abl3

Computer Bassline

OPERATION MANUAL

DRAFT

Re
Rack Extension

Introduction

AudioRealism Bass Line 3 (ABL3) is an emulation of a classic pattern based bass machine from 1982. The legendary silver box that is hallmark in electronic music has been recreated in ABL3 using analog modeling techniques to create a DSP-algorithm that accurately emulates every aspect of the original, from growling basses to hollow middles and beeping highs with metal rattling accents. Patterns are composed in a fashion similar to the original using the integrated step sequencer with easy to use manipulation functions such as transpose and randomization.

History

ABL1 was released in 2003 and became quickly one of the most popular 303 emulations as a VST plug-in. ABL2 improved on that and was released 2007. ABL3 is the latest version of our 303 emulation platform.

The ABL3 engine is a complete rewrite and has been in development for many years with the single goal of making the most authentic 303 emulation possible. With ABL3 we hope it will set a new benchmark in analog emulation.

Features

- Extremely authentic 303 emulation using our ABL3 engine
- Ultra natural knob response, scaled to match the original 303 precisely
- Built-in 303/Rebirth style step sequencer with 64 steps
- Hard sync to the host's transport
- Supports 4 patterns of 16 steps, 2 patterns of 32 steps or 1 pattern of 64 steps
- CV/Gate input to control the sound engine externally
- CV/Gate output to control other Reason devices from the step sequencer
- CV Modulation inputs for Tuning, Cut Off, Resonance, Envelope Modulation, Decay and Accent

- Resonance and Gate Time trimmers that allow tweaking the emulation
- Three different VCO Models
- Noise settings for VCA Clicks and VCA Noise
- Pattern modifiers with Random, Alter, Copy and Paste functions
- Unique vibrato which is activated by setting UP+DOWN on steps. This effect is one of the few extensions to the 303 that we are launching ABL3 with.
- Full 48 and 96kHz support, which means the engine uses the full bandwidth of the project setting
- Step Record mode which allows recording patterns via MIDI or the On-Screen Piano Keys

Panel Overview

The front panel is divided into three sections.

1. Control section
2. Synth section
3. Pattern section

1. Control section

Pattern selector

The Pattern selector allows selecting which one of the 4 patterns should be played and edited (in the pattern section). It is also possible to turn the Pattern off in which case it will not interfere with any incoming MIDI notes.

When the Pattern section is turned off, ABL3 also forwards any CV/Gate input to the CV/Gate output. This allows for chaining multiple ABL3 devices together to expand the number of patterns that can be used.

Patch selector

The Patch selector works the same way as any Reason device. It is possible to load patterns while the Reason transport is running.

Note indicator

The Note indicator will flash when ABL3 receives a MIDI or CV/Gate input. It does not flash when ABL3 is played from its internal pattern sequencer.

2. Synth section

The Synth section is comprised of 7 controls: Waveform, Tuning, Cut Off, Resonance, Env Mod, Decay and Accent.

Waveform

The waveform can be set to sawtooth or square wave. These waveforms are modeled on the original 303 and have a rather unique character; For instance, the pulsewidth of the square wave varies with the frequency of the oscillator.

Tuning

The tuning can be set between -12 and +12 semitones.

Cut Off

The basic cut off frequency of the filter is set with this control.

Resonance

The Resonance control sets the amount of feedback in the filter. A low resonance setting produces a more bass like sound while more resonance produces a more 'electronic' type of sound.

Env Mod

Env Mod (Envelope Modulation) controls how much the envelope modulates the cut off frequency. One unique feature of the 303 is the way the envelope modulates the cut off both positively and negatively, which may result in a filter frequency lower than the Cut Off knob setting.

Decay

The Decay knob sets the decay time of the envelope for the filter.

Accent

The Accent knob sets the amount of effect applied to certain steps or notes that are played accented (with a velocity 100 or greater/the Accent button engaged). The accent effect modulates several parameters in the sound at once; For example, the volume, cut off frequency and decay time of the envelope.

Volume

The volume control can be set to completely silent (-Inf dB) to very loud (9dB). At higher settings clipping may occur so care must be taken with values over 0 dB. The clipping level and character can be set on ABL3's back panel.

3. Pattern section

The Pattern section is used to display, program and edit patterns that are played via ABL3's internal sequencer. It is also possible to generate random patterns or step record a pattern via MIDI.

ABL3 RE's memory can hold a maximum of 64 steps, split across up to 4 patterns. This allows for one patterns of up to 64 steps, 2 patterns of maximum 32 steps, or 4 patterns of maximum 16 steps. It is not possible to have a different number of steps for each pattern (create another ABL3 device for that).

Most functions in the pattern section only affect the steps up to the number of steps selected.

The Pattern section displays only one step (indicated by the yellow number on the right) of the pattern at once. The LEDs display the programmed info on that step: pitch, gate, down, up, accent and slide.

All functions work with Reason's Undo and Redo system. In case of any mistakes, such as clearing a pattern, use Undo to go back to the previous state.
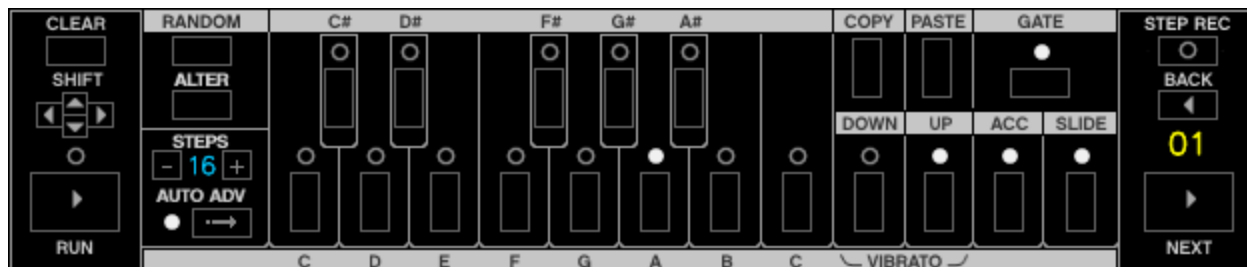
Clear button
Clears the pattern (up to the number of steps). All steps are set to C with Gate On.

Shift buttons
The pattern can be shifted left or right. This function works cyclically so any step shifted off the first step will appear on the last step.

The pattern can also transposed up and down. Any notes that are transposed out of range will cycle and appear at the bottom or highest octave.

Note: When transposing, the Up and Down step modifiers are not affected. If you wish to transpose down, but the lowest note cannot be shifted and appears at the highest octave,

consider instead using the Tuning knob to set the whole tuning one octave lower and transpose the pattern up the desired number of steps.

Run button

The Run button plays or stops playing a pattern via the internal sequencer. This can be used for quickly previewing a pattern. The Run button has no effect when the Reason transport is playing since Reason's transport overrides the play button. If you wish to stop a pattern while Reason is playing, set the Pattern selector to Off.

The Run LED indicator will always be lit when a pattern is being played.

Back button

The Back button causes the step indicator to be decreased by one. If the step indicator is on the first step then it will jump to the last step in the pattern.

Next button

The Next button causes the step indicator to be increased by one. If the step indicator is on the last step then it will jump to first step in the pattern.

Random button

The Random button causes steps in the pattern to be randomized. This affects pitch, down, up, slide and accent.

Alter button

The Alter button causes the order of the steps in the pattern to be randomized. It does not change any of the steps themselves, just the order of them in the pattern. This can be particularly useful for creating variations of patterns or creating pattern in specific scale.

Steps indicator

The Steps indicator shows the pattern length to be edited (the number of steps in the pattern). The number of steps can be 1 up to 64. The number of steps can be increased and decreased by pressing the + and - buttons. It is also possible to click and drag the Step indicator to quickly scroll to the desired number.

Note: Due to the way ABL3's memory is organized it is possible to overwrite other patterns if more than one pattern is used in the device. A good practice is to exercise care when editing patterns over 16 steps. It is possible to edit sections of a 64 step pattern by setting the number of steps to 16 and using the Pattern selector to select which part of the 64 step pattern to edit.

Auto Adv button

Auto Adv stands for Auto Advance. With Auto Advance on the Steps indicator will automatically advance to the next step when entering a pitch (C,C#,D etc). This can be useful for quickly programming scales and modifying patterns.

Turning Auto Advance off and on again will cause the Step indicator to go the first step. This can be handy shortcut to quickly return to the first step of a pattern by double clicking this control.

Copy button

The Copy button copies the current selected pattern into the copy buffer. Note that this function always copies 16 steps.

Paste button

The Paste button pastes the copy buffer to the current selected pattern. Note that this always pastes 16 steps. If you need to copy more than 16 steps, then do so in multiple passes. For instance, if you are working on a 32 step pattern and wish to copy pattern 1 to pattern 3, then:
1) Set pattern selector to pattern 1, press Copy
2) Set pattern selector to pattern 3, press Paste
3) Set pattern selector to pattern 2, press Copy
4) Set pattern selector to pattern 4, press Paste

Pitch buttons

The Pitch buttons set a pitch on the current step set by the Step indicator. The pitch buttons cover a full octave plus one extra C high. Which pitch is entered on the step is indicated by the Pitch LEDs.

Note: When Auto Adv (auto advance step) is turned Off, extra octaves can be reached by clicking a note multiple times:

- White dot indicates the normal untransposed octave

- Red dot indicates extended octave +1

- Yellow dot indicates extended octave +2

This is also useful when using the vibrato which normally would only would affect the standard 303 octave (as it uses both Up+Down to activate vibrato, resulting in a non transposed pitch).

Down button and indicator

When Down is activated the step is transposed one octave down.

Up button and indicator

When Up is activated the step is transposed one octave up.

Accent button and indicator

When Accent is activated the sequencer will play this step with accent.

Slide button and indicator

When Slide is activated the sequencer will tie the step to the previous step via a smooth glide.

Vibrato effect

When both the Down and Up buttons are activated on a step the Vibrato effect is applied. The Vibrato effect works much like a delayed LFO on the pitch. Tying multiple steps together with slide enhances this effect.

Gate button and indicator

When the Gate button is activated the note for that step is sounded. If Gate is off then the note will not be played.

Step Rec

Step Rec stands for Step Recording. This is a useful function for entering patterns via a MIDI keyboard or Reason's On screen Piano Keys. This is reminiscent of the 303's Tap Write mode.

The Step Rec LED will flash when it is in record mode.
- Accented notes are entered by playing a note with velocity 100 or higher.
- Tied or glided notes (Slides) are entered by holding the first note and playing another note.
- Enter a rest by pressing Next in the pattern section.
- Tied notes can be entered by holding the MIDI note and pressing Next
- In case of a mistake use the Back button to go to a previous step and continue entering notes.

Note: The recorded pattern is only copied into ABL3's pattern memory when deactivating the Step Rec button.

Back Panel

The back panel contains several options to set up and customize ABL3.
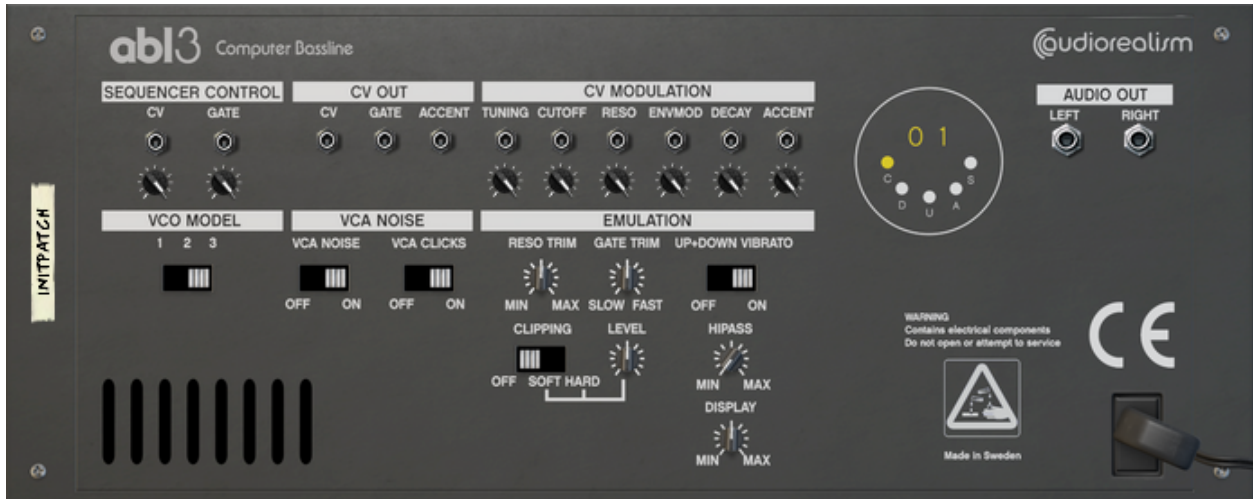
Sequencer Control

ABL3 can be controlled by an external CV/Gate source. For instance, the Matrix or Thor or any other step sequencer rack extension that can output CV/Gate.

ABL3 interprets the incoming CV/Gate in a typical way, except the Gate signal which responds to velocity where values 100 or higher are interpreted as an accented note.

Note: ABL3 only responds to CV/Gate when the Pattern selector is set to Off.

CV Out

ABL3 outputs CV, Gate and Accent signals to allow controlling other devices from ABL3's sequencer. CV/Gate are output in the typical way, but ABL3 also includes an extra CV output for accent which is set to high only on accented notes.

It is possible to use the CV/Gate/Accent outputs to achieve special effects, for instance connecting the Accent CV out to the Tuning CV input to produce an extra tuning effect on accented steps. Or connect CV output to Tuning CV input to produce the classic 303 detuned sound.

When connecting an ABL3 instance to another ABL3 only CV/Gate is needed.

CV Modulation

ABL3 has six CV Inputs with trimmers that can be used to modulate any of the parameters Tuning, Cut Off, Resonance, Env Mod, Decay and Accent.

VCO Model

ABL3 contains three VCO models, each one with a different character.

- Model 1 is a very clean model with a sound reminiscent to the classic Rebirth sound. This model may be useful when using heavy distortion due to low noise.
- Model 2 is a clean model but with a more natural 303 sound but with a volume that is uniform over the full scale of pitches.
- Model 3 is the default model for ABL3 which also contains noise modelling. This sounds most close to the original 303 that ABL3 is modelled after. When using heavy distortion this model can produce more noise than the other models (just like the 303 VCO circuit produces noise).

VCA Noise

ABL3 contains two noise settings, VCA Noise and VCA Clicks.

- VCA Noise can be turned on. Default is Off. The VCA Noise can be heard in certain circumstances and is more apparent when applying distortion to ABL3.
- VCA Clicks can be set to Reduced and Normal. The Normal setting is default, but if this is not desired then set it to reduced. The VCA clicks are also affected by the Gate Trim setting.

Emulation

The emulation can be set up to for the particular session via a number of settings.

- Reso Trim - At minimum setting the filter has less feedback and therefore less resonance. At the maximum setting the feedback is increased and this produces a sharper resonance, which may help cut through in a mix better.
- Gate Trim - At minimum the gate time is very slow and produces almost a legato style of sound. This setting also produces less VCA clicks. At the maximum gate trim setting the gate is very fast and precise and produces a more tight sound. Use this setting depending on the style of the track, the distortion setting and preferred style.
- Up+Down Vibrato - The vibrato can be switched off if it is not preferred. The default setting is on.
- Clipping - The clipping setting can be set to three modes, off, soft and hard. The clipping setting can help guarantee that ABL3 does not output sound that is above the maximum limit of the device. Instead it clips internally before outputting sound. The clipping level is set by the Level trimmer. This can be used for distortion effects, however it should be used with care as it can produce aliasing (digital distortion) especially when running ABL3 at sample rates of 48 kHz or less.

- Hipass - ABL3 has a sweepable high pass filter that can be used to shape the sound and create the "thin" 303 sound.
- Display - The brightness of the buttons in the pattern section can be set with the trimmer.

Audio Out

The Audio Output is a standard stereo output. The level is set by the Volume knob on the front panel. If the output extends too much beyond the clipping range then activate one of the Clipping modes in the Emulation settings.

Pattern Editing Tips

A way of programming a pattern typically involves these steps:
1. Clear the pattern
2. Set the pattern length (Steps) to 16
3. Set Auto Adv (auto advance) to On
4. Enter 16 pitches (C,C#, etc) by clicking on the note buttons. Since Auto Adv is on the next step in the pattern will automatically be selected each time you select a pitch. If you enter the wrong pitch use Back to go to the previous step.
5. When the Step indicator has cycled around and is on step 01 again enter step modifiers (gate,down,up,accent,slide). This requires pressing Next each time a step is entered as the step is only automatically advanced when entering a pitch.

Once a pleasing pattern has been achieved save the pattern using the Patch browser buttons. If a variation or experimentation altering the pattern is desired use Copy to put the pattern in the copy memory buffer. The pattern can then be altered without risk of losing it. If the user wishes to revert to the original pattern simply select Paste.

Note: This works on patterns with up to 16 steps (since the Copy buffer is 16 steps long). If longer patterns are being worked on then use the Patch browser to physically save it, or clone the whole device by using Duplicate Device in Reason.