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Twenty-One Encoder

Software-based ST 2110 encoder and decoder appliance, designed to meet the diverse needs of live broadcast production. Direct support for JPEG-XS TR-07, JPEG2000 TR-01, H.264, HEVC, and NDI

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Hardware specifications

Datasheet

Network Connectivity

2x 10GbE RJ45
2x 10/25GbE SFP28

IPMI

IPMI 2.0 with virtual media over LAN and KVM-over-LAN

Form Factor

1U Rackmount

Dimensions (W x H x D)

17.2" x 1.7" x 18.8"
437 mm x 43 mm x 477 mm

Package (W x H x D)

27" x 8" x 24"
686 mm x 203 mm x 610 mm

Power Supply

100 – 240 VAC 50/60Hz
Redundant Power Supply
Power Consumption - 320W
(Typical consumption under load)

Weight

Net Weight 16 lbs (7.3 kg)
Gross Weight 25.8 lbs (11.7 kg)

Operating Environment

Operating Temperature:
10°C to 35°C (50°F to 95°F)

Non-operating Temperature:
-40°C to 70° C (-40°F to 158°F)

Operating Relative Humidity:
8% to 90% (non-condensing)

Non-operating Relative Humidity:
5% to 95% (non-condensing)

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Software specifications

Datasheet

Accessibility and Monitoring

Web UI
REST API
SSH
SNMP

Input Protocols and Containers

SMPTE 2110
MPEG-TS over RTP or UDP
VSF TR-01 OPTIONAL
VSF TR-07 OPTIONAL
RTMP
SRT w/ Path Redundancy
NDI (including NDI-HX)
HLS

Output Protocols and Containers

SMPTE 2110
MPEG-TS over RTP or UDP
VSF TR-01
VSF TR-07
RTMP or RTMPS
SRT w/ Path Redundancy
NDI
HLS

SMPTE 2110

PTP (IEEE 1588-2008)
2110-10 System Timing and Definitions
2110-20 Uncompressed Active Video
- 4:2:2 10bit only

2110-30 PCM Digital Audio
- Conformance Level CX

NMOS IS-04, IS-05
Multicast (IGMPv3, SSM)
2022-7 Seamless Protection Switching

SRT

Listener and caller mode
Broadcast redundancy mode

Input options:
Decoding encrypted streams
Configurable SRT latency

Output options:
Encryption: AES-128, AES-256 and AES-512
SRT overhead configuration

MPEG-TS

SPTS and MPTS (input only)
RTP or plain UDP
Multicast (IGMPv3, SSM)
2022-7 Seamless Protection Switching

Metadata:
- SCTE-35
- Metadata pass-through
- Subtitles embeding into H.264 SEI messages
- Closed Captions (EIA-608/708)
- SMPTE 2038
- H.264 or H.265 - SEI timestamp messaging codecs

Video codecs:
JPEG-XS (VSF TR-07) OPTIONAL
JPEG 2000 (VSF TR-01) OPTIONAL
H.262 (MPEG-2 Part 2)
H.264 (MPEG-4, AVC)
H.265 (HEVC)

Audio codecs:
AAC (ADTS or LATM)
AAC-HE (ADTS or LATM)
AAC -HEv2 (ADTS or LATM)
AC-3
uncompressed PCM (SMPTE 302M-2007)
MPEG2 audio
E-AC-3 (decoding)
Dolby-E (pass-through)

NDI

Configurable group name
Multiple NDI discovery servers
NDI Ultra High Bitrate settings
Framesync or Freerun mode

HLS

HTTP or HTTPS
Receiving of live and VOD streams
Configurable buffer size of HLS fragments and size of segments
Custom playlist name
Codecs

Video codecs:
H.264 (AVC)

Audio codecs:
AAC-LATM
AAC-ADTS
AC3

RTMP or RTMPS

Stream key filtering on input codecs

Video codecs:
H.264 (AVC)

Audio codecs:
AAC (ADTS or LATM)
AC-3 (ingest)
MPEG2 audio (ingest)
E-AC-3 (ingest)

Video capabilities and processing

Frame rate conversion to half of input frame rate (within the same standard domain)
Interlacing and Deinterlacing
Resizing, Cropping, Padding
Video resolutions up to 4K UHD progressive or interlaced
Color adjustments
Automatic color component subsampling (both configured automatically based on input and output settings)
- 4:2:2 10bit/8bit
- 4:2:0 10bit/8bit

Logo insertion

Audio processing

Channel shuffling and mixing
Volume gain
Sampling rate conversion

Other capabilities

Multi-channel synchronous transport
Combining multiple inputs into a single output
Multiple outputs and formats from a single input
Transcoding to ABR ladder
Auto reconfiguration according to live input
CBR, VBR, capped VBR modes
Locking to external PCR in a separate transport stream and PTS re-timestamping
Timecode generation into SEI messages
Detailed fine-tunings: quality vs latency vs density
Simple software upgrading mechanism and factory reset