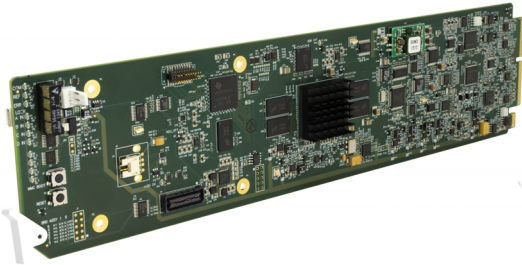# COBALT

9902-2UDX-DI • 3G/HD/SD-SDI Dual-Channel De-interlacing Up-Down-Cross-Converter / Frame Sync

The Cobalt® **9902-2UDX-DI 3G/HD/SD-SDI Dual-Channel De-interlacing Up-Down-Cross-Converter / Frame Sync** offers two independent signal paths of up/down/cross conversion (including independent per-path de-interlacing) and frame sync in a single openGear® card. Using our HPF-9000 20-slot frame, this provides up to 40 channels of processing in a single frame. The 9902-2UDX-DI represents a new level of openGear packaging density!

The 9902-2UDX-DI provides high-density that offers unprecedented multi-input support and flexibility. Dual 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. AFD processing can detect an incoming AFD code and correspondingly set scaling and ARC 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. Bulk and per-channel audio delay controls easily address lip-sync issues.

A convenient input crosspoint 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 or failover to alternate inputs on loss of input conditions. With option **+ANC**, the 9902-2UDX-DI offers full VANC/HANC ancillary data packet de-embedding and 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. 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

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

Independent Up/Down/Cross Conversion with independent de-interlacing for each path

Auto-Changeover can be set to invoke failover for basic input loss

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.

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

Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC

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

Video options include color correction

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 Panel

Hot-swappable

Five year warranty

OPTIONS

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
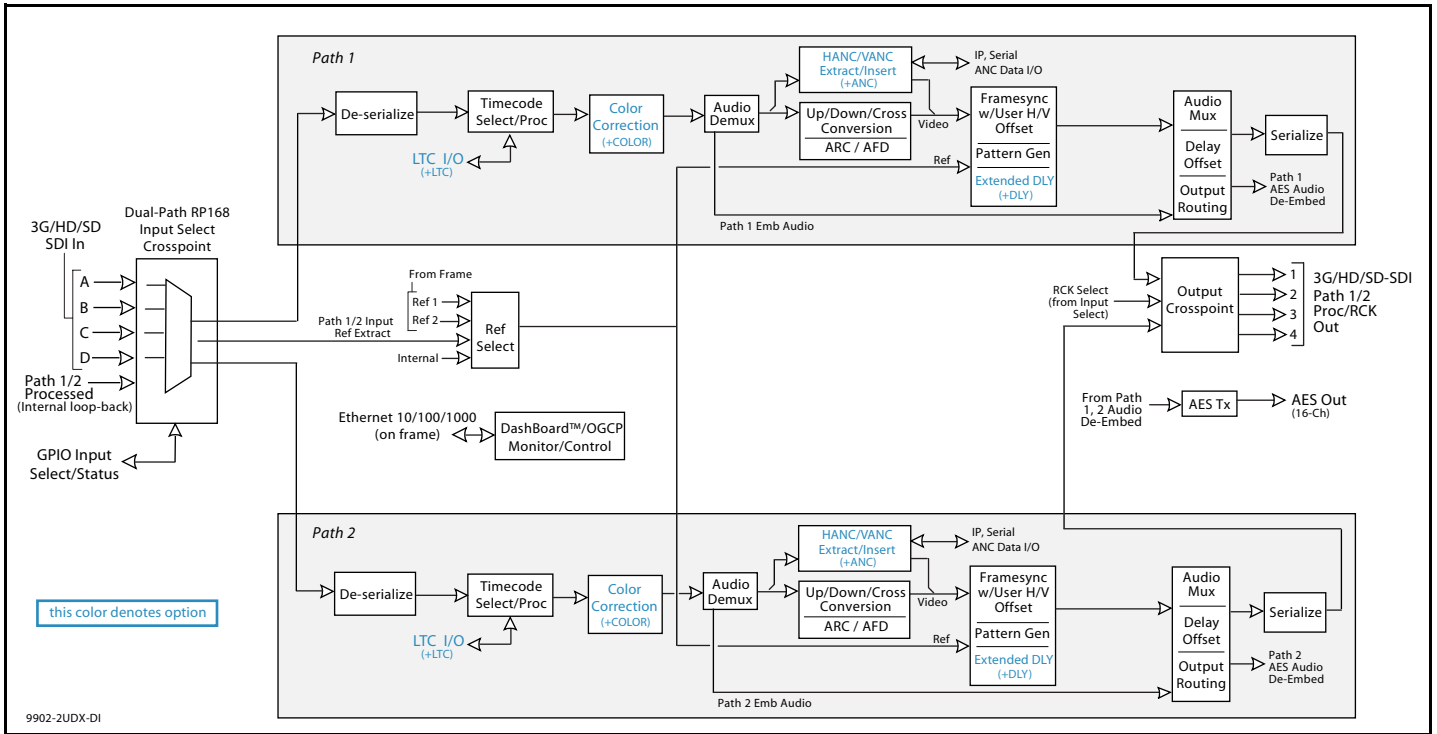
Clean and Quiet Switching Option (**+CQS**) – Provides automatic audio muting during switching transitions from one SDI input source to another to provide silence between input switches.

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.
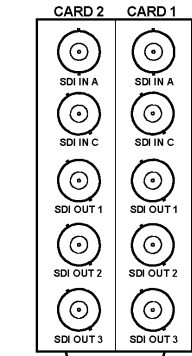
Audio LTC I/O (**+LTC**)

openGear

Path 1

De-serialize → Timecode Select/Proc → Color Correction (+COLOR) → Audio Demux → Up/Down/Cross Conversion / ARC / AFD → Framesync w/User H/V Offset / Pattern Gen / Extended DLY (+DLY) → Audio Mux / Delay Offset / Output Routing → Serialize

HANC/VANC Extract/Insert (+ANC) — IP, Serial ANC Data I/O

LTC I/O (+LTC)

Video / Ref

Path 1 Emb Audio
Path 1 AES Audio De-Embed

3G/HD/SD SDI In
- A
- B
- C
- D

Dual-Path RP168 Input Select Crosspoint

Path 1/2 Processed (Internal loop-back)

GPIO Input Select/Status

Path 1/2 Input Ref Extract

From Frame
- Ref 1
- Ref 2
- Internal

Ref Select

RCK Select (from Input Select)

Output Crosspoint
- 1
- 2
- 3
- 4

3G/HD/SD-SDI Path 1/2 Proc/RCK Out

From Path 1, 2 Audio De-Embed → AES Tx → AES Out (16-Ch)

Ethernet 10/100/1000 (on frame) → DashBoard™/OGCP Monitor/Control

this color denotes option

Path 2

De-serialize → Timecode Select/Proc → Color Correction (+COLOR) → Audio Demux → Up/Down/Cross Conversion / ARC / AFD → Framesync w/User H/V Offset / Pattern Gen / Extended DLY (+DLY) → Audio Mux / Delay Offset / Output Routing → Serialize

HANC/VANC Extract/Insert (+ANC) — IP, Serial ANC Data I/O

LTC I/O (+LTC)

Video / Ref

Path 2 Emb Audio
Path 2 AES Audio De-Embed

9902-2UDX-DI

RM20-9902-2UDX-A/S

CARD 2 / CARD 1 — SDI IN A, SDI IN C, SDI OUT 1, SDI OUT 2, SDI OUT 3

RM20-9902-2UDX-C

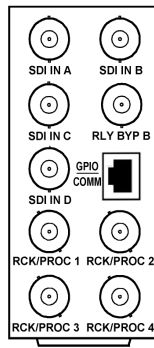SDI IN A, SDI IN B, SDI IN C, RLY BYP B, GPIO COMM, SDI IN D, RCK/PROC 1, RCK/PROC 2, RCK/PROC 3, RCK/PROC 4
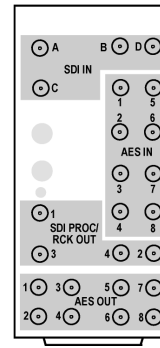
Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input.
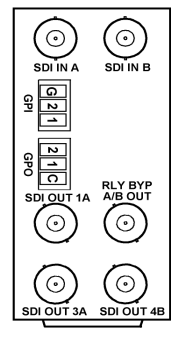
RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.
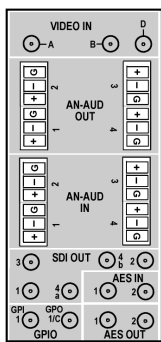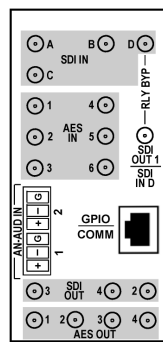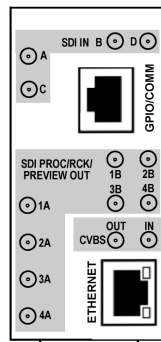
RM20-9902-2UDX-E- (DIN HDBNC)

SDI IN: A, B, C, D
AES IN: 1, 5, 2, 6, 3, 7, 4, 8
SDI PROC/RCK OUT: 1, 2, 3, 4
AES OUT: 1, 3, 5, 7, 2, 4, 6, 8

RM20-9902-2UDX-F

SDI IN A, SDI IN B, GPI 2 1, GPO 2 1, SDI OUT 1A, RLY BYP A/B OUT, SDI OUT 3A, SDI OUT 4B

RM20-9902-2UDX-H- (DIN / HDBNC)

VIDEO IN A, B, D
AN-AUD OUT, AN-AUD IN
SDI OUT 3, 1, 4, 2
GPI 1, GPO 1/C
GPIO
AES IN 1, 3, 2, 4
AES OUT 1, 3, 2, 4

RM20-9902-2UDX-K- (DIN / HDBNC)

SDI IN A, B, C, D
AES IN 1, 4, 2, 5, 3, 6
RLY BYP
SDI OUT 1
AN-AUD IN
GPIO COMM
SDI OUT 3, 4, 2
AES OUT 1, 3, 2, 4

RM20-9902-2UDX-L- (DIN / HDBNC)

SDI IN B, D, C
GPIO/COMM
SDI PROC/RCK/ PREVIEW OUT: 1B, 2B, 3B, 4B
1A, 2A, 3A, 4A
CVBS OUT IN
ETHERNET

8 - GND
7 - COM_A_RX
6 - COM_A_TX
5 - GPO OUT 2
4 - GPO OUT 1
3 - GPO RTN
2 - GPI IN 2
1 - GPI IN 1

Note: A and B outputs are DA pairs of corresponding outputs 1 thru 4.

RM20-9902-2UDX-M/S- (DIN / HDBNC)

CARD 2 / CARD 1
SDI IN A, SDI IN B, SDI IN C, SDI IN D
SDI OUT 1A, 2A, 3A, 4A, 1B, 2B, 3B, 4B

Note: Some Rear I/O Modules shown here are equipped with connectors for signals not supported by this card (such as multi-wire balanced audio connections, CVBS I/O, and AES IN). These Rear I/O Modules can be used with the card, however these connections are N/C when used with this card.
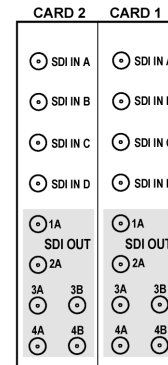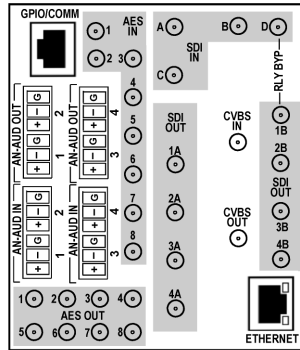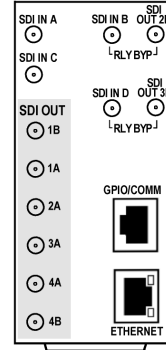
*RM20-9902-2UDX-N-
(DIN | HDBNC)*

*RM20-9902-2UDX-P-
(DIN | HDBNC)*

8 - GND
7 - COM_A_RX
6 - COM_A_TX
5 - GPO OUT 2
4 - GPO OUT 1
3 - GPO RTN
2 - GPI IN 2
1 - GPI IN 1

Note: A and B outputs are DA pairs of corresponding outputs 1 thru 4.

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.

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

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

9902-2UDX-DI • 3G/HD/SD-SDI Dual-Channel De-interlacing Up-Down-Cross-Converter / Frame Sync

ORDERING INFORMATION

9902-2UDX   3G/HD/SD-SDI Dual-Channel De-interlacing Up-Down-Cross-Converter / Frame Sync

Rear I/O Modules:

Note: Some Rear I/O Modules listed below are equipped with connectors for signals not supported by this card (such as multi-wire balanced audio connections, CVBS I/O, and AES IN; the N/C connectors are not listed in the descriptions below). These Rear I/O Modules can be used with the card, however the unsupported connections are N/C when used with this card.

RM20-9902-2UDX-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)

RM20-9902-2UDX-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

RM20-9902-2UDX- E-DIN   20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3)

RM20-9902-2UDX-E-HDBNC   20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC)ORD INFO

RM20-9902-2UDX-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

RM20-9902-2UDX-H-DIN   20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9902-2UDX-H-HDBNC   20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9902-2UDX-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), (4) AES Outputs, GPIO/COMM RJ-45 connector (All coaxial connectors DIN1.0/2.3)

RM20-9902-2UDX-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), (4) AES Outputs, GPIO/COMM RJ-45 connector (All coaxial connectors HD-BNC)**RM20-9902-2UDX-L-DIN**   20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (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)

RM20-9902-2UDX-L-DIN   20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (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)

RM20-9902-2UDX-L-HDBNC   20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (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)

RM20-9902-2UDX-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)

RM20-9902-2UDX-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)

RM20-9902-2UDX-N-DIN   20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (8) AES Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors DIN1.0/2.3.)

RM20-9902-2UDX-N-HDBNC   20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (8) AES Outputs, (1) GPIO/COMM RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

ORDERING INFORMATION (cont.)

RM20-9902-2UDX-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)

RM20-9902-2UDX-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)

Options:

+ANC Ancillary Data Processor Option

+COLOR Color Correction Option

+LTC Audio LTC I/O Option

+CQS Clean and Quiet Switching Option

+DLY Extended Frame Sync Delay Option