UHJ

UHJ Decoding Plugins

v1.0.2

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1 Introduction

UHJ Stereo is a technology from the 1970s which encodes a degree of spatial detail into a stereo signal. These plugins aim to recover it.

UHJ, or Universal HJ, is a hierarchical system designed to encoding surround sound using up to four channels, originally for use over radio. These plugins are intended for use with its stereo incarnation, as this is the format in which a number of recordings have been released. UHJ Stereo has a number of impressive features beyond its ability to carry surround information, including good mono and stereo compatibility.

Plugins are included that can produce quad, or limited first order ambisonic B-Format for use with other decoder libraries.

UHJ Stereo contains an impressive degree of spatial information given that this information is hidden inside a stereo stream. However, its resolution is *far* lower than modern technologies such as O3A. These plugins are primarily aimed at listeners with existing UHJ Stereo libraries.

1.1 Finding UHJ Stereo

A number of commercial releases have been made using UHJ, notably from Nimbus Records.

UHJ Stereo can also be produced from O1A or O3A using plugins, although we don't particularly recommend UHJ as a modern delivery mechanism.

1.2 Technical Requirements

1.2.1 Operating System

Supported versions of Microsoft Windows are 10 or 11, 64bit Intel.

Supported versions of Apple macOS are 10.14 to 13.5, 64bit Intel or Apple Silicon.

1.2.2 VST Host

The VST plugins require a VST 2 host with shell plugin support.

These plugins do not work with all VST 2 hosts. They are multichannel plugins and so will not work on VST hosts that only handle stereo. Also note that not all VST 2 hosts can use shell plugins. In particular, at the time of writing shell plugins are not supported in Nuendo 8.

1.2.3 AAX Host

The AAX plugins require Pro Tools Ultimate or Studio.

1.2.4 PC Hardware

Please check your PC meets the following requirements:

- Intel Pentium D CPU or better, or Apple Silicon.
- 200MB of free disk space.

1.2.5 Internet Connection Required

This software requires an Internet Connection for license activation and verification.

Successful license verification isn't required every time you use the software, but it is needed during installation and needs to succeed once every couple of weeks to keep the license fresh.

The license can be "revoked" to remove it from one machine so it can be moved on to another. You should also do this if you're updating your system in case the machine appears to have changed identity.

1.2.6 Permissions

You'll need administrator permissions while installing on Windows. The software probably won't install properly using a "restricted" account.

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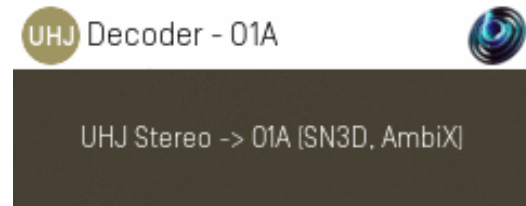
1.3 Levels

The levels of both plugins are slightly reduced relative to Gerzon's formulation, to compensate for a corresponding gain applied to the O1A and O3A Decoder - UHJ Stereo plugins.

The level reduction is approximately 0.87, or -1.2dB.

2 Decoders

2.1 UHJ Decoder - O1A

2.1.1 Host Support

Host Type	Support
AAX	Yes
VST2	Yes

2.1.2 Audio

	Channels	Content
Input	2	UHJ Stereo
Output	4	O1A

2.1.3 Description

This plugin partially recovers first order B-Format from a UHJ Stereo input. No height information is recovered, and horizontal resolution is reduced.

UHJ Stereo signals can be produced from Ambisonic mixes using plugins like the O1A or O3A Decoder - UHJ Stereo.

The output uses the modern SN3D/ACN convention, not the classic W, X, Y and Z channels mentioned in the literature.

2.1.3.1 Decoding the O1A Stream Produced

The output of this plugin is an O1A first order Ambisonic B-Format, not suitable for listening to directly. It needs to be decoded again, to produce actual speaker feeds.

First order decoders can be found in the O1A Decoding pack, or Rapture3D Advanced running in first order mode. The results typically will not be as good as using the original first order stream before UHJ encoding, but they typically aren't bad.

2.2 UHJ Decoder - Quad
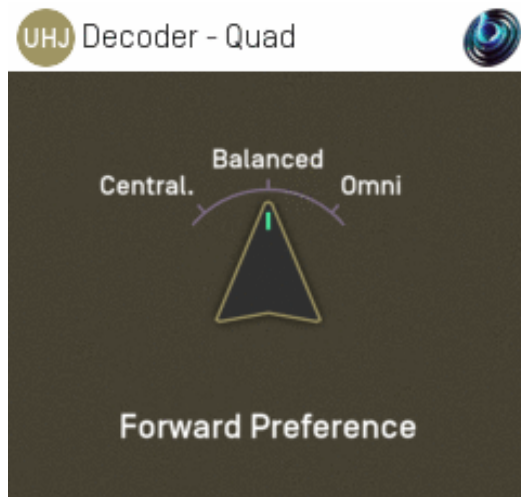
2.2.1 Host Support

Host Type	Support
AAX	Yes
VST2	Yes

2.2.2 Audio

	Channels	Content
Input	2	UHJ Stereo
Output	4	Quad

2.2.3 Controls

- Forward Preference

2.2.4 Description

This plugin renders four-channel surround for a quad array speaker from a UHJ Stereo input, using an algorithm based on a design by Michael Gerzon from 1980.

The algorithm used implements shelf filters, and Forward Preference with three settings. This plugin does not perform distance compensation.

2.2.4.1 Channels

The channel ordering used is:

Channel	AAX/VST
1	Front Left
2	Front Right
3	Back Left
4	Back Right

UHJ Stereo signals can be produced from Ambisonic mixes using plugins like the O1A or O3A Decoder - UHJ Stereo.

2.2.5 Controls

2.2.5.1 Control: Forward Preference

This control affects the phasiness and gains produced by the decoder. Three settings are available:

Label	k'	Description
Centralised	0.000	Same phasiness at front and back
Balanced	0.300	A balance between the extreme settings
Omni	0.677	Same gain at front and back