reasonistas

Core (•) ReLation

CORE Operation Manual v1.0 (March 2018)

Bypass
On
Off

reasonistas

Core (•) ReLation

2.3%

L ⇄ R

LEFT

GAIN
0.0dB

PAN
-100.0%

INVERT PHASE OFF

GLOBAL PAN

-1   -0.5   0   +0.5   +1

M+

L+   R+

S+   S-

R-   L-

M-

HUE

0
-12
-24
-36
-48
-60
-72
-84
-inf

PEAK   VU

S S S

L S R

RIGHT

GAIN
0.0dB

PAN
100.0%

OFF INVERT PHASE

98.4%

0   200

GLOBAL WIDTH

Core (•) ReLation

DESIGNED BY
reasonistas

BUILT BY
LAB:ONE
recordings

- CREATED BY PROFESSIONALS - POWERED BY DREAMS -

CV INPUTS

GLOBAL PAN   ON:BI
                    OFF: UNI

GLOBAL WIDTH   ON:BI
                    OFF: UNI

GAIN   ON:BI   ON:BI
            OFF: UNI   OFF: UNI

PAN   ON:BI   ON:BI
            OFF: UNI   OFF: UNI

LEFT   RIGHT

IN L   R IN

OUT L   R OUT

AUDIO

CE

NRTL
UL 60065
EN 60065

SERIAL: 01071992

100-240~AC
50-60Hz 32W

NOTE:
CTRL(Win) / CMD(Mac) + CLICK
TO RETURN GONIO COLOR KNOB
BACK TO DEFAULT GREEN.

THE GLOBAL WIDTH KNOB TURNS
INTO HAAS EFFECT WHEN THE
LSR TOGGLE SWITCH IS SET TO
EITHER L (LEFT SIGNAL) OR
R (RIGHT SIGNAL) POSITION

CAUTION

Table of Contents

Welcome

Thank you for choosing Reasonistas Rack Extensions. In order to maximize your experience with CoreReLation Phase Analyzer (CORE), we encourage you to read through this operation manual to learn all device functions and capabilities. We've also posted several video tutorials on Reasonistas' YouTube channel.

In addition, we recommend that you become familiar with http://www.reasonistas.com/. There you will find many helpful tools designed specifically for Reason users such as our one-of-a-kind Virtual Reason Rack, Free Rack Extension Checker Combinator, Reason Plugin Slider and PluginTEES, our Reason plugin developer apparel shop. Also, check out our blog and forum for great interviews and tutorials.

By signing up at https://shop.reasonistas.com/ you'll receive information about our Rack Extensions, reminders when updates are available, and the latest news and information about Reason and Rack Extensions.

About Reasonistas
Reasonistas was founded in 2012 by Electronic Music Producer Noel G., a devoted veteran Reason user and an active contributor of the legacy Propellerhead User Forums (PUF) and now ReasonTalk. The "Reason" in Reasonistas is obvious, but what is meant by "-istas"? The –ista suffix comes from Latin and before that Ancient Greek -ιστής (-istés). The derived English variant of this suffix is –ist, used in words like "pianist "futurist "annalist" and so on. All this to say: Reason users are Reasonistas. We are here to support the entire Reason community.

About Lab One Recordings
Lab One Recordings (http://lab-one-recordings.co.uk/rack-extensions/) is an independent digital music label, plus an audio plugin developer company and sound design company founded by Matt Fresha. From all aspects of electronic music, Lab One Recordings strives to supply the cream-of-the-crop products, for all your musical needs. Lab One dedicates themselves to bring quality products to the Reason Rack for all users, be it beginners, amateurs and professionals alike.

Acknowledgements
We thank Matt Fresha of Lab One Recording for partnering with us on our second Rack Extension. CORE would not be possible without Matt's continued support, patience and guidance throughout the project. Once again, Matt's superb coding knowledge, skills and deep understanding of Reason and music production in general continues to amaze. Thank you, Matt.

Next, we thank Mikko Niiranen (aka Nirude) for his ultra-realistic 3D CORE renderings and videos showing CORE in a 3D world. Mikko was again a consummate professional, delivering another round of superb images that began as basic pencil drawings. Thank you, Mikko
.
Last, but not least, we thank our beta testers for their help and you for supporting Reasonistas' CoreReLation Phase Analyzer. Please contact us at support@reasonistas.com should you have any questions or feedback to help us improve.

Also check out our debut and popular Rack Extension, SideChain ReAction Enveloper, the only multiband volume ducker and enveloper shaper available in the Propellerhead Software Shop.

Introduction

Reasonistas' CoreReLation Phase Analyzer, also known as CORE, is the first Reason rack extension designed and optimized for detailed phase and stereo imaging analyzation. We partnered once again with Lab-One Recordings to meticulously design and build CORE. With its unique user interface and iconic big knobs, CORE provides intuitively designed tools and visual mixing aids, essential for detecting and treating phasing and stereo imaging issues to ensure a properly balanced mix.

As with our SideChain ReAction Enveloper, CORE is another multipurpose rack extension, as CORE is in fact 4 capable devices rolled into a single plug-in:

1. Ultra-precise Phase Correlation Meter
2. Audio Goniometer (Vectorscope)
3. Stereo Width Processer
4. HAAS Effect

In addition, CORE is more versatile and capable than similar VST plugins thanks to Reason's unlimited audio routing and control voltage modulation capabilities. CORE is conveniently available for $/€19 in the Propellerhead Shop for Reason versions 9.5 and higher.

Make your mix bold, wide and solid to the CORE!

CORE front panel overview

Following are descriptions of CoreReLation Phase Analyzer's front panel sections and controls.

1. **Bypass/On/Off Switch**

   In Bypass mode, the input signal passes through unaffected to the main outputs of the device. In On mode, the device outputs the processed signal affected by the signal path with CORE. Off mode mutes the inputs, which completely silences the device.

2. **Phase Correlation Meter**

   CORE's Phase Correlation Meter allows you to visually check the phase relationship of a stereo signal with unparalleled and reliable accuracy, as explained below. Ideally, the meter LED will hover continuously between +0 (in phase stereo) and +1 (in phase mono).

Red LED (-1 to -0) Out of Phase	**Yellow LED** (0) Normal Width Stereo	**Green LED** (+0 to +1) In Phase
A steady red LED reading indicates a reduced degree of mono-compatibility, so certain sounds will get attenuated (quieter) or canceled when a stereo signal is summed into a mono signal.	The widest permissible left and right divergence will generally display a fluctuating yellow LED reading around 0, which is typically the widest audible stereo effect before going out of phase.	When left and right audio signals are similar or identical, they are correlated or fully correlated and completely in perfect phase alignment at +1 (mono). Any reading between +0 and +1 should be in phase.

Note: We recommend using the Phase Correlation Meter in conjunction with the Goniometer for a reliable indication of mono compatibility.

By design, CORE's phase meter is also conveniently displayed in both expanded and folded view modes.

CORE front panel overview (continued)

Following are descriptions of CoreReLation Phase Analyzer's front panel sections and controls.

3. Global Pan Knob

The Global Pan Knob controls the left/right position of the main input channel signal. By default it is set at the 12 o'clock position (full stereo or mono depending on the input signal). [Ctrl]-click (Win) or [Cmd]-click (Mac) to return to the default the 12 o'clock position (0.00%).

4. L⇋R – Input Source Toggle Switch

The Input Source Toggle Switch simply flips left and right input channel signal from LR (Left and Right) to RL (Right and Left). Flipping the stereo signal helps to gain or reset perspective of the stereo field. It may also produce pleasant and unintended results.
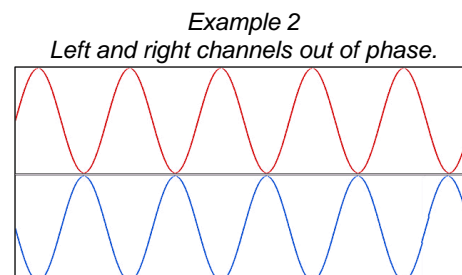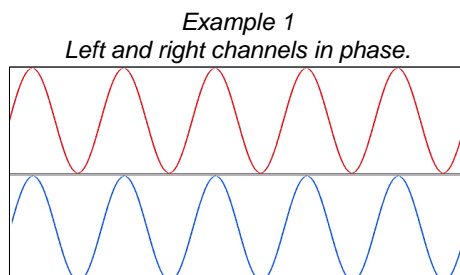
5. Left Gain Knob

The Left Gain Knob independently controls the gain of the left input channel signal. By default it is set to 0.0dB 12 o'clock position (unity gain), -24.0dB to the left position and +24.0dB to the right position. [Ctrl]-click (Win) or [Cmd]-click (Mac) to return to the default 0.0dB 12 o'clock position (unity gain).

6. Left Pan Knob

The Left Pan Knob independently controls the left/right pan position of the left input channel signal. By default it is set to -100.0% left position. [Ctrl]-click (Win) or [Cmd]-click (Mac) to reset to the default -100.0% left position.

7. Left Invert Phase Toggle Switch

The Left Invert Phase Toggle Switch independently inverts the phase of the left input channel signal to correct possible phase problems. Turn on the left invert phase toggle switch to get back in phase.

Example 1
Left and right channels in phase.

Example 2
Left and right channels out of phase.

Source: https://www.uaudio.com/blog/understanding-audio-phase/

CORE front panel overview (continued)

Following are descriptions of CoreReLation Phase Analyzer's front panel sections and controls.
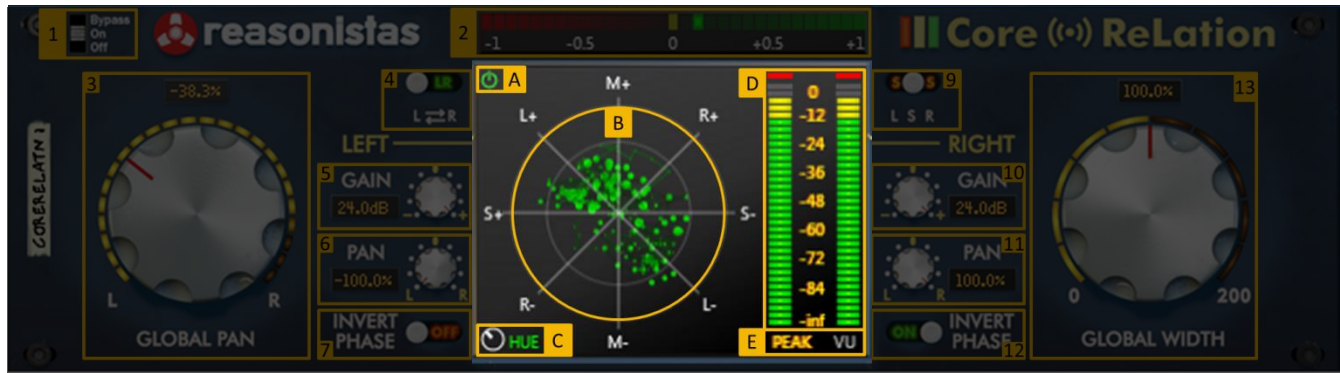

8. **Glass Display Section**

   CORE's glass display provides 2 controls, goniometer (vectorscope) and output meter, as follows:

    A. **Power Button** - The power button turns the audio goniometer (vectorscope) on/off. The button is green when ON and red when OFF. Turning off the audio goniometer when not in use will reduce cpu/dsp use.

    B. **Goniometer** - A goniometer is often included in analog audio equipment to display a Lissajous figure which shows the amount of stereo (that is, phase differences) in a dual-channel signal. It allows the sound technician to adjust for optimal stereo and determine the makeup of errors such as an inverted signal. Source: Wikipedia (S = Stereo: L = Left; M = Middle; R = Right).

    C. **Hue (Color) Knob** - The Hue Knob allows you to change the hue of the audio goniometer to any color in the full visible spectrum. [Ctrl]-click (Win) or [Cmd]-click (Mac) to return to the default green color.

    D. **Audio Output Meter** - The Audio Output Meter is available in PEAK and VU (RMS) mode.
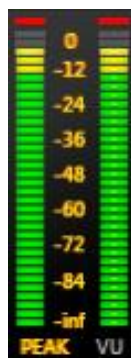
    In PEAK Mode, the meter response is 0 ms for both rise and fall, which means that this mode provides the most accurate representation of the signal level over time. Since the fall time is 0 ms, it could be quite distracting to the eyes to watch the meters in PEAK mode. The peak segment (the topmost LED segment, indicating the highest level) will remain lit until you click anywhere on the meter (not the PEAK or VU text) to reset the red clip lights.
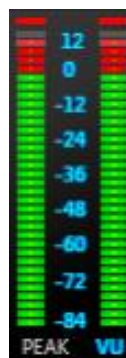
    The VU Mode simulates the behavior of analog meters and shows the RMS (Root Mean Square) value of the signal. Since the RMS value is an "average" of the signal level over time it's not suited for detecting fast transients in the sound. Rather, VU meters are useful for monitoring the overall loudness of the signal. In VU Mode, the meter response is 300 ms/20 dB for both attack and release. There is no peak segment in the meter.

    Source: Reason 10 User Manual

    E. **PEAK and VU Toggle Text** - By default, the audio output meter is set to PEAK mode (orange numbers). Click on the VU text to change the meter to VU/RMS mode (blue numbers) and on the PEAK text to return to PEAK mode. Click anywhere on the meter to reset clip lights.

CORE front panel overview (continued)

Following are descriptions of CoreReLation Phase Analyzer's front panel sections and controls.

9. LSR (Left - Stereo - Right) Monitor Toggle Switch

The LSR Monitor Toggle Switch allows you to monitor the incoming audio signal in 3 modes, as follows:

L mode
You'll hear only the left channel source signal, as a centered mono signal.

S mode
Sound source is a left and right channel signal in stereo or mono, depending on signal.

R mode
You'll hear only the right channel source signal, as a centered mono signal.

Notes:

* *In S mode the Global Width Knob must be set to 100.0% for full stereo.*
* *When the LSR Toggle Switch is set to either L or R, these modes convert the Global Width Knob into a HAAS effect to widen an otherwise mono signal. See point 13 on page 7 for more details.*

10. Right Gain Knob

The Right Gain Knob independently controls the gain of the right input channel signal. By default it is set to 0.0dB 12 o'clock position (unity gain), -24.0dB to the right position and +24.0dB to the right position. [Ctrl]-click (Win) or [Cmd]-click (Mac) to return to the default 0.0dB 12 o'clock position (unity gain).

11. Right Pan Knob

The Right Pan Knob independently controls the Right/right pan position of the right input channel signal. By default it is set to 100.0% right position. [Ctrl]-click (Win) or [Cmd]-click (Mac) to reset to the default 100.0% right position.

CORE front panel overview (continued)

Following are descriptions of CoreReLation Phase Analyzer's front panel sections and controls.

12. Right Invert Phase Toggle Switch

The Right Invert Phase Toggle Switch independently inverts the phase of the right input channel signal to correct possible phase problems. Turn on the right invert phase toggle switch to get back in phase.

Example 1
Left and right channels in phase.

Example 2
Left and right channels out of phase.
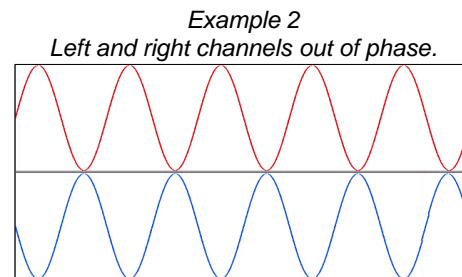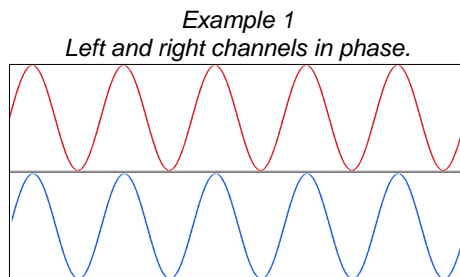
Source: https://www.uaudio.com/blog/understanding-audio-phase/

13. Global Width Knob

The Global Width Knob allows you to control the width of the stereo field when the LSR Toggle Switch is set to S (Stereo) center position. If the source signal is mono there is no stereo field present to widen. By default the Global Width Knob is set to 100.0% 12 o'clock position, which represents the normal width of a stereo signal. Decreasing the global width narrows the stereo spread. Global width at 0.0% is summed mono = total correlation = totally in phase = +1. In some mixes, widening the stereo field to 200% is ideal for pads, piano, hi-hats, background vocals, etc.

HASS Effect

The Global Width Knob becomes a HAAS effect when the LSR Toggle Switch is set to either L (Left) position or R (Right) position.

The HAAS effect will widen the incoming mono signal by delaying a copy of the left or right channel according to the position of the LSR Toggle Switch (L or R). The channel source is "doubled" so the L (Left) channel is always 0ms and the right is a copy of the L (Left) channel then HAAS delayed. Conversely, the R (Right) channel is always 0ms and the left is a copy of the R (Right) channel then HAAS delayed.

At 0.0% left position there is no HAAS effect (0ms offset) while at 200% right position the audio is offset by 35ms, which produces an ultra-wide pseudo stereo effect to an otherwise mono signal.

CORE back panel overview

Following are descriptions of CoreReLation Phase Analyzer's back panel sections and controls.

1. **Audio Jacks**
   CoreReLation Phase Analyzer includes the following audio jacks.

   - **Audio In L&R** - Patch audio signals to process here.
   - **Audio Out L&R** - These are the standard audio outputs.

   Note: CORE should be connected as an "insert effect" in the signal chain to process the whole channel signal, as opposed to a send effect where the effect balance is adjustable in the mixer.
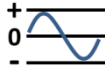
2. **Control Voltage (CV) Global Inputs**
   CoreReLation Phase Analyzer includes 2 global CV inputs to modulate the Global Pan Knob and Global Width/HASS Effect Knob. You can attenuate these CV input signals with their corresponding attenuation knob.

3. **Control Voltage (CV) Channel Inputs**
   CoreReLation Phase Analyzer includes 4 channel CV inputs to modulate the independent Left and Right Gain and Pan Knobs. You can attenuate any of these CV input signals with their corresponding attenuation knob.

   Note: The polarity buttons are used for defining the polarity of the CV input signals (unipolar or bipolar).

Set CV input to unipolar (button off) if you have connected a CV signal from an envelope generator such as our SCRE.	*Set CV input to bipolar (button on) if you have connected a CV signal from a standard low-frequency oscillation (LFO) such as our SCRE.*
■ Unipolar	**□ Bipolar**

Unipolar (button off) is the default setting when a new CORE is created.

Using CoreReLation Phase Analyzer (Out of Phase)

Following are examples of **out of phase** readings between the Phase Correlation Meter and Goniometer. We recommend using the Phase Correlation Meter in conjunction with Goniometer for a reliable indication for mono compatibility.

Out of Phase

A phase cancelled track will be centered on the horizontal S axis. As shown above, the phase correlation meter is sitting around -0.5 (red zone) and the goniometer is displaying a short and wide shape and centered along the horizontal S axis. Also, the outer edges of the shape almost extend past the first inner circle. This is a clear indication that the stereo field is wider than normal. In this state, the mix is out of phase and certain sounds may get attenuated (quieter) or canceled when the entire mix is summed into a mono signal. This should be avoided.

Out of Phase (Horizontal S Axis)

Here is an extreme example of phasing issues, in which the phase correlation meter is sitting to the far left at -1 (red zone) and the goniometer is a thin shape centered on the horizontal S axis. This occurs when the left and right channels are entirely out of phase, which we induced by inverting the phase of the right channel for illustration purposes. In these cases the left channel is positive when right channel is negative and vice versa. This is rarely the case on an entire mix (master bus), but you may find these issues on individual mix channels, which can be corrected by inverting the phase of the left or right channel.

Basic Rule: The shorter and wider the goniometer shapes, the worse the mono compatibility.

Using CoreReLation Phase Analyzer (In Phase)

Following are examples of **in phase** readings between the Phase Correlation Meter and Goniometer. Again, we recommend using the Phase Correlation Meter in conjunction with Goniometer for a reliable indication for mono compatibility.

In Phase (Vertical M Axis)

A quick and simple way to achieve perfect correlation between the left and right channel is to bring CORE's Global Width Knob down to 0.0%, but this collapses the entire mix to mono (summing L & R channels), which is not ideal when you want certain sounds to sit in different areas of the stereo field (i.e. pads, piano, hi-hats, background vocals, etc.). A different approach is to make smarter panning decisions on each mix channel, ensuring you have a balanced stereo mix, verified by CORE's Phase Correlation Meter and Goniometer.

In Phase (Correlated) - The "Sweet Spot".

A well correlated stereo mix will be an ovular shape (tall and narrow) and centered on the vertical M axis. Here we've achieved a good overall balance between channels. Of course, the shape will vary in width and height at various points in the mix, but keep in mind the wider and shorter the shape centered on the horizontal S axis, the more phase issues you'll encounter when the mix in summed to mono.

Basic Rule: Limit the number of sounds in the stereo field by keeping core sounds such as the kick, bass, snare/clap and lead vocals in the center (mono). Use the width knob to decrease the stereo width of excessively wide sounds to avoid sounds from getting attenuated (quieter) or canceled.
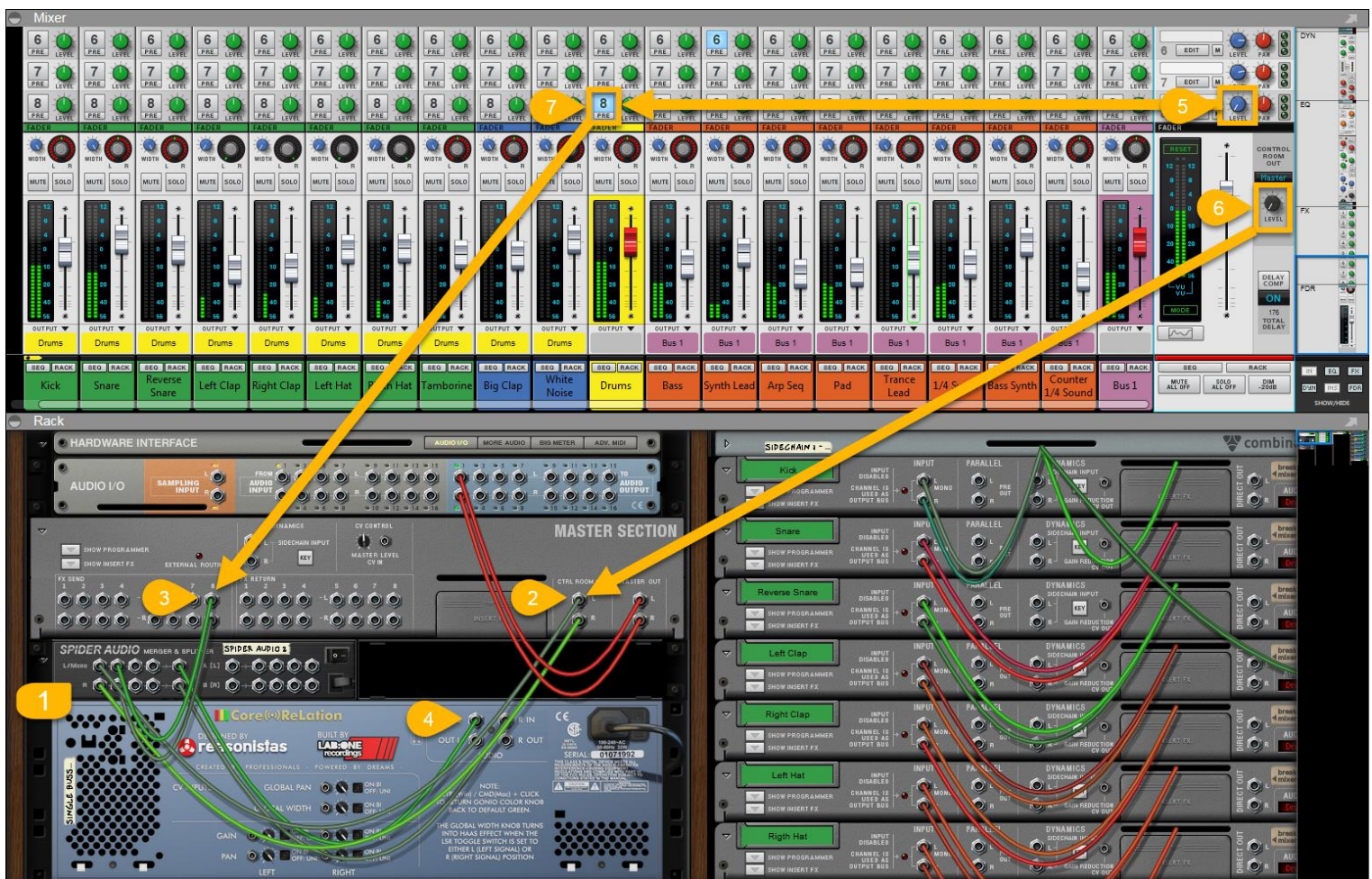
Using CoreReLation Phase Analyzer (continued)

Following is a technique using a single instance of CoreReLation Phase Analyzer to visually analyze with great accuracy the phase and stereo image of individual mix/sub-group channels or the master bus channel.

Device Connections

1. Add a Spider Audio Merger & Splitter below Reason's Master Section.
2. Connect the Master Section's Control Room output to the Spider Audio Merger left and right input 1.
3. Connect the Master Section's FX Send 8 output to the Spider Audio Merger left and right input 2.
4. Connect the Spider Audio Merger output to CORE's left and right audio inputs.

Mixer Settings

5. In the Master Inserts FX Return section, turn down the FX Return Level to 0 dB.
6. In the Mixer's Fader section, turn down the Control Room Level to 0 dB.
7. At this point you can turn on the FX Send 8 on single or multiple mix/sub-group channels to analyze the audio signal and stereo imaging with CORE. To analyze the master bus only, turn off the FX Send 8 on all mix/sub-group channels and turn up the Control Room output dB level (keeping in mind that this is not affecting the overall volume of your master mix bus.). See image on 12 for this setup.

Using CoreReLation Phase Analyzer (continued)

As described in point 7 on the previous page, in the below example we turned off the FX Send 8 on all mix/sub-group channels and turned up the Control Room output level to visually analyze the master bus only.

This technique allows us to analyze individual mix/sub-group channels or the master bus channel with a single instance of CoreReLation Phase Analyzer. By doing this, we can make smart panning and mixing decisions along the way or at the mastering stage to identify and remedy phase issues and ensure a properly balanced stereo mix that will translate well in any environment.

CoreReLation Phase Analyzer MIDI Chart

In MIDI terms, a continuous controller (CC) is a MIDI message capable of transmitting a range of values, usually 0-127. The MIDI Spec makes 128 different continuous controllers available for each MIDI channel.

The table below presents a summary of CORE's MIDI Implementation codes in decimal form.

---

[12] = GLOBALPAN

[13] = GLOBALWIDTH

[14] = SWAPCHANNELS

[15] = MODE

[16] = PHASEINV_L

[17] = PHASEINV_R

[18] = GAINLEFT

[19] = GAINRIGHT

[20] = PANLEFT

[21] = PANRIGHT

[22] = HUE

CoreReLation Phase Analyzer Remote Chart

The Remote protocol was introduced with Reason 3.0, which provides Remote support for a large number of control surfaces. Support for new control surfaces can be added at any time, in many cases by the control surface manufacturers or even by users.

The table below presents the Remote Implementation Chart for Reasonistas' CoreReLation Phase Analyzer.

//Remote Map template for Reasonistas CoreRelation

Scope Reasonistas com.reasonistas.CORE

// Control Surface Item Key Remotable Item Scale Mode

//Map _control_   Global Pan

//Map _control_   Global Width

//Map _control_   Source Inputs

//Map _control_   Monitor Mode

//Map _control_   Phase Invert Left

//Map _control_   Phase Invert Right

//Map _control_   Gain Left

//Map _control_   Gain Right

//Map _control_   Pan Left

//Map _control_   Pan Right

//Map _control_   Gonio Toggle

//Map _control_   Hue

//Map _control_   Meter Mode

Please contact us at support@reasonistas.com should you have any questions or feedback to help us improve.

Thank you.