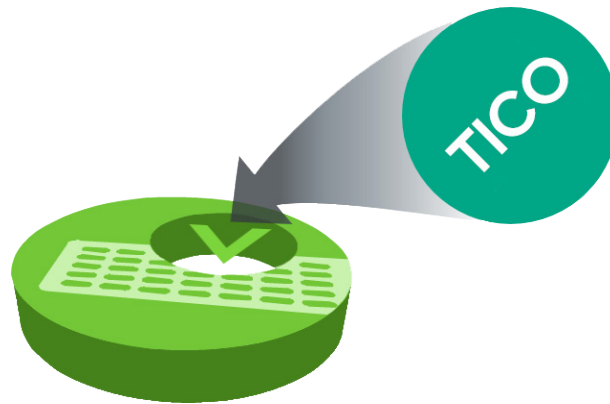




datasheet

Virtuoso  
Media Function

nevion



# Nevion Virtuoso

## TICO UHD/4K Encoding and Decoding

**The Virtuoso TICO Media Function provides visually lossless lightweight 4:1 compression for transport of UHD and 4K signals with sub-frame latency.**

The Nevion TICO Media Function enables cost-effective transport of 12 Gb/s 4K/UHD video over 10GE IP networks using SMPTE 2022-6/7 or over existing 3G-SDI infrastructure.

The TICO Media Function runs on the Virtuoso 10G High Bit Rate Media Accelerator and supports electrical and optical SDI interfaces via video SFPs and breakout cables; and ST2022 IP video/audio via dual 10GE.

Dual hand-off on 10GE and SMPTE 2022-7 is supported for network redundancy, answering the need for high availability.

A single TICO instance supports encoding or decoding of up to 1 UHD signal in each direction with SMPTE 2022-7.

This provides a total of 4 UHD ingress and 4 UHD egress per 1RU on the Virtuoso FA Appliance; or 8 UHD ingress and 8 UHD egress per 1RU on the Virtuoso MI Appliance

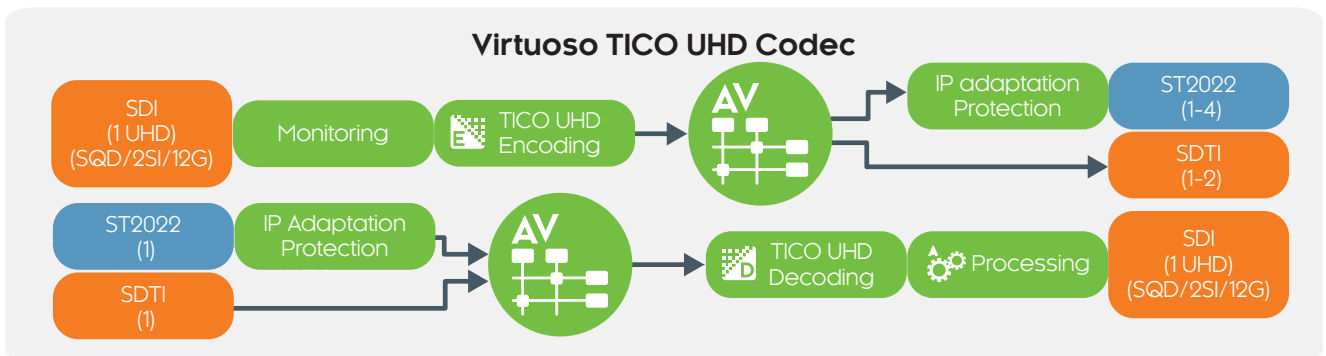
Compressed signals can be aggregated using a HBR accelerator running the 10G Uplink Media function in the Virtuoso MI.

### Applications

- Professional broadcast contribution
- Live sports and event contribution
- Studio-to-studio media exchange

### Key features

- TICO UHD compression
  - Bi-directional operation
  - High video quality and low multi-generation loss
  - Sub-frame end-to-end latency (with 2SI)
  - Support for HDR; broadcast and film formats
- IP and SDI connectivity
  - Uncompressed UHD/4K video sources using square division or 2SI with 4 x 3G/HD-SDI, or 12G-SDI
  - Compressed video on 3G/HD-SDI via video SFPs or IP (SMPTE 2022-6)
  - Aggregation to 10G Uplink module in Virtuoso MI
- Stream protection
  - SMPTE 2022-7 IP protection mechanism for link redundancy
- Monitoring
  - Thumbnails of input and output video
  - In-depth service monitoring incl. video freeze/black frame detection and audio silence detection



### TICO compression technology

Each frame/field is encoded with 4:2:2 10-bit TICO compression, providing visually lossless video quality at a 4:1 compression ratio using only 25% of the bandwidth required for uncompressed video.

### UHD on 3G SDI or SMPTE 2022-6

The TICO Media Function is capable of compressing a 12G/6G UHD/4K signal received as four (4) 3G/HD-SDI (square division and 2SI) or single 12G-SDI and compress it to 3G/1.5G allowing broadcasters to reuse their 3G-SDI infrastructure for UHD/4K, up to two(2) copies of each compressed signal can be output on SDI.

The compressed signal can also be sent as a SMPTE 2022-6 stream over IP. Send up to 3 UHD/4K signals on a 10GE link.

### Transparent audio & ancillary data

The TICO Media Function supports transmission of embedded audio (16 channels for HD and 32 channels for 3G-SDI). The handling of embedded audio, whether it's linear PCM or pre-compressed audio, is fully transparent. Similarly, the handling of ancillary data such as closed captioning, active format description, time code and other metadata is fully transparent line-by-line.

### Bi-directional capability

The TICO Media Function uses the Virtuoso High Bitrate Accelerator to encode and decode simultaneously one (1) UHD/4K signal per Media Accelerator.

### High density and flexibility

Running on the Virtuoso HBR 10G accelerator, the TICO media function supports encoding and decoding of 1 UHD channel simultaneously, giving a density of 4 UHD channels of encoding and 4 UHD channels of decoding in Virtuoso FA; or 8 UHD channels of encoding and 8 UHD channels of decoding in Virtuoso MI.

### 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

SDI media interface	HD-SDI SMPTE ST 292/ST 296/ST 274 3G-SDI SMPTE ST 425-1: 2017 (Level A and Level B input), ST 425-5:2015 12G-SDI SMPTE ST 2082-10 (mode 1)/ ST 2036-1
Video formats	Transmit or receive UHD or 4K signal using 4 (four) HD or 3G-SDI signals (2 sample interleave and square division) or 12G-SDI 3840 x 2160p: 23.98 / 24 /25 / 29.97 / 30 / 50 / 59.94 / 60 Hz 4096 x 2160p: 23.98 / 24 /25 / 47.95 / 48 / 50 / 59.94 / 60 Hz

## Video compression

Video compression	SMPTE RDD 35 TICO profile 2 (decoder compliant with profile 1 and profile 2)
Compression ratio	4:1 (fixed)
Video sampling	YCbCr, 4:2:2, 10 bit per component
Colour space	ITU-R Rec BT.709 ITU-R Rec BT.2020 (4:2:2 10 bit) ITU-R Rec BT.2100 (4:2:2 10-bit for PQ, HLG)
HDR Support	HLG, PQ and S-LOG3
Number of channels	1 channels of encoding and 1 channel of decoding per Accelerator, each UHD format
Video encapsulation	SDI (SMPTE ST 425-1:2017 Level A) SMPTE 2022-6 SDI payload over RTP/UDP/IP

## Audio and ancillary data

Audio and ancillary data taken from the first 3G-SDI input and transported transparently for all SMPTE ST 291-1:2011 ANC data

For cross-conversion between 2SI and SQD, SMPTE ST 352 Video Payload ID codes is regenerated for output 3G-SDI signals

## Video and audio over IP transport

SDI over IP	SMPTE 2022-6 SDI payload over RTP/UDP/IP
Network redundancy	Seamless IP protection Switching (SIPS) compliant to SMPTE ST 2022-7:2013

## 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 alignment	SMPTE 2059-1 (phase offset configurable)

point

## Monitoring

Thumbnails of SDI video input and output
SDI video freeze and black frame detection (licensed)
Audio template monitoring: presence, peak and silence (licensed)

## Media Server Appliance support

Please refer to Nevion Virtuoso Platform datasheet for details.	
Virtuoso FA	Supported in version 2.6 or higher
Virtuoso MI	Supported in version 1.4 or higher

## Accelerator requirement

Accelerator	HBR 10G Media Accelerator
Description	Multi-channel high bitrate Media Accelerator (HW module). 4x SFP+ ports that can accommodate a combination of 10GE SFP+ and video SFPs.
Product codes	VIRTUOSO-HW-HBR-SFP4 (24204)
SFP configuration	Port 1: SDI / Video SFP Port 2: SDI / Video SFP Port 3: 10GE (10GBase-R) Port 4: 10GE (10GBase-R)
Video SFP support	Non-MSA 1.5 Gb/s to 12 Gb/s HD-SDI, 3G-SDI: max 2 in + 2 out 12G-SDI: max 1 in + 1 out Optical and electrical variants
Sync input format	PTP on 10GE (IEEE 1588v2:2008, SMPTE ST2059)
Power consumption	Maximum 45W

## SDI interfaces

SDI interfaces	Video SFP with options for: <ul style="list-style-type: none"> <li>- Dual channel SDI RX (input)</li> <li>- Dual channel SDI TX (output)</li> <li>- Single channel SDI RX + SDI TX (bidirectional)</li> </ul> Video breakout with options for: <ul style="list-style-type: none"> <li>- Dual channel SDI RX + SDI TX</li> <li>- Dual channel SDI RX with passive loop out</li> </ul> All video interfaces support HD/3G-SDI
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## Ordering Options

VIRTUOSO-HW-HBR-SFP4	Multi-channel high bitrate Media Accelerator (HW module). 4x SFP+ ports that can accommodate a combination of 10GE SFP+ and video SFPs. Additional licenses required for use with media adaptation/compression/processing/monitoring functions.
VIR-FA-SW-TICO-UHD1 VIR-MI-SW-TICO-UHD1	License option enabling one (1) channel of TICO 4:1 light-weight compression. 12G-SDI or Quad-Link 4 x 3G-SDI input (2SI or SQD) and transport over 3 Gbps SDTI or SMPTE 2022-6 on IP/10GE. Supports broadcast formats, including 3840x2160 (UHD) resolution at 25/30/50/60 Hz. Licensed per service. Requires an HBR10 accelerator module. Maximum one encoder + one decoder per HBR10 module with Quad-Link 3G-SDI or 12G-SDI interfacing.
VIR-FA-SW-TICO-UHD-FILM1 VIR-MI-SW-TICO-UHD-FILM1	License option enabling one (1) channel of TICO 4:1 light-weight compression. 12G-SDI or Quad-Link 4 x 3G-SDI input (2SI or SQD) and transport over 3 Gbps SDTI or SMPTE 2022-6 on IP/10GE. Supports film and broadcast formats, including 3840x2160 (UHD) and 4096x2160 (4K) resolution at 23.98/24/25/30/50/60 Hz. Requires an HBR10 accelerator module. Maximum one encoder + one decoder per HBR10 module with Quad-Link 3G-SDI or 12G-SDI interfacing.
VIR-FA-SW-UNC-MON[1,4,8] VIR-MI-SW-UNC-MON[1,4,8]	License option enabling advanced monitoring features uncompressed video/audio, including black/ freeze frame and audio silence detection. Licensed per [1,4,8] video services and [16,64,128] audio channels.
VIR-FA-SW-UNC-PROT[1,4] VIR-MI-SW-UNC-PROT[1,4]	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). Applicable for ST2022-6 and ST2110 video IP inputs. License for 1 video service and 16 audio channels.



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