# cineSpace Documentation

Michael Anderson, Michael Chenery & Didier Elzinga

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The cineSpace suite of software tools are created by Rising Sun Research (http://research.rsp.com.au). For further information not contained in this document look in the cineSpace forums (http://research.rsp.com.au/phpBB2/).

# Contents

# Chapter 1

# Change Log

## 1.1 Changes in v2.04

### 1.1.1 New Features

- The availability of both a stable and a development version. It is intended that only serious bug fixes will be done to the stable version while feature additions will occur on the unstable development version.

### 1.1.2 Bug Fixes

- Better accuracy for dark colours and reduced banding effects. This was considered important enough to get a release soon after v2.03.

## 1.2 Changes in v2.03

### 1.2.1 New Features

- The help browser now stores names of locations in addition to locations. The history and bookmark files are now stored in the users `.rsr_settings` directory.

- The font sizes used in equalEyes and cineProfiler are now user specifiable through `RSR_FONT_SIZE`. Each operating system can override these values using `RSR_FONT_SIZE_LINUX`, `RSR_FONT_SIZE_IRIX`, `RSR_FONT_SIZE_OSX` or `RSR_FONT_SIZE_WIN32`.

- There are now indicators for the state of equalEyes on it's front page.

- cineCube now has printer lights are available using `-printerlights` with additional setting specified via `-red-off 26` or `-green-trim 24` type commands. All unspecified trims and offsets default to 25.

### 1.2.2 Bug Fixes

- The help browser history no longer clashes with tcsh history file. Additionally the help files are limited in size, removing several crashes and performance issues.
- equalEyes and cineProfiler were showing in a reduced bit depth in IRIX if the desktop was not in true color mode. The applications now always try to draw in true color mode. Also warns on all platforms if it is not drawing with enough bit-depth.
- The interpolation methods for 1D transforms has been changed and interpolation near 0 and 1 have been improved, resulting in smoother ramps and better reproduction of dark colours.
- A bug in the black point correction causing a light band to occur part way up the grey ramp in some cases has been fixed.
- Permanent profiles are now recognised correctly.
- In linux equalEyes now obtains mouse focus correctly, and come to the front when clicked.
- The Log-Lin button was in the wrong state.
- cineCube no longer complains about correct arguments being invalid.
- Changes to cineShake to support multi-threading broke it for float input – this has been fixed.
- A problem where equalEyes was being drawn way too small on some Fedora Core 2 linux boxes in KDE window manager has been fixed.
- The machine name is now found correctly under windows, rather than using the user domain.

## 1.3 Changes in v2.01

### 1.3.1 New Features

- EqualEyes has a splash page while waiting to obtain a license, which can take a while. (It used to not respond at all.)
- All programs allow specification of the configuration file to use from the command line. `--config=`*filename* will use the configuration file *filename*, while `--config-extra=`*filename* will load *filename* after the normal configuration files. Both options can be used on the same line.

- Serial devices can now be used through serial to usb converters. The port names to check can be given by `RSR_SERIAL_PROBES_ONLY` or `RSR_SERIAL_PROBES_EXTRA`. The first of these replaces the list of usual ports examined with that specified. The second appends the ports specified.

- The file that logging information goes to (when the `RSR_OUTPUT` is set to logging mode) can now be specified foe equalEyes and cineProfiler using the `RSR_EE_LOG_FILE` and `RSR_CP_LOG_FILE`. When these are not specified the old method of writing to `RSR_LOG_FILE` is used.

- The age at which profiles are considered expired can be set for equalEyes. The variable `RSR_MONITOR_LIFETIME` defaults to 14 and `RSR_FILM_LIFETIME` defaults to 180.

- Configuration variables can now be set from the command line for most applications. For example to enable logging in cineProfiler we can run the program as `cineProfiler --rsr-output=LOG`. The variables are prefixed with `--` and are case insensitive. Also where a variable name uses an underscore, the command-line version can use either an underscore or a single dash.

- Multi-threading has been enabled in the cineShake and cineFusion nodes.

- There is now better handling of profiles that contain only primary and grey ramps. (This has removed some of the color shifts observed in the cineon profile). These profiles also support film-like desaturation of the primaries when the primaries add to less than the white point. ( Only observable in applications using full 3D transforms such as cineShake, cineFusion or cineCube)

- Extra navigations buttons added to equalEyes front page.

- Added `RSP_EE_NOCONFIRM_EXIT` variable which makes equalEyes quit without confirmation. This may be useful if you can't get the window manager to shut down while equalEyes is running.

### 1.3.2 Bug Fixes

- Added functions for ensuring monotonicity/smoothness of monitor profiling.

- Fixed crash in cineFusion when user user changes settings while plugin is processing.

- Plugins no longer check out a license for each node.

- The windows installer no longer sets shortcuts that over-ride other applications.

- Fixed a string related crash in the base library that occurred in unusual cases.
- The conflicting messages in the equalEyes dialog regarding profile age has been fixed.
- Inadvertently active button in equalEyes made inactive.
- Logging information is now generated by cineProfiler correctly.
- Various banding observable in the grey ramp has been fixed.

# Chapter 2

# The cineSpace suite

## 2.1 What is cineSpace

CineSpace is a digital film calibration system designed by rising sun research. Via a hardware probe cineSpace is able to accurately profile monitors throughout a facility and then using a simple application the artist is able to

- match the monitor to any desired film output stock
- match the monitor to any other monitor in the building

Simple to use and built with film users in mind cineSpace is designed to give you true "what you see is what you get" functionality on the computer screen without having to print out film - potentially saving thousands of dollars on every project.

Built on the basis of our extensive experience in digital film we have essentially codified all of our esoteric knowledge of how digital film works and made it available to everyone else in order to demistify the process of digital film.

Running on linux, windows 2000/XP, and OSX we are aiming to provide world class tools to artists however they need them. All licenses are floating and we provide support from people who are extensively trained in film production techniques.

## 2.2 The cineSpace Suite

The components of the cineSpace Suite are

**cineProfiler** An application that utilises a hardware probe like a gretag macbeth i1 display, beamer or xrite dtp92 to *profile* the response of your monitor. These profiles are stored in XML files that are used to calibrate your display by the applications listed below.

**equalEyes** This is a standalone tool that uses a monitor profile created by cineprofiler to match your monitor to another monitor, a video standard (like PAL, NTSC or HD) or to film. It works by modifying the gamma table of your graphics card.

**cineCube** A command line tool that is used to generate 3d colour cubes that can be used by realtime playback products from Iridas (the framecycler line of products) and Nucoda (dataConform & film master). These products load these 'cubes' onto the graphics card and provided a cineSpace calibrated display within their own application.

**xml2Legacy** For people still using v1.2 cineSpace xml2legacy transforms profiles built by our v2.0 profiler so that they can be used with v1.2 cineSpace.

**legacy2xml** For people still using v1.2 cineSpace xml2legacy transforms profiles built by our v1.2 profiler so that they can be used with v2.0 cineSpace.

**cineFusion** (*windows only*) The plugin to Digital Fusion which provides the functionality of both equalEyes & cineCube as a node within Fusion. It also has support for multiple accelerated modes for dealing with 3d luts.

**cineShake** (*linux + osx only*) The plugin to Shake which provides the functionality of both equalEyes & cineCube as a node within a tree or as a viewer LUT. It also has support for multiple accelerated modes for dealing with 3d luts.

## 2.3 Setting up cineSpace

### 2.3.1 Linux

Setting up equalEyes under Linux is easy. Open the cineSpace archive ( .tgz file). Copy the RisingSunResearch directory to the desired location. Inside the are the cineSpace applications, plugins and an rsr.conf file. All that remains to be done is to set the `$RSR_APP_DIR` environment variable to the installation directory and ensure that the applications are accessable from your `PATH` [1].

### 2.3.2 OS X

The Mac OS X version of cineSpace comes as a disk image containing an installer. Open the disk image (.dmg file) and run the cineSpace installer (.pkg file) it will be the only file in the disk image.

Running the installer and following the on screen directions will install the cineSpace programs into the directory of your choice. Finally you should set the `$RSR_APP_DIR` variable to point to the location of your installation.

[1] This can be done either by copying or linking the executables to an existing executable directory or appending the instalation directory to you `PATH` variable.


### 2.3.3 Windows

Running the installer (.exe file) will install equalEyes into a specified directory and place shortcut icons in the appropriate places. The installer will setup the required environment/registry variables for you.


### 2.3.4 Setting up the the license server

cineSpace uses a standard flexLM license server architecture. The required server can be obtained from the rsr ftp site. Consult the flexLM documentation for setting up this server.

### 2.3.5 The rsr.conf file

The distribution contains a configuration file called rsr.conf. This file contains the default values for many settings in equalEyes and cineProfiler. These values can be overridden using environment variables and other locations for the

rsr.conf file can be specified using the `RSR_APP_DIR` environment variable. See the environment variable section (Chapter A).

# Chapter 3

# EqualEyes

## 3.1 What and Why

EqualEyes is an application for matching a display device (monitor) to a target device/media (ie. film or HD). ie. Modify the behaviour of the display device to resemble that of the target device so that when given an RGB stimuli the display device responds with the same colour as the target device.

This enables users to view images on their display device as they would appear on the target device (ie. film or HD).

Without such correction the images prepared on your monitor won't look the same when viewed on the target device.

## 3.2 How equalEyes works

EqualEyes uses two "profiles" to do its work. A profile is a file that describes the behaviour of an image display device, they map the RGB stimuli to the colour produced by the device for that stimuli.

The first is the display device profile or *Monitor Profile*, the second is the target device profile or *Target Profile*.

From these profiles a set of look-up-tables is generated and loaded onto the graphics card. These luts are calculated specifically to cause the output from the display device (monitor) to closely match the output from the target device/media for a given stimulus.

## 3.3 Limitations

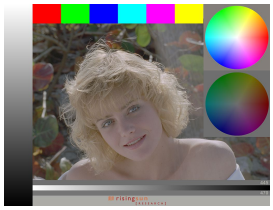
Because equalEyes uses a 1D lookup table for the intensity of each primary, changes in the chromaticities of the primaries can not be accommodated, only changes in intensity. Similarly cross talk between the red green and blue primaries (as occurs in film) cannot be simulated. In these cases the LUTs are

chosen so that the grey ramps match in both cases.

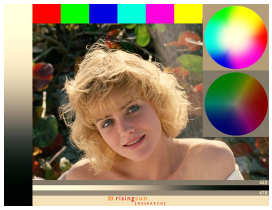
This only effects users who would like to match to a film target, if you want to match to another monitor or one of the HD/Video standards then useing 1D luts is not an issue and equalEyes will give you an excellent match.

The plug-ins section provides details on how to get more accurate results from within applications such as shake and digital fusion using plug-ins.

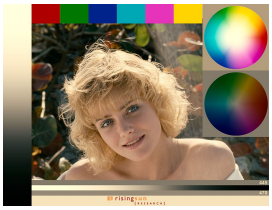
Examples with a normal cineon file, the same file viewed with equalEyes and the file viewed through the cineEngine3D library used by the plug-ins can be seen below.



Unprocessed



equalEyes



cineEngine 3d

## 3.4 Using equalEyes

## 3.5 Anatomy

### 3.5.1 Front Page

This page contains the primary functions of equalEyes.


#### Activate/Deactivate Lut

This button turns the display matching on and off.

**Activate** Loads the currently calculated lut into the graphics card's lut.

**Deactivate** Loads a uniform, linear lut with gamma of 1.0 into the graphics card's lut.

*Note: When you exit equalEyes the lut that was being used by the graphics card before equalEyes was run is reloaded into the graphics card.*

### Monitor Profile

To select the profile of the monitor you are using, press this button. EqualEyes will attempt to guess the right value for your computer but may need some help. The default value can be set in the rsr.conf file. Information about the age of the profile being used will also be displayed in this button.

*We do not recommend using monitor profiles older than 14 days.*

### Target Profile

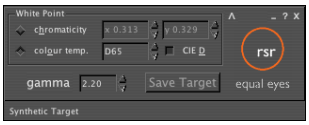
This controls the current target profile. If the current target is specified by a .xml profile, this button will allow you to change the file used. If the current target is a "synthetic profile" you will be taken to the synthetic profile page. The default settings for this button can be controlled by the rsr.conf file.

### Synthetic Profile

Toggles the use of synthetic profiles or .xml profiles for the target.

## 3.5.2 Synthetic Profile Page

EqualEyes has a synthetic profile facility where you can specify the color and gamma for your target rather than needing to load an .xml one.




To setup a 6500K+gamma 2.2 in equalEyes:

- Open equalEyes and select your monitor profile (if not selected by default)
- Switch to the Synthetic Profile 'page' by right clicking and selecting *Synthetic Target* or by pressing **F7**
- Click the *colour temp* check box and the *CIE D* checkbox
- Enter `65` into the *colour temp* text field and press **enter**.
- Enter `2.2` into the *gamma* text field and press **enter**.

The monitor is now being matched to a CIE 6500K illuminant with gamma 2.2 You can return to the EqualEyes *main page* by using the right click menu or pressing **F5**.

Alternatively you can set the synthetic profile values in the rsr.conf file so the user need only click the *Synth* button on the EqualEyes *main page* to match to these settings. To do this set the following settings in the rsr.conf file.

```
RSR_SYNTH_GAMMA = 2.20
RSR_SYNTH_TEMP = 6500
RSR_SYNTH_WP_TYPE = temperature
RSR_SYNTH_TEMP_TYPE = CIE
```

### 3.5.3 Printer Lights

The printer light page allows for tonal adjustments of the target profile. The adjustments simulate the behaviour of standard film printer light settings. The default settings for these can be set in the rsr.conf file.


#### Copy Printer Lights

It is possible to copy the printer lights with Ctrl + C and paste them into Shake to generate a node which will have the same effect as the printer lights.

### 3.5.4 Saved States

You can save the current state of equalEyes and restore it at a later time.

**Save a preset** Press the +/= Key followed by the number [1-9] of the preset you want to store the current settings in.

**Load a preset** Press the number Key of the preset you would like to load.

**Rename a preset** While a preset is loaded press the N key then enter the name you would like to give to the preset and click the 'Set Name' button.

**Unload a preset** While a preset is loaded press the N key then enter the name you would like to give to the preset and click the 'Set Name' button.

**Delete a preset** Press the _/- Key followed by the number [1-9] of the preset you want to delete/clear.

*Saved states will stay set even when EqualEyes is shutdown and restarted.*

### 3.5.5 Right Click Menu

A right-click context menu is available on every page.

**Confidence Test** This performs a test that the screen output is correct using a connected probe.

**Minimize (not in OS X)** Minimize the application.

**Opacity Toggle (not in Linux)** The application can be made transparent to be less intrusive to the user.

**EqualEyes** Displays the main / front page.

**Printer Lights** Displays the Printer light page

**Synthetic Target** Displays the Synthetic Target page

**Log/Linear Mode toggle** This toggle button requires some explanation. In normal use (for film images) toggling log to linear mode allows you to use equalEyes to view linearised film images as well as raw log. However calling it a log/linear mode is somewhat of a misnomer.

What is actually happening is that equalEyes transforms your display so that whatever you are looking at will appear the same as if it was sent straight to the output device with no modification. In the context of film images this means we are talking about log images (ie cineon or dpx file format usually) as this is the format that film recorders expect.

If you were working with normal video files (say for a computer animation) and looking at them with HD calibration on then you would still leave it in 'log' mode as what you are saying essentially is that the image you are looking at will not be corrected on the way out.

Now if you are looking at a linearised film image that is going to be converted to log before being sent to the film recorder you can toggle the log/linear mode and voila it shows you what your currently linearised image will look like after it has been converted and sent to the film recorder. Now if you are following all this you might very well ask the question 'but how do you know how we are going to transform our image to log ?'. The short answer is we don't, you have to tell us. Take a look in the appendix at the rsr.conf file and you will see the settings that we use and that you can customize.

**Scale Mode toggle** When equalEyes is in scale mode (the default) the brightness of what you see is controlled by how bright your monitor can be. When scaling is off the brightness is controlled by the brightness of the target profile. Usually you will want to use the full available brightness of your monitor and thus have scaling on. However when it is important that the *brightness* of nearby monitors match or to compare the brightness of target profiles you will have to use the non-scaling mode.

*Note: Non-scaling mode can introduce gamut clipping artifacts.*

**Clear Luts** Clears the LUTs and resets the application.

**Help** Opens the help browser.

**About** Shows the about page

**Exit** Quits the application.

### 3.5.6 Key Bindings

| | | | |
|---|---|---|---|
| Opacity Toggle | [ F3 ] | — | — |
| Show main page | [ F5 ] | [ Alt + E ] | [ Ctrl + E ] |
| Show printer light page | [ F6 ] | [ Alt + P ] | [ Ctrl + P ] |
| Show synthetic target page | [ F7 ] | [ Alt + G ] | [ Ctrl + G ] |
| Activate / Deactivate | [ Space ] | [ Alt + Space ] | [ Ctrl + Space ] |
| Log / Lin | — | [ Alt + L ] | [ Ctrl + L ] |
| Minimise | — | [ Alt + M ] | [ Ctrl + M ] |
| Help | [ F1 ] | [ Alt + H ] | [ Ctrl + H ] |
| About | — | [ Alt + A ] | [ Ctrl + A ] |
| Exit | [ Esc ] | — | — |
| Copy printer lights | — | [ Alt + C ] | [ Ctrl + C ] |
| Confidence test | — | [ Alt + T ] | [ Ctrl + T ] |
| Set linear lut | | [Backspace] | [Delete] |
| Save lut | [ + or = ] then [ 1–9 ] | | |
| Delete Saved lut | [ _ or - ] then [1-9] | | |
| Apply Saved lut | [ 1 – 9 ] | | |
| Return to last settings | 0 | — | — |
| Name the active saved lut | [ n ] | — | — |

Other key bindings may be defined by the operating system and window manager.

## 3.6 Troubleshooting

### 3.6.1 Linux

When switching applications under Linux the LUTs are reset sometimes. This can occur when there is a graphics config issue with your XF86Config file. To fix make your XF86Config file look more like this ...

```
Section "Device"
        #VideoRam    131072
        Identifier  "Videocard0"
        Driver      "nvidia"
        VendorName  "Videocard vendor"
        BoardName   "NVIDIA Quadro FX (generic)"
        Option      "NvAGP" "3"
        #Don't use overlay. It wll cause cineSpace to fail if maya is open
        #Option      "Overlay" "1"
        #Option      "CIOverlay" "1"
EndSection
```

Thanks to Jami Levesque for this fix.

### 3.6.2 Glitch on restore of profile

On Redhat Linux 7.3 restoring the last non-stored setting, or "0" setting, causes the logarithmic mode to be set. This does not occur on Fedora Core, Windows or Mac OS X. There is no known fix at this stage, apart from upgrading your version of linux, or manually switching out of log mode, which can be done easily with Alt + T.

## 3.7 Errors

### 3.7.1 Clipping Error

A *Clipping Error* warning occurs when some values in the target profile are brighter than the monitor can display.

There are two ways of dealing with this problem, having different pros and cons.

With clipping any values in the target that are brighter than the monitor can display instead use the brightest displayable value. This results in all values below this threshold being correct, but brighter colours being distorted.

With scaling the brightness of the target is reduced so that the relative brightness of all output colours are correct, but the absolute values will be darker than the target profile.

Often this problem occurs when the monitor physically can't display colours as bright as requested (such as trying to match an LCD display on a CRT). However sometimes increasing the monitor brightness and re-profiling can fix this. In particular this can occur when using a dark target profile when profiling with cineProfiler. What happens is that the cineProfiler tells the user to reduce the global brightness of the screen down to match the target requested. If the screen is re-profiled using a brighter target profile (or so that the brightness levels match at higher than 0 in the profiler) these clipping errors may go away.

# Chapter 4

# cineProfiler

cineProfiler is an application that utilises a hardware probe like a gretag macbeth i1 display, beamer or xrite dtp92 to *profile* the response of your monitor. These profiles are stored in XML files that are used to calibrate your display by the applications in the cineSpace suite. Also cineProfiler attempts to help you set your monitor so that you will get the best possible colour response from the setup you intend to use.

## 4.1 Using CineProfiler

CineProfiler has four stages.

### 4.1.1 Stage 1 – Set up probe

**1a)** Detect Probe
Plug in your probe and ensure it has power if needed.

If you are profiling an LCD screen then check the *Monitor is LCD* checkbox at the bottom left of the screen. Note: LCD screens can only be profiled with either the Gretag I1 Beamer or I1 Display probes.

Checking the Advanced Profile option will cause cineProfiler to take a greater number of samples and takes significantly longer to complete. The profiles generated may be useful if you have had trouble with the darker colours, but is usually unecessary. If in doubt leave this box unchecked.

Click the *Detect Probe* button.

**1b)** Calibrate Probe
Place the probe on a flat opaque surface (or holder of your probe has one) so no light can enter it. Click the *Calibrate* button.

### 4.1.2 Stage 2 – Prepare Monitor

Follow the directions on the screen to ready the monitor for profiling.

**2a)** Set the monitor's contrast to 100%

**2b)** Set the *gain* for the Red, Green and Blue channels to approx. 50%

**2c)** Adjust each *gain* channel until white looks *neutral* trying to keep them centered around 50%

**2d)** Set the bias for Red, Green and Blue channels to approx. 50% (if you have separate bias controls)

**2e)** Adjust each *bias* channel until white looks *neutral* trying to keep them centered around 50%

**2f)** If you are profiling for general HD/video/multimedia use we recommend using our default profile as your optimization target. Otherwise check the *Select profile* radio button below to be able to choose the output profile you will be working with as your optimization target.

Once you have completed the on-screen instructions and chosen to *Select a profile* or *Use default profile* click the *Start* button.

### 4.1.3 Stage 3 – Optimize Monitor

**3a)** Adjust the R, G and B *bias* on your monitor until the *bias* sliders all read 0 (-2 to +2, is OK) Then Adjust the R, G and B *gain* sliders on your monitor until the *gain* sliders all read 0 (-2 to +2, is OK) If the bias levels moved while doing the gain then redo the bias, then the gain again ... repeat until all sliders read 0 (-2 to +2, is OK).

Note: As long as the *bias* sliders are all set to 0 (-2 to +2, is OK) then if it impossible to get the gain sliders to 0 it is fine as long as they are all the same ie. If the Red gain slider says +23 and your monitor's gain is at 100% then just adjust the green and blue gains until both the green and blue sliders also read +23 ... or the text under the gain sliders reads *colour good* or *colour OK* Turn off the OSD and check the *gain* and *bias* sliders are still correct. Click the *Start Profiling* button.

### 4.1.4 Stage 4 – Profile Monitor

**4a)** Collect profile data
Sit back and relax while cineProfiler goes to work gathering information about how your monitor performs. This should take between 2-5 minutes depending on the type of probe you are using. When cineProfiler has finished profiling it will prompt you to name and save the profile. The Default name should be the name of the machine being profiled while

the default location to save will be the `RSR_MONITOR_DIR` value set in the rsr.conf file. To make sure equalEyes finds the profile we suggest you use the default name and location.

Your monitor is now profiled. To use the profile close cineProfiler and then open equalEyes it should find the profile you just created. If found equalEyes will load the profile as it's monitor profile automatically.

## 4.2 Profiling Considerations

### 4.2.1 Ambient Lighting

One of the most important parts of profiling is setting the ambient lighting conditions correctly. The ambient lighting should be set up to be as close as possible to the ambient lighting conditions that the work you will be doing on the monitor will finally be viewed in. For TV/video/HD this is quit dim but not completely dark, for film it is just about completely dark.

### 4.2.2 Selecting a target profile

The target profile that you choose to optimize your monitor to will determine the colour and brightness of the white point of the monitor. For the best match from your monitor you should always choose the target you intend working with on the profiled monitor. Ie. If you are about to do some film work and will be using the `kodak_2383.xml` target profile then select this profile as your target when profiling. This will set your monitor up to provide the best possible contrast and resolution when matching the target. If you are going to be doing a variety of work on your monitor then we recommend you use the default target profile as it will optimize the monitor into a more general space better suited to use with a variety of target profiles

### 4.2.3 Optimizing

When using macs or any monitor where there are no physical controls on the monitor you should skip the optimization step of the profiling process. Sometimes these monitors are controlled using the graphics card LUTs and since cineProfiler and equalEyes each clear the LUTs when they load, optimizing this type of monitor will in fact ruin the profile that is created. So unless you know this isn't the case for your LCD don't try to adjust the brightness or contrast.

If you are optimising and find that your monitor's bias and/or gain cannot be adjusted correctly (ie. you need to add more Red gain but your red gain is already at 100%) there are a few things you can try;

- If your monitor has a colour restore function, close cineProfiler run *colour restore* then try profiling again.

- While still in the optimisation page adjust the brightness of the monitor in the direction you need (up if you need for red gain) then adjust your bias sliders to 0 before adjusting the gain again.
  Note: AS long as all the *bias* sliders are at 0 (-2 to +2, is OK) then the black point you set on the pluge page will remain valid even if you have changed the brightness.

- Just set the *bias* sliders correctly and then adjust the R, G and B *gains* until the gain sliders are all level. ie. If the Red gain slider says +23 and your monitor's gain is at 100% then just adjust the green and blue gains until both the green and blue sliders also read +23 ... or the text under the gain sliders reads *colour good* or *colour OK*

- If all else fails buy a new monitor !

# Chapter 5

# cineShake and cineFusion

The cineShake and cineFusion plugins provide a way to access the features of equalEyes, as well as the complete 3d color transformations required for reproducing film behaviour, from within a compositing application.

## 5.1 CineFusion

cineFusion is a plugin to Digital Fusion which provides the functionality of both equalEyes & full 3d colour transforms as a node within Fusion. It also has support for multiple accelerated modes for dealing with 3d luts.

### 5.1.1 Installation

cineFusion requires Digital Fusion version 4 or higher, and is only available on the windows platform.

#### Windows

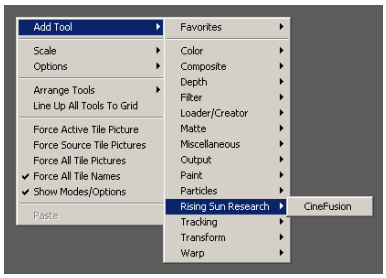
If you run the cineSpace installer when DigitalFusion is installed the cineFusion plugin will automatically be placed in the DigitalFusion plugins directory.

If you install DigitalFusion after cineSpace you can copy the plugin *CineFusion.dfp* from the cineSpace application directory to the DigitalFusion plugins directory. ie.

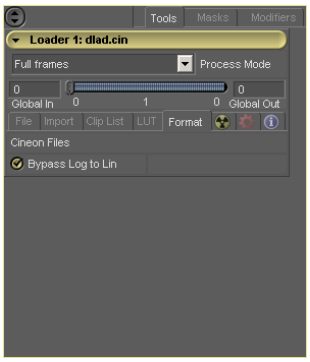
```
COPY C:\Program Files\RisingSunResearch\cineSpace\CineFusion.dfp
     C:\DigitalFusion\plugins\CineFusion.dfp
```

### 5.1.2 Using CineFusion

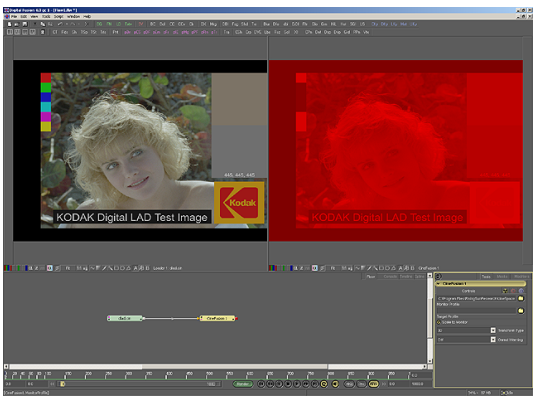
- Open DigitalFusion v4+
- Load cineFusion tool: `Tools>Rising Sun Research>cineFusion`




- Load an image and connect to the cineFusion node. If you are using cineon images be sure to check the *Bypass Log to Lin* checkbox under the format tag in the loader.

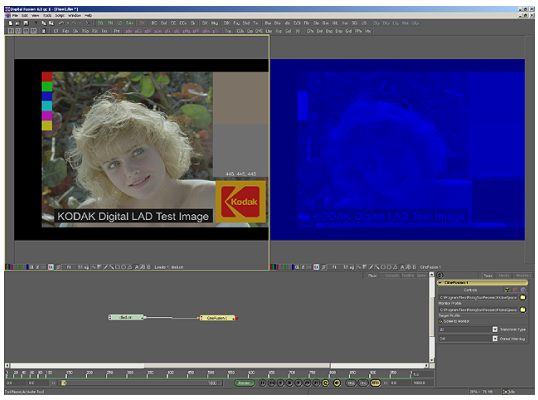



- At this stage cineFusion should be outputting a 'red' frame , this indicates that the monitor and target profiles are not valid.

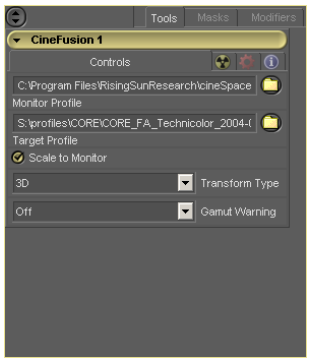



- If cineFusion outputs a blue frame it means that cineFusion cannot find a license. Check your `RSR_APP_DIR` env. variable is pointing to the directory

that contains the rsr.conf file. Check that the RSR_LICENSE_FILE setting in the conf file is set to the full path and file name of the license file.




- Select a recent monitor profile for your monitor and the target you would like to match.




Controls:

- Monitor Profile: Select a recent monitor profile for your monitor. (controls.bmp)
- Target Profile: Select the target profile you would like to match.
- Scale to monitor: This is checked by default. (only uncheck this if you really know what you are doing) Unchecking this will match the luminance as well as the chromaticity of the target white point. This will give the best match to the target but only if the monitor is 'brighter' than the target. If the target has a higher luminance then the white point values will be clipped and the frame output will not match the target. We recommend leaving 'Scale to Monitor' checked, unless you are an experienced user.

- Transform Type: Select the transform type 2D uses a 2D transform the same as equalEyes. 3D uses a 3D cubic transform. This is generally the most accurate transform but is also the slowest. 3D - linear uses a 3D linear transform. This may give some banding but is faster than the 3D cubic transform.
- Gamut Warning: This is set to Off by default. When on any colours that would be out of gamut on the target device are displayed as green and the alpha of the pixel is set to zero.

## 5.2 CineShake

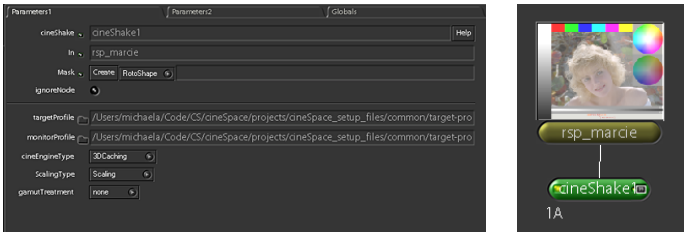
The cineShake node will work under OS X, and linux Fedora core, (and presumably other glibc 2.3 based systems.) On OS X it requires shake version 3.5 or higher. Under linux plug-ins for both version 3.0 and 3.5 are provided.

### 5.2.1 Installation

Copy the `cineShake.so` (linux) or `cineShake` bundle (OSX) into your shake plug-in directory. Copy `cineShake.cineShake.nri` into the shake plug-in images directory. Copy the `cineShakeUI.h` into the shake plugins header directory.

### 5.2.2 Using cineShake

Usage is very similar to the cineFusion node, with some small naming differences.

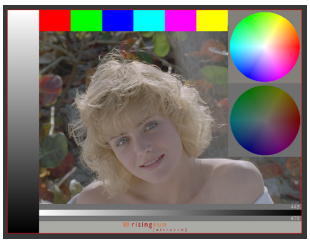



A red output means that the profiles selected are invalid and a blue output means no lincense was available.

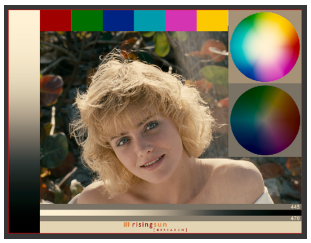
Bad Profile

No License

Typical results are shown below



Original



Color Corrected

# Chapter 6

# CineCube

cineCube is a command line tool that is used to generate 3d colour cubes that can be used by realtime playback products from Iridas (the framecycler line of products) and Nucoda (dataConform & film master). These products load the 'cubes' onto the graphics card and provided a cineSpace calibrated display within their own application.

## 6.1 cineCube Usage

Usage:

`cineCube.exe -target` ⟨*target profile*⟩`.xml -monitor` ⟨*monitor profile*⟩`.xml -bits` ⟨*4..9*⟩ `[-type` ⟨*nucoda/iridas/quantel*⟩`] [-noscale]`

Details: CineCube generates 3D look-up tables (cubes) from cineSpace target and monitor profiles.

`-target` Full path to target profile (profile of device you want to match). Must be a valid cineSpace_v2 .xml profile.

`-monitor` Full path to monitor profile (profile of device you will be working / viewing on). Must be a valid cineSpace_v2 .xml profile.

`-bits` Resolution of generated cube 4..9 (Recommend using 5 ie. a 32x32x32 cube).

`-type` Type of cube you want to generate. Supports `nucoda`, `iridas` and `quantel`.

`-noscale` Set this if you do not want the target and monitor spaces normalised. Setting this option will give greater accuracy as long as the monitor is 'brighter' than the target. If the monitor is not as bright as the target clipping will occur and the created cube will be corrupted.

CineCube currently does no file writing itself so you will need to 'pipe' or 'direct' the standard output to a file as required (see example below).

Example:

```
cineCube.exe -target kodak_2383.xml -monitor sRGB.xml -bits 5 -type iridas
> 2383_sRGB.itx
```

**Printer Lights**

Simulated printerlight settings (similar to those in equalEyes) are available as

`-printerlights` Enable printerlight usage

`-red-off` The red printerlight value (default 25)

`-green-off` The green printerlight value (default 25)

`-blue-off` The blue trim value (default 25)

`-red-trim` The red printerlight value (default 25)

`-green-trim` The green trim value (default 25)

`-blue-trim` The blue trim value (default 25)

If the offsets are the same as the trims there is no effect. ( Only the difference between them are used )

## 6.2 Using cineCube With framecycler

1. Profile your monitor which generates host.xml.
2. Run cineCube with the appropriate target profile.
   ```
   cineCube.exe -target film.xml -monitor host.xml -bits 5 -type iridas
   > cube.itx
   ```
3. Copy the resultant cube.itx into the LUTs directory of your framecycler installation.
4. Restart framecycler if necessary and the cube should appear in the calibration tab when viewing an image sequence.

## 6.3 Using cineCube with Nucoda

1. Profile your monitor which generates host.xml.
2. Run cineCube with the appropriate target profile.
   ```
   cineCube.exe -target film.xml -monitor host.xml -bits 5 -type nucoda
   > cube.cms
   ```
3. Copy the resultant cube.cms into a folder accessible by the nucoda system.
4. Create a project in dataConform/filmMaster and specify userCMS.
5. Click on the CMS Tab on the upper right section of the interface to browse to the cube.

# Chapter 7

# legacy2xml and xml2legacy

While we encourage users to switch completely to a v2.0 setup, for some users this may be impractical and a combination of v2.0 and v1.x need to be in use. In such situations xml2legacy and legacy2xml can be used to transform profiles between the v2.0 and v1.x formats.

## 7.1 legacy2xml

legacy2xml is a tool for converting profiles in the legacy profile format used by cineSpacev1.x to the new .xml based profile format used by v2+.

**USAGE:** `legacy2xml.exe source_directory target_directory`
Converts each legacy profile stored in `source_directory` to a `.xml` profile in `target_directory`.

## 7.2 xml2legacy

xml2legacy is a tool for converting .xml based profiles into the legacy profile format used by cineSpacev1.x

**USAGE:** `xml2legacy.exe source_directory target_directory`
Converts each `.xml` profile stored in `source_directory` to a legacy profile in `target_directory`.

# Chapter 8

# Frequently Asked Questions

## 8.1 cineProfiler

**I have an LCD without any controls on it what do I do?**

You can skip the optimization stage and you should be fine. Note that this is the same as profiling without changing any settings.

**My LCD is registering as way too bright, what do I do?**

Nothing. Profiling should work just fine. For LCDs you can usually skip optimization stage.

**What is an advanced profile and should I be creating one?**

An advanced profile contains 52 points per ramp, as opposed to 16 per ramp for a normal profile. This is mostly for debugging purposes, but may be useful if you are having trouble with the dark colours. But you should almost never have to use one.

**Can I profile my monitor without the colour probe?**

The process of calibrating & profiling your cannot be achieved without a device to measure the absolute response of your display. This is where the XRite DTP92 Colorimeter comes into play.

Without a specific profile based on a workstation's display hardware, the colour correction provided by cineSpace's default profile (in combination with the cineon [film] or PAL/NTSC [broadcast] output paths) will offer a dramatic improvement over that of an un-altered display however, the above-mentioned scenario (without probe) is far from an ideal solution.

In measuring the exact response of your workstation's display (via the colour probe), cineSpace is able to build a customised profile that more accurately compensates for the inadequacies & discrepancies of each particular monitor. This allows for an accuracy & consistency (between all displays in a facility for example) that simply can't be achieved without measuring the absolute response of the display device. Additionally, the calibration phase of profiling a monitor through the probe, matches the colour temperature to industry standards for film or broadcast environments.

Here at our production facility in Australia, we've cultured the habit of profiling our monitors on a regular basis to compensate for their continual variation in response.

**Before I installed the software, my monitor looked pretty good to my eye. It wasn't perfect, nor did it exactly match the other monitors in the facility. Why must I adjust my monitor's hardware settings during the profiling process?**

Indeed the calibration & profiling process may require you to adjust the hardware settings of contrast & brightness, in order to achieve the maximum gamut from your display device. Additionally, the recommended setting for individual colour bias & gain (when you target white dot on the centre-point of r,g,b-space), ensures that your display output is truly colour-independent for a given luminance, & accurately matches the industry standard colour-temperature (5400K, 6500K).

This combination of hardware settings (unique to each monitor) represents the optimal configuration for displaying the possible range of input data, because the output response (measured via the probe) is at it's most accurate & dynamic.

The generated profile in combination with cineSpace, accurately corrects any input to the measured absolute response of your display device, compensating for irregularities across the range of luminance.

It's highly probable that the new calibrated hardware settings of your monitor will give a different look to what you're used to however, once calibrated and profiled, the monitor's hardware settings should not be altered in any way (brightness, contrast, colour gain & bias, geometry, scan-rate etc.) as this may invalidate the generated profile.

For further information, please refer to the section on Advanced Monitor Considerations.

**Why can't cineProfiler detect the probe?**

One common reason for not being able to detect the probe is that the current user doesn't have read/write permissions to the required device. Changing the permissions on the device will usually fix this.

Also ensure that the right drivers are installed. Some platforms need them some platforms don't - check the manual for your probe.

## 8.2 cineShake

**The cineShake node wont work, I get a "`error:/lib/i686/ibc.so.6:version GLIBC_2.3 not found`" error, what can I do?**

Your version of linux is not glibc 2.3 based and the plugin requires some of these libraries. Upgrading to a more recent version of linux should fix this.

If this is a real show stopper contact Rising Sun Research and we *may* be able to help you find a work around.

## 8.3 EqualEyes

> When calibrating a monitor using the default target LUT I find I am left very little head room in Red gain, it is at about 98. When I used older versions of the profiler the overall RGBgain is required to be lower, leaving red at 90. I did not alter the brightness when using v2.0 but I did notice that the screen seemed a lot darker.

*This should not happen in current builds of equalEyes, as scaling is now turned on by default.*

To explain what is happening here:

By default EqualEyes matches the users monitor to the target Monitor in both chromaticity and luminance.

If you have the scale button pressed it will match chromaticity but will scale the luminance to that of the monitor (this is the normal behaviour of cineSpace v1.x).

We have done this for three main reasons;

1. It enables for much more accurate matching between monitors. Using cineSpace v1.x you could profile two machines next to each other and when they both used the same target profile afterward they may still have very different luminances, and hence appearance. So by matching luminance we get a *much* better match.
2. The HD, sRGB and similar standards have ideal luminances and viewing conditions. We can only match these correctly by matching luminance and chromaticity.
3. It enables the users to accurately compare the luminance differences between different targets. Particularly useful for comparing film profiles of different film stock / lab setup combinations.

The main implication of matching to the target luminance is that if it is greater than the monitor trying to match it can achieve, clipping occurs making the white point completely inaccurate. This is what is occurring if the scale light in equalEyes is red.

To help avoid this situation we added the ability for cineProfiler to optimise monitors for luminance as well as black/white point chromaticity.

The problem is if you optimise the monitor to be exactly the same as the target you become completely incapable of viewing targets who have either a brighter luminance or different white point chromaticity, as either of these will cause clipping and so will need to be scaled.

To avoid this we have our default profile with 6100 wp (between film and HD) and we have added some headroom in cineProfiler so that the target you aim for when optimising is actually a little higher than the target profile it's self.

This is why all of a sudden you need to push your monitors higher we have been experimenting with the amount of headroom needed. It is hoped that these problems will be less of an issue in the next release (v2.1) where better control over the desired luminance will be available in cineProfiler.

# Appendix A

# Environment Variables and Configuration Files

Here we examine how the cineSpace libraries use environment variables and configuration files to determine default behaviour at runtime

## A.1 Philosophy

cineSpace uses a combination of configuration files and environment variables. Variables can be defined in either a global configuration file, a local configuration file or using environment variables.

## A.2 Details

The configuration files are looked for in three locations

```
$RSR_APP_DIR\basename
$HOME\basename
.\basename
```

If more than one of these files is found then they are read in that order, with entries in later files overwriting earlier entries. (Similarly repeated entries in the configuration files only take the last value in the file.)

Finally Environment variables can override each of these values.

Thus in order of loading we have

1. The RSR application directory ( `$RSR_APP_DIR`) (if defined in the environment)
2. The users home directory ( $HOME ) (if defined in the environment)
3. The directory from which the application was started (./)
4. Environment variables

## A.3 Common Variables

Settings that effect most RSR applications and plug-ins.

### A.3.1 Directory Settings

**RSR_APP_DIR** = directory
A last resort place to look for shared RSR resources. Enter the absolute (not relative) path to the directory that has the application executable in it.
*RSR_APP_DIR = /usr/local/RisingSunResearch/*

**RSR_MONITOR_DIR** = directory
Sets the location of your monitor profiles.
*RSR_MONITOR_DIR = /usr/local/RisingSunResearch/monitor-profiles/*

**RSR_TARGET_DIR** = directory
Sets the location of your target profiles.
*RSR_TARGET_DIR = /usr/local/RisingSunResearch/monitor-profiles/*

### A.3.2 Default Profile Settings

**RSR_MONITOR_REGEXP** = regexp
RSR applications will look in `RSR_MONITOR_DIR` for profiles matched to the regexp `RSR_MONITOR_REGEXP` to use as the default monitor profile, if more than one match is found the file with the most recent creation/modification date is used. More detail is provided in section A.6.
*# Pick out the most recent file containing the host name ending in .xml*
*RSR_MONITOR_REGEXP = (%HOST).*\.xml$*

**RSR_TARGET_REGEXP** = regexp
RSR applications will look in `RSR_TARGET_DIR` for profiles matched to the regexp `RSR_TARGET_REGEXP` to use as the default target profile, if more than one match is found the file with the most recent creation/modification date is used. More detail is provided in section A.6.
*# Pick out the RSR_ideal_monitor profile*
*RSR_TARGET_REGEXP = ^RSR_ideal_monitor\.xml$*

### A.3.3 License Settings

**RSR_LICENSE** = flexlm path
Sets the path to your license file or server. An absolute path works best as relative paths are relative to the directory that the application was run from not the directory where the application is located (unless the `RSR_APP_DIR` above is set).
*RSR_LICENSE = ./rsr_beta_license.dat*

### A.3.4 IO settings

Settings that generally effect console output from `RSR_OUTPUT` and `RSR_LOG_LEVEL` options:

| RSR_OUTPUT | RSR_LOG_LEVEL | What you actually get |
|---|---|---|
| NOTHING | | Nothing |
| QUIET | 0 | Fatal errors |
| ERROR | 1 | Non-fatal errors + QUIET |
| WARNING | 2 | Warnings + ERROR |
| VERBOSE | 3 | Other comments + WARNING |

**RSR_OUTPUT** = NOTHING, QUIET, ERROR, WARNING, VERBOSE, LOG
If RSR_OUTPUT = LOG then `RSR_LOG_LEVEL` and `RSR_LOG_FILE` should be set. (see below)
*RSR_OUTPUT = VERBOSE*

**RSR_LOG_LEVEL** = 0, 1, 2, 3
Sets level of log output
*RSR_LOG_LEVEL = 3*

**RSR_LOG_FILE** = filename
Sets path to file where logged output should be placed.
*RSR_LOG_FILE = rsr.log*

## A.4 cineProfiler options

**RSR_CP_OPTIMISE** = ON, OFF
If ON (default) then cineProfiler users get to optimise their monitor before profiling. If OFF the optimise monitor step is skipped. Useful when profiling lots of monitors quickly or when using MACs or other systems where there is no hardware control of the monitor, these systems use the graphics system's luts to adjust the display so optimising the monitor has no effect on profiling or using equalEyes.
*RSR_CP_OPTIMISE = OFF*

## A.5 equalEyes options

### A.5.1 Log / Lin settings

**RSR_FILMDATA_WHITE** = int
Sets film white point for log/lin conversions. Range is 0 - 1023. Defaults to (685) if not set. For backward compatibility 'FILMDATAENV_WHITE' is also accepted.
*RSR_FILMDATA_WHITE = 685*

**RSR_FILMDATA_BLACK** = int
Sets film black point for log/lin conversions. Range 0 - 1023. Defaults to (95) if not set. For backward compatibility 'FILMDATAENV_BLACK' is also accepted.
*RSR_FILMDATA_BLACK = 95*

**RSR_FILMDATA_D_GAMMA** = float
Sets conversion/device gamma for log/lin conversions. Range 0.001 - 10.0. Defaults to (1.7) if not set. For backward compatibility 'FILMDATAENV_D_GAMMA' is also accepted.
*RSR_FILMDATA_D_GAMMA = 1.7*

**RSR_FILMDATA_F_GAMMA** = float
Sets film gamma for log/lin conversions. Range 0.001 - 10.0. Defaults to (0.6) if not set. For backward compatibility 'FILMDATAENV_FILM_GAMMA' is also accepted.
*RSR_FILMDATA_F_GAMMA = 0.6*

**RSR_FILMDATA_SOFT_CLIP** = int
Sets the Lin/Log white-point soft-clipping range. Soft clipping occurs over the range WHITE − SOFT_CLIP to WHITE + 4 × SOFT_CLIP. Range 0 - 1023. Defaults to (0) if not set. For backward compatibility 'FILMDATAENV_SOFT_CLIP' is also accepted.
*RSR_FILMDATA_SOFT_CLIP = 0*

### A.5.2 Synthetic profile settings

**RSR_SYNTH_GAMMA** = float
Default gamma for synthetic profiles. Range 0.001 - 9.999. Defaults to 2.20 if not set.
*RSR_SYNTH_GAMMA = 2.20*

**RSR_SYNTH_TEMP** = int
Default white point correlated colour temperature (CCT) for synthetic profiles. Range 4000 - 25000. Defaults to 6500 if not set.
*RSR_SYNTH_TEMP = 5400*

**RSR_SYNTH_X** = float
Default white point CIE x-chromaticity co-ordinate for synthetic profiles. Range 0.001 - 0.999. Defaults to 0.3127 (CIE D65) if not set.
*RSR_SYNTH_X = 0.3127*

**RSR_SYNTH_Y** = float
Default white point CIE y-chromaticity co-ordinate for synthetic profiles. Range 0.001 - 0.999. Defaults to 0.3290 (CIE D65) if not set.
*RSR_SYNTH_Y = 0.3290*

**RSR_SYNTH_WP_TYPE** =
Not yet documented
*RSR_SYNTH_WP_TYPE = temperature*

**RSR_SYNTH_TEMP_TYPE** =
Not yet documented
*RSR_SYNTH_TEMP_TYPE = CIE*

## A.6 Regular Expressions

Instead of selecting a monitor using name alone we can match the most recent version of the file matching a given regular regular expression using RSR_MONITOR_REGEXP. From all matching filenames the one chosen is

1. The one with the highest (sorted alphabetically) last capture.
2. If more than one have same highest last capture, then most recently modified of these.

For example: Example: regexp = `^file(\d\d\d\d)a` is interpreted as
the beginning of the string: `^`file(\d\d\d\d)a,
followed by the string "file": ^`file`(\d\d\d\d)a,
followed by a capture: ^file`(`\d\d\d\d`)`a
of four digits: ^file`(\d\d\d\d)`a
finally followed by an "a": ^file(\d\d\d\d)`a`.

That is the regexp matches the files file0000a, file0000abc, file1234abc and file1234avc but not other_file or file0000b or file1234 or file000x. Of the matches both file1234abc and file1234avc match the last capture, `(\d\d\d\d)`, with "1234" which is greater than the "0000" of the other files. Thus the file chosen will be the most recently modified of these two files.

## A.7 Example

```
1  # RSR Configuration file v2.03 (13 October 2004)
2  #
3  # RSR applictaions read configuration files in the following places. (in the
   following order)
4  # 1) The RSR application directory (if defined in the environment)   (
   $RSR_APP_DIR )
5  # 2) The users home directory (if defined in the environmnet)        ( $HOME
   )
6  # 3) The directory the application was started from                  ( ./)
7  #
8  # with variables set in the later files overwriting those set in earlier
   files.
9  #
10 # Finally the values defined in the environment are loaded and overwrite any
   of these variables
11 #
12
13
14 ### Section 1: Global Environment
15 #
16 # Settings that effect most RSR apllications and plugins
17 #
18
19
20 ### Section 1a: Directory Settings
21 #
22
23 #
24 # RSR_MONITOR_DIR: Sets the location of your monitor profiles.
25 #
26 RSR_MONITOR_DIR = ./monitor-profiles
```

```
27
28  #
29  # RSR_TARGET_DIR: Sets the location of your target profiles.
30  #
31  RSR_TARGET_DIR = ./target-profiles
32
33  #
34  # RSR_APP_DIR: A last resort place to look for shared RSR resources.
35  # Enter the absolute (not relative) path to the directory that has
36  # the application executable in it.
37  #
38  #RSR_APP_DIR = ./
39
40
41
42
43  ### Section 1b: Default Profile Settings
44  #
45
46  #
47  # RSR_MONITOR_REGEXP: RSR applictaions will look in RSR_MONITOR_DIR
48  # for profiles matched to the regexp RSR_MONITOR_REGEXP to use as the
49  # default monitor profile, if more than one match is found the
50  # file with the most recent creation/modfication date is used.
51  #
52  # Pick out the most recent file containing the hostname ending in .xml
53  #
54  RSR_MONITOR_REGEXP = (%{HOST}).*\.xml$
55
56  #
57  # RSR_TARGET_REGEXP: RSR applictaions will look in RSR_TARGET_DIR
58  # for profiles matched to the regexp RSR_TARGET_REGEXP to use as the
59  # default target profile, if more than one match is found the
60  # file with the most recent creation/modfication date is used.
61  #
62  # Pick out the RSR_ideal_monitor profile
63  # (white point: 6100K, gamma: approx~ 1/0.52 ).
64  RSR_TARGET_REGEXP = ^RSR_ideal_monitor\.xml$
65
66
67
68
69  ### Section 1c: License Settings
70  #
71
72  #
73  # RSR_LICENSE: Sets the path to your license file or server.
74  # An absolute path works best as relative paths are relative to the
75  # directory that the application was run from not the directory where
76  # the application is located (unless the RSR_APP_DIR above is set).
77  #
78  #RSR_LICENSE = ./rsun.dat
79
80
81
82
83  ### Section 1d: IO settings
84  #
85  # Settings that generaly effect console output from
86  # RSR_OUTPUT and RSR_LOG_LEVEL options:
87  #
88  # [RSR_OUTPUT] [RSR_LOG_LEVEL] [What you actually get]
89  #
90  #   NOTHING                    Nothing
91  #   QUIET           0          Fatal errors
92  #   ERROR           1          Non-fatal errors + QUIET
93  #   WARNING         2          Warnings         + ERROR
94  #   VERBOSE         3          Other comments   + WARNING
```

```
95  #
96
97  #
98  # RSR_OUTPUT: {NOTHING, QUIET, ERROR, WARNING, VERBOSE, LOG}
99  # If RSR_OUTPUT = LOG then RSR_LOG_LEVEL and RSR_LOG_FILE
100 # should be set. (see below)
101 #
102 RSR_OUTPUT = QUIET
103
104 #
105 # RSR_LOG_LEVEL: Sets level of log output {0, 1, 2, 3, 4}
106 #
107 RSR_LOG_LEVEL = 0
108
109 #
110 # RSR_LOG_FILE: Sets path to file where logged output should be placed.
111 #
112 #RSR_LOG_FILE = rsr.log
113
114
115
116
117 ### Section 2: cineProfiler options
118 #
119
120 #
121 # RSR_CP_OPTIMISE: If ON (default) then cineProfiler users get to optimise
122 # their monitor before profiling.
123 # If OFF the optimise monitor step is skipped. Useful when profiling lots of
124 # monitors quickly or when using MACs, LCDs or other systems where there is
    no
125 # hardware control of the monitor, these systems use the graphics system's
126 # luts to adjust the display so optimising the monitor has no effect on
127 # profiling or using equalEyes.
128 #
129 #RSR_CP_OPTIMISE        = OFF
130
131 #
132 # RSR_CP_GREY_PATCH_OFFSET: Sets an offset for the dark grey patch
133 # used when optimising. Normally this patch is the same brightness
134 # as the center bar of the pluge but sometimes this can be too dark,
135 # so this offset can be used to change the brightness if needed.
136 # Range -50 <-> 205. Defaults to (0) if not set.
137 #
138 # NB: If this value is set to low then the patch becomes to dark for the
    probe
139 # to read reliably and it may be very difficult to optimise the monitor. If
    it
140 # is set to high then the gain controls on the monitor will effect the bias
    sliders
141 # in cineProfiler to much also making it very difficult to optimise.
142 #
143 #RSR_CP_GREY_PATCH_OFFSET = 10
144
145
146
147
148 ### Section 3: equalEyes options
149 #
150
151 ### Section 3a: Log / Lin settings
152 #
153 #
154 # RSR_FILMDATA_WHITE: Sets film white point for log/lin conversions.
155 # Range 0 <-> 1023. Defaults to (685) if not set.
156 # For backward compatibility 'FILMDATAENV_WHITE' is also accepted.
157 #
158 #RSR_FILMDATA_WHITE = 685
```

```
159
160 #
161 # RSR_FILMDATA_BLACK: Sets film black point for log/lin conversions.
162 # Range 0 <-> 1023. Defaults to (95) if not set.
163 # For backward compatibility 'FILMDATAENV_BLACK' is also accepted.
164 #
165 #RSR_FILMDATA_BLACK = 95
166
167 #
168 # RSR_FILMDATA_D_GAMMA: Sets conversion/device gamma for log/lin conversions.
169 # Range 0.001 <-> 10.0. Defaults to (1.0) if not set.
170 # For backward compatibility 'FILMDATAENV_D_GAMMA' is also accepted.
171 #
172 #RSR_FILMDATA_D_GAMMA = 1.7
173
174 #
175 # RSR_FILMDATA_F_GAMMA: Sets film gamma for log/lin conversions.
176 # Range 0.001 <-> 10.0. Defaults to (0.6) if not set.
177 # For backward compatibility 'FILMDATAENV_FILM_GAMMA' is also accepted.
178 #
179 #RSR_FILMDATA_F_GAMMA = 0.6
180
181 #
182 # RSR_FILMDATA_SOFT_CLIP: Sets soft-clip threshhold for log/lin conversions.
183 # Range 0 <-> 1023. Defaults to (0) if not set.
184 # For backward compatibility 'FILMDATAENV_SOFT_CLIP' is also accepted.
185 #
186 #RSR_FILMDATA_SOFT_CLIP = 0
187
188
189 ### Section 3b: Printer Lights options
190 #
191 #
192 # RSR_PRINTERLIGHT_TRIM: Sets the initial trims for the printer lights.
193 # Theses will be the R, G and B (three doubles seperated by commas) values
194 # displayed by the printer lights settings when no adjustments are being
195 # made to the currently generated LUT.
196 # Range 0.0 <-> 50.0. Defaults to (25.0,25.0,25.0) if not set.
197 # For backward compatibility 'CMSCINSTDLIGHT' is also accepted.
198 #
199 RSR_PRINTERLIGHT_TRIM = 25.0,25.0,25.0
200
201 #
202 # RSR_PRINTERLIGHT_OFFSET: Sets the initial offsets for the printer lights.
203 # Theses will be the initial R, G and B (three doubles seperated by commas)
204 # offsets applied by the printer lights.
205 # Range 0.0 <-> 50.0. Defaults to (25.0,25.0,25.0) if not set.
206 #
207 RSR_PRINTERLIGHT_OFFSET = 25.0,25.0,25.0
208
209
210 ### Section 3c: Profile lifetime options
211 #
212 #
213 # RSR_MONITOR_LIFETIME: Sets the lifetime of monitor profiles (both CRT and
    LCD).
214 # The lifetime of a profile is the number of days after the profile was
    created
215 # that the profile is considered to be valid for.
216 # Range 0 <-> 9999. Defaults to 14 if not set.
217 #
218 #RSR_MONITOR_LIFETIME = 14
219
220 #
221 # RSR_FILM_LIFETIME: Sets the lifetime of film profiles.
222 # The lifetime of a profile is the number of days after the profile was
    created
223 # that the profile is considered to be valid for.
```

```
224 # Range 0 <-> 9999. Defaults to 180 if not set.
225 #
226 #RSR_FILM_LIFETIME = 180
227
228
229 ### Section 3d: Synthetic profile options
230 #
231 #
232 # RSR_SYNTH_GAMMA: Default gamma for synthetic profiles.
233 # Range 0.001 <-> 9.999. Defaults to 2.20 if not set.
234 #
235 RSR_SYNTH_GAMMA = 2.20
236
237 #
238 # RSR_SYNTH_WP_TYPE: Default white point type for synthetic profiles.
239 # Range CHROMATICITY or TEMPERATURE. Defaults to TEMPERATURE.
240 #
241 RSR_SYNTH_WP_TYPE = TEMPERATURE
242
243 #
244 # RSR_SYNTH_TEMP_TYPE: Default white Correlated Colour Temperature (CCT)
245 # type for synthetic profiles (If RSR_SYNTH_WP_TYPE = TEMPERATURE).
246 # Range BLACKBODY or CIE. Defaults to CIE.
247 # (CIE D Illuminants nearly always used when specifying whitepoint colour)
248 #
249 #RSR_SYNTH_TEMP_TYPE = CIE
250
251 #
252 # RSR_SYNTH_TEMP: Default white point Correlated Colour Temperature (CCT)
253 # for synthetic profiles.
254 # Range 4000 <-> 25000. Defaults to 6500 if not set.
255 #
256 RSR_SYNTH_TEMP = 6500
257
258 #
259 # RSR_SYNTH_X: Default white point CIE x-chromaticity co-ordinate
260 # for synthetic profiles.
261 # Range 0.001 <-> 0.999. Defaults to 0.3127 (CIE D65) if not set.
262 #
263 RSR_SYNTH_X = 0.3127
264
265 #
266 # RSR_SYNTH_Y: Default white point CIE y-chromaticity co-ordinate
267 # for synthetic profiles.
268 # Range 0.001 <-> 0.999. Defaults to 0.3290 (CIE D65) if not set.
269 #
270 RSR_SYNTH_Y = 0.3290
271
272
273 ### Section 3e: Start up options
274 #
275 #
276 # RSR_EE_INIT_TARGET: Sets weather EqualEyes starts with an xml or synthetic
    profile.
277 # Range XML or SYNTHETIC. Defaults to XML if not set.
278 #
279 #RSR_EE_INIT_TARGET = SYNTHETIC
280
281 #
282 # RSR_EE_INIT_STATE: Sets weather EqualEyes starts active or inactive.
283 # Range INACTIVE or ACTIVE. Defaults to INACTIVE if not set.
284 #
285 #RSR_EE_INIT_STATE = ACTIVE
286
287 #
288 # RSR_EE_INIT_SIZE: Sets weather EqualEyes starts minimised or not.
289 # Range NORMAL or MINIMISED. Defaults to NORMAL if not set.
290 #
```

```
#RSR_EE_INIT_SIZE = MINIMISED



### Section 4: Advanced options
#

### Section 4a: Profiles (advanced)
#
#
# RSR_BLACK_KNEE: Points in the profile with stimuli below this will
# be scaled such that the profile appears to have a black point of 0.
# This is to avoid problems caused by monitors with very bright black points.
# Range 0.0 <-> 1.0. Defaults to (0.2) if not set.
# NB: This setting can cause undesirable colour casts if set to high, it
# should only be changed if really needed and should be kept as low as possible.
# (see the documentation for more details)
#
#RSR_BLACK_KNEE = 0.2

#
# RSR_BLACK_CURVE: Sets the gamma (curve) used to scale values below the RSR_BLACK_KNEE
# set above.
# Range 1.0 <-> 5.0. Defaults to (1.0) if not set.
#
#RSR_BLACK_CURVE = 1.0


### Section 4b: Probes (advanced)
#
#
# NB: The default ports checked for probes are:
#
# IRIX  :       /dev/ttyd1 ... /dev/ttyd8
# LINUX :       /dev/ttyS0 ... /dev/ttyS7 , USB ports
# OSX           :       USB ports only
# WIN32 :       com0 ... com7 , USB ports
#

#
# RSR_SERIAL_PROBES_EXTRA: Sets extra ports to check for a probe.
# Usefull if the probe is on an unusual port and is not found by equalEyes/cineProfiler.
# Defaults to " " if not set (ie. no extra ports are checked for a probe).
#
#RSR_SERIAL_PROBES_EXTRA = /hw/ttys/ttyd1

#
# RSR_SERIAL_PROBES_ONLY: Sets the only port to check for a probe.
# Usefull if the probe is on an unusual port or the user does not want equalEyes/cineProfiler
# checking all common ports for a probe.
# Defaults to " " if not set (ie. only the default ports are checked for a probe).
#
#RSR_SERIAL_PROBES_ONLY = /hw/ttys/ttyd1



### Section 5: GUI options
#

### Section 5a: Font Size
#
#
# RSR_FONT_SIZE: Font size in points (all platforms).
```

```
354 # Defaults to platform defaults below if not set.
355 # NB: This setting is overridden by the platform specific options
356 # below if they are set
357 #
358 #RSR_FONT_SIZE = 9
359
360 #
361 # RSR_FONT_SIZE_IRIX: Font size in points (Irix only).
362 # Enables users to choose a different font size for each platform if needed.
363 # Defaults to 9 if not set.
364 #
365 #RSR_FONT_SIZE_IRIX = 9
366
367 #
368 # RSR_FONT_SIZE_LINUX: Font size in points (Linux only).
369 # Enables users to choose a different font size for each platform if needed.
370 # Defaults to 9 if not set.
371 #
372 #RSR_FONT_SIZE_LINUX = 9
373
374 #
375 # RSR_FONT_SIZE_OSX: Font size in points (MacOSX only).
376 # Enables users to choose a different font size for each platform if needed.
377 # Defaults to 12 if not set.
378 #
379 #RSR_FONT_SIZE_OSX = 12
380
381 #
382 # RSR_FONT_SIZE_WIN32: Font size in points (Windows only).
383 # Enables users to choose a different font size for each platform if needed.
384 # Defaults to 9 if not set.
385 #
386 #RSR_FONT_SIZE_WIN32 = 9
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
```

# Appendix B

# Standard Profiles

## B.1 Film

**cineon**
Based on Kodak spec.
**fuji_3510**
Empirically measured from Fuji 3510 film stock
**fuji_3513D**
Imperially measured from Fuji 3513D High-Density film stock
**kodak_2383**
Imperially measured from Kodak 2383 Vision film stock
**kodak_2393**
Imperially measured from Kodak 2393 Premiere film stock
**kodak_5242_neg**
Imperially measured from Kodak 5242 Negative film stock (LAD: 1.09,1.06,1.03)

## B.2 CRT

All CRT profiles have a nominal white point Luminance $Y = 80cd/m^2$
**ITU-R_709 (ITU-Rec 709)**

| | |
|---|---|
| white: | xy[0.3127, 0.3290](D65) |
| red: | xy[0.6400, 0.3300] |
| green | xy[0.3000, 0.6000] |
| blue | xy[0.1500, 0.0600] |

**gamma:**

$$s_{nl} = \begin{cases} ((0.099 + s)/1.099)^{(1.0/0.45)} & \text{for } s > 0.081 \\ s/4.5 & \text{otherwise} \end{cases}$$

**sRGB**

| | |
|---|---|
| white: | xy[0.3127, 0.3290](D65) |
| red: | xy[0.6400, 0.3300] |
| green | xy[0.3000, 0.6000] |
| blue | xy[0.1500, 0.0600] |

**gamma:**

$$s_{nl} = \begin{cases} ((0.055 + s)/1.055)^{2.4} & \text{for } s > 0.03928 \\ s/12.92 & \text{otherwise} \end{cases}$$

**NTSC (ITU-Rec 601)**

The current NTSC standard.

| | |
|---|---|
| white: | xy[0.3127, 0.3290](D65) |
| red: | xy[0.6700, 0.3300] |
| green | xy[0.2100, 0.7100] |
| blue | xy[0.1400, 0.0800] |

**gamma:**

$$s_{nl} = \begin{cases} ((0.099 + s)/1.099)^{(1.0/0.45)} & \text{for } s > 0.081 \\ s/4.5 & \text{otherwise} \end{cases}$$

**NTSC_601 (CCIR 601-1)**

The old NTSC standard

| | |
|---|---|
| white: | xy[0.3101, 0.3162](C) |
| red: | xy[0.6700, 0.3300] |
| green | xy[0.2100, 0.7100] |
| blue | xy[0.1400, 0.0800] |

**gamma:**

$$s_{nl} = s^{2.2}$$

**PAL**

| | |
|---|---|
| white: | xy[0.3127, 0.3290](D65) |
| red: | xy[0.6400, 0.3300] |
| green | xy[0.2900, 0.6000] |
| blue | xy[0.1500, 0.0600] |

**gamma:**

$$s_{nl} = s^{2.8}$$

**RSR_5400_monitor**

| | |
|---|---|
| white: | xy[0.3358, 0.3433](5400K) |
| red: | xy[0.6400, 0.3300] |
| green | xy[0.3000, 0.6000] |
| blue | xy[0.1500, 0.0600] |

**gamma:**

$$s_{nl} = \begin{cases} ((0.099 + s)/1.099)^{(1.0/0.45)} & \text{for } s > 0.081 \\ s/4.5 & \text{otherwise} \end{cases}$$

**RSR_ideal_monitor**

| | |
|---|---|
| white: | xy[0.3209, 0.3307](6100K) |
| red: | xy[0.6400, 0.3300] |
| green | xy[0.3000, 0.6000] |
| blue | xy[0.1500, 0.0600] |

**gamma:**

$$s_{nl} = \begin{cases} ((0.099 + s)/1.099)^{(1.0/0.45)} & \text{for } s > 0.081 \\ s/4.5 & \text{otherwise} \end{cases}$$

**RSR_funky**
... see for yourself !

## B.3 v2.02 profile changes

- sRGB
- ITU-709
- RSR_ideal_monitor (ITU-709 gamma, 6100K whitepoint)
- RSR_5400_monitor (ITU-709 gamma, 5400K whitepoint)

The previous versions of these profiles were built with out the appropriate linear segment in the low end as specified in either the sRGB or ITU-709 standards.

We have corrected this in cineSpace v2.02b and higher. The new profiles appear quite lifted in the 'bottom end' (mid to dark greys). This is correct and should be expected.

For those who consider consistency through out a job is more important than an exact match to the output target i.e. If changing profiles is going to cause production problems for clients in the middle of jobs, we recommend using the old ones until your current job has finished then switching to the new 'correct' profiles.