

INTINOR

WE ARE DIREKT

NDI IN/OUT ON DIREKT ROUTER

Version 2020-05-11

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 HLS or RTMP source or a SRT/TCP/UDP input from another vendor's live encoder.

MONITORING

One input or program out can be monitored using the DVI/HDMI output or optional SDI output on the Direkt router. All inputs/outputs can be monitored at once with the multiview option. The monitor output can show audio meters for inputs and program out to help detect audio loss and to use correct audio levels.

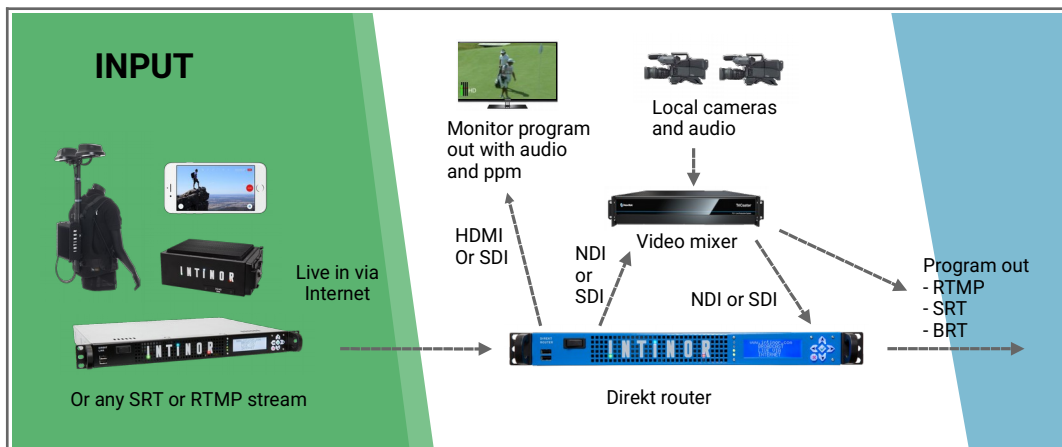


Illustration 1: Common live setup with NDI in/out on Direkt router

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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 ROUTER AS PROGRAM ENCODER

An optional encoder on Direkt router can be useful even if streaming out is a feature included in the video mixer. A Direkt router with 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: <http://www.intinor.se/wp-content/uploads/2018/03/Bifrost-reliable-transport.pdf>

NDI INPUTS ON DIREKT ROUTER

Intinor Direkt router can have optional 1-18x “netvideo inputs” for different kind of IP-based video inputs including RTMP and HLS. With the NDI input option, all netvideo inputs can also be used for NDI inputs selected from a drop-down list in the web interface.

Intinor users with Direkt routers are welcome to contact an Intinor sales

representative for an upgrade to add NDI™ inputs.

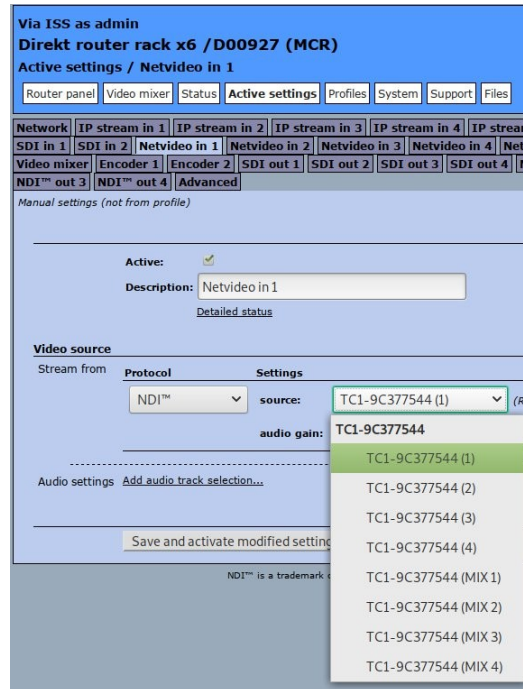


Illustration 2: NDI™ in on Direkt router

NDI OUTPUTS ON DIREKT ROUTER

NDI™ video outputs on Direkt router rack are optional. Up to 8x NDI™ outputs can be added.

When the Direkt router is upgraded to a rack+ system, encoder(s), multiview(s) and other CPU demanding features can also be used on a system with many NDI™ outputs.

Intinor users with Direkt routers are welcome to contact an Intinor sales representative for an upgrade to add NDI™ outputs.

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TESTED VIDEO MIXERS

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



When using progressive resolutions the video always run 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.

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 send from the router. During our tests, we have sometimes experienced flickering when interlaced formats are used with NDI™.

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.

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Newtek has a guide for switch configuration which can be found here:

<https://forums.newtek.com/attachment.php?attachmentid=141895>

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 3.8 outputs on Direkt router and resolutions up to 1080p/60.

NDI™ version 3.8 inputs on Direkt router and Direkt link. Resolutions up to 1080p/60.

Future releases will include NDI™ tally support and 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

NDI is a registered trademark of NewTek Inc

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