

Summer 2008:

„Cinema of the Future“ at Fraunhofer IIS Institute



The Fraunhofer Institute for Integrated Circuits IIS

The Fraunhofer Institute for Integrated Circuits IIS, established in 1985, is the largest of the 56 Fraunhofer Institutes. It develops micro-electronic systems and devices along with associated integrated circuits and software. The Fraunhofer IIS got worldwide acclaim for the development of the MP3 und MPEG AAC audio coding techniques.

The Fraunhofer IIS is a leading research facility for Digital Cinema, developing cinema cameras and equipment for post production as well as all processes bound to determine the future of the cinema. As a partner of the DCI Digital Cinema Initiative and the FFA, the Fraunhofer Institute für Integrated Circuits IIS actively contributes to D-Cinema standardization. Furthermore the IIS is the leader of the Digital Cinema Group which works on the ISO standardization of JPEG2000 for digital cinema.

The Fraunhofer IIS is a leading research facility for

The Project

At the Fraunhofer IIS, the complete workflow of digital movie production for the cinema is developed, tested and configured. Therefore a digital „Cinema of the Future“ has been built at the new extension building of the institute. The new cinema offering 70 seats serves various purposes: As a testing room for different D-Cinema technologies and szenarios and for associated processes of the digital workflow, for introducing new technologies and systems to expert visitors and as a function room for lectures or presentations.

Kinoton Service and Fulfillment

Kinoton accompanied the very demanding project from the conception and implementation planning to the finished installation. The stage technology with masking and decoration materials, the sound technology including the miking, the 2K Digital Cinema projectors, the audio and video racks with patch fields as well as a video control system have been delivered and installed by the German cinema technology supplier.

The Installation

Projection Technology:

For the reproduction of DCI compliant D-Cinema as well as alternative content, a DCP 30 Digital Cinema Projector* offering full 2K resolution has been installed. An electronic rectifier enables the use of a large range of different xenon lamps. A second DCP 30 with reduced light output supplies brilliant digital pictures at the newly furnished post production studio, thus an overall projection standard is guaranteed at the Fraunhofer IIS. Given the flexible modular design of the projectors' lamp modules, all common standard xenon lamps as well as special xenon lamps can be employed. Moreover, the chosen lamp modules offer a high light efficiency and uniform illumination.

Both digital projectors are equipped with Dolby 3D systems already. Due to the special technical design of the DCP projector range, the 3D color wheel can be completely integrated in the projector casing where it is reliably protected against dirt and misalignment. Besides this, the projectors are ready to be combined with other digital 3D systems as well.

* The DLP Cinema® components for the DCP projectors are supplied by Barco, a DLP Cinema® licensee. DLP Cinema is a registered trademark of Texas Instruments.



„Cinema of the Future“ at the Fraunhofer IIS: The technical equipment is clearly visible for presentation purposes.



DCP 30 Digital Cinema Projector at the projection room

Amongst other purposes, the DCP projectors are used for the impartial evaluation of D-Cinema servers and are equally suitable for presenting alternative content.

Stage Technology:

The Fraunhofer IIS set highest importance on first-rate picture and sound quality as well as on maximum flexibility and the possibility to modify the technical equipment easily at any time.

The stage is a very complex construction individually designed by Kinoton to meet the special requirements of this application. A mini perforated screen firmly mounted in a frame guarantees that the movie pictures are not disturbed by bothersome perforation holes, not even when viewed from the front row. The matte white “Preview” screen coating, chosen especially for the given projection conditions, adds to the uniform illumination of the complete screen. Via an automated masking system the screen can be easily masked horizontally and vertically to conform to any picture format.

In front of the screen another screen holding device was installed, so alternate screens featuring different reflection characteristics can be mounted for testing purposes. If additional stage area is needed, the complete screen frame system including screen and speakers can be moved into the back area by a heavy-duty rail system.

Sound Technology:

The sound engineering at the cinema auditorium turned out to be a very demanding task: The movie sound should be as spectacular as possible, but on the other hand optimum speech intelligibility was necessary for lectures or presentations. Different sound systems were installed to solve this conflict:

The cinema sound system provided by Kinoton is a high-quality digital 5.1 Dolby surround system with 3-ways front speakers installed behind the main screen, 12 laterally mounted effect speakers, and a subwoofer. The frontal sound system is a special CRMS (Cinema Ribbon Monitor System) refer-

ence system with very well-matched components. Those sound systems are known to offer a highly precise sound reproduction. Moreover, they significantly reduce the sound pressure level loss towards the back rows, providing an almost uniform sound quality and loudness over all seat rows.

Those sound systems are fed and controlled by 7 double power amplifiers, all in all providing about 14,000 Watt of amplifier performance, and a system controller.

A second sound system especially designed for optimum voice reproduction and equipped with high-quality wireless microphones guarantees good hearing at any place in the auditorium. The two directional broadband speakers in use feature a high backward and lateral attenuation over the complete transmission range. The cardioid radiation pattern of those speakers prevent resonant room modes and bothersome microphone feedback.

Additionally, the three-dimensional IOSONO sound system engineered by the Fraunhofer Institute for Digital



Patch fields for audio control and video data, alongside with the audio and video racks



Auditorium control panel and media control

Media Technology has been installed which realistically reproduces different sound sources by means of many small speakers.

Infrastructure for Auditorium, Projection Booth and Back Stage Area:

More than 9 connection and cable looms provide for the flexible data transfer between auditorium, projection booth, back stage area and sound studio. Kinoton has designed all audio, video and control patch fields to the individual cable layout plans and announced technical equipment. Due to their modular design, retrofitting

and changes are possible at any time. All audio and video connections are equipped with premium components and absolutely suitable for digital applications.

The cinema sound system allows the feeding of "non-cinema" sources as well as of sounds from the in-house sound studio. For crosslinking and circuit-entering of the signals, an electronic cross bar and a freely configurable monitor management system was employed. Two freely programmable and remote-controlled four-channel equalizers take care of the room equalization of the sound system.



Audio and video racks with patch fields at the backstage area

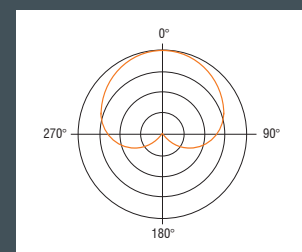
SPL Loss:

The sound pressure level (SPL), given in dB, describes the ambient pressure caused by sound waves. The SPL declines with increasing distance from the sound source; this effect is called SPL loss.

Resonant Room Modes:

Room modes are generated by sound being reflected off the walls of a room, thus interfering with the original traveling wave radiated by the sound source. This results in varying loudness and sound modulation at different places in the room.

Cardioid Radiation Pattern



Video Equipment:

In order to transmit video pictures of the auditorium and the stage, two high-resolution color video cameras with professional day/night function were installed, combined with a audio recording system (analog and digital) including a level meter. Via two video screens and active monitor speakers in the projection room and back stage area, the image and sound quality can easily be supervised. Audio and video racks including the corresponding patch fields complement the installation.

Acoustics:

Special ceiling and wall panelling provides well-balanced room acoustics for optimum sound quality and speech intelligibility throughout the whole auditorium.



Video cameras transmit images from the auditorium