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DTS Digital Cinema JPEG2000 Encoder User Guide

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Version 1.0**

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Welcome

Thank you for choosing the DTS Digital Cinema JPEG2000 Encoder. The JPEG2000 Encoder represents a complete tool that allows for Encoding, Encryption, and Packing of Digital Cinema Distribution Masters (DCDMs). It incorporates variable bit rate encoding in order to minimize not only the size of the final Digital Cinema Package (DCP), but the required encoding time as well. A simple-to-use Graphical User Interface, with a minimal number of screens, allows for intuitive navigation and operation.

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1. Introduction

This user guide explains how to use the DTS Digital Cinema JPEG2000 Encoder, which creates variable bitrate (VBR) JPEG2000 code streams that are fully compliant with the Digital Cinema Initiatives (DCI) specification.

The DTS JPEG2000 Encoder performs four distinct operations:

1. Color Space Conversion (optional)
2. Creation of VBR JPEG200 code streams
3. Encryption of code streams (optional)
4. Packaging of code streams into compliant DCP and creation of targeted KDM.

2. System Requirements

2.1. Physical Requirements

- Input device:
 - Monitor, keyboard, and mouse connected to a standalone DTS Digital Cinema JPEG2000 Encoder
 - Remote connection – Windows computer with X-Windows, a Linux computer, or a Mac running OS X with the X11 optional software package
 - DTS VPN remote access for maintenance, troubleshooting and software upgrades
- Storage device compatible with one of the following interfaces:
 - Gigabit Ethernet
 - High-speed USB 2.0
- Either one 20-amp/110 volt or one 10-amp/220 volt circuits.
- Network information:
 - Up to 3x IP addresses
- Temperature Controlled Environment
 - Maximum Operating Room Temperature: 77° F (25° C)
 - Dust free

2.2. Source File Requirements

2.2.1. Image Files

The DTS JPEG2000 Encoder supports 2K and 4K images. The images must be 12-bit X'Y'Z' color space and must be stored in the 12 most significant bits of 16-bit uncompressed TIFF files (the four least significant bits will be ignored), or 10-bit DPX files in ITU-R Recommendation BT.709 color space (formerly CCIR Rec. 709).

2.2.1.1. Numbering Conventions

Input files must be numbered by frame. Frame numbers can begin with any non-negative integer. For example, frames in a movie titled MyMovie could be named:

MyMovie_00000.tif
MyMovie_00001.tif
MyMovie_00002.tif
etc.

Additional numbers can be used in the file name. For instance, if you want to add reel numbers, the names of frames in MyMovie could be:

MyMovie_Reel-1_00000.tif
MyMovie_Reel-1_00001.tif
MyMovie_Reel-1_00002.tif
etc., and

MyMovie_Reel-2_00000.tif
MyMovie_Reel-2_00001.tif
MyMovie_Reel-2_00002.tif
etc.

2.2.2. Audio Files

NOTE: The audio files must be 24-bit 48 kHz (NOT 47.952) broadcast WAV files.

Audio files should follow a naming convention similar to that used for Image files. In the case of audio files, there will be far fewer files, i.e. only one file per channel for each reel.

For 5.1 channel audio, the following file-naming convention is used:

Channel No.	File No.	Channel
1	001	Left
2	002	Right
3	003	Center
4	004	LFE
5	005	LeftSurround
6	006	RightSurround

An example of proper audio file naming is shown below:

MovieName_Reel-1_001_L.wav
MovieName_Reel-1_002_R.wav
MovieName_Reel-1_003_C.wav

etc.

In this case everything before the File number (001, 002, etc) is identical, so it will have no effect on alphabetical sorting of the files. Since 001 comes before 002, the Left channel file will sort before any others, regardless of what follows the 001.

However, if the following naming convention were used:

MovieName_Reel-1_L_001.wav	}	Not Recommended
MovieName_Reel-1_R_002.wav		
MovieName_Reel-1_C_003.wav		

The first file in the sorted list will be the Center channel file (003), since the first unique value in the file name is the letter C, which comes before L or R. (While there is nothing inherently wrong with this second naming convention, it will not allow for the automatic population of audio channel files when setting up reels for encoding.)

2.2.3. Subtitle Files

The DTS JPEG2000 Encoder supports the addition of subtitles or captions (in the form of XML files), and subpictures (as pre-rendered PNG bitmaps).

When PNG files are used, an XML file for each reel is still necessary in order to carry the associated metadata.

2.3. Accessing Source Files

Access the source data in one of two ways:

1. Mounted storage server RAID

- The internal storage is configured with two 6TB RAID0 arrays, formatted “reiserfs”, and are automatically mounted. Each array has the following folder structure:
 - /raid1(2)/content
 - raid1/projects
 - raid1(2)/tmp
 - raid1(2)/work
- Copy data onto internal storage via USB disk or Gigabit Ethernet connection. Either array’s content folder can be used to hold source content. A 2K feature can be copied to one /raid array, but a 4K feature may have to be distributed across both.
- The USB devices automatically mount under “/media”. For optimal performance, DTS recommends not using a mounted USB disk as the source location for encodes.

2. Mounted network attached storage device (e.g., network attached storage)

- These devices will have to be manually mounted on the storage server and throughout the system.

3. Performing an Encode

3.1. Logging into the Encoder

Login as user `dts` to the Encoder in one of two ways: via remote operation, or through a direct connection to the server.

3.1.1. Login using Remote Operation

The DTS JPEG2000 Encoder runs on a Linux environment. Therefore, any remote computer running Linux can simply connect through a secure shell. This can be a Windows computer with X-Windows, a Linux computer, or a Mac running OS X with the X11 optional software package. Please refer to your operating system guide for more details on setting up the recommended environment.

To connect using the *Windows* operating system, install Cygwin on the remote computer. During the Cygwin installation, be sure to include all the X-Windows components, as well as SSH support. To launch, execute the .bat file `\\cygwin\usr\X11Rx\bin\startwin.bat`.

To connect using Mac OS 10.4 or later, you must install the optional X11 software package, available on the original Mac OS disk. Please see Mac help for details on installation.

NOTE: Be aware that the commands listed below are *case sensitive*, and must be entered exactly as they are shown.

To access the Encoder via a remote Windows, Mac, or Linux computer –

For Windows:

1. Launch Cygwin Bash Shell.
2. Type **startx** – to start the X-Win application. Proceed to step 3.

For Mac:

1. Launch the X11 application.
2. Proceed to step 3.

For Linux:

1. Type `ssh dts@xxx.xxx.xxx.xxx`, where the `xxx...` is the IP address of the Encoder (again, note the space between `ssh` and `dts@`).
2. Proceed to step 5.
3. In the X11 console, type **xhost +** and press Enter (note the space between the “xhost” and the “+” symbol).

4. Type `ssh dts@xxx.xxx.xxx.xxx` , where the xxx... is the IP address of the Encoder (again, note the space between `ssh` and `dts@`).
5. At the password prompt, enter the supplied DTS password.
6. Now type `export DISPLAY=xxx.xxx.xxx.xxx:0` , where xxx... is the IP address of the local machine. (Note the space between “export” and “DISPLAY”)
7. Finally, type `DCPClient` and press Enter.

3.1.2. Login using a Direct Connection

You may also access the encoder through a direct connection to the Encoder hardware.

1. Connect a keyboard, mouse and monitor to the Encoder.
2. Open a console window and type **DCPClient** then press Enter.

<p>NOTE: This assumes the DCDM has been loaded into /raidx/content/film_name/xxx where xxx is the folder of the user’s choice (i.e. – reel-1 through reel-x).</p>
--

The encoder is designed to encode and package in a single process creating a DCP that contains a single or multi-reel composition. Each composition of assets contains an associated packing list and asset map. If a feature is accompanied by other content such as trailers or logos, each should be a separate DCP. It is recommended not to combine content of different type into a single DCP. Keep each element separate during encoding and within separate folders on the master/distribution drive.

Once content is copied to the internal array(s), the basic encode process is as follows:

1. Preparation of the DCDM is an essential time saving step in the encode process. If necessary, prepare the image file name using the specified naming convention. If the content contains unwanted items like the 2-pop, remove those frames. Prepare the sound files with the appropriate naming convention, and verify that they meet the specification noted and that the run lengths match the picture. Subtitles should only have to be copied on to the encoder. Place them in a folder within the same feature folder.
2. Locate and note the frames of a few bright and dark (black) scenes for spot checks. This is especially important for content that needs to be color converted to the X’Y’Z’ color space. One can just encode an entire reel for simplicity if the desired check scenes are within the selected frames, since this will also allow verification of subtitles. If color conversion is not a requirement, encode a reel or the beginning of each reel for acceptance checking of picture quality, sound synchronization and subtitles synchronization.
3. Without the Encrypt option selected, encode and package the check scene(s) with Color Conversion and Pre-Correct Video set if color conversion is required. Note that for image quality testing, audio and subtitles are not a requirement if not yet available.



4. Load the DCP(s) on to the Digital Cinema player and QA the image.
5. If necessary, adjust encode settings, re-encode, and view again. Once satisfied, move on to encoding the entire feature.
6. Using the established settings, setup and execute the encode with all required reels. If the Feature is to be encrypted, make sure that the Encrypt option is selected at this time.
7. Email the CPL of the encrypted content, the DTS KeyStore-targeted KDM, and any Player public device certificate chains to DTS NOC services.
8. Load the full run-length DCP on to a Digital Cinema player. Load the device KDM on to the player. QA the entire DCP or set of DCPs.
9. Redo any encode/packaging is necessary.

The DTS JPEG2000 software will launch and the screen shown in Figure 1 will appear.

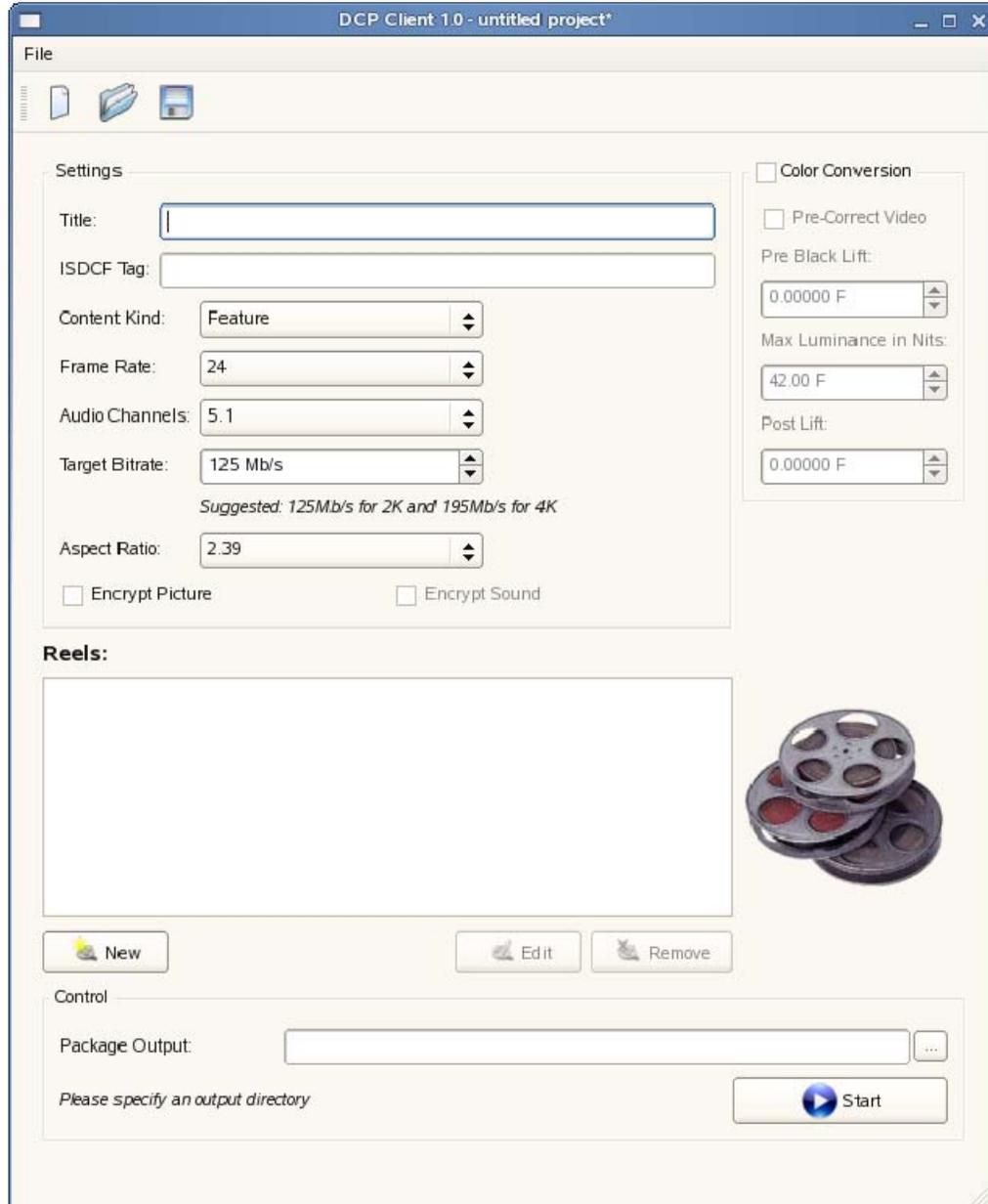


Figure 1

Initially, all fields will be displayed as “grayed-out”, inactive status. They will not become active until a new project is begun, or an existing project is opened. To begin a new project, either click the “New” button on the toolbar (Figure 2), or select New Project from the File menu (Figure 3). Similarly, to open an existing project, click on the Open button on the toolbar (Figure 2), or select Open Project from the File menu (Figure 3).

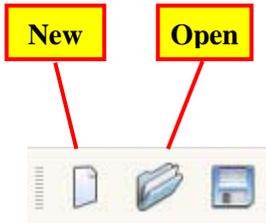


Figure 2

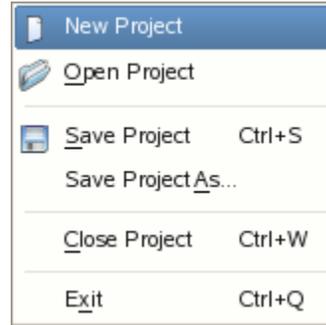


Figure 3

Figure 4 shows a populated version of the DCP Client main screen.

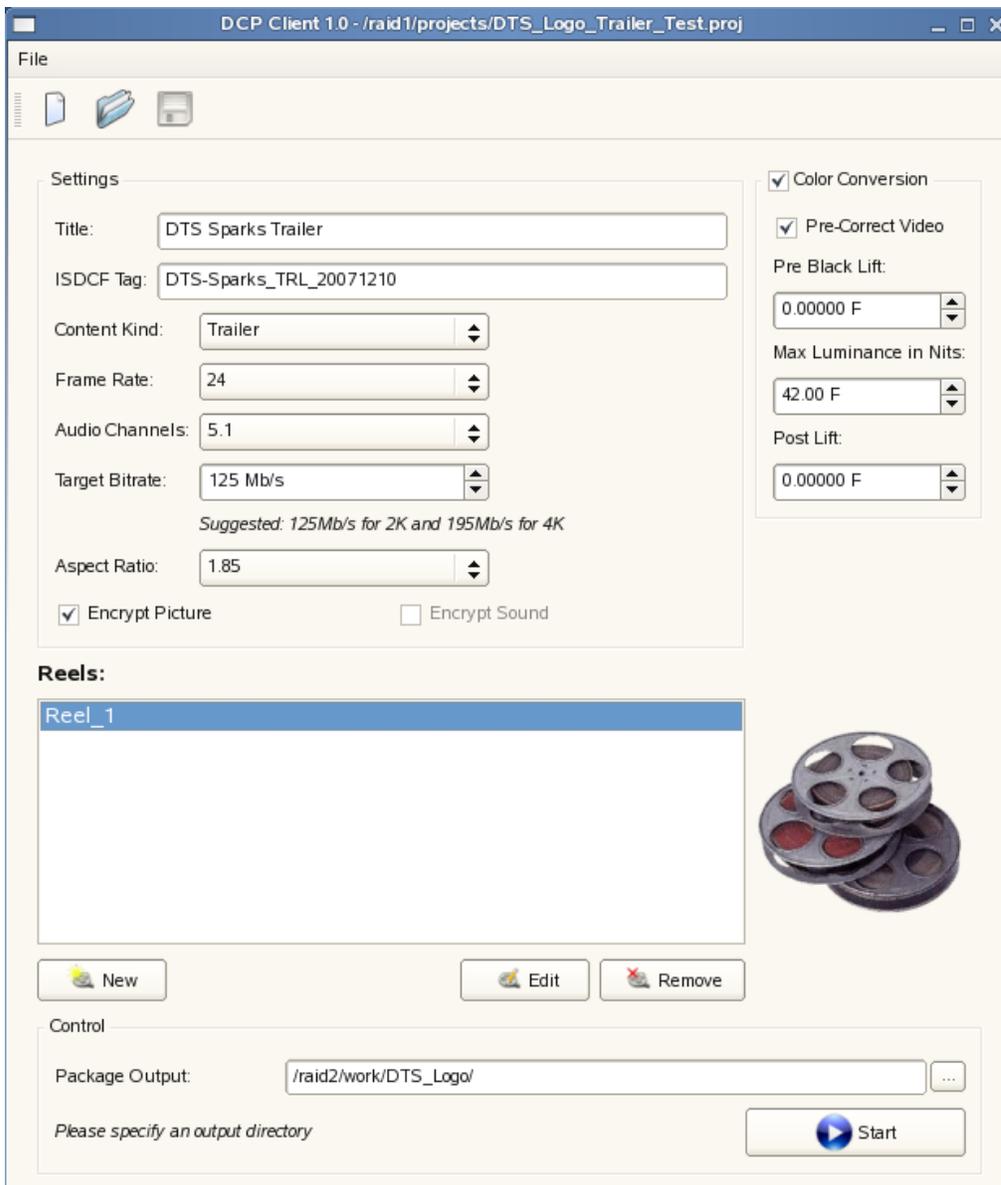


Figure 4

3.2. Settings

This section steps through each field on the main screen. Optional field descriptions are followed by the words **Optional Field**.

3.2.1. Title

Use the Title field to enter a descriptive title for the Encode project.

3.2.2. ISDCF Tag

ISDCF is an acronym for Inter-Society Digital Cinema Forum. This is a required field.

Please see appendix B for instructions on the creation of tags using the ISDCF standardized naming convention for DCPs and CPLs.

3.2.3. Content Kind

Use this drop down list to select the type of content to be encoded.

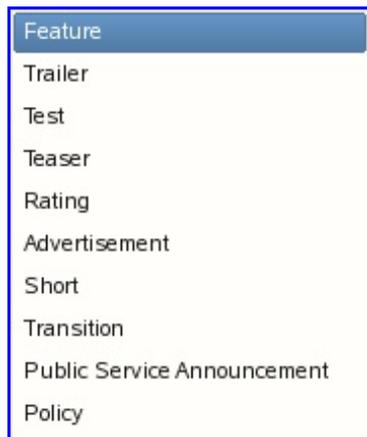


Figure 5 – Content Kind

3.2.4. Frame Rate

Select a frame rate. The default is 24 fps, but either 24 fps or 48 fps may be selected. No other rates are allowed.

3.2.5. Audio Channels

Select the appropriate number of audio channels from the drop down list shown in Figure 6 below. The default value is 5.1 channels.



Figure 6 – Audio Channels

3.2.6. Target Bit Rate

Since the DTS JPEG2000 Encoder uses variable bit rate encoding, you will need to specify an average desired bit rate for the code streams. The default is 125 Mb/s, which assumes a 2K encode. Lower bitrates result in lower quality, smaller files sizes.

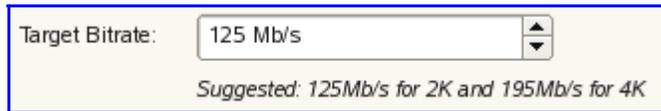


Figure 7 – Target Bit Rate

3.2.7. Aspect Ratio

Available options are shown in Figure 7 below. The default aspect ratio is 2.39.



Figure 8 – Aspect Ratio

For reference purposes, the table below outlines acceptable input image / video aspect ratios.

Accepted Image / Video Aspect Ratios			
Digital Film Standard	Resolution (width x height)	Display Aspect Ratio	Pixels
High Definition (HD)	1920 x 1080	1.78:1	2,073,600
Digital Cinema 2K Flat	1998 x 1080	1.85:1	2,157,840
Digital Cinema 2K Scope	2048 x 858	2.39:1	1,757,184
Digital Cinema 4K Flat	3996 x 2160	1.85:1	8,631,360
Digital Cinema 4K Scope	4096 x 1716	2.39:1	7,020,544

3.2.8. Encryption

Optional Field

The Encrypt Picture box is, by default, unchecked. During the process of creating an encoded file, it is generally preferable to avoid encryption so that color conversion and synchronization may be performed on small sections of a reel. When you are finally satisfied with the color conversion of the reel, be sure to check the encryption box before performing the final encode.

Currently, Audio Encryption is not a requirement of the DCI specification, and is therefore not enabled at this time.

3.2.9. Color Conversion

Optional Field

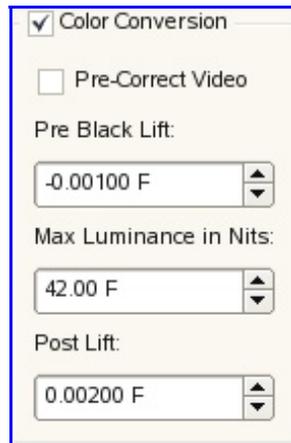


Figure 9

As part of the encoding process, content is normally mapped (converted) into X'Y'Z' color space. The DTS JPEG2000 Encoder supports source content in either RGB or X'Y'Z' color space. Content in RGB color space can, and most likely should, be converted into X'Y'Z' color space using the optional Color Conversion field.

Due to variations in cinematographic practices used in the motion picture production process, the DTS JPEG2000 Encoder includes manual control over several color mapping options. In order to activate the Color Conversion options, you must click the Color Conversion check box. (See Figure 8)

Pre-Correct Video

When video images are converted from analog to digital, depending on how they are converted, the intensity of blacks may change. Because they may be more intense, or less intense than their original values, you may need to encode a scene several times, experimenting with the black values to achieve the best look.

The Pre-Correct Video option may be used if you will be encoding source material that has been captured with a Video Black level of 16 (NTSC 7.5 IRE, PAL 0 mV). This option uses a set of pre-configured values, and attempts to pull the black levels down to zero.

NOTE: The following three controls may be used with, or without using Pre-Correct Video.

Pre Black Lift

If the Pre-Correct Video option produces results that are undesirable and/or the black values are not dark enough, you may enter values manually in the Pre Black Lift field. A negative value for Pre Black Lift will pull the black levels down, and a positive number will push them up. It is recommended that you start with a value of zero, and execute in +/- 0.06 incremental steps until you achieve the desired results.

The Pre Black Lift is considered “Pre” because it is applied to the picture data *before* it is converted to JPEG 2000 X’Y’Z’ color space.

NOTE: Any changes to this setting will require a re-encode of the source.

Max Luminance in Nits

The Max Luminance field helps match video luminance to the brightness of the digital cinema projector.

If you need more precise control over the luminance values, adjust the value in the Max Luminance field. Values for the Luminance scale factor will normally range between 30 and 50, but numbers in the low 40’s tend to be a good starting point. It is recommended to begin with the default value of 42.

(One Nit = One Candela per square meter)

Post Lift

Post Lift allows for custom contrast changes. It is always used in conjunction with Pre Black Lift and Max Luminance. Begin with the default value, and modify accordingly.

NOTE: Post Lift is best left at zero. Using it will destroy the original color intent of the picture.

3.3. Reels

Select the first reel to be encoded from the DCDM by clicking on the **New** button located beneath the large “Reels” box (see Figure 9).



Figure 10

The New Reel dialog box will open, as shown in Figure 11 below.

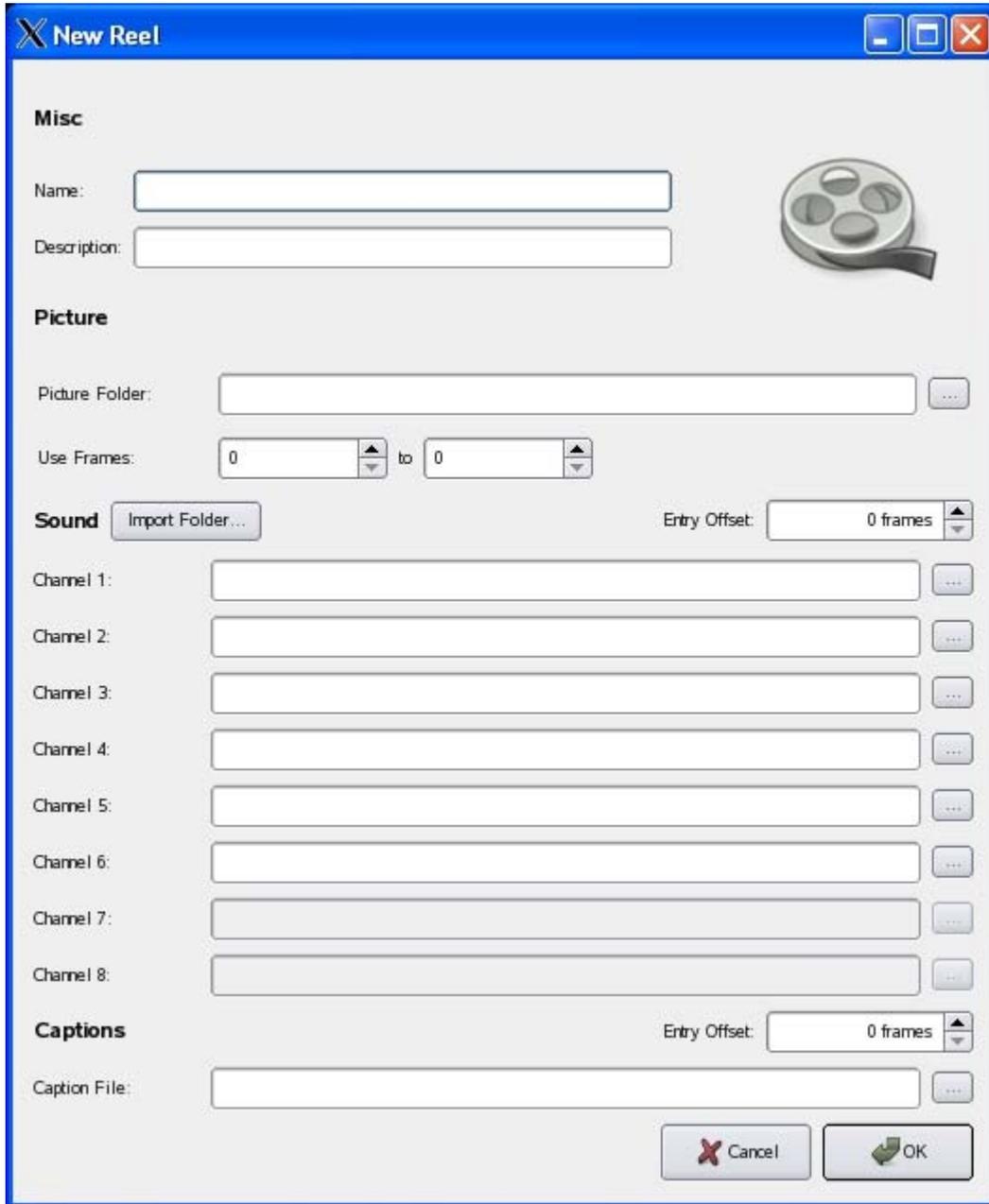


Figure 11

3.3.1. Misc (Name)

In the **Name** box, type in a name for the reel to be encoded. A typical naming convention would follow the form: film_name_reel#

Use the optional description field to add a general description about this particular reel. In the future, these descriptions will allow for rapid searching of content by type, keyword, or various other parameters.

3.3.2. Picture

Using the  button at the right end of the Picture Folder field in Figure 11, browse to the folder where the DCDM is located. (See Figure 12)

Browse to the source content on the local arrays (/raid1 or /raid2) by selecting the Local Disk button.

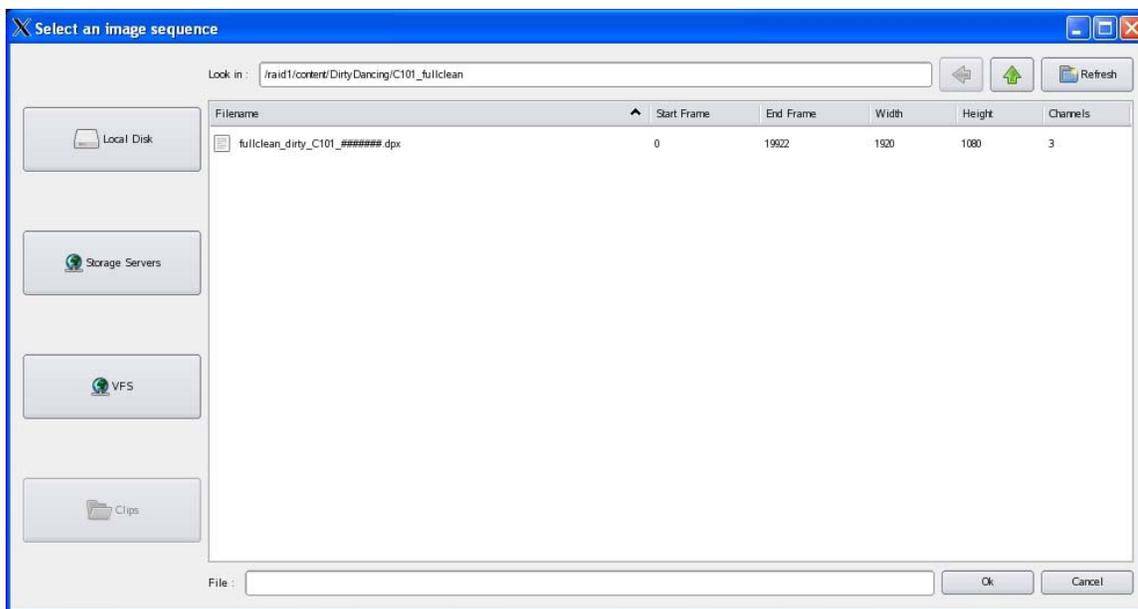


Figure 12

Select the proper file (.tiff or .dpx) for this particular reel, and click OK.

NOTE: After you have selected the picture folder, the DCPClient software will begin searching for every file within that folder. This process may take some time, since there are many, many files associated with a reel.

The Use Frames field will automatically populate with zero at the low end, and the last frame value for the reel, at the high end. If you wish to encode only a portion of the entire reel, manually change the values to the range desired.

Once you have identified the picture folder, you may now select the audio files. These may be located in folders within the picture folder.

3.3.3. Sound

If the naming of the audio files follows the convention outlined in section 2.2.2 (or a similar convention), all files may be imported at once:

Click on the **Import Folder** button, and select the folder containing the appropriate audio files.

(If a naming convention has been used that does not allow proper alpha-numeric sorting, it will be necessary to populate each channel field manually using the browse buttons  to locate each individual file, as in Figure 13.)

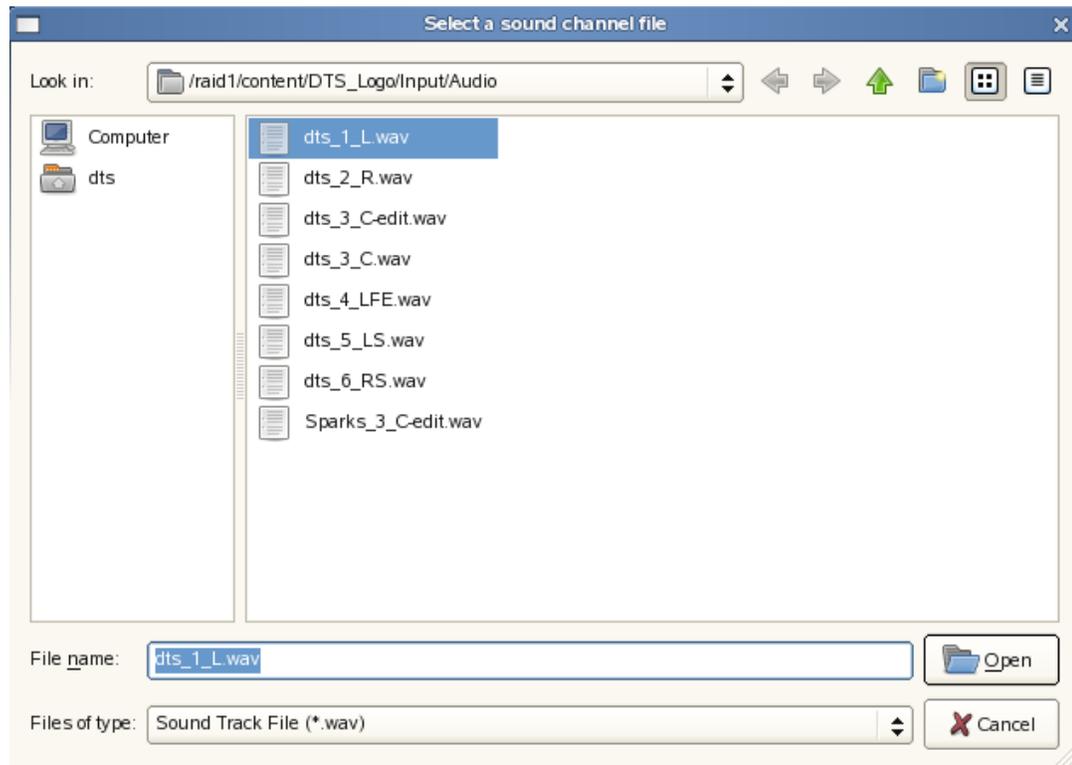


Figure 13

3.3.3.1. Entry Offset

Use the Entry Offset field when picture and sound are not properly synchronized. Positive values will cause audio to lead the picture. Negative values will cause audio to lag the picture.



3.3.4. Captions & Subtitles

If captions will be used for this particular encode, they should also be located in a sub-folder below the Picture folder. Use the browse button to locate and select the XML file associated with the captions or subtitles. There should be one XML file per reel.

3.3.4.1. Entry Offset

As with the sound file offset, this field can be used to correct any synchronization problems between picture and subtitles/captions. Positive values will cause the subtitles/captions to lead the picture. Negative values will cause the subtitles/captions to lag the picture.

Once all appropriate fields have been populated in the New Reel dialog box (Figure 14 below), click **OK** to return to the main screen (Figure 4).

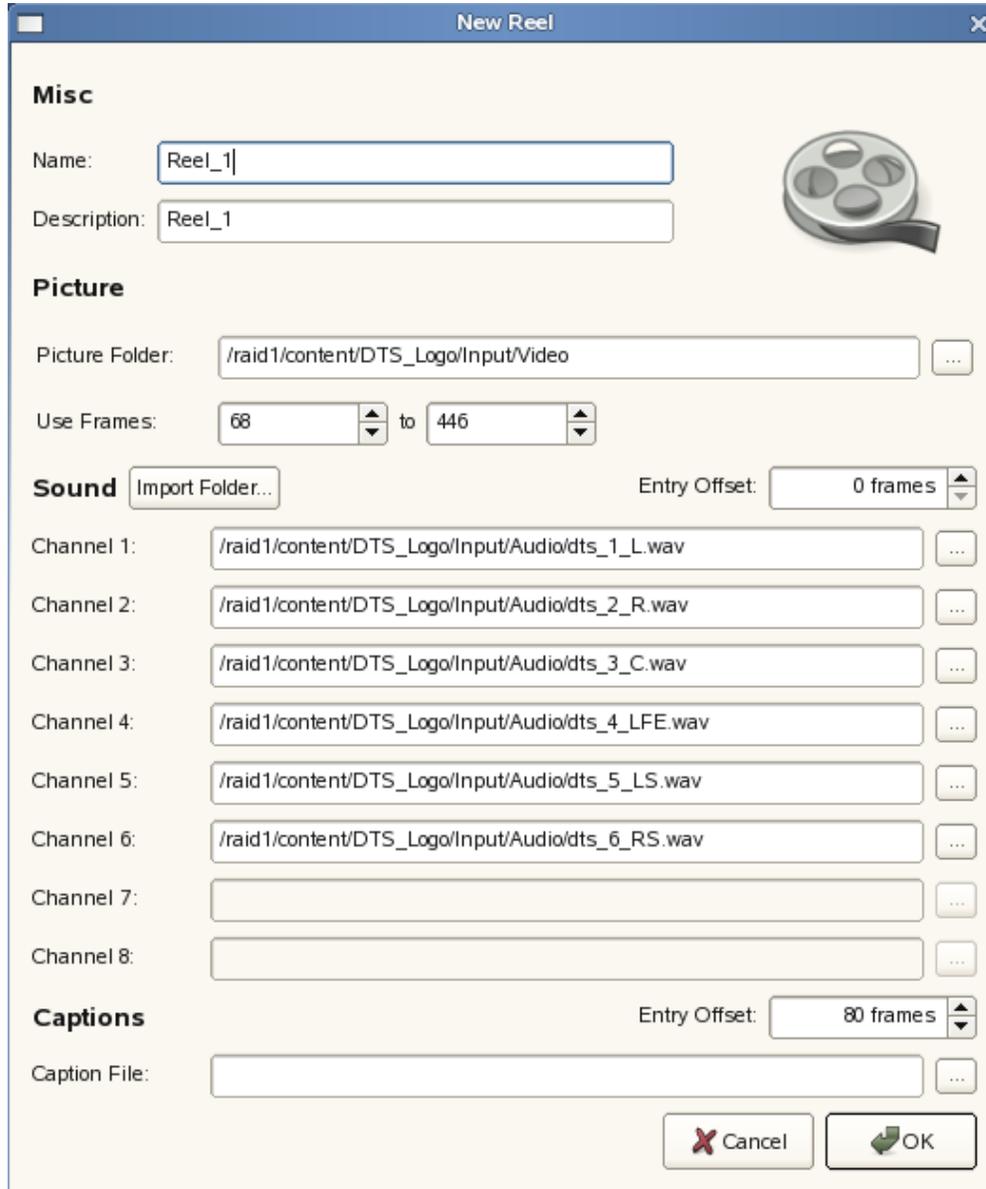


Figure 14

Continue the process above until all reels have been added to the main screen.

After one or more reels have been added to the “Reels” list in the main screen, the **Edit** button may be used to modify a reel’s parameters.

Use the **Remove** button to remove a reel from the list.

(Refer to Figure 10 for Edit and Remove.)

3.4. Selecting the Output Folder



Figure 15

The bottom portion of the screen (shown in Figure 15) allows you to select a location to place the finished DCP.

1. Using the (...) button, browse to: /raid1(2)/work/
2. Create a new folder based on the film name, e.g. /film_name, or /FilmName. Use this complete path as the Package Output folder.
3. Click **Start**. A console window will now open (see Figure 16).
4. Enter the DTS supplied identity passphrase when asked.
5. At the command prompt, enter “**make**” (without quotes), and press Enter.

The encoding process will now begin for each reel. Encoding/Packaging typically takes 4x longer than real-time, but this can vary depending upon options chosen.

The encode portion is processed in three Stages, followed by the packaging into a DCP.

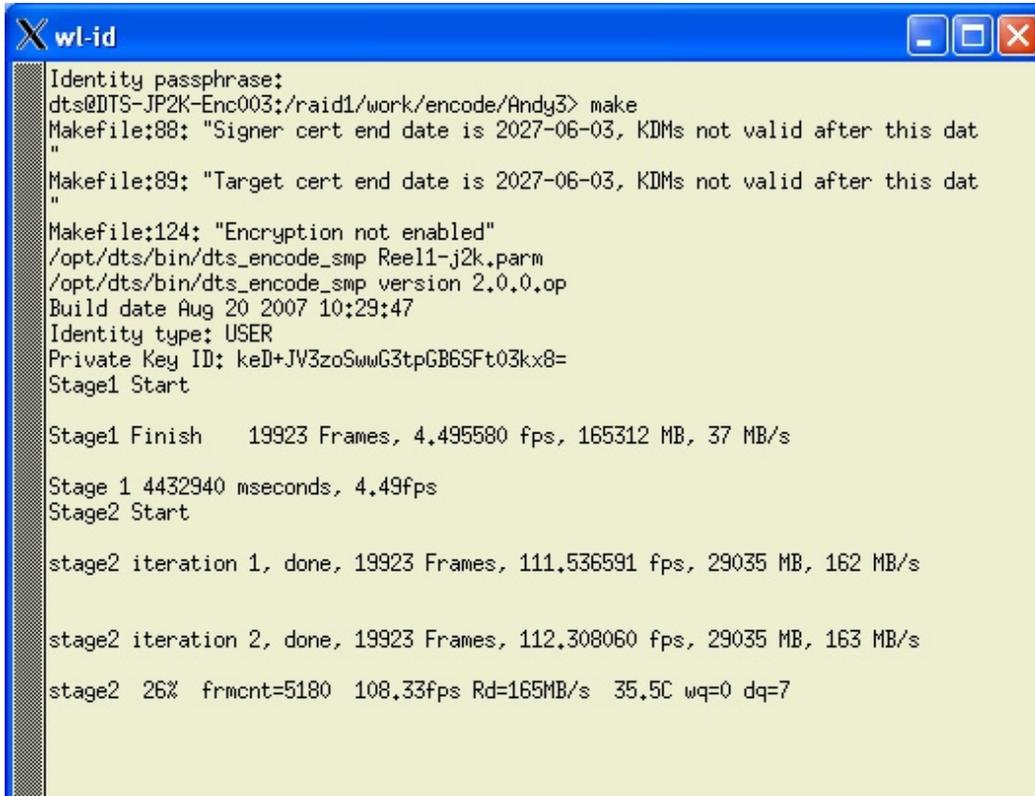
Stages

Stage-1 produces high bit rate codestreams for all image frames.
Stage-2 selects a parsing parameter that maximizes image quality, while holding the average bit rate to a desired value.
Stage-3 uses the output from Phase 1 and the parsing parameter from Phase 2 to create the final VBR codestreams.
Final stage wraps the VBR code streams into an MXF wrapper. A Composition Playlist, Packing List and ASSETMAP are created, and a DCP is placed into a “DCP” folder in the selected output folder. The KDM will be placed into the “work” folder under the film name.

Table 1

Once all three stages have completed, a notification will appear in the command prompt window. The DCP file will have a .j2c extension.

The DCP and one master KDM are now complete and available for QC screening.



```
Identity passphrase:
dts@DTS-JP2K-Enc003:/raid1/work/encode/Andy3> make
Makefile:88: "Signer cert end date is 2027-06-03, KDMs not valid after this dat
"
Makefile:89: "Target cert end date is 2027-06-03, KDMs not valid after this dat
"
Makefile:124: "Encryption not enabled"
/opt/dts/bin/dts_encode_smp Reel1-j2k.parm
/opt/dts/bin/dts_encode_smp version 2.0.0.op
Build date Aug 20 2007 10:29:47
Identity type: USER
Private Key ID: keD+JV3zoSwwG3tpGB6SFt03kx8=
Stage1 Start

Stage1 Finish    19923 Frames, 4,495580 fps, 165312 MB, 37 MB/s

Stage 1 4432940 mseconds, 4.49fps
Stage2 Start

stage2 iteration 1, done, 19923 Frames, 111,536591 fps, 29035 MB, 162 MB/s

stage2 iteration 2, done, 19923 Frames, 112,308060 fps, 29035 MB, 163 MB/s

stage2 26% frmcnt=5180 108,33fps Rd=165MB/s 35.5C wq=0 dq=7
```

Figure 16

3.5. Verify Playback

After completing the steps outlined in this guide, the files will be ready to be loaded and played on a DCI-compatible player. Load the DCI-JPEG2000 package and device KDM onto the player and verify playback.

Appendix A: Power Requirements

DTS does not guarantee proper operation of the Encoder system if the power supplied is not computer grade power.

The Powerware 5125 UPS provided in the system protects against the following power problems.

1. Power failure
2. Power Sag
3. Power surge over 110% of normal line voltage
4. Undervoltage
5. Overvoltage

It does not protect against:

1. Electrical line noise
2. Frequency variation
3. Switching transients
4. Harmonic distortion

DTS requires that the installation use a power line conditioner / isolation transformer to filter out line noise, harmonics and switching transients. Isolation transformers with Faraday Shield offer 100% isolation from the input AC line

The conditioner is installed at the AC mains source of the installation site and prior to the AC mains of the encoder rack.

Standard star grounding technique should be used for any equipment that is connected to the system, as well as for the system itself.

This is part of the AC mains system using isolated grounds where all grounds go back to a central point instead of daisy chaining. This can help eliminate ground-induced noise and ground loops.

The above are generally referred to as “Technical or Computer Power”.

The frequency variation should not be an issue, because the equipment in the rack can handle a standard 50-60 Hz.

Transformer Specification: (AC Power Isolation Transformer)

Working voltage 100 to 240 Vac

Minimum current capacity 6.5kVA (for supplied equipment only) does not account for additional ancillary equipment draw.

100% Faraday shield between primary and secondary windings required for full isolation of all transients, spikes and disturbances.

Receptacle grounding should incorporate standard computer isolated grounding to a central point at the installation power panel or ground rod.

The following link provides data to a recommended Power Conditioner:

<http://www.mgeups.com/products/pdt120/powerc/tpz100/t100.htm>

Appendix B: Digital Cinema Naming Convention V0.99a

(Special thanks to the Inter-Society Digital Cinema Forum, the Digital Cinema Trailer Committee, and Walt Disney Studios for making this, and the following appendices available.)

Some Digital Cinema servers can only show a limited number of characters on their display screens. If the file name of a Digital Cinema Package is lengthy, much of the information may be cut off entirely, or not visible unless you scroll to a second page or have a supplementary laptop to show the additional information. This makes finding a specific trailer or feature challenging if you have multiple titles with long names. It can be especially confusing when you have multiple trailers and rating tags along with the feature of the same name.

To help solve this problem, the Inter-Society Digital Cinema Forum and the Digital Cinema Trailer Committee created a Naming Convention as a temporary solution until future server designs address the issue.

You will start seeing trailer and feature Digital Cinema Packages with file names like:

RATATOUILLE_FTR_S_EN-XX_US-G_51_2K_DI_20060525_TDC

or

PIRATES-3_TLR-1_F_EN-XX_US-GB_51_2K_DI_20060415_TDC

or

PIRATES-3_RTG-T1_F_EN-XX_US-GB_51_2K_DI_20060415_TDC

At first glance, these names will probably be confusing, and depending on your server, may be cut off after a certain number of characters.

In order to make all the pertinent information for each Digital Cinema Package visible, the Naming Convention uses abbreviations for most of the information – including the title of the movie.

Enclosed are Easy Guide Charts to help you understand the Naming Convention. There is an **Abridged Easy Guide** for most applications - the first 40 characters - and an **Unabridged Easy Guide** that contains the complete Naming Convention String.

There are also several Easy Kit Appendices with recommendations for Language and Territory Codes. These appendices were updated on March 1st 2007 due to essential clarifications and conflicts with the newly released ISO 639-3.

Digital Cinema Naming Convention V.99a

Abridged Easy Guide for Studios.

-The First 40 Characters-

Film Title:
 (14 Characters max.
 Often Abbreviated. If
 3D, "3D" in title.)

**Aspect
 Ratio:**
 F = Flat
 (1998 x 1080)
 S = Scope
 (2048 x 858)

**Territory and
 Rating:**
 (See Appendices 2
 and 2a.)
Feature:
 G, PG, 13, R, NC
Trailer:
 GB = Green Band
 RB = Red Band

NAME-OF-MOVIE_TLR-2_F_EN-XX_US-GB_51

Content Type and Version:
 (6 characters max.)

FTR = Feature
 TLR-1 = Trailer # 1
 RTG-F = Rating Tag for Feature
 RTG-T1 = Rating Tag for Trailer # 1
 TSR-1 = Teaser # 1
 POL = Policy
 PSA = Public Service Announcement
 ADV = Advertisement
 SHR = Short
 XSN = Transitional
 TST = Test

**Language:
 Audio &
 Subtitle**
 (See Appendices
 1 and 1a.)

**Audio
 Type:**

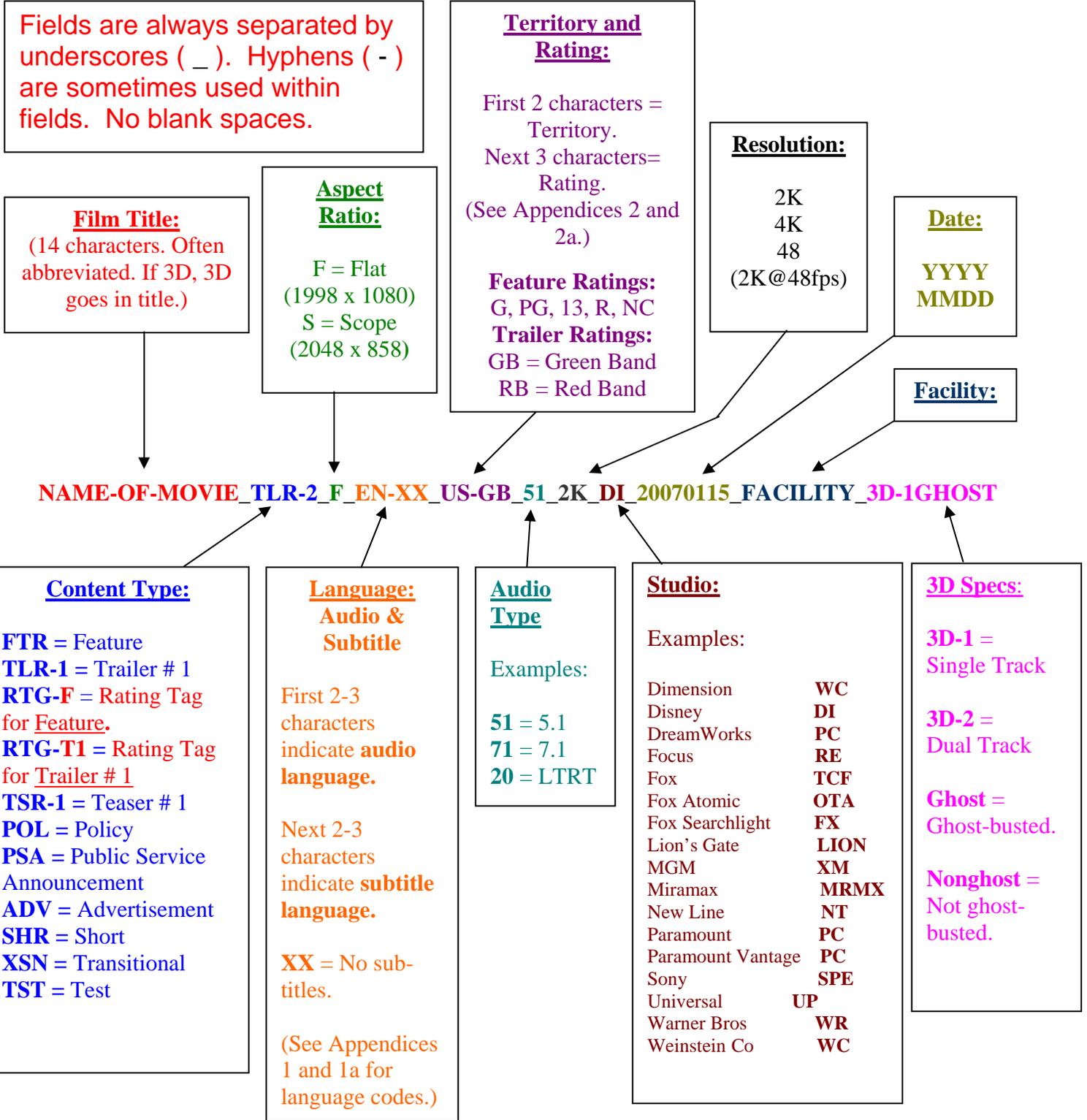
Examples:
 51 = 5.1
 71 = 7.1
 20 = LTRT

Important Tip:

The Content type and
 Version helps
 differentiate between
 the feature, its trailers,
 the trailer's rating tag,
 etc. Remember the
 "F" or the "T" after
 "RTG"!

Digital Cinema Naming Convention V.99a

Unabridged Easy Guide



Appendix 1: Language Codes by Code

Example: EN-FR (English Audio with French Subtitles)

The first language code (“EN” in our example) represents the [audio language](#). The second language code (FR) represents the [subtitle language](#).

Occasionally, Digital Cinema Packages will have two subtitle languages.

Example: GSW-FR-IT (Swiss German audio with French and Italian subtitles.)

Subtitles are either generated in the theatre by the Digital Cinema projector, or are burned into the image by the studio. If the Language Code is UPPER CASE, the sub-titles are generated in real time by the projector. If the Language Code is lower case, the subtitles are burned into the image already.

(Most of the language codes used in the Naming Convention are taken from ISO 639-1, 639-2, and 639-3. If you are looking for a language that is not on the list in the following pages, refer to the ISO website: www.iso.org.)

Frequently Used Language Codes Sorted by Code

March 1, 2007

(Based on ISO 639-1, 639-2, and 639-3 codes¹)

ABBREVIATION	LANGUAGE
ALB	ALBANIAN
AR	ARABIC
ARA	ARABIC
BG	BULGARIAN
BOS	BOSNIAN
BS	BOSNIAN
BUL	BULGARIAN
CA	CATALAN
CAT	CATALAN
CES	CZECH
CMN	CHINESE – MANDARIN PRC (Audio only)
CS	CZECH
CZE	CZECH
DA	DANISH
DAN	DANISH
DE	GERMAN
DEU	GERMAN
DUT	DUTCH
EL	GREEK
ELL	GREEK
EN	ENGLISH
ENG	ENGLISH
ES	CASTILIAN
EST	ESTONIAN
ET	ESTONIAN
FI	FINNISH
FIN	FINNISH
FR	FRENCH
FRA	FRENCH
FRE	FRENCH
GER	GERMAN
GRE	GREEK
GSW	SWISS GERMAN
HE	HEBREW
HEB	HEBREW

¹ Language codes in Red are not currently represented in the ISO standard, but are suggested for this Naming Convention.

HI	HINDI
HIN	HINDI
HR	CROATIAN
HRV	CROATIAN
HU	HUNGARIAN
HUN	HUNGARIAN
ICE	ICELANDIC
IND	INDONESIAN BAHASA
IS	ICELANDIC
ISL	ICELANDIC
IT	ITALIAN
ITA	ITALIAN
JA	JAPANESE
JPN	JAPANESE
KO	KOREAN
KOR	KOREAN
LAS	LATIN AMERICAN SPANISH (This conflicts with the 639-3 code for Lama, one of 39 languages spoken in Togo. We are keeping it in this naming convention for Latin American Spanish, however, due to its widespread use in film distribution.)
LAV	LATVIAN
LIT	LITHUANIAN
LT	LITHUANIAN
LV	LATVIAN
MSA	MALAY BAHASA
NAN	CHINESE - TAIWANESE (Audio only)
NL	DUTCH
NLD	DUTCH
NO	NORWEGIAN
NOR	NORWEGIAN
PL	POLISH
POL	POLISH
POR	PORTUGUESE - EUROPEAN
PT	PORTUGUESE - EUROPEAN
QBP	PORTUGUESE - BRAZILIAN
QFC	FRENCH CANADIAN
QMS	CHINESE - MANDARIN SIMPLIFIED (Subtitles only)
QMT	CHINESE - MANDARIN TRADITIONAL (Subtitles only)
QSA	ARGENTINIAN SPANISH
QSM	MEXICAN SPANISH
QTM	CHINESE - TAIWANESE MANDARIN (Audio only)
RO	ROMANIAN
RON	ROMANIAN
RU	RUSSIAN
RUM	ROMANIAN
RUS	RUSSIAN
SCC	SERBIAN
SCR	CROATIAN
SK	SLOVAK
SL	SLOVENIAN
SLK	SLOVAK



SLO	SLOVAK
SLV	SLOVENIAN
SPA	CASTILIAN
SQ	ALBANIAN
SQI	ALBANIAN
SR	SERBIAN
SRP	SERBIAN
SV	SWEDISH
SWE	SWEDISH
TA	TAMIL
TAM	TAMIL
TE	TELUGU
TEL	TELUGU
TH	THAI
THA	THAI
TR	TURKISH
TUR	TURKISH
UK	UKRAINIAN
UKR	UKRAINIAN
VI	VIETNAMESE
VIE	VIETNAMESE
VLS	FLEMISH
YUE	CHINESE - CANTONESE

Appendix 1a: Language Codes by Language

Frequently Used Language Codes

Sorted by Language

March 1, 2007

The language codes are based on ISO 639-1, 639-2, or 639-3 codes. When a 2 character 639-1 code is available, this is the preferred code. Codes in blue represent a code change from earlier versions of the Naming Convention Easy Kit due to clarifications, or to conflicts discovered with the recently released 639-3 code. Codes beginning with “Q” are not represented in the ISO Standard, but are named using the 639-2 methodology for additional languages. “LAS”, representing Latin American Spanish, is a special case in that LAS represents Lama (spoken in Togo) in the 639-3 codes. Due to the widespread use of “LAS” as Latin American Spanish in Film Distribution, however, we have chosen to keep it as Latin American Spanish for purposes of this convention.

LANGUAGE

ALBANIAN	SQ
ARABIC	AR
BAHASA INDONESIA	IND
BAHASA MALAY	MSA
BOSNIAN	BS
BULGARIAN	BG
CATALAN	CA
CHINESE - CANTONESE	YUE
CHINESE - MANDARIN PRC	CMN (Use for <u>Audio</u> only)
CHINESE - MANDARIN SIMPLIFIED	QMS (Use for <u>Subtitles</u> only!)
CHINESE - MANDARIN TRAD.	QMT (Use for <u>Subtitles</u> only!)
CHINESE - TAIWANESE	NAN (Use for <u>Audio</u> only!)
CHINESE - TAIWANESE MANDARIN	QTM (Use for <u>Audio</u> only.)
CROATIAN	HR
CZECH	CS
DANISH	DA
DUTCH	NL
ENGLISH	EN
ESTONIAN	ET
FINNISH	FI
FLEMISH	VLS
FRENCH	FR
FRENCH CANADIAN	QFC
GERMAN	DE
GREEK	EL
HEBREW	HE
HINDI	HI
HUNGARIAN	HU
ICELANDIC	IS
INDONESIAN	IND
ITALIAN	IT



JAPANESE
KOREAN
LATVIAN
LITHUANIAN
MALAY
NORWEGIAN
POLISH
PORTUGUESE - BRAZILIAN
PORTUGUESE - EUROPEAN
ROMANIAN
RUSSIAN
SERBIAN
SLOVAK
SLOVENIAN
SPANISH - ARGENTINIAN
SPANISH - CASTILIAN
SPANISH - LATIN AMERICAN

SPANISH - MEXICAN
SWEDISH
SWISS GERMAN
TAMIL
TELUGU
THAI
TURKISH
UKRAINIAN
VIETNAMESE

JA
KO
LV
LT
MSA
NO
PL
QBP
PT
RO
RU
SR
SK
SL
QSA
ES

LAS (LAS conflicts with 639-3 code for LAMA, one of 39 languages spoken in Togo. We are keeping it in this Naming Convention for Latin American Spanish, however, due to its widespread use in film distribution.)

QSM
SV
GSW
TA
TE
TH
TR
UK
VI



Appendix 2: Territory Codes by Code

The territory and rating field in the Naming Convention consists of two to five characters. The first two characters indicate the release territory. They are based on ISO 3166-1 country codes. The next 3 characters indicate the local rating, if one exists. For example, “US-13” would indicate: US territory with a feature rating of PG-13. For US trailers, “GB” indicates Green Band; “RB” indicates Red Band. “GB” indicates that the trailer has been approved for all audiences by the MPAA, but does not indicate the rating of the advertised feature.

US Ratings

G	=	G
PG	=	PG
13	=	PG-13
R	=	R
NC	=	NC-17

Note: Although “XX” is often used in the Language field to indicate “No Subtitles”, XX is not used in the Ratings field to indicate “No Rating”, since this might be confused as an “X” rating.



Frequently Used Territory Codes

Sorted by Code

March 1, 2007

AE	U.A.E.
AL	ALBANIA
AR	ARGENTINA
AT	AUSTRIA
AU	AUSTRALIA
BA	BOSNIA/HERZ
BE	BELGIUM
BG	BULGARIA
BH	BAHRAIN
BO	BOLIVIA
BR	BRAZIL
BY	BELARUS
CA	CANADA
CH	SWITZERLAND
CL	CHILE
CN	CHINA
CO	COLOMBIA
CS	SERBIA
CZ	CZECH REP
DE	GERMANY
DK	DENMARK
DU	DUBAI
EC	ECUADOR
EE	ESTONIA
EG	EGYPT
ES	SPAIN
FI	FINLAND
FR	FRANCE
GR	GREECE
GT	GUATEMALA
HK	HONG KONG
HR	CROATIA
HU	HUNGARY
ID	INDONESIA
IE	IRELAND
IL	ISRAEL
IN	INDIA
IS	ICELAND
IT	ITALY
JO	JORDAN
JP	JAPAN
KE	KENYA
KR	SOUTH KOREA



KW KUWAIT
KZ KAZAKHSTAN
LB LEBANON
LT LITHUANIA
LU LUXEMBOURG
LV LATVIA
ME MONTENEGRO
MX MEXICO
MY MALAYSIA
NL NETHERLANDS
NO NORWAY
NZ NEW ZEALAND
OM OMAN
PA PANAMA
PE PERU
PH PHILIPINES
PK PAKISTAN
PL POLAND
PT PORTUGAL
PY PARAGUAY
QA QATAR
RO ROMANIA
RU RUSSIA
SA SAUDI ARABIA
SE SWEDEN
SG SINGAPORE
SI SLOVENIA
SK SLOVAKIA
TH THAILAND
TR TURKEY
TT TRINIDAD
TW TAIWAN
UA UKRAINE
UK UNITED KINGDOM
US USA
UY URUGUAY
VE VENEZUELA
VN VIETNAM
ZA SOUTH AFRICA

Appendix 2a: Territory Codes by Country

Frequently Used Territory Codes

Sorted by Country

March 1, 2007

ALBANIA	AL
ARGENTINA	AR
AUSTRIA	AT
AUSTRALIA	AU
BAHRAIN	BH
BELARUS	BY
BELGIUM	BE
BOLIVIA	BO
BOSNIA/HERZ	BA
BRAZIL	BR
BULGARIA	BG
CANADA	CA
CHILE	CL
CHINA	CN
COLOMBIA	CO
CROATIA	HR
CZECH REP	CZ
DENMARK	DK
DUBAI	DU
ECUADOR	EC
EGYPT	EG
ESTONIA	EE
FINLAND	FI
FRANCE	FR
GERMANY	DE
GREECE	GR
GUATAMALA	GT
HONG KONG	HK
HUNGARY	HU
ICELAND	IS
INDIA	IN
INDONESIA	ID
IRELAND	IE
ISRAEL	IL
ITALY	IT
JAPAN	JP
JORDAN	JO
KAZAKHSTAN	KZ
KENYA	KE
KUWAIT	KW



LATVIA	LV
LEBANON	LB
LITHUANIA	LT
LUXEMBOURG	LU
MALAYSIA	MY
MEXICO	MX
MONTENEGRO	ME
NETHERLANDS	NL
NEW ZEALAND	NZ
NORWAY	NO
OMAN	OM
PAKISTAN	PK
PANAMA	PA
PARAGUAY	PY
PERU	PE
PHILIPINES	PH
POLAND	PL
PORTUGAL	PT
QATAR	QA
ROMANIA	RO
RUSSIA	RU
SAUDI ARABIA	SA
SERBIA	CS
SINGAPORE	SG
SLOVAKIA	SK
SLOVENIA	SI
SOUTH AFRICA	ZA
SOUTH KOREA	KR
SPAIN	ES
SWEDEN	SE
SWITZERLAND	CH
TAIWAN	TW
THAILAND	TH
TRINIDAD	TT
TURKEY	TR
U.A.E.	AE
UKRAINE	UA
UNITED KINGDOM	UK
URUGUAY	UY
USA	US
VENEZUELA	VE
VIETNAM	VN

EXAMPLES:

Note: ISO 639.2 does not currently have a code for Latin American Spanish. In this case, “LAS” is recommended.

PIRATES-2_FTR_S_EN-LAS_US-13_51_2K_DI_20060607_TDC



(Pirates 2 Feature. Scope. English Audio with Latin American Spanish Subtitles for US. Rated PG-13. 5.1 Audio. 2K Resolution. Disney. Packaged on June 7, 2006 at Technicolor Digital Cinema.)

PIRATES-2_RTG-F_S_EN-LAS_US-13_51_2K_DI_20060607_TDC

(Pirates 2 Feature Rating Tag. Scope. English Audio with Latin American Spanish Subtitles for US. Rated PG-13. 5.1 Audio. 2K Resolution. Disney. Packaged on June 7, 2006 at Technicolor Digital Cinema.)

PIRATES-2_TLR-2_F_EN-LAS_US-GB_51_2K_DI_20060415_TDC

(Pirates 2 Trailer 2. Flat. English Audio with Latin American Spanish Subtitles for US. Green Band trailer. 5.1 Audio. 2K Resolution. Disney. Packaged on April 15, 2006 at Technicolor Digital Cinema.)

PIRATES-2_RTG-T2_F_EN-LAS_US-GB_51_2K_DI_20060415_TDC

(Pirates 2 Rating Tag for Trailer 2. Flat. English Audio with Latin American Spanish Subtitles for US. Green Band. 5.1 Audio. 2K Resolution. Disney. Packaged on April 15, 2006 at Technicolor Digital Cinema.)

MANOFTHEYEAR_FTR-V2_S_EN-XX_US-13_51_2K_UP_20061006_TDC

(Man of the Year Feature, Version 2. Scope. English Audio with no subtitles for US. Rated PG-13. 5.1 Audio. 2K Resolution. Universal. Packaged on October 6, 2006 at Technicolor Digital Cinema.)

CHICKNLITTLE3D_FTR_F_GSW-FRE-ITA_CH_51_2K_DI_20060315_TDC_3D-1ghost

(Chicken Little 3D Feature. Flat. German Audio with French and Italian Subtitles for Switzerland. 5.1 Audio. 2K. Disney. Packaged on March 15, 2006 at Technicolor Digital Cinema. Single Track 3D. Ghost-busted.)

REFERENCES:

International Organization for Standardization (ISO) – see <<http://www.iso.org>>:

ISO 639-1:2002 Codes for the representation of names of languages -- Part 1: Alpha-2 code

ISO 639-2:1998 Codes for the representation of names of languages -- Part 2: Alpha-3 code

ISO 3166-1:2006 Codes for the representation of names of countries and their subdivisions -- Part 1: Country codes

ISCI (Industry Standard Commercial Identifier) codes are assigned and maintained by the American Association of Advertising Agencies – see <<http://www.aaaa.org>>