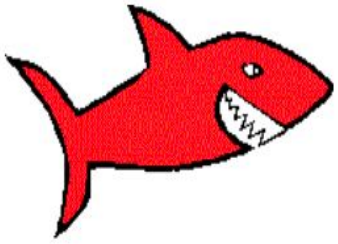

Project Setup Guidelines

Acknowledgments
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Version
This is Version 1.0 of this document. This is the NTSC version of this document.

The post production path
Decisions made in pre-production have a fundamental effect on the nature of the overall post production route. The choices that are made regarding the way that dailies are sunk, viewed and transferred to tape, will have a number of implications for both picture and sound editorial departments in terms of working methods, quality, scheduling, and cost.

The following questions need to be answered before you start:

What are the footage estimates for printed or selected takes? How much Lightworks storage will be required to digitize this amount of footage? (Storage is measured in gigabytes of disk space.)
What picture quality is required on the Lightworks? Higher picture and sound quality use up more disk space. Picture quality is measured in minutes per gigabyte. (See below for information on how to calculate storage requirements.) Will film be printed?
Will film dailies need to be screened with track? Where will syncing up take place?
This can happen:

1. in the editing room prior to telecine using traditional film methods (you would use this method if film dailies need to be screened with track).
2. in telecine.
3. in the editing room after telecine, using Lightworks. Will a database be created during the telecine transfer of dailies? Will this database contain a separate event for each take, or will additional work need to be done in the editing room before it can be used for the batch digitizing of dailies? See below for a further discussion of telecine issues. Is pro sound quality required in Lightworks? Do you intend to use playouts of Lightworks audio for test screenings or final audio? Sound quality will depend on:
4. the method and tape formats during the transfer of original production audio to the digitizing source tapes.
5. the way the Lightworks is configured for sound. Pro sound uses up twice as much disk space as

edit quality sound.
See below for more information about audio.

Many of the above questions are interrelated. Choosing one option will tend to rule out others, but open up another range of possibilities.

For a detailed discussion of the pros and cons of the various approaches, refer to “Sound for Film In A Non-Linear Environment”, section 4.3.

Estimates for storage requirements
Determine picture and audio qualities. Higher picture and sound quality require more storage. (Most feature films to date have used 40 or 50 minute per gigabyte quality and edit quality sound -- you may want to run your own tests).

Estimate storage requirements in gigabytes based on production budget for feet of film to be printed. Additional storage requirements for B neg, music and sound effects should amount to 10 or 15 percent of budgeted film to be printed.

Example
Show "X" has budgeted 200,000 feet of 35mm film to be printed. It is assumed that storage for B-negative, opticals, music and sound effects has been estimated at 15 percent of the above figure. So in this case, you need to multiply the estimate for printed takes by 1.15 to get an overall footage.

total film budgeted (feet) x 1.15 = estimated footage

Now you need to convert this figure from feet to minutes. 35mm film runs at 90 feet per minute , so divide the estimated footage by 90:

estimated footage ÷ 90 = estimated minutes of footage

You have chosen to digitise at 50 minutes per gigabyte quality, so in order to find out the total number of gigabytes of hard disk space required, divide the total estimated minutes by 50:

estimated minutes of footage ÷ digitising quality = Gigabytes required

Summary
Total film budgeted (feet) x 1.15 = estimated footage Estimated footage ÷ 90 = estimated minutes of footage Estimated minutes of footage ÷ quality = Gigabytes required

200,000'x 1.15 =230,000'
230,000' ÷ 90'per minute =2556 minutes

2556 minutes ÷ 50 minute quality =51.1 Gb required

Picture and Pro quality sound
Gigabytes required x 1.163 for 48 kHz pro audio 1.111 for 44.1 kHz pro audio
1.107 for 32 kHz pro audio

For “Pro audio” recommendations on NON-TURBO Lightworks machines call Lightworks/USA
Digitising with a letterbox matte does not provide any significant storage savings and is not recommended. However, letterbox settings can be used after digitising in projects intended for editing only to alter the aspect ratio of viewers and tiles. Doing this allows you to more closely replicate the finished film frame and saves screen space.

Audio considerations
Will transfers of production audio be made to a primary or intermediate medium?

Transfers made to primary media are those which preserve the quality of the original recording. DAT, ADAT, DA88, Dolby SR encoded mag, and videotape ‘Hi-Fi’ tracks are considered primary media.

Transfers made to intermediate media degrade the quality of the original recording. Videotape linear audio tracks and nonDolby SR encoded mag fall into this category. Digitizing from intermediate audio source will result in...

1. lesser sound quality (possibly resulting in more work for preview screenings)
2. additional sound transfer costs Digitizing from a primary audio source will result in...
3. Improved sound quality, and the option of using Lightworks audio for temp mixes or final audio.
4. Reduced workload for preview screenings, reduced assistant hours.
5. Potentially increased telecine cost.

Productions which intend to digitise directly from field DATs or 1/4” tapes for purposes of syncing in the Lightworks should first consult Lightworks Customer Support.

What are the input audio settings to be used on the Lightworks?

1. Input audio quality (Pro or Edit)
2. Input audio sampling rate - 48kHz, 44.1kHz, 32kHz If edit quality audio is chosen, the sampling rate is halved (24kHz, 22.05kHz and 16kHz).
3. Input audio type (analog, AES/EBU digital, or SPDIF digital)

Projects wanting to use Lightworks audio for test screenings or final audio will generally use Pro quality at 48kHz. However, many of our feature film users have found that Lightworks edit quality sound is adequate for use in temp mixes provided that the audio has been digitised from a primary source.

How are edit decision lists, audio playouts, cut tracks and sound files to be presented to the sound editors? Discussions should be held with the sound editors to determine a scheme for getting information out of the Lightworks and into sound editorial. See Sections 6 & 7 of “Sound for Film In A Non Linear Environment”. Also, “Playing out Lightworks Digital Audio to DAT” and “The Sound Editors Guide to the Lightworks”.

Audio Timecode

The timecode standard used in the transfer of film dailies should match that used to record production audio. It is recommended that location sound recordists should use 30fps Non Drop frame timecode when recording to either 1/4” or DAT.

Productions which intend to use drop frame time code as a video tape time code standard should consider recording sound with drop frame time code.
See p.13 of “Sound for Film In A Non-Linear Environment”

Telecine Setup

Most shows that encounter problems with their EDLs and cutlists do so because sufficient care has not been taken in setting up telecine. This is an area where cutting costs and corners can have serious and expensive consequences.

Telecine logging databases

The accuracy of the telecine logging database is crucial to the film cutting process. Numbers that are not accurate will cause problems in the CUTLIST and CHANGELIST programs. Audio EDLs will also be affected.

2:3 pulldown

A large number of transfers are done in sequence 0 - putting ‘A’ frames on timecodes ending in 0 and 5 consistently throughout the tape. This makes it easier for Lightworks assistants to identify any problems with their tapes or errors in the telecine logging database. It also means that telecine personnel are more likely to get immediate notification if and when a problem arises.

However, as far as the Lightworks is concerned, it is not critically important if the sequence number changes from one take to another on a dailies tape, provided that the sequence is noted accurately in the telecine logging database. If variations in sequence are noted, then Lightworks can make the necessary adjustments for each take automatically during digitising.
For more information about 2:3 pulldown refer to "The Lightworks Assistants Guide To Telecine”

Timecode

For telecine transfers in the NTSC environment, the following timecode conventions should be observed:

The timecode standard used in the transfer of film dailies should match that used to record production It is preferred that this be NON DROP FRAME, since this will mean that A frames will fall consistently on

the same timecode numbers throughout a recording. If drop frame timecode is used, then it becomes difficult to identify the pulldown sequence from the tape. Should the sequence information in the telecine logging database be incorrect (and this is a common failing), then it will be necessary for the assistant to figure out the sequence and correct the database by hand.

Production audio should be recorded with 30fps NTSC non-drop frame timecode.
DO NOT use 24 fps timecode or 29.97 fps timecode. Most telecine bays cannot synchronize 24 fps timecode with their film transfer machines. 29.97 fps timecode relates to video speed. Location recordings are made at film speed. The speed change occurs later, during the transfer process.

Timecode hours
Due to the SMPTE clock turning over at 23:59:59:29 (midnight), you will have repeating time codes. This is the reason for differing video tape reel numbers. It is recommended that time is rolled back to 1:00:00:00 every 20 reels instead of every 23 reels. This creates a relationship between tape numbers and time code hour (i.e., tape 001=01:00:00:00, tape 021=01:00:00:00, tape 041=01:00:00:00 and so on...).

Video tape reel numbers
Use three digit numbers to identify your video tape reels. Use numeric placeholders (your first reel will be “001” instead of “1”). Numeric searches/lists in DOS will appear in proper order if this technique is used.

Dailies Rolls
If Kem/dailies rolls with sync audio track are telecined in their entirety (without stopping at camera stops), additional preparation time will be required to break down individual takes in the Lightworks or to manually build a digitising database.

Burn in windows
It is advisable to have a burn in window for video and audio timecode, and keycode or Acmade numbers. This will provide a basis for resolving any cutting list problems. Your telecine house should put in a punch hole at the start of each dailies reel if you are transferring workprint, or at the start of each neg break if you are transferring from the negative. In this way you can easily verify the accuracy of the burn in.

For more information about telecine issues, see "The Lightworks Assistants Guide To Telecine” and “Telecine Recommendations"

Checking the information you get from
telecine
Checking your tapes
Digitise a series of shots and check that the timecode displayed on the Lightworks viewer matches the burn in window. If there is a discrepancy then it may mean that the timecode is arriving out of sync or that the burn in is incorrect. Do this in a 30 fps project, or change your project settings to 30fps before

you check timecodes in this way.

Breaks in address track LTC are a common occurrence. Lightworks can be instructed to ignore these breaks during digitising. The command is located in the pop out menu of the Record Panel.

Note: Lightworks will create a new shot at every break in timecode if the timecode break detection feature is switched on. This can be an advantage if your tapes' timecodes break between takes.

Checking your databases
Any erroneous information should be corrected and your telecine facility notified immediately with the aim of avoiding additional problems.

We recommend that you check the following:

1. Videotape timecode and KeyKode or Acmade code accuracy should be verified against the window burn at the 'in point' noted in the database.

The relationship between videotape timecode and film numbers is quite critical with regard to cutlist accuracy. The Lightworks film cutlist software uses timecode and videotape reel number as a means of cross referencing to the film numbers in the database.

2. Videotape timecode overlaps (i.e. start time overlapped by previous end time) should be eliminated in order to avoid duplicate time code numbers.

3. Sequence number.
If the 2:3 pulldown sequence on the tape is not reflected accurately in the telecine logging database then material will be digitised with incorrect sequence. Look for a smooth sequence of ABCD film frames when you play back your shots in Lightworks. If you don't see this, identify what the sequence should be by looking at the tape. The database can be corrected by hand (remember to save your work often) and the shot in question can be redigitised.

Note: shots which are digitised with incorrect sequence will cause errors in film cutlists.

See the "Lightworks Assistant's Guide to Telecine" for more information on how to identify and correct problems related to pulldown sequence

4. Audio timecode
There are generally three places this will show up: in your database/shot file card, as a burn in window on your tape, and on the smart slate. The relationship between the file card timecode and the burn-in timecode is more critical than the relationship of those numbers to the smart slate numbers. This is because there is often a 2-4 frame offset between the timecode on the Nagra and the timecode on the smart slate. If, however, the timecode the Lightworks expects to see doesn't match the timecode on the

burn-in window, you should speak with your telecine house to verify which timecode is correct. See “Sound For Film in a Non-Linear Environment” section 5.1 for more advice on how to verify the accuracy of your audio timecode numbers.

5. Acmade code format
Lightworks cutting list software will expect to see Acmade numbers with an 8 digit prefix, 4 digit footage count and 2 digit frame count. If you have a prefix of only three or four characters, then the deficit should be made up with underscores. So a typical entry in a Lightworks database might look like this: 001_____1025+07
6. Scene and take info

7. Camera roll and sound roll numbers

Project Organisation
Projects should be kept at a reasonable size in order to optimize system performance. On standard Lightworks systems, an upper limit of approximately 1500 records should be observed. Lightworks Turbos are capable of handling much larger projects. Note that some hard disk defragmentation programs cannot be run on directories containing more than 3000 records. If you wish to break down your film into several projects, you may want to refer to the guidelines below:

Script
Feature films 20-25 pages per project

This will break the film up into approximately 2000ft reels, based on the assumption that a page of script equals one minute of screen time.

Television 30-35 pages per project

Ultimately your show, whether a 90 minute MOW, a 60 minute episodic, or a 30 minute sit-com, can be conveniently broken down into 30 minute segments. Lightworks projects can be set up accordingly. Further act breakdowns can be made within projects.

Note: There should only be one project on the system when it arrives in your editing room. It should be named ‘Default’ or display a ‘cookie number’ of P0001000). Do not delete this project under any circumstances.

Storage
If your requirements exceed the maximum number of towers that can be on line at any one time**, additional storage will be necessary as well as a plan to distribute your dailies over a “set” of towers. In this way, you can have all of the material for a given section of the film on-line at once. Estimates for additional storage need to be made well in advance of shooting and can be made based on the total amount of film expected and number of script pages. See the following example which uses some of the

calculations from the earlier section “Estimates for storage requirements”(p.2).

Show “X” has estimated footage of 230,000’ and a 120 page script. To determine the number of feet per page... 230,000’ ¸ 120 = 1917’ per page

To determine total minutes of film...
per page ¸ 90 = 21.3 minutes of film per page

To determine total gigabytes of storage required for each page... minutes of film per page ¸ 50 minute quality = 0.43 gigabytes per page.

Using the above estimates of script pages per project you can now formulate an estimate of gigabytes required per project... gigabytes per page X 20 script pages per project = 8.6 gigabytes per project.

This will give you a resonable estimate. However, excessive shooting, action scenes or multi-camera shoots may require additional storage.

Creating a digitising project/database management Accompanying each day's dailies will be a telecine logging database on a floppy disk. Some telecine houses are now producing finished Lightworks databases (these have the DOS file extension .odb) which can be accessed directly from floppy using the ‘load from’ command in the logging database panel. You may also receive your databases in the form of a flex (.flx) , keylog (.ftl or .asc) or other file. These files can be converted into Lightworks databases using one of the Lightworks conversion utilities and saved to your project.

It is advisable to create a separate project for digitising. This will mean that the databases for the entire show will all reside in a single place. This makes it easier to check the databases for errors, and means that any modifications that you make need only be done once.

Dailies will be digitised in this project and then subsequently moved to the appropriate project for editing. This greatly speeds up the digitising process since a tape containing material from a wide range of scenes can be digitised in one pass.

Later it will be necessary to merge the databases into a single file using the Addlog program.

Name projects by scene
The project name is often referenced in the utility programs (e.g. Addlog) that are used in conjunction with the main Lightworks program. Naming your projects by scene reduces the need for crossreferencing to a code book to see which scenes are in which projects.

Note project cookie number/SNOOP
Each project created on the Lightworks is totally independent. Shots, edits and material cannot be accessed across project boundaries. If common material is to be used in multiple projects it can be copied

or digitised into any desired project. Lightworks can also move shots and edits between projects safely and easily.

In order to see a list of projects with their cookie numbers, type ‘snoop’ at the Lworks prompt. At this point, you also have the option of creating a file which lists all shots, ghosts, edits and galleries within a specific project. The snoop file will include DOS level information i.e. file names, dates and sizes.

Project details card
Film/TV and time code standards
NTSC
Expresses the running time of edits in non-drop frame time code. Timecode will not correspond to actual clock times. Suitable for:
Television video tape shoot
Television film shoot which NEVER intends to cut the negative NTSC_drop
Expresses the running time of edits in drop frame time code. Timecode will correspond to actual clock times.
Suitable for:
Television video tape shoot
Television film shoot which NEVER intends to cut the negative **NTSC_24**
Expresses the running time of edits in feet and frames or non drop frame timecode.
Suitable for:
Television film shoot which intends to cut negative Feature film
NTSC_drop_24
Expresses the running time of edits in feet and frames or drop frame time code.
Suitable for:
Television film shoot which intends to cut negative Feature film
PAL & PAL_24
Contact London office for details if working in Europe or in the PAL standard.
TIMECODE STANDARDS FOR LIGHTWORKS EDITS CAN BE CHANGED AT ANY TIME DURING EDITING. Please refer to the helpsheet on changing TV and timecode standards within a project.
For additional information regarding television and timecode standards, refer to the Lightworks recommended reading list at the end of this document.

Using more than one Lightworks system.
There are a variety of scenarios in which multiple Lightworks systems can be used on a project. If you are sharing or duplicating material, logs and edits between two or more Lightworks systems then you need to adhere to a strict procedure to avoid complications. This procedure is described in “Guidelines for Using Multiple Lightworks Systems”. You should consult this document and discuss any questions that you might have with Lightworks US Customer Support.

Before you digitise...
Check that your system disk and material drives have been cleaned out properly by your supplier.

If you there is less disk space indicated on the record panel or disk manager tool than you know is available, run the recovery program while in Lightworks software by typing Alt + Z followed by Alt + Q on the keyboard (see the Lightworks User Guide section C6.8). Lightworks will create tiles for any orphaned material files that have been stranded on the material drives. These can then be destroyed. If you still encounter problems, contact your machine supplier. 16mm film runs at 36 feet per minute. If you are budgeting for a 16mm project, divide the estimated footage by 36, not 90. You may want to read Sound For Film In a Non-Linear Environment before reading this section.
Contact Lightworks Customer Support for information on exporting Lightworks sound files directly to digital audio workstations. One shot = one continuous recording.
Project Setup Guidelines
