User Manual

Version 1.0

License and Limited Warranty Agreement

PLEASE READ CAREFULLY BEFORE DOWNLOADING, INSTALLING OR USING THIS SOFTWARE:
THIS SOFTWARE LICENSE AGREEMENT IS A LEGAL AGREEMENT BETWEEN YOU (EITHER AN INDIVIDUAL OR, IF PURCHASED OR OTHERWISE ACQUIRED BY OR FOR AN ENTITY, AN ENTITY) AND DB&W BORNEMANN UND WOLF GBR.
BY CLICKING THE “ACCEPT” BUTTON, OPENING THE PACKAGE, DOWLOADING, INSTALLING OR OTHERWISE USING THIS SOFTWARE YOU AGREE TO BECOME BOUND BY THE TERMS OF THIS LICENSE . IF YOU DO NOT AGREE TO THE TERMS OF THIS LICENSE, CLICK THE “DO NOT ACCEPT” BUTTON AND DO NOT DOWNLOAD, INSTALL OR USE THIS SOFTWARE OTHERWISE.

1.0 DEFINITIONS

“Licensee” means you, the User, who agrees to all of the terms set forth in this Software License and Warranty Agreement, by downloading, installing or using this software.

“Licensed Software” shall mean the frameD plug in for LightWave 3D and documentation for frameD.

“Software” shall mean the frameD plug in for LightWave 3D and documentation for frameD.

2.0 OWNERSHIP OF THE SOFTWARE

The Licensee acknowledges and agrees that all of the computer programs and associated documentation are owned exclusively by db&w Bornemann und Wolf GbR. You agree that the price paid by you for the Software is a license fee granting you only rights set forth in this License Agreement.

3.0 RESTRICTED LICENSE frameD

db&w Bornemann und Wolf GbR grants Licensee a non-exclusive, non-transferable, non-assignable, non-sub licensable, revocable and restricted license to use Licensed Software, in machine-readable, object code form only. The licensee agrees to use the Software solely for the purposes as outlined in this Agreement. The License Agreement does not convey to the licensee any ownership rights or any other interest in the software.

4.0 SCOPE OF LICENSE

This Software is licensed to be installed and used only in connexion with one LightWave 3D license. A valid license must be purchased for each LightWave 3D license.

5.0 LICENSE RESTRICTIONS

No license is granted to Licensee for any other purpose and Licensee may not sell, rent, lent, lease, loan or sub-license or otherwise encumber or transfer the Licensed Software, in whole or in part, to any third party for any purpose.

5.1 Licensee may not duplicate or modify or translate or decompile or create derivative works of the Licensed Software, or disassemble or reverse-engineer script or protocols of the Licensed Software.

5.2 Licensee agrees to use all reasonable efforts to protect the Software from unauthorized use, modification, reproduction, distribution or publication.

5.3 Licensee acknowledges that nothing in this Agreement gives Licensee the right to use any trademark, trade name, or service mark of db&w Bornemann und Wolf GbR or any third party from whom db&w Bornemann und Wolf GbR has acquired license rights.

5.4 The License and other terms and conditions set forth in this Agreement shall apply to any and all versions and components of the Licensed Software furnished by db&w Bornemann und Wolf GbR to Licensee during the term of this Agreement and all versions and components of the Licensed Software used by Licensee in accordance with this Agreement.

5.5 The Licensed Software shall be used only by Licensee and only subject to the terms and conditions in this Agreement.

6.0 TITLE, PROPRIETARY RIGHTS, AND DEVELOPMENT

6.1 The Licensee agrees that db&w Bornemann und Wolf GbR and/or its licensors own all right, title and interest in the Licensed Software and in all patents, trademarks, trade names, inventions, copyrights, know-how and trade secrets relating to the design, manufacture, operation or service of the Licensed Software. All rights not expressly granted are hereby reserved by db&w Bornemann und Wolf GbR. Unauthorized copying or use of the Licensed Software, or failure to comply with the restrictions provided in this Agreement, will result in automatic termination of this Agreement. Nothing in this Agreement shall change db&w Bornemann und Wolf GbR’s or any of its licensors’ ownership rights to their respective intellectual property, including but not limited to the Licensed Software.

6.2 db&w Bornemann und Wolf GbR is under no obligation to support the Licensed Software in any way, or to provide Licensee with updates, bug fixes, builds, or error corrections (collectively "Software Updates"). If db&w Bornemann und Wolf GbR at its sole option, supplies Software Updates to Licensee, the Updates will be considered part of Licensed Software, and subject to the terms and conditions of this Agreement.

6.3 The Licensee acknowledges that db&w Bornemann und Wolf GbR shall have the right, in its sole discretion and without incurring any liability, to modify the Licensed Software or discontinue its use or distribution at any time and for any reason.

7.0 TERM AND TERMINATION OF AGREEMENT

This Agreement will commence on the date on which Licensee downloads Licensed Software (the "Effective Date") and will remain in force until terminated.

7.1 Licensee might terminate the license at any time by removing the Software from the computer and destroying the original Software and all copies.

7.2 Upon termination or expiration of this Agreement, Licensee must cease use of and destroy the Licensed Software, any records or copies thereof and any related materials, and provide to db&w Bornemann und Wolf GbR a written statement certifying that Licensee has complied with the foregoing obligations within thirty (30) days.

7.3 This license will automatically terminate if the licensee breaches any of the terms or conditions set out in this license agreement.

7.4 Rights and obligations under this Agreement which by their nature should survive, shall remain in effect after termination or expiration hereof.

8.0 DISCLAIMER OF WARRANTY

8.1 Licensed Software IS PROVIDED “AS IS.” ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS, AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, SATISFACTORY QUALITY,

FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID.

8.2 db&w Bornemann und Wolf GbR does not warrant that the operation of the Licensed Software will be uninterrupted or error-free.

9.0 LIMITATION OF LIABILITY

9.1 IN NO EVENT SHALL db&w Bornemann und Wolf GbR BE LIABLE FOR ANY DAMAGES WHATSOEVER, INCLUDING ANY OR ALL GENERAL, SPECIAL, CONSEQUENTIAL, INCIDENTAL, INDIRECT OR PUNITIVE DAMAGES ARISING OUT OF THIS AGREEMENT OR USE OF THE LICENSED Software OR CONFIDENTIAL INFORMATION, HOWEVER CAUSED, ON ANY THEORY OF LIABILITY, AND WHETHER OR NOT db&w Bornemann und Wolf GbR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. THESE LIMITATIONS SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

9.2 Notwithstanding the foregoing, any damages that you might incur for any reason whatsoever (including, without limitation, all damages referenced above and all direct or general damages), the entire liability of db&w Bornemann und Wolf GbR and any of its suppliers under any provision of this Agreement and your exclusive remedy for all of the foregoing shall be limited to the greater of the amount, if any, actually paid by you for the Licensed Software or U.S. $5.00. The foregoing limitations, exclusions and disclaimers shall apply to the maximum extent permitted by applicable law, even if any remedy fails its essential purpose.

9.3 Licensee will hold db&w Bornemann und Wolf GbR harmless from any claims based on Licensee's use of the Licensed Software for any purposes, and from any claims that later versions or releases of any Licensed Software furnished to Licensee are incompatible with the Licensed Software provided to Licensee under this Agreement.

9.4 Licensee shall have the sole responsibility to adequately protect and backup Licensee's data or equipment used in connexion with the Licensed Software. Licensee shall not claim against db&w Bornemann und Wolf GbR for lost data, inaccurate output, work delays or lost profits resulting from Licensee's use of the Licensed Software.

9.5 Neither party will be liable for any indirect, punitive, special, incidental or consequential damage in connection with or arising out of this Agreement, including loss of business, revenue, profits, use, data or other economic advantage, however it arises, whether for breach or in tort, even if that party has been previously advised of the possibility of such damage.

10.0 GENERAL TERMS AND INDEMNITY

10.1 Any action relating to or arising out of this Agreement shall be governed by German law.

10.2 Neither party may assign or otherwise transfer any of its rights or obligations under this Agreement, without the prior written consent of the other party, except that db&w Bornemann und Wolf GbR may assign this Agreement to any other company.

10.3 If any part of this Agreement is found void and unenforceable, it will not affect the validity of the balance of the Agreement, which shall remain valid and enforceable according to its terms. In the event that it is determined by a court of competent jurisdiction as a part of a final non-appeal able judgement that any provision of this Agreement (or part thereof) is invalid, illegal, or otherwise unenforceable, such provision will be enforced as nearly as possible in accordance with the stated intention of the parties, while the remainder of the Agreement will remain in full force and effect and the parties will be bound by obligations which approximate, as closely as possible, the effect of the provision found invalid or unenforceable, without being themselves invalid or unenforceable. The waiver of any breach or default shall not constitute a waiver of any other right in this Agreement or any subsequent breach or default. No waiver shall be effective unless in writing and signed by an authorized representative of the party to be bound. Failure to pursue, or delay in pursuing, any remedy for a breach shall not constitute a waiver of such breach.

10.4 Licensee agrees that the Licensee shall indemnify, defend, and hold harmless db&w Bornemann und Wolf GbR, and its respective officers, directors, employees, agents, successors, and assigns, from any damage, allegation, cost, loss, liability, or expense (including court costs and reasonable fees for attorneys or other professionals) arising out of or resulting from or in connexion with any breach or claimed breach of the terms of this Agreement or warranties provided herein.

Trademark and copyright information

All brands, company names, and product names are trademarks or registered trademarks of their respective holder.

TRADEMARKS

This paper may contain brands, company names and product names of third parties, and following are the requirements for identifying trademarks and registered trademarks of those third parties. This list is not exhaustive and the paper may contain brands, company names and product names of additional third parties. All brands, company names and product names are trademarks or registered trademarks of their respective holder.

LightWave® and LightWave 3D® are registered Trademarks of NewTek, Inc.

IP Acknowledgements

This plugin uses some 3rd party open source libraries and projects:

1) TinyXML

TinyXML is distributed under the zlib license. www.sourceforge.net/projects/tinyxml

2) OpenEXR by ILM

OpenEXR: Copyright (c) 2002, Industrial Light & Magic, a division of Lucas Digital Ltd. LLC All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

- Neither the name of Industrial Light & Magic nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

3) zlib

zlib general purpose compression library
version 1.2.3, July 18th, 2005
Copyright (C) 1995-2005 Jean-loup Gailly and Mark Adler

This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Jean-loup Gailly jloup@gzip.org
Mark Adler madler@alumni.caltech.edu

4) LightWrap++, a C++ wrapper for LightWave

Copyright (c) 2007-2012, db&w Bornemann und Wolf GbR All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- Neither the name of db&w GbR nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED.

IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Acknowledgements

Software Design and Development
Michael Wolf

Management
Dagmar Bornemann

Documentation and Tutorials
Michael Wolf

Product Marketing
Dagmar Bornemann

Special thanks go to our team of dedicated beta testers. You've all done a great job and your feedback, time, criticism and bug hunting skills were invaluable.

Special thanks must go to Ernest Chan for filling our bug database not only with bugs, but also with good questions and suggestions. Thank you!

We also thank the LightWave community and the members of the LightWave Plugin Developers mailing list, especially Marvin Landis and Ernie Wright for their insight into the more obscure depths of the LightWave SDK.

---

db&w Bornemann und Wolf GbR
Seyfferstr. 34
70197 Stuttgart
Germany

www.db-w.com
info@db-w.com

Table of Contents

Introduction

frameD is a plugin for LightWave3D to create, load and manage image sequences defined by text files.[1]

The main usage scenarios are image sequences that contain duplicate images (such as mouth shapes mapped on a character's face) as well as backplates used for reference.[2]

These text files are treated by LightWave3D as animation files. However, they point to individual images which are loaded as frames of the “virtual” animation.

Since the individual images are loaded through the frameD plugin, it can perform additional processing or even not load from disk at all. This is leveraged by providing the option to load proxy images (which are created automatically) and by using available memory to cache images.

frameD supports both standard “IFL” based sequences as well as its own proprietary “XFD” format. The latter is XML based and allows for more attributes to be saved than simple IFL files allow for.

Features

- X-Sheet based editor for image sequences
- Loader settings per image sequence
- Image proxies to speed up interactivity in Layout
- Image RAM cache speeds up interactivity in Layout and rendering in some cases
- Retiming of image sequences using envelopes

Plugins

frameD consists of a collection of plugins with different purposes:

The frameD animation loader loads IFL/XFD based sequences into LightWave 3D.

The frameD editor allows the creating and editing of IFL/XFD based images sequences within Layout.

The frameD Master Plugin can be added to a scene in Layout to individually control settings per loaded Sequence.

Compatibility

frameD is compatible with LightWave3D 9.6 up to LightWave 3D 11.

It currently runs with the Windows 32bit, Windows 64bit and Mac OSX versions of LightWave. It has been tested with Windows 2000, the 32bit and 64bit versions of Windows XP as well as Mac OSX. This is why you will see screen shots of both the OSX and the Windows port in this manual.

Please visit http://framed.db-w.com for more up to date information.

1 Gratuitous footnote. We'll try to make the following ones more informative. ;)
2 We know – actually we expect – that many of you will come up with uses that we certainly never thought of.

Setting up frameD

Installation

The download contains ZIP compressed files for all platforms supported by frameD. Extract the appropriate ZIP file for your platform.

Windows 32-bit/64-bit

The frameD.p file can be copied to any directory where you keep your plugins. We recommend using a manually created plugin directory to separate third party plugins from plugins shipped with LightWave 3D. This will simplify upgrades of LightWave 3D.

Now use the Edit Plug-ins panel (alt-F11) of the Add Plugins menu item to add the plugin file shaderMeister.p to LightWave 3D.

As of LightWave 10.0, plugins can also be copied into the .NewTek\LightWave\10.0\plugins or .NewTek\LightWave\11.0\plugins directory in the user profile.

OSX 32-bit/64-bit UB

The OS X version of frameD is included as a DMG (Disk Image). Double click on the icon to mount the disk image.

LightWave 9.6

Copy frameD.plugin to **~/Library/Application Support/LightWave3D/Plugins**

or **/Library/Application Support/LightWave3D/Plugins**

In both cases LightWave 3D 9.6 will automatically pick up the plugins once you launch it.

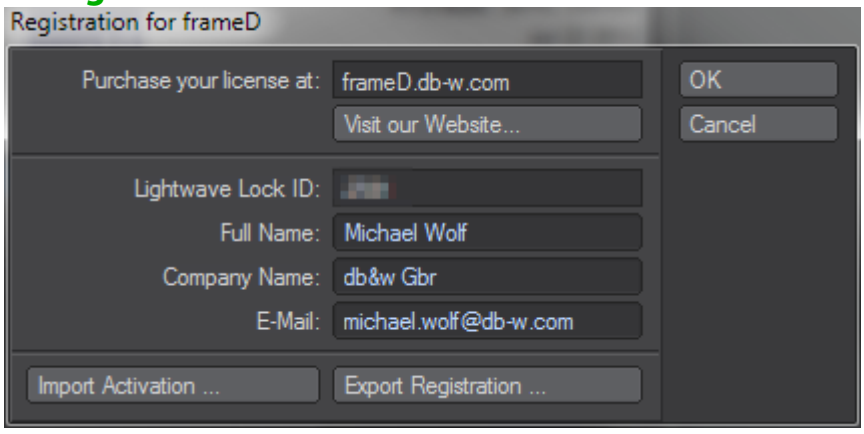
LightWave 10.0 and higher

Copy frameD.plugin to **~/Library/Application Support/NewTek/LightWave/1x.x/plugins** (where 1x.x is either 10.0, 10.1 or 11.0, depending on the version of LightWave 3d).

This will allow LightWave 3D to automatically pick it up at the next restart.

In either case you are of course free to copy the plugin file to another location and add it manually.

Licensing



Once you've installed the plugin, apply the **db&w frameD Master** handler plugin to your scene, and click on the “Register Plugin...” button.
Alternatively you can also run the **db&w frameD Editor** generic plugin.

Enter your full name, company name (if applicable) and e-mail address. Export the registration and attach it to an e-mail to **registration@db-w.com**. We will mail you an activation code within 24 hours after payment is received, depending on the time difference[3].

You can then import the (unzipped) keyfile attached to the activation e-mail.

The registration is now complete and you will see the interface of frameD, allowing you to use it.

The registration file is stored in the user profile by default, in the file frameD.key. If you use multiple licenses of LightWave 3D from a single network share, the registration manager will only append/edit licenses locked to the dongle installed on the host machine.

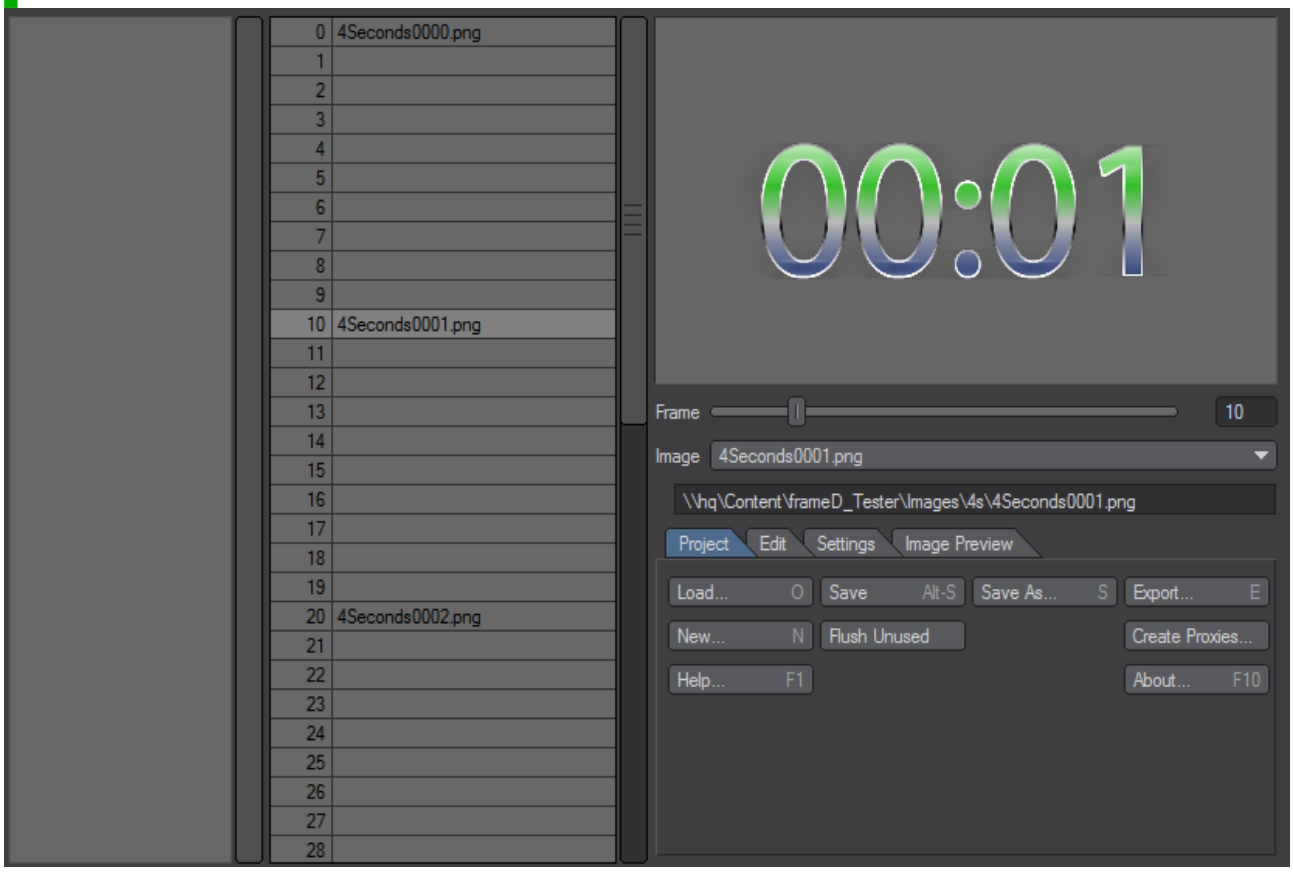
A key file containing multiple keys can be copied to the same location as the frameD.p plugin file itself in the case of a network based, shared installation.

Running without a license

If there is no valid license then the frameD editor will not be available. It is also not possible to change any settings of the loaded sequences.
However, scenes created with frameD will still load and save, as well as render.

3 Our key generator needs some sleep every now and then ;)

frameD Editor



This is an overview of the frameD editor and the implemented functionality.

The list on the very left is the clipboard, next to it is the X-Sheet, it showing the frames in the sequence and the images assigned to them.

The preview shows the image at the currently selected frame.
Underneath the preview is the current frame slider (as well as a matching numeric input).

The tabs at the bottom right contain the menus which offer various options to edit, load and save sequences or change the way images are displayed.

The editor will load the last used project when the editor is launched and an automatic backup is found, asking the user first. No data can thus be lost by exiting it. The automatic backup is saved on exit, if there are frames assigned to the X-sheet.

If you'd like to start with a blank project, make sure to use “New...” in the editor prior to exiting it.[4]

X-Sheet (list view in the middle)

The X-Sheet displays a list of frames and the images they contain.

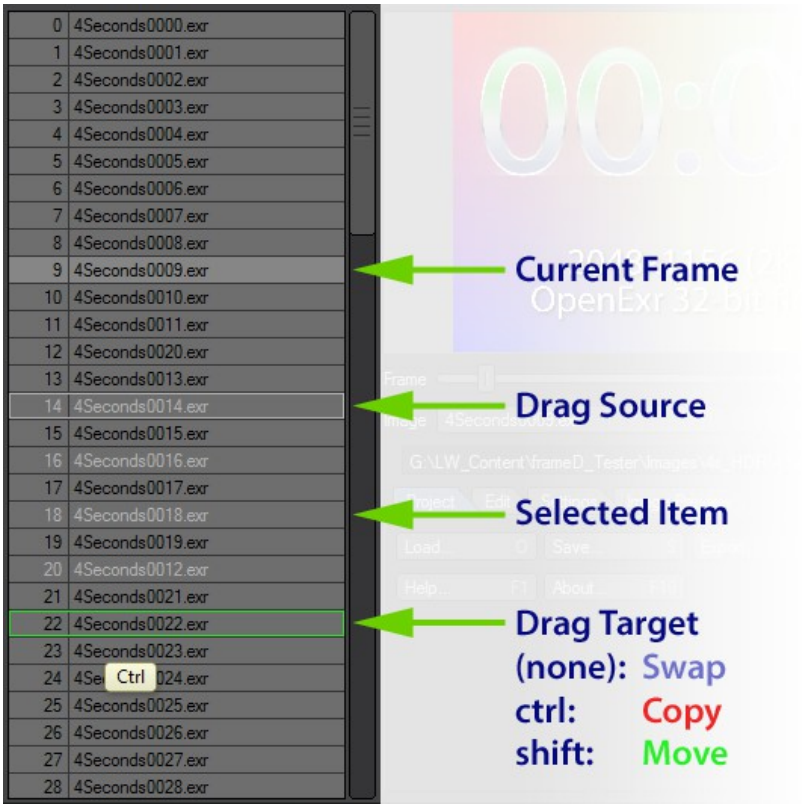
The X-Sheet highlights both the current frame as well as frame selections.

4 We agree that this behaviour isn't quite optimal. It is certainly bound to change in future revisions, at least by making it an option.

Current Frame

The current frame is highlighted using a slightly brighter row background. This is the same frame as the one selected by the frame slider underneath the preview.

The Image pop-up under the frame slider allows you to change the image used by the current frame.



Frame Selections

The X-Sheet also allows you to select entries directly by clicking on them. This is independent of the current frame that is displayed in the preview.
Selected frames are displayed using a brighter colour to display the text.

Alt-left-click will select a frame and directly open a pop-up to select an image (this is identical to the Image pop-up described further below).

Multi-selection with shift- or ctrl-left-click combinations are also possible to drag items.

Shift-click will select all images from the last selected one to the one clicked on.

Ctrl-click will toggle the selection state of the item.

Frame Dragging

Selected items can be dragged to another position.

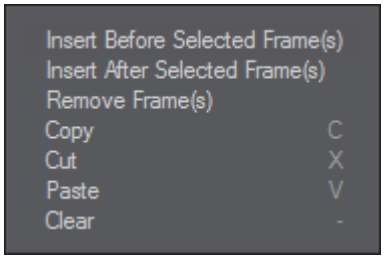
By default, the first selected item will be swapped with the target of the drop operation.

If shift is pressed while dragging, they will then be deleted from their original positions (a move operation). The dragging indicator will switch to red to indicate move mode.

If ctrl is pressed while dragging, then the selected items will be copied without erasing the original entries (a copy operation). The dragging indicator will switch to green to indicate the copy mode.
While dragging, the start of the dragging operation will be highlighted using a light grey frame.

Right Click Menu

Often used functions are available by right clicking on the X-Sheet.



Insert Before Selected Frame(s)
This will insert an empty frame before the selected frame(s).

Insert After Selected Frame(s)
This will insert an empty frame after the selected frame(s).

Remove Frame(s)
This will remove the selected frame(s).

Cut / Copy / Paste

Cut or copy the selection. Paste will happen on the current frame. Please see the section on the Edit Tab for further details.

Clear

Clears the selected frames.

Clipboard (list view on the left)

This displays the current content of the clipboard after a cut/copy operation. Nothing can be selected here, this list is just for informational purposes.

Frame slider

The slider allows you to set or scrub to the current frame in the X-Sheet.

Image

The image pop-up allows you to set the image for the current frame in the X-Sheet.
You can also set it to (none) – in this case the first image that precedes the current frame will be used.

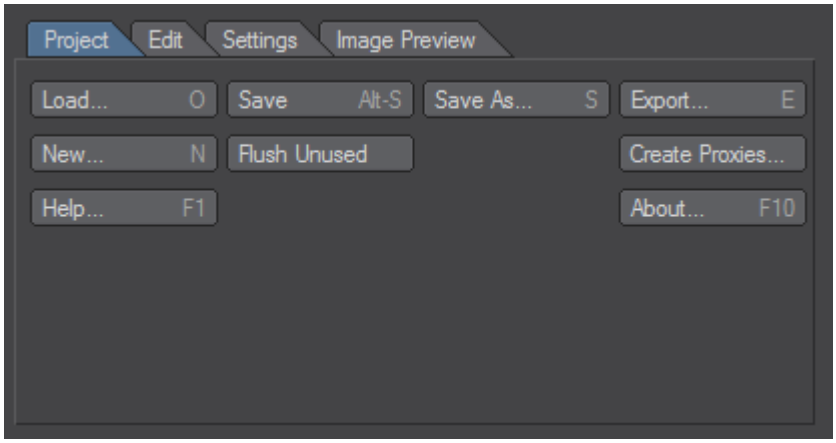
Images can be loaded using the (load image) option. Multiple images may be selected.

If one image is selected and frameD detects it as being part of a sequence, then it will prompt for a range of frames of that sequence to load.

This automatic detection works if only one frame is selected (it can be any frame of the sequence) and the frame numbers are at the end of the file name, before the extension. i.e. “textSequence0001.png”

Existing frames will be overwritten.

Project Tab



Load...

This will load an existing project into the frameD editor, clearing the current one.

It can load both IFL and XFD files.

Save

This will save the current project without prompting the user.

If the current project is a new project or the editor just started, then the user will be prompted for a file name.

If the project is used in the current LightWave 3D scene, then it will be updated there as well.

Save As...

This will save the current project either as a XFD or IFL file, prompting for a file name. Either of them can be loaded into LightWave 3D using the included frameD animation loader.

If the project is used in the current LightWave 3D scene, then it will be updated there as well.

Export...

Exports the current project as an IFL file

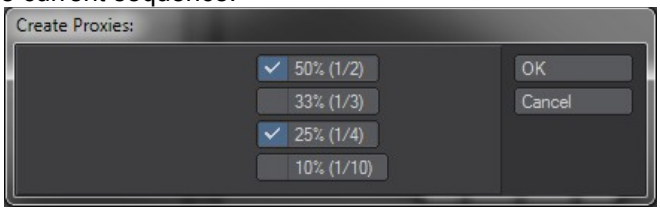
New...

Clears the project to start a new one.

Flush unused

This removes all images that are not used in the current sequence.

Create Proxies...



Opens a window to select proxy sizes. This will create them in a single operation and store them on disk.
This isn't necessary as the loader will automatically create and save proxies, but it can speed up the very first time a sequence is loaded in Layout.

Help...

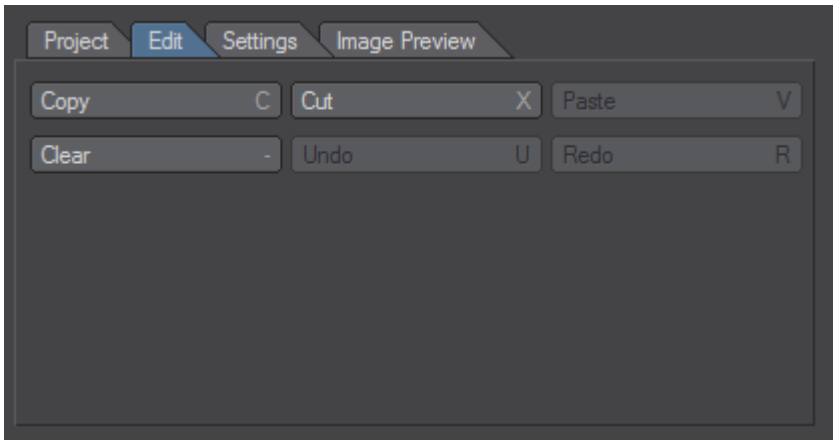
Currently displays the keyboard shortcuts as well as mouse options for the X-Sheet.

The help panel may remain open as a reference while you continue to work in the editor.

About...

Display the version number of frameD as well as the build date.

Edit Tab



Copy

Copies the currently selected frames into the “clipboard”.
The current contents of the clipboard is displayed as a third column in the X-sheet.

Cut

Copies the currently selected frames into the “clipboard” and then clears them in the x-sheet.

The current contents of the clipboard is displayed as a third column in the X-sheet.

Paste

Paste the contents of the clipboard into the x-sheet. The first frame to copy to is determined by the currently selected frame.

Clear

Clear the currently selected frame(s) from the x-sheet.

Undo

Undo the last edit(s) in the x-sheet. Only edits to the x-sheet are stored on the undo stack.

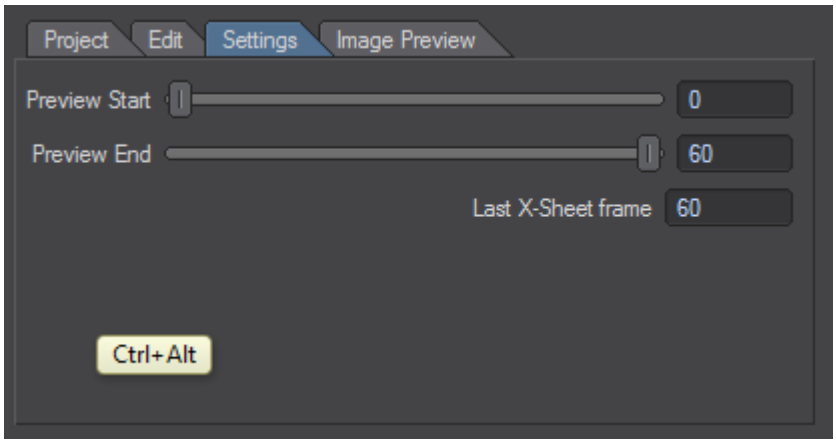
Redo

Redo the undo step[5]. Redos are available immediately after undos, but are cleared if further editing takes place.

5 Undoes the undo?

Settings Tab

A change of the preview start/end or the sequence length will clear the current selection of frames in the x-sheet.



Preview Start

Set the start frame to display in the x-sheet to limit the scope and focus of edits.

Preview End

Set the end frame to display in the x-sheet to limit the scope and focus of edits.

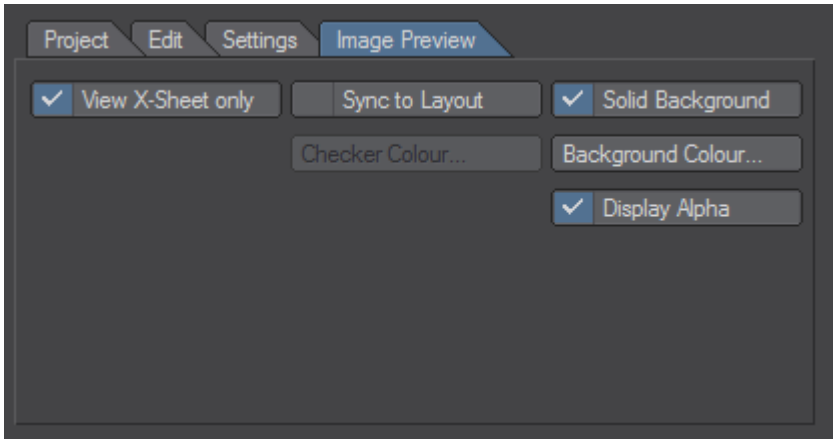
Last X-Sheet Frame

This sets the length of the sequence as displayed in the X-Sheet. If the new length is shorter than the previous one then excess frames will be deleted. However, there is also a warning before that happens.
If the length is extended then new, empty frames will be added at the and of the X-Sheet.

Image Preview Tab

These are general, non-project specific settings.

However, currently they are saved with the project.



Preview X-Sheet only

If this is checked the preview displays the image stored in the selected frame. If the current frame contains no image, nothing will be displayed.
When not checked, it displays the image for the frame selected in the X-Sheet. If the current frame contains no image, the image from the earliest frame that contains one will be displayed.
Essentially, images are “held” until a new one is set in the X-Sheet.
This corresponds to the behaviour of the frameD loader as well as LightWave's behaviour when loading image sequences.

Sync to Layout

The current time is synced with Layout. If you scrub in Layout then the current frame in the frameD editor will change as well.
The reverse doesn't work. Scrubbing in frameD doesn't change the current frame in Layout.

Solid Background

Draw the background in the preview using either a solid colour or checks. This is only visible outside the current image or when the image contains an alpha channel.

Checker Colour

This defines the colour of the checks if the **Solid Background** option is off.

Background Colour

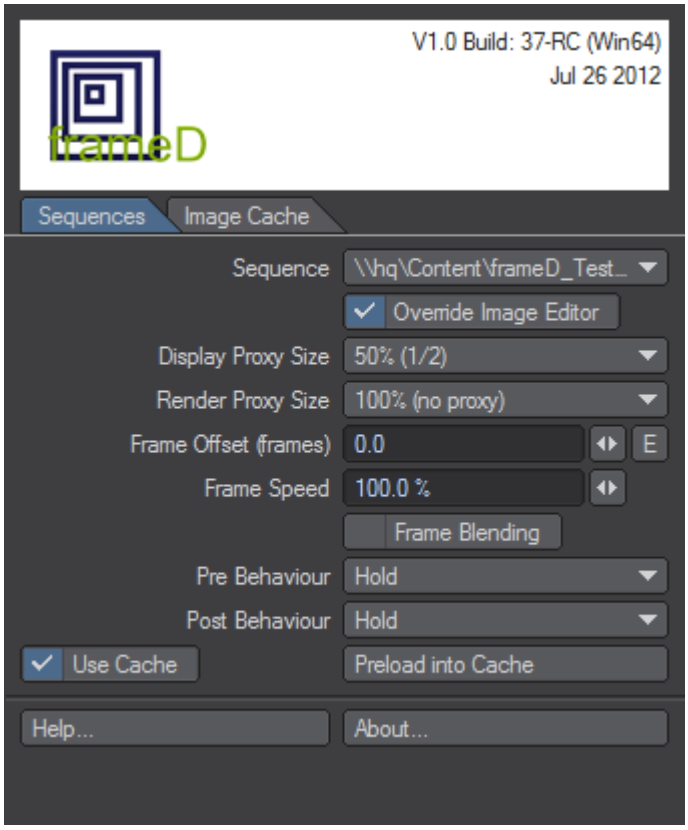
This defines the background colour in the preview.

Display Alpha Channel

If this option is enabled then the alpha channel[6] of the current image will be taken into account when displaying it.

6 Obviously only if the current image actually contains an alpha channel.

Master Plugin



The frameD Master plugin makes the individual settings for frameD managed image sequences available in a scene. The settings are saved with the scene and respected in Screamernet as well[7].

The **Sequences** tab hosts the individual controls for specific sequences. The **Image Cache** tab host the controls responsible for managing the image RAM cache which is used both by Layout as well as Screamernet.

The following controls are available:

Sequences

Sequence

This allows you to select the loaded frameD sequence to edit.

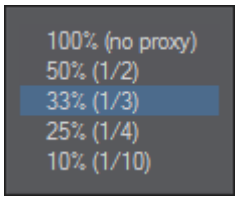
Override Image Editor

If this setting is turned off then the sequence playback is controlled by the settings in the image editor.

If it is turned on then the following controls are enabled, the sequence playback is controlled by them.

Please note: If this setting is turned on then the post-behaviour of the loaded frameD sequence needs to be set to Loop in the image editor.

Display Proxy Size



This sets the scale of the images loaded by the sequence when working interactively in Layout. Proxies will be created transparently by the frameD loader and stored in a subdirectory next to the images used in the sequence.

If proxy images exist on disk (and are more recent than the image file) then those will be loaded directly to speed up interactions in Layout.

Render Proxy Size

This sets the scale of the images loaded by the sequence when rendering. Proxies will be created automatically by the frameD loader and stored in a subdirectory next to the images used in the sequence.

If proxy images exist on disk (and are more recent than the image file) then those will be loaded directly.

Frame Offset (frames)

This changes the offset of the sequence. The setting is in frames and can be enveloped.

To directly control which sequence frame is loaded, at which time in Layout, use the envelope. If an envelope is used to define the offset, then the Frame Speed as well as the Pre- and Post-Behaviour will be ignored and the respective controls disabled.

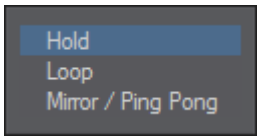
7 Obviously, only the Render Proxy Size will be used when rendering in Screamernet.

Frame Speed

This changes the speed of the frameD sequence. The sequence will always be loaded at the scene FPS settings.
If you slow down the sequence it may extend beyond the length as defined by LightWave in the image editor. You can change the end behaviour to “Loop” in the image editor to prevent that. The sequence will not loop in that case but behave as defined by the frameD Master.

Pre Behaviour

This setting determines how frames are handled when loaded before the starting frame of the sequence (which could be due to a negative current frame or a changed Frame Offset).



Hold
The first image of the sequence will be displayed

Loop
The sequence will be looped

Mirror / Ping Pong
The sequence will be repeated but the loops will be mirrored in time.

Post Behaviour

This setting determines how frames are handled when loaded after the end frame of the sequence.

Hold
The last image of the sequence will be displayed

Loop
The sequence will be looped

Mirror / Ping Pong
The sequence will be repeated but the loops will be mirrored in time.

Frame Blending

Frame Blending blends frames in the image sequence to smooth the transition between. If a sequence contains an image at frame 0 as well as another frame at frame 10, Frame Blending will gradually blend from one to the other over the course of the frames 1 to 9.
Blending will be performed onto the first image. If the second image is larger, it will be cropped. If it is smaller then it will be blended in on the top left of the first image.

Use Cache

This allows the current sequence to use the image cache if it is enabled. This setting is on by default.

Preload into Cache

This loads all images that are a part of the current sequence into the cache.

The size of the cache will not be increased automatically if they don't fit, instead, the images that have been used the least will be purged from RAM.

Help...

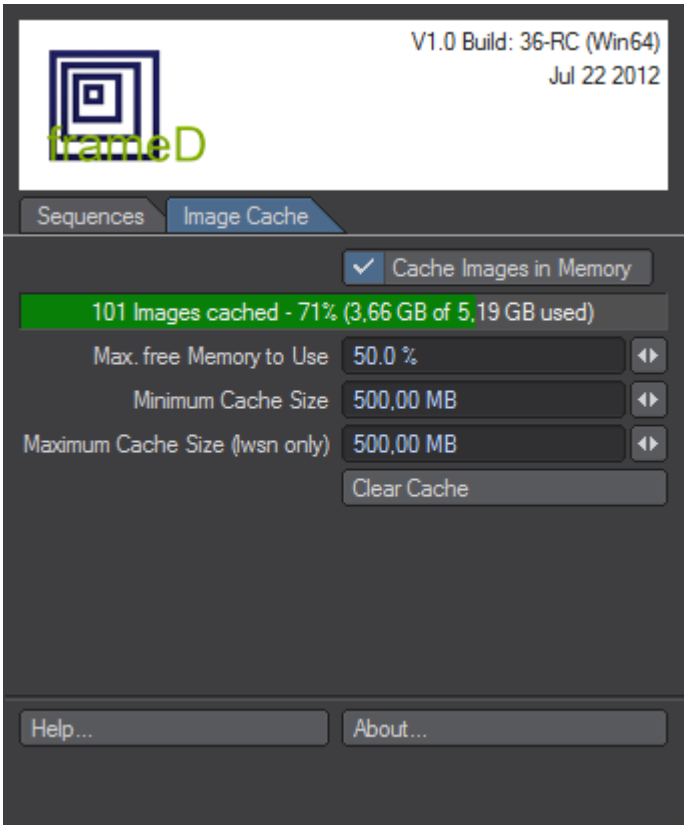
This opens a panel with short descriptions of the controls and associated functionality. You can leave it open as a reference.

About...

Displays detailed version information as well as credits for frameD.

Image Cache

The Image Cache stores used images in memory to allow for faster scrubbing within Layout. It also speeds up sequences that perform frame blending or the use of multiple sequences that refer to the same images on disk.
If the memory limit of the cache is reached then the least recently[8] used images will be removed from the cache.



Cache Images in Memory

This switch turns the image cache on or off for all sequences.
If it is off, then image caching is completely disabled.

The amount of memory used by the cache is controlled by the following settings.

Max. free Memory to use

This determines the largest amount of memory that the cache may use. It is a percentage of the available (free, physical) memory on the workstation.

This allows the cache size to adapt to the amount of installed as well as available memory on the system.

Minimum Cache Size

This determines the minimum amount of memory for the cache. It will always provide at *least* this much memory to cache images.

The control understands the units MB, KB and GB[9] for the cache size. Numbers without a unit are interpreted as Megabytes.

Maximum Cache Size

This is the largest amount of memory that the cache may use when rendering in Screamernet. While there is no interactive workflow to accelerate, it can still speed up rendering if frame blending is used or multiple sequences use the same frames on disk.

The control accepts memory units just like the previous one.
If set to 0 then the cache will be effectively disabled.

Clear Cache

This empties the cache to free up memory.

8 Which is just a fancy way of saying: The oldest images are removed.
9 Actually, just the first letter is taken into account here. i.e. “1 GB” is interpreted as one Gigabyte, as is “1gb” or even just “1g”.

Appendix

Keyboard shortcuts for the editor

The frameD editor provides numerous to speed up working with it.

Shortcut	*Function*
← / →	Scrub to the previous/next frame, selecting it (and deselecting all other frames).
Ctrl + ← / →	Swap the contents of the current frame with the previous/next frame. Scrub to the previous/next frame, selecting it (and deselecting all other frames).
Alt + ← / →	Change the image for the currently selected frame to the previous/next frame respectively, alphabetically sorted. The first frame in the sorted list is (none).
Space	Select the current frame, deselect all others
Ctrl-Space	Toggle the selection state of the current frame
a	Select all frames
d	Deselect all frames
i	Invert (toggle) the frame selection
↑/↓	Change the current frame to the previous/next frame. Does not modify the selection.
Shift + ↑/↓	Change the current frame to the previous/next frame, adding it to the selection.
Ctrl + ↑/↓	Copy the currently selected frames to to the previous/next frames, keeping the copy selected.
Shift + Ctrl + ↑/↓	Move the currently selected frames to to the previous/next frames (setting the original frames to blank), keeping the moved frames selected.
-	Clear the selected images (set them to (none))
+	Load an image or sequence into the current frame
F1	Display the help panel
F10	Display the About panel
Esc	Close the editor (saving the project automatically, just in case)
o	Load a project
s	Save a project
Alt-s	Save a project without prompting for a file name
e	Export a project as an IFL file
c	Copy selection to clipboard
x	Cut selection to clipboard
v	Paste from Clipboard
u	Undo (only edits, not selections)
r	Redo (only edits, not selections)

Adding the IFL and the XFD extension to the list of known image types in LightWave 3D

The configuration file for LightWave 3D contains an entry that starts like the following

```
FileType Images
```

Adding the file extension for .xfd (frameD projects) and .ifl will allow you to load them directly into Layout without having to display “All Types” in the file requester. Just append the following to the line:

```
;*.xfd;*.ifl
```

Description of the XFD file format

XFD is the native, XML based, format used by frameD. It is used both to store editor projects and to load projects directly into LightWave 3D as an animation using the frameD loader.

Sample XFD file

```
<?xml version="1.0" ?>
<frameD firstFrame="0" length="100" version="1">
    <settings previewStart="0"
     previewEnd="100"
     currentFrame="0"
     syncToLayout="0"
     previewXsheet="1"
     solidBG="1"
     background.R="102" background.G="102" background.B="102"
     checks.R="153" checks.G="153" checks.B="153" />

    <frame src="Images\4s\4Seconds0000.png" duration=”10”/>
…
    <frame src="Images\4s\4Seconds0100.png" />
    <clip src="Images\4s\4Seconds0000.png" />
…
    <clip src="Images\4s\4Seconds0100.png" />
</frameD>
```

firstFrame is optional and 0 by default
settings stores the frameD editor settings as attributes, they have no effect on loading the sequence into LightWave and may be omitted.
clip is optional as well and used to store images that are a part of the project but not in the sequence itself.
duration per frame is optional and 1 by default (if omitted)
src paths are either absolute or relative to the .xfd file itself.

Image specific files created by frameD

frameD automatically creates and stores scaled down versions of the images if required. These are used as proxies or to speed up loading sequences into the frameD editor.

Scaled down images are stored in a sub-directory of the directory where the respective image is located.

The **thumbs** subdirectory stores images used to speed up loading projects into the frameD editor. This will prevent it from needing to read all original images to create the preview displayed in the editor.

The **proxy** directories contain scaled down versions of the images used if a sequence is loaded as a proxy.

All of these directories and contained files may be deleted at any time. However, they will be created again if required by frameD.

If the original image changes then the proxy/thumb will be re-created as well if required.

frameD saves 8-bit images as PNGs, HDR images as OpenEXR. In both cases the highest compression rate is used to keep disk usage down. While this slows down writing the images, this only happens rarely. Reading the images will not be affected[10].

Proxy and thumb images are accompanied by a .xfi file, which is an XML file pointing to the actual image. This is required because frameD doesn't know if it is looking for a PNG or EXR image initially.

Known limitations and Issues[11]

Supported image formats

FrameD loads images by using the image loading plugins for LightWave 3D directly. TGA and IFF are however not loaded by plugins and thus not supported by frameD.

Images with colour palettes are currently not supported.

Pixel aspect ratios other than 1 are only partially supported at the moment (ignored by the editor, passed through by the frameD loader).

Since infiniMap uses a completely different approach to managing images, by-passing the imaging pipeline of LightWave 3D completely, it will not work in combination with frameD. However, both may certainly be used at the same time.

Support for colour spaces

If OpenGL colour correction is enabled, then the preview image in the editor will be corrected as well. However, since the frameD editor doesn't support colour correction yet[12], this may result in washed out images.

This does not affect the ability to apply colour spaces to a frameD sequence when loading it into LightWave 3D. This is still possible via the global options or per sequence in the image editor.

Image cache

Cached images are not automatically updated in the memory cache if the image changes on disk.

Instances of frameD .xfd/.ifl sequences

Due to issues within the image instancing system in LightWave 3D (that is, instancing/referencing in the image editor) we don't recommend cloning instances of .xdf or .ifl sequences[13].
However, it is easy enough to rename a .xfd or .ifl file and load that instead. Since the image cache is shared, and thus works across all .xfd or .ifl files that are loaded in a scene, there will be a small performance hit only.

Exporting IFL files

Since the IFL specifications are rather limited, there should be no spaces in the image names as well as the path from the exported .ifl file to the images.

10 It's actually slighter quicker since there's less data to read from the disks.
11 We will certainly be working on removing these in the future.
12 For speed and memory reasons. Actually either: The editor would either need to store images twice or linearise images on-the fly every time they are displayed.
13 One reason would be to extract the alpha channel from the clone of a sequence