

PC Hardware support

- ✓ x86-64 CPU (Intel or AMD), supported by Linux
- ✓ Minimum 4 Go RAM, more in case of RAM disk usage or encoding
- ✓ Operating system is provided and maintained by EasyTools
- ✓ At least one available USB port
- ✓ Hard drive/SSD is optional, for file storage (supported by Linux)

Management

- ✓ Totally SNMP-based with a provided MIB and documentation, and SNMP traps
- ✓ Innovative Web 2.0 user interface
- ✓ RESTful control API
- ✓ Automatic wireless management interface
- ✓ Master/slave configuration replication

Event scheduler

- ✓ Execute jobs (configuration changes, file extraction, remote SNMP commands) at given times
- ✓ Schedules are triggered punctually, periodically or manually, or automatically on a function trigger

Inputs and outputs

- ✓ Ethernet 10/100/1000/10G (supported by Linux) with static or DHCP configuration
- ✓ UDP/RTP over IPv4 (multicast and unicast), configuration of port, TTL, TOS, MTU, source address and port
- ✓ TS files on a local hard drive or a NAS mounted with NFS or CIFS
- ✓ DVB-S, S2, T, T2, C and ATSC using cards supported natively by the linuxtv.org project (input only), with configuration of frequency, symbol rate, modulation, channel bandwidth, output voltage, 22kHz pulse, inversion, FEC, roll-off factor, pilot, diseqc (if applicable)
- ✓ DVB-ASI using cards from DVEO (input only)
- ✓ SDI, HD-SDI, HDMI and analog using cards from Blackmagic (input only)

Monitor failover functions

- ✓ Perform failover at cluster level in case of hardware failure

Forward functions

- ✓ Copy a TS live stream identically to another output
- ✓ Input and output: UDP/RTP over IPv4, multicast or unicast, RTMP or icecast server, HLS service or RTSP server (input only)



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Switch functions

- ✓ Switch at the TS level between several live streams

- ✓ Inputs and output: UDP/RTP over IPv4

Monitor functions

- ✓ Check characteristics of a TS stream (bitrate, presence of a specific PID, presence of a number of elementary streams of a given type, presence of video frames which are not still frames, BER of a DVB tuner, discontinuities or errors in the input)
- ✓ Able to switch its output from input to fallback either manually or in case of error (switch-back is manual or automatic depending on configuration)
- ✓ Trigger may be caught by a schedule to change local or remote configuration
- ✓ Inputs and output: UDP/RTP over IPv4, multicast

Transmit input and output functions

- ✓ Transmit a TS stream in unicast between two machines, using one or several links and packet retransmission (typically used for stream contribution over public Internet)
- ✓ Input: UDP/RTP over IPv4
- ✓ Output: UDP/RTP over IPv4
- ✓ Compatible with peers supporting FEC, SRT or RIST

Record functions

- ✓ Write a TS source to a storage, exactly as it is received
- ✓ Input: UDP/RTP over IPv4
- ✓ The web interface allows extracting programs from the storage (catch-up TV)

Hint functions

- ✓ Search for reference video sequences in a live stream recorded by a record function
- ✓ Inputs: reference video sequences stored as TS files
- ✓ Send a trap when a sequence is found, add markers in the web interface to extract programs (typical application: assisted catch-up TV extraction), and optionally start a schedule

Playout functions

- ✓ Play a TS source to an output, and switches between sources
- ✓ Optionally rewrite continuity counters and PCR/PTS/DTS
- ✓ Inputs: TS files or recorded stream with a record function and a delay in milliseconds (time-delay)
- ✓ Output: UDP/RTP over IPv4



Demux functions

- ✓ Split a TS stream according to SID/PID selection
- ✓ Input: DVB-S, S2, T, C, ATSC, DVB-ASI or UDP/RTP over IPv4 (typically MPTS)
- ✓ Outputs: UDP/RTP over IPv4
- ✓ Support configuration of output network ID, network name, transport stream ID, and pass-through of DVB conformance tables and EIT schedules, and remapping of ONID, service ID, service name, and PIDs

Remux functions

- ✓ Remux a TS stream and transcode elementary streams, optionally in low latency mode
- ✓ Input and output: UDP/RTP over IPv4 and TS, MP4, FLV, MKV, AVI, etc. files
- ✓ Video decoding: MPEG-2 up to MP@HL, MPEG-4 AVC up to HP@L5.0 or progressive HEVC
- ✓ Video encoding: MPEG-2, MPEG-4 AVC, or progressive HEVC (performance depending on hardware), features: MBAFF, adaptive GOP structure, macroblock tree rate control, psychovisual optimizations, noise reduction, scene cut detection, look-ahead, resizing, deinterlacing, 4:2:0, 4:2:2 and 4:4:4, 10bit (depending on codec)
- ✓ Audio decoding: MPEG-1/2 layers I, II and III, AAC, A/52, A/52e
- ✓ Audio encoding: MPEG-1/2 layers II and III, AAC, HE-AACv1, HE-AACv2 (ADTS), A/52, A/52e
- ✓ Multiplexing: T-STD compliant transport stream, CBR, IPTV CBR or IPTV capped VBR, PID remapping

Acquire functions

- ✓ Acquire a raw video signal (eg. from SDI) and encode it
- ✓ Input: Blackmagic DeckLink devices, OP47 subtitles, SCTE-104
- ✓ Output: UDP/RTP over IPv4, same codecs as the remux functions

Mux functions

- ✓ Create a multiple program transport stream from several UDP/RTP single program transport streams

Extract functions

- ✓ Extract whole or part of files in a directory (batch processing) and feeds it into one or several remux or copy functions

Copy functions

- ✓ Copy files or thumbnails to a directory, typically on a NAS, or to an FTP/SFTP server

(De)scramble functions

- ✓ (De)scramble a UDP/RTP TS stream

Grid input, acquire, image and output functions

- ✓ Act as an SDI grid, but with UDP/RTP inputs and outputs, raw video input or JPEG/PNG files
- ✓ Able to switch between elementary streams seamlessly, both video and audio (separately), on any kind of event, sequence detection with grid hint function, SCTE-35 and SCTE-104 splicing, monitor function feedback, or manually
- ✓ Same codecs as the remux function
- ✓ All following functions use the inputs and outputs of the grid:

Mosaic functions

- ✓ Create a video stream compositing several video sources, with or without audio bargraphs
- ✓ The background is also a video source that can be animated or fixed

Overlay functions

- ✓ Create a video stream compositing overlays at defined locations over a background video, with optional animations

Monitor delay functions

- ✓ Compare video streams to a reference video stream, check if they are similar (overall picture appearance, not taking into account resolution or encoding artifacts), and accordingly compute the delay between streams

Monitor still functions

- ✓ Check whether all pictures of a video stream are identical, and alert if it is the case

Monitor r128 functions

- ✓ Calculate R128 loudness and check whether it is within defined bounds, and alert if it is not the case

Grid hint functions

- ✓ Search for reference video sequences in a live stream, and frame-accurately trigger schedules on the beginning and end of the sequences
- ✓ Suitable for video-based content replacement
- ✓ Uses TS files for reference video sequences

Watermark embed and detect functions

- ✓ Embed or detect a Kantar watermark in an audio stream