

X H U N | A U D I O

# IRONAXE

Physical Modeled Electric Guitar

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## INTRODUCTION

### Overview

Khun Audio is proud to present IronAxe, a high-end Physical Modeling simulation of one of the most popular and loved electro-acoustic instruments : the Electric Guitar.

The result of two years of research and development, IronAxe reaches all the authentic beauty and expressivity of a real Electric Guitar by simulating the physics of all the acoustic and electronic components found in the original instrument, preserving the same nuances and multi-techniques playability impossible to perform on standard frozen-sounding sampled instruments.

Break with the past - forget all the old, expensive, bulky sample libraries.

Build your custom Stratocaster® or Telecaster® guitar, choose Pickups type, number and position, set the Tone knobs to get the right sound, select the Plectrum hardness or pluck a String with fingers at any point along its length. Finally take real-time control of all this (and much more...) using a MIDI Keyboard or a real - natively supported - MIDI Guitar.

IronAxe will bring in your next Productions the sound and feel of a real Electric Guitar.

And the included full set of analogue modeled Stompboxes, legendary Amp/Cabinets and Room Simulation, make IronAxe a perfect tool for advanced guitar sound designing, without the need of additional (and expensive) external software/hardware units.

A full electro-acoustic setup, just at your fingertips.

## Modeling Reality

Modeling Nature and Physics is a growing practice for reaching true-to-life systems simulations with 'alive' feedbacks, including complexity management and unpredictability integration.

While in the past running an accurate Physical Modeling simulation was possible (due to its complexity) only on expensive multi-processor workstations or even computer clusters, today thanks to the exponential increase of modern CPUs' processing power, reaching parity with real instruments is possible in real-time (including polyphony and multi-instances possibilities) at a fraction of the costs.

*"The continuum between sampling and modeling is analogous to the extremes of motion photography versus computer-generated animation in film making. Just as computer-generated graphics is finding increasing use in films, model-based musical instruments are likely to grow in importance over time..."*

*J. O. Smith, CCRMA Stanford University*

IronAxe is the first in a series of instruments developed by Xhun Audio to use this revolutionary technology. The core of this kind of approach is the interaction between the Instrument's model, the Performer's model and the Unpredictability simulation.

All the six Strings, the Transducers (Pickups), the Plectrum/Finger excitation and more as well as Performer's actions like Palm Muting, Tapping Harmonics (even muting a String after its excitation is possible) are physically simulated. Add Unpredictability (instrument's and performances' micro-imperfections) to the equation and what you hear at the end of the whole process is given by the interaction of this three worlds.

The result is an 'alive' instrument, a state-of-the-art simulation for an unparalleled realism.

PRODUCT IMAGES

Section A



Section B



## FEATURES

- Physical Modeling simulation of real electronic and acoustic components
- An all-in-one complete Electric Guitar + FX / Stompboxes + Amp / Cabinets setup
- Native Guitar Control : in addition to the classic MIDI Keyboard control system, IronAxe is designed to be the ultimate tool for Guitarists - build your custom and physically accurate Electric Guitar and play it through a real MIDI Guitar for an unparalleled realism
- Performance Engine (Performer's modeling), allowing real-time multi-techniques playability (Palm Muting, Tapping Harmonics, Strumming, etc...) using a standard MIDI Keyboard
- Choose your Guitar model : Solidbody with 2 or 3 Pickups (more will follow)
- Excitation modeling : select the Plectrum hardness or pluck a String with fingers at any point along its length
- Strings modeling : independent simulation of each of the 6 (different) strings
- Pickups modeling : select Pickups type (single-coil, humbucker, steelplate), number and place them into Guitar's body
- KeyPerformer Engine : perform complex Strums, Phrases and Riffs with ease and in true real-time, using only a standard MIDI Keyboard
- StringsToucher Engine : play/touch each of the 6 virtual Electric Guitar strings individually and in true real-time, using only a standard MIDI Keyboard
- Master Compressor and EQ
- Four insert effects slots with the possibility to choose between 10 analogue modeled Stompboxes (more will follow)
- Amp/Cabinet simulation, with the possibility to choose between 6 legendary Cabinets (more will follow)
- Full MIDI CC#s mapping
- Supported Sample Rates : 44.1 / 48 / 88.1 / 96 kHz

## PARAMETERS



**The Performance Engine Keys (available in 'MIDI Keyboard' Controller Mode)**

While *Blue Keys* represent the note range of a real Electric Guitar (and consequently the range that can be played on the master keyboard), *Performance Keys* (the *Red Keys*) are a quick, easy and powerful way to perform different execution techniques in real time - live during the performance - without the need of complex procedures or program changes. Playing an arpeggio, then a power chord or a palm muting riff has never been so easy and natural. And because of Physical Modeling, performing techniques are not a mere 'sample-set-switch', but a full series of algorithms applied in real time to the whole simulation, with the possibility to combine them together (eg. *major chords + palm muting* or *power chords + chunking*). Everything is authentic as in a real Electric Guitar - and easy as pressing a key.

Different techniques are selectable:

- C1 *Palm muting (available also via Modulation Wheel - CC#01)*
- C#1 *Note Harmonics*
- D1 *Note Chunking*
- D#1 *-None-*
- E1 *Strumming - Power/Major/Minor Chords (QuickStrum Engine)*
- F1 *Solo mode*
- F#1 *Note Pull-off*
- G1 *Note Hammer-on*

QuickStrum Engine (Activated by Performance Key E1):

- *Power Chords* From **E2** To **D#3**
- *Major Chords* From **E3** To **D#4**
- *Minor Chords* From **E4** To **D#5**

Performance Engine is accessible when *Controller/Mode* is set to *MIDI Keyboard*.

## Control Interface



- *Controller/Mode* - Select the input controller type and/or the operative mode used by IronAxe.
  - *MIDI Keyboard* (default) - Select this mode to play IronAxe note-by-note from a MIDI Keyboard. IronAxe's engine will switch automatically between the 6 simulated strings. In this mode the *Performance Engine* is available for use.
  - *MIDI Guitar* - Select this mode when using a MIDI Guitar controller. The MIDI input data from the MIDI Guitar is routed directly to each of the six physically simulated strings using multiple MIDI channels. Selecting this mode, the MIDI input channels [ 1 , 2 , 3 , 4 , 5 , 6 ] are routed to strings [ E , A , D , G , B , E ] respectively.
  - *KeyPerformer* - Select this mode to perform complex electric guitar strums/phrases/riffs with ease and in true real-time, using only a standard MIDI Keyboard. Press one of the *Blue Keys* (E2-D#4) to select the chord. Press one of the *Red Keys* (B4-G5) to perform the different techniques/strum types. Press the *Purple Keys* (E6-C7) to activate the *StringsToucher Engine*, allowing to play/touch each of the 6 virtual Electric Guitar strings individually (notes/strings are kept sustained until all *Purple Keys* are released).

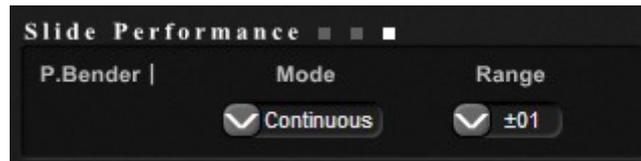
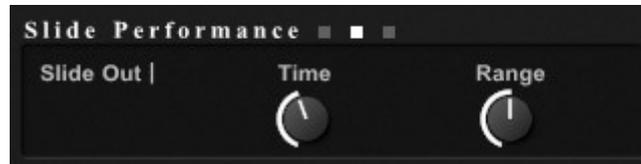
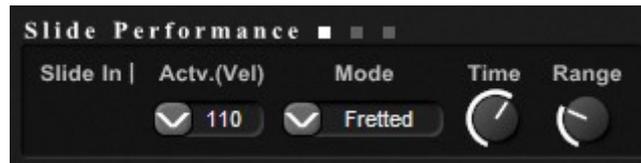
The selectable strums/techniques are:

- B4 - Stops all current vibrating strings
- C5 - Strum Up , with speed defined by the *Strum Speed* parameter
- C#5 - Strum Down , with speed defined by the *Strum Speed* parameter
- D5 - Strum Up , with speed set to *fast strum* (fixed value)
- D#5 - Strum Down , with speed set to *fast strum* (fixed value)
- E5 - Power Chord Strum , using palm-muting technique
- F5 - Power Chord Strum
- F#5 - Strum Up , using note-chunking technique
- G5 - Strum Down , using note-chunking technique
- from E6 to C7 - Touch/play each virtual string individually

When performing *Strums Up* and *Strums Down*, the *Blue Keys* (E2-D#3) produce Major Chords and the *Blue Keys* (E3-D#4) produce Minor Chords.

When using the *StringsToucher Engine*, played notes/strings are kept sustained until all *Purple Keys* are released.

## Slide Performance



- *Slide In* , *Actv.(Vel)* - Set the velocity value above which the *Slide In* technique is performed (activated).
- *Slide In* , *Mode* - Set the modality of bending. *Continuous* simulates a Whammy Bar or a Slide Guitar, *Fretted* simulates the finger's sliding on frets.
- *Slide In* , *Time* - Sets the duration (speed) of the performed *Slide In* technique.
- *Slide In* , *Range* - Sets the range (pitch) of the performed *Slide In* technique.
- *Slide Out* , *Time* - Sets the duration (speed) of the performed *Slide Out* technique.
- *Slide Out* , *Range* - Sets the range (pitch) of the performed *Slide Out* technique.
- *P.Bender* , *Mode* - Set the modality of bending for the Pitch Bender Wheel / MIDI Event. *Continuous* simulates a Whammy Bar or a Slide Guitar, *Fretted* simulates the finger's sliding on frets.
- *P.Bender* , *Range* - Sets the range (pitch) for the Pitch Bender Wheel / MIDI Event. Values are expressed in semitones.

The *Slide In* is performed at Note-On events and it is triggered by Velocity. The *Slide Out* is performed at Note-Off events and it is active only when *Performance Engine Keys F#1* or *G1* are also pressed down.

The *P.Bender* parameters affect the whole electric guitar physical model only when the parameter *Controller/Mode* (in *Control Interface*) is set to *MIDI Keyboard* or to *KeyPerformer*. When *Controller/Mode* is set to *MIDI Guitar*, the Pitch Bender Wheel is set by default to a fixed range of ( -2 , +2 ) semitones (for the native simulation of a Whammy Bar).

## Strum



- *Speed* - Sets the time (duration/speed) of the Strum (available in *Performance Engine* and *KeyPerformer* mode).

## Excitation



- *Picking Point* - Set the picking point along the strings.
- *Mass* - Sets the excitator's type/mass. *Finger* means that strings are plucked with fingers, higher values set the excitator to be a plectrum and set its hardness from soft (middle value) to hard.
- *Finger Tap Noise* - Set the amount for the finger tapping noise that occurs at strings' release.

## Strings



- *Damping* - Set the strings damping (energy dispersion). This parameter is linked by default to the Modulation Wheel.
- *Tone (material)* - Sets the strings material (and tone). *Bright* is the equivalent for pure steel strings, *Mellow* is the equivalent for chromes, middle values is the equivalent for nickel.
- *Behaviour* - This parameter sets the way each string is tuned, the way its materials are deformed / its energy is dispersed over time and the way its oscillation interacts with Electric Guitar's body through the bridge. *Ideal* lets the strings to be perfectly tuned and perfectly rigid-terminating, *Natural* gives more authenticity to the system, simulating the real micro-detunings over time on all the six strings and adding more genuiness on their oscillation.
- *Tension Amount* - Sets the strings tension amount
- *Tension Flexibility* - Sets the strings tension flexibility coefficient

## Body / Pickups



- *E. Guitar Model* - Selects the Electric Guitar model : *Solidbody with 2 Pickups* or *Solidbody with 3 Pickups*.

For each pickup (*Bridge, Middle, Neck*) :

- *Pickup Position* - Set the position of the Pickup along Electric Guitar's body.
- *Pickup Type* - Selects the type of Pickup : *Single Coil, Humbucker, Steelplate* (a Single Coil pickup mounted on a steel plate, available only in *Solidbody / 2 Pickups* mode)
- *Pickup Switch* - Selects the Pickups combinations :
  - *Bridge, Bridge/Neck, Neck*
  - *Bridge, Bridge/Middle, Middle, Middle/Neck, Neck*
- *Volume, Tone(1,2)* - Sets the value of the Volume and Tones knobs of the Electric Guitar

IronAxe Section B - The Amp/Cabinet and Multi-FX Rack



CMP-1 Compressor



Stereo Compressor with *Attack*, *Release*, *Gain*, *Ratio* and *Threshold* controls.

EQ-3 Three Band Equalizer



Three Band Stereo Equalizer with *Low*, *Mid* and *High* frequencies Gain controls.

## Stompboxes



Four stereo insert effects slots are available, each featuring 11 analogue modeled Stompboxes:

- -No Effect-
- XS-DY1 Digital Stereo Delay (MIDI Tempo sync)
- XS-RV1 Electronic Reverb
- XS-DT1 Distortion (Hard Clipping)
- XS-FL1 Flanger
- XS-CS1 Chorus
- XS-PH1 Phaser
- XS-TR1 Tremolo
- XS-FT1 Auto-Wha
- XS-DY2 Analog Stereo Delay
- XS-DT1 Overdrive

## Amp/Cabinet Simulation



Select a legendary, vintage Amp/Cabinet to shape your final sound. Six modeled Amp/Cabinets are available:

- -No Cabinet-
- Model A Based on the Fender© Bassman©

- Model B Based on the Fender© Vibrolux©
- Model C Based on the Marshall© 1960A©
- Model D Based on the Marshall© JCM2000©
- Model E Based on the Marshall© VS412©
- Model F Based on the Matchless© Chieftain©

### Room Simulation



Virtually places the Amp/Cabinet in a room and simulates its distance from the auditor. *Direct* sets zero distance (Amp/Cabinet output only), *Ambi* places the Amp/Cabinet at the maximum distance from the auditor.

### Main Volume



Main Volume control. Sets the Volume for the whole simulation (IronAxe instrument).

## USING MIDI GUITARS



IronAxe is designed to support MIDI Guitars natively. Controlling IronAxe through a MIDI Guitar is easy as follow three easy steps.

1. On IronAxe set *Controller/Mode* : *MIDI Guitar* (*Control Interface* section)
2. Set your MIDI Guitar to send data for strings [ E , A , D , G , B , E ] to MIDI channels [ 1 , 2 , 3 , 4 , 5 , 6 ] respectively.
3. In your Host/Sequencer allow IronAxe to accept as input all MIDI channels (1-6) simultaneously

## COMPATIBILITY

### Windows Vista and Windows 7

A few Users reported an issue loading IronAxe VST in Windows Vista and Windows 7.

The majority of these problems were due to a Windows Vista and 7 permissions issue in VST plugins folder.

IronAxe need to 'unpack' his modules into a subdirectory and by default Windows Vista / 7 do not allow saving to your VST Plugins folder.

You can fix this by changing the folder's Permissions:

- Use Windows Explorer to browse to your VST Plugins folder.
- Right-click the folder - 'Properties'
- Choose 'Security' tab.
- Click 'EDIT' (You may need to click a UAC prompt).
- Select username "Users".
- Tick options Allow 'Write' and 'Modify'.
- To finish Select 'OK' to close the two dialog boxes.

## MIDI IMPLEMENTATION

### *IronAxe MIDI CC#s Assignments List:*

<b>Function</b>	<b>CC#</b>
2 Pkp Model : Bridge Pos	26
2 Pkp Model : Neck Pos	27
2 Pkp Model : Pickup Switch	28
2 Pkp Model : Tone Knob	30
2 Pkp Model : Volume Knob	29
3 Pkp Model : Bridge Pos	31
3 Pkp Model : Middle Pos	32
3 Pkp Model : Neck Pos	41
3 Pkp Model : Pickup Switch	46
3 Pkp Model : Tone1 Knob	52
3 Pkp Model : Tone2 Knob	53
3 Pkp Model : Volume Knob	47
Slide Performance : Mode	54
Slide Performance : Range 1	23
Slide Performance : Speed 1	22
Slide Performance : Range 2	18
Slide Performance : Speed 2	24
Excitation : Mass	9
Excitation : Picking Point	3
Excitation : Finger Tap Noise	8
Strings : Damping	1
Strings : Tone (Material)	14
Strings : Behaviour	15
Strings : Tension Amount	21
Strings : Tension Flexibility	20
Strum : Speed	25
Main Volume	7
FX : Stomp Slot 1 On/Off	80
FX : Stomp Slot 2 On/Off	81
FX : Stomp Slot 3 On/Off	82
FX : Stomp Slot 4 On/Off	83

## CREDITS

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