber EOOE Transport/Distribution Amplifier with Full-Flexibility Crosspoint

RM20-9410-EOOE-D-DIN 20-Slot Frame Rear I/O Module (Standard-Width). (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) Fiber in (LC connector), (1) Fiber out (LC connector), (8) DA coaxial outputs (DA output connectors are DIN1.0/2.3) (**Note:** Mates to card in **odd** frame slot.) (**Note:** This rear module supersedes -B model (which is discontinued).

RM20-9410-EOOE-D-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width). (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) Fiber in (LC connector), (1) Fiber out (LC connector), (8) DA coaxial outputs (DA output connectors are HD-BNC) (**Note:** Mates to card in **odd** frame slot.) (**Note:** This rear module supersedes -B model (which is discontinued).

RM20-9410DA-EOOE-D/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (1) Fiber in (LC connector), (1) Fiber out (LC connector), (4) DA coaxial outputs (connections are per card; DA output connectors are DIN1.0/2.3) (**Note:** This rear module supersedes -B/S model (which is discontinued).

RM20-9410DA-EOOE-D/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (1) Fiber in (LC connector), (1) Fiber out (LC connector), (4) DA coaxial outputs (connections are per card; DA output connectors are HD-BNC) (**Note:** This rear module supersedes -B/S model (which is discontinued).

RM20-9410DA-EOOE-E/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (1) Fiber in (LC connector), (1) Fiber out (LC connector), (6) DA coaxial outputs (connections are per card; coaxial connectors are DIN1.0/2.3) (**Note:** This rear module supersedes -C/S model (which is discontinued).

RM20-9410DA-EOOE-E/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (1) Fiber in (LC connector), (1) Fiber out (LC connector), (6) DA coaxial outputs (connections are per card; coaxial connectors are HD-BNC) (**Note:** This rear module supersedes -C/S model (which is discontinued).

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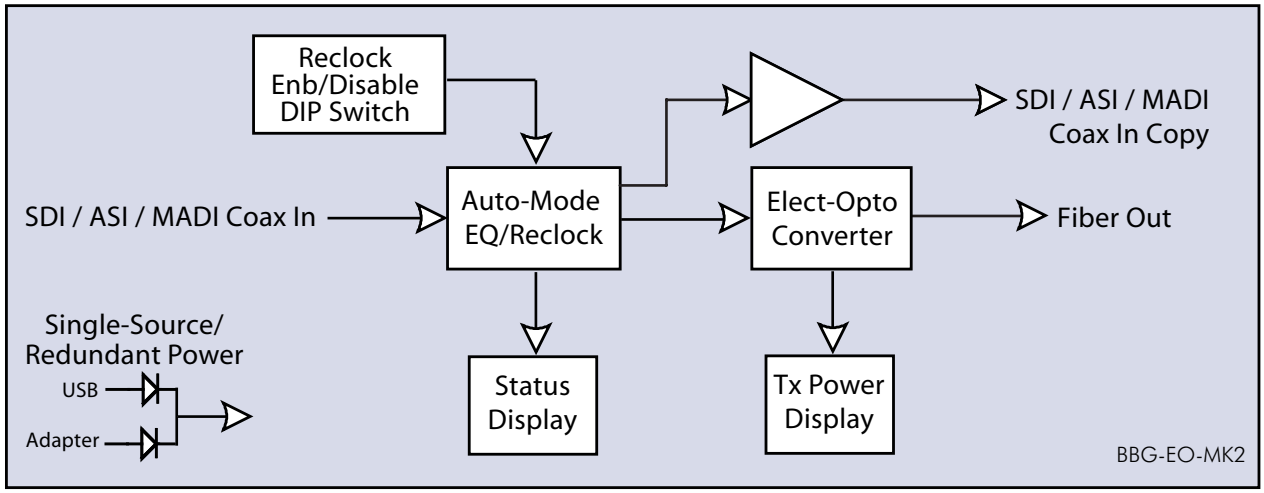
BBG-EO-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC TRANSPORT TRANSMITTER

The Blue Box **BBG-EO-MK2 Coax-to-Fiber** throw-down converter unit is a new part of the BlueBox™ group of compact, rugged, and portable converter boxes. Super-easy to use, Blue Box BBG-EO-MK2 supports SMPTE 424M, 292M, and 259M as well as ASI and MADI audio. Auto-mode EQ/reclocking automatically sets to the signal type being received while allowing unrecognized formats to be safely passed without reclocking (auto-reclock can also be manually disabled). Its wide operating range (from 5Mbps to 3Gbps) flexibly supports most professional digital serial communications. Fully error-free pathological pattern operation is fully compatible with other professional fiber video interfaces. An SFP-based EO converter provides state-of-the-art fiber performance, power consumption, and compactness.

BBG-EO-MK2 receives its operating power via a USB connection or using an AC adapter connection. These power sources can be simultaneously used to provide redundant power sourcing.

FEATURES

- Full support of 5Mbps thru 3Gbps transport conversions, with seamless auto-mode EQ/reclocking. No switches to set for different payloads.
- Compatible with SMPTE 424M, 292M, 259M, 310M, M2S, DVB-ASI, and MADI audio
- Input lock status indicator. Optical Tx power meter field allows optical Tx confidence assessment.
- Error-free pathological support. Full compatibility with other BlueBox™ Coax/Fiber units and Cobalt 9400-series openGear® frame-installed fiber cards.
- Compact size and low weight design easily affixes directly to camera or host device chassis. Optional BBG-MB mounting bracket provides rigid, secure mounting to mounting surfaces.
- SFP-based EO converter provides state-of-the-art fiber performance, power consumption, and compactness
- Available with ST, LC, or FC fiber termination
- Auxiliary reclocked coax BNC input copy output
- Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.
- Rugged construction backed with a five-year warranty



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BBG-EO-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC TRANSPORT TRANSMITTER

SPECIFICATIONS

Power
5-16 VDC, 2.4 W
DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Standards/Data Rates Supported
SMPTE 424M, 292M, 259M, 344M, 305M, DVB-ASI
5Mbps to 3Gbps pathological pattern operation
(does not support AES-3id audio or other standards using data rates < 5Mbps)

Inputs
(1) 75Ω BNC. Reclocking automatically engaged for recognized signal standards; bypassed for unrecognized standards.
Return Loss: >18 dBm up to 270 MHz

Outputs
(1) Fiber output. FC, ST, or LC connectors per ordered configuration (see Ordering Info)
Wavelength: 1310 nm
Power: -5.0 dBm (min)
(1) 75Ω BNC input copy. Reclocking automatically engaged for recognized signal standards; bypassed for unrecognized standards.
Return Loss: >18 dBm up to 270 MHz

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
32°F to 122°F
(0°C to 50°C)

Note: Specifications subject to change.

ORDERING INFORMATION

BBG-EO-MK2-FC 3G/HD/SD-SDI / ASI /MADI Fiber Optic Transport Transmitter (Type FC fiber connector)
BBG-EO-MK2-ST 3G/HD/SD-SDI / ASI / MADI Fiber Optic Transport Transmitter (Type ST fiber connector)
BBG-EO-MK2-LC 3G/HD/SD-SDI / ASI / MADI Fiber Optic Transport Transmitter (Type LC fiber connector)

BBG-MB Mounting Bracket

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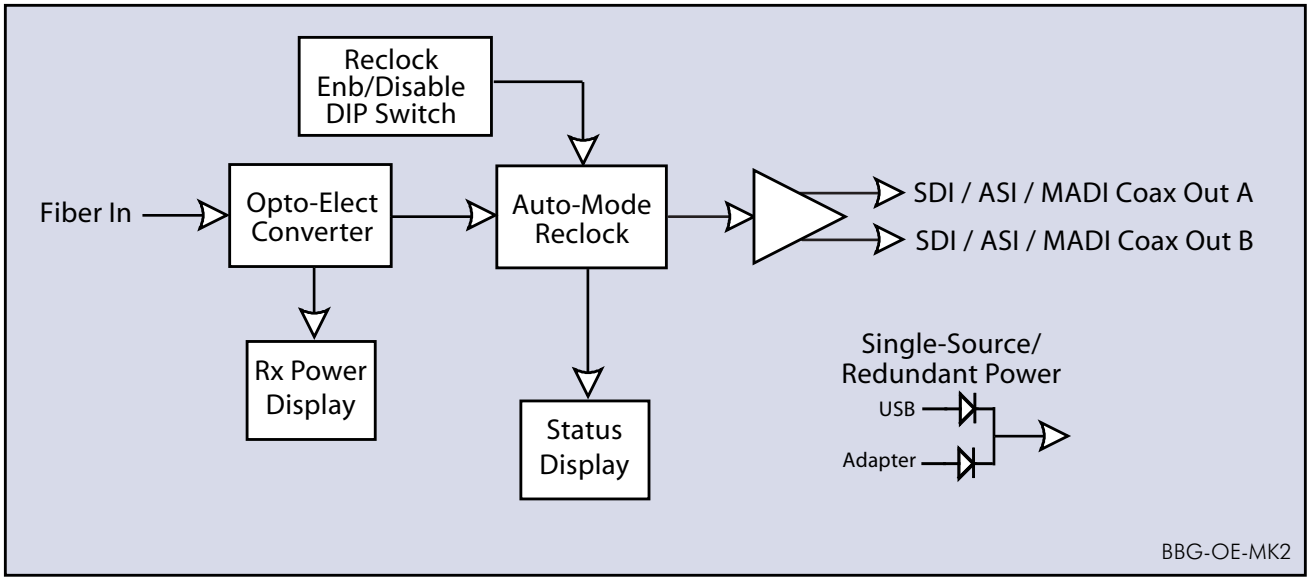
BBG-OE-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC TRANSPORT RECEIVER

The Blue Box™ **BBG-OE-MK2 Fiber-To-Coax** throw-down converter unit is a part of the Blue Box Group™ of compact, rugged, and portable converter boxes. Super-easy to use, BBG-OE-MK2 supports SMPTE 424M, 292M, and 259M as well as ASI and MADI audio. Auto-mode EQ/reclocking automatically sets to the signal type being received while allowing unrecognized formats to be safely passed without reclocking (auto-reclock can also be manually disabled). Its wide operating range (from 5Mbps to 3Gbps) flexibly supports most professional digital serial communications. Fully error-free pathological pattern operation is fully compatible with other professional fiber video interfaces. An SFP-based OE converter provides state-of-the-art fiber performance, power consumption, and compactness.

BBG-OE-MK2 receives its operating power via a USB connection or using an AC adapter connection. These power sources can be simultaneously used to provide redundant power sourcing.

FEATURES

- Full support of 5Mbps thru 3Gbps transport conversions, with seamless auto-mode EQ/reclocking. No switches to set for different payloads.
- Compatible with SMPTE 424M, 292M, 259M, 310M, M2S, DVB-ASI, and MADI audio
- Input lock status indicator. Optical Rx power meter field allows optical Rx confidence assessment.
- Error-free pathological support. Full compatibility with other BlueBox™ Coax/Fiber units and Cobalt 9400-series openGear® frame-installed fiber cards.
- Compact size and low weight design easily affixes directly to camera or host device chassis. Optional BBG-MB mounting bracket provides rigid, secure mounting to mounting surfaces.
- SFP-based OE converter provides state-of-the-art fiber performance, power consumption, and compactness
- Available with ST, LC, or FC fiber termination
- Dual buffered/reclocked coax BNC outputs
- Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.
- Rugged construction backed with a five-year warranty



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BBG-OE-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC TRANSPORT RECEIVER

SPECIFICATIONS

Power
5-16 VDC, 2.4 W
DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Standards/Data Rates Supported
SMPTE 424M, 292M, 259M, 344M, 305M, DVB-ASI
5Mbps to 3Gbps pathological pattern operation
(does not support AES-3id audio or other standards using data rates < 5Mbps)

Input
(1) Fiber input. FC, ST, or LC connectors per ordered configuration (see Ordering Info)
Wavelength: 1260 to 1620 nm
Sensitivity/Input Usable Range: -18 dBm min; -1dBm max

Outputs
(2) 75Ω BNC. Reclocking automatically engaged for recognized signal standards; bypassed for unrecognized standards.
Return Loss: >18 dBm up to 270 MHz

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
32°F to 122°F
(0°C to 50°C)

Note: Specifications subject to change.

ORDERING INFORMATION

BBG-OE-MK2-FC 3G/HD/SD-SDI / ASI / MADI Fiber Optic Transport Receiver (Type FC fiber connector)
BBG-OE-MK2-ST 3G/HD/SD-SDI / ASI / MADI Fiber Optic Transport Receiver (Type ST fiber connector)
BBG-OE-MK2-LC 3G/HD/SD-SDI / ASI / MADI Fiber Optic Transport Receiver (Type LC fiber connector)

BBG-MB Mounting Bracket

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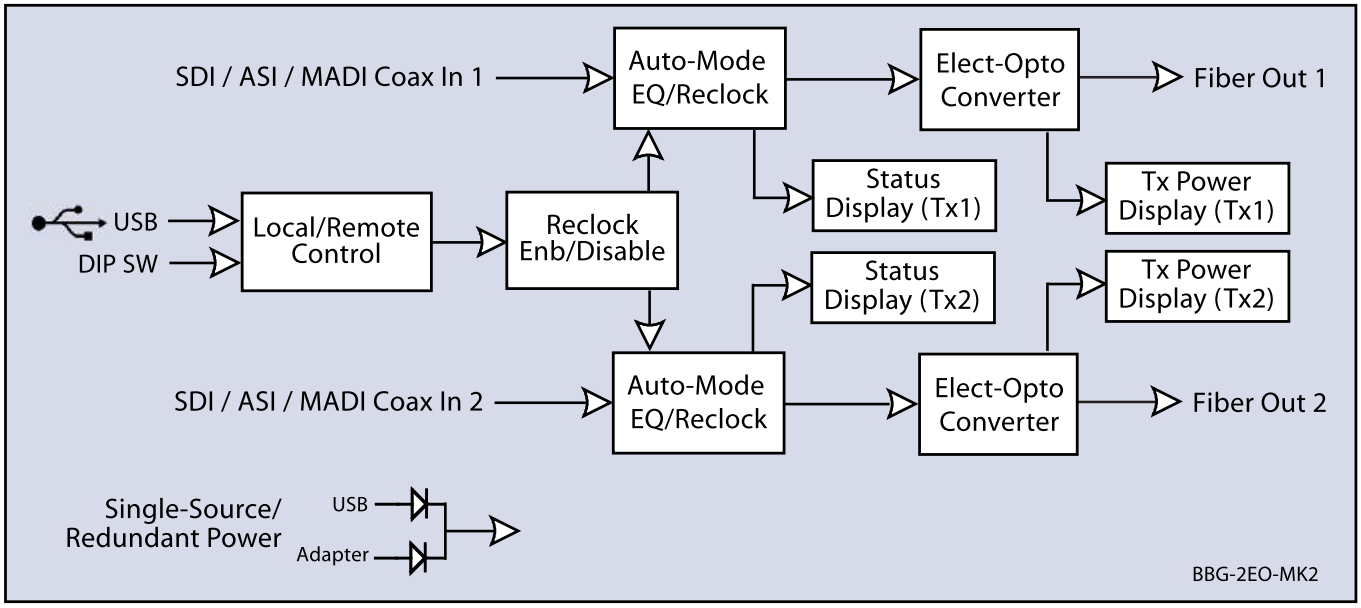
BBG-2EO-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC DUAL TRANSPORT TRANSMITTER

The **BBG-2EO-MK2 Dual Coax-To-Fiber** throw-down converter unit is a new part of the Blue Box group of compact, rugged, and portable converter boxes. Super-easy to use, Blue Box Dual Coax-To-Fiber supports SMPTE 424M, 292M, and 259M as well as ASI and MADI audio on two independent coax-to-fiber paths. Auto-mode EQ/reclocking automatically sets to the signal type being received while allowing unrecognized formats to be safely passed without reclocking (auto-reclock can also be manually disabled for either path as desired). Its wide operating range (from 5Mbps to 3Gbps) flexibly supports most professional digital serial communications. Fully error-free pathological pattern operation is fully compatible with other professional fiber video interfaces. SFP-based EO converters provide state-of-the-art fiber performance, power consumption, and compactness.

BBG-2EO-MK2 receives its operating power via a USB connection or using an AC adapter connection. These power sources can be simultaneously used to provide redundant power sourcing.

FEATURES

- Dual independent fiber-to-coax paths – all in one easy to use throw-down box
- Full support of 5Mbps thru 3Gbps transport conversions, with seamless auto-mode EQ/reclocking. No switches to set for different payloads.
- Dual-channel input lock status indicators. Optical Tx power meter fields allow optical Tx confidence assessment.
- Error-free pathological support. Full compatibility with other BlueBox™ Coax/Fiber units and Cobalt 9400-series openGear® frame-installed fiber cards.
- Available with ST, LC, or FC fiber termination
- Compatible with SMPTE 424M, 292M, 259M, 310M, M2S, DVB-ASI, and MADI audio
- Compact size and low weight design easily affixes directly to camera or host device chassis. Optional BBG-MB mounting bracket provides rigid, secure mounting to mounting surfaces.
- USB remote control/status in addition to device indicator and switches
- SFP-based EO converters provide state-of-the-art fiber performance, power consumption, and compactness
- Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.
- Rugged construction backed with a five-year warranty



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BBG-2EO-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC DUAL TRANSPORT TRANSMITTER

SPECIFICATIONS

Power
5-16 VDC, 2.4 W
DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Standards/Data Rates Supported
SMPTE 424M, 292M, 259M, 344M, 305M, DVB-ASI
5Mbps to 3Gbps pathological pattern operation
(does not support AES-3id audio or other standards using data rates < 5Mbps)

Inputs
(2) 75Ω BNCs. Reclocking automatically engaged for recognized signal standards; bypassed for unrecognized standards.
Return Loss: >18 dBm up to 270 MHz

Outputs
(2) Fiber outputs. FC, ST, or LC connectors per ordered configuration (see Ordering Info)
Wavelength: 1310 nm
Power: -5.0 dBm (min)

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
32°F to 122°F
(0°C to 50°C)

Note: Specifications subject to change.

ORDERING INFORMATION

BBG-2EO-MK2-FC 3G/HD/SD-SDI / ASI / MADI Fiber Optic Dual Transport Transmitter (Type FC fiber connectors)
BBG-2EO-MK2-ST 3G/HD/SD-SDI / ASI / MADI Fiber Optic Dual Transport Transmitter (Type ST fiber connectors)
BBG-2EO-MK2-LC 3G/HD/SD-SDI / ASI / MADI Fiber Optic Dual Transport Transmitter (Type LC fiber connectors)

BBG-MB Mounting Bracket

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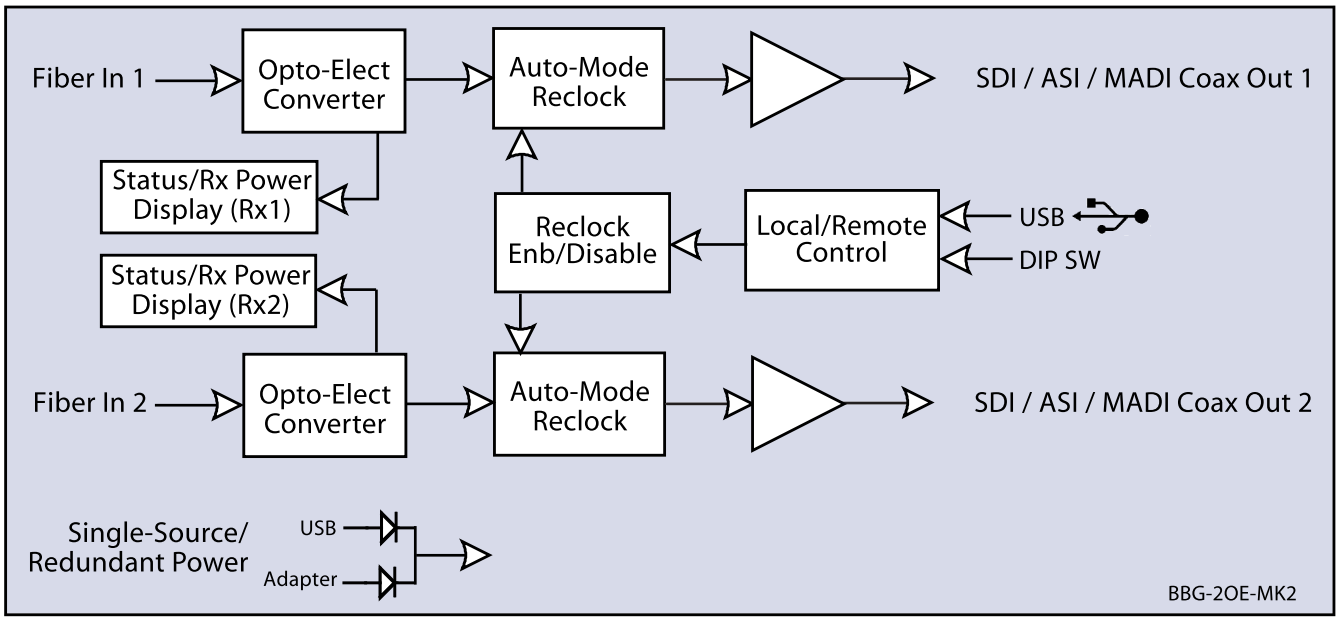
BBG-2OE-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC DUAL TRANSPORT RECEIVER

The Blue Box **BBG-2OE-MK2 Dual Fiber-To-Coax** throw-down converter unit is a new part of the Blue Box Group™ of compact, rugged, and portable converter boxes. Super-easy to use, Blue Box Dual Fiber-To-Coax supports SMPTE 424M, 292M, and 259M as well as ASI and MADI audio on two independent fiber-to-coax paths. Auto-mode EQ/reclocking automatically sets to the signal type being received while allowing unrecognized formats to be safely passed without reclocking (auto-reclock can also be manually disabled for either path as desired). Its wide operating range (from 5Mbps to 3Gbps) flexibly supports most professional digital serial communications. Fully error-free pathological pattern operation is fully compatible with other professional fiber video interfaces. SFP-based OE converters provide state-of-the-art fiber performance, power consumption, and compactness.

BBG-2OE-MK2 receives its operating power via a USB connection or using an AC adapter connection. These power sources can be simultaneously used to provide redundant power sourcing.

FEATURES

- Dual independent fiber-to-coax paths – all in one easy to use throw-down box
- Full support of 5Mbps thru 3Gbps transport conversions, with seamless auto-mode reclocking. No switches to set for different payloads.
- Available with ST, LC, or FC fiber termination
- Dual-channel input lock status indicators. Optical Rx power meter fields allow optical Rx confidence assessment.
- Error-free pathological support. Full compatibility with other BlueBox™ Coax/Fiber units and Cobalt 9400-series openGear® frame-installed fiber cards.
- Compatible with SMPTE 424M, 292M, 259M, 310M, M2S, DVB-ASI, and MADI audio
- Compact size and low weight design easily affixes directly to camera or host device chassis. Optional BBG-MB mounting bracket provides rigid, secure mounting to mounting surfaces.
- USB remote control/status in addition to device indicator and switches
- SFP-based OE converters provide state-of-the-art fiber performance, power consumption, and compactness
- Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.
- Rugged construction backed with a five-year warranty



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BBG-2OE-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC DUAL TRANSPORT RECEIVER

SPECIFICATIONS

Power
5-16 VDC, 2.4 W
DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Standards/Data Rates Supported
SMPTE 424M, 292M, 259M, 344M, 305M, DVB-ASI
5Mbps to 3Gbps pathological pattern operation
(does not support AES-3id audio or other standards using data rates < 5Mbps)

Inputs
2) Fiber input. FC, ST, or LC connectors per ordered configuration (see Ordering Info)
Wavelength: 1260 to 1620 nm
Sensitivity/Input Usable Range: -18 dBm min; -1dBm max

Outputs
(2) 75Ω BNC. Reclocking automatically engaged for recognized signal standards; bypassed for unrecognized standards.
Return Loss: >18 dBm up to 270 MHz

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
32°F to 122°F
(0°C to 50°C)

Note: Specifications subject to change.

ORDERING INFORMATION

BBG-2OE-MK2-FC 3G/HD/SD-SDI / ASI / MADI Fiber Optic Dual Transport Receiver (Type FC fiber connectors)
BBG-2OE-MK2-ST 3G/HD/SD-SDI / ASI / MADI Fiber Optic Dual Transport Receiver (Type ST fiber connectors)
BBG-2OE-MK2-LC 3G/HD/SD-SDI / ASI / MADI Fiber Optic Dual Transport Receiver (Type LC fiber connectors)

BBG-MB Mounting Bracket

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BBG-E0OE-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC TRANSPORT TRANSCEIVER

The Blue Box **BBG-E0OE-MK2 Coax/Fiber Transceiver** throw-down converter unit is a new part of the BlueBox™ group of compact, rugged, and portable converter boxes. Super-easy to use, BBG-E0OE-MK2 supports SMPTE 424M, 292M, and 259M as well as ASI and MADI audio on independent fiber-coax and coax-fiber paths. Auto-mode EQ/reclocking automatically sets to the signal type being received while allowing unrecognized formats to be safely passed without reclocking (auto-reclock can also be manually disabled for either path as desired). Its wide operating range (from 5Mbps to 3Gbps) flexibly supports most professional digital serial communications. Fully error-free pathological pattern operation is fully compatible with other professional fiber video interfaces. SFP-based EO and OE converters provide state-of-the-art fiber performance, power consumption, and compactness.

BBG-E0OE-MK2 receives its operating power via a USB connection or using an AC adapter connection. These power sources can be simultaneously used to provide redundant power sourcing.

FEATURES

Independent companion fiber Rx and Tx paths – all in one easy to use throw-down box. 4-mode crosspoint provides for numerous coax/fiber conversions and routing schemes.

Full support of 5Mbps thru 3Gbps transport conversions, with seamless auto-mode EQ/reclocking. No switches to set for different payloads.

Available with ST, LC, or FC fiber termination

Compatible with SMPTE 424M, 292M, 259M, 310M, M2S, DVB-ASI, and MADI audio

Dual-channel input lock status indicators. Optical Tx and Rx power status fields allow optical Tx/Rx confidence assessment.

Error-free pathological support. Full compatibility with other BlueBox™ Coax/Fiber units and Cobalt 9400-series openGear® frame-installed fiber cards.

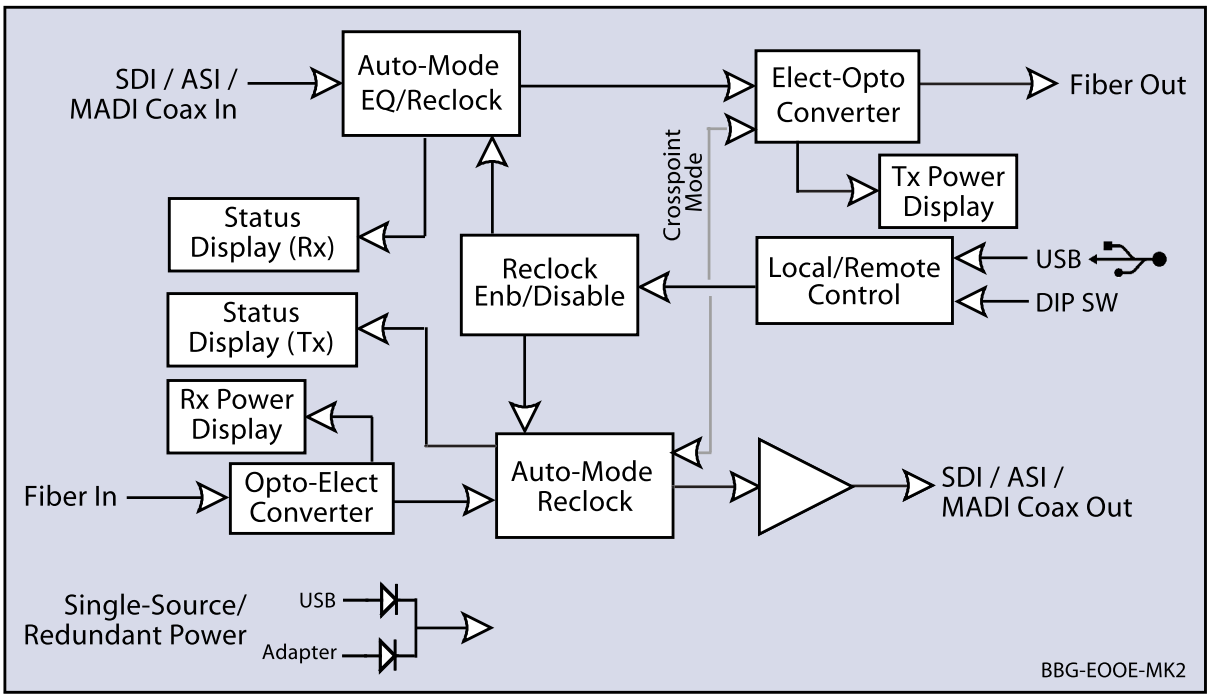
Compact size and low weight design easily affixes directly to camera or host device chassis. Optional BBG-MB mounting bracket provides rigid, secure mounting to mounting surfaces.

USB remote control/status in addition to device indicator and switches. USB BBGConfig app (free download) offers device alternate OEO mode.

SFP-based EO/OE converters provide state-of-the-art fiber performance, power consumption, and compactness

Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.

Rugged construction backed with a five-year warranty



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BBG-E0OE-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC TRANSPORT TRANSCEIVER

SPECIFICATIONS

Power
5-16 VDC, 2.4 W
DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Standards/Data Rates Supported
SMPTE 424M, 292M, 259M, 344M, 305M, DVB-ASI
5Mbps to 3Gbps pathological pattern operation
(does not support AES-3id audio or other standards using data rates < 5Mbps)

Input (Fiber-to-Coax Path; Fiber Receive)
(1) Fiber input. FC, ST, or LC connectors per ordered configuration (see Ordering Info)
Wavelength: 1260 to 1620 nm
Sensitivity/Input Usable Range: -18 dBm min; -1dBm max

Output (Fiber-to-Coax Path; Fiber Receive)
(1) 75Ω BNC. Reclocking automatically engaged for recognized signal standards; bypassed for unrecognized standards.
Return Loss: >18 dBm up to 270 MHz

Input (Coax-to-Fiber Path; Fiber Transmit)
(1) 75Ω BNC
Return Loss: >18 dBm up to 270 MHz

Output (Coax-to-Fiber Path; Fiber Transmit)
(1) Fiber output. FC, ST, or LC connectors per ordered configuration (see Ordering Info). Reclocking automatically engaged for recognized signal standards; bypassed for unrecognized standards.
Wavelength: 1310 nm
Power: -5.0 dBm (min)

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
32°F to 122°F
(0°C to 50°C)

Note: Specifications subject to change.

ORDERING INFORMATION

BBG-E0OE-MK2-FC 3G/HD/SD-SDI / ASI / MADI Fiber Optic Transport Transceiver (Type FC fiber connectors)
BBG-E0OE-MK2-ST 3G/HD/SD-SDI / ASI / MADI Fiber Optic Transport Transceiver (Type ST fiber connectors)
BBG-E0OE-MK2-LC 3G/HD/SD-SDI / ASI / MADI Fiber Optic Transport Transceiver (Type LC fiber connectors)

BBG-MB Mounting Bracket

Note: The USB GUI application available for BBG-E0OE-MK2 is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. The application is not required for device usage where only DIP switch configuration is desired.

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BBG-SFP-SXH » 3G/HD/SD-SDI / ASI RECONFIGURABLE VIDEO SFP TRANSCEIVER

with Externally-Accessible SFP Module

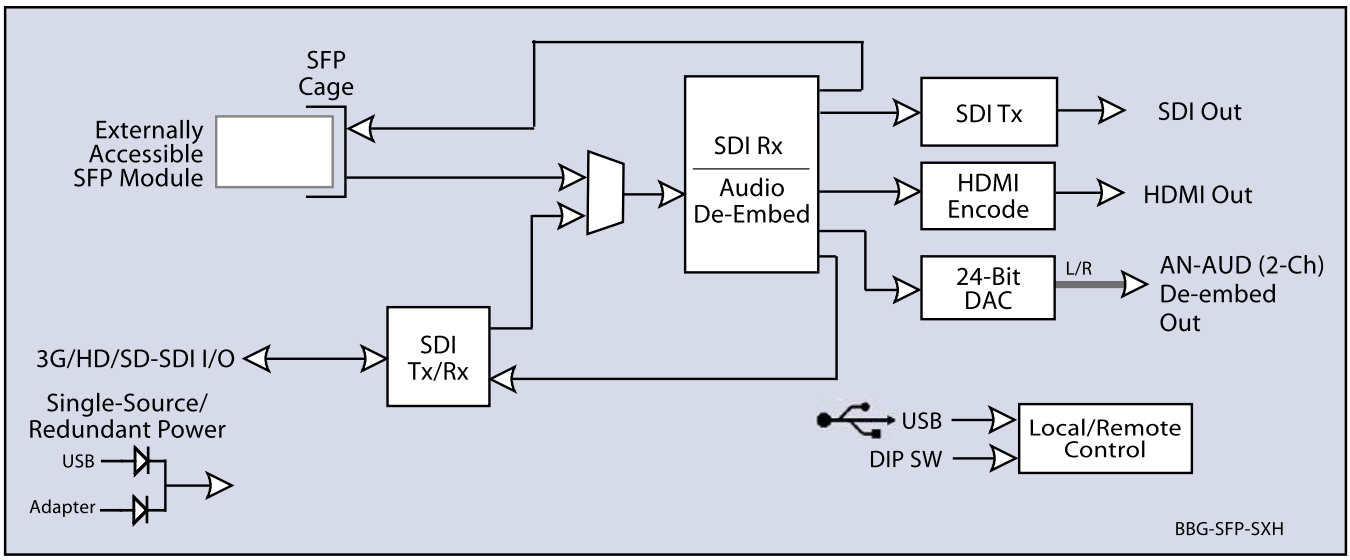
The Blue Box **BBG-SFP-SXH** 3G/HD/SD-SDI / ASI Reconfigurable Video SFP Transceiver with Externally-Accessible SFP Module throw-down converter unit is a part of the Blue Box Group™ of compact, rugged, and portable converter boxes.

The unprecedented flexibility of user-accessible, externally-mounted SFP modules on a throwdown unit makes BBG-SFP-SXH easily configurable as transceiver/converter between coaxial and fiber interfaces. The external SFP cage (along with numerous SFP choices) makes BBG-SFP-SXH virutally obsolescence-proof. BBG-SFP-SXH also features a 3G/HD/SD-SDI selectable input or output with SDI reclock copy and can convert SDI to HDMI. A convenience stereo analog audio de-embed output is also provided.

BBG-SFP-SXH can be configured using the device DIP switches or by using the intuitive BBGConfig GUI application that communicates with BBG-SFP-SXH over a PC's USB port. The GUI app allows dynamic configuration control, status display (including optical receive power where applicable), and other advanced control functions not commonly found on "throwdown" packages. When configured using the GUI app, the USB connection can be removed with all settings held in non-volatile device memory.

FEATURES

- Utmost in flexibility with external SFP cage. Configure to numerous media and format types with a simple SFP change using industry-standard Embrionix™ SFPs.
- Direct conversion to HDMI from SMPTE 259M, 292M and 424M SDI
- Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.
- Configurable using device DIP switches or USB GUI remote control offering dynamic configuration control, status display, and other advanced control functions not commonly found on “throwdown” packages
- Wide range of available state-of-the-art Embrionix™ SFPs supported, offering fiber and coaxial options
- Compact size and low weight design easily affixes directly to camera or host device chassis
- Convenient 2-channel analog audio output
- Rugged construction backed with a five-year warranty



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BBG-SFP-SXH » 3G/HD/SD-SDI / ASI RECONFIGURABLE VIDEO SFP TRANSCEIVER

with Externally-Accessible SFP Module

SPECIFICATIONS

Standards Supported (SDI)

SMPTE 259M, 292M, 424M

Inputs/Outputs

(1) Bidirectional SFP external cage connector (supports Embrionix Video SFPs; see Ordering Info)
(1) Bidirectional SDI / ASI BNC connector (mode user selectable)
(1) SDI reclocked output
(1) HDMI output (HDMI 1.4a compliant). HDMI output can be set as DVI-D (limited to SMPTE HD formats).
(1) Stereo analog audio out (L/R unbalanced pair via 3.5mm TRS jack)

Fiber Tx/Rx Specifications

Tx Wavelength (SPF EO, EOOE): 1310 nm
Tx Power (SFP EO, EOOE): -5.0 dBm (min)
Rx Sensitivity (SFP OE, EOOE): -23 dBm
Rx Wavelength Range (SFP OE, EOOE): 1260 to 1620 nm

Audio Conversion Format

48 kHz sampling, 24-bit
8-Ch HDMI to SDI groups 1 and 2

Power Source

Power-sourced directly from host equipment USB port. Converter can also be powered using corded AC adapter (included)

Power

5-16 VDC, 5W
DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

USB Port

Mini-USB (used for power source, USB remote control connection, and firmware upgrade upload to device)

Dimensions (WxHxD)

5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range

32°F to 122°F
(0°C to 50°C)

ORDERING INFORMATION

BBG-SFP-SXH 3G/HD/SD-SDI / ASI Reconfigurable Video SFP Transceiver with Externally-Accessible SFP Module

Note: Options denoted as "+" are software-based options which can be uploaded on new product when ordered. The SFP-IP-SWD SFP module is purposed to the types described and specified below using a corresponding factory software upload.

The following SFP modules are available for BBG-SFP-SXH (purchased and available separately):

-SFP-EO Single-Channel Video Optical Transmitter (EO); Embrionix™ GO2918
-SFP-OE Single-Channel Video Optical Receiver (OE); Embrionix™ GO2917
-SFP-EOOE Single-Channel Video Optical Transceiver (EOOE); Embrionix™ GO2929
-SFP-IP-SWD Software-Defined EmSFP 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for units using SFP type -SPF-IP-SWD:
+ADD-SFP-2SDI-TO-IP-2022-6 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2022-6
+ADD-SFP-2SDI-TO-IP-2110 SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2110
+ADD-SFP-IP-TO-2SDI-2022-6 SFP Software License; Dual-Channel De-Encapsulator IP-2022-6-to-2SDI
+ADD-SFP-IP-TO-2SDI-2110 SFP Software License; Dual-Channel De-Encapsulator IP-2110-to-2SDI
+ADD-SFP-IP-TO-SDI-2022-6 SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-SDI
+ADD-SFP-IP-TO-SDI-2110 SFP Software License; Single-Channel De-Encapsulator IP-2110-to-SDI
+ADD-SFP-SDI-TO-IP-2022-6 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2022-6
+ADD-SFP-SDI-TO-IP-2110 SFP Software License; Single-Channel Encapsulator SDI-to-IP-2110

Note: The USB GUI application available for BBG-SFP-SXH is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. Currently, this application is available only for Windows Vista thru Windows 10.

BBG-MB Mounting Bracket

Note: Device includes one PS4 Power Supply (AC adapter). Power supplies listed below are for replacement or spares purposes:
- **PS4** Universal Power Supply, UL/CSA. Input: 100-240V, 60/50 Hz. Output: 5 VDC @ 12 Watts
- **PS5** Universal Power Supply, IEC Connector, CE/UL/CSA. Input: 100-240V, 60/50 Hz. Output: 5V, 2A (International Power Supply. Specify country of destination.)

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BBG-H-TO-F » 3G/HD/SD HDMI-TO-FIBER OPTIC CONVERTER

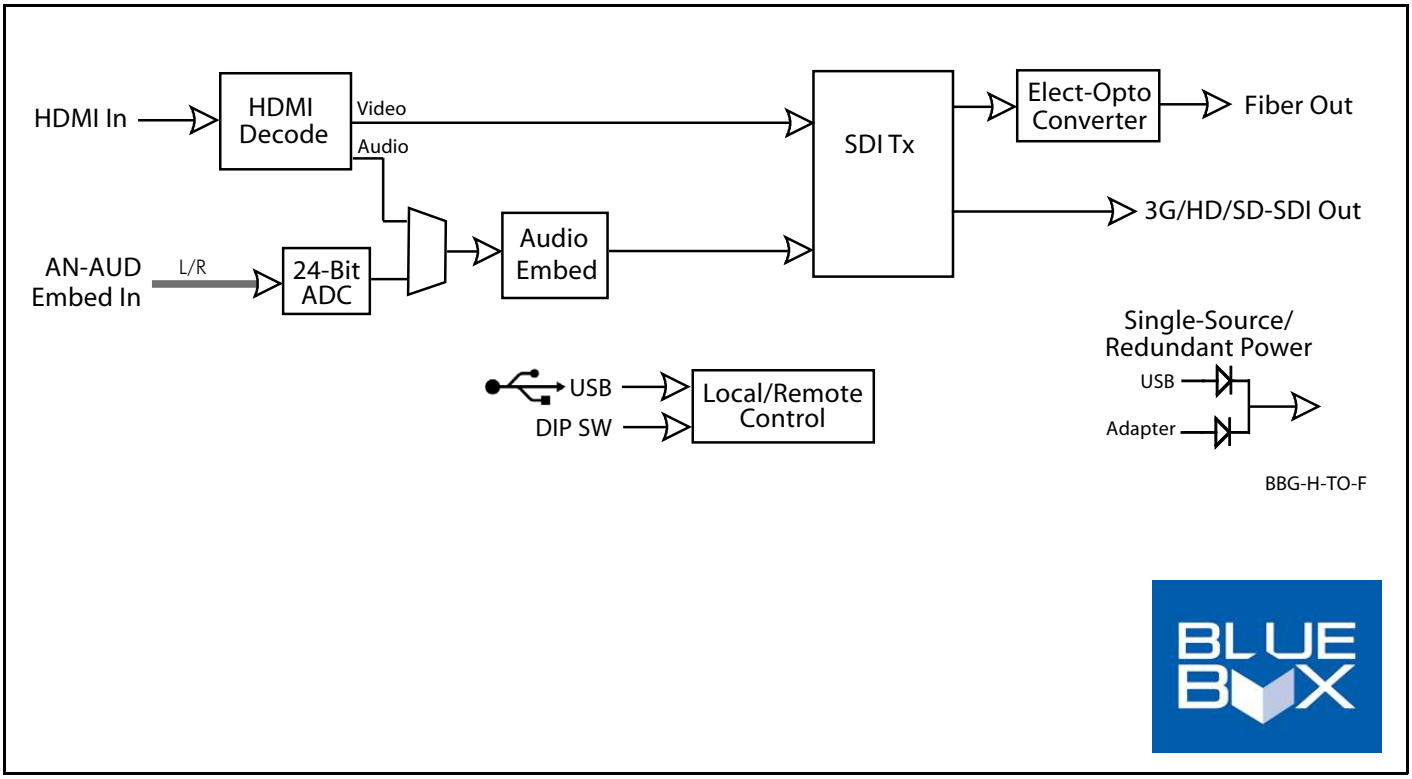
The Blue Box™ **BBG-H-TO-F HDMI-to-Fiber** throw-down converter unit is a part of the Blue Box Group™ of compact, rugged, and portable converter boxes. BBG-H-TO-F offers a compact throwdown unit that provides direct HDMI-to-fiber conversion and much more.

BBG-H-TO-F also provides a 3G/HD/SD-SDI output, and also provides a stereo analog audio embed input. The HDMI input can also receive and convert DVI-D sources (limited to SMPTE HD formats). Along with the analog audio embedding offered by BBG-H-TO-F, this allows a fiber and coax SDI output with embedded audio from DVI-D video sources.

BBG-H-TO-F can be configured using the device DIP switches or by using an intuitive GUI application that communicates with BBG-H-TO-F over a PC's USB port. The GUI app allows dynamic configuration control, status display, and other advanced control functions not commonly found on "throwdown" packages. When configured using the GUI app, the USB connection can be removed with all settings held in non-volatile device memory.

FEATURES

- Provides simultaneous HDMI-to-fiber and HDMI-to-coax SDI conversions. Accepts DVI-D input sources with SDI format conversions to coax and fiber SDI.
- Direct conversion from HDMI to SMPTE 259M, 292M and 424M SDI
- Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.
- Configurable using device DIP switches or USB GUI remote control offering dynamic configuration control, status display, and other advanced control functions not commonly found on "throwdown" packages
- Compact size and low weight design easily affixes directly to camera or host device chassis
- Singlemode fiber link distance >10 km (3Gbps), >20 km (1.5Gbps), and >35 km (270Mbps). Multimode typically >200 m.
- Rugged construction backed with a five-year warranty



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BBG-H-TO-F » 3G/HD/SD HDMI-TO-FIBER OPTIC CONVERTER

SPECIFICATIONS

Standards Supported
SMPTE 259M, 292M, 424M

Inputs/Outputs
HDMI input (HDMI 1.4a compliant). DVI-D compliant input (limited to SMPTE HD formats).
(1) Fiber output. FC, ST, or LC connectors per ordered configuration (see Ordering Info).
(1) Stereo analog audio pair in (L/R unbalanced pair via 3.5mm TRS jack)
(1) SDI output

Audio Conversion Format
48 kHz sampling, 24-bit
8-Ch HDMI to SDI groups 1 and 2

Power Source
Power-sourced directly from host equipment USB port. Converter can also be powered using corded AC adapter (included)

Power
5-16 VDC, 2.4 W
DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

USB Port
Mini-USB (used for power source, USB remote control connection, and firmware upgrade upload to device)

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
32°F to 122°F
(0°C to 50°C)

ORDERING INFORMATION

BBG-H-TO-F-FC 3G/HD/SD HDMI-To-Fiber Optic Converter (Type FC fiber connector)

BBG-H-TO-F-ST 3G/HD/SD HDMI-To-Fiber Optic Converter (Type ST fiber connector)

BBG-H-TO-F-LC 3G/HD/SD HDMI-To-Fiber Optic Converter (Type LC fiber connector)

BBG-MB Mounting Bracket

Note: The USB GUI application available for BBG H-TO-F is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. The application is not required for device usage where only DIP switch configuration is desired.

Currently, this application is available for only the following operating systems:

- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

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BBG-F-TO-H » 3G/HD/SD-SDI FIBER OPTIC-TO-HDMI CONVERTER

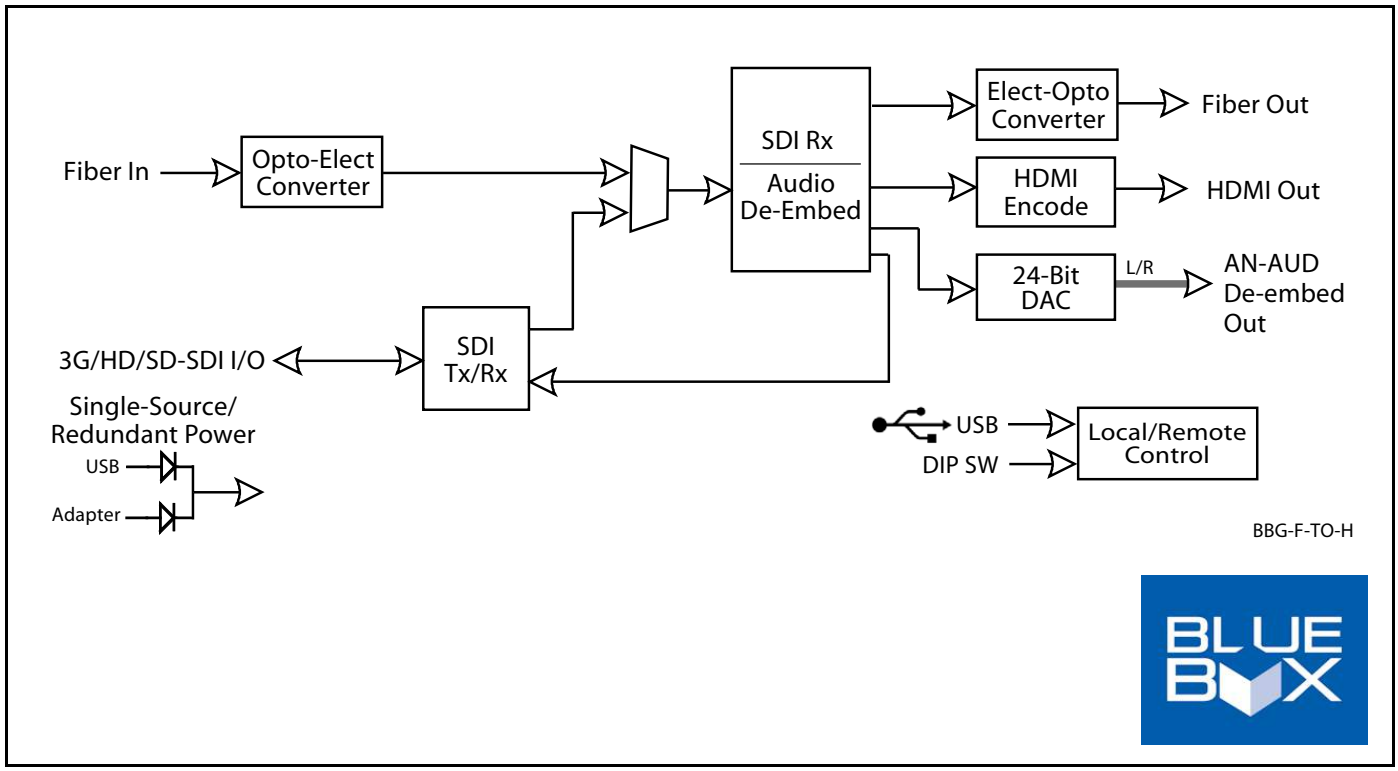
The Blue Box™ **BBG F-TO-H Fiber-To-HDMI** throw-down converter unit is a new part of the Blue Box Group™ of compact, rugged, and portable converter boxes. BBG F-TO-H offers a compact throwdown unit that provides direct fiber-To-HDMI conversion and much more.

The flexible built-in crosspoint and flexible I/O allows BBG-F-TO-H to also act as a fiber regen while providing an HDMI output. The HDMI output can be set to instead provide a DVI-D output directly compatible with computer monitors. The BBG-F-TO-H also can receive a coax SDI input (SMPTE 259M, 292M, and 424M) and in turn provide an HDMI and a fiber output. BBG F-TO-H can also provide a coax SDI output while converting fiber to HDMI. A convenience stereo analog audio de-embed output is also provided.

BBG-F-TO-H can be configured using the device DIP switches or by using an intuitive GUI application that communicates with BBG-F-TO-H over a PC's USB port. The GUI app allows dynamic configuration control, status display, and other advanced control functions not commonly found on "throwdown" packages. When configured using the GUI app, the USB connection can be removed with all settings held in non-volatile device memory.

FEATURES

- Flexible crosspoint and multiple inputs/outputs provide fiber-To-HDMI, SDI-To-fiber, and fiber regen conversions. HDMI output can be set as DVI-D for direct connection to computer monitors.
- Direct conversion to HDMI from SMPTE 259M, 292M and 424M SDI
- Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.
- Configurable using device DIP switches or USB GUI remote control offering dynamic configuration control, status display, and other advanced control functions not commonly found on "throwdown" packages
- Compact size and low weight design easily affixes directly to camera or host device chassis
- Singlemode fiber link distance >10 km (3Gbps), >20 km (1.5Gbps), and >35 km (270Mbps). Multimode typically >200 m.
- Rugged construction backed with a five-year warranty



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BBG-F-TO-H » 3G/HD/SD-SDI FIBER OPTIC-TO-HDMI CONVERTER

SPECIFICATIONS

Standards Supported
SMPTE 259M, 292M, 424M

Inputs/Outputs
(1) Fiber input. FC, ST, or LC connectors per ordered configuration (see Ordering Info)
(1) Fiber regen output. FC, ST, or LC connectors per ordered configuration (see Ordering Info)
(1) SDI I/O (mode user selectable)
(1) HDMI output (HDMI 1.4a compliant). HDMI output can be set as DVI-D (limited to SMPTE HD formats).
(1) Stereo analog audio out (L/R unbalanced pair via 3.5mm TRS jack)

Audio Conversion Format
48 kHz sampling, 24-bit
8-Ch HDMI to SDI groups 1 and 2

Power Source
Power-sourced directly from host equipment USB port. Converter can also be powered using corded AC adapter (included)

Power
5-16 VDC, 2.4 W
DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

USB Port
Mini-USB (used for power source, USB remote control connection, and firmware upgrade upload to device)

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
32°F to 122°F
(0°C to 50°C)

ORDERING INFORMATION

BBG-F-TO-H-FC 3G/HD/SD-SDI Fiber Optic-To-HDMI Converter (Type FC fiber connectors)

BBG-F-TO-H-ST 3G/HD/SD-SDI Fiber Optic-To-HDMI Converter (Type ST fiber connectors)

BBG-F-TO-H-LC 3G/HD/SD-SDI Fiber Optic-To-HDMI Converter (Type LC fiber connectors)

BBG-MB Mounting Bracket (see Product Downloads for downloading installation instruction sheet)

Note: The USB GUI application available for BBG F-TO-H is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. The application is not required for device usage where only DIP switch configuration is desired.

Currently, this application is available for only the following operating systems:

- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

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BBG-H-TO-S » HDMI-TO-3G/HD/SD-SDI WITH AUDIO EMBEDDER

The Blue Box **BBG-H-TO-S** HDMI-to-SDI throw-down converter unit is a part of the BlueBox™ group of compact, rugged, and portable converter boxes.

Embedded audio on the 2x SDI output can be sourced from the HDMI input (channels 1-8) or from a line-level analog audio pair input. Along with the analog audio embedding offered by BBG H-To-S, this allows an SDI output with embedded audio using DVI-D video sources.

Blue Box can power directly via USB to get its power from video monitors or other equipment. Blue Box BBG H-To-S provides true 3G and HD conversions from HDMI to SMPTE 424M, 292M, or 259M. The HDMI input can also receive and convert DVI-D sources (limited to SMPTE HD formats).

FEATURES

Direct conversion from HDMI to SMPTE 259M, 292M and 424M SDI. Accepts DVI-D input sources with conversion to coax SDI.

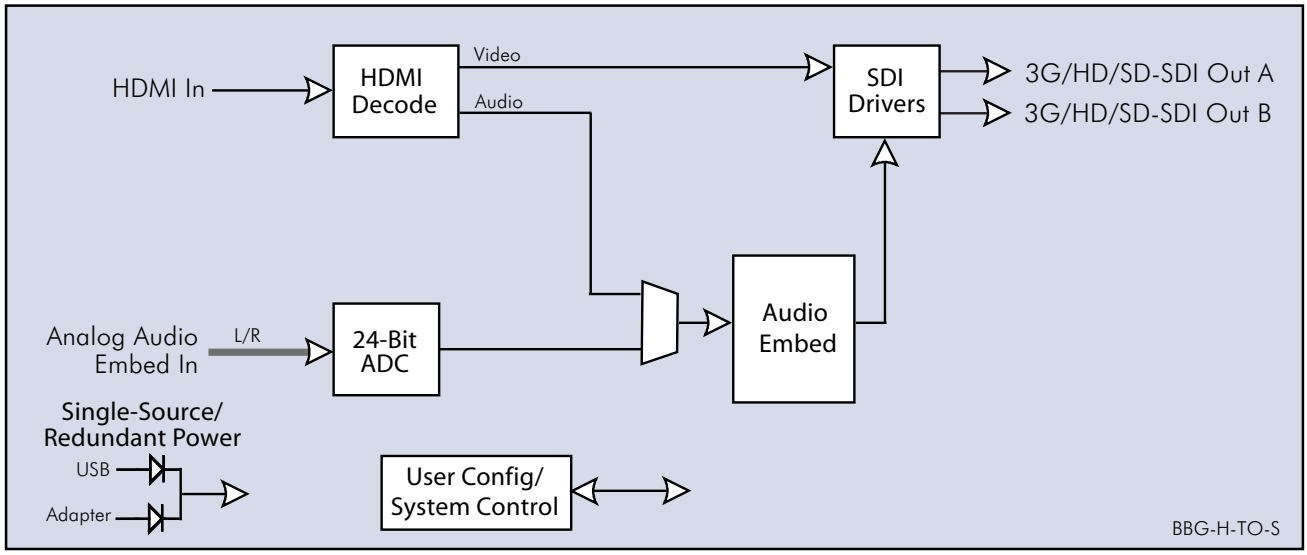
Compact size and low weight design easily affixes directly to camera or host device chassis

5.1-channel embedding from HDMI audio. Stereo analog audio embedding from stereo analog audio input pair.

Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.

2x SDI DA output

Rugged construction backed with a five-year warranty



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BBG-H-TO-S » HDMI-TO-3G/HD/SD-SDI WITH AUDIO EMBEDDER

SPECIFICATIONS

Standards Supported
SMPTE 259M, 292M, 424M

Inputs
HDMI (HDMI 1.4a compliant). DVI-D compliant input (limited to SMPTE HD formats).
(2) analog audio (unbalanced consumer RCA)
DC power (via USB or adapter)

Outputs
(2) SDI (75Ω BNC)

Latency Delay
SD: <30 us
HD: <17 us
3G <8 us

Audio Conversion Format
48 kHz sampling, 24-bit
8-Ch HDMI to SDI groups 1 and 2

Power Source
Power-sourced directly from host equipment USB port. Converter can also be powered using corded AC adapter (included)

Power
5-16 VDC, 2.4 W

DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
-4°F to 158°F
(-20°C to 70°C)

ORDERING INFORMATION

BBG-H-TO-S HDMI-to-HD/SD-SDI with Audio Embedder Converter Unit

BBG-MB Mounting Bracket

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BBG-S-TO-H » 3G/HD/SD-SDI-TO-HDMI WITH AUDIO DE-EMBEDDER

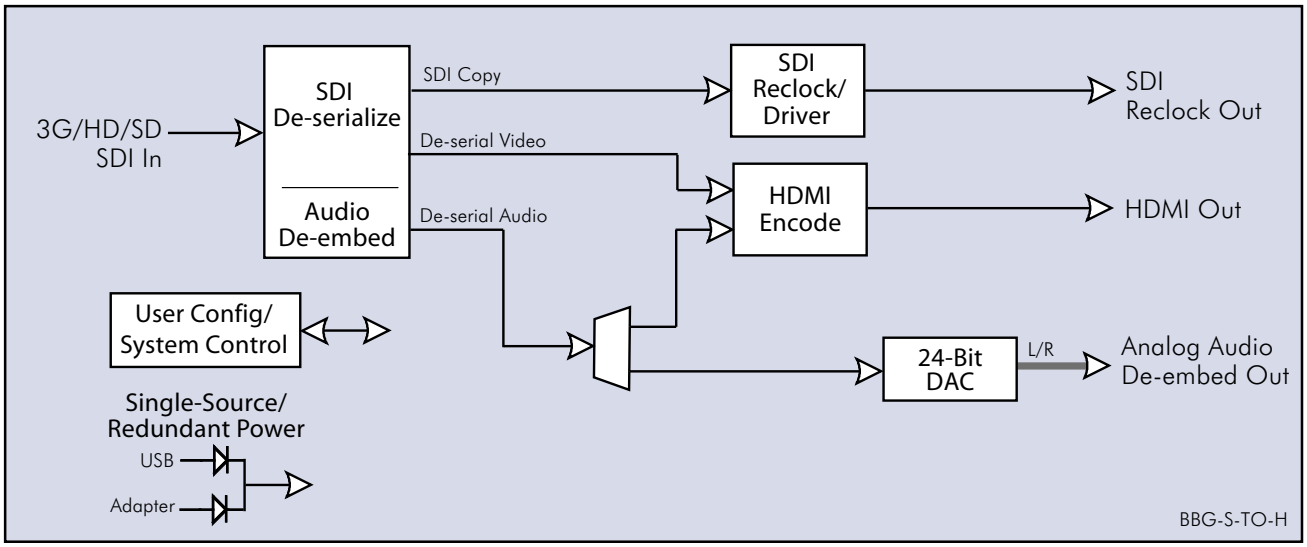
The Blue Box **BBG-S-TO-H** SDI-to-HDMI throw-down converter unit is a part of the BlueBox™ group of compact, rugged, and portable converter boxes.

Blue Box can power directly via USB to get its power from video monitors or other equipment. BBG-S-to-H provides direct conversion from SMPTE 259M, 292M and 424M SDI to HDMI. Easy to use DIP switch sets YPbPr or RGB colorspace and HDMI or DVI output modes.

Full group 1/2 conversion to HDMI audio is provided, with user control of C/LFE channel line-up as well as group 1/2 selected audio pair de-embed to a stereo line-level audio output pair.

FEATURES

- Rugged construction backed with a five-year warranty
- Selectable YPbPr or RGB colorspace and HDMI/DVI output modes
- Full 5.1 channel audio conversion to HDMI audio with selectable C/LFE line-up control. Audio de-embed of selected group 1/2 pair to analog audio output pair.
- Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.
- SDI input copy output allows converter to provide SDI pass-thru
- Compact size and low weight design easily affixes directly to camera or host device chassis



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BBG-S-TO-H » 3G/HD/SD-SDI-TO-HDMI WITH AUDIO DE-EMBEDDER

SPECIFICATIONS

Standards Supported
SMPTE 259M, 292M, 424M
(10-bit video processing)

Inputs
SDI (75Ω BNC)
DC power (via USB or adapter)

Outputs
HDMI (HDMI 1.4 compliant). HDMI output can be set as DVI-D (limited to SMPTE HD formats).
SDI reclocked input copy (75Ω BNC)
(2) analog audio (unbalanced consumer RCA)

Latency Delay
SD: <30 us
HD: <17 us
3G <8 us

Audio Conversion Format
48 kHz sampling, 24-bit
SDI groups 1/2 to HDMI Ch 1-8 (with user-selectable C/LFE line-up)

Power
5-16 VDC, 2.4 W

DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

Operating Temperature Range
-4°F to 158°F
(-20°C to 70°C)

ORDERING INFORMATION

BBG-S-TO-H HD/SD-SDI-to-HDMI with Audio De-Embedder Converter Unit

BBG-MB Mounting Bracket

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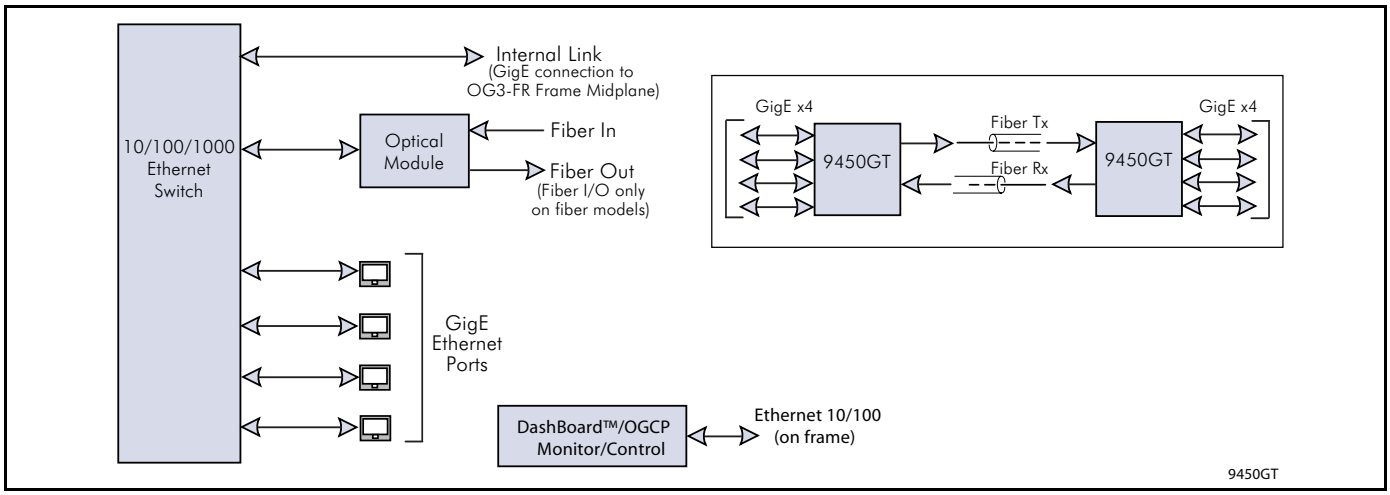
9450GT » FIBER ETHERNET SWITCH TRANSCEIVERS

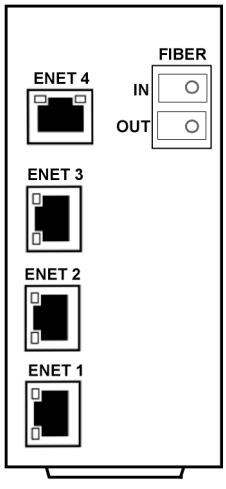
The **9450GT** series of fiber Ethernet switch transceivers are available in several versions providing various link length support using dual-fiber Tx/Rx. (Non-fiber model 9450GT-NF is also available.) A built-in switch accommodates four Ethernet ports. Gbit ports flexibly support most communications including IP-based video/audio, control, and other data.

RJ-45 Ethernet ports provide 1Gb/s connectivity for multiple Ethernet enabled devices or links to additional network switches. A dual-fiber optical port provides an Ethernet link over a dual fiber connection for extended distances (available in 20km, 40km, and 80km link-length versions). CWDM models are available with 16 wavelength divisions, allowing 64 discrete Ethernet ports to be muxed onto a single fiber pair.

FEATURES

- Four independent copper Gigabit Ethernet ports supporting DHCP, ARP, Multicast/Broadcast
- Dual LC Optical Connection. Blindmate connections with no active components on rear I/O module.
- Low-power, high-density design; <8 Watts
- Internal GigE midplane connection (with OG3-FR frame only)
- CWDM models available in 16 different wavelength divisions, offering up to 64 channels of discrete Ethernet port muxing
- SNMP compliant
- Available in 20km, 40km, and 80km versions using LC-terminated fiber
  - 9450GT-20KM-LC – 20km link length
  - 9450GT-40KM-LC – 40km link length
  - 9450GT-80KM-LC – 80km link length
  - 9450GT-CWDM – see Ordering Information
- Five year warranty





RM20-9450GT-B
(Model 9450GT-NF has fiber ports unpopulated)

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9450GT » FIBER ETHERNET SWITCH TRANSCEIVERS

SPECIFICATIONS

Electrical

Power: 7 Watts

Optical

Number of inputs/outputs: 1
Nominal Wavelength: 1310nm (9450GT-20KM, 9450GT-40KM)
1550 (9450GT-80KM)
Tx Power:
-3dBm to –8dBm (9450GT-20KM)
+3dBm to –2dBm (9450GT-40KM)
+5dBm to 0dBm (9450GT-80KM, 9450GT-CWDM-XX-LC)
+7dBm to +2dBm (9450GT-CWDM-XXH-LC)
Rx Sensitivity:
-3dBm to –22dBm (9450GT-20KM)
-3dBm to –24dBm (9450GT-40KM, 9450GT-80KM, 9450GT-CWDM-XX-LC)
-10dBm to –32dBm (9450GT-CWDM-XXH-LC)
Optical Budget:
14 dB (9450GT-20KM)
22 dB (9450GT-40KM)
24 dB (9450GT-80KM, 9450GT-CWDM-XX-LC) 34 dB (9450GT-80KM, 9450GT-CWDM-XXH-LC)Receiver Overload: values above –3dB; -10dBM (9450GT-CWDM-XXH-LC)
Connector Type: Single Mode LC/UPC.

Ethernet

Number of Ports: 4
Cable Type: Standard straight-thru CAT-5e
Connector Type: RJ-45

ORDERING INFORMATION

9450GT-20KM-LC Single-Link Ethernet/Fiber Transceiver. Dual-Fiber 20km, 1310nm Tx/Rx. Includes Rear I/O Module (LC connectors only)

9450GT-40KM-LC Single-Link Ethernet/Fiber Transceiver. Dual-Fiber 40km, 1310nm Tx/Rx. Includes Rear I/O Module (LC connectors only)

9450GT-80KM-LC Single-Link Ethernet/Fiber Transceiver. Dual-Fiber 80km, 1550nm Tx/Rx. Includes Rear I/O Module (LC connectors only)

9450GT-NF 4-Port Ethernet Switch (omits fiber I/O interfaces). Includes Rear I/O Module.

9450GT-CWDM-XX-LC Single-Link Ethernet/Fiber Transceiver. Dual-Fiber 20km, CWDM Tx/Rx. Includes Rear I/O Module (LC connectors only). Replace "XX" with desired CWDM wavelength when ordering. See table below for available CWDM wavelengths.

9450GT-CWDM-XXH-LC Single-Link Ethernet/Fiber Transceiver. Dual-Fiber 20km, CWDM Tx/Rx with high-sensitivity Rx. Includes Rear I/O Module (LC connectors only). Replace "XX" with desired CWDM wavelength when ordering. See table below for available CWDM wavelengths.

-27: 1270nm	-29: 1290nm	-31: 1310nm
-33: 1330nm	-35: 1350nm	-37: 1370nm
-43: 1430nm	-45: 1450nm	-47: 1470nm
-49: 1490nm	-51: 1510nm	-53: 1530nm
-55: 1550nm	-57: 1570nm	-59: 1590nm
-61: 1610nm		

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9490-OS Series » FIBER OPTIC PASSIVE SPLITTERS FOR 20-SLOT FRAMES

The **9490-OS** series of passive splitters offer a flexible, cost-effective solution of fiber distribution using our HPF-9000 or OG3-FR 20-slot frames. Similar to a DA, these splitters provide branching of optical signals. Fully passive with low-loss optics, the devices require no frame power or communications for operation.

The 9490-OS models are available in 1x2, 1x4, and 1x8 splitting fan-outs. Fully passive operation helps ensure the utmost in reliability. Each device occupies 2 frame slots.

9490-OS Models

- **9490OS-1X2-LC** Optical 1x2 Splitter (LC connectors)
- **9490OS-D1X2-LC** Dual Optical 1x2 Splitter (LC connectors)
- **9490OS-1X4-LC** Optical 1x4 Splitter (LC connectors)
- **9490OS-D1X4-LC** Dual Optical 1x4 Splitter (LC connectors)
- **9490OS-1X8-LC** Optical 1x8 Splitter (LC connectors)

FEATURES

Modular, scalable design allows easy expansion. Available in several 1x2, 1x4, and 1x8 versions.

Fully passive design using low-loss filters. Requires no frame power or communications.

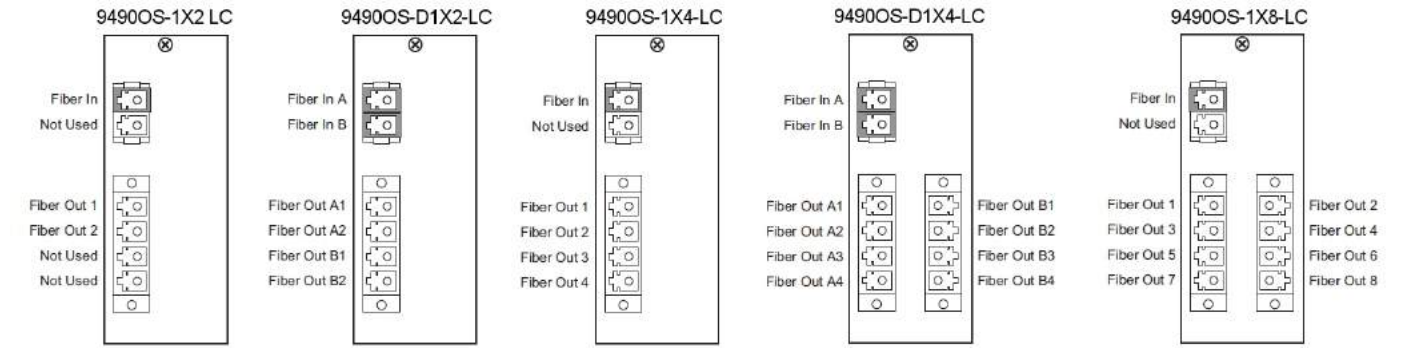
Wavelength agnostic operation - supports 1270nm thru 1620nm signals

Supports single-mode fiber

Fits 20-slot openGear frames using blindmate-connection rear I/O modules

Five year warranty

Rear Module I/O Connections



SPECIFICATIONS

Wavelength Range
1260nm to 1650nm

Return Loss (minimum)
50 dB

Insertion Loss (maximum)
94900S-1x2, 94900S-D1x2: 4 dB
94900S-1x4, 94900S-D1x4: 8 dB
94900S-1x8: 11 dB

Uniformity
94900S-1x2, 94900S-D1x2: 0.4 dB
94900S-1x4, 94900S-D1x4: 0.6 dB
94900S-1x8: 0.8 dB

Directivity
55 dB

Slots required per device
2

Connector Type
Single Mode, LC/UPC

ORDERING INFORMATION

94900S-1x2-LC Optical 1x2 Splitter (LC connectors only). Includes type LC connector Rear I/O Module

94900S-D1x2-LC Dual Optical 1x2 Splitter (LC connectors only). Includes type LC connector Rear I/O Module

94900S-1x4-LC Optical 1x4 Splitter (LC connectors only). Includes type LC connector Rear I/O Module

94900S-D1x4-LC Dual Optical 1x4 Splitter (LC connectors only). Includes type LC connector Rear I/O Module

94900S-1x8-LC Optical 1x8 Splitter (LC connectors only). Includes type LC connector Rear I/O Module

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BBG-4490-CWDM » MODULAR MULTI-CHANNEL FIBER OPTICAL MULTIPLEXERS/DE-MULTIPLEXERS

The BlueBox™ BBG-4490 series of CWDM passive multiplexers (mux) / de-multiplexers (demux) offer a flexible, scalable, cost-effective solution to mux and demux up to 18 fiber channels onto a shared fiber trunk. 4 and 8-channel units are available which can be used as standalones or rack-mounted using an optional 1RU mounting panel (12, 16, and 18-channel units are rack-mounted 1RU units). Used in conjunction with our fiber EO and OE converter cards, digital video, audio, and IP can all be carried over a shared fiber trunk. Coarse Wave Division Multiplexing (CWDM) offers a cost-effective, scalable, and convenient solution for multiplexing and de-multiplexing discrete channels onto a shared fiber trunk. Each model can be used as a mux or a de-mux unit **(two units are required for a complete mux/de-mux setup)**.

The BBG-4490 mux/de-mux units are available in 4, 8, 12, 16, and 18-channel versions. Epoxy-free optical paths help ensure reliability over a wide range of operating conditions. The low-loss passive devices use no external power.

OPTIONS_

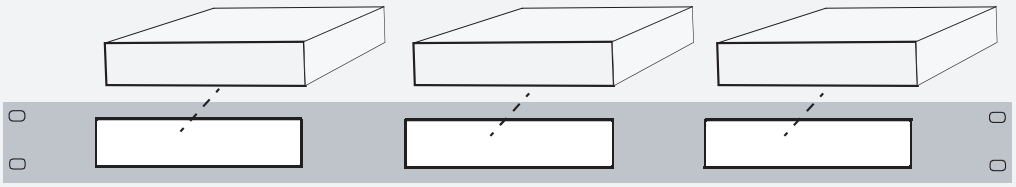
RMT Rack Mounting Panel; 3-device. Provides 1RU rack mounting for up to three BBG-4490-CWDM-4A, 4B, and/or BBG-4490-CWDM-OS.
RMD Rack Mounting Panel; 2-device. Provides 1RU rack mounting for up to two BBG-4490-CWDM-8.

» FEATURES

- Modular design allows use as a standalone or rack-mounted without a frame
- Available in several connector configurations - ST, SC, LC, FC
- Same models can be used either as mux or demux unit - fully bidirectional
- Epoxy-free optical paths help ensure reliability over a wide range of operating conditions
- Fully passive design using low-loss filters. Requires no power or communications.
- Five year warranty

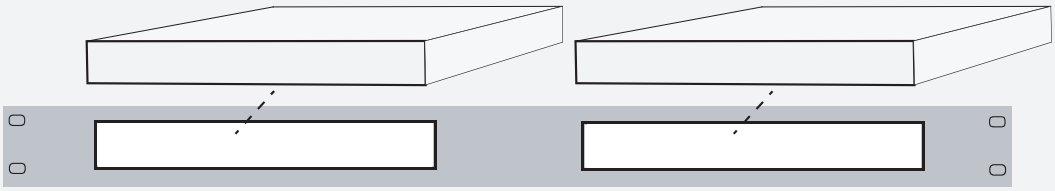
BBG-4490-CWDM-4

BBG-4490-CWDM-4 provide 4-in mux or 4-out demux which can be used as standalone, or used as 1RU triple rack-mounted using optional RMT mounting panel



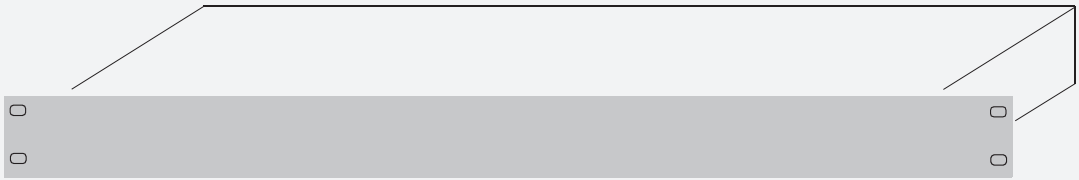
BBG-4490-CWDM-8

BBG-4490-CWDM-8 provide 8-in mux or 8-out demux which can be used as standalone, or used as 1RU dual rack-mounted using optional RMD mounting panel



BBG-4490-CWDM-12
BBG-4490-CWDM-16
BBG-4490-CWDM-18

These units (available as 12, 16, or 18-channel) provide multi-channel mux or demux and are available each as an integral 1RU unit



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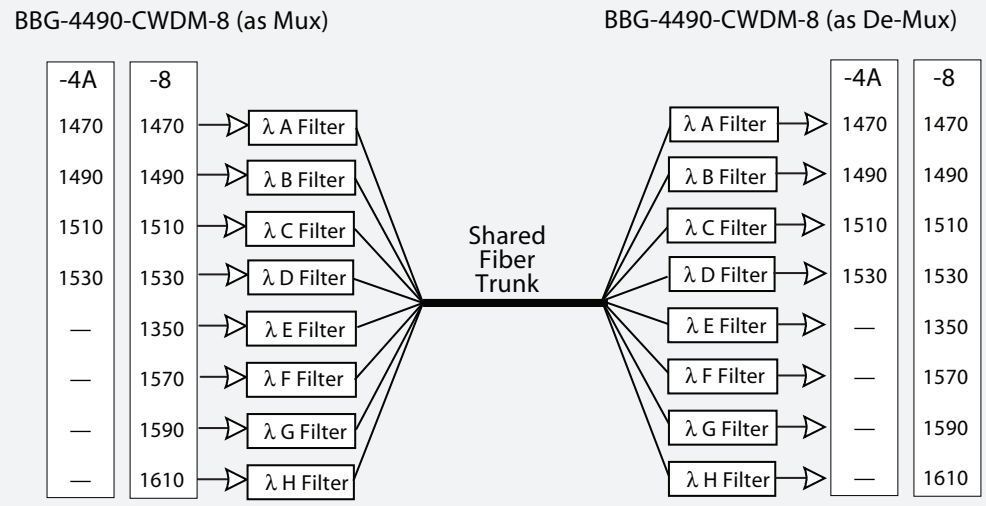
BBG-4490-CWDM » MODULAR MULTI-CHANNEL FIBER OPTICAL MULTIPLEXERS/DE-MULTIPLEXERS



BBG-4490-CWDM offers several choices in fiber wavelength (channel) capacity, ranging from 4-channel to 18-channel (shown here are the 4- and 8-channel models; see Ordering Info that lists wavelength divisions for 12-, 16-, and 18-channel models). All units can be used as a mux or a de-mux unit. Two units (min) are required for a complete mux / de-mux setup.

» SPECIFICATIONS

Filter Wavelengths
See Ordering Information
Central Wavelength Accuracy
< ± 1nm
In-band Ripple
0.5 dB
Passband Width @ 0.5 dB
>13nm
Insertion Loss
<= 3.6 dB
Adjacent Channel Isolation
>= 15 dB

Non-adjacent Channel Isolation (demux usage)
>= 40 dB
Uniformity
3 dB (max)
Polarization-dependent Loss
0.15 dB (max)
Polarization Mode Dispersion
0.1 ps (max)
Return Loss
50 dB (min)
Directivity
50 dB (min)

Temperature Stability
0.007 dB/°C (max)
Temperature Wavelength Drift
0.005 nm/°C (max)
Power Handling
300 mW (max)
Tensile Load
5N (max)
Temperature Range
0-70°C (operating)
-40 to +85°C (storage)

» ORDERING INFORMATION

BBG-4490-CWDM-4A-XX 4-Channel CWDM Mux/Demux; 1470-1490-1510-1530 nm. (3 units per 1RU optional mounting panel)

BBG-4490-CWDM-4B-XX 4-Channel CWDM Mux/Demux; 1550-1570-1590-1610 nm. (3 units per 1RU optional mounting panel)

BBG-4490-CWDM-8-XX 8-Channel CWDM Mux/Demux; 1470-1490-1510-1530-1550-1570-1590-1610 nm. (2 units per 1RU optional mounting panel)

BBG-4490-CWDM-12-XX 12-Channel CWDM Mux/Demux; 1270-1290-1310-1330-1470-1490-1510-1530-1550-1570-1590-1610 nm. (1RU unit)

BBG-4490-CWDM-16-XX 16-Channel CWDM Mux/Demux; 1310-1330-1350-1370-1390-1410-1430-1450-1470-1490-1510-1530-1550-1570-1590-1610 nm. (1RU unit)

BBG-4490-CWDM-18-XX 16-Channel CWDM Mux/Demux; 1270-1290-1310-1330-1350-1370-1390-1410-1430-1450-1470-1490-1510-1530-1550-1570-1590-1610 nm. (1RU unit)

BBG-4490-CWDM-OS-1X2-SC 1x2 50/50 Optical Splitter. SC connectors only. <3.5 dBm insertion loss. (3 units per 1RU optional mounting panel)

RMT Rack Mounting Panel; 3-device. Provides 1RU rack mounting for up to three BBG-4490-CWDM-4A, 4B, and/or BBG-4490-CWDM-OS.

RMD Rack Mounting Panel; 2-device. Provides 1RU rack mounting for up to two BBG-4490-CWDM-8.

Note: All units can be used as multiplexer or de-multiplexer. Two units are required for a complete mux-de-mux setup. Where operating wavelength differences are specified, make certain mux/demux pair is ordered with correspondingly matched wavelengths.

Note: Add fiber connector suffix to part numbers to specify fiber connection type (LC, ST, SC, FC). (For example, BBG-4490-CWDM-4A-XX fitted with LC connectors is ordered as BBG-4490-CWDM-4A-LC".)

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9978-ANC-MON » 3G/HD/SD-SDI ANCILLARY DATA MONITORING PROBE

with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding

The Cobalt® **9978-ANC-MON 3G/HD/SD-SDI Ancillary Data Monitoring Probe** with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding provides an easy to use, economical solution that offers comprehensive ancillary data monitoring/"probing" to validate and ensure expected presence and handling of ancillary data in SDI streams.

Unlike expensive and hard to use waveform monitors or typical test systems, the 9978-ANC-MON is an economical openGear®-based solution that provides on-screen burn-in status in "plain language" text and icons. Unlike typical test equipment, the 9978-ANC-MON user interface is designed from the ground up to be used by everyday operations personnel and not just engineers. The status burn-in is available on the card SDI output as well as a convenience HDMI output that can be directly connected to a wall monitor.

In addition to its user interface, the 9978-ANC-MON can integrate with automation systems via its IP and SNMP interfaces. The 9978-ANC-MON is an unprecedented first in the high-density openGear® based card form factor that fits in your existing openGear environment without the need for expensive, delicate, bulky test gear. The 9978-ANC-MON supports and offers monitoring for many data packages such as closed captioning, SCTE 104, 608-XDS, AFD and others, providing not just presence/absence status but also interpreters that parse the payload and display it as a burn-in. Also included standard is a continuously running display of ATSC A/85 LKFS loudness. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

Intuitive layout clearly and simultaneously showing multiple aspects of the input signal and its ancillary data are displayed in real time along with programming.

Conditions for any number of criteria are immediately apparent via color coding to indicate normal operation, errors, ancillary data absense or other errors. No difficult nested menus or difficult to interpret messages.

FEATURES

- Easy to use, economical solution for comprehensive ancillary data monitoring/"probing"
- "Plain language" easy to understand status burn-in overlay displayed along with program video makes status monitoring easy. HDMI output allows use with standard consumer monitor panels.
- Quality Check provides immediate alert status for quality issues such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.
- On-screen presence/absence of selected DID/SDIDs
- Fully flexible and configurable with user presets to simplify setup
- Closed Captioning, SCTE 104, AFD, and 608-XDS monitoring and payload interpret
- Full status forwarding to automated systems using IP and SNMP interfaces
- Audio level bars display and LKFS numeric display
- Low-power/high-density design – less than 18 Watts per card
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Five year warranty

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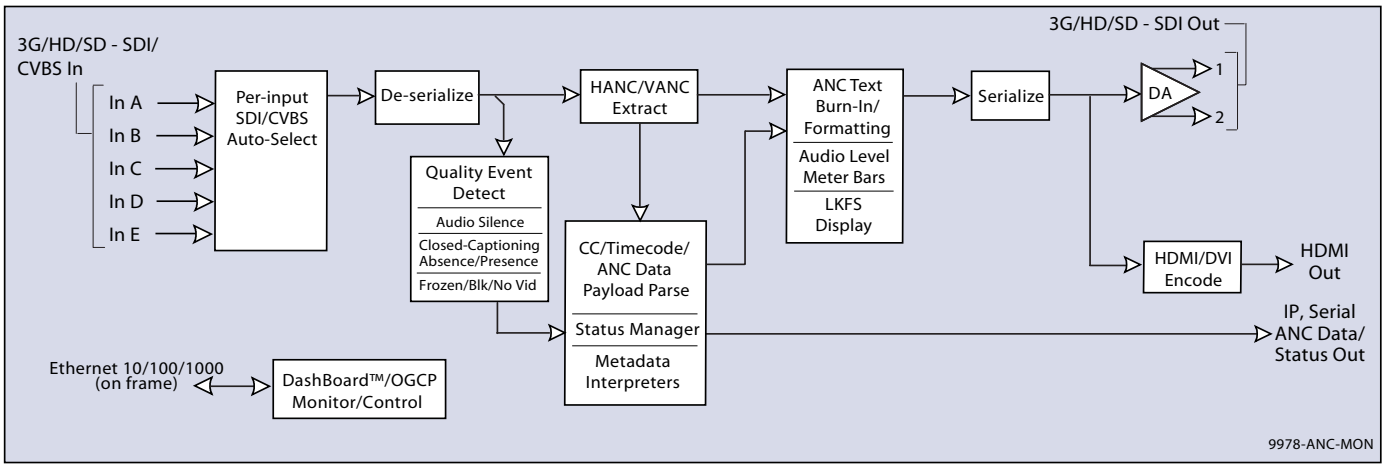
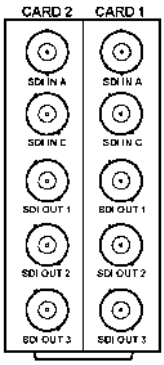
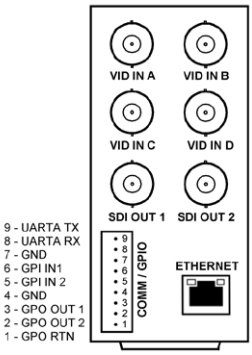
9978-ANC-MON » 3G/HD/SD-SDI ANCILLARY DATA MONITORING PROBE

with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding

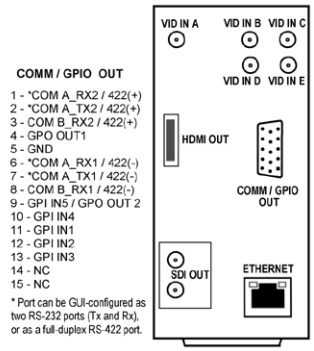




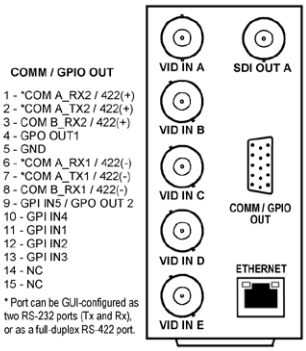
RM20-9978-A|S



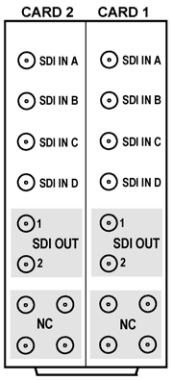
RM20-9978-B



RM20-9978-C-DIN
RM20-9978-C-HDBNC

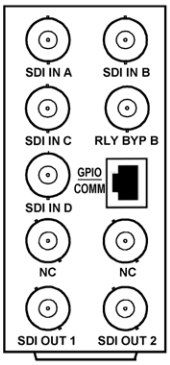


RM20-9978-D



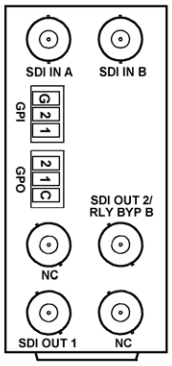
RM20-9978-G|S-DIN
RM20-9978-G|S-HDBNC

Note: RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.

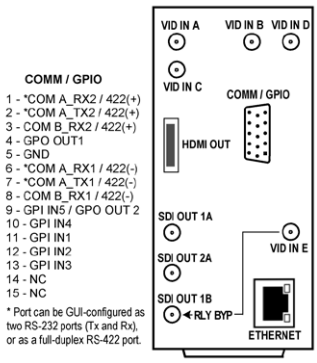


RM20-9978-E

Note: RLY BYP B is the card processed output which uses either input SDI IN A or SDI IN B. This output uses relay latching to retain selected routing in the event of power loss regardless of whether a selection was manually invoked or by a unit-detected failover (for example, if an auto-changeover from A to B was invoked while active, routing of input B to this output is retained in the event of power loss).



RM20-9978-F



RM20-9978-H-DIN
RM20-9978-H-HDBNC

Note: Some rear module illustrations may show GPIO/COMM connections. These connections/functions are reserved and currently NC for this model.

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9978-ANC-MON » 3G/HD/SD-SDI ANCILLARY DATA MONITORING PROBE

with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

Video Input/Outputs

Video Inputs: (5, max) 75O BNC; auto-detect/setup for 3G/HD/SD-SDI or CVBS
SDI Outputs: (4) 75Ω BNC (rear module determines number of outputs)
HDMI Output: (1) HDMI output with audio embedding)
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

ORDERING INFORMATION

9978-ANC-MON 3G/HD/SD-SDI Ancillary Data Monitoring Probe with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding

RM20-9978-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNCs, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per each Card 1 / Card 2 connector bank)

RM20-9978-B 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD-SD-SDI Input BNCs, (2) 3G/HD/SD-SDI Output BNCs , Ethernet Port

RM20-9978-C-DIN 20-Slot Frame Rear I/O Module (Standard Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) 3G/HD/SD-SDI Outputs, HDMI Output, Ethernet Port (all coaxial connectors DIN 1.0/2.3)

RM20-9978-C-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) 3G/HD/SD-SDI Outputs, HDMI Output, Ethernet Port (all coaxial connectors HD-BNC)

RM20-9978-D 20-Slot Frame Rear I/O Module (Standard Width) (5) 3G/HD-SD-SDI/CVBS Input BNCs, (1) 3G/HD/SD-SDI Output BNC, Ethernet Port

RM20-9978-E 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Input BNCs, (2) 3G/HD/SD-SDI Output BNCs, (1) 3G/HD/SDI Output BNC (with relay bypass failover)

RM20-9978-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (1) 3G/HD/SD-SDI Processed Output BNC

RM20-9978-G/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (2) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors DIN1.0/2.3)

RM20-9978-G/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (4) 3G/HD/SD-SDI Inputs, (2) 3G/HD/SD-SDI Outputs (Connections are per each Card 1 / Card 2 connector bank; all coaxial connectors HD-BNC)

RM20-9978-H-DIN 20-Slot Frame Rear I/O Module (Standard Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) 3G/HD/SD-SDI Outputs, (1) 3G/HD/SD-SDI Output with Relay Bypass Protect, HDMI Output, Ethernet Port (all coaxial connectors DIN 1.0/2.3)

RM20-9978-H-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) 3G/HD/SD-SDI Outputs, (1) 3G/HD/SD-SDI Output with Relay Bypass Protect, HDMI Output, Ethernet Port (all coaxial connectors HD-BNC)

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BBG-1078-ANC-MON » 3G/HD/SD-SDI STANDALONE ANCILLARY DATA MONITORING PROBE

with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding

The Cobalt® **BBG-1078-ANC-MON 3G/HD/SD-SDI Standalone Ancillary Data Monitoring Probe with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding** provides an easy to use, economical solution that offers comprehensive ancillary data monitoring/"probing" to validate and ensure expected presence and handling of ancillary data in SDI streams.

Unlike expensive and hard to use waveform monitors, the BBG-1078-ANC-MON shows status in "plain language" on-screen overlays. Unlike typical test equipment, its user interface is designed from the ground up to be used by everyday operations personnel and not just engineers. The status burn-in is available on the card SDI output as well as a convenience HDMI output that can be directly connected to a wall monitor.

In addition to its user interface, the BBG-1078-ANC-MON can integrate with automation systems via its IP and SNMP interfaces. The BBG-1078-ANC-MON is an unprecedent first in a compact standalone form factor that fits in your existing environment without the need for expensive, delicate, bulky test gear. The BBG-1078-ANC-MON supports and offers monitoring for many data packages such as closed captioning, SCTE 104, 608-XDS, AFD and others, providing not just presence/absence status but also interpreters that parse the payload and display it as a burn-in. Also included standard is a continuously running display of ATSC A/85 LKFS loudness.

The BBG-1078-ANC-MON can be remote-controlled using DashBoard™. The compact standalone form factor allows desktop usage, as well as the 1/3-rack size of the BBG-1078-ANC-MON allowing 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting to a standard 19" frame).

Intuitive layout clearly and simultaneously showing multiple aspects of the input signal and its ancillary data are displayed in real time along with programming.

Conditions for any number of criteria are immediately apparent via color coding to indicate normal operation, errors, ancillary data absense or other errors. No difficult nested menus or difficult to interpret messages.

FEATURES

Easy to use, economical solution for comprehensive ancillary data monitoring/"probing"

"Plain language" easy to understand status burn-in overlay displayed along with program video makes status monitoring easy. HDMI output allows use with standard consumer monitor panels.

Quality Check provides immediate alert status for quality issues such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.

On-screen presence/absence of selected DID/SDIDs

Fully flexible and configurable with user presets to simplify setup

Closed Captioning, SCTE 104, AFD, and 608-XDS monitoring and payload interpret

Audio level bars display and LKFS numeric display

Full status forwarding to automated systems using IP and SNMP interfaces

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.

Uses DashBoard remote control (device appears as single-card frame)

Five year warranty

OPTIONS

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

Redundant Power Supply Module (BBG-1000-PS)

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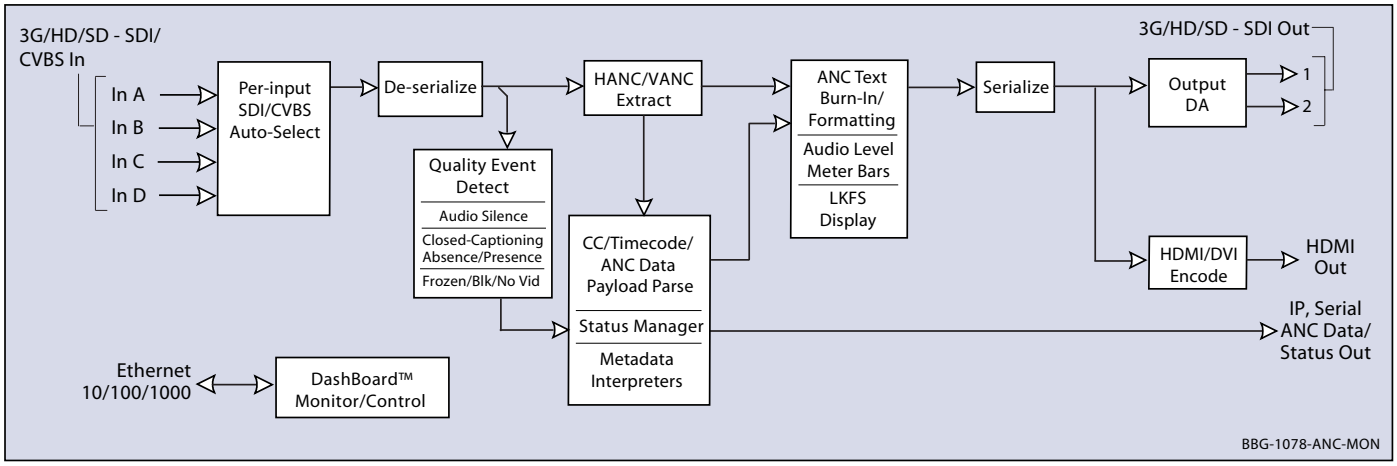
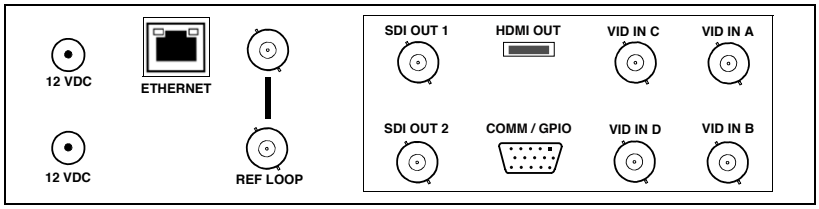
BBG-1078-ANC-MON » 3G/HD/SD-SDI STANDALONE ANCILLARY DATA MONITORING PROBE

with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding



Note: Rear panel illustrations may show GPIO/COMM connections. These connections/functions are reserved and currently NC for this model.

Rear Panel



SPECIFICATIONS

Power

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

Video Input/Outputs

Video Inputs: (4) 75Ω BNC; auto-detect/setup for 3G/HD/SD-SDI or CVBS
SDI Outputs: (2) 75Ω BNC
HDMI Output: (1) HDMI output with audio embedding)
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

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)

ORDERING INFORMATION

BBG-1078-ANC-MON 3G/HD/SD-SDI Standalone Ancillary Data Monitoring Probe with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding

BBG-1000-PS Redundant Power Supply Module

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

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9960-TG2-REF1 » 3G/HD/SD-SDI DUAL TEST SIGNAL GENERATOR with Moving Box Active Signal Indication and Bi-Level/Tri-Level Sync Out

The Cobalt® **9960-TG2-REF1 3G/HD/SD-SDI Dual Test Signal Generator with Moving Box Active Signal Indication and Bi-Level/Tri-Level Sync Out** offers an easy to use, economical solution to providing comprehensive test signal packages to ensure validity of downstream baseband SDI systems. The 9960-TG2-REF1 is an unprecedented first in the high-density openGear® based card form factor. Two independent generator blocks can be set to offer dual test packages which can be simultaneoulsy outputted or selectively fed to a single downstream path via a 2x4 output crosspoint.

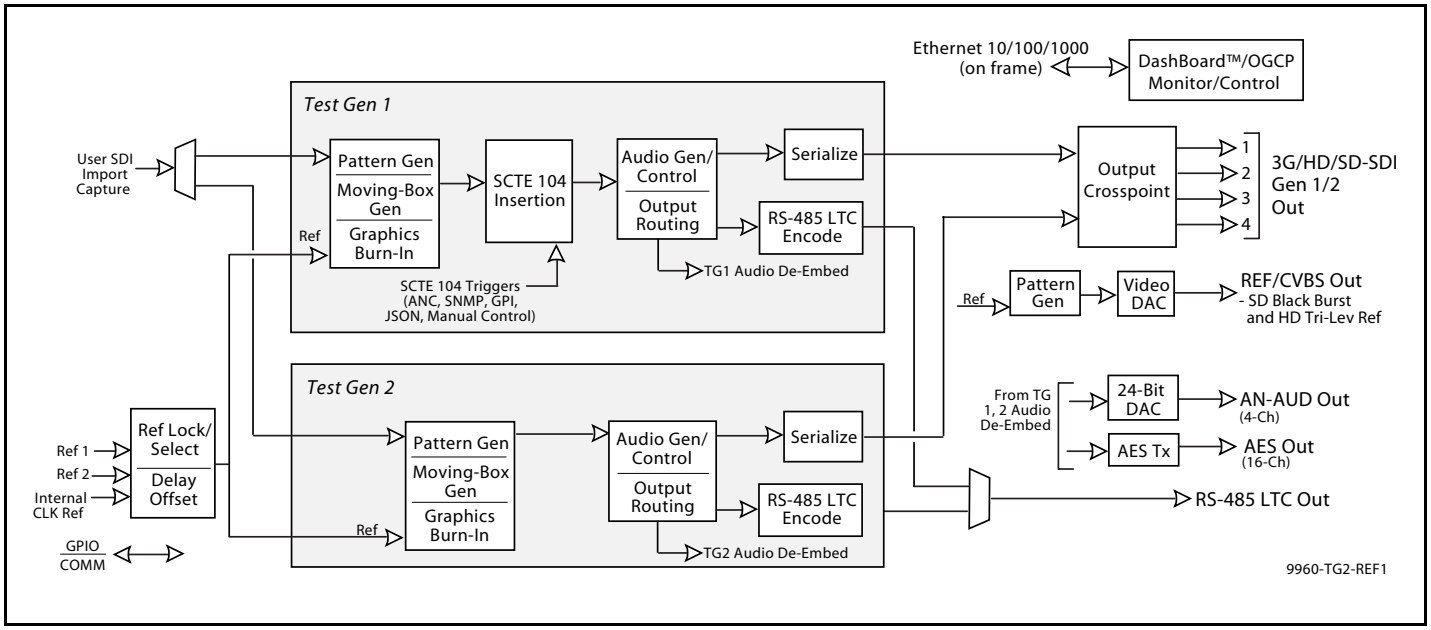
SCTE 104 insertion function provides generation and insertion of SCTE 104 messages into baseband SDI. Message send can be triggered from automation GPI, manual, or other event action modes. The function can also execute card actions based on SCTE 104 messages received by the card, as well as send triggered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

The 9960-TG2-REF1 also provides AES and analog audio test tones (both using 24-bit data). A moving-box insertion can be enabled to serve as a dynamic raster confidence check. The 9960-TG2-REF1 can use either of two frame references to provide an output that's synchronous with house ref, or use its internal ref timing to generate its own ref. An analog video output offers SD black burst or HD tri-level reference output.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern while not changing any other settings or aspects. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

- Comprehensive test signal generation for SDI/analog video and baseband discrete audio in an easily integrated openGear® card
- Easy to use, intuitive, flexible, and far more economical than typical bench equipment
- Fully-independent dual generator blocks offer simultaneous output of user-configured test packages, or instant user selection between generators via output crosspoint
- Moving-box/motion insertion enable serves as an easy to use dynamic raster confidence check
- Closed-captioning CEA 608 generator allows user test packages of VBI closed captioning for testing downstream systems
- SCTE 104 insertion available using ancillary data, GPI, SNMP, or JSON via HTTP POST / WebSocket, with full control of splice start, end, and cancel as well as pre-roll and break duration offsets
- SDI import allows insertion of user static raster/patterns as an alternative addition to standard test pattern outputs
- Full suite of output interfaces – SDI, CVBS, AES and analog audio
- Convenience RS-485 LTC output works with legacy systems and checks bi-phase LTC/SMPTE 12 correlation in mixed systems
- Low-power/high-density design – less than 18 Watts per card
- Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
- Five year warranty



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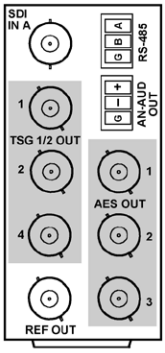
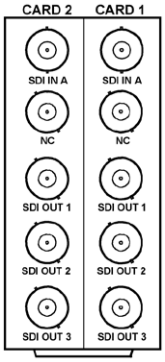
9960-TG2-REF1 » 3G/HD/SD-SDI DUAL TEST SIGNAL GENERATOR with Moving Box Active Signal Indication and Bi-Level/Tri-Level Sync Out



RM20-9960-A



RM20-9960-A/S

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
< 18 Watts

SDI Inputs/Outputs
(1) SDI User Input (75Ω BNC)
Up to (4) 75Ω BNC outputs
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
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

CVBS Video Output
(1) 75Ω BNC output

Discrete Audio Outputs
AES-3id 75Ω outputs (8 pair (16-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 THD+N: -96 dB (20 Hz to 10 kHz)
Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

Timecode Insertion/Burn-In
Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In
(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

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. All connections via rear module RJ-45 GPIO/COMM jack.

Frame Reference Input
(2) reference from frame bus. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M.
Return Loss: >35 dB up to 5.75 MHz

ORDERING INFORMATION

9960-TG2-REF1 3G/HD/SD-SDI Dual Test Signal Generator with Moving Box Active Signal Indication and Bi-Level/Tri-Level Sync Out

RM20-9960-A 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (3) 3G/HD/SD-SDI Output BNCs, (1) REF/CVBS Out BNC, (3) AES Out BNC, (1) Balanced Analog Audio Output, (1) RS-485 I/O

RM20-9960-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) 3G/HD/SD-SDI Input BNC, (2) 3G/HD/SD-SDI Input BNCs, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per each Card 1 / Card 2 connector bank)

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BBG-1060-TG2-REF1 » 3G/HD/SD-SDI STANDALONE DUAL TEST SIGNAL GENERATOR

with Moving Box Active Signal Indication and Bi-Level/Tri-Level Sync Out

The Cobalt® **BBG-1060-TG2-REF1 3G/HD/SD-SDI Standalone Dual Test Signal Generator** with Moving Box Active Signal Indication and Bi-Level/Tri-Level Sync Out offers an easy to use, economical solution to providing comprehensive test signal packages to ensure validity of downstream baseband SDI systems. Two independent generator blocks can be set to offer dual test packages which can be simultaneously outputed.

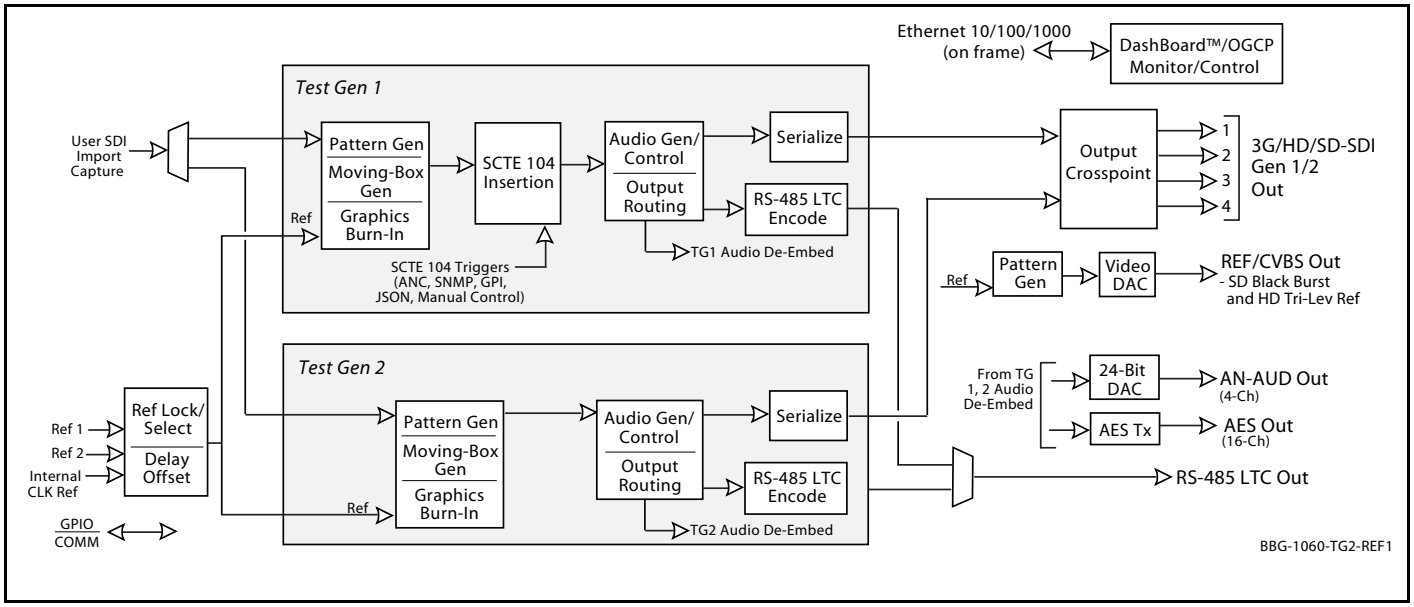
SCTE 104 insertion function provides generation and insertion of SCTE 104 messages into baseband SDI. Message send can be triggered from automation GPI, manual, or other event action modes. The function can also execute device actions based on SCTE 104 messages received by the BBG-1060, as well as send triggered SCTE 104 packets to other downstream systems.

The BBG-1060-TG2-REF1 also provides AES and analog audio test tones (both using 24-bit data). A moving-box insertion can be enabled to serve as a dynamic raster confidence check. The BBG-1060-TG2-REF1 can use an external reference to provide an output that's synchronous with house ref, or use its internal ref timing to generate its own ref. An analog video output offers SD black burst or HD tri-level reference output.

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 while not changing any other processing settings or aspects. The BBG-1060-TG2-REF1 can be remote-controlled using DashBoard™. The compact standalone form factor allows desktop usage, as well as the 1/3-rack size of the BBG-1060-TG2-REF1 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

- Comprehensive test signal generation for SDI/analog video and baseband discrete audio in an easily integrated standalone unit
- Easy to use, intuitive, flexible, and far more economical than typical bench equipment
- Fully-independent dual generator blocks offer simultaneous output of user-configured test packages, or instant user selection between generators via output crosspoint
- Full suite of output interfaces – SDI, CVBS, AES and analog audio.
- Closed-captioning CEA 608 generator allows user test packages of VBI closed captioning for testing downstream systems
- SCTE 104 insertion available using ancillary data, GPI, SNMP, or JSON via HTTP POST / WebSocket, with full control of splice start, end, and cancel as well as pre-roll and break duration offsets
- Moving-box/motion insertion enable serves as an easy to use dynamic raster confidence check
- SDI import allows insertion of user static raster/patterns as an alternative addition to standard test pattern outputs
- Convenience RS-485 LTC output works with legacy systems and checks bi-phase LTC/SMPTE 12 correlation in mixed systems
- 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 or Web Browser User Interface
- Five year warranty



DashBoard

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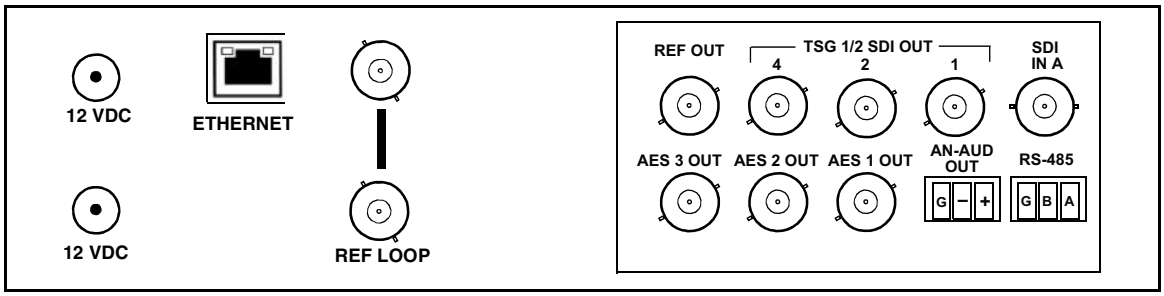
BBG-1060-TG2-REF1 » 3G/HD/SD-SDI STANDALONE DUAL TEST SIGNAL GENERATOR

with Moving Box Active Signal Indication and Bi-Level/Tri-Level Sync Out

Rear Panel



SPECIFICATIONS

Power

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

SDI Input/Outputs

(1) SDI User Input (75Ω BNC)
Up to (4) 75Ω BNC outputs
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
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

CVBS Video Output

(1) 75Ω BNC output

Discrete Audio Outputs

AES-3id 75Ω outputs (8 pair (16-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 THD+N: -96 dB (20 Hz to 10 kHz)
Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

User Audio Delay Offset from Video

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

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
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)

ORDERING INFORMATION

BBG-1060-TG2-REF1 3G/HD/SD-SDI Standalone Dual Test Signal Generator with Moving Box Active Signal Indication and Bi-Level/Tri-Level Sync Out

BBG-1000-PS Redundant Power Supply Module

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

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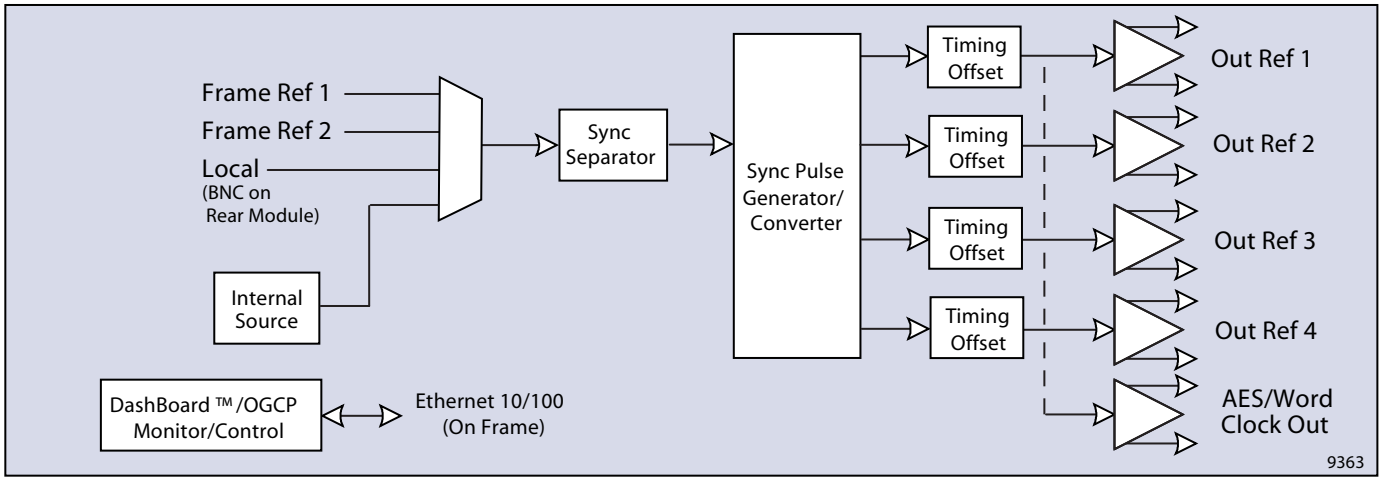
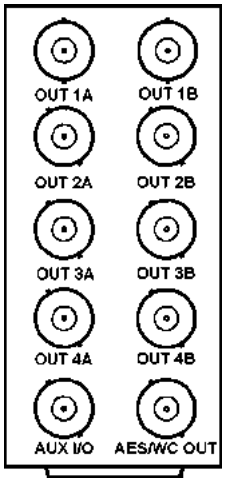
9363 » MULTI-FORMAT REFERENCE GENERATOR

The highly flexible **9363 Multi-Format Reference Generator** generates four reference signal pairs that are independently configurable as composite black burst or tri-level reference sources. Each output can be any industry standard rate related to a received input reference source, or can be generated using the card's internal clocking source. Timing for each output pair can be independently offset (in vertical lines or horizontal pixels) from the received reference or internal clock.

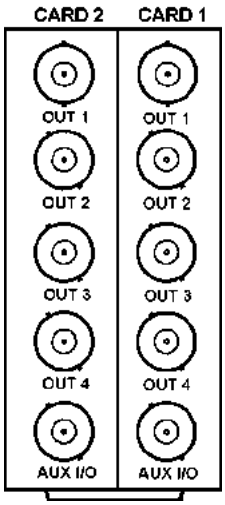
FEATURES

- Flexible, single-card source for any NTSC or PAL SD/HD broadcast or film reference rate
- Develops output reference using external analog reference or stand-alone internal clock source
- AES/Word Clock output synchronized to any of the four card reference outputs
- Outputs can be independently set for frame rate and delay relative from input/internal reference, or from each other
- Genlock to output rates of 1:1, 1:2, or 2:1 relationship with clock source. Field Lock for interlaced format outputs from progressive clock sources.
- Remote control/monitoring via DashBoard™ software
- Hot-swappable
- Five year warranty





RM20-9363-A



RM20-9363-A/S

openGear®

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9363 » MULTI-FORMAT REFERENCE GENERATOR

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
6 Watts

Reference Input
Impedance: 75 Ω
Standard: SMPTE 274M, 296M, 170M; ITU-R BT.470-6 (PAL-B)
Return Loss: >40 dB to 10 MHz

Reference Outputs
Reference Outputs: 4 pairs max. (each pair independently configurable)
Rates (Hz; internal clock): 60, 59.94, 50, 30, 29.97, 25, 24, 23.98
Signal Level: 1 Vp-p
Impedance: 75 Ω
Return Loss: >40 dB to 30 MHz
Internal Clock Count Stability: 1 ppm initial (4.6 ppm 10 years; all conditions within specifications)
Thermal Stability: ±0.25 ppm (0° to 70° C)

AES/Word Clock Output
Signal Level: 1 Vp-p
Impedance: 75 Ω
Return Loss: >25 dB to 10 MHz
AES Sample Rate: 48 kHz

ORDERING INFORMATION

9363 Multi-Format Reference Generator

RM20-9363-A 20-Slot Frame Rear I/O Module (Standard Width) BNC Analog Reference Input or AES/Word Clock Output (configurable), 4x2 BNC Analog Reference Outputs, dedicated AES/Word Clock BNC Output

RM20-9363-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) BNC Analog Reference Input or AES/Word Clock Output (configurable), 4 BNC Analog Reference Outputs (connections are per card)

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NOTES »

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Cobalt Digital Inc. designs and manufactures award-winning IP and 12G/6G/3G/HD/SD conversion, throwdown, and multiviewer technology for the production and broadcast television environment. As a founding member in the openGear® initiative, Cobalt offers a full range of openGear-compliant solutions as well as video and audio processing products for closed caption compliance, production trucks, master control, HD news, signal transport, audio loudness processing, and color correction. Cobalt's Blue Box Group™ line of interface converter throwdown boxes streamlines and simplifies a wide range of IP and 12G/6G/3G/HD/SD conversion and processing tasks. In addition, the company's multi-image display processors enable multiviewer capabilities in the most demanding studio and remote production/broadcasting environments. Cobalt Digital products are distributed through a worldwide network of dealers, system integrators, and other partnerships.

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