ROUSH Media
Post-Production Services

The specifications for Digital Cinema are very exact. The following guidelines must be followed to ensure that a proper Digital Cinema Package (DCP) is created which can play in all theaters. Material that does not meet these specifications will need to be reformatted at additional expense. We are here to help so give us a call to make a smooth delivery.

Image

- Digital Source Material (DSM) can be either HD tape (HDCAM, HDCAM-SR) or files. File formats must be DPX, TIFF, QuickTime ProRes 444, or 10bit Uncompressed. A DCDM is also accepted. Contact us for approval for any other formats.
- Frame rate must be either 23.98 or 24fps. Theaters only play at 24fps. We will retime 23.98 to 24. Any other frame rate will need to be converted at an additional cost.
- Files or tapes must be color graded to either Rec. 709, P3, DCI xyz color space and be clearly labeled as such. A Color space conversion matrix or LUT will be applied to convert Rec.709, P3 etc. to DCI XYZ. (P3 is the color space used for Digital Cinema, Rec. 709 is for TV.)
- Files should be linear with black at code value 0 and peak white at 1023. (0 and 255 for 8-bit sources)
    - If the files black/white are at 64/940 that MUST be specified or your package levels will be wrong.
- Files must have square pixels & meet the 2K or 4K flat or Scope DCI specifications.
  (2048x1080, 1998x1080, 1920x1080, 2048x858 & 4096x2160, 4096x1716 3996x2160)
- Files should not have black borders (letterbox or pillarbox).
    - Video tapes may be letterboxed or pillarboxed. The letterbox will be cropped off in the output as required.
    - DCI/SMPTE specifications state that the picture must fill the screen either horizontally or vertically. We will scale the image to comply.
    - You must provide us with the projection aspect ratio and the current aspect ratio. If they differ you must state how we are to convert between the two. (i.e. Crop HD 1.78:1 to 1.85:1 for projection)
- QuickTime file names must include the title and reel number (title_reel1.mov)
- File sequences must follow these rules:
    - File names must include the title and reel number. (title_reel1_00001.dpx)
    - File names should not include any spaces.
    - Frame numbers must have enough leading zeros so that they sort properly. (00001, not 1)
    - If there are multiple reels all the reels must be in separate sub-folders of the main title folder.
        - Title
        - Reel1
        - Reel2, …
- Each reel must have a visual Two Pop two seconds (48 frames) before start of program to ensure audio sync.

Audio

- Audio must be provided in the Broadcast Wave format (or be embedded into the QuickTime file).
- Files must be provided in reels or long play and exactly match the image.
- Each channel should be a separate wav file.
- Each file must be clearly named to identify title, reel, and channel (title_reel1_left.wav)
- Standard channel abbreviations are: L=Left, R=Right, C=Center, LFE=sub, LS=Left Surround, RS=Right Surround
- Wave files must be 23.98 or 24 frames per second, 48Khz, 24 bit, with a reference level of -20dbfs. The audio must sync at the listed frame rate. Please note the frame rate the audio is to sync at (23.98 or 24)
- Each file must have a single frame Two Pop two seconds before start of program.

Subtitles
- There are two types of subtitles acceptable for Digital Cinema, text only, and graphical.
  - Text only is an XML file that specifies the font and timing of the titles which are then generated on the fly by the server and projector in the theater.
  - Graphical subtitles use PNG files for the subtitles and an XML file for the timing.
- Subtitles must be delivered in a Digital Cinema ready format and include all fonts and/or PNG files as required.
- Subtitle elements (XML, font, PNG, etc.) must be in folders clearly named by title and reel. Each reel must be in a separate folder.

Encryption (KDM)
- Digital Cinema Packages can be highly secure via a KDM allowing playback only on specific hardware at a specific time frame. Packages can also be keyless so they can be played anywhere (no security). You MUST specify whether you want a secure or unsecured package (with or without KDM).
- If you want a secure package the following information is required
  - The start and end dates and times for the key (when the package may be played).
  - The security certificate for each device that will be allowed to play this package.
- The distributor or theater should provide you with these.
- A Key Delivery Message (KDM) file will be generated and delivered separately from the DCP.

Other Required Information
- The file naming convention for the DCP is very specific and requires the following additional information
  - Title (will be abbreviated to 14 characters in the DCP file name)
  - Content Type (Feature, Trailer, Advertisement, etc.)
  - Language
  - Territory and Rating (i.e. US PG-13)

Terminology

Digital Cinema has its own unique terms and abbreviations. Here is a sample workflow:

The DI facility provides a DSM from which a DCDM is made using the appropriate Essence elements. The DCDM is combined with the appropriate Metadata, compressed and packaged to create a DCP. The DCP along with a CP and a KDM are shipped to the DCT where it is shown to the PP.
- DI – Digital Intermediate
  - This is where the final color corrected, assembled, ready for an audience master is created
- DSM – Digital Source Master
  - This is the final master, color corrected, assembled and ready to go. It can be any format.
- DCDM – Digital Cinema Distribution Master
  - The DSM picture has to be sized to fit the DCI/SMPTE specification (2048x1080) and converted to XYZ 16-bit Tiff files. Audio and subtitles are in the correct formats. This is the movie ready to be packaged for distribution. The DCDM will play at 24 frames per second.
- Essence – All picture, audio, and subtitles. Everything the audience sees.
- Metadata – Data which describes or relates to the essence
  - Used by the theater's server or projector to determine how the movie should be shown, or to identify the package.
- DCP – Digital Cinema Package
  - The picture is compressed into the JPEG2000 format and wrapped into an MXF file along with the other essence and metadata. A package may contain multiple audio tracks and subtitles so that one package can be used for multiple languages.
- CP – Composition Playlist
  - Tells the server how to play back the package(s). An English language playlist would play the
- English versions of the movie, the Spanish playlist would play the Spanish version, etc.
- KDM – Key Delivery Message
  - A DCP can be encrypted so that only specific devices can play it and only at specific times. The
- KDM contains the key to allow the designated device to unlock the package.
- DCT – Digital Cinema Theater
- PP – Paying Public