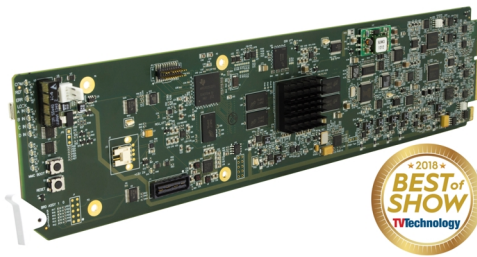


9904-UDX-4K • 12G/6G/3G/HD/SD UHD Up/Down/Cross Converter / Frame Sync / Embed/De-Embed Audio Processor



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

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

The 9904-UDX-4K-DSP model provides the same functionality as the 9904-UDX-4K SDI-based model, and also offers a DSP-based platform that supports multiple audio DSP options, including Dolby® Real-Time Loudness Leveling automatic loudness processing, Dolby® E/D/D+ encode/decode, and Linear Acoustic® UPMAX™ automatic upmixing. Embedded audio and metadata are properly delayed and re-embedded to match any video processing delay, with full adjustment available for audio/video offset.

The high-density openGear® design allows for up to five 9904-UDX-4K to be installed in one 2RU openGear® frame. Card control/monitoring is available via DashBoard user interface, integrated HTML5 web interface, SNMP, or Cobalt's RESTful-based Reflex protocol.

Alternate Models:

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

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



FEATURES

High-density openGear comprehensive UHD UDX solution

Full up/down conversion between HD/3G, ST 2082 12G-SDI single-wire, and SDQS/2SI quad 3G-SDI based formats, with ST 2082 12G-SDI single-wire and quad 3G UHD available at both input and output

Supports Square Division Multiplex (SDM) and Two-Sample Interleave (2SI) quad UHD formats

12G-SDI and quad 3G frame sync and user delay

Supports SNMP and Cobalt's Reflex (JSON) Protocols

Noise Reduction and Detail Enhancement provide image quality optimization

Remote control/monitoring via Dashboard™ software, OGCP-9000 remote control panels, integrated HTML5 web interface, SNMP, or Cobalt's RESTful-based Reflex protocol

Five year warranty

OPTIONS

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

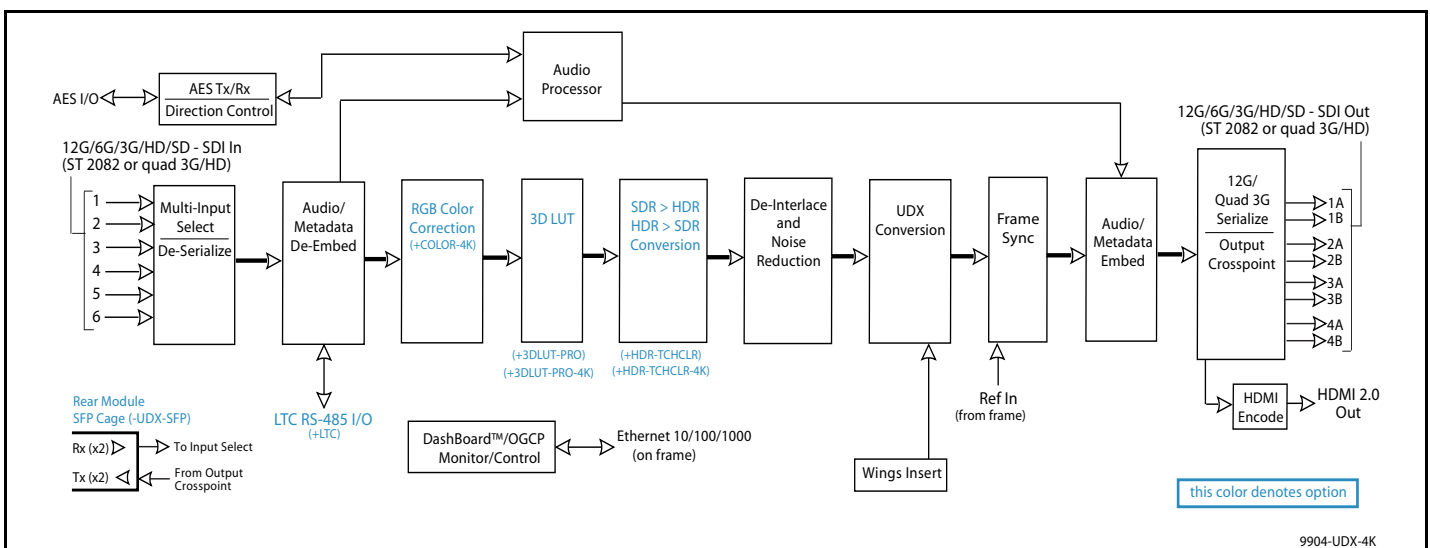
3D LUT Options (+3DLUT-PRO-4K, +3DLUT-PRO) - 3D LUT (Lookup Table) options provide 33 cube LUT mapping between 10-bit RGB and HDR color spaces.

3D LUT Cube Presets Option (+3D-LUT-BBC) - Licensed product developed by the BBC, provides the BBC 3D LUT CUBE presets as optional SDR-to-HDR and HDR-to-SDR profiles.

-UDX-SFP Option - Adds daughter card supporting externally-accessible dual SFP cage. (See Ordering Information for SFP types available and detailed descriptions.)

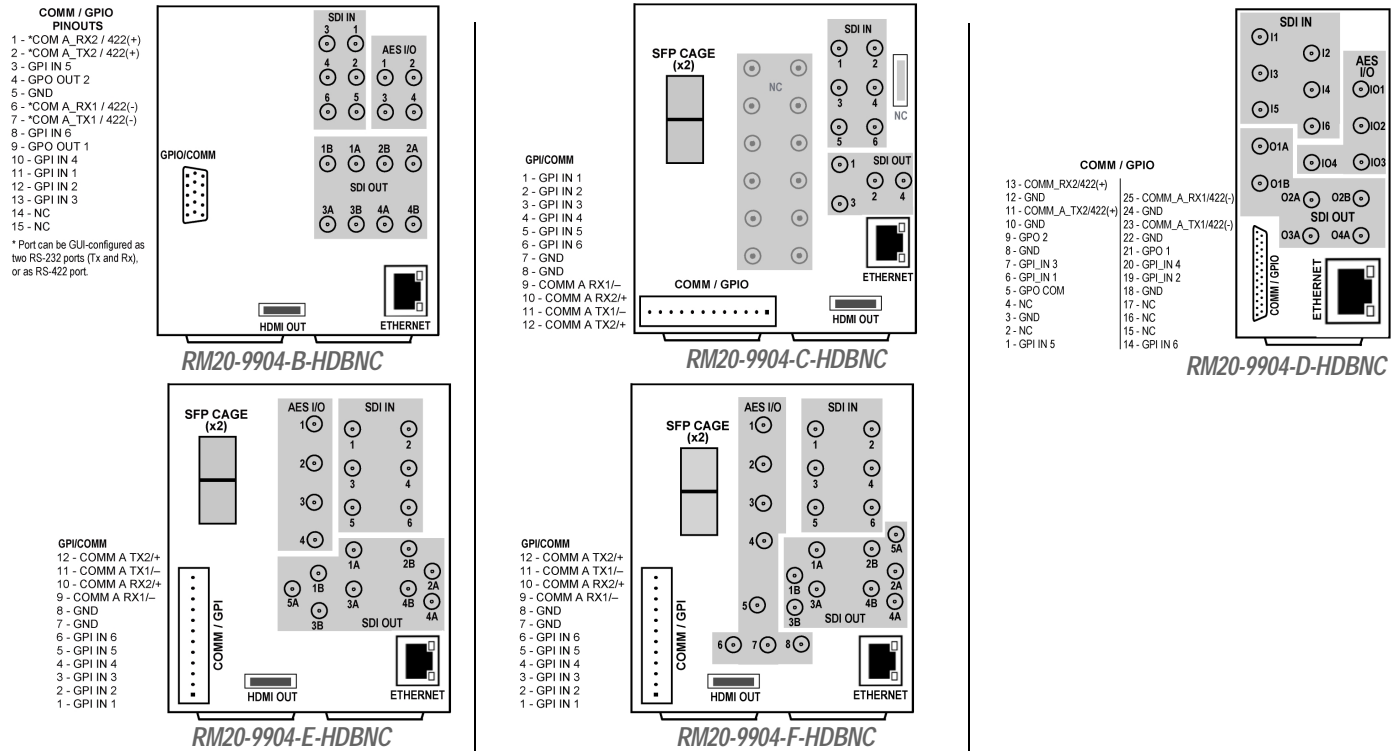
Color Correction Options (+COLOR-4K, +COLOR) - Provides full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.

Audio LTC I/O Option (+LTC)



9904-UDX-4K

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SPECIFICATIONS

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

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

Frame Sync Audio/Video Delay

- Max offset: 20 frames
- Latency (min): 1 frame

User Audio Delay Offset from Video

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

AES Audio Inputs/Outputs

- (8) AES-3id 75Ω coaxial ports; port direction assignable as inputs or outputs in groups of 4 ports.
- Note:** Hardware rev -E and later has 8 AES ports; earlier versions have 4 port max.

HDMI Output

- HDMI 2.0 Output; type A standard connector

GPIO

- 6 GPI (max); 2 GPO (max)
- Note:** GPIO max capacity is a function of Rear Module used. See Rear Module illustrations for specific information.

Frame Reference Input

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

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ORDERING INFORMATION

9904-UDX-4K 12G/6G/3G/HD/SD UHD Up/Down/Cross Converter/Frame Sync/Embed/De-Embed Audio Processor

RM20-9904-B-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (8) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (4) AES I/O (User Selectable), GPIO/COMM, HDMI 2.0 Output (type A standard connector), 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

RM20-9904-C-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (4) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, GPI/COMM, HDMI 2.0 Output (type A standard connector), (2) SFP cage receptacles (when used in conjunction with option -UDX-SFP), 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

RM20-9904-D-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (6) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (4) AES I/O, GPIO/COMM, 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

RM20-9904-E-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (9) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (4) AES I/O, GPI/COMM, HDMI 2.0 Output (type A standard connector), (2) SFP cage receptacles (when used in conjunction with option -UDX-SFP), 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

RM20-9904-F-HDBNC 20-Slot Frame Rear I/O Module (Double-Width) (6) 12G/6G/3G/HD/SD/SD-SDI Inputs, (9) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (8) AES I/O, GPI/COMM, HDMI 2.0 Output (type A standard connector), (2) SFP cage receptacles (when used in conjunction with option -UDX-SFP), 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

Options:

Note: • Options denoted as “+” are **software-based** options which are available on new product when ordered or can be customer field-installed as a software upload upgrade.
• Options or ordering line items denoted as “-” are **hardware-based** options/items. These options are available as factory-installed only on new product, or product returned to Cobalt for factory installation.

+HDR-TCHCLR-4K 4K SDR/HDR Conversion Option (This option includes SL-HDR encode, SL-HDR decode, and ITM Intelligent Tone Management.)

+HDR-TCHCLR SDR/HDR Conversion Option (This option includes SL-HDR encode, SL-HDR decode, and ITM Intelligent Tone Management.)

+3DLUT-PRO-4K 3D LUT 4K Option (compatible with up-mapping to HDR and processing for down-conversions to HD SDR color space)

+3DLUT-PRO 3D LUT Option (compatible with processing for down-conversions to HD SDR color space)

+3D-LUT-BBC BBC 3DLUT CUBE Option (Requires +3D-LUT-PRO or +3D-LUT-PRO-4K option to also be present to support this option)

+COLOR-4K 4K Color Correction Option

+COLOR Color Correction Option

+LTC Audio LTC I/O Option

-UDX-SFP Adds daughter card supporting externally-accessible dual SFP cage; orderable as new option. **Note:** To support SFP option(s), this option is required in addition to desired specific SFP options below. **Note:** To support SFP option(s) below, card must be fitted with rear module (such as RM20-9904-C-HDBNC, RM20-9904-E-HDBNC, or RM20-9904-F-HDBNC) that supports MSA SFP plug-in modules.

-SFP-E00E-MSA-12G 12G/6G/3G/HD/SD-SDI UHD Transceiver (LC female connectors)

-SFP-E0-MSA-12G 12G/6G/3G/HD/SD-SDI UHD Transmitter (LC female connector)

-SFP-OE-MSA-12G 12G/6G/3G/HD/SD-SDI UHD Receiver (LC female connector)

-SFP-E00E-MSA Single-Channel Video Optical Transceiver (LC female connectors)

-SFP-E0-MSA Single-Channel Video Optical Transmitter (LC female connector)

-SFP-OE-MSA Single-Channel Video Optical Receiver (LC female connector)

-SFP-IP-SWD-MSA Software-Defined EmSFP 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for cards using SFP type -SPF-IP-SWD-MSA (Up to 3 software licenses can be added to the -SFP-IP-SWD-MSA, but only 1 license can be active at a time):

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

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

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

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

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

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

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

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