



PREFACE

Edifis Telecine and Tape-to-tape grading server products comprise a family of innovative and economic systems, capable of being purchased by a wide variety of users. This White Paper has been prepared as a companion to the Edifis User Manual, with those people in mind who have some experience of what transpires in a film or tape-grading suite.

The White Paper shows several system designs for using Edifis products, both at Standard and High definition resolution. Terms are highlighted as they are introduced, and defined alphabetically, in a glossary at the back of the document.



TABLE OF CONTENTS

PREFACE	1
THE EDIFIS RANGE OF TELECINE/GRADING SERVERS.....	3
Introduction.....	3
Traditional Telecine Room	4
A traditional Telecine Suite	4
Telecine	4
Colour Corrector	4
Noise & Grain Reducer	4
Still Store.....	5
Video Recorder	5
Video Switcher or Mixer.....	5
Preparing for transfer in a traditional Telecine suite	5
Choosing your Edifis system	7
Classic Brick.....	7
Sting TK	9
Graduate	10
Gradebox Tape-to-tape	14
HD Brick.....	17
Glossary of Terms	19

THE EDIFIS RANGE OF TELECINE/GRADING SERVERS

Introduction

Why do Edifis produce a range of Telecine and Tape Grading Server Systems and how do they differ from each other and what else is on the market? The detailed explanations appear in each functional area of this white paper, but by way of basic definition:

Classic Brick is a direct competitor to traditional grading suite DDRs, except that it offers a number of significant advantages over basic disk recorders. One unit can replace three different sub-systems, at the same time i.e. DDR, Still Store and Video Wipe Generator/Mixer, saving capital expenditure and complexity.

Sting TK is the original 2-channel telecine & grading server system. Having dual independent video and audio channels allows two separate users to share storage whilst each performing their own tasks. It also makes it easier to move data around the facility and reduces the need for expensive VTRs and personnel.

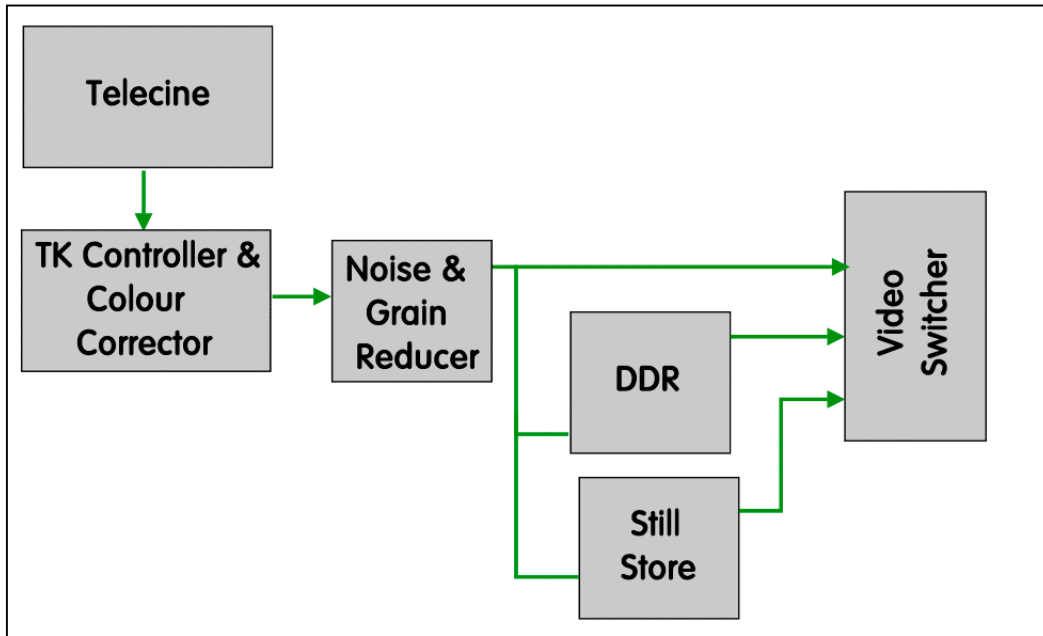
Graduate was developed from Sting TK and extends the model of dual users and processes into an integrated grading and conforming central server, seamlessly linking the telecine and on-line areas.

Gradebox was designed for tape-to-tape suites and offers the only integrated recording, grading, conforming, de-spotting and playout system on the market today. It drastically reduces the cost of grading tape by removing VTRs and speeding up all associated processes.

HD Brick is the High Definition counterpart of Classic Brick and like the SD version, makes a HD suite cheaper to run by acting as 3 devices in one; Still Store, DDR and Switcher. It also can operate any of the Edifis SD applications such as Graduate, Scratchbox, Gearbox and Gradebox making it a very cost-effective alternative to single-purpose HD DDRs or disk-arrays.

Traditional Telecine Room

In actual fact, there is no such thing as a traditional telecine room, with identical equipment and multi-purpose versatility. However, most rooms share similar types of equipment and some of those generic units are described below.



A traditional Telecine Suite

Telecine

A Telecine is a device that converts film images into video images. Most telecines have film gates available for 8mm, Super 8mm, 16mm and 35mm film and are capable of supporting 525 NTSC and 625 PAL formats. Some others are also capable of supporting HD (High Definition) and 2k data formats.

It is beyond the scope of this document to fully describe telecine design. Suffice to say that Edifis systems are compatible with all telecine systems currently on the market today.

Colour Corrector

A colour corrector interfaces with a telecine and remembers operator modified colour settings, on a scene-by-scene basis and is able to reproduce those settings, on demand and in real-time.

There are two types of colour corrector available: controllers, which record and replay the settings of the telecine's control panel and controller/processors which in addition to the controller functions, also modify the video signal, typically by digital signal processing.

It is beyond the scope of this document to fully describe colour corrector design. Suffice to say that Edifis systems are compatible with all major colour corrector systems currently on the market today.

Noise & Grain Reducer

An optional device, used to **reduce video noise** and **film grain**, by a succession of filters. Fitted on the output of a telecine, the various median, recursive and temporal filters, if incorrectly applied can cause reduction in picture sharpness and blurring.

Many clients insist upon no grain reduction in the telecine suite, preferring to have this done afterwards, in the editing or repair phase. Usually grain reducers are wired in circuit, but at a minimal setting and used on an occasional, scene-by-scene basis.

Still Store

Still stores are used to record individual video frames and replay them on demand. They are used in a telecine suite to make comparisons between reference frames recorded earlier in the session and the output of the colour corrector i.e. the scene currently being colour corrected.

Possessing limited storage, still stores are used less and less now, in preference to DDRs.

Video Recorder

Either a Video Tape Recorder (VTR) or **Digital Disk Recorder** (DDR). Typically used to record the finished, graded result of the telecine transfer session.

Many DDRs use a frame-numbering system to facilitate accurate recording and playback of single or continuous sequences of frames, meaning that the primary relationship between original timecode (or film code) and the DDR frame numbers needs to be constantly updated, by manual means. This impediment is not applicable to Edifis systems and brings some important advantages, which are discussed, later in this document.

Video Switcher or Mixer

Normally a small video mixer or switcher is employed to switch and transition (wipe, fade and dissolve) between video sources within the suite. A common use of the wipe function is to make a side-by-side comparison between a reference frame in the Still Store and the scene currently being graded.

Preparing for transfer in a traditional Telecine suite

The level of planning that is required for successful film-to-video transfer will vary from project to project but three requirements are constant:

1. Handling the film negative as little as possible
2. Optimising telecine use i.e. as little time as possible
3. Preparing for the next work process, usually on-line editing

Planning considerations

Film negative is extremely valuable. It is the original version of what was captured by the camera and may be impossible, or very expensive, to replace. Consequently, handling of developed negative should be as little as possible, because every time that the negative is loaded, unloaded, shuffled and played in the telecine it becomes susceptible to damage from dirt, scratches and other physical damage.

The preferred solution is to arrange the film rolls so that **selected takes** can be transferred to the video recorder with the minimum number of passes through the film roll, ideally the film only goes forward through the gate. This solution does require multiple videotape reels or a very large capacity disk server.

Another way to reduce time in telecine, and therefore reduce cost, is to begin transferring selected takes only, starting with what is sometimes known as an **establishing shot**. This is usually a wide shot, containing the entire scope of colour values in the following scene, and helps to ensure that colour balance is maintained across film rolls. Using an establishing shot is another way of making sure that, as the transfer proceeds, the film only moves forward except for the occasional rewind to make colour corrections and cue the in-points.

The process directly after telecine is **on-line editing**, which requires graded material from telecine to be arranged in the most suitable manner for the video editor. Much time and effort is expended on assembling material, in logical sequences, from the same camera or same days shooting as well as maximising the capacity of videotape reels.

Edifis systems have been designed to make significant improvements in the planning processes required to optimise film-to-video transfer and these are detailed in the following section

Choosing your Edifis system

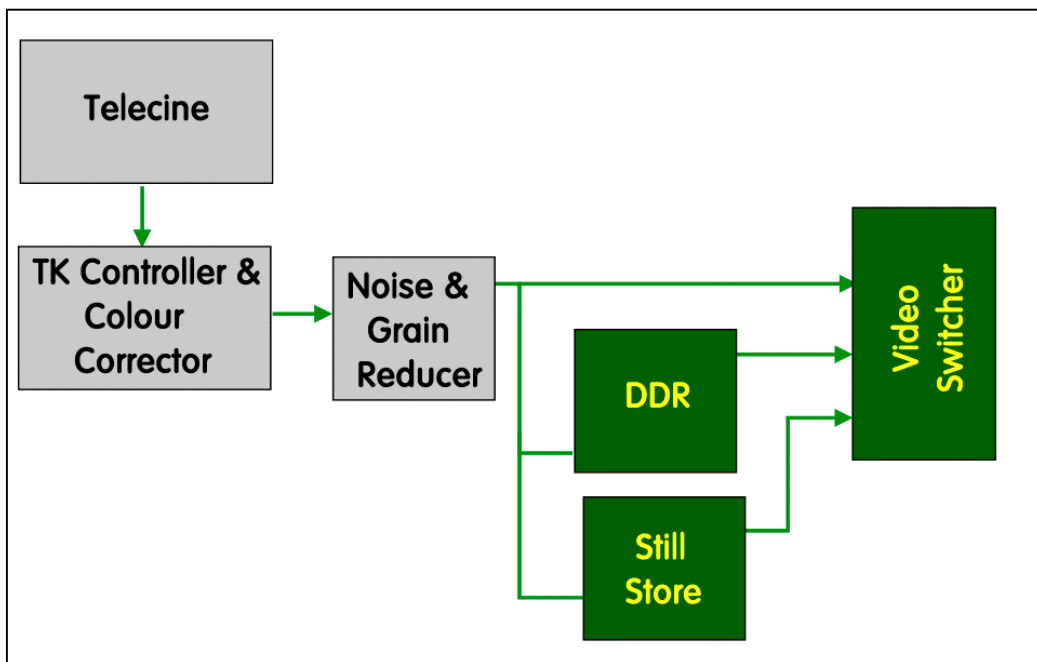
There are five telecine and tape-to-tape grading server systems available from Edifis. Starting with Classic Brick, each system can be commissioned, secure in the knowledge that it is capable of being upgraded to meet changing circumstances, such as extra storage needs, additional Inputs and Outputs and increased functionality such as restoration tools.

Classic Brick

Brick is the Edifis entry-level DDR & VTR replacement system for telecine. Its salient attributes are:

Speed

Being a true **random-access** device means that clips can be recalled, cued and played, instantly from either the Edifis or colour corrector panels, via a deterministic i.e. predictable Ethernet connection or RS 422 respectively



Classic Brick replaces DDR, Still Store & Video Switcher

Simple to record still frames

The primary interface to Classic Brick is through the colour corrector work surface. The colourist need only consider the Brick to be a VTR, albeit an extremely fast one. If the colour corrector interface is missing an easy-to-use **wipe** feature, like some Pandora systems, this functionality can be provided via the Edifis panel and a simple to use menu. The colour corrector typically uses the disk channel of Classic Brick for grabbing still frames. These are used as reference frames to compare grades for scene-to-scene continuity. Both Pandora and Da Vinci systems perform this grab function, using no pre-roll. Proxy images are stored in the colour corrector computer, full resolution images being on the Brick and are recalled by "clicking" the proxy image.

Integral Wipe Generator

Comparison of frames from different scenes can be performed using the Edifis wipe generator feature. Sources can be between Brick to external source or between two external sources. Although still frames are normally required, the wipe can be performed between moving

sources as well. The Edifis T-bar control panel is used to control the wipe, and several shapes are possible, including squares, corner wipes as well as dissolves

Chroma Keyer

A simple chroma-keyer is included to facilitate the removal of blue screens from effects shots. A background can be inserted, from disk or external video, to replace the blue screen and ease colour correction

Cost-effective

The alternatives to Classic Brick are a stand-alone Still Store plus a Wipe Generator plus a DDR. The total cost of these three items is far greater than a single unit from Edifis.

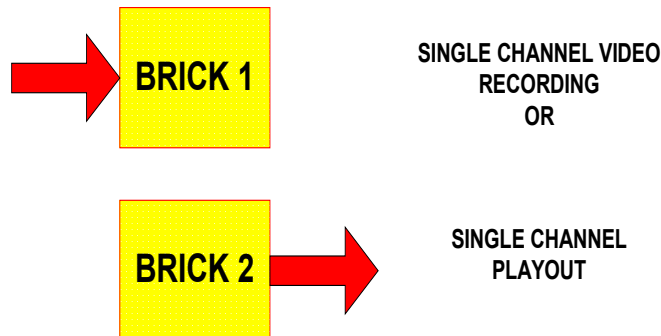
In addition, Classic Brick is the only DDR of its type, to offer as standard:

HTML Web Browser Interface

Personal computers running a Web Browser can access, and control, Classic Brick, via a network connection. Low-resolution proxy images of clips, stored at full resolution in the Classic Brick, are displayed on the user's desktop. The interface is intended for playlist creation and directory management but can also directly control the Classic Brick through transport buttons (PLAY, STOP, FORWARD ONE FRAME, BACKWARDS ONE FRAME, RE-CUE TO START OF CLIP)

AES/EBU Audio

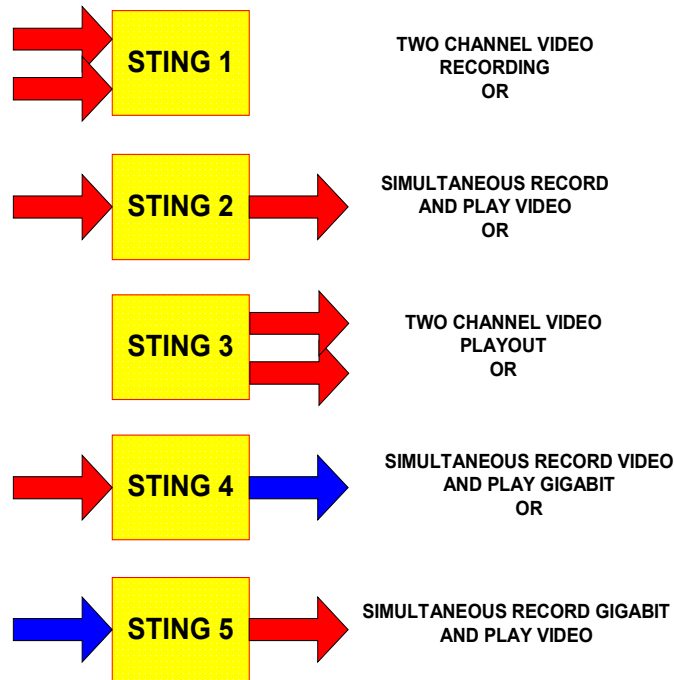
Up to 4 stereo pairs (or 8 tracks mono) of digital audio are part of the system. The Brick is a one-channel DDR, and is most similar in operation to a VTR i.e. it is either recording OR playing.



Full random access of Brick permits playlists of clips, to be run in any order, with clips of any length. Play list editing tools allow the run order to be modified, clips to be trimmed or edited and total runtimes to be visualised

Sting TK

The two video and audio I/O (input/output) streams of Sting TK are technically half-duplex i.e. they are each capable of recording material or playing that same material out depending upon the client requirement. Additionally, this I/O does not even need to be video; it could equally well be data files. Such versatility results in the system being used in any one of 5 possible configurations and sometimes even used in more than one configuration, depending upon the workflow required and the time of day. The possible combinations are shown below:



Like the Classic Brick, Sting TK can be controlled a number of ways:

Edifis T-Bar Control Panel via **10 Base T Ethernet**
 Colour Corrector via **9-pin RS 422 protocol**
 General Purpose Interface (**GPI**)
 HTML Web Browser

Normally though, the Sting TK is controlled only by the colour corrector and/or the Edifis T-Bar panel.

The most common Sting TK configuration, of the five possible, is the simultaneous record and play/conform mode. The reason for this is simple; Sting TK is the only dual-channel telecine server system available today that permits two separate job functions to be accomplished. The jobs could be as varied as:

1. Recording a new project whilst simultaneously laying-off the previous job
2. Grading, by the colourist on one channel whilst an audio editor is 'sound-synching' previously graded scenes or material on the other channel,
3. Playing out de-spotted, graded archive material at one aspect ratio (typically 4:3) to be converted by an ARC (**Aspect Ratio Converter**) to 16:9, and then simultaneously recorded back into the other channel for subsequent conforming in the Sting TK.

4. Recording data frames from 3D and 2D animation workstations, over a network, and converting them to video format for subsequent grading, in the other channel, by the colourist
5. Grading by the colourist on one channel whilst the second channel, containing the previously graded and conformed content is used as a source for on-line editing

Unique two-channel architecture

Architecturally, one channel of Sting TK may be thought of as containing all of the features of Classic Brick i.e. it is a random access DDR that also acts as a still store and wipe generator, and is controlled by a colour corrector system. It is the second channel though that makes Sting TK so cost-effective and useful.

Discontinuous time code

All Edifis telecine server systems are exceptional in that they handle discontinuous time code. What does this really mean? Well, as defined in the traditional telecine room section, DDRs designed before Sting TK operate on a frame numbering system, in which the original timecode of recorded material is lost once ingested into the DDR. Consequently, complicated and laborious techniques are invented to maintain a relationship between original timecode and DDR system timecode (actually frame numbering). This relationship may be manually updated or through additional software modules. It is not easy though.

Edifis systems, on the other hand, always maintain an internal and electronic relationship between original source **timecode** (itself referenced to **film code**) and system code, allowing the original code to be re-generated at any time. How is this useful?

In simple terms, material recorded can be played out in any order, whilst maintaining original timecode. This one feature has an enormous impact on film-to-video transfer planning, which has traditionally been a compromise between minimising handling of the negative, maximising the video recorder capability with the minimum number of film passes and optimising the videotape reels for conforming, or arranging, the material for subsequent on-line editing.

Typically in film grading, one channel of Sting TK is used to record successive, complete graded shots. These are recorded, consecutively into the channel timeline. Each shot has its own individual timecode. Conforming these clips into the right order is accomplished by use of a special function called "Fragment", which isolates the shots with their timecode, and is able to manually or automatically if desired, play them out to order.

Recording in any order, regardless of EDL restrictions

Allowing selected takes to be recorded in any order, immediately makes life simpler. The film roll still only moves forward, keeping film handling to a minimum, but the required clips are recorded regardless of where they will occur in the finished feature. There is no need for multiple videotapes to record the graded clips, which saves both tape stock but also VTR maintenance costs. There is no clumsy, manual relationship between original timecode and system timecode because the Edifis system makes each timecode transparent to the other.

All of the material can be recorded in a **freeform** manner in whatever order suits the colourist and assistant because, once the content is recorded into an Edifis, it will quickly and easily be reassembled into any order that is required for on-line editing or elsewhere. This could be final programme order or the clips arranged in ascending timecode order. Maybe date of grading or size, either are also possible.

Graduate

Graduate is a high capacity, uncompressed video & audio, dual channel telecine system, built upon a foundation of Sting TK. The two independent channels allow two separate tasks to be undertaken simultaneously e.g.

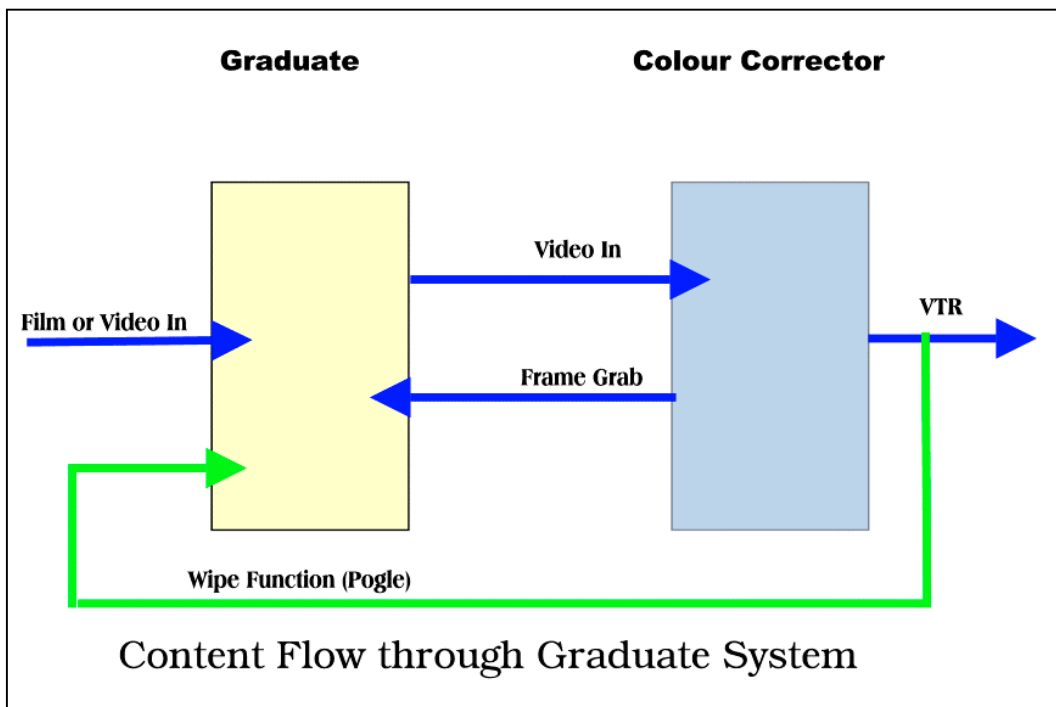


1. Grading on one channel whilst conforming an EDL on the other channel
2. Recording telecine rushes on one channel whilst the second channel is used as a video guide track by a **Digital Audio Workstation** (DAW) i.e. synchronising dailies
3. Laying off to VTR or another application a finished project whilst simultaneously Recording the next project to be undertaken

The central premise of Graduate is that it allows the colourist freedom to work in a manner that is not solely dictated by the **EDL**, created in Offline, and the flexibility to present his finished work to either client or online edit suite in whichever form they require.

In addition to the freedom and flexibility achieved, there are also many financial advantages to be gained by utilising Graduate in telecine.

Preparing for telecine transfer



In order to maximise efficient use of telecine transfer time and hence lessen the overall cost, it is normally necessary to pre-establish the correct order for the transfer of film rolls to video. This lessens the number of times a film roll is loaded, unloaded, shuttled and played because each time a film roll is passed through a telecine it acquires dirt and suffers damage. Consequently, much thought is directed to planning the minimum number of film passes, even if it means having a large number of destination videotapes to conform to the EDL and on-line editing requirements.

Establishing the correct colour balance and maintaining it over all film rolls is a lengthy process, so the colourist usually begins the film transfer with an "Establishing" or master shot. This master shot contains the entire range of tonal values in the scene and which are likely to be referred back to for subsequent colour grading.

After transfer of the master shot begins the process of transferring the many rolls of film required that form part of a finished project. Only selected takes on each roll will be graded by the colourist but special consideration is given to minimising the amount of time each roll is spooled up in the telecine, to lessen damage, but also to its destination video device. If the device is a VTR, the common limitation is the reel length and the time taken to spool material from one end of the tape to the other. If it is a disk recorder, the usual characteristic is of low storage capacity and the high cost of uncompressed storage.

Graduate overcomes the limitations of VTR spool time because it is a true random-access hard disk recorder, which means any clip or frame on the disk can be loaded instantly when selected. It also overcomes the limitations of low capacity uncompressed storage because Edifis have revolutionised the advent of telecine systems with typically 6 hours storage and above, more than enough capacity for 3 or more feature films.

Also, Graduate releases the colourist from the tyranny of the EDL, which forces them to plan in minute detail just how, and in what order, they will transfer film through the telecine. Selected takes can be transferred, in any order, into Graduate and conformed "On the fly" to the client's wishes. This is because Graduate allows recording of material with "discontinuous" timecode; the only system available to do so.

Grading

Once the colourist commences grading i.e. adjusting the geometry and colour of the film according to the client's wishes it is necessary to match various scenes to others, according to the Edit Decision List. This is accomplished with the aid of a colour correction controller and video colour processor system.

Amongst the ancillary equipment required in the telecine suite are Still Stores which are used to make side-by-side comparisons between stored reference frames recorded earlier in the transfer session and the scene currently being colour corrected.

A small mixer or switcher is also necessary to facilitate the side-by-side wipes, normally horizontal, vertical, diagonal and box patterns and works in conjunction with the Still Store.

Graduate interfaces via the RS422 level to all major colour correction controllers such as those from Pandora and Da Vinci amongst others and works closely with other manufacturers to deliver interfaces that reflect the functionality of both Graduate and the control system.

Because Graduate comes complete with its own wipe generator tools, and because reference frames and recorded clips can be stored in one timeline, it is unnecessary to purchase a dedicated Still Store and telecine switcher, resulting in substantial cost savings to the new facility especially.

Conforming

A great deal of effort and time is spent within telecine areas to ensure that film transferred to video has an accurate relationship between film edge numbers and video time code. This relationship has to be maintained throughout the transfer, grading, assemble editing and lay back processes.

Graduate is transparent to the original film edge to video time code relationship and ensures that original source time code remains unaltered no matter what. Its ability to automatically record discontinuous time code i.e. all of the select takes from roll 10, then all select takes from roll 4 and so on; mean that it is very simple and quick to batch load a large number of film rolls. Even non-monotonic (not in ascending or descending time code order) and duplicate time codes can be recorded.

As recording or grading is undertaken, it is very simple to simultaneously re-conform the recorded clips into whatever order is required. Maybe the telecine client wants to see a **rough-cut** of the work-in-progress, or maybe the material has to be conformed prior to On-line editing. Graduate is a recording device that allows clips or events to be rescheduled exactly how they need to be, and not just how the EDL states.

No other telecine server system available today:

1. Is capable of performing two jobs at the same time

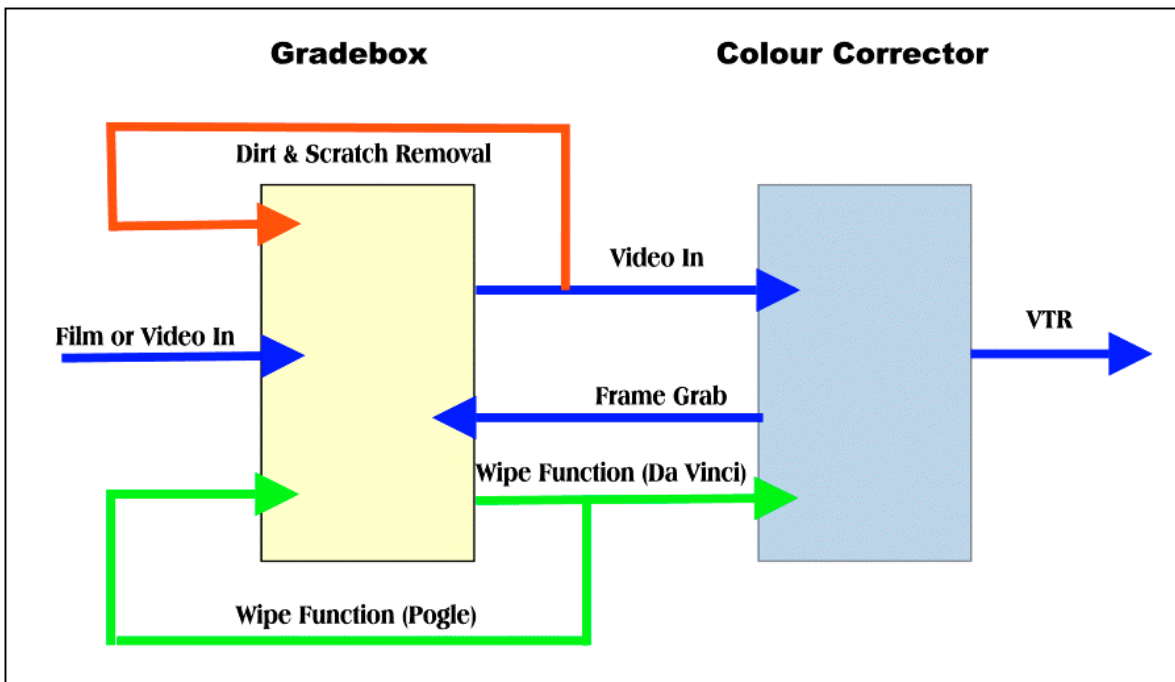
Edifis Telecine Products

2. Has the storage capacity to hold up to 12 feature films in uncompressed quality
3. Retains original timecode for multiple re-conforming "On the fly"
4. Has the functionality of a disk recorder, still store and wipe generator
5. Can also be used for tape-to-tape grading as well as telecine work
6. Has film and video dirt and scratch removal tools

Gradebox Tape-to-tape

Gradebox is the first disk-based system, working with standard colour correction systems, that sets out to:

- Reduce the number of VTRs used from two to one, thereby reducing capital and running costs. The VTR would only be needed for the duration of the original source material and the time taken to layback the finished content. It would not be needed all day, costing money and doing very little.
- There is no need to wait until recording stops before starting grading. The colourist can commence grading on channel 1, within seconds of starting recording on channel 2
- **Auto-conform** the graded content, easily and quickly
- Allow side-by-side comparison between graded and ungraded content, in the one storage medium
- Replace the dedicated Still Store, used for matching reference frames
- Replace the dedicated wipe generator or mixer, used for comparing reference frames with content
- Use dirt and scratch concealment tools as an integral part of the system, allowing fast and easy restoration of video artefacts such as **tape drop-out**



Content Flow through Gradebox

Similar in concept to film grading, tape-to-tape grading is where a colourist applies colour correction to content that was originally recorded on videotape or to film material that has since been transferred to videotape.

Video from the source VTR is colour corrected by the colourist, in a similar manner to a telecine transfer and then recorded onto a second VTR, hence the term tape-to-tape. It is a two-pass process. One pass of the source VTR allows the colourist to make the necessary adjustments to be saved in the colour correction computer and the second VTR pass is when the source VTR is re-cued and plays its material and the adjustments are saved on videotape loaded in the destination VTR.

The advantages of working with tape rather than film is principally financial, as the cost of colour matching an edited tape is a lot less than colour correcting **film rushes**, some of

which may be discarded in the final edited version. From a creative perspective, tape-to-tape grading allows the colourist to vary the colour of scenes exactly as they will appear in the final edited form, so precisely meeting the Director or DOP (Director of Photography's) wishes.

Less equipment used

Gradebox instantly replaces the Record VTR in an old-fashioned tape-to-tape suite, immediately producing maintenance cost savings, whether or not the facility decides to use previously owned tape decks. The source VTR is only necessary for the time it takes to play in the source material and for the duration of the final layback to tape. If they had considered purchasing new VTRs, the overall capital expenditure would be greatly reduced.

Minimum film handling

If the transfer were from film-to-tape, a simple **one-light transfer** from telecine to Gradebox has the advantage that precious negative is in the telecine for as short a time as possible. This minimal handling of film reduces the risk of damage and dirt pick-up, lessening expensive TK suite time and ensuring that a top quality flat transfer of the film is available for future re-use.

Dual-channel operation

Whilst the colourist is colour correcting the source video, they are also simultaneously recording the source onto the Gradebox system disks, thus negating the need for a re-cue and second pass of the source VTR. The reduced VTR use produces a faster process and also slashes the amount of VTR hours, resulting in even lower running costs.

No extra equipment required

Amongst the ancillary equipment required in the grading suite are Still Stores, which are used to make side-by-side comparisons between stored reference frames recorded earlier in the transfer session and the scene currently being colour corrected.

A small mixer or switcher is also necessary to facilitate the side-by-side wipes, normally horizontal, vertical, diagonal and box patterns and works in conjunction with the Still Store.

Because Gradebox comes complete with its own wipe generator tools, and because reference frames and recorded clips can be stored in one timeline, it is unnecessary to purchase a dedicated Still Store and telecine switcher, resulting in substantial cost savings, especially to the new facility.

Multiple project storage

As Gradebox has ample storage capacity, a colourist can record an ungraded version of material, make the necessary adjustments to it, and store the resulting colour corrected version of the same scene or feature in the system and use the wipe generator to instantly compare "Before and After". No other system in the world is able to bring such creative power to tape grading.

Simultaneous Play & Record

Often it is desirable to pass the colour-corrected material, on videotape, to an **online** session for final editing. If time is of the essence, then waiting for a tape to be recorded and then carried into an edit suite can be an unwanted stress.

Gradebox has the benefit of multiple input and output ports, which act as virtual VTRs to other systems, such as Colour Correctors and Edit Controllers. Thus colour corrected material can be instantly played out when finished, to the edit suite, and there is no need to spend time laying off to tape.

In addition, whilst material is being played into the edit suite, new material can be simultaneously recorded into Gradebox for the next session, once again reducing time, increasing efficiency and SAVING money.

Because older film is often "grainy", it is best to store transferred video in an uncompressed, ideally **10 bit**, format as this does not produce visual artefacts on subsequent re-grading.

Gradebox is capable of storing up to 19 hours of 10 bit uncompressed standard definition video and audio.

Much of the material graded in tape-to-tape suites originated from film and as such carries the effects of scratches, dust and various film artefacts. Tape originated material may be old or used heavily and prone to tape artefacts such as dropouts. Normally, a skilled editor laboriously removes these defects in the online edit suite.

Installed, as standard, within the Gradebox system are the fastest, easiest to use and most cost effective video restoration tools, based upon the world famous Scratchbox. Either the colourist, as they work in real time, or the assistant after grading is completed, can easily remove unwanted film or video artefacts from the material.

No other tape grading system available today:

- Can save money and offer a faster Return On Investment
- Replaces one VTR immediately, by acting as both destination and replay VTR
- Has the ability to internally store and compare "Before and After" grades
- Has multiple I/O ports to allow simultaneous Record of new material and Playout of completed work
- Has real-time video restoration tools, as standard
- Has the storage capacity to hold up to 10 feature films, in uncompressed video quality

HD Brick

Increasingly, post-production facilities are working in both Standard Definition (SD) and High Definition (HD) video formats. Whereas previously, content may have been acquired on film and down-converted to standard definition for editing, effects and final deliverables to the client, now it is possible that the end-user wants an HD 24psf master tape.

HD 24psf is not film but it does have some of its characteristics; 24 frames per second, a high resolution and easy to work with. It doesn't have the grain of film or its gamut of speed and exposure but it does look very nice, and there are distinct financial advantages to using HD 24psf for post-production facilities and their clients

Nonetheless, there is still a vast amount of original material shot on film that will require transferring to video, whether it is HD or standard definition and therefore, the telecine room will continue to flourish. Only some of the equipment will be different although all of it will need to be multi-resolution i.e. capable of working in HD and SD formats.

HD Brick is the high definition version of Classic Brick. It operates with the following standards: 50i, 25psf, 24psf and 23.976psf and is used as an HD/SD multi-purpose, telecine suite recorder, still store and video switcher.

Speed

Being a true random-access device means that clips can be recalled, cued and played, instantly from either the Edifis or colour corrector panels, via a deterministic i.e. predictable Ethernet connection or RS 422 respectively

Simple to record still frames

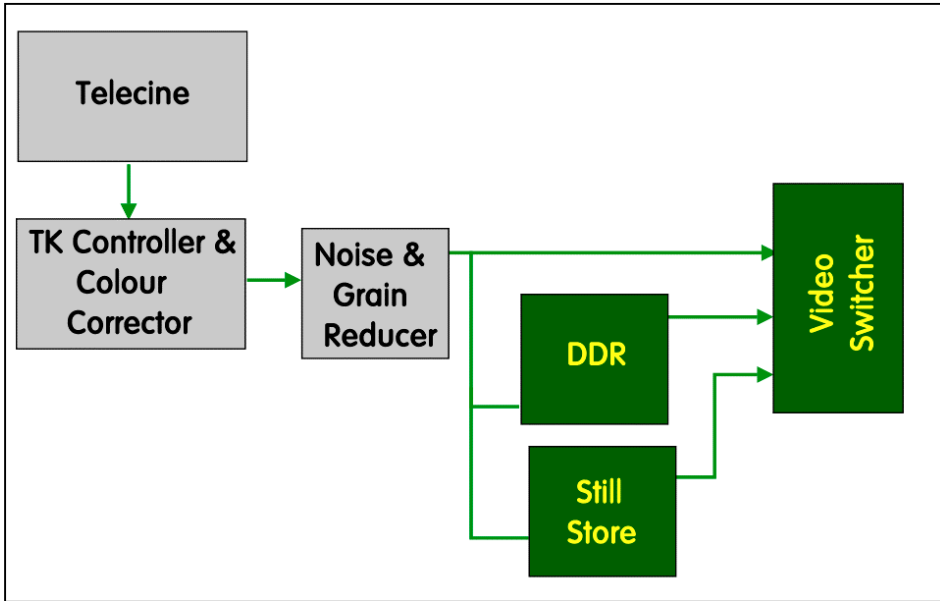
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The Pandora system can grab frames manually and automatically. Proxy images are stored in the colour corrector computer, full resolution images being on the Brick and are recalled by "clicking" the proxy image.

Integral Wipe Generator

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HD Brick replaces HD DDR, HD Still Store & HD Video Switcher

Chroma Keyer

A simple chroma-keyer is included to facilitate the removal of blue screens from effects shots. A background can be inserted, from disk or external video, to replace the blue screen and ease colour correction

Cost-effective

The alternatives to Classic Brick are a stand-alone Still Store plus a Wipe Generator plus a DDR. The total cost of these three items is far greater than a single unit from Edifis.

AES/EBU Audio

Up to 8 stereo pairs (or 16 tracks mono) of digital audio are part of the system.

Glossary of Terms

9-PIN RS 422 PROTOCOL: Normally referred to Sony 9-pin protocol, through which two devices can communicate commands, such as Play, Stop, Locate, Shuttle e.g. a colour corrector and Edifis system

10 BASE-T ETHERNET: Data rate (10Mb/s) within a spectrum of speeds in the Ethernet standardised data network

10-BIT: Signifies the amount of levels in the digital signal. There are 1023 levels in 10-bit signal

ASPECT RATIO CONVERTER: The ratio between the width and height of video images i.e. 4:3 (4 units wide and 3 units high) may often have to be changed to another visual representation i.e. 16:9. Aspect Ratio Converters are heavily used in post-production facilities, especially where original material has to be modified for different presentation media, geographic regions or simply to blend in with other acquired material shot in differing formats

AUTO-CONFORM: Making the final edit according to a prepared order e.g. an EDL

CHROMA-KEY: Video effect where areas of a picture that appear in a specific key colour are replaced by corresponding parts of a different video image. Blue or green is usually used as the key colour

DAW (DIGITAL AUDIO WORKSTATION): Computer workstation, incorporating 9-pin RS 22 machine control, used for synchronising audio with video content

DDR (DIGITAL DISK RECORDER): Device that records video and audio information on internal magnetic disks, rather than magnetic tape

DISSOLVE: Transition from one picture sequence to the next where the picture contents are superimposed and a soft transition between the scenes is created

EDL (EDIT DECISION LIST): A list of the decisions that describe a series of edits that are produced by an electronic editing system. The EDL contains information that identifies the location of source material and builds the edited master

ESTABLISHING SHOT: A wide shot, containing all of the tonal values that are in the scene to be subsequently graded. Frame grabbed from the Colour Corrector and stored in the Still Store

FILM CODE: An optical marking system, applied to the edge of the film, to identify individual frames. Can be human and machine-readable

FILM GRAIN: The light-sensitive particles in a film emulsion that form the image. Grain is only noticeable when these silver grains form clumps

FREE-FORM: Edifis term to describe a way of non-linear working, allowing instant access to all stored material, the ability to be creative, make versions and not constrained to, or by, the Edit Decision List

GPI (GENERAL PURPOSE INTERFACE): An interface between a computer and other equipment that enables the computer to operate that equipment. GPIs are usually used to trigger simple, single actions

ONE-LIGHT TRANSFER: Telecine film-to-video transfer with a single set of colour-correction values across the content. The simplest, fastest and cheapest transfer

ON-LINE EDITING: Process performed in an edit suite, using original source tapes to produce a final, edited master tape suitable for broadcast

RANDOM ACCESS: Random Access refers to speed and is directly linked to "non-linear" i.e. the physical nature of tape or film, and the technical process of manipulating those media do not enforce or dictate a process by which they must be physically ordered. Random access permits instant retrieval of media and play out in any order. Combine random access and non-linear working and one achieves a possibility to work in a free-form manner – the essence of Edifis telecine server working

ROUGH CUT: An initial edit of a commercial or programme and usually seen by the client for approval

RUSHES: Unedited film prints, processed overnight to view by performers and production staff the previous days filming

SELECT TAKES: The Director's choice of which "take" or recording will be part of the final feature. All other takes will be developed but usually only the select takes are transferred from film to video

STILL STORE: Device used to record and store individual picture frames, and replay them on demand

TAPE DROPOUT: Transitory information missing from the tape during playback of a recording. Can be painted away by a system such as Edifis Gradebox

TIMECODE: A unique number assigned to an individual frames which is then recorded together with the video picture

VIDEO NOISE: Irregular level variations or unwanted picture artefacts, which can be caused by magnetic fields, or component tolerances

WIPE: Transition between two video signals that occurs in the shape of a selected pattern