

NDI OUT ON DIREKT ROUTER

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SDI has been the standard for connecting live broadcast equipment since the end of 20th century. New standards for HD, 3G and 4K have been developed, but SDI still needs relatively short cables - one for each video+audio signal. With NDI™ developed by NewTek, multiple signals can be send both ways over a standard gigabit IP LAN which simplifies installations and reduce the hardware investments.

NDI®

LIVE INPUTS OVER INTERNET

Intinor Direkt router is used to receive and handle live inputs from Internet. The input can be from an Intinor Direkt link encoder (rack, mobile or backpack), but also an RTMP source or a TCP/UDP input from another vendor's live encoder.

MULTIVIEW FOR MONITORING

One input can be monitored using the DVI/HDMI output of the Direkt router. All inputs can be monitored at once with the multiview option. The program out can also be monitored either by using a Direkt link as program encoder or pulling the RTMP stream from the CDN. The monitor output can show audio meters for input and program out to help detect audio loss and to use correct audio levels.

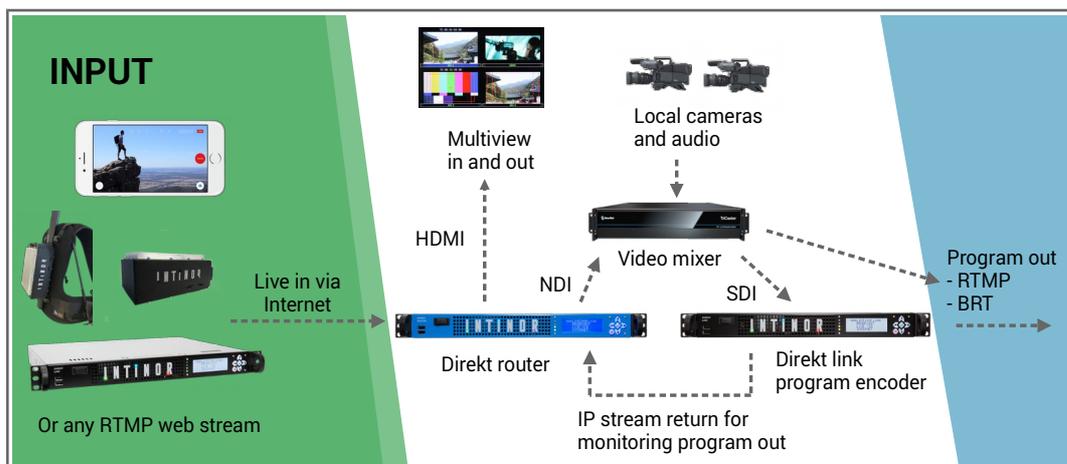


Illustration 1: Common live setup with NDI out on Direkt router

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Solid Solutions for Live Broadcasting

VIDEO MIXER

Any video mixer with NDI™ and/or SDI in can receive live streams from Direkt router and local cameras. Local audio can be connected via audio input if available or via a camera.

DIREKT LINK PROGRAM ENCODER

An optional program encoder can be useful even if streaming out is a feature included in the video mixer. A Direkt link encoder can send web and/or broadcast streams to multiple destinations using most common protocols, but also BRT – Bifrost Reliable Transport – Intinors own transport protocol, which includes network bonding, adaptive bitrate and very powerful error correction.

A description of BRT can be found here:

NUMBER OF OUTPUTS ON DIREKT ROUTER

SDI and NDI™ video outputs on Direkt router 2000IP are optional. 1, 2 or 4 SDI outputs can be added on a standard 1U router. 1, 2 or 4 NDI™ outputs can also be added, but the total number of broadcast video outputs is however limited to 4.

When the Direkt router is upgraded to a 2RU, dual CPU system, the maximum number of broadcast outputs is increased to 8.

Intinor users with 2x SDI out and 2RU Direkt routers are welcome to contact an Intinor sales representative for an upgrade to add NDI outputs.

TESTED VIDEO MIXERS

We have tested Newtek Tricaster TC1, vMix, Wirecast and Livestream. All work fine receiving NDI™ input from Direkt router.



VIDEO FORMATS

Each NDI™ output from Direkt router can be configured as auto or set to a specific resolution and frame rate. All common European and US formats up to 1080p/59.94 can also be selected to make the router scale any input to this format.

On all tested mixers, NDI™ inputs work no matter which format is sent from the router. During our tests, we have sometimes experienced flickering when interlaced formats are used with NDI™. When using progressive resolutions the video always runs very smooth. Because of this, we recommend always to use progressive. For example, set the router NDI™ output to 1080p/50 if the video mixer input is 1080i/25 for best result.

NAMING THE NDI™ OUTPUTS

All inputs and outputs on Direkt router can have a "description". By default, the NDI™ outputs are named "NDI™ out 1", "NDI™ out 2" etc. When having more than one NDI™ out on the router, changing description to describe the live input gives a better overview of the system. Since the video mixer identifies the NDI™ source by its name, changing descriptions is recommended to do early in the setup. The video mixer may need to be restarted before it can connect to an NDI™ input after name change. Never change the description during a live production.

BANDWIDTH AND NETWORK SWITCHES

Each NDI™ signal needs up to 100mbps throughput on the LAN. Also, each client connected to the NDI™ signal, for example video mixer + NDI™ monitor on a laptop, adds load to the network. On a gigabit network, make sure never to exceed 9 NDI™ signals.

Also, some cheap gigabit network switches don't support more than 800mbps throughput or less.

To help understanding how much network load is caused by NDI™ out from Direkt router, the status display shows the total bitrate sent out.

LATENCY ADDED BY MIXER

With the setup as illustration 1, local cameras and remote Internet live feeds are handled by a video mixer with NDI™ in support. As long as an NDI™-based mixer is based on software like Tricaster or Vmix, latency is added from the local cameras to mixer output. This is important to know when using a video mixer for an arena production or outputting to a LED big screen where you want to sync the local cameras with live audio. Tricaster added about 170ms from local SDI camera to SDI output in our tests with 50fps signal. An SDI-only-based video mixer like Blackmagic Atem with almost zero-latency can be a better choice for productions to be shown locally.

Latency is also added to a signal from Direkt router NDI™ output via Tricaster to SDI out, but in our tests it was only about 60ms. Perhaps, connecting local cameras with native NDI™ out to the Tricaster would reduce the latency from 170ms to 60ms, but this was outside the scope of our tests.

When producing for viewers not on location, the video mixer latency is usually not relevant.



CURRENT STATUS AND FUTURE PLANS

Intinor has developed support for NDI™ version 2.0 outputs on Direkt router and resolutions up to 1080p/60.

Future releases will include NDI™ inputs on both Direkt link encoders and Direkt routers but also newer versions of NDI™. Ask your Intinor sales representative for more information about our road map.

BRT – Bifrost Reliable Transport is Intinors own protocol for redundant multi-network transport

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