ENGINEERING BEYOND THE SIGNAL

COBALT®

2016-2017 PRODUCT CATALOG

openGear

BBG1000

LMNTS
LOUDNESS MANAGER FOR N TRANSPORT STREAMS

SPOTCHECK®

BLUE BOX

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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	9903-UDX-ADDA	9922-FS	9922-2FS	9932-EMDE	9950-EMDE-ANC	9901-UDX (-XC) (-DC) (-UC)	9921-FS	9931-EMDE	9985	9121	9371-9374	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	0		S	S	0	S											
AES Audio Embed / De-Embed	S	S	S	S	S		S	S	S	S		S			S	S	S	S			
Analog Audio Embed / De-Embed	S	S	S	S	S			0	0	0											
CVBS I/O	S	S	S	S	S		0	0	0	0											
HD/SD Component Video I/O		S					0	0	0	0											
Fiber I/O and EO / OE Conversion							0	0	0	0							S	S			
Color Correction	0	0	0	0	0		0	0	0	0			S	S							
Text-to-Speech 21CVAA	0		0	0	0																
Dual-Path Program Video Processing			0	S										S							
Wings Insertion	S		S	S			0	0													
Trouble Slate/Logo Insertion	0		0	0	0														S		
Keying	0		0	0			0	0		0											
Advanced Audio Proc (per-channel and bulk advance/delay, AES SRC, downmix, flexmix)	S		S	S	S		S	S	S	S											
Audio DSP Features (Loudness Proc, Upmix, Dolby encode/decode)	0		0	0	0			0	0	S											
ANC Embed / De-Embed	0	0	0	0	0	S															
AFD	0						S														
Video-Audio-ANC Quality / Presence Check	0		0	0	0																S
Multi-Input Failover / Relay Bypass	0	0	0	0	0		0	0	0	0	S								S	S	
MADI Embed / De-Embed												S									
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-EO, OE, OEO, EOOE, 2EO, 2OE
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	

S Standard
O Optional

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

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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.

Available for the following cards and models on product purchased new or as field software upgrade:

- 9501-DCDA, 9502-DCDA, 9902-UDX, 9903-UDX-ADDA, 9922-FS, 9922-2FS, 9932-EMDE, 9940-4x1-CS
- All Fusion3G® models (9901, 9921, 9931, 9985)
- BBG-1000 series standalone/desktop units BBG-1002-UDX, BBG-1003-UDX-ADDA, BBG-1022-FS, BBG-1022-2FS, BBG-1032-EMDE, BBG-1040-4x1-CS

+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.

Available for the following cards and models:

- 9902-UDX, 9922-FS, 9922-2FS, 9932-EMDE (Available for these models on product purchased new or as field software upgrade)
- BBG-1000 series standalone/desktop units BBG-1002-UDX, BBG-1022-FS, BBG-1022-2FS, BBG-1032-EMDE (Available for these models on product purchased new or as field software upgrade)
- 9901, 9921, 9985 (Available for these cards only on cards purchased new)

+WINGS – Wings Insertion Software Option

Provides wings insertion using an independent SDI input provided for wings signal. On models equipped with a scaler, allows wings insertion width to automatically track with AFD.

Available for the following cards and models:

- 9902-UDX, 9922-FS, 9922-2FS, 9932-EMDE (Available for these models on product purchased new or as field software upgrade)
- BBG-1000 series standalone/desktop units BBG-1002-UDX, BBG-1022-FS, BBG-1022-2FS, BBG-1032-EMDE (Available for these models on product purchased new or as field software upgrade)
- 9901, 9921, 9985 (Available for these cards only on cards purchased new)

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QUALITY CHECK/SIGNAL INTEGRITY ASSURANCE AND ANCILLARY DATA SUPPORT 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.

Available for the following cards and models on product purchased new or as field software upgrade:

- 9902-UDX, 9922-FS, 9922-2FS, 9932-EMDE, 9940-4x1-CS
- BBG-1000 Series standalone/desktop units BBG-1002-UDX, BBG-1022-FS, BBG-1022-2FS, BBG-1032-EMDE, BBG-1040-4x1-CS

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

ANCILLARY DATA SUPPORT OPTIONS

+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.

Available for the following cards and models on product purchased new or as field software upgrade:

- 9902-UDX, 9903-UDX-ADDA, 9922-FS, 9922-2FS, 9932-EMDE, 9940-4x1-CS (standard feature on 9950-EMDE-ANC)
- BBG-1000 Series standalone/desktop units BBG-1002-UDX, BBG-1003-UDX-ADDA, BBG-1022-FS, BBG-1022-2FS, BBG-1032-EMDE, BBG-1040-4x1-CS (standard feature on BBG-1050-EMDE-ANC)

+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.

Available for the following cards and models on product purchased new or as field software upgrade:

- 9501-DCDA, 9502-DCDA, 9902-UDX, 9903-UDX-ADDA,
- 9922-FS, 9922-2FS, 9932-EMDE, 9940-4x1-CS
- BBG-1000 series standalone/desktop units BBG-1002-UDX, BBG-1003-UDX-ADDA, BBG-1022-FS, BBG-1022-2FS, BBG-1032-EMDE, BBG-1040-4x1-CS
- All Fusion3G® models (9901, 9921, 9931, 9985)
- Most Compass legacy models

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TEXT-TO-SPEECH AUTOMATION AND DEVICE UPGRADE OPTIONS »

TEXT-TO-SPEECH 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."

Available for the following cards and models on product purchased new or as field software upgrade:

- 9902-UDX, 9922-FS, 9922-2FS, 9932-EMDE
- BBG-1000 series standalone/desktop units BBG-1002-UDX, BBG-1022-FS, BBG-1022-2FS, BBG-1032-EMDE

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.

Available for the following cards and models on product purchased new or as field software upgrade:

- 9501-DCDA-HD, 9502-DCDA-HD
- 9901-UDX-HD

+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.

Available for the following cards and models on product purchased new or as field software upgrade:

- 9931, 9932-EMDE, BBG-1032-EMDE
- 9501-DCDA, 9502-DCDA

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

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

Available for the following cards and models on product purchased new or as field software upgrade:

- 9922-FS, BBG-1022-FS

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AUDIO DSP OPTIONS »

AUDIO DSP OPTIONS

+LP – Linear Acoustic® AEROMAX® Loudness Processing Software Options (+LP20 - Stereo; +LP51 - 5.1)
Using Linear Acoustic® AEROMAX® algorithms, performs ATSC A/85-compliant 5.1 or stereo loudness processing on any digital audio channels outputted by the card.

Available for the following cards and models on product purchased new or as field software upgrade:
- 9902-UDX, 9922-FS, 9922-2FS, 9932-EMDE
- BBG-1000 series standalone/desktop units BBG-1002-UDX, BBG-1022-FS, BBG-1022-2FS, BBG-1032-EMDE
- 9901, 9921, 9931, 9985 (standard feature on 9985)"

+UM – Linear Acoustic® UPMAX™ Audio Upmixer Software Option
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, allowing legacy stereo programming to fully utilize 5.1-channel audio capabilities. Upmixing can be combined with loudness processing options as listed in +LP51/LP20 above.

Available for the following cards and models on product purchased new or as field software upgrade:
- 9902-UDX, 9922-FS, 9922-2FS, 9932-EMDE
- BBG-1000 series standalone/desktop units BBG-1002-UDX, BBG-1022-FS, BBG-1022-2FS, BBG-1032-EMDE
- 9901, 9921, 9931, 9985

+ENCDA THRU +ENCDD – Dolby Digital Encoder Software Options
Up to four Dolby® Digital/Digital Plus encoders can be installed and simultaneously enabled on a card. Provides full assortment of Dolby® Digital/Digital Plus encoding formats with multiple stream encoding – all on the same card. Uses any combination of audio sources supported by the card (including mixed, upmixed, and loudness processed signals). Encode using internal metadata selections with a full complement of encoding formats and bit rates, as well as from serial or SMPTE 2020 external metadata.

Available for the following cards and models on product purchased new or as field software upgrade:
- 9902-UDX, 9922-FS, 9922-2FS, 9932-EMDE
- BBG-1000 series standalone/desktop units BBG-1002-UDX, BBG-1022-FS, BBG-1022-2FS, BBG-1032-EMDE
- 9901, 9921, 9931, 9985

+ENCE – Dolby E Encoder Software Option
Provides Dolby® E encoding from any combination of audio sources supported by the card (including mixed and loudness controlled signals). Full metadata support using internally generated or external metadata via SMPTE 2020 or serial. Can be added to card already equipped with ENCD option(s) above.

Available as option +ENCEA the following cards and models on product purchased new or as field software upgrade:
- 9902-UDX, 9922-FS, 9922-2FS, 9932-EMDE
- BBG-1000 series standalone/desktop units BBG-1002-UDX, BBG-1022-FS, BBG-1022-2FS, BBG-1032-EMDE
- 9901, 9921, 9931, 9985

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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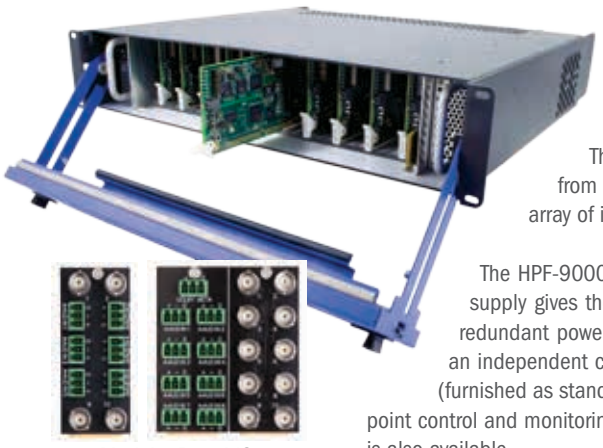
HPF-9000 » HIGH-POWER 20-SLOT FRAME

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.

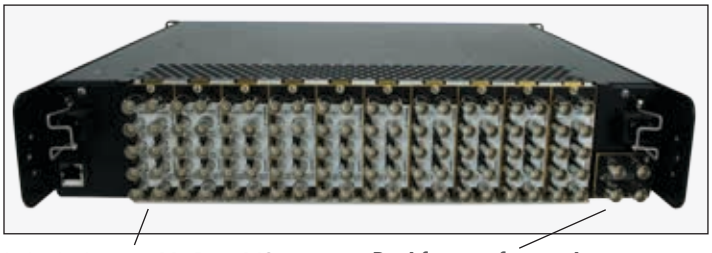


Modular Rear I/O

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.

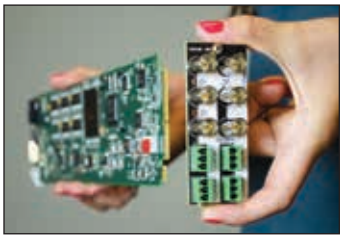
The HPF-9000 can accommodate two front-loaded PSU-9000 power supply modules. Adding a second (optional) supply gives the frame full power redundancy. The PSU-9000 power supply unit is interchangeable as a primary or redundant power supply module, with supplies in either position being hot-swappable. Each power supply contains an independent cooling fan, status LED, and a front-mounted power switch. The MFC-8320-N 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 (MFC-8320-N) 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 9-10 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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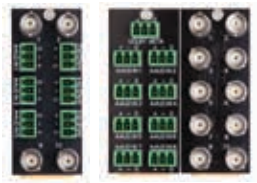
OG3-FR » 20-SLOT FRAME

The OG3-FR is a next-generation 2RU high-density modular frame offering increased available user (net) power and enhanced Gigabit Ethernet control/monitoring 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.) The frame's lightweight construction and removable, heavy-duty hinged front door is designed for maximum durability. Long term reliability is assured with the front mounted cooling fans and optional redundant power supply.



Modular Rear I/O

LCD Status Screen

The OG3-FR-CN offers the same Ethernet connectivity via DashBoard as our previous 8321-CN frame in addition to providing gigabit Ethernet networking which enhances present and future support of the openGear® remote control platform, and supports the DataSafe feature which allows faster swap-out of cards (with all card settings stored locally on the frame network card instead of on the card). A new front-panel LCD display shows a user-configured frame name, IP address, and status.

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.

The OG3-FR uses the same rear modules as our other 20-slot frame, allowing a seamless transition from an 8321 frame to the OG3-FR. These rear modules offer a broad selection for a flexible and wide array of interfaces such as BNC, twisted-pair audio, and fiber.

The OG3-FR can accommodate two power supply modules. Adding a second (optional) supply gives the frame full power redundancy. Each power supply contains an independent cooling fan, status LED, and a front-mounted power switch. Optional SNMP support, for large scale monitoring implementation, is also available.

» FEATURES

- Standard 300 Watt (user net) power supply with integral cooling
- Gigabit Ethernet offers faster access to cards, with support for future platform enhancements
- Two independent looping references internally routed to all user card slots
- Separate power cords to each power supply for power redundancy
- Power switch/supplies accessible from the front of the frame
- Independent card-based rear I/O modules flexibly support multiple interfaces, including coaxial, fiber, and 3-wire audio/control/comm interfaces. Wide array of rear I/O modules offer various connector break-outs, with high-density split rear modules allowing maximum 20-card per frame capacity.
- Network Controller Card enables multiple copies of DashBoard™ for seamless remote setup, monitoring, and control
- Front-panel LCD display shows frame name, IP address, and status
- 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
- Optional SNMP control and monitoring
- Five-year warranty

» ORDERING INFORMATION

OG3-FR 20-slot openGear® 2RU Frame with Fans and Metal Plates on Rear I/O - Includes one PS-OG3 Power Supply

OG3-FR-CN 20-slot openGear® 2RU Frame with Fans and Metal Plates on Rear I/O - Includes one PS-OG3 Power Supply and MFC-8322-N Advanced GigE Network Controller Card

OG3-FR-CNS 20-slot openGear® 2RU Frame with Fans and Metal Plates on Rear I/O - Includes one PS-OG3 Power Supply and MFC-8322-N Advanced GigE Network Controller Card with SNMP support

PS-OG3 Redundant or Spare Power Supply

FSB-OG3 Rear Support Bars and Brackets

Note: Please see "20-Slot Frame Card Capacity and Rear Modules" on the pages 9-10 for helpful information about practical card capacity, descriptions of available rear module types, and other important considerations.

openGear DashBoard

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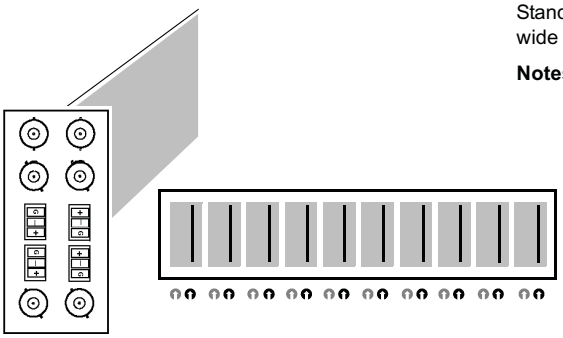
20-SLOT FRAME CARD CAPACITY AND REAR MODULES

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

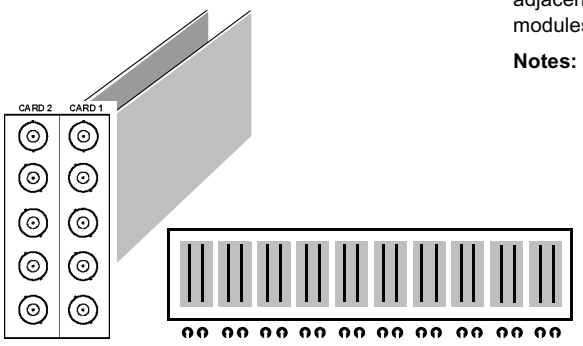
→ **10** cards per frame (max)
10 rear modules per frame (max)

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

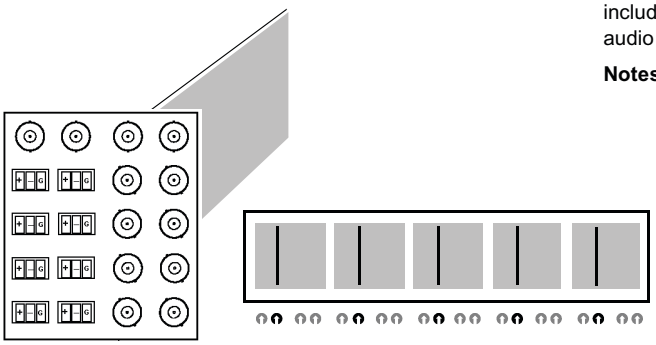
→ **20** cards per frame (max)
10 rear modules per frame (max)

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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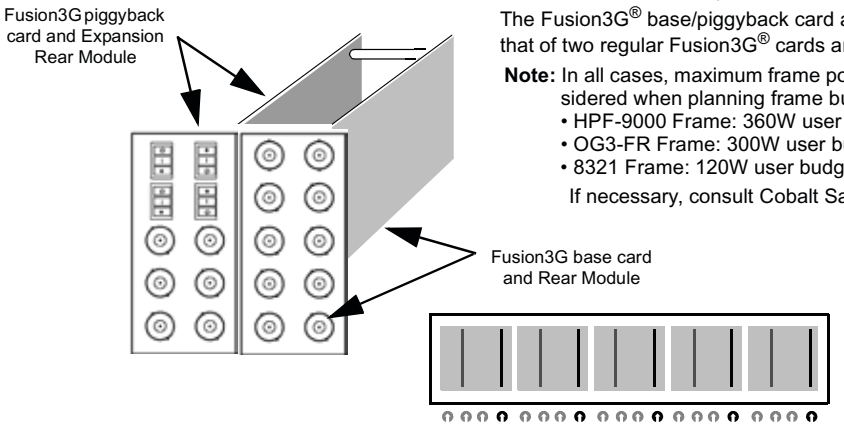
20-SLOT FRAME CARD CAPACITY AND REAR MODULES

Expansion Rear Module

(Fusion3G® only)



1 card assembly per base/expansion rear module combination
4 card slots used

➡ **5** card assemblies per frame (max)
5 base/expansion rear modules per frame (max)

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.**

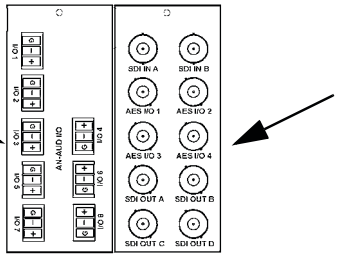
The expansion rear module installs directly to the **left** of the base Rear Module (as shown viewed from rear), and interfaces with the piggyback card.

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.

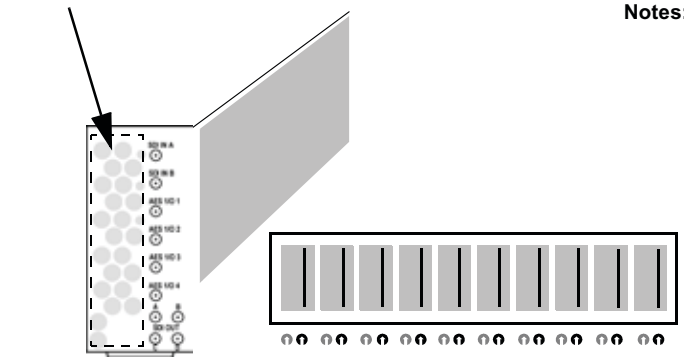
Expansion Rear Module installs directly to the **left** of base Rear Module, and interfaces with the piggyback card. In this example, an RM20-9901-XC expansion rear module breaks out analog audio connections provided by Option **+ANA** (analog audio option).



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

High-Ventilation Rear Module

Ventilation openings allow increased ventilation in installations where normal above-frame ventilation clearance is reduced



1 card per rear module
2 card slots used

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

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

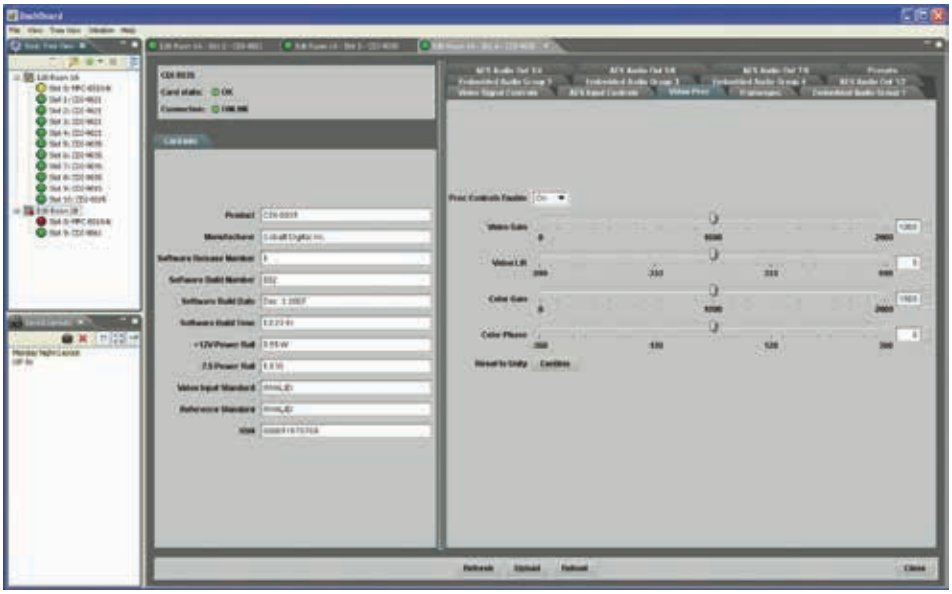
DashBoard™

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.



openGear DashBoard

» 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.

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.)

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

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

The all-new 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.

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

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

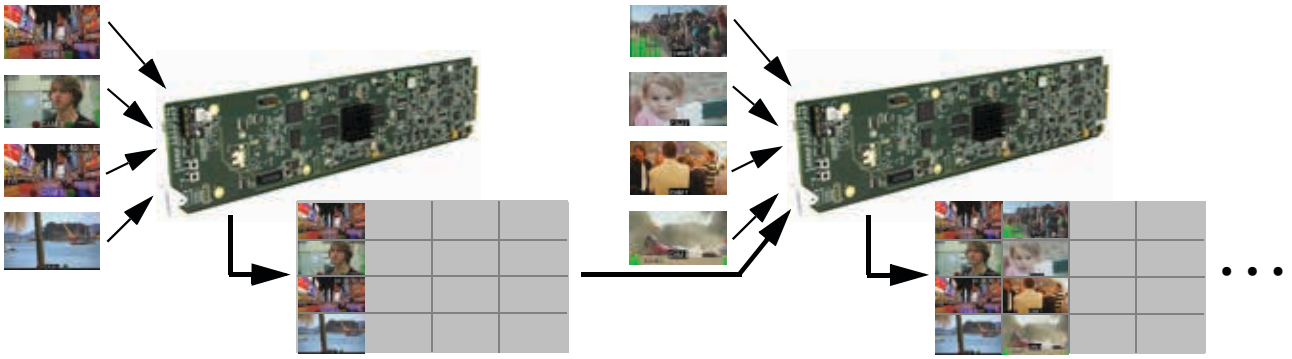
Fully flexible input compatibility – mixed formats on inputs can be automatically sized and outputted in a combined output scaled to desired broadcast SD/HD/3G output format. Each input automatically detects and sets up for SDI or CVBS input. Supports asynchronous inputs using per-PiP ref lock. Per-PiP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

DashBoard™ remote control status monitoring and setup/control

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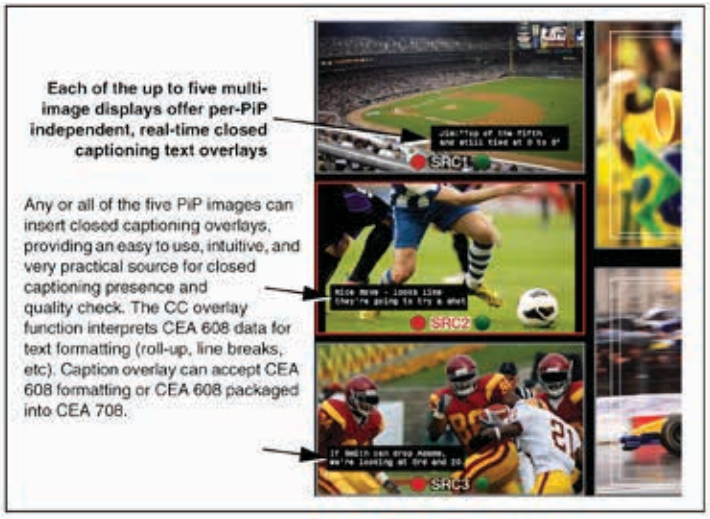
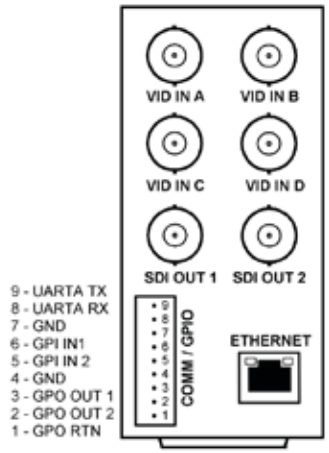
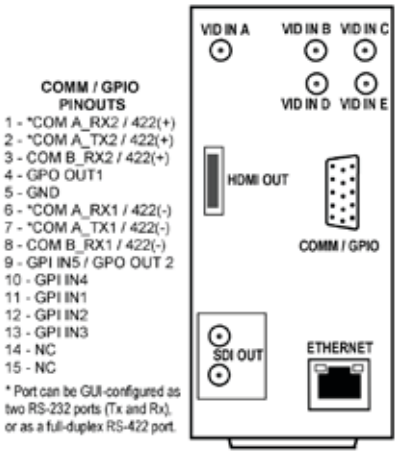
9970-QS » 3G/HD/SD-SDI/CVBS EXPANDABLE MULTIVIEWER with Advanced On-Screen Graphics

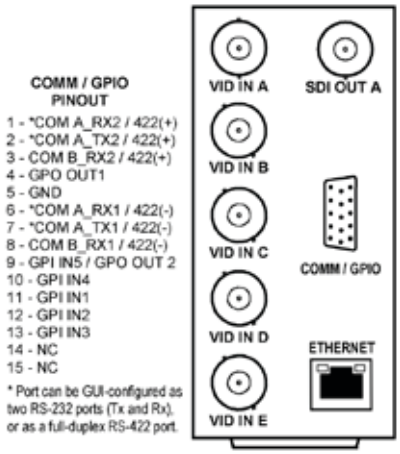




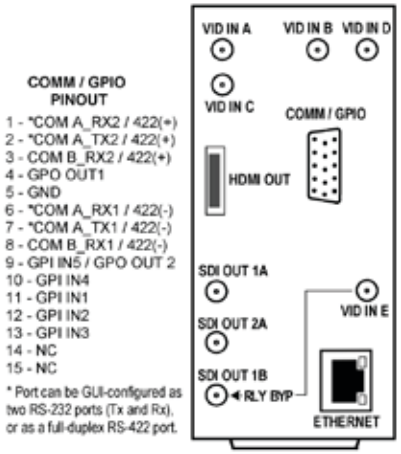
RM20-9970-B



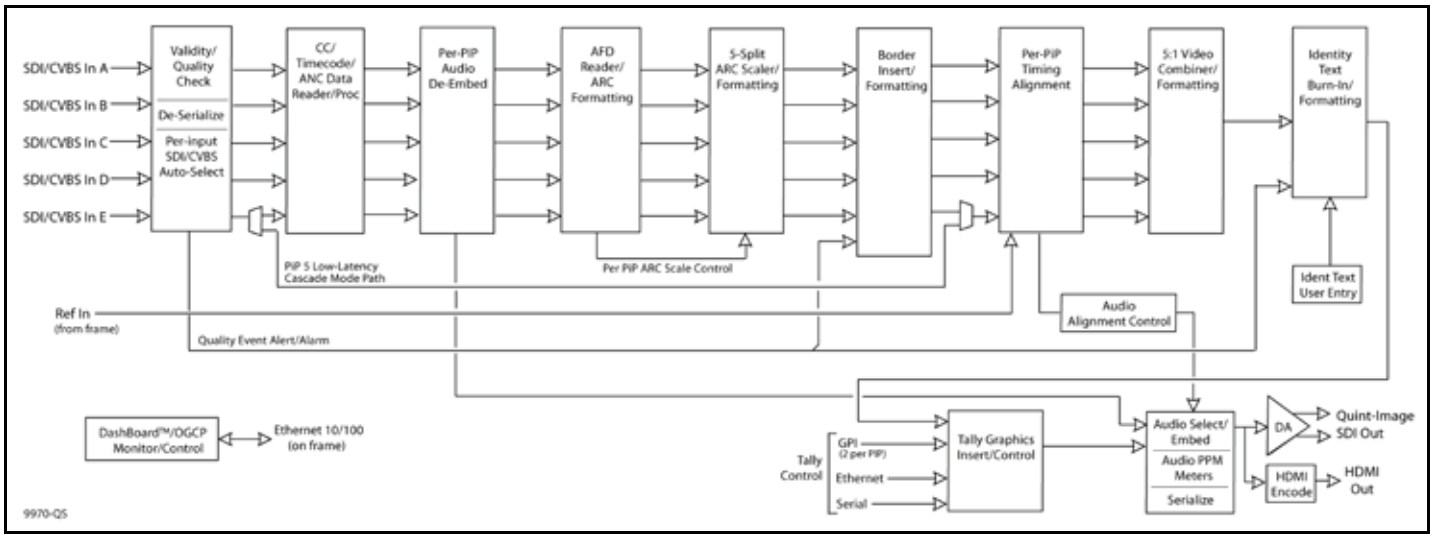
RM20-9970-C-DIN
RM20-9970-C-HDBNC



RM20-9970-D



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 all-new 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 web 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.

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

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

3G/HD/SD-SDI and HDMI outputs 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

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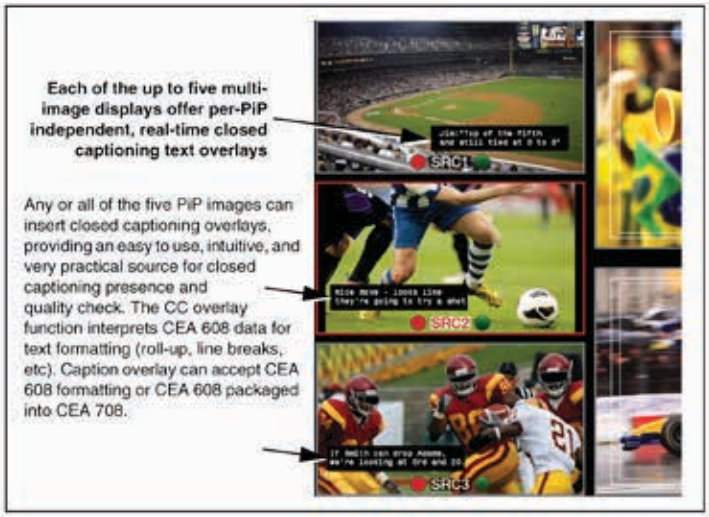
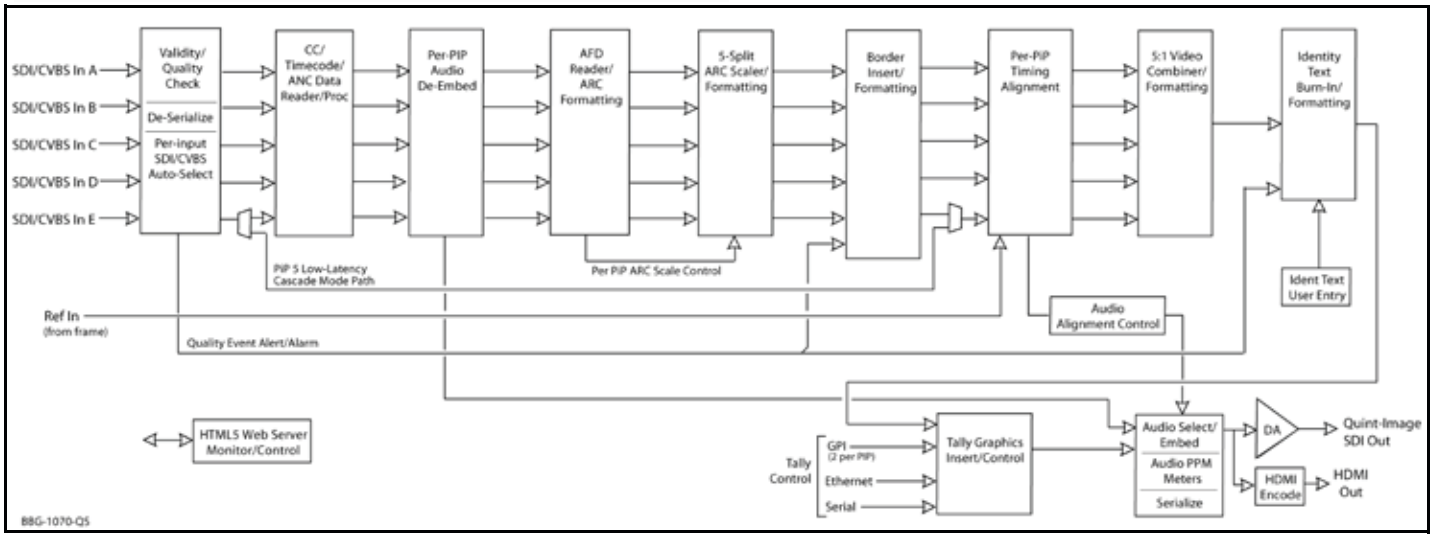
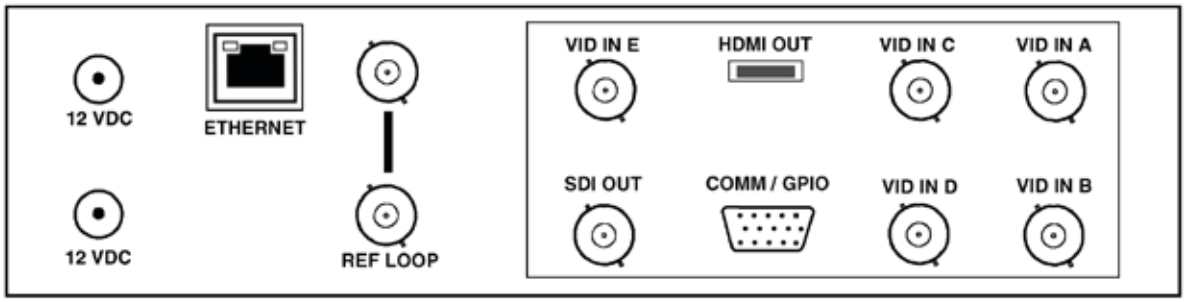
BBG-1070-QS » 3G/HD/SD-SDI/CVBS STANDALONE EXPANDABLE MULTIVIEWER

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.

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

The all-new 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, flexibility, and ease of use and integration.

With option +ANC, the 9902-UDX 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.

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.

Multiple SDI input ports allow manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions. 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 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 that allows CEA 608/708 and line 21 SD CC absence or presence to be detected.

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 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. Quality Check option (+QC) provides failover on 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
- Up/Down/Cross Conversion with user and AFD 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 CGMS support, color correction, and keying
- 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
- Option +ANC adds full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, and closed captioning. 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
- 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.
- 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)
- CGMS Support (+CGMS)
- 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.
- Audio LTC (+LTC)
- 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.
- Extended Frame Sync Delay Option (+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.

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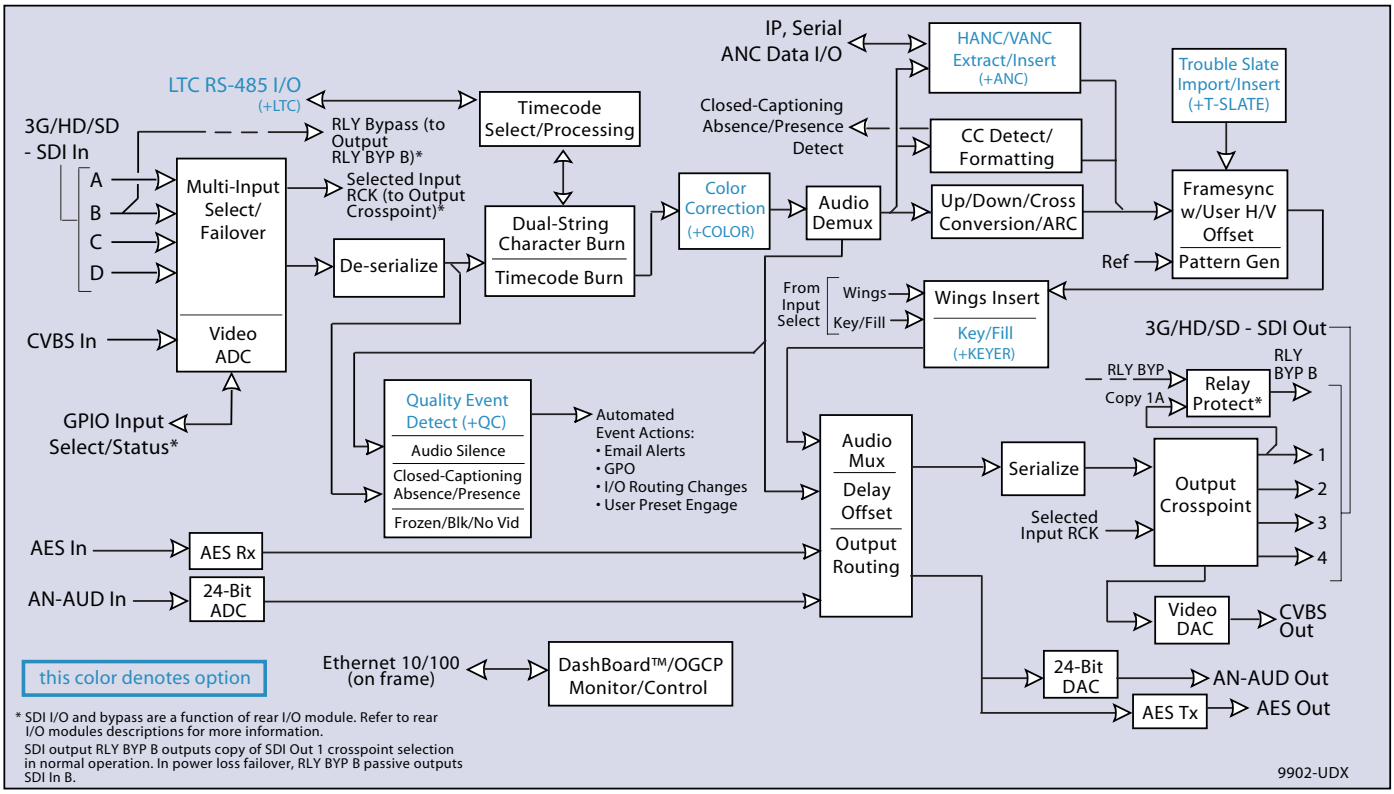
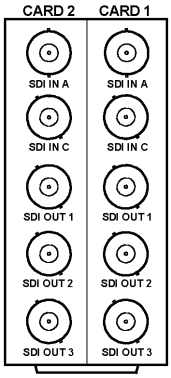
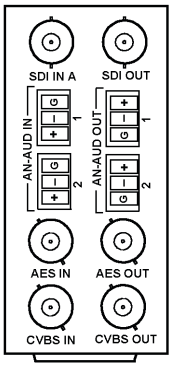
9902-UDX » 3G/HD/SD-SDI UP-DOWN-CROSS CONVERTER/FRAME SYNC/ AUDIO EMBED/DE-EMBED with Multi-Input Auto-Changeover





RM20-9902-A/S



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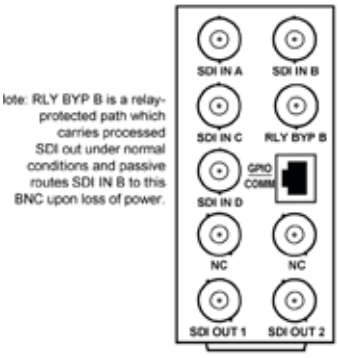

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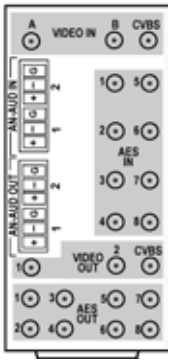
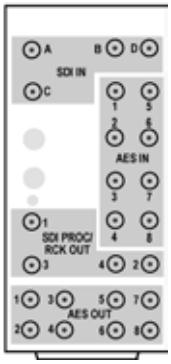
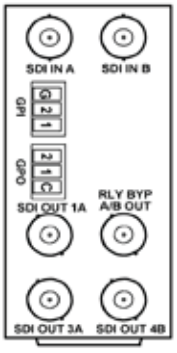


RM20-9902-D-DIN
RM20-9902-D-HDBNC



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



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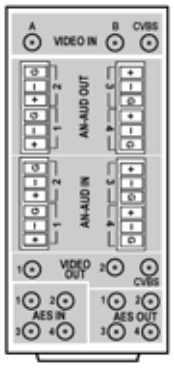
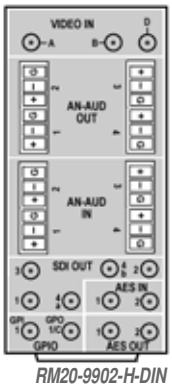
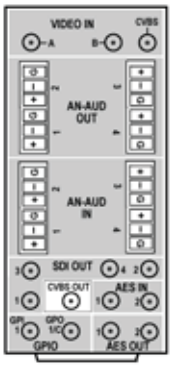


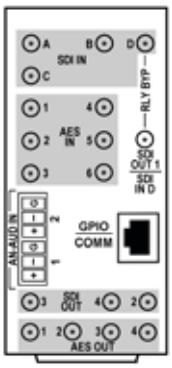
RM20-9902-G-DIN
RM20-9902-G-HDBNC



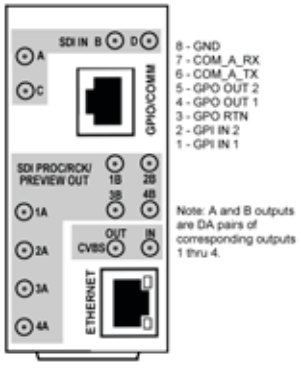
RM20-9902-H-DIN
RM20-9902-H-HDBNC



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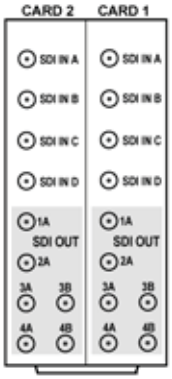
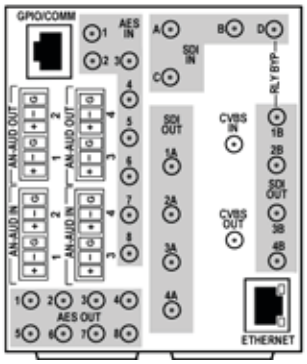
9902-UDX » 3G/HD/SD-SDI UP-DOWN-CROSS CONVERTER/FRAME SYNC/ AUDIO EMBED/DE-EMBED with Multi-Input Auto-Changeover



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 (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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9902-UDX » 3G/HD/SD-SDI 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

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-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-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-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.)

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

ORDERING INFORMATION (cont.)

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/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 (Standard Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 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 (Standard Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 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.)

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer Option

+QC Quality Check 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)

+T-SLATE User Trouble Slate Graphic Import Option

+SCTE104 SCTE 104 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 all-new 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, flexibility, and ease of use and integration. Multiple SDI input ports allow manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions.

With option +ANC, the BBG-1002-UDX 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.

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.

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 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 user presets or other actions.

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. 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. The BBG-1002-UDX-AV-EMDE model additionally provides analog video (CVBS) inputs and outputs, with AES and analog audio 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 uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control (can also 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

- 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 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.
- Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID. Also controllable using DashBoard remote control.
- Five year warranty

acapela

html5 web UI remote control

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 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

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.

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.

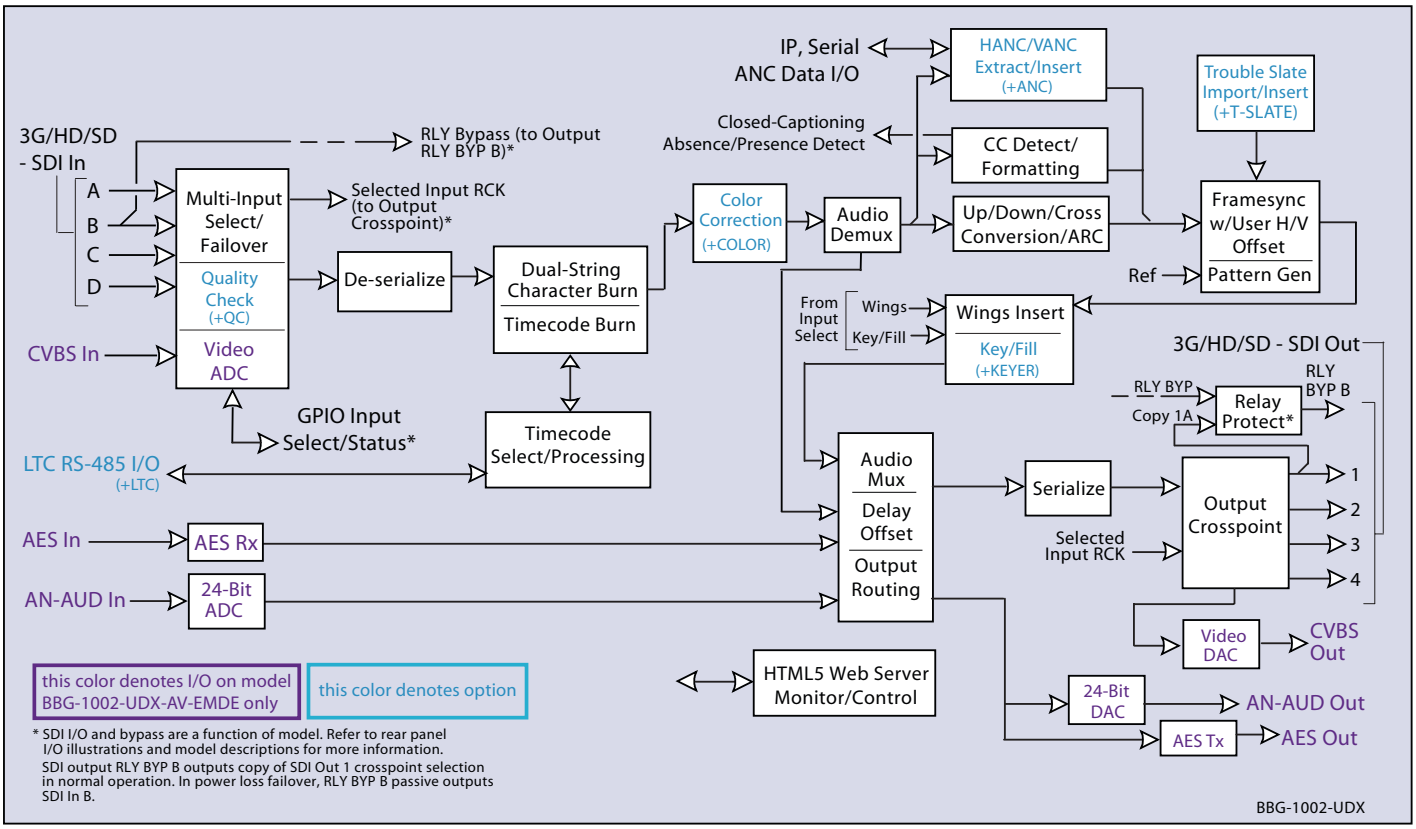
CGMS Support (+CGMS)

Trouble Slate Import (+T-SLATE)

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 B passive outputs SDI In B.

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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 (BBG-1002-UDX-AV-EMDE only)

(1) 75Ω BNC input
(1) 75Ω BNC output. CVBS can be upscaled to any supported SDI format; all SDI formats can be downconverted to CVBS.

Discrete Audio Input/Outputs (BBG-1002-UDX-AV-EMDE only)

(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

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

HTML5 web server/interface via rear-panel 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 Standalone Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed with Multi-Input Auto-Changeover (includes one BBG-1000-PS Power Supply)

BBG-1002-UDX-AV-EMDE 3G/HD/SD-SDI Multi-Input Standalone Up-Down-Cross Converter/Frame Sync with Auto-Changeover and Character Burn with CVBS analog video I/O and analog/AES audio embed/de-embed (includes one BBG-1000-PS Power Supply)

Options and Accessories:

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+CGMS CGMS Option

+KEYER Key/Fill Keyer 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)

+T-SLATE User Trouble Slate Graphic Import Option

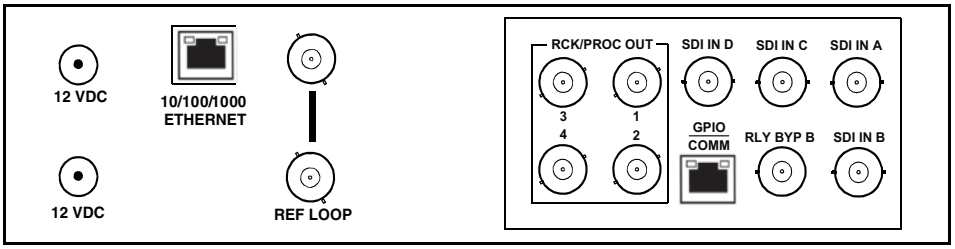
+DLY Extended Frame Sync Delay Option

+SCTE104 SCTE 104 Insertion Option

BBG-1000-PS Redundant Power Supply Module

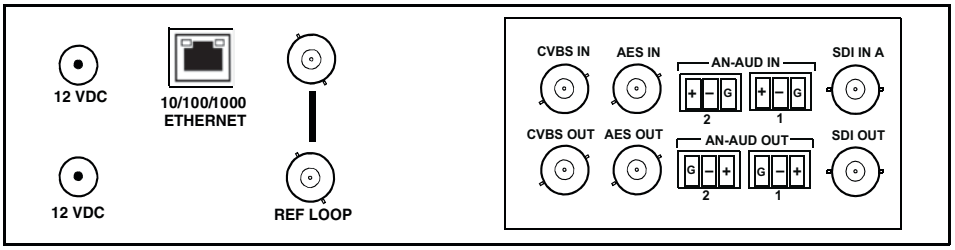
BBG-1000-TRAY 1RU Mounting Tray (supports 3 units)

BBG-1002-UDX 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.

BBG-1002-UDX-AV-EMDE Rear Panel



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9903-UDX-ADDA » 3G/HD/SD-SDI UNIVERSAL FORMAT CONVERTER/FRAME SYNC

with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding

The all-new 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 clean switching performed on the RP168 switch line. 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, 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 SDI RP168 switch line clean 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 and 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

openGear

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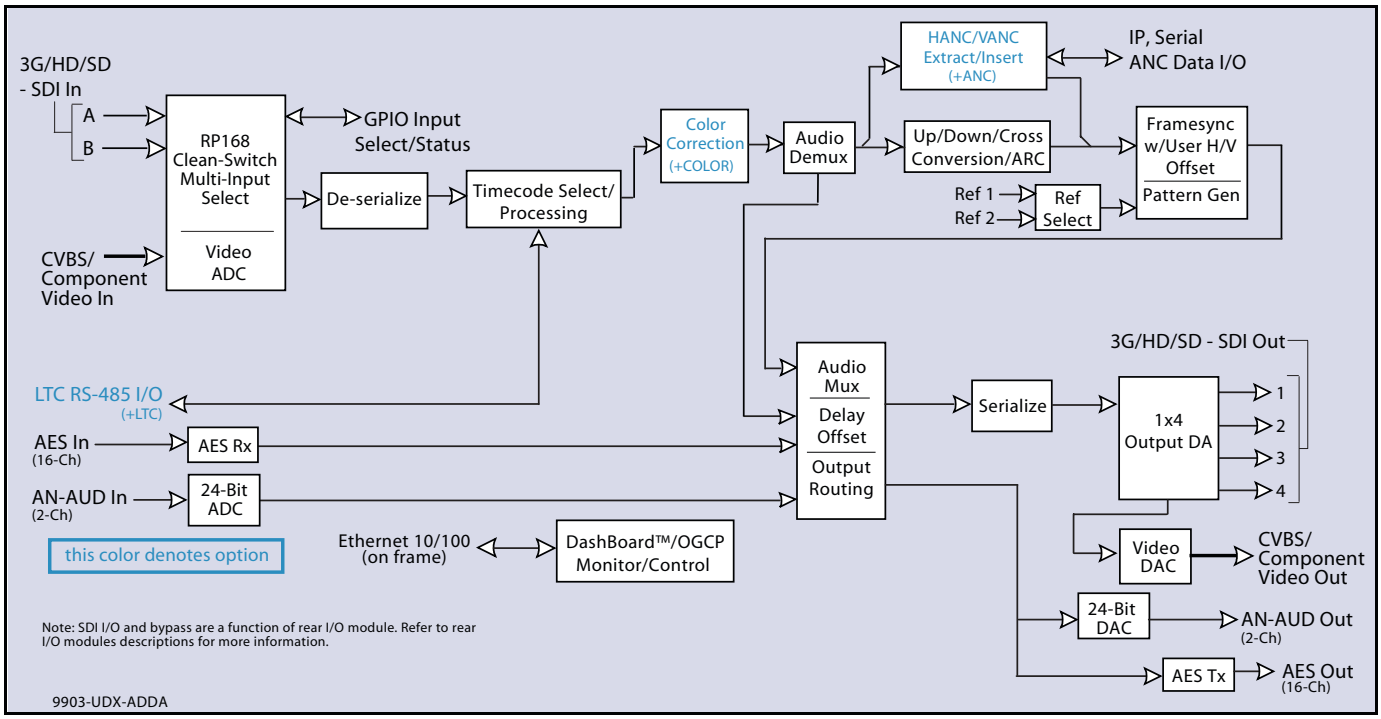
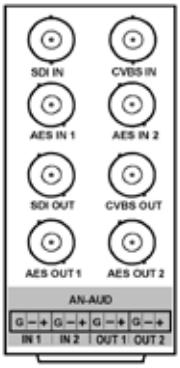
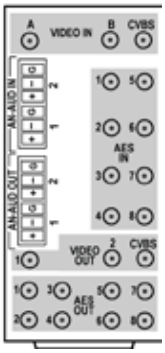
9903-UDX-ADDA » 3G/HD/SD-SDI UNIVERSAL FORMAT CONVERTER/FRAME SYNC

with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding

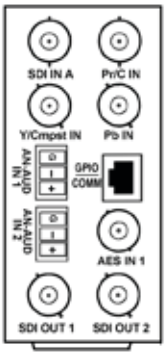




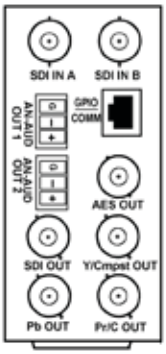
RM20-9903-B



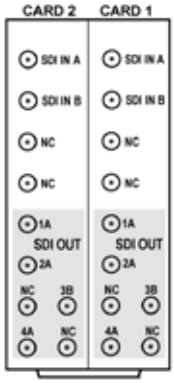
RM20-9903-D-DIN
RM20-9903-D-HDBNC



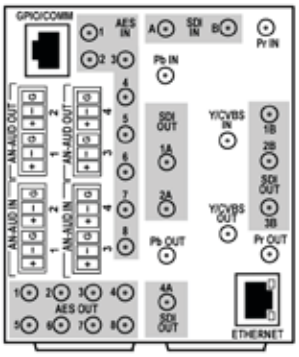
RM20-9903-E



RM20-9903-F



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



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

Rear Module complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new rear module models.

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with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, 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)

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/FRAME SYNC

with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, 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, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) Component/CVBS 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)

RM20-9903-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, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) Component/CVBS 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)

+LTC Audio LTC I/O Option

+COLOR Color Correction Option

+ANC Ancillary Data Processor

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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, AES and Analog Audio Embedding / De-Embedding

The all-new 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 clean switching performed on the RP168 switch line. 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, 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-1003-UDX-ADDA uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control (can also 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

- Multi-input, with SDI RP168 switch line clean 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 and 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.
- Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID. Also controllable using DashBoard remote control.
- 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
- 1RU Mounting Tray (supports 3 units) (BBG-1000-TRAY)
- Redundant Power Supply Module (BBG-1000-PS)

html5 web UI remote control | DashBoard

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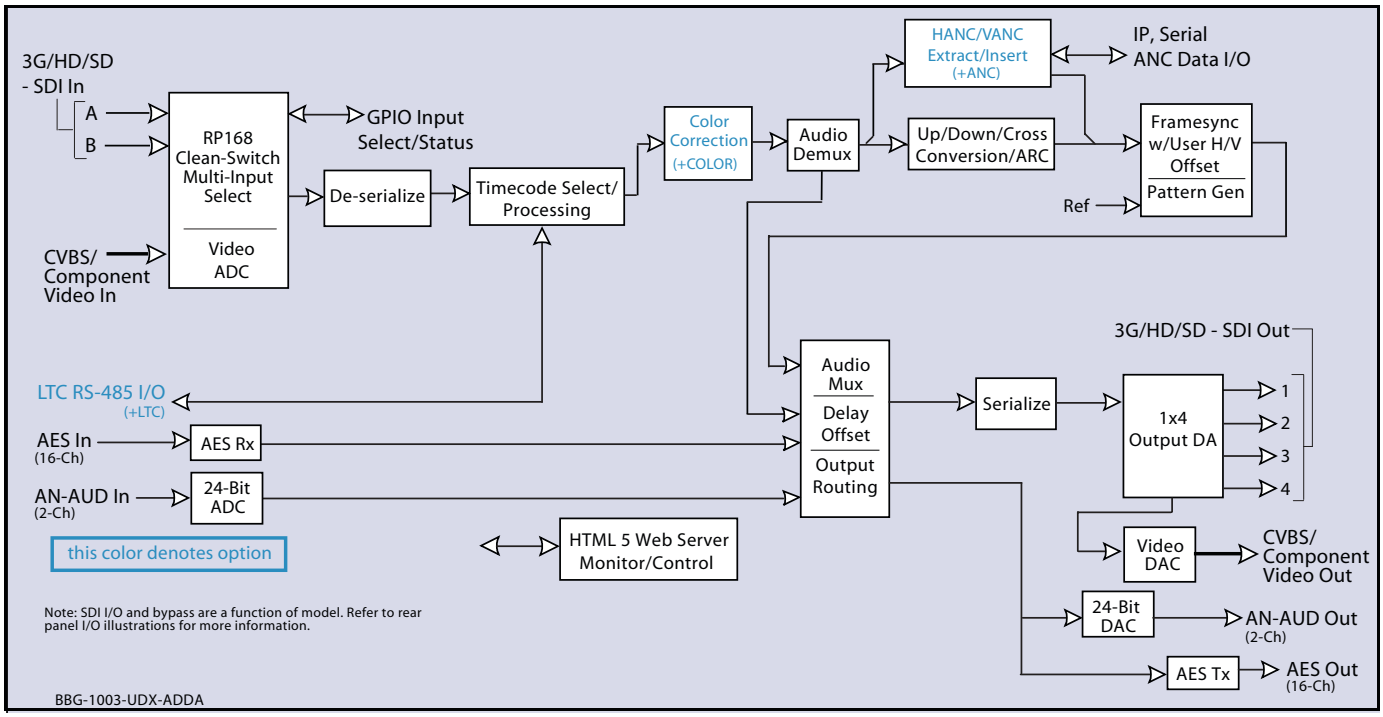
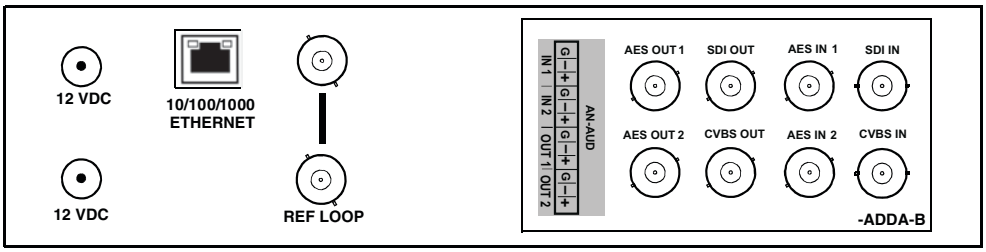
BBG-1003-UDX-ADDA » 3G/HD/SD-SDI STANDALONE UNIVERSAL FORMAT CONVERTER/FRAME SYNC

with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding

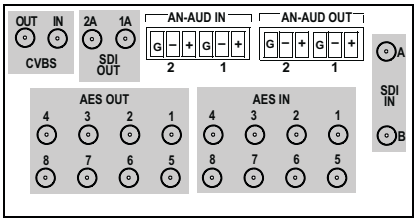


Rear Panel

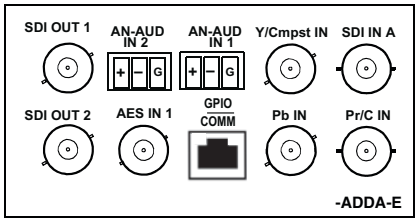


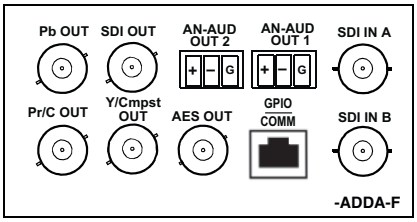
Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

-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, 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)

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

HTML5 web server/interface via rear-panel 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, 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

BBG-1000-PS Redundant Power Supply Module

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

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9901-UDX » 3G/HD/SD UP/DOWN/CROSS CONVERTER WITH FRAME SYNC

Alternate Base Models:

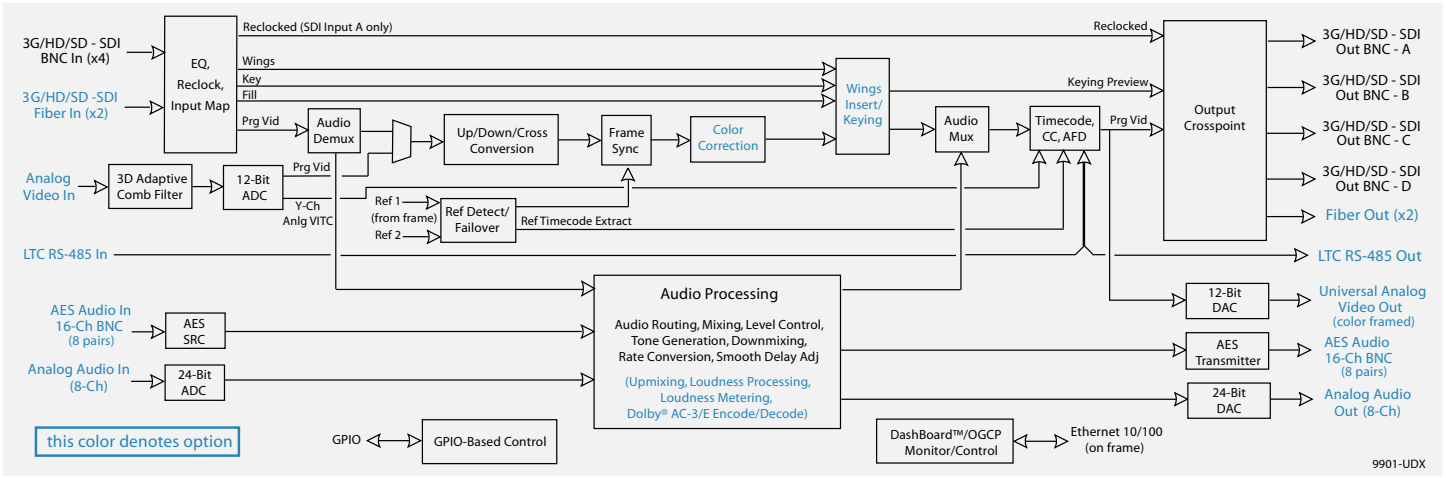
9901-UC
SD to 3G/HD Upconverter with 3G/HD/SD Passthrough

9901-DC
3G/HD to SD Downconverter with 3G/HD/SD Passthrough

9901-XC
3G/HD to 3G/HD Cross Converter with 3G/HD/SD Passthrough

The award-winning 3G/HD/SD-SDI Fusion3G® 9901-UDX card offers up/down/cross format conversion, frame sync, and advanced audio and ancillary data support, plus many other powerful features. Full audio support includes per-channel audio delay. Remote control is quick and easy with the free DashBoard™ remote control software or the Cobalt OGCP-9000 remote control panels.

You can select from options to add (as inputs and/or outputs) fiber, analog video, AES, and analog audio. This level of integration reduces module count and simplifies the signal chain, as well as providing flexibility for ever-changing requirements, including 3-D TV compliant 1080p. Options also include wings insertion, general purpose keying, color correction, Dolby® E/AC-3 encoding and decoding (with both decode and re-encode on the same card), ITU/ATSC/EBU compliant loudness metering, and Linear Acoustic® upmixing and loudness processing. Where the full conversion capability is not required, the 9901 series is available as the following base model versions (if desired later, any of these versions can be field upgraded to base 9901-UDX functionality using a firmware upgrade without removing the card from its frame).



» STANDARD FEATURES

- Full 3G/HD/SD-SDI support on BNC coax
- Advanced up/down/cross format conversions utilizing high-quality, motion-adaptive de-interlacing and video scaling techniques
- Preset standard and user-definable ARC w/configurable pan, tilt, & crop controls
- HD/SD captioning format translation
- Per-channel audio delay with glitchless delay adjustment
- Frame sync with reference failover using dual reference inputs on frame
- Full SMPTE timecode support with translation between formats. Timecode sources selectable from SDI and analog video inputs, reference, and internally generated.
- Advanced audio processing allows routing, gain, delay, and flexible mixing as standard features
- GPIO ports with user-definable functions for system automation and monitoring
- Centralized GUI remote control using DashBoard™ software and Cobalt OGCP-9000 remote control panels – custom settings saved as presets can be recalled manually, or with GPI or events-based triggering
- Five-year warranty

» OPTIONAL FEATURES

- Fiber 3G/HD/SD inputs/outputs. Fiber ports use blind mating interface, allowing card swapping (including optical transceivers) with no cable disconnection.
- Analog audio I/O
- Wings insertion and general purpose keying feature
- LTC input/out and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O
- Relay bypass available from SDI input to SDI output
- Universal HD/SD analog I/O. Composite video input sources converted with 3D comb decoder, mitigating common decoding artifacts. Composite video output is color-framed to match reference burst, plus user offset.
- AES embedding/de-embedding. AES ports are GUI selectable as input or output. Each input has independent sample rate converter.
- Linear Acoustic® loudness processing and automatic upmixer technology
- Full Dolby® E / AC-3 encoding and decoding options. Decode + re-encode and multiple AC-3 streaming available on the same card.

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9901-UDX » 3G/HD/SD UP/DOWN/CROSS CONVERTER WITH FRAME SYNC

» I/O OPTIONS

16 CHANNEL AUDIO EMBEDDING/DE-EMBEDDING (+AES)
Provides eight (total) AES pair BNC connections that can be GUI-configured as inputs or outputs. Independent SRC for all AES inputs, with auto and manual bypass for non-PCM data.

8-PORT AES OUTPUT EXPANSION (+AES16)
Provides the 16-channel embed/de-embed of option +AES (see above) as well as eight added AES output ports to provide a total complement of AES I/O 1 thru AES I/O 8 and added ports AES OUT 1 thru AES OUT 8. Allows 16 channels of AES embedding and 16 channels of AES de-embedding simultaneously. (Option is not available as a field upgrade and also requires Rear I/O Module RM20-9901-G.)

LTC RS-485/AUDIO INPUT/OUTPUT (+LTC)
Provides LTC input/output and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O.

FIBER INPUTS/OUTPUTS (+FRX / +FTX / +FRXTX / +FRXRX / +FTXTX)*
Provides one or two fiber connections per card. Inputs can serve any function in the product, outputs can be assigned from any function in the card. Connector type is dual LC with blind-mate connectors. Cards are fully swappable.

UNIVERSAL ANALOG VIDEO INPUTS/OUTPUTS (+ANV)*
Provides an analog video input and output (CVBS, component, RGB (sync on green))

ANALOG AUDIO INPUTS/OUTPUTS (+ANA)*
Provides up to eight channels (total) of balanced analog audio inputs and outputs

*Requires expansion Rear Module (for example, 9901-UDX+ANV requires RM20-9901-XB expansion Rear Module)

» VIDEO OPTIONS

WINGS INSERTION (+WINGS)
Provides wings insertion using an independent SDI input provided for wings signal. Provides programmable insertion width.

KEYING (+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.

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.

UPGRADE TO 3G (+3G)
Upgrades a 9901 HD/SD alternate base model to 3G/HD/SD.

FRAME BUFFER EXPANSION (+MEM)
Increases the independently adjustable audio and video delay buffer capacity to 47 seconds for SD video, 8 seconds for HD video, or 4 seconds for 3G video. (+MEM is a hardware-based option and is not available as a field upgrade. This option is displayed as "+2GB" on the DashBoard card info pane.)

» AUDIO OPTIONS

LINEAR ACOUSTIC® LOUDNESS PROCESSING (+LP51/+LP20)*
Featuring Linear Acoustic® AEROMAX® technology and available in 5.1-channel (LP51) and stereo (LP20) configurations. These loudness processors use inputs from any source received by the card, or any mixing setting produced by the card. AEROMAX® algorithms use a sophisticated multi-band approach to loudness processing, and can apply multi-faceted loudness correction specifically targeted to various frequency ranges and other characteristics within the program material, resulting in audio free from abrupt loudness or image shifts while preserving more of the original content than previously possible.

Up to two 5.1 loudness processors can be ordered per card, order as +LP51A and +LP51B. Up to four stereo loudness processors can be ordered per card, order as +LP20A, +LP20B, +LP20C and +LP20D.

LINEAR ACOUSTIC® AUTOMATIC UPMIXER (+UM)*
Featuring Linear Acoustic® UPMAX™ technology, upmixing allows legacy stereo program content to be converted to full 5.1-channel audio. UPMAX™ mode detects 2.0 content and automatically applies upmix mode (with configurable switchover fade-in/fade-out) depending on absence or presence of 5.1 source audio.

Up to two upmixers may be configured on the card, order as +UMA and +UMB.

SOFTWARE LOUDNESS METER (+LM-C)
Cobalt's +LM audio loudness metering option (in conjunction with a Cobalt OGCP-9000 Remote Control Panel with +LM-P option) provides a flexible solution for ingest or on-air loudness metering and assessment in compliance with ITU/ATSC/EBU standards. Easy to use, the +LM offers "true peak" level detection, error tracking and logging, and intuitive interface with touch screen control.

AUDIO FAILOVER (+AFO)
Provides automatic failover to alternate ("secondary") channels to substitute for the primary channels in the event of audio signal loss.

AUTO DOWNMIX (+ADM)
Provides automatic Stereo downmix from selected alternate multi-channel sources if primary Stereo channels lose signal.

DOLBY® DIGITAL/DIGITAL PLUS™ ENCODING (+ENCD)
Provides Dolby® Digital/Digital Plus™ encoding from any combination of audio sources supported by the card. Up to four independent encoders - all on the same card - can be included (+ENCDA thru +ENCDD). This option is available on the same card along with any other Dolby options listed here. See Dolby Options (page 78) for more information.

DOLBY® E/DIGITAL/DIGITAL PLUS™ DECODING (+DEC)
Decodes Dolby® E, Digital, and Digital Plus™ signals from AES or embedded sources. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 78) for more information.

DOLBY® E ENCODING (+ENCE)
Provides Dolby® E encoding from any combination of audio sources supported by the card. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 78) for more information.

DOLBY® DESCRIPTIVE VIDEO SERVICES® ENCODING (+ENCDVS)
Provides DVS encoding of secondary narrative audio on cards equipped with Dolby® Digital/Digital Plus™ encoding. This option is available on the same card along with any other Dolby options listed here. See Dolby Options (page 78) for more information.

*The following Processing/Upmixing combinations, and their subsets, are available. Contact sales for more information.

- Upmixer, 5.1 Processor, Aux Stereo Processor (+UMA, +LP51A, +LP20A)
- Two stereo processors, Two upmixers (+LP20A, +LP20B, +UMA, +UMB)
- Two 5.1 loudness processors (+LP51A, +LP51B)
- Four stereo loudness processors (+LP20A, +LP20B, +LP20C, +LP20D)

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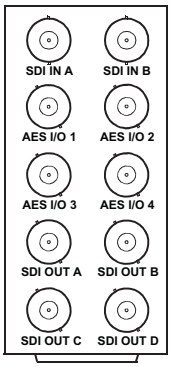
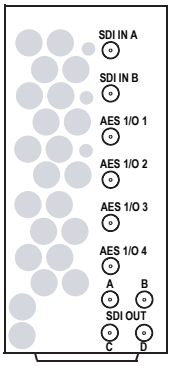
9901-UDX » 3G/HD/SD UP/DOWN/CROSS CONVERTER WITH FRAME SYNC



RM20-9901-B



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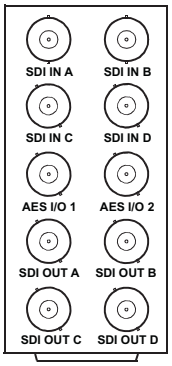
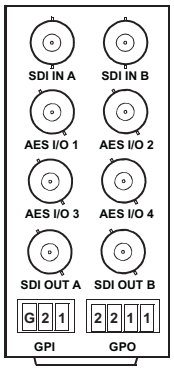


RM20-9901-C



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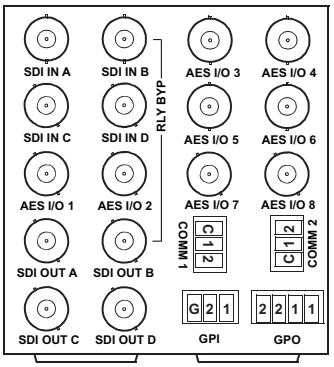

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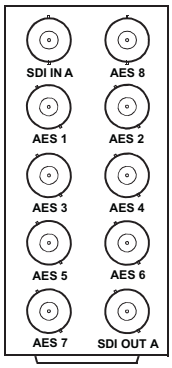

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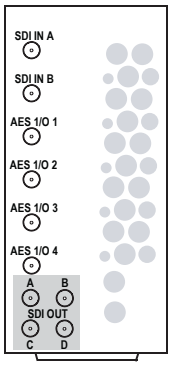
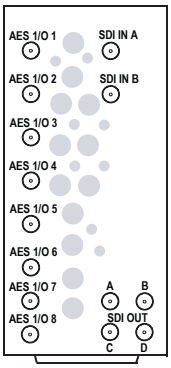
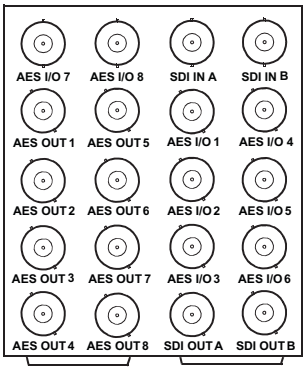


RM20-9901-F-HV2



RM20-9901-F-HV



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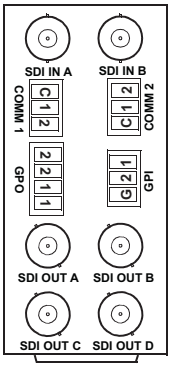
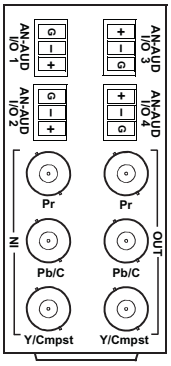
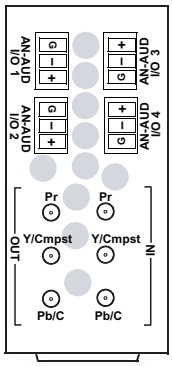


RM20-9901-H

» EXPANSION REAR I/O MODULES

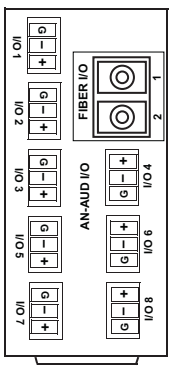


RM20-9901-XB

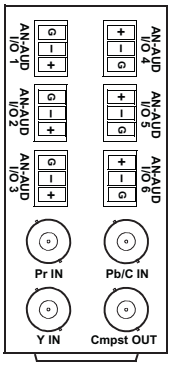


RM20-9901-XB-HV

Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an "-X" in the part number and must be used used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 9)



RM20-9901-XC



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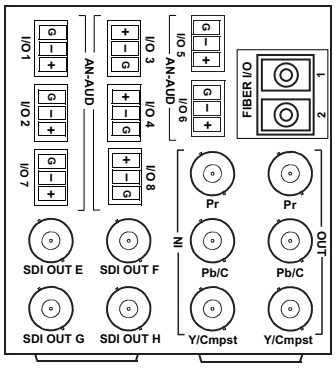
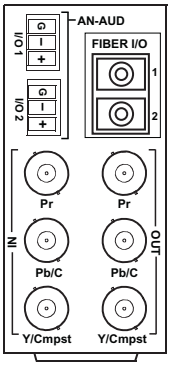
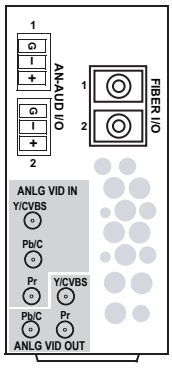


RM20-9901-XE



RM20-9901-XF



RM20-9901-XF-HV

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9901-UDX » 3G/HD/SD UP/DOWN/CROSS CONVERTER WITH FRAME SYNC

» ORDERING INFORMATION

9901-UDX 3G/HD/SD Up/Down/Cross Converter with Frame Sync

9901-UC SD to 3G/HD Upconverter with 3G/HD/SD Passthrough

9901-DC 3G/HD to SD Downconverter with 3G/HD/SD Passthrough

9901-XC 3G/HD to 3G/HD Cross Converter with 3G/HD/SD Passthrough

-HD HD/SD Only Option for any card model listed above (e.g., 9901-UDX-HD)

+UDX Field-upgrade to +UDX option for 9901-UC/9901-DC/9901-XC models

+3G Upgrade of ***-HD*** alternate model to 3G/HD/SD

BASE REAR I/O MODULES

Base Rear I/O Modules provide connections for standard card BNC video and audio connections, as well as other connections depending on rear module part number. These modules mate directly with the Fusion3G® card.

RM20-9901-B 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI Inputs, 4 AES I/O BNCs, 4 3G/HD/SD-SDI Outputs

RM20-9901-B-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9901-B-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9901-C 20-Slot Frame Rear I/O Module (Standard Width) 4 3G/HD/SD-SDI Inputs, 2 AES I/O BNCs, 4 3G/HD/SD-SDI Outputs

RM20-9901-D 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI Inputs, 4 AES I/O BNCs, 2 GPIO, 2 3G/HD/SD-SDI Outputs

RM20-9901-E 20-Slot Frame Rear I/O Module (Double Width) 4 3G/HD/SD-SDI Inputs (1 with Relay Bypass), 8 AES I/O BNCs, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI Outputs

RM20-9901-F 20-Slot Frame Rear I/O Module (Standard Width) 1 3G/HD/SD-SDI Input, 8 AES I/O BNCs, 1 3G/HD/SD-SDI Output

RM20-9901-F-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9901-F-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9901-F-HV2-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) (2) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors DIN 1.0.2.3)

RM20-9901-F-HV2-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) (2) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors HD-BNC)

RM20-9901-G 20-Slot Frame Rear I/O Module (Double Width) 2 3G/HD/SD-SDI Inputs, 8 AES I/O BNCs, 8 additional AES Outputs, 2 3G/HD/SD-SDI Outputs (Available only in conjunction with card option +AES16)

RM20-9901-H 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI BNC Inputs, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI BNC Outputs

EXPANSION REAR I/O MODULES

Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an "-X" in the part number and must be used used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 9)

RM20-9901-XB 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9901-XB-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9901-XB-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9901-XC 20-Slot Frame Rear I/O Module (Standard Width) 2 Fiber I/O, 8 Analog Audio I/O

RM20-9901-XD 20-Slot Frame Rear I/O Module (Standard Width) Component In, 6 Analog Audio I/O, Composite Out

RM20-9901-XE 20-Slot Frame Rear I/O Module (Double Width) Component In, 2 Fiber I/O, 8 Analog Audio I/O, Component Out, 4 3G/HD/SD-SDI Outputs

RM20-9901-XF 20-Slot Frame Rear I/O Module (Standard Width) Component In, 2 Fiber I/O, 2 Analog Audio I/O, Component Out

RM20-9901-XF-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are DIN1.0/2.3) This Rear I/O Module must be used with an HV Base Rear I/O Module.

RM20-9901-XF-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are HD-BNC) This Rear I/O Module must be used with an HV Base Rear I/O Module.

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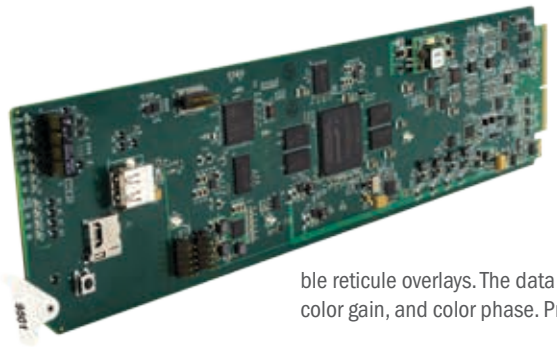
9501-DCDA-3G » DOWNCONVERTER WITH 3G/HD/SD-SDI INPUT, SDI RECLOCKING, SD-SDI AND ANALOG VIDEO/AUDIO OUTPUTS/AES OUTPUTS



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. 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. 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 card status and control access locally or across a standard Ethernet network.

9501-DCDA Options

- LTC In/Out Software Option (+LTC)
- 3G Upgrade for -HD model Software Option (+3G)
- Frame Sync Software Option (+FS)
- Color Correction Software Option (+COLOR)

OBSIDIAN 3G®

Alternate Base Model

- 9501-DCDA-HD Downconverter/DA with HD/SD-SDI Input, SDI 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

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 down-conversion to legacy SD monitoring systems

Auto-format detect/down-conversion of SMPTE 425/292/259M formats

Full timecode and CEA 708 / CEA 608 conversion to SD VITC-based timecode and closed-captioning. Option +LTC allows bidirectional transfer and conversion between embedded video timecode formats and audio LTC. Audio LTC can be received or sent via embedded audio channels. Video embedded timecode formats can be converted to audio LTC and sent over embedded or analog audio output channels.

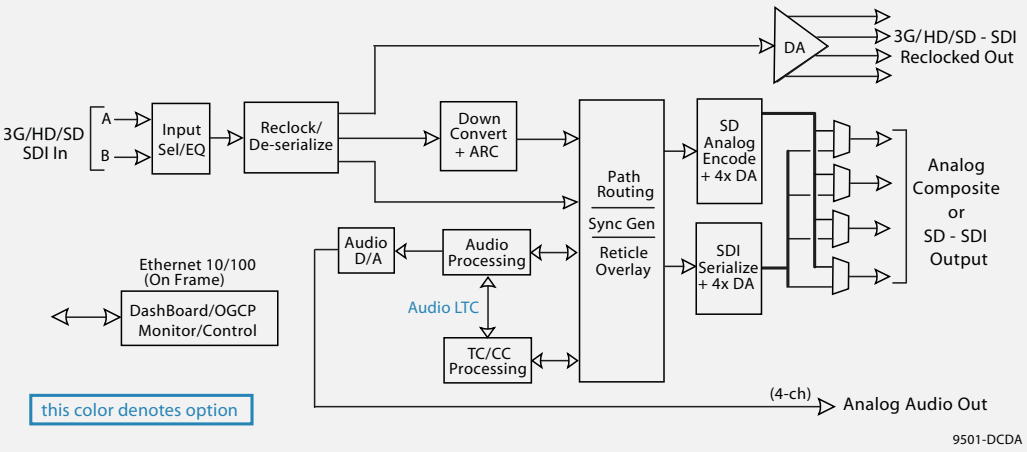
Color framing preserved on CVBS outputs for all conversions

GUI-based output selector allows flexible SDI or CVBS outputs on four processed-output BNCs

Full embedded audio control with selectable downmix and analog audio de-embed

Remote control/monitoring via Dashboard ™ software or OGCP-9000 remote control panels

Five-year warranty



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

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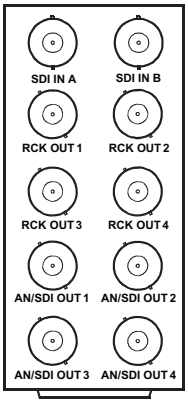
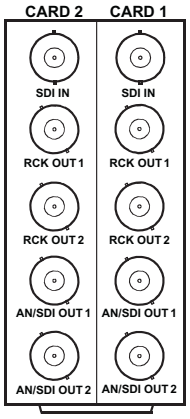
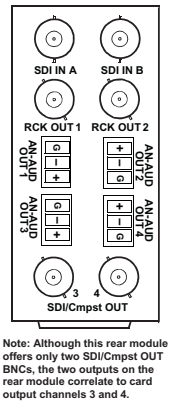
9501-DCDA-3G » DOWNCONVERTER WITH 3G/HD/SD-SDI INPUT, SDI RECLOCKING, SD-SDI AND ANALOG VIDEO/AUDIO OUTPUTS/AES OUTPUTS



RM20-9501-A

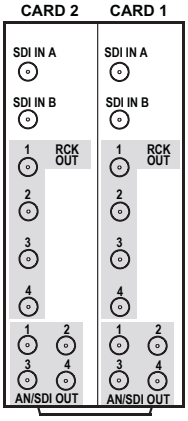


RM20-9501-A/S

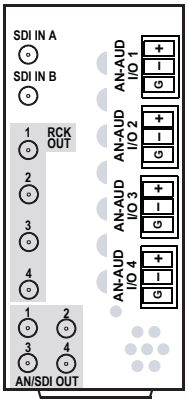


Note: Although this rear module offers only two SDI/Cmpst OUT BNCs, the two outputs on the rear module correlate to card output channels 3 and 4.

RM20-9501-B



RM20-9501-C/S



RM20-9501-F

» SPECIFICATIONS

Power
<18 Watts

HD/SD-SDI Input

Number of Inputs:	(2) 3G/HD/SD-SDI BNCs. GUI-selectable.
Standards:	SMPTE 259M, 292, 425
Supported Formats:	1080p59.94,50,29.97, 24, 23.98, 1080i59.94,50, 625I, 525i
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

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 Downconverter with 3G/HD/SD-SDI Input, SDI 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) 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) (inputs/outputs listed 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, Hi-Density) (2) 3G/HD/SD-SDI Input BNCs, (4) HD/SD-SDI Reclocked Outputs, (4) Outputs (GUI-selectable as SD-SDI and/or Analog CVBS) (inputs/outputs listed are per card; all connectors DIN1.0/2.3)

RM20-9501-C/S-HDBNC 20-Slot Frame Rear I/O Module (Split, Hi-Density) (2) 3G/HD/SD-SDI Input BNCs, (4) HD/SD-SDI Reclocked Outputs, (4) Outputs (GUI-selectable as SD-SDI and/or Analog CVBS) (inputs/outputs listed 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 DIN1.0/2.3)

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

+LTC Audio LTC Option

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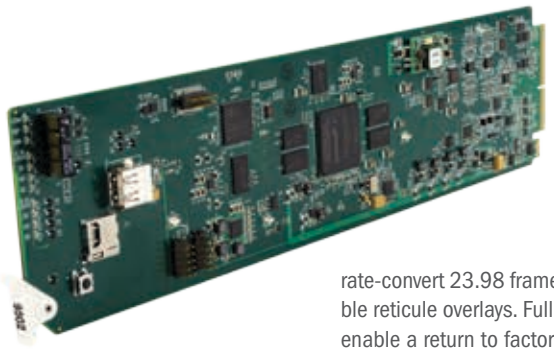
9502-DCDA-3G » DOWNCONVERTER WITH 3G/HD/SD-SDI INPUT, HD/SD-SDI PROCESSED OUTPUTS, AND SDI INPUT RECLOCKING



The 9502-DCDA 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. AES audio outputs can be de-embedded from selected embedded audio channels. 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. 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.

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 (and card-edge monitor/control) allows full card status and control access locally or across a standard Ethernet network.

9502-DCDA Options

- LTC In/Out Software Option (+LTC)
- 3G Upgrade for -HD model Software Option (+3G)
- Frame Sync Software Option (+FS)
- Color Correction Software Option (+COLOR)

OBSIDIAN 3G

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

Economical solution for 3G downconversion to legacy SD monitoring systems

Auto-format detect/down-conversion of SMPTE 425/292/259M formats

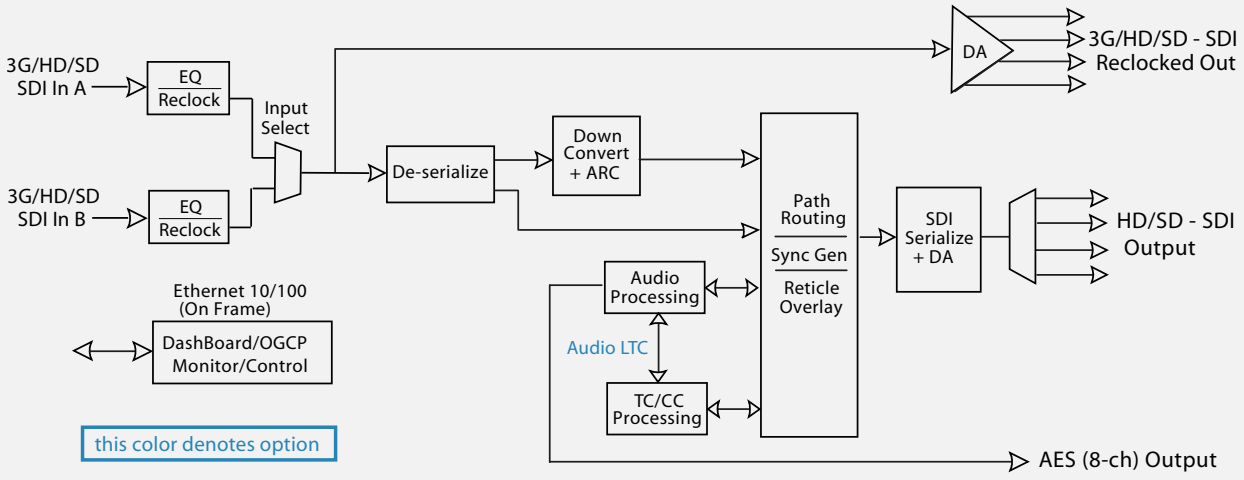
Full timecode and CEA 708 / CEA 608 conversion to SD VITC-based timecode and closed-captioning. Option +LTC allows bidirectional transfer and conversion between embedded video timecode formats and audio LTC. Audio LTC can be received or sent via embedded audio channels. Video embedded timecode formats can be converted to audio LTC and sent over embedded audio output channels.

GUI-based output crosspoint allows flexible processed or reclocked outputs

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

Five-year warranty



9502-DCDA

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

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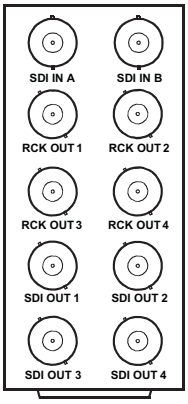
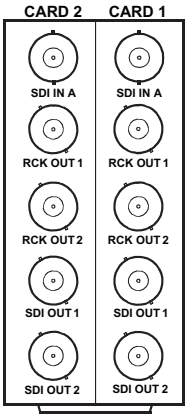
9502-DCDA-3G » DOWNCONVERTER WITH 3G/HD/SD-SDI INPUT, HD/SD-SDI PROCESSED OUTPUTS, AND SDI INPUT RECLOCKING



RM20-9502-A



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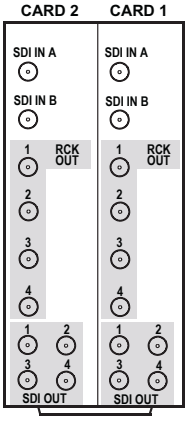

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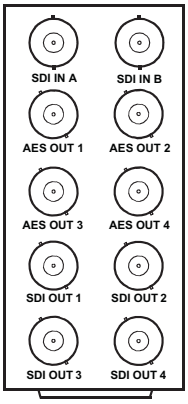

RM20-9502-F

» SPECIFICATIONS

Power
<18 Watts

HD/SD-SDI Input

Number of Inputs:	2
Standards:	SMPTE 259M, 292, 425
Supported Formats:	1080p59.94,50,29.97,25,24,23.98 1080i59.94,50 625i50, 525i59.94
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

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 Downconverter with 3G/HD/SD-SDI Input, SDI Reclocking, SD-SDI and Analog Video/Audio Outputs

9502-DCDA Downconverter with 3G/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) 3G/HD/SD-SDI Input BNC, (2) HD/SD-SDI Reclocked Output BNCs, (2) HD/SD-SDI Processed Output BNCs (inputs/outputs listed are per card)

RM20-9502-C/S-DIN 20-Slot Frame Rear I/O Module (Split, High-Density) (2) 3G/HD/SD-SDI Inputs, (4) HD/SD-SDI Reclocked Outputs, (4) HD/SD-SDI Processed Outputs (inputs/outputs listed are per card; all connectors DIN1.0/2.3)

RM20-9502-C/S-HDBNC 20-Slot Frame Rear I/O Module (Split, High-Density) (2) 3G/HD/SD-SDI Inputs, (4) HD/SD-SDI Reclocked Outputs, (4) HD/SD-SDI Processed Outputs (inputs/outputs listed 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

+LTC Audio LTC Option

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9902-DC-4K » UHDTV QUADRANT COMBINING DOWNCONVERTER

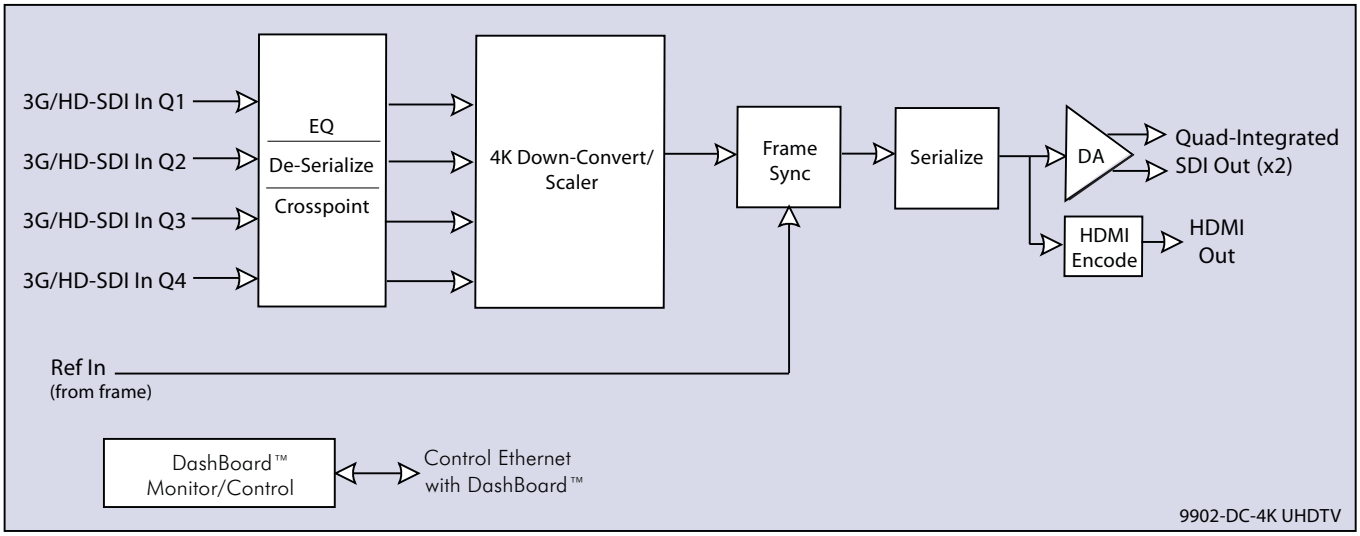
The 9902-DC-4K UHDTV Quadrant Combining Downconverter provides an easily integrated openGear® solution for converting 4K quadrant-division content into 3G/HD/SD-SDI. Easy to use DashBoard configuration and monitor provides for easy setup.

The 9902-DC-4K precisely combines the four quadrant-divided 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/SD-SDI. 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 quadrant-division down-conversion/integration to SDI for cinema and sports production
- 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
- DashBoard™ remote control status monitoring and setup/control
- Five year warranty



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9902-DC-4K » UHDTV QUADRANT COMBINING DOWNCONVERTER

SPECIFICATIONS

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

Power
< 18 Watts

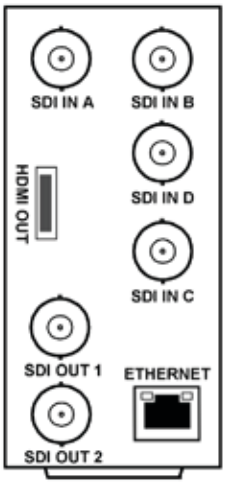
Video Inputs/Outputs
Video Inputs: (4) 3G/HD/SD-SDI 75Ω BNC
SDI Output: (2) 3G/HD/SD-SDI 75Ω BNCs (2x DA)
HDMI Output: (1) HDMI output
Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

ORDERING INFORMATION

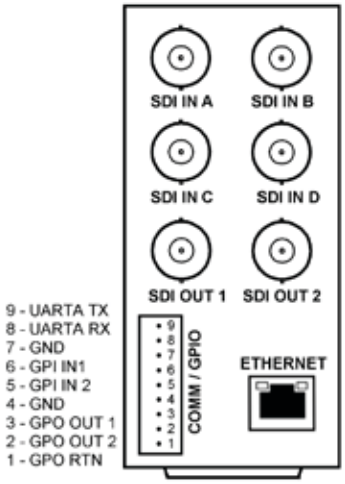
9902-DC-4K UHDTV Quadrant Combining Downconverter

RM20-9902DC4K-B 20-Slot Frame Rear I/O Module (Standard Width) (4) Quadrant 3G/HD/SD-SDI Input BNCs, (2) 3G/HD/SD-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) Quadrant 3G/HD/SD-SDI Input BNCs, (2) 3G/HD/SD-SDI Output BNCs (2x DA), (1) COMM/GPIO Port, (1) 100/1000 BaseT Ethernet Control Port



RM20-9902DC4K-B



RM20-9902DC4K-C

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BBG-1002-DC-4K » STANDALONE UHDTV QUADRANT COMBINING DOWNCONVERTER

The BBG-1002-DC-4K Standalone UHDTV Quadrant Combining Downconverter provides an easily integrated standalone solution for converting 4K UHDTV Quadrant-division content into 3G/HD/SD-SDI. Easy to use DashBoard configuration and monitor provides for easy setup.

The BBG-1002-DC-4K precisely combines the four UHDTV quadrant-divided 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/SD-SDI. An HDMI output allows direct use with monitors. The BBG-1002-DC-4K uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control (can also 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).

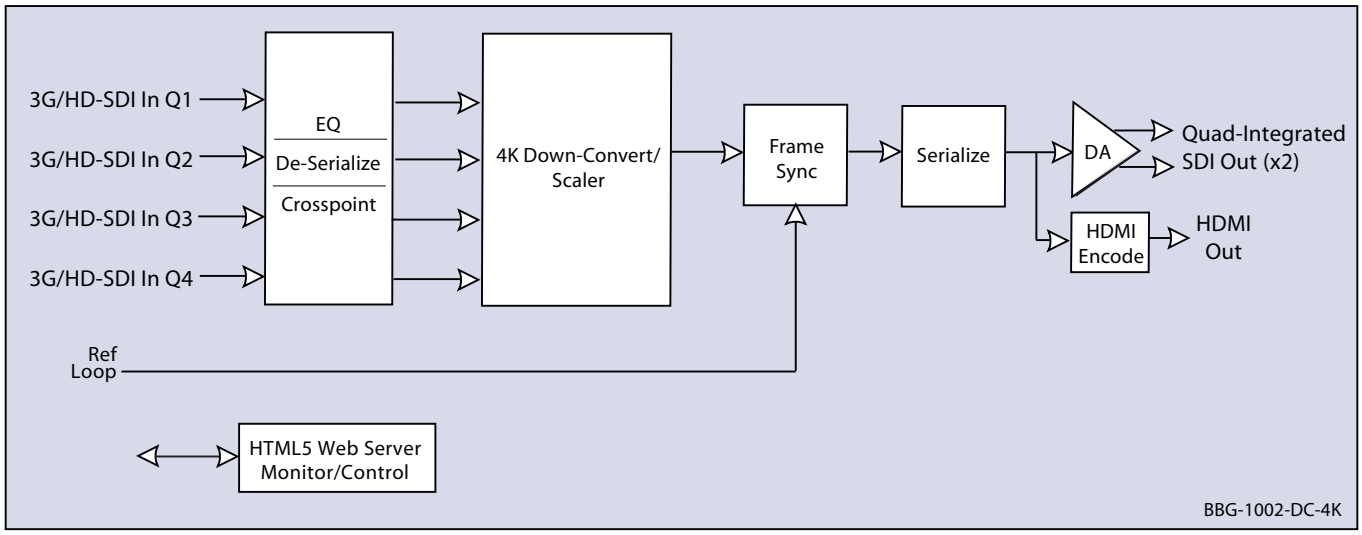
FEATURES

- Scalable solution for 4K UHDTV quadrant-division down-conversion/integration to SDI for cinema and sports production
- Input crosspoint allows quadrant inputs to be easily re-arranged without changing connections
- Flexible downconvert output provides 3G/HD/SD-SDI output
- 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
- Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID. Also controllable using DashBoard remote control.
- Low-power/high-density design – less than 13 Watts
- Five year warranty

OPTIONS

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

Redundant Power Supply Module (BBG-1000-PS)



html5 web UI remote control | DashBoard

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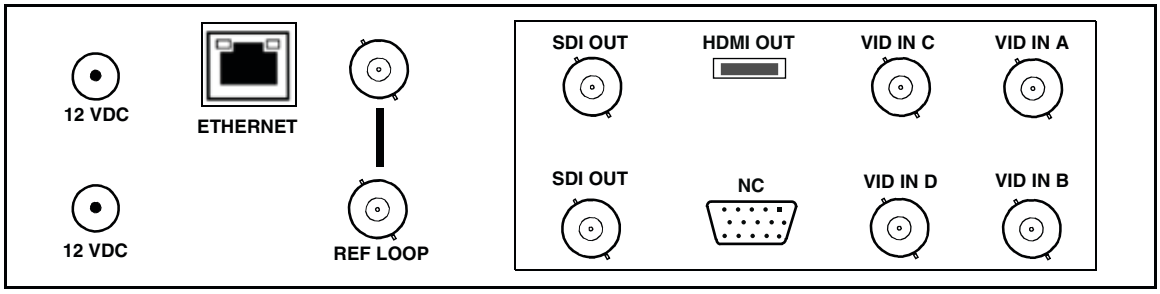
BBG-1002-DC-4K » STANDALONE UHDTV QUADRANT COMBINING DOWNCONVERTER

Rear Panel Layout



SPECIFICATIONS

Power

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

Video Input/Outputs

Video Inputs: (4) 3G/HD/SD-SDI 75Ω BNC
SDI Output: (1) 3G/HD/SD-SDI 75Ω BNC
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

HTML5 web server/interface via rear-panel 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 UHDTV Quadrant Combining Downconverter (includes one BBG-1000-PS Power Supply)

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, 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.

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 inserts realistic human-voice audio into user-configured audio channels.

With option +ANC, the 9922-FS 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.

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 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 that allows CEA 608/708 and line 21 SD CC absence or presence to be detected.

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, with manual selection or GPI controlled input selection
- 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.
- 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.
- 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
- Video options include color correction and keying
- 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

- 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.
- 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.
- 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.
- 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)
- 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.
- 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)

acapela group

openGear®

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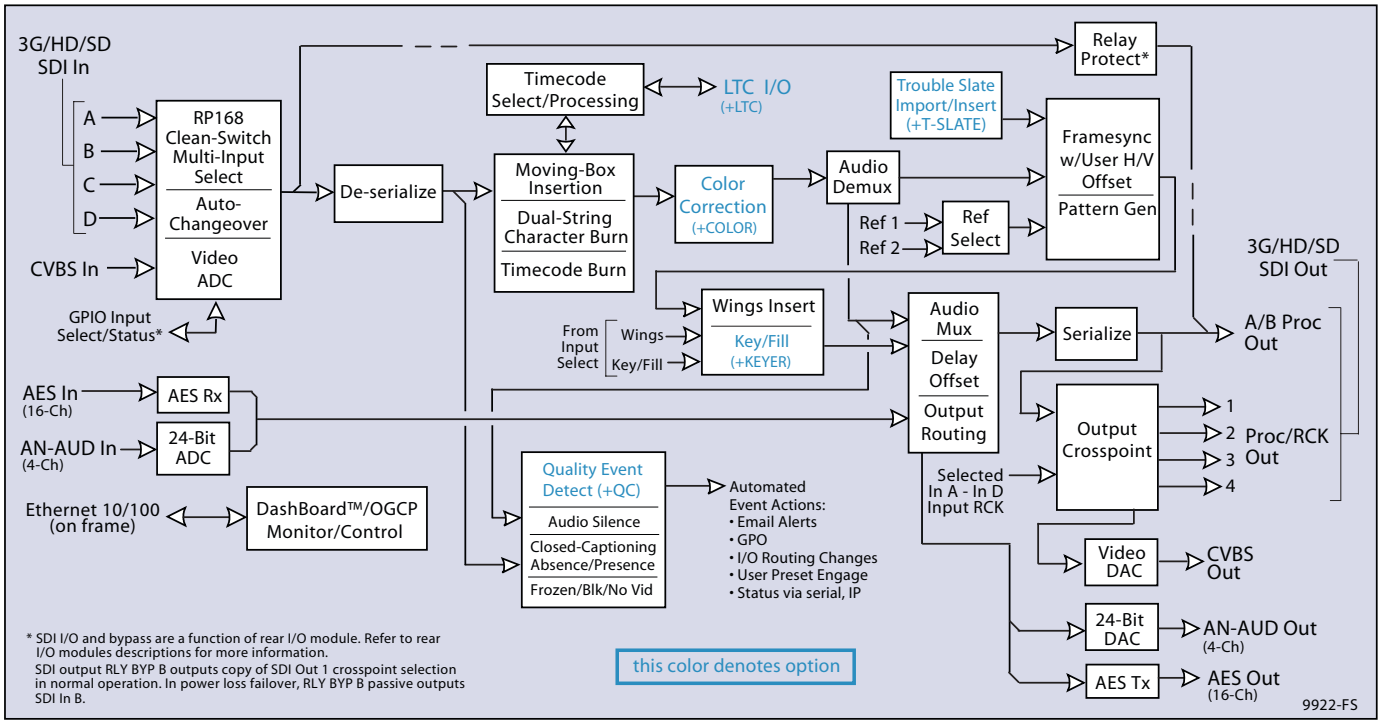
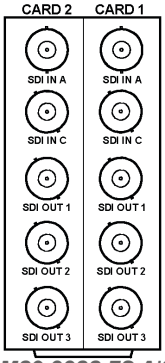
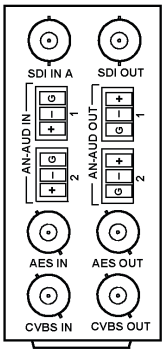
9922-FS » 3G/HD/SD-SDI FRAME SYNC with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O





RM20-9922-FS-A/S



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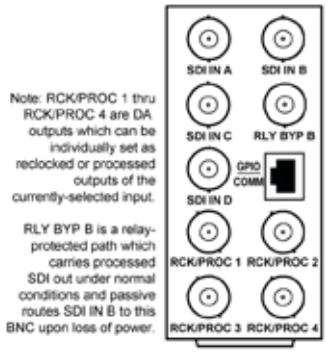

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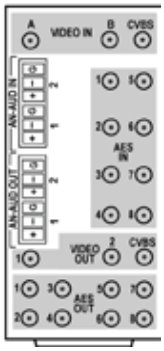

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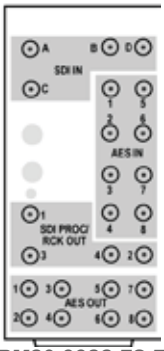
(DIN / HDBNC)



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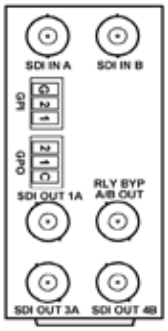

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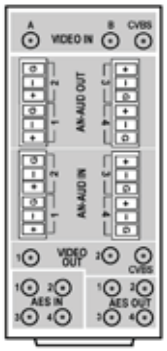

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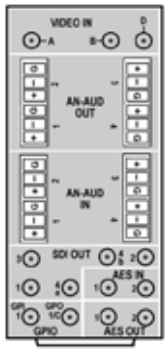

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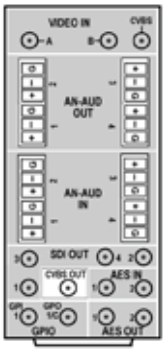

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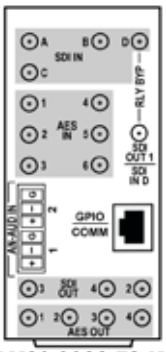

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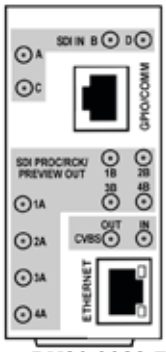

RM20-9922-FS-L-
(DIN / HDBNC)

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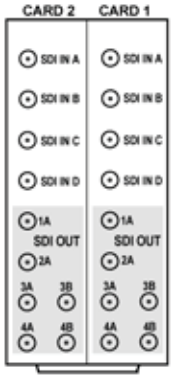
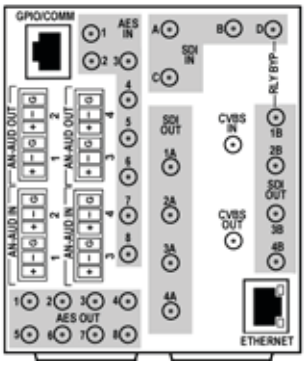
9922-FS » 3G/HD/SD-SDI FRAME SYNC with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O



RM20-9922-2FS-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-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.)

RM20-9922-FS-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.)

RM20-9922-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.)

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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-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)

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 (Standard Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 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 (Standard Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 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.)

+2FS Add Dual-Channel Option

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+DLY Extended Delay Option

+KEYER Key/Fill Keyer 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.)

+DLY Extended Frame Sync Delay Option

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

+T-SLATE User Trouble Slate Graphic Import Option

+SCTE104 SCTE 104 Insertion Option

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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 all-new 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. 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 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, 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. 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. 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. With option +ANC, the BBG-1022-FS offers full VANC/HANC ancillary data packet de-embedding and embedding for 3G/HD/SD-SDI streams, with 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.

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 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 that allows CEA 608/708 and line 21 SD CC absence or presence to be detected.

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 uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control (can also 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

- 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. 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)
- 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
- CVBS analog video I/O and analog/AES embed / de-embed available
- Pattern generator can provide raster/test pattern and patterns for LOS failover insertion
- 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.
- Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID. Also controllable using DashBoard remote control.
- 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.

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.

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

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

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.

Audio LTC I/O (+LTC)

Trouble Slate Import (+T-SLATE)

html5 web UI remote control

DashBoard

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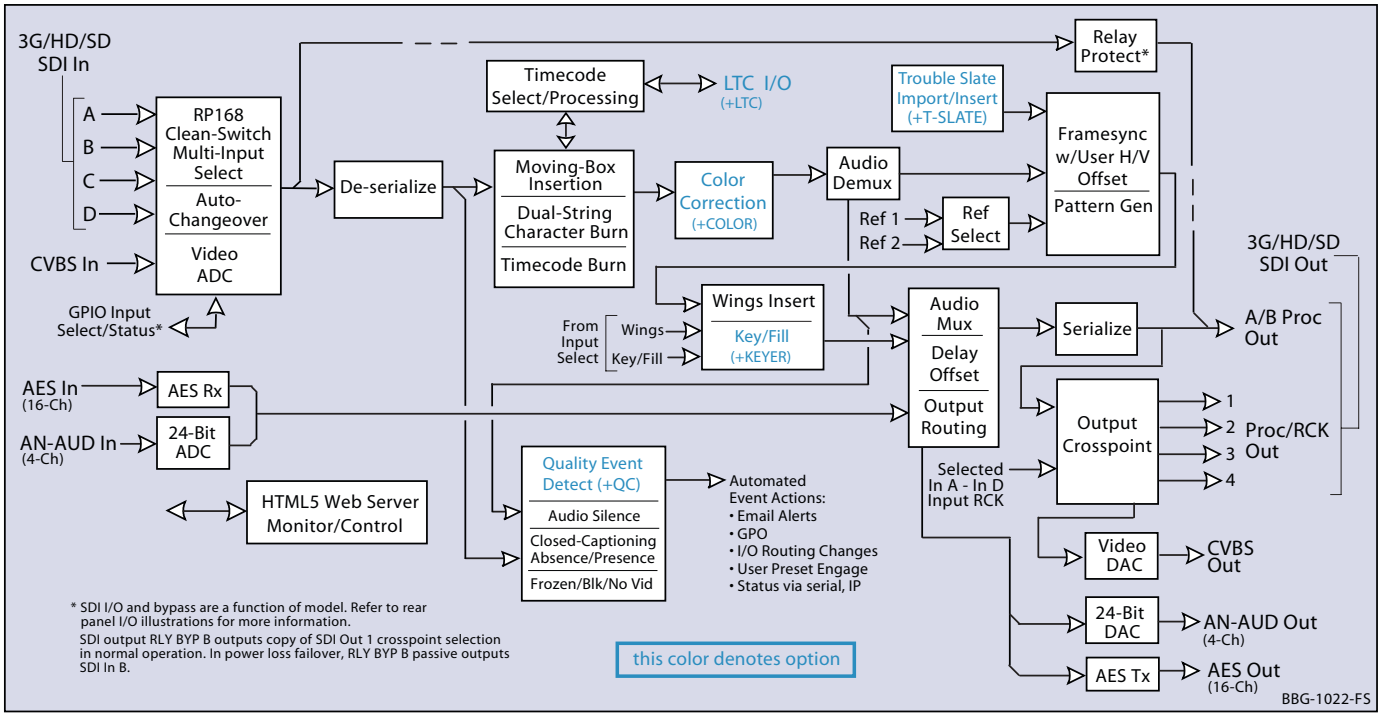
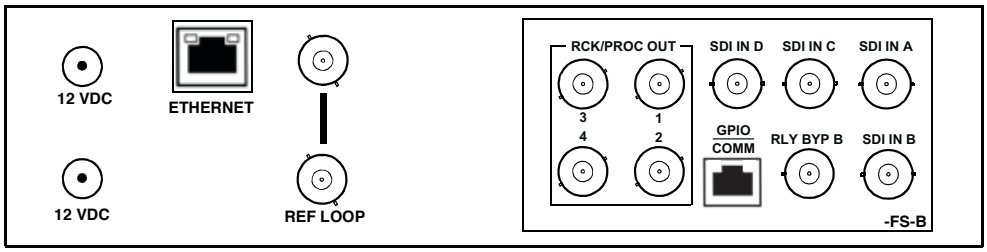
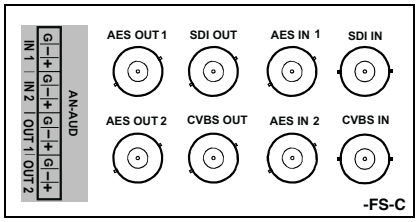
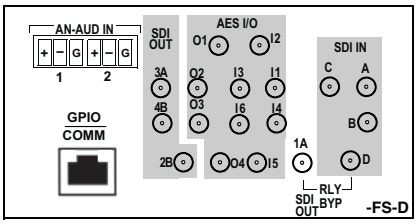


Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

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

HTML5 web server/interface via rear-panel 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

+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)

+T-SLATE User Trouble Slate Graphic Import Option

+DLY Extended Frame Sync Delay Option

+SCTE104 SCTE 104 Insertion Option

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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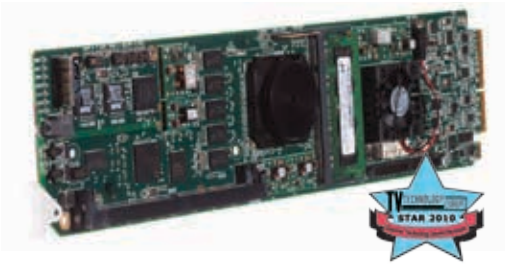
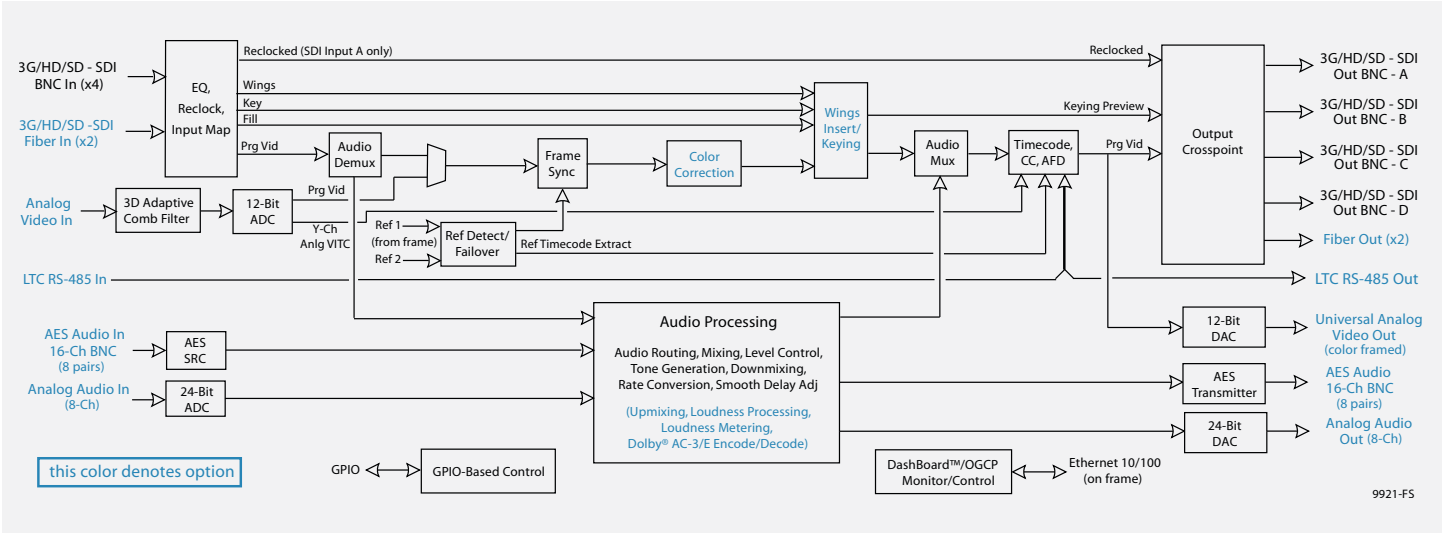
9921-FS » 3G/HD/SD FRAME SYNC



The award-winning 3G/HD/SD Fusion3G® 9921-FS card 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. Remote control is quick and easy with the free DashBoard™ remote control software or the Cobalt OGCP-9000 remote control panels.

You can select from options to add (as inputs and/or outputs) fiber, analog video, AES and analog audio. Other options include wings insertion, general purpose keying, color correction, Dolby® E/AC-3 encoding and decoding (with both decode and re-encode on the same card), ITU/ATSC/EBU compliant loudness metering, and Linear Acoustic® upmixing and loudness processing.



» STANDARD FEATURES

- Full 3G/HD/SD-SDI support on BNC coax
- Per-channel audio delay with glitchless delay adjustment
- Frame sync with reference failover using dual reference inputs on frame
- Full SMPTE timecode support with translation between formats. Timecode sources selectable from SDI and analog video inputs, reference, and internally generated.
- Advanced audio processing allows routing, gain, delay, and flexible mixing as standard features
- GPIO ports with user-definable functions for system automation and monitoring
- Centralized GUI remote control using DashBoard™ software and Cobalt OGCP-9000 remote control panels – custom settings saved as presets can be recalled manually, or with GPI or events-based triggerings
- Five-year warranty

» OPTIONAL FEATURES

- Fiber 3G/HD/SD inputs/outputs. Fiber ports use blind mating interface, allowing card swapping (including optical transceivers) with no cable disconnection.
- Analog audio I/O
- Wings insertion and general purpose keying feature
- LTC input/out and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O
- Relay bypass available from SDI input to SDI output
- Universal HD/SD analog I/O. Composite video input sources converted with 3D comb decoder, mitigating common decoding artifacts. Composite video output is color-framed to match reference burst, plus user offset.
- AES embedding/de-embedding. AES ports are GUI selectable as input or output. Each input has independent sample rate converter.
- Linear Acoustic® loudness processing and automatic upmixer technology
- Full Dolby® E / AC-3 encoding and decoding options, including decode + re-encode and multiple AC-3 stream encoding on the same card.

9921-FS » 3G/HD/SD FRAME SYNC

» I/O OPTIONS

16 CHANNEL AUDIO EMBEDDING/DE-EMBEDDING (+AES)

Provides eight (total) AES pair BNC connections that can be GUI-configured as inputs or outputs. Independent SRC for all AES inputs, with auto and manual bypass for non-PCM data.

8-PORT AES OUTPUT EXPANSION (+AES16)

Provides the 16-channel embed/de-embed of option +AES (see above) as well as eight added AES output ports to provide a total complement of AES I/O 1 thru AES I/O 8 and added ports AES OUT 1 thru AES OUT 8. Allows 16 channels of AES embedding and 16 channels of AES de-embedding simultaneously. (Option is not available as a field upgrade and also requires Rear I/O Module RM20-9921-G.)

LTC RS-485/AUDIO INPUT/OUTPUT (+LTC)

Provides LTC input/output and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O.

*FIBER INPUTS/OUTPUTS (+FRX / +FTX / +FRXTX / +FRXRX / +FTXTX)**

Provides one or two fiber connections per card. Inputs can serve any function in the product, outputs can be assigned from any function in the card. Connector type is dual LC with blind-mate connectors. Cards are fully swappable.

*UNIVERSAL ANALOG VIDEO INPUTS/OUTPUTS (+ANV)**

Provides an analog video input and output (CVBS, component, RGB (sync on green))

*ANALOG AUDIO INPUTS/OUTPUTS (+ANA)**

Provides up to eight channels (total) of balanced analog audio inputs and outputs

*Requires expansion Rear Module (for example, 9921-FS+ANV requires RM20-9921-XB expansion Rear Module)

» VIDEO OPTIONS

WINGS INSERTION (+WINGS)

Provides wings insertion using an independent SDI input provided for wings signal. Provides programmable insertion width.

KEYING (+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.

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 BUFFER EXPANSION (+MEM)

Increases the independently adjustable audio and video delay buffer capacity to 47 seconds for SD video, 8 seconds for HD video, or 4 seconds for 3G video. (+MEM is a hardware-based option and is not available as a field upgrade. This option is displayed as "+2GB" on the DashBoard card info pane.)

» AUDIO OPTIONS

*LINEAR ACOUSTIC® LOUDNESS PROCESSING (+LP51/+LP20)**

Featuring Linear Acoustic® AEROMAX® technology and available in 5.1-channel (LP51) and stereo (LP20) configurations. These loudness processors use inputs from any source received by the card, or any mixing setting produced by the card. AEROMAX® algorithms use a sophisticated multi-band approach to loudness processing, and can apply multi-faceted loudness correction specifically targeted to various frequency ranges and other characteristics within the program material, resulting in audio free from abrupt loudness or image shifts while preserving more of the original content than previously possible.

Up to two 5.1 loudness processors can be ordered per card, order as +LP51A and +LP51B. Up to four stereo loudness processors can be ordered per card, order as +LP20A, +LP20B, +LP20C and +LP20D.

*LINEAR ACOUSTIC® AUTOMATIC UPMIXER (+UM)**

Featuring Linear Acoustic® UPMAX™ technology, upmixing allows legacy stereo program content to be converted to full 5.1-channel audio. UPMAX™ mode detects 2.0 content and automatically applies upmix mode (with configurable switchover fade-in/fade-out) depending on absence or presence of 5.1 source audio.

Up to two upmixers may be configured on the card, order as +UMA and +UMB.

SOFTWARE LOUDNESS METER (+LM-C)

Cobalt's +LM audio loudness metering option (in conjunction with a Cobalt OGCP-9000 Remote Control Panel with +LM-P option) provides a flexible solution for ingest or on-air loudness metering and assessment in compliance with ITU/ATSC/EBU standards. Easy to use, the +LM offers "true peak" level detection, error tracking and logging, and intuitive interface with touch screen control.

AUDIO FAILOVER (+AFO)

Provides automatic failover to alternate ("secondary") channels to substitute for the primary channels in the event of audio signal loss.

AUTO DOWNMIX (+ADM)

Provides automatic Stereo downmix from selected alternate multi-channel sources if primary Stereo channels lose signal.

DOLBY® DIGITAL/DIGITAL PLUS™ ENCODING (+ENCD)

Provides Dolby® Digital/Digital Plus™ encoding from any combination of audio sources supported by the card. Up to four independent encoders - all on the same card - can be included (+ENCDA thru +ENCDD). This option is available on the same card along with any other Dolby options listed here. See Dolby Options (page 78) for more information.

DOLBY® E/DIGITAL/DIGITAL PLUS™ DECODING (+DEC)

Decodes Dolby® E, Digital, and Digital Plus™ signals from AES or embedded sources. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 78) for more information.

DOLBY® E ENCODING (+ENCE)

Provides Dolby® E encoding from any combination of audio sources supported by the card. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 78) for more information.

DOLBY® DESCRIPTIVE VIDEO SERVICES® ENCODING (+ENCDVS)

Provides DVS encoding of secondary narrative audio on cards equipped with Dolby® Digital/Digital Plus™ encoding. This option is available on the same card along with any other Dolby options listed here. See Dolby Options (page 78) for more information.

*The following Processing/Upmixing combinations, and their subsets, are available. Contact sales for more information.

- Upmixer, 5.1 Processor, Aux Stereo Processor (+UMA, +LP51A, +LP20A)
- Two stereo processors, Two upmixers (+LP20A, +LP20B, +UMA, +UMB)
- Two 5.1 loudness processors (+LP51A, +LP51B)
- Four stereo loudness processors (+LP20A, +LP20B, +LP20C, +LP20D)

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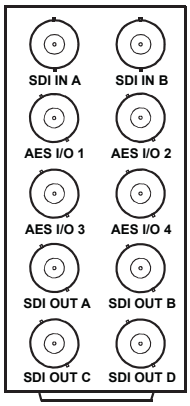
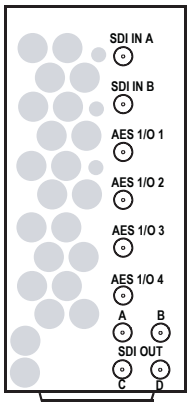
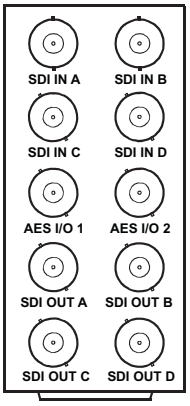
9921-FS » 3G/HD/SD FRAME SYNC



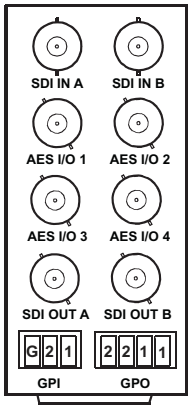
RM20-9921-B



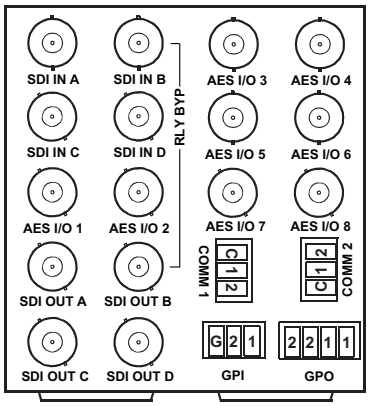
RM20-9921-B-HV



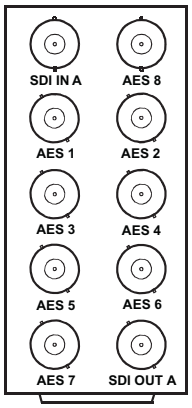
RM20-9921-C



RM20-9921-D

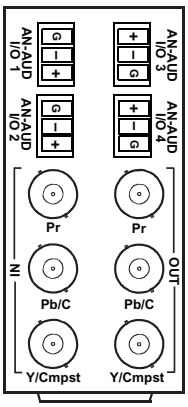


RM20-9921-E



RM20-9921-F

» EXPANSION REAR I/O MODULES



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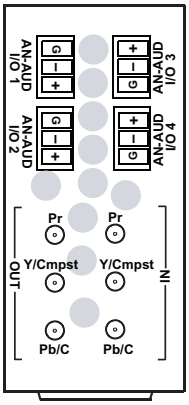
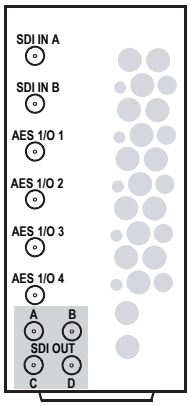


RM20-9921-XB-HV



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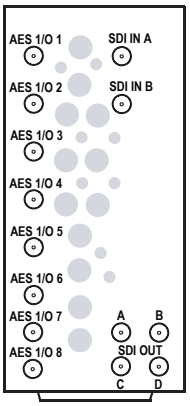
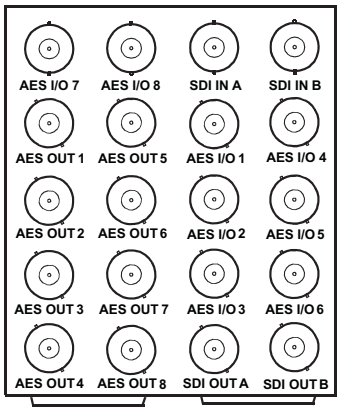
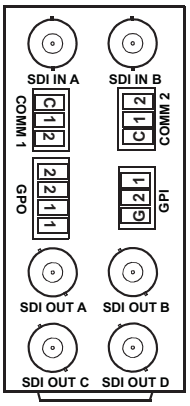


RM20-9921-F-HV

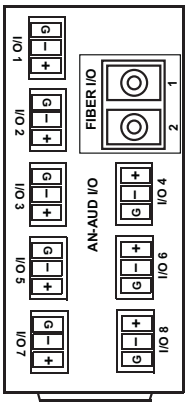


RM20-9921-G



RM20-9921-H

Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an "-X" in the part number and must be used used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 9)



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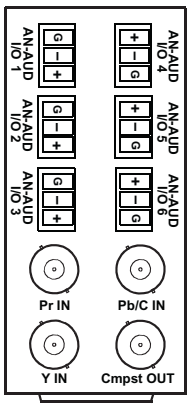

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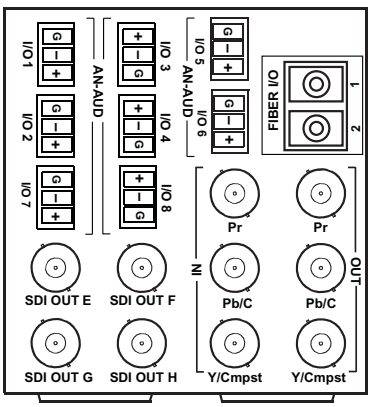

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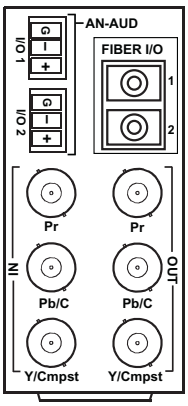

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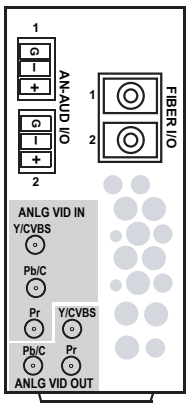

RM20-9921-XF-HV

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9921-FS » 3G/HD/SD FRAME SYNC

» ORDERING INFORMATION

9921-FS 3G/HD/SD Frame Sync

BASE REAR I/O MODULES

Base Rear I/O Modules provide connections for standard card BNC video and audio connections, as well as other connections depending on rear module part number. These modules mate directly with the Fusion3G® card.

RM20-9921-B 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI Input, 4 AES I/O BNCs, 4 3G/HD/SD-SDI Outputs

RM20-9921-B-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9921-B-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9921-C 20-Slot Frame Rear I/O Module (Standard Width) 4 3G/HD/SD-SDI Inputs, 2 AES I/O BNCs, 4 3G/HD/SD-SDI Outputs

RM20-9921-D 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI Inputs, 4 AES I/O BNCs, 2 GPIO, 2 3G/HD/SD-SDI Outputs

RM20-9921-E 20-Slot Frame Rear I/O Module (Double Width) 4 3G/HD/SD-SDI Inputs (1 with Relay Bypass), 8 AES I/O BNCs, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI Outputs

RM20-9921-F 20-Slot Frame Rear I/O Module (Standard Width) 1 3G/HD/SD-SDI Input, 8 AES I/O BNCs, 1 3G/HD/SD-SDI Output

RM20-9921-F-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9921-F-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9921-F-HV2-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) (2) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors DIN 1.0.2.3)

RM20-9921-F-HV2-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) (2) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors HD-BNC)

RM20-9921-G 20-Slot Frame Rear I/O Module (Double Width) 2 3G/HD/SD-SDI Inputs, 8 AES I/O BNCs, 8 additional AES Outputs, 2 3G/HD/SD-SDI Outputs (Available only in conjunction with card option +AES16)

RM20-9921-H 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI BNC Inputs, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI BNC Outputs

EXPANSION REAR I/O MODULES

Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an "-X" in the part number and must be used used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 9)

RM20-9921-XB 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9921-XB-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9921-XB-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9921-XC 20-Slot Frame Rear I/O Module (Standard Width) 2 Fiber I/O, 8 Analog Audio I/O

RM20-9921-XD 20-Slot Frame Rear I/O Module (Standard Width) Component In, 6 Analog Audio I/O, Composite Out

RM20-9921-XE 20-Slot Frame Rear I/O Module (Double Width) Component In, 2 Fiber I/O, 8 Analog Audio I/O, Component Out, 4 3G/HD/SD-SDI Outputs

RM20-9921-XF 20-Slot Frame Rear I/O Module (Standard Width) Component In, 2 Fiber I/O, 2 Analog Audio I/O, Component Out

RM20-9921-XF-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are DIN1.0/2.3) This Rear I/O Module must be used with an HV Base Rear I/O Module.

RM20-9921-XF-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are HD-BNC) This Rear I/O Module must be used with an HV Base Rear I/O Module.

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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 23.98/29.97/29.94 to 24/30/60 frame rates. Frame sync can select from multiple reference inputs, with failover to alternate selected sources. 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. 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.

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 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 that allows CEA 608/708 and line 21 SD CC absence or presence to be detected.

With option +ANC, the 9922-2FS 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, (Bridge mode), or inserted and/or extracted to and from external interface via serial or IP interfaces.

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

- Two independent processing paths per card – 20 channels of processing in only 10 slots
- 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.
- 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 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
- 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
- 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
- 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 with 4-line Adaptive Comb Filter
- Video options include color correction and keying
- 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 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.
- 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.
- 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. Installation: Hardware feature available only on new card.
- Audio LTC I/O (+LTC)
- Trouble Slate Import (+T-SLATE)
- 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.

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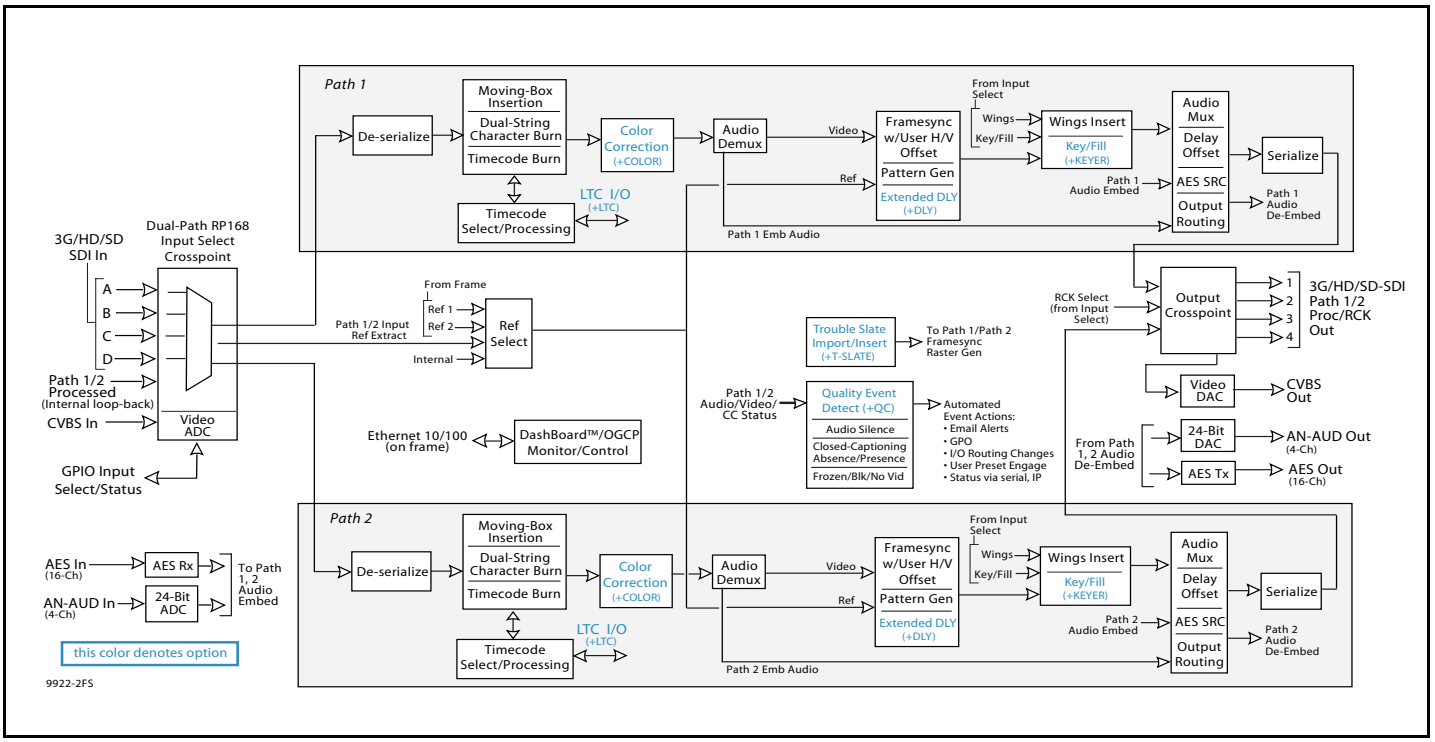
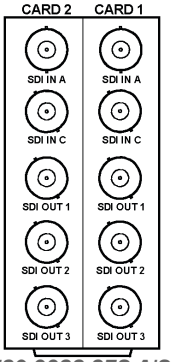
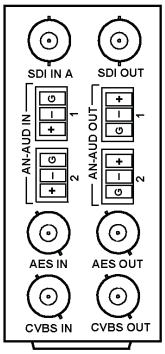
9922-2FS » 3G/HD/SD-SDI DUAL-CHANNEL FRAME SYNC

with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O

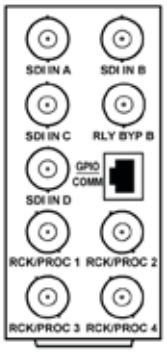




RM20-9922-2FS-A/S



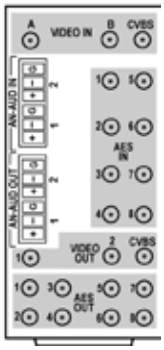
RM20-9922-2FS-B



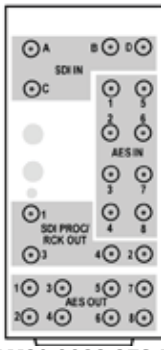
Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input.

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.

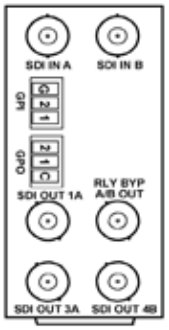
RM20-9922-2FS-C



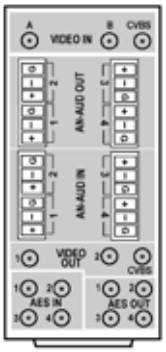
RM20-9922-2FS-D-
(DIN / HDBNC)



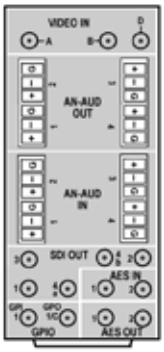
RM20-9922-2FS-E-
(DIN HDBNC)



RM20-9922-2FS-F



RM20-9922-2FS-G-
(DIN / HDBNC)



RM20-9922-2FS-H-
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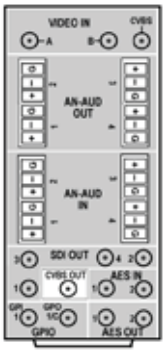
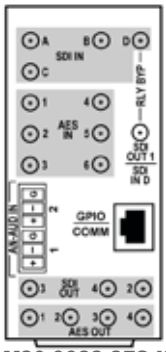
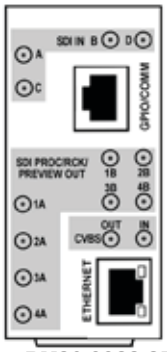


RM20-9922-2FS-J-
(DIN / HDBNC)



RM20-9922-2FS-K
(DIN / HDBNC)



RM20-9922-2FS-L-
(DIN / HDBNC)

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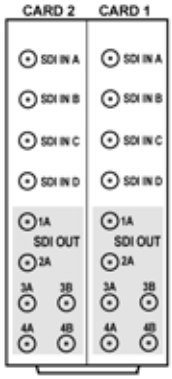
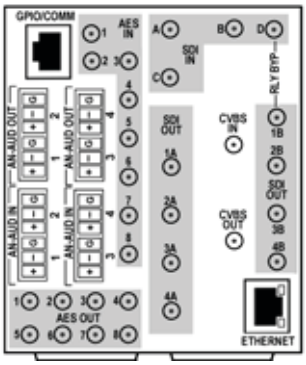
9922-2FS » 3G/HD/SD-SDI DUAL-CHANNEL FRAME SYNC

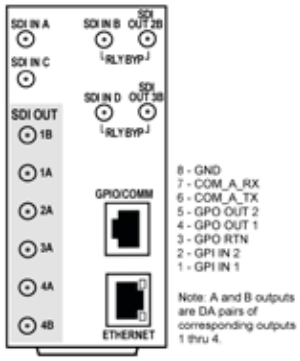
with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O



RM20-9922-2FS-M/S-
(DIN / HDBNC)



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-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

RM20-9922-2FS-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-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.)

RM20-9922-2FS-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.)

RM20-9922-2FS-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.)

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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-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)

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 (Standard Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 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 (Standard Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 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)

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+DLY Extended Delay Option

+KEYER Key/Fill Keyer 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)

+DLY Extended Frame Sync Delay Option

+T-SLATE User Trouble Slate Graphic Import Option

+SCTE104 SCTE 104 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 all-new 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 with RP168 clean switching 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 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 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 that allows CEA 608/708 and line 21 SD CC absence or presence to be detected.

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. With option +ANC, the BBG-1022-2FS offers full VANC/HANC ancillary data packet de-embedding and embedding for 3G/HD/SD-SDI streams with 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.

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 uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control (can also 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, 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.
- 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 with 4-line Adaptive Comb Filter
- 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
- Video options include 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.
- 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.
- Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID. Also controllable using DashBoard remote control.
- 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. 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.
- 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.
- 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.
- Audio LTC I/O (+LTC)
- Trouble Slate Import (+T-SLATE)
- 1RU Mounting Tray (supports 3 units) (BBG-1000-TRAY)
- Redundant Power Supply Module (BBG-1000-PS)

html5 web UI remote control | DashBoard

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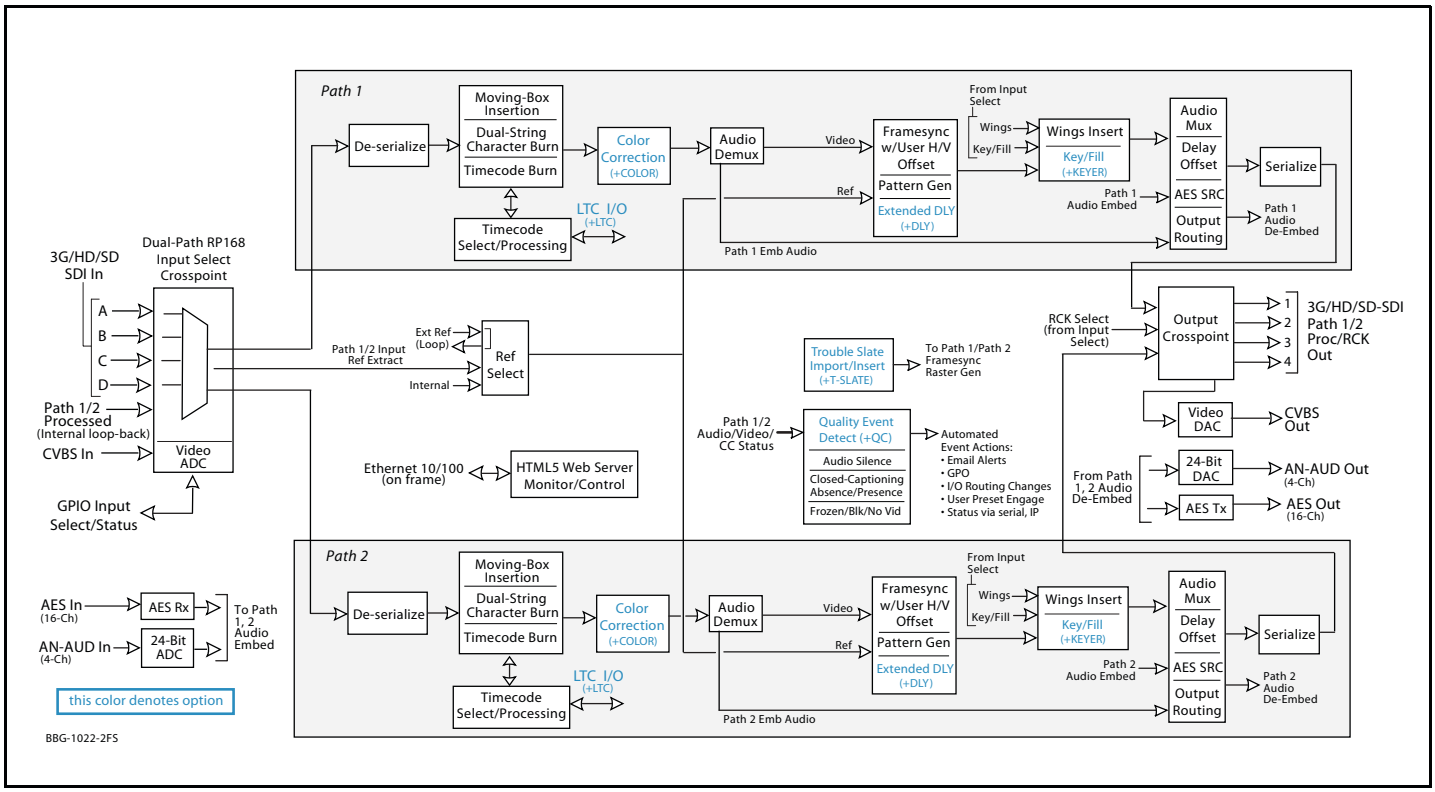
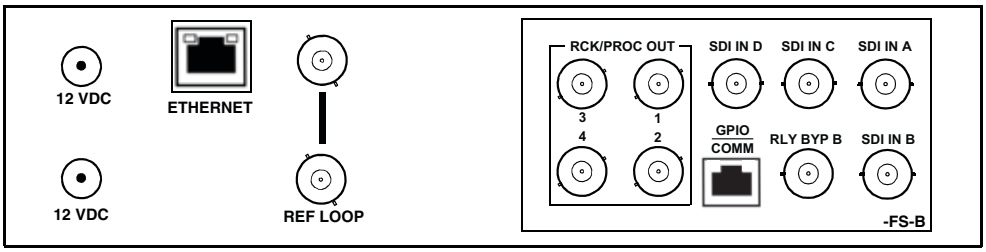
BBG-1022-2FS » 3G/HD/SD-SDI STANDALONE DUAL-CHANNEL FRAME SYNC

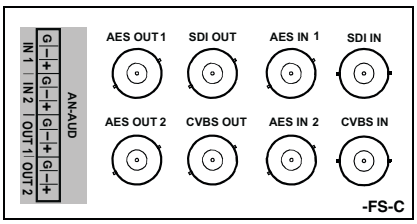
with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O

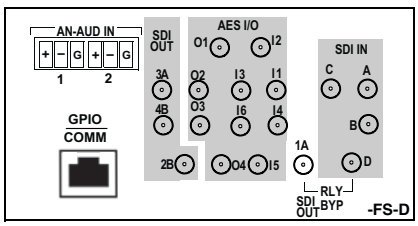


Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

Rear Panel







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

HTML5 web server/interface via rear-panel 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

+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)

+DLY Extended Frame Sync Delay Option

+T-SLATE User Trouble Slate Graphic Import Option

+SCTE104 SCTE 104 Insertion Option

BBG-1000-PS Redundant Power Supply Module

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

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FRAME SYNC » The Following Products also include Frame Sync as a Feature

Please refer to respective product page for more information

9902-UDX 3G/HD/SD-SDI Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed with Multi-Input Auto-Changeover. 21

BBG-1002-UDX 3G/HD/SD-SDI Standalone Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed with Multi-Input Auto-Changeover. 26

9903-UDX-ADDA 3G/HD/SD-SDI Universal Format Converter/Frame Sync with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding 30

BBG-1003-UDX-ADDA 3G/HD/SD-SDI Standalone Universal Format Converter/ Frame Sync with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding 34

9901-UDX (-UC, -DC, -XC) 3G/HD/SD Up/Down/Cross Converter with Frame Sync 38

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 79

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 81

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 83

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 86

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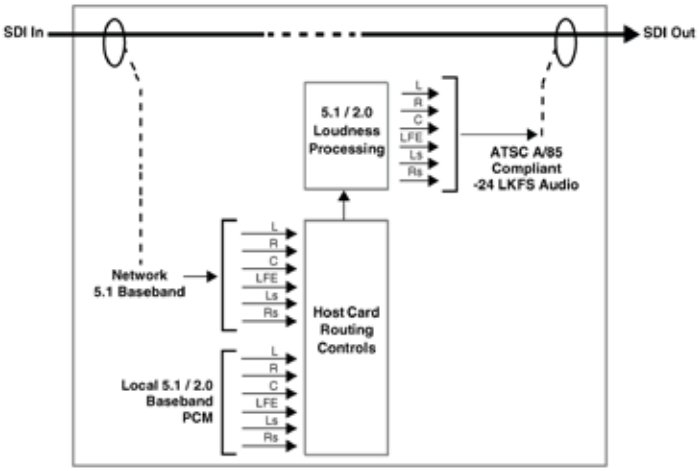
LOUDNESS PROCESSING AND UPMIXING »



Cobalt® Baseband Loudness Processing Using +LP	
Advantages	**Applications**
• Economical loudness processing solution • Easiest path to CALM compliance • No cumulative loudness processing A/V delay	• Baseband Master Control • Plant with merged network and local insertion for limited number of broadcast channels

LINEAR ACOUSTIC®

Loudness Processing option **+LP** is available for numerous Cobalt® cards. It's also available as a purchased field-installed licensable feature upload. Using Linear Acoustic® **AEROMAX®** technology, loudness control is applied on up to six channels of audio from any audio inputs sourced by the host card. **AEROMAX®** algorithms use a sophisticated multiband approach to loudness processing. These algorithms can apply multi-faceted loudness correction specifically targeted to various frequency ranges and other characteristics within the program material, resulting in audio free from abrupt loudness or image shifts while preserving more of the original content than available using less refined approaches. Because +LP processes audio loudness locally and in sync with the video, loudness is processed without the large accumulated latency delay found in other loudness processors.

The loudness processor function receives up to six selected channels from the internal bus and performs ITU BS.1770 – ATSC A/85 loudness processing on the selected channels. A loudness processing profile best suited for the program material can be selected from several loudness processing presets. The loudness processor has a default target loudness of -24 LKFS. A Custom Preset user interface page allows detailed manipulation of various parametric factors that comprise each of the factory preset profiles, thereby allowing user "tweaking" of the loudness processing actions to suit individual preferences. Loudness processing options are available on a wide range of Cobalt cards.

Upmixer option **+UM** features Linear Acoustic **UPMAX™** technology to receive any stereo pair on the card and generate 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. The 5.1 upmixer can always generate a 5.1 feed from a stereo pair, or be set to look at signal levels on designated channels. Where valid 5.1 audio is present, the 5.1 upmixer allows the channels to pass unaffected. Where 5.1 audio is not present, the 5.1 upmixer then automatically generates and routes the 5.1 audio on the designated channels.

FEATURES

- High-quality, seamless Linear Acoustic® AEROMAX® Loudness Processing
- Available for new cards or can be added to existing cards with easy field software upload
- Upmixing handles any type of stereo pair accommodated by the card
- Multiple user-selectable loudness profile preset choices with configurable target LKFS
- Default set to provide ATSC A/85 –24 LKFS loudness when used with AC-3 –24 dialnorm; no parametric setup required
- Auto Upmix activation uses configurable thresholds to tailor seamless automatic operation

ORDERING INFORMATION

Loudness Processing is available for the models listed below on product purchased new or as field software upgrade in the following packages:

+LP51A, +LP51B Two independent 5.1-channel loudness processors

+LP20A, +LP20B, +LP20C, +LP20D Four independent 2.0-channel loudness processors

+LP20A, +LP20B, +UMA, +UMB Two independent 2.0-channel loudness processors; two upmixers

+LP51A, +LP20A, +UMA 5.1-channel loudness processor, aux stereo (SAP) loudness processor, one upmixer

Available for the following models on product purchased new or as field software upgrade:
· 9902-UDX, 9922-FS, 9922-2FS, 9932-EMDE, BBG-1002-UDX, BBG-1022-FS, BBG-1022-2FS, BBG-1032-EMDE
· 9901-UDX (-DC, -UC, -XC), 9921-FS, 9931-EMDE, 9985 (standard feature on 9985)
+LP, when used with the nodels above, has custom parametric controls allowing engineering tailoring of EQ, AGC, and limiter sub-blocks.

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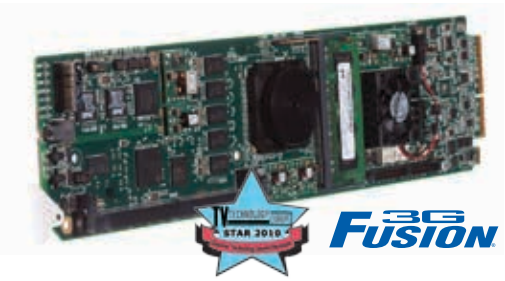
9985 » LOUDNESS PROCESSOR with Frame Sync



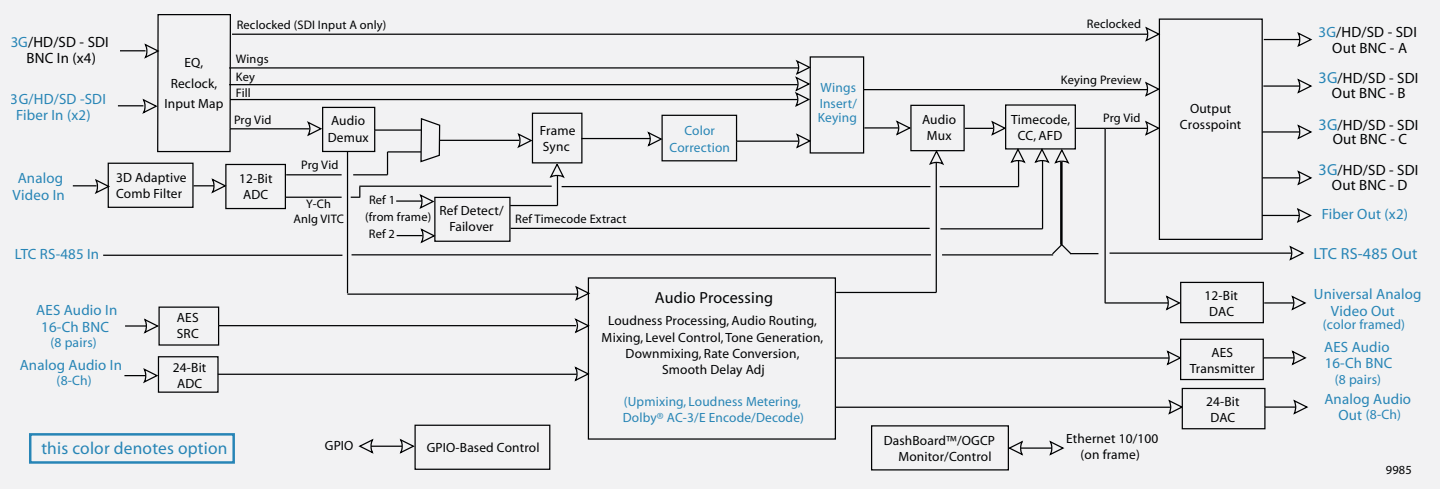
Using Linear Acoustic® AEROMAX® technology, the Fusion3G® 9985 card offers 5.1-channel or stereo loudness processing for any audio channels sourced from embedded, AES, or analog audio inputs. AEROMAX algorithms use a sophisticated multiband approach, in which loudness correction is specifically targeted to various frequency ranges and other characteristics within the program material. The result is audio free from abrupt loudness or image shifts while preserving more of the original ambience than previously possible. Because the card processes audio loudness locally and in sync with the video, loudness is processed without the accumulated latency delay found in other loudness processors. Remote control is quick and easy with the free DashBoard™ remote control software, or Cobalt OGCP-9000 series remote control panels.

Base Models:

9985-LP5.1
HD/SD 5.1 Channel Loudness Processor with Frame Sync

9985-LP2.0
HD/SD Stereo Loudness Processor with Frame Sync

The 9985's powerful dual DSPs uniquely support optional bundling of multiple loudness and upmixing processing. You can select from options to add (as inputs and/or outputs) fiber, analog video, AES, and analog audio. Other options include wings insertion, general purpose keying, color correction, Dolby® E/AC-3 encoding and decoding (with both decode and re-encode on the same card), ITU/ATSC/EBU compliant loudness metering, and Linear Acoustic® upmixing.



» FEATURES

Loudness processing actively and automatically corrects irritating loudness level differences between programs and commercials

Pre-Post loudness metering provides utmost in confidence and assessment of material (requires OGCP-9000 or WinOGCP remote control panel and option +LM)

Dual DSPs allow multiple audio proc functions — all on the same card
Base loudness processing available in single 5.1-channel, dual stereo, or stereo configurations

Per-channel audio delay with glitchless delay adjustment

Frame sync with reference failover using dual reference inputs on frame
Advanced audio processing allows routing, gain, delay, and flexible mixing

GPIO ports with user-definable functions for system automation and monitoring

Centralized GUI remote control using DashBoard™ software and Cobalt OGCP-9000 remote control panels — custom settings saved as presets can be recalled manually, or with GPI or events-based triggerings

Five-year warranty

» OPTIONAL FEATURES

Dual loudness processors or loudness processor with Linear Acoustic® upMAX™ upmixing on same card

3G SDI (coax) I/O

LTC input/out and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O

Relay bypass available from SDI input to SDI output

Wings insertion/general purpose keying

Fiber 3G/HD/SD inputs/outputs. Fiber ports use blind mating interface & allow card swapping (including optical transceivers) w/ no cable disconnection.

Universal HD/SD analog video I/O. Composite video input sources converted with 3D comb decoder, mitigating common decoding artifacts. Composite video output is color-framed to match reference burst, plus user offset.

AES embedding/de-embedding. AES ports are GUI selectable as input or output. Each input has independent sample rate converter.

Analog audio I/O support

Complete set of Dolby® E / AC-3 encoding and decoding options, including decode + re-encode and multiple AC-3 stream encoding on the same card.

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9985 » LOUDNESS PROCESSOR with Frame Sync

» I/O OPTIONS

16 CHANNEL AUDIO EMBEDDING/DE-EMBEDDING (+AES)
Provides eight (total) AES pair BNC connections that can be GUI-configured as inputs or outputs. Independent SRC for all AES inputs, with auto and manual bypass for non-PCM data.

8-PORT AES OUTPUT EXPANSION (+AES16)
Provides the 16-channel embed/de-embed of option +AES (see above) as well as eight added AES output ports to provide a total complement of AES I/O 1 thru AES I/O 8 and added ports AES OUT 1 thru AES OUT 8. Allows 16 channels of AES embedding and 16 channels of AES de-embedding simultaneously. (Option is not available as a field upgrade and also requires Rear I/O Module RM20-9985-G.)

LTC RS-485/AUDIO INPUT/OUTPUT (+LTC)
Provides LTC input/output and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O.

3G/HD/SD-SDI INPUTS/OUTPUTS (+3G)
Extended input/output processing to include 3G, as well as HD/SD-SDI coax support

FIBER INPUTS/OUTPUTS (+FRX / +FTX / +FRXTX / +FRXRX / +FTXTX)*
Provides one or two fiber connections per card. Inputs can serve any function in the product, outputs can be assigned from any function in the card. Connector type is dual LC with blind-mate connectors. Cards are fully swappable.

UNIVERSAL ANALOG VIDEO INPUTS/OUTPUTS (+ANV)*
Provides an analog video input and output (CVBS, component, RGB (sync on green))

ANALOG AUDIO INPUTS/OUTPUTS (+ANA)*
Provides up to eight channels (total) of balanced analog audio inputs and outputs

*Requires expansion Rear Module (for example, 9985+ANV requires RM20-9985-XB expansion Rear Module)

» VIDEO OPTIONS

WINGS INSERTION (+WINGS)
Provides wings insertion using an independent SDI input provided for wings signal. Provides programmable insertion width.

KEYING (+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.

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.

UPGRADE TO 3G (+3G)
Upgrades base 9985 model to 3G/HD/SD

FRAME BUFFER EXPANSION (+MEM)
Increases the independently adjustable audio and video delay buffer capacity to 47 seconds for SD video, 8 seconds for HD video, or 4 seconds for 3G video. (+MEM is a hardware-based option and is not available as a field upgrade. This option is displayed as "+2GB" on the DashBoard card info pane.).

» AUDIO OPTIONS

LINEAR ACOUSTIC® LOUDNESS PROCESSING (+LP51/+LP20)*
Featuring Linear Acoustic® AEROMAX® technology and available in 5.1-channel (LP51) and stereo (LP20) configurations. These loudness processors use inputs from any source received by the card, or any mixing setting produced by the card. AEROMAX® algorithms use a sophisticated multi-band approach to loudness processing, and can apply multi-faceted loudness correction specifically targeted to various frequency ranges and other characteristics within the program material, resulting in audio free from abrupt loudness or image shifts while preserving more of the original content than previously possible.

Up to two 5.1 loudness processors can be ordered per card, order as +LP51A and +LP51B. Up to four stereo loudness processors can be ordered per card, order as +LP20A, +LP20B, +LP20C and +LP20D.

LINEAR ACOUSTIC® AUTOMATIC UPMIXER (+UM)*
Featuring Linear Acoustic® UPMAX™ technology, upmixing allows legacy stereo program content to be converted to full 5.1-channel audio. UPMAX™ mode detects 2.0 content and automatically applies upmix mode (with configurable switchover fade-in/fade-out) depending on absence or presence of 5.1 source audio.

Up to two upmixers may be configured on the card, order as +UMA and +UMB.

SOFTWARE LOUDNESS METER (+LM-C)
Cobalt's +LM audio loudness metering option (in conjunction with a Cobalt OGCP-9000 Remote Control Panel with +LM-P option) provides a flexible solution for ingest or on-air loudness metering and assessment in compliance with ITU/ATSC/EBU standards. Easy to use, the +LM offers "true peak" level detection, error tracking and logging, and intuitive interface with touch screen control.

AUDIO FAILOVER (+AFO)
Provides automatic failover to alternate ("secondary") channels to substitute for the primary channels in the event of audio signal loss.

AUTO DOWNMIX (+ADM)
Provides automatic Stereo downmix from selected alternate multi-channel sources if primary Stereo channels lose signal.

DOLBY® DIGITAL/DIGITAL PLUS™ ENCODING (+ENCD)
Provides Dolby® Digital/Digital Plus™ encoding from any combination of audio sources supported by the card. Up to four independent encoders - all on the same card - can be included (+ENCDA thru +ENCDD). This option is available on the same card along with any other Dolby options listed here. See Dolby Options (page 78) for more information.

DOLBY® E/DIGITAL/DIGITAL PLUS™ DECODING (+DEC)
Decodes Dolby® E, Digital, and Digital Plus™ signals from AES or embedded sources. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 78) for more information.

DOLBY® E ENCODING (+ENCE)
Provides Dolby® E encoding from any combination of audio sources supported by the card. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 78) for more information.

DOLBY® DESCRIPTIVE VIDEO SERVICES® ENCODING (+ENCDVS)
Provides DVS encoding of secondary narrative audio on cards equipped with Dolby® Digital/Digital Plus™ encoding. This option is available on the same card along with any other Dolby options listed here. See Dolby Options (page 78) for more information.

*The following Processing/Upmixing combinations, and their subsets, are available. Contact sales for more information.

- Upmixer, 5.1 Processor, Aux Stereo Processor (+UMA, +LP51A, +LP20A)
- Two stereo processors, Two upmixers (+LP20A, +LP20B, +UMA, +UMB)
- Two 5.1 loudness processors (+LP51A, +LP51B)
- Four stereo loudness processors (+LP20A, +LP20B, +LP20C, +LP20D)

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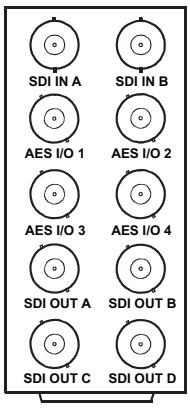
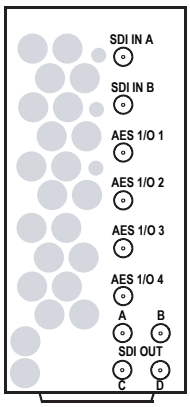
9985 » LOUDNESS PROCESSOR with Frame Sync



RM20-9985-B



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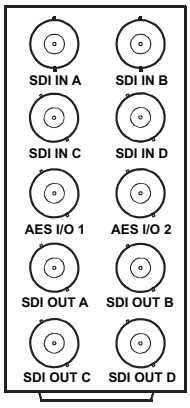

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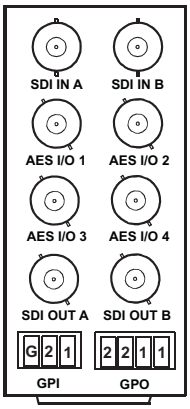

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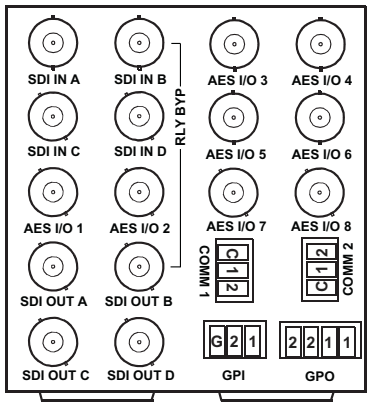

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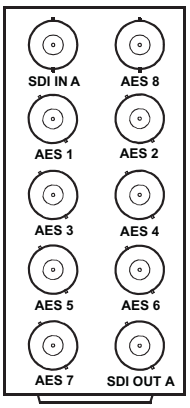
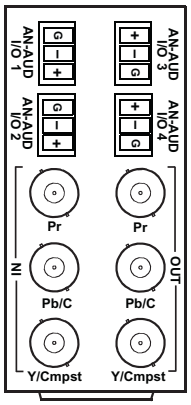


RM20-9985-F

» EXPANSION REAR I/O MODULES



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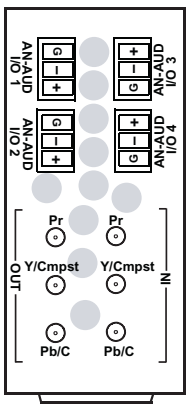
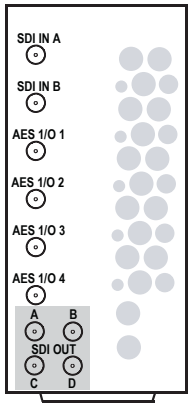


RM20-9985-XB-HV



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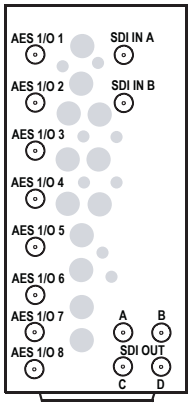
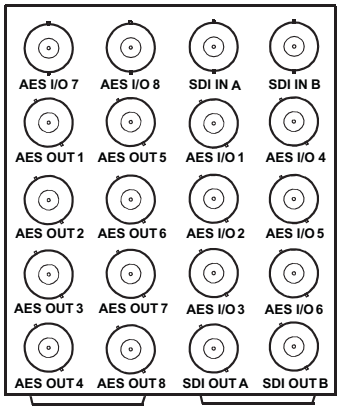


RM20-9985-F-HV



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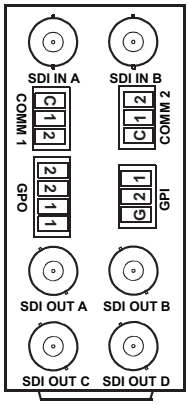
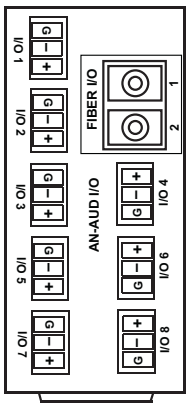


RM20-9985-H

Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an "-X" in the part number and must be used used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 9)



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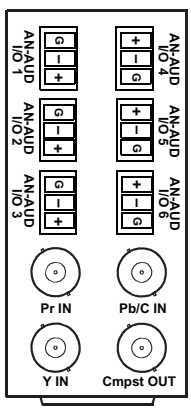

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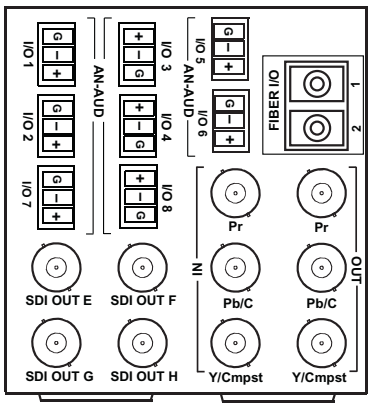

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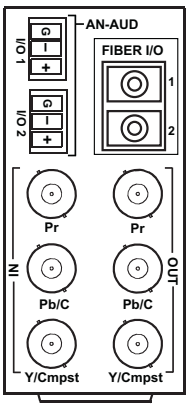

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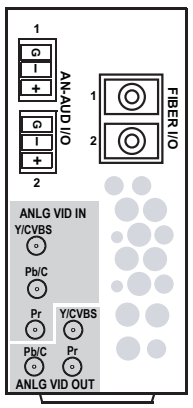

RM20-9985-XF-HV

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9985 » LOUDNESS PROCESSOR with Frame Sync

» ORDERING INFORMATION

9985-LP51 Linear Acoustic® AEROMAX® 5.1 Channel Loudness Processor with Frame Sync

9985-LP20 Linear Acoustic® AEROMAX® 2.0 Channel Loudness Processor with Frame Sync

BASE REAR I/O MODULES

Base Rear I/O Modules provide connections for standard card BNC video and audio connections, as well as other connections depending on rear module part number. These modules mate directly with the Fusion3G® card.

RM20-9985-B 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI Input, 4 AES I/O BNCs, 4 3G/HD/SD-SDI Outputs

RM20-9985-B-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9985-B-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9985-C 20-Slot Frame Rear I/O Module (Standard Width) 4 3G/HD/SD-SDI Inputs, 2 AES I/O BNCs, 4 3G/HD/SD-SDI Outputs

RM20-9985-D 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI Inputs, 4 AES I/O BNCs, 2 GPIO, 2 3G/HD/SD-SDI Outputs

RM20-9985-E 20-Slot Frame Rear I/O Module (Double Width) 4 3G/HD/SD-SDI Inputs (1 with Relay Bypass), 8 AES I/O BNCs, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI Outputs

RM20-9985-F 20-Slot Frame Rear I/O Module (Standard Width) 1 3G/HD/SD-SDI Input, 8 AES I/O BNCs, 1 3G/HD/SD-SDI Output

RM20-9985-F-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9985-F-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9985-F-HV2-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors DIN 1.0.2.3)

RM20-9985-F-HV2-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors HD-BNC)

RM20-9985-G 20-Slot Frame Rear I/O Module (Double Width) 2 3G/HD/SD-SDI Inputs, 8 AES I/O BNCs, 8 additional AES Outputs, 2 3G/HD/SD-SDI Outputs (Available only in conjunction with card option +AES16)

RM20-9985-H 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI BNC Inputs, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI BNC Outputs

UPGRADE TO 3G (+3G) Upgrades base 9985 model to 3G/HD/SD

EXPANSION REAR I/O MODULES

Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an "-X" in the part number and must be used used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 9)

RM20-9985-XB 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9985-XB-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9985-XB-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9985-XC 20-Slot Frame Rear I/O Module (Standard Width) 2 Fiber I/O, 8 Analog Audio I/O

RM20-9985-XD 20-Slot Frame Rear I/O Module (Standard Width) Component In, 6 Analog Audio I/O, Composite Out

RM20-9985-XE 20-Slot Frame Rear I/O Module (Double Width) Component In, 2 Fiber I/O, 8 Analog Audio I/O, Component Out, 4 3G/HD/SD-SDI Outputs

RM20-9985-XF 20-Slot Frame Rear I/O Module (Standard Width) Component In, 2 Fiber I/O, 2 Analog Audio I/O, Component Out

RM20-9985-XF-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are DIN1.0/2.3) This Rear I/O Module must be used with an HV Base Rear I/O Module.

RM20-9985-XF-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are HD-BNC) This Rear I/O Module must be used with an HV Base Rear I/O Module.

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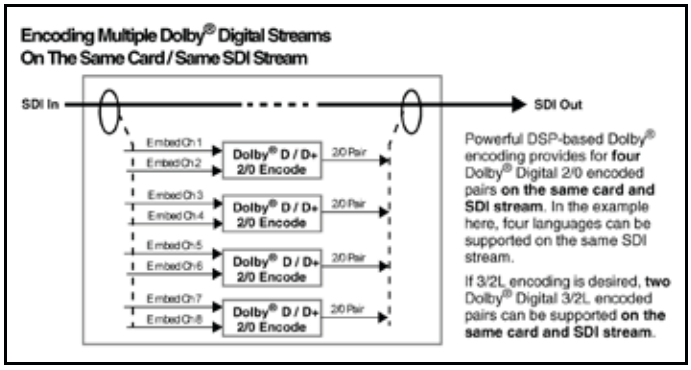
DOLBY® ENCODING/DE-ENCODING OPTIONS »

Our DSP-based® Dolby encoder packages are virtually unmatched in single-card Dolby® audio capacity and capabilities. Several Dolby options provide capacity that optimizes your operating costs, space requirements, and bandwidth economy. Powerful DSP features allow for same-card decoding and multiple-format encoding.

Dolby encoders can use any audio source supported by the card (including upmixed and loudness-processed sources). Encode using internal metadata templates with a full complement of encoding formats and bit rates, as well as external metadata from serial, SMPTE 2020 embedded metadata, or from same-card Dolby decoder metadata. Software option Dolby encoding is available on cards purchased new, or as an easy-to-install field upgrade using a license key upload to the card via DashBoard™ remote control.

- **Dolby® Digital/Digital Plus™ Encoding** – 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, RS-485, or from a same-card decoder. Up to four independent encoders (**+ENCDA** thru **+ENCDD**) can be included on the same card. This allows for multiple-stream encoding that supports four languages or SAP streams on the same SDI stream. Independent encoders can support distinct coding modes and bit rates for each encoded pair.
- **Dolby® E Encoding** – Option **+ENCEA** Provides Dolby® E 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, RS-485, or from a same-card decoder.
- **Dolby® Descriptive Video Services (DVS®) Encoding** – Option **+SDVS** provides SDVS retaining all the surround content from the original 5.1-channel mix, with this content aesthetically ducked (via new External Program Scaling Factor (EPSF) metadata) to accommodate and promote the descriptive narrative when present. The vision-impaired listener experiences the dynamicism and impact of the full multi-channel programming while being provided with the useful descriptive content without compromises. (Requires card also licensed with +ENCDA and +ENCDB dual encoding.)



DOLBY DIGITAL

DOLBY DIGITAL PLUS

Option

FEATURES

Fully scalable – choose any combination of up to four mulitple encoders

Up to four encoders can provide simultaneous encoding – perfect for multi-language/ SAP support on same SDI stream

DSP software-based option – can be purchased with new card or added using easy-to-install field software upgrade

Full metadata support for all encoders and modes. Source metadata from internal templates, external serial or SMPTE 2020, or from same-card decoder.

Usable with any audio source received by the card, including on-card upmixed and loudness-processed content

ORDERING INFORMATION

+ENCDA Full Dolby® Digital/Digital Plus (3/2L or lesser) Encoding Option

+ENCDB Full (second) Dolby® Digital/Digital Plus (3/2L or lesser) Encoding Option

+ENCDC 2/0 Dolby® Digital/Digital Plus (third encoder) Encoding Option

+ENCDD 2/0 Dolby® Digital/Digital Plus (fourth encoder) Encoding Option

+ENCEA Dolby® E Encoding Option

+SDVS SDVS Encoding Option (requires two ENCD encoders on same card for use)

Available for the following models on product purchased new or as field software upgrade:
· 9902-UDX, 9922-FS, 9922-2FS, 9932-EMDE, BBG-1002-UDX, BBG-1022-FS, BBG-1022-2FS, BBG-1032-EMDE
· 9901-UDX (-DC, -UC, -XC), 9921-FS, 9931-EMDE, 9985 (standard feature on 9985)
+LP, when used with the nodels above, has custom parametric controls allowing engineering tailoring of EQ, AGC, and limiter sub-blocks.
Note: Multiple encode capacity is contingent upon codec format, mode, bit rate and other factors. Contact Cobalt Sales for more information about multiple simultaneous encode details.

Dolby® is a registered trademark of Dolby Laboratories, Inc. Dolby® encoder technology for these options is manufactured under license from Dolby Laboratories.

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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

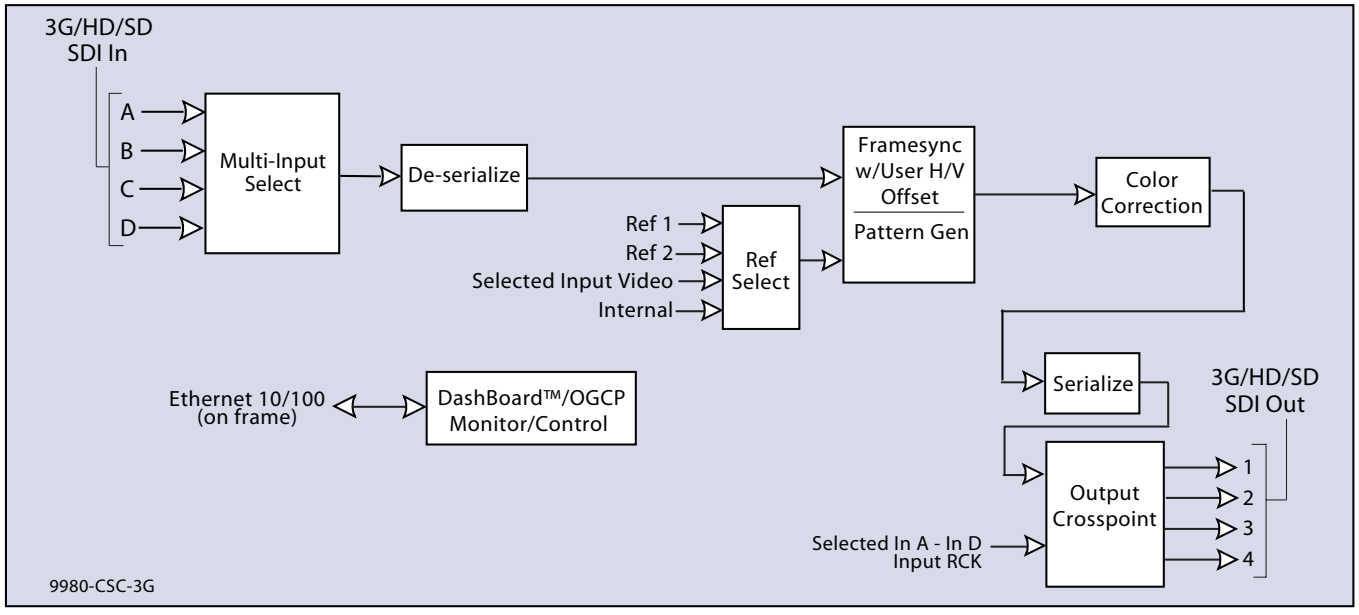
The all-new Cobalt® 9980-CSC-3G 3G/HD/SD-SDI RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support provides a high-density card-based solution that includes an advanced frame sync/pattern generator in addition to a full-featured SD/HD/3G color 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.
- Five year warranty



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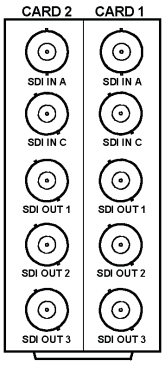
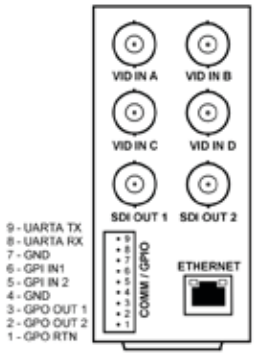
9980-CSC-3G » 3G/HD/SD-SDI RGB COLOR SPACE CORRECTOR / FRAME SYNC

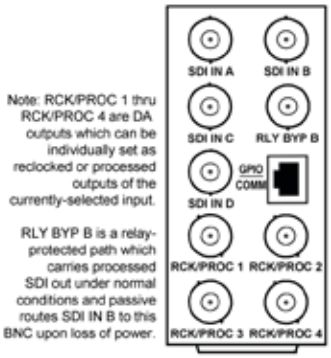
with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support



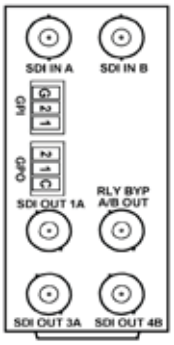
RM20-9980-A/S



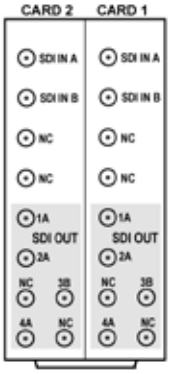
RM20-9980-B



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 (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

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

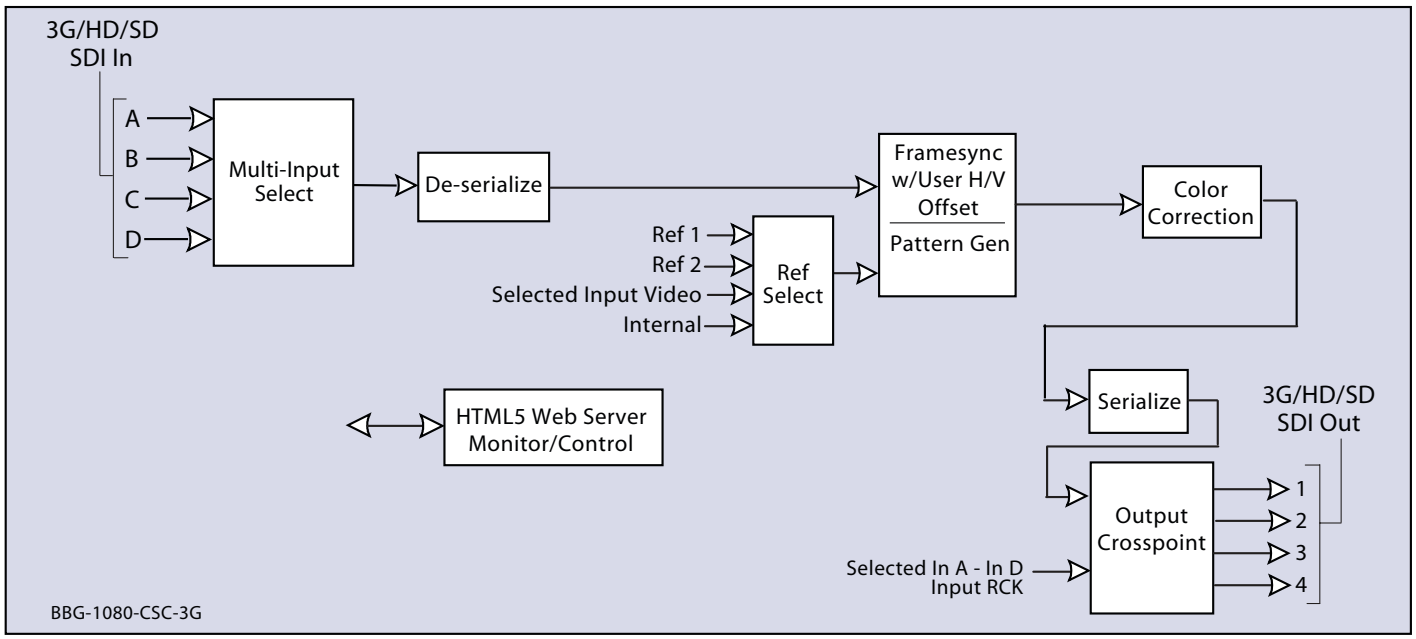
The all-new Cobalt® BBG-1080-CSC-3G 3G/HD/SD-SDI Standalone RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support provides a high-density standalone solution that includes an advanced frame sync/pattern generator in addition to a full-featured 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 uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control (can also 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.
- Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID. Also controllable using DashBoard remote control and OGCP-9000/CC remote control panel.
- Five year warranty



html5 web UI remote control

DashBoard

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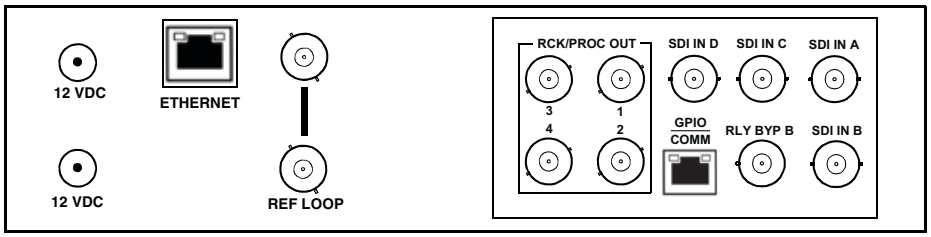
BBG-1080-CSC-3G » 3G/HD/SD-SDI STANDALONE RGB COLOR SPACE CORRECTOR / FRAME SYNC

with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

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
HTML5 web server/interface via rear-panel 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)

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

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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

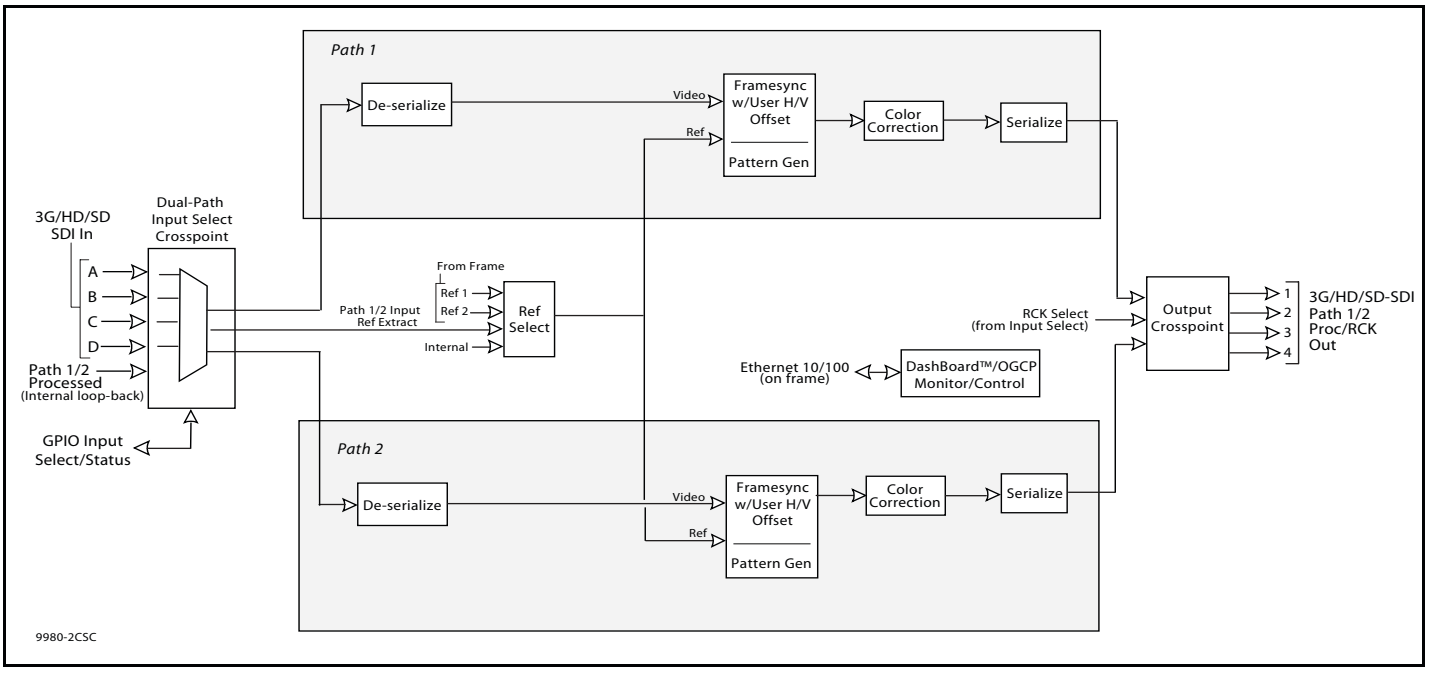
The all-new Cobalt® 9980-2CSC-3G 3G/HD/SD-SDI Dual-Channel RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support offers two independent signal paths of color correction/frame sync on a single open-Gear® card. Using our HPF-9000 20-slot frame, 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.
- Five year warranty



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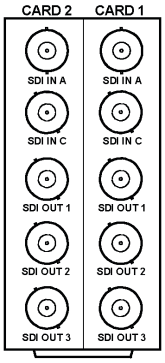
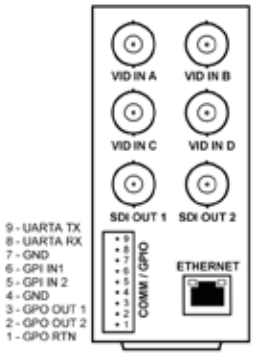
9980-2CSC-3G » 3G/HD/SD-SDI DUAL-CHANNEL RGB COLOR SPACE CORRECTOR / FRAME SYNC

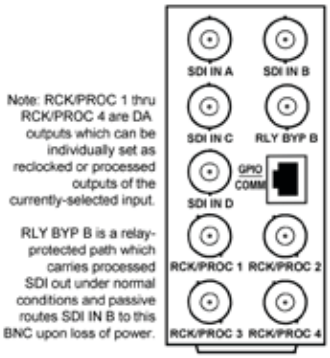
with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support



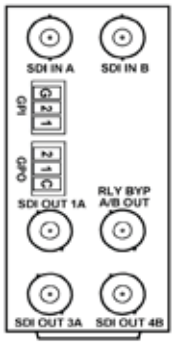
RM20-9980-A/S



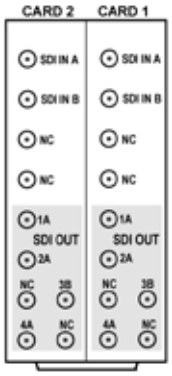
RM20-9980-B



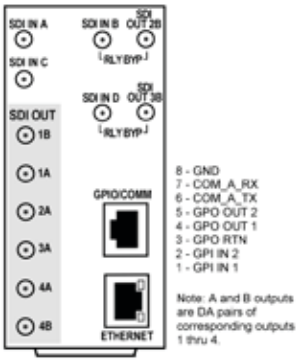
RM20-9980-C



RM20-9980-F



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
- 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

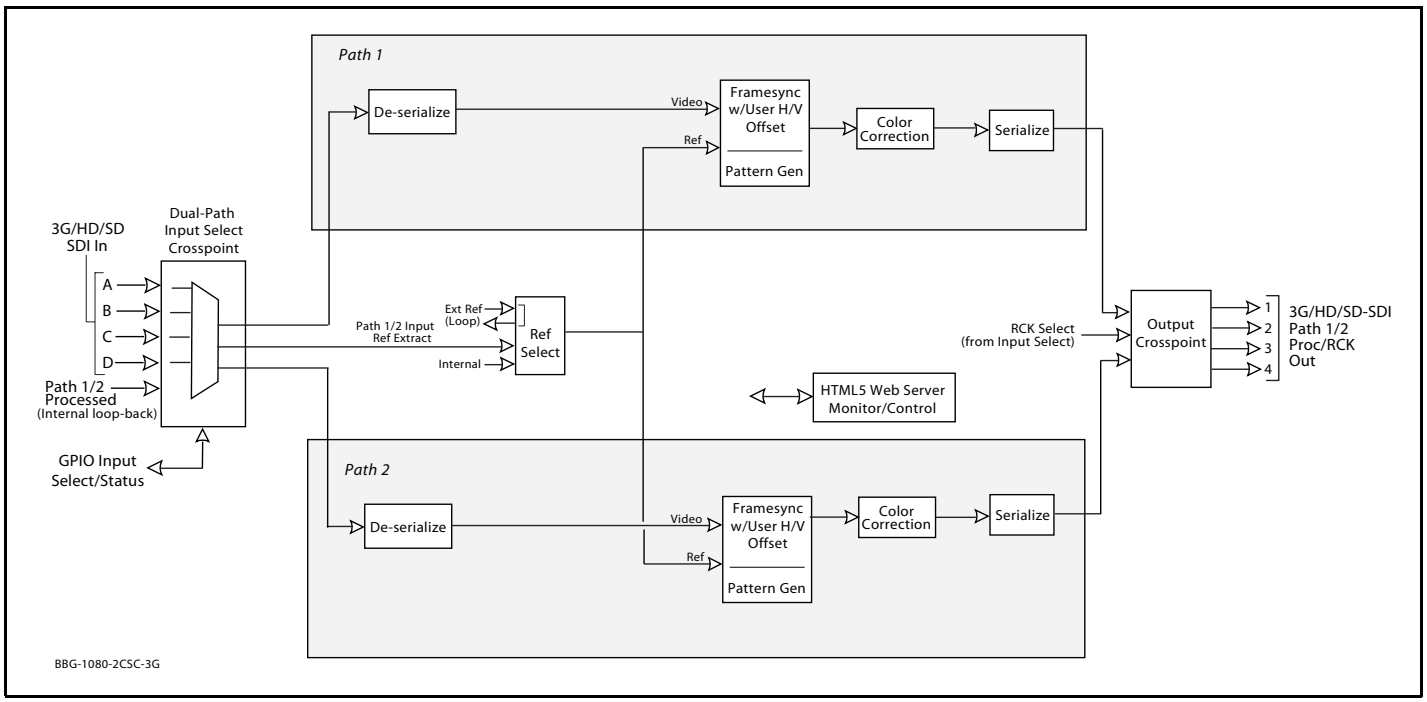
The all-new Cobalt® BBG-1080-2CSC-3G 3G/HD/SD-SDI Dual-Channel Standalone RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support offers two independent signal paths of color correction/frame sync in a standalone unit.

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 web GUI, 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 uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control (can also 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.
- Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID. Also controllable using DashBoard remote control and OGCP-9000/CC remote control panel.
- Five year warranty



html5 web UI remote control

DashBoard

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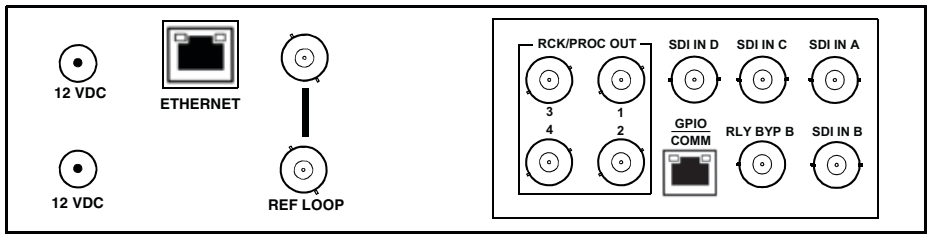
BBG-1080-2CSC-3G » 3G/HD/SD-SDI DUAL-CHANNEL STANDALONE RGB COLOR SPACE CORRECTOR / FRAME SYNC

with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

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
HTML5 web server/interface via rear-panel 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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+COLOR » Full Color Correction Functionality Can Be Added to the Following Models

Full color correction functionality can be added to numerous models as the +COLOR software upgrade option, allowing economical expanded functionality combining the functions of multiple devices in one unit. This option is available as a software upgrade upload which can be ordered on new cards/units or field-installed on existing cards without removing the card from its frame. +COLOR is available for the cards and BBG-1000 standalone units listed below.

OPENGEAR CARDS

9902-UDX 3G/HD/SD-SDI Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed with Multi-Input Auto-Changeover 21

9903-UDX-ADDA 3G/HD/SD-SDI Universal Format Converter/Frame Sync with CVBS/ YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding 30

9901-UDX (-UC, -DC, -XC) 3G/HD/SD Up/Down/Cross Converter with Frame Sync 38

9502-DCDA-3G Downconverter with 3G/HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking 44

9501-DCDA-3G Downconverter with 3G/HD/SD-SDI Input, SDI Reclocking, SD-SDI and Analog Video/Audio Outputs/AES Outputs 42

9922-FS 3G/HD/SD-SDI Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O . . . 50

9922-2FS 3G/HD/SD-SDI Dual-Channel Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O 63

9932-EMDE 3G/HD/SD-SDI 16-Channel Embedder / De-Embedder with Audio/Video Processing and CVBS I/O 156

9940-4X1-CS 3G/HD/SD-SDI 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control 122

BBG-1000 STANDALONE UNITS

BBG-1002-UDX 3G/HD/SD-SDI Standalone Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed with Multi-Input Auto-Changeover 26

BBG-1022-FS 3G/HD/SD-SDI Standalone Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O 55

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 63

BBG-1003-UDX-ADDA 3G/HD/SD-SDI Standalone Universal Format Converter/Frame Sync with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding 34

BBG-1032-EMDE 3G/HD/SD-SDI Standalone 16-Channel Embedder / De-Embedder with Audio/Video Processing and CVBS I/O 174

BBG-1040-4X1-CS 3G/HD/SD-SDI Standalone 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control 125

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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 the following products:

- 9501-DCDA, 9502-DCDA, 9902-UDX, 9903-UDX-ADDA, 9922-FS, 9922-2FS, 9932-EMDE, 9940-4x1-CS
- All Fusion3G® models (9901, 9921, 9931, 9985)
- BBG-1000 series Standalone/Desktop units BBG-1002-UDX, BBG-1003-UDX-ADDA, BBG-1022-FS, BBG-1022-2FS, BBG-1032-EMDE, BBG-1040-4x1-CS

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BBG-A-TO-S » HD/SD ANALOG COMPONENT/COMPOSITE-TO-HD/SD-SDI with Audio Embedder

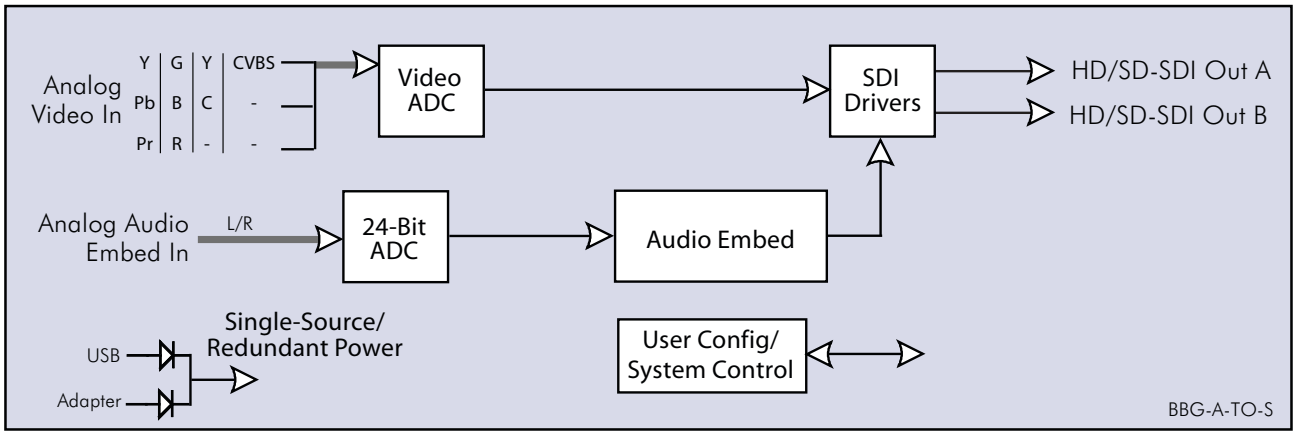
Cobalt introduces Blue Box Group™ – our all-new line of interface converter boxes that not only offer excellent performance, but also excel to a new level of ease of use and installation practicality.

Blue Box 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)

ORDERING INFORMATION

BBG-A-TO-S BlueBox™ Analog-to-SDI HD/SD Analog Component/Composite-to-HD/SD-SDI with Audio Embedder Converter Unit

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BBG-S-TO-A » HD/SD-SDI-TO-HD/SD ANALOG COMPONENT/COMPOSITE with Audio De-Embedder

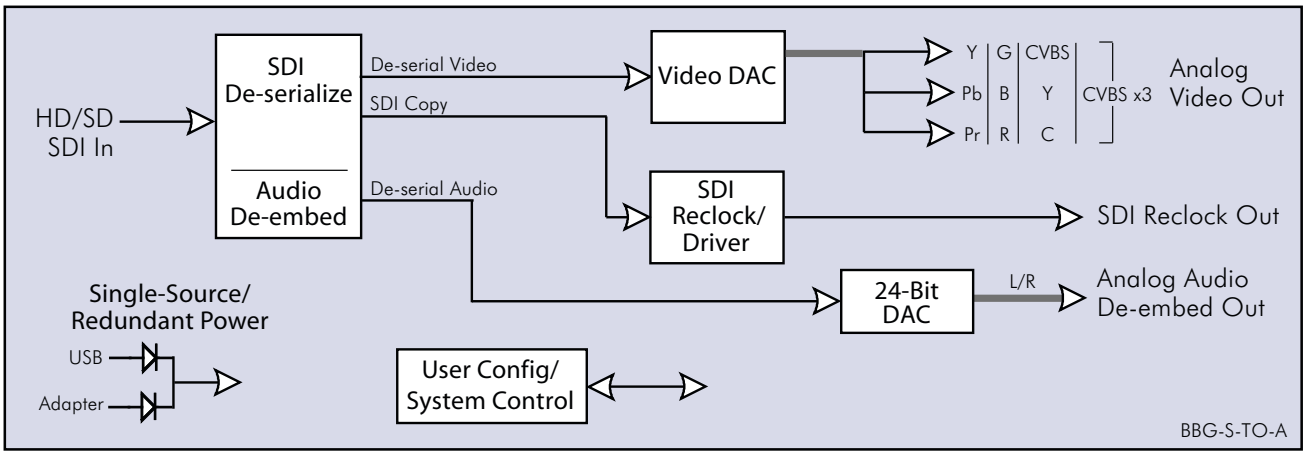
Cobalt introduces Blue Box Group™ – our all-new line of interface converter boxes that not only offer excellent performance, but also excel to a new level of ease of use and installation practicality.

Blue Box 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)

ORDERING INFORMATION

BBG-S-TO-A HD/SD-SDI-to-HD/SD Analog Component/Composite with Audio De-Embedder Converter Unit

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A/D - D/A PROCESSING » The Models Below Offer Video A/D and/or D/A Processing

Please see respective product pages for more information

OPENGEAR CARDS

9902-UDX 3G/HD/SD-SDI Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed with Multi-Input Auto-Changeover 21

9903-UDX-ADDA 3G/HD/SD-SDI Universal Format Converter/Frame Sync with CVBS/ YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding 30

9901-UDX (-UC, -DC, -XC) 3G/HD/SD Up/Down/Cross Converter with Frame Sync 38

9501-DCDA-3G Downconverter with 3G/HD/SD-SDI Input, SDI Reclocking, SD-SDI and Analog Video/Audio Outputs/AES Outputs 42

9922-FS 3G/HD/SD-SDI Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O . . . 50

9922-2FS 3G/HD/SD-SDI Dual-Channel Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O 63

9932-EMDE 3G/HD/SD-SDI 16-Channel Embedder / De-Embedder with Audio/Video Processing and CVBS I/O 156

BBG-1000 STANDALONE UNITS

BBG-1002-UDX 3G/HD/SD-SDI Standalone Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed with Multi-Input Auto-Changeover 26

BBG-1022-FS 3G/HD/SD-SDI Standalone Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O 55

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 68

BBG-1003-UDX-ADDA 3G/HD/SD-SDI Standalone Universal Format Converter/Frame Sync with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding 34

BBG-1032-EMDE 3G/HD/SD-SDI Standalone 16-Channel Embedder / De-Embedder with Audio/Video Processing and CVBS I/O 174

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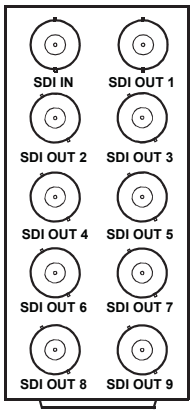
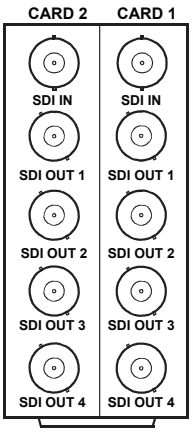
9001 » 3G/HD/SD 1X9 RECLOCKING DISTRIBUTION AMPLIFIER

The 9001 is a multi-rate 1x9 SDI and ASI distribution amplifier capable of equalizing and reclocking 3G, HD, and SD signals. All outputs are non-inverting, allowing for reclocking of ASI signals. Excellent receiver EQ performance allows up to 150m cable lengths for HD signals.



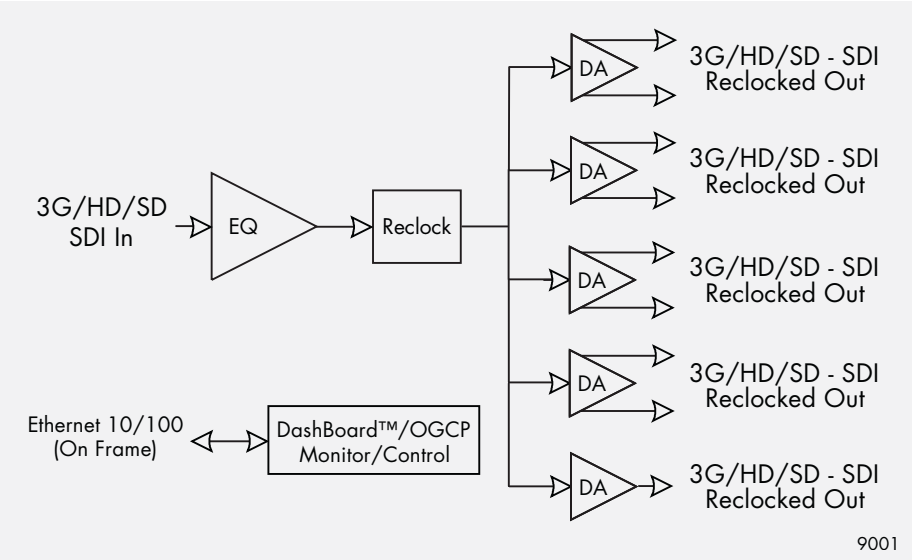
RM20-9001-A

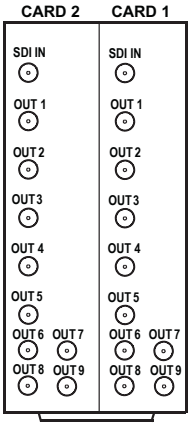


RM20-9001-A/S

» FEATURES

- Equalizes up to 150m of Belden 1694A cable at 1.485 Gbit
- Automatic rate detection for all popular data rates
- ASI reclocking on all outputs
- Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panel
- Five year warranty





RM20-9001-B/S

openGear

DashBoard

» SPECIFICATIONS

Electrical

Power:	2 watts

3G/HD/SD-SDI Input

Number of Inputs:	1
Standard:	SMPTE 424M, 292M, and 259M
Return Loss:	>15 dB at 5 MHz - 1.485 GHz >10 dB at 1.5 GHz to 3 GHz

Cable Length Equalized (w/Belden 1694A)

3 Gbps:	80m
1.485 Gbps:	150m
143-360 Mbps:	350m

3G/HD/SD-SDI Output

Number of outputs:	9 (ASI compatible)
Standard:	SMPTE 424M, 292M, and 259M
Signal Level:	800 mV nominal
Return Loss:	>15 dB at 5 MHz - 1.485 GHz >10 dB at 1.5 GHz to 3 GHz
Jitter (wideband):	HD: < 0.2 UI

» ORDERING INFORMATION

9001 3G/HD/SD 1x9 Reclocking Distribution Amplifier

RM20-9001-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 9 Reclocked HD/SD-SDI Output BNCs

RM20-9001-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input BNC, 4 Reclocked HD/SD-SDI Output BNCs per card

RM20-9001-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input (HDBNC), 1x9 / 1x9 HD/SD-SDI Outputs per card (All connectors HDBNC)

RM20-9001-B/S-DIN 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input (DIN1.0/2.3), 1x9 / 1x9 HD/SD-SDI Outputs per card (All connectors DIN1.0/2.3)

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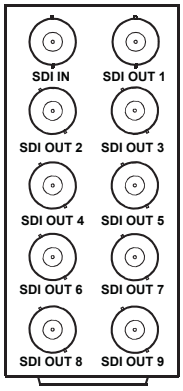
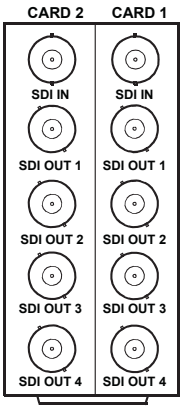
9002 » 3G/HD/SD 1X9 DISTRIBUTION AMPLIFIER (NON-RECLOCKING)

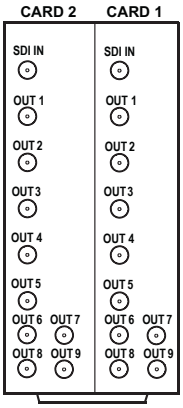
The 9002 is a multi-rate 1x9 SDI and ASI distribution amplifier capable of equalizing 3G, HD, and SD signals. All outputs are non-inverting, allowing for distribution of ASI signals. Excellent receiver EQ performance allows up to 150m cable lengths for HD signals.



RM20-9002-A



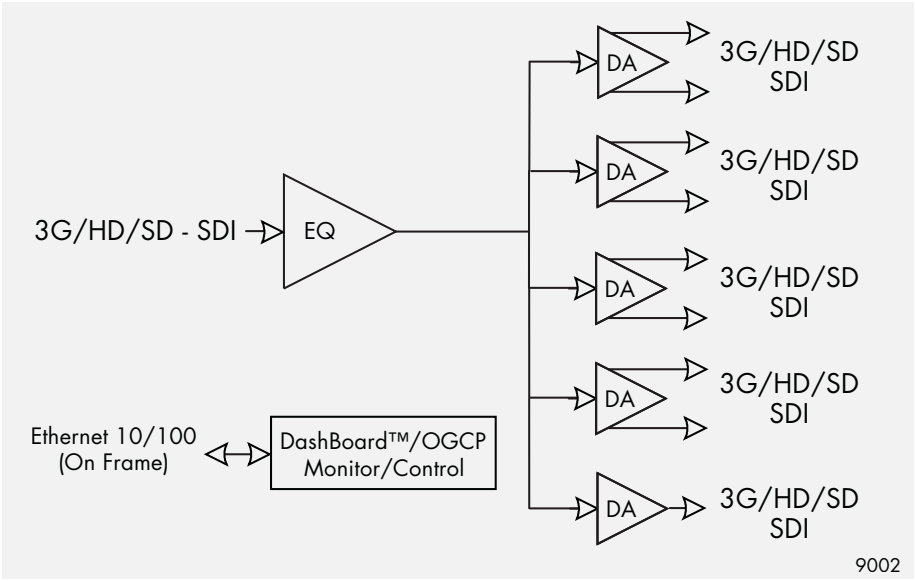
RM20-9002-A/S



RM20-9002-B/S

» FEATURES

- Automatic rate detection/display for all popular data rates
- Remote monitoring via DashBoard™ software or OGCP-9000 remote control panel
- ASI distribution on all outputs
- Equalizes up to 150m of Belden 1694A cable at 1.485 Gbit
- Five year warranty



openGear

DashBoard

» SPECIFICATIONS

Electrical

Power:	2 watts

3G/HD/SD-SDI Input

Number of Inputs:	1
Standard:	SMPTE 424M, 292M, and 259M
Return Loss:	>15 dB at 5 MHz - 1.485 GHz >10 dB at 1.5 GHz to 3 GHz

Cable Length Equalized (w/Belden 1694A)

3 Gbps:	80m
1.485 Gbps:	150m
143-360 Mbps:	350m

3G/HD/SD-SDI Output

Number of outputs:	9 (ASI Compatible)
Standard:	SMPTE 424M, 292M, and 259M
Signal Level:	800 mV nominal
Return Loss:	>15 dB at 5 MHz - 1.485 GHz >10 dB at 1.5 GHz to 3 GHz
Jitter (wideband):	HD: < 0.2 UI

» ORDERING INFORMATION

9002 3G/HD/SD 1x9 Non-Reclocking Distribution Amplifier

RM20-9002-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 9 HD/SD-SDI Output BNCs

RM20-9002-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input BNC, 4 HD/SD-SDI Output BNCs per card

RM20-9002-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input (HDBNC), 1x9 HD/SD-SDI Outputs per card (All connectors HDBNC)

RM20-9002-B/S-DIN 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input (DIN1.0/2.3), 1x9 HD/SD-SDI Outputs per card (All connectors DIN1.0/2.3)

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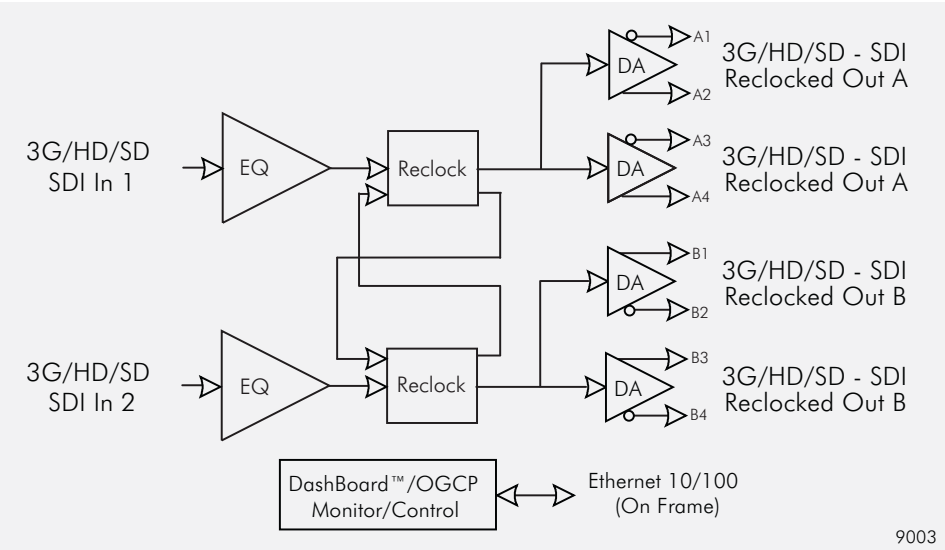
9003 » DUAL-CHANNEL 3G/HD/SD RECLOCKING DISTRIBUTION AMPLIFIER

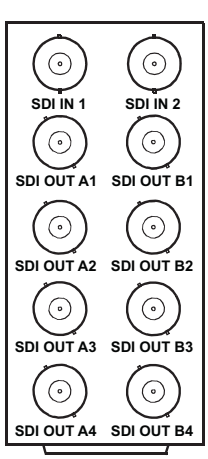
The 9003 is a two-channel, multi-rate SDI distribution amplifier capable of equalizing and reclocking 3G, HD, and SD signals. Excellent receiver EQ performance allows for up to 160m cable lengths for HD signals.

The 9003 can be set up as either a single-channel 1:8, dual-channel 1:4, or 1:8 with failsafe using DashBoard™ remote control software or card-edge switches. In failsafe mode, the card automatically switches to the secondary input if the primary input is lost.

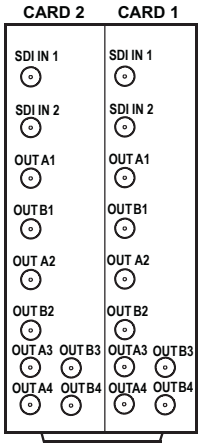
» FEATURES

- Dual or single input with user-configurable modes
- Automatic rate detection/display for all popular data rates
- Equalizes up to 160m of Belden 1694A cable at 1.485 Gbit
- Remote monitoring via DashBoard™ software or OGCP-9000 remote control panel
- Failsafe mode automatically switches to secondary input on primary input loss
- Five year warranty





RM20-9003-A



RM20-9003-B/S

openGear

DashBoard

» SPECIFICATIONS

Electrical

Power:	3 watts

3G/HD/SD-SDI Input

Number of Inputs:	2
Standard:	SMPTE 424M, 292M, and 259M
Return Loss:	>15 dB at 5 MHz - 1.485 GHz >10 dB at 1.5 GHz to 3 GHz

Cable Length Equalized (w/Belden 1694A)

3 Gbps:	100m
1.485 Gbps:	160m
143-360 Mbps:	350m

3G/HD/SD-SDI Output

Number of outputs:	8 (4 ASI Compatible)
Standard:	SMPTE 424M, 292M, and 259M
Signal Level:	800 mV nominal
Return Loss:	>15 dB at 5 MHz - 1.485 GHz >10 dB at 1.5 GHz to 3 GHz
Jitter (wideband):	HD: < 0.2 UI

» ORDERING INFORMATION

9003 Dual-Channel 3G/HD/SD Reclocking Distribution Amplifier, 2 X 4 or 1 X 8 Configurations, Failover Mode

RM20-9003-A 20 Slot Frame Rear I/O Module (Standard Width) Dual 3G/HD/SD-SDI Inputs, 8 Reclocked 3G/HD/SD-SDI Outputs (1x8 or 1x4/1x4 DA Modes)

RM20-9003-B/S-HDBNC 20 Slot Frame Rear I/O Module (Split; connections listed are per card) Dual 3HD/SD-SDI Inputs, 8 Reclocked 3G/HD/SD-SDI Outputs (1x8 or 1x4/1x4 DA Modes) (HDBNC High Density)

RM200-9003-B/S DIN RM20-9003-B/S-DIN 20 Slot Frame Rear I/O Module (Split; connections listed are per card) Dual 3HD/SD-SDI Inputs, 8 Reclocked 3G/HD/SD-SDI Outputs (1x8 or 1x4/1x4 DA Modes) (DIN 1.0/2.3 High Density)

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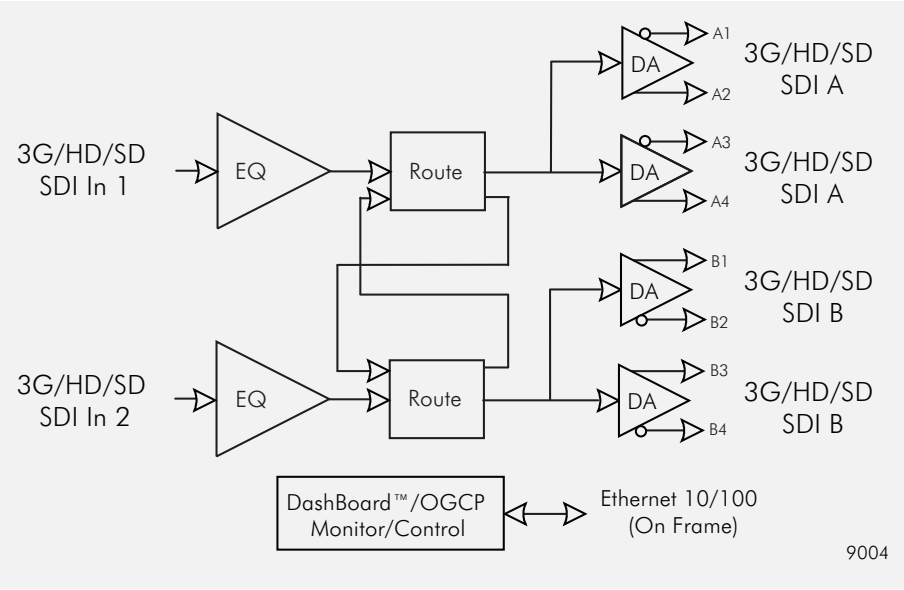
9004 » DUAL-CHANNEL 3G/HD/SD DISTRIBUTION AMPLIFIER (NON-RECLOCKING)

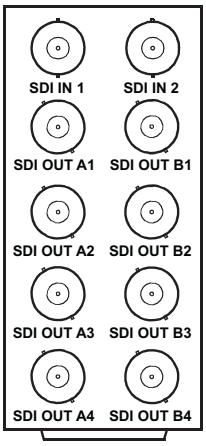
The 9004 is a dual multi-rate SDI distribution amplifier capable of equalizing 3G, HD, and SD signals. Excellent receiver EQ performance allows for up to 160m cable lengths for HD signals.

The 9004 can be set up as either a single-channel 1:8, dual-channel 1:4, or 1:8 with failsafe using DashBoard™ remote control software or card-edge switches. In failsafe mode, the card automatically switches to the secondary input if the primary input is lost.

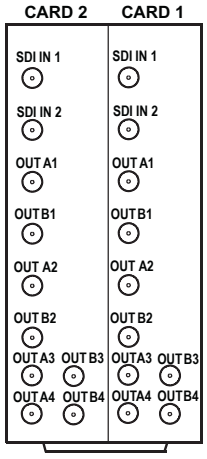
» FEATURES

- Automatic rate detection/display for all popular data rates
- Failsafe mode automatically switches to secondary input on primary input loss
- Equalizes up to 160m of Belden 1694A cable at 1.485 Gbit
- Remote monitoring via DashBoard™ software or OGCP-9000 remote control panel
- Five year warranty





RM20-9004-A



RM20-9004-B/S

openGear

DashBoard

» SPECIFICATIONS

Electrical

Power:	3 watts

3G/HD/SD-SDI Input

Number of Inputs:	2
Standard:	SMPTE 424M, 292M, and 259M
Return Loss:	>15 dB at 5 MHz - 1.485 GHz >10 dB at 1.5 GHz to 3 GHz

Cable Length Equalized (w/Belden 1694A)

3 Gbps:	100m
1.485 Gbps:	160m
143-360 Mbps:	350m

3G/HD/SD-SDI Output

Number of outputs:	8 (4 ASI Compatible)
Standard:	SMPTE 424M, 292M, and 259M
Signal Level:	800 mV nominal
Return Loss:	>15 dB at 5 MHz - 1.485 GHz >10 dB at 1.5 GHz to 3 GHz
Jitter (wideband):	HD: < 0.2 UI

» ORDERING INFORMATION

9004 Dual 3G/HD/SD Non-Reclocking Distribution Amplifier, 2 X 4 or 1 X 8 Configurations, Failover Mode

RM20-9004-A 20 Slot Frame Rear I/O Module (Standard Width) Dual 3G/HD/SD-SDI Inputs, (8) 3G/HD/SD-SDI Outputs (1x8 or 1x4/1x4 DA Modes)

RM20-9004-B/S-HDBNC 20 Slot Frame Rear I/O Module (Split; connections listed are per card) Dual 3G/HD/SD-SDI Inputs, (8) 3G/HD/SD-SDI Outputs (1x8 or 1x4/1x4 DA Modes) (HDBNC High Density)

RM20-9004-B/S-DIN 20 Slot Frame Rear I/O Module (Split; connections listed are per card) Dual 3G/HD/SD-SDI Inputs, (8) 3G/HD/SD-SDI Outputs (1x8 or 1x4/1x4 DA Modes) (DIN 1.0/2.3 High Density)

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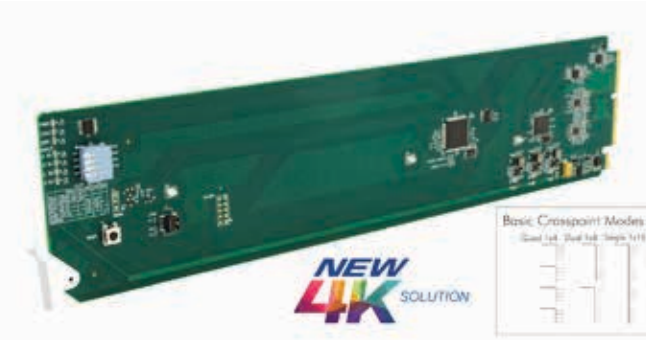
9910DA-4Q-3G » 3G/HD/SD QUAD-CHANNEL MULTI-RATE DA With x4 Output Crosspoint (Non-Reclocking)



The all-new Cobalt® 9910DA-4Q-3G 3G/HD/SD 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.

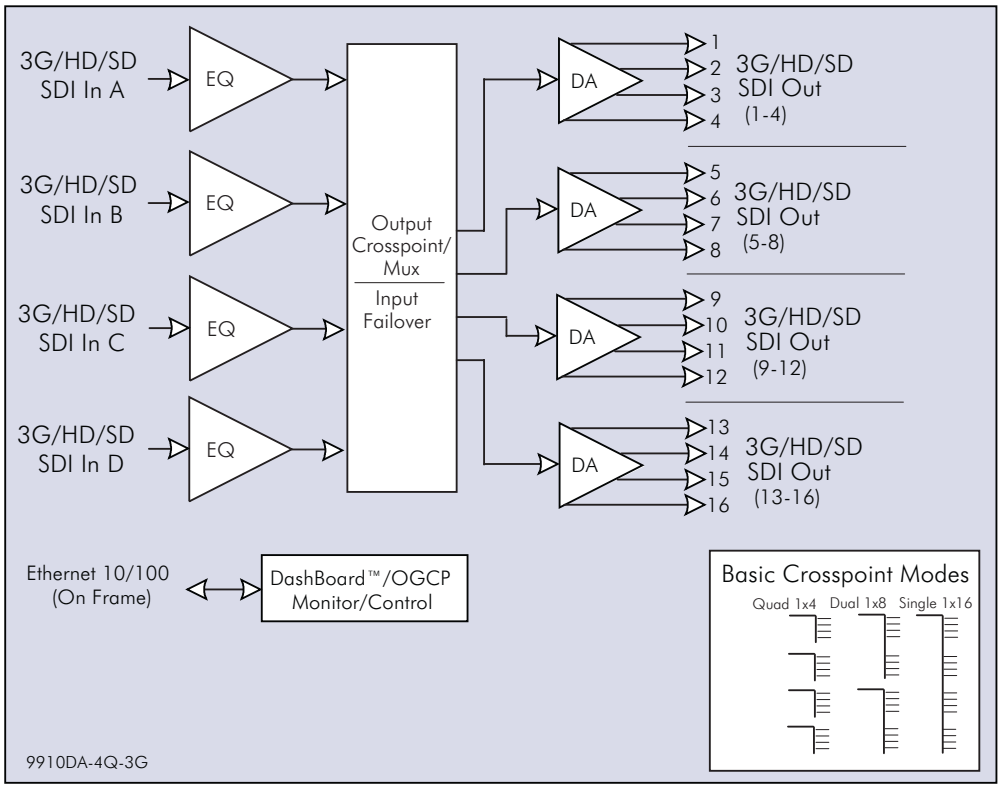
The extremely flexible crosspoint (which is user-configurable via DashBoard™ GUI remote control) allows quad 1x4, dual 1x8, single 1x16 and other routing possibilities (such as dual 1x4 plus a single 1x8). Any of the four input channels can be distributed or duplicated across four groups of 1x4 DAs, 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
- 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
- Five year warranty



openGear

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9910DA-4Q-3G » 3G/HD/SD QUAD-CHANNEL MULTI-RATE DA With x4 Output Crosspoint (Non-Reclocking)

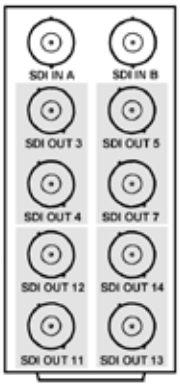
Rear I/O Module output designations here correlate to output numbers for four DA quadrants as shown in the card block diagram (for example, SDI OUT 3 in diagrams below is tied to (driven from) DA quadrant "SDI Out (1-4)" in the block diagram; SDI OUT 5 in diagrams below is tied to (driven from) DA quadrant "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).

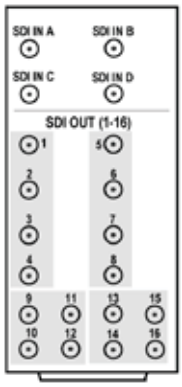
When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

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



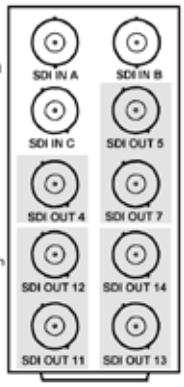
RM20-9910-4Q-B-DIN
RM20-9910-4Q-B-HDBNC

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.



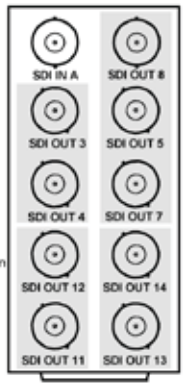
RM20-9910-4Q-C

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).

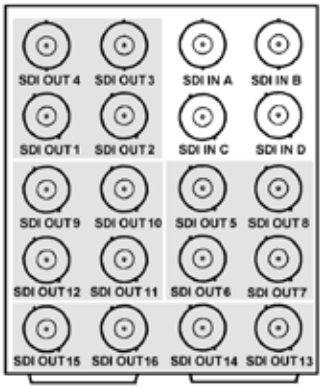
When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

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 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 BNC 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 BNC 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 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 Input BNC, (8) 3G/HD/SD-SDI Output BNCs

RM20-9910-4Q-B-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (16) 3G/HD/SD-SDI 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 Inputs, (16) 3G/HD/SD-SDI Outputs (HDBNC) (High Density)

RM20-9910-4Q-C 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Input BNC, (7) 3G/HD/SD-SDI Output BNCs

RM20-9910-4Q-D 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (9) 3G/HD/SD-SDI Output BNCs

RM20-9910-4Q-E 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Input BNC, (16) 3G/HD/SD-SDI Output BNCs

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9910DA-4Q-3G-RCK » 3G/HD/SD QUAD-CHANNEL MULTI-RATE RECLOCKING DA

with x4 Output Crosspoint

The all-new Cobalt® 9910DA-4Q-3G-RCK 3G/HD/SD 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.

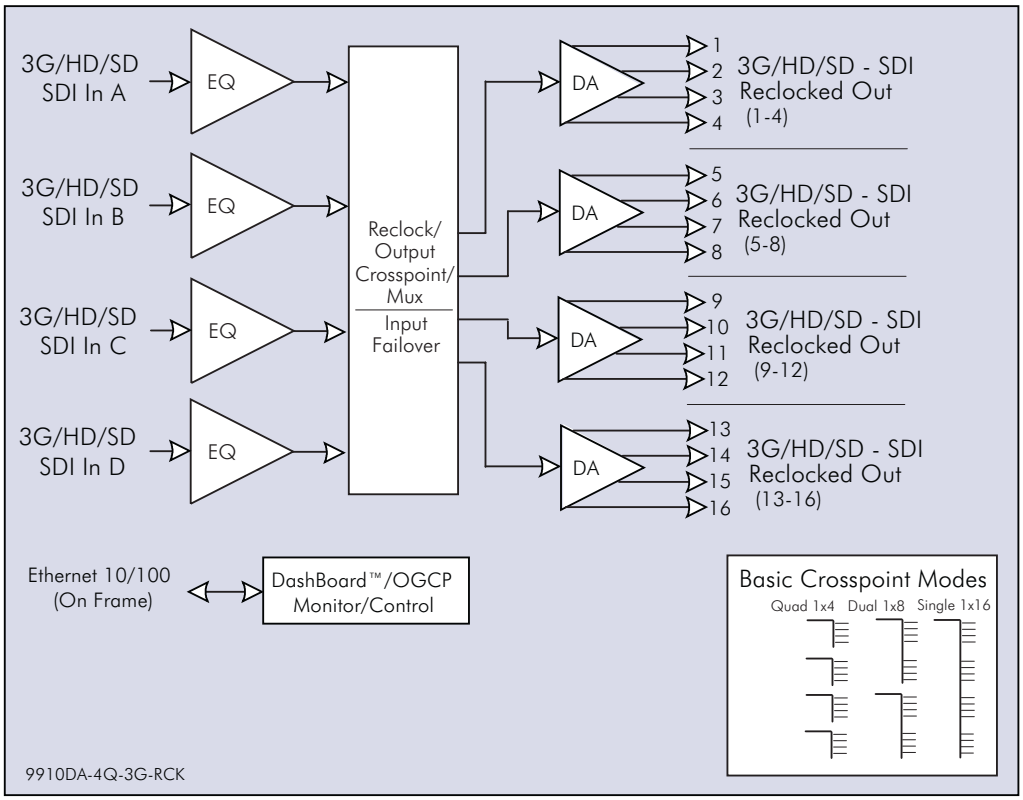
The extremely flexible crosspoint (which is user-configurable via DashBoard™ GUI remote control) allows quad 1x4, dual 1x8, single 1x16 and other routing possibilities. Any of the four input channels can be distributed or duplicated across four groups of 1x4 DAs, and any of the four inputs can be set 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
- 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
- Card edge and DashBoard™ status and individual input lock indicators
- Five year warranty



openGear

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9910DA-4Q-3G-RCK » 3G/HD/SD QUAD-CHANNEL MULTI-RATE RECLOCKING DA

with x4 Output Crosspoint

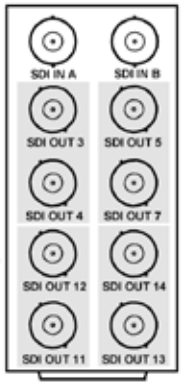
Rear I/O Module output designations here correlate to output numbers for four DA quadrants as shown in the card block diagram (for example, SDI OUT 3 in diagrams below is tied to (driven from) DA quadrant "SDI Out (1-4)" in the block diagram; SDI OUT 5 in diagrams below is tied to (driven from) DA quadrant "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).

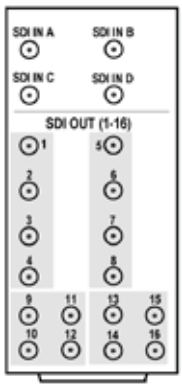
When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

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



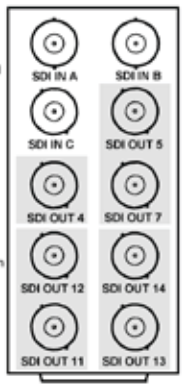
RM20-9910-4Q-B-DIN
RM20-9910-4Q-B-HDBNC

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.



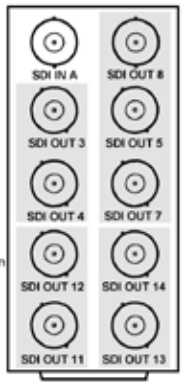
RM20-9910-4Q-C

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).

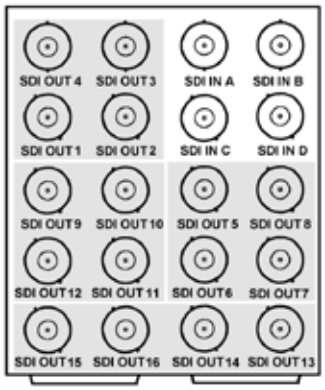
When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

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 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 BNC 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 BNC 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 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 Input BNC, (8) 3G/HD/SD-SDI Output BNCs

RM20-9910-4Q-B-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (16) 3G/HD/SD-SDI 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 Inputs, (16) 3G/HD/SD-SDI Outputs (HDBNC) (High Density)

RM20-9910-4Q-C 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Input BNC, (7) 3G/HD/SD-SDI Output BNCs

RM20-9910-4Q-D 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (9) 3G/HD/SD-SDI Output BNCs

RM20-9910-4Q-E 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Input BNC, (16) 3G/HD/SD-SDI Output BNCs

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DA FUNCTIONS » The Models Below Offer DA Functions in Addition to Input Down-Conversion

Please see respective product pages for more information

9501-DCDA-3G Downconverter with 3G/HD/SD-SDI Input, SDI Reclocking, SD-SDI and Analog Video/Audio Outputs/AES Outputs 42

9502-DCDA-3G Downconverter with 3G/HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking 44

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9910DA-AV-EQ » ANALOG VIDEO DISTRIBUTION AMPLIFIER WITH EQ

The all-new 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.

» FEATURES

Multi-mode input provides differential or single-ended input and hi-Z looping or card-terminated operation

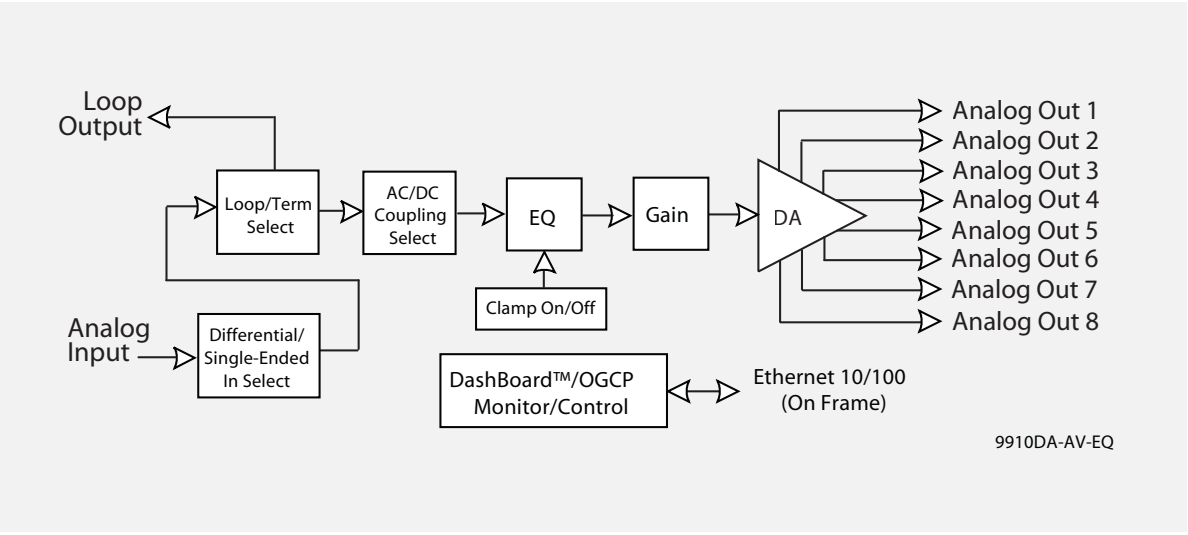
Signal path can be set as DC or AC coupled

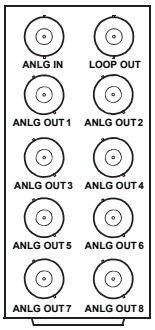
User adjustable EQ and gain with easily accessible controls on front of card edge. EQ optimizes performance for input cable lengths exceeding 1000 ft (300m).

User-selectable input clamping (none, fast, or slow clamping selectable)

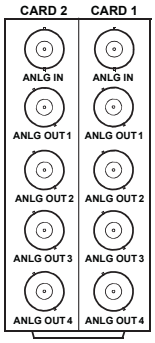
Remote monitoring via DashBoard™ software or OGCP-9000 Remote Control Panel

Five-year warranty



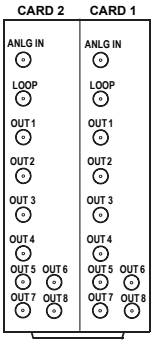


RM20-9910AV-B



RM20-9910AV-A/S

Note: RM20-9910AV-A/S allows only typical single-ended input operation (shield conductor of input BNC tied to GND). Also, this rear module can only be used when input termination (non-looping) is selected using the card jumper.



RM20-9910AV-B/S

Note: RM20-9910AV-B/S allows only typical single-ended input operation (shield conductor of input BNC tied to GND).

» SPECIFICATIONS

Power
2 Watts

Analog Video Input
Number of inputs: (1)
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

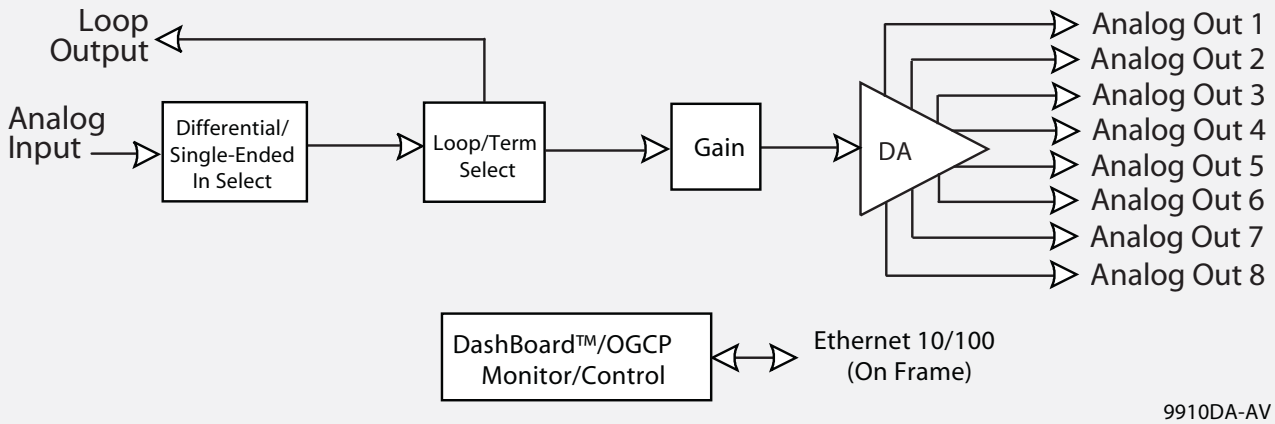
The all-new Cobalt® **9910DA-AV** Analog Video Distribution Amplifier provides 1x8 distribution with one analog input and eight 75Ω analog outputs. Card jumpers allow setting the input as differential (floating ground) or single-ended, and Hi-Z looping input or on-card 75Ω terminated. A trim control located on the front of the card allows gain control. The card can be accessed using DashBoard™ remote control for status monitoring.

» 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

Five-year warranty



» SPECIFICATIONS

Power
2 Watts

Analog Video Input
Number of inputs: (1)
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

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

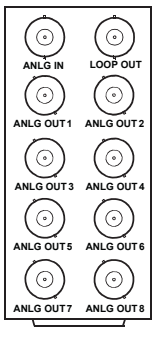
9910DA-AV Analog Video Distribution Amplifier

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

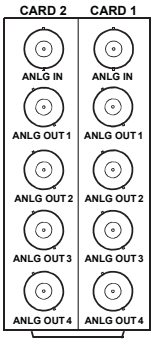
RM20-9910AV-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) Analog Video Input BNC, (4) Analog DA Output BNCs (connections are per card)

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)

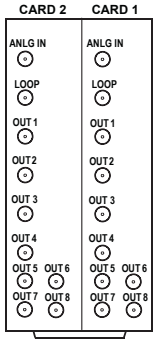


RM20-9910AV-B



RM20-9910AV-A/S

Note: RM20-9910AV-A/S allows only typical single-ended input operation (shield conductor of input BNC tied to GND). Also, this rear module can only be used when input termination (non-looping) is selected using the card jumper.



RM20-9910AV-B/S

Note: RM20-9910AV-B/S allows only typical single-ended input operation (shield conductor of input BNC tied to GND).

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BBG-DA-3G-1X6 » 3G/HD/SD/ASI RECLOCKING DISTRIBUTION AMPLIFIER with Bit-Rate Status

The BB-DA-3G-1x6 is an HD/SD/ASI multi-rate distribution amplifier that features HD/SD status LEDs for quick identification of the input bit rate. The unit is fully automatic and supports 424 (3 Gbit), 292 and 259M signals, and is equipped with 1 input and 6 reclocked SDI outputs. (Reclocking on 424M, 292 and 259M-C inputs, all other bit rates are non-reclocking.) The unit supports 1x3 ASI distribution using its non-inverting outputs.

» FEATURES

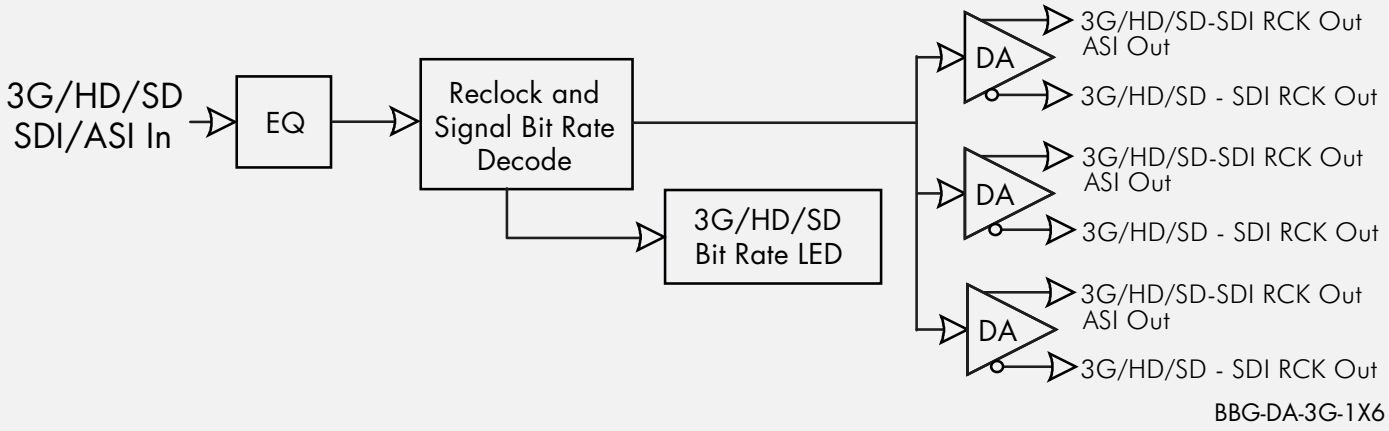
Six 3G/HD/SD equalized and reclocked outputs

1x3 ASI distribution capability

Signal type (3G/HD/SD) status display

Auto standard detect and configuration
SMPTE 424M/292/259M

Five-year warranty



» SPECIFICATIONS

Input
SMPTE 424M 3 Gbps
SMPTE 292 1.485 Gbps
SMPTE 259M 143-540 Mbps
ASI

Output
6 reclocked HD/SD-SDI
1x3 ASI distribution (using 3 non-inverting outputs)

Return loss
> 15 dB

Power
5-18 VDC @ 3.5 watts
Requires Power Supply PS11 or PS12

Size
5.5" x 3"x 1" (139 x 77 x 26 mm)

» ORDERING INFORMATION

BBG-DA-3G-1X6 3G/HD/SD Reclocking Distribution Amplifier with Bit-Rate Status (Supports SMPTE 424M - 3Gbit).

PS11 Universal Power Supply, UL/CSA, Input: 100-240 60/50 Hz, Output: 5V 1.5A

PS12 Universal Power Supply, IEC Connector, CE/UL/CSA, Input: 100-240 60/50 Hz, Output: 5V 2A (International Power Supply. Specify country of destination.)

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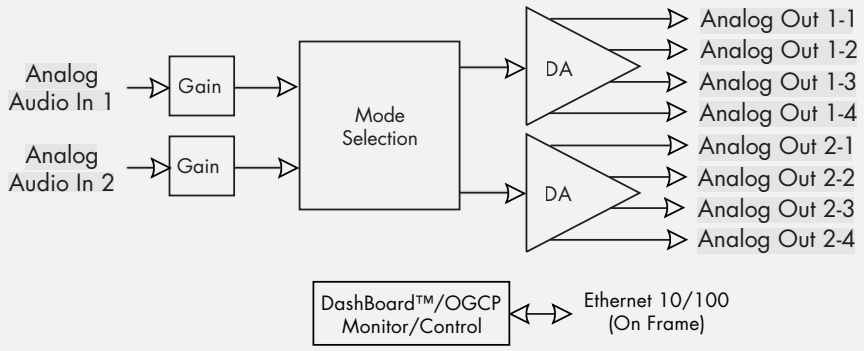
9241 » ANALOG AUDIO DISTRIBUTION AMPLIFIER

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

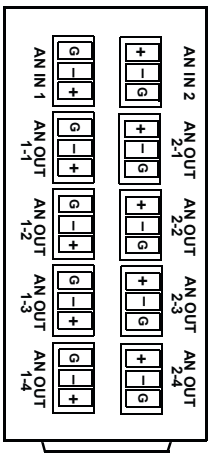
Number of inputs:	2 balanced
Impedance:	>20 kΩ balanced
Max Level:	+27.5 dBu
Common Mode Rejection:	>80 dB, 20 Hz to 20 kHz

Performance

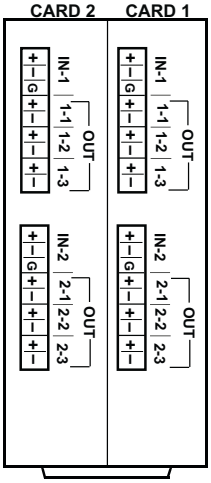
Freq. Response:	>0.1 dB at 20 Hz to 20 kHz
Gain:	-14 dB to +18 dB cont. variable
Harmonic Dist:	<0.01%
SNR:	> 95 dBu

Analog Audio Output

Number of Outputs:	8
Impedance:	60 Ω balanced
Max Level:	+26 dBu

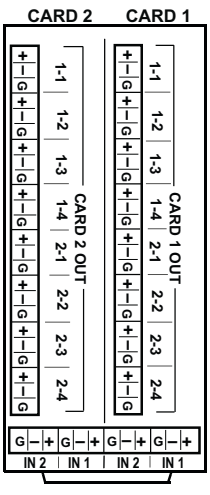


RM20-9241-B



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 In/Out (per card)

RM20-9241-D/S 20-Slot Frame Rear I/O Module (Split) Dual 1x4 Differential Analog Audio In/Out (per card)

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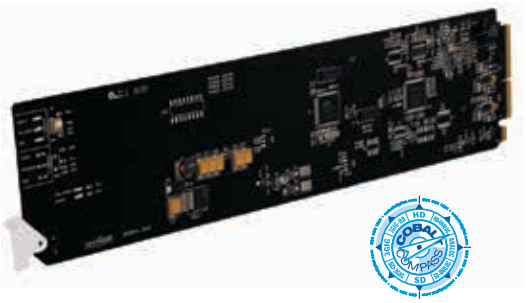
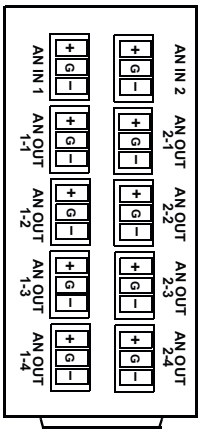
9242 » ANALOG AUDIO DISTRIBUTION AMPLIFIER with Remote Gain Control



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.



Note: + / G / - orientation on connectors varies from that on other Cobalt products. Make certain hookup is as shown here.

RM20-9242-B

» FEATURES

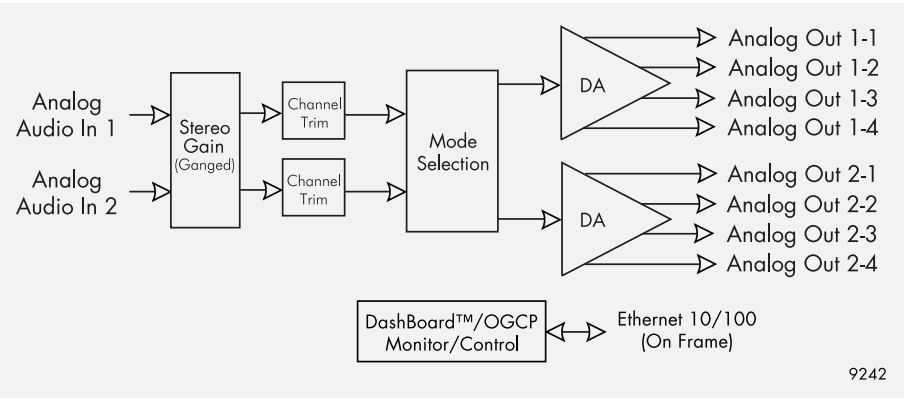
Full remote control of operating mode and gain control

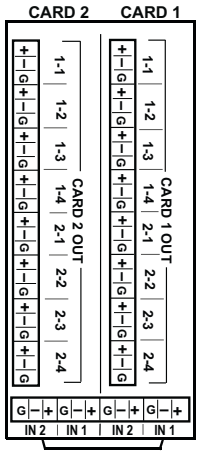
Multiple modes – stereo 2x4, mono 1x8, and stereo sum L+R x 8 outputs

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)

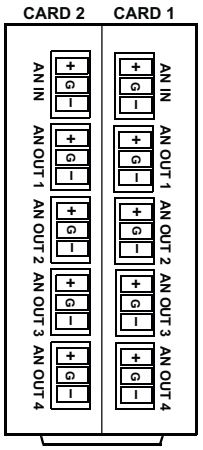
Five-year warranty





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.

RM20-9242-D/S



Note: + / G / - orientation on connectors varies from that on other Cobalt products. Make certain hookup is as shown here.

RM20-9242-C/S

openGear DashBoard

» SPECIFICATIONS

Electrical

Power:	< 5 Watts

Analog Audio Input

Number of Inputs:	Two, 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:	Eight, 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

9242 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) 1x4 Balanced Analog Audio I/O (per card)

RM20-9242-D/S 20-Slot Frame Rear I/O Module (Split) Dual 1x4 Balanced Analog Audio I/O (per card)

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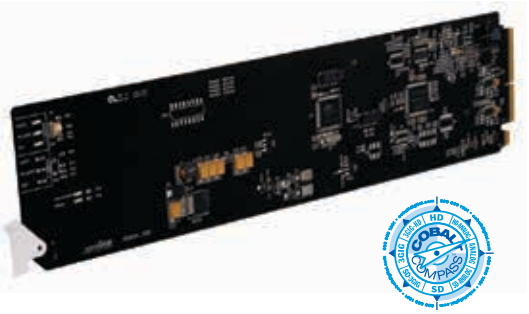
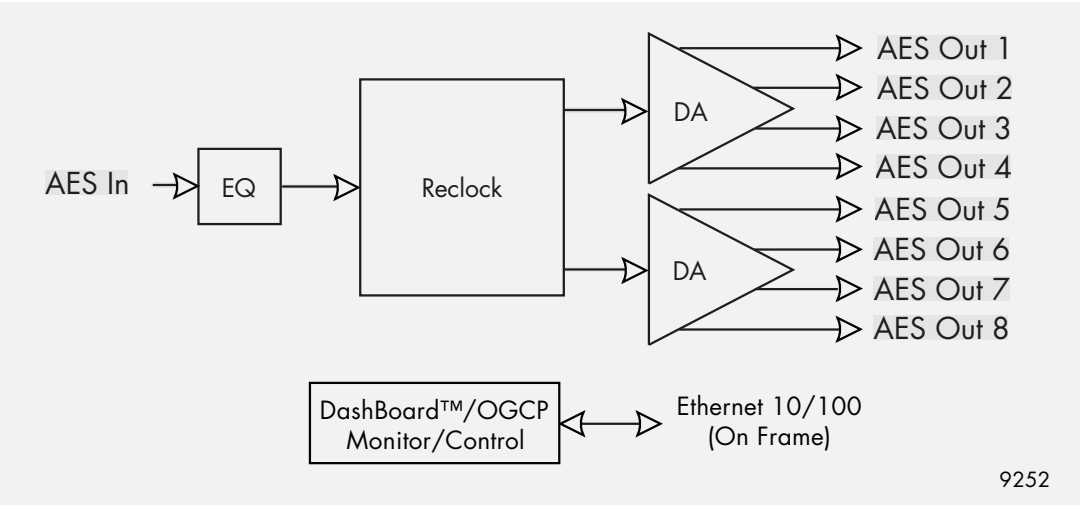
9252 » AES AUDIO DISTRIBUTION AMPLIFIER, 110 OHMS

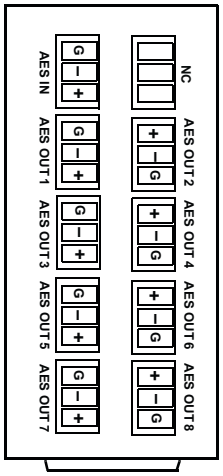


The 9252 is an AES/EBU distribution amplifier designed for broadcast use. It provides eight, 110-Ω balanced copies of the 110-Ω balanced input signal. The 9252 supports audio sampling frequencies from 30 kHz to 192 kHz. Cable equalization and reclocking techniques enable the 9252 to reliably recover the incoming digital audio signal.

» FEATURES

- Supports audio sampling frequencies from 30 kHz to 192 kHz
- Cable equalization and data reclocking on incoming AES/EBU signal
- 1x8 DA: one input, eight outputs
- 110 Ω balanced AES connections
- Remote control/monitoring via DashBoard™ software
- Five year warranty





RM20-9252-B

» SPECIFICATIONS

Electrical

Power:	4 watts

AES Input

Number of Inputs:	1 balanced
Impedance:	110 Ω
Resolution:	24-bit
Level:	0.2 - 7 Vp-p
Sample Rate:	30 kHz to 192 kHz

AES Output

Number of Outputs:	8 unbalanced
Impedance:	110 Ω
Resolution:	24-bit
Level:	1 Vp-p
Sample Rate:	30 kHz to 192 kHz
Jitter:	<5 ns

» ORDERING INFORMATION

9252 1 X 8 AES/EBU Reclocking Distribution Amplifier, 110 Ohm, Balanced, Phoenix I/O

RM20-9252-B 20-Slot Frame Rear I/O Module (Standard Width) 1 Differential AES Audio In, 8 Differential AES Audio Outs

openGear DashBoard

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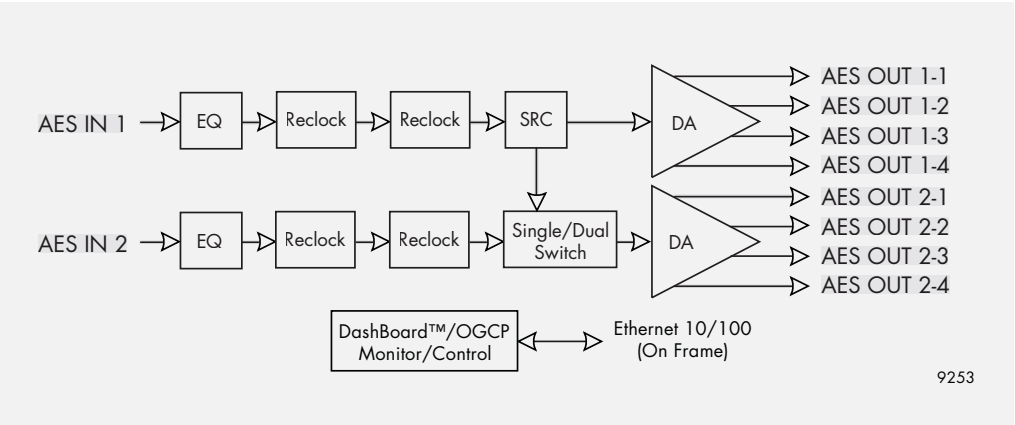
9253 » 2X4 AES AUDIO DISTRIBUTION AMPLIFIER, 75 OHMS

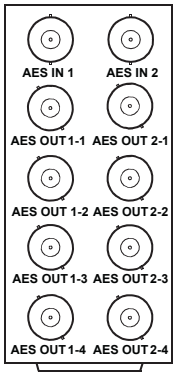
The 9253 is a dual AES/EBU distribution amplifier, providing four copies of each incoming signal. The card supports audio sampling frequencies from 30 kHz to 192 kHz. It can also be used as a 1x8 distribution amplifier, providing eight outputs that are sample rate converted. Cable equalization and reclocking 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.

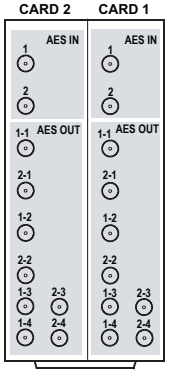
» FEATURES

- 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

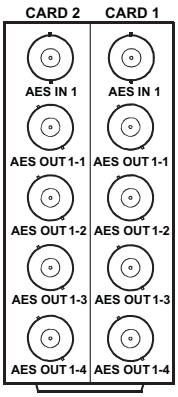
Power:	4 watts

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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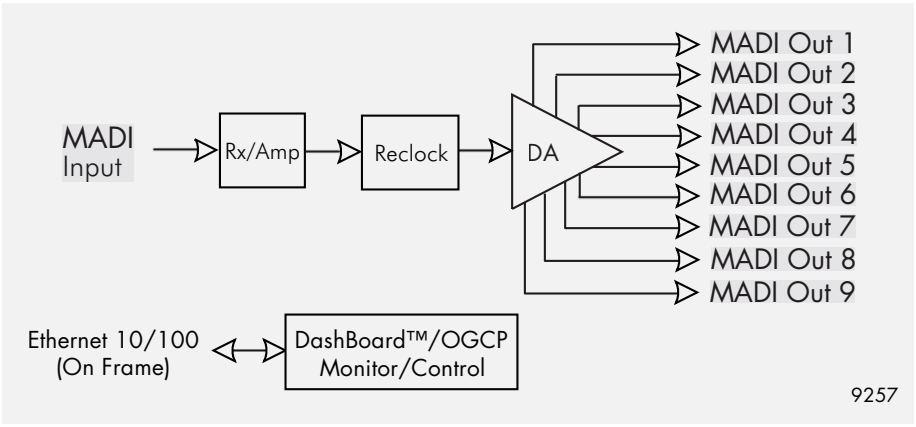
9257 » 1X9 MADI AUDIO DISTRIBUTION AMPLIFIER

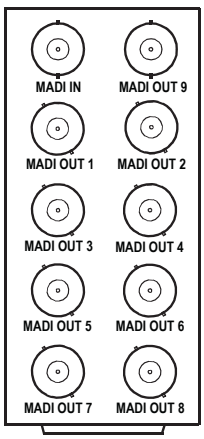
The 9257 provides an award-winning card-based solution for distribution of AES10 MADI signals. The card supports sampling frequencies up to 96 kHz, with a 64-channel payload supported at the industry standard 48 kHz sampling rate (all other sampling rates specified as valid per AES10-2003 are also supported 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.

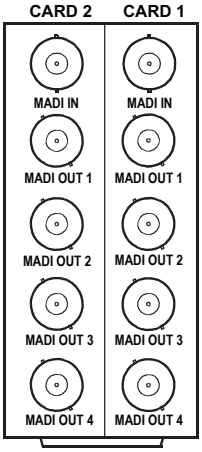
» FEATURES

- 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

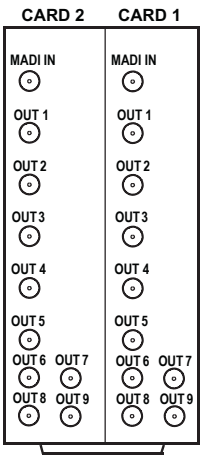




RM20-9257-A



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

openGear DashBoard

» 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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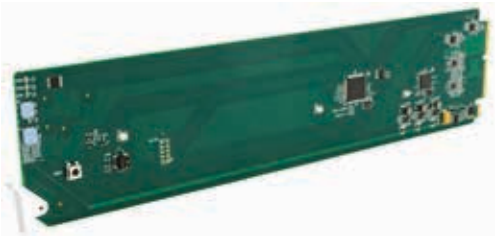
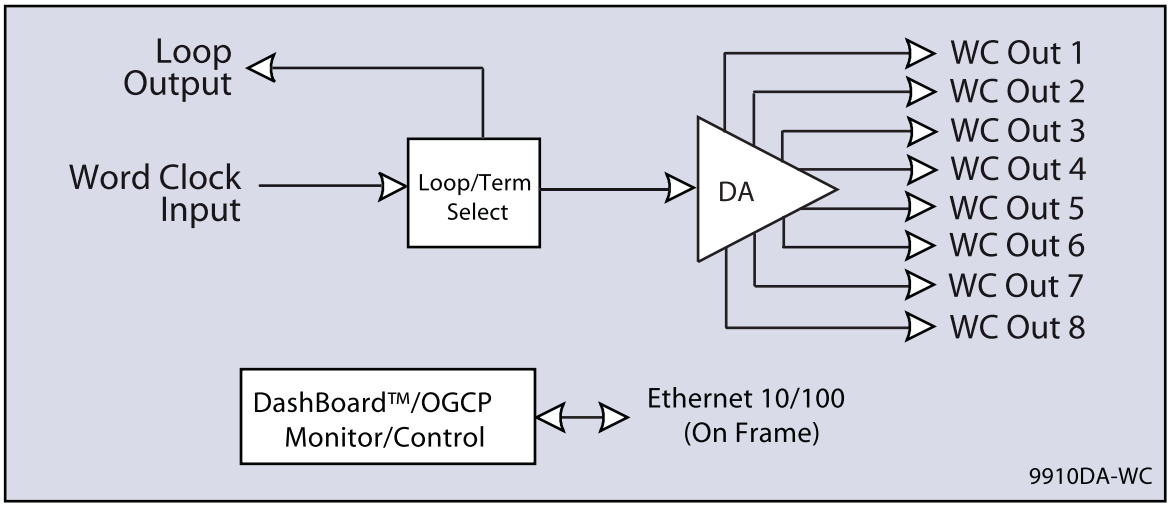
9910DA-WC » AUDIO WORLD CLOCK DISTRIBUTION AMPLIFIER

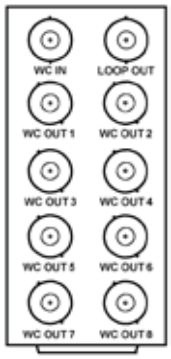


The all-new Cobalt® 9910DA-WC Audio Word Clock Distribution Amplifier provides 1x8 distribution with one word clock input and eight 75Ω word clock outputs. Card jumpers allow setting the input as Hi-Z looping input or on-card 75Ω terminated. The card can be accessed using DashBoard™ remote control for status monitoring.

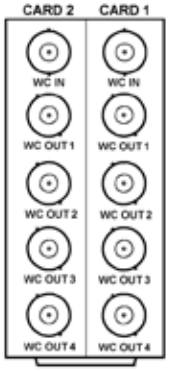
FEATURES

- 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



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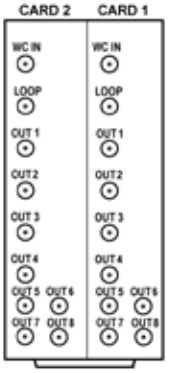

RM20-9910WC-BS-DIN
RM20-9910WC-BS-DIN

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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 a latching relay to retain the selected I/O path even if the card/frame is powered down or 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 relay path output (alternately, the selected input is available via non-relay coupled 4x cable drivers). The entire signal package is kept intact with no modification of the signal.

» FEATURES

Actively provides simplified protection switchover to alternate SDI/ASI stream in case of signal loss

Simple relay routing signal path maintains full signal integrity. Latching relay maintains signal path even if card/power is removed.

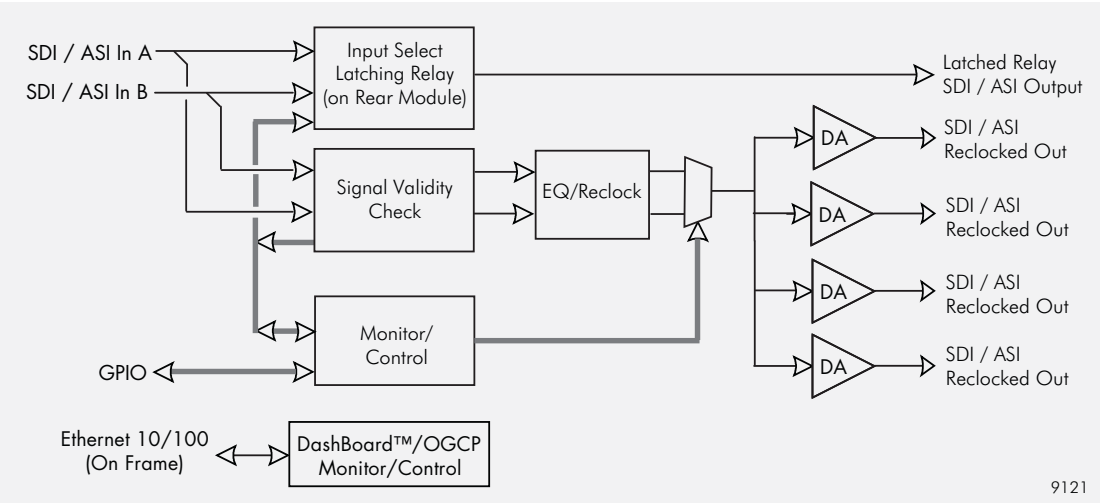
Alternate non-relay 4x DA output (with reclock enable/disable) also provided

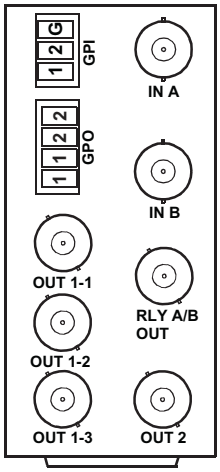
Selectable input switchover with automatic failover on loss of input, or manual switchover using DashBoard remote control or GPI

3G/HD/SD-SDI and ASI compatible on all inputs and outputs

DashBoard™ signal status monitoring of both active and alternate inputs

Five-year warranty





RM20-9121-B

» SPECIFICATIONS

Electrical
Power: < 6 Watts

Switchover Triggering
Selectable automatic failover upon loss of valid SMPTE 425M, 292M, or 259M formatted signal. Manual switchover using DashBoard remote control or GPI.

3G/HD/SD-SDI / ASI Inputs
Number of inputs: 2
Standards: 3G-SDI (SMPTE 424M)
HD-SDI (SMPTE 292M)
SD-SDI (SMPTE 259M)
Impedance: 75Ω

SDI 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
Complement/Signaling: Two, independent. Non-referenced SPST relay closure upon configurable true condition(s). Connector: 4-terminal Phoenix; GPO 1-1/GPO 2-2

» 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, Relay SDI/ASI Output, 4 SDI/ASI Non-relay DA Outputs, 2 GPI, 2 GPO

openGear DashBoard

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9940-ACO » 3G/HD/SD-SDI MULTI-INPUT INTELLIGENT AUTO-CHANGEOVER SWITCH AND TROUBLE SLATE INSERTER

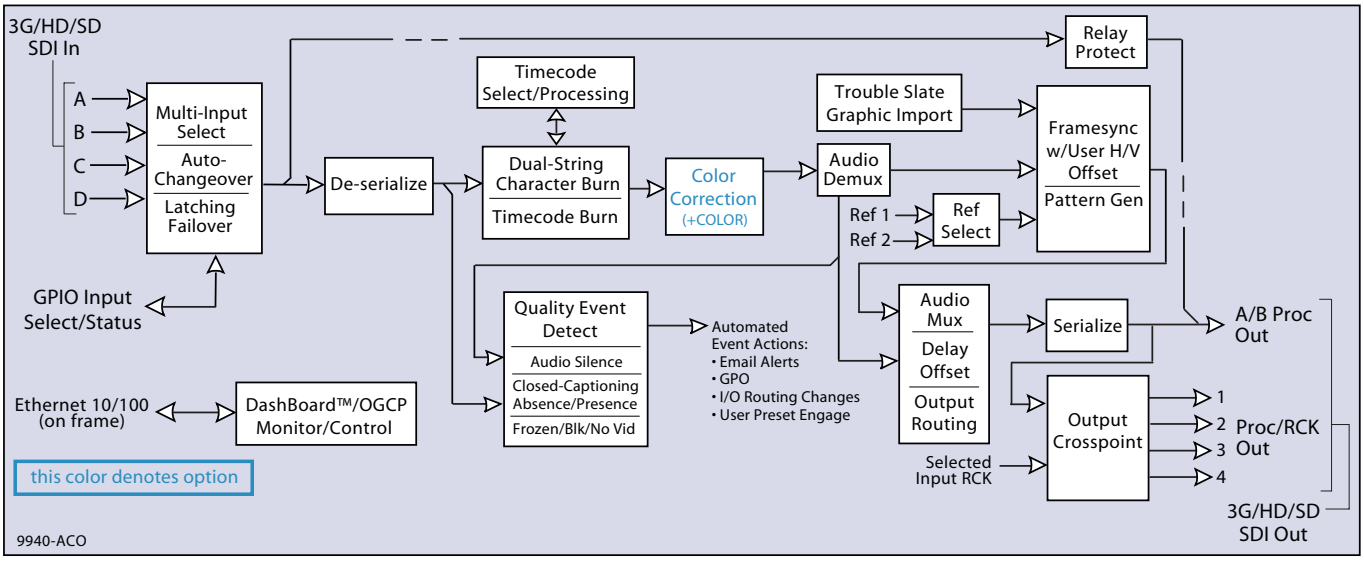
The Cobalt® 9940-ACO 3G/HD/SD-SDI Multi-Input Intelligent Auto-Changeover Switch and Trouble Slate Inserter allows manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions as well as user-configurable Video Quality Event intelligent assessments such as black/frozen frame or audio silence. Also included standard is closed captioning absence/presence detection that allows CEA 608/708 and line 21 SD CC absence or presence to be detected. 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 be enabled to 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
- 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)
- 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
- Five year warranty



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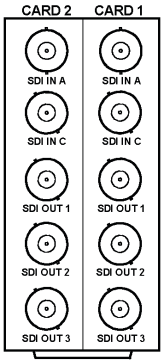
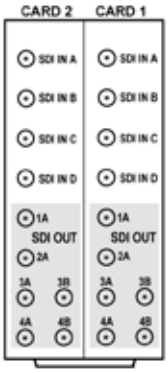
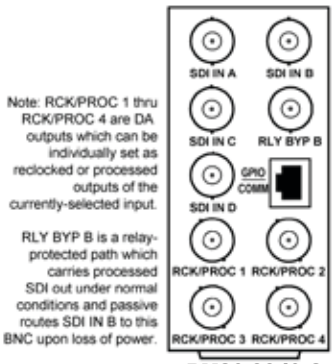
9940-ACO » 3G/HD/SD-SDI MULTI-INPUT INTELLIGENT AUTO-CHANGEOVER SWITCH AND TROUBLE SLATE INSERTER



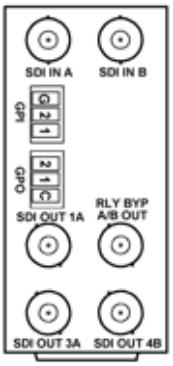
RM20-9940-A/S



RM20-9940-B/S-DIN
RM20-9940-B/S-HDBNC



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

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.

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.

Frame Reference Input

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

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9940-ACO » 3G/HD/SD-SDI MULTI-INPUT INTELLIGENT AUTO-CHANGEOVER SWITCH AND TROUBLE SLATE INSERTER

ORDERING INFORMATION

9940-ACO 3G/HD/SD-SDI Multi-Input Intelligent Auto-Changeover Switch and 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

+LTC Audio LTC I/O Option

+COLOR Color Correction Option

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BBG-1040-ACO » 3G/HD/SD-SDI STANDALONE MULTI-INPUT INTELLIGENT AUTO-CHANGEOVER SWITCH AND TROUBLE SLATE INSERTER

The Cobalt® BBG-1040-ACO 3G/HD/SD-SDI Standalone Multi-Input Intelligent Auto-Changeover Switch and 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 that allows CEA 608/708 and line 21 SD CC absence or presence to be detected. 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 be enabled to 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 uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control (can also 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)
- 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
- Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format
- 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
- Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID. Also controllable using DashBoard remote control.
- 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.
- Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID. Also controllable using DashBoard remote control.
- Five year warranty

OPTIONS

- Color Corrector (+COLOR)
- Audio LTC I/O (+LTC)
- 1RU Mounting Tray (supports 3 units) (BBG-1000-TRAY)
- Redundant Power Supply Module (BBG-1000-PS)

html5 web UI remote control | DashBoard

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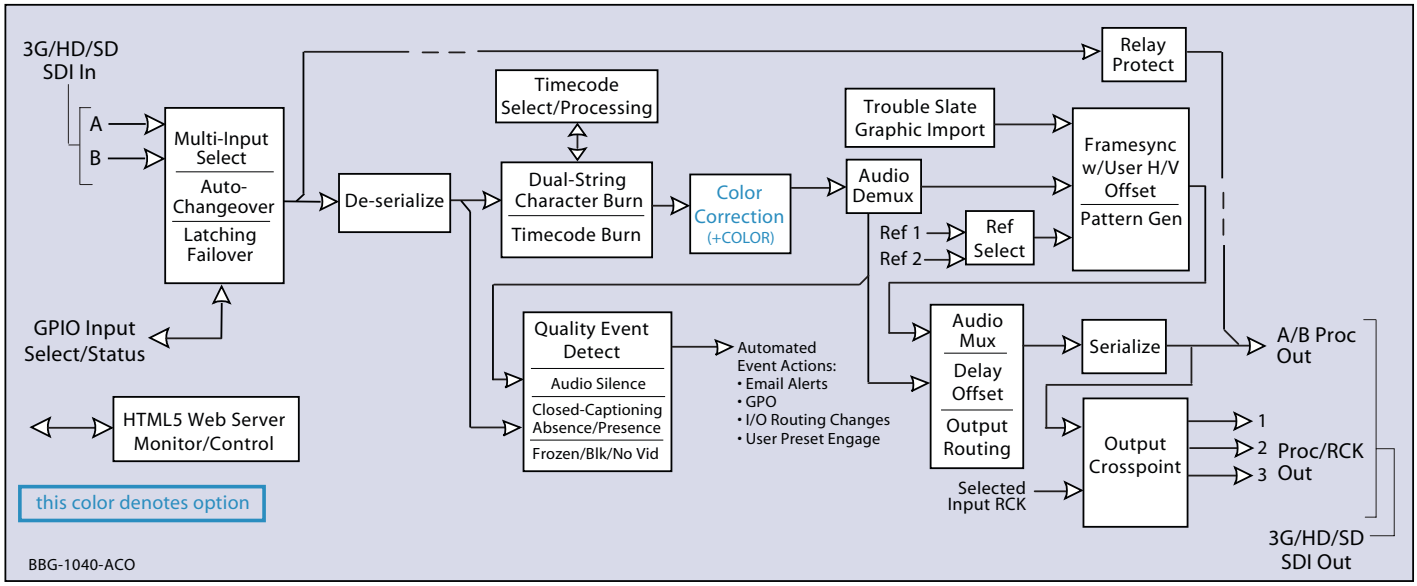
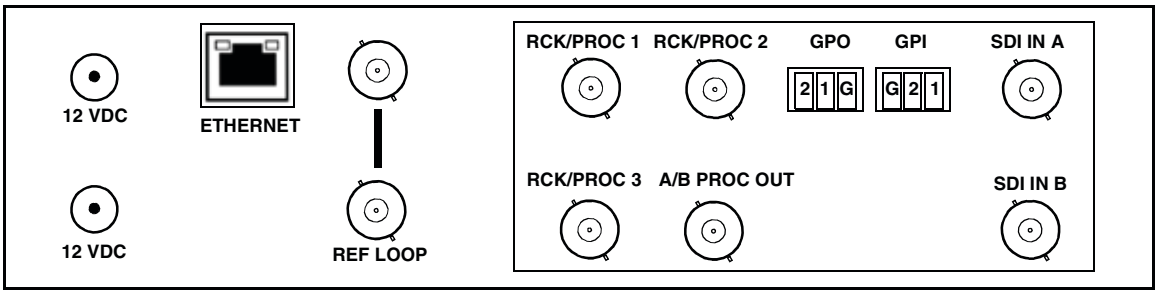
BBG-1040-ACO » 3G/HD/SD-SDI STANDALONE MULTI-INPUT INTELLIGENT AUTO-CHANGEOVER SWITCH AND TROUBLE SLATE INSERTER





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 AND 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 web GUI/front panel controls 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.
- 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 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

HTML5 web server/interface via rear-panel 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 and Trouble Slate Inserter (includes one BBG-1000-PS Power Supply)

Options and Accessories:

+COLOR Color Correction 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

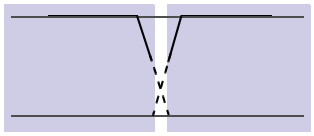
The all-new Cobalt® 9940-4x1-CS 3G/HD/SD-SDI 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control provides Clean & Quiet routing in a high-density card-based openGear® solution. The Clean & Quiet routing not only provides switching on the RP168-specified VANC switch 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 that allows CEA 608/708 and line 21 SD CC absence or presence to be detected. 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 be enabled to 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.
- 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 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.
- 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

openGear®

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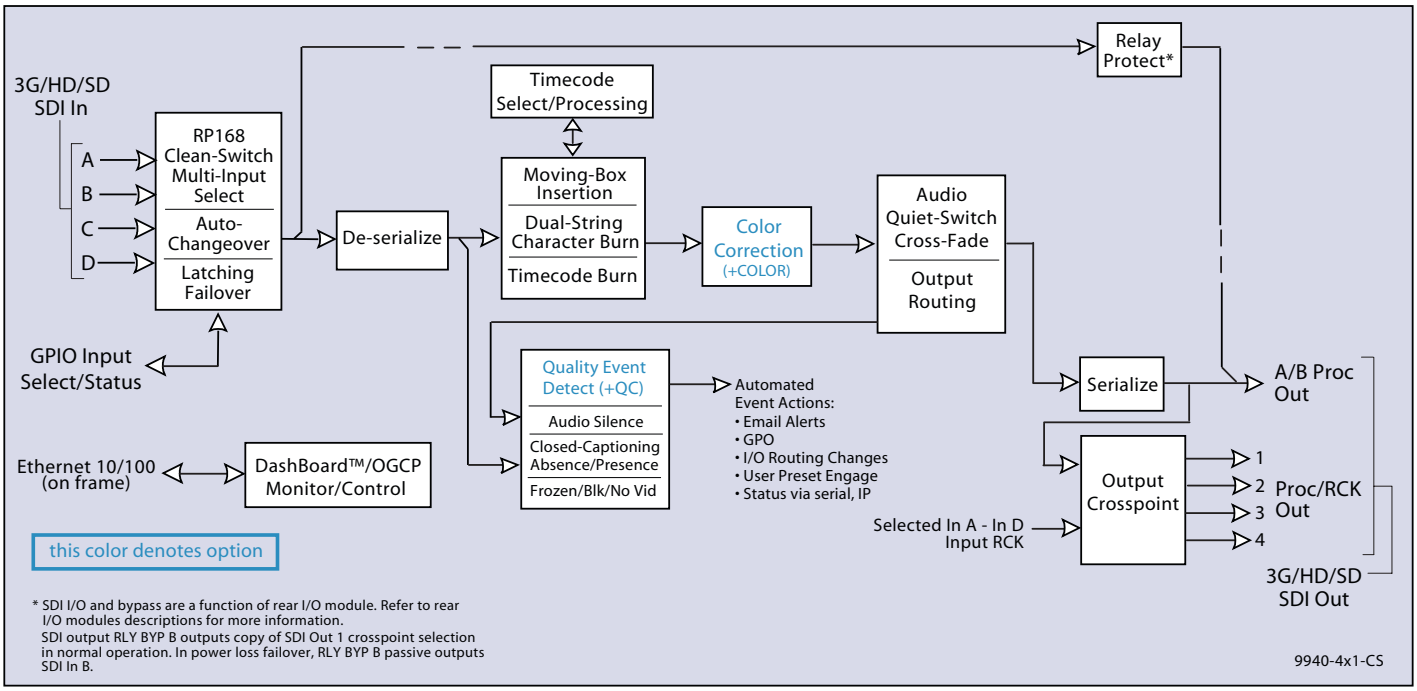
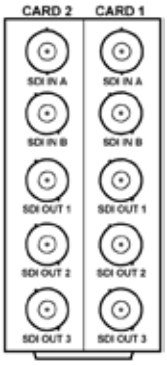
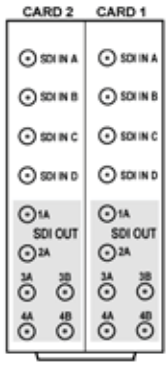
9940-4X1-CS » 3G/HD/SD-SDI 4X1 CLEAN AND QUIET BYPASS ROUTER

with Relay-Protected Input and GPIO Monitoring / Control





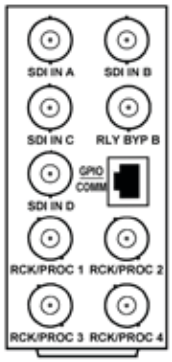
RM20-9940-A/S



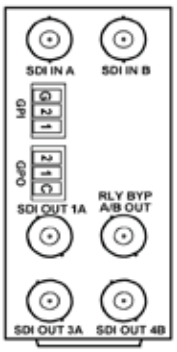
RM20-9940-B/S-DIN
RM20-9940-B/S-HDBNC

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.

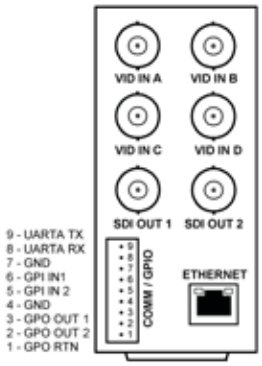
RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.



RM20-9940-C



RM20-9940-F



RM20-9940-G

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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: 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

RM20-9940-G 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

+QC Quality Check Option.

+COLOR Color Correction Option

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BBG-1040-4X1-CS » 3G/HD/SD-SDI STANDALONE 4X1 CLEAN AND QUIET BYPASS ROUTER

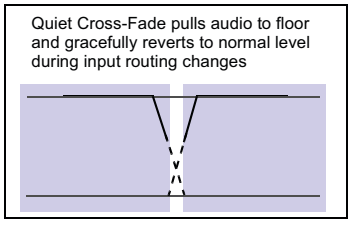
with Relay-Protected Input and GPIO Monitoring / Control

The all-new 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 that allows CEA 608/708 and line 21 SD CC absence or presence to be detected. 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 be enabled to 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 uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control (can also 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).



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.
- Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID. Also controllable using DashBoard remote control.
- 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

html5 web UI remote control | DashBoard

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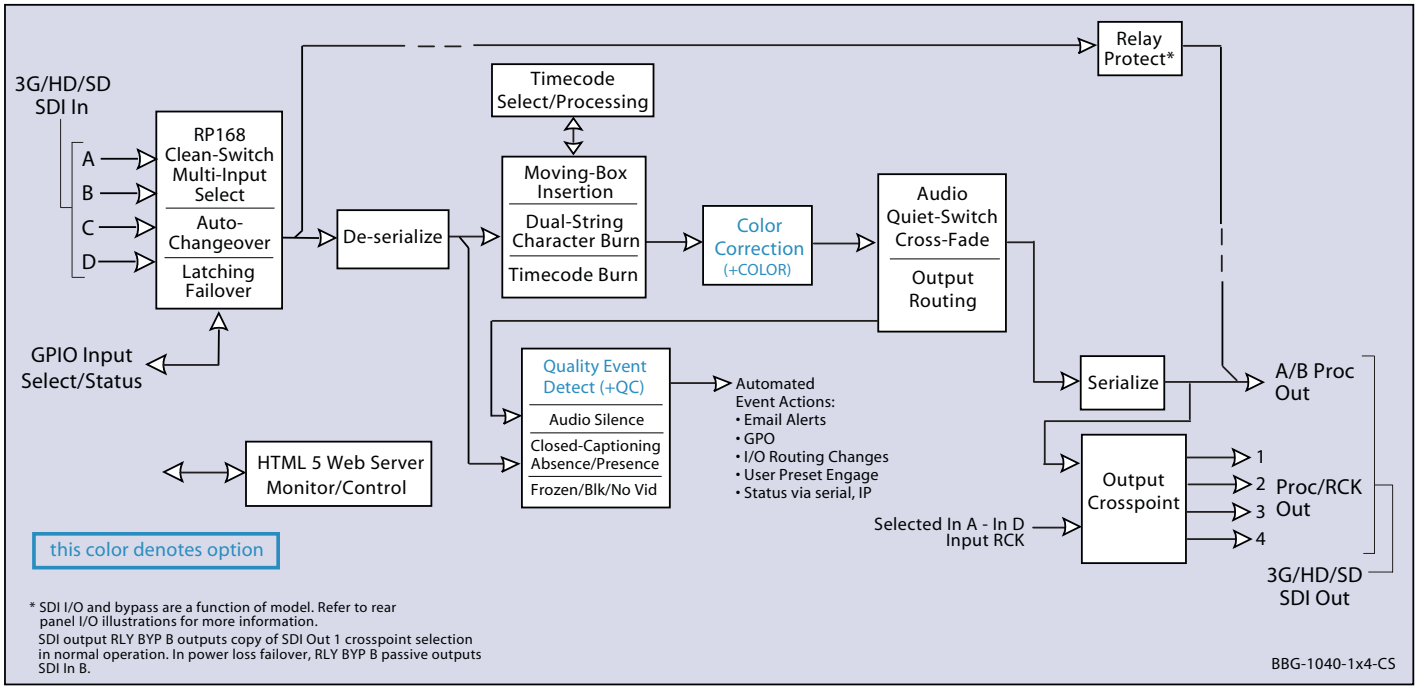
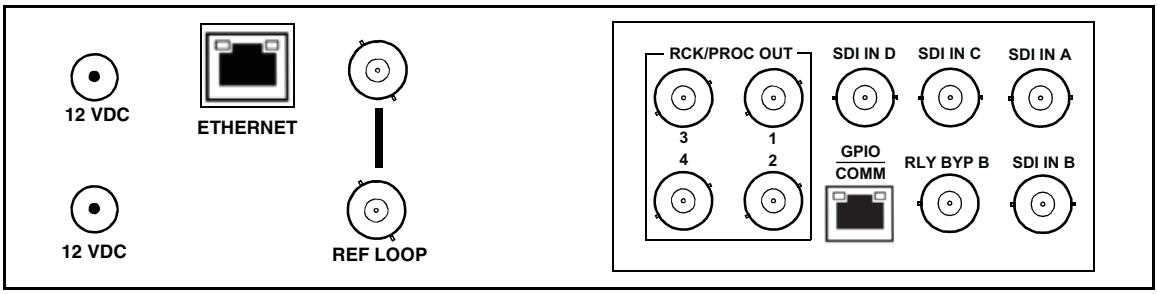
BBG-1040-4X1-CS » 3G/HD/SD-SDI STANDALONE 4X1 CLEAN AND QUIET BYPASS ROUTER

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.

Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

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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:
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

HTML5 web server/interface via rear-panel 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

BBG-1000-PS Redundant Power Supply Module

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

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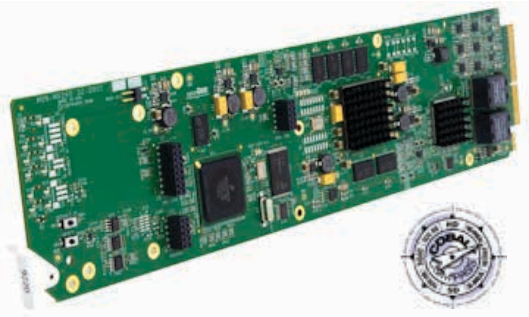
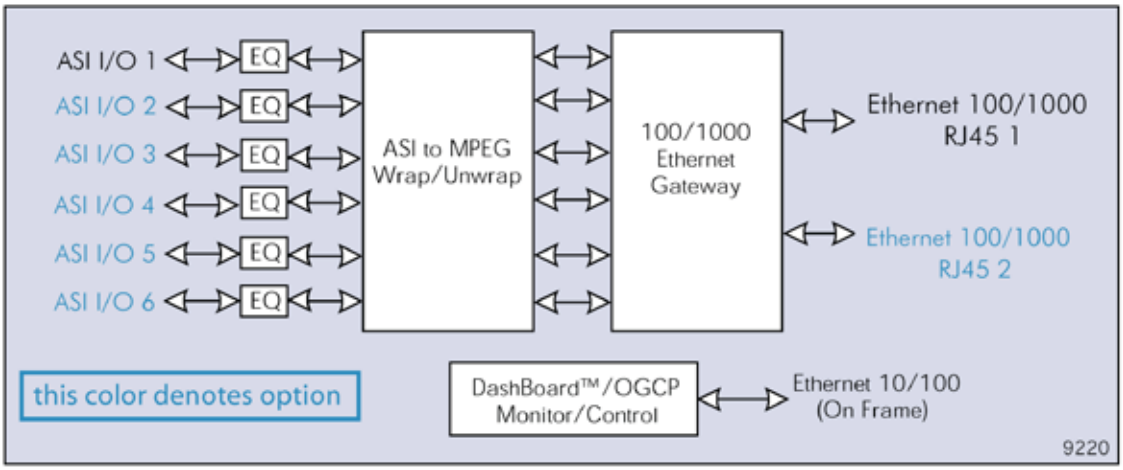
9220 » BIDIRECTIONAL ASI/MPTS GATEWAY

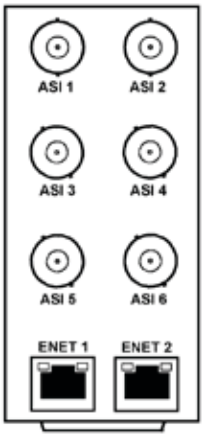


The 9220 card bidirectional ASI/IP gateway can receive transport streams over ASI and transmit streams over IP, or receive transport streams over IP and transmit streams over ASI. It features up to 6 ASI ports, individually configurable as inputs our outputs. With option +TS, the 9220 can support up 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 card supports both unicast and multicast, with IGMP V1, V2 and V3. DashBoard™ remote control allows easy centralized control and monitoring access.

FEATURES

- Up to six ASI inputs/outputs supported (standard supports one ASI/IP gateway with up to five additional with corresponding +TS licensing)
- Multicast IGMP v1, v2, and v3 support
- Bidirectional ASI/IP encapsulation or de-encapsulation
- 1x Gigabit Ethernet IP interface (Optional 2x Gigabit IP interface)
- Hot-swappable
- High density with 60 channels per 2RU frame
- Energy-efficient 12 watt power consumption
- Remote control/monitoring via DashBoard™ software
- Five year warranty





RM20-9220-B

SPECIFICATIONS

DVB-ASI Input

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 & 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

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9220-SA » BIDIRECTIONAL ASI/MPTS GATEWAY UNIT

The 9220-SA provides a compact form-factor standalone bidirectional ASI/IP gateway that 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-SA can be remotely controlled and monitored with the free, easy-to-use DashBoard™ setup and control operator interface. (When connected to your network, the 9220-SA appears in DashBoard just like any other device.)

It features up to 6 ASI ports, individually configurable as inputs our outputs. With option +TS-SA, the 9220-SA can support up to six ASI/IP bidirectional conversions simultaneously (standard support with no additional licenses supports one ASI/IP bidirectional gateway). The 9220-SA 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-SA supports both unicast and multicast, with IGMP V1, V2 and V3. DashBoard™ remote control allows easy centralized control and monitoring access.

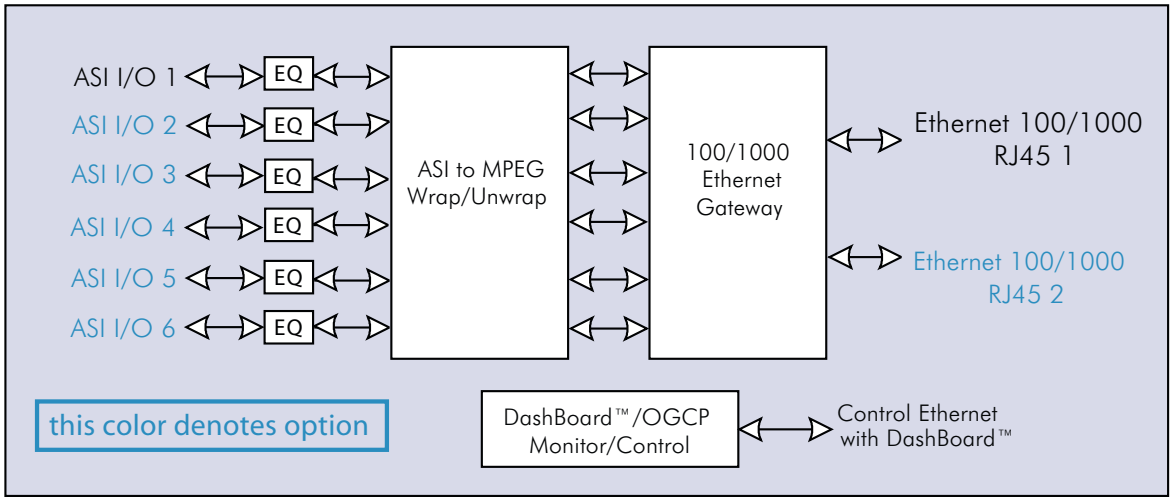
FEATURES

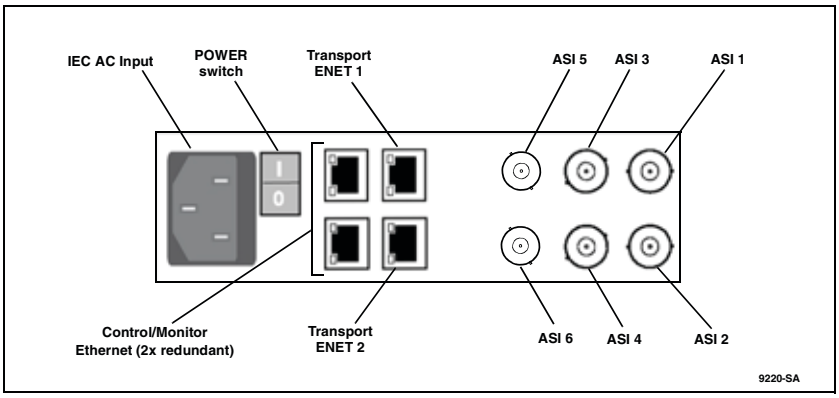
- Compact self-contained form with built-in AC power supply
- Up to six ASI inputs/outputs supported (standard supports one ASI/IP gateway with up to five additional with corresponding +TS-SA licensing)
- Bidirectional ASI/IP encapsulation or de-encapsulation
- 1x Gigabit Ethernet IP interface
- Optional 2x Gigabit IP interface
- Multicast IGMP v1, v2, and v3 support
- Ethernet remote control/monitoring via free DashBoard™ software
- Easy integration and control/monitoring via DashBoard remote control
- Five year warranty

OPTIONS

+TS-SA – Additional ASI or IP Transport Stream Output

+GBE-SA – Second Activated Gigabit Ethernet Port





DashBoard

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9220-SA » BIDIRECTIONAL ASI/MPTS GATEWAY UNIT

SPECIFICATIONS

Power

100-250 VAC, 47-63 Hz, 15W

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 & 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

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

Physical

Dimensions (WxHxD): 5.8 x 1.8 x 14 in (14.7 x 4.6 x 35.6 cm) (including component projection)

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)

ORDERING INFORMATION

9220-SA Bidirectional ASI/MPTS Gateway Unit

+TS-SA 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-SA Optional Activated Second Gigabit Ethernet Port

TRAY 1 RU Rack Mount Tray (supports up to 3 units)

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

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9223 » DUAL-CHANNEL 3G/HD/SD MPEG-4 ENCODER

The 9223 provides a card-based solution for distribution of MPEG-4 encoding. Utilizing the openGear® open-architecture platform, the 9223 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 20 individual or simulcast channels in a single frame, using less than 150W total, for reduced operating expenses.

The 9223 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 provides 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.

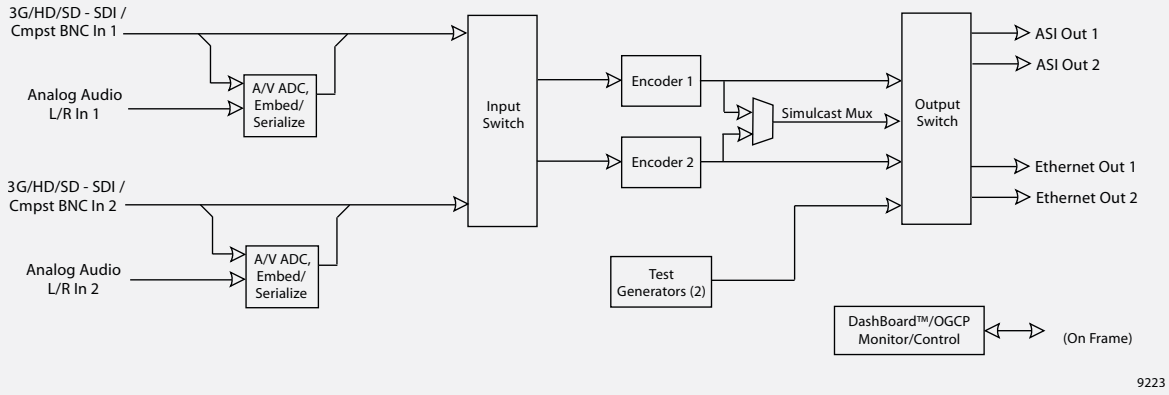
When using the Ethernet output, the 9223 supports the traditional UDP/RTP/SPMTE 2022 FEC protocols, as well as the HTTP Live Streaming protocol for transmitting live video over the Internet. Using HTTP Live Streaming, the 9223 can transmit broadcast-quality video to mobile phones (Apple and Android 4.0 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.

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

- DVB-ASI and Ethernet outputs
- Input video auto-detect mode automatically configures output to correspond to input frame rate and scaling
- Full support of CEA-608 and CEA-708 closed captioning and PMT information
- License-based options allow packages limited to only options needed for each unit and its processed channels 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.
- Built-in video/audio ADC and embedder allows direct use with SD composite video and audio analog sources
- Built-in Packet Test Generators allow pre-validation of transport
- Optional support for additional audio pairs per encoded output
- Multiple pre-defined control templates provide automatic setup of popular contribution-to-distribution schemes Ethernet remote control/monitoring via free DashBoard™ software
- Five-year warranty



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9223 » DUAL-CHANNEL 3G/HD/SD MPEG-4 ENCODER

» SPECIFICATIONS

Electrical
Power: 8 W

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),
Unbalanced stereo audio via RCA jacks

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
Dolby® Digital AC 3 (optional)
MPEG-4 AAC-LC up to 2 pairs
MPEG-2(ADTS) & MPEG-4(LATM/LAOS encapsulation)
Lip sync adjustment

Video Resolution Supported
HD: 1080 x 1920p 60/50
1080 x 1920/1440i 25/29.97/30
720 x 1280/960/640p 50/59.94
SD: 576 x 720/528i 29.97fps
576 x 720/528i 25fps

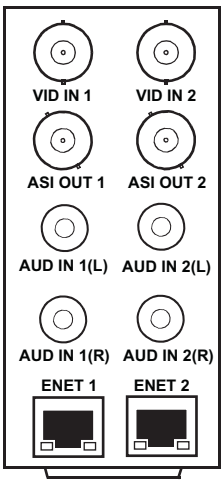
Video Pre-Processing
Advanced adaptive spatial filtering
Closed Captions CEA 608B & CEA-708C
WSS/AFD
Teletext (WST system B)

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)

Options
Note: Some options listed here are upgrades for the single-channel version of this product. Refer to Ordering Information for further details.

Upgrade License; SD Channel to HD up to 1080i **(+SD-HD-I)**
Upgrade License; SD Channel to HD up to 1080p **(+SD-HD-P)**
Upgrade License; HD 1080i Channel to HD 1080p **(+HD-I-HD-P)**
AAC Audio License; one AAC-LC Stereo Channel **(+UP-AAC)**
Additional Audio Pair License; allows an additional audio pair (from an SDI embedded pair) to be encoded along with base single-pair embedding. See Ordering Information for more details **(+2A)**
SMPTE 2022 FEC Insertion License. Provides one FEC insertion per device Ethernet port (one +SMPTE2022FEC license max. per device) **(+SMPTE2022)**
Add Encoder Second Channel H.264 SD (applicable for single-channel card 9223-S) **(+SD)**
Add Encoder Second Channel H.264 SD/HD (up to 1080i) (applicable for single-channel card 9223-S **(+HD-I)**
Add Encoder Second Channel H.264 SD/HD (up to 1080p) (applicable for single-channel card 9223-S **(+HD-P)**



RM20-9223-B

» 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) Unbalanced Analog Audio RCA In, (2) 100/1000Base-T RJ-45 Ethernet

+SD-HD-I Upgrade License; SD Channel to HD up to 1080i

+SD-HD-P Upgrade License; SD Channel to HD up to 1080p

+HD-I-HD-P Upgrade License; HD 1080i Channel to HD 1080p

+UP-AAC AAC Audio License

+2A Additional Audio Pair License

+SMPTE2022 SMPTE 2022 FEC License

Single-Channel Alternate Models and Add Channel Upgrade Licenses

9223-S Single-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD

9223-S-HD-I Single-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD/HD up to 1080i

9223-S-HD-P S ingle-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD/HD up to 1080p

+SD Add Encoder Second Channel H.264 SD (applicable for single-channel card 9223-S)

+HD-I Add Encoder Second Channel H.264 SD/HD (up to 1080i) (applicable for single-channel card 9223-S)

+HD-P Add Encoder Second Channel H.264 SD/HD (up to 1080p) (applicable for single-channel card 9223-S)

Note: The Upgrade, Audio, and SMPTE2022 licenses above are also available for single-channel alternate models.

Single-Channel Encoders 9223-S (9223-SA-S)		
Base	**One +2A License**	**Two +2A Licenses**
1 Stereo PID	2 Stereo PIDs	3 Stereo PIDs
Dual-Channel Encoders 9223-D (9223-SA-D)		
Base	**One +2A License**	**Two +2A Licenses**
2 Stereo PIDs	3 Stereo PIDs (Added PIDs per licensing can be applied to Encoder 1 or Encoder 2 channels)	4 Stereo PIDs (Added PIDs per licensing can be applied to Encoder 1 or Encoder 2 channels as desired, also including configuring the device as single-channel with 4 total Stereo PIDs in one encoder channel)

Note:
• Maximum of two (2) **+2A** licenses can be added to single-channel (-S) or dual-channelencoder (-D).

• For Dual-Channel Encoders, added **+2A** audio channels can only be sourced from de-embedded SDI.

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BBG-1090-ENC-H264 (9223-SA) » DUAL-CHANNEL 3G/HD/SD MPEG-4 ENCODER UNIT

The BBG-1090-ENC-H264 provides a compact form-factor standalone unit for distribution of MPEG-4 encoding. Utilizing the openGear® open-architecture control/monitoring platform, the BBG-1090-ENC-H264 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-1090-ENC-H264 appears in DashBoard just like any other device.) The BBG-1090-ENC-H264 includes dual redundant 10/100/1000 Mb/s Ethernet ports for control.

The BBG-1090-ENC-H264 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-1090-ENC-H264 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-1090-ENC-H264 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-1090-ENC-H264 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-1090-ENC-H264 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).

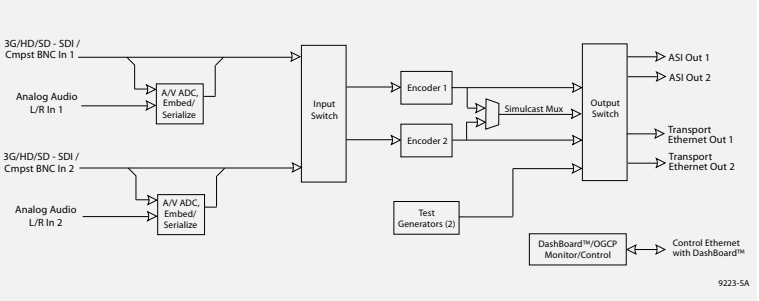
openGear DashBoard

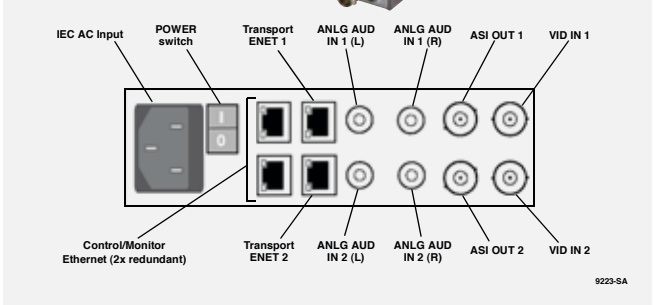
RTMP support allows direct publishing of real-time, live content to Adobe® Media Servers or any other servers, web sites and CDNs with RTMP ingress, such as Justin.tv, UStream, LiveStream and Akamai. Publish professional-quality real-time SD/HD content to Internet viewers (including some critical features 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.

Full user remote monitor/control allows full device status and control access across a standard Ethernet network.

» FEATURES

- Compact self-contained form with built-in AC power supply
- 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
- 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.
- License-based options allow packages limited to only options needed for each unit and its processed channels
- Built-in video/audio ADC and embedder allows direct use with SD composite video and audio analog sources
- Built-in Packet Test Generators allow pre-validation of transport
- Optional support for additional audio pairs per encoded output
- Multiple pre-defined control templates provide automatic setup of popular contribution-to-distribution schemes
- Ethernet remote control/monitoring via free DashBoard™ software
- Five-year warranty





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BBG-1090-ENC-H264 (9223-SA) » DUAL-CHANNEL 3G/HD/SD MPEG-4 ENCODER UNIT

» SPECIFICATIONS

Electrical
Power: 100-250 VAC, 47-63 Hz, 15W

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),
Unbalanced stereo audio via RCA jacks

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)

ASI Outputs
Number of outputs: 2, 75Ω BNC DVB-ASI
213Mbit/s maximum ASI TS bit-rate per port

Audio Encoding
MPEG-1 layer II, up to 2 stereo pairs
Dolby® Digital AC 3 (optional)
MPEG-4 AAC-LC up to 2 pairs
MPEG-2(ADTS) & MPEG-4(LATM/LAOS encapsulation)
Lip sync adjustment

Video Resolution Supported
HD: 1080 x 1920p 60/50
1080 x 1920/1440i 25/29.97/30
720 x 1280/960/640p 50/59.94
SD: 576 x 720/528i 29.97fps
576 x 720/528i 25fps

Video Pre-Processing
Advanced adaptive spatial filtering
Closed Captions CEA 608B & CEA-708C
WSS/AFD
Teletext (WST system B)

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

Physical
Dimensions (WxHxD): 5.8 x 1.8 x 14 in
(14.7 x 4.6 x 35.6 cm)
(including component projection)

Options
Note: Some options listed here are upgrades for the single-channel version of this product. Refer to Ordering Information for further details.

Upgrade License; SD Channel to HD up to 1080i **(+SD-HD-I-SA)**
Upgrade License; SD Channel to HD up to 1080p **(+SD-HD-P-SA)**
Upgrade License; HD 1080i Channel to HD 1080p **(+HD-I-HD-P-SA)**
AAC Audio License; one AAC-LC Stereo Channel **(+UP-AAC-SA)**
Additional Audio Pair License; allows an additional audio pair (from an SDI embedded pair) to be encoded along with base single-pair embedding. See Ordering Information for more details. **(+2A-SA)**
SMPTE 2022 FEC Insertion License. Provides one FEC insertion per device Ethernet port (one +SMPTE2022FEC license max. per device) **(+SMPTE2022)**
Add Encoder Second Channel H.264 SD (applicable for single-channel version 9223-SA-S) **(+SD-SA)**
Add Encoder Second Channel H.264 SD/HD (up to 1080i) (applicable for single-channel version 9223-SA-S) **(+HD-SA-I)**
Add Encoder Second Channel H.264 SD/HD (up to 1080p) (applicable for single-channel version 9223-SA-S) **(+HD-SA-P)**
1 RU Rack Mount Tray (supports up to 3 modular chassis units) **(TRAY)**

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BBG-1090-ENC-H264 (9223-SA) » DUAL-CHANNEL 3G/HD/SD MPEG-4 ENCODER UNIT

» ORDERING INFORMATION

Note: This product is identified as BBG-1090-ENC-H264 as well as legacy part number 9223-SA. Either part number is valid for ordering, or for reference or for information.

9223-SA-D Dual-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD

9223-SA-D-HD-I Dual-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080i

9223-SA-D-HD-P Dual-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080p

+SD-HD-I-SA Upgrade License; SD Channel to HD up to 1080i

+SD-HD-P-SA Upgrade License; SD Channel to HD up to 1080p

+HD-I-HD-P-SA Upgrade License; HD 1080i Channel to HD 1080p

+UP-AAC-SA AAC Audio License

+2A-SA Additional Audio Pair License

+SMPTE2022 SMPTE 2022 FEC License

TRAY 1 RU Rack Mount Tray (supports up to 3 modular chassis units)

Single-Channel Alternate Models and Add Channel Upgrade Licenses

9223-SA-S Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD

9223-SA-S-HD-I Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080i

9223-SA-S-HD-P Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080p

+SD-SA Add Encoder Second Channel H.264 SD (applicable for single-channel unit 9223-SA-S)

+HD-I-SA Add Encoder Second Channel H.264 SD/HD (up to 1080i) (applicable for single-channel unit 9223-SA-S)

+HD-P-SA Add Encoder Second Channel H.264 SD/HD (up to 1080p) (applicable for single-channel unit 9223-SA-S)

Note: The Upgrade, Audio, and SMPTE2022 licenses above are also available for single-channel alternate models.

Single-Channel Encoders 9223-S (9223-SA-S)		
Base	**One +2A License**	**Two +2A Licenses**
1 Stereo PID	2 Stereo PIDs	3 Stereo PIDs
Dual-Channel Encoders 9223-D (9223-SA-D)		
Base	**One +2A License**	**Two +2A Licenses**
2 Stereo PIDs	3 Stereo PIDs (Added PIDs per licensing can be applied to Encoder 1 or Encoder 2 channels)	4 Stereo PIDs (Added PIDs per licensing can be applied to Encoder 1 or Encoder 2 channels as desired, also including configuring the device as single-channel with 4 total Stereo PIDs in one encoder channel)

Note:
• Maximum of two (2) **+2A** licenses can be added to single-channel (-S) or dual-channelencoder (-D).

• For Dual-Channel Encoders, added **+2A** audio channels can only be sourced from de-embedded SDI.

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9990-TRX-MPEG » MULTI-STANDARD BROADCAST TRANSCODER

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.

The 9990-TRX-MPEG is a full-featured quad-channel video transcoder that delivers up to 40 individual HD/SD channels. The latest advances in video compression technology 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.

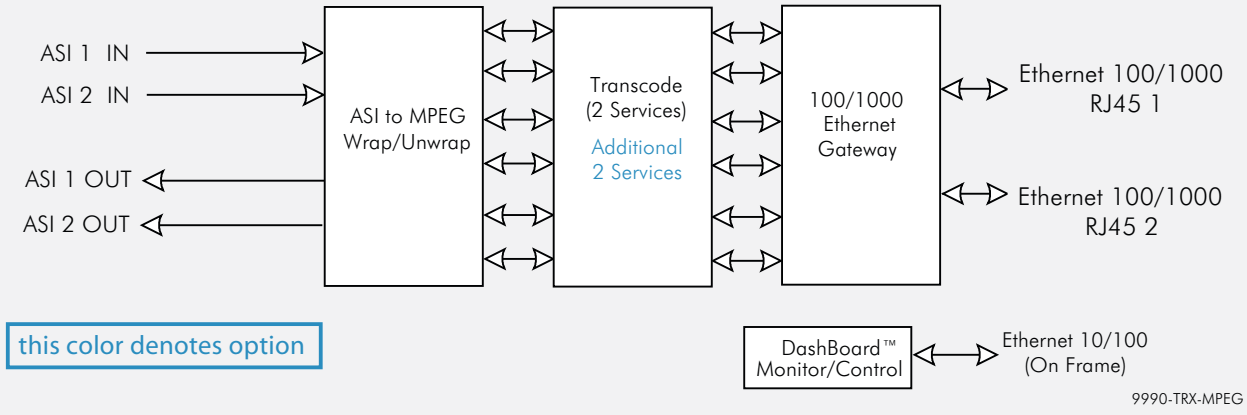
OPTIONS

+XC2HD – Adds two transcoding licenses

The openGear® card form factor and DashBoard™ remote control makes for easy integration into existing terminal equipment environments.

» FEATURES

- Dual-channnel 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
- Five year warranty



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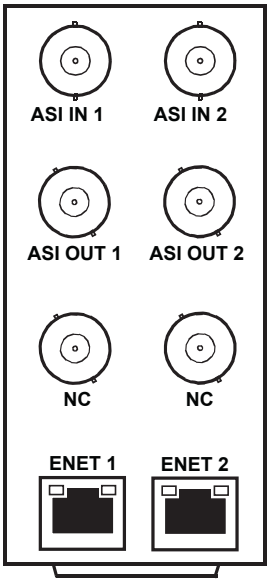
9990-TRX-MPEG » MULTI-STANDARD BROADCAST TRANSCODER

» 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 75 Ω
213Mbit/s maximum ASI TS bit-rate per port
Ethernet
Number of Ports: 4
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
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-B

» ORDERING INFORMATION

9990-TRX-MPEG Multi-Standard Broadcast Transcoder

+TRX2 Add Transcoding License. Adds transcoding for two additional services

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

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BBG-1090-TRX-MPEG » MULTI-STANDARD STANDALONE BROADCAST TRANSCODER

The BBG-1090-TRX-MPEG provides a compact form-factor standalone offering 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 BBG-1090-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 BBG-1090-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 device. DashBoard™ remote control allows easy centralized control and monitoring access.

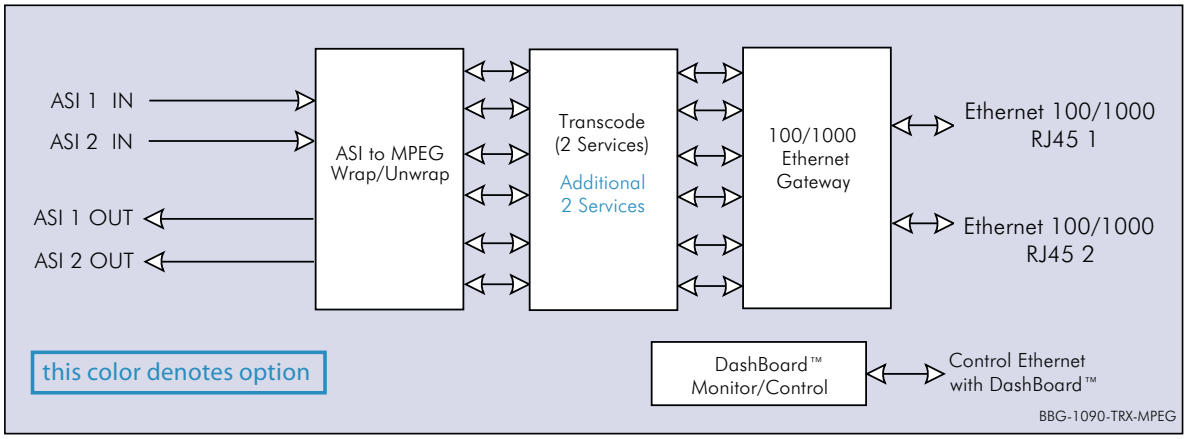
FEATURES

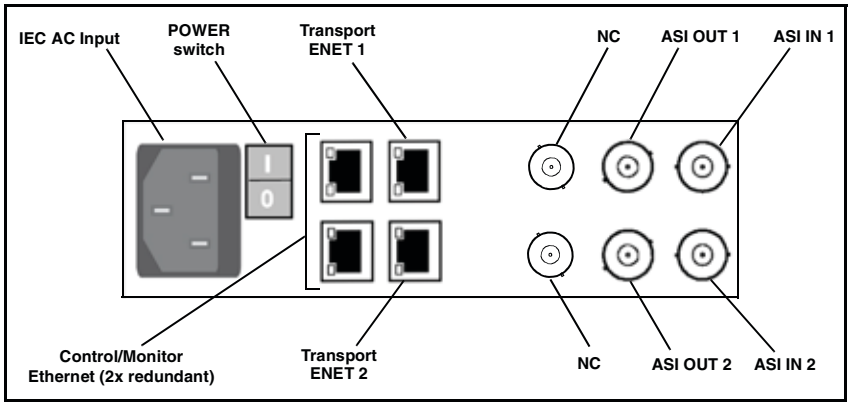
- Dual-channnel multi-standard HD/SD transcoding standard - scalable for additional transcoding using software licenses as simple downloads
- Supports MPEG-1 Layer II, AAC, and Dolby® AC-3 audio inputs
- Full, future-proof "any-to-any" multi-standard codec support - adapts services from both MPEG-2 and MPEG-4 AVC systems
- Compact self-contained form with built-in AC power supply
- 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
- Five year warranty

OPTIONS

+XC2HD-SA – Adds two transcoding licenses

+TRXDDEC-SA – Adds Dolby® decoding license (per video service (channel))





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BBG-1090-TRX-MPEG » MULTI-STANDARD STANDALONE BROADCAST TRANSCODER

SPECIFICATIONS

Power
100-250 VAC, 47-63 Hz, 15W

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: 4
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 pass-thru

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)

Video Transcoding (cont.)
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

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

ORDERING INFORMATION

BBG-1090-TRX-MPEG Multi-Standard Standalone Broadcast Transcoder

+TRX2-SA Transcoding License. Adds transcoding for two additional services

+TRXDDEC-SA Dolby® decoding license (per video service (channel))

TRAY 1 RU Rack Mount Tray (supports up to 3 modular chassis units)

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9990-ENC-H264-IP » HD/SD-SDI/CVBS H.264 ENCODERS WITH STREAMING IP OUTPUT

with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

The 9990-ENC-H264-IP cards provide a card-based solution 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 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, 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-ENC-H264-IP provides the flexibility of supporting SD analog composite video and an analog audio stereo pair per input channel.

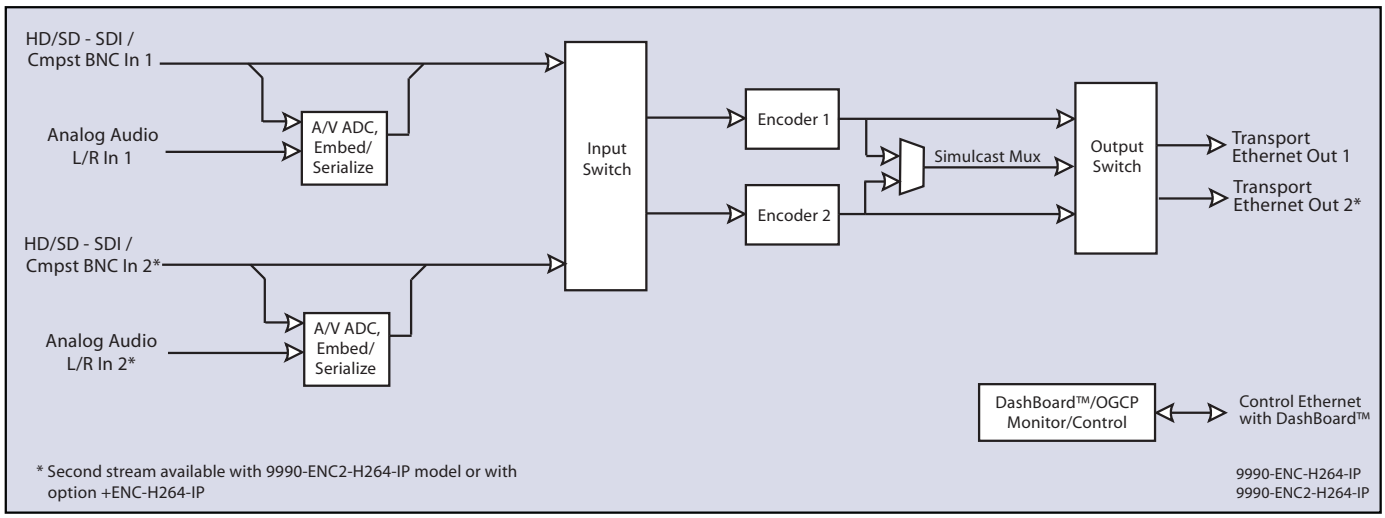
The 9990-ENC-H264-IP offers the latest advances in video compression that delivers excellent video quality at very low bit rates. Unique encoding designs allow delivery of multiple HD and SD video services simultaneously. The 9990-ENC-H264-IP provides two Ethernet outputs, supporting full-duplex 100 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.

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; only 6 Watts per card
- 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
- 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. 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
- Five year warranty



openGear®

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9990-ENC-H264-IP » HD/SD-SDI/CVBS H.264 ENCODERS 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
- 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

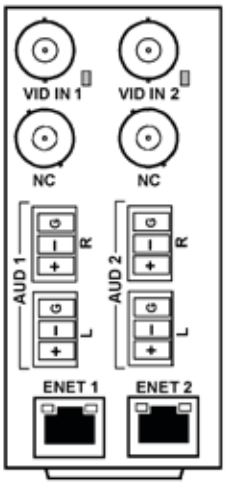
Video Resolution Supported
- HD: 1080 x 1920p 60/50
- 1080 x 1920/1440i 25/29.97/30
- 720 x 1280/960/640p 50/59.94
- SD: 576 x 720/528i 29.97fps
- 576 x 720/528i 25fps

Video Pre-Processing
- Closed Captions CEA 608B and CEA-708C
- WSS/AFD
- Teletext (WST system B)

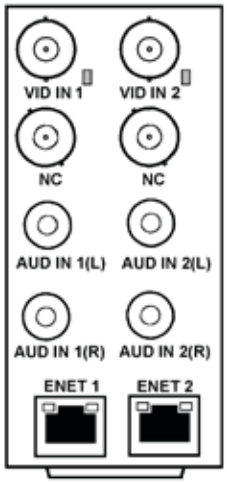
Management and Control
- 10/100Base-T Ethernet
- Configuration Import/Export
- Audible/visual fault warning
- In-band and out-of-band control
- SNMP v1, v2
- Datasafe automated card configuration
- Accurate bit rate control
- Startup to streaming in seconds

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 H.264 ENCODERS 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

9990-ENC2-H264-IP HD/SD-SDI/CVBS (Dual 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

+ENC-H264-IP Add Encoder Second Channel Option (applicable for single-channel card 9990-ENC-H264-IP)

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

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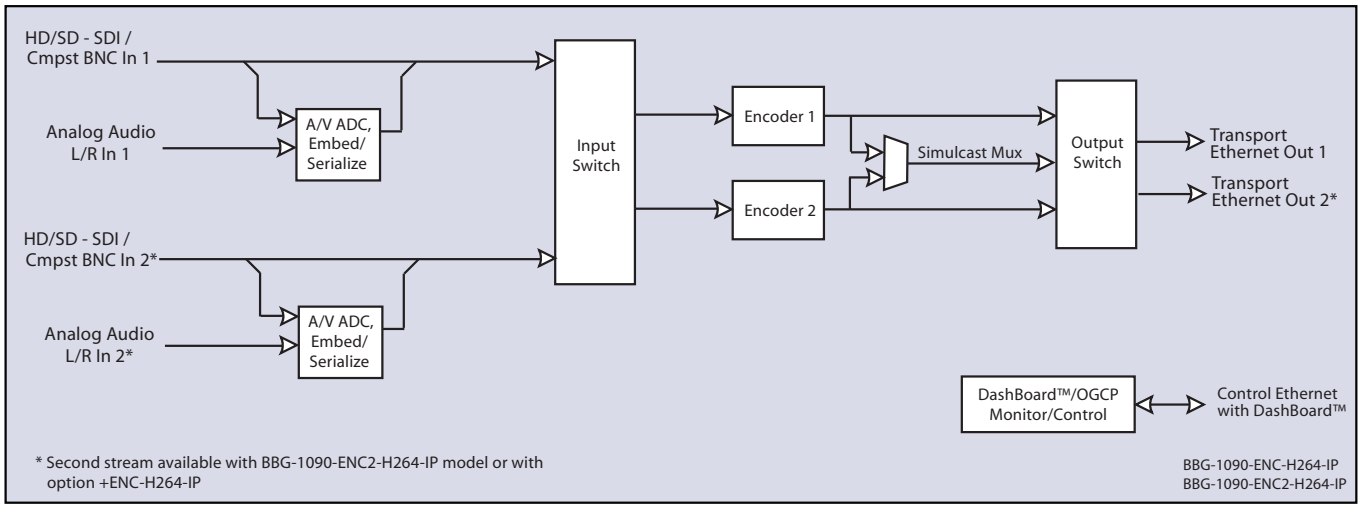
BBG-1090-ENC-H264-IP » HD/SD-SDI/CVBS H.264 STANDALONE ENCODERS WITH STREAMING IP OUTPUT with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

The BBG-1090-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-1090-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-1090-ENC-H264-IP offers easy-to-use DashBoard™ setup and control operator interface. In addition to HD/SD-SDI inputs, the BBG-1090-ENC-H264-IP provides the flexibility of supporting SD analog composite video and an analog audio stereo pair per input channel.

The BBG-1090-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-1090-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. Using HTTP Live Streaming, the BBG-1090-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 via front panel status indication.

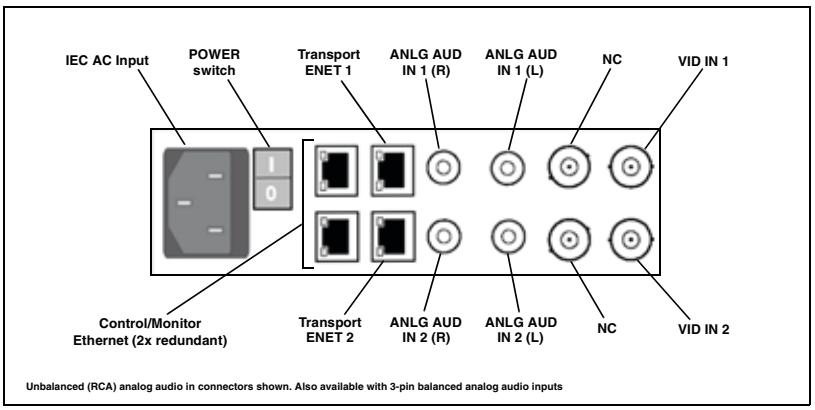
FEATURES

- Compact self-contained form with built-in AC power supply
- 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
- 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
- Five year warranty



* Second stream available with BBG-1090-ENC2-H264-IP model or with option +ENC-H264-IP

BBG-1090-ENC-H264-IP
BBG-1090-ENC2-H264-IP



Unbalanced (RCA) analog audio in connectors shown. Also available with 3-pin balanced analog audio inputs

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BBG-1090-ENC-H264-IP » HD/SD-SDI/CVBS H.264 STANDALONE ENCODERS WITH STREAMING IP OUTPUT with Advanced Protocol Support including UDP Single/Multicast, HLS, and RTMP

SPECIFICATIONS

Electrical
Power: 100-250 VAC, 47-63 Hz, 15W

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: 1080 x 1920p 60/50
1080 x 1920/1440i 25/29.97/30
720 x 1280/960/640p 50/59.94
SD: 576 x 720/528i 29.97fps
576 x 720/528i 25fps

Video Pre-Processing
Closed Captions CEA 608B and CEA-708C
WSS/AFD
Teletext (WST system B)

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

Physical
Dimensions (WxHxD): 5.8 x 1.8 x 14 in (14.7 x 4.6 x 35.6 cm) (including component projection)

ORDERING INFORMATION

BBG-1090-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-1090-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-1090-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-1090-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

+ENC-H264-IP Add Encoder Second Channel Option (applicable for single-channel model BBG-1090-ENC-H264-IP)

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9990-DEC-MPEG » MPEG4 AVC & MPEG2 DECODER WITH ASI & IP INPUTS & SDI OUTPUTS

with support up to 3G 1080p 60

The all-new Cobalt® 9990-DEC-MPEG MPEG4 AVC and MPEG2 Decoder with ASI and IP Inputs and SDI Outputs with support up to 3G 1080p 60 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.

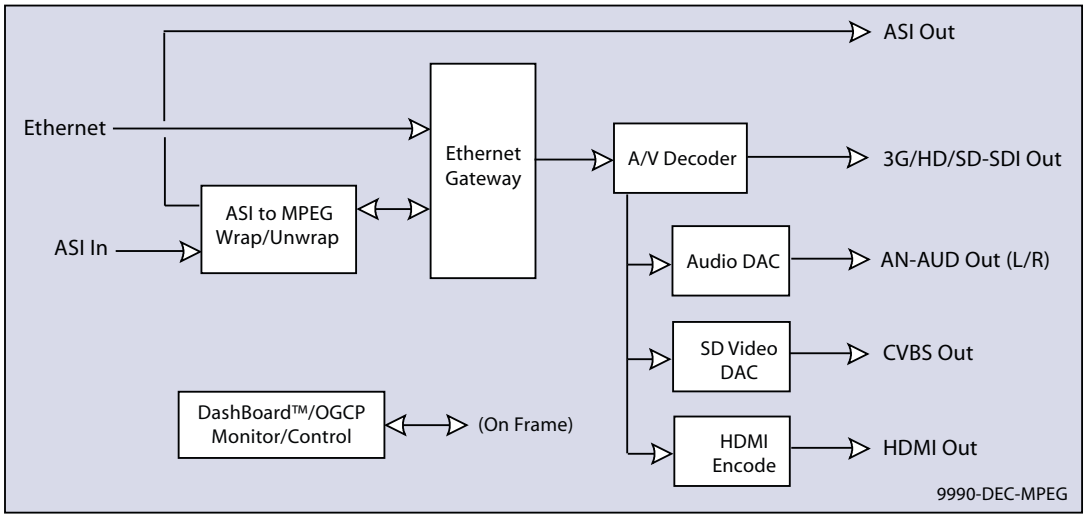
IP and DVB-ASI input streams are supported, with outputs as ASI, DVB-ASI, SDI, HDMI, and CVBS (for SD streams) using MPEG4 AVC or MPEG2 decoding. The 9990-DEC-MPEG can decode from several audio codecs and provides Dolby® pass-thru. Full user DashBoard™ remote control allows full status and control access locally or across a standard Etherenet network. A complete SNMP MIB is also included.

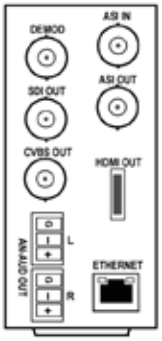
FEATURES

- Comprehensive MPEG decoding solution – MPEG4 AVC and MPEG2 to ASI, SDI, HDMI and CVBS with built-in audio codecs. Convenience IP output also.
- Supports RTMP and RTSP sources
- MPEG-1 Layer II, AAC -LC, AAC-HE, E-AC-3 and AC-3 audio decoding standard. Dolby pass-thru (Dolby decode option available).
- DVB-ASI Turnaround to IP and ASI with SPTS Splitting
- IP reception of unicast or multicast
- Several options available for scalable configuring
- SNMP MIB included
- Low-power/high-density design – less than 14 Watts per card
- Remote control/monitoring via Dashboard™ software
- Five year warranty

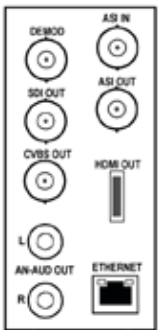
OPTIONS

- 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)
- IP License (+IP)
- Automatic Repeat Request License (+ARQ)
- Monitoring License (+TSMON)
- Genlock License (+GENLOCK)
- Stream Splitting License Option (+SPTS)





RM20-9990DECMPEG-B



openGear®

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9990-DEC-MPEG » MPEG4 AVC & MPEG2 DECODER WITH ASI & IP INPUTS & SDI OUTPUTS

with support up to 3G 1080p 60

SPECIFICATIONS

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

Power
< 14 Watts

Inputs
(1) DVB-ASI 75Ω BNC
(1) IP; 1000Base-T RJ-45
Gen lock (from frame ref 1/2)

Outputs
(1) 3G/HD/SD-SDI 75Ω BNC
(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

Video Resolution
HD:
1080 x 1920p - 60/50
1080 x 1920/1440i - 25/29.97/30
720 x 1280p/960 - 50/59.94
960 x 540 - 25/29.97
SD:
480 x 720/704/640/528 - 29.97
360 x 640p - 29.97
576 x 720/704/640/528 - 25
Lower Resolutions:
480x270, 320x240, 320x180

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 with support up to 3G 1080p 60

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) DEMOD 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) DEMOD Output BNC, (1) CVBS Output BNC, (1) HDMI Output (2) Unbalanced Analog Audio Outputs (RCA)

+ARQ ARQ License Option

+DEC-DDEC Dolby® Decode License Option

+FEC SMPTE 2022 Forward Error Correction License Option

+GENLOCK Genlock License Option

+IP IP License Option

+SPTS SPTS Stream Splitting License Option

+TSMON Monitoring License Option

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BBG-1090-DEC-MPEG » MPEG4 AVC & MPEG2 MODULAR DECODER WITH ASI & IP INPUTS & SDI OUTPUTS with support up to 3G 1080p 60

The all-new Cobalt® BBG-1090-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 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-1090-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-1090-DEC-MPEG can decode from several audio codecs and provides Dolby® pass-thru.

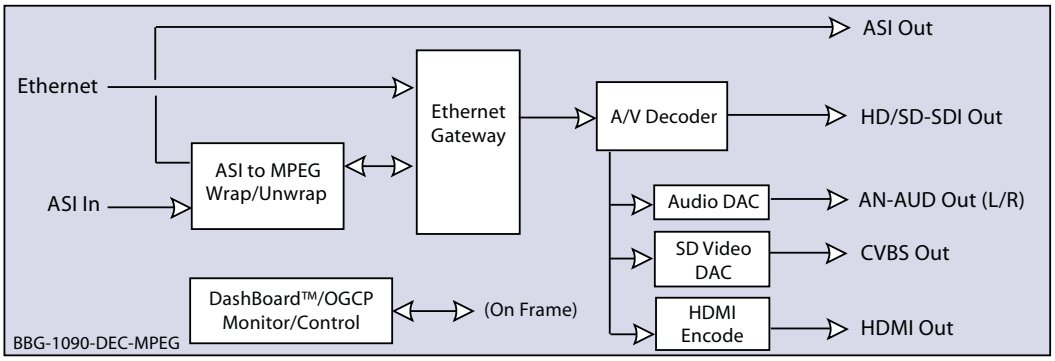
Full user DashBoard™ remote control allows full status and control access locally or across a standard Ethernet network. A complete SNMP MIB is also included.

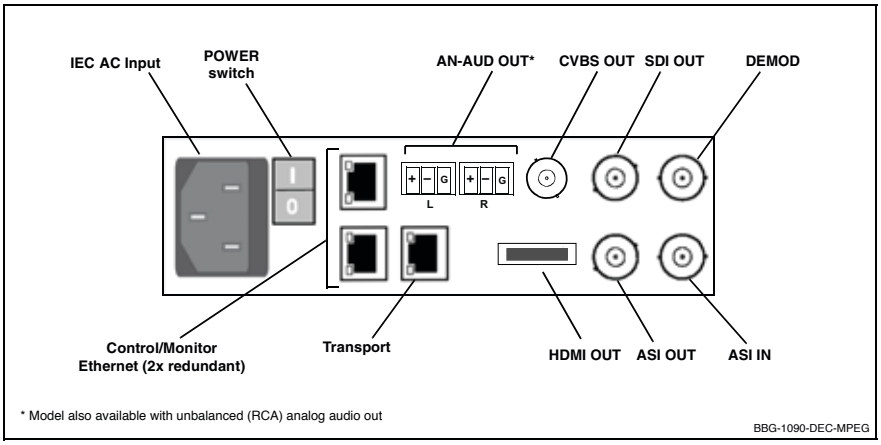
FEATURES

- Comprehensive MPEG decoding solution – MPEG4 AVC and MPEG2 to ASI, SDI, HDMI and CVBS with built-in audio codecs. Convenience IP output also.
- 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)
- DVB-ASI Turnaround to IP and ASI with SPTS Splitting
- IP reception of unicast or multicast
- Several options available for scalable configuring
- SNMP MIB included
- Low-power/high-density design – less than 14 Watts
- Remote control/monitoring via Dashboard™ software
- 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)
- IP License (+IP)
- Automatic Repeat Request License (+ARQ)
- Monitoring License (+TSMON)
- Genlock License (+GENLOCK)
- Stream Splitting License Option (+SPTS)





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BBG-1090-DEC-MPEG » MPEG4 AVC & MPEG2 MODULAR DECODER WITH ASI & IP INPUTS & SDI OUTPUTS with support up to 3G 1080p 60

SPECIFICATIONS

Power
100-250 VAC, 47-63 Hz, 14 Watts

Inputs
(1) DVB-ASI 75Ω BNC
(1) IP; 1000Base-T RJ-45

Outputs
(1) HD/SD-SDI 75Ω BNC
(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
UPD (Unicast or Multicast)
RTP (Unicast or Multicast)
RTMP (Adobe Flash)
RTSP (Security Camera)
SMPTE 2022 Pro-MPEG-FEC
ARQ

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

Audio Codec Supported/Processing
MPEG-1 Layer 2 (mp2)
AAC-LC
HE-AAC
AC-3, E-AC-3 (Dolby® pass-thru)

ORDERING INFORMATION

BBG-1090-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-1090-DEC-MPEG-B Balanced analog audio outputs
BBG-1090-DEC-MPEG-U Unbalanced (RCA) analog audio outputs

+ARQ ARQ License Option

+DEC-DDEC Dolby® Decode License Option

+FEC SMPTE 2022 Forward Error Correction License Option

+GENLOCK Genlock License Option

+IP IP License Option

+SPTS SPTS Stream Splitting License Option

+TSMON Monitoring License Option

US SALES 800 669-1691 / DIRECT +1 217-344-1243 / SALES@COBALTDIGITAL.COM
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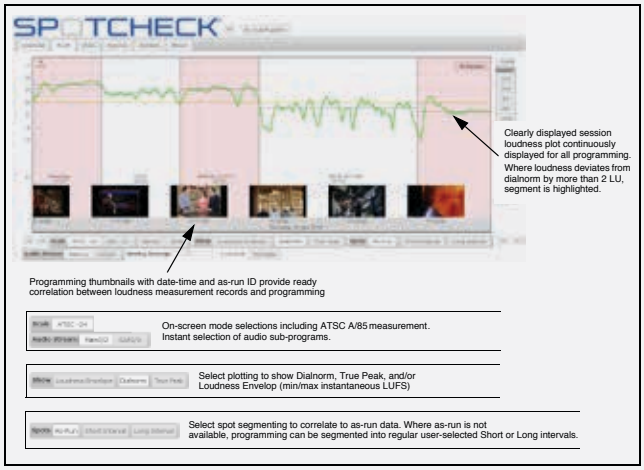
SPOTCHECK® » TRANSPORT STREAM COMPLIANCE MONITOR

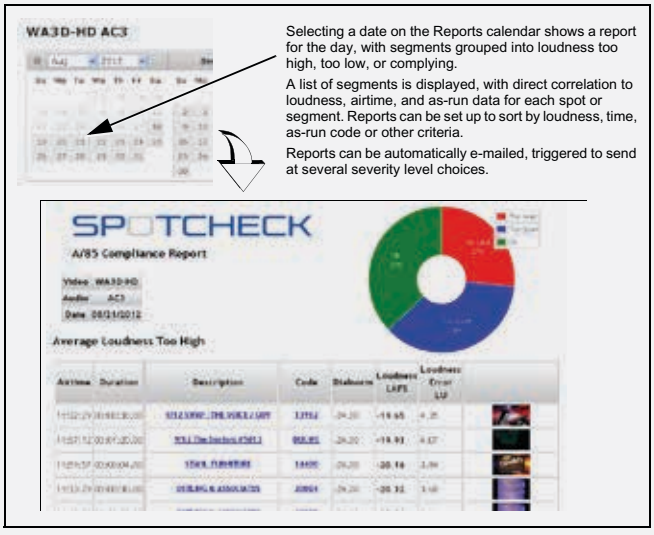
SpotCheck® provides easy to use, no-guesswork, automatic A/85 loudness measurement and access to all audio loudness records. Because SpotCheck® monitors an IP, ASI, or a transmitted over-the-air MPEG stream at the transmit (emission) encode point, SpotCheck® measures and logs loudness for all programming 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

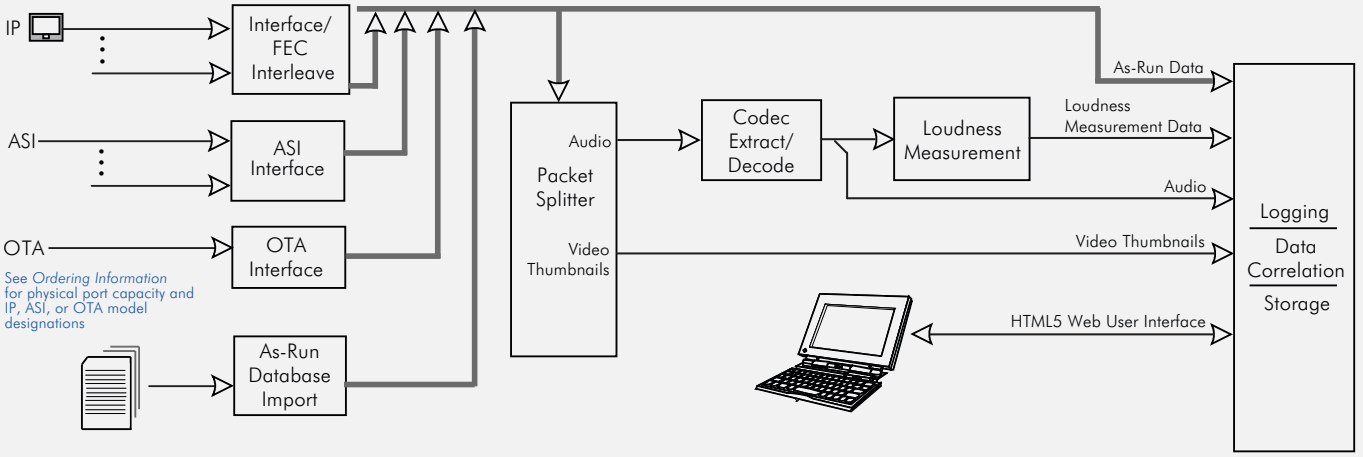
Direct GigE MPEG, ASI, or OTA interface. No complicated external breakout of signals.

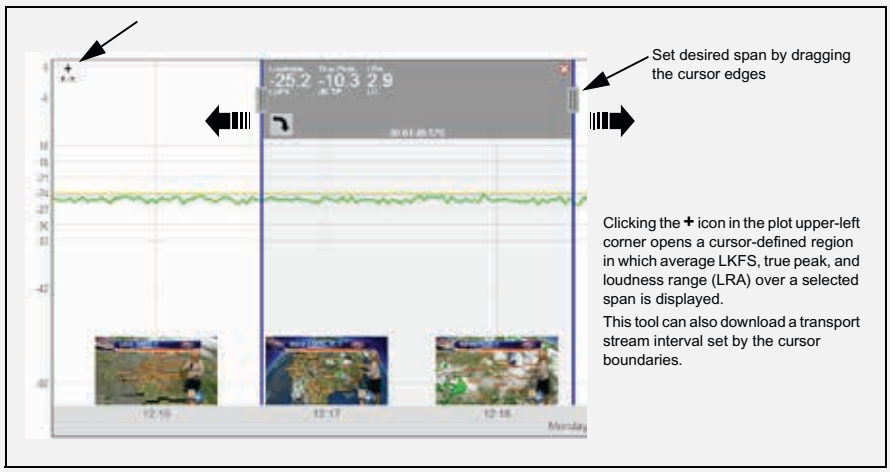
Automatically accounts for program loudness, dialnorm, and DRC effect on audio – no interpretation of readings or loudness metadata needed

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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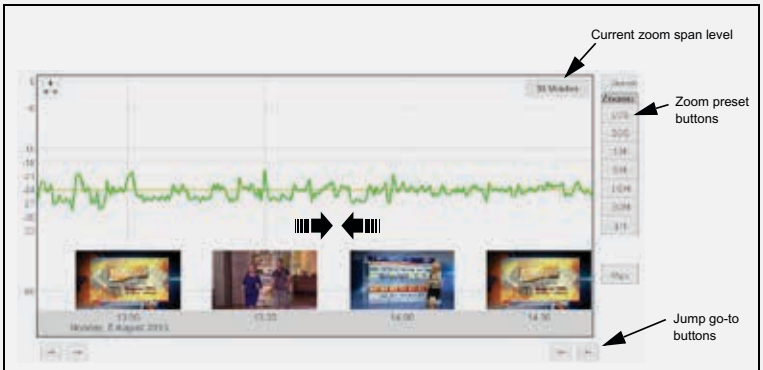
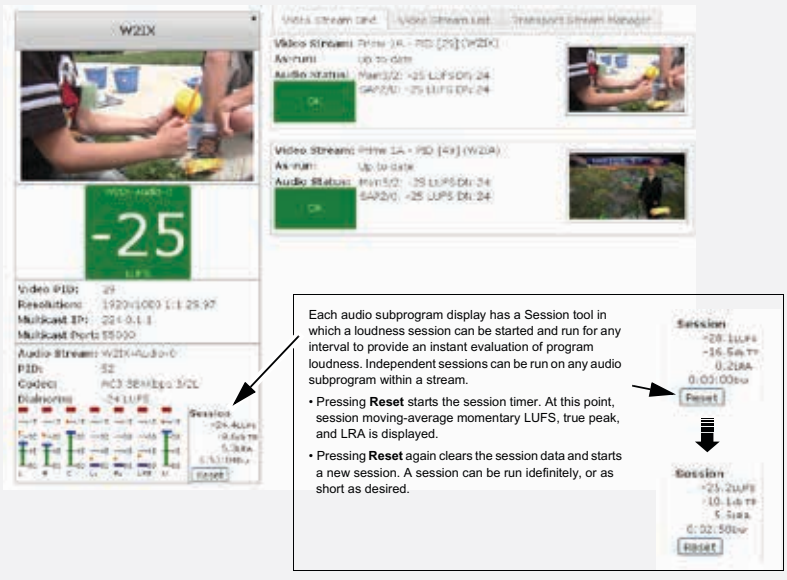
SPOTCHECK® » TRANSPORT STREAM COMPLIANCE MONITOR



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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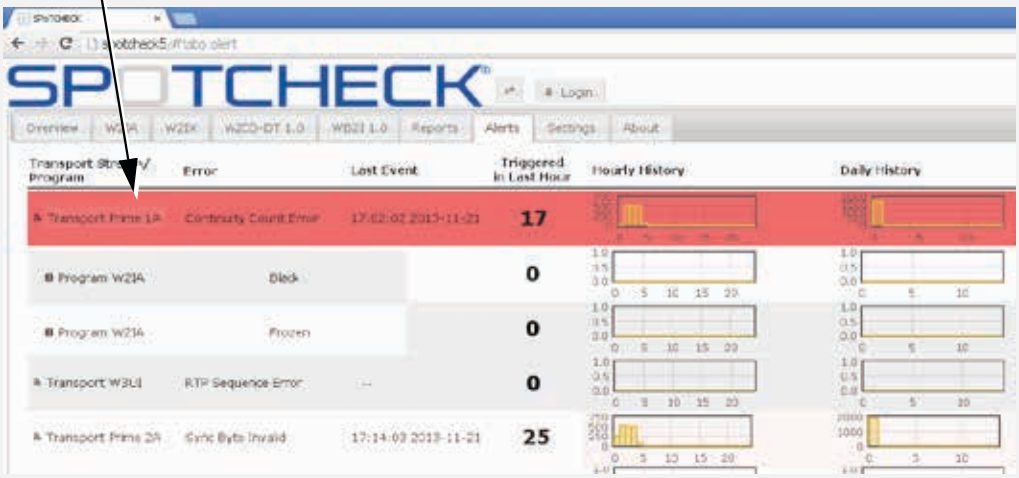
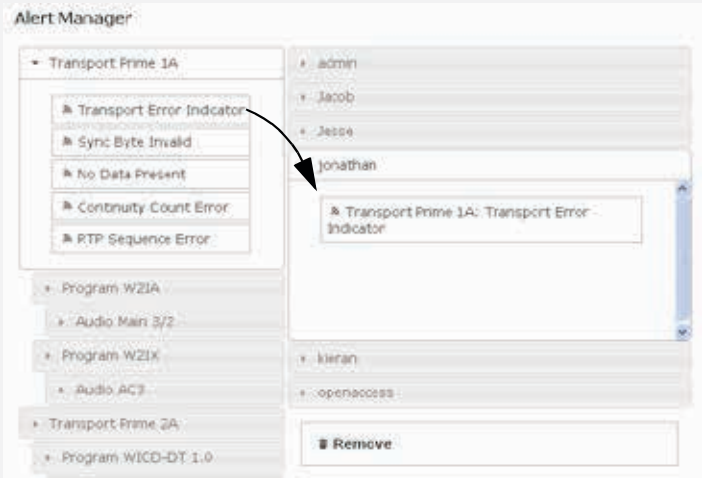
SPOTCHECK® » TRANSPORT STREAM COMPLIANCE MONITOR

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

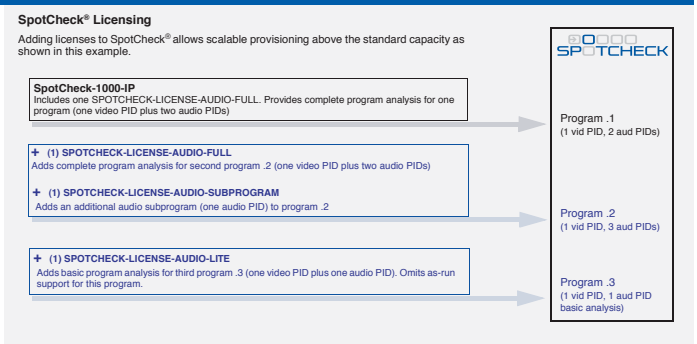
SPOTCHECK®-LICENSE-AUDIO-FULL Complete program analysis for one program (1 video PID plus 2 audio PIDs). Each optional additional license adds complete analysis for one program.

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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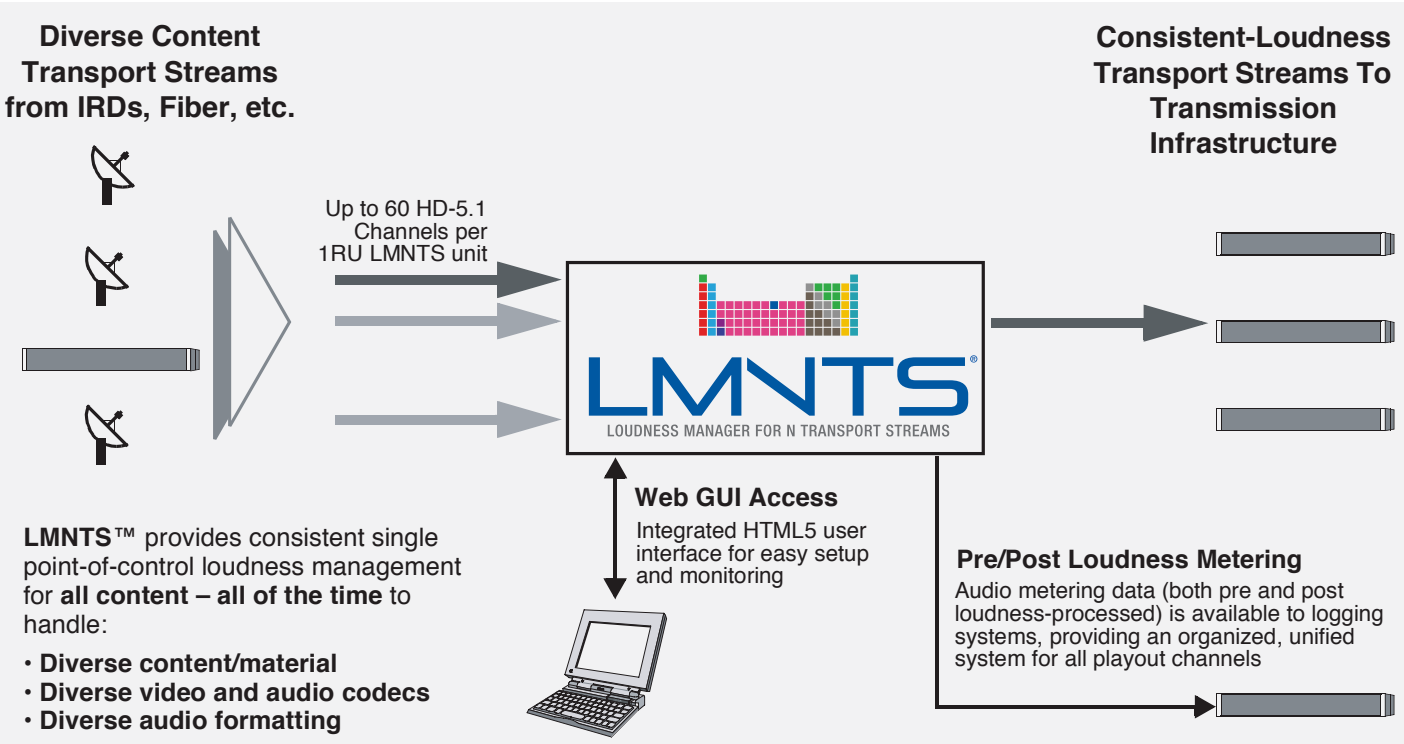
LMNTS® » TRANSPORT STREAM LOUDNESS PROCESSOR

LMNTS®-1000
Supports up to 80 surround audio PIDs
LMNTS®-2000
Supports up to 120 surround audio PIDs

PICK HIT BroadcastEngineering 2012

TVTechnology STAR 2012

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. LMNTS®-IP version directly interfaces with GigE-based playout servers.

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

Integrated HTML5 user interface for easy setup and local or remote monitoring

Full compatibility with MPTS and SPTS streams

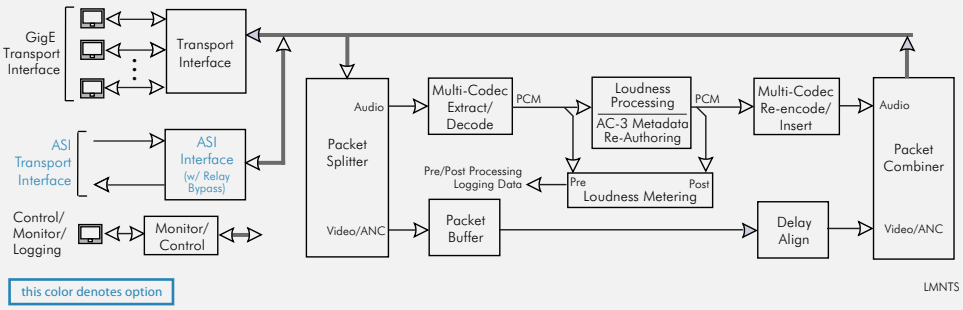
ASI option provides ASI transport stream processing

Fully scalable solution using licensing to support desired number of audio programs required

Integrated video/audio delay re-alignment compensates for any internal processing delays

Low delay latency (500 msec) Transparent processing maintains payload size and video/audio quality. No added re-compression or de-compression.

Three year warranty with extension options available



» 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

Interface
IP Transport: GigE (1000 Base-T) via RJ-45
ASI Transport (Optional; LMNTS-OPT-ASI-1X1): ASII/O, 75Ω BNCs with relay bypass

Capacity
LMNTS-500

Data throughput:	(3) GigE (1000 Base-T) RJ-45 Media Ports
Channel capacity:	(10) 5.1 HD channels, (20) 2.0 HD or SD channels
Processing latency delay:	500 msec

LMNTS-1000

Data throughput:	(5) GigE (1000 Base-T) RJ-45 Media Ports
Channel capacity:	(60) 5.1 HD channels, (100) 2.0 HDor SD channels
Processing latency delay:	500 msec

LMNTS-2000

Data throughput:	(5) GigE (1000 Base-T) RJ-45 Media Ports
Channel capacity:	(100) 5.1 HD channels, (140) 2.0 HD or SD channels
Processing latency delay:	500 msec

Note: Channel capacities above are maximum capacities. Practical capacity is a function of licenses added.

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™ (E-AC-3), MPEG 1 Layer 2, AAC
Video Codecs:	Supports all video codecs; video passed without alteration

Control/Monitoring
HTML5 web browser via dedicated 10/100/1000 Ethernet port

» ORDERING INFORMATION

LMNTS-500 Transport Stream Loudness Processor, 1RU, (10) 5.1-channel capacity, (20) 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.

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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9932-EMDE » 3G/HD/SD-SDI 16-CHANNEL EMBEDDER / DE-EMBEDDER

with Audio/Video Processing and CVBS I/O

The all-new Cobalt® 9932-EMDE 3G/HD/SD-SDI 16-Channel Embedder / De-Embedder with Audio/Video Processing and CVBS I/O provides a full-feature embedder/de-embedder with up to 32 channels of simultaneous AES embedding/de-embedding. The 9932-EMDE is available with numerous options that expand its function well beyond embed/de-embed to maximize frame processing density and system economy.

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. 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.

Multiple SDI input ports allow manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions. Quality Check option +QC allows failover to alternate inputs based on user-configurable criteria such as black/frozen frame or audio silence. Included standard is closed captioning absence/presence detection that allows CEA 608/708 and line 21 SD CC absence or presence to be detected.

Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted on the output video. The 9932-EMDE also provides analog CVBS video inputs and outputs, and analog audio embedding and de-embedding. With option +ANC, the 9932-EMDE offers full VANC/HANC ancillary data packet de-embedding and embedding for 3G/HD/SD-SDI streams.

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
- Auto-Changeover can be set to invoke failover for basic input loss. Quality Check option (+QC) provides failover on criteria such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.
- Advanced audio processing allows routing, gain, delay, and flexible mixing as standard features
- 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
- 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.
- 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
- Video options include color correction and keying
- 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.
- 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.
- Audio LTC I/O (+LTC)
- Add Frame Sync (+FS)
- 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.
- Extended Frame Sync Delay Option (+DLY) (Add-on to option +FS; requires option +FS)
- 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
- 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.

acapela

openGear

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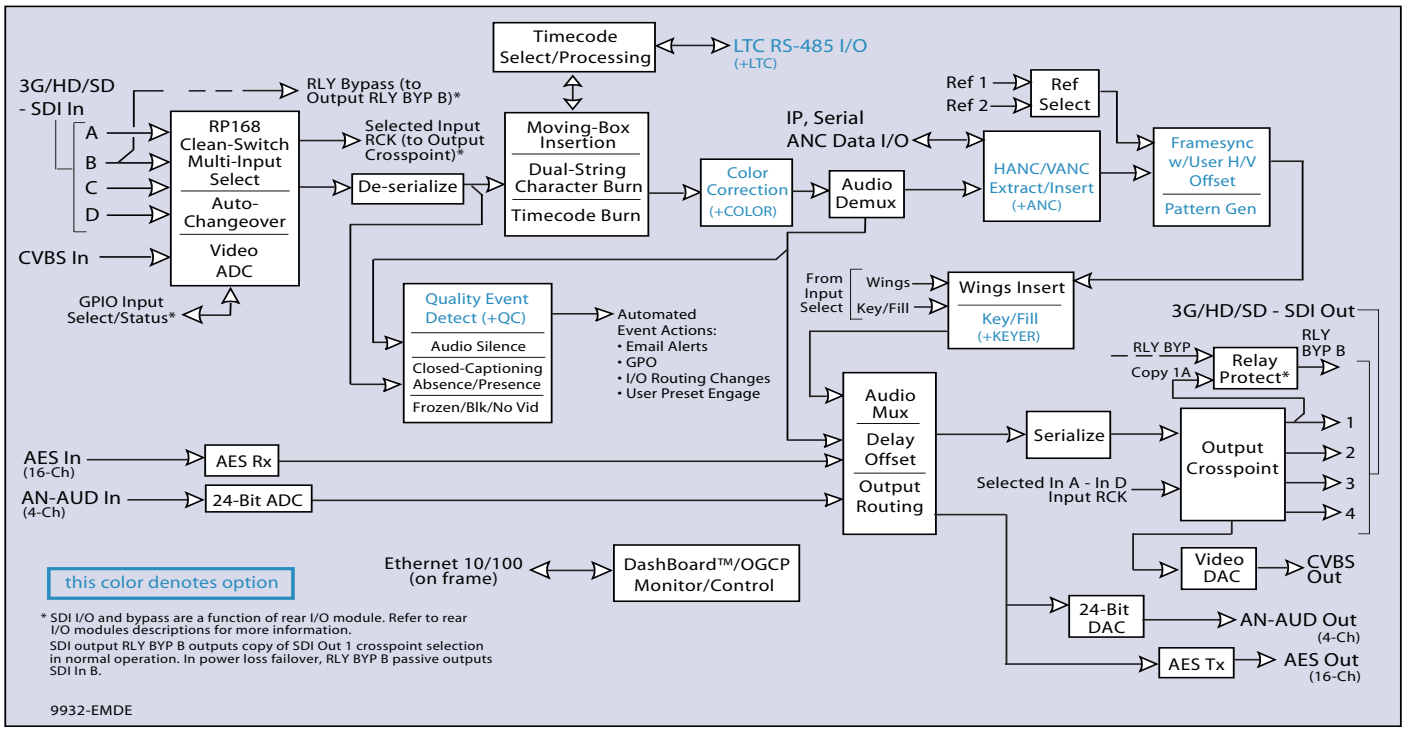
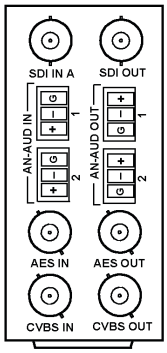
9932-EMDE » 3G/HD/SD-SDI 16-CHANNEL EMBEDDER / DE-EMBEDDER

with Audio/Video Processing and CVBS I/O





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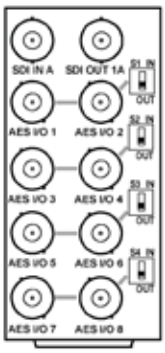

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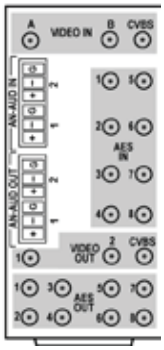

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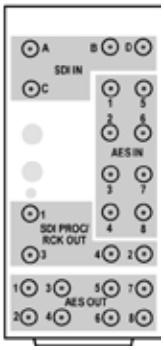
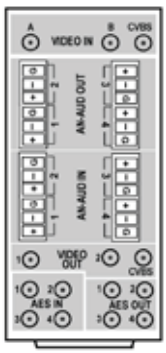


RM20-9932-E-DIN
RM20-9932-E-HDBNC



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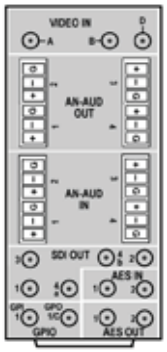
RM20-9932-G-HDBNC



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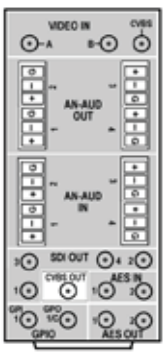

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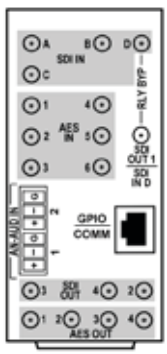
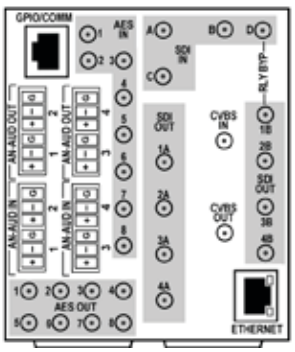
RM20-9932-J-HDBNC



RM20-9932-K-DIN
RM20-9932-K-HDBNC



RM20-9932-N-DIN
RM20-9932-N-HDBNC

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9932-EMDE » 3G/HD/SD-SDI 16-CHANNEL EMBEDDER / DE-EMBEDDER

with Audio/Video Processing and CVBS I/O

SPECIFICATIONS

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

Power

< 18 Watts

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 75Ωoutputs (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 (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

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.

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9932-EMDE » 3G/HD/SD-SDI 16-CHANNEL EMBEDDER / DE-EMBEDDER

with Audio/Video Processing and CVBS I/O

ORDERING INFORMATION

9932-EMDE 3G/HD/SD-SDI 16-Channel Embedder / De-Embedder with Audio/Video Processing and CVBS I/O

RM20-9932-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

RM20-9932-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

RM20-9932-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.)

RM20-9932-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.)

RM20-9932-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.)

RM20-9932-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.)

RM20-9932-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.)

RM20-9932-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.)

RM20-9932-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.)

RM20-9932-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.)

RM20-9932-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.)

RM20-9932-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.)

RM20-9932-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)

RM20-9932-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)

RM20-9932-N-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 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.)

RM20-9932-N-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 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.)

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer 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)

+FS Add Frame Sync Option

+DLY Extended Frame Sync Delay Option (add-on to option +FS; option +FS required)

+SCTE104 SCTE 104 Insertion Option

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9933-EMDE-ADDA » 3G/HD/SD-SDI 16-CHANNEL AES / 8-CHANNEL ANALOG AUDIO EMBEDDER / DE-EMBEDDER

The all-new 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.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

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.

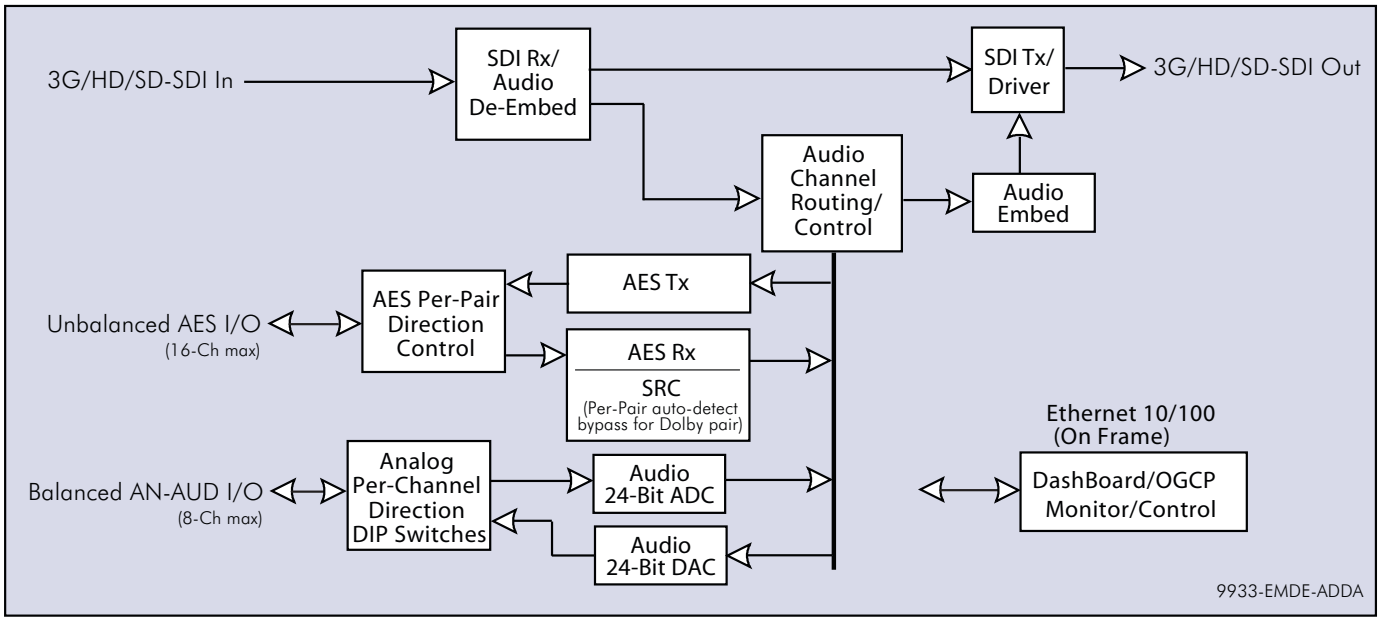
DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.

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

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)

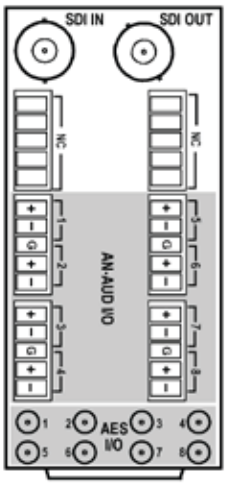
Discrete Audio Input/Output
(8) Unbalanced AES (AES-3id; 75Ω) with per-pair port direction controls
(8) Balanced Analog Audio with per-channel port direction switches

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)



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 all-new 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.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

FEATURES

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.

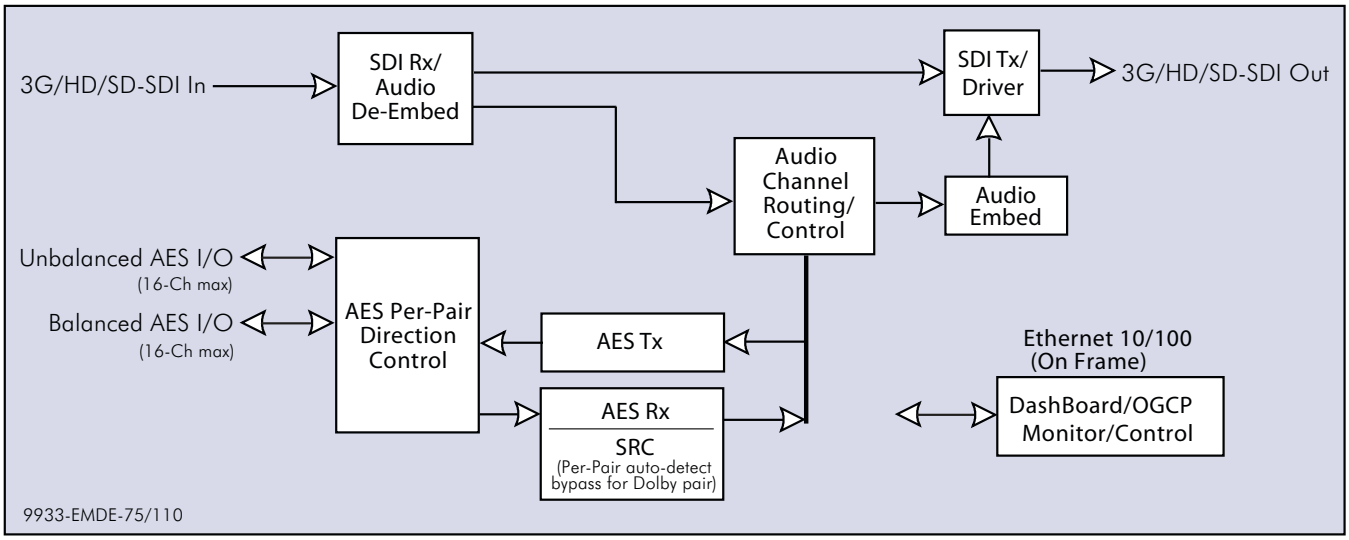
DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.

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

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.

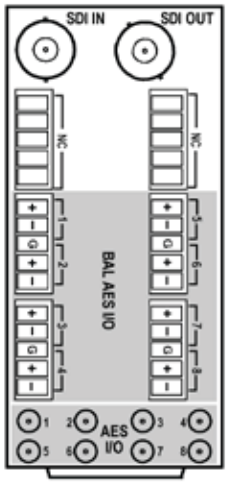
AES Audio Input/Output
(8) Unbalanced AES (AES-3id; 75Ω) with per-pair port direction controls
(8) Balanced AES (AES/EBU; 110Ω) with per-pair port direction controls

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)



RM20-9933EMDE-A-DIN
RM20-9933EMDE-A-HDBNC

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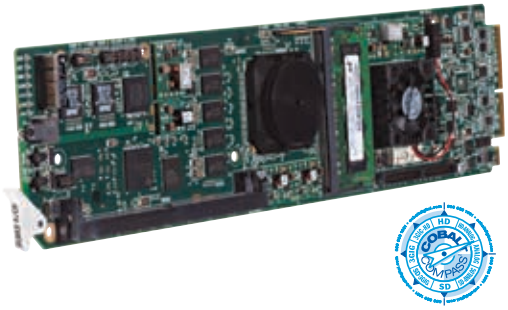
9371-EMDE » SDI – AES – MADI EMBEDDER/DE-EMBEDDER



The 9371 offers a comprehensive solution for digital audio transport conversion and embedding/de-embedding. A full unrestricted audio crosspoint provides channel routing between any channels on an SDI stream, discrete AES-3id, and AES-10 MADI interfaces.

The card MADI interface supports a 64-channel payload at the industry standard 48 kHz sampling rate, and can reliably receive from 1694A cable runs up to 250m, thereby allowing longer MADI cable runs without resorting to fiber cabling. All SDI embedding and SDI output timing is timed in common to a selected timing source. A convenient 2-channel analog confidence monitor output allows monitoring of any selected input or output. The line-level output pair directly interfaces with audio monitoring units or powered monitors.

Utilizing the openGear® open-architecture platform, the 9371 offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface. Full user remote monitor/control allows full card status and control access locally or across a standard Ethernet network.

DashBoard PPM meters for all input/output audio channels assist in rapidly locating and assessing content and line-up on any group of channels

Direct Monitor buttons provide direct routing of any channel pair to a confidence monitor analog audio output pair

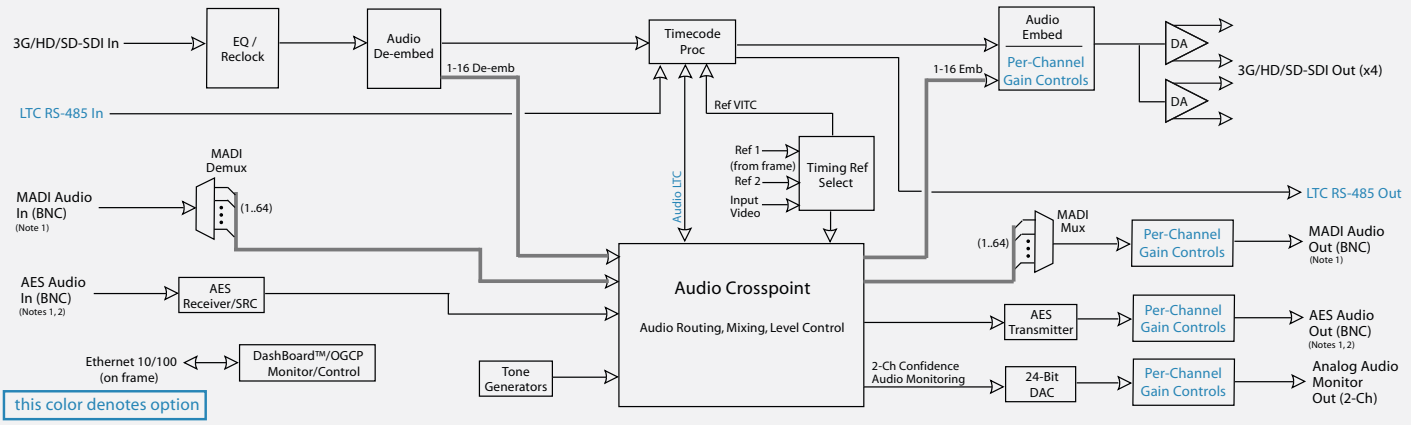
Alternate Base Models

9371-EM
SDI – AES – MADI Embedder

9371-DE
SDI – AES – MADI De-Embedder

» FEATURES

- Unrestricted de-embed/embed from multiple digital audio sources – embedded SDI audio, MADI, and discrete AES-3id (BNC) – all on the same card
- De-embed, route, channel swap, mix, and embed between SDI stream and discrete digital streams
- DashBoard PPM meters for all inputs and outputs helps in easily locating and assessing channel content and line-up
- Built-in flexible general-purpose mixing between any audio channels from any input to any card output
- Up to 250m 1694A MADI receive capability
- Built-in 2-channel analog audio confidence monitor outputs provide instant pushbutton routing of any input/output pair to playout monitors
- Built-in multi-frequency configurable tone generators
- Remote control/monitoring via DashBoard™ software
- Five-year warranty



Note 1: AES and MADI ports are input-only on 9371-EM card and output-only on 9371-DE card.
Note 2: AES channel capacity is determined by Rear I/O Module used

openGear DashBoard

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

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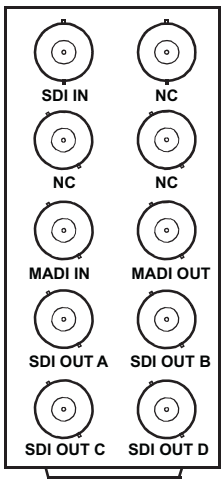
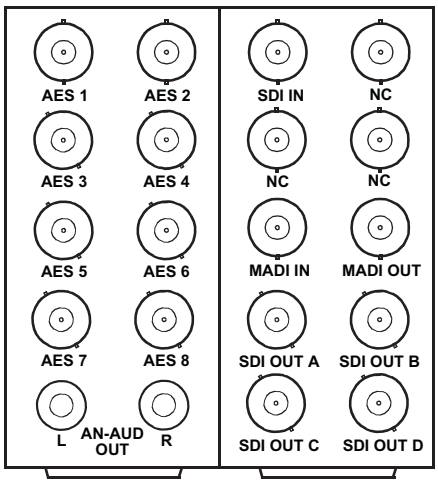
9371-EMDE » SDI – AES – MADI EMBEDDER/DE-EMBEDDER



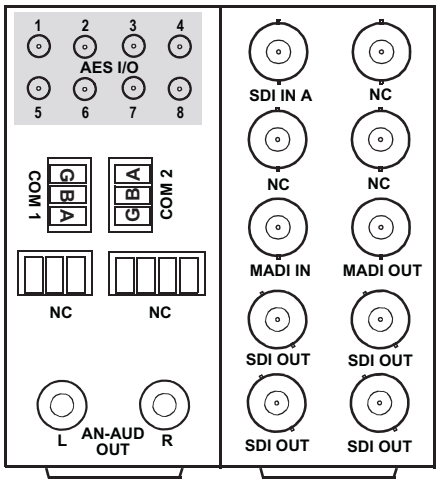
Note: MADI IN port only on 9371-EM card and MADI OUT port only on 9371-DE card.

RM20-9371-C



Note: AES ports are GUI-configurable as inputs or outputs on 9371-EMDE card. AES ports and MADI ports are input-only on 9371-EM card and output-only on 9371-DE card.

RM20-9371-E



Note: AES ports are GUI-configurable as inputs or outputs on 9371-EMDE card. AES ports and MADI ports are input-only on 9371-EM card and output-only on 9371-DE card.

RM20-9371-F

» ORDERING INFORMATION

9371-EMDE SDI - AES - MADI Embedder/De-Embedder

9371-EM SDI - AES - MADI Embedder

9371-DE SDI - AES - MADI De-Embedder

RM20-9371-C RM20-9371-C 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input, (4) 3G/HD/SD-SDI Outputs (x4 DA), (1) MADI BNC Input, (1) MADI BNC Output

RM20-9371-E 20-Slot Frame Rear I/O Module (Double Width) (1) 3G/HD/SD-SDI Input, (4) 3G/HD/SD-SDI Outputs (x4 DA), (8) AES I/O BNCs, (1) MADI BNC Input, (1) MADI BNC Output, (2) Stereo Unbalanced Analog Audio Outputs (RCA)

RM20-9371-F-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (1) 3G/HD/SD-SDI Input BNC, (4) 3G/HD/SD-SDI Output BNCs, (1) MADI Input BNC, (1) MADI Output BNC, (2) RS-485 LTC Inputs, (2) Analog Audio Out (unbalanced RCA), (8) AES I/O (AES connectors are HD-BNC)

RM20-9371-F-DIN 20-Slot Frame Rear I/O Module (Double Width) (1) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) MADI Input BNC, (1) MADI Output BNC, (2) RS-485 LTC Inputs, (2) Analog Audio Out (unbalanced RCA), (8) AES I/O (AES connectors are DIN 1.0/2.3)

+LTC LTC In/Out Option

+GAIN Output Gain Controls Option

» SPECIFICATIONS

Power
<20 Watts (maximum)

SDI Input/Output

Capacity:	1 In, 1 Out
Standards:	SMPTE 259M, SMPTE 292M, SMPTE 425 A and B
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
Timing Jitter:	3G/HD/SD: < 2.0/1.0/0.2 UI

Note: AES-3id and MADI should be synchronous with SDI stream to ensure clean audio cross-routing.

Timing Reference Input

Sources:	Selectable from frame-supplied external reference REF1 or REF2 or SDI video input. Timing source provides output PLL common timing
External Reference Signal:	SMPTE 170M/318M "Black Burst" SMPTE 274M/296M "Tri-Level"
Return Loss:	>35 dB up to 5.75 MHz

AES-3id Audio Input/Output

Capacity:	Up to 8 BNC ports (user selectable as input or output). Practical capacity determined by Rear I/O Module used.
Physical Interface:	BNC per AES3-id
Input Level:	0.2 to 2 Vp-p
Output Level:	1.0 Vp-p
Impedance:	75Ω
Return Loss:	>15 dB up to 6.144 MHz
Input SRC Range:	32 to 96 kHz
Input SRC Performance:	>130 dB THD+N

MADI (AES10-2003) Input/Output

Number of Inputs/Outputs:	1 BNC Input, 1 BNC Output
Supported Sample Rate:	48 kHz only
Input/Output Impedance:	75 Ω
Input Data Rates:	125 Mbps
Input Level:	0.15 – 0.6 Vp-p
Output Level:	0.3 – 0.6 Vp-p
Output Jitter:	0.1 UI

Analog Audio Confidence Monitor Output

Channel Complement:	L and R, user-assigned sources direct from any input channel or mixed channels comprising a 2-channel mix
Output Type:	2-channel unbalanced, consumer line-level

Note: Analog audio output available only in conjunction with Rear I/O Module equipped with analog audio outputs

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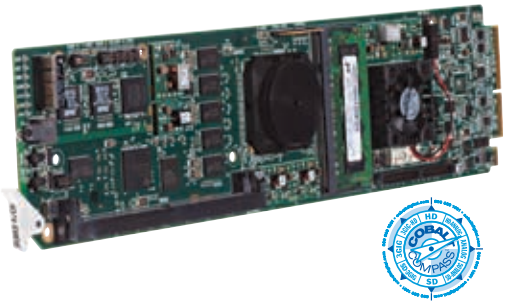
9372-EMDE » DUAL-STREAM SDI – AES – MADI EMBEDDER/DE-EMBEDDER



The 9372 offers a comprehensive solution for digital audio transport conversion and embedding/de-embedding. A full unrestricted audio crosspoint provides channel routing between any channels on up to two SDI streams, discrete AES-3id, and AES-10 MADI interfaces.

The card MADI interface supports a 64-channel payload at the industry standard 48 kHz sampling rate, and can reliably receive from 1694A cable runs up to 250m, thereby allowing longer MADI cable runs without resorting to fiber cabling. All SDI embedding and SDI output timing is timed in common to a selected timing source. A convenient 2-channel analog confidence monitor output allows monitoring of any selected input or output. The line-level output pair directly interfaces with audio monitoring units or powered monitors.

Utilizing the openGear® open-architecture platform, the 9372 offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface. Full user remote monitor/control allows full card status and control access locally or across a standard Ethernet network.

DashBoard PPM meters for all input/output audio channels assist in rapidly locating and assessing content and line-up on any group of channels

Direct Monitor buttons provide direct routing of any channel pair to a confidence monitor analog audio output pair

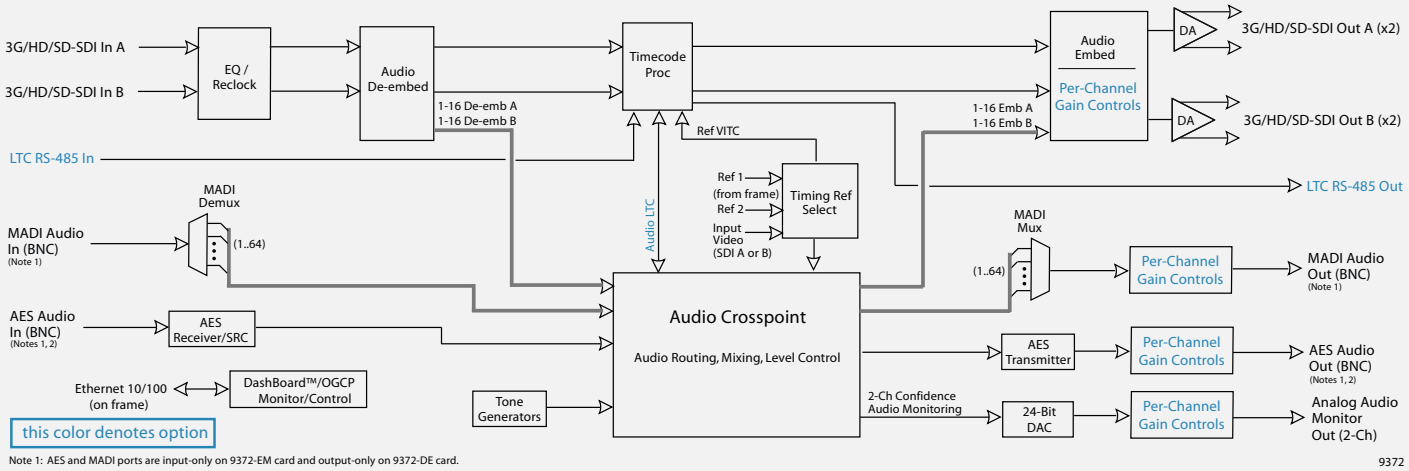
Alternate Base Models

9372-EM
Dual-Stream SDI – AES – MADI Embedder

9372-DE
Dual-Stream SDI – AES – MADI De-Embedder

» FEATURES

- Unrestricted de-embed/embed from multiple digital audio sources – embedded SDI audio, MADI, and discrete AES-3id (BNC) – all on the same card
- De-embed, route, channel swap, mix, and embed between up to two discrete SDI streams and discrete digital streams
- DashBoard PPM meters for all inputs and outputs helps in easily locating and assessing channel content and line-up
- Built-in flexible general-purpose mixing between any audio channels from any input to any card output
- Up to 250m 1694A MADI receive capability
- Built-in 2-channel analog audio confidence monitor outputs provide instant pushbutton routing of any input/output pair to playout monitors
- Built-in multi-frequency configurable tone generators
- Remote control/monitoring via DashBoard™ software
- Five-year warranty



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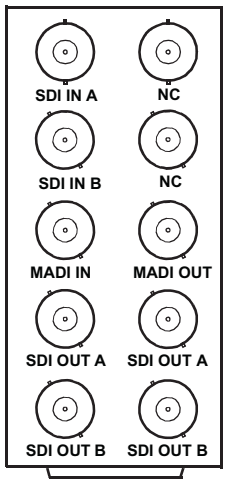
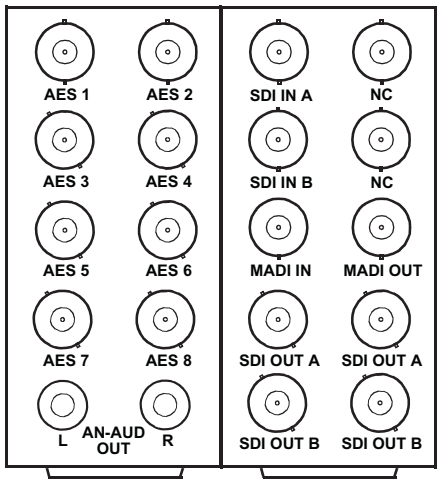
9372-EMDE » DUAL-STREAM SDI – AES – MADI EMBEDDER/DE-EMBEDDER



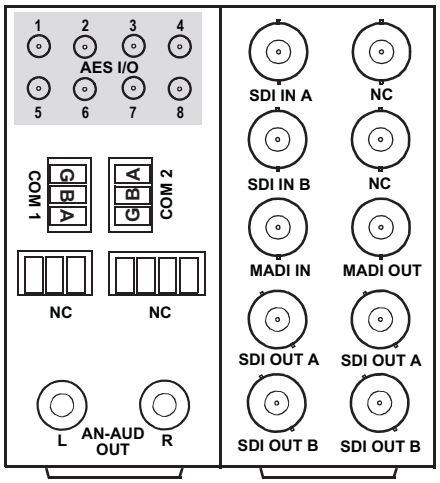
Note: MADI IN port only on 9372-EM card and MADI OUT port only on 9372-DE card.

RM20-9372-C



Note: AES ports are GUI-configurable as inputs or outputs on 9372-EMDE card. AES ports and MADI ports are input-only on 9372-EM card and output-only on 9372-DE card.

RM20-9372-E



Note: AES ports are GUI-configurable as inputs or outputs on 9372-EMDE card. AES ports and MADI ports are input-only on 9372-EM card and output-only on 9372-DE card.

RM20-9372-F

» ORDERING INFORMATION

9372-EMDE Dual-Stream SDI - AES - MADI Embedder/De-Embedder

9372-EM Dual-Stream SDI - AES - MADI Embedder

9372-DE Dual-Stream SDI - AES - MADI De-Embedder

RM20-9372-C 20-Slot Frame Rear I/O Module (Standard Width) SDI A/B 3G/HD/SD-SDI Inputs, (2) SDI A 3G/HD/SD-SDI Outputs, (2) SDI B 3G/HD/SD-SDI Outputs, (1) MADI BNC Input, (1) MADI BNC Output

RM20-9372-E 20-Slot Frame Rear I/O Module (Double Width) SDI A/B 3G/HD/SD-SDI Inputs, (2) SDI A 3G/HD/SD-SDI Outputs, (2) SDI B 3G/HD/SD-SDI Outputs, (8) AES I/O BNCs, (1) MADI BNC Input, (1) MADI BNC Output, (2) Stereo Unbalanced Analog Audio Outputs (RCA)

RM20-9372-F-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (2) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) MADI Input BNC, (1) MADI Output BNC, (2) RS-485 LTC Inputs, (2) Analog Audio Out (unbalanced RCA), (8) AES I/O (AES connectors are HD-BNC)

RM20-9372-F-DIN 20-Slot Frame Rear I/O Module (Double Width) (2) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) MADI Input BNC, (1) MADI Output BNC, (2) RS-485 LTC Inputs, (2) Analog Audio Out (unbalanced RCA), (8) AES I/O (AES connectors are DIN 1.0/2.3)

+LTC LTC In/Out Option

+GAIN Output Gain Controls Option

» SPECIFICATIONS

Power
<20 Watts (maximum)

SDI Input/Output

Capacity:	2 In, 2 Out
Standards:	SMPTE 259M, SMPTE 292M, SMPTE 425 A and B
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
Timing Jitter:	3G/HD/SD: < 2.0/1.0/0.2 UI

Note: All inputs must be synchronous (e.g., all frame synced to same reference) to assure clean audio cross-routing between SDI streams. AES-3id and MADI should also be synchronous with selected SDI stream(s) to ensure clean audio cross-routing.

Timing Reference Input

Sources:	Selectable from frame-supplied external reference REF1 or REF2 or any of two SDI video inputs. Timing source provides output PLL common timing
External Reference Signal:	SMPTE 170M/318M "Black Burst" SMPTE 274M/296M "Tri-Level"
Return Loss:	>35 dB up to 5.75 MHz

AES-3id Audio Input/Output

Capacity:	Up to 8 BNC ports (user selectable as input or output). Practical capacity determined by Rear I/O Module used.
Physical Interface:	BNC per AES3-id
Input Level:	0.2 to 2 Vp-p
Output Level:	1.0 Vp-p
Impedance:	75Ω
Return Loss:	>15 dB up to 6.144 MHz
Input SRC Range:	32 to 96 kHz
Input SRC Performance:	>130 dB THD+N

MADI (AES10-2003) Input/Output

Number of Inputs/Outputs:	1 BNC Input, 1 BNC Output
Supported Sample Rate:	48 kHz only
Input/Output Impedance:	75 Ω
Input Data Rates:	125 Mbps
Input Level:	0.15 – 0.6 Vp-p
Output Level:	0.3 – 0.6 Vp-p
Output Jitter:	0.1 UI

Analog Audio Confidence Monitor Output

Channel Complement:	L and R, user-assigned sources direct from any input channel or mixed channels comprising a 2-channel mix
Output Type:	2-channel unbalanced, consumer line-level

Note: Analog audio output available only in conjunction with Rear I/O Module equipped with analog audio outputs

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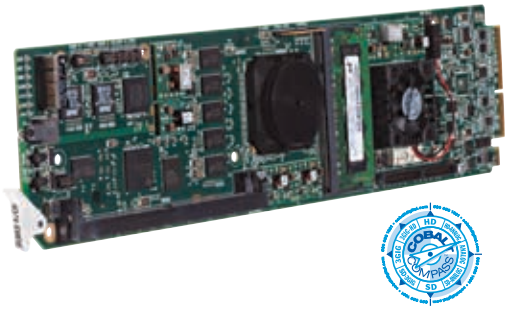
9374-EMDE » QUAD-STREAM SDI – AES – MADI EMBEDDER/DE-EMBEDDER



The 9374 offers our most comprehensive solution for digital audio transport conversion and embedding/de-embedding. A full unrestricted audio crosspoint provides channel routing between any channels on up to four SDI streams, discrete AES-3id, and AES-10 MADI interfaces.

The card MADI interface supports a 64-channel payload at the industry standard 48 kHz sampling rate, and can reliably receive from 1694A cable runs up to 250m, thereby allowing longer MADI cable runs without resorting to fiber cabling. All SDI embedding and SDI output timing is timed in common to a selected timing source. A convenient 2-channel analog confidence monitor output allows monitoring of any selected input or output. The line-level output pair directly interfaces with audio monitoring units or powered monitors.

Utilizing the openGear® open-architecture platform, the 9374 offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface. Full user remote monitor/control allows full card status and control access locally or across a standard Ethernet network.

DashBoard PPM meters for all input/output audio channels assist in rapidly locating and assessing content and line-up on any group of channels

Direct Monitor buttons provide direct routing of any channel pair to a confidence monitor analog audio output pair

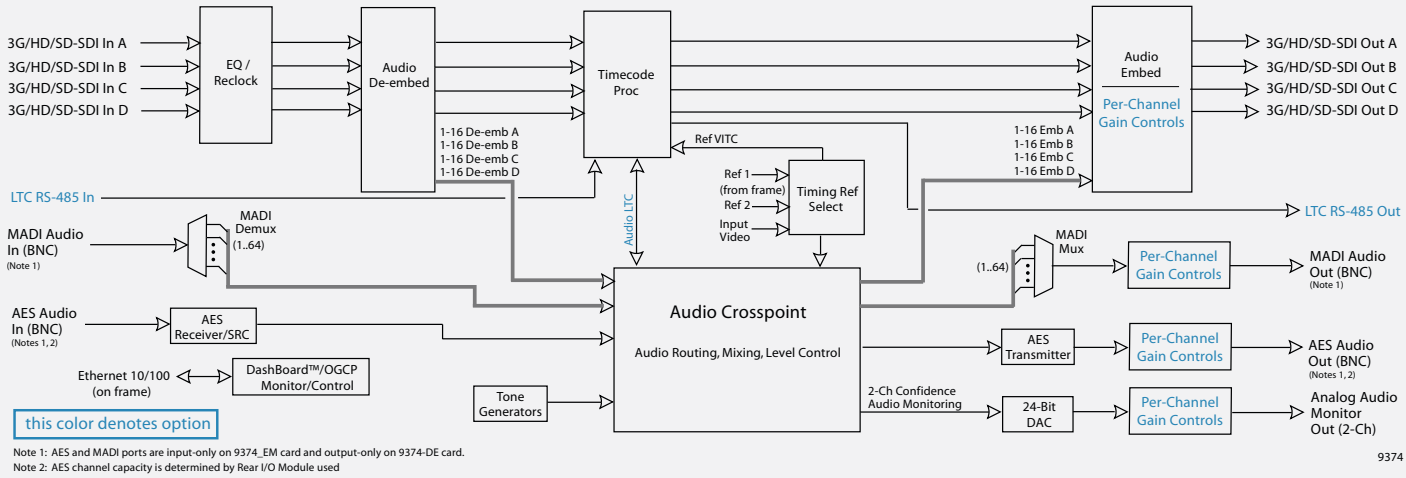
Alternate Base Models

9374-EM
Quad-Stream SDI – AES – MADI Embedder

9374-DE
Quad-Stream SDI – AES – MADI De-Embedder

» FEATURES

- Unrestricted de-embed/embed from multiple digital audio sources – embedded SDI audio, MADI, and discrete AES-3id (BNC) – all on the same card
- De-embed, route, channel swap, mix, and embed between up to four discrete SDI streams and discrete digital streams
- DashBoard PPM meters for all inputs and outputs helps in easily locating and assessing channel content and line-up
- Built-in flexible general-purpose mixing between any audio channels from any input to any card output
- Up to 250m 1694A MADI receive capability
- Built-in 2-channel analog audio confidence monitor outputs provide instant pushbutton routing of any input/output pair to playout monitors
- Built-in multi-frequency configurable tone generators
- Remote control/monitoring via DashBoard™ software
- Five-year warranty



Note 1: AES and MADI ports are input-only on 9374_EM card and output-only on 9374-DE card.
Note 2: AES channel capacity is determined by Rear I/O Module used

openGear DashBoard

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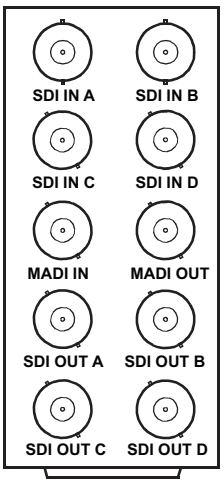
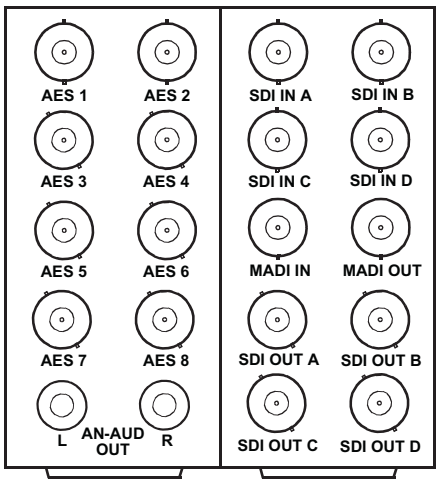
9374-EMDE » QUAD-STREAM SDI – AES – MADI EMBEDDER/DE-EMBEDDER



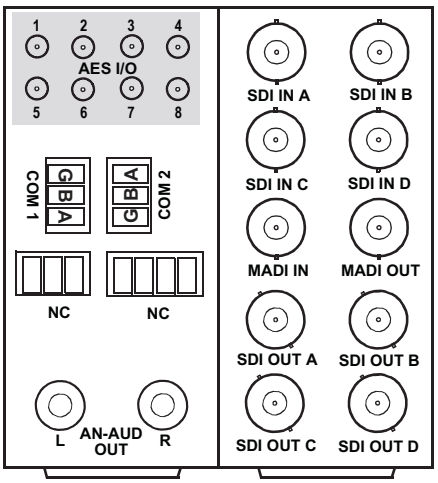
Note: MADI IN port only on 9374-EM card and MADI OUT port only on 9374-DE card.

RM20-9374-C



Note: AES ports are GUI-configurable as inputs or outputs on 9374-EMDE card. AES ports and MADI ports are input-only on 9374-EM card and output-only on 9374-DE card.

RM20-9374-E



Note: AES ports are GUI-configurable as inputs or outputs on 9374-EMDE card. AES ports and MADI ports are input-only on 9374-EM card and output-only on 9374-DE card.

RM20-9374-F-DIN-HDBNC

» ORDERING INFORMATION

9374-EMDE Quad-Stream SDI - AES - MADI Embedder/ De-Embedder

9374-EM Quad-Stream SDI - AES - MADI Embedder

9374-DE Quad-Stream SDI - AES - MADI De-Embedder

RM20-9374-C 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs, (1) MADI BNC Input, (1) MADI BNC Output

RM20-9374-E 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES I/O BNCs, (1) MADI BNC Input, (1) MADI BNC Output, (2) Stereo Unbalanced Analog Audio Outputs (RCA)

RM20-9374-F-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) MADI Input BNC, (1) MADI Output BNC, (2) RS-485 LTC Inputs, (2) Analog Audio Out (unbalanced RCA), (8) AES I/O (AES connectors are HD-BNC)

RM20-9374-F-DIN 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs,(1) MADI Input BNC, (1) MADI Output BNC, (2) RS-485 LTC Inputs, (2) Analog Audio Out (unbalanced RCA), (8) AES I/O (AES connectors are DIN 1.0/2.3)

+LTC LTC In/Out Option

+GAIN Output Gain Controls Option

» SPECIFICATIONS

Power
<20 Watts (maximum)

SDI Input/Output

Capacity:	4 In, 4 Out
Standards:	SMPTE 259M, SMPTE 292M, SMPTE 425 A and B
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
Timing Jitter:	3G/HD/SD: < 2.0/1.0/0.2 UI

Note: All inputs must be synchronous (e.g., all frame synced to same reference) to assure clean audio cross-routing between SDI streams. Multiple simultaneous formats are supported on a limited basis (e.g., HD on SDI Inputs A/B and SD on SDI Inputs C/D). AES-3id and MADI should also be synchronous with selected SDI stream(s) to ensure clean audio cross-routing.

Timing Reference Input

Sources:	Selectable from frame-supplied external reference REF1 or REF2 or any of four SDI video inputs. Timing source provides output PLL common timing
External Reference Signal:	SMPTE 170M/318M "Black Burst" SMPTE 274M/296M "Tri-Level"
Return Loss:	>35 dB up to 5.75 MHz

AES-3id Audio Input/Output

Capacity:	Up to 8 BNC ports (user selectable as input or output). Practical capacity determined by Rear I/O Module used.
Physical Interface:	BNC per AES3-id
Input Level:	0.2 to 2 Vp-p
Output Level:	1.0 Vp-p
Impedance:	75Ω
Return Loss:	>15 dB up to 6.144 MHz
Input SRC Range:	32 to 96 kHz
Input SRC Performance:	>130 dB THD+N

MADI (AES10-2003) Input/Output

Number of Inputs/Outputs:	1 BNC Input, 1 BNC Output
Supported Sample Rate:	48 kHz only
Input/Output Impedance:	75 Ω
Input Data Rates:	125 Mbps
Input Level:	0.15 – 0.6 Vp-p
Output Level:	0.3 – 0.6 Vp-p
Output Jitter:	0.1 UI

Analog Audio Confidence Monitor Output

Channel Complement:	L and R, user-assigned sources direct from any input channel or mixed channels comprising a 2-channel mix
Output Type:	2-channel unbalanced, consumer line-level

Note: Analog audio output available only in conjunction with Rear I/O Module equipped with analog audio outputs

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9931-EMDE » 3G/HD/SD-SDI EMBEDDER/DE-EMBEDDER

Alternate Base Models:

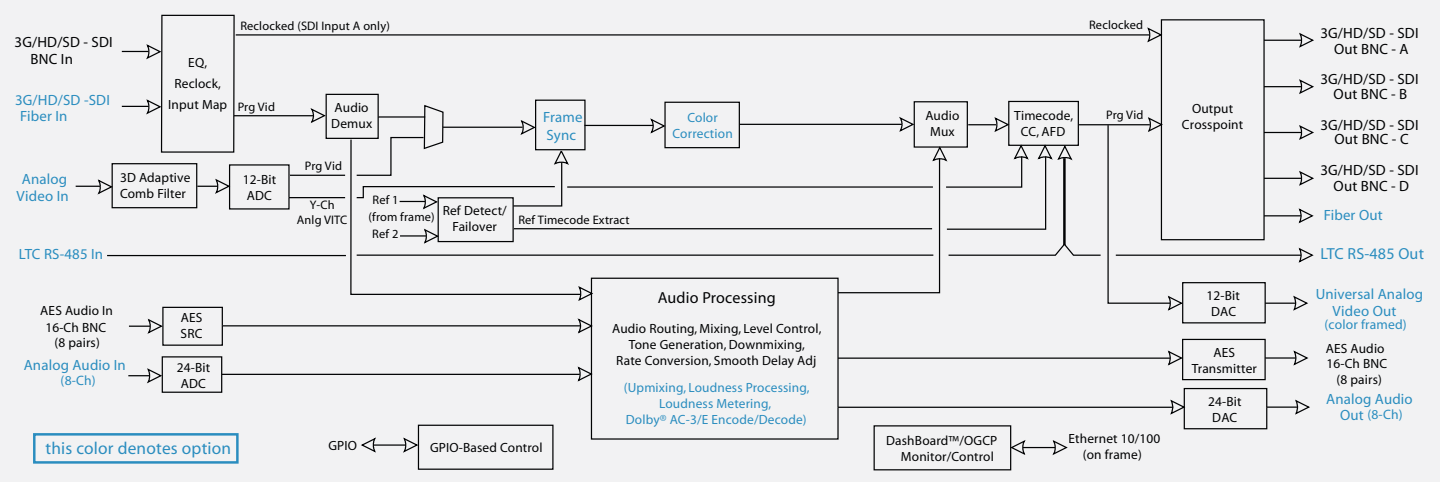
9931-EM
3G/HD/SD-SDI Embedder

9931-DE
3G/HD/SD-SDI De-Embedder

The award-winning 3G/HD/SD Fusion3G® 9931-EMDE card offers advanced audio support. Full audio support includes per-channel audio delay. Remote control is quick and easy with the free DashBoard™ remote control software or the Cobalt OGCP-9000 series remote control panels.

You can select from options to add (as inputs and/or outputs) fiber, analog video, and analog audio. Other options include color correction, Dolby® E/AC-3 encoding and decoding (with both decode and re-encode on the same card), ITU/ATSC/EBU compliant loudness metering, and Linear Acoustic® upmixing and loudness processing.

Where full embedding/de-embedding capability is not required, the 9931 card is available as the following base model versions (if desired later, any of these versions can be field upgraded to 9931-EMDE functionality using a firmware upgrade, without removing the card from its frame).



» STANDARD FEATURES

Full 3G/HD/SD-SDI support on BNC coax

Advanced audio processing allows routing, gain, delay, and flexible mixing.

GPIO ports with user-definable functions and an advanced data logging feature provide the utmost in system automation and monitoring

Full SMPTE timecode support with translation between formats. Timecode sources selectable from SDI and analog video inputs, reference, and internally generated.

Centralized GUI remote control using DashBoard™ software and Cobalt OGCP-9000 remote control panels – custom settings saved as presets can be recalled manually, or with GPI or events-based triggering

Five-year warranty

» OPTIONAL FEATURES

Fiber 3G/HD/SD inputs/outputs. Fiber ports use blind mating interface, allowing card swapping (including optical transceivers) with no cable disconnection.

Analog audio I/O support

LTC input/out and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O

AES embedding/de-embedding. AES ports are GUI selectable as input or output. Each input has independent sample rate converter.

Universal HD/SD analog I/O. Composite video input sources converted with 3D comb decoder, mitigating common decoding artifacts. Composite video output is color-framed to match reference burst, plus user offset.

Linear Acoustic® loudness processing and automatic upmixer technology

Full Dolby® E / AC-3 encoding and decoding options, including decode + re-encode and multiple AC-3 stream encoding on the same card.

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9931-EMDE » 3G/HD/SD-SDI EMBEDDER/DE-EMBEDDER

» I/O OPTIONS

LTC RS-485/AUDIO INPUT/OUTPUT (+LTC)
Provides LTC input/output and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O.

8-PORT AES OUTPUT EXPANSION (+AES16)
Provides the 16-channel embed/de-embed of option +AES (see above) as well as eight added AES output ports to provide a total complement of AES I/O 1 thru AES I/O 8 and added ports AES OUT 1 thru AES OUT 8. Allows 16 channels of AES embedding and 16 channels of AES de-embedding simultaneously. (Option is not available as a field upgrade and also requires Rear I/O Module RM20-9931-G.)

*FIBER INPUTS/OUTPUTS (+FRX / +FTX / +FRXTX / +FRXRX / +FTXTX)**
Provides one or two fiber connections per card. Inputs can serve any function in the product, outputs can be assigned from any function in the card. Connector type is dual LC with blind-mate connectors cards fully swappable.

*UNIVERSAL ANALOG VIDEO INPUTS/OUTPUTS (+ANV)**
Provides an analog video input and output (CVBS, component, RGB (sync on green))

*ANALOG AUDIO INPUTS/OUTPUTS (+ANA)**
Provides up to eight channels (total) of balanced analog audio inputs and outputs

*Requires expansion Rear Module (for example, 9931-EMDE+ANV requires RM20-9931-XB expansion Rear Module)

» VIDEO OPTIONS

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 (+FS)
Adds frame sync to card. Offers unsurpassed accuracy in audio-video delay (lip sync) management, with glitch-free per-channel audio delay adjustment.

DOLBY® DESCRIPTIVE VIDEO SERVICES® ENCODING (+ENCDVS)
Provides DVS encoding of secondary narrative audio on cards equipped with Dolby® Digital/Digital Plus™ encoding. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 78) for more information

FRAME BUFFER EXPANSION (+MEM)
Increases the independently adjustable audio and video delay buffer capacity to 47 seconds for SD video, 8 seconds for HD video, or 4 seconds for 3G video. (+MEM is a hardware-based option and is not available as a field upgrade. This option is displayed as "+2GB" on the DashBoard card info pane.).

» AUDIO OPTIONS

*LINEAR ACOUSTIC® LOUDNESS PROCESSING (+LP51/+LP20)**
Featuring Linear Acoustic® AEROMAX® technology and available in 5.1-channel (LP51) and stereo (LP20) configurations. These loudness processors use inputs from any source received by the card, or any mixing setting produced by the card. AEROMAX® algorithms use a sophisticated multi-band approach to loudness processing, and can apply multi-faceted loudness correction specifically targeted to various frequency ranges and other characteristics within the program material, resulting in audio free from abrupt loudness
or image shifts while preserving more of the original content than previously possible.

Up to two 5.1 loudness processors can be ordered per card, order as +LP51A and +LP51B. Up to four stereo loudness processors can be ordered per card, order as +LP20A, +LP20B, +LP20C and +LP20D.

*LINEAR ACOUSTIC® AUTOMATIC UPMIXER (+UM)**
Featuring Linear Acoustic® UPMAX™ technology, upmixing allows legacy stereo program content to be converted to full 5.1-channel audio. UPMAX™ mode detects 2.0 content and automatically applies upmix mode (with configurable switchover fade-in/fade-out) depending on absence or presence of 5.1 source audio.

Up to two upmixers may be configured on the card, order as +UMA and +UMB.

SOFTWARE LOUDNESS METER (+LM-C)
Cobalt's +LM audio loudness metering option (in conjunction with a Cobalt OGCP-9000 Remote Control Panel with +LM-P option) provides a flexible solution for ingest or on-air loudness metering and assessment in compliance with ITU/ATSC/EBU standards. Easy to use, the +LM offers "true peak" level detection, error tracking and logging, and intuitive interface with touch screen control.

AUDIO FAILOVER (+AFO)
Provides automatic failover to alternate ("secondary") channels to substitute for the primary channels in the event of audio signal loss.

AUTO DOWNMIX (+ADM)
Provides automatic Stereo downmix from selected alternate multi-channel sources if primary Stereo channels lose signal.

DOLBY® DIGITAL/DIGITAL PLUS™ ENCODING (+ENCD)
Provides Dolby® Digital/Digital Plus™ encoding from any combination of audio sources supported by the card. Up to four independent encoders - all on the same card - can be included (+ENCDA thru +ENCDD). This option is available on the same card along with any other Dolby options listed here. See Dolby Options (page 78) for more information.

DOLBY® E/DIGITAL/DIGITAL PLUS™ DECODING (+DEC)
Decodes Dolby® E, Digital, and Digital Plus™ signals from AES or embedded sources. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 78) for more information.

DOLBY® E ENCODING (+ENCE)
Provides Dolby® E encoding from any combination of audio sources supported by the card. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 78) for more information.

DOLBY® DESCRIPTIVE VIDEO SERVICES® ENCODING (+ENCDVS)
Provides DVS encoding of secondary narrative audio on cards equipped with Dolby® Digital/Digital Plus™ encoding. This option is available on the same card along with any other Dolby options listed here. See Dolby Options (page 78) for more information.

*The following Processing/Upmixing combinations, and their subsets, are available. Contact sales for more information.

- Upmixer, 5.1 Processor, Aux Stereo Processor (+UMA, +LP51A, +LP20A)
- Two stereo processors, Two upmixers (+LP20A, +LP20B, +UMA, +UMB)
- Two 5.1 loudness processors (+LP51A, +LP51B)
- Four stereo loudness processors (+LP20A, +LP20B, +LP20C, +LP20D)

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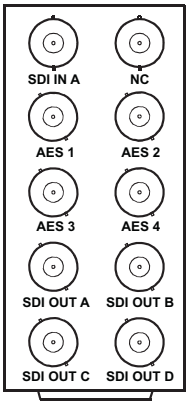
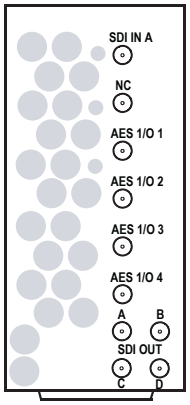
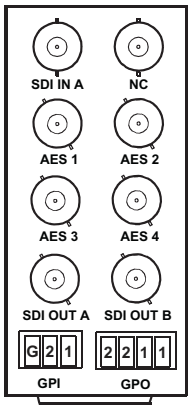
9931-EMDE » 3G/HD/SD-SDI EMBEDDER/DE-EMBEDDER



RM20-9931-B



RM20-9931-B-HV



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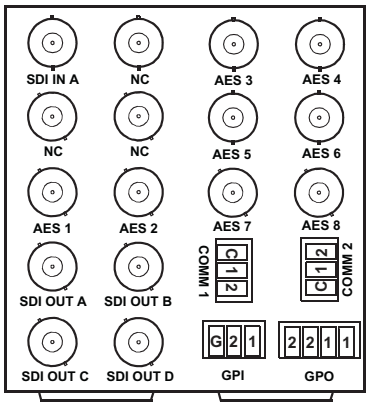
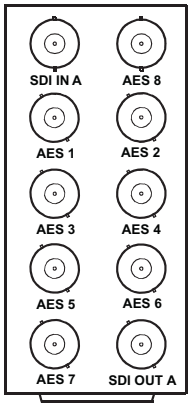
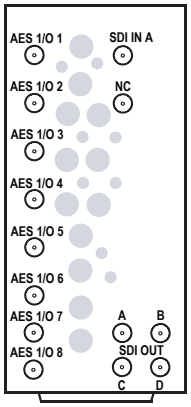


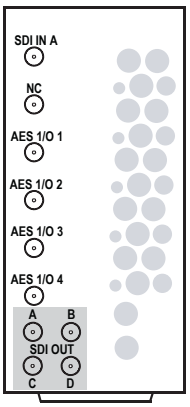
RM20-9931-E



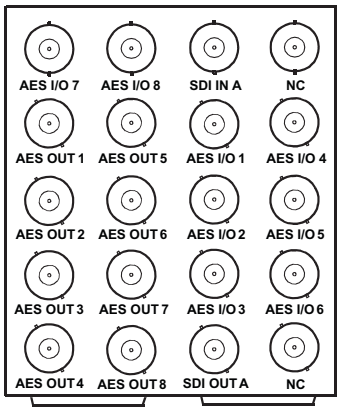
RM20-9931-F



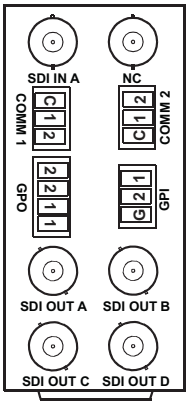
RM20-9931-F-HV



RM20-9931-F-HV2

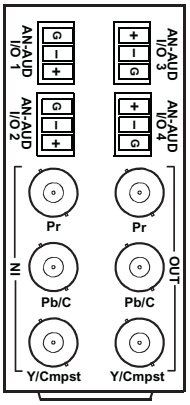


RM20-9931-G

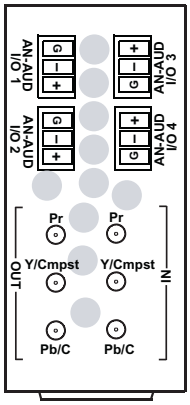


RM20-9931-H

EXPANSION REAR I/O MODULES

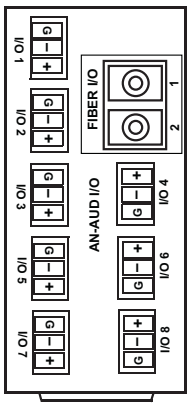


RM20-9931-XB

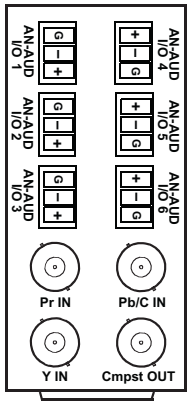


RM20-9931-XB-HV

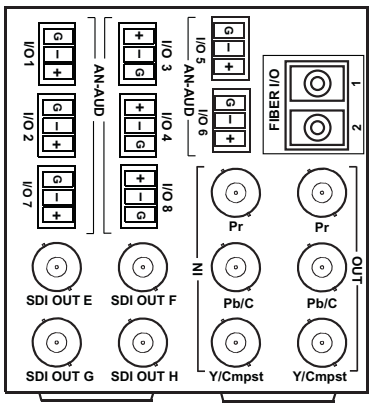
Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an "-X" in the part number and must be used used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 9)



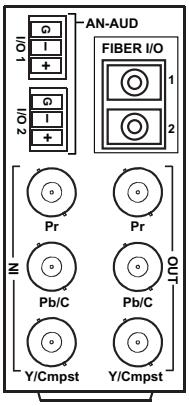
RM20-9931-XC



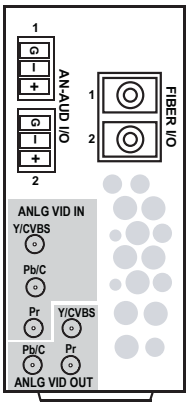
RM20-9931-XD



RM20-9931-XE



RM20-9931-XF



RM20-9931-XF-HV

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9931-EMDE » 3G/HD/SD-SDI EMBEDDER/DE-EMBEDDER

» ORDERING INFORMATION

9931-EMDE 3G/HD/SD-SDI Embedder/De-Embedder

9931-DE 3G/HD/SD-SDI De-Embedder

9931-EM 3G/HD/SD-SDI Embedder

BASE REAR I/O MODULES

Base Rear I/O Modules provide connections for standard card BNC video and audio connections, as well as other connections depending on rear module part number. These modules mate directly with the Fusion3G® card.

RM20-9931-B 20-Slot Frame Rear I/O Module (Standard Width) 1 3G/HD/SD-SDI Input, 4 AES I/O BNCs, 4 3G/HD/SD-SDI Outputs

RM20-9931-B-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 1 3G/HD/SD-SDI Input, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9931-B-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 1 3G/HD/SD-SDI Input, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9931-D 20-Slot Frame Rear I/O Module (Standard Width) 1 3G/HD/SD-SDI Input, 4 AES I/O BNCs, 2 GPIO, 2 3G/HD/SD-SDI Outputs

RM20-9931-E 20-Slot Frame Rear I/O Module (Double Width) 1 3G/HD/SD-SDI Input, 8 AES I/O BNCs, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI Outputs

RM20-9931-F 20-Slot Frame Rear I/O Module (Standard Width) 1 3G/HD/SD-SDI Input, 8 AES I/O BNCs, 1 3G/HD/SD-SDI Output

RM20-9931-F-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 1 3G/HD/SD-SDI Input, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9931-F-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 1 3G/HD/SD-SDI Input, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9931-F-HV2-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors DIN 1.0.2.3)

RM20-9931-F-HV2-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors HD-BNC)

RM20-9931-G 20-Slot Frame Rear I/O Module (Double Width) 3G/HD/SD-SDI Input, 8 AES I/O BNCs, 8 additional AES Outputs, 3G/HD/SD-SDI Output (Available only in conjunction with card option +AES16)

RM20-9931-H 20-Slot Frame Rear I/O Module (Standard Width) 1 3G/HD/SD-SDI BNC Input, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI BNC Outputs

EXPANSION REAR I/O MODULES

Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an "-X" in the part number and must be used used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 9)

RM20-9931-XB 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9931-XB-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9931-XB-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9931-XC 20-Slot Frame Rear I/O Module (Standard Width) 2 Fiber I/O, 8 Analog Audio I/O

RM20-9931-XD 20-Slot Frame Rear I/O Module (Standard Width) Component In, 6 Analog Audio I/O, Composite Out

RM20-9931-XE 20-Slot Frame Rear I/O Module (Double Width) Component In, 2 Fiber I/O, 8 Analog Audio I/O, Component Out, 4 3G/HD/SD-SDI Outputs

RM20-9931-XF 20-Slot Frame Rear I/O Module (Standard Width) Component In, 2 Fiber I/O, 2 Analog Audio I/O, Component Out

RM20-9931-XF-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are DIN1.0/2.3) This Rear I/O Module must be used with an HV Base Rear I/O Module.

RM20-9931-XF-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are HD-BNC) This Rear I/O Module must be used with an HV Base Rear I/O Module.

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BBG-1032-EMDE » 3G/HD/SD-SDI STANDALONE 16-CHANNEL EMBEDDER / DE-EMBEDDER

with Audio/Video Processing and CVBS I/O

The all-new Cobalt® BBG-1032-EMDE 3G/HD/SD-SDI Standalone16-Channel Embedder / De-Embedder with Audio/Video Processing and CVBS I/O provides a full-feature embedder/de-embedder with up to 16 channels of simultaneous AES embedding/de-embedding. The BBG-1032-EMDE is available with numerous options that expand its function well beyond embed/de-embed to maximize processing density and system economy.

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.

Multiple SDI input ports allow manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions. Quality Check option +QC allows failover to alternate inputs based on user-configurable criteria such as black/frozen frame or audio silence. Included standard is closed captioning absence/presence detection that allows CEA 608/708 and line 21 SD CC absence or presence to be detected.

The BBG-1032-EMDE also provides analog CVBS video inputs and outputs, and analog audio embedding and de-embedding. 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.

With option +ANC, the BBG-1032-EMDE offers full VANC/HANC ancillary data packet de-embedding and embedding for 3G/HD/SD-SDI streams. 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-1032-EMDE uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control (can also 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-1032-EMDE 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

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 criteria such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.

Advanced audio processing allows routing, gain, 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

Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output 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

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

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.

Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID. Also controllable using DashBoard remote control.

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. 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.

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.

Audio LTC I/O (+LTC)

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

Add Frame Sync option (+FS)

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.

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.

acapela group

Acapela Text-To-Speech from Acapela Group™

html5 web UI remote control

DashBoard

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

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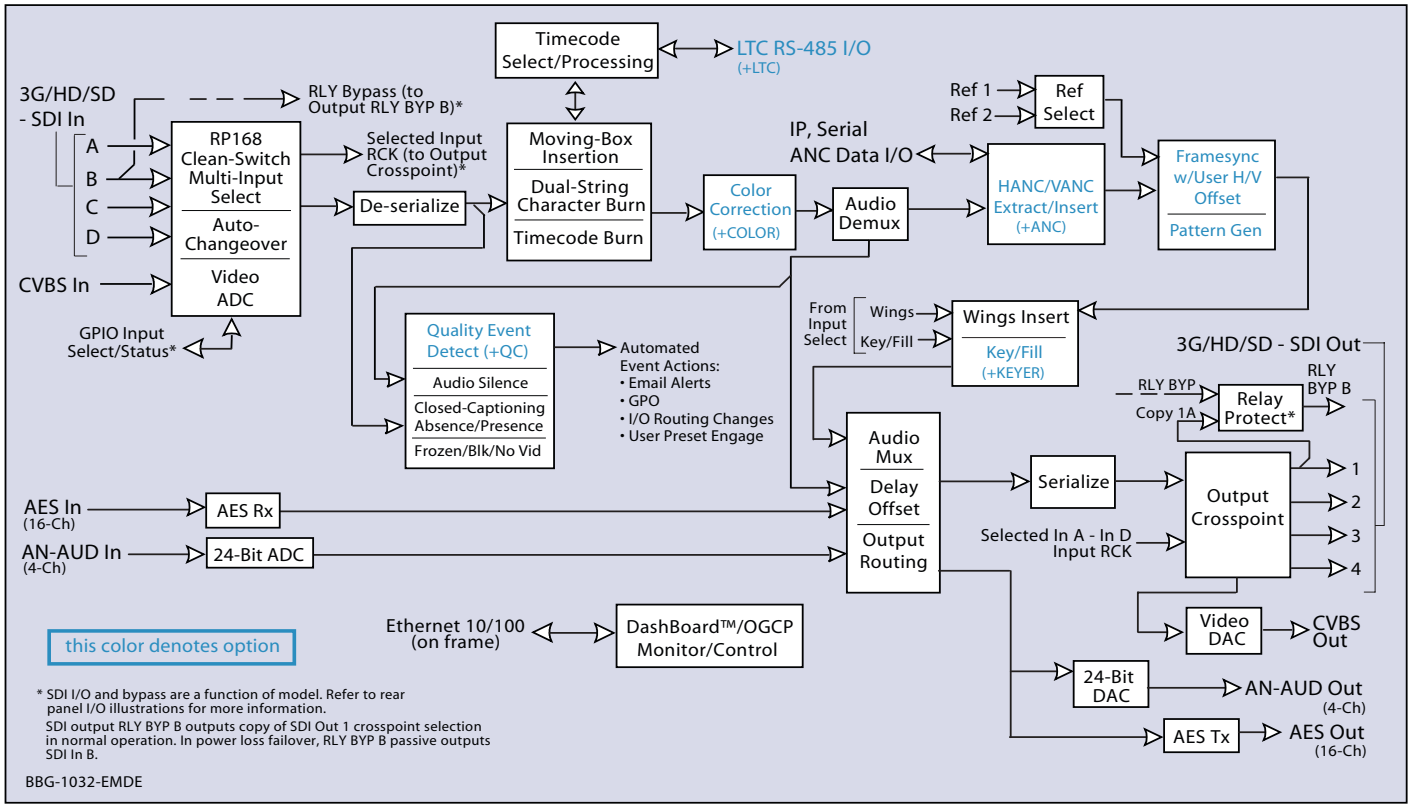
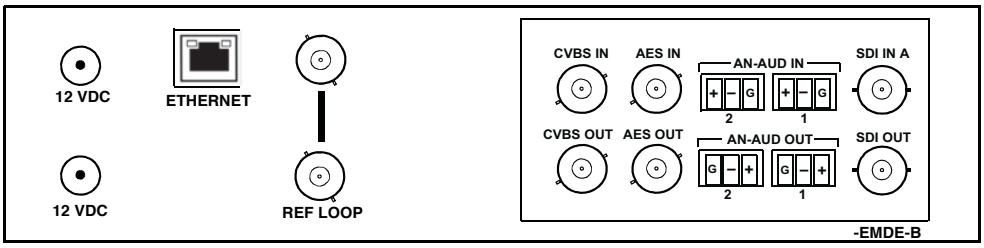
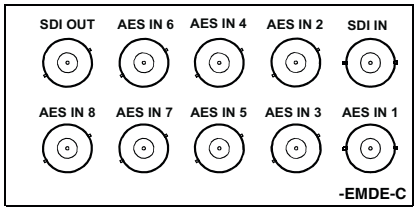
BBG-1032-EMDE » 3G/HD/SD-SDI STANDALONE 16-CHANNEL EMBEDDER / DE-EMBEDDER

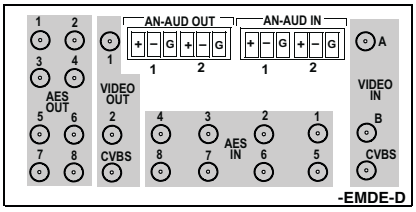
with Audio/Video Processing and CVBS I/O



Rear Panel







Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

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BBG-1032-EMDE » 3G/HD/SD-SDI STANDALONE 16-CHANNEL EMBEDDER / DE-EMBEDDER

with Audio/Video Processing 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:
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 Analog THD+N: -96 dB (20 Hz to 10 kHz)
Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

User Audio Delay Offset from Video

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

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

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.

Control/Monitor Interface

HTML5 web server/interface via rear-panel 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-1032-EMDE » 3G/HD/SD-SDI STANDALONE 16-CHANNEL EMBEDDER / DE-EMBEDDER

with Audio/Video Processing and CVBS I/O

ORDERING INFORMATION

BBG-1032-EMDE 3G/HD/SD-SDI Standalone 16-Channel Embedder / De-Embedder with Audio/Video Processing and CVBS I/O, available in the following rear-panel I/O configurations:

BBG-1032-EMDE-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-1032-EMDE-C 3G/HD/SD-SDI Modular 16-Pair (32-Channel) Embedder / De-Embedder with Audio/Video Processing and CVBS I/O. (1) 3G/HD/SD-SDI Input BNC, (8) AES Input BNCs, (1) 3G/HD/SD-SDI Output BNC

BBG-1032-EMDE-D-DIN 3G/HD/SD-SDI Modular 16-Pair (32-Channel) Embedder / De-Embedder with Audio/Video Processing and CVBS I/O. (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-1032-EMDE-D-HDBNC 3G/HD/SD-SDI Modular 16-Pair (32-Channel) Embedder / De-Embedder with Audio/Video Processing and CVBS I/O. (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.)

Options and Accessories:

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer Option

+LTC Audio LTC I/O Option

+QC Quality Check Option

+FS Add Frame Sync Option

+DLY Extended Frame Sync Delay Option (add-on to option +FS; option +FS required)

+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)

+SCTE104 SCTE 104 Insertion Option

BBG-1000-PS Redundant Power Supply Module

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

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ADVANCED AUDIO EMBED / DE-EMBED FUNCTIONS »

The models below offer advanced audio embed / de-embed functions in addition to other functions such as Frame Sync, Format Conversion, and Fiber I/O. Please see respective product pages for more information

OPENGEAR CARDS

9501-DCDA-3G Downconverter with 3G/HD/SD-SDI Input, SDI Reclocking, SD-SDI and Analog Video/Audio Outputs/AES Outputs 42

9502-DCDA-3G Downconverter with 3G/HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking 44

9902-UDX 3G/HD/SD-SDI Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed with Multi-Input Auto-Changeover 21

9903-UDX-ADDA 3G/HD/SD-SDI Universal Format Converter/Frame Sync with CVBS/ YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding 30

9922-FS 3G/HD/SD-SDI Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O . . . 50

9922-2FS 3G/HD/SD-SDI Dual-Channel Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/ De-Embedding and CVBS I/O 63

9433-EMDE-75/110-EOOE 3G/HD/SD-SDI Fiber-Optic Transceiver with 16-Channel Unbalanced/Balanced AES Embed / De-Embed 206

9433-EMDE-75/110-EO 3G/HD/SD-SDI Fiber-Optic EO Transmitter with 16-Channel Unbalanced/Balanced AES Embed / De-Embed 208

9433-EMDE-75/110-OE 3G/HD/SD-SDI Fiber-Optic OE Receiver with 16-Channel Unbalanced/Balanced AES Embed / De-Embed 210

9433-EMDE-ADDA-EOOE 3G/HD/SD-SDI Fiber-Optic Transceiver with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed 212

9433-EMDE-ADDA-EO 3G/HD/SD-SDI Fiber-Optic EO Transmitter with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed 214

9433-EMDE-ADDA-OE 3G/HD/SD-SDI Fiber-Optic OE Recceiver with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed 216

9901-UDX (-UC, -DC, -XC) 3G/HD/SD Up/Down/Cross Converter with Frame Sync 38

9921-FS 3G/HD/SD Frame Sync 59

BBG-1000 STANDALONE UNITS

BBG-1002-UDX 3G/HD/SD-SDI Standalone Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed with Multi-Input Auto-Changeover 26

BBG-1003-UDX-ADDA 3G/HD/SD-SDI Standalone Universal Format Converter/Frame Sync with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding 34

BBG-1022-FS 3G/HD/SD-SDI Standalone Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O 55

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 68

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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™ 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

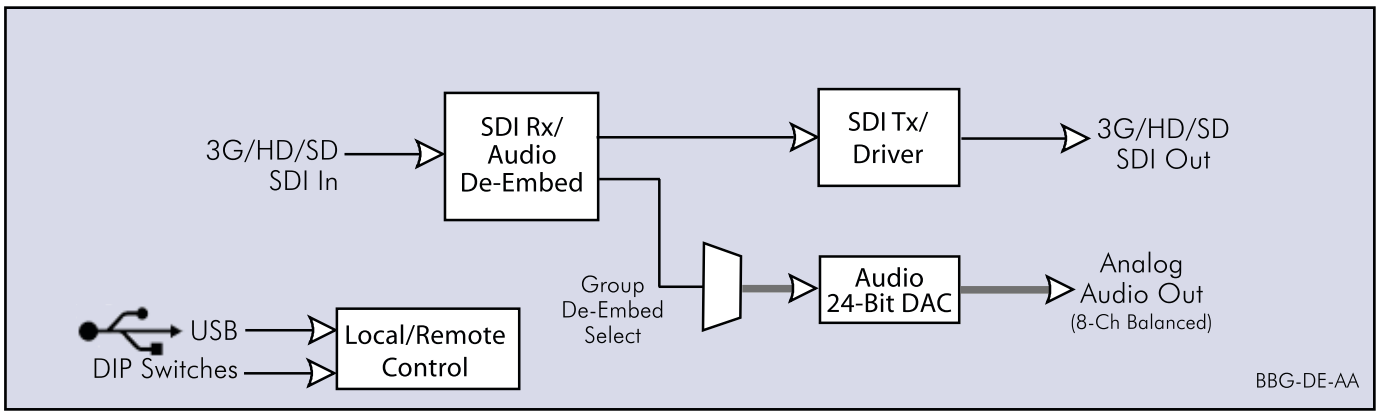
Eight balanced analog audio outputs with user-selectable direct de-embedding of groups 1 thru 4. DB-25 connector provides compact footprint. Balanced analog audio outputs can utilize direct connection to standard DB-25 connectors, or by using accessory DB-25/XLR breakout cable (available separately).

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 AES Analog Audio De-Embedder (includes PS4 Power Supply AC adapter)

BBG-CA-110-XLRM DB-25 Male-to-8 XLR Male Connector Breakout Cable

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

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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™ 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

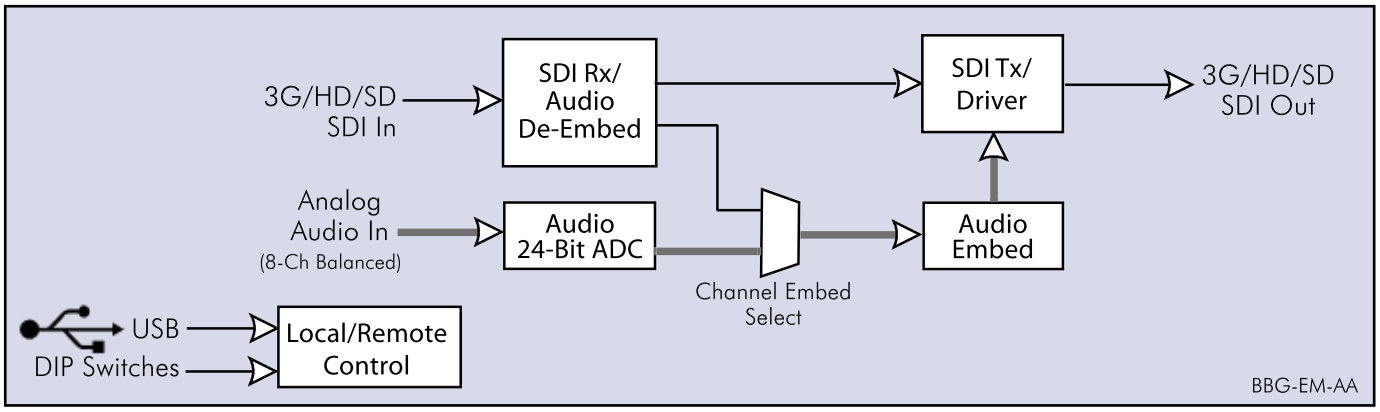
Eight balanced analog audio inputs with user-selectable direct embedding to groups 1 thru 4. DB-25 connector provides compact footprint. Balanced analog audio inputs can utilize direct connection to standard DB-25 connectors, or by using accessory DB-25/XLR breakout cable (available separately).

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

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

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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™ 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

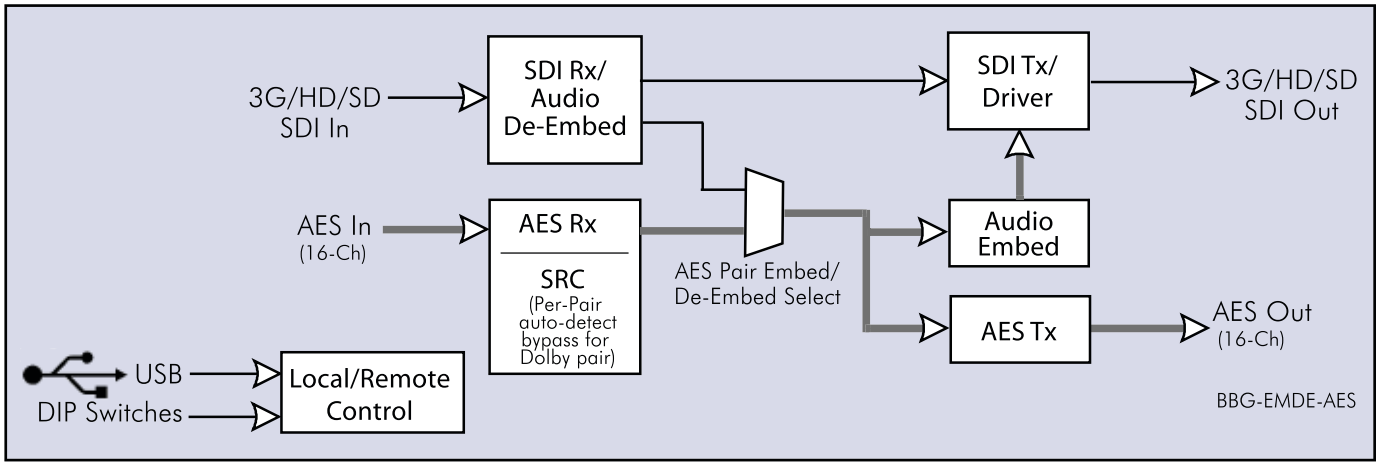
8-pair (16-channel) AES support. Individual per-pair embedding or de-embedding. Multi-pin AES I/O connector provides compact footprint. AES I/O can utilize direct connection to standard HD-15 connectors, or by using accessory BNC breakout cable (available separately).

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-BNCM HD-15 Male-to-8 BNC Male Connector Breakout Cable (for use with model BBG-EMDE-AES75)

Note: The USB GUI application available for BBG-EMDE-AES 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

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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™ 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

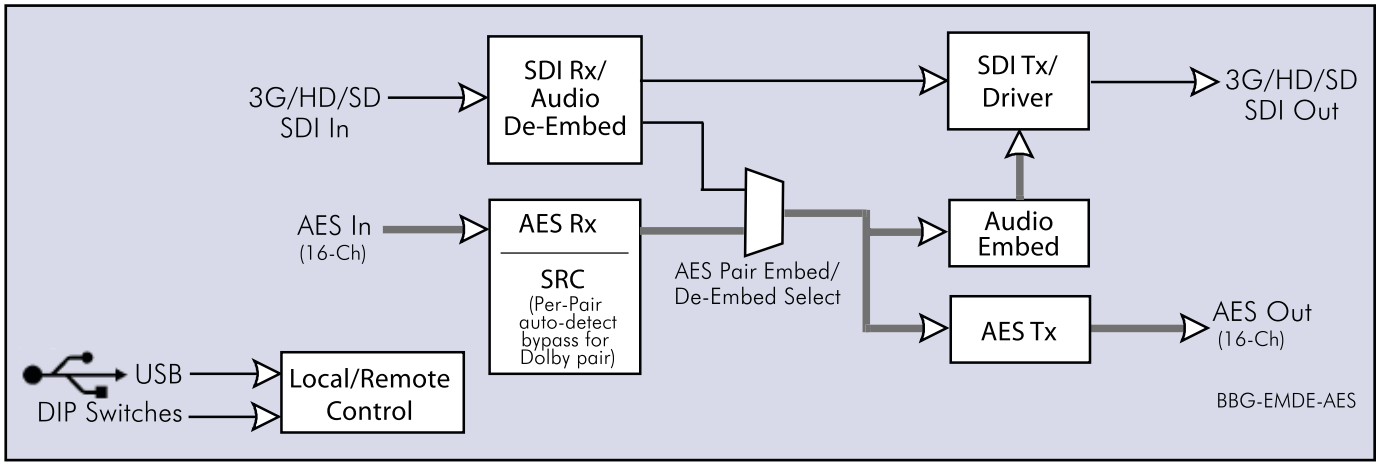
8-pair (16-channel) AES support. Individual per-pair embedding or de-embedding. Multi-pin AES I/O connector provides compact footprint. AES I/O can utilize direct connection to standard DB-25 connectors, or by using accessory XLR breakout cable (available separately).

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)

Note: The USB GUI application available for BBG-EMDE-AES 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

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AUDIO EMBED / DE-EMBED FUNCTIONS »

The models below offer audio embed / de-embed functions in addition to other functions such as media conversion (analog, SDI, HDMI, fiber). Please see respective product pages for more information

BlueBox Comact Throwdowns

BBG-A-TO-S HD/SD Analog Component/Composite-To-HD/SD-SDI with Audio Embedder 90

BBG-S-TO-A HD/SD-SDI-To-HD/SD Analog Component/Composite with Audio De-Embedder. 92

BBG-S-TO-H 3G/HD/SD-SDI-To-HDMI with Audio De-Embedder 246

BBG-H-TO-S HDMI-To-3G/HD/SD-SDI with Audio Embedder. 244

BBG-F-TO-H 3G/HD/SD-SDI Fiber Optic-To-HDMI Converter. 242

BBG-H-TO-F 3G/HD/SD HDMI-To-Fiber Optic Converter. 240

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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

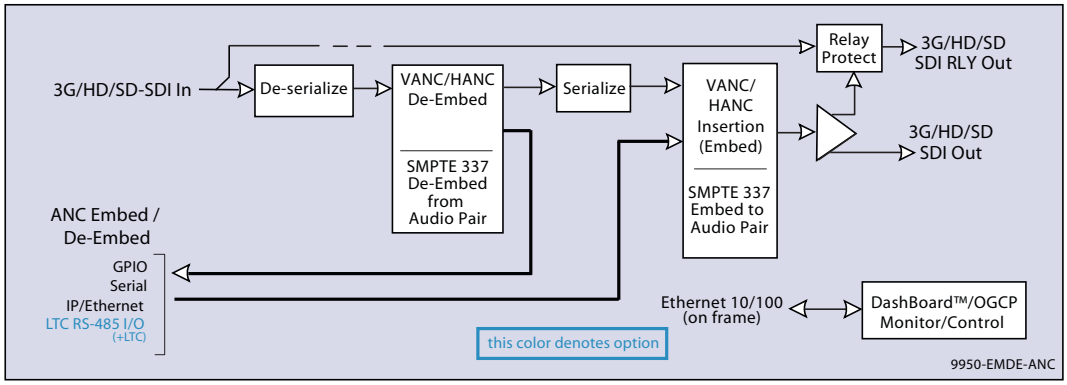
(Option +LTC) – Provides LTC embed to SDI from embedded audio or external RS-485 LTC sources. Also provides de-embed from SDI of timecode as embedded audio LTC or RS-485 LTC.

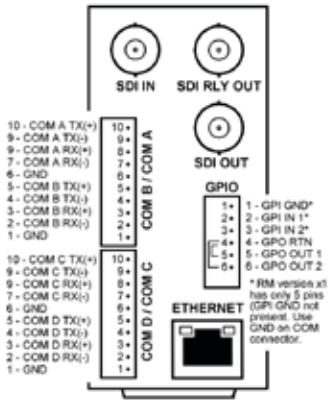
Latching relay protect SDI output provides input SDI bypass backup even in the event of power failure

openGear® card-based form factor provides easy, compact, and economical integration

DashBoard™ remote control status monitoring and setup/control

Five year warranty





RM20-9950-B

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

+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

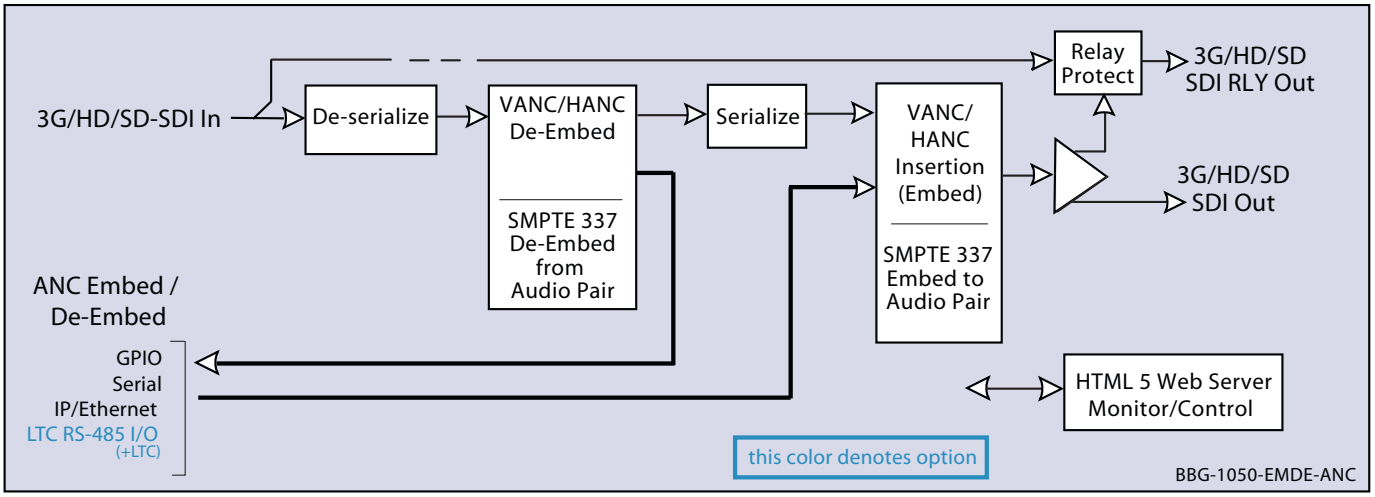
(Option +LTC) – Provides LTC embed to SDI from embedded audio or external RS-485 LTC sources. Also provides de-embed from SDI of timecode as embedded audio LTC or RS-485 LTC.

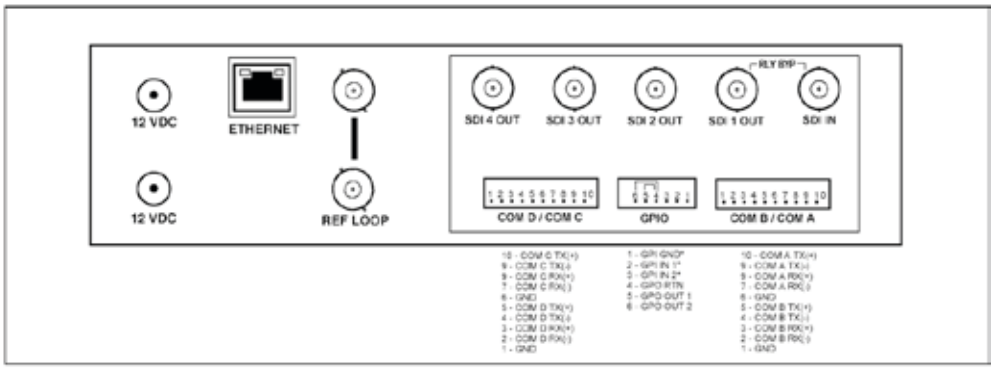
Latching relay protect SDI output provides input SDI bypass backup even in the event of power failure

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

Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID. Also controllable using DashBoard remote control.

Five year warranty





Rear Panel

html5 web UI remote control | 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

+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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+ANC » Ancillary Data Embed/De-Embed when Licensed with Option +ANC

The models below offer ancillary data embed/de-embed when licensed with option +ANC.
Please see respective product pages for more information

OPENGEAR CARDS

9902-UDX 3G/HD/SD-SDI Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed with Multi-Input Auto-Changeover 21

9903-UDX-ADDA 3G/HD/SD-SDI Universal Format Converter/Frame Sync with CVBS/ YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding 30

9922-FS 3G/HD/SD-SDI Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O. . . 50

9922-2FS 3G/HD/SD-SDI Dual-Channel Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O 63

9932-EMDE 3G/HD/SD-SDI 16-Channel Embedder / De-Embedder with Audio/Video Processing and CVBS I/O. 156

BBG-1000 STANDALONE UNITS

BBG-1002-UDX 3G/HD/SD-SDI Standalone Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed with Multi-Input Auto-Changeover. 26

BBG-1003-UDX-ADDA 3G/HD/SD-SDI Standalone Universal Format Converter/Frame Sync with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding 34

BBG-1022-FS 3G/HD/SD-SDI Standalone Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O 55

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 68

BBG-1032-EMDE 3G/HD/SD-SDI Standalone 16-Channel Embedder / De-Embedder with Audio/Video Processing and CVBS I/O. 174

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9941-RTR SERIES » 12G/3G/HD/SD-SDI/ASI/MADI ROUTERS FOR OPENGEAR® SYSTEMS

Available in 2016 Q3, Cobalt introduces the 9941-RTR series of SDI/ASI/MADI routers for the openGear® form factor. Using the openGear platform, the 9941-RTR series provides a high-density card-based solution that offers unprecedented flexibility and ease of use and integration that is exclusive for the openGear platform.

3G/HD/SD-SDI/ASI/MADI versions are available in size from 24x24 I/O to a 12x4 asymmetrical I/O configuration. A 12x4 12G-SDI version is also available. Offering the card-based flexibility and scalability of the openGear form factor, rear I/O modules are also available to suit your I/O requirements. The rear modules are available in standard BNC or high-density DIN 1.0/2.3 and HD-BNC formats.

The 9941-RTR series offer built-in Ethernet ports, as well as multiple serial and GPIO control interfaces. Also supported are easy-to-use JSON-based ReFLEX, SNMP, and third-party router protocols that allow for easy integration with A/V control and automation systems. GUI choices include an integrated HTML-5 Web server and support for the DashBoard™ control system, allowing users to design custom control panels that provide the most intuitive remote control and monitoring interfaces possible.

The 9941-RTR integrates perfectly with other advanced Cobalt products such as our 9970-QS Expandable Multiviewer with Advanced On-Screen Graphics cards. This synergy provides a dynamically reconfigurable, nonblocking 20 x 4 multiviewer, with configurations of four independent 5 x 1 multiviewers all the way up to a 17-window system – or any number of intermediate cascade combinations.

Full user DashBoard™ and Remote Control Panel remote control allows full setup, status, and local control across a standard Ethernet network.

9941-RTR Models

- **9941-RTR-12x4-12G** 12G (and lower) 12x4 Router
- **9941-RTR-12x4-3G** 3G/HD/SD-SDI / ASI / MADI 12x4 Router
- **9941-RTR-12x12-3G** 3G/HD/SD-SDI / ASI / MADI 12x12 Router
- **9941-RTR-24x24-3G** 3G/HD/SD-SDI / ASI / MADI 24x24 Router

FEATURES

- Exclusive openGear card-based scalable router solution
- High-density design in openGear form offers compact 2RU solution
- Available in several matrix sizes with rear IO modules suited to your requirements
- Integrates seamlessly with Cobalt 9970-QS Expandable Multiviewer
- Flexible control/monitoring options including Ethernet, JSON-based ReFLEX, SNMP, and third-party router protocols
- Fully embedded software/processing platform with all processing done locally on card
- Supports software upgrades allowing expanded functionality without removing cards and minimal disruption
- DashBoard™ remote control status monitoring and setup/control
- Five year warranty

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9404-EO » 4K/3G/HD/SD-SDI/ASI/MADI QUAD-CHANNEL FIBER OPTIC TRANSMITTERS

with 4 BNC In/4 Fiber Out 4x4 Router

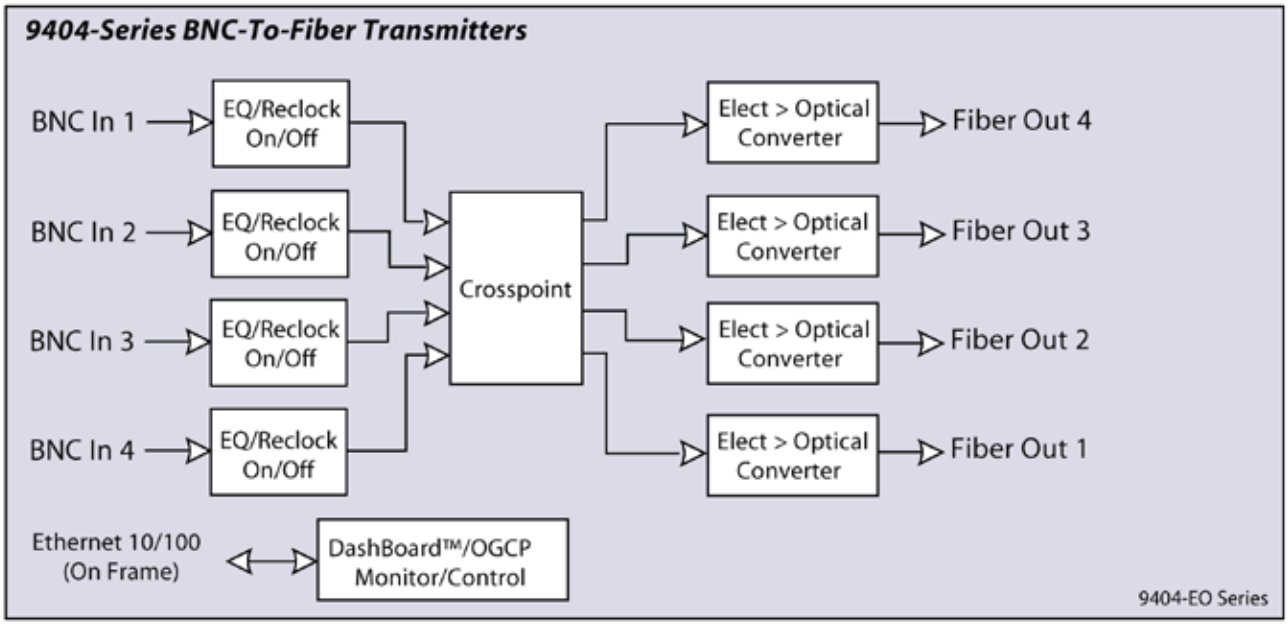
The 9400-series Coax/Fiber transport cards provide a card-based solution for high-density distribution and multiplexing between discrete coaxial ("BNC") signals (such as 3G/HD/SD-SDI, ASI, and MADI) and fiber buses. Utilizing the openGear® open-architecture platform, the 9400-series offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface.

The 9400-series cards offer I/O crosspoints, allowing easy to configure and flexible routing between card inputs and outputs. Up to 10 of any 9400-series cards can be installed in our 20-Slot frame, offering support for up to 40 BNC input/outputs and 40 fiber input/outputs in a single frame. In addition to SDI support, the cards support a wide range of signals/standards from 5 Mb/s to 3 Gb/s. The scalability of the 9400-series offers a high degree of flexibility and density, maximizing economy of both space and costs. Full user remote and card-edge monitor/control allows full card status and control access locally or across a standard Ethernet network.

BNC-to-Fiber (EO)	
9404-EO	4 BNC In x 4 Fiber Out; 4x4 Router; 1310 nm
9404-EO-CWDM	4 BNC In x 4 Fiber Out; 4x4 Router; CWDM
9404-EO-CWDML	4 BNC In x Looping Fiber Out; 4x4 Router; CWDM Looping

FEATURES

- Card-based design allows scalability with up to 40 BNC/Fiber interfaces per frame
- Low power/high-density design; only 10 Watts max. per card
- Full support of SMPTE 424M, 292M, 259M and SMPTE 310M, SMPTE 344M, SMPTE 305M, M2S, DVB-ASI, and MADI standards/formats
- I/O router crosspoints on all models allow selectable and flexible crosspoint distribution and DA functions on same card
- Remote control/monitoring via DashBoard™ software, with soft-configurable crosspoint, EQ on/off, and reclock on/off
- Five year warranty



openGear®

DashBoard™

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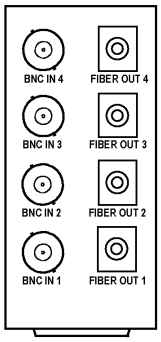
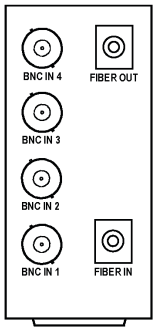
9404-EO » 4K/3G/HD/SD-SDI/ASI/MADI QUAD-CHANNEL FIBER OPTIC TRANSMITTERS

with 4 BNC In/4 Fiber Out 4x4 Router



Note: FIBER OUT 4, 3, and 2 positions progressively depopulated on models 9403, 9402, and 9401, respectively.

RM20-9404-B



Note: All models have four BNC IN connectors (as shown) which are routable to card fiber channels. On models with less than 4 fiber channels, not all four BNCs can be routed simultaneously to the fiber trunk.

RM20-9404-B-CWDML

SPECIFICATIONS

Electrical
Power: 10 watts (max)

General

Tx/Rx Fiber Range:
Single-Mode optics; rates thru SD: 40 km (24.8 mi) max
Single-Mode optics; rates thru HD: 24 km (14.9 mi) max

Fiber Connector:
LC, ST, SC, or FC

Standards:
SMPTE 259M-C, SMPTE 292M, SMPTE 425M, SMPTE 297M, DVB/ASI, HD-SDI (SMPTE 292M), SD-SDI (SMPTE 259M) with EDH, MADI (AES10-2003) (Not compatible with AES-3id (standard AES PCM))

Input Type: BNC, 75Ω

Input/Output Loop Return Loss:
>15 dB up to 1.5 GHz
>10 dB up to 3 GHz

Optical Power: -5 dBm to 0 dBm

Laser Power Range: Laser Class 1

Added Jitter: <0.03 UI under 1 MHz

ORDERING INFORMATION

9404-EO 4K/3G/HD/SD-SDI/ASI/MADI Quad-Channel 1310 nm Fiber Optic Transmitter with 4 BNC In/4 Fiber Out 4x4 Router

9404-EO-CWDM-WX-WX-WX-WX 4K/3G/HD/SD-SDI/ASI/MADI Quad-Channel Fiber Optic Transmitter with 4 BNC In/4 Fiber Out 4x4 Router; CWDM

9404-EO-CWDML-WX-WX-WX-WX 4K/3G/HD/SD-SDI/ASI/MADI Quad-Channel Fiber Optic Transmitter with 4 BNC In/4 Fiber Out 4x4 Router; CWDM Looping

RM20-9404-B-XX 20-Slot Frame Rear I/O Module (Standard Width) 4 BNC In, 4 Fiber Out

RM20-9404-B-XX-CWDML 20-Slot Frame Rear I/O Module (Standard Width) 4 BNC In, Fiber I/O Loop (please substitute fiber connector type in place of "-XX" in part number when ordering; see Note (2) below)

Notes:
(1) Use fiber wavelength codes for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 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 -41: 1410nm -43: 1430nm -45: 1450nm
-47: 1470nm -49: 1490nm -51: 1510nm -53: 1530nm
-55: 1550nm -57: 1570nm -59: 1590nm -61: 1610nm (Example: For wavelengths 1270-1290-1310-1330 for 9404 card, order as "9404-EO-CWDM-27-29-31-33")
(2) Add fiber connector suffix to part numbers to specify fiber connection type (LC, ST, SC, FC) when ordering. (Example: For RM20-9404-B-XX-CWDM with type LC fiber connectors, order as "RM20-9404-B-LC-CWDM".)
(3) Make certain when ordering companion OE (Receiver) cards that the same wavelength groupings are correspondingly also specified.

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9414-OE » 4K/3G/HD/SD-SDI/ASI/MADI QUAD-CHANNEL FIBER OPTIC RECEIVERS

with 4 Fiber In/4 BNC Out 4x4 Router

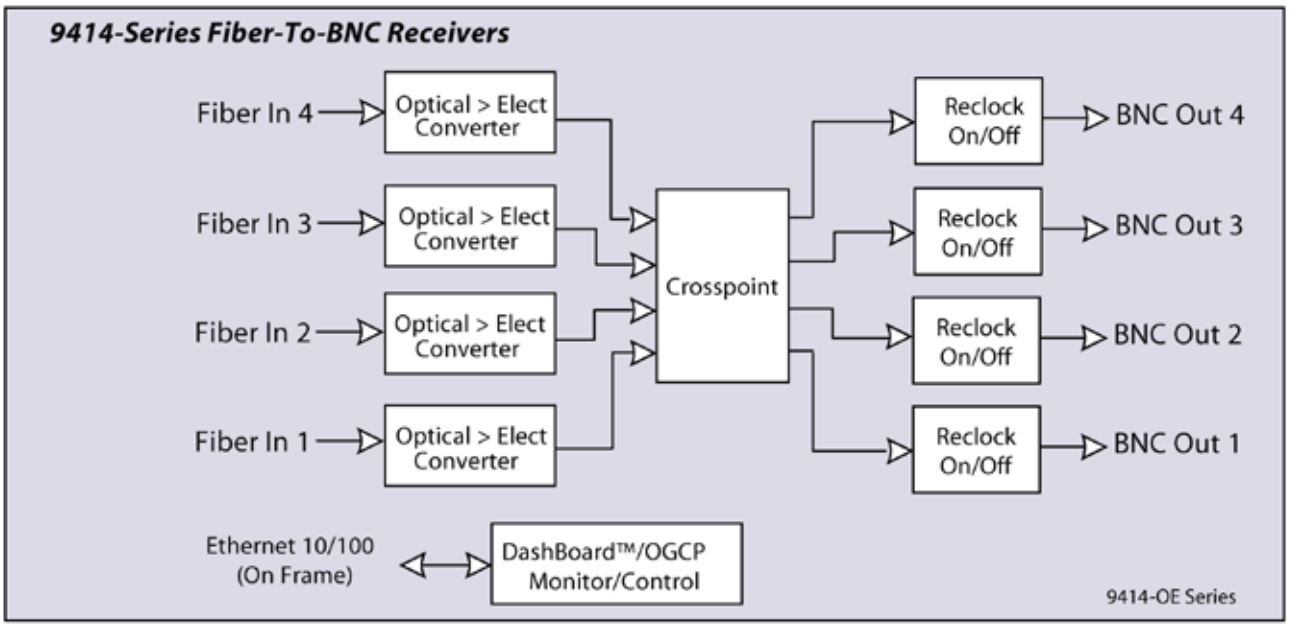
The 9400-series Coax/Fiber transport cards provide a card-based solution for high-density distribution and multiplexing between discrete coaxial ("BNC") signals (such as 3G/HD/SD-SDI, ASI, and MADI) and fiber buses. Utilizing the openGear® open-architecture platform, the 9400-series offers scalable incorporation and the easy-to use DashBoard™ setup and control operator interface.

The 9400-series cards offer I/O crosspoints, allowing easy to configure and flexible routing between card inputs and outputs. Up to 10 of any 9400-series cards can be installed in our 20-Slot Frame, offering support for up to 40 BNC input/outputs and 40 fiber input/outputs in a single frame. In addition to SD/HD-SDI support, the cards support a wide range of signals/standards from 5 Mb/s to 3Gb/s. The scalability of the 9400-series offers a high degree of flexibility and density, maximizing economy of both space and costs. Full user remote and card-edge monitor/control allows full card status and control access locally or across a standard Ethernet network.

Fiber-to-BNC (OE)	
9414-OE	4 Fiber Out x 4 BNC Out; 4x4 Router
9414-OE-CWDM	4 Fiber Out x 4 BNC Out; 4x4 Router; CWDM
9414-OE-CWDML	4 Fiber Out x 4 BNC Out; 4x4 Router; CWDM Looping

FEATURES

- Card-based design allows scalability with up to 40 BNC/Fiber interfaces per frame
- Low power/high-density design; only 10 Watts max. per card
- Full support of SMPTE 424M, 292M, 259M and SMPTE 310M, SMPTE 344M, SMPTE 305M, M2S, DVB-ASI, and MADI standards/formats
- I/O router crosspoints on all models allow selectable and flexible crosspoint distribution and DA functions on same card
- Remote control/monitoring via DashBoard™ software, with soft-configurable crosspoint, EQ on/off, and reclock on/off
- Five year warranty



openGear®

DashBoard™

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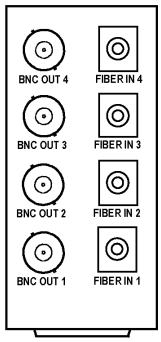
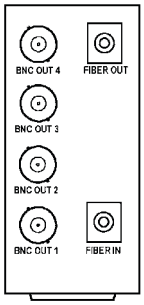
9414-OE » 4K/3G/HD/SD-SDI/ASI/MADI QUAD-CHANNEL FIBER OPTIC RECEIVERS

with 4 Fiber In/4 BNC Out 4x4 Router



Note: FIBER IN 4, 3, and 2 positions progressively depopulated on models 9413, 9412, and 9411, respectively.

RM20-9414-B



Note: All models have four BNC OUT connectors (as shown) which are routable from card fiber channels. On models with less than 4 fiber channels, "extra" BNCs can serve as DA outputs for a particular fiber channel.

RM20-9414-B-CWDML

SPECIFICATIONS

Electrical
Power: 10 watts (max)

General

Tx/Rx Fiber Range:
Single-Mode optics; rates thru SD: 40 km (24.8 mi) max
Single-Mode optics; rates thru HD: 24 km (14.9 mi) max

Fiber Connector:
LC, ST, SC, or FC

Standards:
SMPTE 259M-C, SMPTE 292M, SMPTE 425M, SMPTE 297M, DVB/ASI, HD-SDI (SMPTE 292M), SD-SDI (SMPTE 259M) with EDH, MADI (AES10-2003) (Not compatible with AES-3id (standard AES PCM))

Output Type: BNC, 75Ω

Fiber Loop Input Optical Sensitivity:
Pathological 3Gbps: -18 dBm
Pathological HD-SDI: -20 dBm

Input/Output Loop Return Loss:
>15 dB up to 1.5 GHz
>10 dB up to 3 GHz

Optical Power: -5 dBm to 0 dBm

Laser Power Range: Laser Class 1

Added Jitter: <0.03 UI under 1 MHz

ORDERING INFORMATION

9414-OE 4K/3G/HD/SD-SDI/ASI/MADI Quad-Channel Fiber Optic Receiver with 4 Fiber In/4 BNC Out 4x4 Router

9414-OE-CWDM-WX-WX-WX-WX 4K/3G/HD/SD-SDI/ASI/MADI Quad-Channel Fiber Optic Receiver with 4 Fiber In/4 BNC Out 4x4 Router; CWDM

9414-OE-CWDML-WX-WX-WX-WX 4K/3G/HD/SD-SDI/ASI/MADI Quad-Channel Fiber Optic Receiver with 4 Fiber In/4 BNC Out 4x4 Router; CWDM Looping

RM20-9414-B-XX 20-Slot Frame Rear I/O Module (Standard Width) 4 Fiber In, 4 BNC Out

RM20-9414-B-XX-CWDML 20-Slot Frame Rear I/O Module (Standard Width) 4 BNC Out, Fiber I/O Loop (please substitute fiber connector type in place of "-XX" in part number when ordering; see Note (2) below)

Notes:
(1) Use fiber wavelength codes for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 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 -41: 1410nm -43: 1430nm -45: 1450nm
-47: 1470nm -49: 1490nm -51: 1510nm -53: 1530nm
-55: 1550nm -57: 1570nm -59: 1590nm -61: 1610nm (Example: For wavelengths 1270-1290-1310-1330 for 9414 card, order as "9414-OE-CWDM-27-29-31-33")
(2) Add fiber connector suffix to part numbers to specify fiber connection type (LC, ST, SC, FC) when ordering. (Example: For RM20-9414-B-XX-CWDM with type LC fiber connectors, order as "RM20-9414-B-LC-CWDM".)
(3) Make certain when ordering companion EO (Transmitter) cards that the same wavelength groupings are correspondingly also specified.

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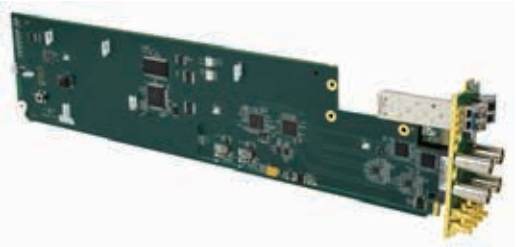
9415DA-SFP » 3G/HD/SD-SDI / ASI / MADI RECONFIGURABLE VIDEO SFP TRANSCEIVER/ DISTRIBUTION AMPLIFIER with Full-Flexibility Crosspoint and Externally-Accessible SFP Module

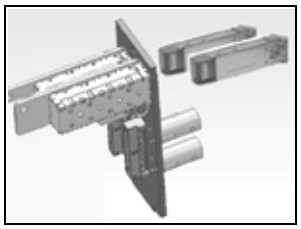


The all-new Cobalt® 9415DA-SFP 3G/HD/SD-SDI / ASI / MADI Reconfigurable Video SFP Transceiver/Distribution Amplifier with Full-Flexibility Crosspoint and Externally-Accessible SFP Module provides a card-based solution for high-density conversions between coax SDI/ASI, fiber, HDMI, and MADI. With an externally-accessible SFP cage on the card rear module, SFP modules can be easily hot-swapped for maintenance or card repurposing. Because all connections are direct to the card rear module and external SFPs, all cabling remains undisturbed for card removal/ installation.

A crosspoint (which is user-configurable via DashBoard™ remote control) allows the card to apply any of the card inputs to various coax DA outputs as well as up to 2 Rx and Tx paths through the external SFP. Up to 10 coaxial DA outputs are available per each card. Using a high-density split rear module, up to 20 cards can be installed in a frame, providing 40 channels of conversion.

The card accepts non-MSA video SFP modules, with single and dual-channel Tx and Rx modules available, supporting an extensive range of electrical/coax and fiber conversions. 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.

Externally-accessible SFP cages on the card Rear Module allow easy maintenance or repurposing of the card by simply swapping SFP modules as desired.



FEATURES

Externally-accessible SPF cages allow easy card repurposing. Wide array of industry-standard SPF modules available, including fiber I/O, and HDMI.

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)

Full support of 3G/HD/SD-SDI and ASI/DVB

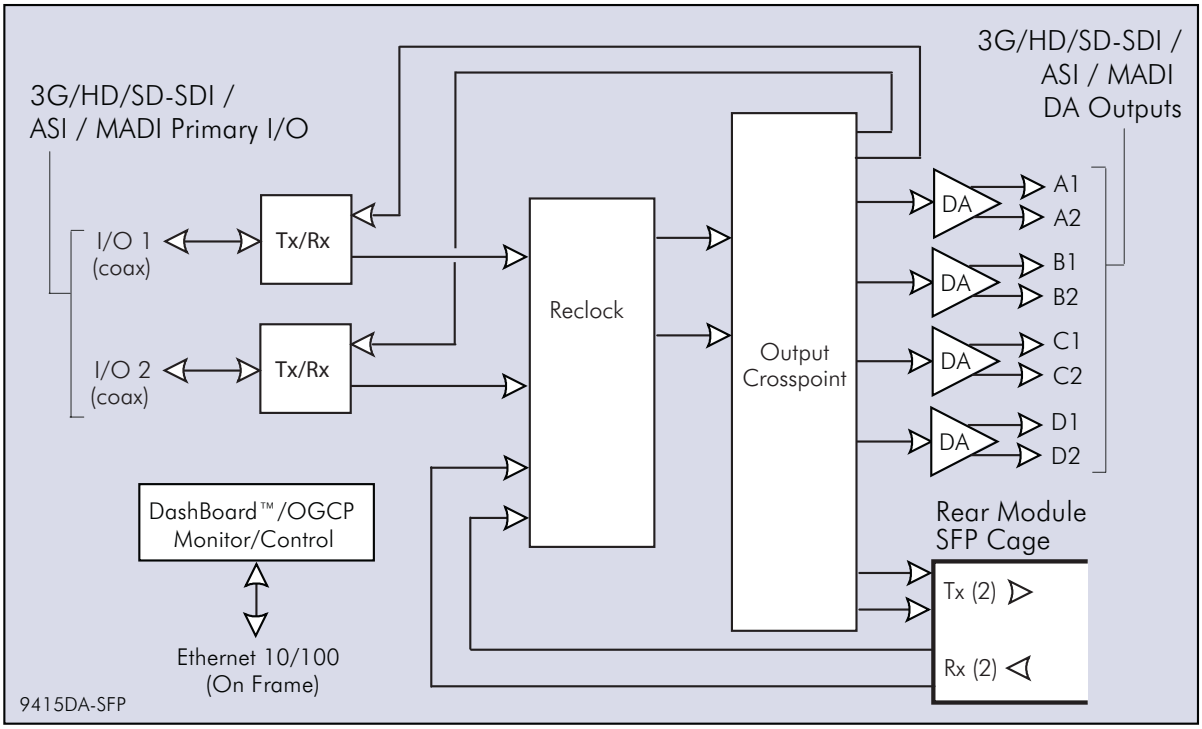
Automatic reclocking for all SDI data rates (auto-bypass for non-SDI data rates)

SFP-based converters provide state-of-the-art fiber performance, power consumption, and compactness.

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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9415DA-SFP » 3G/HD/SD-SDI / ASI / MADI RECONFIGURABLE VIDEO SFP TRANSCEIVER/ DISTRIBUTION AMPLIFIER with Full-Flexibility Crosspoint and Externally-Accessible SFP Module

SPECIFICATIONS

Note: Inputs/outputs are a function of rear I/O module used. Fiber specifications are typical, and only applicable for card fitted with Tx or Rx (as applicable) fiber SFP module. Specifications subject to change.

Power
< 10 Watts

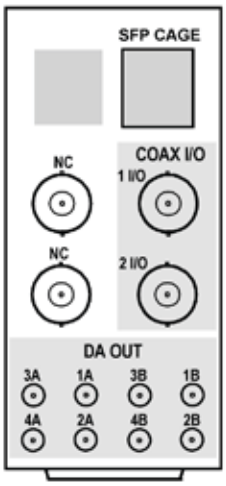
3G/HD/SD-SDI / ASI / MADI Inputs/Outputs (Coaxial Primary)
(2) 75Ω BNC input/outputs max (I/O1 and I/O2)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Coaxial Receive Performance (Cable Length; Belden 1694A)
SDI Receive Cable Length (1694A): 110m/180m/360m (3G/HD/SD)

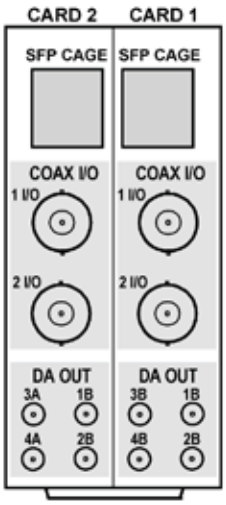
Fiber Transmit Output
(1) Fiber output; LC connector
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)

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

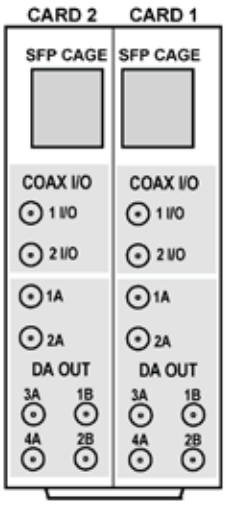
3G/HD/SD-SDI / ASI / MADI Outputs (DA Outputs)
Four, 1x2 75Ω BNC outputs (8 total, max). Each DA pair can receive any primary or opposite-channel DA signal.
Signal Level: 800 mV nominal
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI



RM20-9415DA-SFP-B-DIN|HDBNC



RM20-9415DA-SFP-B|S-DIN|HDBNC



RM20-9415DA-SFP-C|S-DIN|HDBNC

ORDERING INFORMATION

9415DA-SFP 3G/HD/SD-SDI / ASI / MADI Reconfigurable Video SFP Transceiver/Distribution Amplifier with Full-Flexibility Crosspoint and Externally-Accessible SFP Module

RM20-9415DA-SFP-B-DIN 20-Slot Frame Rear I/O Module. (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) SFP cage receptacle, (8) DA coaxial outputs (connections are per card; DA output connectors are DIN1.0/2.3) (**Note:** Mates to card in **odd** frame slot.)

RM20-9415DA-SFP-B-HDBNC 20-Slot Frame Rear I/O Module. (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) SFP cage receptacle, (8) DA coaxial outputs (connections are per card; DA output connectors are HD-BNC) (**Note:** Mates to card in **odd** frame slot.)

RM20-9415DA-SFP-B/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) SFP cage receptacle, (4) DA coaxial outputs (connections are per card; DA output connectors are DIN1.0/2.3)

RM20-9415DA-SFP-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) SFP cage receptacle, (4) DA coaxial outputs (connections are per card; DA output connectors are HD-BNC)

RM20-9415DA-SFP-C/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (1) SFP cage receptacle, (6) DA coaxial outputs (connections are per card; coaxial connectors are DIN1.0/2.3)

RM20-9415DA-SFP-C/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards). (2) 3G/HD/SD-SDI / ASI / MADI input/outputs, (1) SFP cage receptacle, (6) DA coaxial outputs (connections are per card; coaxial connectors are HD-BNC)

The following SFP modules are available for the 9415DA card (purchased and available separately):

SFP-EO Single-Channel Video Optical Transmitter (EO); Embrionix™ GO2918 or equivalent

SFP-OE Single-Channel Video Optical Receiver (OE); Embrionix™ GO2917 or equivalent

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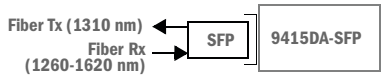
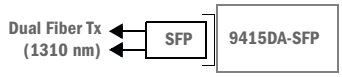
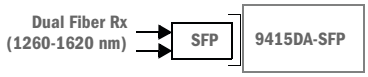
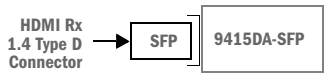
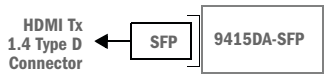
9415DA-SFP » 3G/HD/SD-SDI / ASI / MADI RECONFIGURABLE VIDEO SFP TRANSCEIVER/ DISTRIBUTION AMPLIFIER with Full-Flexibility Crosspoint and Externally-Accessible SFP Module

	**SFP-E0OE** Single-Channel Video Optical Transceiver (E0OE); Embrionix™ GO2929 or equivalent
	**SFP-2E0** Dual-Channel Video Optical Transmitter (2E0); Embrionix™ GO2928 or equivalent
	**SFP-20E** Dual-Channel Video Optical Receiver (20E); Embrionix™ GO2927 or equivalent
	**SFP-H-TO-S** HDMI-to-SDI Video Optical Receiver (H-TO-S); Embrionix™ EB34TD1R-SX or equivalent
	**SFP-S-TO-H** SDI-to-HDMI Video Optical Transmitter (S-TO-H); Embrionix™ EB34TD1T-SM/N or equivalent Compatible with SMPTE 259M, 292M, 425A (Mapping 1), 425B (372M Mapping)

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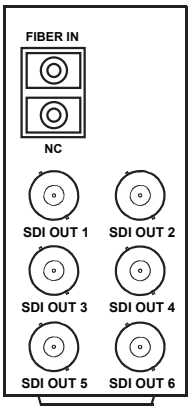
9211-OE » 3G/HD/SD-SDI FIBER RECEIVER

The 9211-OE is a 3G/HD/SD-SDI fiber receiver card, and converts a fiber optic signal to an SDI signal. The 9211-OE detects the incoming fiber signal and outputs the SDI signal over six BNC connectors. Card-edge LED indicators identify the presence of incoming video and the identified signal data rate.

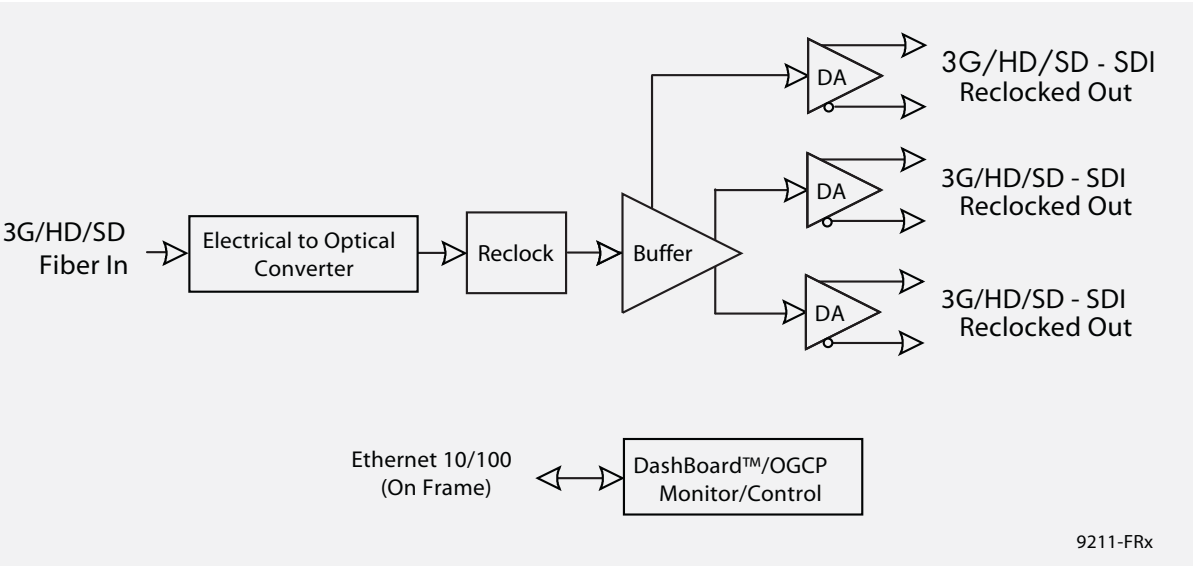
The 9211-OE can operate as a 1x6 (one in, six out) BNC DA using a full rear module (RM20-9211-B), or operate as an independent 1x3 BNC DA using the split rear module (RM20-9211-B/S). In the 1x3 configuration, the outputs are non-inverting, making it an excellent ASI distribution amplifier.

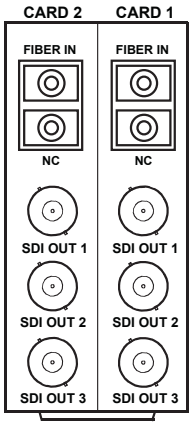


RM20-9211-B

» FEATURES

- Conforms to SMPTE 424M, SMPTE 292M, and SMPTE 259M
- Reclocking at 270 Mbps, 1.483 Gbps, 1.485 Gbps, and 2.970 Gbps
- LC/UPC optical connection
- Automatic detection of incoming data rate
- LED indicators for signal presence and data rate
- High density with 20 cards per 20-Slot frame using split rear modules
- Remote monitoring via DashBoard™ software or OGCP-9000 control panel
- Five-year warranty





RM20-9211-B/S

» SPECIFICATIONS

Electrical

Power:	4 watts

Optical Input

Number of Inputs:	1
Standard:	143-360 Mbps SMPTE 259 1.485 Gbps - SMPTE 292 3 Gbps - SMPTE 424M
Operating Wavelength Range:	1210 nm to 1600 nm
Connector Type:	Single Mode, LC/UPC

SDI Outputs

Number of Outputs:	Full Rear Module: 6 Split Rear Module: 3
Return Loss:	>15 dB to 1.485 GHz >10 dB from 1.485 GHz to 2.97 GHz
Connector Type:	BNC

» ORDERING INFORMATION

9211-OE 3G/HD/SD-SDI Fiber Receiver Card

RM20-9211-B 20-Slot Frame Rear I/O Module (Standard Width) with 1 Optical LC Input, 6 Reclocked Output BNCs

RM20-9211-B/S 20-Slot Frame Rear I/O Module (Split) 1 Optical LC Input, 3 Reclocked Output BNCs (per card)

openGear DashBoard

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

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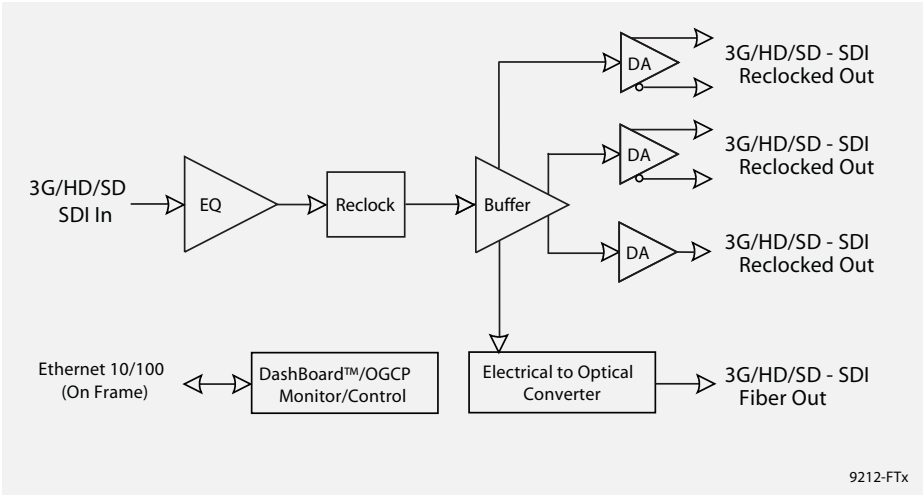
9212-EO » 3G/HD/SD-SDI FIBER TRANSMITTER

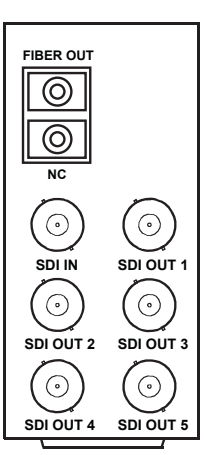
The 9212-EO is a 3G/HD/SD-SDI fiber transmitter (EO) card. The card converts an SDI signal to a fiber optic link, allowing for longer transport distances. The 9212-EO also equalizes the incoming SDI signal, and then reclocks the signal with automatic rate detection for all popular data rates. Card-edge LED indicators identify the presence of incoming video and the identified signal data rate. With full 3G/HD/SDI support of both fiber and coax, the 9212-EO is the ideal universal SDI distribution amplifier.

The 9212-EO can operate as a 1x5 (one in, five out) BNC DA with fiber output using a full rear module (RM20-9212-B) or as an independent 1x2 BNC DA with fiber output using the split rear module (RM20-9212-B/S). In the 1x2 configuration, the outputs are non-inverting making it an excellent ASI distribution amplifier. Using the split rear module, up to 20 9212-FTx cards can be used in a frame.

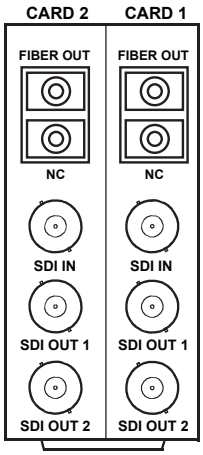
» FEATURES

- Conforms to SMPTE 424M, SMPTE 292M, and SMPTE 259M
- Reclocking at 270 Mbps, 1.483 Gbps, 1.485 Gbps, and 2.970 Gbps
- LC/UPC optical connection
- Automatic detection of incoming data rate
- LED indicators for signal presence and data rate
- High-density with 20 cards per 20-Slot frame using split rear modules
- Remote monitoring via DashBoard™ software or OGCP-9000 control panel
- Five-year warranty





RM20-9212-B



RM20-9212-B/S

» SPECIFICATIONS

Electrical

Power:	4 watts

Optical Input

Number of Inputs:	1
Standard:	143-360 Mbps - SMPTE 259M 1.485 Gbps - SMPTE 292 3 Gbps - SMPTE 424M
Operating Wavelength Range:	1210 nm to 1600 nm

SDI Outputs

Number of Outputs:	Full Rear Module: 5 SDI BNC; 1 Fiber Split Rear Module: 2 SDI BNC; 1 Fiber
Return Loss:	>15 dB to 1.485 GHz >10 dB from 1.485 GHz to 2.97 GHz
Connector Type:	BNC and Single Mode, LC/UPC

» ORDERING INFORMATION

9212-EO 3G/HD/SD Fiber Transmitter Card

RM20-9212-B 20-Slot Frame Rear I/O Module (Standard Width) with 1 Optical LC Output, 5 Reclocked Copies of Input

RM20-9212-B/S 20-Slot Frame Rear I/O Module (Split) 1 BNC Input, 1 Optical LC Output, 2 Reclocked Input Copy BNCs (per card)

openGear DashBoard

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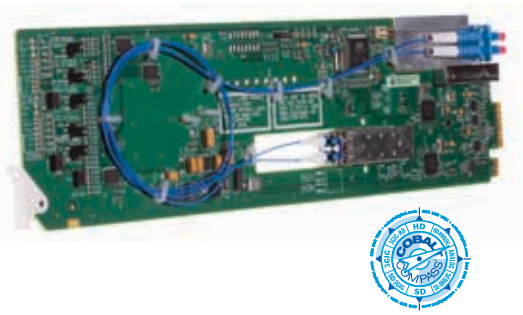
9213-20E » DUAL 3G/HD/SD-SDI FIBER RECEIVER

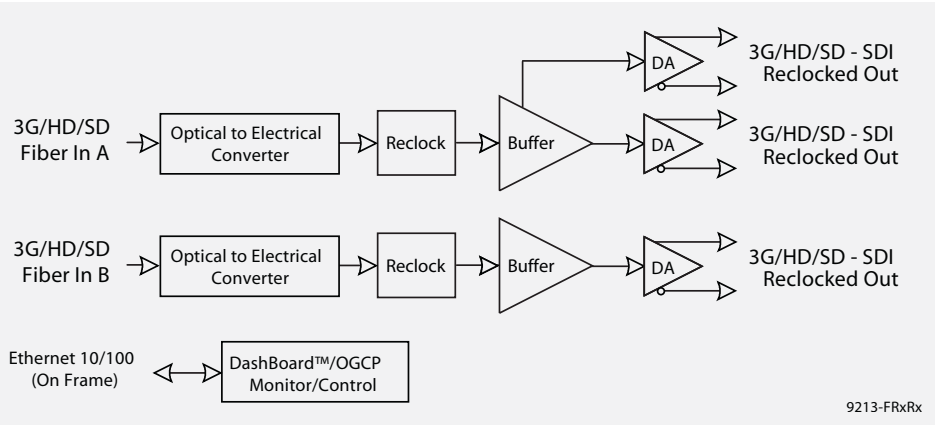


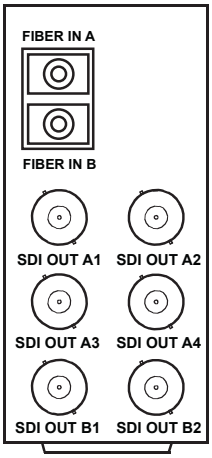
The 9213-20E is a dual 3G/HD/SD-SDI fiber receiver (OE) card. The card converts six fiber optic signals to independent SDI output signals. The 9213-20E detects the incoming fiber signal and outputs the up to six SDI signals over six BNC connectors. Card-edge LED indicators identify the presence of incoming video and the identified signal data rate.

The 9213-20E is fully hot swappable with all active components on the front removable module. No active components are installed on the rear module, greatly reducing down time and eliminating any need for users to access the back of the rack frame. Up to 20 cards can be used in the 20-Slot frame to acheive a density of 40 optical to electrical conversions in 2RU.

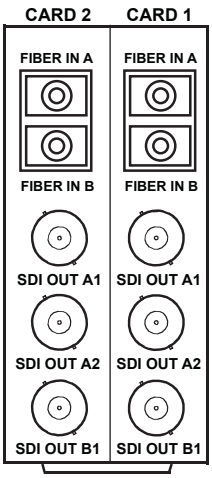
» FEATURES

- Supports single-mode fiber
- Reclocking at 270 Mbps, 1.483 Gbps, 1.485 Gbps, 2.967 Gbps, and 2.970 Gbps
- LC/UPC optical connection
- Automatic detection of incoming data rate
- LED indicators for signal presence and data rate
- Remote monitoring via DashBoard™ software or OGCP-9000 control panel
- Five-year warranty





RM20-9213-B



RM20-9213-B/S

» SPECIFICATIONS

Electrical

Power:	5 watts

Optical Input

Number of Inputs:	2
Standard:	143-360 Mbps - SMPTE 259M 1.485 Gbps - SMPTE 292 3 Gbps - SMPTE 424M
Operating Wavelength Range:	1210 nm to 1600 nm
Connector Type:	Single Mode, LC/UPC

SDI Outputs

Number of Outputs:	Full Rear Module: 6 Split Rear Module: 3
Return Loss:	>15 dB to 1.485 GHz >10 dB from 1.485 GHz to 2.97 GHz
Connector Type:	BNC

» ORDERING INFORMATION

9213-20E Dual 3G/HD/SD Fiber Receiver Card (Standard Width) with 2 Optical LC Inputs, 4 Reclocked Outputs of Input 1 and 2 Reclocked Outputs of Input 2

RM20-9213-B 20-Slot Frame Rear I/O Module 2 Optical LC Inputs, 2 Input A Reclocked Output BNCs, 1 Input B Reclocked Output BNC (per card)

RM20-9213-B/S 20-Slot Frame Rear I/O Module (Split)

openGear DashBoard

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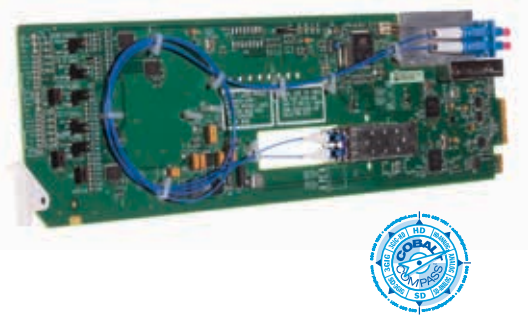
9214-2EO » DUAL 3G/HD/SD-SDI FIBER TRANSMITTER

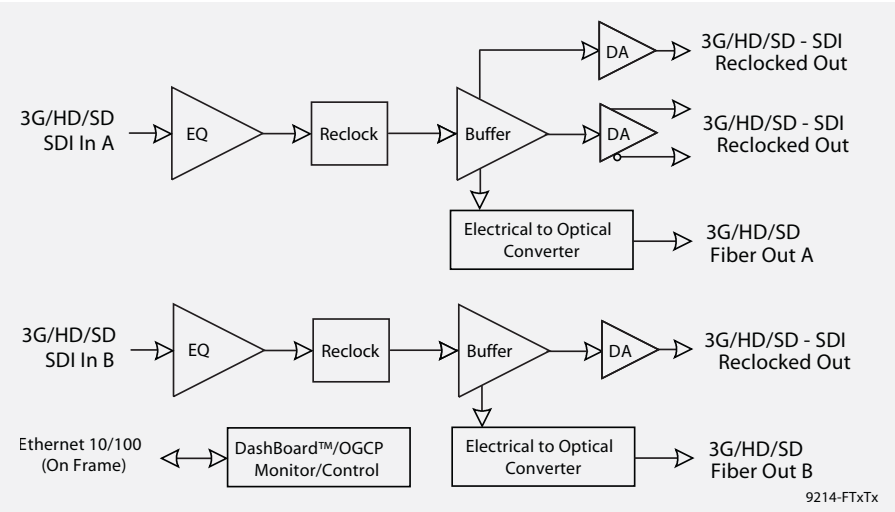


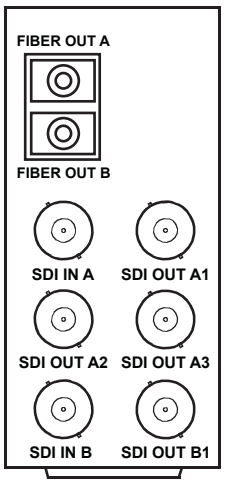
The 9214-2EO is dual SDI to fiber optic transmitter card. The card converts two SDI signals to two fiber optic links, allowing for longer transport distances. Reclocked SDI outputs provide copies of each SDI input signal. The card supports serial digital data rates from 270 Mbps up to 2.98 Gbps (1080p). LED indicators at the front of the card identify the presence of incoming video and the identified signal data rates for each channel independently.

The 9214-2EO is fully hot swappable with all active components on the front removable module. No active components are installed on the rear module, greatly reducing down time and eliminating any need for users to access the back of the rack frame. Each channel of the 9214-2EO equalizes the incoming SDI signal and reclocks the signal with automatic rate detection for all popular data rates. Up to 20 cards can be used in the 20-Slot frame to acheive a density of 40 electrical to optical conversions in 2RU.

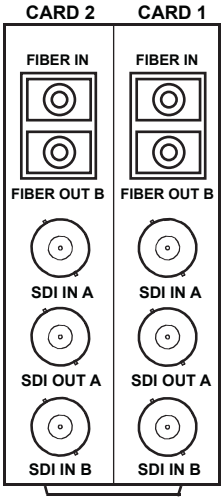
» FEATURES

- Supports single-mode fiber
- Reclocking at 270 Mbps, 1.483 Gbps, 1.485 Gbps, 2.967 Gbps, and 2.970 Gbps
- LC/UPC optical connection
- Automatic detection of incoming data rate
- LED indicators for signal presence and data rate
- Remote monitoring via DashBoard™ software or OGCP-9000 control panel
- Five-year warranty





RM20-9214-B



RM20-9214-B/S

» SPECIFICATIONS

Electrical

Power:	4 watts

SDI Input

Number of Inputs:	2
Standard:	143-360 Mbps - SMPTE 259M 1.485 Gbps - SMPTE 292 3 Gbps - SMPTE 424M

Cable Lengths (w/Belden 1694A)

3 Gbps:	80 m
1.485 Gbps:	120 m
143-360 Mbps:	300 m

SDI Outputs

Number of Outputs:	4 Full Rear Module: 4 Split Rear Module: 1
Return Loss:	>15 dB (for SMPTE 259M)
Connector Types:	BNC and Single Mode LC/UPC Fiber

» ORDERING INFORMATION

9214-2EO Dual 3G/HD/SD Fiber Transmitter Card (Standard Width) with 2 Optical LC Outputs, 3 Reclocked Copies of Input 1 and 1 Reclocked Output of Input 2

RM20-9214-B 20-Slot Frame Rear I/O Module 2 Input BNCs, 2 Optical LC Outputs, 1 Input A Reclocked Output BNC (per card)

RM20-9214-B/S 20-Slot Frame Rear I/O Module (Split)

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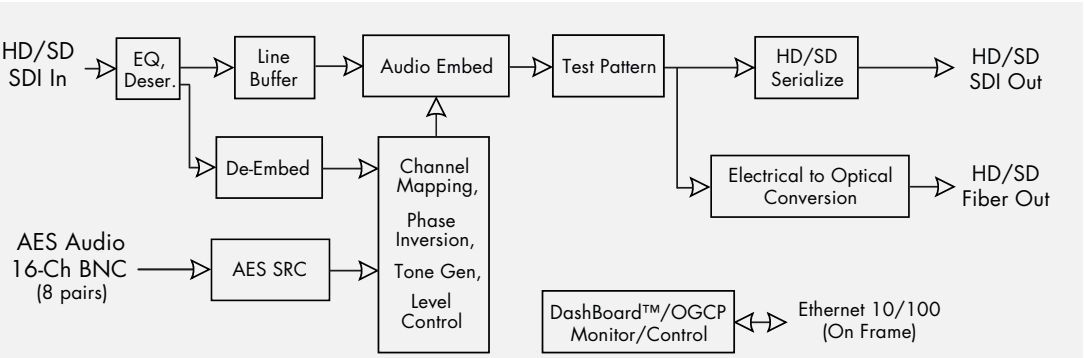
9215-EO-EM » AES/EBU FIBER AUDIO EMBEDDER

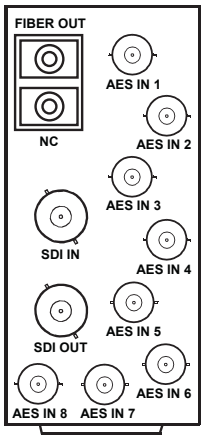
The 9215-EO-EM accepts an HD/SD-SDI BNC input along with up to 8 AES audio pairs, providing embedding and audio processing. The card provides SDI outputs on HD/SD-SDI BNC and fiber outputs.

The 9215-EO-EM offers full 24-bit audio processing/routing control (card edge and remote control) for individual channel gain, delay (up to one second), phase invert, as well as channel summing. Individual-channel SRC is also provided. User presets allow fast and easy recall of custom settings.

» FEATURES

- Conforms to SMPTE 259M and SMPTE 292M
- LC/UPC optical connection
- Audio channel mapping, level control, phase inversion, and summing
- Audio delay user-adjustable up to one second
- Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with card 48 kHz timing for glitch-free AES embedding
- Automatic detection of incoming data rate
- Remote monitoring via DashBoard™ software or OGCP-9000 control panel
- LED indicators for signal presence and data rate
- Five-year warranty





RM20-9215-B

» SPECIFICATIONS

Electrical

Power:	4 watts

SDI Input

Number of Inputs:	1
Standard:	SMPTE 292M, SMPTE 259M-C
Impedance:	75 Ω terminating
Return Loss:	> 15 dB to 1.485 GHz to 2.97 GHz
Connector Type:	> 300 m

AES Inputs

Number of Inputs:	16-Ch unbalanced (nominal 48 kHz only)
Impedance:	75 Ω
Input Level:	0.1 V to 2.5 V p-p (5 V p-p tolerant)
Resolution:	24-bit

Optical Output

Number of Inputs:	1
Standard:	SMPTE 259M-C, SMPTE 292M
Nominal Wavelength:	1310 μm
Output Power:	-7 dBm to -2 dBm
Connector Type:	Single Mode, LC/UPC

SDI Output

Number of Outputs:	1
Standard:	SMPTE 292M, SMPTE 259M-C
Impedance:	75 Ω terminating
Return Loss:	>15 dB to 1.485 GHz >10 dB 1.485 GHz to 2.97 GHz
DC Offset:	0V ± 50 mV
Rise and Fall Time(20-80%):	700 ps typical (270 Mbps) 120 ps

» ORDERING INFORMATION

9215-EO-EM HD/SD-SDI Fiber Audio Embedder Card

RM20-9215-B 20-Slot Frame Rear I/O Module (Standard Width) with 1 HD/SD-SDI Input BNC, 1 HD/SD-SDI Output BNC, 1 Optical LC Input, 8 AES Inputs (DIN 1.0/2.3 connectors)

openGear DashBoard

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

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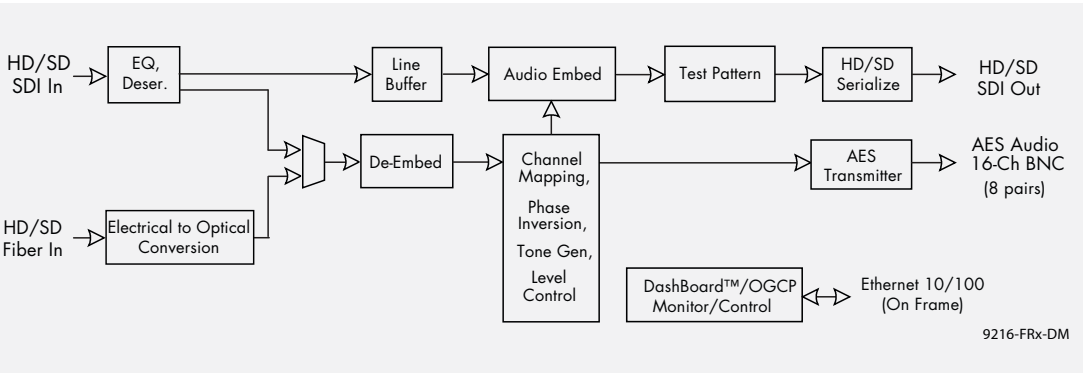
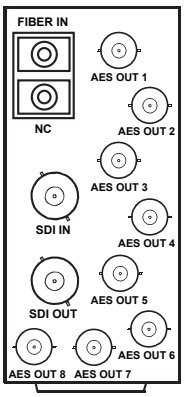
9216-OE-DM » AES/EBU FIBER AUDIO DE-EMBEDDER

The 9216-OE-DM accepts HD/SD-SDI or fiber inputs and provides up to eight de-embedded AES pairs. The 9216-OE-DM offers full 24-bit audio processing/routing control (card edge and remote control) for individual channel gain, delay (up to 1 second), phase invert, as well as channel summing. AES outputs can be set to mute when routed channels fall below a selectable threshold. User presets allow fast and easy recall of custom settings.

» FEATURES

- Conforms to SMPTE 259M and SMPTE 292M
- LC/UPC optical connection
- Audio channel mapping, level control, phase inversion, and summing
- Audio delay user-adjustable up to one second
- Automatic detection of incoming data rate
- LED indicators for signal presence and data rate
- Remote monitoring via DashBoard™ software or OGCP-9000 control panel
- Five-year warranty





RM20-9216-B

» SPECIFICATIONS

Electrical

Power:	4 watts

SDI Input

Number of Inputs:	1
Standard:	SMPTE 292M, SMPTE 259M-C
Impedance:	75 Ω terminating
Return Loss:	> 15 dB to 1.485 GHz to 2.97 GHz
Connector Type:	> 300 m

Optical Input

Number of Inputs:	1
Standard:	143-360 Mbps - SMPTE 259M 1.485 Gbps - SMPTE 292
Operating Wavelength Range:	1210 nm to 1600 nm
Connector Type:	Single Mode, LC/UPC

AES Outputs

Number of Outputs:	16-Ch unbalanced DIN 1.0/2.3
Impedance:	75 Ω
Sampling Rate:	48 kHz
Resolution:	24-bit

SDI Output

Number of Outputs:	1
Standard:	SMPTE 292M, SMPTE 259M-C
Impedance:	75 Ω terminating
Return Loss:	>15 dB to 1.485 GHz >10 dB 1.485 GHz to 2.97 GHz
DC Offset:	0V ± 50 mV
Rise and Fall Time(20-80%):	700 ps typical (270 Mbps) 120 ps

» ORDERING INFORMATION

9216-OE-DM AES/EBU Fiber Audio De-Embedder Card

RM20-9216-B 20-Slot Frame Rear I/O Module (Standard Width) 1 HD/SD-SDI Input BNC, 1 HD/SD-SDI Output BNC, 1 Optical LC Input, 8 AES Outputs (DIN 1.0/2.3 connectors)

openGear DashBoard

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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 all-new 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.

Option +DT allows serial data and GPIO received by a card to be embedded on an unused embedded audio pair, and then de-embedded and sent over another card's serial Tx port. This offers a very convenient self-contained transport within the program stream physical media, greatly simplifying this data transfer workflow.

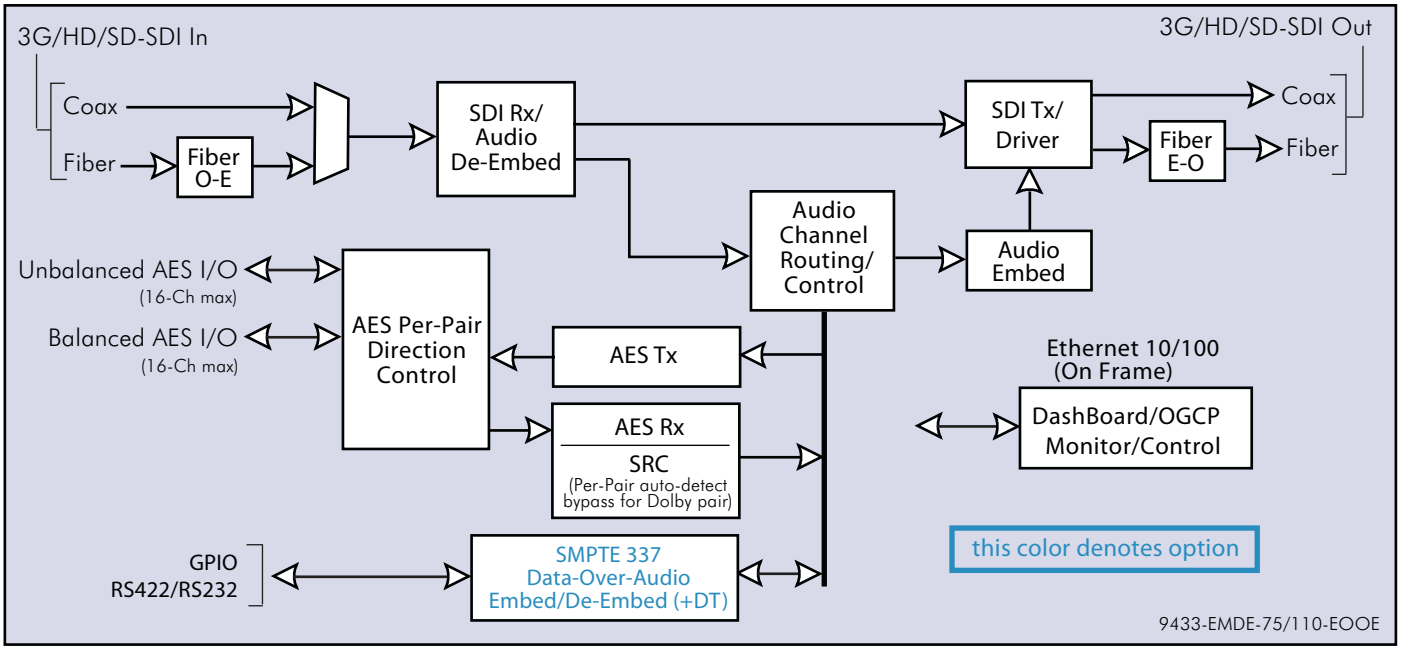
Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

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
- Five year warranty

OPTIONS

SMPTE 337 Data Embed/De-embed (+DT) – COMM/GPIO over audio embed/de-embed



openGear

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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

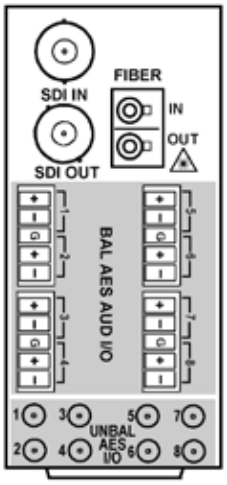
(1) 75Ω BNC inputs
(1) 75Ω BNC output
SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.
Alignment 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-E00E-A-DIN
RM20-9433EMDE-E00E-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

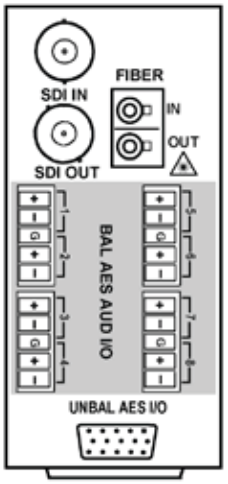
Use fiber wavelength codes below for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1370, 1390, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610.
In "WX" places in part number, substitute code for wavelengths 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, (2) Unbalanced AES I/O, GPIO/COMM (via HD-15 connector)

+DT Data-Over-Audio SMPTE 337 Option



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

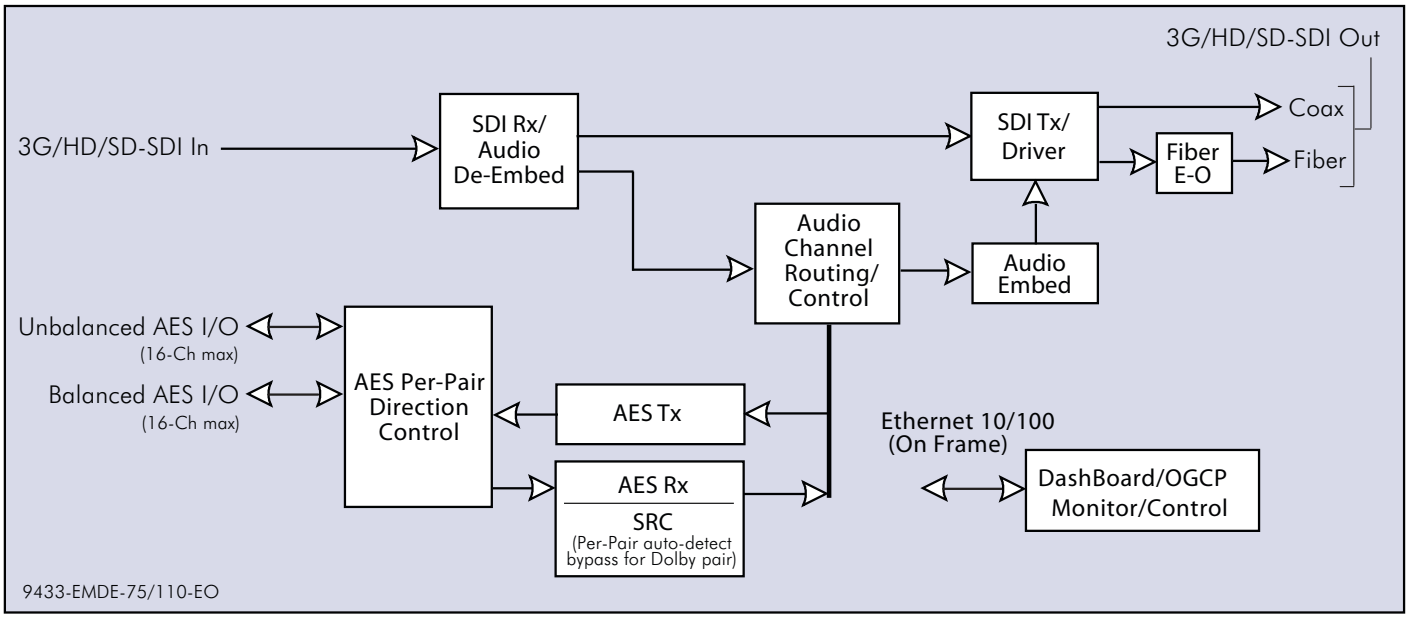
The all-new Cobalt® 9433-EMDE-75/110-EO 3G/HD/SD-SDI Fiber-Optic EO Transmitter with 16-Channel Unbalanced/Balanced AES Embed / De-Embed offers full-flexibility AES embedding/de-embedding for unbalanced and balanced AES with SDI-to-fiber EO in a basic, economical, high-efficiency openGear® card. More 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. Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. 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
- 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

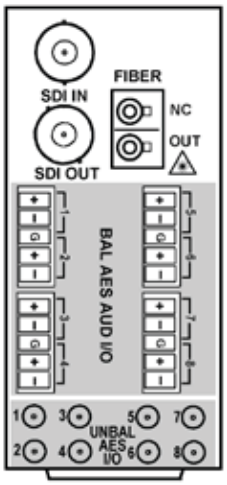
(1) 75Ω BNC inputs
(1) 75Ω BNC output
SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.
Alignment 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

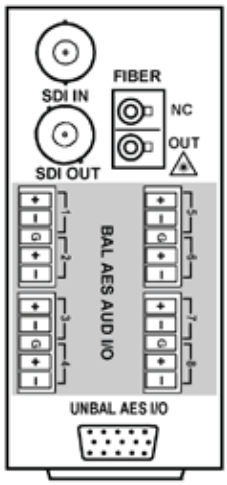
Use fiber wavelength codes below for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1370, 1390, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610.

-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, (2) Unbalanced AES I/O (via HD-15 connector; other connections reserved)



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

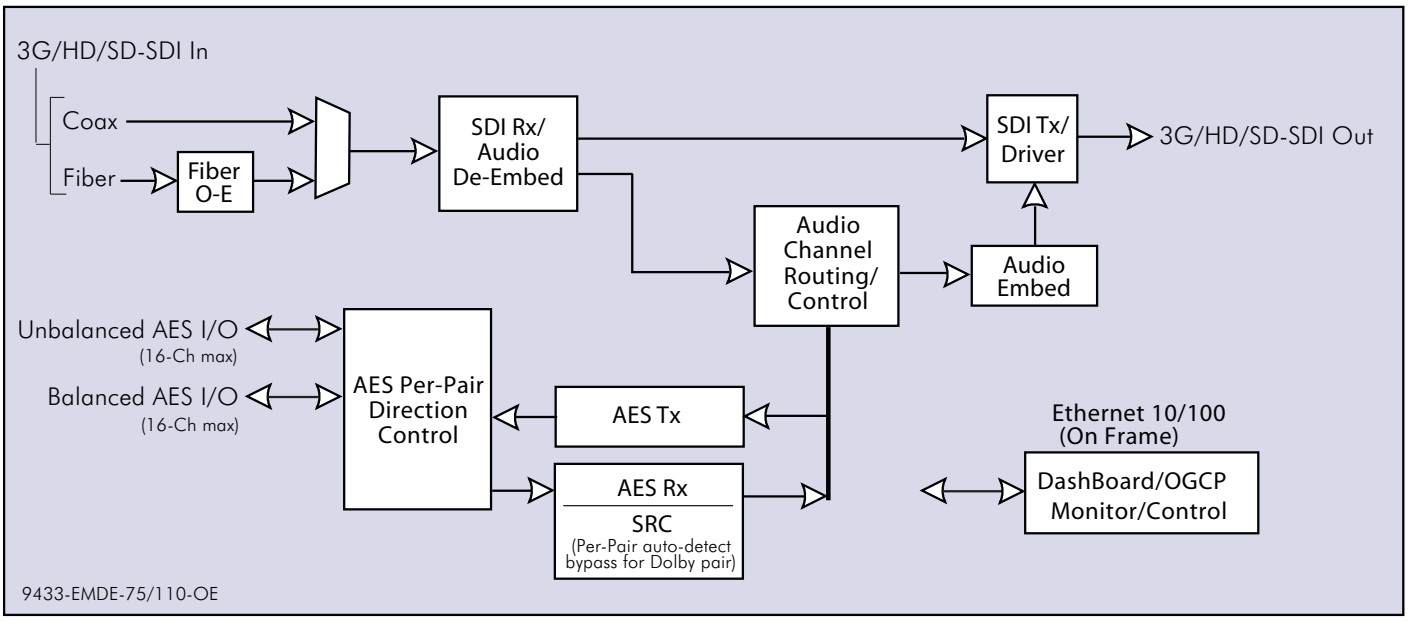
The all-new Cobalt® 9433-EMDE-75/110-OE 3G/HD/SD-SDI Fiber-Optic OE Receiver with 16-Channel Unbalanced/Balanced AES Embed / De-Embed offers full-flexibility AES embedding/de-embedding for unbalanced and balanced AES with the built-in versatility of both coaxial and fiber SDI inputs in a basic, economical, 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.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. 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
- 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

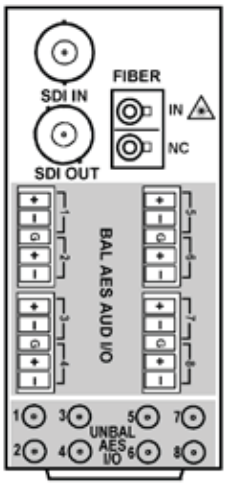
ORDERING INFORMATION

9433-EMDE-75/110-OE 3G/HD/SD-SDI Fiber-Optic OE Receiver with 16-Channel Unbalanced/Balanced AES Embed / De-Embed

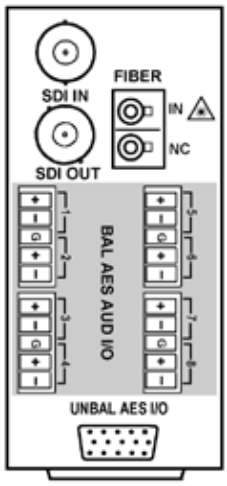
RM20-9433EMDE-OE-A-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Input (LC connector), (8) Balanced AES Audio I/O, (8) Unbalanced AES I/O (coaxial; DIN 1.0/2.3)

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, (2) Unbalanced AES I/O (via HD-15 connector; other connections reserved)



RM20-9433EMDE-OE-A-DIN
RM20-9433EMDE-OE-A-HDBNC



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 all-new 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.

Option +DT allows serial data and GPIO received by a card to be embedded on an unused embedded audio pair, and then de-embedded and sent over another card's serial Tx port. This offers a very convenient self-contained transport within the program stream physical media, greatly simplifying this data transfer workflow.

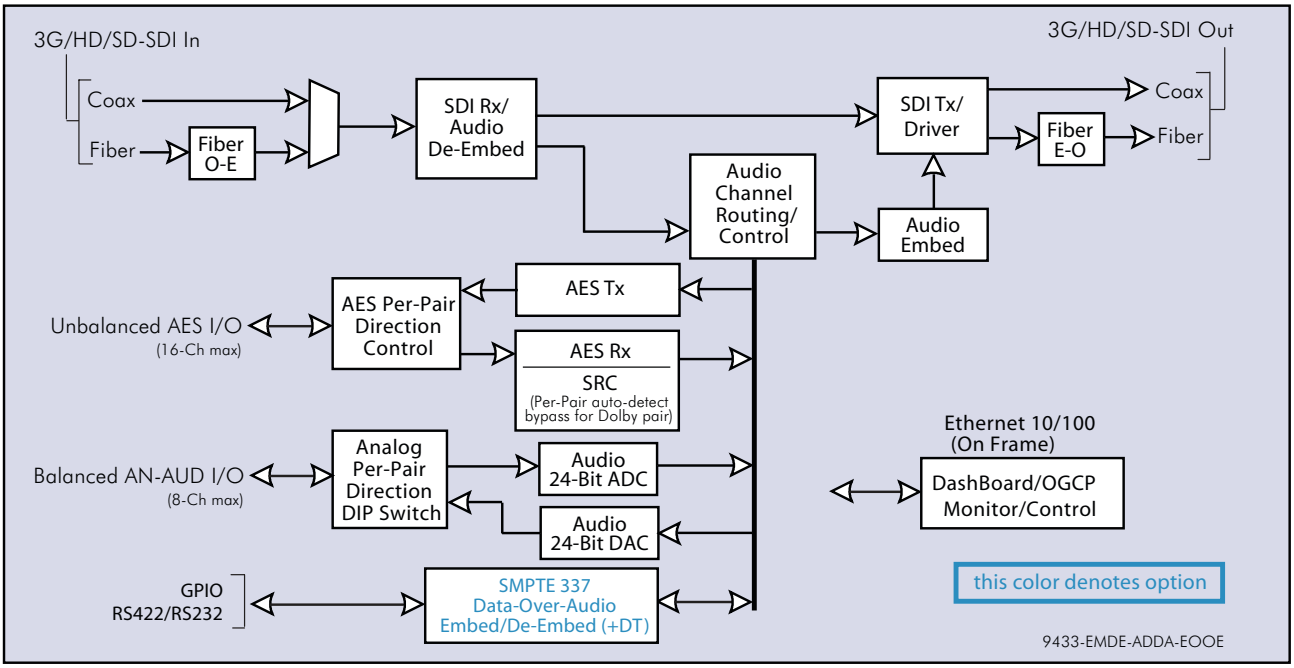
Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

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
- Five year warranty

OPTIONS

SMPTE 337 Data Embed/De-embed (+DT) – COMM/GPIO over audio embed/de-embed



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9433-EMDE-ADDA-E0OE » 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

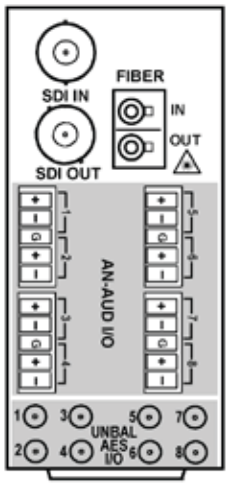
48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs. Analog audio I/O conforms to +24 dBu <=> 0 dBFS.

Analog Audio Specifications

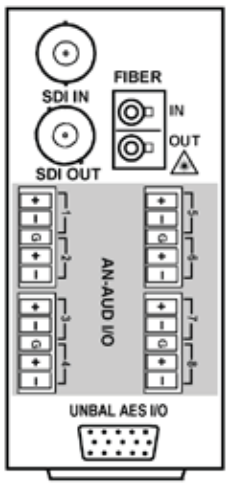
Input Impedance: >10 kΩ
Reference Level: -20 dBFS
Nominal Level: +4 dBu
Input Clip Level: +24 dBu (0 dBFS)
Freq. Response: ±0.2 dB (20 Hz to 20 kHz)
SNR: 115 dB (A weighted)
THD+N: -96 dB (20 Hz to 10 kHz)
Crosstalk: -106 dB (20 Hz to 20 kHz)
Output Impedance: < 50 Ω
Max. Output Level: +24 dBu (0 dBFS)

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



RM20-9433EMDE-EOOE-C-DIN
RM20-9433EMDE-EOOE-C-HDBNC



RM20-9433EMDE-EOOE-D

ORDERING INFORMATION

9433-EMDE-ADDA-E0OE 3G/HD/SD-SDI Fiber-Optic Transceiver with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed

9433-EMDE-ADDA-E0OE-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-E0OE-27 has 1270 nm FIBER OUT wavelength)

RM20-9433EMDE-E0OE-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-E0OE-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-E0OE- 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, (2) Unbalanced AES I/O, GPIO/COMM (via HD-15 connector)

+DT Data-Over-Audio SMPTE 337 Option

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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 all-new 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.

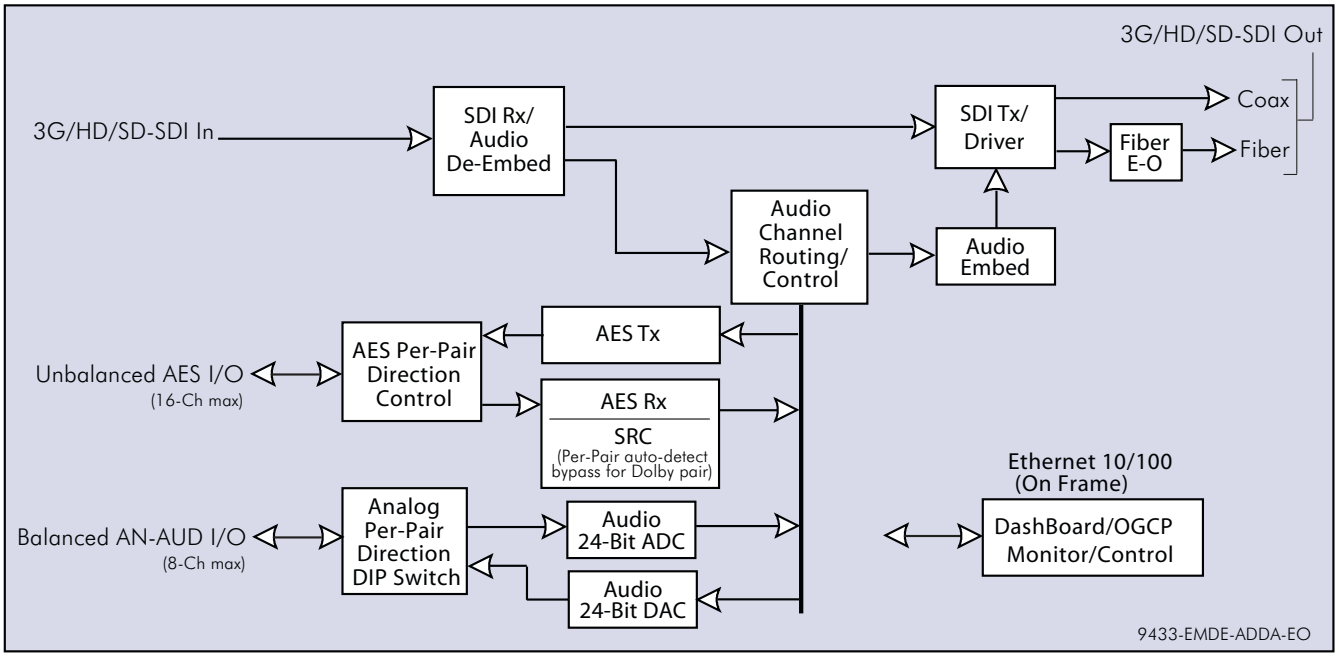
The 9433-EMDE-ADDA-EO provides full 16-channel embed / de-embed between AES, 8-channel analog audio, and all four groups of embedded audio. Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair 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.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. 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
- 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

ORDERING INFORMATION

9433-EMDE-ADDA-EO 3G/HD/SD-SDI Fiber-Optic Transceiver with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed

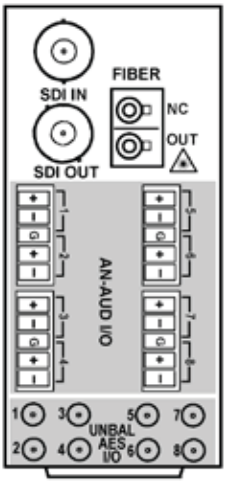
9433-EMDE-ADDA-EO-CWDM-WX 3G/HD/SD-SDI Fiber-Optic Transceiver with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed with Fiber Optic CWDM I/O

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)

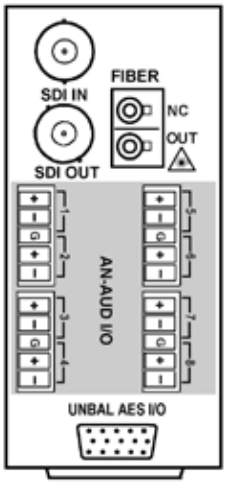
RM20-9433EMDE-EO-C-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Output (LC connectors), (8) Balanced Analog Audio I/O, (8) Unbalanced AES I/O (coaxial; DIN 1.0/2.3)

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, (2) Unbalanced AES I/O (via HD-15 connector; other connections reserved)



RM20-9433EMDE-EO-C-DIN
RM20-9433EMDE-EO-C-HDBNC



RM20-9433EMDE-EO-D

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9433-EMDE-ADDA-OE » 3G/HD/SD-SDI FIBER-OPTIC OE RECCEIVER

with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed

The all-new 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.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. 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.

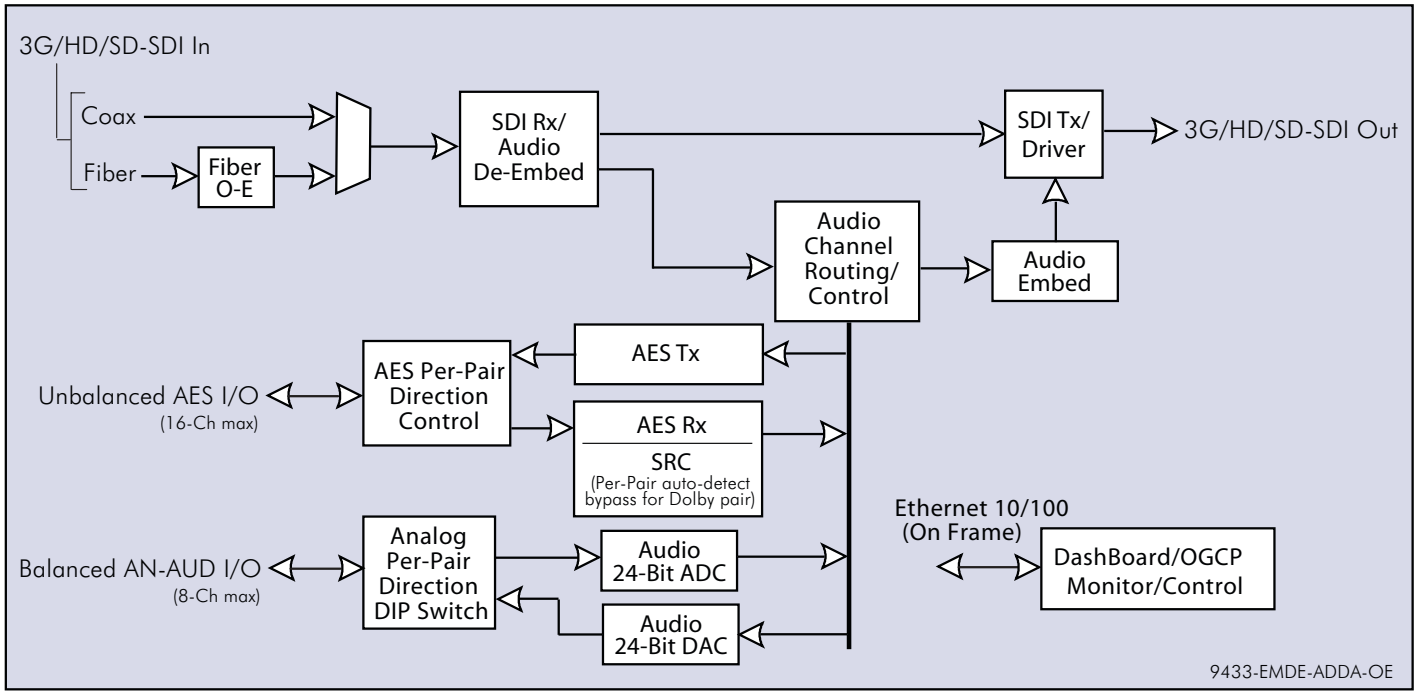
DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.

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

Five year warranty



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9433-EMDE-ADDA-OE » 3G/HD/SD-SDI FIBER-OPTIC OE RECCEIVER

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

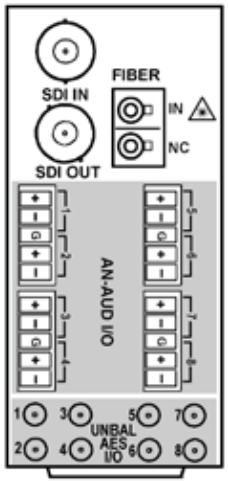
ORDERING INFORMATION

9433-EMDE-ADDA-OE 3G/HD/SD-SDI Fiber-Optic OE Receiver with 16-Channel AES / 8-Channel Analog Audio Embed / De-Embed

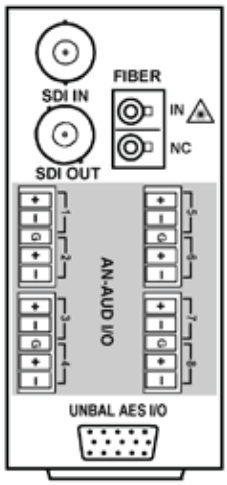
RM20-9433EMDE-OE-C-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Fiber Input (LC connector), (8) Balanced Analog Audio I/O, (8) Unbalanced AES I/O (coaxial; DIN 1.0/2.3)

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, (2) Unbalanced AES I/O (via HD-15 connector; other connections reserved)



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

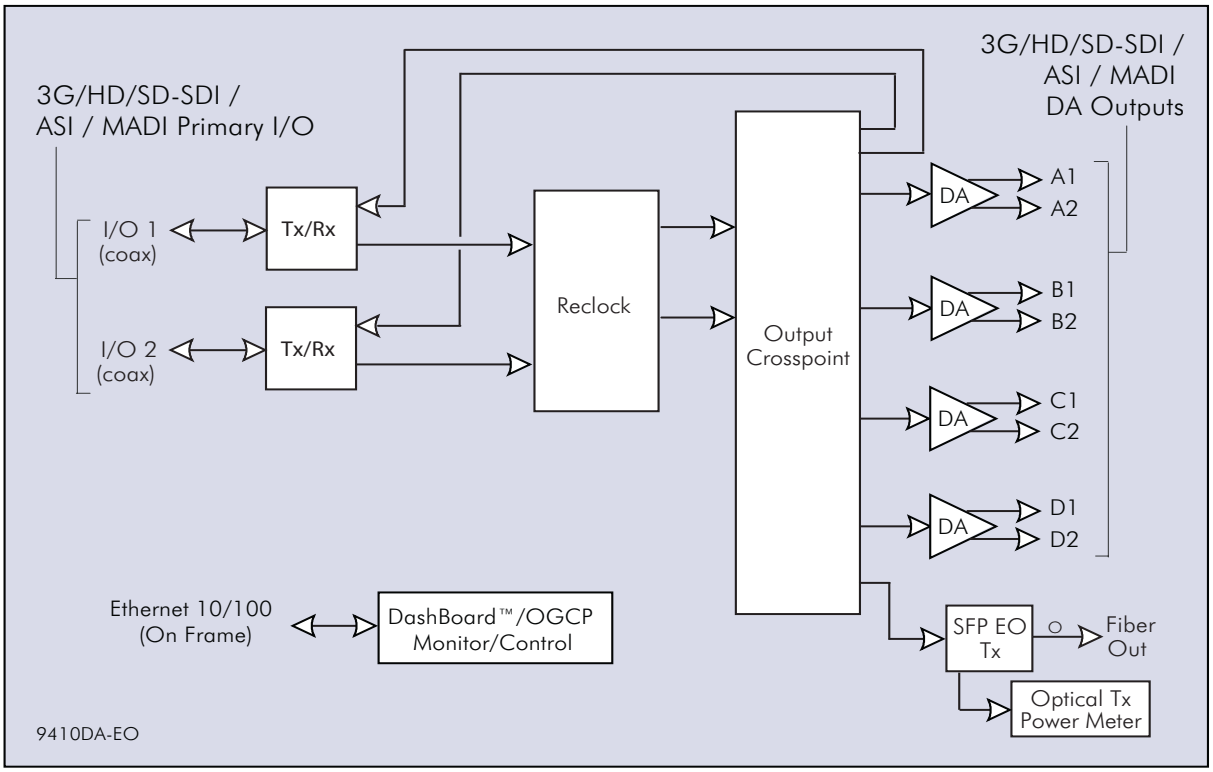
The all-new Cobalt® 9410DA-EO 3G/HD/SD-SDI / ASI / MADI Fiber EO Transport/Distribution Amplifier with Full-Flexibility Crosspoint provides a card-based solution for high-density conversion from coax to fiber, as well as coaxial distribution. The 9410DA-EO is multi-rate, and supports SDI and ASI/DVB 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.

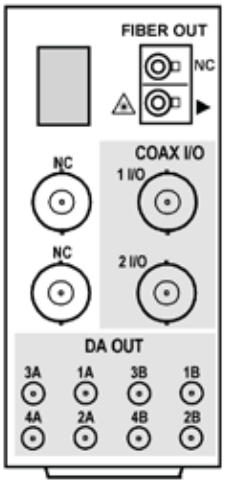
Power
< 10 Watts

3G/HD/SD-SDI / ASI / MADI Inputs/Outputs (Coaxial Primary)
(2) 75Ω BNC input/outputs max (I/O1 and I/O2)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

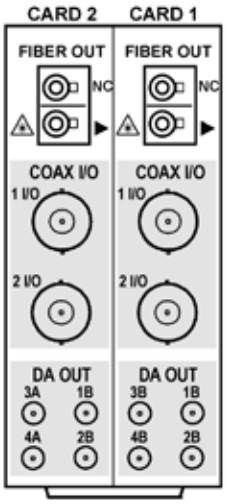
Coaxial Receive Performance (Cable Length; Belden 1694A)
SDI Receive Cable Length (1694A): 110m/180m/360m (3G/HD/SD)

Fiber Transmit Output
(1) Fiber output; LC connector
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)

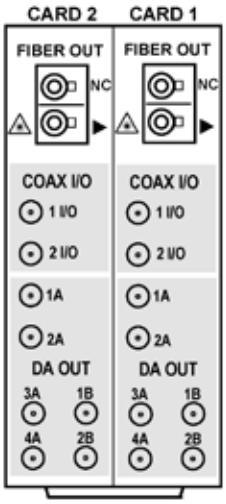
3G/HD/SD-SDI / ASI / MADI Outputs (DA Outputs)
Four, 1x2 75Ω BNC outputs (8 total, max). Each DA pair can receive any primary or opposite-channel DA signal.
Signal Level: 800 mV nominal
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI



RM20-9410DA-EO-B-DIN|HDBNC



RM20-9410DA-EO-B|S-DIN|HDBNC



RM20-9410DA-EO-C|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-B-DIN 20-Slot Frame Rear I/O Module. (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) Fiber out (LC connector), (8) DA coaxial outputs (connections are per card; DA output connectors are DIN1.0/2.3) (**Note:** Mates to card in **odd** frame slot.)

RM20-9410-EO-B-HDBNC 20-Slot Frame Rear I/O Module. (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) Fiber out (LC connector), (8) DA coaxial outputs (connections are per card; DA output connectors are HD-BNC) (**Note:** Mates to card in **odd** frame slot.)

RM20-9410DA-EO-B/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)

RM20-9410DA-EO-B/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)

RM20-9410DA-EO-C/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)

RM20-9410DA-EO-C/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)

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9410DA-OE » 3G/HD/SD-SDI / ASI / MADI FIBER OE TRANSPORT/DISTRIBUTION AMPLIFIER

with Full-Flexibility Crosspoint

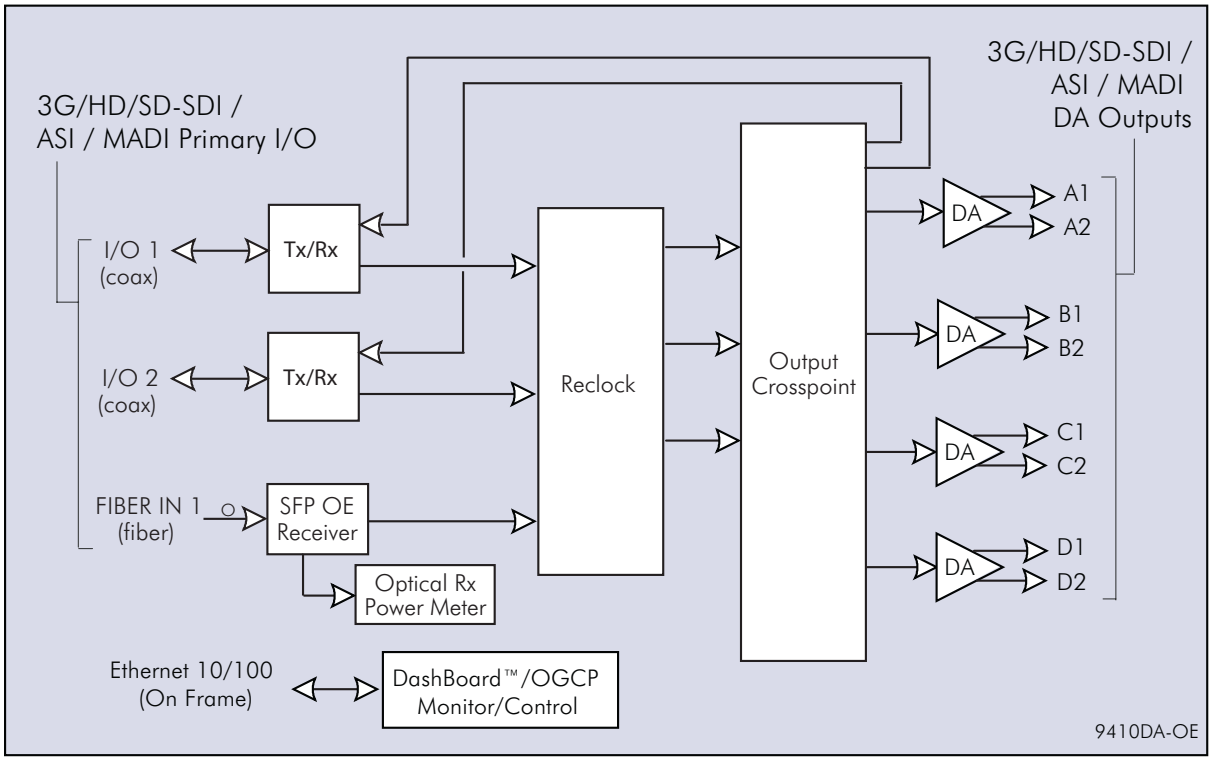
The all-new Cobalt® 9410DA-OE 3G/HD/SD-SDI / ASI / MADI Fiber OE Transport/Distribution Amplifier with Full-Flexibility Crosspoint provides a card-based solution for high-density conversion from fiber to coax, as well as coaxial distribution. The 9410DA-OE is multi-rate, and supports SDI and ASI/DVB 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.

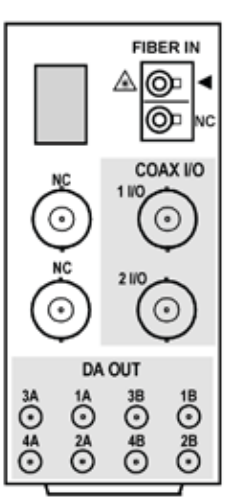
Power
< 10 Watts

3G/HD/SD-SDI / ASI / MADI Inputs/Outputs (Coaxial Primary)
(2) 75Ω BNC input/outputs max (I/O1 and I/O2)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

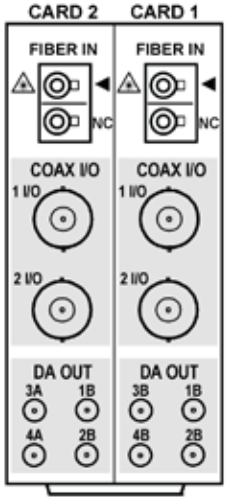
Coaxial Receive Performance (Cable Length; Belden 1694A)
SDI Receive Cable Length (1694A): 110m/180m/360m (3G/HD/SD)

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

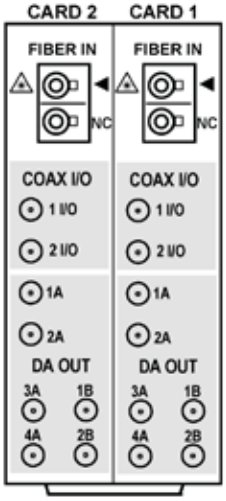
3G/HD/SD-SDI / ASI / MADI Outputs (DA Outputs)
Four, 1x2 75Ω BNC outputs (8 total, max). Each DA pair can receive any primary or opposite-channel DA signal.
Signal Level: 800 mV nominal
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI



RM20-9410DA-OE-B-DIN|HDBNC



RM20-9410DA-OE-B|S-DIN|HDBNC



RM20-9410DA-OE-C|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-B-DIN 20-Slot Frame Rear I/O Module. (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) Fiber in (LC connector), (8) DA coaxial outputs (connections are per card; DA output connectors are DIN1.0/2.3) (**Note:** Mates to card in **odd** frame slot.)

RM20-9410-OE-B-HDBNC 20-Slot Frame Rear I/O Module. (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) Fiber in (LC connector), (8) DA coaxial outputs (connections are per card; DA output connectors are HD-BNC) (**Note:** Mates to card in **odd** frame slot.)

RM20-9410DA-OE-B/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)

RM20-9410DA-OE-B/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)

RM20-9410DA-OE-C/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)

RM20-9410DA-OE-C/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)

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9410DA-2EO » 3G/HD/SD-SDI / ASI / MADI FIBER DUAL EO TRANSPORT/ DISTRIBUTION AMPLIFIER with Full-Flexibility Crosspoint

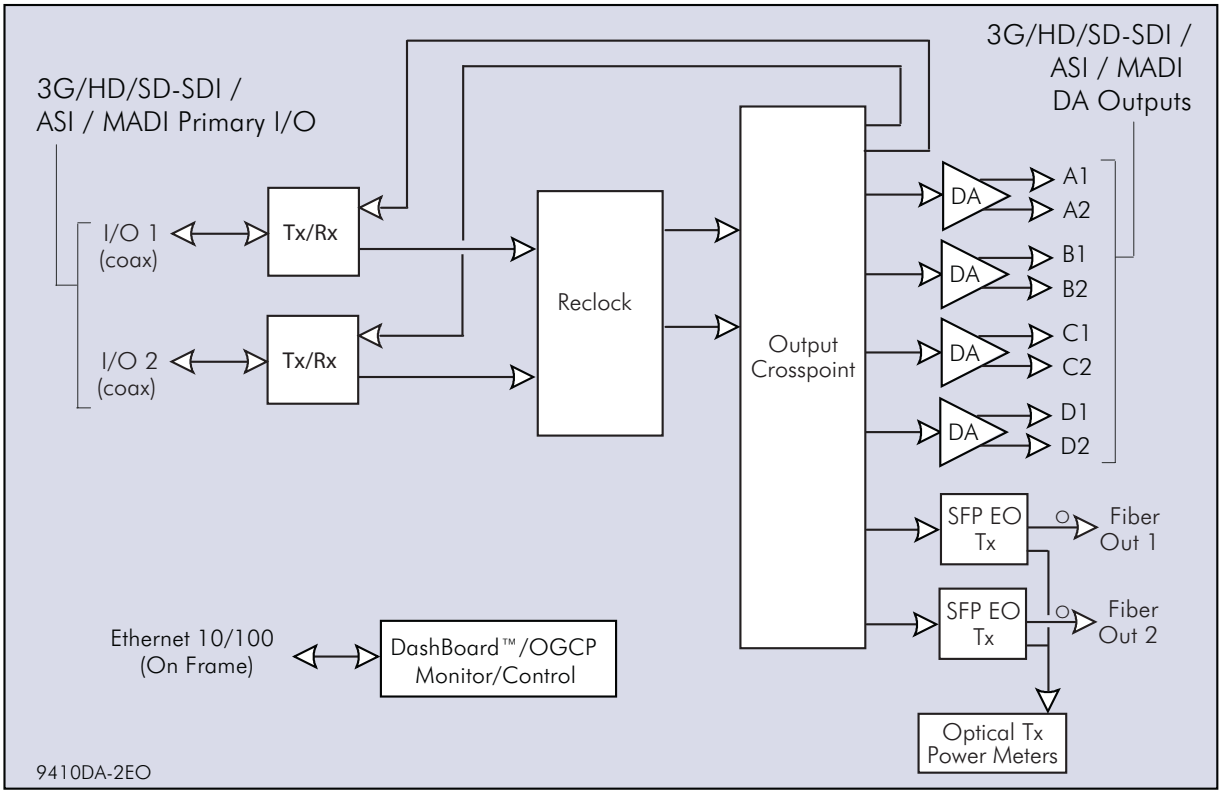
The all-new Cobalt® 9410DA-2EO 3G/HD/SD-SDI / ASI / MADI Fiber Dual EO Transport/ Distribution Amplifier with Full-Flexibility Crosspoint provides a card-based solution for high-density conversion from coax to fiber (with two independent EO channels), as well as coaxial distribution. The 9410DA-2EO is 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 Crosspoint

SPECIFICATIONS

Note: Inputs/outputs are a function of rear I/O module used. Specifications subject to change.

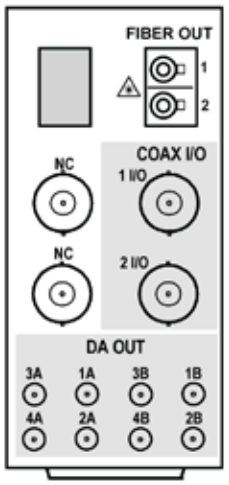
Power
< 10 Watts

3G/HD/SD-SDI / ASI / MADI Inputs/Outputs (Coaxial Primary)
(2) 75Ω BNC input/outputs max (I/O1 and I/O2)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

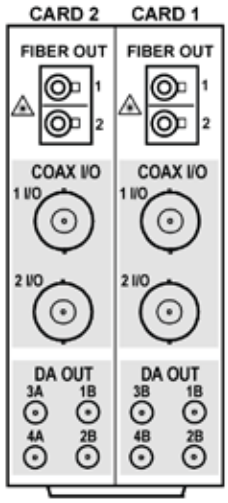
Coaxial Receive Performance (Cable Length; Belden 1694A)
SDI Receive Cable Length (1694A): 110m/180m/360m (3G/HD/SD)

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-B-DIN/HDBNC



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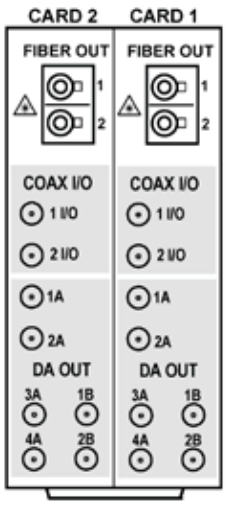

RM20-9410DA-2EO-C/S-DIN/HDBNC

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-B-DIN 20-Slot Frame Rear I/O Module. (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (2) Fiber out (LC connectors), (8) DA coaxial outputs (connections are per card; DA output connectors are DIN1.0/2.3) (**Note:** Mates to card in **odd** frame slot.)

RM20-9410-2EO-B-HDBNC 20-Slot Frame Rear I/O Module. (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (2) Fiber out (LC connectors), (8) DA coaxial outputs (connections are per card; DA output connectors are HD-BNC) (**Note:** Mates to card in **odd** frame slot.)

RM20-9410DA-2EO-B/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)

RM20-9410DA-2EO-B/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)

RM20-9410DA-2EO-C/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)

RM20-9410DA-2EO-C/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)

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9410DA-2OE » 3G/HD/SD-SDI / ASI / MADI FIBER DUAL OE TRANSPORT/ DISTRIBUTION AMPLIFIER with Full-Flexibility Crosspoint

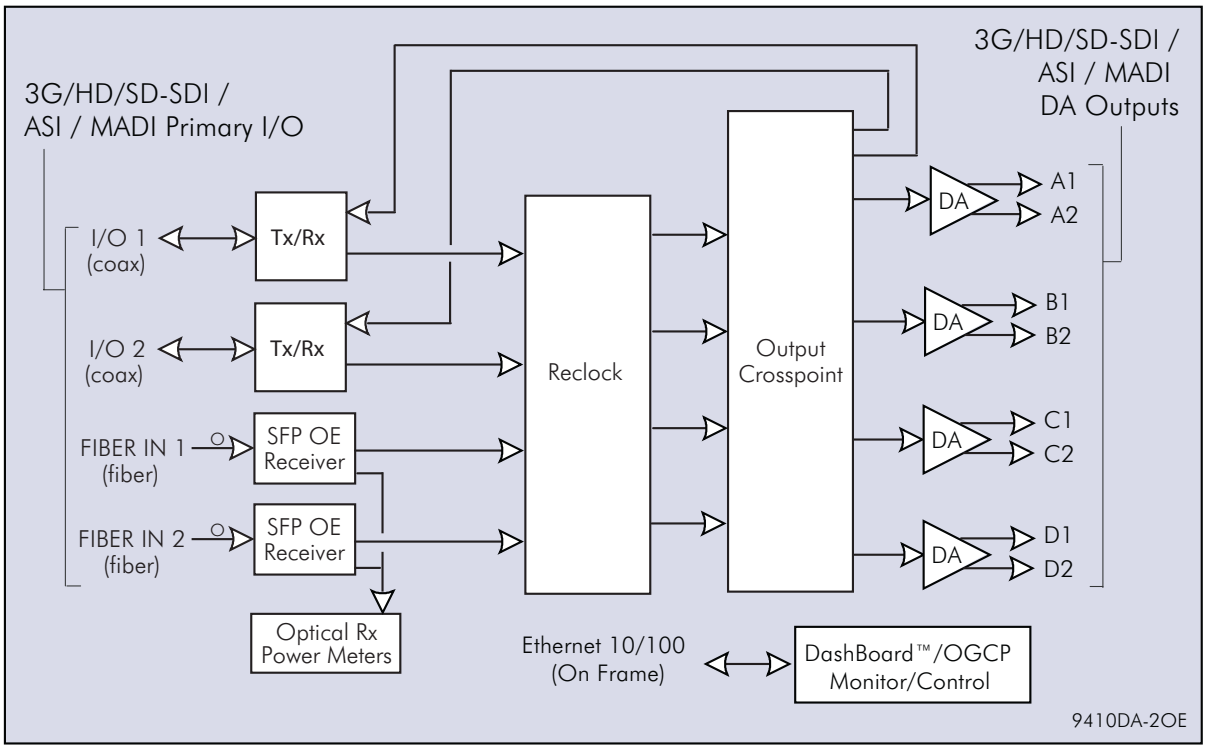
The all-new Cobalt® 9410DA-2OE 3G/HD/SD-SDI / ASI / MADI Fiber Dual OE Transport/ Distribution Amplifier with Full-Flexibility Crosspoint provides a card-based solution for high-density conversion from fiber to coax (with two independent OE channels), as well as coaxial distribution. The 9410DA-2OE is 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



openGear

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9410DA-20E » 3G/HD/SD-SDI / ASI / MADI FIBER DUAL 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.

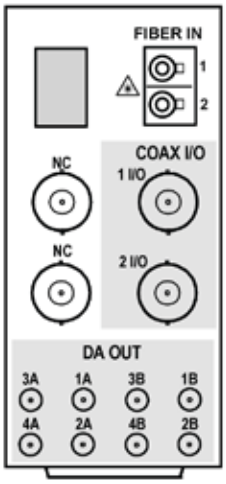
Power
< 10 Watts

3G/HD/SD-SDI / ASI / MADI Inputs/Outputs (Coaxial Primary)
(2) 75Ω BNC input/outputs max (I/O1 and I/O2)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

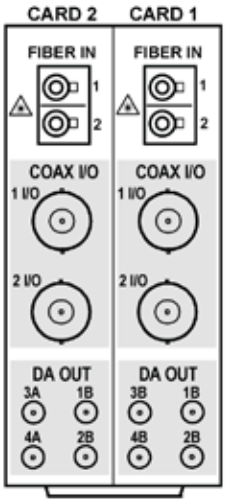
Coaxial Receive Performance (Cable Length; Belden 1694A)
SDI Receive Cable Length (1694A): 110m/180m/360m (3G/HD/SD)

Fiber Receive Input
(2) Fiber input; LC connectors
Receive Sensitivity: -23 dBm; 1260 to 1620 nm (with internal power meter status display)

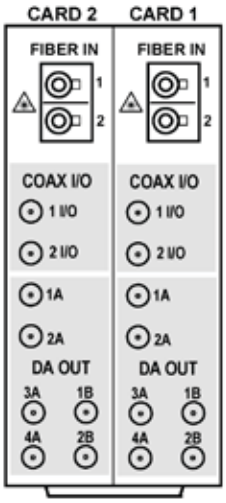
3G/HD/SD-SDI / ASI / MADI Outputs (DA Outputs)
Four, 1x2 75Ω BNC outputs (8 total, max). Each DA pair can receive any primary or opposite-channel DA signal.
Signal Level: 800 mV nominal
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI



RM20-9410DA-2OE-B-DIN|HDBNC



RM20-9410DA-2OE-B|S-DIN|HDBNC



RM20-9410DA-2OE-C|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-B-DIN 20-Slot Frame Rear I/O Module. (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (2) Fiber in (LC connectors), (8) DA coaxial outputs (connections are per card; DA output connectors are DIN1.0/2.3) (**Note:** Mates to card in **odd** frame slot.)

RM20-9410-20E-B-HDBNC 20-Slot Frame Rear I/O Module. (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (2) Fiber in (LC connectors), (8) DA coaxial outputs (connections are per card; DA output connectors are HD-BNC) (**Note:** Mates to card in **odd** frame slot.)

RM20-9410DA-20E-B/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)

RM20-9410DA-20E-B/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)

RM20-9410DA-20E-C/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)

RM20-9410DA-20E-C/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)

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9410DA-EOOE » 3G/HD/SD-SDI / ASI / MADI FIBER EOOE TRANSPORT/ DISTRIBUTION AMPLIFIER with Full-Flexibility Crosspoint

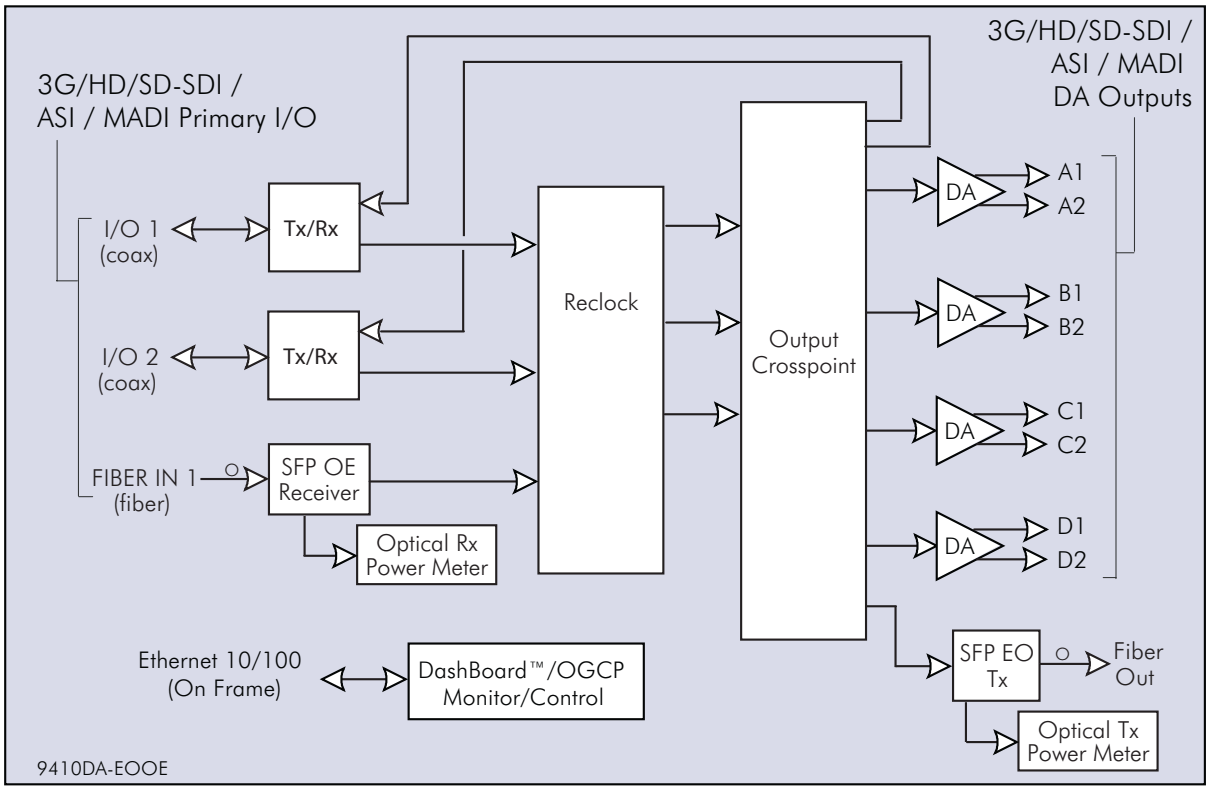
The all-new Cobalt® 9410DA-EOOE 3G/HD/SD-SDI / ASI / MADI Fiber EOOE Transport/Distribution Amplifier with Full-Flexibility Crosspoint provides a card-based solution for high-density conversion between coax and fiber, as well as coaxial distribution. The 9410DA-EOOE is multi-rate, and supports SDI and 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

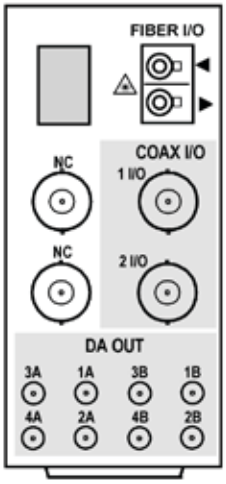
3G/HD/SD-SDI / ASI / MADI Inputs/Outputs (Coaxial Primary)
(2) 75Ω BNC input/outputs max (I/O1 and I/O2)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Coaxial Receive Performance (Cable Length; Belden 1694A)
SDI Receive Cable Length (1694A): 110m/180m/360m (3G/HD/SD)

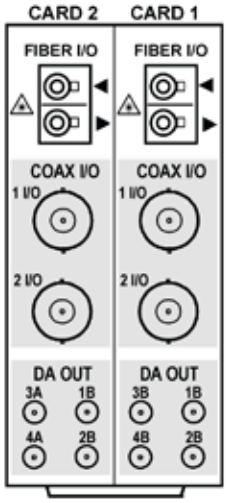
Fiber Transmit Output
(1) Fiber output; LC connector
Fiber Wavelength, Tx: 1310 nm
Tx Power: -5.0 dBm (min)

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

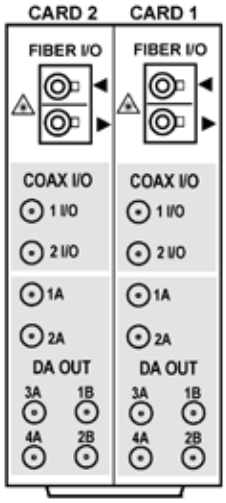
3G/HD/SD-SDI / ASI / MADI Outputs (DA Outputs)
Four, 1x2 75Ω BNC outputs (8 total, max). Each DA pair can receive any primary or opposite-channel DA signal.
Signal Level: 800 mV nominal
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI



RM20-9410DA-EOOE-B-DIN/HDBNC



RM20-9410DA-EOOE-B/S-DIN/HDBNC



RM20-9410DA-EOOE-C/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-B-DIN 20-Slot Frame Rear I/O Module. (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) Fiber in (LC connector), (1) Fiber out (LC connector), (8) DA coaxial outputs (connections are per card; DA output connectors are DIN1.0/2.3) (**Note:** Mates to card in **odd** frame slot.)

RM20-9410-EOOE-B-HDBNC 20-Slot Frame Rear I/O Module. (2) 3G/HD/SD-SDI / ASI / MADI input/output BNCs, (1) Fiber in (LC connector), (1) Fiber out (LC connector), (8) DA coaxial outputs (connections are per card; DA output connectors are HD-BNC) (**Note:** Mates to card in **odd** frame slot.)

RM20-9410DA-EOOE-B/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)

RM20-9410DA-EOOE-B/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)

RM20-9410DA-EOOE-C/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)

RM20-9410DA-EOOE-C/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)

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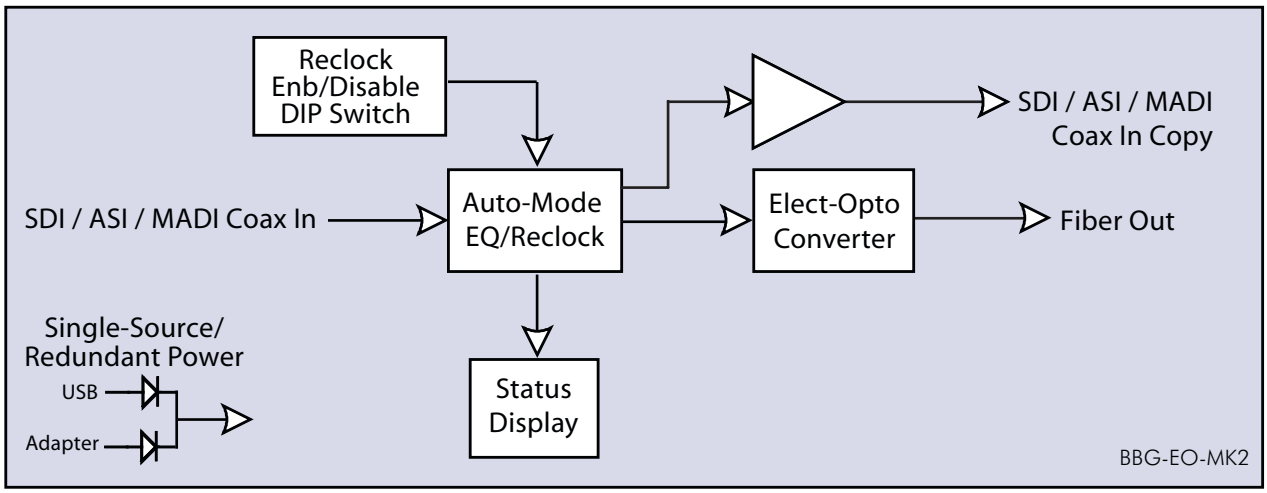
BBG-EO-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC TRANSPORT TRANSMITTER

The new Mark-II 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 professional fiber video interfaces.

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
- 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.
- Singlemode fiber link distance >10 km (3Gbps), >20 km (1.5Gbps), and >35 km (270Mbps). Multimode typically > 200 m.
- 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: -7.5 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)

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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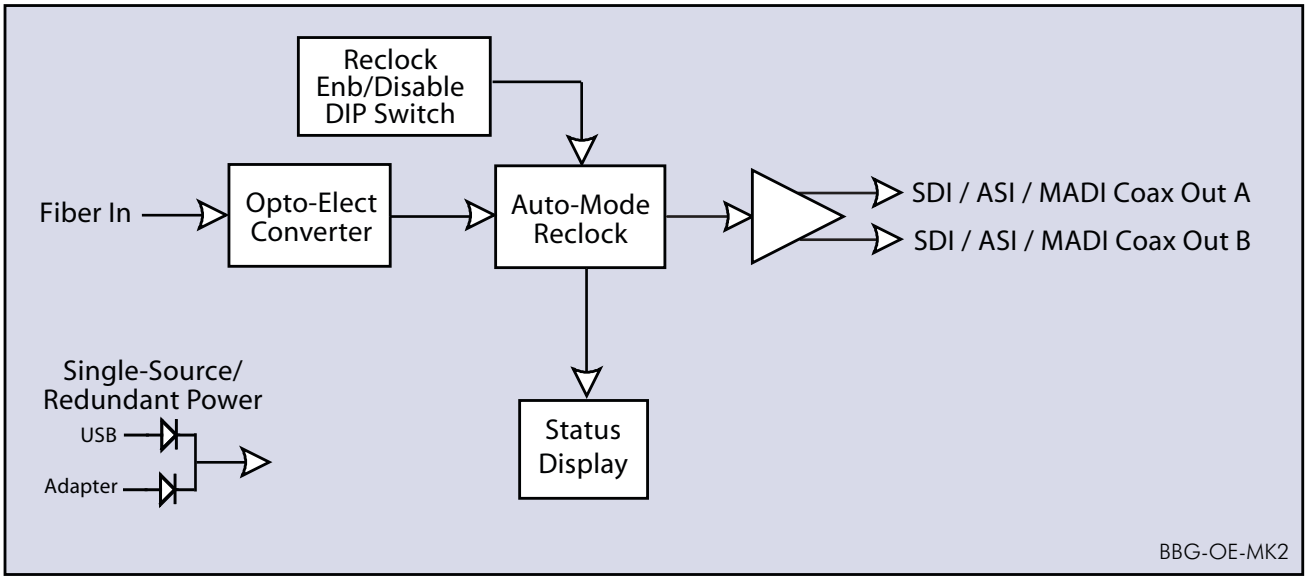
BBG-OE-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC TRANSPORT RECEIVER

The new Mark-II Blue Box BBG-OE-MK2 (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, 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 professional fiber video interfaces.

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
- 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.
- Singlemode fiber link distance >10 km (3Gbps), >20 km (1.5Gbps), and >35 km (270Mbps). Multimode typically > 200 m.
- 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)

Inputs
2) Fiber input. FC, ST, or LC connectors per ordered configuration (see Ordering Info)
Wavelength: 1100 to 1610 nm
Sensitivity: -20 dBm

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)

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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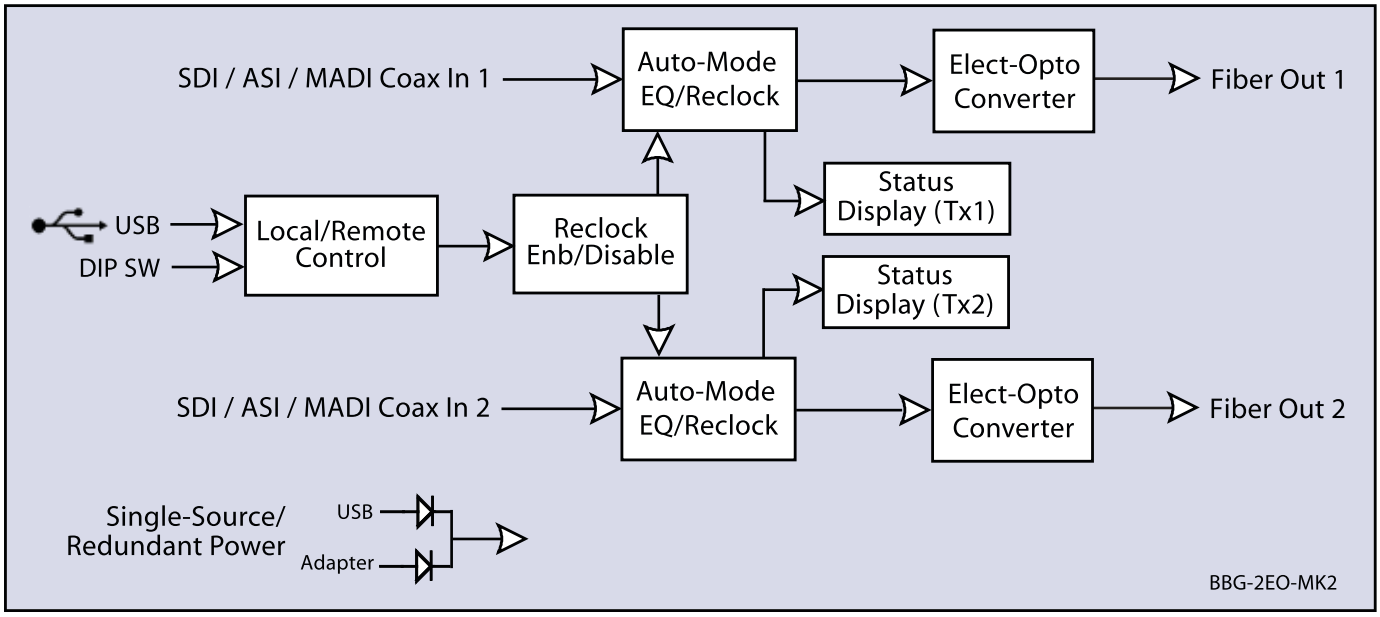
BBG-2EO-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC DUAL TRANSPORT TRANSMITTER

The new Mark-II 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 professional fiber video interfaces.

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

- 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
- 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
- Singlemode fiber link distance >10 km (3Gbps), >20 km (1.5Gbps), and >35 km (270Mbps). Multimode typically > 200 m.
- 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: -7.5 dBm (min)

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

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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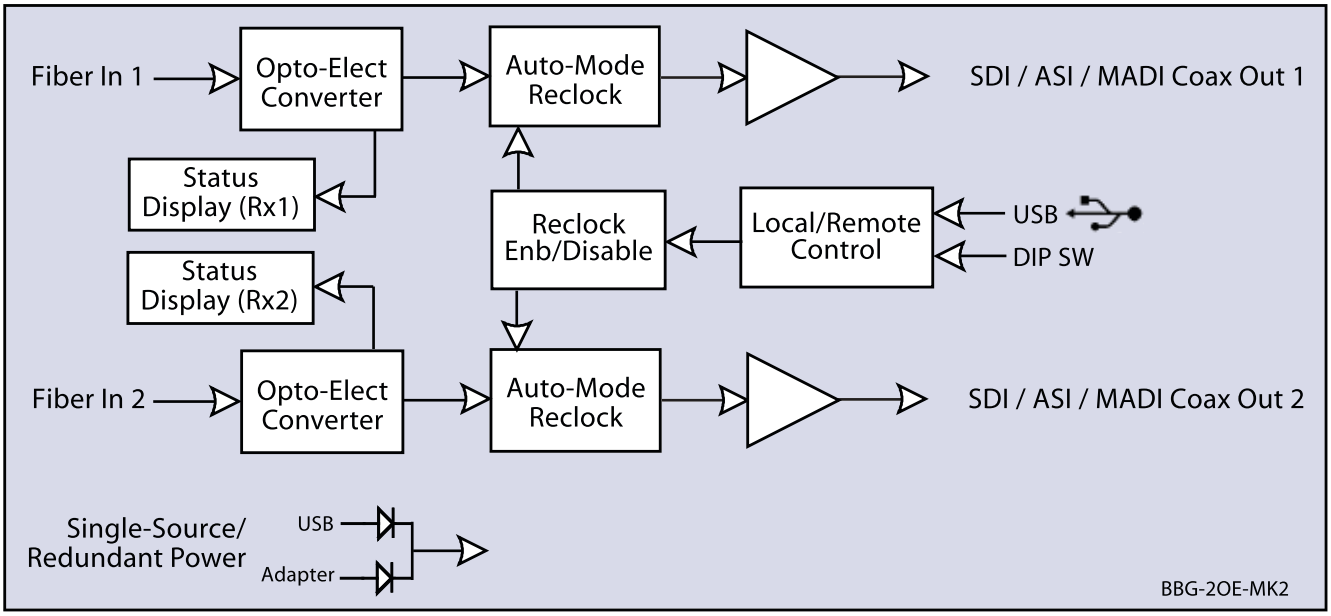
BBG-2OE-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC DUAL TRANSPORT RECEIVER

The new Mark-II 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 professional fiber video interfaces.

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

- 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
- 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
- Singlemode fiber link distance >10 km (3Gbps), >20 km (1.5Gbps), and >35 km (270Mbps). Multimode typically > 200 m.
- 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: 1100 to 1610 nm
Sensitivity: -20 dBm

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)

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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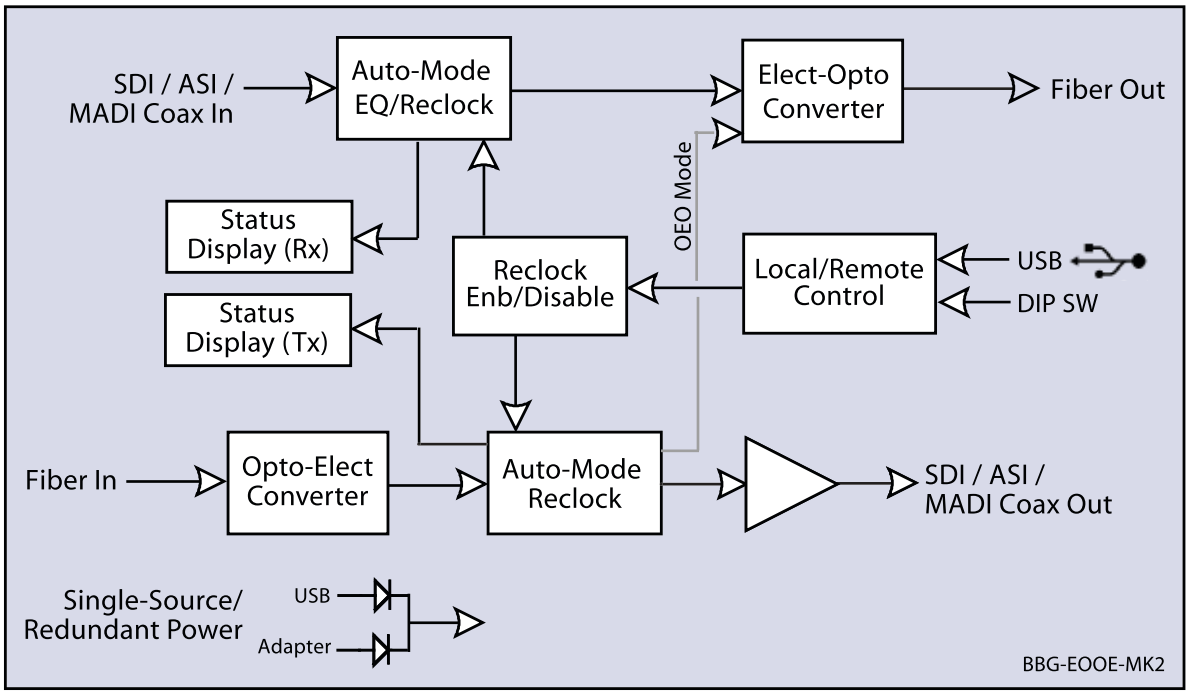
BBG-EOOE-MK2 » 3G/HD/SD-SDI / ASI / MADI FIBER OPTIC TRANSPORT TRANSCEIVER

The new Mark-II Blue Box BBG-EOOE-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-EOOE-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 professional fiber video interfaces.

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

- Independent companion fiber Rx and Tx 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.
- 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
- 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.
- Singlemode fiber link distance >10 km (3Gbps), >20 km (1.5Gbps), and >35 km (270Mbps). Multimode typically > 200 m.
- 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: 1310 nm
Sensitivity: -20 dBm

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. Reclocking automatically engaged for recognized signal standards; bypassed for unrecognized standards.
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)
Wavelength: 1310 nm
Power: -7.5 dBm (min)

Dimensions (WxHxD)
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

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

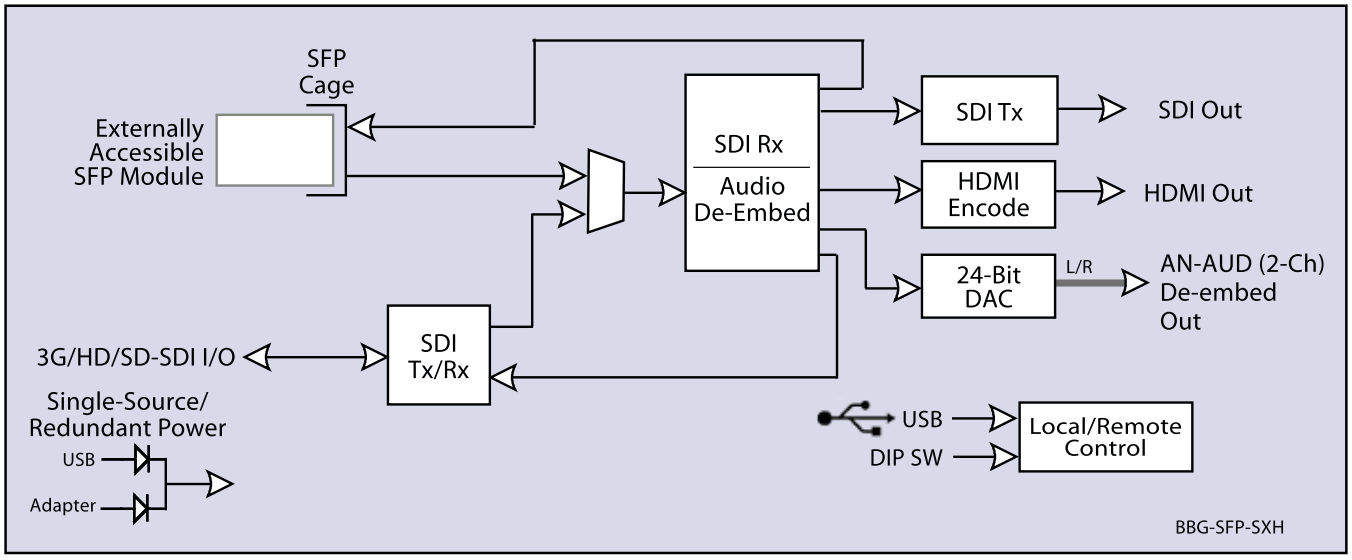
The new BlueBox 3G/HD/SD-SDI / ASI Reconfigurable Video SFP Transceiver with Externally-Accessible SFP Module (BBG-SFP-SXH) throw-down converter unit is a new part of the Blue Box Group™ of compact, rugged, and portable converter boxes.

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)

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)

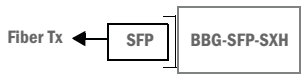
ORDERING INFORMATION

BBG-SFP-SXH 3G/HD/SD-SDI / ASI Reconfigurable Video SFP Transceiver with Externally-Accessible SFP Module

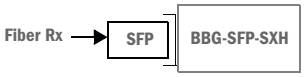
Note: The USB GUI application available for BBG-SFP-SXH is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. Currently, this application is available only for Windows Vista thru Windows 10.

BBG-MB Mounting Bracket

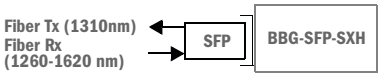
The following SFP modules are available for BBG-SFP-SXH (purchased and available separately):



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

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BBG-H-TO-F » 3G/HD/SD HDMI-TO-FIBER OPTIC CONVERTER

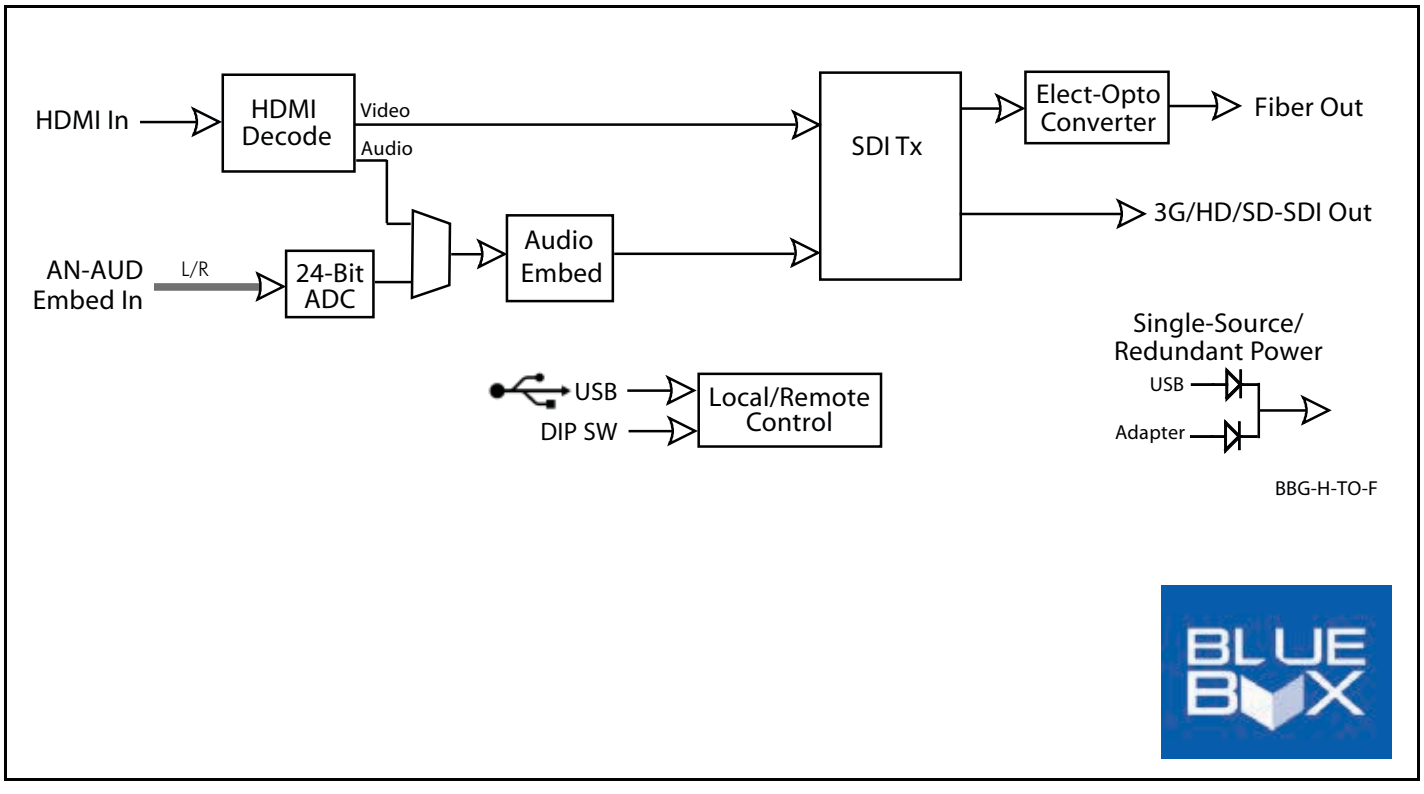
The new Blue Box HDMI-to-Fiber (BBG-H-To-F) throw-down converter unit is a new part of the Blue Box Group™ of compact, rugged, and portable converter boxes. BBG-H-to-F offers a compact throwdown unit that provides direct HDMI-to-fiber conversion and much more.

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)

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)

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

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BBG-F-TO-H » 3G/HD/SD-SDI FIBER OPTIC-TO-HDMI CONVERTER

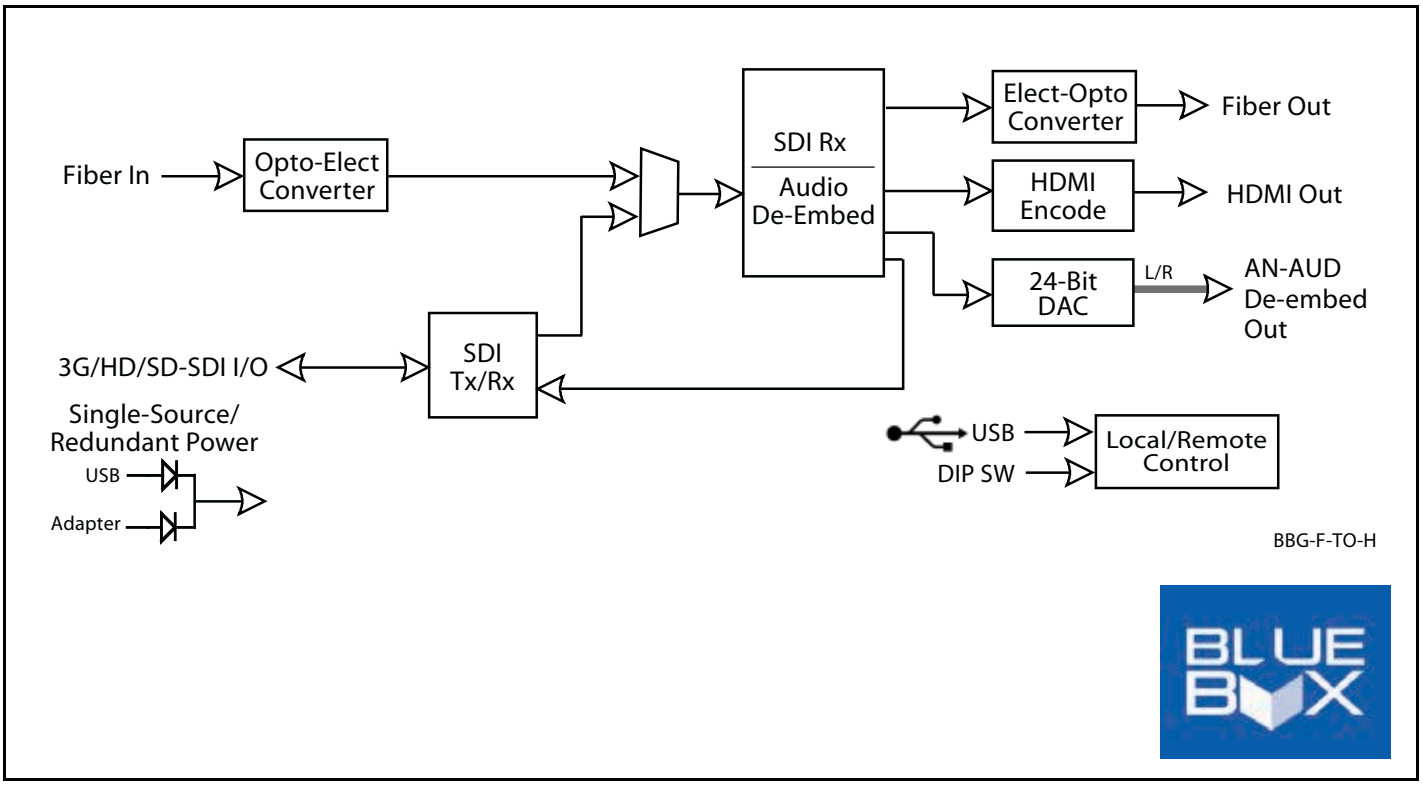
The new Blue Box Fiber-To-HDMI (BBG F-To-H) throw-down converter unit is a new part of the Blue Box Group™ of compact, rugged, and portable converter boxes. BBG F-To-H offers a compact throwdown unit that provides direct fiber-To-HDMI conversion and much more.

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)

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)

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

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BBG-H-TO-S » HDMI-TO-3G/HD/SD-SDI WITH AUDIO EMBEDDER

Cobalt introduces Blue Box Group™ – our all-new line of interface converter boxes that not only offer excellent performance, but also excel to a new level of ease of use and installation practicality.

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).

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.

FEATURES

Direct conversion from HDMI to SMPTE 259M, 292M and 424M SDI. Accepts DVI-D input sources with conversion to coax SDI.

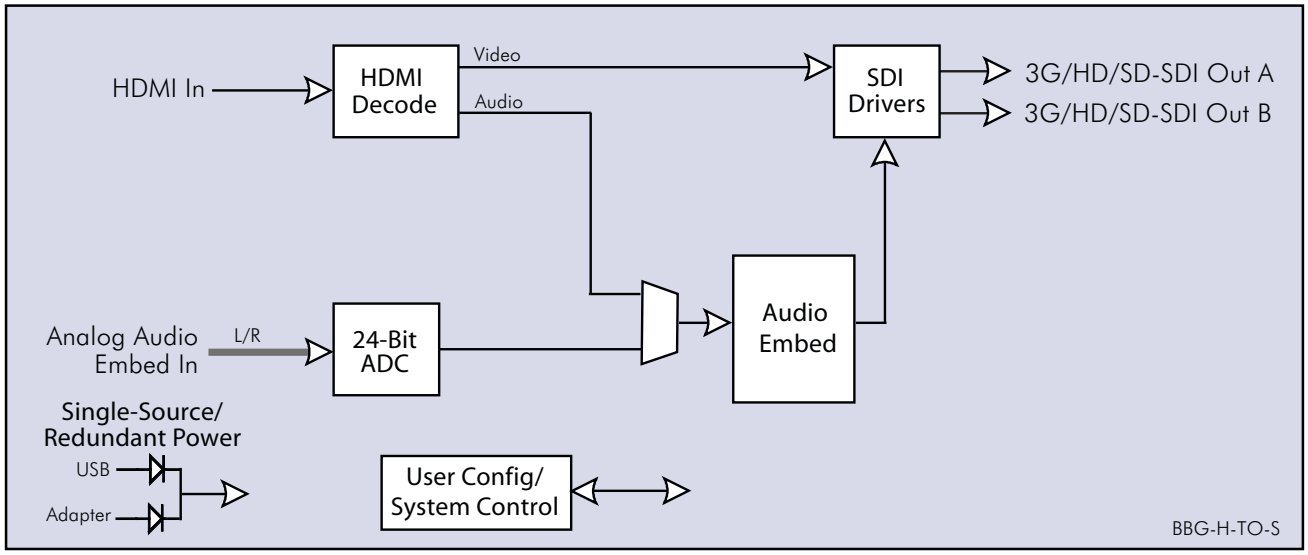
Compact size and low weight design easily affixes directly to camera or host device chassis

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)

ORDERING INFORMATION

BBG-H-TO-S HDMI-to-HD/SD-SDI with Audio Embedder Converter Unit

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BBG-S-TO-H » 3G/HD/SD-SDI-TO-HDMI WITH AUDIO DE-EMBEDDER

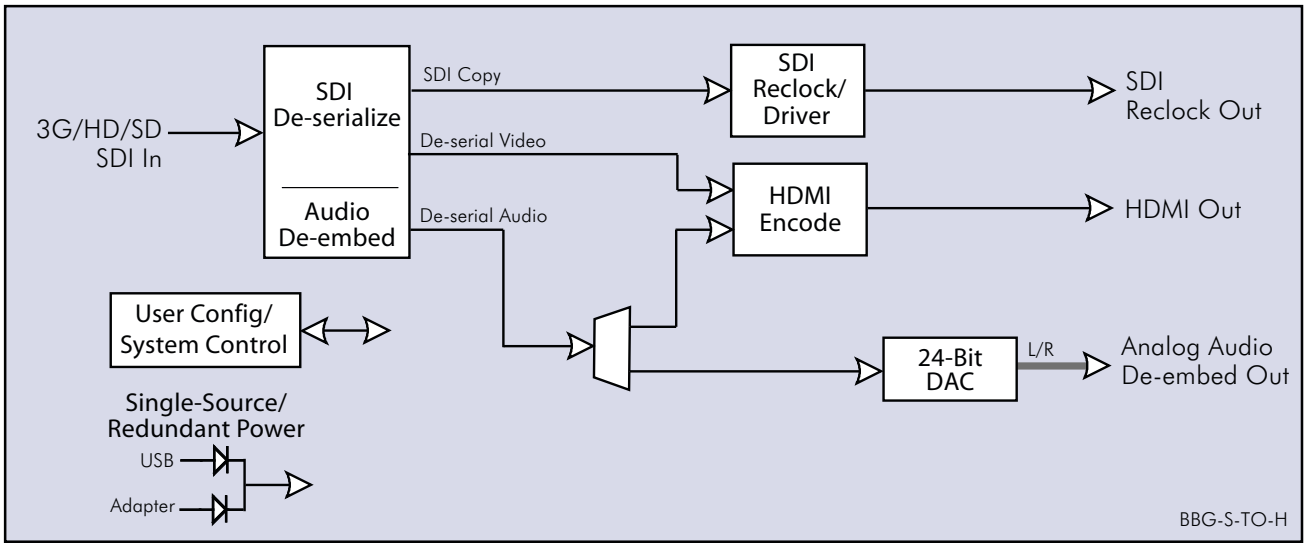
Cobalt introduces Blue Box Group™ – our all-new line of interface converter boxes that not only offer excellent performance, but also excel to a new level of ease of use and installation practicality.

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)

ORDERING INFORMATION

BBG-S-TO-H HD/SD-SDI-to-HDMI with Audio De-Embedder Converter Unit

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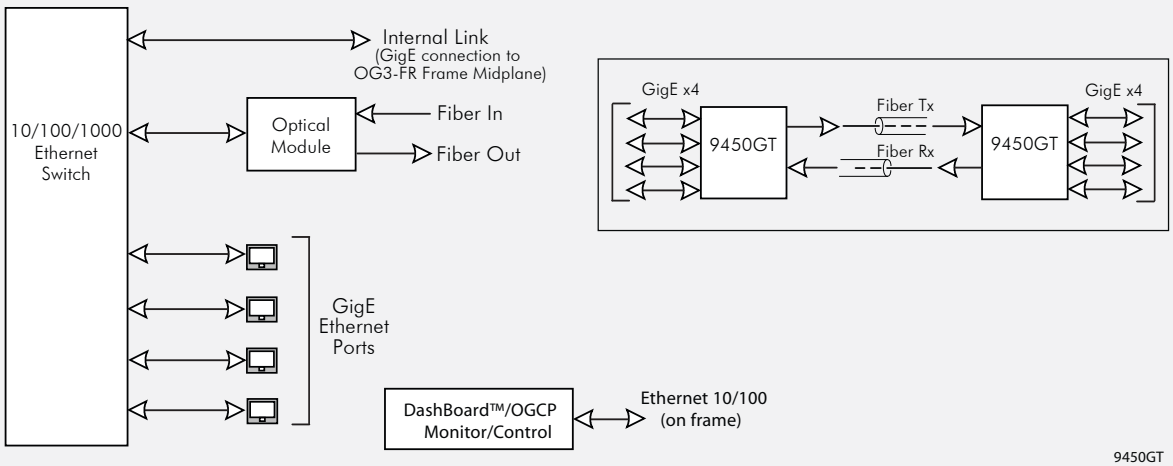
9450GT » FIBER ETHERNET SWITCH TRANSCEIVERS

The 9450GT series of fiber Ethernet switch transceivers are available in several versions providing various link length support using dual-fiber Tx/Rx. 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
- 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
- Remote control/monitoring via Dashboard™ software
- Five year warranty



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9450GT » FIBER ETHERNET SWITCH TRANSCEIVERS

» SPECIFICATIONS

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)

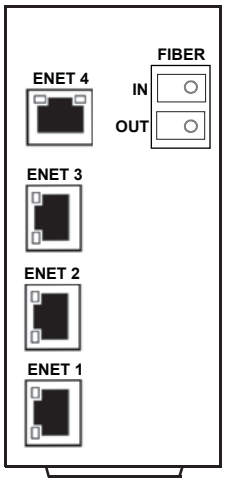
9450GT-40KM-LC Single-Link Ethernet/Fiber Transceiver. Dual-Fiber 40km, 1310nm Tx/Rx. Includes Rear I/O Module (LC connectors only)

9450GT-80KM-LC Single-Link Ethernet/Fiber Transceiver. Dual-Fiber 80km, 1550nm Tx/Rx. Includes Rear I/O Module (LC connectors only)

9450GT-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



RM20-9450GT-B

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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.

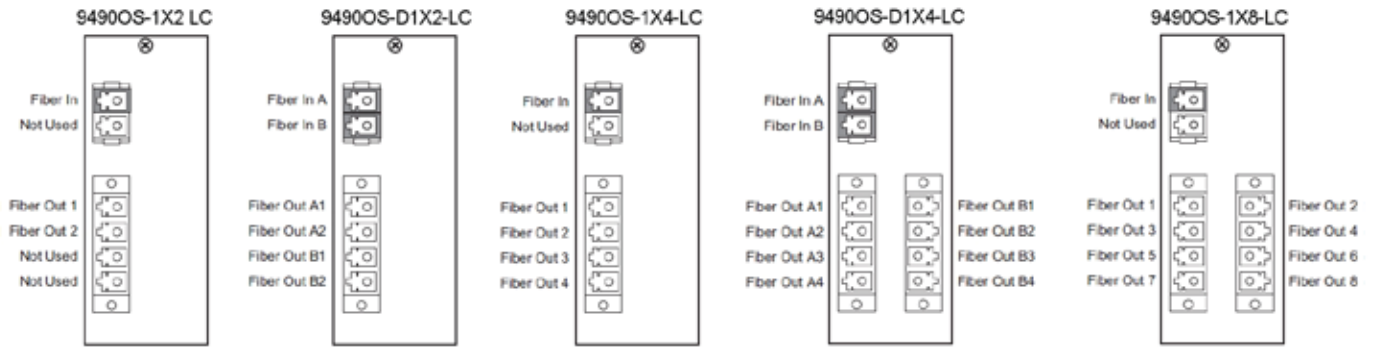
Wavelength agnostic operation - supports 1270nm thru 1620nm signals

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)
9490OS-1x2, 9490OS-D1x2: 4 dB
9490OS-1x4, 9490OS-D1x4: 8 dB
9490OS-1x8: 11 dB

Uniformity
9490OS-1x2, 9490OS-D1x2: 0.4 dB
9490OS-1x4, 9490OS-D1x4: 0.6 dB
9490OS-1x8: 0.8 dB

Directivity
55 dB

Slots required per device
2

Connector Type
Single Mode, LC/UPC

ORDERING INFORMATION

9490OS-1x2-LC Optical 1x2 Splitter (LC connectors only). Includes type LC connector Rear I/O Module

9490OS-D1x2-LC Dual Optical 1x2 Splitter (LC connectors only). Includes type LC connector Rear I/O Module

9490OS-1x4-LC Optical 1x4 Splitter (LC connectors only). Includes type LC connector Rear I/O Module

9490OS-D1x4-LC Dual Optical 1x4 Splitter (LC connectors only). Includes type LC connector Rear I/O Module

9490OS-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_

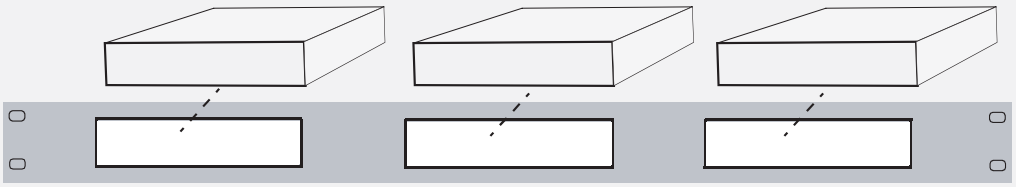
RMT Rack Mounting Panel; 3-device. Provides 1RU rack mounting for up to three BBG-4490-CWDM-4A, 4B, and/or BBG-4490-CWDM-OS.
RMD Rack Mounting Panel; 2-device. Provides 1RU rack mounting for up to two BBG-4490-CWDM-8.

» 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

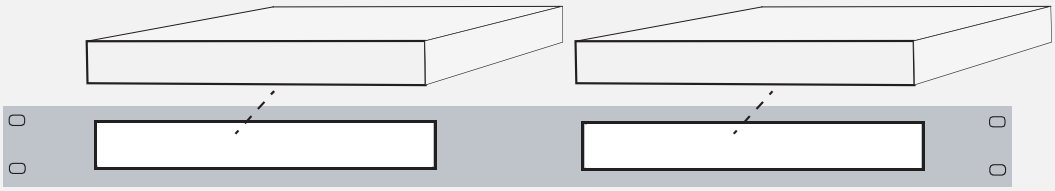
BBG-4490-CWDM-4

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



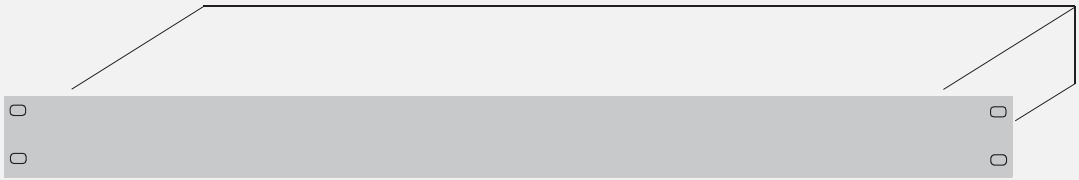
BBG-4490-CWDM-8

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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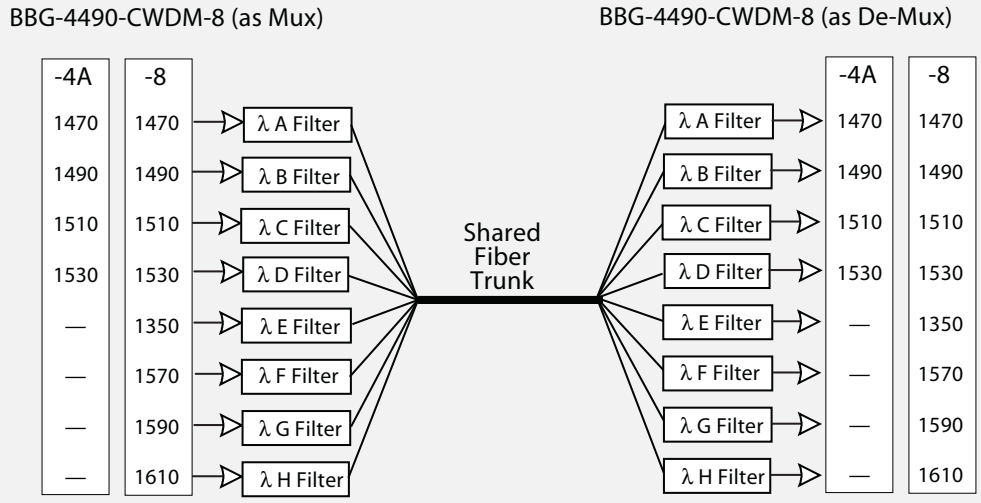
BBG-4490-CWDM » MODULAR MULTI-CHANNEL FIBER OPTICAL MULTIPLEXERS/DE-MULTIPLEXERS



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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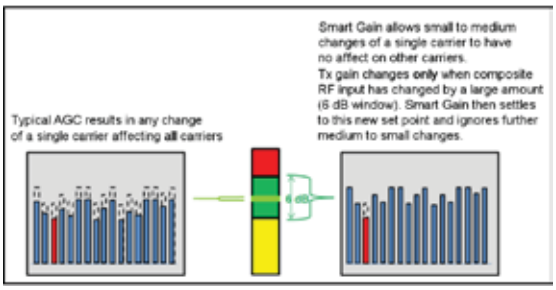
9420 SERIES » L-BAND / IF-BAND RF-FIBER TRANSMITTER AND RECEIVER



The 9420-Series of linear RF-Fiber (E-O) Transmitter and linear Fiber-RF (O-E) Receiver SATCOM Fiber Optic Link Cards provides an easily integrated openGear® solution for a fiber optic link between an LNB and an IRD. With models specifically optimized for L-band and IF-band linear RF communications, the card combination of fiber transmitter and receiver allows up to 30 km of transport length. The cards fit our standard 20-slot frames and utilize blind mate connection beween the card and its rear module, allowing card installation without requiring rear access to the frame or its connections.

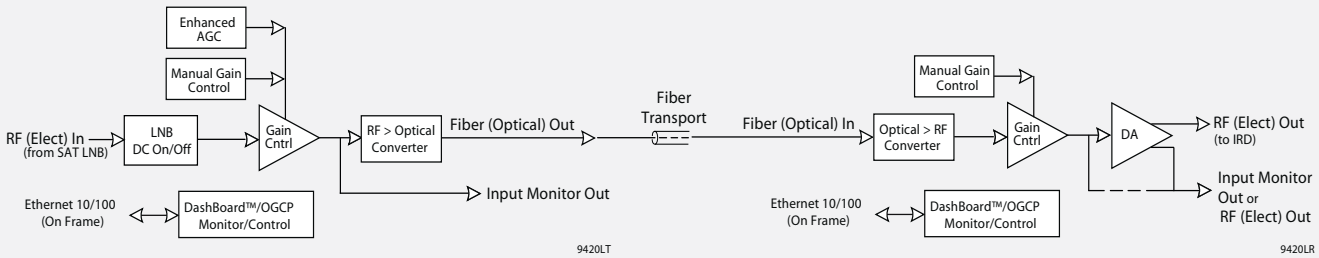
The 9420 transmit (Tx) cards offer Smart Gain to help provide stable gain control in the presence of varying input signal levels. This helps maintain constant operating power in these conditions.

Full user DashBoard™ remote control allows full status and control access locally or across a standard Etherenet network.

» FEATURES

- Models specifically optimized for L-Band and IF-band signals
- Supports up to 30 km links
- Optically-Isolated DFB Lasers enable high-dynamic-range links
- 25 dB Tx and Rx adjustable gain range
- One-button Peak Optimizer allows quick and easy set-up
- SmartGain provides enhanced AGC performance
- LNB power sourcing – LNB power can be enabled or disabled as desired
- Tx / Rx RF power monitoring via DashBoard, card-edge LEDs, monitoring ports, and SNMP
- Blind mate rear module connections allow card installation without requiring rear frame access
- Five year warranty

Combined E-O Tx (9420LT) and O-E Rx (9420LR) L-Band Fiber Optic Link



» SPECIFICATIONS

9420 RF-FIBER (E-O) TRANSMITTER CARDS

Power
12 Watts.
Input/Outputs
Inputs: (1) 75Ω RF input; 850-2300 MHz (L-band) with LNB DC power inject enable/disable
Outputs: (1) Fiber Optic (LC-APC or SC-APC terminations). (1) Monitor port 75Ω.
Fiber Wavelength: 1310, 1550 nm

Performance
Fiber Transport Length: up to 30 km
Optical Output Power: 5 ±2 dBmo
Frequency Range:
(L-Band) 850-2300 MHz
(IF-Band) 50-1000 MHz
Input Return Loss (minimum): 10 dB
Total Front-End RF Gain(1) (at minimum attenuation setting): 25 ±2 dB
Attenuation Adjustment Range: 30 dB
Spurs Free Dynamic Range(2): 98 dB-Hz
Noise Figure (at maximum gain, 25°C): 23 dB
Input IP3 (at maximum gain, 25°C): -4 dBm
Total RF Power Into Laser: 2 ±2dBm

1. Link RF Gain dB = TG + RG - 2*Fiber Loss dBo
2. SFDR = 2/3*(IIP3 + 174 - NF).Power

9420 FIBER-RF (O-E) RECEIVER CARDS

Power
12 Watts
Input/Outputs
Inputs: (1) Fiber Optic; LC-APC or SC-APC terminations.
Outputs: (1) 75Ω RF input; 850-2300 MHz (L-band).
(1) Monitor port 75Ω.
Fiber Wavelength: 1310, 1550 nm
Performance
Output Return Loss (Minimum): 10 dB
Total Front-End RF Gain(1) (at minimum attenuation setting): 20 dB (dual output mode); 25 dB (single output mode)
Attenuation Adjustment Range: 15 dB
Output IP3 (at maximum gain, 25°C): 20 dB (dual output mode); 25 dB (single output mode)

1. Link RF Gain dB = TG + RG - 2*Fiber Loss dBo

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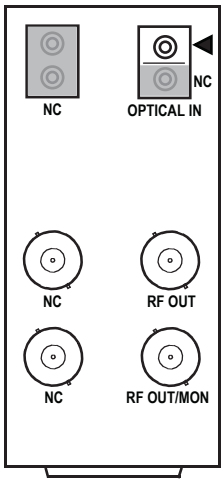
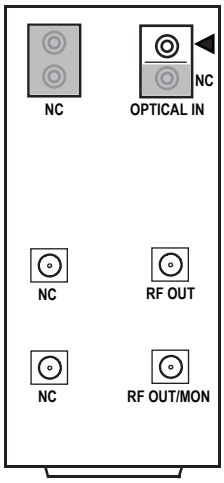
9420 SERIES » L-BAND / IF-BAND RF-FIBER TRANSMITTER AND RECEIVER



RM20-9420-LC-BNC-50
RM20-9420-LC-BNC-75
RM20-9420-SC-BNC-50
RM20-9420-SC-BNC-75



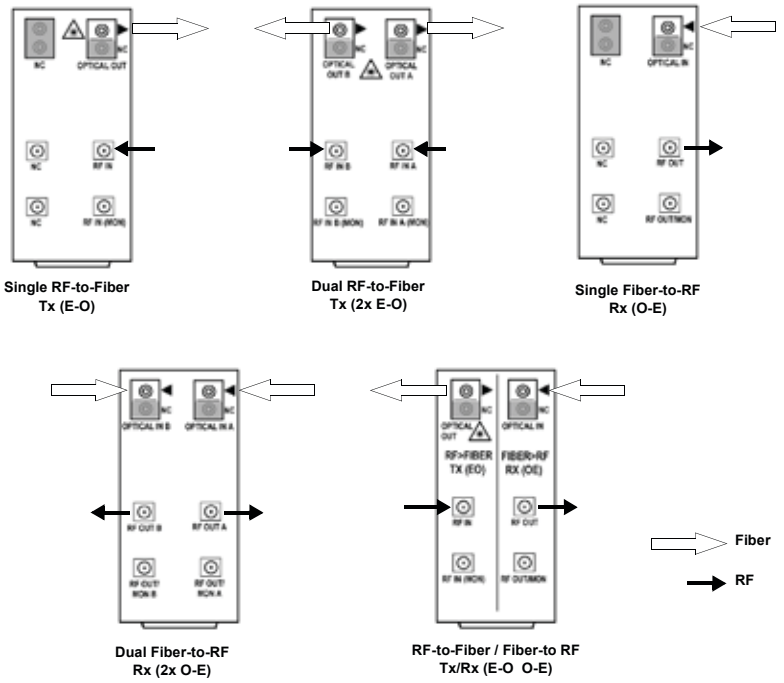
RM20-9420-LC-SMA-50
RM20-9420-SC-SMA-50

Note: Rear modules are equipped with a slot blocker preventing two Tx cards from being fitted to the same rear module. This accommodates limited per-slot power capacity for earlier frames such as the 8321. For OG3-FR and HPF-9000 frames, this blocker can be removed with no restrictions on dual-card installation for a given rear module.

Rear Modules shown are applicable for all card models. Example I/O shown here is a function of card(s) fitted to the rear module. Refer to Rear I/O Module Single and Dual-Card Tx/Rx Combinations for depictions of various I/O complements.

9420 Rear I/O Module Connectorization

All 9420 cards use a passive blindmate rear module. The same rear module is used for all card models. The rear module is a "split" type and can accommodate up to two cards per rear module. The connections are determined by the card(s) installed and are as shown below.



» ORDERING INFORMATION

Note: Dual Tx installation for a rear module (two adjacent slots served by a shared rear module) is not compatible using limited-power frame such as the 8321. This frame can only accommodate one Tx, one Rx, or two Rx cards per rear module/slot pair. This restriction does not apply if using an HPF-9000 or OG3-FR frame.

9420-LT13 L-Band (850 MHz - 2.3 GHz) RF-Fiber Optic Transmitter; 1310nm DFB Tx @ +5dBm

9420-LT15 L-Band (850 MHz - 2.3 GHz) RF-Fiber Optic Transmitter; 1550nm DFB Tx @ +5dBm

9420-LR L-Band (850 MHz - 2.3 GHz) Fiber-RF Optic Receiver

9420-IFT13 IF-band (40 MHz - 1 GHz) RF-Fiber Optic Transmitter; 1310nm DFB Tx @ +5dBm

9420-IFT15 IF-band (40 MHz - 1 GHz) RF-Fiber Optic Transmitter; 1550nm DFB Tx @ +5dBm

9420-IFR IF-Band (40 MHz - 1 GHz) Fiber-RF Optic Receiver

9420-LTCWDM-XX L-Band (850 MHz - 2.3 GHz) RF-Fiber Optic Transmitter; CWDM wavelength DFB Tx @ +5dBm. Replace "XX" with desired CWDM wavelength when ordering. See table below for available CWDM wavelengths.

9420-IFTCWDM-XX L-Band (40 MHz - 1 GHz) RF-Fiber Optic Transmitter; CWDM wavelength DFB Tx @ +5dBm. Replace "XX" with desired CWDM wavelength when ordering. See table below for available CWDM wavelengths.

Note: The receiver cards listed above work with any respective L-Band or IF-Band CWDM transmitter card.

-27: 1270nm	-29:	1290nm	-33: 1330nm		
-35: 1350nm	-37:	1370nm	-39: 1390nm		
-41: 1410nm	-43:	1430nm	-45: 1450nm		
-47: 1470nm	-49:	1490nm	-51: 1510nm		
-53: 1530nm	-57:	1570nm	-59: 1590nm		
-61: 1610nm					

Note: Rear I/O Modules are blindmate type and vary only in connector type and Zo as shown below. Rear I/O Module RF and fiber connection population and function is determined by card.

RM20-9420-LC-BNC-50 20-slot Frame Rear I/O Module (Standard Width; Split) 50Ω BNC, LC-APC Fiber Connectors. Supports 2 Cards.

RM20-9420-LC-BNC-75 20-slot Frame Rear I/O Module (Standard Width; Split) 75Ω BNC, LC-APC Fiber Connectors. Supports 2 Cards.

RM20-9420-LC-SMA-50 20-slot Frame Rear I/O Module (Standard Width; Split) 50Ω SMA, LC-APC Fiber Connectors. Supports 2 Cards.

RM20-9420-SC-BNC-50 20-slot Frame Rear I/O Module (Standard Width; Split) 50Ω BNC, SC-APC Fiber Connectors. Supports 2 Cards.

RM20-9420-SC-BNC-75 20-slot Frame Rear I/O Module (Standard Width; Split) 75Ω BNC, SC-APC Fiber Connectors. Supports 2 Cards.

RM20-9420-SC-SMA-50 20-slot Frame Rear I/O Module (Standard Width; Split) 50Ω SMA, SC-APC Fiber Connectors. Supports 2 Cards.

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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 all-new 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 serial, GPIO, 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. GPIO allows direct input routing control and status monitoring.

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 serial, GPIO, 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

openGear®

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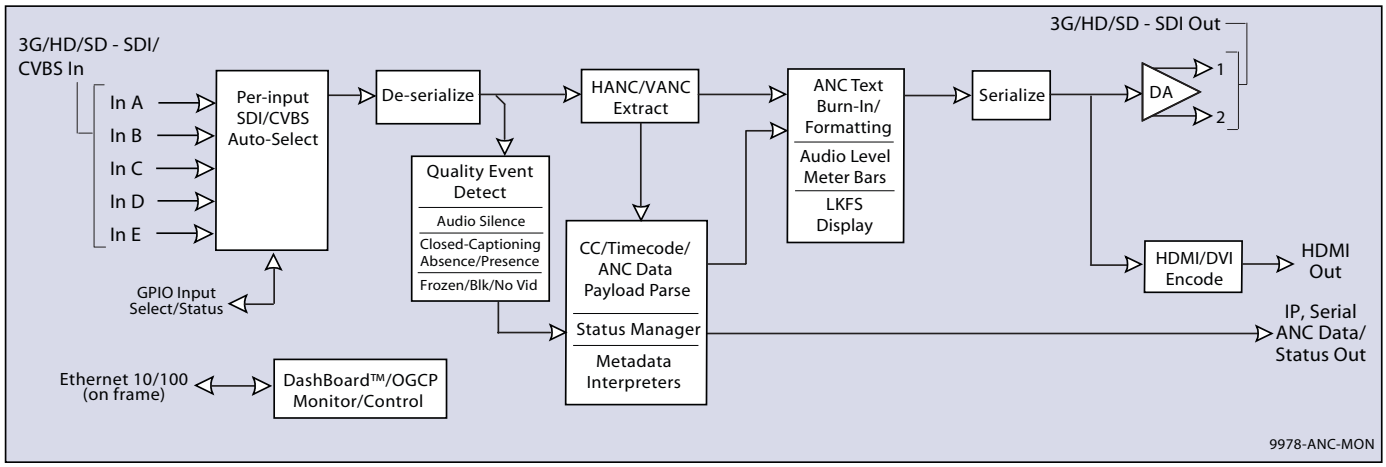
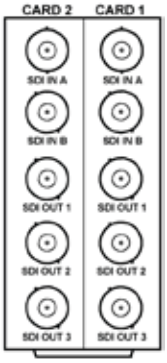
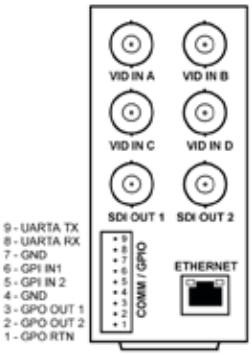
9978-ANC-MON » 3G/HD/SD-SDI ANCILLARY DATA MONITORING PROBE

with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding

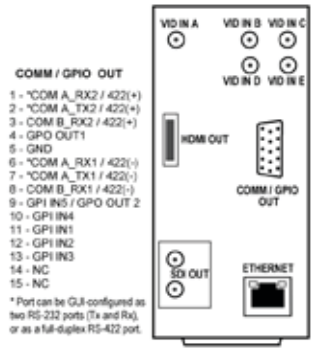




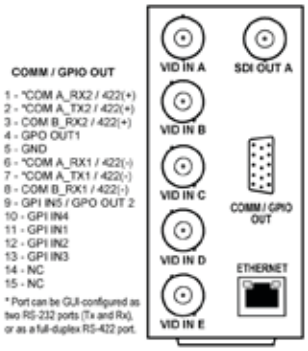
RM20-9978-A/S



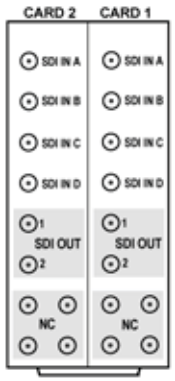
RM20-9978-B



RM20-9978-C-DIN
RM20-9978-C-HDBNC

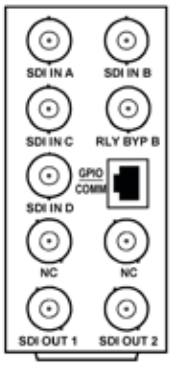


RM20-9978-D



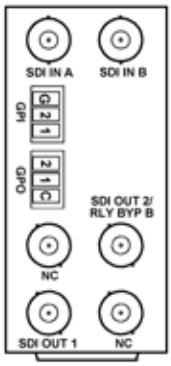
RM20-9978-G/S-DIN
RM20-9978-G/S-HDBNC

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.

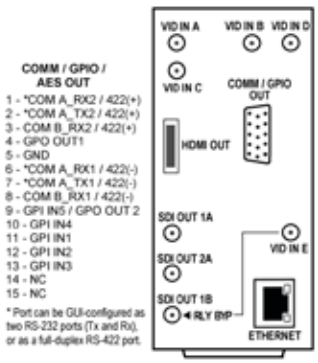


RM20-9978-E

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

openGear

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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

GPIO/COMM

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

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 , COMM/GPIO Port, 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, COMM/GPIO (Combined HD-15 connector), 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, COMM/GPIO (Combined HD-15 connector), 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, COMM/GPIO (Combined HD-15 connector), 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), (1) GPIO/COMM RJ-45 connector

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, (2) GPI, (2) GPO

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, COMM/GPIO (Combined HD-15 connector), 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, COMM/GPIO (Combined HD-15 connector), 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 all-new 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 serial, GPIO, 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.

A built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control (can also 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-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

Full status forwarding to automated systems using serial, GPIO, IP, and SNMP interfaces

Audio level bars display and LKFS numeric display

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.

Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID.

Five year warranty

OPTIONS

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

Redundant Power Supply Module (BBG-1000-PS)

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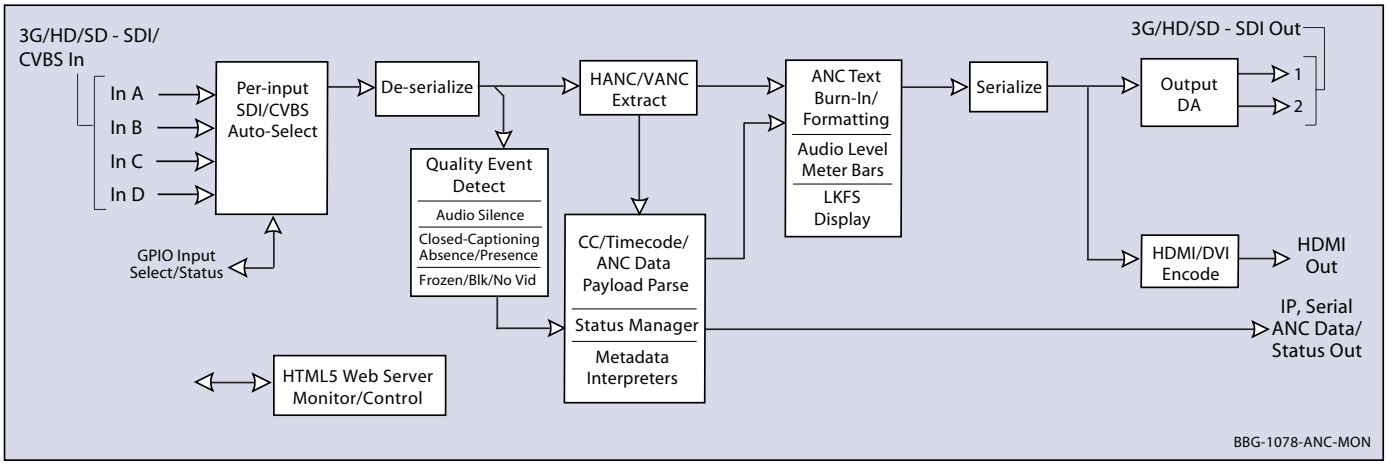
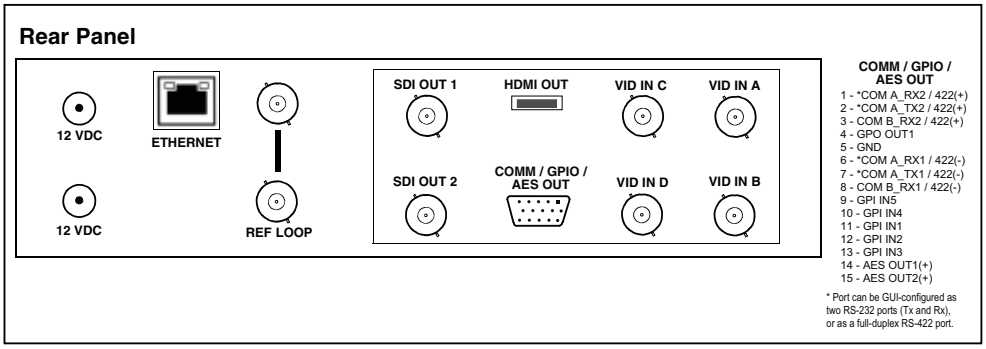
BBG-1078-ANC-MON » 3G/HD/SD-SDI STANDALONE ANCILLARY DATA MONITORING PROBE

with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding



Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.



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

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

HTML5 web server/interface via rear-panel 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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+QC » The Models Below Offer Quality Check which Provides Failover, Alert, or User Presets Action

With option +QC, the models below offer Quality Check which provides failover, alert, or user presets action on criteria such as black/frozen frame, audio silence, and CC absence. With option +ANC, the models below offer 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, SMPTE 337, and GPIO external interfaces. Please see respective product pages for more information

OPENGEAR CARDS

9902-UDX 3G/HD/SD-SDI Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed with Multi-Input Auto-Changeover 21

9903-UDX-ADDA 3G/HD/SD-SDI Universal Format Converter/Frame Sync with CVBS/ YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding 30

9932-EMDE 3G/HD/SD-SDI 16-Channel Embedder / De-Embedder with Audio/Video Processing and CVBS I/O 156

9922-FS 3G/HD/SD-SDI Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O . . . 50

9922-2FS 3G/HD/SD-SDI Dual-Channel Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O 63

BBG-1000 STANDALONE UNITS

BBG-1002-UDX 3G/HD/SD-SDI Standalone Up-Down-Cross Converter/Frame Sync/Audio Embed/De-Embed with Multi-Input Auto-Changeover 26

BBG-1003-UDX-ADDA 3G/HD/SD-SDI Standalone Universal Format Converter/Frame Sync with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, AES and Analog Audio Embedding / De-Embedding 34

BBG-1022-FS BBG-1022-FS · 3G/HD/SD-SDI Standalone Frame Sync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, and CVBS I/O 55

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 68

BBG-1032-EMDE 3G/HD/SD-SDI Standalone 16-Channel Embedder / De-Embedder with Audio/Video Processing and CVBS I/O 174

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9960-TG2-REF1 » 3G/HD/SD-SDI DUAL TEST SIGNAL GENERATOR with Moving Box Active Signal Indication, Bi-Level Sync Out, and Embedded ANC Data Signal Generator

The all-new Cobalt® 9960-TG2-REF1 3G/HD/SD-SDI Dual Test Signal Generator with Moving Box Active Signal Indication, Bi-Level Sync Out, and Embedded ANC Data Signal Generator 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.

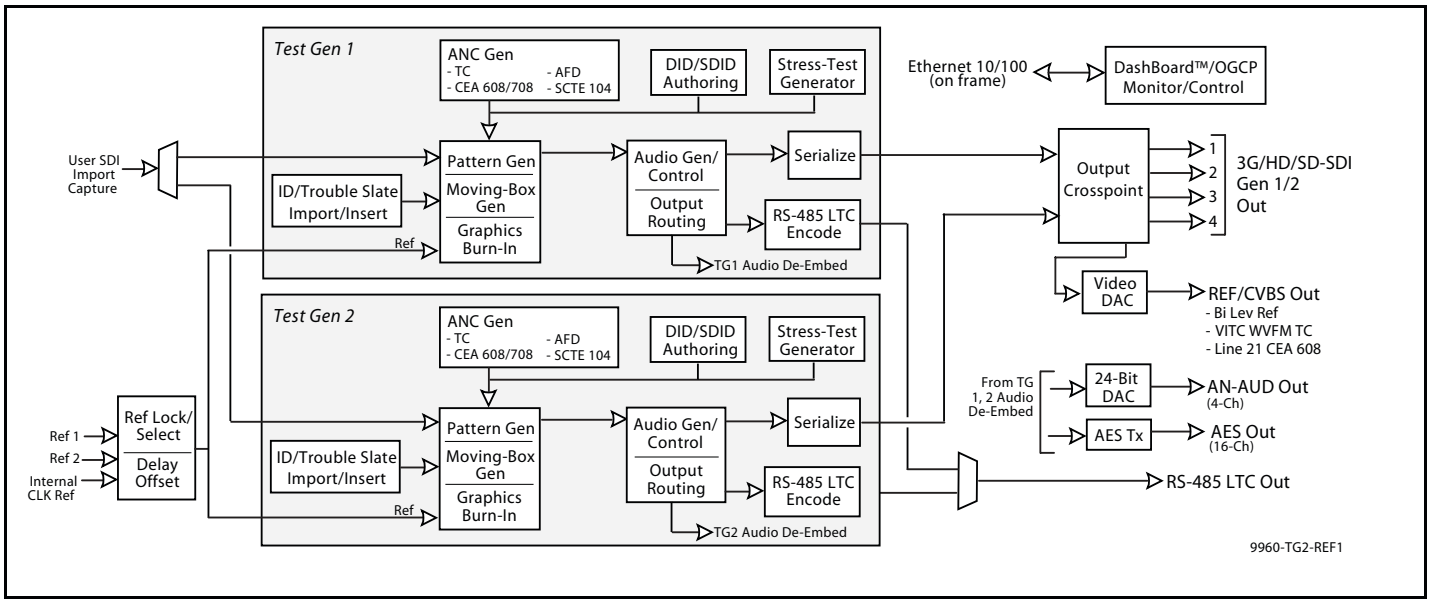
In addition to numerous high-quality industry-standard test patterns and user static raster import, the 9960-TG2-REF1 also provides ANC data generators that are designed to thoroughly check all standard ANC packages (including CEA 608/708 closed captioning, SMPTE 12M timecode, SMPTE 2020 HANC audio, and SMPTE 2010 SCTE 104 test packets). Custom DID/SDID packages can be added to test non-conventional or custom processing. An ingenious Stress-Test Generator can send intentional error-bearing packets that help flush out unexpected error handing problems in downstream systems – errors are discovered and remedied in testing and setup instead of when carrying on-air programming.

The 9960-TG2-REF1 also provides AES and analog audio test tones (both using 24-bit data), and also provides waveform-based test data over its CVBS video output. 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. A CVBS output offers bi-level reference output, line 21 CEA 608 closed-captioning and VITC waveform test sequences. Audio LTC test sequences are available over embedded, AES, and analog audio as well as via an RS-485 serial port. A user ID/trouble slate graphic file can be uploaded to the card, which in turn can be automatically inserted in active 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 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
- Full array of test stimulus for SDI, including CEA608/708, packetized and waveform timecode, SCTE 104, and AFD
- Moving-box/motion insertion enable serves as an easy to use dynamic raster confidence check
- User ID/trouble slate graphic import allows slate to be inserted as active video
- SDI import allows insertion of user static raster/patterns as an alternative addition to standard test pattern outputs
- DID/SDID authoring allows custom payloads to be written to specific DID/SDID locations as test packets for downstream systems
- Stress-Test generators provide illegal character, TRS, line length and other error cases that help flush out surprises in downstream error handling tolerance and robustness
- 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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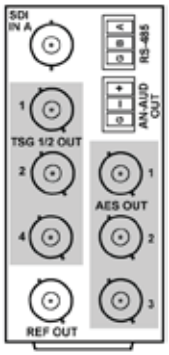
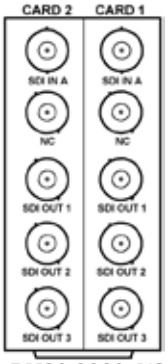
9960-TG2-REF1 » 3G/HD/SD-SDI DUAL TEST SIGNAL GENERATOR with Moving Box Active Signal Indication, Bi-Level Sync Out, and Embedded ANC Data Signal Generator



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. CVBS output functional only when selected path is carrying SD-SDI.

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 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, Bi-Level Sync Out, and Embedded ANC Data Signal Generator

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, Bi-Level Sync Out, and Embedded ANC Data Signal Generator

The all-new Cobalt® BBG-1060-TG2-REF1 3G/HD/SD-SDI Standalone Dual Test Signal Generator with Moving Box Active Signal Indication, Bi-Level Sync Out, and Embedded ANC Data Signal Generator 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 outputted.

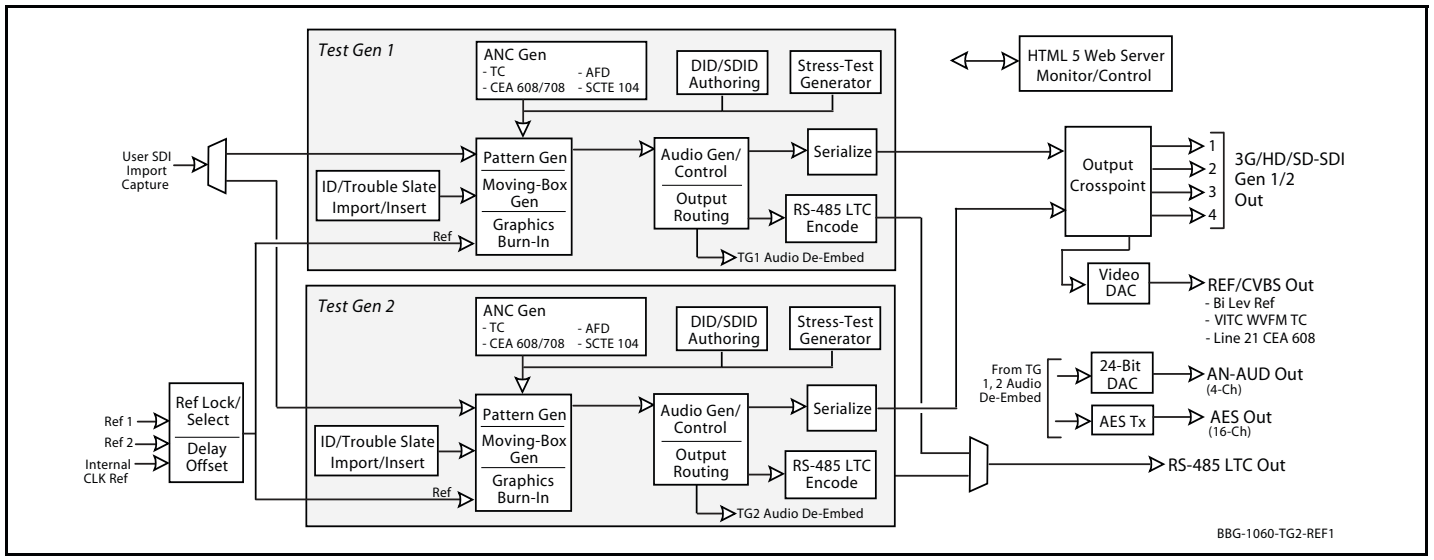
In addition to numerous high-quality industry-standard test patterns and user static raster import, the BBG-1060-TG2-REF1 also provides ANC data generators that are designed to thoroughly check all standard ANC packages (including CEA 608/708 closed captioning, SMPTE 12M timecode, SMPTE 2020 HANC audio, and SMPTE 2010 SCTE 104 test packets). Custom DID/SDID packages can be added to test non-conventional or custom processing. An ingenious Stress-Test Generator can send intentional error-bearing packets that help flush out unexpected error handing problems in downstream systems – errors are discovered and remedied in testing and setup instead of when carrying on-air programming.

The BBG-1060-TG2-REF1 also provides AES and analog audio test tones (both using 24-bit data), and also provides waveform-based test data over its CVBS video output. 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. A CVBS output offers bi-level reference output, line 21 CEA 608 closed-captioning and VITC waveform test sequences. Audio LTC test sequences are available over embedded, AES, and analog audio as well as via an RS-485 serial port. A user ID/trouble slate graphic file can be uploaded to the card, which in turn can be automatically inserted in active 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 while not changing any other processing settings or aspects. The BBG-1060-TG2-REF1 uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control (can also 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
- User ID/trouble slate graphic import allows slate to be inserted as active video
- Full array of test stimulus for SDI, including CEA608/708, packetized and waveform timecode, SCTE 104, and AFD
- 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
- DID/SDID authoring allows custom payloads to be written to specific DID/SDID locations as test packets for downstream systems
- Stress-Test generators provide illegal character, TRS, line length and other error cases that help flush out surprises in downstream error handling tolerance and robustness
- 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
- Compact footprint – up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.
- Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID. Also controllable using DashBoard remote control.
- Five year warranty



html5 web UI remote control

DashBoard

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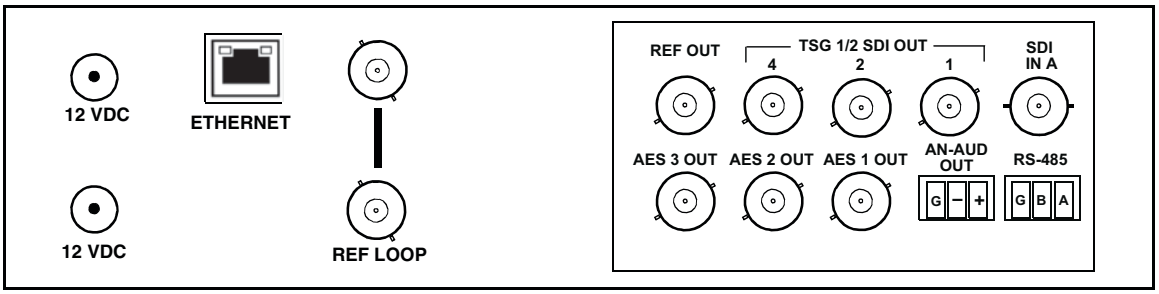
BBG-1060-TG2-REF1 » 3G/HD/SD-SDI STANDALONE DUAL TEST SIGNAL GENERATOR with Moving Box Active Signal Indication, Bi-Level Sync Out, and Embedded ANC Data Signal Generator

Rear Panel



Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

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. CVBS output functional only when selected path is carrying SD-SDI.

Discrete AudioOutputs
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 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
HTML5 web server/interface via rear-panel 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, Bi-Level Sync Out, and Embedded ANC Data Signal Generator

BBG-1000-PS Redundant Power Supply Module

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

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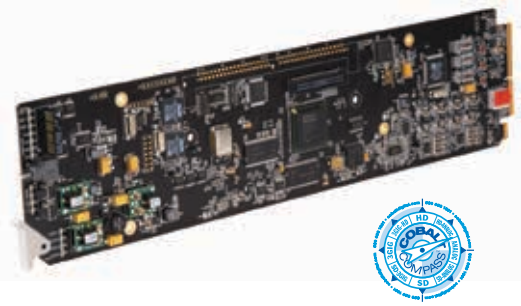
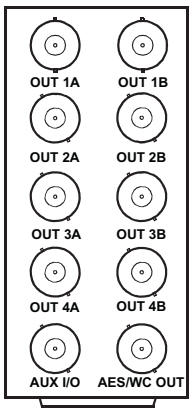
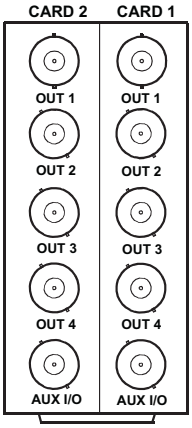
9363 » MULTI-FORMAT REFERENCE GENERATOR



The highly flexible 9363 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 highly stable 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.



RM20-9363-A



RM20-9363-A/S

» 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

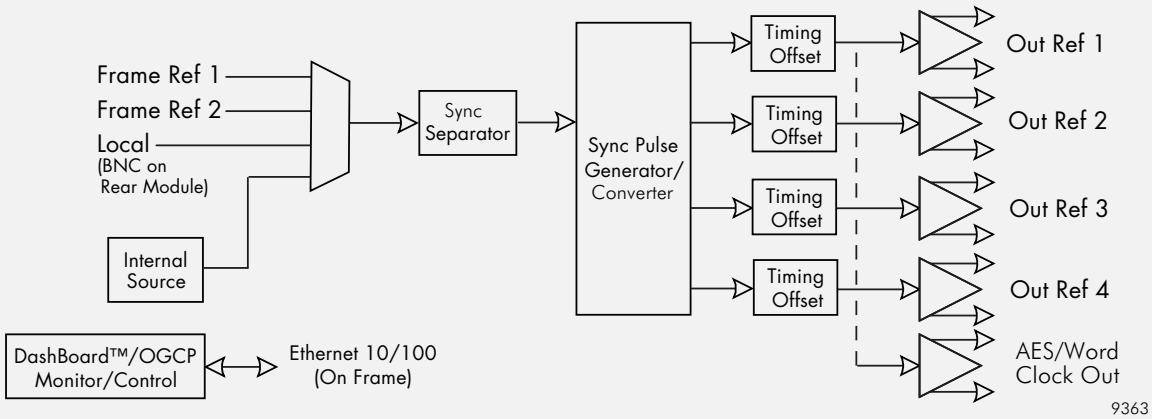
Outputs can be independently set for frame rate and delay relative from input/internal reference, or from each other

Remote control/monitoring via DashBoard™ software

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.

AES/Word Clock output synchronized to any of the four card reference outputs

Five-year warranty



» SPECIFICATIONS

Electrical

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)
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) Dual BNC Analog Reference Input or AES/Word Clock Output (configurable), 4 BNC Analog Reference Outputs per card

openGear DashBoard

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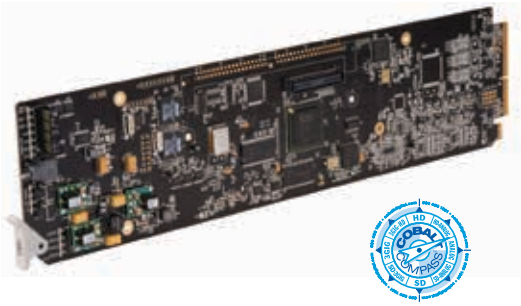
9362 » HD/SD-SDI TEST SIGNAL GENERATOR

with Text Overwrite, SDI Input Frame Capture/Store, and Fail Safe Mode

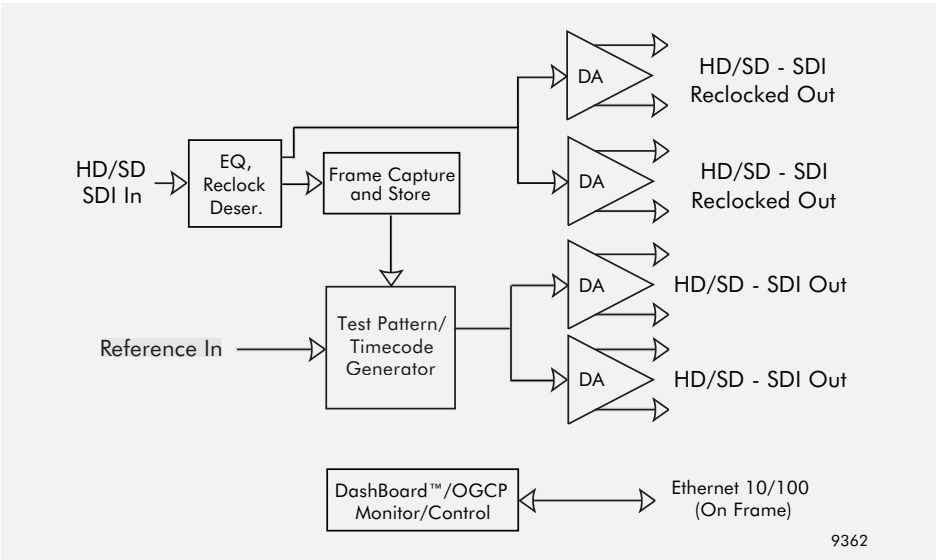


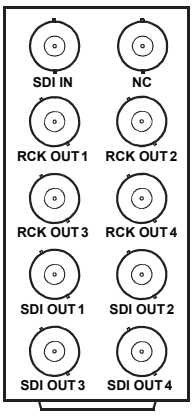
The 9362 is an HD/SD-SDI multi-format test signal generator that provides a user-selectable test pattern in several SD and HD-SDI formats. The 9362 is installed in the HD/SD-SDI feed and passes the video signal as normal when not needed. In the event of video signal loss, the test signal generator function can be set to switch to a selected pattern manually, or set to provide a selected pattern.

The 9362 can overlay up to 20 characters of text onto the test pattern for channel ID. The SDI outputs can either be locked to a reference signal connected to the openGear® frame, or run off an internal clock. The 9362 can capture and store a frame such as a station ID logo from the HD/SD-SDI input and use this as a selectable test pattern.

» FEATURES

- 75% Color Bars, Black Flat Frame, Sweep Pattern, and User-Captured Freeze Frame Test Patterns
- Up to 20 character text overlay
- Locks to external reference (bi-level, black burst, or tri-level)
- Controllable timing offset from reference
- Timecode generator can insert ATC_VITC, ATC_LTC, or VITC waveform timecode with user-configured count when pattern generation is active
- Four tone generators with selectable frequency and level, allow tone insertion when pattern generator is active
- Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panel
- Five-year warranty





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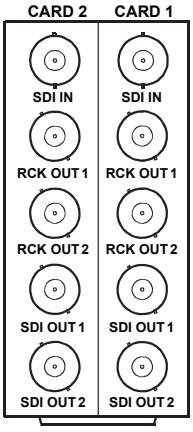

RM20-9362-A/S

» SPECIFICATIONS

Electrical

Power:	8 watts

HD/SD-SDI Input

Number of Inputs:	1
Standard:	SMPTE 292 and 259M
Return Loss:	>15 dB at 5 MHz - 1.485 GHz

Reference Video Input

Number of Inputs:	2 looping (openGear® frame)
Standard:	Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

Test Patterns

HD/SD:	Black flat frame, 75% Color Bars, Sweep Pattern, User Captured

HD/SD-SDI Output

Number of Outputs:	4 reclocked, 4 processed
Standard:	SMPTE 292 and 259M
Signal Level:	800 mV nominal
Return Loss:	>15 dB at 5 MHz - 270 MHz >12 dB at 270 MHz - 1.485 GHz
Jitter:	HD: < 0.15 UI SD: < 0.10 UI
Embedded Audio:	16-Ch SD/HD

openGear

DashBoard

» ORDERING INFORMATION

9362 HD/SD-SDI Test Signal Generator with Text Overwrite, SDI Input Frame Capture/Store, and Fail Safe Mode

RM20-9362-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 SDI Reclocked Outputs, 4 SDI Outputs

RM20-9362-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input, 2 SDI Reclocked Outputs per card, 2 SDI Outputs per card

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NOTES »

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Cobalt Digital Inc. designs and manufactures award-winning 3G/HD/SD conversion, throwdown, and multiviewer technology for the broadcast television environment. As a founding partner in the openGear® initiative, Cobalt offers a full range of openGear-compliant solutions as well as video and audio processing cards for closed-caption compliance, production trucks, master control, HD news, signal transport, audio loudness, and color correction. Cobalt's Blue Box Group™ line of interface converter boxes streamlines and simplifies a wide range of 3G/HD/SD conversion tasks. In addition, the company's multi-image display processors enable multiviewer capabilities in the most demanding studio and remote broadcasting environments. Cobalt Digital products are distributed through a worldwide network of dealers, system integrators, and other partnerships.

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TO LEARN MORE, PLEASE VISIT ***COBALTDIGITAL.COM***

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