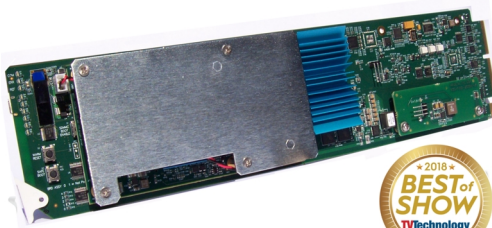


9904-UDX-4K-IP • 12G/6G/3G/HD/SD UHD Up/Down/Cross Converter/Frame Sync with Dual 10GigE IP Ports



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

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

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

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



FEATURES

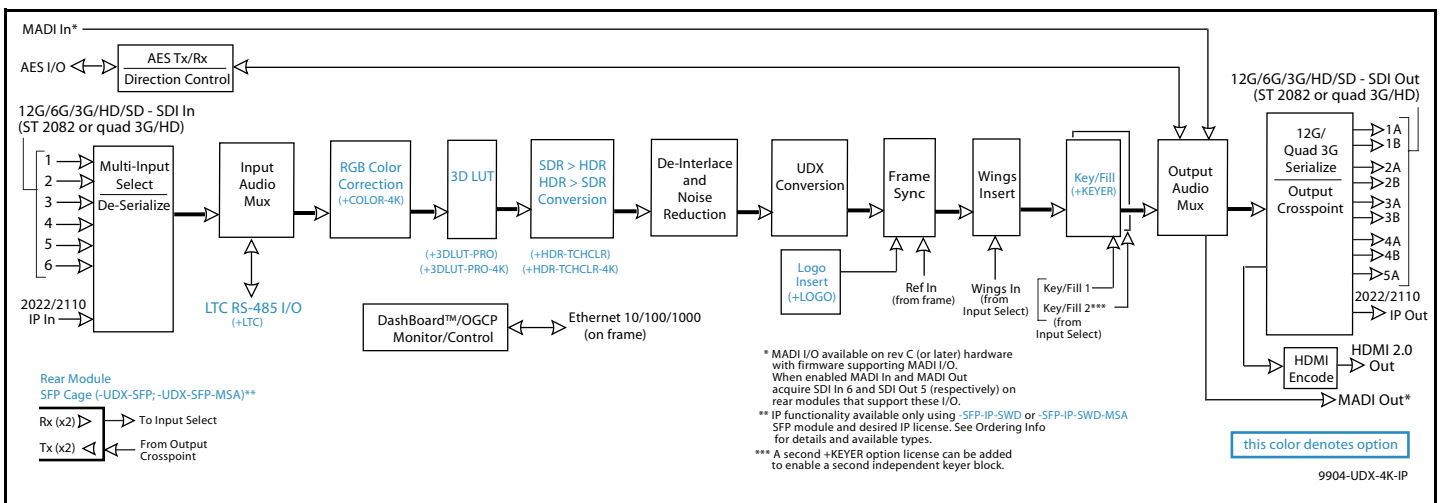
- High-density openGear comprehensive UHD UDX solution
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Full up/down conversion between HD/3G, ST 2082 12G-SDI single-wire, and SDQS/2SI quad 3G-SDI based formats, with ST 2082 12G-SDI single-wire and quad 3G UHD available at both input and output
- Supports Square Division Multiplex (SDM) and Two-Sample Interleave (2SI) quad UHD formats
- 12G-SDI and quad 3G frame sync and user delay

- Supports Cobalt's Reflex (JSON) Protocols
- Noise Reduction and Detail Enhancement provide image quality optimization
- Remote control/monitoring via Dashboard™ software, OGCP-9000 remote control panels, or Cobalt's RESTful-based Reflex protocol
- Hot-swappable
- Five year warranty

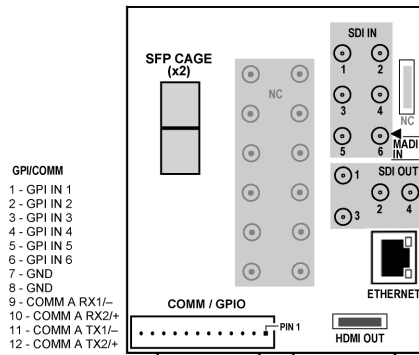
OPTIONS

- SDR/HDR Conversion Options (+HDR-TCHCLR-4K, +HDR-TCHCLR) – Provides real-time intelligent HDR conversion powered by Technicolor®. Contains SDR-to-HDR, HDR-to-SDR, and HDR-to-HDR conversion with dynamic metadata creation. Technicolor toolkits include SL-HDR encode, SL-HDR decode, and ITM Intelligent Tone Management.
- 3D LUT Options (+3DLUT-PRO-4K, +3DLUT-PRO) – 3D LUT (Lookup Table) options provide 33 cube LUT mapping between 10-bit RGB and HDR color spaces.
- 3D LUT Option (+3D-LUT-BBC) – Licensed product developed by the BBC, provides BBC 3D LUTS as optional SDR-to-HDR and HDR-to-SDR profiles.
- Logo Insertion Option (+LOGO) – Provides file-based insertion for branding local or destination branding/ID requirements.
- Audio LTC I/O Option (+LTC)

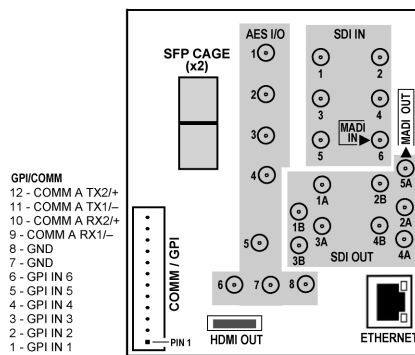
- Color Correction Options (+COLOR-4K, +COLOR) – Provides full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.
- Key/Fill Keyer Option (+KEYER-4K, +KEYER) – Provides keying using SDI inputs for key and fill signals. Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input. (A second +KEYER option license can be added to enable a second independent keyer block.)
- UDX-SFP Options – Adds daughter card supporting externally-accessible dual SFP cage. (See Ordering Information for SFP types available, descriptions, and further info.)



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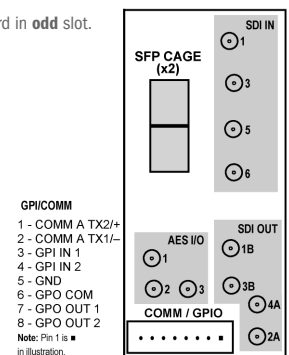


RM20-9904-C-HDBNC



RM20-9904-F-HDBNC

Note: Mates to card in odd slot.



RM20-9904-G-HDBNC

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

SPECIFICATIONS

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

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

Frame Sync Audio/Video Delay

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

User Audio Delay Offset from Video

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

AES Audio Inputs/Outputs

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

MADI Audio Inputs/Outputs

- (2) 75Ω coaxial ports (max)
- Note:** Not all rear modules support full MADI I/O. MADI I/O is a function of Rear Module used and is available only on card with on rev C (or later) hardware with firmware supporting MADI I/O. See Rear Module illustrations for specific information.

HDMI Output

- HDMI 2.0 Output; type A standard connector

IP ST 2022-6 Interface

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

GPIO

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

Frame Reference Input

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

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

ORDERING INFORMATION

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

Rear Modules:

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

• Rear modules with SFP access do not come standard with any SFP functionality. Appropriate SFP option must be provisioned for rear module SFP functionality.

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

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

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

Options:

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

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

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

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

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

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

+COLOR-4K 4K Color Correction Option

+COLOR Color Correction Option

+KEYER-4K 4K Key/Fill Keyer (Alpha) Option (Additional second option license enables a second independent keyer block.)

+KEYER Key/Fill Keyer (Alpha) Option (Additional second option license enables a second independent keyer block.)

+LOGO Logo Insertion Option

+LTC Audio LTC I/O Option

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-UDX-SFP-MSA Adds daughter card supporting externally-accessible dual SFP cage.

Note:

- To support SFP option(s) below, card must be fitted with rear module (such as RM20-9904-C-HDBNC, RM20-9904-F-HDBNC, or RM20-9904-G) that supports SFP plug-in modules.
- This daughter card included standard on 9904-UDX-4K-IP model, but needs to be specified at purchase to support MSA-type SFP below.
- **-UDX-SFP-MSA-2S** is required where **2-slot** ("Standard-Width") rear module (such as RM20-9904-G-HDBNC) is to be fitted with SFP option.
- **-UDX-SFP-MSA-4S** is required where **4-slot** ("Double-Width") rear module (such as RM20-9904-C-HDBNC or RM20-9904-F-HDBNC) is to be fitted with SFP option.

Rear modules RM20-9904-C-HDBNC, RM20-9904-F-HDBNC, or RM20-9904-G-HDBNC and option -UDX-SFP-MSA-2S or -UDX-SFP-MSA-4S are available separately.

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

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

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

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

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

-UDX-SFP Adds daughter card supporting externally-accessible dual SFP cage.

Note:

- To support SFP option(s) below, card must be fitted with rear module (such as RM20-9904-C-HDBNC, RM20-9904-F-HDBNC, or RM20-9904-G) that supports SFP plug-in modules.
- This daughter card included standard on 9904-UDX-4K-IP model, but needs to be specified at purchase to support SFP below.
- **-UDX-SFP-2S** is required where **2-slot** ("Standard-Width") rear module (such as RM20-9904-G-HDBNC) is to be fitted with SFP option.
- **-UDX-SFP-4S** is required where **4-slot** ("Double-Width") rear module (such as RM20-9904-C-HDBNC or RM20-9904-F-HDBNC) is to be fitted with SFP option.

Rear modules RM20-9904-C-HDBNC, RM20-9904-F-HDBNC, or RM20-9904-G-HDBNC and option -UDX-SFP-2S or -UDX-SFP-4S are available separately.

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

+ADD-SFP-2SDI-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