



## EN5990 HD Encoder for MPEG-4 AVC

Achieving the best picture quality at the lowest bit-rate enables operators to broadcast more channels in their available bandwidth over digital cable, satellite and terrestrial networks - maximising return on investment of this valuable resource. For broadband operators offering TV services over xDSL networks, achieving the lowest bit-rate can provide multiple simultaneous services into the home, or be used to extend the loop length over which TV services can be carried from the DSLAM to the consumers home - maximising return on network investment.

TANDBERG Television has always led the market in provide encoding platforms that give optimum quality at the very lowest possible bit-rates. The EN5990 combines the sophisticated MPEG-4 AVC video and latest audio compression algorithms with the TANDBERG High Definition Intelligent Compression Engine (HD-ICE). A dedicated hardware and software implementation, based on over 10 years in-house experience of creating high performance real-time encoders.

### PRODUCT OVERVIEW

#### Market Leading Performance

Extensive video pre-processing helps get the best picture, whatever the source. A proven history of providing customers with in-field performance improvement upgrades over time, keeps our customers ahead of the market.

#### Reliable Service Delivery for any Application

Designed with all the proven system interconnect and control that our MPEG-2 product range enjoys today. In combination with the rest of the TANDBERG Television product range this makes MPEG-4 AVC deployable today in any broadcast or broadband application.

#### Advanced Features for IPTV

Options for encoding of a low resolution, low bit-rate simultaneous Picture -in-Picture (PIP) service, and direct IP multicasting from the encoder enable the EN5990 to be deployed in any IP distribution or TV over xDSL application.

#### Variable Bit-Rate Operation Modes

Option for standalone variable bit-rate operation allow IPTV operators to maximize picture quality while harvesting capacity for Internet data traffic delivery to the home. Option for Reflex™ statistical multiplexing enable satellite, cable and terrestrial operators to maximize picture quality using bit-rate sharing techniques.

### BASE UNIT FEATURES

#### EN5990 Encoder (EN5990/BAS)

- MPEG-4 AVC real-time video encoding.
- High profile at Level 4 (HP@L4).
- HDSI video input.
- Extensive video pre-processing including:
  - Noise reduction (option).
  - Resolution changing.
- Constant bit-rate encoding from 1 Mbit/s to 20 Mbit/s.
- Variable bit-rate and Reflex™ statistical multiplexing support (option).
- Stereo audio encoding:
  - MPEG Layer II and Dolby Digital®.
  - Options for advanced audio encoding.
  - Digital, analog and HDSI embedded inputs.
- Control and monitoring via web browser, the front panel or TANDBERG nCompass Control.
- MPEG-2 Transport stream (ASI) output.

#### EN5990 Encoder (EN5990/BAS/48V)

As EN5990/BAS except with -48Vdc power supply.

## SOFTWARE OPTIONS

### Professional Grade Noise Reduction (EN5900/SWO/NR)

- Improve picture quality and reduce bit-rate requirement.
- Fully adaptive spatial, temporal noise reduction.

### MPEG-2 AAC-LC Advanced Audio Coding (EN5900/SWO/MPEG2/AAC)

- Enables 2 stereo pairs of MPEG-2 AAC-LC (Low Complexity) audio encoding.

### MPEG-4 HE-AAC Advanced Audio Coding (EN5900/SWO/MPEG4/HEAAC)

- Contact TANDBERG Television for availability.
- Enables 2 stereo pairs of MPEG-4 (High Efficiency) HE-AACv1 audio encoding.

### Variable Bit-Rate Operation (EN5900/SWO/REFLEX)

- Enables Reflex™ statistical multiplexing between multiple encoders as part of a multiplex based system.
- Enables standalone automatic variable bit-rate video at a fixed quality setting for optimum bandwidth usage.
- User configurable target quality and maximum bit-rate allow optimization of bit-rate harvesting for other applications.

### Simultaneous Picture-in-Picture Video Service Encoding (EN5900/SWO/PIP)

- Simultaneous encoding of low resolution version of main video service.
- MPEG-4 AVC real-time encoding.
- Main Picture-in-Picture (PIP) 196 x 196 to full D1 SD resolution.
- A secondary PIP of 96 x 96 pixels is also generated.
- Single box solution for PIP functionality in IPTV applications.

## HARDWARE OPTIONS

### IP Transport Stream Output (EN5900/HWO/IPTS)

- UDP/IP encapsulation of MPEG-2 transport stream output.
- 100 Base-T Ethernet physical interface.
- Multicast or unicast capable.

### Dual Port IP Transport Stream Output (EN5900/HWO/IPTSDUAL)

- UDP/IP or RTP/UDP/IP encapsulation of MPEG-2 transport stream output.
- Dual port 100/1000 Base-T Ethernet physical interface.
- CBR or VBR multicast outputs.
- User configurable network and multicast parameters.

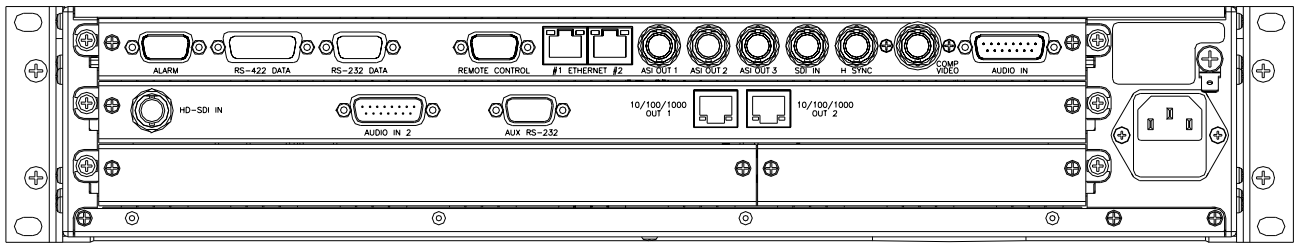
### Additional Audio Encoder (EN5900/HWO/AUDLIN2)

- Additional two stereo pairs of audio encoding in either MPEG Layer II or Dolby Digital® format.
- Audio services may be associated with video service, or as radio services.

### E3 ATM Output (EN5900/HWO/ATMS34)

- ATM encapsulation of MPEG-2 transport stream output.
- E3 Physical Interface (34 Mbit/s) with AAL-1 & AAL-5 support.

## SAMPLE CONFIGURATION



## SPECIFICATIONS

## Inputs

## Video

HDSDI serial digital video with EDH error detection and health monitoring

## Audio

2 stereo pairs input via analog audio balanced 600Ω/20kΩ or AES-EBU or HDSDI

Up to 4 stereo pairs can be de-embedded from HDSDI

## Studio Reference

625 and 525 line HSYNC

## Outputs

DVB-ASI (3 ports)

MPEG-TS over IP (100/1000baseT 2 ports) (option)

## Video Encoder

## MPEG-4 AVC Video Compression

Main profile at level 3 (MP@L3)

0.256 Mbit/s to 5 Mbit/s, depending on resolution

Interlace and progressive encoding support

## MPEG-2 Video Compression (option)

Main profile at Main Level (MP@ML)

0.256 kbit/s – 15 Mbit/s

## Main Picture-in-Picture (option)

0.256 to 5 Mbit/s depending on resolution

196 x 196 to full D1 resolutions

## Second Picture-in-Picture

MPEG-4 AVC MP@L3 progressive encoding

96 x 96 pixels at 175 kbit/s

## Supported Video Resolutions

## Resolutions Supported by MPEG-4 AVC Encoder

1080 x 1920/1440/1280/960pSF 25

1080 x 1920/1440/1280/960i 25

1080 x 1920/1440/1280/960i 29.97

1080 x 1920/1440/1280/960i 30

720 x 1280/960p 50

720 x 1280/960p 59.94

720 x 1280/960p 60

## Audio Encoder

MPEG Layer II

Dolby Digital®

MPEG-2 AAC-LC (option)

MPEG-4 HE-AAC (option)

Up to 2 stereo pairs audio encoding

## Advanced Video Pre-Processing

TANDBERG Television adaptive spatial and temporal noise reduction (option)

Closed captioning extraction from VBI

Image resizing (multiple resolutions)

Professional grade de-interlacer

## Features

Easy-to-use front panel control

Web based control

Auto frame-rate input switching

Simple pre-configured set-ups

Accurate bit-rate control

No frame loss guarantee

## Physical and Power

## Dimensions (w x d x h)

442.5 x 545 x 44.5mm (17.5" x 20.7" x 1RU)

## Approximate Weight

7.5kg

## Power Input

100 – 120 Vac or 220 – 240 Vac wide ranging –48Vdc

## Environmental Conditions

## Operating Temperature

-10°C to 40°C (14°F to 104°F)

## Compliance

CE marked in accordance with EU Low Voltage and EMC directives

EMC Compliance: EN55022, EN55024, AS/NZS3548, EN61000-3-2 and FCC CFR47 Part 15B Class A  
Safety Compliance: EN60950, IEC60950