PROFESSIONAL

JAX CHROMATIC SERIES

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A mastering toolset for tonal modifications

JAX CHROMATIC SERIES

The JAX Chromatic Series is a collection of highly specialized mastering audio processors (audio units for iOS), which are build on the unique concept of using chromatically adjusted bandpass filters - a tonal filter bank - where a complete audio mix is passed thru.

The entire series are also available in one unique audio unit, the **JAX Chromatic Master** and extra special modules for independent channel and mid/side processing.

Per default, each of the maximum 128 analog modelled band pass filters has a frequency range, that corresponds to the center frequencies of the MIDI tone range (all 128 defined musical semi tones, octave divisions and so on).

The effects are intended to be used as specialized mastering processors, analyzing and modifying complete arrangements with several parameters in a strict musical, not so much a technical relation. There is generally too much technical Babylonian ballaballa (that does not even work very well) going on nowadays.

The JAX Chromatic Series effects are for multiple detailed frequency band operations (mainly) on mixed audio material, whereby a few tweaks can make wonders but there are by no means any “automatic” or lately-so-called “IA” improvements implemented, where you for instance just select a “magic” preset and suddenly everything will sound professional and ready for BeatPort submission and such...

Everything is made for careful human “listening” here, there are intentionally no mathematical termini or numerical scales (merely made for nerds and freaks) used across our entire product series.

You always should merely focus on and trust your own ears, and not any automatic tools to give the sound what it actually mostly needs. Users also should think in musical ranges, relations and tonal parts rather than mathematical frequencies while using our chromatic series effects to get successful results.

And they always should carefully listen to the sound, instead of adjusting numerical values and applying mathematical theorems. We did everything that is necessary to not to distract the user from the *listening* with our chromatic series.

So what now? Do the JAX Chromatic Series effects replace or supersede classic mastering tools?

No. Our chromatic series effects are conceptually for special purposes alongside with the classic mastering procedures, even in cases, were most classic mastering tools even may fail.

We find, that our chromatic tools can make a mix much more organic and living with some simple enhancements in selected tonal ranges, while most mastering tools actually often will tend to squash everything to an entire out of control bulk of lifeless but “commercially successfully” boosted kind of ... erm ... noise.

Subtlety is the key

JAX Chromatic Series effects conceptually allow to adjust quite extreme values. In most cases subtile changes at the right places will improve an aspect of the mix. When needed also selective extreme adjustments can make the game.

We recommend to listen carefully for all side effects, when adjusting parameters. Mostly it is a good strategy to even drive back the effect to a little amount, if it apparently sounds good. This prevents overdoing things.

Take breaks! If you think it's sounding perfect, take a break. A break will drive down and reset your ears and if you come back, it most probably will sound much clearer. Get some sort of distance, if you finish mastering.

General Mastering Advices:

We recommend to use high quality dynamic headphones with a frequency range of 5 to 35.000 Hz (i.e. high quality Beyerdynamic reference studio headphones like the DT-770 / 880 / 990 series or better). These are affordable and essential for professional mastering. Most of them are available as low impedance versions for mobile devices too (the lower the better for mobile usage).

Cheep headphones and consumer products probably will not be able to play back important frequency ranges in an adequate manner, nor do the inbuilt speakers of mobile devices even play back the required frequency range for any professional mastering tasks (the altered frequencies will not even be audible there).

Headphones with high impedances (250, 400, 600 ohm) may also not give the desired loudness and usually will require too much battery power while usage.

Also please do not *blindly* trust any mastering tools (including ours)! We tested several acclaimed “professional” tools on the iOS platform (in this case pro level EQs from 2 self acclaimed “pro-level companies”). And we actually found, that there are fundamental, particular quite fatal differences and deficits.

We discovered for instance that even such a basic function, like the realtime FFT analysis will give completely different visual results with different tools, so that you by fact *cannot trust* what you see on the screen. (One of the tools displayed a ridiculously bass boosted, down falling frequency plot across the entire spectrum, that definitively did not correctly analyse the real frequency response of the sound.) With such EQs and tools, you actually would adjust everything wrong!

This is especially so fatal, because a false displaying frequency response (like in our experience above) will most likely make you doing wrong things with the frequencies in the sound, in this case for instance probably flattening the entire frequency balance of your mix to a finally undesired, suboptimal result.

The exciters we tested (single band and multi band), all had undesired, yet unpleasing tonal results, but this may be a matter of taste, as all kinds of distortions are that kind of tasty. Therefore, with our chromatic series we tried to provide different, pleasing, more decent kinds and methods of sound excitation and we hope, you will like it.

Excitation should always be applied decently and selectively, otherwise it makes the mix just scream, in a bad way. It is also irreversible, as it damages the frequencies rather than improves them.

The only tool that is most important and also most trustful for mixing and mastering are your own <ears>. If you are sticking to certain digital tools for measurement and adjustments, please make sure, these are working correctly and they are doing their acclaimed things right.

Performance Notes:

The JAX Chromatic Series effects are generally not recommended to be used with older devices. It are high processor-power-consuming audio units by conception.

There is a maximum of 2 x 128 stereo (256 !) bandpass filters and their additionally connected parallel stereo effects running with any instance, processing each single sample, which needs some certain performance.

This are in fact effectively millions of calculations per second. The kernel is therefore SSE/NEON optimized, so (mostly) calculating 4 floating point values at one processor cycle, but this may not be sufficient on some devices. never the less.

1. A great way to reduce performance is to reduce the total band count. The full band count of 128 MIDI frequencies/tones is often not required. I.e. if you select a count of 64 stereo bands, then the performance can be improved significantly (lowered to the half) and each band is adjusted to cover the frequencies of 2 neighbour MIDI keys, a 1/6 octave division. 32 stereo bands will cover 4 MIDI keys/tones (classic third octave division), 16 bands will use 8 tones and 11 bands will use 12 semi tones per octave (whole octave) and so forth.

There are only special musically senseful mappings, where the filters are adjusted in certain tone intervals, octaves, half octaves, quarter octaves and so on. An octave filter/analyzer, for instance, will exactly use one band per musical octave (of 12 semi tones). A half-octave bandpass filter will use 6 neighbour semi tones (a half octave) and so on and it so has uneven (22) bands. A quarter octave bandpass has approximately 42.6 (43) bands. A third-octave has 32 bands and corresponds to 3 groups of 4 keys per octave. The latter is probably the most acceptable efficient way to do things strictly musically with quite good performance. Classic analog vocoders will usually drive 16 to 32 bandpass filters, that

are not mapped to musical keys but optimized for speech recognition with certain frequencies.

2. Switch the modules off, that you do not need. Processing chains, that are not required should be switched completely off. This effectively will save processing power. If you for instance do not need stereo imaging in your current mix, it should be bypassed by deactivating the active indicator near to the button. This is recommended for every processing chain, that is not used.

Even with the JAX Chromatic Master this is important, as there can be all possible processors active and mixed together at ones at same time.

A Side Note For Preset Junkies

We hate mastering presets. Period.

This is for a certain reason. If you are a kind of preset junkie, we do not recommend to use mastering tools and other professional music equipment at all. Presets for mastering tools and especially EQs are probably one of the most stupid ideas that exist.

Because:

Each sound, each composition needs an individual setup for mixing and mastering. If you cannot hear what your sound actually needs and desperately do “wildly switching presets” to improve your music “anyhow”, you better should have selected a different hobby or profession or start to build the composition and learning from scratch.

Music making is surely a steep learning process and the way to perfection is long and full of stones. But apparently, especially music fora are full of hobbyist and laymen people, who obviously do not have a clue of what they are doing with all their massively collected ‘pro’ tools and at same time they do not hesitate to write even massively misinformation, misunderstanding, pure

nonsense, and selling that as “product reviews” and state of judgements. There is a lot of missing respect recently. And a massively growing amount of stupidity.

Switching Band Count Will Reset

Please note, that selecting a different band count always will reset the internal engine to default band adjustments. This is absolutely necessary, because of keeping the filter stability.

Analog modelled filters tend to become unstable with extreme values and sometimes also, if parameters are changed unexpectedly. A filter bank of such kind is even more sensitive to filter stability.

If the processor registers run into a NAN (not a number) state, the engine must be reset completely. This is mostly audible with a loud popping/crackling with immediately switching off the entire sound. NAN states sometimes can drive a complete audio bus or entire setup crazy, with all effects connected. In such cases only a total reset of the audio system can help.

The JAX CHROMATIC Master

The JAX Chromatic Master is the flagship of the Chromatic Series audio units and combines all the separate chromatic series effects into a single instance. Complex corrective pre- and/or post-mastering can be done with only one single step and multiple and different tonal bandpass modifications can be applied all at ones to a mix in realtime.

Please refer to the sub module descriptions inside this manual for the functionality of all Master functions.

Sometimes several applied modifications interfere, so it is ideal for experimentation, fine tuning and also conceptual testing. We recommend to place the processor before a common final mastering stage, that is at least a final EQ and a professional limiting/maximizing device.

The chromatic master also includes a reverb (and possibly other) interesting additional send effects too. Applying a mastering reverb is not very popular nowadays. The combination with selective input bands can give astonishing results with lifeless mixes, closing existing holes or emphasizing certain frequencies in a very unique way, rather than applying just a reverberation to the entire mix.

PS: We also have a triple band mastering reverb in our arsenal, which is specialized to do ... what? ... mastering.

A word to Mixing versus Mastering:

Mixing and mastering are 2 completely different steps, often mismatched. If you discover deficits at the mastering stage, you always should try to fix it prior, at the mixing stage, if possible. A badly mixed piece will not really be improvable afterwards and a musical deficit even will not be correctable with mastering and mixing at all.

JAX Chromatic and Spectro Series can help you to identify certain deficits in the tonal frequency domain. Often, while playing around with our series, certain tonal glitches and holes inside a mix come quite clear and conscious and can give an idea and the tools, how to improve the sonic results effectively. It can even be applied to tracks that are already “mastered”, but still are unsatisfactory and cannot be re-mixed for several reasons.

It (mostly) will be helpful, if you give your mixes some time while doing something different or even consider to give away the mix to another person for mastering. In most cases, a good arranger is not the best person for mastering, because the deep dive into the internals and musical details prevents him/here to apply the necessary improvements for the entire mix. In worst cases he/she would even apply the exactly false things or try to correct mixing issues with mastering and so on.

Do I need the several other products, if I have JAX Chromatic Master?

No. The other modules are not needed, if you use JAX Chromatic Master. You may need the special modules for independent L/R or M/S processing. These are not included with the JAX Chromatic Master.

The following will describe the single modules, which are included in JAX Chromatic Master.

The JAX CHROMATIC Analyzer

This unconventional, no scientific analyzer is able to display the audio stream in the ordered range of all 128 musical key frequencies, corresponding to the equally tempered MIDI frequency scale. Unlike other frequency analyzers, that mostly are based on FFT (Fast Fourier Transform) and more or less approximatily scaled to a musical useful range, the JAX Chromatic Analyzer uses consequently its bank of analog modeled bandpass filters to separate the exact tonal balance of the entire audio mix. It is made for recognition by human eyes and ears, not for scientific or mathematical usage.

The analyzer actually also has an optional range selector, where the user can listen to the selected tonal range for learning, how the tones are mapped and how it is sounding. The graphs are bi-directional, which means that the upper bands will correspond to the right stereo channel and the graphs below will correspond to the left.

A frequency analyzer of such capabilities can be considered as a true musical frequency analyzer and makes much more sense for any musician, as it enables to identify all musical pitches and intervals of the audio stream even visually with ease and in realtime.

The analyzer is able to detect and indicate prominent (polyphonic) pitches in the analyzed audio materials and optionally may give out these signals as MIDI (notes) data or controllers. This function is probably available as in-app-purchase.

Do I need JAX Chromatic Analyzer, if I have JAX Chromatic Master?

No. Other units are not needed, if you use JAX Chromatic Master, because it is inbuilt there. However, the MIDI output module is an extra in-app-purchase of the JAX Chromatic Analyzer.

The JAX CHROMATIC Leveler

The leveler is the most fundamental of our chromatic filter band processor series and allows to freely re-adjust the tonal balance of an audio composition. It very much is comparable with a 128 band equalizer or filter, whereby the frequencies of each single band are exactly mapped to the MIDI tone range of 128 half tones (12 tones per octave or any another octave division). So it is for instance possible to emphasize, suppress or even filter out certain tones and frequency intervals* (i.e. damping selected chords) inside an audio mix. All the parameters are automate-able with Audio Unit parameters and thought for dynamic usage.

It basically can be used like a usual parametric EQ too. But generally, if used for selective tones, the JAX Chromatic Leveler gives much more precise and musical senseful results than any other available multi band EQ on the market. You even can get results, that are just impossible to achieve with common filters and EQs or very difficult and cumbersome.

The filter bank is auto level adjusting and does not apply distortion or saturation, even with extreme level adjustments.

So the working flow and adjustment of parameters with a chromatic filter bank is somewhat different than using usual EQs or filters. Users consequently must think in the sense of musical tones rather than physical frequency ranges, as often used.

Sometimes tweaking a few selected single tones in the right manner (in sense of the music theory) can improve the entire sound of a mix drastically. Advanced psychoacoustic knowledge additionally will play an important role with this too.

In difference to usual EQs, the slider position below the center position will reduce the level of the selected tone or range down to zero (completely suppressing), while the slider position above the center position will raise the tone level up to a selected factor (default is x2).

*Please note, that a complete isolation of a single tone is generally impossible with analog modeled bandpass filters, like with digital filter paradigms (i.e. the FFT filters in our Spectro Series). But nevertheless, any tone (despite a simple sine wave) always has complex harmonics and inharmonics and these cannot be isolated perfectly with any of the currently available tools. This lies in nature of things and nature laws cannot (and actually also should not!) be changed.

Our audio processor uses analog modelled filters with a slope of 6 to 12 dB. So it is not the steepest digital effect, where it would be possible to filter a tonal part more isolated (i.e. with a FFT processor). The sonic result of the analog filter bank is therefore always more natural, more smooth and always crossfaded to the neighbour frequency ranges.

Do I need JAX Chromatic Leveler, if I have JAX Chromatic Master?

No. Other units (except the special modules for independent channel processing) are not needed, if you use JAX Chromatic Master, because it is inbuilt there.

The JAX CHROMATIC (Spectral) Compander

A “compander” is a synonym for a combined parametric compressor/expander, where the latter does inverse compression (aka expansion). A usual compressor/expander will alter the time domain with attenuation of an audio signal. The spectral compander in contradiction, will boost or reduce the relations of the selected frequency bands.

So compressing (a parameter value above the center position) will boost the loudness relations and make the spectrum more dense in the most prominent frequencies. The expander will do exactly the opposite. So spectral compression will basically boost frequencies and spectral expansion will damp frequencies, but in

time dependency and in relation to a maximum level, detected by 128 tonal followers.

The JAX Chromatic Compander allows to adjust each tonal band individually up to a maximum factor, whereby the applied modification factor for each band is auto-calculated in dependence to its current peak amount.

The sonic result of the expander seems to be at first sight (listen) quite similar to direct level adjustment of the filter bands but should not be mismatched with that. Because the result is different, time and level dependent.

While adjusting the filter bands manually (the JAX Chromatic Leveler) always has a static character, the peak dependent adjusting has a dynamic impact, is dependent from the rhythmic content and thus can heavily alter the rhythmic relations inside a mix.

It very much depends on the kind of audio material, which kind of frequency adjusting (static or dynamic) the best choice is, for adjusting individual frequency bands in general. With the JAX Chromatic Master you will have the possibility to combine all possible modifications altogether, which is the most advanced usage and usually delivers most optimal results in one single session. Although this approach will need some performance power, even if used with full chromatic bands of 128 stereo bands.

JAX Chromatic Compander is build in a way that supersedes any dynamic EQ that provides peak dependent band compression/ expansion. The sonic effect can be quite intriguing like a drug. But please be warned, that heavy spectral compression will effectively maximize the loudness of the selected frequency bands in a mix, with the dangerous side effects of squashing all natural dynamics to death.

Especially unexperienced people tend to overdo maximizing effects of any kind (see the awful loudness war), finally merely

having left a piece of loud screaming noise, which rather could be described as a “completely damaged sound”.

The spectral compressor effect also can be used as an “exciter”-alike approach, with the difference, that it merely can boost frequencies, that are actually already present in the mix. Which means, it cannot generate new harmonics, like the JAX Chromatic Saturator, which basically is a tonal exciter (de/saturator).

Do I need JAX Chromatic Compander, if I have JAX Chromatic Master?

No. Other units (except the special modules for independent channel processing) are not needed, if you use JAX Chromatic Master, because it is inbuilt there.

The JAX CHROMATIC (Spectral) Saturator

The saturator can saturate and also desaturate selected frequencies of a mix, in a controlled manner, not out of control, like with many EQs. Saturating (a value above the center position) will apply analog (smooth) tube like saturation - squashing the wave shape slightly, fattening the selected tones, while a position below the center position will desaturate the tones, making them “thinner” or “lighter”, less prominent, quite similar to a narrowing wave shaper. This approach we call “desaturating”.

The de/saturator also can be seen as adding odd or even harmonics to the selected bands. Both methods are the inverse of the other.

The saturator can be compared with a multi band exciter, whereby each single tone can be separately adjusted and controlled to the needs. For instance only certain bass frequencies of a mix can be slightly saturated with odd harmonics, increasing the rhythmic punch and tonal presence, while the some medium tones can be thinned out of even or odd harmonics, or adding some kind of harmonics at same time.

Both directions will effectively alter the tonal character of the sound. It can be used to generate subtile “air” in the upper (highest) frequency ranges or just for exciting certain selected frequencies across the entire spectrum, very much dependent from the kind of the sound source.

Exciting is generally much more effective than equalizing, but should be used with some care. In combination with global filter band adjusting, the effect can be easily fine-tuned and balanced. Spectral saturation/desaturation will alter the frequency content of a mix, so it may be necessary to re-adjust the single filter bands slightly after saturation was applied. This is possible and very easy with the JAX Chromatic Master.

Do I need JAX Chromatic Saturator, if I have JAX Chromatic Master?

No. Other units (except the special modules for independent channel processing) are not needed, if you use JAX Chromatic Master, because it is inbuilt there.

The JAX CHROMATIC (Stereo) Imager

The chromatic imager will divide the signal into 128 mono and side signal (correlation) bands internally. The re-mix adjustment can be made for each single tone or range separately. A slider position above the center will emphasize the stereo part of the selected band, while the opposite will reduce the signal to mono. Centered positions will left the selected stereo adjustment untouched (original).

If for instance certain bass ranges have too much stereo information, making the stereo image somehow unstable, these should be reduced, while the rest of the mix remains unaltered. But sometimes even the contradiction is required in certain parts of a mix. The parameters can be automated and should not be merely used statically.

Interesting effects can be achieved by vitalizing or widening certain selected tones across the entire tonal range of a mix or just gradually in the upper ranges, which usually will clearly “excite” the stereo image. High frequencies are mostly perceived louder and more “airy”, if these are widened. This is one discovery of the fundamental psycho-acoustical knowledge. A stereo reduced high frequency spectrum always gives the impression of an anyhow “artificially” reduced space in the manner of a monophonic recording.

Many mastered pieces are suffering a well balanced stereo field, even if it was there prior, because the mastering processing has flattened the entire stereo image with loudness and dynamics processors and did not apply the necessary corrections.

Please note, that monophonic (pseudo stereo) audio has no stereo information. So this cannot be adjusted nor generated with a stereo balancer of that kind. Use the JAX Chromatic Panner instead, which allows to generate stereo information based on selective band adjustment.

Please also note, that all basic JAX Chromatic Series effects will (intentionally) process the left and the right channel consequently stereo linked. If you want to process mid/side signal or left/right signal independently, you can use the JAX Chromatic special modules.

Do I need JAX Chromatic Imager, if I have JAX Chromatic Master?
No. Other units (except the special modules for independent channel processing) are not needed, if you use JAX Chromatic Master, because it is inbuilt there.

The JAX CHROMATIC Panner

The chromatic panner can, in contradiction to the stereo imager, re-adjust the complete stereo information of a composition based on tonally re-positioned frequency bands. This way, it also can

make stereo out of monophonic recordings, but the effect should be applied with care and subtile. A value below the center position pans each selected tone or range gradually to the left, while the opposite will pan to the right side. This is automate-able too.

A monophonic recording of an orchestra could be re-vitalized by panning the single tones approximately according the positions of the players in the orchestra, for instance, or a narrow Grand Piano could be panned chromatically according its string positions in front of the player and so on.

Please note, that all parameters in the JAX Chromatic series can be automated in realtime and create dynamic adjustments this way. Later versions of the series do even implement the "Relativator" adjusment, a special group parameter, that allows to adjust all band parameters collectively in their current relations.

Do I need JAX Chromatic Panner, if I have JAX Chromatic Master?
No. Other units (except the special modules for independent channel processing) are not needed, if you use JAX Chromatic Master, because it is inbuilt there.

The JAX CHROMATIC Emphasizer

The emphasizer can be used to boost tonal center frequencies (aka filter band resonances) in a mix. The resonances of each band pass filter can be adjusted separately, which gives quite interesting punching results. Dull frequencies in a certain range can be vitalized with doing just this. It is also a great resource for wider experimentation, or if a mastering has squashed everything to death or produced strange tonal side effects, which have to be corrected afterwards. High resonant tones, that are already available in the sound source cannot be filtered out with this techniques.

Resonance effectively alters the bandwidth of the selected filter bands and emphasizes their center frequencies. So crossfading

effects of different intensity will occur by adjusting the resonance parameters with single bands. Sometimes even the dynamic relations of the frequency bands (adding pressure) can be altered with just a very few selective band adjustments. This parameter is kind of a “magic” force and should be used with care.

Do I need JAX Chromatic Emphasizer, if I have JAX Chromatic Master?

No. Other units (except the special modules for independent channel processing) are not needed, if you use JAX Chromatic Master, because it is inbuilt there.

SPECIAL MODULES

Independent Stereo and Mid/Side processing

The JAX CHROMATIC L/R Module

This special module is technically equal to the chromatic main effects with the difference, that left and right channels are split, allowing to adjust the available parameter sets independently for each audio channel (separately). The panning and the stereo width control are not included here, as it would conflict with the mixing. Included are Filter band adjustment, resonance, saturation and spectral dynamics.

The module is thought for cases, where complex stereo problems of a mix must be corrected or where binaural audio must be edited separately for optimized results.

A special mode allows to mute one of the channels, so that the result can be mixed with external busses by using multiple instances of the unit.

Do I need the special products, if I have the JAX Chromatic Master?

Yes, probably. The special modules are not included with the JAX Chromatic Master.

The JAX CHROMATIC M/S Module

This special module allows to separate the mid (monophonic part) of the signal from the side (stereo correlation part) and to independently edit both with different parameter sets. As with the L/R module, the panning and the stereo width are not integrated here, because this would conflict with the mixing. Included are filter band adjustment, resonance, saturation and spectral dynamics.

Separate stereo field and/or mono part mastering is widely used to fine-tune the stereo image and for frequency-selectively altering the mid/side correlation. Some music styles will profit from a separate mono-part adjustment, some other from a

separate stereo field adjustment. In many cases both methods can optimize the entire stereo relation across a mix. The effect should be applied dynamically rather than static to a mix.

A special mode allows to mute one of the splits, so that the result can be mixed with external busses by using multiple instances of the unit. High-end mastering will probably always use multiple instances and special mixing configurations and mix busses to finally achieve the desired results with multiple stages of mastering.

Do I need the special products, if I have the JAX Chromatic Master?

Yes, probably. The special modules are not included with the JAX Chromatic Master.

JAX CHROMATIC Creative Modules

(This part of the documentation and the planned effects are possibly subject of future changes.)

JAX CHROMATIC Creative Modules

While the bespoken audio units above are developed for special mixing and mastering purposes, we created also a number of really unique and extraordinary effects that are based on the principles of the chromatic bandpass filter bank but are focused for creative usage.

JAX CHROMATIC Phase

This effect allows to adjust a individual static delay per filter band. These delays are usually very short. The purpose is to correct out of phase voices in a mix or even the contradictory : moving selected frequency bands out of phase by intention. Countless special effects can be created with this method.

So this effect is also a stereophonic effect and will move the phases of the both selected channel bands linked up to a maximum amount of 1 second (1000 ms). The phases also can be moved “pitch tuned” for creative purposes and to achieve interesting side effects, where the amount of the shift is adjusted frequency dependent, this means synchronized to the center frequency of the bandpass filters.

A second version allows to adjust the phases of both stereo channels independently. Stereo phases are a common problem with recordings, if the microphones were not calibrated correctly. Out of stereo phases can make a mix dull, outwash transients and make entire recordings apparently completely a kind of “comb filtered’.

JAX CHROMATIC Shifter

The shifter uses a Bode frequency shifter per band to modify (shift) the frequency of each band pass either up or down. The Bode frequency shifter is a special kind of frequency shifter which

is not comparable with a common pitch shifter. It is widely used with analog synthesizer equipment to creatively modify voices.

This effect unit is thought for special effects, rather than common correction tasks.

JAX CHROMATIC Toner

The chromatic toner is able to add fundamental tones to the selected bands. These tones come from an integrated oscillator bank and are calibrated to the center frequencies of each band pass filter.

Adding fundamental tones can enrich the tonality of a mix in selected ranges. The generated tones can be octave shifted too.

JAX CHROMATIC Comb

A bank of additional comb filters is connected to the band pass filter bank. Each comb filter is adjusted to the center frequency of the single bands. With the slider, the feedback of the comb filter can be adjusted per band.

Comb filters create interesting resonating tones which have impulsive character. Using comb filters on entire mixes has an awful sonic effect. Applied on selective tonal ranges, it can be used to give presence, emphasis and punch, because the center frequency of the band is effectively boosted and impulsed.

This effect is quite similar with the JAX Chromatic Emphasis. The latter directly adjusts the filter resonance, while the sonic result is somewhat different to the comb filter.

The comb filters can be adjusted to an octave below or above the center frequency.

JAX CHROMATIC Pitch

We have connected each single band of the chromatic band pass filter to a monophonic pitch shifter, whereby the pitch and the formants can be adjusted separately for each band. So the entire bank of pitch shifters can create interesting polyphonic results including formant shifts across the entire tonal range.

This effect is very performance intensive but can create effects, that are not possible with any other effects on the market.