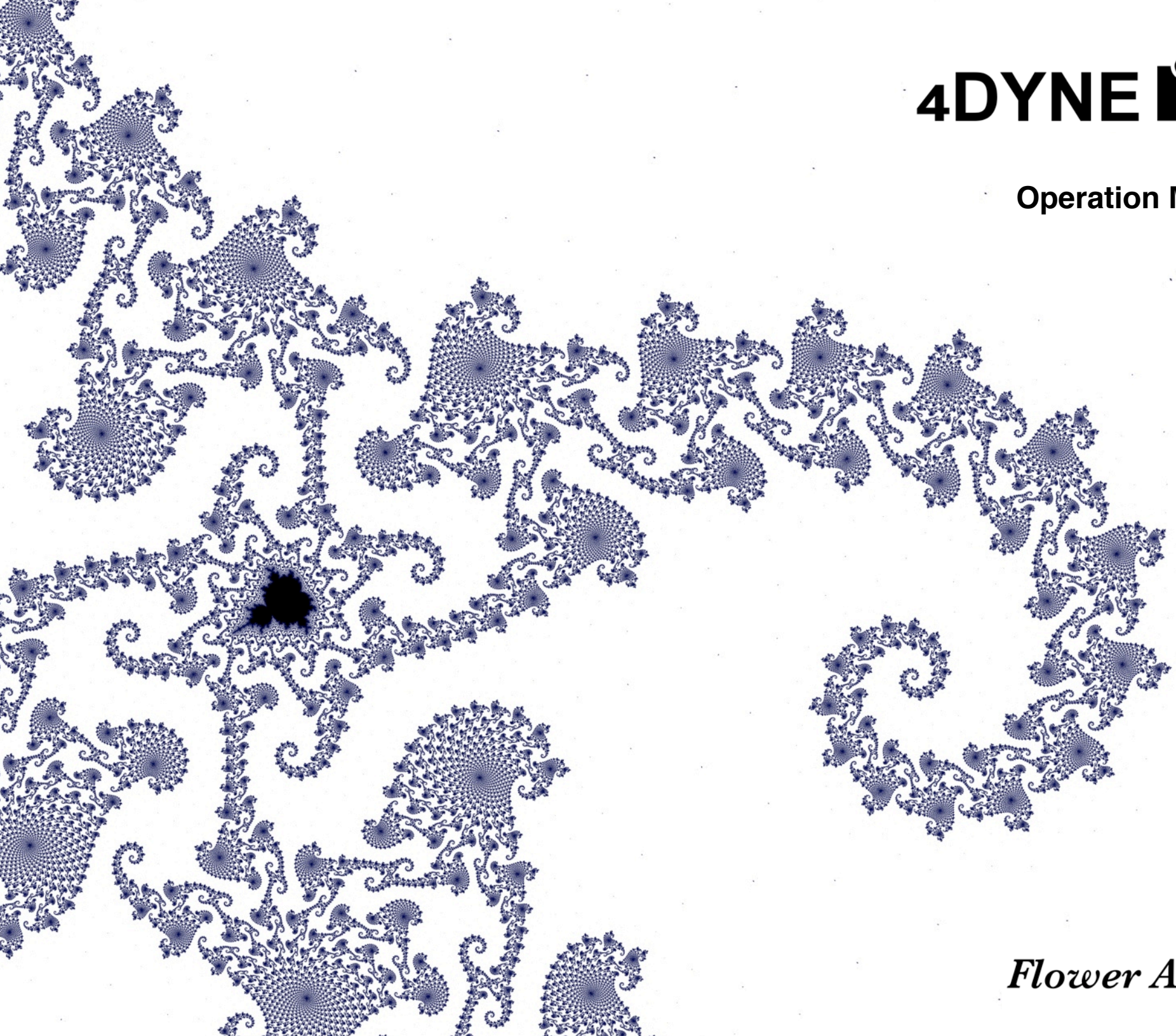


4DYNE

Operation Manual

Flower Audio


Bypass
On
Off
4DYNE
mastering multiband dynamics
4-Band Mastering
VOLUME
AUDIO IN
SPLITTER 1
SPLITTER 2
SPLITTER 3
TYPE
PERFECT 24
PERFECT 12
ANALOG 48
ANALOG 24
BYPASS
FREQUENCY
Flower Audio
BAND 1
BAND 2
BAND 3
BAND 4
S
B
LOOKAHEAD
PEAK
SIDE CHAIN
INPUT GAIN
LEVEL
THRESHOLDS
REDUX
COMP
LIMITER
GATE
ON
RATIO
ATTACK
RELEASE
SOFT KNEE
MAKE-UP GN
DRY-WET
BAND VOL
4DYNE 1

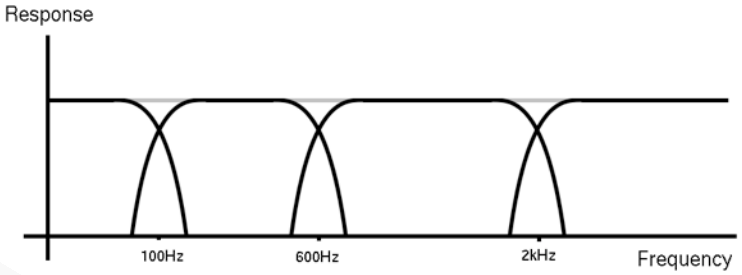

4DYNE
Flower Audio
AUDIO IN
L
R
BAND 1
BAND 2
BAND 3
BAND 4
SIDECHAIN IN
GAIN REDUCTION CV-OUT
RED. - EXP.(BI)
RED. ONLY (UNI)
DRY SEND
DRY RETURN
WET SEND
WET RETURN
VOLUME CV IN
SEPARATE OUT
4DYNE 1
LATENCY WARNING
MAKING A SEND-RETURN LOOP INTRODUCES A SMALL AMOUNT OF DELAY INTO THE SIGNAL. IF YOU USE ANY OF THE SEND-RETURN LOOPS, PLEASE CONSIDER CONNECTING ALL OTHER SEND OUTS TO THEIR CORRESPONDING RETURN INS TO PREVENT PHASING ISSUES.
AUDIO OUT

Introduction to 4Dyne

Thank you for your interest in 4Dyne, Flower Audio's mastering-grade multi-band dynamics processor. 4Dyne is a studio effect that can be used both as a precise mastering tool as well as an all-purpose mixing and sound-design tool.

Main Principles of Multi-Band Dynamics
A multi-band effect takes the audio signal and splits it into multiple bands based on frequency. It then applies the desired effect to each band separately and sums the signal back together. This ensures that the effect can be applied independently to different frequency bands. The most common multi-band effect applied in music production is multi-band dynamics processing. This allows the musician or engineer to control the dynamics using compression (and limiting and gating) on each frequency band separately.

The following is a typical 4-Band split:



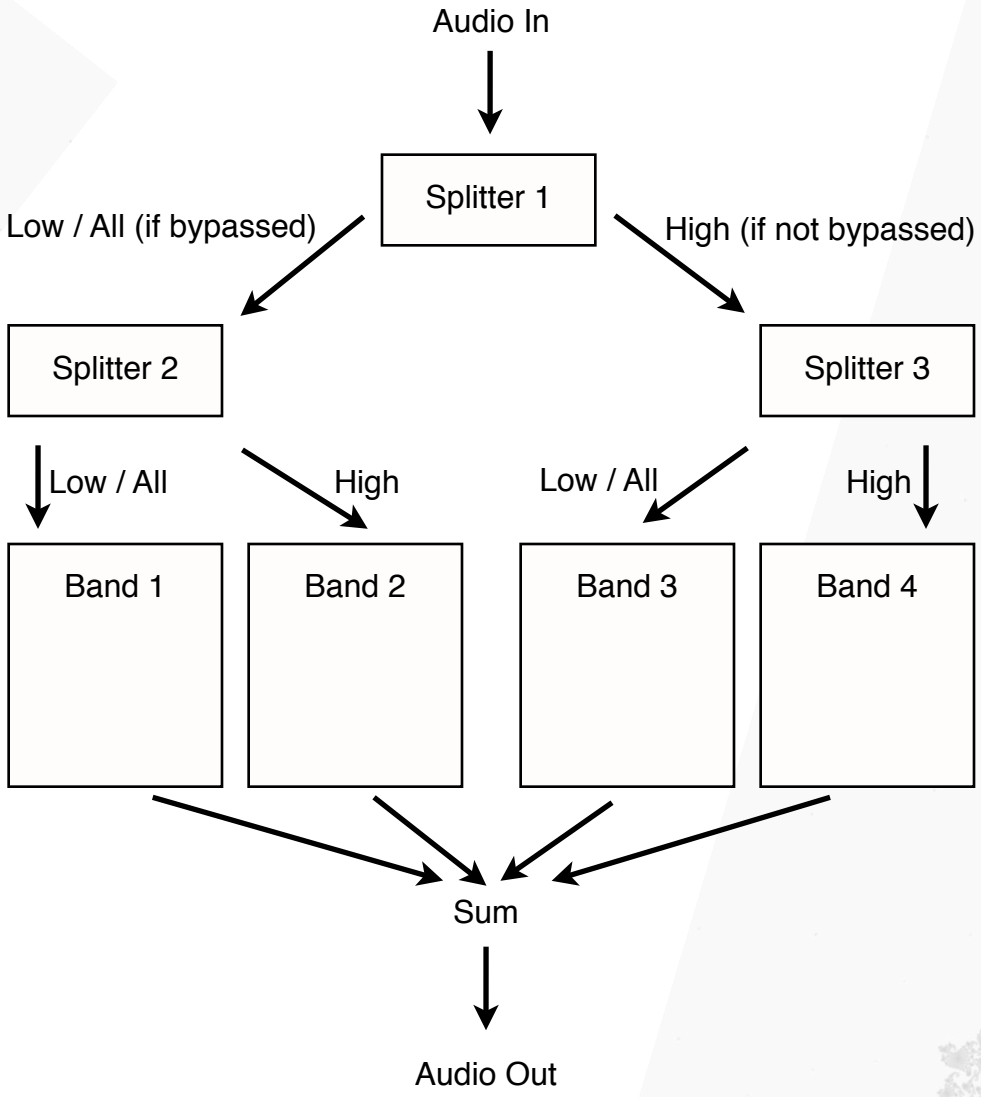
The four regions represent the four frequency bands that 4Dyne splits the audio signal into.

The Signal Chain
4Dyne achieves this splitting by running the audio through three two-way frequency splitters.

The audio signal comes to Splitter 1 (in the middle). If the splitter is on, the low signal is passed to the left and the high signal is passed to the right. If the splitter is in bypass mode, the whole signal is passed to the left. White arrow lights light up to indicate that a signal path is live.

The signals are then routed through the other two splitters when applicable and reach the separate band dynamics processors. The outputs of these are summed internally and fed to 4Dyne's main audio outputs.

4Dyne's global signal chain



The Frequency Splitters

Each frequency splitter can split frequencies between 20Hz and 20KHz and has four different splitting modes. These are:

Perfect 24: perfect reconstruction splitter that has 24 dB per octave low pass slope. Perfect reconstruction splitters are able to split the audio into bands in a way that, if the bands are summed back together without dynamics applied, the original audio is reconstructed with a slight latency (delay) based on the frequencies of the filters but not the frequencies in the sound. This delay depends on the splitting frequency set and is higher for low frequencies.

Perfect 12: perfect reconstruction splitter that has 12 dB per octave low pass slope.

Analog 48: Linkwitz-Riley crossover with 48 db per octave slopes. These two filters give a zero-latency alternative to the perfect reconstruction splitters (though in most cases the amount of latency caused by a perfect reconstruction filter is very small).

Analog 24: Linkwitz-Riley crossover with 24 db per octave slopes.

Please note that these filters cannot be automated.

In 4Dyne, latency caused by 4Dyne's own functions in splitters and bands are compensated across the bands automatically so that perfect reconstruction is not altered and phasing issues are avoided.

However, for technical reasons, the send and return functions at the back of the device are not part of this internal latency compensation and therefore if any send-return loop is used, all eight send-return loops must be connected

The Bands

We now give a description of the controls on each band, and comment on some of the functions. In order:

Arrow light “band is active” indicator: indicates is audio is being routed to the band.

Solo (S) button: makes only the bands that have their solo buttons on audible.

Bypass (B) button: bypasses dynamics processing for this band, as well as the gain processing, dry-wet processing and send-returns. Does not bypass “Band Volume” processing.

Lookahead button: makes all the dynamics processing look 4ms ahead for level detection by delaying the processed signal by 4ms after level detection. The latency caused by having this button on is compensated across all bands so that phasing does not occur.

Peak button: makes the level detection for the dynamics processing be in peak mode, the default mode is RMS (root mean square). Or naturally makes the level meter show the peak value instead of the RMS.

Side Chain lamp: indicates that the side-chain inputs are connected at the back of the device. When the light is on, the side-chain audio is used for level detection in order to compress the signal of the band.

Input gain knob: controls the value of the input gain for dynamics processing. This only affects the wet signal that is mixed with the dry signal using the dry-wet knob.

Level meter: Shows the RMS or peak level of audio detected in the band.

Threshold faders: Compressor, limiter and gate thresholds. The levels for these match the levels for the level meter on the left side. The compressor and limiter reduce the gain when the detected level is above the threshold level, while the gate kicks in when the level is below the threshold level.

Gain reduction meter: by default, displays the amount of gain reduction applied by the compressor and limiter.

Gate to display button: the gate's gain reduction is not displayed in the gain reduction meter by default. This button makes the meter also display the gate's gain reduction.

Compressor, limiter and gate on buttons: activate the respective sections. Please note that the limiter has the same design as a compressor, which can be used as a limiter in high ratio settings, but can also be used as a compressor or even as an expander. Also, the compressor, limiter and gate are not connected one after the other, they all react to the input signal post input-gain and the gain reduction they provide is combined.

Compressor and limiter ratio knobs: control the amount by which the level of the signal above the threshold is reduced. If the limiter ratio does not need to be higher than the compressor and can be set to any value independent of the compressor ratio. The ratios can also be set below 1, which turns these sections into expanders, increasing the level of the audio when it goes above the threshold. This works great on drums, but please be wary that it can cause the level to rise too high on low threshold settings.

Attack and release knobs: control the attack and release times of gain reduction for each section.

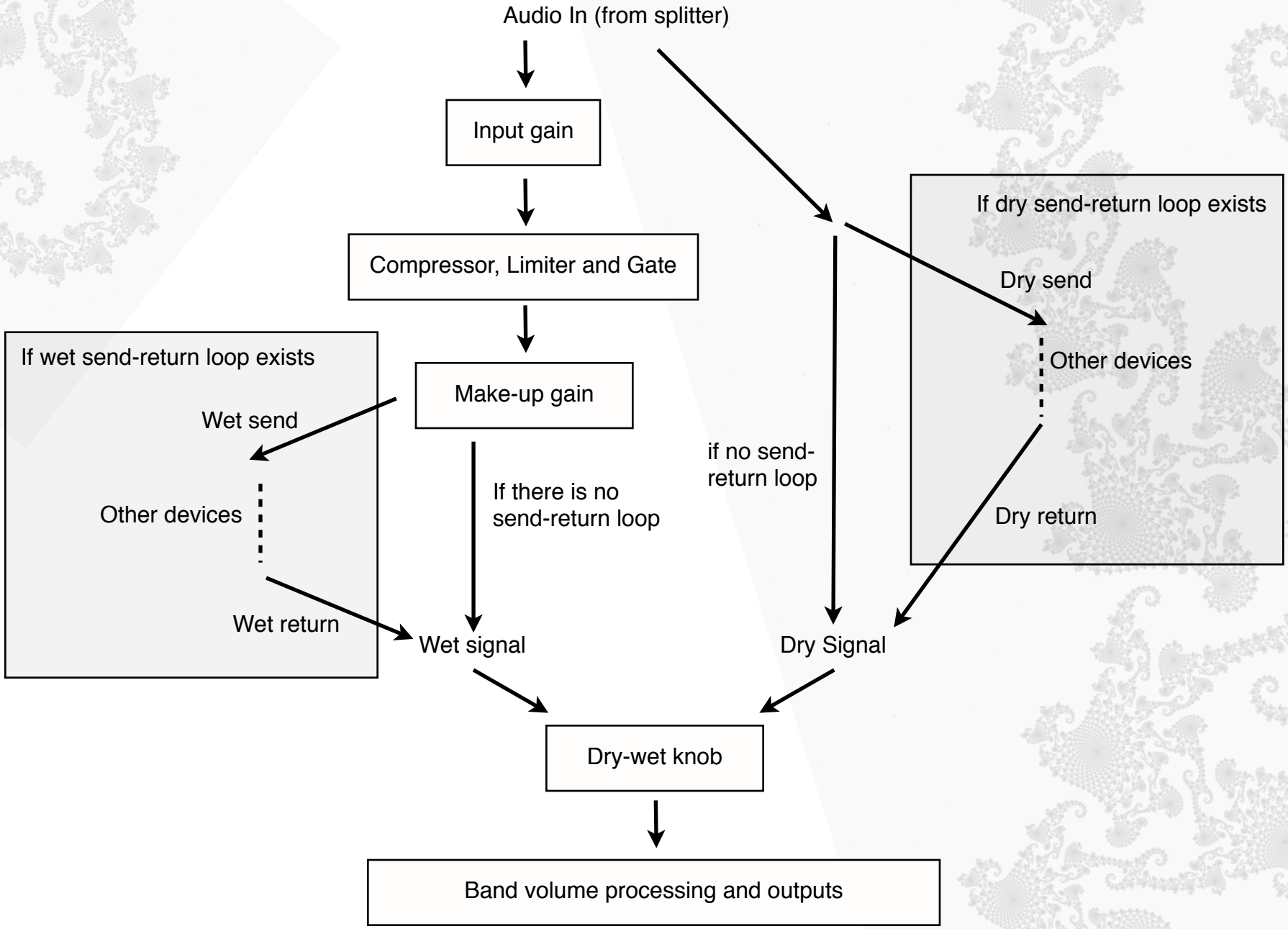
Soft knee buttons: makes the dynamics processors smoother near threshold levels.

Make-up gain knob: an additional gain after dynamics processing. As the input gain knob, it only affects the wet-signal.

Dry-wet knob: mixes the processed (wet) signal with the unprocessed (dry) signal.

Band volume: controls the volume of the whole band. This affects both the signal coming out of the band added to the main audio outputs, and the signal that comes from the separate outs of the band.

Individual band signal chain



The Back

The connections in the back of 4Dyne allow you to extend 4Dyne's functionality with other devices. This may involve using the four bands for different compressors or other mastering effects. Or simply doing interesting send effects.

All these input and outputs are active only if the band is active (i.e. audio is being routed to the band by the splitters)

Sidechain in: any signal routed to these inputs will be used for level detection inside the dynamics processors for this band.

Gain reduction cv-output: outputs the combined gain reduction of the compressor, limiter and gate. Ranges 0 to 1 in unipolar mode (0 for no reduction) and ignores if the gain is increased by the processors (when the ratios are below 1). In bipolar mode, the range is -1 to 1 and the negative values correspond to expansion (gain increase).

Dry send and return loop: Sends and returns the dry signal to other devices and back before it is combined with the wet signal by the dry-wet knob.

Wet send and return loop: Sends and returns the wet (compressed, limited and gated) signal to other devices and back.

Volume cv in: controls the band volume. Try sending a gate cv into these cv inputs from a matrix for pure fun.

Separate band output: these outputs are separate and do not affect the main outputs of 4Dyne. They can be summed anywhere.

If you have any comments and questions, please contact us at
flower@flowerau.com

We love to see what our users have done with our products,
please feel free to send us your music and patches.