STEREO SPLITTER

MID / SIDE ENCODER & DECODER,
STEREO ENHANCEMENT UTILITY BOX

Operation Manual

QUADELECTRA
AUDIOWORX

Re
Rack Extension

↘ Intro: What Is The Quadelectra Stereo Splitter?

Welcome and thank you for choosing the Quadelectra Stereo Splitter. This small Rack Extension device for Propellerhead Reason, is guaranteed to become a handy companion and an essential tool in your Reason Rack, as it offers a set of very useful tools for stereo enhancing and manipulation - perfect for mastering and sound designing.

Fundamentally, the Quadelectra Stereo Splitter, as the words imply, splits a stereo signal. The splitting process in fact is the encoding of a true stereo signal in to a pair of Middle & Side signals. The figure 1-1 shows how this encoding works.

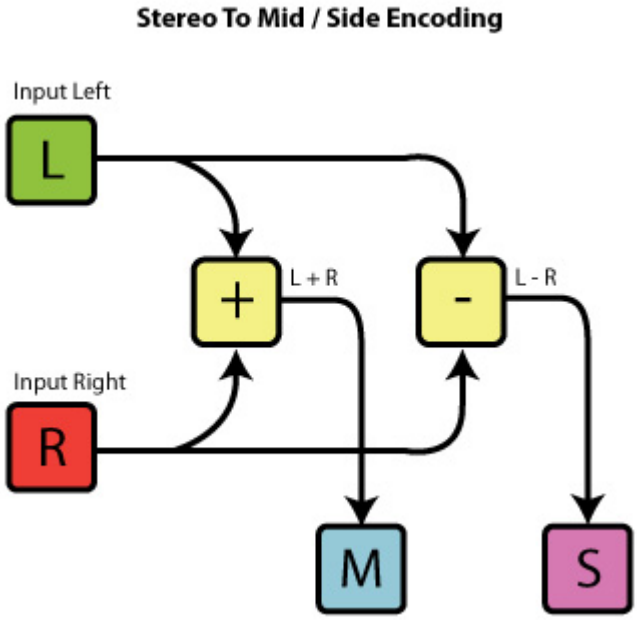

Fig.1-1: The Mid /Side encoding process. By adding Left & Right Stereo Channels we get the Mid Signal, while by Subtracting Right from Left we get the Side Signal.

Vice versa- the Middle and Side are two distinct monophonic signals that when added or subtracted together, composite the Left & Right stereo channels from which they originated. The figure 1-2 below shows this conversion:

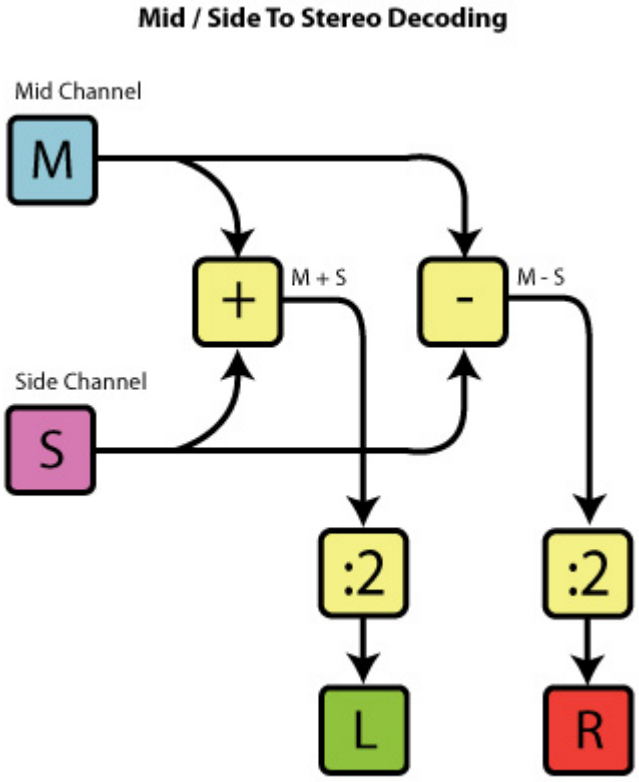

Fig.1-2: By Adding Mid to Side Signal we get the Left channel of the original stereo signal, while when we subtract Side from Mid signal we get the Right channel. Notice the division by two before each stereo output. This is done because M+S = (L+R) + (L-R) ergo 2L and M - S = (L + R) - (L - R) = 2R. Meaning that we get twice the amplitude of the original channel signals.

By splitting a stereo signal into Mid & Side you have the ability to enhance the stereo image of your sound by processing these signals thru separate effect chains, and ultimately create more vivid masters, or even widen pads, bass lines etc. inside your mix. In fact most professional mastering suites, will offer separate Mid & Side processing in their tools.

For that reason the Quadelectra Stereo Splitter is equipped with Mid & Side separate audio outputs. Although the M/S signals are monophonic, their separate outputs on Stereo Splitter leave as stereo pairs.

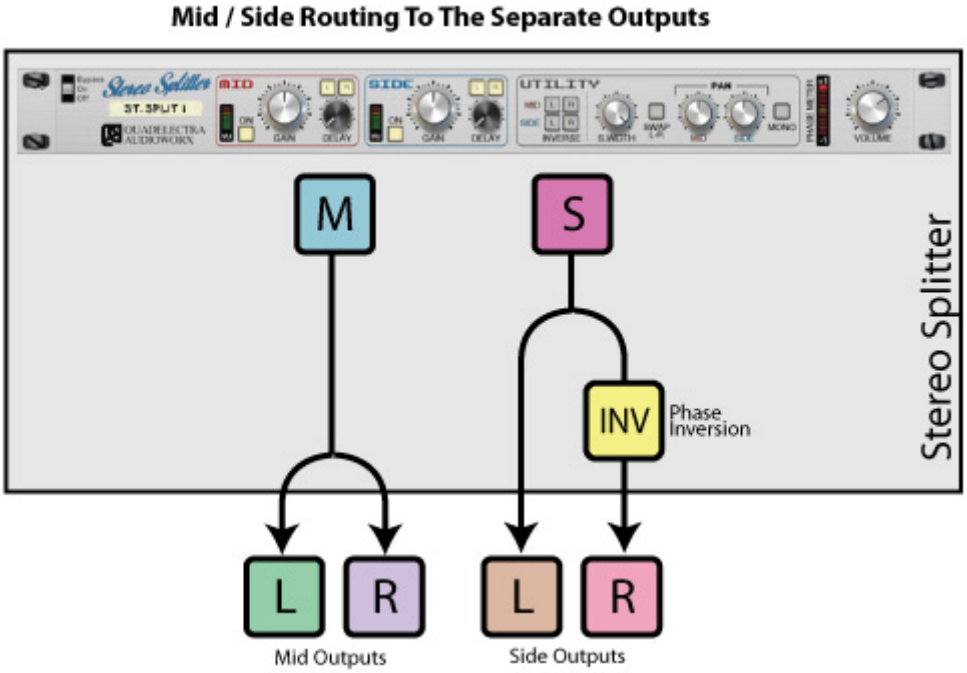

Fig.1-3: How the Mid / Side Signal is routed to the separate stereo outputs at the back of the device. Features such as delays and phase inversions can also be applied to each L-R channel separately.

These stereo pairs are configured in such way that when, unaffected, mixed together (i.e. by a 6:2 Mixer) the original stereo signal will be recomposed. The figure 1-4 shows this process.

From that point on, you can form separate effect chains for mid / side outputs by inserting effects, and use any of your favorite reason rack effects to separately enhance the Middle or the Side portions of a sound.

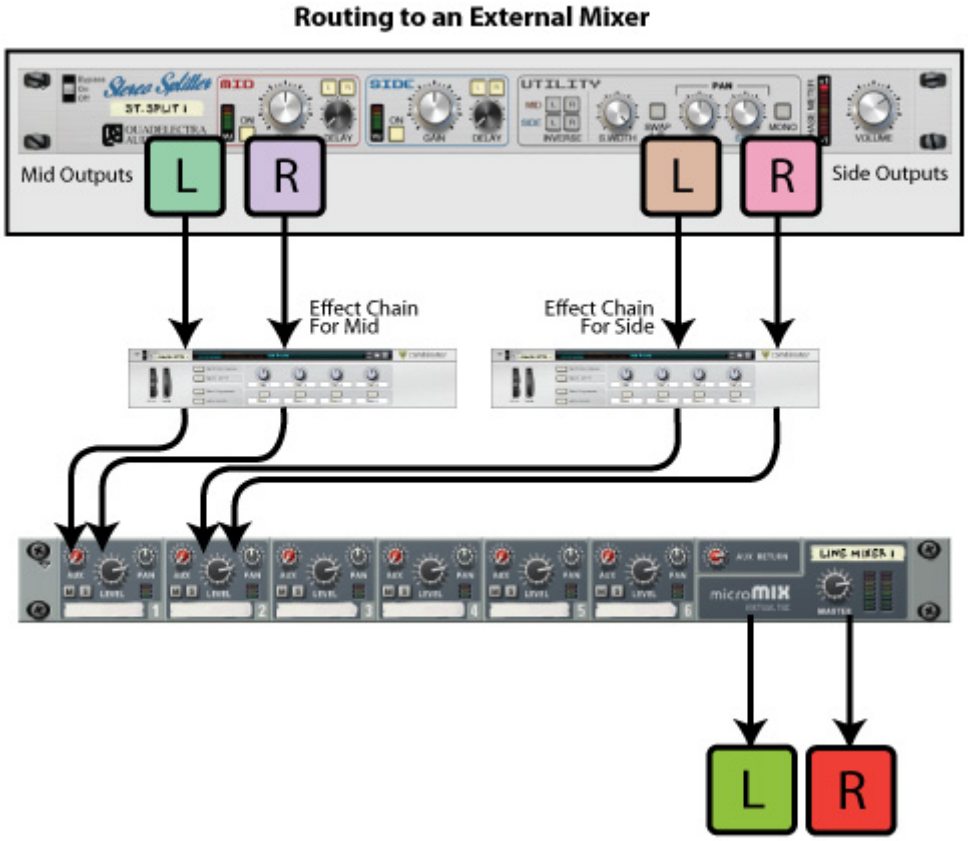

Fig.1-4: A typical example of routing to an external mixer. By using the default Stereo Splitter settings, and not applying any effects, the mixer will just recompose the originating stereo signal. Fun starts when you start tweaking the Stereo Splitter or / and adding effect chains to the outputs.

What's more the Quadelectra Stereo Splitter is equipped with a set of additional tools to give you more control over the splitting process: You can change the Gain of Mid and Side channels, invert phase on both stereo channels of both signals, introduce a short delay, narrow the stereo width, change panning separately on Mid or Side, plus more. Of course the result of the process is also composed back to stereo and its available thru the main audio outputs.

NOTE: *The Mid / Side effect has results in a true stereo signal! Although monophonic signals will be converted and processed as stereo by the Stereo Splitter, there will be no Side signal generated, because the subtraction of two mono (therefore identical) signals always equals zero.*

↘ The Device

The Quadelectra Stereo Splitter device Front Panel is divided in four sections.

1) **The Mid Section:** Provides controls for manipulating the Mid Signal, such as gain and delay. All operations have audible results to the main output stereo pair, but also to the separate Mid stereo pair.

2) **The Side Section:** Likewise in Mid Section, the Side Section provides controls for manipulating the Side Signal. As with Mid section, all operations are audible to the main output and the separate Side stereo pair.

3) **The Utility Section:** The Utility Section offers features to further process the mid / side signals and the stereo channels altogether. You can phase invert the left and right channels on both signals separately, narrow or convert stereo image to mono, pan separately mid from side signal plus more. Note that although these options are audible from Stereo Splitter's main output, only a subset applies to the separate mid / side outputs.

4) **Global Controls:** These are controls such as the Bypass / On / Off switch, the main volume, and a very handy phase meter on the right side of the front panel.

At The Back Panel of the device, four distinct sections are apparent:

1) Audio Inputs (1 x Stereo LR Jacks)
2) Mid / Side Outputs (2 x Stereo LR Jacks)
3) Audio Outputs (1 x Stereo LR Jacks)
4) CV Modifier Inputs (6 x CV Jacks)

↘ Front Panel

Fig.3-1: The Quadelectra Stereo Splitter front panel

Looking from left to right, the first two sections entitled Mid & Side contain controls to manipulate the corresponding signals separately. Changes made in these sections are also audible from the separate Mid / Side stereo outputs at the back panel of the device - in contrast to Utility where *not* all parameters apply to the separate outputs.

Mid / Side Section Controls

The controls for the section of each signal are:

- **Peak Meters (LEDs):** These are 5 step led meters for signal metering.
- **Gain (Knob**): Changes the corresponding signal gain from 0% to 400%. When in the middle the gain is 100% and therefore untouched.
- **Delay (Knob):** Adds a short delay (offset) to the signal. You can set this parameter from 0ms (no delay) to 100ms.
- **L(eft) & R(ight) (Buttons):** These are situated above, and relate to the delay setting.

  Since each of the Mid & Side signals is expanded to stereo, you can select to which of the two stereo channels the delay will apply to.

  In other words you can use the delay, to offset not only one signal to the other, but also to offset the left and right channels of the same signal individually.

***NOTE**: When changing the delay of a signal, the sound drops (ducks) to prevent audible clicks and pops during the procedure.*

The Utility Section Controls

The utility section provides a set of tools to further refine, mostly the composite (main) output of the device. The available controls are:

- **Invert Switches (4 x Buttons):** You have the ability to invert the polarity of any of the Middle & Side, Left & Right channels. Try experimenting with these buttons and separate channel delays from the Mid / Side sections, to produce interesting effects. These changes are the only ones from the "Utility" Section that will be audible from the separate M/S output pairs.

- **Stereo Width (Knob):** Widens or narrows the width of the stereo field.

- **Swap L-R (Button):** Swaps Left & Right Channels**.**

- **Mid / Side Pan (2 x Knobs):** These knobs set the pan position for the separate M/S signals.

- **Mono (Button):** Switches output from and to monophonic.

The Global Controls

- **Bypass Switch:** The typical Reason effect devices 3 state switch.

- **Phase Meter (LEDs):** An 11 step level meter that provides visual feedback between the phase difference from the output L/R stereo pair.

- **Volume (Knob):** Sets the device volume for the main output.

↘ The Back Panel

Fig.2-2: The Quadelectra Stereo Splitter back panel.

The Stereo Splitter back panel is divided also into four sections. These are from left to right:

- **Input (Stereo Pair):** As expected you connect the stereo signal you want to process here.
- **Mid / Side (2 x Stereo Pair):** Two separate stereo outputs for the Mid and the Side signals. Processing from mid / side sections as well as phase inverting from the utility section are applied to the signals of these outputs.
- **Main Output (Stereo Pair):** The main effect output which sends the recomposed Left / Right signal affected by all of the controls of the device.
- **CV Modifiers Input (6 x CV connectors):** These 6 CV inputs correspond to six parameters of the device, which can be altered by using CV signals from other Reason devices. The parameters are:
    - **Mid Gain**: Affects Front Panel / Mid Section / Gain
    - **Side Gain**: Affects Front Panel / Side Section / Gain
    - **Width**: Affects Front Panel / Utility / Width
    - **Mid Pan**: Affects Front Panel / Utility / Mid Pan
    - **Side Pan**: Affects Front Panel / Utility / Side Pan
    - **Volume**: Affects Front Panel / Volume

Note that Stereo Splitter accepts both unipolar and bipolar signals without negative value trimming. All cv gates affect the signal above or below the value set for the parameter they control, in the front panel. Positive values increase that value while negative values decrease it. Value sums from both the parameter and the CV signals that exceed the minimum or the maximum of each parameter are clamped out.

↘ MIDI Implementation Chart (CC only)

MIDI CC	Parameter
7	Volume
80	Mid: Gain
81	Mid: Delay
82	Mid: Enabled
83	Side: Gain
84	Side: Delay
85	Side: Enabled
86	Utility: Invert Mid Left Channel
87	Utility: Invert Mid Right Chanel
88	Utility: Invert Side Left Channel
89	Utility: Invert Side Right Channel
90	Utility: Mid Pan
91	Utility: Side Pan
92	Utility: Mono
93	Utility: Swap L-R
94	Utility: Width

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