

# OpenEXR CLI Tools

This document accompanies the pre-built OpenEXR CLI (Command Line Interface) tools provided as a convenience by fnord software. They are utilities written by Industrial Light and Magic and included in the open source OpenEXR library. Nothing in the package is fnord intellectual property. If you would like to get the source code and build the tools yourself, visit [OpenEXR.com](http://OpenEXR.com). For more legal disclaimers, see the end of this document.

Some ILM documentation for **exrdisplay** and **playexr** can be found [here](#) and [here](#). Sample EXR files can be found on the OpenEXR [downloads](#) page.

## The Tools

### Image display tools:

exrdisplay	View a single EXR file on screen. Includes a myriad of options for displaying different aspects of the file and controls for adjusting exposure and other viewing parameters. Also a good demonstration of certain EXR features such as colorimetry and display window. If you suspect a program is not displaying a file correctly, compare it with this.
playexr	Play an EXR file sequence in real time, if possible. Includes some keyboard playback controls and the ability to adjust exposure in hardware as the image plays.

## Other tools:

exr2aces	Conforms a regular EXR to the <a href="#">Academy Image Interchange Framework</a> , which is an EXR file with more restricted parameters.
exrenvmap	Converts environment maps between six cube faces and a single latitude-longitude map.
exrheader	Prints the attributes stored in an EXR file's header. Every EXR has a list of channels, file dimensions, file compression, etc. But they can also contain any number of optional attributes from color space information to informative text descriptions to camera matrix transforms.
exrmakepreview	EXRs can include a small preview image for applications to quickly display the image contents. This utility will add one, although I'm not sure if any applications actually read them outside of ILM.
exrmaketiled	Most EXR files are organized as single array of scanlines, but they can also be arranged into a series of tiles. Tiled images can also include multiple resolutions. These features can save certain programs (particularly 3D renderers) from loading the entire image when perhaps they only need to use part of it to texture a far-off polygon. Anyway, this tool can create a tiled image from a scanline one.
exrmultiview	Takes a stereo pair of EXR images and merges them into a single image following the EXR stereo specification.
exrstdattr	Add or edit standard EXR attributes.

# Installation

These are all command-line tools, so they are usually run by typing their name in a command shell (Terminal on Mac, Command Prompt on Windows) followed by an EXR file as an argument. You can put them anywhere you want on your system, but you might want to put them somewhere the shell will always see them, like `/usr/local/bin` on a Mac. Or you can configure your shell to see another path you want to leave them in. Details on how to do so are *well* beyond the scope of this document.

Most of the utilities included will stand on their own, not requiring any external DLLs or Frameworks to run. The exception is **playexr**, which relies on nVidia's **Cg Runtime Libraries**, also included in the archive. On Windows, the DLLs can be left in the same directory as `playexr`, or you can move them to a system-wide DLL directory. On Mac OS X, it's probably easiest to copy `Cg.framework` to `/Library/Frameworks`.

# Documentation

All these tools must be run from a command-line. Double-clicking them won't do anything useful. Here are some sample command lines:

```
exrdisplay Desktop/explosion.exr
```

```
playexr Desktop/animation/car.%.exr 1 100
```

```
exrmaketiled -t 8 8 Desktop/scanline.exr Desktop/tiles.exr
```

One thing I'll point out right now is that `playexr` unfortunately doesn't work with sequences that have leading zeroes. So you need a sequence of `car.1.exr`, `car.2.exr`, not `car.0001.exr`, `car.0002.exr`, etc.

To get full documentation for each utility, run it without passing any arguments to it.

## Nerd Info

The programmers in the audience may notice that these very small utilities are actually quite large because they each contain the entire OpenEXR library. Static linking in programmer parlance. This lets them run without any dependence on DLLs or Frameworks being properly installed (except for playexr, which relies on nVidia libraries that are only available as DLLs). This is how I personally prefer things. If you prefer to use DLLs I encourage you to download the source and build them that way yourself.

## Credits

Let's give a shout out to the authors, shall we?

**Florian Kainz**  
**Rod Bogart**  
**Drew Hess**  
**Paul Schneider**  
**Bill Anderson**  
**Wojciech Jarosz**  
**Andrew Kunz**

## Legal

### **Plain English License Agreement**

You are free to do anything you want with the software included in this package, but for software and Industrial Light and Magic can not be held responsible for any positive, neutral, or negative effects from doing so. So don't try to sue us! Plus, you are bound by the legalese ILM license agreement seen here:

## **ILM License Agreement**

Copyright ©2006, Industrial Light & Magic, a division of Lucasfilm Entertainment Company Ltd. Portions contributed and copyright held by others as indicated. 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 any other contributors to this software 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.

## **nVidia Cg Toolkit Distribution Terms**

### **DISTRIBUTION LICENSE**

IMPORTANT NOTICE -- READ CAREFULLY: THIS DISTRIBUTION LICENSE IS THE AGREEMENT THAT GOVERNS USE OF THE SOFTWARE AND ASSOCIATED MATERIALS PROVIDED HEREIN. BY DOWNLOADING, INSTALLING, COPYING, OR OTHERWISE USING THE SOFTWARE, YOU EXPRESSLY AGREE TO BE BOUND BY THE TERMS OF THIS AGREEMENT. IF YOU DO NOT AGREE TO ALL OF THE TERMS AND CONDITIONS SET FORTH IN THIS AGREEMENT, YOU MAY NOT INSTALL, USE, OR DISTRIBUTE THE SOFTWARE.

1) Subject to all of the terms set forth herein, NVIDIA Corporation ("NVIDIA") hereby grants a non-exclusive, worldwide, royalty-free license ("License") to the distributor or publisher ("Distributor") set forth below to use, reproduce, distribute, publicly display, and publicly perform NVIDIA's software comprising its Cg Toolkit, including CgFX, any associated documentation, and any portions thereof provided by NVIDIA (all together, each apart, referred to herein as "Software") by incorporating the Software into Distributor's software or published works ("Works") and any advertising and promotional materials relating thereto.

2) NVIDIA represents that the Software is either owned by NVIDIA or that, to the best of NVIDIA's knowledge, it has full authority from the owner of items incorporated into the Software to grant the rights set forth in this License and that such items do not violate the copyright, trademark, or any other rights of any third party.

3) Distributor agrees that the Software is proprietary information of NVIDIA and that NVIDIA owns all right, title and interest therein. There are no implied licenses under this License, and any rights not expressly granted are reserved by NVIDIA. The Software is protected by copyright laws and international copyright treaties, as well as other intellectual property laws and treaties. The Software is not sold, and instead is only licensed for use, strictly in accordance with this License. Distributor agrees not to disassemble, decompile or reverse engineer the Software in whole or in part. All copies of the Software shall contain NVIDIA's proprietary rights notices as provided therein. Distributor shall not remove or modify any such proprietary rights notices of NVIDIA. This License will automatically terminate if Distributor fails to comply with any of the terms and conditions hereof. In such event, Distributor must cease reproducing, distributing, or otherwise using the Software and destroy all copies thereof.

4) NVIDIA will not be responsible for providing maintenance and support to Distributor, its customers, or any other end users for the Software or Works distributed by Distributor or others.

5)THE SOFTWARE IS PROVIDED BY NVIDIA TO DISTRIBUTOR “AS IS.” NVIDIA DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF TITLE, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NONINFRINGEMENT.

6)IN NO EVENT SHALL NVIDIA BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES (WHETHER IN AN ACTION IN CONTRACT OR TORT) WHATSOEVER (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, OR ANY OTHER PECUNIARY LOSS) ARISING OUT OF THE USE OF OR INABILITY TO USE THE SOFTWARE OR IN CONNECTION WITH THIS LICENSE, EVEN IF NVIDIA HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THESE LIMITATIONS SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY. NVIDIA SHALL HAVE NO CONTRACTUAL OBLIGATION TO INDEMNIFY DISTRIBUTOR UNDER THIS LICENSE. DISTRIBUTOR AND/OR ITS CUSTOMERS ASSUME THE ENTIRE COST OF ANY DAMAGE, LOSS, OR EXPENSE RESULTING FROM THEIR USE OR EXPLOITATION OF THE SOFTWARE.

7)Distributor may not assign, sublicense, or otherwise attempt to transfer this License or any right or obligation hereunder without NVIDIA’s prior written consent.

8)The export of the Software may be subject to the export control laws of the United States of America and/or other countries, and Distributor agrees to abide by all such export control laws and regulations.

9)If any provision of this License is held to be invalid or unenforceable for any reason, the remaining provisions will continue in full force without being impaired or invalidated in any way.

10)No term or provisions hereof shall be deemed waived, and no breach excused, unless such waiver or consent is in writing and signed by the party claimed to have waived or consented. The waiver by either party of a breach of any provision of this License will not operate or be interpreted as a waiver of any other or subsequent breach.

11)This License will be governed and construed in accordance with the laws of the State of California without giving effect to principles of conflict of laws. Any suit or controversy arising hereunder shall be brought in the federal or state courts located in Santa Clara County, California, and each party submits to the venue and jurisdiction thereof. The United Nations Convention on Contracts for the International Sale of Goods is specifically disclaimed.

12) This License constitutes the final, complete, and exclusive agreement between the parties with respect to the subject matter hereof and supersedes any previous proposals, negotiations, agreements, letters of intent, arrangements, or warranties, whether verbal or written, made between the parties with respect to such subject matter. This License may be changed only by mutual agreement in writing of the authorized representatives of the parties.

*Fin*

The logo for 'fnord' is displayed in a lowercase, sans-serif font. The letters 'f' and 'n' are blue, 'o' is red, and 'r' and 'd' are blue. A soft, light blue shadow is cast to the right of the text.