UHJ Encoder/Transcoder VST

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Please Note:

This VST plugin is provided free and as-is. There is no warranty and no guarantee that it will work for any particular purpose. The user uses this software at their own risk. It is still in an alpha version and therefore no guarantees are made for its stability or its compatibility with different hosts.

Update Notes

10/10/2012

This update has included several major and minor changes to both the GUI, the functions and the underlying code.

- Additional functions:
  - Added a fourth encoded channel (**Q**) for height information/periphony.
  - Added 2 more inputs to allow first order B-format to be converted to either a stereo/two-channel mix or full 4-channel UHJ. This allows the plugin to act as either a mono/stereo→UHJ encoder or a B-format→UHJ transcoder.

- GUI changes:
  - Redesign of the GUI to include a dial for **elevation**.
  - Complete cosmetic redesign.

- Minor code changes:
  - Previously high CPU usage when idle (after first use) due to denormal numbers. Changes to handle this so stored samples for the filter to no become denormal.
  - Minor changes to the flow of the code to improve efficiency.

11/08/2012

- Initial alpha release version of VST. No updates as of yet.

Overview of the Plugin

This VST can be used primarily in one of two ways:

- To convert a mono or stereo track into four spatially encoded channels that, when combined with the appropriate decoder, can create a 3D sound scene.

- To convert first order B-format channels (W, X, Y and Z) in to UHJ format. The first two output channels can be played back over a standard stereo setup without the need for decoding.

What can it do?

The VST has four outputs: **L**, **R**, **T** and **Q**.

It can be used with either two, three or four of the output channels in a few different configurations.

- The simplest is to take the **L** and **R** channels and use them as the signals to your left and right loudspeakers, as you would with conventional stereo. This raw/undecoded format allows it to work as a stereo panner that uses both amplitude and phase.

- The second option is to use it in conjunction with a UHJ decoder as an Ambisonic encoder. If used like this then either two, three or all four output channels can be used and, for an appropriate loudspeaker configuration, will allow it to function as a surround panner. If the first three channels are used it will be equivalent to 1st order 2D B-format. If only the **L** and **R** channels are used then the spatial resolution will be reduced. If all four channels are used then it is equivalent to 1st order 3D B-format and allows height reproduction (periphony).

Please see Figure 1 for the required signal flow required in both cases.

Please Note: At the current time this VST has been compiled for both 32bit Windows and 32bit OSX. I do intend to make 64bit versions available but unless there's some unprecedented demand for them I'll not be doing them too soon. I'd rather get the **B-format Encoder** and the **SARCoder** working efficiently on both platforms first.

Tips for Stereo/Undecoded Processing

Since it can only do first order surround sound the more interesting properties of the VST are as a stereo effect. Here are two things you can try:
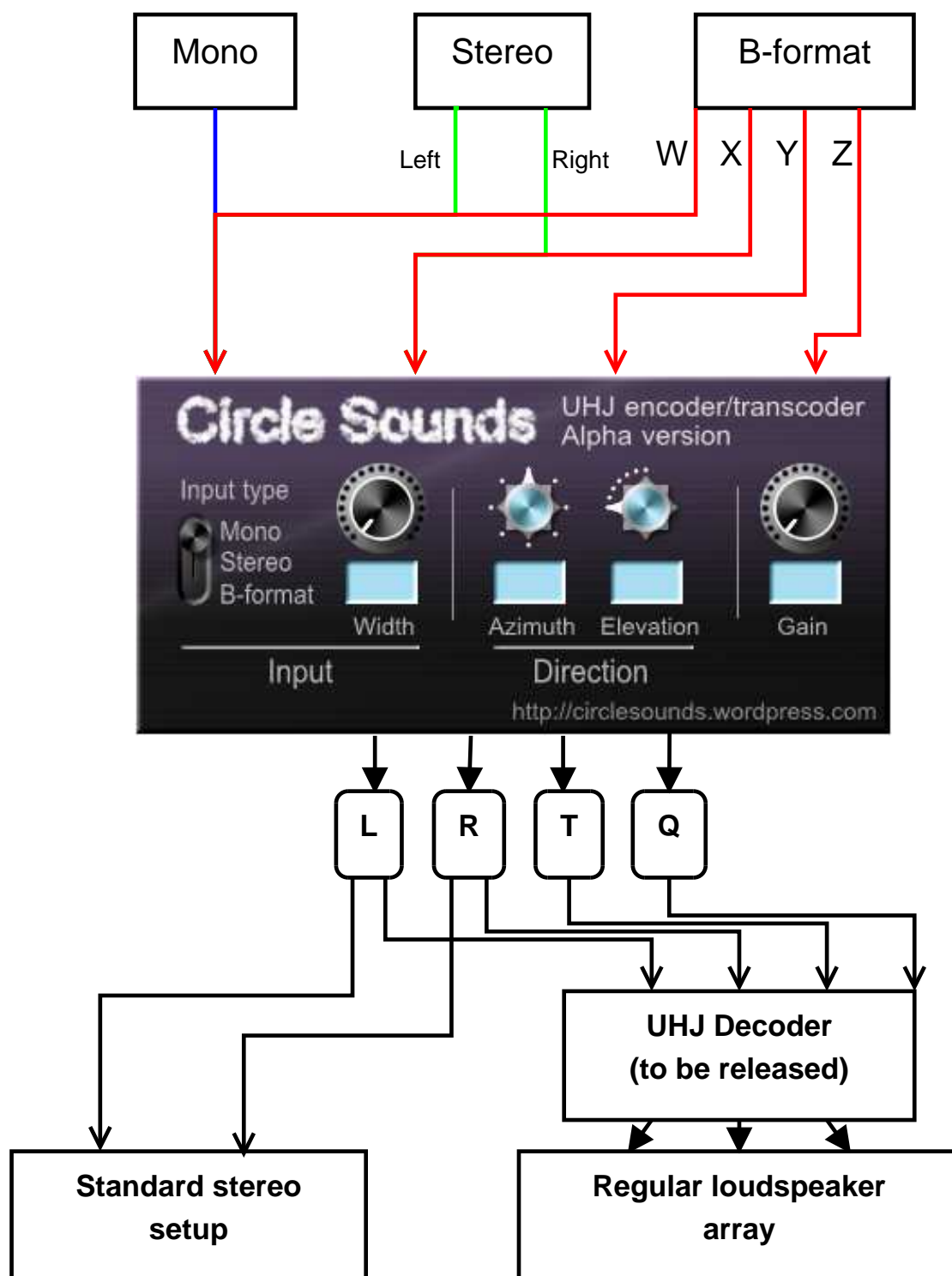
Figure 1: Signal chains for different configurations.

- For a mono input signal try turning the **Source Angle** beyond ±90 degrees. You should notice a change in character between sounds in the front and "rear". For the most obvious difference check out the difference between a source at 0 degrees and 180 degrees. The one at 180 degrees should be broader or less focused than the one directly in front. This allows a slightly different "flavour" of stereo than conventional amplitude panning.

- Using a stereo input signal, leave the **Source Angle** at 0 degrees, set the input to **Stereo in** and try changing the **Source Width**. It will act as a stereo width control that goes from completely mono to full width.

Basis for the VST

This plugin is based on work done by Michael Gerzon. The equations used are from the appendix of:

Gerzon, M. (1985). Ambisonics in multichannel broadcasting and video. J. Audio Eng. Soc, 33(11), 859-871.

The original version of this VST was made a part of an assignment for the Spatial Audio module during the MA in Sonic Arts at the Sonic Arts Research Centre (SARC) at Queen's University Belfast. It has since been slightly modified for stability and efficiency.