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diTTo data scanner

User Guide

Issue 2.0

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Declarations of Compliance

CE Declaration of Conformity   *Compliance To Be Advised*

FCC Part 15 Class A Declaration of Conformity   *Compliance To Be Advised*

Information for Users on Disposal of Old Equipment

European Union]

This symbol indicates that the electrical and electronic equipment should not be disposed as general household waste at its end-of-life. Instead, the product should be handed over to the appliance collection point for the recycling of electrical and electronic equipment for proper treatment, recovery and recycling in accordance with your national legislation.

By disposing of this product correctly, you will help to conserve natural resources and will help prevent potential negative effects on the environment and human health which could otherwise be caused by inappropriate waste handling of this product. For more information about collection point and recycling of this product, please contact your local municipal office, your household waste disposal service or Cintel International, or your agent of Cintel International.

Attention
This symbol is only valid in the European Union

Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

(Business Users)
If you wish to dispose of this product, please contact service@cintel.co.uk to obtain information about returning the product.

[Other Countries outside the European Union]

If you wish to dispose of this product, please do so in accordance with applicable national legislation or other rules in your country for the treatment of old electrical and electronic equipment.

Warning
Electrical supplies in excess of 50 (fifty) volts are potentially hazardous or lethal; supplies of up to 264V exist within the diTTo Scanner. THE SCANNER MUST ONLY BE OPERATED WITH ALL COVERS IN PLACE; covers must only be removed by qualified service personnel for maintenance purposes.

The scanner is designed so that it CANNOT be operated remotely with the film transport door open; safety interlock switches force the scanner into a STOP condition when the door is opened. Do NOT in any way over-ride, modify or alter the operation of these switches; these switches are fitted for safety purposes and can only be over-ridden by a qualified engineer equipped with the correct service tool. In the event of an interlock being overridden the operator waivers ALL liability.

Ensure that film tension is switched OFF (Film on film path is slack) BEFORE touching any part of the film transport mechanism.

Introduction

diTTo data Scanner

diTTo is a high quality, high speed digital film scanner designed for all data scanning applications including film mastering, digital intermediate, special effects, archiving and restoration.

diTTo uses cutting edge technology in a unique, space saving 'desktop' design and is designed as a 'plug and play' device.

diTTo is uniquely designed to be a user-friendly film scanner that does not require highly trained operational and maintenance personnel. The scanner has an inbuilt PC and 1.2TBytes of local RAID storage.

diTTo has an intuitive Windows-based Graphical User Interface (GUI) which provides simple, automatic, film calibration, clip management and all the features expected from a professional data film scanner.

diTTo scans 35mm and S35mm 4-perf film to Super2K and 4K data files.

(Catalogue Number DT2005200)

diTTo can be upgraded with the following options:

35mm and S35mm 3-perf Operation	*(Catalogue Number DT2005230)*
Dust and Scratch Concealment	*(Catalogue Number DT2005220)*
Keycode Reader	*(Catalogue Number DT2005240)*
35mm PRINT Operation	*(Catalogue Number DT2005250)*

Installation

System set-up

Ensure the ac mains supply has been fully disconnected prior to removing any cover plates. This task must be performed only by suitably qualified personnel.

Connections to the scanner are via an EMC gland plate located at rear of the scanner. Remove the 4 screws (4 x M3) that hold the small adjustable aperture plate, Fig 1(A), feed through the appropriate cable to the diTTo internal PC. Further access can be gained by removal of the side vent plates (6 x M6).
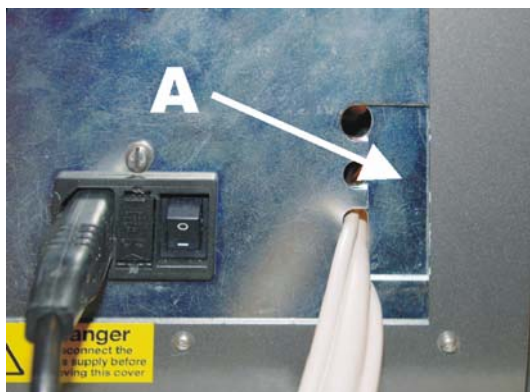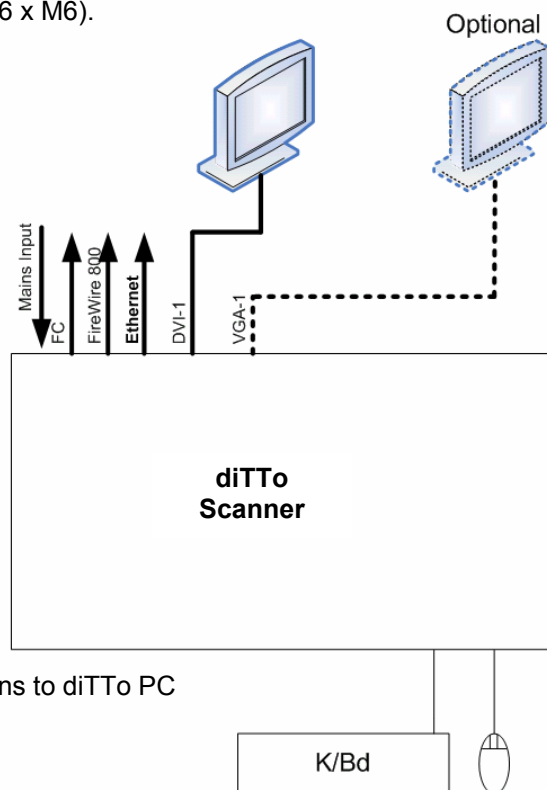
Fig 1 EMC Gland

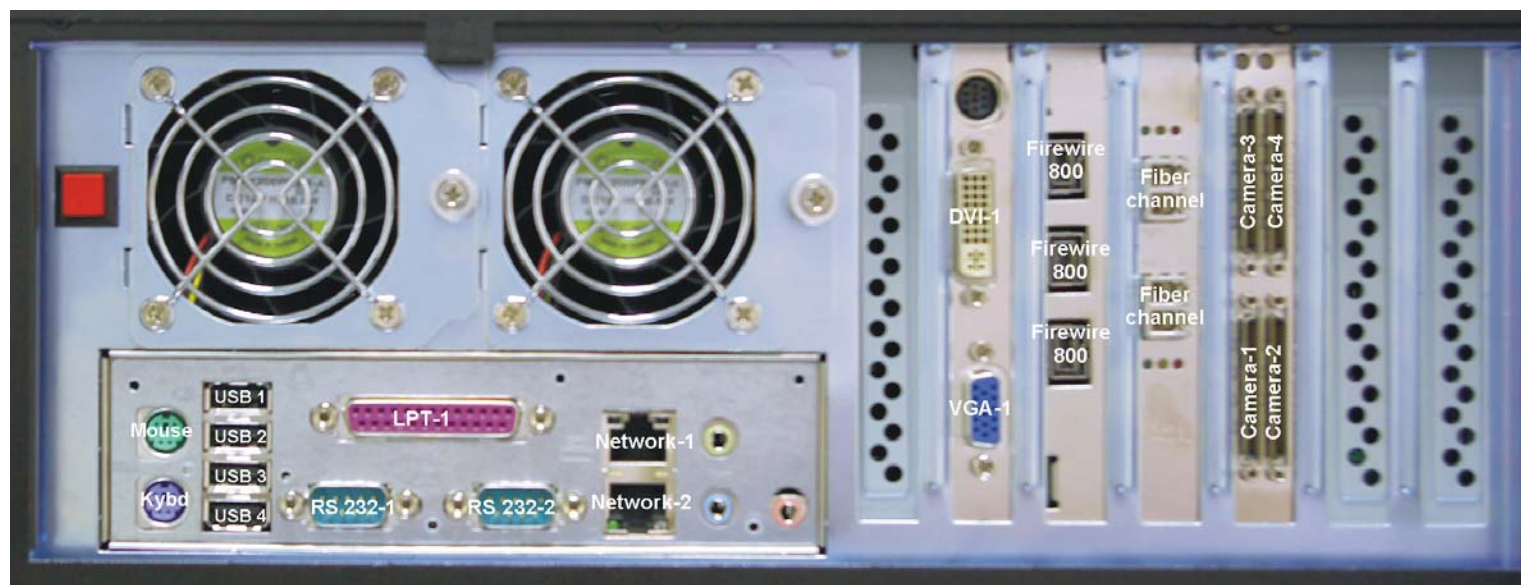Fig 2 External Connections to diTTo PC

Fig 3 Internal connectors of diTTo PC

The scanner is connected to the scanner GUI monitor, keyboard and mouse via a KVM extension lead (supplied). See Fig 2. All network connections are made directly to the internal PC panel. See Fig 3

Once all cables are connected refit the rear aperture plate and the side panel to maintain EMC compliance.

Network set-up

Consult your local network administrator before connection to any 3rd Party network.

Standard Windows TCPIP file transfer can be performed by changing the Host PC to be on a compatible workgroup and IP address. If the network is running DHCP then manually changing the Host PC workgroup is all that is required. This is performed by accessing **Control panel > System Properties > Computer Name.**

If manual IP setting is required changes can be made by accessing:
Control panel > Network connections >(Select network component)>Properties>*Make selection)

IP / Subnet mask can be verified via DOS shell >ipconfig

The following connections at the internal PC are available (See Fig 3):

Fibre HBA (Host Bus Adaptor)   2Gb Fibre Dual Channel, LC-LC
FireWire 800
USB 2.0
Ethernet 10bT/100bT/1Gb auto-switching

Virus Protection
Due to the inherent background processing overhead imposed by any virus protection software this product is delivered with none fitted. It is strongly recommended that NO background operational software is loaded as this WILL impede the operational speed of this scanner. Access to external gateways is strongly advised against i.e. Internet / Mail servers etc.

Operation

Power up

Note: **There are no user serviceable parts contained within this scanner. Only suitably qualified personnel are allowed to operate it with any protective covers removed.**

The Mains switch is located at rear Left Hand corner as part of the mains inlet unit. See Fig 1
The GUI Monitor power cord is separate to the main scanner. The main scanner includes the internal Host PC.
The Host PC will boot and then display the familiar Windows XP.
Note: The internal RAID fans will initially run at high speed until the PC takes over temperature control of fan speed.

At login, select the **diTTo** user Icon and input password "diTTo"

The scanner desktop will now appear. Double clicking the **diTTo** icon will launch the Scanner GUI application.
The diTTo GUI is Windows-based and designed to be easily navigated.

For details of the diTTo transport and film lacing please refer to the Film Transport section of this manual. (Page 22)
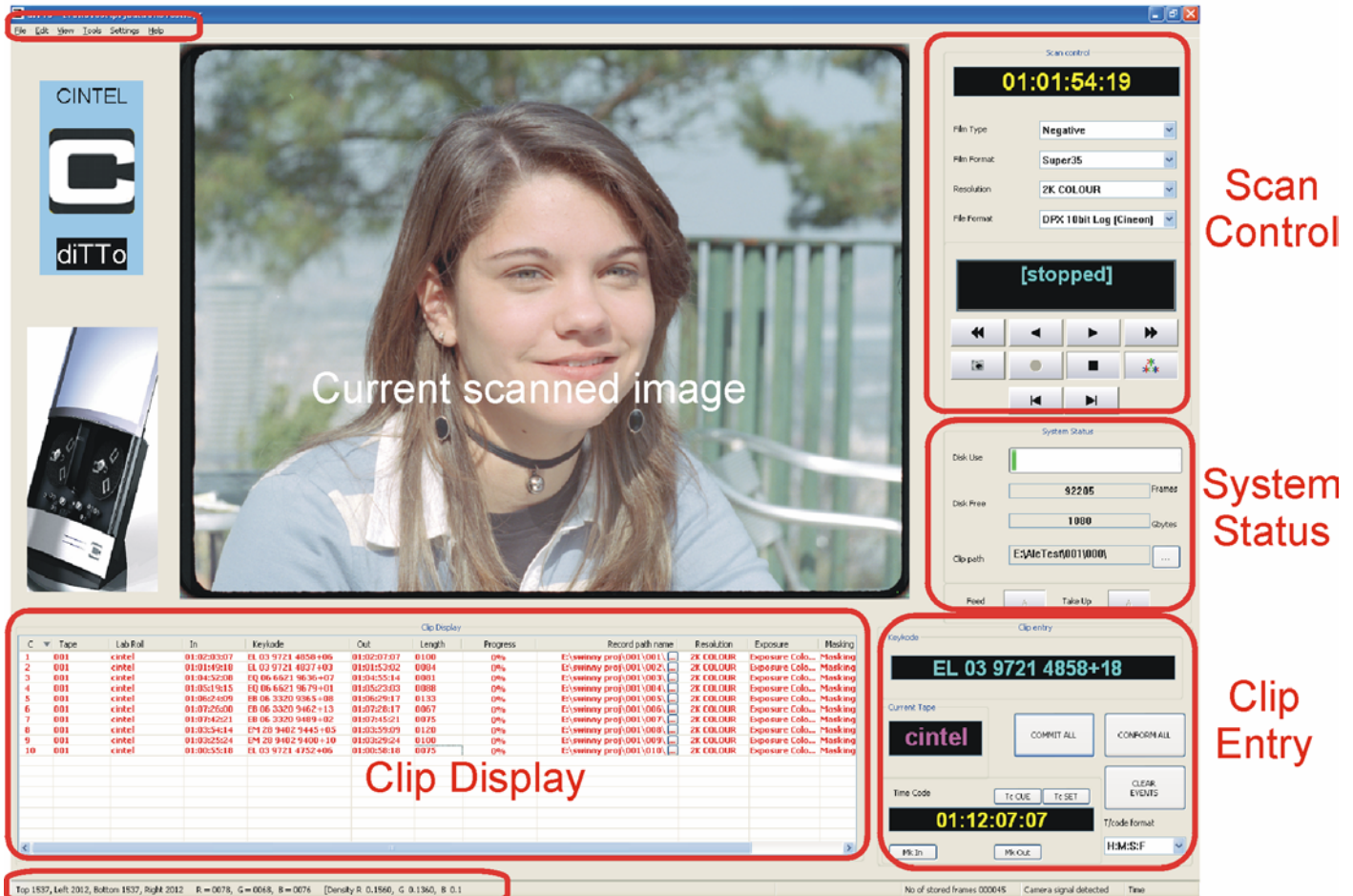
GUI Application

The Graphical User Interface application consists of a Main page where all of the required Scanning, Recording and viewing controls are located as well as a number of additional **Tools** and **Settings**.

Main page

The Main page gives the user full control over diTTo.

Fig 4 Main GUI Window

Scan Controls
Current timecode location of film on transport`

The user can select the following configurations (*dependent upon which options are fitted*):
Film Type - Negative, Inter-Negative, Inter-Positive, Print, B/W Negative, B/W Print
Film Format- Super 35mm, Acadamy 35mm, 3 Perf 35mm
Resolution - 2K Colour, 2K Mono, 4K Colour, 4K Mono. See Appendix 2 for details of settings related to film type.
File Format - DPX 10bit LOG (Cineon), DPX 10bit Linear (Cineon)

Current status of transport
Transport controls using familiar symbols: **Play Forward**, **Play Reverse**, **Stop**, **Fast Forward**, **Fast Reverse**, **Single Frame Forward**, **Single Frame Reverse**, **Continuous Crash Record (only available in Play Forward mode).**

Crash Record (Single Frame) [ ] and **LED illumination ON/OFF** [ ] controls.

System Status

This shows the amount of local RAID free Disk Space in terms of **GBytes**, **Frames,** as well as a visual indicator
(The space is dependent on the Resolution value set in Scan control window.)
A **Browse** control for setting a manual (crash recording) destination is included.

A or **B** wind settings for the **Feed** and **Take Up** Reels. Only available in Unloaded mode (see **Lacing Film** Page 21**)**

Clip Entry

Clips can be created by using the **Mk In** and **Mk Out** buttons. Uses (Transport Time code as reference)
diTTo control includes Edit Decision List (EDL) management. See Clip Management below.

Keycode displays the current frame Keykode (if the optional reader is fitted)

Timecode window. Allows keyboard entry of timecode for diTTo to be cued to, or for setting the main diTTo timecode.
                (This window is NOT used for editing EDL lists).

T/code format menu provides a choice of global timecode type. **H:M:S:F, Foot:Frames, Frames**

Current Tape. The appropriate alpha-numeric entry must match that of the clip list Lab-Roll or Tape, to allow
                a conformed recording.

TC CUE will cause diTTo to transport the film to the timecode entered in Clip Entry Timecode window.
TC SET will set diTTo's counter to the timecode entered in Clip Entry Timecode window
COMMIT ALL will activate all changes made to the EDL list shown in the Clip Display.
CONFORM ALL will cause diTTo to perform all committed scans created in the EDL and shown in the Clip Display.
CLEAR EVENTS will clear all clips from the Clip Display List. (An option will displayed to delete recorded files as well)

Clip Display

This window shows Clip listings as edit decision lists (EDL). The listing includes:
Clip number
Tape, an alpha-numeric value
Lab-Roll, an alpha-numeric value
In Point of clip
Keykode, if available. If no Keykode reader is fitted, only imported ALE list Keykodes will appear.
Out Point of clip
Length of clip
Progress, a percentage of the recording of each clip
Record Path Name, the folder location of recorded images from each clip
Resolution, selectable for each clip. (2K Colour,2K Mono, 4K Colour, 4K Mono).
Exposure, selectable from a list of created exposures.
Masking, selectable from a list of created mask settings.
Pre-scale, selectable from a list of created pre-scale settings**.**

Clip Management

Clips can be created by several methods

Manual clip generation.
Entering **In** and **Out** points using the diTTo GUI, while transporting the film to the required clip starts and ends will
create clips. As soon as an **In** point is created the list will show a clip. Once an **Out** point is entered the clip list will
calculate the length. (If the optional **Keykode** reader is fitted and the film has valid **Keykode** the **In** point entry will also
create a **Keykode** value). The **Tape/Reel number** will be that entered in the Clip Entry box and the **Record path** will
be that determined in the Project Wizard. (See **New Project** creation. Page 12).

New Clips can also be created manually by double clicking an empty clip line and filling in the details.

EDL and ALE Import to create clips

Edl's and ALE files can be imported by selecting **File** then **Import EDL** or **Import ALE.** Before the file is imported, certain parameters such as frame rate **(24fps, 25fps or 30fps)** will need to be confirmed in the **New Project** or **Settings > Project Time code** menu.

The imported list will appear in the **Clip Display** window.

Fig 5. Clip Display Window; all events uncommitted.

Clip Editing

The following parameters within each clip can be edited prior to recording: **IN** and **OUT** points, **Length, Record Path Filename, Resolution, Exposure, Masking** and **Pre-scale.**

Clip **In** and **Out** points can be edited by pointing the mouse at the relevant box containing the timecode, a left click will highlight all the clips parameters, a 2nd left click will highlight the appropriate box; a new value can now be entered. (Ensure to enter in the correct format by including ":") Invalid numbers will be rejected with a warning notice.

Fig 6. Clip Display Window; event options.

A right click on an individual clip will give you the option to **Cue to Start, Cue to End, Commit, Conform** or **Delete**.

A Left Click on the box to the right of **Record Path Name** will allow new selection of destination for scanned clip.

Fig 7. Record Path selection.
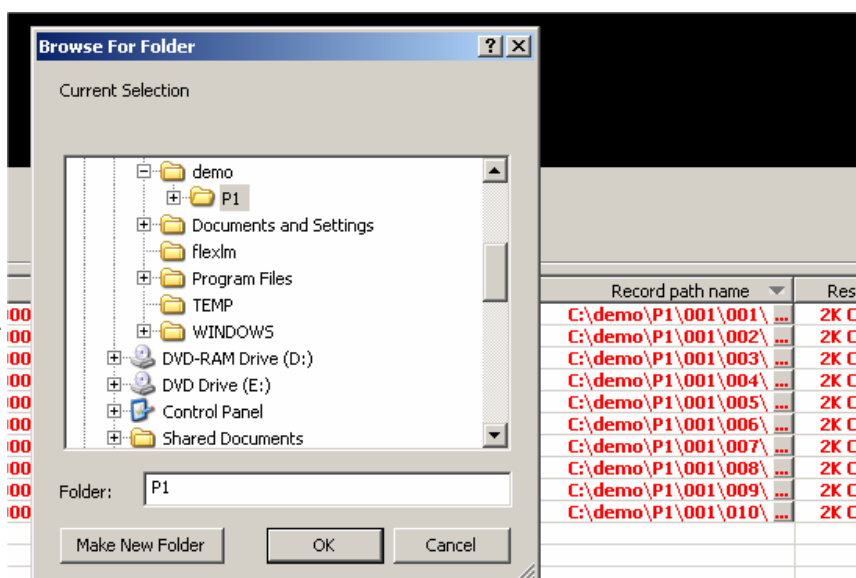
Fig 8 Resolution selection

Fig 9 Exposure selection

Fig 10 Masking selection

Fig 11 Pre-scale selection

A Left Click on the box to the right of **Film Type, Resolution, Exposure** and **Pre-scale** will allow new selections of parameters of scanned clips. Changing the **Resolution**, for example, will allow exactly the same clips to be scanned at 2K and then on a subsequent conform at 4K

Clip	Tape	Lab ...	In	Keykode	Out	Len...	Progress	Record path name	Resolution	
1	001		01:02:03:07	?? 00 0000 0000+00	01:02:07:07	0100	0%	C:\demo\P1\001\001\ ...	2K COLOUR	E
2	001		01:01:49:17	?? 00 0000 0000+00	01:01:53:02	0085	0%	C:\demo\P1\001\002\ ...	2K COLOUR	E
3	001		01:04:52:08	?? 00 0000 0000+00	01:04:55:14	0081	0%	C:\demo\P1\001\003\ ...	2K COLOUR	E
4	001		01:05:18:15	?? 00 0000 0000+00	01:05:23:03	0113	0%	C:\demo\P1\001\004\ ...	2K COLOUR	E
5	001		01:06:24:09	?? 00 0000 0000+00	01:06:29:17	0133	0%	C:\demo\P1\001\005\ ...	2K COLOUR	E
6	001		01:07:26:01	?? 00 0000 0000+00	01:07:28:17	0066	0%	C:\demo\P1\001\006\ ...	2K COLOUR	E
7	001		01:07:42:21	?? 00 0000 0000+00	01:07:45:21	0075	0%	C:\demo\P1\001\007\ ...	2K COLOUR	E
8	001		01:03:54:14	?? 00 0000 0000+00	01:03:59:09	0120	0%	C:\demo\P1\001\008\ ...	2K COLOUR	E
9	001		01:03:25:24	?? 00 0000 0000+00	01:03:29:24	0100	0%	C:\demo\P1\001\009\ ...	2K COLOUR	E
10	001		01:00:55:18	?? 00 0000 0000+00	01:00:58:18	0075	0%	C:\demo\P1\001\010\ ...	2K COLOUR	E

Fig 12 Clip Display Window; Some clips committed

Colour Indication of Clip Display

A Red clip indicates that the clip has just been imported, created or modified. As such it is not committed to scanning.
A Blue clip indicates that it has been committed for scanning. (Modifying a Blue Clip will un-commit it.)
A Green clip indicates that the clip has been completely scanned

When editing or modification of the Clip List is complete the entire list can be Committed to recording using the **Commit ALL** button or clips can be individually committed using the right click pull down menu on the clip list (See Fig 6). The text will change from Red to Blue at this point.

Clip	Tape	Lab Roll	In	Keykode	Out	Length	Progress	Record path name	Resolution
1	001		01:02:03:07	?? 00 0000 0000+00	01:02:07:07	0100	0%	C:\demo\P1\001\001\ ...	2K COLOUR
2	001		01:01:49:17	?? 00 0000 0000+00	01:01:53:02	0085	0%	C:\demo\P1\001\002\ ...	2K COLOUR
3	001		01:04:52:08	?? 00 0000 0000+00	01:04:55:14	0081	0%	C:\demo\P1\001\003\ ...	2K COLOUR
4	001		01:05:18:15	?? 00 0000 0000+00	01:05:23:03	0113	0%	C:\demo\P1\001\004\ ...	2K COLOUR
5	001		01:06:24:09	?? 00 0000 0000+00	01:06:29:17	0133	0%	C:\demo\P1\001\005\ ...	2K COLOUR
6	001		01:07:26:01	?? 00 0000 0000+00	01:07:28:17	0066	0%	C:\demo\P1\001\006\ ...	2K COLOUR
7	001		01:07:42:21	?? 00 0000 0000+00	01:07:45:21	0075	0%	C:\demo\P1\001\007\ ...	2K COLOUR
8	001		01:03:54:14	?? 00 0000 0000+00	01:03:59:09	0120	0%	C:\demo\P1\001\008\ ...	2K COLOUR
9	001		01:03:25:24	?? 00 0000 0000+00	01:03:29:24	0100	0%	C:\demo\P1\001\009\ ...	2K COLOUR
10	001		01:00:55:18	?? 00 0000 0000+00	01:00:58:18	0075	0%	C:\demo\P1\001\010\ ...	2K COLOUR

Fig 13 Clip Display Window; All clips committed

When committed, The clips can be conformed (Scanned) using **Conform All** or **Conform** individual clips by a right click of the mouse and select Conform from the pull down individual clips menu.
diTTo will automatically scan the appropriate sections of the film to the Recorded path name in the clip list.

The **Progress** window will display the percentage of each clip recorded.

Conform in progress:
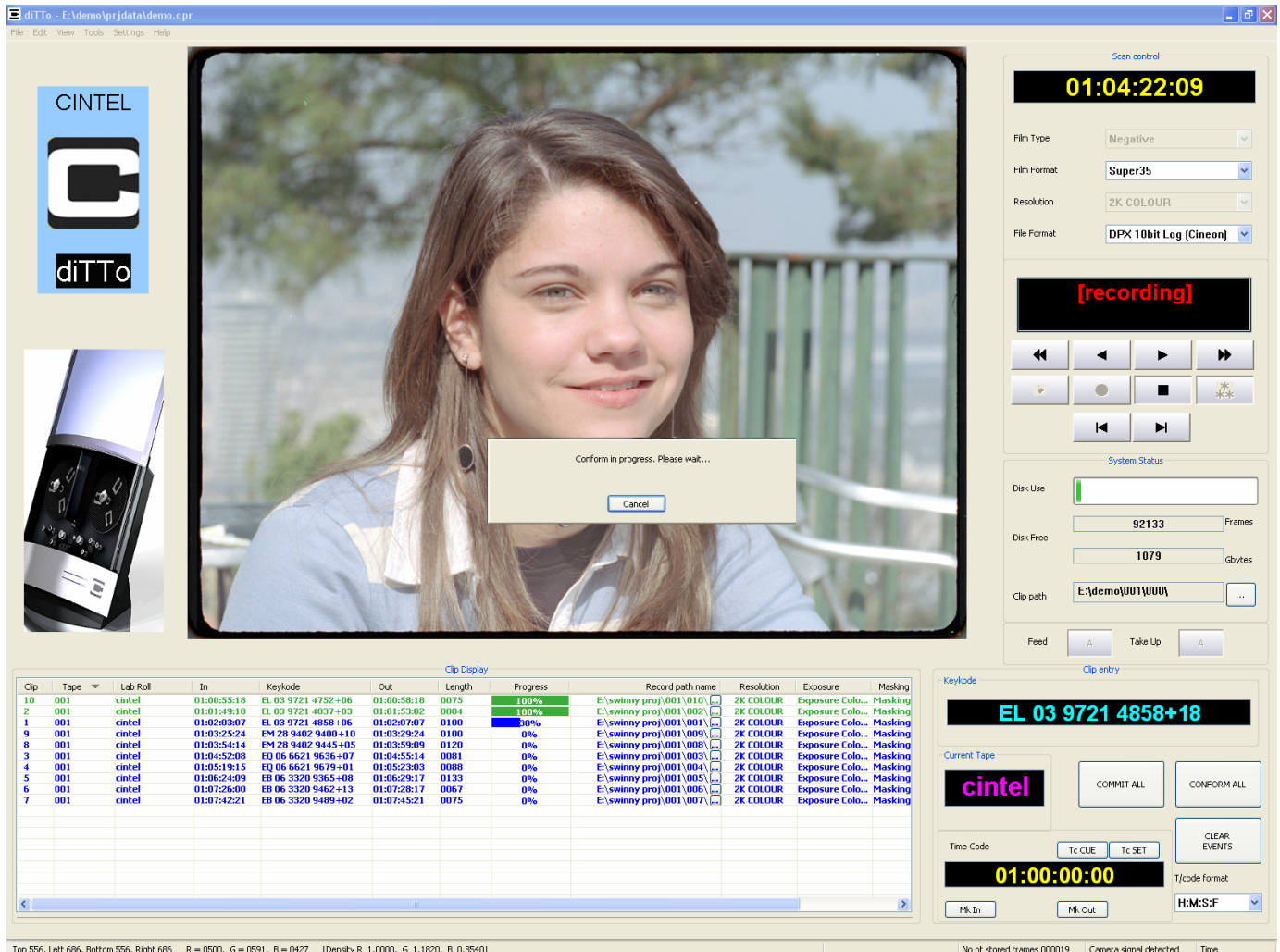
Fig 14 Conform (Recording in progress)

When the recording is complete, a Right click on the clip will give you the option to **Delete** or **Play** the clip using the Playback viewer (see page 14) If **Delete** is chosen, the option to also delete the files will be offered

If **Play** is chosen, the **Playback Viewer** will appear showing the first frame of the clip. (See Tools: Playback page 14)

The **Playback Viewer** can be called up from the tools menu at any time, except when diTTo is conforming.
(See Tools selection Page 14)

A note about editing a conformed and recorded Clip.
Once a clip has been conformed and recorded it appears in green on the Clip List. If a clip that has been recorded is further edited it will become Red awaiting a **Commit** or **Conform** command. Note that in order not to overwrite the recorded image files from a previous conform, it will be necessary to select or enter a new **Record path name** prior to committing the clip.

File Menu

This menu is accessed to create **New Projects**, **Open and Save Projects** and **Import EDL and ALE** files. At this time it Is not possible to Export EDL or ALE files. However **Clip Lists** created with **EDL** or **ALE** files and subsequently modified within the diTTo GUI will be saved as part of the Project.
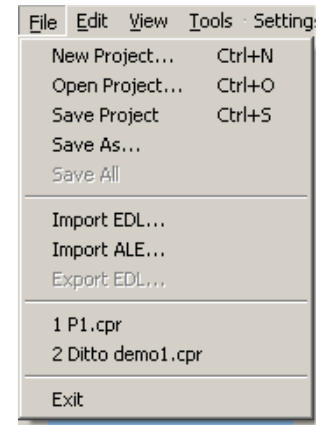
Fig 15 File Pull down menu

File: New Project

The **Project Wizard** allows set up of all parameters that may be required for each project.

Step 1 includes **the Project Name** and Folder locations for the main project, the recorded clips and any EDL files associated with the project. The default paths used will depend on the default selection set in **Settings: Project** (See page 20)

Timecode rates must be set here to match any EDL timecode rates, else a mismatch In timecodes in the clip list relative to the Film clips will occur.

An EDL file can be opened with the new project by providing an import path name for the EDL file.
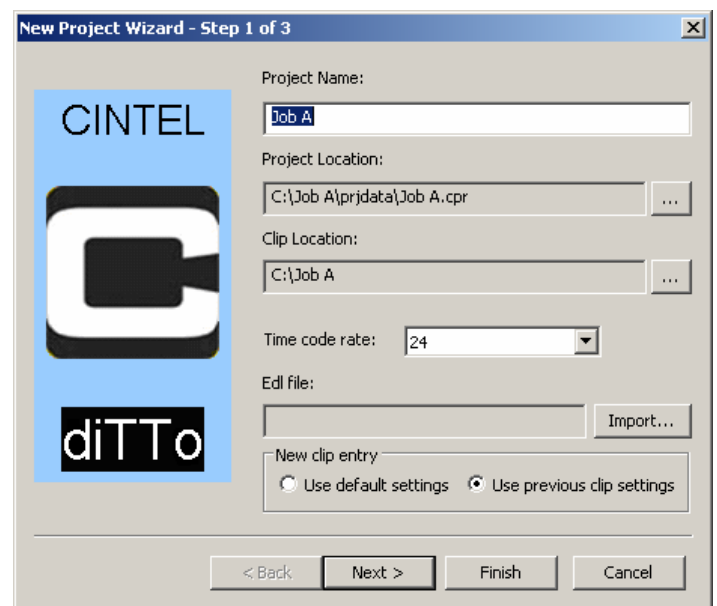
Fig 16(a) New Project Window 1
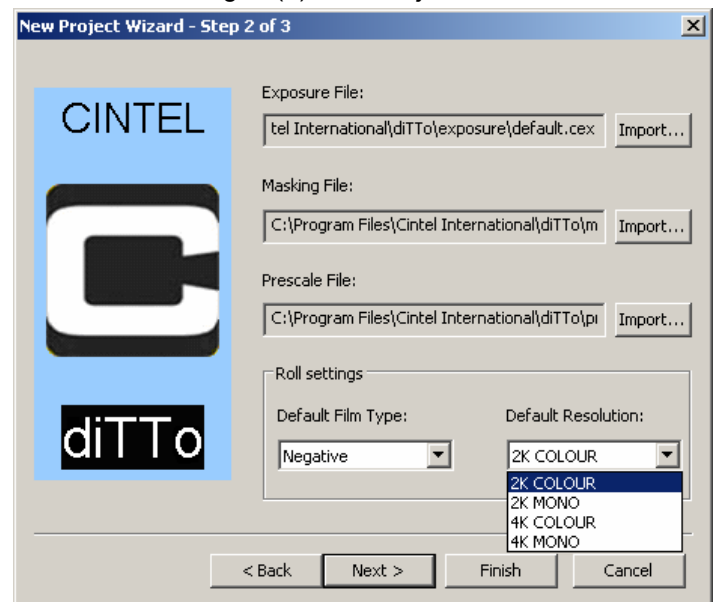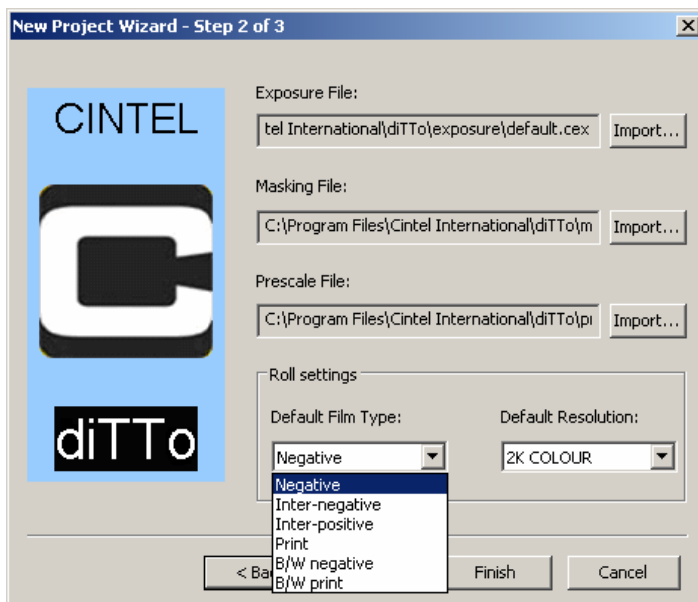
Fig 16(b) New Project Window 2

Step 2 shows the default location of **Exposure, Masking and Pre-Scale** setting, these can be changed to copy a set of parameter from different previous projects if required. Default **Film Types** and **Resolutions** are also set here.

Step 3 provides pull down selection of **Exposure, Masking and Pre-scale** settings for the project, both **Colour and Mono** versions. The selected parameter will apply to each clip created unless **Settings: Projects General**, has its **NEW Clip Entry** set to **"Use Previous Clip settings**" (See Fig 31, Page 19)

EDL Heads and Tails can be set here. The settings will cause extra frames to be recorded at the head and tail of each clip.

DMIN Aim is also set here. (See **DMIN** calibration For an explanation. Page 17)
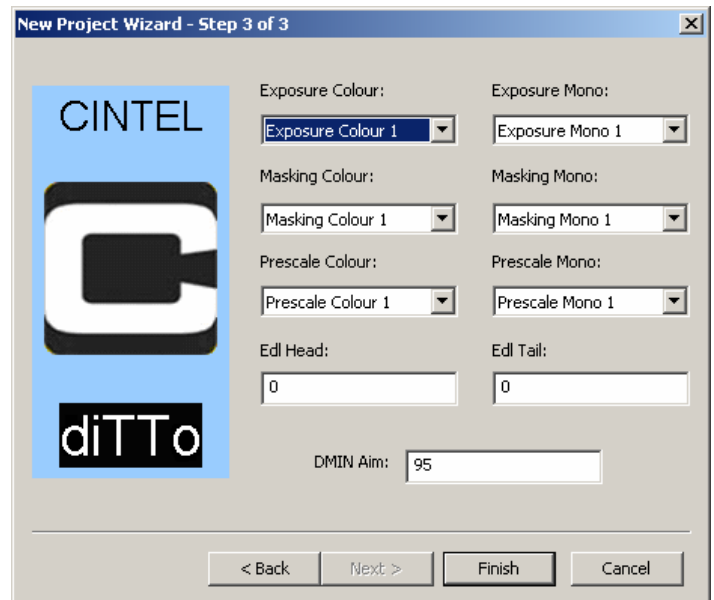
Fig 16(c) New Project Window 3

View Menu.

This menu provides selection of ways to view both the **Main diTTo GUI and the Playback Viewer GUI**. It only sets the image display within each GUI.

Fit to Window is the default. In this mode the image, regardless of scanned resolution, will all be fitted within the window.
This allows the whole frame to be observed
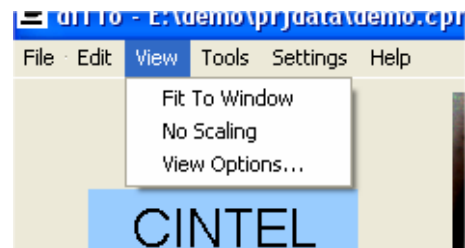
Fig 17 View Pull down menu

**No Scaling.** This mode provides a pixel to pixel match between the scanned image and the display device.
This mode offers a more detailed view of the scanned image. However the user must move the image within the frame to see the whole image.

View Options
This window allows the user to set specific Width and Height **Scaling** of the Record and Playback windows either by Pixel number or by percentage. Lock Aspect ratio will cause the Width or Height to automatically track its value when only one parameter is adjusted. These settings have no effect on the recorded image.

Range specifies how many of the most significant bits (MSB) are not to be viewed. This is included as the GUI display can only show, at best, 8 bits. By limiting the MSBs the GUI display can resolve the lesser bits as a check that no lowlight clipping or other artefacts are present on the recorded image. This settings has no effect on the recorded image.
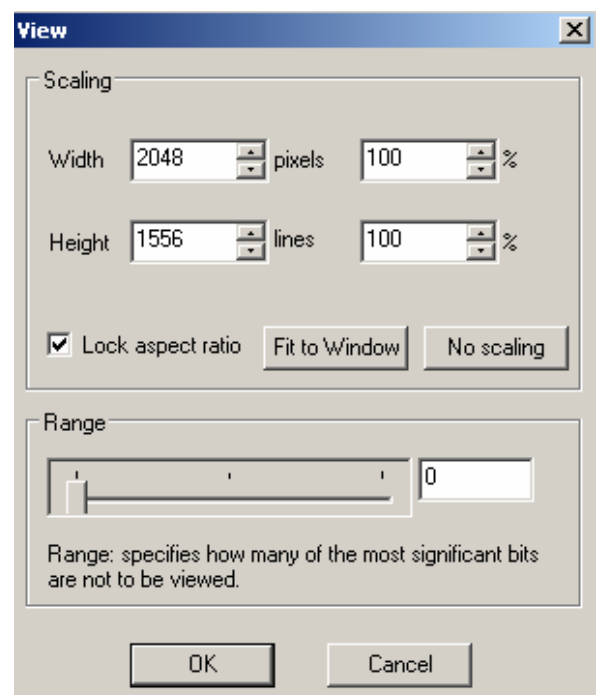
Fig 18 View Scaling Window

Tools Menu

The tools pulldown menu allows selection of :
Playback Viewer

Additional Image control functions
      Prescale
      Masking
      Exposure
      Scratch Gain (If option is fitted)

System Calibrations
      Auto Shading
      Dmin Calibration
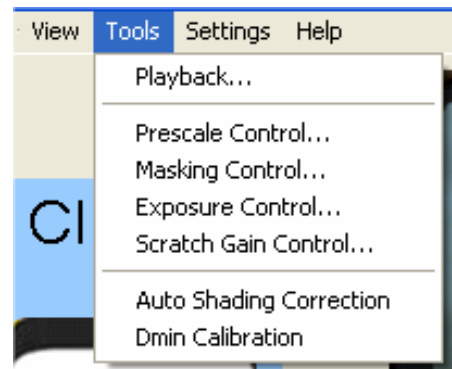
Fig 19 Tools Pull down menu

Tools : Playback

This **Playback Viewer** is also directly available via **Play** from the recorded **Clip Display** selection

Fig 20 Playback Window

The viewer allows near real-time playback of 2K files. The files to be viewed are accessed by the **Browse** button. A familiar Windows browser will appear. If the viewer has been called up from the **Clip Display** the clip will be loaded automatically.

The viewer gives extensive information on the file being viewed:

Keycode	(if the information has been stored in the File Header)
Timecode	(if the information has been stored in the File Header)
Frames Per Second	(original recorded speed)
Frame Number	(the viewed frame number within the sequence)
Display resolution	(Defined by the View mode selected from the menu)
Source Resolution	(the original scan resolution)
File Format	(DPX etc.)

Selecting **Histogram** will enable an RGB Histogram Monitoring Tool. The histogram is NOT updated live.

Playback can be controlled using familiar symbols – **Play Forward**, **Play Reverse**, **Stop**, **Fast Forward**, **Fast Reverse**, **Single Frame Forward**, **Single Frame Reverse**.

Playback modes can be selected as   **Single Play**   → (Forward or Reverse)

Forward or Reverse ↔ **Playback runs in two Directions**

A continuous loop mode ↕ **of either the above operations**

Tools: Pre-Scale Control

Warning.
Adjustments of the Pre-scale will invalidate the settings
of **DMIN** and will not comply with Cineon DPX standards.
Resetting **DMIN** will NOT return Pre-scale values to a default.

The **Pre-Scale** control provides the ability to individually adjust
the 'contrast' of the Red Green and Blue signals.

Multiple settings can be made and each setting can be named
by **Add to list**

Named Pre-scale settings are saved with the current project.
.
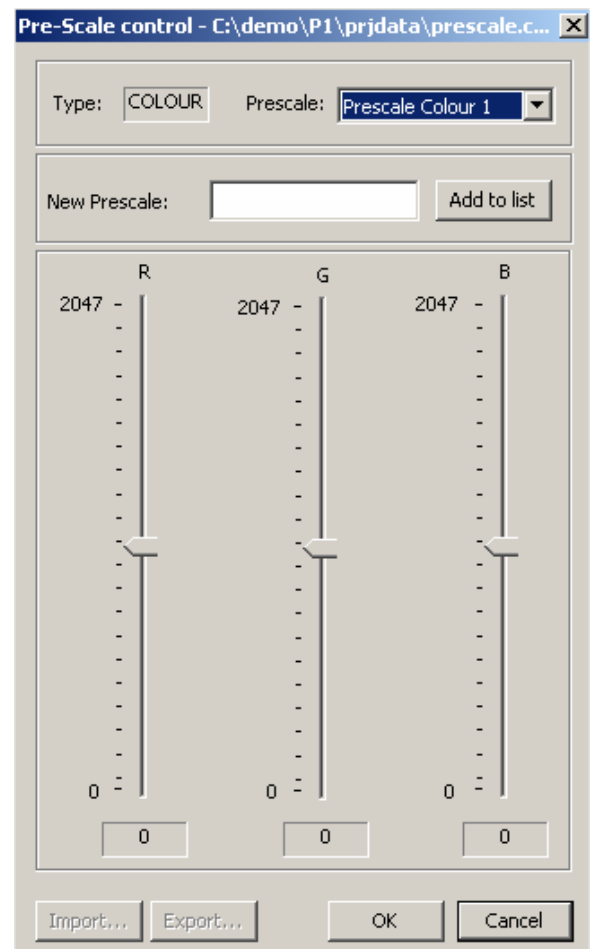
Fig 21 Pre-scale Control Window

Tools: Masking Control. (See also Appendix 4)
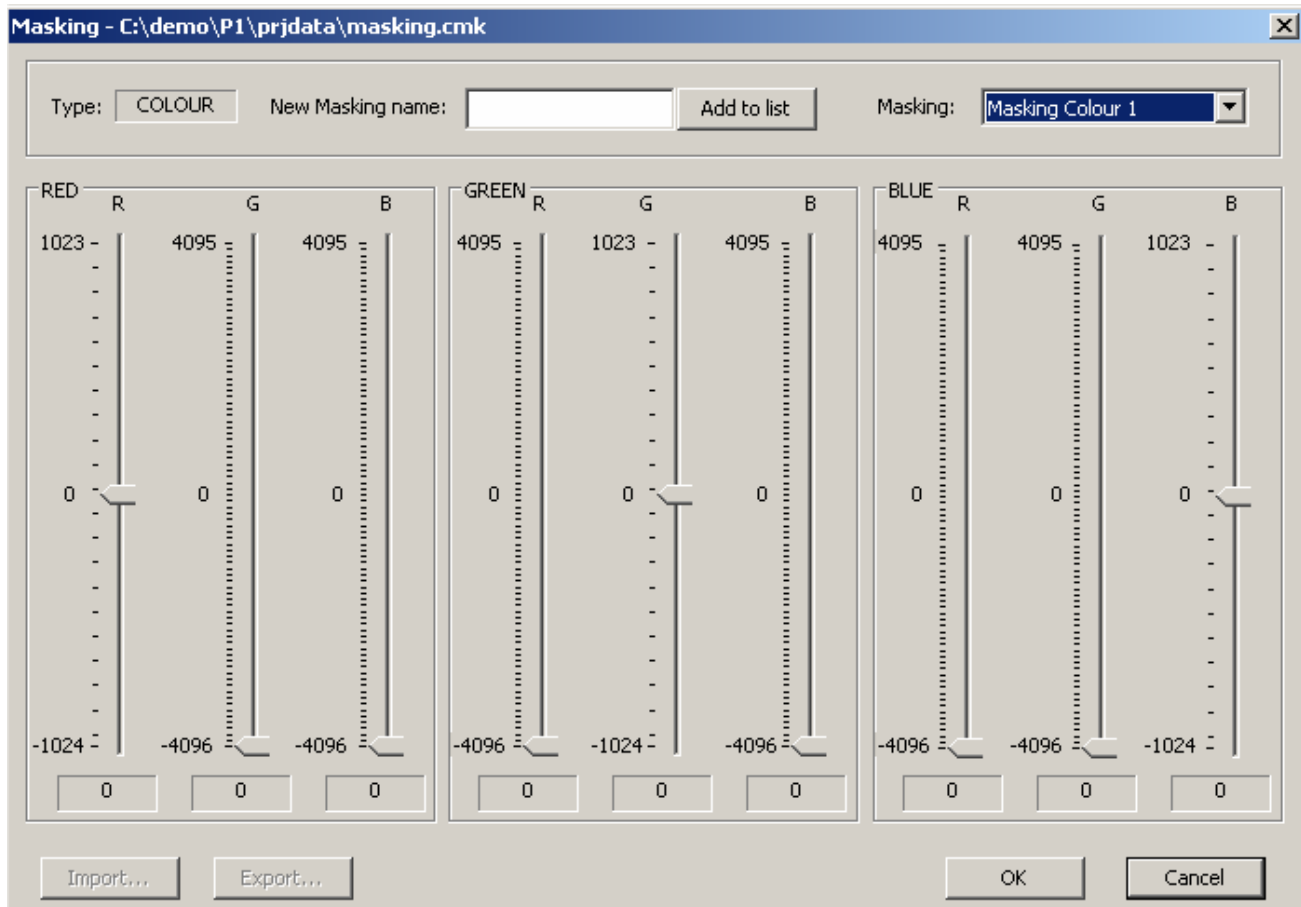
Fig 22 Masking Control Window

Warning.
Adjustments of the **Masking** may invalidate the settings of **DMIN** and may not comply with Cineon DPX standards.
Resetting **DMIN** will NOT return Masking values to a default. But may offer a valid DPX file.

When **Masking** is adjusted to correct for film taking characteristics colorimetry and a subsequent **DMIN** calibration is performed the resulting Cineon values will be correct. If masking is used for other aesthetic adjustments to the image the resulting Cineon DPX values may not be correct.(See Appendix 4)

Multiple **Masking** settings can be made and each setting can be named by **Add to list**.

Named **Masking** settings are saved with the current project.

Tools: Exposure Control

Warning.
Adjustments of the **Exposure** will invalidate the settings
Of **DMIN** and may not comply with Cineon DPX standards.
Be careful with this adjustment, it is very easy to cause the scan
to cut-off (clip) some of the image detail in the highlights or
lowlights
Resetting **DMIN** will return **Exposure** values to a default.

The **Exposure** control provides the ability to individually adjust
the 'setting' of the Red Green and Blue signals. The adjustment
varies the light exposure time of the Red, Green and Blue
illumination and can therefore make a minor change the scan
time.

Multiple settings can be made and each setting can be named
by **Add to list**

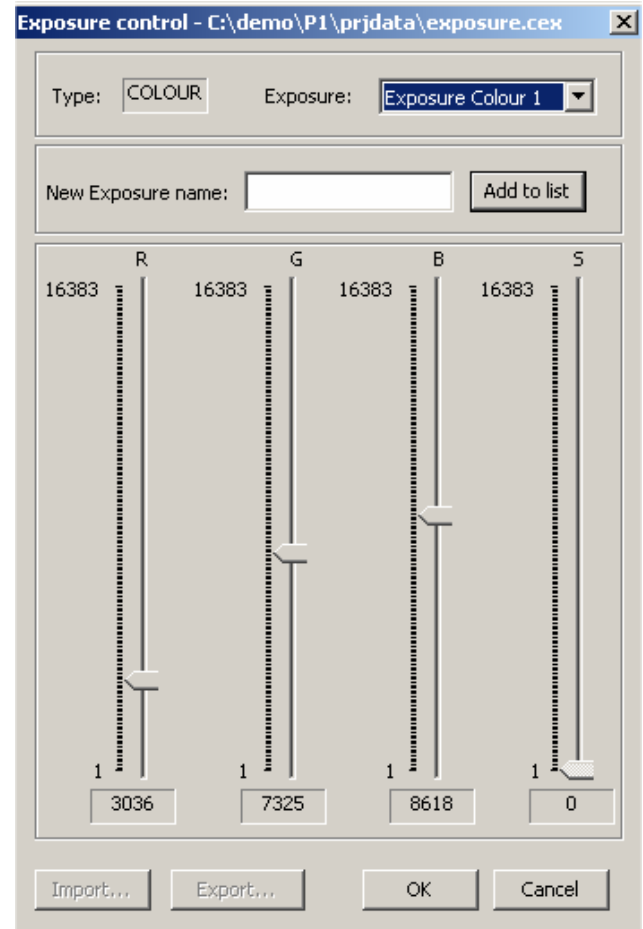Named **Exposure** settings are saved with the current project

Fig 23 Exposure Control Window

Tools: Auto Shading Correction

Automatic shading compensation caters for any optical variations (RGB) and calibrates the camera cell white and
black balances. It is customary to perform a shading align weekly only after verification of a clean optical path. (See
maintenance section Page 26).
1. **Perform only with an open gate**. Unload servo and remove film. Ensure gate is in loaded position.(See page 21)
2. Select **Auto Shading Correction**
3. Follow the on-screen prompts (Note: operation takes approximately 5 Minutes)
4. The resultant Shading file is saved by default on the local C Drive and is automatically applied to all future scans.

Tools: DMIN Calibration (Minimum Density setting)

DMIN calibration gives automatic exposure balance to level 95 (~1% level) of the Cineon transfer function. This target
level can be set to an alternate value in New Project Wizard (Page 12) or Project Settings (Page 31). See Appendix 1
for more details about DPX files and levels.

1. Load required film and transport to required clip
2. Select **DMIN Calibration** and follow the on screen prompts
    The scanner will automatically rack the film until the framing bar is visible and then select a portion of the framing
    bar to use as the DMIN. The scanner will ask for confirmation at this point.
3. If the area automatically selected has some picture information visible or a better area is available, Use the mouse
    to drag a sample window over a new desired area. (Verification of minimum levels can be seen in the Pixel Picker)
    Select OK and wait until the calibration is complete.
    Progress can be viewed on the pixel picker feedback at the bottom of the GUI by observing the RGB levels
    moving towards a level of 95 or other level if set differently in the **Project Settings**. Note that the values may not
    display as exactly 95 as the picker averages the pick area values including any dust etc. However the DMIN
    Calibrator ignores any values greater than the lowest and will therefore ignore dust etc. The film is now
    automatically calibrated to Cineon DMIN specification.

Fig 24 Pixel Picker Feedback
        at bottom of GUI

Top 1537, Left 2012, Bottom 1537, Right 2012   R = 0078, G = 0068, B = 0076   [Density R 0.1560, G 0.1360, B 0.1

Picker location and size   Average value   Average density

Multiple D MIN settings for stock mixtures on same roll.

When scanning camera negative materials it is often found that many different film stocks will be spliced on the same roll. While a single **DMIN** adjustment from a typical stock should provide a good unclipped balance for all stocks, it is sometimes desirable to set **DMIN**s for each stock. diTTo provides a means to achieve this. Along with Keykode information the user can then select a **DMIN** for each stock's clip entry. As the **Exposure Control** is set by a **DMIN calibration**, if a calibration is performed on each stock and a new **Exposure Control** name is used for each calibration, the Exposure can be recalled at each clip entry. It is suggested that the exposure name match the stock type; for instance Kodak's four digit code, such as 54xx.

It will then be easy to match an exposure parameter to the first Four digits of the keykode, which represents the stock.

The following will need to be made for each stock

Perform a **DMIN** calibration on each stock, after calibration is complete open **Tools: Exposure Control.** Enter the stock code or similar into the **New Exposure Name** window then **Add to List.** Examples can be seen in Fig 25 and Fig 26.

These Exposure parameters will be saved with the current Project. If the same Exposure parameters are required for a different project it will be necessary to recall the Exposures file from another project. See **New Project: Step 2: Exposure File: Import** (Page 12)

Fig 25
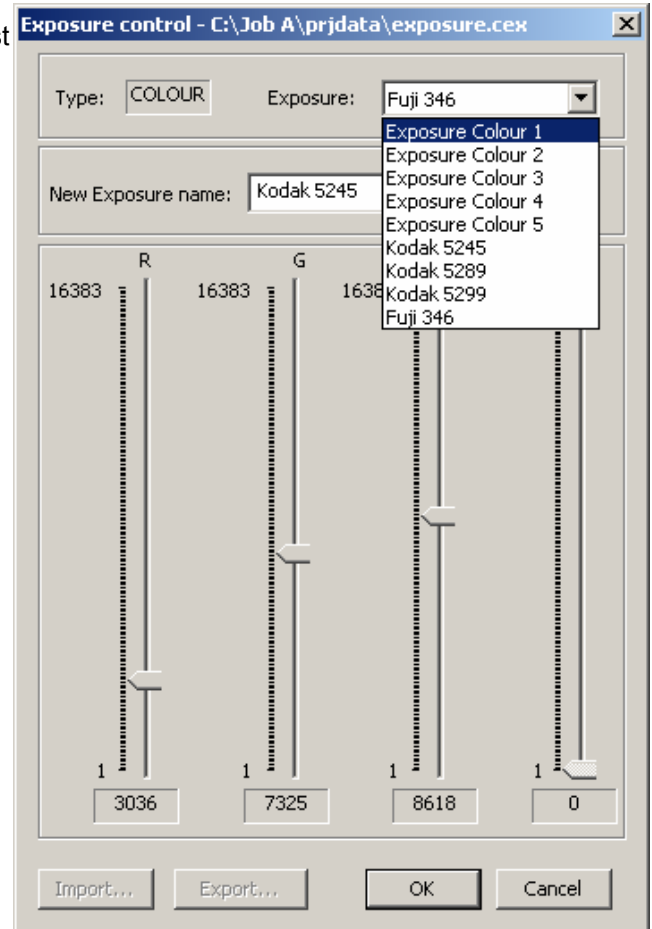
Fig 26

Warning.
If the user modifies the exposure value for any of the film stocks, after they have been set for Multiple DMIN use, the DMIN will become incorrect. It is advised that no attempt is made to manually adjust Exposure values marked as a film type. If they are adjusted manually it will be necessary to re-perform a DMIN calibration before the film type exposure can be used as a genuine DMIN setting.

Tools: Scratch Gain Control (If Option is fitted)

This tool provides control over the degree of scratch and dust removal of the D/SCO option.

While observing a scanned scratched or dusty image on the main GUI, adjust the slide bar till the scratch/dust is minimised.
Excessive adjustment will cause scratches and dust, a lighter area on negative film, to become darker than the surrounding image. Correct adjustment is when the area of the scratches and dust is minimised.
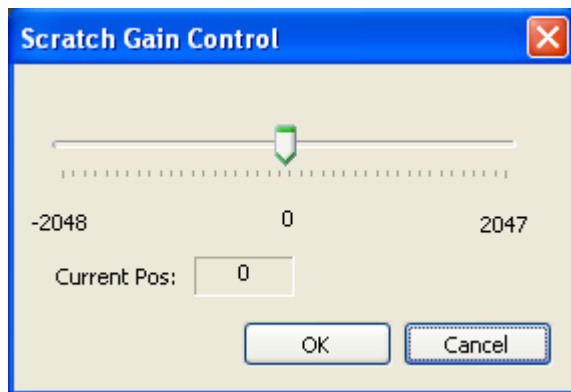
Fig 27 Scratch Control Window

Fig 28

Fig 29

Fig 30

D/SCO can also output a "defect Map" of Dust and Scratches in the Alpha channel; of a DPX file.
This is useful where downstream software packages can work on the DPX images at a later stage to provide fast image "clean up".

Fig 31
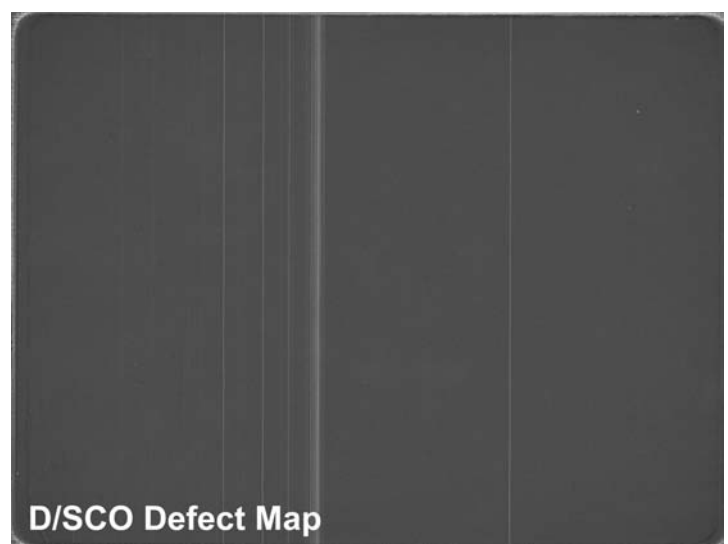
Settings: Engineering is Password protected and for Cintel Engineering use only.

Settings: Site

This allows **Time Code display** type to be set.
Record File Name generation to be set-up to include various parameters automatically by default or by user.

The Default Project path to be set.

MRU (Most Recently Used) **List size** configurations to be set.

If you choose to **Show picture during Cueing/Conform** this will show an active image during these processes but it will slow the scanning down.
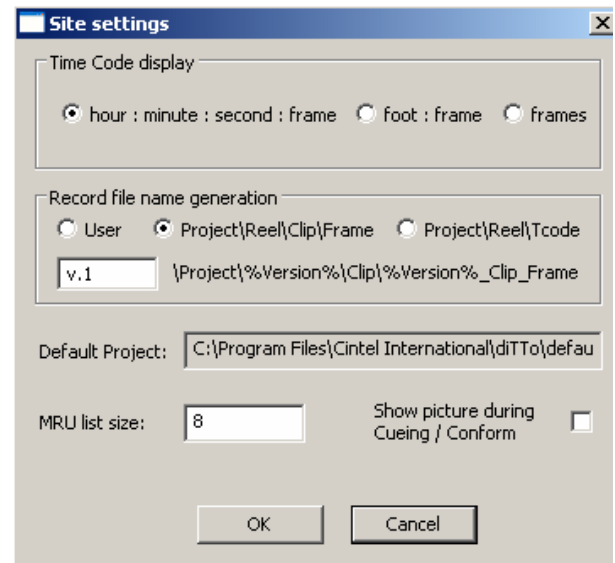
Fig 32 Site Settings Window

Settings: Project

Settings: Project: General
This section defines some major Project's parameters and will define how new projects and clip entry is handled.

The **DMIN aim value** (usually level 95) allows the target film minimum density to be set with the Project.
The range is 0 -150. This figure is stored in DPX metadata. See Appendix for more details.

The **Timecode Rate** can be set at 24fps, 25fps or 30fps. **Timecode rates** must be set here to match any EDL timecode rates, else a mismatch in timecodes in the clip list relative to the Film clips will occur.

EDL Heads and Tails can be set here. The settings will cause extra frames to be recorded at the head and tail of each clip.

Default Roll settings, Film Type and Resolution can be changed

New Clip Entry parameters can be set to user default or previous clip settings. Under **User default settings**, each created clip will have the default **Exposure, Masking** and **Pre-scale** settings applied. If **Use previous clip settings** is chosen then the **Exposure, Masking** and **Pre-scale** selected in the previous Clip will be applied.

Fig 33 Project (General) Settings Window

Set as default. This will set file folder location, and clip entry settings to those set in this menu

Restore Defaults. This will reset defaults to those supplied by Cintel International with this software.

Settings: Project: Advanced

This menu defines the location of **Exposure, Masking** and **Pre-scale** files.

Such files are always stored with the current project. It is not possible to store these parameters in other locations. However this feature allows such files to be selected from previous projects

Set as default. This will set file folder location from which to extract the **Exposure, Masking** and **Pre-scale** settings for use with the current project.

Restore Defaults. This will reset locations to extract the **Exposure, Masking** and **Pre-scale** settings to those supplied by Cintel International with this software.
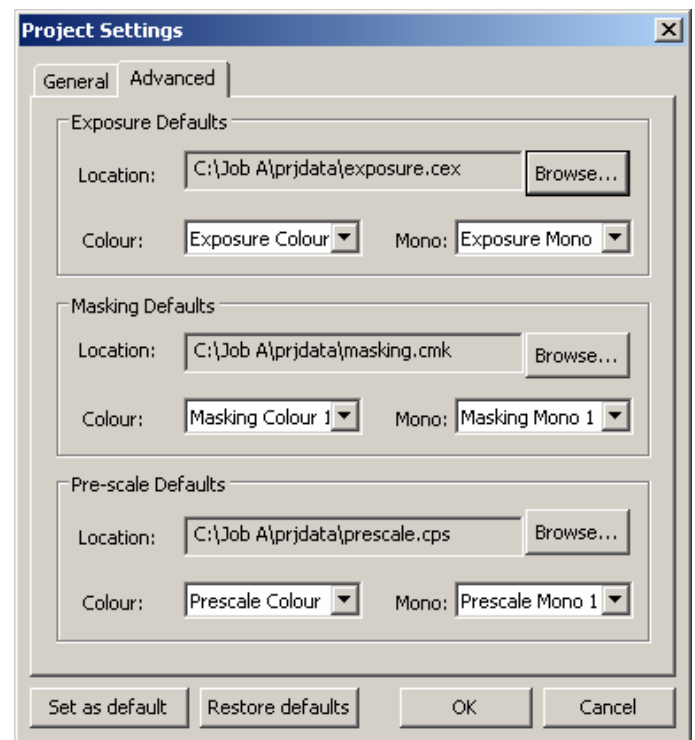
Fig 34 Project (Advanced) Settings Window

Description of Film Transport
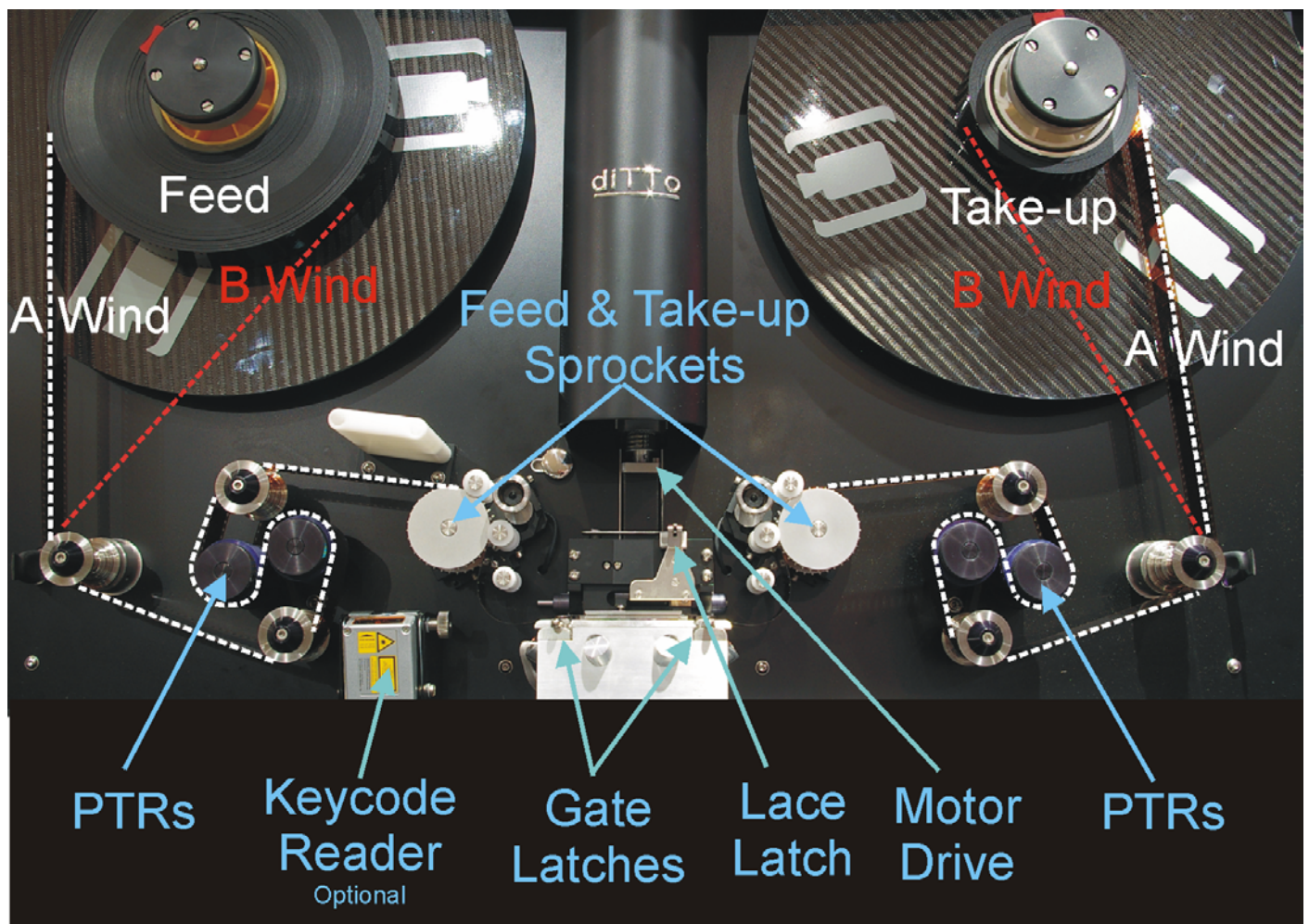
Fig 35 Transport

The Film Transport (Fig 35) comprises continuous rotation feed & take-up back plates that can accept 2000ft of 35mm film. The film is fed to an intermittent clapper type register pin gate by continuously rotating sprockets, with free loops formed either side of the clapper gate. This mechanism minimises any transport tension on the film by avoiding tensioned intermittent motion. The transport includes PTR cleaning rollers, a keycode reader, means to select A/B wind of the back-plates and a removal gate mechanism.

Transport Safety Interlock
When the diTTo door is open remote control from the GUI is inhibited. Local controls remain active. This interlock should only be overridden, when necessary, by qualified service personnel. On no account should diTTo be operated with the interlock overridden due to the possible danger from the rotating mechanisms.

Lacing film

Always scan the film with Emulsion up (towards camera lens). *Focus will be compromised if film is laced emulsion down*.

Ensure gate is in "Lace position" as shown in Fig 36. The Latch will push in to keep the gate in lace mode.
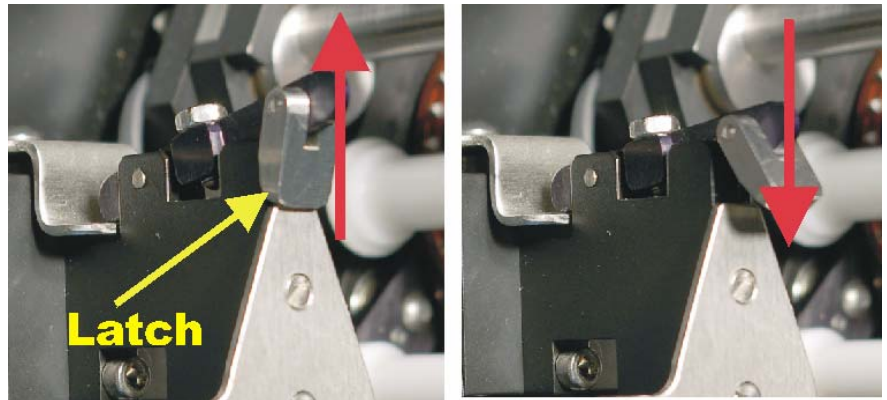
Lace Position   Fig 36   **Loaded Position**

1.   Lace Film left to right missing the feed and take up sprockets and run the film straight from the Feed Compliance arm to the Take Up compliance arm via the PTR (Particle Transfer Roller) rollers to the take up film core. Lace as A or B wind depending on the wind direction of the supplied film rolls.(See Fig 34).

   A or B status is set on the GUI (see page 7). Wind sufficient film onto the take-up film core to ensure a tight wrap.
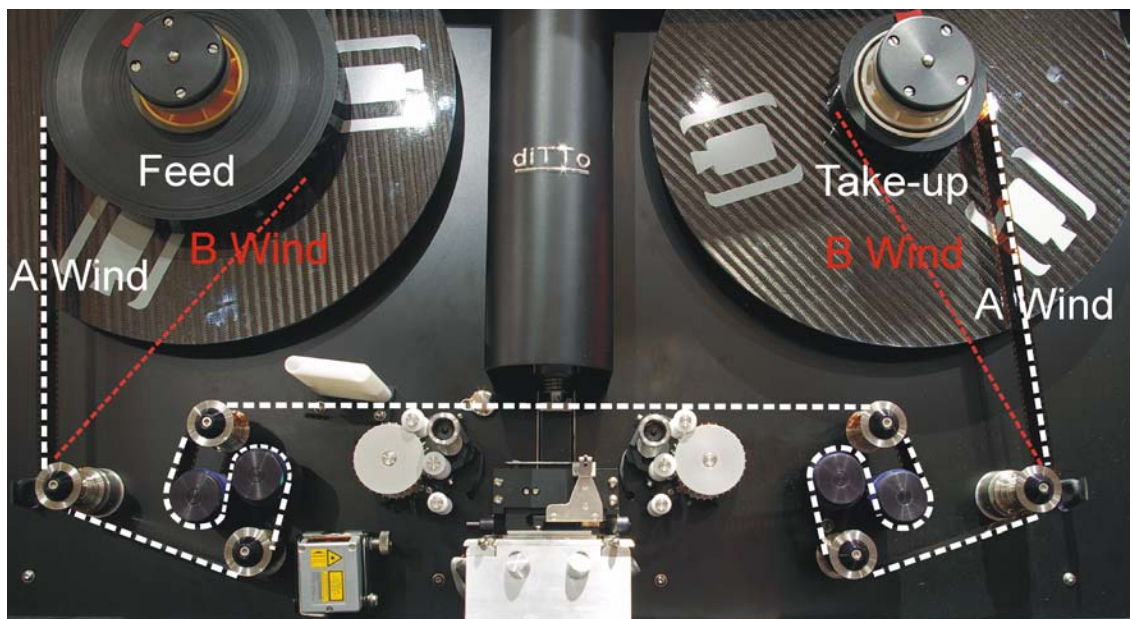
Fig. 37 Initial lacing path

2   Lace Take Up Sprocket. Rotate hold down clamp to lift hold down rollers away from the sprocket as shown in Fig 38. Wrap film around sprocket as indicated, ensuring film perforations engage with sprocket teeth. When correctly wrapped rotate hold down clamp to lower rollers onto film.

3   Lace film temporarily through gate, leaving sufficient loop for film motion.. The loop lengths should be set so they are just touching the skid plate area of the gate. (See Fig 37/38)
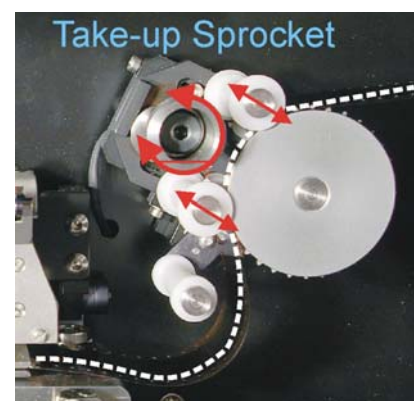
Fig 38 Sprocket lacing path
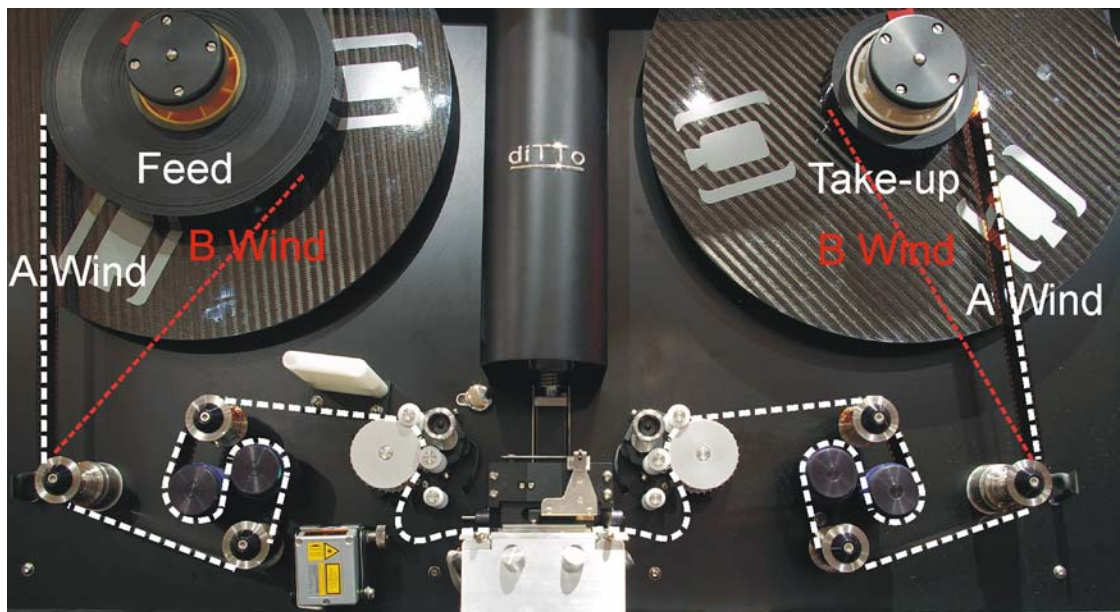
Fig 39 Final lacing path

4. Lace Feed sprocket. In a similar way to the take-up sprocket (See Fig 42)

5 Centre the film loop between the sprockets and align the film frame bar in the centre of the aperture plate just to the right of the shuttle pins (as in Fig 40/41 below) Release the gate lace latch (Fig 36) gently lowering the shuttle pins into the film's perforations. Lightly rock the film to verify that the pins are fully located in the film perforation. (*See Gate Lacing below for more details)*
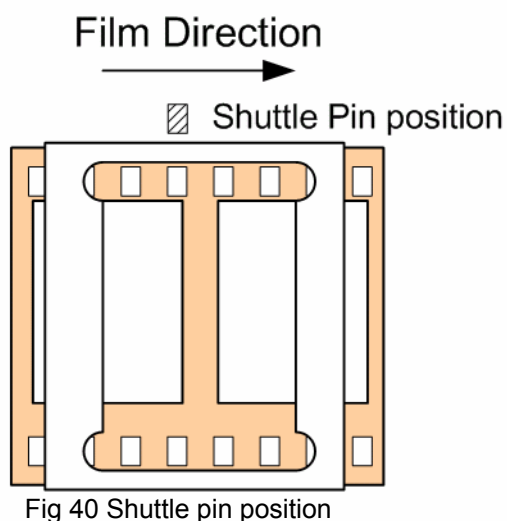
Fig 40 Shuttle pin position
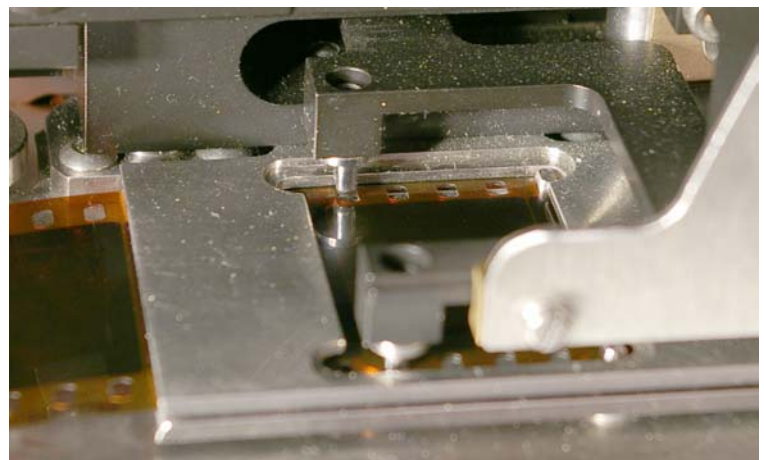
Fig 41 Shuttle pins over film

6 If a Keykode reader is fitted ensure that the a framing bar of the film aligns with the marked sprocket teeth on the feed sprocket. If aligned with the wrong framing bar the loop will either be too short or too long.

This alignment is essential to ensure correct synchronisation between the Keykode and scanned frame.

Fig 42 Feed Sprocket Frame bar markings in Red
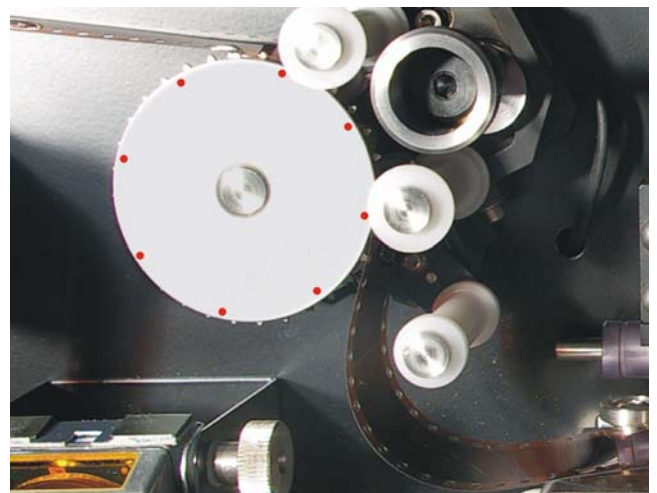
LOCAL CONTROLS

The Local Control buttons are arranged like this:
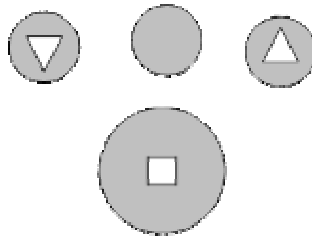
Some of them have dual functions depending on whether you are in 'Loaded' or 'Unloaded' mode;

LOAD

Loading the film is a 2 stage process. Press and hold LOAD then confirm with either ▽ or △
(see 'Load transport tension' below)

STOP / Unload
The Stop button, when already 'stopped' further depression of this button "unloads" the transport tension.

When diTTo is in Un-Loaded mode;
Pins DOWN.
. Lowers gate stripper plate down, pins film on fixed register pins then parks gate shuttle at extreme LH side.

Pins UP.
Raises stripper plate up, gate shuttle is parked at LH side of centre permitting lacing of film

When diTTo is in Loaded mode;
Forward (FWD)
A single press will cause the transport to advance 1 frame, a continuous press will advance frames until released.

Reverse (REV)
A single press will cause the transport to reverse 1 frame, a continuous press will reverse frames until released.

Gate Lacing

1. Make sure the transport is in 'Unloaded' mode by depressing the Stop/Unload button.

2. Raise the gate stripper plate up off the fixed register pins by pressing △. *Sometimes you need to slightly rotate the motor drive to free up the plate. See Fig 41 and 43*

3. Lift the shuttle pins up and latch it in the upper position. See fig 36
4. Lace the film between the plate top and bottom.

5. Have the frame bar positioned in the middle of the gate aperture. Make sure the fixed register pins are lined up with the film perforations. The shuttle pin should line up with the perforation just to the left of the framing bar. You may need a little physical adjustment by sliding the shuttle pins side to side until over the perforations by rotating the motor drive (Fig 43) until the plate and shuttle pins are at the correct point in the cycle.

6. Unclip the shuttle pin latch and lower the pins carefully down and into the film perforation. See Fig 36 & 41

7. Press ▽ to lower the plate down onto the pins. The Transport should then automatically frame the film and bring the image into focus.

8. Do not operate the transport with the lacing latch (Fig 36) in the up position as this could damage some film perforations
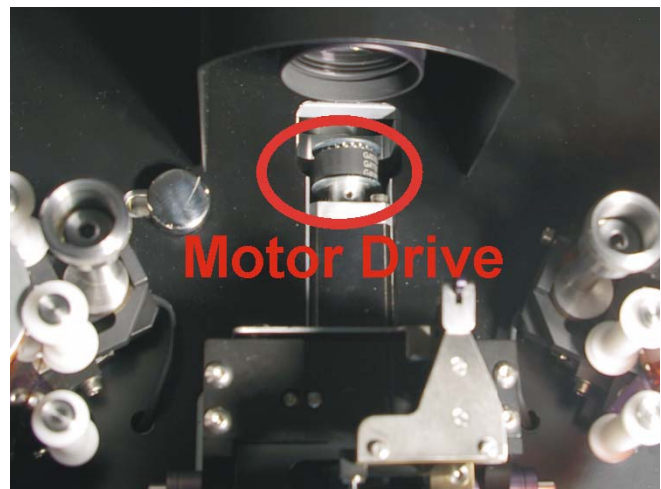
Fig 43 Location of Motor Drive

Load Transport Tension

Make sure the film is correctly laced through all rollers and sprockets then take up any excess film onto the reels

1. Make sure film is not slack and load transport by pressing and holding ◯

2. If everything is OK with the film path, and the wind direction (A or B) is correct on both Feed and Start-up reels, press either ▽ or △ to confirm the LOAD.

The Transport is now fully tensioned and ready for operation. This can be checked by pressing the Inch **FWD** or **REV** buttons to verify correct transportation.

Keykode Reader (Optional)
For safety information about this option refer to Appendix 3

diTTo can be supplied fitted with a Keykode reader, mounted to the left of the film gate. The reader can be adjusted to accommodate keykode on either side of the film.

To adjust, refer to Fig 44.

1. Loosen the locking screw.

2. Move the keykode reader in or out as required. It is best to run the transport with film containing the appropriate keykode position while adjusting the position to ensure corrct readings are being obtained, by looking at he keykode box on the GUI.

3. Tighten the locking screw.

- For Original Camera Negative (OCN). Position A
- For Interpositive (IP) keycode. Position A
- For OCN keycode printed on IP. position B**
- For OCN Keykode printed via an IP to an Internegative. Position A

** This is only available if the lab has printed the OCN keykode correctly on the Interpositive.
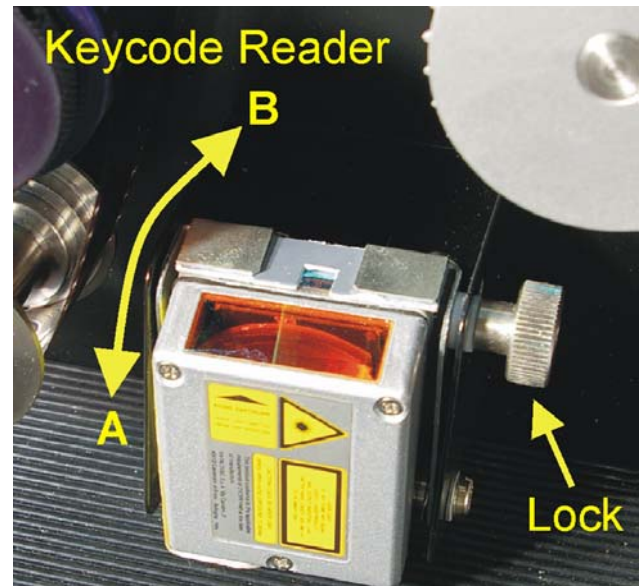
Fig 44 Optional Keykode Reader

Maintenance
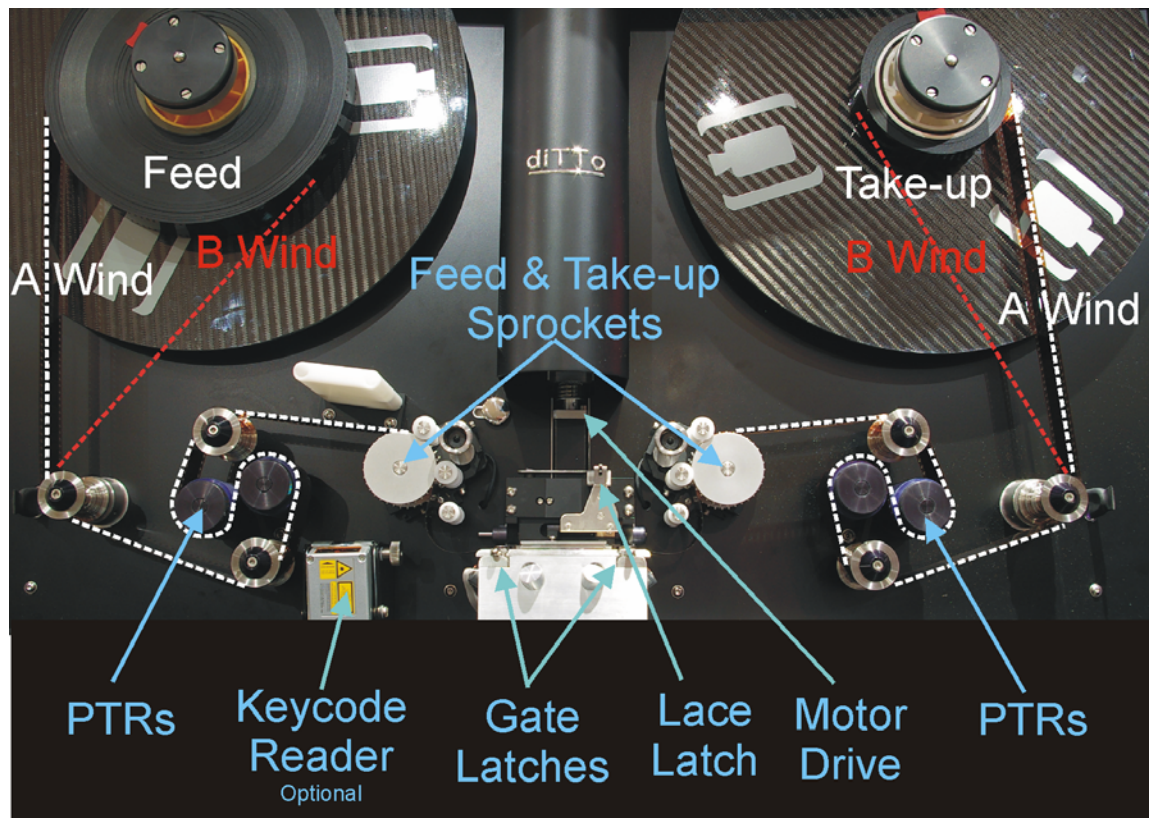
Fig 45 Transport

Like any professional film scanner, diTTo should be kept in an appropriate environment (see page 30) and should be regularly cleaned.

Film Gate Removal

The film gate can be removed, if necessary, by undoing the 2 fixing latches and carefully lifting the mechanism out.
Clean as necessary (see below).
Refitting the gate may require pressing of the Pins Up/Pins Down buttons to seat properly. (See page 26)
Secure the gate with the fixing latches.

Fig 46 Location of Gate levers

Transport (Film Path Rollers and Gate)

The film transport path should be checked before every job and cleaned if necessary.
Check that there is no physical damage on any of the transport path areas. Also check that there is no build-up of dirt or dust. Any accumulated deposits should be removed using a lint-free cloth.

Check that the gate shuttle mechanism is free and that the shafts are clean. If necessary, clean well and apply a very small quantity of fine oil via a lint-free cloth, removing any surplus.

Camera and illumination Lenses

The camera lens should be checked before every job and cleaned if necessary.
The lens should be gently dusted using Optical quality wipes.
Access to the illumination lens can be made when the film gate is removed.
Caution: All Cintel lenses are coated to improve their performance, this coating is very easily scratched, and therefore great care must be taken to avoid damage.

Particle Transfer Rollers (PTR's)

The PTR's should be cleaned before each job using a damp cloth. Every week the rollers should be removed and cleaned thoroughly with soapy water. Wash PTR's in cold water with a mild detergent, at a ratio of 2-4 drops per litre of water. Use slightly more detergent if the water is "hard". The manufacturer recommends Palmolive detergent.
Do not use dishwasher detergent.
Do not use hot water as it can cause PTR's to become very sticky and cause excessive adhesion and potential damage to the film. Do not use packaging or other adhesive type tapes to clean a PTR after it has been washed! Such tapes will transfer some of adhesives to the PTR and cause excessive adhesion of the film to the PTR, resulting in damage to the film.

Simply wash the PTR's and allow them to dry thoroughly before re installation. If cleaned properly, PTR's should roll off one another when placed together. PTR's that stick together without falling off must be re washed in cold water and (Palmolive) detergent.

Before replacing the rollers a small amount of grease should occasionally be applied to the roller shafts. Failure to do this can result in the rollers binding to the shafts which can lead to damage to the compliance arm assembly. On no account allow any grease to contact the PTR cleaning surface

PTR's will remove dust, dirt and lint from film for a period of 3-4 months of constant use if cleaned properly and regularly. All PTR's are anti-static.

Replacements can be ordered from **spares@cintel.co.uk** The Cintel part number is **661115**

Specification

Network Connections
RJ45 - Gigabit Ethernet connection
USB 2.0
Firewire 400
Dual Fibre Channel HBA (LC style Connectors)

Environment
diTTo should be installed in a dust free environment.
Temperature range   18°c to 25°c
Relative Humidity   55% to 65%

Power
Mains supply   90v – 265v 47/63Hz Auto sensing
Consumption   2kW Maximum   1kW Nominal

Dimensions
Width   1087mm
Height   785mm Closed   1352mm Open
Depth   820mm
Weight   178kg

Transport System
Over 2000ft per roll capacity
S35mm/35mm Pin Registration

Light Source
RGB Light Emitting Diode (LED) Illumination
Diffusing Sphere for Dust and Scratch reduction

Scanning System
3K Area Array CCD camera
Over-sampled "super" 2K at 4.5 frames per second
4K at 3 frames per second
Auto "D-MIN" Calibration
Fast (12fps) B&W mode

Frequently Asked Questions (FAQ's)

Q.   Do we have to record to the Local RAID?

A.   No, the choice is yours. The internal RAID will store over an hour of 2K files but is designed primarily as a buffer. It is anticipated that most users will record directly to a Network via Gigabit Ethernet, for example.

Q.   What is Intelligent Network Transfer?

*A.   There are times when a Network is extremely busy with 'traffic'. In these instances, the interface (Gigabit Ethernet, for example) may not be able to sustain the bandwidth required for diTTo's high speed scanning.
In these instances, diTTo will slow down its scanning rate to match the available bandwidth. Even when bandwidth temporarily becomes zero, diTTo will only pause while the condition exists, and will recommence scanning as bandwidth again becomes available. This means that scanning will not stop but will continue at the most efficient rate without user intervention.*

Support details

The Cintel Customer Support Department can be contacted on **service@cintel.co.uk** and **service@cintelinc.com**

Cintel International Ltd.	(UK)	Tel: +44 (0) 1920 463939
Cintel Inc.	(USA)	Tel: +1 (661) 294 2310
Cintel Asia Pacific	(Hong Kong)	Tel: +852 2887 8727

In all communication, it will help if the diTTo Serial Number and Software Version are known. The Serial Number will be found on the rear upper right panel of diTTo and the Software Version will be found in **Help: About diTTo**
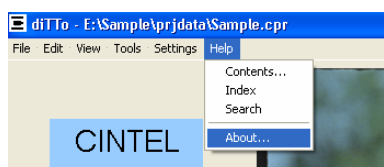
Fig 47 Help pull down menu
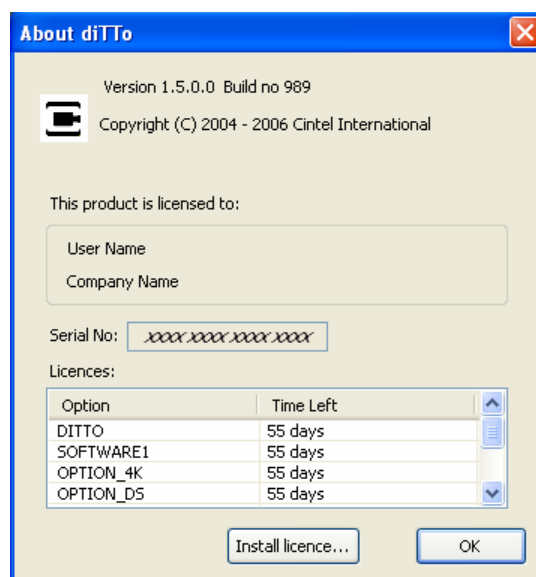
Fig 48 About diTTo Window

For any replacement parts, please contact **spares@cintel.co.uk**

Software Updates

diTTo software upgrades will be supplied on CD or DVD or may be sent via email.
Installation of Upgrades is via Windows install shield and is largely automatic.

diTTo and diTTo options Licenses are issued for life on purchased items.

Where diTTo or a diTTo option is under trial or supplied by Cintel International on a restricted basis Temporary licenses may be issued

Renewal of Temporary License

diTTo Software Options can be licensed for 7, 28 or 56 days. Licenses will be sent via email.

As a license nears its end of life a warning will be displayed on the GUI six to seven days prior to the end of licenses life advising that a new license should be obtained from Cintel International.

If a new license is not obtained by the end of life of the license the following will happen.
If a scan is in operation at license expiry the scan will complete all conformed clips in the current listing as long as diTTo is not disturbed..

At completion of any scan or if no scan is in progress the LED Illumination will be disabled until a new license is obtained.

FUSES

Mains Inlet

F1	240V	6.3A (T) 20mm
	110V	10A (T) 20mm

LED Machine Status Information

Circuit Board LED's

Summary of Circuit Board LED functions and status feedback.

TK1058-B3

LED1	Red	+5V = OK
LED2	Red	+24Fan = OK
LED3	Red	+12V = OK
LED4	Red	-12V = OK
LED5	Red	+24V = OK
LED6	Red	-24V = OK
LED702	Red / Orange	NOT Used

M102750-AA1

LED1	Red	R&D test only
LED2	Red	R&D test only
LED3	Red	R&D test only
LED4	Orange	Xillinx Done = OK
LED5	Red	R&D test only
LED6	Red	R&D test only

TK1048-A2

Interlock PCB changes state.

LED1	Red	Lite = Door "CLOSED"
		Un-Lite =Door "OPEN"

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The licence is personal to the Licensee who shall not transfer it or grant any sub licences without Cintel's written consent which shall not be unreasonably withheld where the proposed transfer is in respect of the sale of Equipment to a bona fide user and the purchaser has consented to accept these licence terms and provided the Licensee retains no copies of the Software/Firmware including any printed materials. A transfer fee may be required.
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The Licensee shall permit Cintel's representatives to have access at all reasonable times to the Software/Firmware and any records relating to its use.

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This Licence shall be interpreted in accordance with the laws of England and the Licensee hereby submits to the exclusive jurisdiction of the English Courts.

Product Serial Number   _____   Software Version   _____

Licensee Name   _____   Licensee Position Title   _____

Licensee Signature*   _____   For Cintel International   _____

Date   _____

*Only the initial 28-day license will be issued until this document is received by Cintel International with an official Licensee signature.

Appendix 1   **DPX file format and Metadata**

www.cineon.com gives detailed information of the Cineon film data specification.
www.cinesite.com has extensive information on Digital Picture eXchange (DPX) file formats.

_____

Appendix 2   **Resolution vs File size selection and quick reference chart**

Resolution vs File size
File size depend on both the scan resolution and colour or B/W selection.

For Colour Film settings
          Resolution 2K Colour   12.5MB   RGB   Full colour Image
                        4K Colour   50MB   RGB   Full colour image
                        2K Mono   4.1MB   1 channel Matrixed RGB to monochrome
                        4K Mono.   16.6MB   1 channel Matrixed RGB to monochrome

For B/W Film settings
          Resolution 2K Colour   12.5MB   RGB   Colour scan, may show colour tint
                        4K Colour   50 MB   RGB   Colour scan, may show colour tint
                        2K Mono   4.1MB   1 channel   Monochrome
                        4K Mono.   16.6MB   1 channel   Monochrome

Note: All files are DPX compliant. In some instances OEM software may not decode 1 channel monochrome files correctly.

Approximate File sizes for Colour DPX 10 bit LOG data scans

	Frame	Second	Minute	Hour
Standard Definition (720 x 576)	1.6MB	38.4MB	2.25GB	135GB
1K data (1024 x 768)	3.2MB	76.8MB	4.5GB	270GB
High Definition (1920 x 1080)	8.2MB	197MB	11.53GB	692GB
2K data (2048 x 1556)	12.5MB	300MB	17.6GB	1.03TB
4K data (4096 x 3112)	50MB	1.2GB	70.3GB	4.1TB

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Appendix 3   Safety information relating to Keykode reader. (DATALOGIC USS Scanner)

SAFTEY PRECAUTIONS and FCC COMPLIANCE

> This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
> (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference which may cause undesired operation

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radiocommunications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct this interference at his own expense.   851000173 (Rev C)

The following information is provided to comply with the rules imposed by international authorities.

STANDARD LASER SAFETY REGULATIONS
This scanner conforms to the applicable requirements of both CDRH 21 CFR 1040 and EN60825-1 at the date of manufacture.

CAUTION

> Use of controls or adjustments or performance of procedures other than those specified herein may result in exposure to hazardous visible laser light.

The laser light is visible to the human eye and is emitted from the window indicated at figure A in the relative installation manual and the orange window shown in Fig 41 page 25 in this manual.

This product utilises a low-power laser diode. Although staring directly at the laser beam momentarily causes no known biological damage, avoid staring at the beam as one would with any very strong light source, such as the sun. Avoid that the laser beam hits the eye of an observer, even through reflective surfaces such as mirrors etc.

Laser warning and classification labels are placed on the product and reproduced in the installation manual.

Label contents: LASER LIGHT
                    DO NOT STARE INTO BEAM
                    CLASS 2 LASER PRODUCT
                    MAX. OUTPUT RADIATION;
                    EMITTED RADIATION;
                    TO EN60825-1 (200

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Appendix 4   Masking

The term masking, as used in film scanning devices, has a different meaning to that used in the film production and post production industry. Masking in the context of film scanning is NOT a means of keying certain parts of an image for special effects or image compilation.

The **Masking** control provides the ability to individually adjust the 'masking' of the Red Green and Blue signals by adding or subtracting Red, Green and Blue information.
Masking is used to match colorimetric balances due to the variations in the taking characteristics of colour film stock.
Masking should generally be used only to compensate for such variations. It should not be used as a means of general colour correction.

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