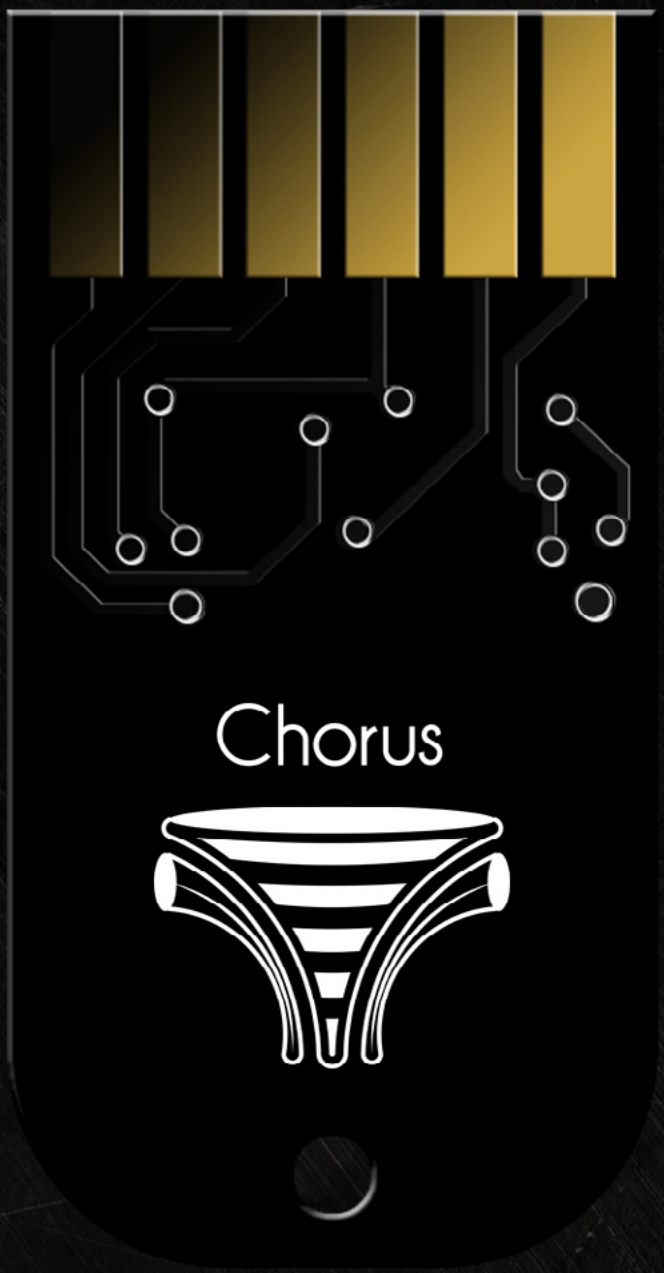
Chorus

Z-DSP card



TIPTOPaudio

Chorus Z-DSP card

For best results, even with mono signals, use both inputs on the Z-DSP and the stereo out. A short Stackcable can be used to connect the left and right inputs to a mono signal.

Chorus is one of the most essential effects for synthesizers and the chorus unit on many classic poly synths created much of their sonic signatures. This card for the Z-DSP offers 8 different algorithms inspired by some of the most classic effects in the genre.

Chorus effects use one or more delay lines which are modulated to produce a 'doubling' of the sound as if more voices are present. Programs vary from two to six delay line 'taps' or voices. Generally, the more voices the thicker and more complex the sound.

The delay times of these programs tend to be in the 18-24 millisecond range which is common to most of the high end studio devices. Analog pedals are more in the flanger < 10ms range in order to use cheaper BBD parts, but there is also a Dual Flanger program with shorter times on the card.

LFO modulation provides a way to not only break up the comb filtering of a static delay, but also creates a sense of movement in stereo. Several of the programs use one or more methods like multiple LFOs, quadrature LFO, random walk and phasing to produce even more movement in the stereo field.

LFOs have both Rate and Depth controls: Rate is simply the speed of the LFO, and depth is how wide the LFO sweeps through the delay line. Most of the Programs on the card have Rates from several seconds to several times a second (0.1 Hz to 6+ Hz). Depth can vary the delay line position from less than 1ms to the entire delay range of 20ms or more. As the LFO sweeps through the delay line the sound changes pitch producing a 'detune' effect. Detuning is really what makes the 'choral' element in a Chorus effect.

Setting a slow Rate and higher Depth makes the pitch change subtler and can be very effective on pad and other ambient sound sources. Increasing the Rate will introduce a more pronounced vibrato effect and extreme settings of Rate and Depth can sound underwater.

Adding external Feedback can make the Chorus sound more intense and high levels of feedback can add a small room ambience. The Dual Flanger program has an internal feedback for the classic Flanger swoosh.

Chorus effects can sound quite subtle compared to many other types of effect, and in some cases the effect is only noticed when it is switched off!.

1> Dual Chorus

Independent chorus lines for Left and Right outputs. Each is modulated by a sine LFO with individual control for the speed of the LFO. The center control sets how deep the modulation sweeps.

RateL - Speed of Left output LFO
Depth - Amount of modulation sweep for both channels
RateR - Speed of Right output LFO

2> Dimension ?

Two chorus delay lines modulated by a single triangle LFO. The orientation of the LFO and signal phase are inspired by a classic 80s studio rack device. Unlike that unit, this algorithm offers both LFO rate and the depth of the modulation sweep. A High Pass Filter control removes low end from input for a clearer sound. This effect sums input to Mono, and works best with the Mix setting mostly or even fully wet.

Rate - Speed of LFO modulation
Depth - Amount of modulation sweep for LFO
HPF - High Pass Filter cutoff

3> Ensemble

The ensemble effect is one of the most classic synth effects. Originally made using analog BBD chips, ensemble circuits gave the string synths their 'string' sound. This ensemble is derived from that circuit where a slow and fast LFO provide the distinctive 'string' modulation. For maximum string synth effect, set the mix fully wet and feed it saw waves. The center control is for the amount of vibrato - the classic setting is about 35% or so. A High Pass Filter control removes low end from the input which adds clarity and makes the sound less wobbly. This program sums the input into mono, but has a wide stereo output and works well 100% wet.

None
Vibrato - AMount of vibrato in output mix
HPF - High Pass Filter cutoff

4> 6 Voice Chorus

This is a classic multiple delay line Chorus, found in high end studio effects, that uses 6 independent delay lines which are modulated. This program uses two sine LFOs with individual control for the speed of each LFO. The center control sets how deep the modulation sweeps. The chorus taps are panned across in stereo and have subtle feedback internally.

RateL - Speed of Left output LFO
Depth - Amount of modulation sweep for both channels
RateR - Speed of Right output LFO

5> Dual Flange

Same basic algorithm as Program #1, but with shorter delay times and a feedback control. Independent delay lines for Left and Right channels. Each is modulated by a sine LFO with the rates slightly offset for stereo effect. The center control sets how deep the modulation sweeps. The Feedback control sets the internal feedback amount for more resonant flanging.

Rate - Speed of Left output LFO
Depth - Amount of modulation sweep for both channels
+/-Fdb - Amount of positive or negative signal fed back into delays

6> Diffuse Chorus

Independent chorus lines for Left and Right channels made from allpass delays that would normally be the input 'diffusion' section of a reverb. Chaining a few of these delays in a row makes for a cross between a chorus and very small room (add external feedback for more reverb tone). Each delay is modulated by one of two sine LFOs with control for the speed of the LFOs. The center control sets how deep the modulation sweeps.

Rate - Speed of LFO modulation
Depth - Amount of modulation sweep for LFO
HPF - High Pass Filter cutoff

7> Random Chorus 4 Voice

Four independent chorus lines split between Left and Right channels. Each is modulated by a random walk algorithm with individual control for the speed of the LFO. The Left/Right controls set how deep the modulation sweeps. The randomness of the modulation is a secret of many high end studio devices. Internal feedback adds fullness to the sound and at high levels imparts a small room type ambience. The pitch wobble can be less noticeable compared to using periodic waveforms for modulation, but at extreme settings the effect is like having a few too many pints at the pub!

DepthL - Amount of modulation for Left side LFO
Fdbk - Amount of signal fed back into delays
DepthR - Amount of modulation for Right side LFO

8> Tri Stereo Chorus

Three delay lines are panned Left, Center and Right in a configuration similar to some rare guitar and electric piano effect units. Each is modulated by quadrature outputs of the same sine LFO with control for the speed of the LFO. The center control sets how deep the modulation sweeps. A High Pass Filter control removes low end from the input which adds clarity and makes the sound less wobbly. This is summed mono input and very stereo output - try 100% wet!

Rate - Speed of LFO modulation
Depth - Amount of modulation sweep for LFO
HPF - High Pass Filter cutoff

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