

Link baseband
to IP in a flash
– with Nevion's
Flashlink

nevision

ARCHITECTS OF VIRTUALIZED MEDIA PRODUCTION

Moving to IP in studios and facilities

IP is making its way into studios and facilities. It's no longer a case of whether to move to IP, it's when to move to IP.

Some broadcasters are already planning a move to IP relatively soon, often driven by the construction of new facilities. Others are keen to start exploring now the capabilities and the possibilities of the technology in order to be ready for an eventual move.

Either way, the focus is rightly on the actual IP network itself rather than the studio equipment, as it is the part of the infrastructure that delivers most of the promised benefits in terms of flexibility and cost effectiveness.

What about the baseband equipment?

Broadcasters have invested heavily in baseband studio equipment from cameras to monitors, and the business case for replacing them with their IP equivalent is not necessarily compelling.

So broadcasters are looking for cost-effective ways to use their baseband equipment with an IP network – whether for testing purposes or an actual move to IP.

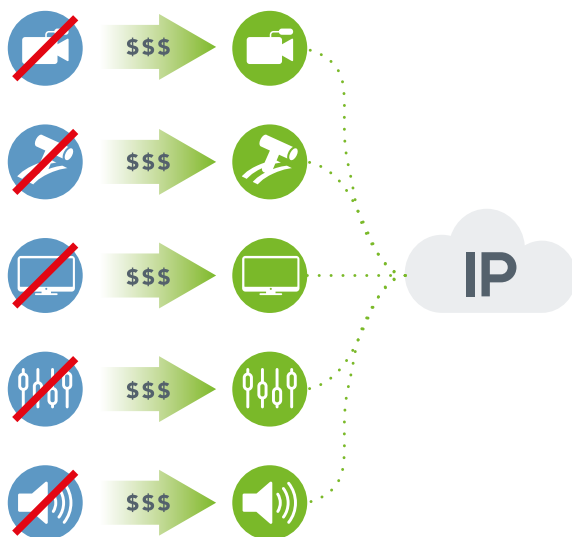
The solution

Connecting baseband equipment to an IP network could not be easier or cost-effective – thanks to Nevision's Flashlink IP converters.

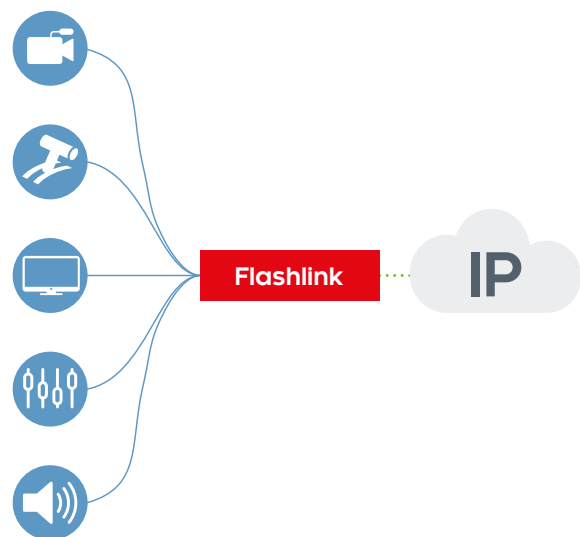
The Flashlink IP converters provide a simple and convenient way to convert from synchronized baseband video, audio and data signals to their IP equivalent, and vice-versa.

Nevion also provides a sync converter that generates analog and digital sync signals from the PTP (precision time protocol) sync signal used in IP networks, allowing the baseband equipment to be fully synchronized with other baseband or IP equipment across the network.

The **Expensive** Way



The **Cost-Effective** Way





Easy to use

Nevion's Flashlink family of products is long established in studios and facilities across the world, and has become a byword for reliability, cost effectiveness and ease-of-use.

Building on that tradition, Nevision offers 5 separate Flashlink IP converter cards, each with a specific use, making it easy to select the right converters for the application:

- **SPG-PTP** for synch over IP – to distribute a sync based on PTP
- **3G-IP-MUX-8** for video over IP – able to handle, for example, 2 studio cameras (including return feeds)
- **AES-IP-MUX** for digital audio over IP – for audio mixers, microphone amplifiers, or AES based audio monitors
- **ADA-IP-MUX** for analog/digital Audio over IP – for mixed analog and digital audio environments and 4-wire intercom solutions
- **ETH1000-SW-COM-SFP** for data and GPI over IP – for serial camera control, motion control, and tally

These cards are bi-directional, so for example the video card can be used to convert the camera ingest to IP (baseband to IP) or to forward video signals transported over the IP network onto a baseband monitor (IP to baseband).

The cards can be configured easily through the web-interface of Nevision's Multicon.

An enclosure for every need

Nevion's Flashlink IP converter cards are designed to fit into existing Flashlink chassis, alongside other Flashlink cards or on their own. Nevision offers different chassis for different uses, including:

- **The FR202**, a high power 2RU modular chassis for 10 dual-card modules, for connecting a lot of equipment to the IP network
- **FR-2RU-10-2-RP**, a low power, silent 10 card housing without fans, appropriate for use in a studio where no background noise is acceptable
- **FLASHCASE II**, a portable rugged enclosure, extremely appropriate for example if the IP conversion set-up needs to be transported between locations
- **N-BOX**, a ruggedized single card enclosure, very appropriate for example to create a highly portable sync distribution unit using the SPG-PTP card

NEVISION'S SOLUTION

Nevion's solution supports 3G-SDI, HD-SDI, SD-SDI, AES, analog audio, 4-wire, RS422/RS232/RS485 and GPI I/O



Standards compliant

Standards for IP transport in the studios are evolving, but there is an emerging consensus on the roadmap for those standards, with the multi-vendor support of the AIMS group (Alliance for IP Media Solutions), of which Nevion is a founding member.

Initially, SMPTE 2022-6 (SDI over RTP) was adopted for the transport of video and audio over IP. In studios however, signals are typically carried as separate streams so the current recommendation is to use the VSF's TR-04, which is what the Flashlink IP converters support currently.

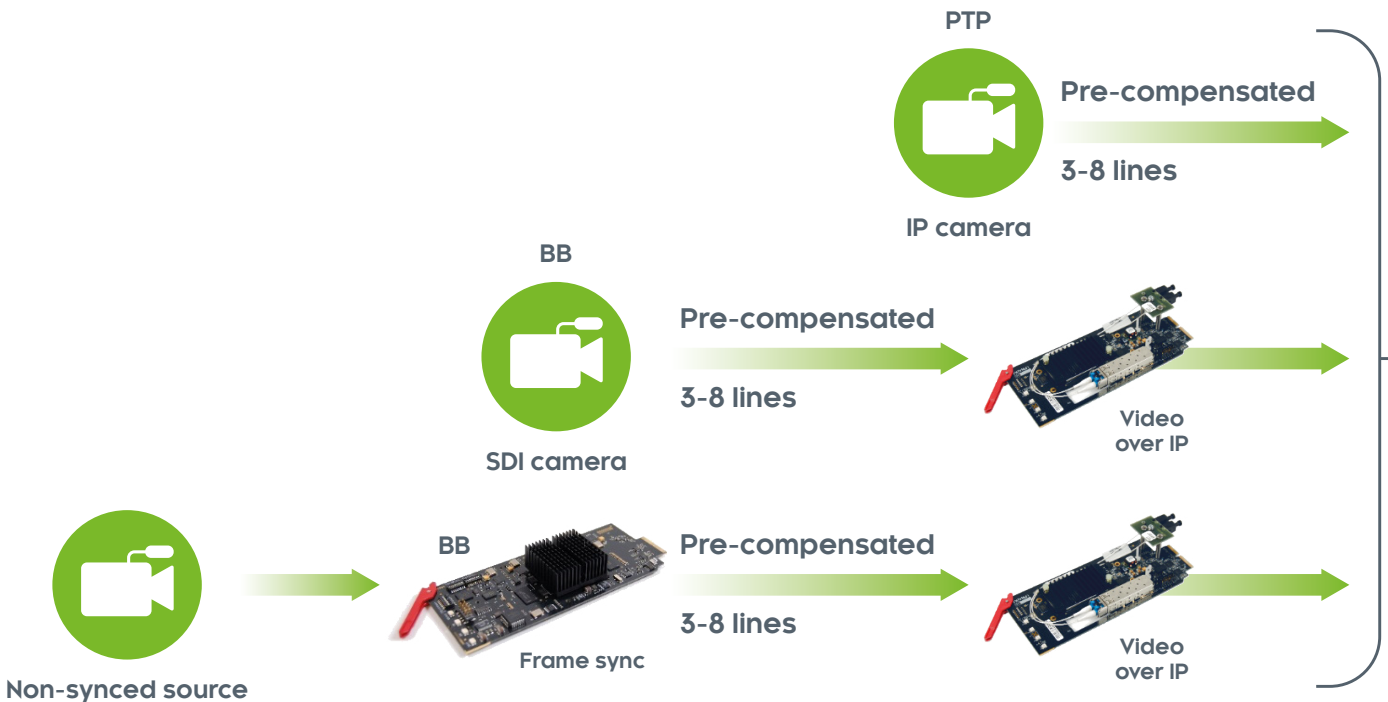
Eventually, the standards will evolve to TR-03 and then SMPTE 2110, which the Flashlink IP converters will be able to support through software upgrades.

STANDARDS

VSF TR04 – video and audio are carried over an IP network separately as RTP streams. Video is mapped as SMPTE2022-6, but with PTP information added. Discrete audio is mapped as AES67. Ancillary data is still carried embedded inside the SMPTE2022-6 stream.

VSF TR03 - video, audio and ancillary data are carried over an IP network as separate elementary RTP streams. Video uses the mapping according to RFC4175. Audio is still AES67.

SMPTE2110 – Mostly equal to TR03 but includes auto discovery of devices and their supported media standards in the network according to NMOS.



Fully synchronized

Synchronization is an important topic in a studio network, and can be quite complex. The situation can become even more complicated when baseband and IP networks need to co-exist.

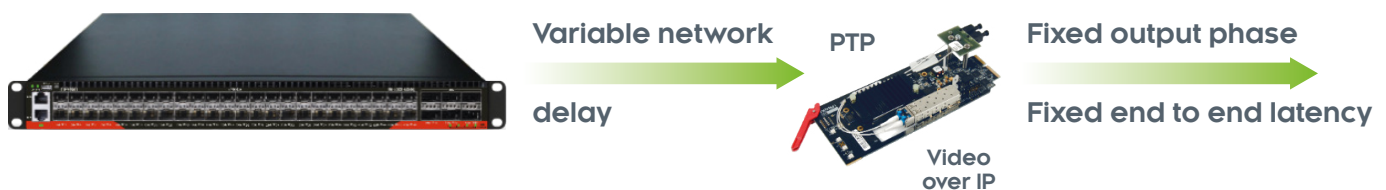
Nevion has built functionality into all its IP converters to establish a fixed latency through the network, bringing a deterministic phase at its baseband outputs as well as providing a latency of just a few lines of HD video.

SYNCHRONICITY IN IP

The baseband world, synchronizing signals is relatively straight forward as the network has a predictable latency. Various pieces of equipment may have slightly different latencies, but each is fixed and known so can easily be handled by pre-compensating at the ingest. Once all the signals from the various pieces of equipment are aligned, they stay that way throughout the network.

In contrast, in IP networks, the end to end latency is not fixed – it varies. Nonetheless, fixed end-to-end latency can be achieved.

This is done firstly by extending the baseband concept of pre-compensation at the ingest, to anticipate the total IP network latency variation. Typically this can be from 3-8 HD lines or 50 – 150 μ s. This alone does not guarantee that signals will remain fully aligned, however it does insure that they all stay within a certain range from each other. That's where the second part of the solution comes in: the signals are corrected when they come out of the IP network to ensure a fixed output phase corresponding to the phase used for the baseband domain.



No better way to link baseband to IP

Using Flashlink to connect baseband equipment to an IP network is the simplest and most cost-effective way.

Each Flashlink IP converter card costs a fraction of the cost of new piece of IP-enabled equipment, such as an IP camera, and can handle a great variety of equipment – so, for example a single video card can handle multiple cameras or be used for a video-mixer. With Flashlink, it is easy to scale by simply adding the appropriate cards as needs dictate.

In other words, the Flashlink IP converters open up the possibility for broadcasters to leverage their investment in an IP world, offering a return on investment that cannot be matched.

Synch over IP – SPG-PTP

PTP, IEEE1588, SMPTE2059

1x SDI output

4x analogue black outputs

2x PPS outputs

4x AES11

4x Wordclock

Adjustable video phase



Video over IP – 3G-IP-MUX-8

VSF TR-04 compliant

PTP, IEEE1588, SMPTE2059

8x 3G-SDI/ HD-SDI/ SD-SDI ports

2 input ports

2 output ports

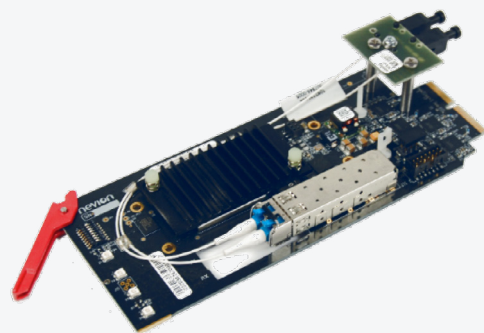
4 direction configurable ports

Low latency

PTP referenced video output generator

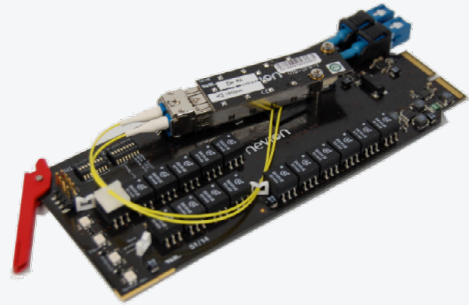
CWDM and DWDM support for long distance transport

Hot-swap main board with optics without detaching fiber connections.



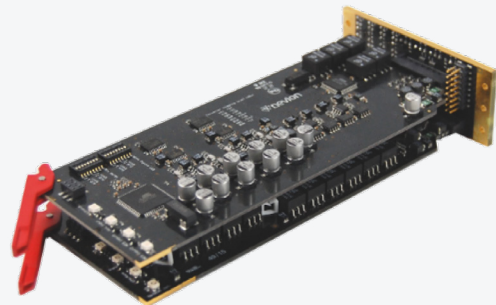
Digital Audio over IP Converter – AES-IP-MUX

- AES67 compliant stereo stream
- VSF TR-04 compliant
- 24bit, 48kHz sampling
- PTP, IEEE1588, SMPTE2059
- Flexible setup for distributed networks
- Supports low latency local device routing
- 16 direction configurable AES ports
- Ultra simple setup for distributed 128x128 router
- Optical interface option supporting CWDM and DWDM
- Choice of silent AES or AES off on loss of IP connection



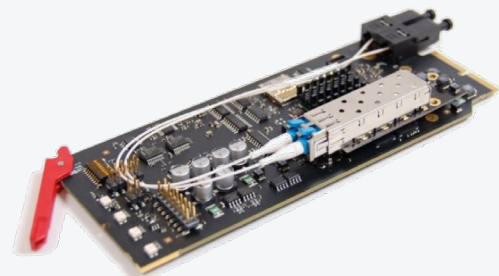
Analog/Digital Audio over IP Converter – ADA-IP-MUX

- AES 67 compliant stereo stream
- VSF TR-04 compliant
- 4 analog stereo pair ports
- >105dBA dynamic range
- 4 direction configurable AES ports
- 24bit, 48kHz sampling
- PTP, IEEE1588, SMPTE2059
- Flexible setup for distributed networks
- Supports low latency local device routing
- Ultra simple setup for distributed 128x128 router
- Optical interface option supporting CWDM and DWDM



Data and GPI over IP Gateway – ETH1000-SW-COM-SFP

- Supports LAN
- Optical GbE port
- 2x GbE electrical ports
- 4x RS422/RS485/RS232 over IP
- 4x GPI in/ 4x GPI out over IP
- In-band management port
- > 30dB optical budget





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