# E5720

## MPEG-2 Standard Definition Encoder

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 - maximizing 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 consumer's home - maximizing the return on network investment.

TANDBERG Television has always led the market in providing encoding platforms that give optimum quality at the very lowest possible bit-rates. The E5720 is the result of over 15 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 improvements and feature upgrades, keeps our customers ahead of the market.

**Appropriate for a Wide Range of Applications**

The E5720 is easily adaptable to a wide range of professional applications that require top-level performance and functionality. The 2RU chassis allows up to 6 option cards to be fitted and supports a 12- key alphanumeric key pad, 8 hot keys and video input confidence monitor. Coupled with the low bit-rate performance, this makes it an ideal component in contribution and distribution applications, as well as multi-channel solutions for broadband DSL/FTTH, cable, satellite or digital terrestrial.

**Comprehensive Operational Options**

The E5720 offers breadth and depth in operational capabilities including Variable Bit-rate (VBR) and Constant Bit-rate (CBR) modes, Reflex™ statistical multiplexing and audio capabilities allowing operators to design their ideal encoding system and maximize their bandwidth capacity. For content protection, the E5720 supports both RAS and BISS for secure contribution networks.

**Reliable, Efficient Management**

The E5720 can be remotely controlled via a web browser and can also be efficiently managed and maintained through integration into TANDBERG Television's nCompass control system. This scalable system enables reliable, remote management and monitoring, reducing the need for costly, on-site operation.

## BASE UNIT FEATURES

**E5720 Encoder (M2/ENC/E5720)**

The encoder features 6 physical expansion slots for hardware options and has a range of software enabled options for flexibility to suit specific applications. These expansion slots facilitate upgrade paths for either multi-pass encoding (E5775), HD MPEG-2 (E5780 and E5782), HD MPEG-4 AVC (EN8092) or HD Windows Media® Video 9 Series (EN5980) or SD MPEG-4 AVC (EN8032).

- SDI and composite video inputs
- Analog, digital AES-EBU and embedded SDI audio input
- MPEG-1 Layer II Audio
- Dolby Digital® (AC-3) 1-5.1 and Dolby® E channel pass-through
- Fully exhaustive motion estimation
- Extensive pre-processing features
- Support for a wide range of VBI data formats
- Closed caption support input via RS-232 or SDI SMPTE 334
- Conversion of EIA 608 to EIA 708 format
- Support for splice points and special features for VOD ingest
- 3 ASI outputs plus wide range of optional telco interfaces
- Control via front panel, SNMP, RS-232/RS-485, web browser or TANDBERG nCompass Control systems
- Film mode detection (3:2 pull-down)
- Data insertion supporting RS-232 data and RS-422
- Flexible expansion support (6 slots available)
- Upgrade path for multi-pass SD MPEG-2
- Upgrade path for HD MPEG-2
- Upgrade path for HD SMPTE VC-1
- Upgrade path for SD and HD MPEG-4 AVC
- The front panel includes a video and audio input monitor, 8 soft keys and an alphanumeric keypad

# SOFTWARE OPTIONS

**Performance Upgrade (M2/ESO2/PU)**

- The performance upgrade enables advanced TANDBERG Television coding algorithms that increase the efficiency by at least 0.8 Mbps per channel. It also reduces the lower bit-rate limit to 256 kbps and enables bit-rate saving features such as adaptive GOP and long GOP.

**Upgrade to 422 profile @ ML (M2/ESO2/422)**

- For professional editing quality pictures, 1.5 Mbps to 50 Mbps

**Auto Concatenation (M2/ESO2/ACON)**

- Aligns the encoder to the previous encoder's GOP structure to significantly reduce coding artifacts caused by successive coding and decoding

**Noise Reduction (M2/ESO2/NR)**

- Four levels of professional-grade adaptive noise reduction plus 3 fixed levels of noise reduction

**Reflex and VBR (M2/ESO2/VBR)**

- Automatic variable bit-rate at a fixed quality setting for optimum bandwidth usage in stand-alone or Reflex™ statistical multiplexing modes

**ProMPEG FEC (M2/ESO2/PROFEC)**

- Enables ProMPEG FEC protection in the Dual IP output card for robust IP streaming

**RAS (M2/ESO2/RAS)**

- Allows material to be protected from illegal viewing using TANDBERG Television's proprietary scrambling system

**Dolby® AC-3 Two Channel Encoding (M2/ESO2/AC3)**

- Enables Dolby Digital® (AC-3) stereo encoding. The first 2 stereo pairs are free of charge

**DTS (Digital Theater Sound) (M2/ESO2/DTS)**

- Enables pass-through of pre-encoded DTS audio

**NABTS VBI Extraction (M2/ES02/525VBIDATA)**

- Enables the extraction of GEMSTAR and EIA 516 NABTS data from the VBI and carriage in a transport stream packet

**Digital Program Insertion (M2/ESO2/DPI)**

- Enables carriage of DPI messages as per SCTE 35 controlled by either DVS 525 or contact closure read by the GPI input option card

# HARDWARE OPTIONS

Please contact TANDBERG Television or an approved reseller to confirm which combinations of options are supported.

**Audio Option Card (M2/EOM2/AUDLIN2)**

- 2 stereo pairs supported per card
- Analogue input levels: 12, 15, 18, 21, 22 and 24dB
- MPEG-1 Layer II audio encoding
- Dolby Digital® (AC-3) 2.0 encoding
- Dolby Digital® (AC-3) 1 - 5.1 channel and Dolby® E pass-through
- Linear PCM and DTS pass-through
- Up to 3 audio option cards may be fitted supporting a total of 8 stereo pairs in the unit
- AES3 compliant input

**Advanced Audio Option Card (M2/EOM2/ADVAUD)**

- 8 audio channels configurable as 4 x 2 stereo pairs, 5.1 surround plus a stereo pair or 7.1 surround
- AES3id compliant inputs
- AAC (ISO 13818-7 LC) encoding. Mono, dual mono, stereo, 5.0 and 5.1 encoding, 64 kbps to 256bit/s
- Linear PCM

**G.703 Output (M2/EOM2/G703)**

- The G.703 card supports both DS-3 at 44.736 Mbps and E3 at 34.368 Mbps

**Range of ATM Outputs (M2/EOM2/ATMS34, M2/EOM2/ATMS45, M2/EOM2/ATMS155)**

- Range of ATM outputs to support AAL-1 & AAL-5

**REMUX (M2/EOM2/REMUX)**

- Re-multiplex three external MPTS transport streams with the locally generated stream
- Supports automatic PID re-mapping and resolves service name conflicts
- Supports insertion of externally generated dynamic PSIP

**IP Output (M2/EOM2/IPTSDUAL)**

- Dual output
- UDP/IP or RTP/UDP/IP encapsulation of MPEG-2 transport stream output
- 100/1000BaseT Ethernet physical interface
- Multicast or unicast capable
- Supports multiple SPTS streams

**SSI – SMPTE 310 (M2/EOM2/SSI)**

- This card provides three SSI outputs to support links to 8VSB transmitters in ATSC applications

**ASI Optical (M2/EOM2/ASI-OPT)**

- This card provides an ASI optical output as specified by EN 50083-9

**GPI Contact Closure Input (M2/EOM2/GPI)**

- Reads one of eight input signals to trigger SCTE 35 messages
- Other functions and encoder parameters may be controlled by contact closures. Please contact TANDBERG Television or an approved reseller for further details.

**BISS Scrambler Card (M2/EDCOM2/BISS)**

- BISS (Basic Interoperable Scrambling System) for secure contribution links
- Allows material to be protected from unwanted viewing using the BISS open standard
- Supports BISS Modes 0, 1 and Mode E for encrypted session words (as defined in EBU Tech 3292, May 2002). An application for generating encrypted session words can be downloaded from the encoder via a web browser.
- This option is a daughter card on the motherboard and so does not occupy an option slot

**Multi-pass Upgrade (M2/EOM2/MPM)**

- Upgrades the E5720 to an E5775 to enable the highest quality encoding solution for a multichannel environment

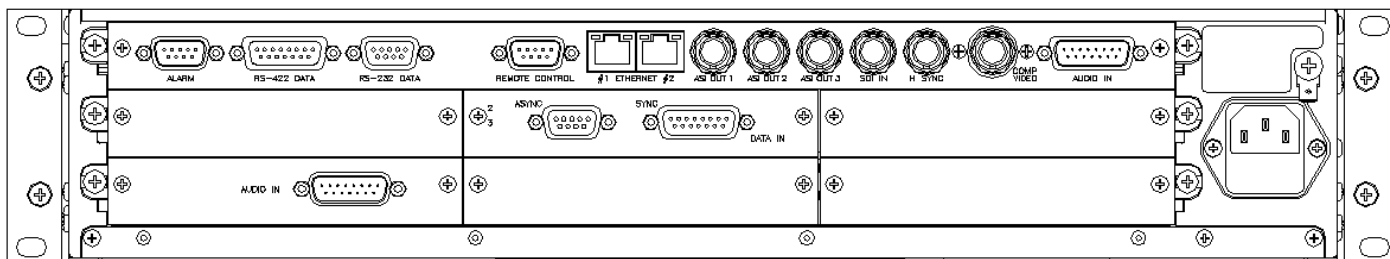**Upgrade to HD MPEG-2 (UPG/HD/HWO/420 and UPG/HD/SWO/422)**

- The HD MPEG-2 upgrade can support both 4:2:0 (E5780 equivalent) and 4:2:2 MPEG-2 HD (E5782 equivalent)

**Upgrade to SD or HD Advance Video Compression (UPG/HWO/ICE3/SD) or (UPG/HWO/ICE3/HD)**

- The Intelligent Compression Engine option card supports the latest MPEG-4 AVC encoding, either SD or HD

## SAMPLE CONFIGURATION



## SPECIFICATIONS

### Inputs

**Video**

Analog composite video (PAL/NTSC) 10bit sampling

SNR >60dB

SDI serial digital video 625 and 525 line standard supported with EDH error detection and health monitoring

HSYNC support for 625 and 525 line

**Audio**

2 stereo pairs input via analog, AES-EBU or SDI

Analog audio balanced 600 /20k

Input levels: 12, 15, 18, 21, 22 and 24dB

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

### Outputs

3 x ASI copper Single Program Transport Stream

### Video Encoder

MPEG-2 MP@ML

1.5 to 15 Mbps (without performance upgrade)

0.256 to 15 Mbps (with performance upgrade)

Performance upgrade option enables long GOP and adaptive GOP features

MPEG-2 422P@ML (option)

1.5 to 50 Mbps

"Pixel Perfect" fully exhaustive motion estimation

TANDBERG Reflex™ statistical multiplexing support (option)

Vertical Resolutions 576, 288 (PAL), 480, 240 (NTSC)

Horizontal Resolutions 720, 704, 640, 544, 528, 480, 352

### Audio Encoder

2 x stereo audio channel processing

**MPEG-1 Layer II audio encoding standard**

Encoding rates from 32kbit/s to 384kbit/s

**Dolby Digital® (AC-3)**

Encoding rates from 56 kbps to 640 kbps

Dolby Digital® (AC-3) 1 – 5.1 channel, Dolby® E, linear

PCM and DTS pass-through

### VBI

World Standard Text (WST - ETS300472) 625 only

Closed captioning EIA-608, EIA-708 and SCTE 20

Closed captions inserted by line 21, SMPTE 333 or SMPTE 334.

Nielson data AMOL I & AMOL II, 525 only

NABTS - 525 line only (option)

Video Index and Active Format Descriptor (AFD)

Video programming signal (VPS) 625 only

Wide screen signaling (WSS) 625 only

Time Code from VITC

### Advanced Pre-processing

Adaptive bandwidth

Border processing

TANDBERG Television professional grade adaptive spatio & temporal noise reduction offering 4 adaptive levels plus 3 fixed levels (option)

"Auto-Concatenation" I frame detection and alignment system – optimizes re-encoding performance (option)

Film mode inverse 3:2 pull-down

Scene cut detection

Frame re-synchronization

### Features

Selectable range of delay modes for low latency operation

Front panel LCD with easy set-up and operation

16 fully adjustable operational configurations

Internal test tone and test pattern generation

Auto switching on loss of input source to test pattern, colored image, last good video frame with selectable text message

Input freeze frame and audio silence detection

Logo insertion

SCTE 35 controlled by SCTE104 or GPI contact closure

### Data

VANC data extraction up to 500 kbps

RS-232. Supported baud rates 1200, 2400, 4800, 9600, 19200, 38400 baud

RS-422 n x 64 kbps from 64 kbps to 2048 kbps (selectable) or n x 56 kbps from 56 kbps to 1792 kbps (selectable)

### Control

Front panel

TANDBERG nCompass Control supported via dual Ethernet

RS-232 & RS-485 interfaces for remote control

Support for external SNMP control

Support for SNMP traps

Full control & monitoring via web browser

### Physical and Power

**Dimensions (W x D x H)**

442.5 x 545 x 89mm  (17.5" x 20.7" x 2RU)

**Approximate Weight**

10.5kg

**Power Input**

100 – 120 VAC or 220 – 240 VAC wide ranging, or -48 VDC

**Consumption**

100W no options, 250W maximum, depending on the option cards selected

### Environmental Conditions

**Operating Temperature**

-10°C to 50°C  (14°F to 122°F)

**Operating Humidity**

<95% non-condensing

### 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, IE60950

### Optional Outputs

Dual GigE IP (optional ProMPEG FEC)

ATM 34 Mbps, 45 Mbps

ATM 155 Mbps, Multi-mode, Single-mode & Copper

G.703

ASI Optical

SMPTE 310 (SSI)