

AEQ PHOENIX AUDIOCODECS IN LONDON 2012. USER REPORT

Audio distribution for large international events using the Phoenix Studio Audiocodec. Case study, EBU Sports Operations London 2012

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1. INTRODUCTION – OUR SCENARIO.

Broadcast operations at large international events such as the Olympic Games always present challenges of scale. One of them is the distribution of thousands of audio circuits from different sources (commentary, International Sound, PA, etc.) to all of the Rights Holding Broadcasters. When using a common infrastructure for this purpose, it is necessary create a structure similar to the figure below and that we call “Commentary System”.

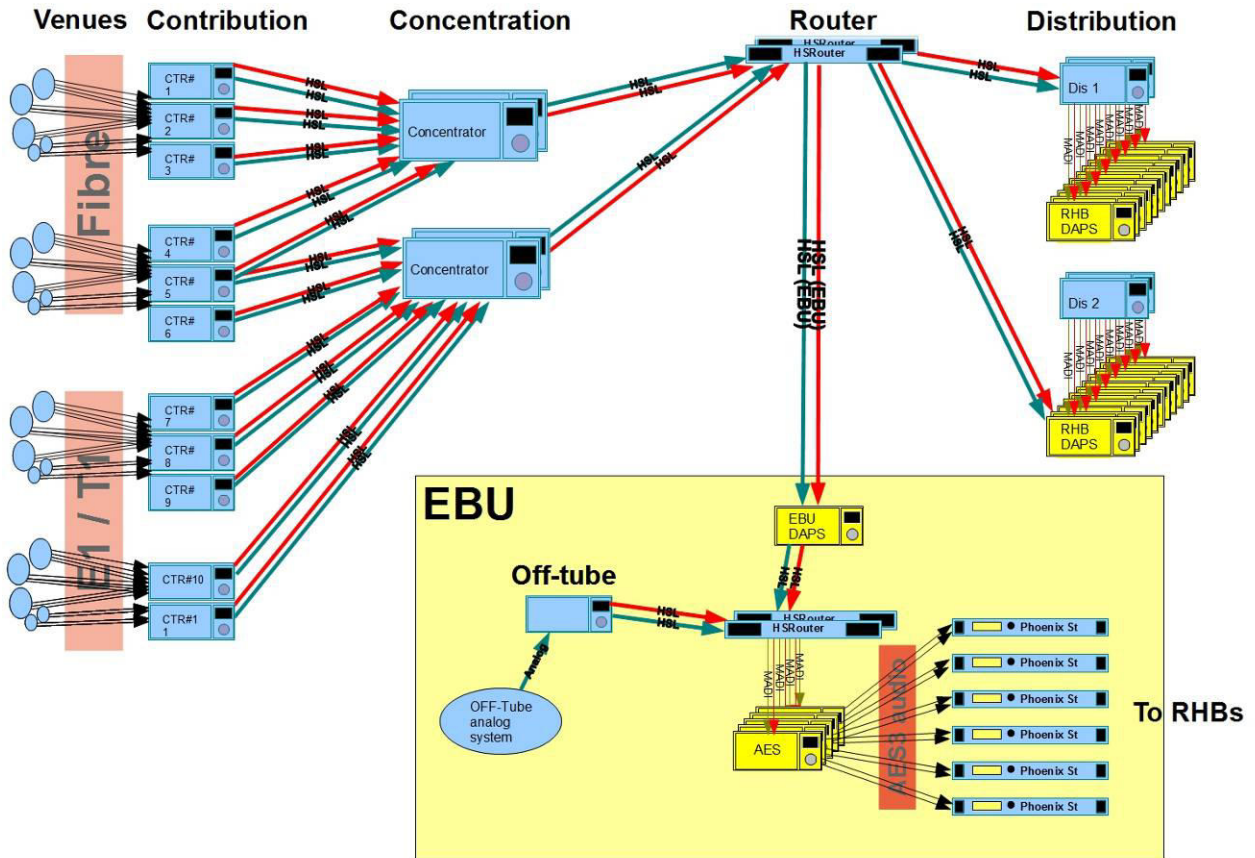


Figure 1: Commentary System Diagram

The audio signals are generated by the Host broadcasting organisation at the Rights Holding Broadcasters commentary positions at the different venues and through the AEQ commentary system. All circuits from every venue are sent to the IBC (International Broadcasting Centre) and specifically to the CSC (Commentary Switching Centre) through AEQ BC 2000D routers. This we call Contribution.

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Once all the circuits from the venues have arrived, they are sorted at Concentration and then they go through an AEQ TITAN Router of 5000x5000 audio circuits and that handles the circuit switching, ensuring that each circuit reaches its respective destinations and according to the planning of the Host Broadcasting Organisation. This switching is in most cases fixed, following an extensive and very rigorous planning, but can also be dynamic with circuits shared by several users at different times.

The whole system is redundant. In the event of a failure, the circuits will be automatically switched to the backup path. The different audio and data boards are also either duplicated or have backup boards.

All the individual RHBs or operators have their own DAP. However, in our case (EBU, European Broadcasting Union), it works a little bit different: the EBU switching centre at the IBC receives a high-capacity direct link from the main router (TITAN) in the Host Broadcaster Commentary Switching Centre. EBU distributes the circuits through their own AEQ TITAN matrix to each associate or member broadcaster. These audio circuits are sent through dedicated equipment to the countries of destination using several different link types, like E1, IP or ISDN.



Figure 2: EBU switching centre, showing the AEQ TITAN frames (right), Interface Frames (center) and 24 Phoenix Studio for international circuits distribution, ready to be installed in London.

The E1 circuit distribution is accomplished directly with AEQ BC2000 frames and multiplexer boards, with the corresponding equipment at the broadcaster's facilities in their home country. However, to transmit or distribute the audio circuits by IP and ISDN, it is necessary to use an audio-codec with the most demanding requirements for high quality, low delay audio and reliability of transmission, including automatic communication recovery in the event of a temporary transmission line failure. The AEQ Phoenix Studio audio-codec is ideal for this application.

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Figure 3: AEQ Phoenix Studio Dual Channel Audiocodex

2. AUDIO TRANSMISSION TO THE EBU ASSOCIATE OR MEMBER BROADCASTERS

In the London Olympic Games, peer-to-peer links will be used. The audio circuits can be accomplished with either high quality 15KHz AEQ-LD+ algorithm or traditional 7,5 KHz G.722.

The audio circuit transmission path will be digital from the commentators microphone inputs up to the broadcasters audio mixing console or the viewers TV receiver

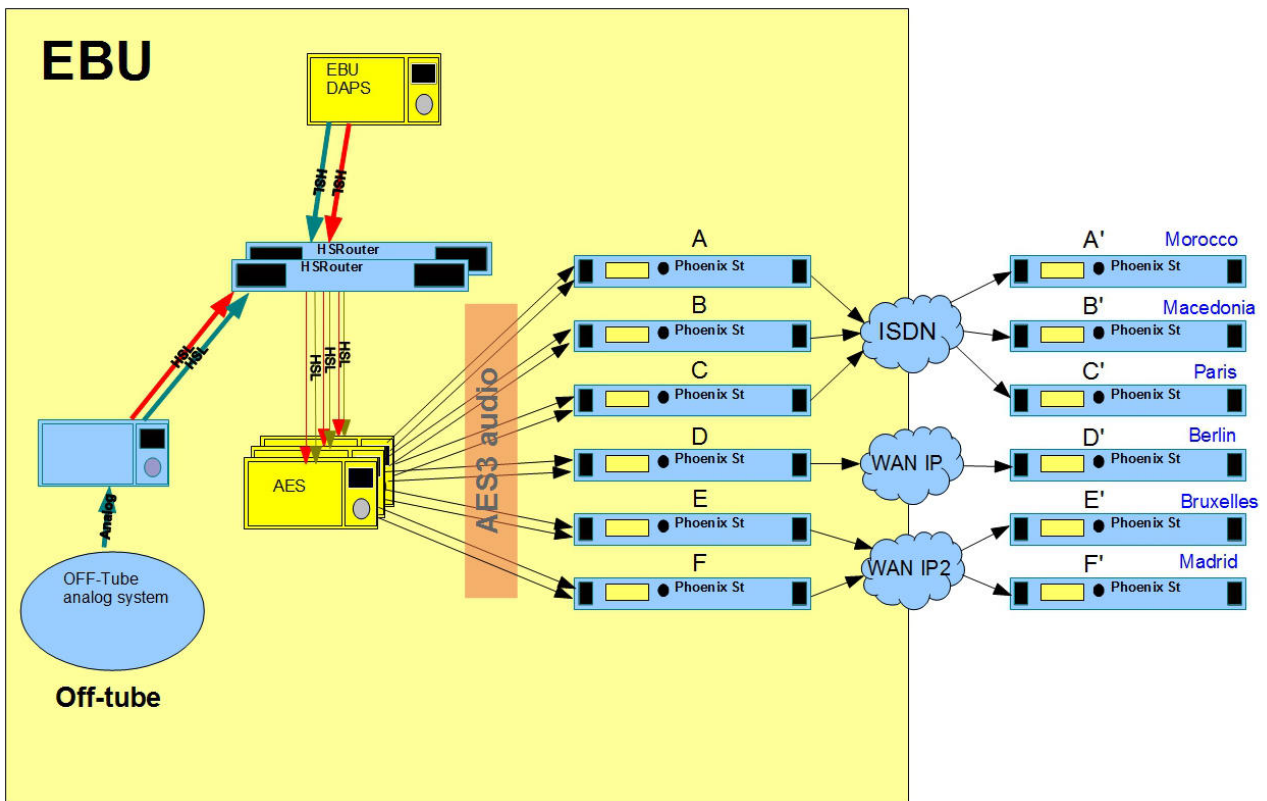


Figure 4: EBU Specific system diagram at IBC, including circuit distribution for the associate or member broadcasters.

Sending IP Circuits

Broadcasters with greater resources use an IP infrastructure for their broadcast circuits. This consists in a high-availability, high-quality WAN network with layer 2 quality of service. The audio-codexes in London and the remote ones (located in the broadcasters home countries) are all configured to operate within the same logical network – all units have an IP address in the same range.

Phoenix Studio provides two transmission channels, it is possible to transmit two different programs using one piece of equipment per peer and even using a single Ethernet interface. Both channels will share the same IP address using RTP and RTCP (Real Time Control) Protocol.

The chosen method of IP transmission is SIP (without using proxy). Sending audio, is performed using RTP and RTCP (Real Time Control) Protocol.

Each equipment will have an identifier or "URL", e.g. <equipment_name>@<ip> = Phoenix_233@172.26.33.55. These URL's can be stored in the Phoenix Studio agenda with a more indicative name (e.g. "Audiocodec Paris 1"), in order to simplify the process of calling.

The AEQ-LD+ encoding have dual modes that double the equipment capacity: it is possible to send up to 4 independent bidirectional channels with a two Phoenix Studio in a peer-to-peer configuration.

Sending ISDN Circuits

The Phoenix Studio audio-codec is a multi-interface system, and also allows establishing connection over for example ISDN networks, using optional telecoms interfaces.

Some Radio/TV carriers prefer to use ISDN lines (Integrated Services Digital Network) for their program audio circuits.

Phoenix Studio allows both B channels to be aggregated into one 128Kbps channel that enables high-quality audio transmission. To transmit two 128Kbps channels, it is therefore required to have two ISDN BRI's, but not two Phoenix Studio units, since each audio-codec has the capacity to allocate two optional telecommunication interfaces.

Failover protection

It is paramount that the system is fault tolerant and that it also provides features of automatic recovery. Phoenix Studio offers several recovery methods: Backup, Auto-disconnect when detecting lack of data (RTP Inactivity Mode) and auto-redial.

CONCLUSION

Both Host and EBU Broadcasters have been using AEQ equipment for decades. The Phoenix Audiocodec, in addition to the AEQ's new digital commentary equipment, automated and integrated, represents a quantum leap with regards to the audio and communications quality and system reliability when broadcasting the worlds greatest sport events.