



European  
Digital Cinema  
Forum

## EDCF TECHNICAL MODULE

### 2003 REPORT

#### OVERVIEW

Many of you will have heard the terms “D & E Cinema” bandied around.

What does it mean and is it important to have a differentiation?

Digital Cinema is a relatively new term. There have been pseudo electronic cinema demonstrations around for at least 20 years, but only now are there serious attempts to replace the existing celluloid distribution and exhibition.

There are a host of solutions for displaying large pictures throughout our industry. These solutions vary in price enormously and are mostly centred on television technology, whether they are in the boardroom or at a trade show.

Now that the technology has moved on to the point where the picture quality can equal a 35mm release print, digital cinema is coming of age.

An important point is that this quality target uses the very latest projection technology in a very professional implementation. So, in order to differentiate between good quality large picture presentation and exceptional quality large screen presentation for movies we call one system “electronic cinema” and the 35mm equivalent system, “digital cinema”.

### **Is the technology new?**

The fundamentals of the technology now being rolled out for digital cinema go back many years. The implementations used also have a long history, but only now are all the systems coming together at an integration and quality level which makes digital cinema viable.

### **Systems are King**

Progress in digital cinema technology has now led to the point where complete operational systems can be installed and operated. These systems stretch from the lens system right back to the programme transfer.

### **Why Standardise?**

Bearing in mind that systems will be the key to enabling digital cinema, it is important that the components of the system will work together. The only way to achieve interoperability between, for example a server or a projector from different manufacturers is if the interfaces are standardised by International Standards Authorities.

## **E CINEMA VERSUS D CINEMA**

### **E cinema: Non-cinema venue or content.**

- Multi purpose venues
- Alternative content, live, interactive sports etc
- Relaxed technical requirements
- Utilising existing standards

### **D cinema: 35mm equivalent**

- Existing cinema venues
- First run quality
- Several levels of service

## **HEADLINE REQUIREMENTS**

### **FROM THE EDCF COMMERCIAL MODULE**

The EDCF Commercial requirements specification calls for the following parameters.

- **Better quality than 35mm**

Better quality than 35 mm has been a common request from exhibitors, this has led to several attempts to technically define what this means. It is certain that digital cinema systems of today can yield a quality at least as good as a commercially available release print.

As this is a new age for digital cinema, the DCI in Hollywood have suggested that any new digital cinema system should have better quality than a 35mm studio answer print in the longer term. The EDCF would like to propose that the reference for quality be derived from camera negative as this is then not subject to the degradations of an analogue printing process.

- **Universal System (Quality Tiers)**

The cinema environment today varies between the headline first run blockbuster theatres with circa 1500 seats to the least used screen in the multi-plex with, for example, 150 seats. Add to this those venues which may be delivering cinema to smaller communities and you realise that there have to be tiers of service.

- **Interoperability between manufacturers**

It is important for the economy of digital cinema that the system be planned with natural building blocks and that the interfaces between these blocks be standardised. For any system in the future it is desirable for there to be interoperability between the equipment from different manufacturers thus facilitating competition which hopefully leads to lower cost of installation.

- **Secure and Flexible Transport**

Digital cinema facilitates the display of high quality studio masters anywhere in the world. Although these masters will be compressed the bit rate available will be such that they can be considered to be clones of the master files. This means that the distribution system has to be secure across any chosen transport mechanism. Transport can be via satellite, data tape, hard disk, fibre optic etc.

- **High Security System**

As mentioned above with relation to the transport, digital cinema systems have to be very secure. The security, although mostly related to the content from the point of view of direct theft, also needs to take into account unusual operational patterns within the cinema chain e.g. camcorder piracy at 3.00 am! By integrating encryption systems, play list management and asset tracking, digital cinema offers better security than 35mm. It can also be enhanced with water marking and finger printing.

- **Sustainability over time**

It is important for digital cinema systems that they be built from a series of blocks that have standardised interfaces and functionality. The dilemma for the operator is obsolescence. It is not easy but it is vital to be able to upgrade systems at reasonable cost or continue to operate an existing older system.

- **Reasonable Cost**

All exhibitors are concerned about the cost of investment for digital cinema. Volumes are relatively small and technology in most areas is cutting edge. This means that standardisation again plays a big part. When designing systems it is important to allow them to fit within a reasonable revenue structure. It is reasonable to assume that the system designed for an auditorium of 1500 seats at a ticket price of 10 euros will be different to that serving 150 seats at a ticket price of 6 euros but the volume of equipment may be 10:1 or more.

## **TECHNICAL LEVELS OF SERVICE**

About 2 years ago, in early EDCF technical module meetings we discussed the issue of E-cinema, D-cinema, mainstream venues and community venues. It seemed prudent to lay out levels of service appropriate to the various venues and communities served. There are four levels suggested – levels 4 and 3 cover E-cinema, levels 2 and 1 cover D-cinema, 2 being current roll out and 1 being future as standardised by SMPTE.

**Level 1** – 35mm camera negative quality, circa 2K or 4K distribution resolution, wide colour gamut, file based distribution with cinema grade security, Digital Cinema grade projector. Suitable for future 1<sup>st</sup> run theatrical release and large format presentations.

**Level 2** – 35mm release print quality circa 2K distribution resolution for wide colour gamut, file based distribution with Cinema grade security, Digital Cinema grade projector. Suitable for mainstream first run theatrical release. May use, 1.3K or 2K projection equipment.

N.B. It is recommended that Exhibitors should use equipment conforming to existing technical standards where appropriate.

**Level 3** – HD quality, with HDTV resolution, HDTV colour Gamut, medium security, professional grade projector. DVB distribution bit rates, 2<sup>nd</sup> run theatrical release.

**Level 4** – SDTV resolution, SDTV colour gamut, consumer level security, consumer grade projector. DVB or DVD distribution bit rates.

It is anticipated that digital cinema will reside at level 2 for a period of time moving onto level 1, initially in the larger venues.

## **MODULE TOPIC GROUPS**

The EDCF Technical module is a mixture of general members and topic group chairs, of which all are voluntary. The topic group chairs have volunteered to lead small groups of people discussing the various topics encompassed within E & D Cinema. The topic groups are as follows:

- A. Mastering - Wolfgang Lempp (Film Light)  
[wolf@filmlight.ltd.uk](mailto:wolf@filmlight.ltd.uk)
- B. Image Compression - – Mike Croll (BBC)  
[mike.croll@rd.bbc.co.uk](mailto:mike.croll@rd.bbc.co.uk)
- C. Transport & Delivery - Wolfgang Ruppel (Deutsche Telekom) –  
[wolfgang.ruppel@t-systems.com](mailto:wolfgang.ruppel@t-systems.com)
- D. Security - Xavier Verians (Octalis)  
[verians@octalis.com](mailto:verians@octalis.com)
- E. Theater Systems - Angelo D'Alessio  
[angelo.dalessio@genie.it](mailto:angelo.dalessio@genie.it)
- F. Audio - Jason Power (Dolby)  
[JVP@dolby.co.uk](mailto:JVP@dolby.co.uk)
- G. Projection Systems - Matthieu Sintas (CST)  
[m.sintas@cst.fr](mailto:m.sintas@cst.fr)
- H. Server Systems - Benoit Michel (EVS)  
[b.michel@evs.tv](mailto:b.michel@evs.tv)
- Secretary – Dietrich Westerkamp (Thomson) =  
[dietrich.westerkamp@thomson.net](mailto:dietrich.westerkamp@thomson.net)

The majority of the topic group heads also play a key part in International Standardisation liaising closely with SMPTE and other relevant bodies.

## **STANDARDISATION**

There are many standardisation groups around the world looking at aspects of digital cinema. Levels 4, 3 & 2 mostly draw from existing standards bodies such as SMPTE, ITU, DVB, MPEG etc.

Level 1 is work in progress, with a combination of DCI requirements and SMPTE calling on other standards bodies where required. The EDCF is closely coupled with DTI and SMPTE via EDCF management and membership.

## **PARTICIPATION**

Please join the EDCF. If you wish, you can then join the Technical Module, where you will get access to an FTP site with all the EDCF – T documentation. If you are feeling particularly active, please join up with the topic groups.

## **Glossary**

DCI	Digital Cinema Initiatives
DVB	Digital Video Broadcast
DVD	Digital Versatile Disc
D-cinema	Digital Cinema
E-cinema	Electronic Cinema
EDCF	European Digital Cinema Forum
HDTV	High Definition Television
ITU	International Telecommunication's Union
MPEG	Motion Picture Experts Group
Pixel	Picture element
SDTV	Standard Definition Television
SMPTE	Society of Motion Picture and Television Engineers
1.3K	An image with 1280 horizontal Pixels, (1024 vertical)
2K	An image with 2048 horizontal pixels, (1080 vertical)

**Peter Wilson 17/02/04**