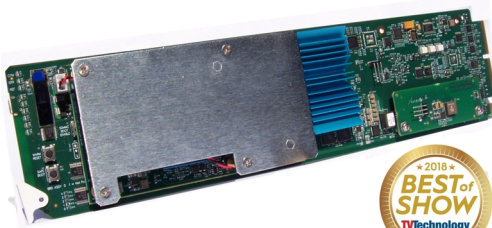


# 9904-UDX-4K-IP • 12G/6G/3G/HD/SD UHD Up/Down/Cross Converter/Frame Sync with Dual 10GigE IP Ports



The Cobalt® 9904-UDX-4K-IP 12G/6G/3G/HD/SD UHD Up/Down/Cross Converter/Frame Sync with Dual 10GigE IP Ports is Cobalt's next generation of advanced scaler/frame synchronizers for the openGear® platform.

The 9904-UDX-4K-IP upconverts 12G/6G/3G/HD/SD to either UHD1 3840x2160 Square Division Multiplex (SDM) or Two-Sample Interleave (2SI) quad 3G-SDI based formats, or can output ST 2082 12G-SDI for single-wire 4K transport. With both 12G-SDI and quad 3G-SDI inputs, the 9904-UDX-4K can downconvert 12G and quad UHD. The 9904-UDX-4K provides an HDMI 2.0 output for economical 4K video monitoring. The 9904-UDX-4K offers numerous options, including SDR-to-HDR conversion and color correction.

The 9904-UDX-4K-IP provides dual 10GigE ports providing support for the emerging uncompressed video/audio/data over IP standards.

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

## FEATURES

High-density openGear comprehensive UHD UDX solution

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

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

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

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

Supports Cobalt's Reflex (JSON) Protocols

Noise Reduction and Detail Enhancement provide image quality optimization

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

Hot-swappable

Five year warranty

## OPTIONS

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

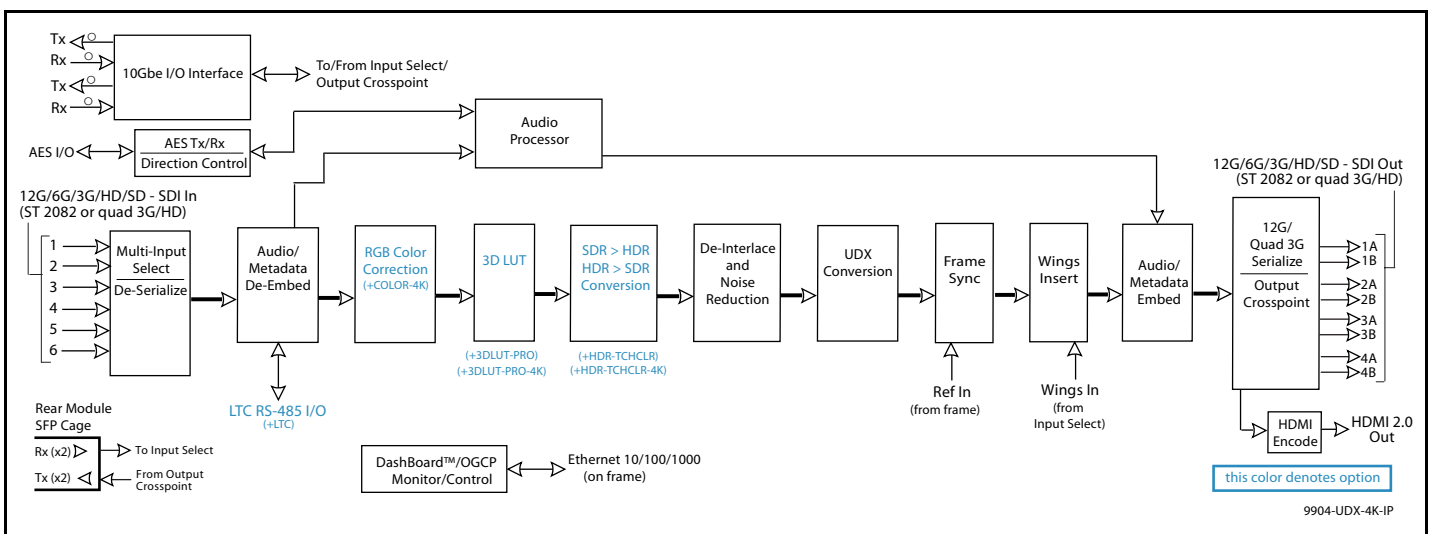
3D LUT Options (+3DLUT-PRO-4K, +3DLUT-PRO) - 3D LUT (Lookup Table) options provide 33 cube LUT mapping between 10-bit RGB and HDR color spaces.

3D LUT 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.

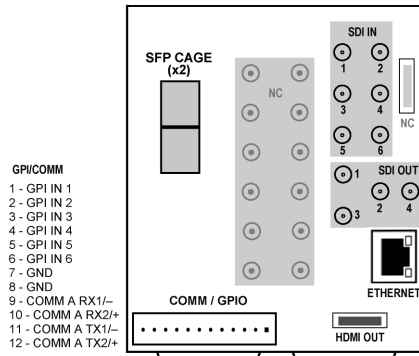
Color Correction Options (+COLOR-4K, +COLOR) - Provides full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.

Audio LTC I/O Option (+LTC)

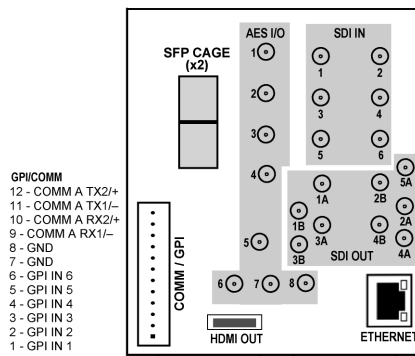
SFP Options - Rear module externally-accessible dual SFP cage supports numerous plug-in SFP options. (See Ordering Information for SFP types available and detailed descriptions.)



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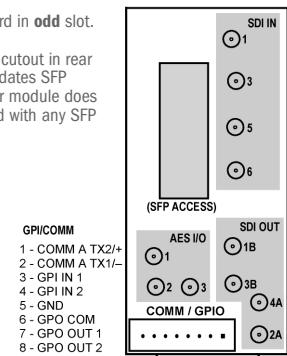
RM20-9904-C-HDBNC



RM20-9904-F-HDBNC

Note: Mates to card in odd slot.

Note: SFP Access cutout in rear module accommodates SFP option(s). This rear module does not come standard with any SFP functionality.



RM20-9904-G-HDBNC

## 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

### IP ST 2022-6 Interface

(2) 10GigE multi-mode optical Tx/Rx interface; female LC duplex connectors

### GPIO

(6) GPI (max); (2) GPO (max)

Note: GPIO max capacity is a function of Rear Module used. See Rear Module illustrations for specific information.

### Frame Reference Input

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

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## ORDERING INFORMATION

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

### Rear Modules:

**Note:** All Rear I/O Modules are preliminary designs/layouts and subject to change.

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

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

**RM20-9904-G-HDBNC** 20-Slot Frame Rear I/O Module (Standard-Width) (4) 12G/6G/3G/HD/SD/SD-SDI Inputs, (4) 12G/6G/3G/HD/SD/SD-SDI Processed Outputs, (3) AES I/O, GPIO/COMM (All coaxial connectors HD-BNC.) (**Note:** Mates to card in odd frame slot.)

### Options:

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

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

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

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

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

**+3D-LUT-BBC** BBC 3DLUT 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

**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-0E-MSA-12G** 12G/6G/3G/HD/SD-SDI UHD Receiver (LC female connector)

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## ORDERING INFORMATION (cont.)

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

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

**-SFP-0E-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

**-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