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.
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

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)
Accessibility and Monitoring

- Web UI
- REST API
- SSH
- SNMP

Input Protocols and Containers

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

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 embedding into H.264 SEI messages
- Closed Captions (EIA-608/708)
- SMPTE 2038
- H.264 or H.265 - SEI timestamp messaging codec

Video codecs:
- JPEG-XS (VSF TR-07)
- JPEG 2000 (VSF TR-01)
- 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)
- AC-3

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 half of input frame rate (within the same standard domain)
- Interfacing and Deinterfacing
- 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
- Multi 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

Input 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

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

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

NDI

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

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