Key Capabilities of D Cinema (debunking the Myths)

from a Projection Viewpoint
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D Cinema Environment

- Digital Cinema requirements are driven by a vision of the need to deliver the best story telling environment.
- The ‘Out of Home’ experience must remain special.
  - Entertaining, Engaging, Unique
- Leisure market has never been so competitive.
- Home entertainment market is improving rapidly.
  - HD Broadcasts, Bigger Displays, Better Audio.
- Cinema industry can deliver a complete ‘system’.
  - Create. Make and Deliver to Customer.

D Cinema System

- 35mm film format created a benchmark ‘standard’ of image quality.
- Costs pressures have created compromises.
- Film processing consistency and resilience have become major issues.
- Environmental factors are a new concern.
- Digital Cinema enables:
  - Improved quality
  - Presentation consistencv

D Cinema System

- Cinema has the opportunity to define requirements through to the screen to ensure quality and new experiences (e.g. 3D).
- This enables much higher standards than are available to TV industry where the consumer chooses the end equipment.
- The challenge was to define the system that is
  - Competitive
  - Deliverable
  - Not soon obsolete.

D Cinema Requirements

- Contrast – Depth of Image, Sharpness and Colours.
- Colour – Range (gamut), Accuracy.
- Calibration – Provides absolute reference.
- Cropping – Handles ARs and Screens.
- Closed Captions – Multi Character Sets and Separate.
- Consistency – Colours, White Point, Contrast.
- Control – Drives house functions (Lights, Curtains etc)
- Compression – Visually lossless, not bandwidth ltd.
- Cryptography – Encoded, Watermarks, F Prints & Local.
- Confidence – Dependable to all involved.

- Customer – Stays at centre of business!

HDTV Drivers

- Contrast – Determined by producer, display & profile.
- Colour – Ltd to producer and display.
- Calibration – no closed loop.
- Cropping – fixed AR. Trim not normal
- Closed Captions – Part of video stream?
- Consistency – No.
- Control – GPIO Not normally provided
- Compression – Economically ltd.
- Cryptography – predominantly HDCP?
- Confidence – Depends on equipment and producer.

- Customer – Advertisers and retail implementation costs drive performance.

Myth 1 – DC defines US Technology

- DCI (and now ITU) Specifications doesn't define any hardware technology.
  - Essentially about image quality and functional performance.
- Projectors are currently available from
  - Barco (European)
  - Christie (N.American)
  - NEC (Japanese)
  - Sony (Japanese)
- Servers available from around the globe.
  - N. America, Asia, Europe.

Myth 2 – DC Resolution Rqmts drive unreasonable Cost

- DC specifications define wider aspect ratios to better deal with film formats.
  - Better matched to human visual fields.
  - 4K format defined for future needs.
- Image quality is driven by Contrast, Colour and Consistency before Spatial Resolution.
- Brightness (3D), Contrast, Colour, Dependability and Security drive cost.

Myth 3 – HD Projectors are good enough for small Cinemas

- HD projectors are designed for a broad variety of tasks and not optimised for cinema environments.
  - Predeminantly designed for Home Environments
    - Not bright enough
  - Or Professional Events
    - Not inexpensive.
  - Security not satisfactory for content owners.
- Exhibitors don’t want to only offer an early public DVD preview. (even in HD)
- Theatrical environments and consumers are more demanding over time – not less so.

Myth 4 – DC Projectors set for a short life span.

- Specification designed to be long lasting
  - Image Quality tuned to limits of Human Visual System – Resolution and Depth.
- Colour System designed to embrace wider gamuts as better illumination becomes economically viable. (e.g. Laser).
- Coding and Compression designed for future (AES) and JPEG 2000 @250MBs
- 16 Channel Sound and Text + Graphics.

Myth 5 – DC Projectors not designed for European use.

- European requirements for multi-language sub-titling and frame rates added into standard for both future and archive footage.
  - Already available in server playback
- No European requests have been denied in DCI and SMPTE processes.

Myth 6 – DC Projectors cannot be supplied by broad competitors.

- No restriction in the standards as to who or what technologies can be used to make D Cinema compliant projectors.
- Some companies choose to limit their licenses to motivate ongoing development investment.
- Cinema market is small compared with business projection (for Conference Rooms and Staging and Rental).
  - 30,000 lumen projectors are not inexpensive!

Myth 7 – European Cinema Exhibitors would be helped by a less demanding ‘European’ standard.

- Exhibitors would like a single global standard so that all movies can be shown. (Hollywood, Bollywood, European and others)
  - Just like 35mm films.
- Multiple standards with ‘alternative content’ (video) is hampering wider use.

An Urgent Need

- DC Spec equipment is very difficult to justify in some markets:
  - limited box office revenues
  - programming diversity is too broad.
- DC Equipment was initially designed for biggest screens
  - More choice for smaller screen venues is required.
  - Funding support is required in the transition period to preserve venues offering diverse cultural choices.
- DC Systems will enable broader access for small local movie makers to markets and customers.
  - Essential to the preservation of local culture.