TEST TANDBERG EDGE 95 MXP HD

GENERAL

Period: November 26, 2006 - December 1, 2006
SW-Version: F5.2 PAL (2006-10-09)

Device Class
Tandberg Edge 95 MXP HD (High Definition) is a stand-alone group and room system for small and medium conferences.

Scope of Delivery
The system consists of a separate hardware codec, an external power supply, an external camera head and a remote control for the camera head. The power cables have a wide range of country-specific plug connectors. The documentation consists of a CD ROM manual in PDF with 315 pages (in English) (Software version F5 D13947.01 of June 2006).

Bandwidths
Tandberg Edge 95 MXP HD enables video conferences in H.320 over ISDN up to 512 kbps (4 lines with 128 kbps each) and in H.323 over IP as well as SIP up to 1920 kbps.

INSTALLATION

Installing the device is carried out fluently in the beginning. The user will not experience any difficulties if he is familiar with Tandberg video conference systems. Table microphone and remote control are identical in instruction with their predecessors.

The codec does not have a display or signalling for the operation state of the power supply, 'on', 'connected' or 'transmitting data'. Thus, in case of operation difficulties one has to check the connecting cables on the back, which is rather inconvenient.

The new Tandberg PrecisionHD camera with a proprietary and firm connection cable is new and needs some familiarization. The possible cascading effect of the camera with additional power supplies was not tested (Daisychain support, Visca protocol camera). The camera also has a new HDCP (High-bandwidth Digital Content Protection) connection from the Consumer Electronic area in addition to the proprietary connection cable. Neither is the HDMI version (1.0 to 1.3) displayed, nor is the necessary HDCP (High-bandwidth Digital Content Protection) available. Thus a high definition video on HDMI/HDCP displays, which meet the standards, is practically impossible. An analogue HD component cable, which could be used alternatively, is missing as well.

Whereas the codec, besides analogue standard video outputs(Composite Video und S-Video), has at least a digital small band Single Link DVI-I(Digital Visual Interface - Integrated) output integrated, there is only one analogue DVI-I/VGA cable for installation. Thus the possible picture quality is significantly poorer for modern digital LCD-TFT or plasma displays by unnecessarily manifold signal change from digital-to-analogue and vice versa from analogue-to-digital. Hence, during the test our HD display was connected with a digital DVI-DVI cable, which is not included in delivery.

Surprisingly the high definition mode HD 720p (720 lines in progressive complete picture mode) was switched off as a standard setting, with only a conventional video resolution available. Neither in the setting menus nor in the documentation were there any hints for switching or activating HD. Only after contacting the support setting options over telnet commands and an internet connection were available.
Operation

Tandberg menus to a large extent correspond to former Tandberg systems. Additions were made e.g. in the graphic and animated display of audio in- and outputs. Asking about not-documented features or unactivated specifications we obtained information e.g. about telnet settings of the system.

After activating the high definition HD 720p replay in 16:9 picture ratio, we scaled the unadapted Tandberg menus over the wide picture display over 16:9, so that menu settings outside the visible screen were scaled. A correct control over the remote control is therefore not ensured.

Audio/Video

Tests with other end systems went in good audio and video quality. Whereas speech communication had a very good quality, video, especially the claimed High Definition HD Quality in 1280x720p@16:9 pixels, lagged behind expectations. HD resolution was switched off as a standard setting. When activated, colour space as well as resolution changed. Picture quality and detail resolution becomes slightly better with adequate illumination in own image of HD in comparison with Standard Definition SD Video.

After compression, decompression and interpolation when replaying there is no HD quality, even when receiving a maximum of 1920 kpbs. In communication with other HD video conference systems like LifeSize the picture frequency declines to 15 frames per second, which is not enough for a fluent video picture.

Picture Aspect Ration, Scaling, and Presentations between 16:9 and 4:3 (Aspect Ratio)

With HD wide screen the new picture aspect ratio @16:9 meets video conference technology. In mixed environments the picture quality becomes worse and unnatural because of scaling, interpolation and distortion. The participants of the conferences are displayed in a stretched, compressed or cut-off way. These visual quality losses in mixed environments are to be found, however, not only with Tandberg, but also with other systems like LifeSize.

Because of the reduced resolution the readability of texts in presentations worsens clearly. In mixed conferences with HD and conventional systems a double adjustment with the effect of a black frame at all four sides of the wide screen display occurred. This is possibly caused by the effect, that first the sent wide screen picture in 16:9 is reduced to 4:3 with a black frame to the right and left. After that the wide screen format is adjusted to the 4:3 sector with an additional black frame on the top and the bottom. Thus there remain first 960x720, then only 960x540 visible pixels of the original 1280x720. This is only 56 % of the available screen. The framed rest remains unused and black.

H.264 Video Compression MPEG-4 / AVC

Advanced Video Coding H.264 / AVC is possible up to a bandwidth of 1920 kbps. However, often video resolution is reduced here to CIF with 352x288@4:3 or w288p (Wide-CIF) with 512x288 @16:9 pixels. If the automatic codec selection had a too low resolution, the video codec H.264 could be switched off and a higher resolution with H.263 could be enforced.

H.239 for Presentations
H.239 was usually possible in very good quality up to XGA resolution (1024x768). The effective connection to a so-called WXGA mode with an independent and untypical width-to-height ratio of 1280x768@15:9, however, was impossible. The same is true for settings over telnet protocol.

**Camera Remote Control**
Camera remote control was possible in both directions if the technical requirements on both sides were met.

**MCU - Multipoint Control Unit**
Cooperation with the MCUs within DFNVideoConference service (Radvision MCU and Codian MCU as well as Codian IP VCR 2220 recorder) worked without problems.

**Gatekeepers**
Cooperation with the gatekeepers GNU-GK 2.0.7 and CISCO MCM worked without problems.

**Miscellaneous**
In separating camera from codec, the design of the Tandberg Edge series follows current developments. Since screens and displays become flatter and flatter and the demands on codecs increase with rising resolution, the codec is not placed as setup box on the display anymore. It is placed vertically besides the screen or in a separate shelf away from the camera. The power supply is external as well. Fortunately it does not become overheated, which, however, is also due to the limited capacity of the codec (HD 720p with 15 fps).

The wide angle objective of the HD camera does not have a constructive lens protection integrated. Thus the surface of the unprotected lens is sensitive to scratches. The construction of the camera is not robust enough, thus making it unsafe in transport.

When zooming the camera there are squeaking noises, that need some getting used to. These can disturb video conferences in small rooms. Because of the smaller HD pixels the automatic camera focussing had some problems, sometimes being very slow. In order to support it manual zooming and panning of the camera were necessary, which, however, impaired the video conference.

The systems of Tandberg Edge series 85 MXP are contrary to the tested Edge 95 MXP according to manufacturer information only usable in clearly lower bandwidths.

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**RESULTS**

Tandberg Edge 95 MXP HD is according to standard MPEG-4 (part 10) AVC/H.264 not yet to be assigned to Baseline Profile with level 3.1 (AVC BP@L3.1), as the demanded 30 fps are not reached with the current capacity. The Tandberg Edge Series tends to be backward-compatible with classical systems like Tandberg 990 MXP with lower requirements.

Options for the aspect ratio are necessary. In a better, undistorted video and picture quality with e.g. a 4:3 sector of the HD camera the system often can cooperate more effectively with conventional systems with a better sharpness and less objective trimming. XGA/WXGA mode should be available at 4:3 or 16:9 and not introduce untypical 15:9, whereas PC presentations tend to be in 16:10 format.

In mixed environments the backward-compatibility even to Tandberg systems in the video area is not yet ideal. Tandberg Edge 95 MXP HD has the potential to reach the standard of other HD conference systems. For real HD challenges, however, further improvements are necessary.

**Documentation**
Manufacturer: Tandberg  [http://www.tandberg.com/]
Distributor: MVC   [http://www.mvc.de/]
<table>
<thead>
<tr>
<th>Supported General Standards</th>
<th>H.323 for IP Call, H.320 for ISDN to IP connection, SIP</th>
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<tbody>
<tr>
<td>Sound Coding</td>
<td>(G.711 (Telephone Quality, 3.1 kHz, u-law, a-law, 64 kbps), G.722 (7 kHz, 48 kbps, 56 kbps oder 64 kbps), G.722.1 (7 kHz, compressed, 24 kbps, 32 kbps oder 48 kbps), G.728 (Telephone Quality, 3.1 kHz, 16kbps), MPEG4 AAC-LD (Low Delay, 20 kHz, mono 64 kbps, stereo 128 kbps)</td>
</tr>
<tr>
<td>Video Compression</td>
<td>(H.261), H.263, H.263+, H.263++ (Natural Video), H.264, manual choice H.264 or H.263 possible, mixed sending H.264 and receiving H.263 possible</td>
</tr>
<tr>
<td>Video Transmission</td>
<td>SIF 352x240, CIF 352x288, VGA 640x480, 4SIF 704x480, 4CIF 704x576 (H.261 Annex D), SVGA 800x600, XGA 1024x768</td>
</tr>
<tr>
<td>Data Compression</td>
<td>H.239 secondary Media Channel, Dual Stream, DuoVideo, available H.323 and H.320</td>
</tr>
<tr>
<td>Audio Inputs</td>
<td>2 x microphone, 24V Phantom supply, XLR connectors, RCA/Phono, Leitungspegel: Auxiliary (or VCR Stereo L), RCA/Phono, Leitungspegel: VCR/DVD (Stereo R)</td>
</tr>
<tr>
<td>Audio Outputs</td>
<td>RCA/Phono, S/PDIF (Mono / Stereo) or analogue Leitungspegel: Main Audio or analogue Stereo L, RCA/Phono, Leitungspegel: VCR or analogue Stereo R</td>
</tr>
<tr>
<td>Video Inputs</td>
<td>9 Pin DSUB, proprietary for HD high definition main camera, S-Video MiniDin for additional Aux / Document Camera, RCA/Phono, FBAS (Composite) for Document Camera / Aux, RCA/Phono, FBAS (Composite) for VCR</td>
</tr>
<tr>
<td>Video Outputs</td>
<td>S-Video MiniDin for main monitor, RCA/Phono, FBAS (Composite) for main monitor or VCR, RCA/Phono, FBAS (Composite) for second/dualmonitor or VCR, DVI-I up to XGA for main monitor or second monitor</td>
</tr>
<tr>
<td>Data Input</td>
<td>DVI-I (Digital Visual Interface - Integrated) Single Link, Input for Presentations from PC (XGA. XVGA)</td>
</tr>
<tr>
<td>Bandwidths</td>
<td>IP up to 1920 kbps, ISDN up to 512 kbps</td>
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Thanks to MVC and Tandberg for supplying the test.