

ATK for Reaper : Read Me

This is the Ambisonic Toolkit (ATK) as a JSFX plugin suite for Reaper. It can be used with Reaper on C and Windows, and can also be used with other VST hosts on the Windows platform using the ReaJS plu ReaJS is part of the [ReaPlugs](#) plugin suite.

The Ambisonic Toolkit (ATK) is intended to bring together a number of tools and methods for working Ambisonic surround sound. The intention is for the toolset to be both ergonomic and comprehensive, providing both classic and novel algorithms to creatively manipulate and synthesise complex Ambisonic soundfields.

The tools are framed for the user to think in terms of the soundfield kernel. By this, it is meant the ATK addresses the holistic problem of creatively controlling a complete soundfield, allowing and encouraging composer to think beyond the placement of sounds in a sound-space and instead attend to the impressic image of a soundfield. This approach takes advantage of the model the Ambisonic technology presents, is viewed to be the idiomatic mode for working with the Ambisonic technique.

We hope you enjoy the ATK!

For more information please visit the [Ambisonic Toolkit website](#) or send us an [e-mail](#).

Installing

Requirements

- ATK for Reaper requires [Reaper 4.75 or above](#).

Windows

1. Start Reaper.
2. From the Options menu choose "Show REAPER resource path in explorer/finder".
3. Unzip the ATK for Reaper archive.
4. Follow the instructions suggested by the folder names in the unzipped archive. If the Data and Ef folders already contains ATK subfolder from a previous install, these can safely be deleted before copying.

Mac OSX

When you run the installer, the required files are installed into the following two folders in your home li
folder:

```
~/Library/Application Support/ATK
~/Library/Application Support/Reaper/Effects/ATK
```

Additionally an alias (or rather a symlink) is created at:

```
~/Library/Application Support/Reaper/Data/ATK
```

that points to:

```
~/Library/Application Support/ATK
```

If you are using Ambisonic Toolkit with SuperCollider as well, the convolution kernels are installed in t
same place and have the exact same content. We do not expect this to cause any conflicts.

If you want to take a look at the installed files and do not see the Library folder in Finder, please press
ALT button while clicking the "Go" menu in Finder. The Library folder will show up as an additional o

Need Some Sound Files to Play Around With?

You can find a collection of sound files here:

- <http://www.ambisonictoolkit.net/wiki/tiki-index.php?page=Downloads>

Additional sound files can be grabbed from these fine sources:

- <http://ambisonia.com/>.
- <http://www.freesound.org/browse/tags/B-format/>.
- <http://www.surround-library.com/> (commercial library ambisonic sound effects).
- <http://www.spheric-collection.com/> (commercial library ambisonic sound effects).

And most of the catalogue of Nimbus Records are UHJ recordings:

- <http://www.wyastone.co.uk/>.

Feedback and Bug Reports

Known Issues and Limitations:

Encoders:

- Diffuser encoder: Only works if the Reaper project is set to one of the following sample rates: 44100, 48000, 88200, 96000 or 192000 Hz.
- Spreader encoder: Only works if the Reaper project is set to one of the following sample rates: 44100, 48000, 88200, 96000 or 192000 Hz.
- SuperStereo encoder: Only works if the Reaper project is set to one of the following sample rates: 44100, 48000, 88200, 96000 or 192000 Hz.
- UHJ encoder: Only works if the Reaper project is set to one of the following sample rates: 44100, 48000, 88200, 96000 or 192000 Hz.
- ZoomH2: Not yet implemented.

Transformers:

- The proximity effect plugin does not seem to have any effect, apart from extreme gain clipping as distance goes to zero.
- All effects with custom GUIs can be made more CPU efficient by only redrawing the GUI when it is changed. This holds true for encoders and decoders as well.

Decoders:

- Binaural decoder: The Cipic and Listen HRTFs only work if the Reaper project is set to 44100 Hz sample rate.
- Diametric: Not yet implemented.
- Periphonic: Not yet implemented.
- UHJ decoder: Only works if the Reaper project is set to one of the following sample rates: 44100, 48000, 88200, 96000 or 192000 Hz.
- Quad: K and shelf filter remains to be implemented.
- Pantophonic: K and shelf filter remains to be implemented.

Reporting issues

For issues pertaining to the ATK for Reaper plugins, please e-mail trond.lossius@bek.no. Alternatively, you can use the JS plugins issue tracker:

- http://www.ambisonictoolkit.net/wiki/tiki-view_tracker.php?trackerId=6

If you use the plugins for some project, please let us know! You can either [mail us](#), or [add information to wiki](#).

List of Changes

Version 1.0.b5 - 2015-08-07

- Added new utils plugin: MuteSoloChannels - can be used to mute or solo individual channels of a four-channel track. This can be useful when monitoring effect processing of signals within a Bformat => BtoA => SoundFXs => AtoB => B-format signal processing chain.
- The 4channels plugin is now properly installed on Windows.
- Set up the infrastructure required to provide Factory Presets for plugins. A number of presets are provided for the MuteSoloChannels effect.
- Fixed bug in binaural decoder that would prevent the use of Spherical HRTFs at 88.2kHz and 96kHz. Thanks to Juan Pampin for pointing this out!
- Resolved: JS plugin automation data generated by GUI is not always properly recorded. This was in Reaper, and was fixed in Reaper 4.75. Issue on the Reaper issue tracker: <http://forum.cockos.com/showthread.php?t=147151>

Version 1.0.b4

- New utility plugin "4channels": Can be used to extract 4-channel A- or B-format recording from file with additional channels, e.g. recorded in the field using a portable recorder such as Tascam I or Sound Devices 788T.
- Fixed an issue where matrix-based encoders could cause very loud signals if used on a track with insufficient number of channels.

Version 1.0.b3

- Fixed issue where multi-channel matrix-based decoders could blow up when used on 2-channel (stereo) tracks.
- Encode/UHJ: Corrected description of plugin in GUI
- Decode/Binaural: Improving text describing in GUI of this plugin
- Decode/5_0: Text description now provides information on output channels
- Decode/Quad: Text description now provides information on output channels

Version 1.0.b2

- Fixed issue where matrix-based transform plugins could blow up when used on 2-channel (stereo) tracks.
- Fixed issue that prevented Omni encoder from producing sound.
- OSX installer is now distributed as disk image.
- Creation of Zip archive for Windows distribution is automated using a Terminal script.
- Info for beta testers has been merged into this readme document.
- This Readme file is now versioned and maintained as markdown document, and converted to html installer script using [Pandoc](#). A minimum of CSS is used for it to look OK as a stand-alone HTML document as well as in the OSX installer.

Version 1.0.b1:

- First beta release.

Credits

Copyright the ATK Community, Joseph Anderson, Joshua Parmenter and Trond Lossius, 2014.

- J Anderson : [\[e-mail\]](#)
- J Parmenter : [\[e-mail\]](#)
- T Lossius : [\[e-mail\]](#)

The port of ATK as a set of Reaper JS plugins by Trond Lossius is supported by [BEK, Bergen Centre for Electronic Arts](#).

The filter kernels distributed with the Ambisonic Toolkit are licensed under a Creative Commons Attribution-Share Alike 3.0 Unported License and are copyright the Ambisonic Toolkit Community and Joseph Anderson, 2011.

<http://creativecommons.org/licenses/by-sa/3.0/>

Third Party Notices

Diametric Decoder Theorem (DDT) decoding

Support for Gerzon's Diametric Decoder Theorem (DDT) decoding algorithm is derived from Aaron He Octave code available at: <http://www.ai.sri.com/ajh/ambisonics/>

Benjamin, et al., "Localization in Horizontal-Only Ambisonic Systems" Preprint from AES-121, 10/2000 Francisco

Implementation in the SuperCollider3 version of the ATK is by [Joseph Anderson](#).

Irregular array decoding

Irregular array decoding coefficients (5.0, 7.0) are kindly provided by Bruce Wiggins:
<http://www.brucewiggins.co.uk/>

B. Wiggins, "An Investigation into the Real-time Manipulation and Control of Three-dimensional Sound Fields," PhD Thesis, University of Derby, Derby, 2004.

CIPIC HRTF Database (University of California)

V. R. Algazi, R. O. Duda, D. M. Thompson, and C. Avendano, "The CIPIC HRTF Database," in Proceedings of the 2001 IEEE ASSP Workshop on Applications of Signal Processing to Audio and Acoustics, New York, NY, 2001.

"The CIPIC HRTF Database - CIPIC International Laboratory." [Online]. Available:
<http://interface.cipic.ucdavis.edu/sound/hrtf.html>. [Accessed: 07-Jul-2011].

CIPIC Notices:

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CIPIC- Center for Image Processing and Integrated Computing University of California 1 Shields Avenue
 Davis, CA 95616-8553

Listen HRTF Database (IRCAM)

"LISTEN HRTF DATABASE." [Online]. Available: <http://recherche.ircam.fr/equipes/salles/listen/>. [Accessed: 07-Jul-2011].

IRCAM Notices:

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Reserved

Use of Materials

The Listen database is public and available for any use. We would however appreciate an acknowledgment of the database somewhere in the description of your work (e.g. paper) or in your development.

Contacts:

Olivier Warusfel, Room Acoustics Team, IRCAM 1, place Igor Stravinsky 75004 PARIS, France

MESA GLU Library

Code for calculating the inverse of a 4x4 matrix is based on the MESA implementation of the GLU library.
<http://www.mesa3d.org/>

The default Mesa license is as follows:

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