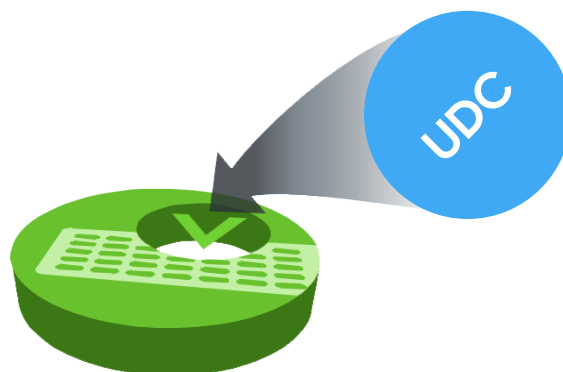




datasheet

Virtuoso  
Media Function

nevion



# Nevion Virtuoso

## Up/Down/Cross for UHD/HD

**Nevion Virtuoso's Up/Down/Cross Media Function offers a variety of high-quality format conversions for HD and UHD with native SMPTE ST 2110-20 uncompressed video in/out on 25 GigE.**

A single Up/Down/Cross (UDC) instance running on an HBR25 card in Virtuoso MI supports two independent video converters. Each converter can perform de-interlacing, scaling, 3D LUT colour conversion, legalization, frame synchronization and delay. Any-to-any conversion is supported for HD 720p, 1080i, 1080p and UHD 2160p video formats.

The versatility, performance and low latency of the UDC media function makes it ideal for live broadcast and media production applications.

A single Virtuoso MI supports up to 16 UHD/HD Up/Down/Cross video conversion processes, taking up only 1RU of rack space, offering a highly dense and power efficient solution for video processing.

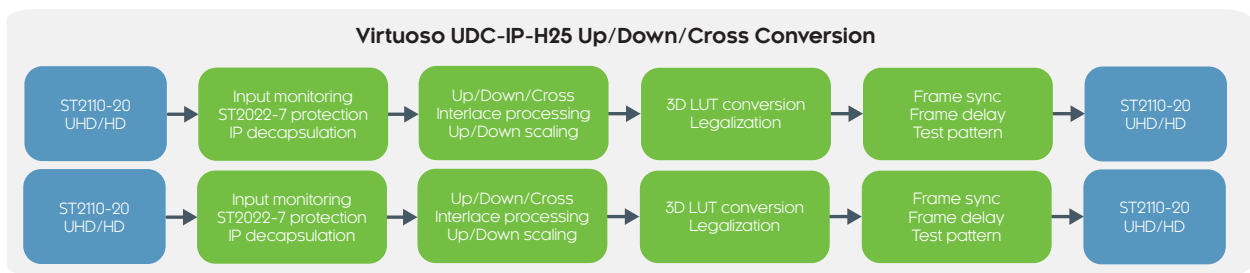
The Up/Down/Cross function can of course be combined with other Virtuoso media functions such as baseband SDI adaptation for HD and UHD, MADI and AES3 audio adaptation, audio processing and mixing, or JPEG XS encoding and decoding.

### Applications

- Live production
- IP facility infrastructure
- Distributed production

### Key features

- Video format conversion for HD and UHD
  - UHD to HD down-conversion
  - HD to UHD up-conversion
  - HD to HD conversion
- Video colour conversion
  - 3D-LUT conversion
  - HDR/SDR conversion
- Native IP connectivity
  - Native SMPTE 2110 video/audio interfacing
  - ST2022-7 hitless switching on dual IP/25GigE
- Video processing
  - High quality de-interlacing and interlacing
  - High quality resolution scaling
  - Built-in frame synchronizer with PTP support
  - Video sample legalization on output
- Monitoring and control
  - Thumbnails of input and output video
  - Advanced video monitoring option
  - HTML5 user interface for configuration
  - NMOS IS-04/05 and REST API for control



## High quality format conversion

The Nevision Virtuoso Up/Down/Cross media function provides dual channel high-quality format conversion for UHD and HD signals.

The signal conversion capabilities include option for de-interlacing for converting 1080i interlaced formats to HD/UHD progressive formats at 50/59.94 Hz, followed by high-quality scaling to go between HD 720p, 1080p and UHD 2160p resolution.

## 3D LUT colour space conversion

The media function supports 3D LUT conversion for the ultimate flexibility in colour space and HDR/SDR conversion for live production, on-set preview/monitoring, and broadcast distribution. The solution offers a high level of customization as up to 32 user-defined LUTs can be uploaded, pre-stored and easily switched between.

## Flexible interfacing via IP/25GE

The UDC media function is available for the HBR25 accelerator card in the Virtuoso MI appliance and supports native SMPTE 2110 via dual 25GE ports.

## PTP timing and sync

Precision Timing Protocol (PTP) provides accurate synchronization for IP video and audio, using IEEE 1588v2 profiles or SMPTE 2059-2. Locking to PTP/TAI ensures fully synchronous operation across any network and any distance. PTP redundancy is supported with bumpless PTP failover switching.

## RTP-based A/V sync

In a native ST2110 network, uncompressed audio and video is available on the network as ST2110 elementary streams, so that audio and video can be processed independently. In order to facilitate downstream synchronization, the UDC software will process the ST2110-20 video input RTP timestamps and publish a new video source on the network, in the desired format and resolution, inheriting the RTP timestamps of the source.

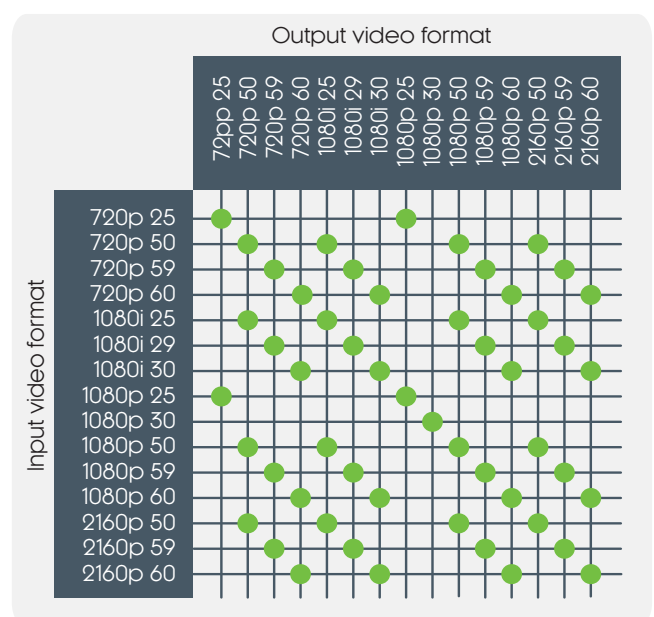
This allows other devices in the network to choose between different video resolutions and color formats, while still using RTP timestamps for automatically synchronizing audio and video.

## Built-in video frame sync

The UDC media function includes built-in video frame synchronization with media alignment to PTP/ST2059, or legacy BB/TLS analog sync in Virtuoso MI. Video delay up to 10 video frames is supported.

## Network redundancy with ST2022-7

Transmitting the same RTP/IP stream across dual, fully diverse network links enables receivers/decoders to utilize SMPTE ST 2022-7 Seamless IP Protection Switching (SIPS), which gives error-free transport even in case of severe packet loss or link outages as long as a packet arrives on either of the two network links. Support for ST 2022-7 requires the protection license.



## Video formats

IP media interface	SMPTE ST 2110-20 Video SMPTE ST 2110-21 (NL sender, W receiver) SMPTE ST 2110-30/31 audio SMPTE ST 2110-40 ANC
Video formats	1280 x 720p: 25/50/59.94/60 Hz 1920 x 1080i: 25/29.97/30 Hz 1920 x 1080p: 25/50/59.94/60 Hz 3840 x 2160p: 50/59.94/60 Hz

## Video conversion and processing

Input/output video	YCbCr, 4:2:2, 10 bit per component
Interlace processing	De-interlacing: 1080i to 1080p Interlacing: 1080p to 1080i
Down-scaling	2160p to 1080p/720p 1080p to 720p
Up-scaling	1080p to 2160p 720p to 1080p/2160p
Colour conversion	3D-LUT conversion (33 cube LUT) User-defined LUTs (cube format)
Colour formats	ITU-R BT.709 (HDTV) ITU-R BT.2020-2 (UHDTV) ITU-R BT.2100 HDR (HLG / PQ)
Legalize / clip	Yes
Frame sync	Yes
Sync reference	PTP (IEEE 1588v2) from 25GE Analog BB/TLS via Virtuoso appliance
Processing latency	1-2 frames
Video delay	Yes, up to 10 frames additional delay
Test patterns	75% and 100% Bars, SMPTE RP 219, SMPTE EG 1 EIA RS-189-A, EBU TECH-3373 colour bar for HDR/HLG Flat-field with configurable color Custom test image (BMP/JPG/PNG) Configurable text overlay Moving box/bar

## Timing and synchronization

Sync input format	PTP (IEEE 1588v2:2008) Analog BB/TLS via Virtuoso appliance
PTP profile support	PTP default and media profile SMPTE 2059-2 PTP profile
PTP redundancy	Internal PTP failover in Virtuoso FA/MI
Media timing	SMPTE ST 2059-1, SMPTE ST 2110-10 SDI video timing based on SMPTE ST 2059-1
RTP timestamp	Pass-through mode (transparent), or generated based on PTP/ST2110

## Ordering options

VIRTUOSO-HW-HBR25-SFP3	24645	Nevion Virtuoso 25G High Bit-Rate Accelerator (HW module). 2x25G SFP28 ports. Additional licenses required for use with media adaptation/compression/ processing/monitoring functions.
VIR-MI-SW-UNC-UDC1	25021	License option enabling one (1) channel of HD/UHD Up/Down/Cross video format conversion, including de-interlacing/interlacing, scaling, legalization and frame synchronization. Includes ST2110-20 input/output video interface. Requires an HBR25 accelerator module running UDC media function, max 2 licenses per module.
VIR-MI-SW-UNC-3DLUT1	25021	License option enabling one (1) channel of 3D LUT video colour conversion. Requires an HBR25 accelerator module running UDC media function and VIR-MI-SW-UNC-UDC1 licenses. Max 2 licenses per module.
VIR-MI-SW-UNC-PROT1	24743	License option enabling IP protection features, including SMPTE 2022-7 Seamless IP Protection Switching (SIPS) for RTP/IP transport over dual diverse network links (license only needed on receiver). License for 1 video service.
VIR-MI-SW-UNC-MON1	24740	License option enabling advanced monitoring features for uncompressed video/audio, including black/ freeze frame detection. License for 1 video service.

## IP media interfaces

Video over IP	SMPTE ST 2110-20 video in RTP/UDP/IP SMPTE ST 2110-21 (NL sender, W receiver)
Discovery/Reg.	SDP (Session Description Protocol) NMOS IS-04/IS-05
Link protection	Hitless/seamless switching for all RTP flows compliant to SMPTE ST 2022-7:2019 ST2110-20: class A or C (WBUF license).

## Monitoring

Thumbnails of video input and output	
Video freeze and black frame detection (licensed)	

## Media Server Appliance support

Please refer to Nevision Virtuoso Platform datasheet for details.	
Virtuoso MI	Supported in version 1.6 or higher.

## Accelerator requirement

Accelerator	HBR 25G Media Accelerator
Description	Multi-channel high bitrate Media Accelerator (HW module). 2x25G SFP ports. Additional licenses required for use with media adaptation/compression/ processing/ monitoring functions.
Product codes	VIRTUOSO-HW-HBR25-SFP3 (24645)
SFP configuration	Port 1: Video SFP (not used) Port 2: 25GE (25GBase-LR/SR) Port 3: 25GE (25GBase-LR/SR)
Sync input format	PTP (IEEE 1588v2:2008, SMPTE ST2059-2)
Power consumption	Maximum 45W

(\* ) Contact Nevision for more information



## **Nevion near you!**

Nevion has a presence in all the major regions, and an extensive network of partners to reach customers anywhere in the world.

Visit our website for your nearest sales contact

**[neviON.com](https://neviON.com)**

Copyright © NeviON, 2022, all rights reserved.

No part of this documentation may be reproduced in any form or by any means or be used to make any derivative work (including translation, transformation or adaptation) without explicit written consent of NeviON.

Nevion reserves the right to make changes without notice to equipment specification or design. The information provided in this document is for guidance purposes only and shall not form part of any contract.