



## E5780 / E5782



### MPEG-2 High Definition Encoders

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 consumers' home - maximizing return on network investment.

TANDBERG Television has always led the market in providing encoding platforms that give optimum quality at the lowest possible bit-rates.

### 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 E5780 and E5782 are easily adaptable to a wide range of professional applications that require top-level performance and functionality. The 2RU chassis allows up to four option cards to be fitted and supports a twelve key alphanumeric key pad, eight hot keys and video input confidence monitor. The low bit-rate performance makes the E5780 an ideal component in any HD DTH platform.

The E5782 adds support for HD 4:2:2 encoding which, when combined with the maximum bit-rate of 90 Mbps, make the E5782 ideal for the highest quality contribution links and for HD cinema applications. For content protection, the E5780 supports both RAS and BISS for secure contribution networks.

#### Variable Bit-rate Operation Modes

Option for stand-alone variable bit-rate operation allows operators to maximize picture quality while harvesting opportunistic data.

Option for Reflex™ statistical multiplexing enable satellite, cable and terrestrial operators to maximize picture quality using bit-rate sharing techniques. The E5780 supports mixed SD and HD statistical multiplexing systems including multi-pass statistical multiplexing.

### BASE UNIT FEATURES

#### E5780 & E5782 High Definition Encoder (M2/ ENC/ E5780, M2/ ENC/ E5780/ ATSC, M2/ ENC/ E5782)

The unit supports a wide range of SD and HD formats for maximum usage and flexibility.

- The E5782 model supports 4:2:2 HD
- Supports DVB-T or ATSC standards
- Provides internally generated static PSIP & PSI
- Interfaces for insertion of dynamic PSIP/ SI
- Front panel control and operation for SPTS applications
- Advanced hierarchical motion estimation
- TANDBERG Television professional grade noise reduction (eight levels)
- Film mode detection (3:2 pull-down)
- Closed caption support input via RS-232 or HD-SDI SMPTE 334
- Conversion of EIA 608 to EIA 708 format
- MPEG-1 Layer II Audio
- Dolby® Digital (AC-3) 1-5.1 and Dolby® E channel pass-through
- Data insertion supporting RS-232 data and RS-422
- Flexible expansion support (four slots available)
- AFD ready to support control of downstream decoders, selecting letter box or center cut for correct viewing on analog receivers

## HARDWARE OPTIONS

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

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

### BISS Option 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). This option is a daughter card and so does not occupy an option slot. The PC application for generating BISS-E encrypted session words can be downloaded from the encoder via a web browser.

### 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

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

- This card provides an ASI optical output as specified by EN50083-9

### SSI – SMPTE 310 (M2/ EOM2/ SSI-US)

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

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

- This card can read one of eight input signals to trigger SCTE 35 messages

**Note:** Other functions and encoder parameters may be set by contact closures. Please contact TANDBERG Television or an approved reseller for further details.

### REMUX & PSIP Insertion (M2/ EOM2/ REMUX)

- The REMUX card will re-multiplex three external MPTS transport streams with the locally generated stream. The card supports automatic PID re-mapping and resolves service name conflicts. The REMUX card also supports the insertion of externally generated dynamic PSIP into the transport stream and DVB subtitles.

### 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

## SOFTWARE OPTIONS

### Noise Reduction (M2/ ESO2/ HDNR)

- Four levels of professional grade adaptive noise reduction

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

- Enables Dolby® Digital (AC-3) stereo encoding

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

- Enables pass-through of pre-encoded DTS audio

### RAS (M2/ ESO2/ RAS)

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

### Reflex™ and VBR (M2/ ESO2/ HDVBR)

- Automatic variable bit-rate at a fixed quality setting for optimum bandwidth usage in stand-alone or Reflex™ statistical multiplexing modes. Statistical multiplexing is possible amongst mixed groups of SD and HD encoder as well groups of HD encoders.

### SMPTE 2022 ProMPEG FEC (M2/ ESO2/ PROFEC)

- Enables SMPTE 2022 ProMPEG FEC protection in the Dual IP output card for robust IP streaming

### Multi-Pass (M2/ ESO2/ HDMULTIPASS)

- Significantly improves statistical multiplexing by improving the bit-rate prediction. This option allows the HD E5780 to be placed in the same pool as the SD E5770.

### 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

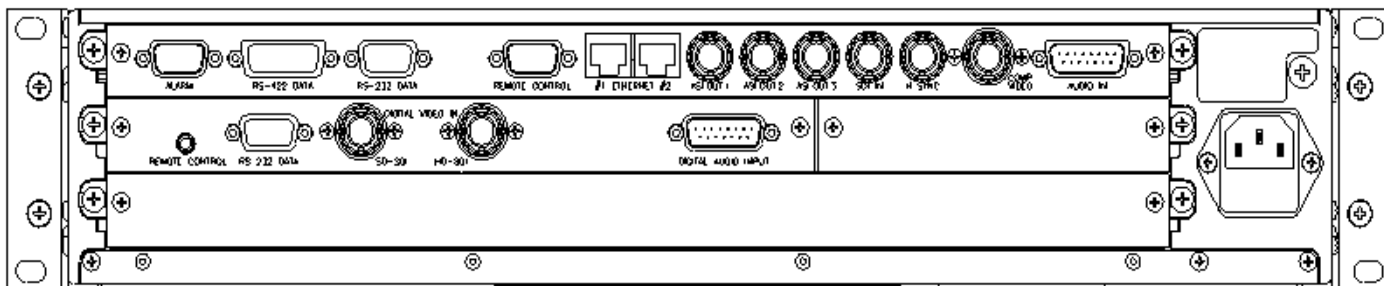
### NABTS VBI Extraction (M2/ ESO2/ 525VBI DATA)

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

### 4:2:2 HD Upgrade (UPG/ HD/ SWO/ 422)

- Upgrades the E5780 to the E5782 to support 4:2:2 profile

## SAMPLE CONFIGURATION



## SPECIFICATIONS

### Inputs

#### Video

Composite video (PAL/NTSC) 10 bit 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

HD-SDI (SMPTE 292M)

#### Audio

Analog input levels: 12, 15, 18, 21, 22 and 24dB

2 x AES/EBU digital audio inputs

Up to four stereo pairs can be extracted from the SDI or HD-SDI input.

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

2 x analog audio's balanced 600W/20kW

Sampling rates of 32 kHz, 44.1 kHz & 48 kHz

### Outputs

3 x ASI copper Single Program Transport Stream

### Video Encoder

MPEG-2 422P@ML 2 to 50 Mbps (in SD mode)

MPEG-2 MP@ML 1.5 to 15 Mbps (in SD mode)

MPEG-2 MP@HL 2 to 90 Mbps (480p and 576p)

MPEG-2 MP@HL 6 to 90 Mbps (720p and 1080i)

MPEG-2 422P@HL 6 to 90 Mbps (720p and 1080i)\*

\* Only supported on the E5782

### Audio Encoder

2 x stereo audio channel processing

#### MPEG-1 Layer II Audio Encoding Standard

Encoding rates from 32 kbps to 384 kbps

#### 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

#### Supported Standard Definition VBI MPEG-2 MP@ML

World Standard Text (WST)

Closed captioning

SCTE 20

Nielsen data AMOL I & AMOL II

Program delivery control (PDC)

Video programming signal (VPS)

Wide screen signaling (WSS)

Time code from VITC

#### Supported Standard Definition VBI MPEG-2 422P@ML

All types when encoded as picture information

#### Supported High Definition VBI MPEG-2

EIA-708 Closed caption insertion via RS-232 interface or via HDSDI (SMPTE 334)

World standard text (WST) via SD SDI or CVBS

Closed Captioning via SD SDI, CVBS, SMPTE 333 or SMPTE 334

Time Code from VITC in HD-SDI (SMPTE RP 188)

### Advanced Pre-processing

Wide ranging hierarchical motion estimation search

TANDBERG Spatial & temporal noise reduction

Film Mode 3:2 pull down

Frame re-synchronization

### Features

Selectable range of delay modes for low latency operation

Front panel LCD with easy set-up and operation

Sixteen 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

### Supported HD Resolutions

1080 x 1920/1440/1280/960pSF 23.976, 24, 25

1080 x 1920/1440/1280/960i 25, 29.97, 30

720 x 1280/960p 50, 59.94, 60

576 x 720/704p 50

480 x 720/704p 59.94, 60

### Data

VANC data extraction up to 1.4 Mbps

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 LCD with quick access keys and alpha numeric keypad

nCompass Control

RS-232 & RS-485 inputs and outputs for remote control

Support for external SNMP control

### Physical and Power

2RU 19" rack-mountable chassis

#### Dimensions (W x H x D)

442.5 x 88.9 x 499.5mm (17.25 x 3.5 x 19" approx.)

#### Approximate Weight

12Kg

#### Power Input

100 - 120 VAC / 220 - 240 VAC wide ranging auto sensing

#### Consumption

150W (250W fully populated)

### 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 EEC Low Voltage and EMC directives EN55022, EN55024: 1998, EN61000-3-2 for EMC and the EN/IEC60950 Safety Standard as a minimum where applicable

Also meets other relevant requirements and national standards derived from international requirements on which the above European Standards are based and FCC Pt 15 Class A