

Minimax

Introduction

What's the Max about the Mini?

Structure and Overview

Operation

Controllers

CV

External Input

Oscillator Bank

Mixer

Modifiers

Filter

Loudness Contour

Output



creamw@re[®]

fidelity at work.

NOAH

- Tactive Instrument Modeller

Minimax

Main Table of Contents

Contents

Index

1

Introduction

What's the Max about the Mini?

Just what is it about the Minimax?

Today you would probably not expect too much in terms of sound from a synthesizer with 3 oscillators and noise, a mixer, followed by a filter with an amplifier and two envelope generators. But we're not talking about just any synthesizer, we're talking about *the* synthesizer!

Minimax is an emulation of the probably best-known of all vintage synths. It's simple structure makes it easier to learn sound creation techniques than on many other synthesizer models. And its sound is famous. The oscillators are strong and powerful, the filter pack and envelope generators blindingly fast.

Many have tried to duplicate these characteristics. However, attempts by both hardware and software manufacturers have failed. With hardware, the different electronic components often used changed the sound. And in software only some parts of the original, such as the filter, were successfully emulated. Other elements, like the oscillators and envelopes, were imported from outside sources.

CreamWare knows how difficult a true emulation is. From today's perspective, the Miniscope and Miniscope MkII must be considered as great synthesizers in their own right, but not as emulations of the original.

Minimax is different than anything that's come before. Minimax does not just emulate parts of the instrument - Minimax *is* the instrument. Where there have been limits to the hardware, such as original components no longer being available, and where software has not dared to go, there goes Minimax.

With the Minimax we modeled all important sound elements on the original circuit diagrams. And throughout the process we constantly recalibrated our design to conform with the original so that even the positions of the controls agree. Still the reproduction was not exact. Calibration and adjustment was only part of the work we had to do.

We had yet another hurdle to jump before we could claim success. The original synth produces frequencies that, had we relied on the usual algorithms, would have led to aliasing. And those familiar with aliasing know what an unpleasant noise it is to have in a signal. The modules used in the Minimax are built on newly-developed algorithms free from aliasing. For this reason Minimax easily handles even the wildest filter, FM, or oscillator modulations. And the beauty of it is - Minimax always sounds like the original. Minimax represents the pinnacle of synthesis algorithm development.

Structure and Overview

Like the original, Minimax has an oscillator section with three oscillators. Oscillator 3 can also serve as an LFO. The oscillator signals are mixed with noise or an external signal, if desired, in the mixer section. From the mixer, the combined signal is sent to an amplifier and a filter, each of which has an associated envelope generator with adjustable attack, release and sustain.

The quality of the algorithms is readily apparent in all sections of the synthesizer. The full-range oscillators produce signals with extended highs giving you soaring sound with great vitality and energy. We also paid careful attention to the saturation behavior of the mixer section, both for internal and external signals. Saturation gives the sound more ability to penetrate. More power.

The filter, in particular, benefits from the new algorithms. Although previous filters had resonance, it was never as convincing as true analog resonance. With digital filters designers had to make sure that aliasing would not develop during filter sweeps. Therefore, many filters limit the resonance range (or do not allow it to fully open) to prevent the signal from exceeding the aliasing threshold (the Nyquist frequency, half the sample rate). Filter sweeps with these filters are useful, but are less lively than they could be. The Minimax filter is completely convincing all down the line. The filter has a unique liveliness and produces all the resonance and distortion you could ever wish for in a filter. Resonance can be fully opened up and sweeps are free of aliasing - even beyond half the sampling frequency.

Finally, the envelope generators need not shrink from comparison with their analog counterparts either. Not only are they fast - they reproduce the overall behavior of the original with great accuracy.

Although the goal of the development of Minimax was to create an absolutely faithful reproduction, we couldn't resist adding a few enhancements. The envelopes have adjustable velocity and switchable trigger behavior, and the normal low-note priority can be switched instead to last-note priority.

Our love of detail is also apparent in the graphic front panel. The controls were treated with particular care so that they correspond exactly to the originals. If you still have any of your old sound sheets, you can set them up on the Minimax and then store them as presets!

Operation

The Minimax graphic panel is switchable to display either the main or an auxiliary panel. The layout of the sections provides a rough indication of the synthesizer structure. The oscillators, mixer section, and the filter with envelope and amplifier with envelope section are all on the main panel. The effects and global parameters are on the **Add** panel (Add stands for "additional"—that is, extended parameters).

To switch from one view to the other use the switches in the upper left corner of the panel.



A text field for the current preset, and an icon to open the Preset List are located in the upper right corner, along with the On Top and Close buttons.



To maintain the graphic panel in the foreground, click the On Top button. Use the Close button to close the panel (and also the Preset List dialog if it is open).

Controllers

This section covers the general settings and provides some tips regarding modulation techniques. The Add page section contains descriptions of some other parameters.



Tune

This control adjusts the overall tuning of the instrument. The range is +/- 2.5 semitones.

Glide On

Enables the Glide function. When glide is on one note glides into the next (glissando) at an adjustable speed (see Glide, below).

Glide

When the glide function is enabled this control adjusts the rate of the rise or fall in pitch between notes.

Modulation Mix

Controls the proportion of oscillator 3 and noise in the modulation signal. The resulting signal is used to modulate the oscillator bank and filter. To hear the result you must have modulation switched on and the modulation wheel set to produce some intensity.

Decay On

Switches the decay times of the envelopes to assume the release time. The release times are then controlled with the decay controls. If Decay is off, the minimum release time is used.

Bend Range

Sets the maximum pitchbend deflection. The range is from 0 to 24 semitones.



Modulation Wheel

In principle, the intensity of the modulation signal applied to the oscillators and filter is controlled by the modulation wheel. In the original this was the only way to control modulation. For greater control we've added modulation intensity and offset controls as well.

Modulation Intensity

Sets the maximum intensity of the of the modulation applied to the oscillator bank and the filter by the modulation wheel.

Modulation Offset

The fundamental intensity of the modulation signal applied to the oscillator bank and the filter with the modulation wheel at zero. The modulation wheel increases the intensity according to the offset and intensity settings.

Low Note On

Enabling Low Note On gives low notes a priority over high notes. A higher note cannot displace a low note. When switched off, the last-played note will always have priority.

Retrig On

Switches the retrigger mode of the envelope generators from legato to retrigger. When Retrig is on, the envelopes trigger every time a new key is pressed, even if you are playing a legato style (that is, when you play a new note before you release the previous one). In legato mode the envelopes trigger only if the previous note has been released.

With Low Note on and Retrig off, the behavior of the Minimax is the same as that of the original. For some presets, such as pads and sequencer sounds, it may be appropriate to switch Low Note off and Retrig on.

Single On

Forces the instrument to operate in single-voice mode, regardless of how many voices are actually currently loaded. Guarantees proper performance of solo sounds with portamento.

CV

The original synth had three CV inputs for external control of the sounds. One input controlled oscillator pitch, one controlled filter cutoff and one controlled volume. In the Minimax, these three parameters can be modulated via aftertouch, with modulation intensity adjustable per mod destination.

OSC

Intensity and direction of oscillator pitch modulation. Permits generation of an oscillator pitch bend under aftertouch control.

Filter

Intensity and direction of filter cutoff modulation. Permits generation of filter sweeps under aftertouch control.

Loudness

Intensity and direction of volume modulation. This option is particularly interesting in connection with the internal feedback feature. The amount of overdrive can be controlled via aftertouch.



External Input

Source

Select the external signal source here (see chapter 'Mixer').



Oscillator Bank

The oscillator bank consists of three oscillators. Each oscillator has controls to adjust the octave and select the waveform. Oscillators 2 and 3 also have Frequency controls for detuning. Oscillator 3 can also serve as a modulation source in which case it ignores frequency input from the keyboard and functions as an LFO. The LFO rate is then controlled by the Range and Frequency controls. Pitch modulation can be turned on or off with a switch.

Range

Sets the octave of the oscillators. The octaves available are Lo, 32', 16', 8', 4' and 2'. The values 32' and 16' are low octaves suitable for bass while 8' and 4' are good for lead voices. To use oscillator 3 as an LFO, select the value Lo.



Waveform

Selects the waveform for an oscillator. Each oscillator can produce one of six possible waveforms: triangle, a mix of triangle and sawtooth, sawtooth up, square, wide pulse, and narrow pulse. In keeping with the character of an LFO, oscillator 3 substitutes a sawtooth down waveform for the triangle/sawtooth mix.

Frequency

Adjusts the tuning of oscillators 2 and 3 with respect to oscillator 1. The scaling indicates the amount of detune in intervals. The maximum adjustment is about 9 semitones.

OSC3 Control

This switch sets oscillator 3 to ignore keyboard frequency control. You can then use oscillator 3 to provide a fixed frequency as a sonic element, or to serve as an LFO. When using oscillator 3 as an LFO, adjust the coarse frequency with the Range control and the fine tuning with the Frequency control.

Oscillator Modulation

Enables pitch modulation for the three oscillators. Select the modulation source signal - which can be noise, oscillator 3, or a combination of both - under Modulation Mix. The intensity is controlled by the modulation wheel and associated parameters.

Mixer

The Mixer combines the various signals before sending them to the filter. Up to five signals can be included in the mix: oscillators 1-3, plus noise and an external signal. For each signal there is a switch to include or exclude it from the mix, and a level control. External signals can be amplified to produce distortion that you can use for special sonic effects.

Volume

Adjusts the level of the respective signal in the mix.



External Input Volume

The volume level of the external signal. For this to have an effect, a sound source must be connected to the Audio input of the Minimax. A signal lamp above the control serves as a level meter. The brightness of the lamp indicates the strength of the signal output or an over condition.

Feedback On

With feedback on, the synthesizer's output is internally routed to the external input. You can then use the External Input Volume control to add distortion to the overall signal as a sound element. A signal connected to the External input is ignored in this mode.

Noise Volume

Controls the level of the noise signal. When noise is used as a modulation source, the volume level has no effect on the intensity of the modulation.

Noise White/Pink

Selects the noise 'color'. When noise is used as a modulation source, the color has an effect on the modulation.

Modifiers

In this section an amplifier and filter further process the signal. The filter and amplifier each has its own envelope generator with Attack, Sustain, and Release controls. The Release time can be set to the Decay time by a switch in the Controllers section.

Filter

Along with the envelope, the filter controls changes in the tone color. The filter is a 24dB/octave low-pass filter. Frequencies beneath the Cutoff frequency pass freely, while frequencies above are attenuated by 24dB/octave. There's probably not a lot to say about this filter other than it is generally considered to be one of the best sounding filters ever put in a synthesizer. The Minimax confirms this.



Cutoff Frequency

The cutoff frequency is the frequency above which the spectrum is cut—overtones are attenuated. This control lets you adjust the cutoff frequency manually.

Emphasis

This is the resonance control. Resonance results from the coupling of the filter output to the filter input, thereby reinforcing the frequencies lying near the cutoff frequency. At the maximum setting the filter begins to oscillate, producing a pure sine tone at the cutoff frequency. You can use emphasis as a possible sixth sound source.

Amount of Contour

Adjusts the intensity of the envelope modulation. The cutoff frequency follows the progression (contour) of the envelope with the degree of change controlled by this setting. At the beginning and end points of the envelope the cutoff is the adjusted Cutoff Frequency.

Attack

Duration of the first envelope segment. In the attack phase the cutoff frequency increases to its maximum value in the time adjusted here. Adjust the amount of the increase with the Amount of Contour control. The maximum value is determined by the adjusted cutoff frequency and the Amount of Contour setting.

Decay

The duration of the decay segment. In the decay segment, the cutoff frequency falls to the sustain level. If the Decay switch in the Controllers section is set to "on", the time setting here is applied to envelope release.

Sustain

The envelope's third segment. This is the level held after the decay segment completes. The actual cutoff frequency is determined by this value and the Amount of Contour setting.

Release

The fourth envelope segment. This is enabled only when Decay is switched on. There is no direct controller for the release phase. In the release phase the envelope falls to its minimum value. This is the value set by the Cutoff parameter. The rate at which it falls is determined by this setting.

Velocity

The amount of modulation of the envelope as influenced by key velocity. This setting controls the envelope peak level between minimum and maximum depending on how hard you strike the keys on your keyboard. This controls how much your playing style (aggressive or gentle) influences the tone quality.

Filter Modulation

Enables additional filter modulation. The Modulation Mix section serves as the modulation source. The signal can come from Oscillator 3, Noise, or a combination of both. The Modulation Wheel controls the intensity of the modulation.

Keyboard Control

Cutoff Keyfollow is enabled in two stages. With the first switch, the cutoff frequency follows the keyboard position at 1/3 octave per keyboard octave. With the second switch the cutoff frequency follows the keyboard position at 2/3 octave per octave. With both switches turned on, the cutoff frequency rises by an octave for each keyboard octave.

Loudness Contour

Along with the envelope generator, the amplifier controls the progression of the volume level of the sound.

Attack

The first envelope segment. During the attack phase of the envelope the volume reaches its maximum level. This setting adjusts how quickly the level is reached.

Decay

The second envelope segment. During the decay phase of the envelope the volume falls to the level set by the Sustain control. If the Decay switch in the Controllers section is set to "on", the time setting here is applied to the envelope's release phase.

Sustain

The third envelope segment. This is the volume level at which the sound is held at the end of the decay segment.



Release

The fourth envelope segment. This is enabled only when Decay is switched on. There is no direct controller for the release phase. In the release phase the envelope falls to its minimum value, silencing the sound. The rate at which it falls is determined by the Decay setting.

Output

Velocity

The amount of modulation of the envelope as influenced by key velocity. This setting controls the envelope peak level between minimum and maximum depending on how hard you strike the keys on your keyboard. This controls how much your playing style (aggressive or gentle) influences the volume level of the sound.

Volume

Overall volume level of the synthesizer. This control is located before the effects section, so it can also be used to control the effects in order to, for example, avoid distortion in the Flanger at high feedback levels.

Index

A

Amount of Contour 10
Attack 11, 12

B

Bend Range 6

C

Close 4
Contour 10
Controllers 5
Cutoff Frequency 10
CV 7

D

Decay 11, 12
Decay On 5

E

Emphasis 10
External Input 7
External Input Volume 9

F

Feedback On 9
Filter 7, 10
Filter Modulation 11
Frequency 8

G

Glide 5
Glide On 5

I

Introduction 2

K

Keyboard Control 11

L

Loudness 7
Loudness Contour 12
Low Note On 6

M

Miniscope 2
Miniscope MkII 2
Mixer 9
Modifiers 10
Modulation 8
Modulation Intensity 6
Modulation Mix 5
Modulation Offset 6
Modulation Wheel 6

N

Noise Volume 9
Noise White/Pink 9

O

OnTop 4
Operation 4
OSC 7
OSC3 Control 8
Oscillator 8
Oscillator Modulation 8
Output 12
Overview 3

P

Pink 9
Presets 4

R

Range 8
Release 11, 12
Retrig On 6

S

Source 7
Structure 3
Sustain 11, 12

T

Tune 5

V

Velocity 11, 12
Volume 9, 12

W

Waveform 8
White/Pink 9