WORNG Electronics MidSide+ manual

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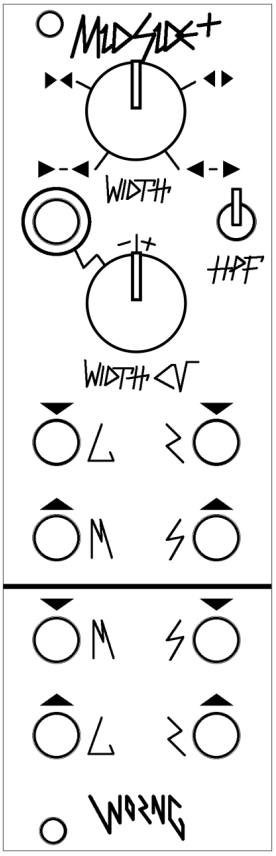


Thank you for purchasing a WORNG Electronics MidSide+ module. MidSide+ is a development of our original LRMSMSLR mid/side encoder/decoder, which introduced the Eurorack world to the power of mid/side processing. MidSide+ adds a voltage controlled through-zero width control to the MS->LR decoder section, allowing you to control the width of your mid-side processing from super-wide stereo, through mono and then into negative stereo. MidSide+ is designed with ergonomics in mind, with user friendly controls that have plenty of clearance for tweaking and LED feedback of modulation.

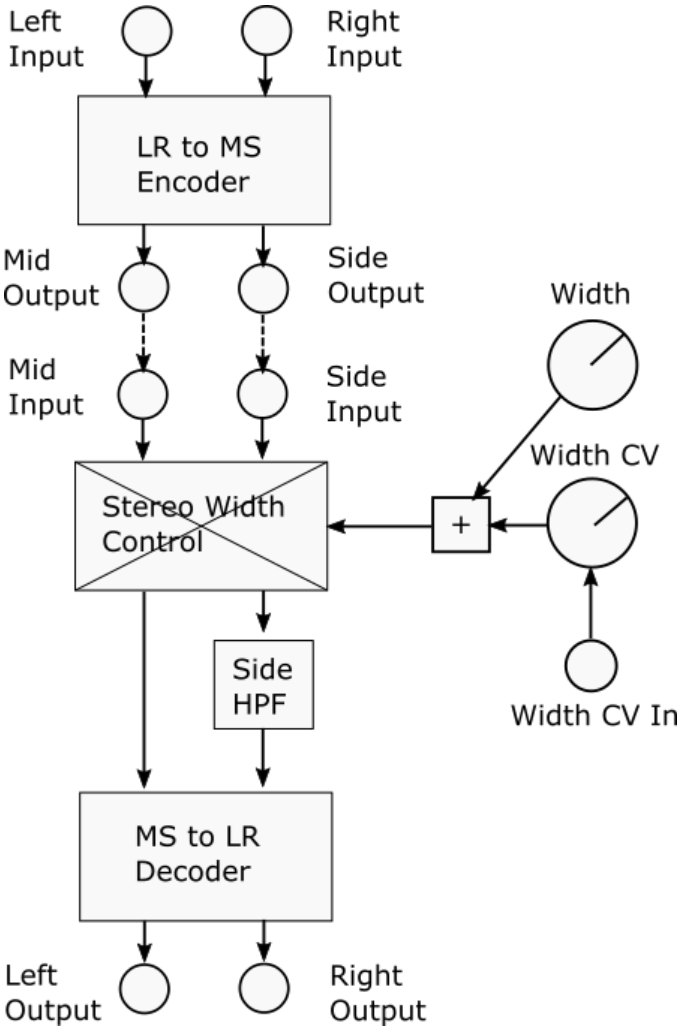
Connecting your MidSide+

MidSide+ requires 8hp of space in your Eurorack system, and a depth of at least 25mm. Connect the included power cable to the back of the module and to your power busboard. The connection on the module is shrouded and can only go one way, but is also marked with a line to let you know which way the red stripe should be facing. The module is also electrically protected against damage from reverse power connection, but you should still always be careful connecting power.

MidSide+ Essential Concepts

MidSide+ uses a technique known as Mid/Side processing which separates a stereo signal into a Mid signal containing all signals from the left and right channels, and a Side channel consisting of only the differences between the left and right channels. This is a classic studio technique which is often used during mastering and while cutting records, as it allows the manipulation of stereo signals in more complex and powerful ways than simply processing the left and right

channels individually. In a Eurorack synth it allows not only processing, but also the creation of incredibly wide and thick stereo signals which can’t be created with traditional techniques.



Your MidSide+ can be thought of as two sections, the LR to MS section which encodes a traditional LR stereo signal to MS stereo, and the MS to LR section which decodes the MS signal back to LR. These two sections are normalled together so that if you don’t patch anything to the Mid and Side inputs they will be fed by the Mid and Side outputs of the previous section. Patching into the Mid or Side input breaks the normalling for that signal, allowing quick ABing of any effect you patch in on the Mid and Side effects loops, as well as use of the through-zero stereo width control circuit without having to patch anything between the two sections.

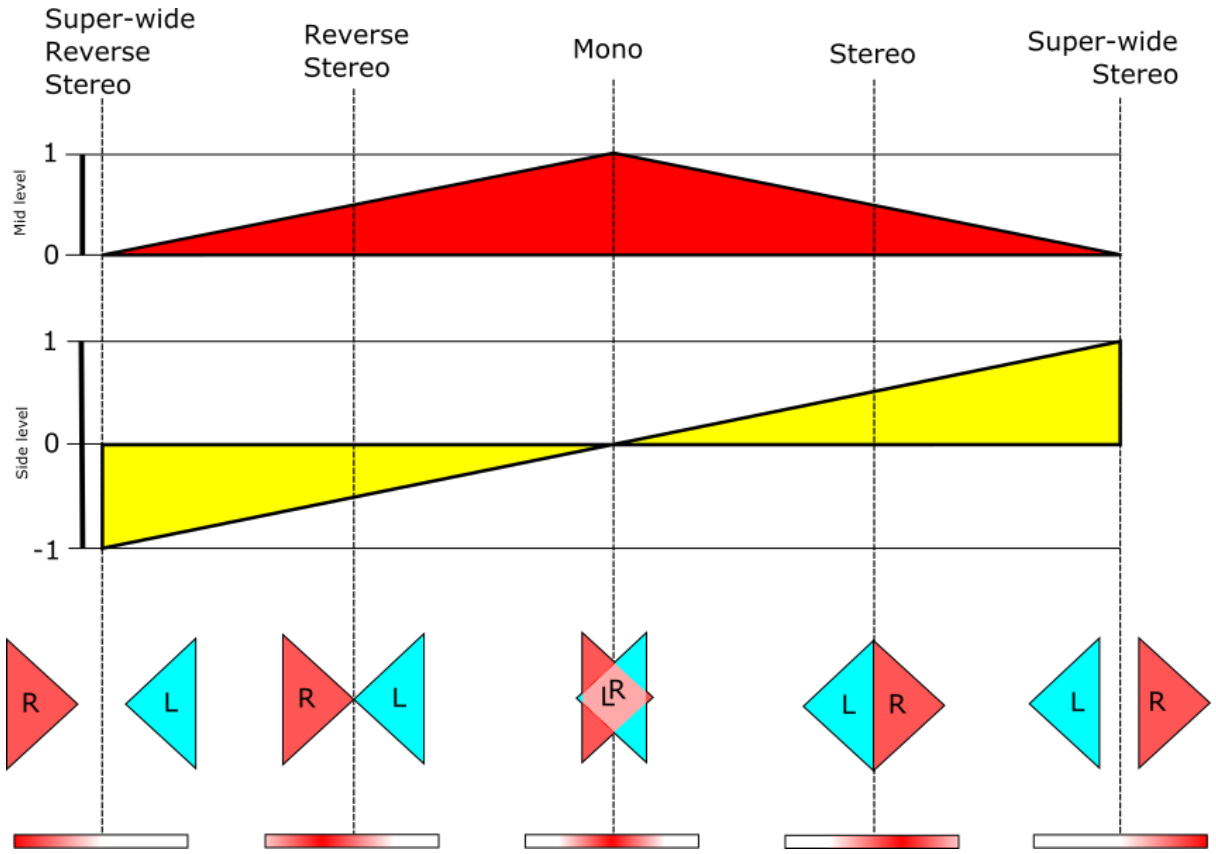
The MidSide+ MS to LR section contains a combined VCA and 4 Quadrant Multiplier on the Mid and Side signals respectively, and a switchable 250Hz high pass filter on the Side signal. These specially designed circuits allow you to control the width of your signal from Super-wide Stereo, through to regular Stereo, to Mono, and then through zero to Reverse Stereo, finally to Reversed Super-wide stereo.

The HPF is engaged when the switch is in the down position. It is a -12dB/oct filter designed for minimum phase shift in the pass band to be as transparent as possible.

Super-wide Stereo signals are those where the Left and Right channels are phase inverted versions of one another. When played back on headphones or speakers in a good acoustic space a super-wide stereo signal gives a sense of impossible width without a definite sense of positioning in the stereo field. Because MidSide+ allows smooth control of a stereo image from Reversed Super-wide Stereo through Mono and all the way to Super-wide stereo you can dial in and process the exact amount of width and positioning you like for your stereo signal.

Note that the Left input is not normalled to the Right when there's nothing patched to the Right input as is common in Stereo modules which can also be used with Mono signals. This is because patching identical signals to both Left and Right inputs results in no Side signal, for obvious reasons. If you're interested in processing a Mono signal into Stereo with MidSide+ then patching to just the Left or Right input and leaving the other unpatched with give you equal signals on both the Mid and Side outputs so you'll have plenty to process and create your stereo signal.

Instead of being limited to only operating in the region from Mono to Super-wide Stereo, the through-zero capabilities of the MidSide+ allow you to reverse the stereo image so the Left channel is on the Right and vice versa. This allows you to create signals that are mirrored through the stereo axis.



The LED meter on the front of the module allows you to see the width you're decoding to even when dynamically modulating the width with a CV. Fully to the left indicates Super-wide Reverse Stereo, left and centre lit up indicates Reverse Stereo, centre only indicates Mono, centre and right indicates Stereo and only right indicates Super-wide Stereo. Note that depending on the levels and phase coherence of your Mid and Side signals the levels of your Left and Right outputs will vary as you manipulate stereo width, this is to be expected and a demonstration of the power of mid-side processing.

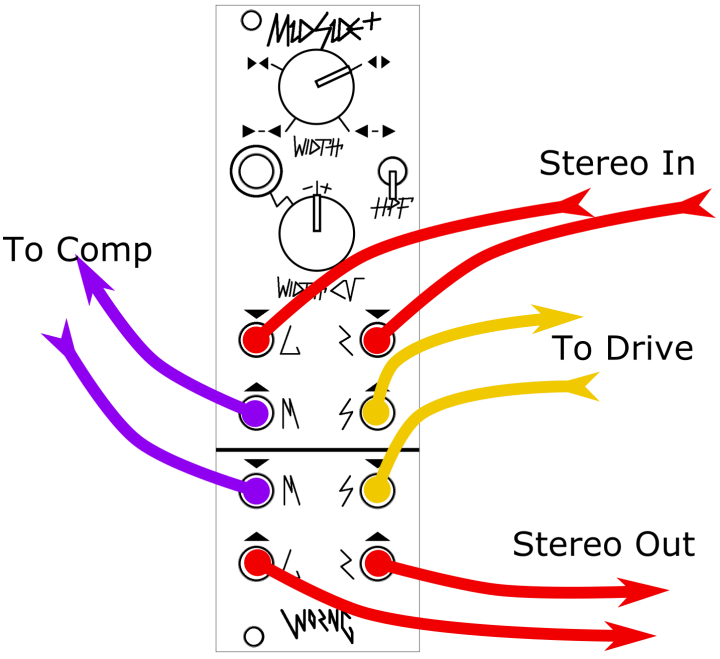
The design choice was made to place the width control and HPF *after* the MS processing send and return loop as this gives more power and more control, allowing for more extreme MS effects to be patched in and then controlled. The switchable high pass filter allows the removal of low frequency signals on the Side input which can cause phase cancellation issues, allowing the creation of super-wide signals in the higher frequency bands while maintaining mono compatibility in the crucial low frequency area. This allows the use of effects which can

create low-frequency artefacts such as pitch shifters, resonant filters etc on the Side send and return loop without creating phase issues in the low end.

This makes the MidSide+ not only fantastic at processing stereo material but also a powerful sound design tool for creating thick, wide stereo signals with plenty of wide harmonic material to process with stereo filters. With MidSide+ you no longer just have access to the individual Left and Right levels of a stereo signal, you also have control of the width of the stereo image and have the ability to modulate it through zero and at audio rates.

Patch Ideas:

Processing a stereo mix

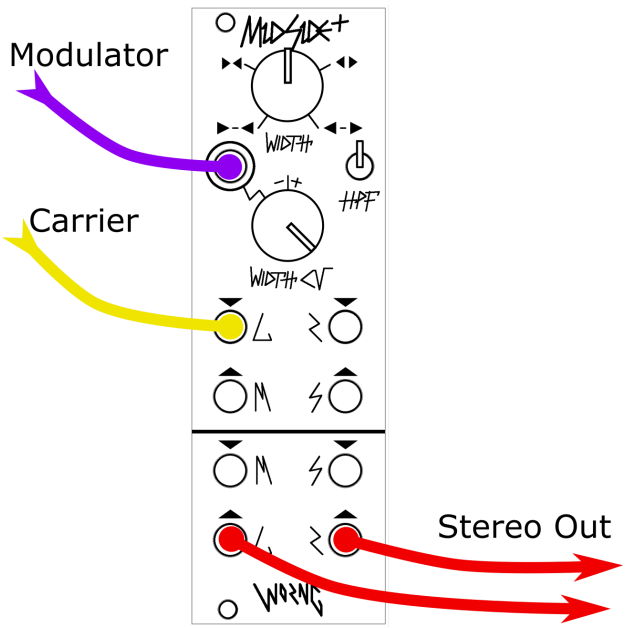


This is the basic functionality of MidSide+ and other Mid/Side processors, run your stereo mix into the Left and Right inputs and then use the Mid and Side processing loops to do symmetrical stereo processing of your signal using mono processors. A basic starting patch would be to run the Mid out to a compressor to create glue and energy in the main body of your mix. Increase the width of your mix by applying some light distortion or drive to the side signal and ensure mono phase compatibility by engaging the HPF switch. Starting in the Stereo (◂▸) position, use the Width control to balance the width of your final mix to taste and to make up for any level differences introduced by your processing. You may find that a slightly wider than stereo width setting

will work well for your mix, but be sure to listen to the imaging to make sure you don't go so wide that you lose a sense of the pan position of the elements of your mix.

As always, experiment with different processes and techniques to find what works for you, but be aware that processes that change the phase and time information as well as amplitude (EQ, phase shifters, some filters) may give unexpected results when used with Mid/Side, as the decoding of the signal back to Left Right stereo depends on the phase relationships between the Mid and Side signals.

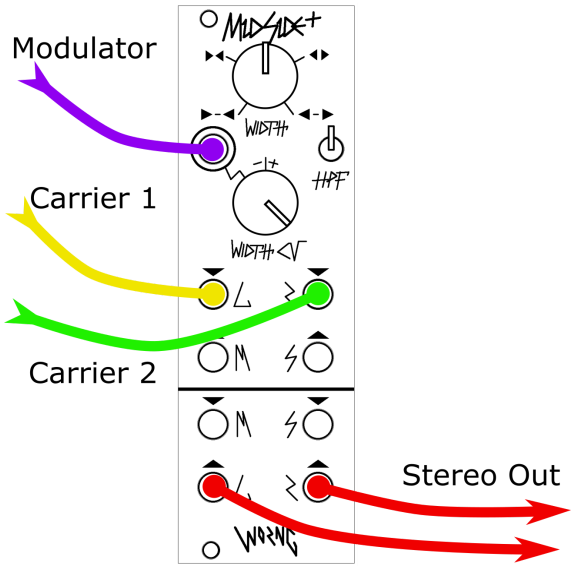
Through-zero stereo ring mod



A classic patch from the LRMSMSLR, now perfected with the specifically designed VCA and 4QM through-zero stereo width processing circuitry of the MidSide+. Patch an oscillator to either the Left or Right input, set the Width control to Mono and then modulate with another Oscillator patched to the Width CV input. The modulation of stereo amplitude through zero will create very wide and thick sidebands in the stereo field which can't be created with other techniques. Experiment with the tuning of the oscillators, as they approach harmonic multiples of one another beat frequencies will appear that stretch right through the listener's head. To begin with use an oscillator waveform (such as a Saw) with a lot of harmonics as the carrier (Input) wave, and a waveform with few harmonics such as a Sine for the Modulator (Width CV) wave, but try experimenting with different waves to see the differences in effect you get with them. With more complex modulator waveforms it can be effective to limit the amount of modulation to

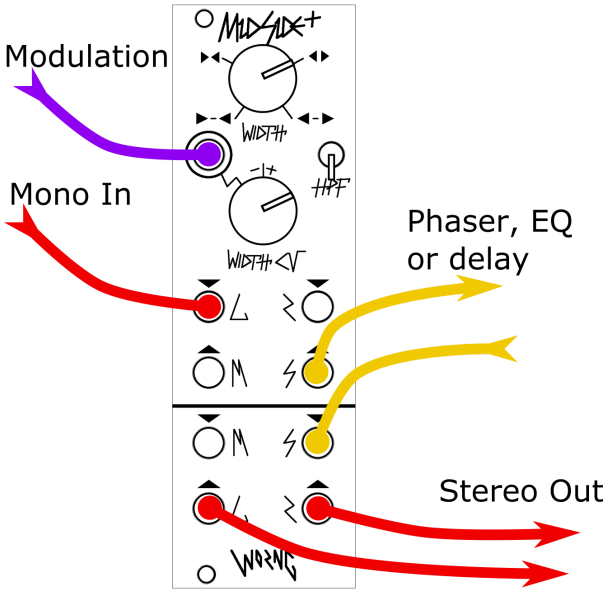
between Stereo and Reverse Stereo with the Width CV knob, for a sense that the signal is panning rapidly.

Thicker through-zero stereo ring mod



This is a variation of the Through-zero stereo ring mod patch above, with a third oscillator patched into the Right input. Make sure that there is some timbral difference and detuning between the oscillators patched to the Left and Right inputs, so that the Side signal being modulated morphs and breathes creating thicker moving sidebands. This technique excels at producing stereo drones, but also can create thick stereo waveforms perfect for creating stereo voices to be processed with stereo filters.

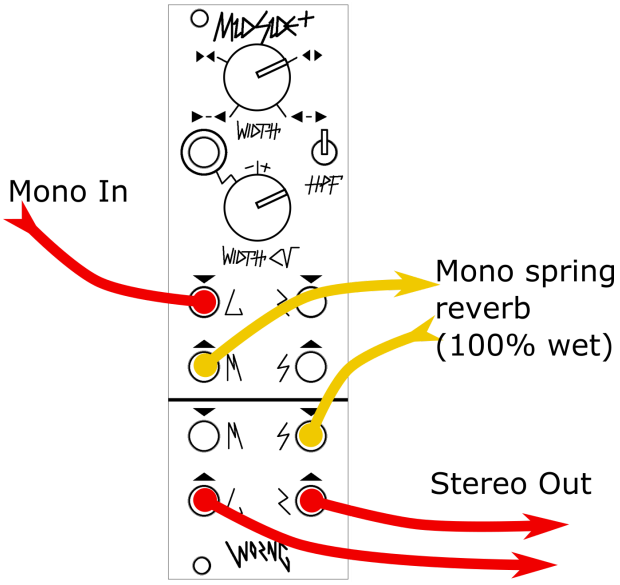
Wide stereo from a mono signal (“Faux Stereo”)



A common use of Mid/Side processing is to create a wide stereo signal from a mono one, sometimes called “faux stereo” although the signals you create are just as stereo as any other. Because Mid/Side processing uses phase and level differences to manipulate the stereo image, processing which alters phase and level differently at different frequencies can be particularly

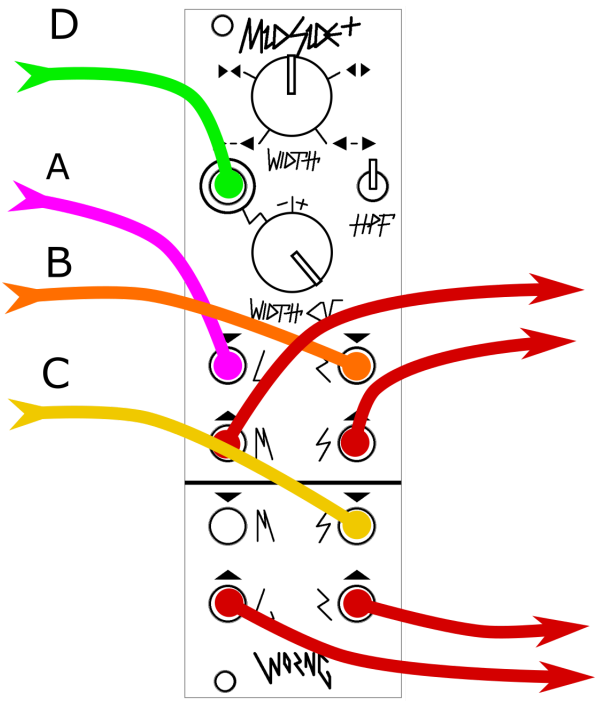
effective at stereo widening. Patch your mono signal to the Left input and then take the Side output and run it through a phaser, EQ with extreme cuts and boosts, or short delay (5-25ms) set up to create comb filtering. Start with the Width control set to Stereo (◂▸) and then increase if necessary until your signal sounds as though it's spread across the stereo field. You can use the Width CV to dynamically modulate the stereo width, for example rhythmically with an LFO or Envelope or by using an envelope follower on your input signal, so that as the signal you're inputting increases in level the width of the stereo effect increases. You may find that this processing creates too much width in the low end causing phase coherence issues, if you encounter this then the HPF can be engaged to remove low frequencies from the Side signal, fixing the problem.

One-spring wide mono to stereo reverb



This classic patch comes from the ARP 2600, which creates a wide reverb effect using Mid/Side processing. Patch your mono signal to the Left input and then take the Mid out and patch to a spring reverb. Return the 100% wet reverb to the Side input and monitor the Left and Right outputs, you will now have a centre-panned mono signal surrounded by a wide stereo reverb. Use the Width control to adjust the wet/dry levels of the reverb to get the correct balance for your tastes. A digital reverb can also be used for this patch but must be set to 100% wet to work correctly. Because digital effects introduce a small time delay any dry signal which comes though will recombine with the original signal causing unwanted comb filtering.

Dynamic complex CV processing



MidSide+ is DC coupled throughout, allowing for the processing of CVs as well as audio signals. MidSide+ can act as a collection of mixers, polarisers, a VCA, and a Four Quadrant Multiplier to combine simple CVs into much more complex and musically interesting combinations. Given four CVs (A, B, C, and D) patched to the Left (A), Right (B), and Side (C) Inputs, as well as the Width CV (D) input, the following combinations are created at the following outputs:

- Mid out = $\frac{A+B}{2}$
- Side out = $\frac{A-B}{2}$
- Left out = $(1 - |D|)\left(\frac{A+B}{2}\right) + CD$
- Right out = $(1 - |D|)\left(\frac{A+B}{2}\right) - CD$

While the maths involved may look complex, all you need to know to make music is that MidSide+ will create different mixes of the A, B, and C inputs and that D will crossfade between them. Try different slow moving modulations in and patch them to differing destinations so as one output goes up another will go down, morphing modulation in and out of your patch. If you only have three modulation sources available then you'll still get good results using only the A, B, and D inputs. Don't forget to mult the Left and Right outs and use a copy of them to modulate the speed of modulation going to the Left and Right inputs for some seriously complex mod patching.

Care and Warranty

WORNG Electronics modules are designed in Australia and built in the USA with the utmost care. In the extremely unlikely event you have any issues with your module, get in touch with us at info@worngelectronics.com and we'll repair or replace it for you.

Your MidSide+ has a matte black panel which we think looks great, but over time it may develop an inconsistent finish due to oils from your hands collecting on the panel. To clean simply use a soft cloth and a little isopropyl alcohol and your module will look good as new. Always spray the isopropyl onto the cloth and then wipe the module, don't spray directly onto the module.