

## High Density IP to 10-bit SMPTE ST-2110 Decoder

The DenzCoder platform consists of ten-bit and eight-bit encoders/decoders. They support high density SMPTE ST-2110 applications with a focus on encoding, decoding and transport. Both ten-bit and eight-bit DenzCoders come in 1RU (up to 2 nodes) or 2RU (up to 4 nodes) form factors.

Our decoder model is meant to provide an all-2110 workflow for those customers who have a mix of sources but wish gather all content streams on their 2110 platforms for editing and other purpose.

Each node in both the 1u or 2u form factors can either decode or encode. The only limitation is that you cannot do both on the same node at the same time. Each node can simultaneously decode multiple streams, or encode multiple streams. With one node dedicated to encoding and another to decoding, you can simultaneously encode or decode as many streams as you wish, subject only to the hardware resources provisioned on that node.

You can easily configure a node to encode, and subsequently, reconfigure it to decode.

DenzCoder's unique strength derives from the efficiency of its very high speed networking. 25 Gbps fiber adapters are beginning to become common. Each DenzCoder node features not one, but *two* 25Gbps ports, plus a third GBE port. More importantly, only DenzCoder has software that can "pipeline" the streams coming in or going out to those network cards fast enough to get them to the CPU for processing. *No other vendor can match this.*

Because of its unique design, the DenzCoder family can achieve latencies as low as 3 frames on encode and 4 frames on decode. We lead the market with this capability. *The DenzCoder platform therefore, is demonstrably ahead of all competition in latency and density.*

The DenzCoder 10-bit Decoder comes as either a 1u rackmount (1-2 nodes/blades) or as a 2u rackmount (1-4 nodes/blades) SMPTE ST-2110 to IP decoder. (1-2 nodes/blades) SMPTE ST-2110 to IP encoder. It is designed for ultra high density IP packet transport via its 50Gbps network interfaces (2 x 25Gbps) per node.

The DenzCoder decodes from compressed streams to uncompressed 10-bit SMPTE ST-2110 uncompressed streams for use in your 2110 network. Typically, the input streams might be high-quality, low-latency h.264/AAC MPEG encoded transport streams (1-300Mbps each), via udp or rtp protocol. The decoded output can be used by your other equipment that requires SMPTE ST-2110 input.

The platform allows production facilities to concentrate numerous ultra high density streams for manageable transport and processing. Its ability to decode and emit, or, in the opposite direction, digest and encode such very high rate uncompressed streams means it will continue to serve its purpose even as new standards bring ever greater resolutions to media streaming. It enables smart and efficient management of 2110 production work flows.

High quality real or near-real-time encoding/decoding, with latency as low as three frames becomes a simple question of populating and provisioning the nodes correctly. Choosing the right DenzCoder TV model consists of "rules of thumb,"

such as four cores per stream for SMPTE ST-2110 to IP (or two to three cores vice versa). Both 1u and 2u form factors feature 2nd Gen Intel® Xeon processors, with two sockets per node, and up to 28 cores, plus a GPU to supercharge transcoding. Each node can be populated with up to 4TB memory. Both feature redundant power supplies, of course.

You can also ingest the streams with our RIST error correction protocol products. This enables transmission over public IP with our own LibRist technology, with no packet loss to distribution points. In effect, the DenzCoder links the world to your 2110 devices.

Important note: we do not wish to confuse anyone. Our 10-bit Denz Decoder is exactly the same as our 10-bit Denz Encoder. We may recommend provisioning it slightly differently based upon the intended use. The reason we have two slightly different documents for the same product is for the convenience of customers with a single purpose in mind (decoding), and who do not wish to deal with many documents.



# System Overview DenzCoder 10-Bit

## Decoding

- MPEG-4/AVC High/High422 up to Level 4.2 (10-bit)
- UDP/RTP (including 2022-7 seamless switching)
- SMPTE 2022-1 FEC
- RIST ARQ for public internet delivery

## Video

- 1080i @ 25, 29.97Hz
- 1080p @ 23.98, 24, 25, 29.97, 30, 50, 59.94, 60Hz
- 720p @ 50Hz, 59.94Hz, 60Hz
- 576i @ 25Hz (PAL)
- 480i @ 29.97Hz (NTSC)

## Audio

- (up to 8 stereo pairs)
- MPEG-1 Layer II
- Opus
- AAC-LC
- AC-3 Passthrough
- SMPTE 302M (including data realignment)

## Metadata

- CEA-608/CEA-708 captioning
- Teletext (VBI/OP-47)
- Timecode passthrough
- SCTE 35 to SCTE 104 conversion

## Output

- Uncompressed IP (SMPTE 2022-6/7 and 2110)

## Hardware

### CPUs/Memory (per node)

- Dual Socket P (LGA 3647) 2nd Gen Intel® Xeon® Scalable Processors (6230R is our standard)
- Up to 28 Cores
- 96 GB RAM, Up to 4 TB Memory total
- Intel® C621 chipset

### I/O (per node)

- 6 Gbps SATA 3
- Dual Port 25 Gbps Fiber Network Adapters (SFP28/SFP+/SFP)
- 1 RJ45 GBE LAN (*usually used for management, SNMP, etc.*)

### GPU

- Nvidia Quadro series

### Power/Physical

- 2200W Redundant Power Supplies with PMBus; 1200W with Input 100-127Vac
- Dimensions: 438 x 88 x 774 mm (4u form factor), 437 x 44 x 718 mm (2u form factor)

## Encoding

- MPEG-4/AVC High/High422 Intra up to Level 4.1 (10-bit) up to 150Mbps
- VC-2 HQ encode up to 300Mbps
- Low latency - 30-80ms encode latency Input
- Uncompressed IP (SMPTE 2022-6/7 and SMPTE 2110)
- Bars and tone with editable text on signal-loss

## Video

- 1080i @ 25, 29.97Hz
- 1080p @ 23.98, 24, 25, 29.97, 30, 50, 59.94, 60Hz
- 720p @ 50Hz, 59.94Hz, 60Hz
- 576i @ 25Hz (PAL)
- 480i @ 29.97Hz (NTSC)

## Audio

- (up to 8 stereo pairs)
- MPEG-1 Layer II audio (MUSICAM)
- AAC-LC (HE-AAC is too high latency)
- SMPTE 302M
- Opus

## Metadata

- CEA-608/CEA-708 captioning
- Teletext (VBI/OP-47)
- Timecode passthrough
- SCTE 104 to SCTE 35 conversion

## Multiplexing

- MPEG Transport Stream with full T-STD compliance

## Output

- UDP/RTP (including 2022-7 seamless switching)
- SMPTE 2022 FEC
- RIST ARQ for public internet delivery



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