The Multi-Path 9905-MPx 3G/HD/SD Quad-Path Up/Down/Cross Converter/Frame Sync/Embed/De-Embed Audio Processor is a Cobalt® next-generation advanced scaler/frame synchronizer for the openGear® platform. The 9905-MPx provides four independent signal paths of UDX / frame sync / audio embedding and de-embedding on a single open-Gear® card. Using our HPF-9000 20-slot frame, this provides up to 24 channels (6 cards) of processing in a single frame. The 9905-MPx represents a new level of openGear packaging density!

The 9905-MPx provides high-density that offers unprecedented multi-input support and flexibility. Independent up/down/cross convert scalers are specifically designed for broadcast video formats, with full ARC control suitable for conversions to or from 4:3 and 16:9 aspect ratios. Discrete AES and MADI audio embedding/routing/mixing/de-embedding to any of four processing paths is supported. Standard 3D LUT feature and available color correction provide accommodation of SDR and HDR processing for downstream HDR systems.

Card control/monitoring is available via DashBoard user interface or Cobalt’s RESTful-based Reflex protocol. The 9905-MPx can be software-converted to a 4K Quad-Link Input SDM/2SI 4K UDX/Frame Sync card with an option software license.

FEATURES

- Multi-Path design offers four independent UDX / frame sync paths (channels) per card
- Flexible AES and MADI embed/de-embed for each path
- Up/Down/Cross Conversion with user ARC control. 3D-LUT is standard feature for all paths.
- Supports all popular formats: 480i, 576i, 720p, 1080i, 1080pSF, 1080p
- Independent four-path ANC bridging, including closed-captioning processing
- Noise Reduction and Detail Enhancement provide image quality optimization
- Remote control/monitoring via Dashboard™ software, OGCP-9000 remote control panels or Cobalt’s RESTful-based Reflex protocol
- Five year warranty

OPTIONS

- Color Correction (+COLOR) - Provides full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.
- Logo Insertion (+LOGO) - Allows uploading of user logo graphic file to card, with automated insertion controlled by GPI or other events
- Trouble Slate Import (+T-SLATE) - Allows uploading of up to three different user trouble slate graphic file to card, with automated insertion controlled by GPI or other events
- Clean & Quiet Switching (+CQS) - Provides automatic audio ramp-down and up during input switching events for noise-free audio between input switches
- Dante Option (+MPx-DANTE-64x64) - Adds DANTE support of 64x64 channels to the quad path 9905-MPx. Software option to be added per card.
- BBC LUTS (+3D-LUT-BBC) - Licensed product developed by the BBC, provides BBC 3D LUTs for SDR-to-HDR and HDR-to-SDR
- Serial-To-Embedded Audio LTC In (+LTC)
- ANC IP Insert/Extract (+ANC) (Internal ANC Bridge is standard)
- Software-Defined Convert Card to 4K Quad-Link Input SDM/2SI 4K UDX/Frame Sync (+2K-TO-4K-9905) - Software-defined option license that converts card to Quad-Link Input SDM/2SI 4K UDX/Frame Sync model
- -UDX-SFP Options – Adds daughter card supporting externally-accessible dual SFP cage. (See Ordering Information for SFP types available, descriptions, and further info.)
9905-MPx • 3G/HD/SD Quad-Path Up/Down/Cross Converter / Frame Sync / Embed/De-Embed Audio Processor

Note:
Due to the alignment of the 9905-MPx card and the -D rear module, the combination of the card and rear module will consume the adjacent odd frame slot in addition to the even slot occupied by the card.

Note: This rear module cannot be installed in frame slots 19/20 location. The 9905-MPx card, when installation is attempted, will clash/interfere with the frame network controller card.

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

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

**3G/HD/SD-SDI Input/Outputs**
- (4) 75Ω inputs (max); (4) inputs can be simultaneously routed to the four UDX/FS paths.
- (2x4) 75Ω outputs (max)
- SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
- Return Loss:
  - > 15 dB up to 1.485 GHz
  - > 10 dB up to 3 GHz
- Input Cable Length:
  - 120m Belden 1694A cable at 2.97 Gbps
  - 240m Belden 1694A cable at 1.485 Gbps
  - 400m Belden 1694A cable at 270 Mbps
- Output Signal Level: 800 mV ± 10%
- DC Offset: 0 V ± 50 mV
- Alignment Jitter (3G/HD/SD): < 0.3/0.2/0.2 UI

**Frame Sync Audio/Video Delay**
- Max offset: 20 frames
- Latency (min): 1 frame

**User Audio Delay Offset from Video**
- Bulk delay control: -33 msec to +3000 msec
- Per-channel delay controls: -800 msec to +800 msec

**AES Audio Inputs/Outputs**
- (8) AES-3id 75Ω coaxial ports (max); port direction assignable as inputs or outputs in groups of 4 ports.

**MADI Audio Inputs/Outputs**
- (2) 75Ω coaxial ports (max)
  - Note: Not all rear modules support full MADI I/O. MADI I/O is a function of Rear Module used. See Rear Module illustrations for specific information.

**MPx-DANTE-64x64 Audio Inputs/Outputs**
- (64) Input Channels
- (64) Output Channels
  - Note: This is an optional feature.

**HDMI Output**
- HDMI 2.0 Output; type A standard connector. Crosspoint-selectable program source as Path 1, 2, 3, or 4.

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

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

**Frame Loading (Max. recommended number of 9905 cards supported per Frame Model)**
- • OG3 Frame: (5) cards
- • HPF-9000 Frame: (5) cards
- • oGx Frame: (7) cards
  - Note: In all cases, it is recommended to leave a 1RU gap above the frame and set frame Network Controller Card to run the frame cooling fans at full (max.) speed.
### Ordering Information

**9905-MPx** 3G/HD/SD Quad-Path Up/Down/Cross Converter / Frame Sync / Embed/De-Embed Audio Processor

**Rear Modules:**

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

- **Option -UDX-SFP (non-MSA):**
  - Card Rev E and earlier with -C, -F, -G rear IO module:
    - Top SFP port supports up to 2 Fiber inputs and up to 2 Fiber outputs.
    - Bottom SFP port supports up to 2 Fiber inputs.
  - Card Rev F and later with -C, -F, -G rear IO module:
    - Top SFP port supports up to 2 Fiber inputs and up to 2 Fiber outputs.
    - Bottom SFP port supports up to 2 Fiber inputs and up to 2 Fiber outputs.
- **Option -UDX-SFP-MSA (no card restrictions):**
  - Top SFP port supports 1 Fiber input and 1 Fiber output.
  - Bottom SFP port supports 1 Fiber input and 1 Fiber output.

### Options:

**Note:** Options denoted as "+" are software-based options which are available on new product when ordered or can be customer field-installed as a software upload upgrade. Unless otherwise noted, software options are per-card based. Options which are per-path based are identified as such.

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

- **+3D-LUT-BBC** BBC 3D LUTs Option
- **+COLOR** Color Correction Option (per-path based)
- **+LTC** RS-485 Serial-To-Embedded Audio LTC In Option
- **+ANC** IP/ANC Insert/Extract Option (per-path based)
- **+LOGO** Logo Insertion Option (per-path based)
- **+T-SLATE** Trouble Slate Insertion Option (per-path based)
- **+CQS** Clean & Quiet Switching Option
- **+MPx-DANTE-64x64** Adds DANTE support of 64x64 channels to the quad path 9905-MPx. Software option to be added per card.
- **+2K-TO-4K-9905** Software-Defined Convert Card to 4K Quad-Link Input SDM/2SI 4K UDX/Frame Sync Option
- **UDX-SFP-MSA** Adds daughter card supporting externally-accessible dual MSA SFP cage; orderable as new option. **Note:** To support SFP option(s), this option is required in addition to desired specific SFP options below. The SFP modules listed below are available for the 9905-MPx card when also fitted with SFP option -UDX-SFP-MSA.

  - **UDX-SFP-MSA-2S** is required where 2-slot (“Standard-Width”) rear module (such as RM20-9905-G-HDBNC) is to be fitted with SFP option.
  - **UDX-SFP-MSA-4S** is required where 4-slot (“Double-Width”) rear module (such as RM20-9905-C-HDBNC or RM20-9905-F-HDBNC) is to be fitted with SFP option. Rear modules RM20-9905-C-HDBNC, RM20-9905-F-HDBNC, or RM20-9905-G-HDBNC and option -UDX-SFP-MSA-2S or -UDX-SFP-MSA-4S are purchased and available separately.

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

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

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

**SFP-2EO-12G**
12G/6G/3G/HD/SD-SDI UHD Dual Transmitter (LC female connector)

**SFP-2OE-12G**
12G/6G/3G/HD/SD-SDI UHD Dual Receiver (LC female connector)

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

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

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

**SFP-2EO**
Dual-Channel Video Optical Transmitter (LC female connector)

**SFP-2OE**
Dual-Channel Video Optical Receiver (LC female connector)

**SFP-IP-SWD**
Software-Defined EmSFP; 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing software options are available for cards using SFP type -SPF-IP-SWD-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; Single-Channel Encapsulator SDI-to-IP-2110
  - **ADD-SFP-IP-TO-2SDI-2022-6** SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-2SDI
  - **ADD-SFP-IP-TO-2SDI-2110** SFP Software License; Single-Channel De-Encapsulator IP-2110-to-2SDI

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**-UDX-SFP** Adds daughter card supporting externally-accessible dual SFP cage; orderable as new option. **Note:** To support SFP option(s), this option is required in addition to desired specific SFP options below. The SFP modules listed below are available for the 9905-MPx card when also fitted with SFP option -UDX-SFP.

  - **UDX-SFP-MSA-4S** daughter card is used with 4-slot (“Double-Width”) rear module (such as RM20-9905-C-HDBNC or RM20-9905-F-HDBNC). UDX-SFP-MSA is only available for use in conjunction with 4-slot rear modules and daughter card -UDX-SFP-MSA-4S). Rear modules RM20-9905-C-HDBNC, RM20-9905-F-HDBNC and option -UDX-SFP-MSA-4S are available separately.

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**ORDERING INFORMATION (cont.)**