Broadcasters and news gathering organizations want pictures from anywhere in the world, live, and at an instant. Increasingly, they are looking to mobile microwave links to cover news events in places where using satellite is difficult, such as in the world’s largest cities, or where satellite is too slow or expensive, as during natural disasters or fast-breaking events. New technology includes digital COFDM systems, which have rapidly replaced analog transmission because they are fast to set-up, more efficient and don’t have point-to-point link limitations. TANDBERG Television’s E5750 Voyager Digital ENG system is designed for this market, offering robust, long-range DENG transmission with outstanding MPEG-2 encoding, highest picture quality and a flexible array of options.

The E5750 is available in 4:2:0 and 4:2:2 encoding versions in a 2RU chassis, offering a complete range of quality options including ultra high-performance encoding for special events. The encoder also supports a range of low-latency modes to reduce encoding delay, and can be upgraded to MPEG-2 high definition (HD) or MPEG-4 AVC (SD and HD) with option cards.

TANDBERG Television can configure the E5750 with a DVB-S2 modulator card along with the COFDM modulator, providing a dual-purpose DENG/DSNG system for maximum flexibility and convenience. The unit supports all of the major DVB-T modes and can support RF output with the addition of a RF up-converter card. TANDBERG Television’s extensive video pre-processing combined with advanced encoding techniques provides superior picture quality and a longer transmission range over the COFDM link.

**PRODUCT OVERVIEW**

**Highly Flexible DENG Platform**

The E5750 is easily adaptable from fast-paced news gathering to concerts and high-quality sporting events with its 4:2:0 and 4:2:2 encoding capabilities. The 2RU chassis allows up to five option cards, which enables a highly customized solution. Options include MPEG-2 HD or MPEG-4 AVC HD/SD encoding formats for lower bit-rate, higher quality delivery. TANDBERG Television’s powerful REMUX option card provides MPEG multiplexer and multi-channel MCPC capability.

**DC Power and Remote Control Support for External Up-converters**

ENG delivery can require additional amplification and external RF frequency conversion. The E5750 can support a TRIAX option card for transferring the modulated IF signal over large distances. The card provides DC power (+48V) to support an external, integrated up-converter and power amplifier for all established DENG frequency bands. For shorter cable distances between the DENG equipment and the TX antenna an internal RF up-converter card can be used.

**Dual Purpose DENG and DSNG Platform**

The E5750 with an integrated COFDM modulator can also be equipped with a DVB-S2 modulator, which can provide up to 35% bandwidth savings for satellite applications. This provides a highly flexible dual-purpose platform for news gathering operations, allowing news teams to decide the best method for delivery based on their needs at any given time.

**Upgrade Paths to High Definition**

The E5750 can be upgraded to provide either MPEG-2 HD / SD, MPEG-4 AVC HD/SD. The ability to provide MPEG-2 SD is retained in both cases. Our MPEG-4 HD option has proven to be of great value to those finding that using MPEG-2 HD increases bit-rate too much, causing transmission range and stability problems that using MPEG-4 HD solves.

**BASE UNIT FEATURES**

**Voyager E5750 DENG (M2/VOY/E5750)**

- COFDM modulator supporting all major DVB-T modes
- Input confidence monitoring
- Easy-to-use front panel with alphanumeric keypad and eight soft keys
- Flexible expansion support – up to five slots available
- Sixteen fully adjustable operational configurations
- Selectable range of delay modes for low latency operation

**Note:** An 18-36 volt DC power option is available for special order.
HARDWARE OPTIONS

Note: Contact TANDBERG Television or an approved reseller to confirm which combinations of options are supported.

L-band Satellite Modulator (M2/EOM2/SM3LBAND)
- Allows an L-band satellite modulator to be added to the E5750
- The L-band satellite modulator includes a switchable 10 MHz reference and switchable block up-converter DC power. The modulator is hardware-ready for HOM and DVB-S2 as standard

IF Satellite Modulator (M2/EOM2/SM3IF)
- Allows an IF satellite modulator to be added to the E5750. The modulator is hardware-ready for HOM and DVB-S2 as standard.

Audio Option Card (M2/EOM2/AUDLIN2)
- Two stereo pairs supported per card
- Analog input levels: 12, 15, 18, 21, 22 and 24dB
- MPEG 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
- Up to 2 audio option cards may be fitted supporting a total of six stereo pairs in the unit

REMUX (M2/EOM2/REMUX)
- The REMUX card will re-multiplex three external 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

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

TRIAX Output Card (M2/EOM2/TRIAIAX)
- Provides a direct TRIAX interface for transferring the modulated IF signal over large distances. The card also provides DC power (+48V) from an additional PSU and in-band communications to support an external integrated up-converter and power amplifier. This is mounted close to the transmit antenna to minimize high-frequency cable losses.

Up-Converter Card (M2/EOM2/UPCON)
- Provides an SHF output at final frequency. Up-converter cards are available supporting all of the existing and new DENG bands

SOFTWARE OPTIONS

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

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. A complimentary thirty-day trial license is available upon request.

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 three fixed levels of noise reduction

MPEG-2 422P@ML (M2/ESO2/422)
- For professional editing quality pictures 1.5 Mbps to 50 Mbps

RAS (M2/ESO2/RAS)
- Allows material to be protected from illegal viewing using TANDBERG Television’s proprietary scrambling system
- Low symbol rate software option (M2/ESO2/LSYM) – for satellite modulator option
- Low symbol rate operation, down to 300 ksyms, allows operation on a tight link budget using low power amplifiers and small dishes

8PSK/16QAM (M2/ESO2/SM38PSK, M2/ESO2/SM316QAM) – for satellite modulator only
- DVB-S higher order modulation upgrades

DVB-S2 QPSK and 8PSK (M2/ESO2/SM3S28PSK) / DVB-S2 16APSK (M2/ESO2/SM3S216APSK)
- DVB-S2 modulation upgrade

NABTS VBI Extraction (M2/ESO2/525VBIDATA)
- Enables the extraction of NABTS data from the VBI and carriage in a transports stream packet as per EIA 516

SMPTES 2022 ProMPEG FEC (M2/ESO2/IPROFEC)
- Enables SMPTES 2022 ProMPEG FEC protection in the Dual IP output card for robust IP streaming
E5750 Voyager MPEG-2 Standard Definition DENG

SAMPLE CONFIGURATION

SPECIFICATIONS

**Inputs**

**Video**
- Analog 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

**Audio**
- Two stereo pairs input via analog, AES-EBU or SDI
- Analog audio balanced 600Ω/20kΩ
- Input levels: 12, 15, 18, 21, 22 and 24dB
- Up to four stereo pairs can be de-embedded from SDI

**Outputs**

**OFDM Modulator**
- Main 70 MHz IF output, nominal 0dBm
- Monitor 70 MHz IF output, -10dBm
- 6, 7 or 8 MHz bandwidth
- QPSK, 16QAM or 64QAM modulation
- Selectable guard interval and FEC Rate
- 2k carriers or 8k carriers
- Compliant to ETS 300 744

**Transport Stream**
- 3 x ASI Copper Single Program Transport Stream

**Video Encoder**

**Vertical resolutions:** 576, 288 (PAL), 480, 240 (NTSC)
**Horizontal resolutions:** 720, 704, 640, 544, 528, 480, 352

**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

**Audio Encoder**

**Audio Encoder**
- 2 x stereo audio channel processing
- **MPEG 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**
  - World Standard Text (WST – ETS300472) 625 only
  - Closed captioning EIA-608, EIA-708 and SCTE 20
  - Nielsen 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 (VSS) 625 only
  - Time code from VITC

**Data**

**RS-232 Supported baud rates** 1200, 2400, 4800, 9600, 19200, 38400 baud
**RS-422 n x 64 kbps from 64 to 2048 kbps (selectable) or n x 56 kbps from 56 to 1792 kbps (selectable)**

**Advanced Pre-processing**

**TANDBERG Television professional grade adaptive spatial & temporal noise reduction**
  - offering four adaptive levels plus three 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
- 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 test message
- Input freeze frame and audio silence detection
- Logo insertion

**Control**

- Front panel LCD with quick access keys
- 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, IEC60950

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