OPERATION MANUAL

イセーニン

8-VOICE ANALOG SYNTHESIZER

BY BLACK CORPORATION

1.1.4

FCC COMPLIANCE STATEMENT

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

EUROPEAN UNION REGULATION COMPLIANCE STATEMENT

This product complies with the Low Voltage Directive 2006/95/EC and the Electromagnetic Compatibility Directive 2004/108/EC. The product meets the requirements of RoHS 2 Directive 2011/65/EU.

This product must be disposed of properly according to local laws and regulations.

IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of a polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

TABLE OF CONTENTS

INTRODUCTION

Thank you for purchasing イセーニン, 8-voice, 16 oscillator analogue polyphonic synthesizer! The architecture and programmability of イセーニン is one that welcomes experimentation ranging from beautiful to strangely alien. Additionally, some classic performance functions in addition to assignable VELOCITY and POLYPHONIC AFTERTOUCH will take you out into new, uncharted territory.

We hope you have as much fun with イセーニン as we have had developing it.For the sake of the reader and the authors' sanity, イセーニン will be written as ISE-NIN for the rest of this manual.

PACKAGE CONTENTS

When unpacking your ISE-NIN, check to make sure all of the following contents are present, and nothing has been lost or damaged in shipping. It may be helpful to save the packaging to protect the unit when transporting it. If you have any questions, feel free to contact us at support@black-corporation.com.

The following applies to pre-built ISE-NIN units only. DIY ISE-NIN builders will obtain or assemble all of the following items from the most recent bill of materials (BOM) which can be found at https://www.dsl-man.de/

ISE-NIN ships with the following items:

- ISE-NIN Desktop Analogue Synthesizer
- 12.0V 2.5A 30W wall wart power supply with US/JP, UK, EU, and AU local adapters.
- Rack Ears and Mounting Screws (Caution: Use the screws provided in the bag or you could damage your unit!)
- 4 Self-Adhesive Felt Pads
- Black Corporation Logo Stickers

It is a good idea to hold on to your packaging if you would like to transport ISE-NIN safely.

FEATURES AND SPECIFICATIONS

|	
Polyphony:	8 voices
Oscillators:	16 (2 per voice)
Oscillator Type:	Voltage controlled analog oscillators
Oscillator Frequency Range:	10Hz to 12.5kHz
Oscillator Waveforms:	Triangle, Ramp, Square, Noise and adjustable Pulse
Oscillator Controls:	Octave (2'-16'), Transpose, Pulse Width, Volume
Oscillator Modulations:	Pulse Width (PWM), Cross Mod, Hard Sync
Low Frequency Oscillators (LFO):	MIDI syncable, independent LFO per layer
LFO Waveforms:	Sine, Saw, Square, Random
LFO Destinations:	Osc 1/2 pitch, Amplifier, Filter, Pulse Width 1/2
LFO Controls:	Depth, Delay, Frequency (or Multiplier)
Filter:	1 filter per voice
Filter Options:	24/12 db/oct Low Pass and High Pass
Filter Modulations:	LFO 1 and 2, Velocity, Aftertouch, Envelope, Keyboard tracking
Preset Memory:	558 Total Presets – 256 in 2 Factory Banks, 46 in Vintage Bank, and 2 User Banks of 128 Patches each, 500 single Layers
Keyboard Touch Response:	Velocity, Aftertouch (Channel and Polyphonic), MPE
Connections:	MIDI IN/OUT/THRU, AUDIO U+L, USB (isolated), Headphones
Power:	+12VDC, 2.5A
Dimensions:	460 W, 175 H, 50 D (mm) (Wood panels attached)
Weight:	2.3 Kg/ 5.07 lbs

PANEL LAYOUT
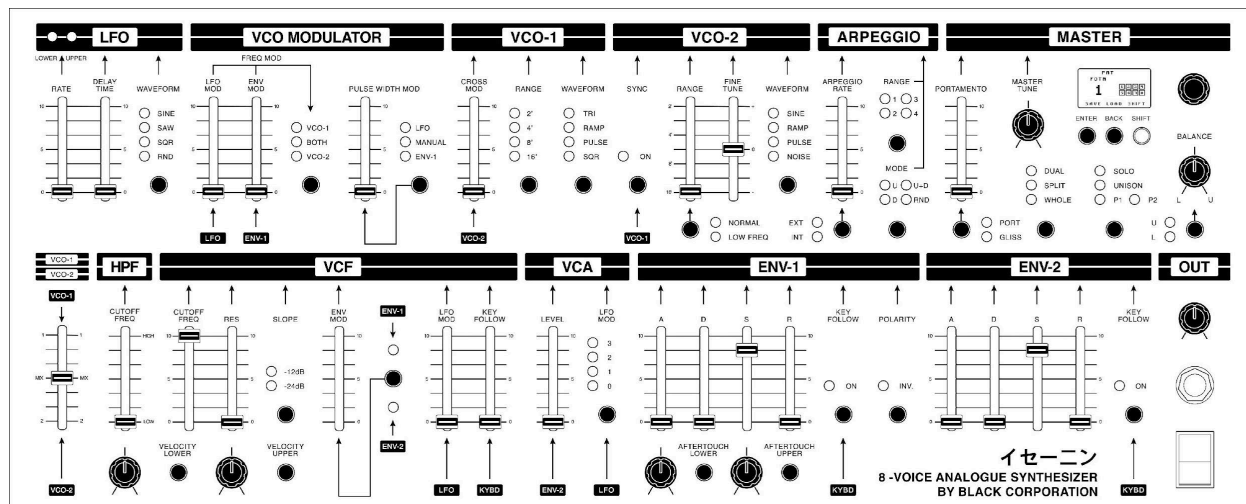
In order to make ISE-NIN's architecture easier to follow, we will start from the MASTER section and move left towards the LFO section, then down to the MIXER and move right to the OUT section.
ISE-NIN can save LAYERS and PRESETS. LAYERS are individually saved patches which are able to recall all of the settings of VCO-1 and VCO-2, Modulators, LFOs, Filters, VCA, and Envelopes, but not ARPEGGIATOR and MASTER. PRESETS store combinations of UPPER and LOWER LAYERS and/or PANEL settings as well as ARPEGGIATOR and MASTER settings.

- **MASTER:** The MASTER section manages overall functions of ISE-NIN.
- **OLED DISPLAY:** Displays status and knob value, allows access to patch memory, settings, and additional parameters.
- **ARPEGGIO:** Arpeggio function repeatedly plays individual notes or a chord sequentially.
- **VCO 1 and 2:** Selects the frequencies, waveforms, modulations.
- **VCO MODULATION:** This control alters the sound by changing the frequency of the Voltage-Controlled Oscillator (VCO) through modulation.
- **LFO:** Generates low-frequency signals that can be routed to various destinations.
- **SOURCE MIXER:** Controls the overall level of the sound between VCO-1 and 2.
- **HPF:** Allows high-frequency sounds to pass through while filtering out low-frequency sounds.
- **VCF:** The Voltage-Controlled Filter (VCF) section on the ISE-NIN allows you to shape the timbre of the sound by filtering out certain frequencies, with adjustable cutoff frequency and resonance parameters.
- **VCA:** The VCA (Voltage Controlled Amplifier) section controls the amplitude of the audio signal, controlled by the envelope generator and LFO.
- **ENV 1 and 2:** Controls attack, decay, sustain, and release parameters for the VCA, VCA and VCF envelope.
- **OUT:** Contains the master volume control, headphones output, and power switch.
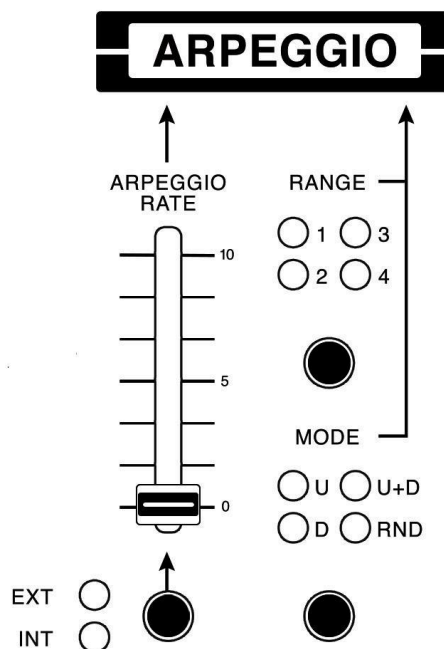
MASTER
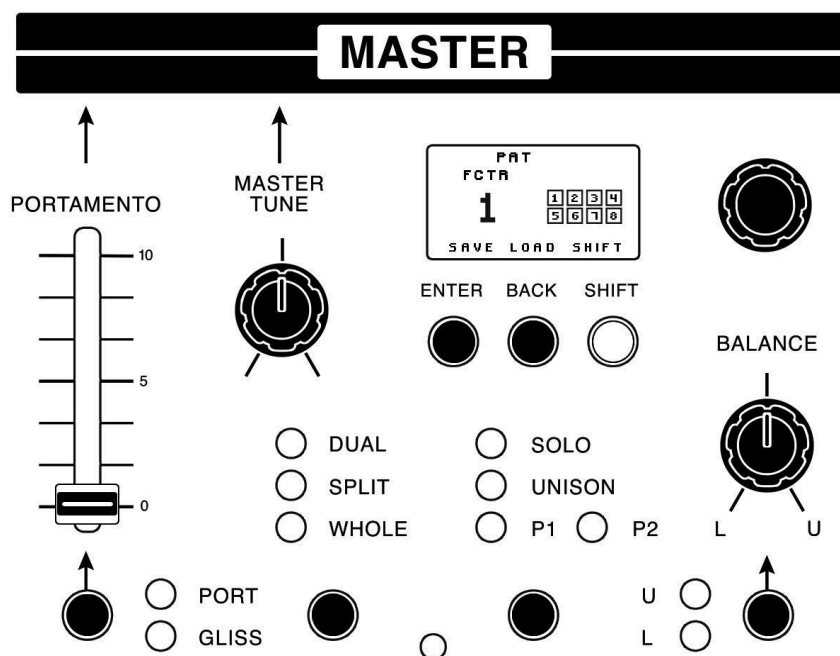
The DISPLAY along with the ENTER, BACK, SHIFT buttons and ENCODER knob navigate through the SETTINGS menu. ENTER selects a menu item or executes the selected function. BACK exits a menu or cancels a function. SHIFT accesses secondary functions as well as allows for some alternative adjustments of the sliders and knobs. The ENCODER is used to select presets, saved layers, and menu items. It can also be pressed to act like the ENTER button or switch between PRESET and PANEL modes.

SHIFT BUTTON	Aside from allowing for secondary functions, the SHIFT button has two other very important uses.
PORTAMENTO	Slider sets the time it takes for notes to slide to the next note when this function is on. Portamento button toggles OFF, PORTAMENTO, and GLISSANDO (chromatically stepped portamento).
MASTER TUNE	Adjusts tuning up and down half a semitone.

| KEY MODE BUTTON	Selects DUAL, SPLIT, or WHOLE modes. ISE-NIN can be used in three different play modes. When the unit is in Whole mode, the Upper layer plays a single preset or panel configuration as a standard 8 voice synthesizer. ISE-NIN behaves in the familiar way of an analogue polyphonic synthesizer. The next two modes get a bit more interesting. SPLIT mode allows UPPER and LOWER layers to be played individually on the higher and lower range of the keyboard respectively allowing for two LAYERS or panel configurations to be played individually on different sides of the keyboard as two individual 4 voice synthesizers. Finally, DUAL mode will play two selected LAYERS or programmed panel configurations (UPPER and LOWER) layered on one another acting as a 4 voice synthesizer with up to 4 oscillators per voice.
ASSIGN MODE BUTTON	Selects how ISE-NIN applies the 8 voices, each acting as a two oscillator synthesizer, to notes played/sent. SOLO, UNISON, P1, and P2 can be selected. P1 (POLY-1) behaves in what would be considered the normal manner a synthesizer is expected to behave in which each note plays two VCOs which will play through their full natural envelope cycle. P1, along with P2 and UNISON Modes all give first note priority meaning up to 8 notes can be played, but new notes can not be played until one of the original notes is released. As notes are released, new notes will replace the original notes even if their envelope cycle is incomplete. P2 (POLY-2) behaves similarly to P1 with the only difference being the last note or notes played determine the natural release and previous notes release immediately. As a result, selecting P2 is useful to reduce notes played with longer release times from overcrowding.
BALANCE KNOB	Controls the levels of the Lower and Upper Layers in a Dual or Split patch. In the center both layers are at 100%. Turn towards L to reduce the level of the Upper Layer, and towards U to reduce the level of the Lower Layer.

ARPEGGIO

ISE-NIN's arpeggiator section allows for automatically playing and shifting notes harmonically in real time. This can be useful for improvising during a performance or for inspiring ideas while composing.
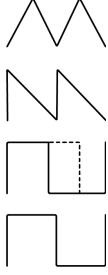
EXT/INT BUTTON	Selects whether ARPEGGIATOR is Externally Clocked (This ONLY works when ISE-NIN is receiving a clock signal over MIDI), Internally Clocked, or OFF.
ARPEGGIO RATE SLIDER	Controls the rate of the Arpeggiated notes. When in EXT mode, the value is indicated by divisions or multiples of the incoming clock from 1/16 to 16X. When in INT mode, the rate is indicated in Frequency from 0.10HZ to 20.0Hz.
RANGE BUTTON	Selects the Octave range of the notes played. When 2, 3, or 4 are selected, the notes played will be repeated and transposed the selected number of octaves. This order is determined with the MODE selector button
MODE BUTTON	Selects the direction of the octave transpositions. Up, Down, Up & Down. When RND (RANDOM) is selected, all notes are played in random order.
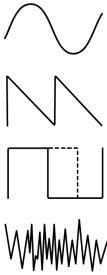
VOLTAGE CONTROLLED OSCILLATORS (VCO)
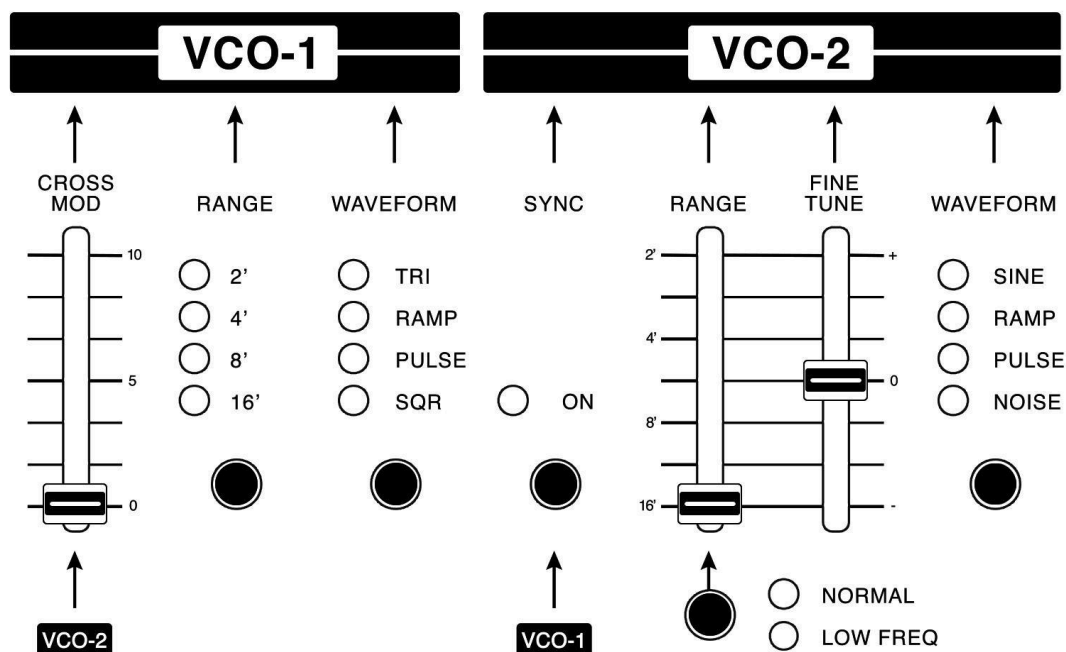
ISE-NIN has two independent Voltage Controlled Oscillators (VCOs) per voice which are the main sound source of the synthesizer. They can be used together to create a wide range of tones and timbres.

VCO-1	Controls the parameters of the first VCO.
CROSS MOD	An additional control over the pitch of VCO-1 modulated by VCO-2. This slider controls the amount of modulation introduced from VCO-2 and depending on the shape and frequency of VCO-2, will produce a variety of effects from an LFO like vibrato at low frequencies to a ring modulation type metallic sound at high frequencies. This parameter can be used to introduce interesting harmonics, make strange FX, and make bell like timbres reminiscent of FM synthesis.
RANGE	Selects an octave range from 16', 8', 4', and 2' similar to the convention used in organs.

VCO-1	Controls the parameters of the first VCO.
WAVEFORM	Gives control over the color of the tone of VCO-1 by selecting the shape of the waveform of the signal. These waveforms include ● **TRIANGLE** ● **RAMP** ● **PULSE** ● **SQUARE**
VCO-2	Is a second, independent sound source. Controls for the parameters of VCO-2, work slightly differently from VCO-1.
NORMAL / LOW FREQUENCY Button	In Normal mode, pitch is just like VCO-1. When Low Frequency is engaged, VCO-2 essentially functions as an LFO. This is a more advanced parameter which can be useful when using VCO-2 to cross modulating VCO-1 to create strange effects. One additional function of this button is when VCO-2 is set to noise, it toggles between WHITE noise and PINK noise.
SYNC	Forces the pitch of VCO-2 to synchronize itself to that of VCO-1. This is useful to prevent "beating" of the two oscillators when they are slightly out of tune and can also be used to create a harmonically rich effect when VCO-2 is pitched higher than VCO-1. When the pitch envelope or LFO is set to modulate VCO-2 this can create a classic effect used in many classic polyphonic synthesizer patches.

VCO-1	Controls the parameters of the first VCO.
VCO-2 RANGE	Covers the same pitch range as VCO-1, but is quantized, so the pitch changes in half steps as the slider is moved up.
VCO-2 FINE TUNE	Adds control between the discrete half steps selected by VCO-2's RANGE control.
VCO-2 WAVEFORM	Similarly to the controls of VCO-1, the waveform of VCO-2 can be selected. These options are ● **SINE** ● **RAMP** ● **PULSE** ● **NOISE** a random mix of all frequencies useful to achieve various tones and modulation options when cross modulating VCO-1.

VCO MODULATOR
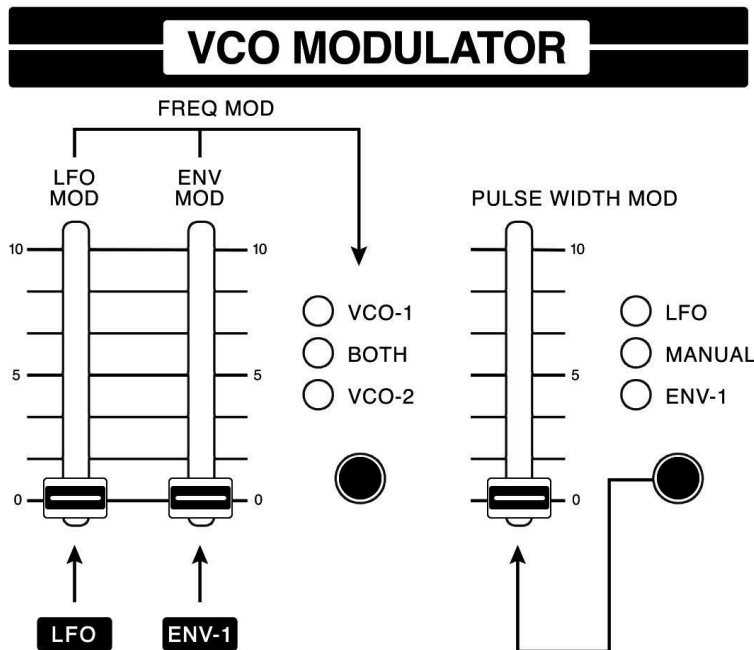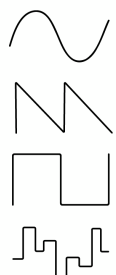
This section sets the amounts which the various modulation sources are applied to the pitch of VCOs 1 and 2: This section also controls modulator amounts to vary the width of PULSE when selected in either or both VCOs.

LFO MOD	Controls the amount the low frequency operator (LFO) modulates the pitch of VCO-1, VCO-2, or BOTH.
ENV MOD	Controls the amount Envelope 1 (ENV-1) affects the pitch of VCO-1, VCO-2, or BOTH.
FREQ MOD Destination Button	Selects the destination frequency to be affected by the LFO and/or ENV-1. Options are VCO-1, VCO-2, or BOTH.
PULSE WIDTH MOD	Controls the amount the selected source modulates the width of the PULSE if selected in VCO-1, VCO-2, or both.
PULSE WIDTH MOD Source	Selects the sources of Pulse Width Modulation. LFO, Manual, or ENV-1 can be selected.
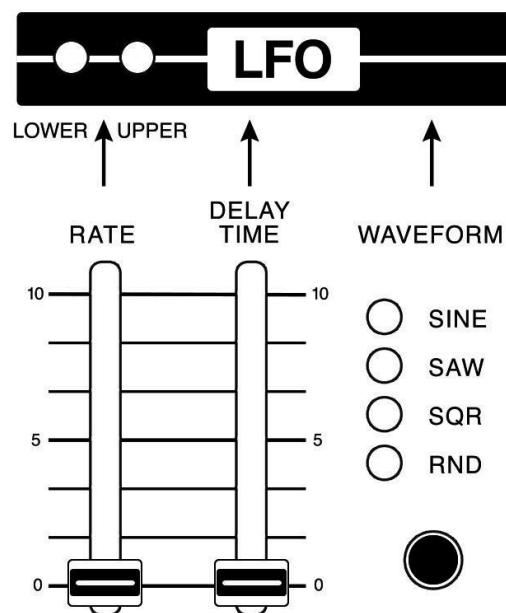
LFO (LOW FREQUENCY OSCILLATOR)

ISE-NIN has a very simple main Low Frequency Oscillator (LFO), however it can produce some advanced tones when routed separately to LOWER and UPPER sections in a Preset. LFO works identically for LOWER and UPPER sections.

RATE	Adjusts the frequency of the LFO.
DELAY TIME	Adjusts the delay before the onset of the LFO. As the slider is moved up, the amplitude of the LFO gradually increases to maximum at a slower rate.
WAVEFORM Select Button:	Selects the shape of the LFO. Options are ● **SINE** ● **SAW** ● **SQR (SQUARE)** ● **RND (RANDOM)**

SOURCE MIXER
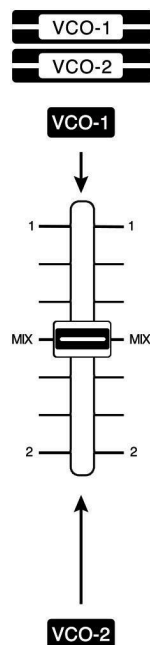
This section is important to adjust parameters relating to the output of ISE-NIN's Oscillators. These parameters are the MIXER VCO-1/VCO-2, FILTER, Voltage Controlled Amplifier (VCA), and Envelopes (ENV).

VCO-1/VCO-2	Adjusts the relative levels between VCO-1 and VCO-2 similar to a cross fader on a DJ mixer.

FILTER SECTION

The filter section on the ISE-NIN synthesizer is an important component that can help shape the sound of your patches. It allows you to control the frequencies that are passed through the synthesizer, giving you the ability to create more complex and interesting timbres.

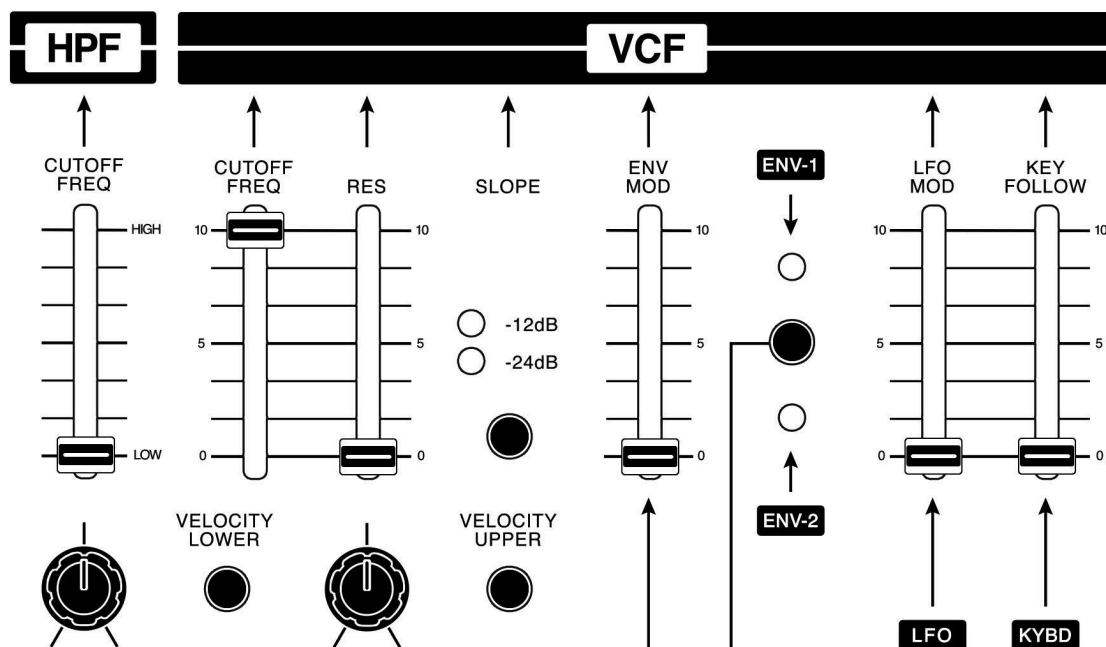|	
HPF	Cuts the low frequencies of the layer being edited. This is useful to remove "muddiness" of the tone and adds additional control over the finished sound.
VCF CUTOFF FREQ	Controls the cutoff frequency of the low-pass filter. At the top of the slider, the low-pass filter is open and lets all frequencies through. At the bottom of the slider, the low-pass filter is nearly closed and lets only very low frequencies through.
VCF CUTOFF RES	Controls the depth of the resonance (or the point at which the VCF begins to feed back) for the low-pass filter. At the bottom of the slider, no resonance is present. At the top of the slider, the maximum amount of resonance is present.
VCF CUTOFF SLOPE Selector	Allows for selection between a steep and rich -24dB/octave slope, good for "synthetic" and bass sounds, and a more acoustic -12dB/octave slope, better for string ensemble type or higher pitched sounds, to provide increased control over ISE-NIN's filter.

VCF CUTOFF ENV MOD	Controls the amount the selected envelope affects the cutoff frequency.
VCF CUTOFF ENV-1/ENV-2 Selector	Selects source envelope applied to the cutoff frequency.
VCF CUTOFF LFO MOD	Controls the amount the LFO affects the cutoff frequency.
VCF CUTOFF KEY FOLLOW	Controls the amount the note played affects the cutoff frequency. The higher the note played on a keyboard, the more the cutoff frequency is raised.

VOLTAGE CONTROLLED AMPLIFIER (VCA)
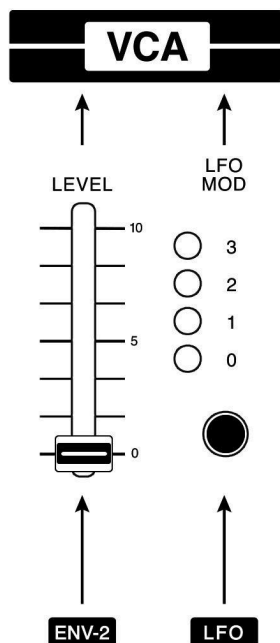
VCA section is responsible for controlling the volume or amplitude of the sound signal that passes through it. In the ISE-NIN, this section will likely include controls for adjusting the level of the audio signal, as well as controls for shaping the envelope that controls the VCA.

VCA LEVEL	Controls the amplitude level of the layer being edited, post VCF. It is not used to boost the volume as the VCA section is used to shape volume of the layer being edited. Level is modulated by ENV-2.
VCA LFO MOD	Controls the amount of modulation from the LFO to the volume to create a vibrato effect, where 0 is inactive and 3 is maximum effect.

ENVELOPES
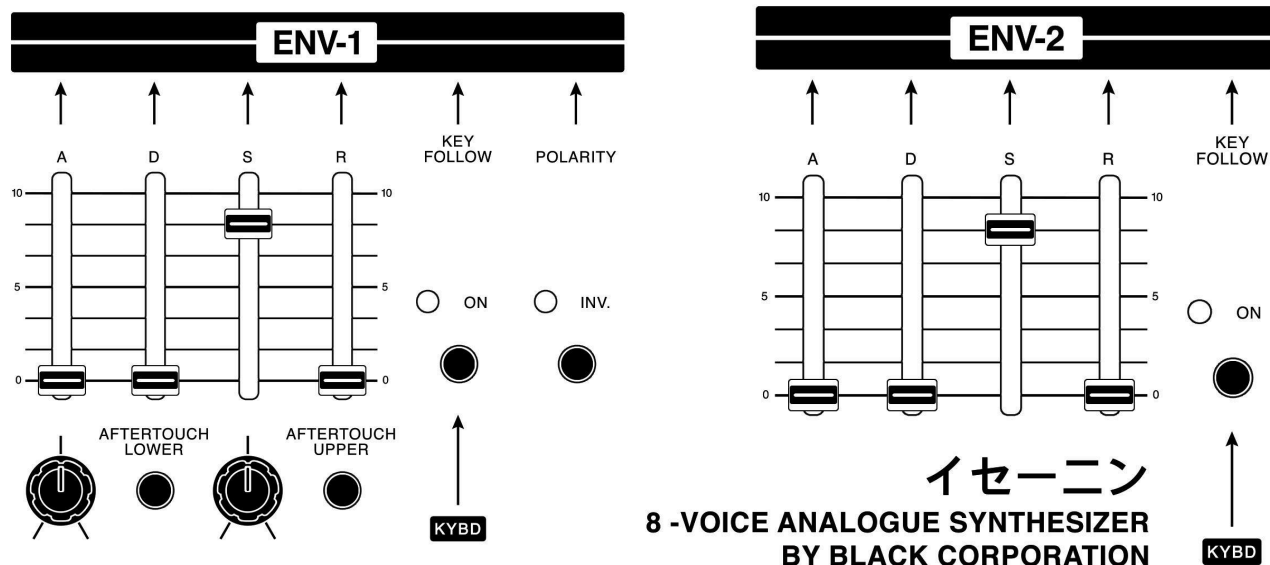
ISE-NIN features two envelope generators that are used to shape the sound over time. These envelope generators are typically labeled as Envelope 1 (ENV-1) and Envelope 2 (ENV-2).

ADSR	Adjusts the Attack, Decay, Sustain and Release to send time based modulation to various destinations including the VCO, VCF, and the VCA.
POLARITY	Inverts polarity of ENV-1 from $(\frown)$ to $(\smile)$
OUT	controls the master volume for both the headphone jack and the balanced output jacks on the back of the unit.
KEY FOLLOW Button	Toggles whether the relative envelope amount source levels increase as lower keys are played on the keyboard.

VELOCITY & AFTERTOUCH Buttons	This is perhaps the most interesting aspect of ISE-NIN. The VELOCITY and AFTERTOUCH buttons allow you to assign up to 5 slider controllers as well as the BALANCE and MASTER TUNE knobs. VELOCITY can be assigned to every one of these mentioned controls, however AFTERTOUCH can not be assigned to ENV-1 and ENV-2 Release (R), because of how aftertouch and releasing a key work in opposite directions.
	To assign these functions, simply press the relevant VELOCITY or AFTERTOUCH button. The display will show 5 slots, which may already be assigned if you are using a preset, or all of them might be EMPTY if you are working with a new patch. To DELETE an individual assignment, press the ENTER button below the display indicated with DEL on the screen. To DELETE all assignments, press the SHIFT button below the display indicated with CLEAR on the screen.
	VELOCITY and AFTERTOUCH for the LOWER section can only be accessed in DUAL or SPLIT mode, as WHOLE mode only functions with the UPPER layer.
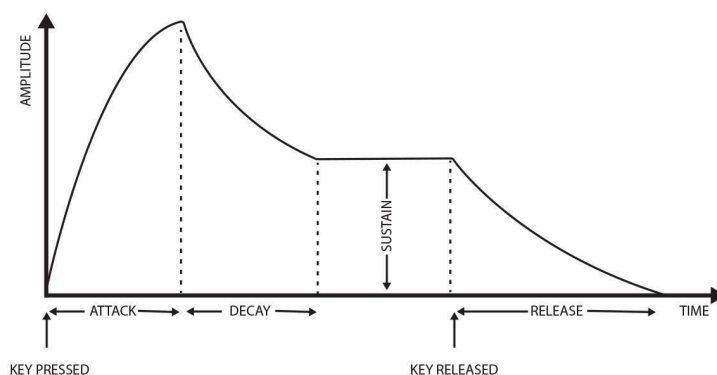
ENV-1 and ENV-2 have different routing options. In the ISE-NIN synthesizer, ENV-1 can be routed to control parameters, such as filter cutoff, oscillator pitch, or pulse width modulation, while ENV-2 is typically used to control the amplitude of the sound and filter.

SETTINGS MENU

Most of ISE-NIN's tonal controls are accessible on the front panel in order to provide immediacy and a hands on approach to sound design, however there are additional functions which can be reached in the SETTINGS MENU to allow for more additional customizing of preferences.

ACCESSING THE SETTINGS MENU

To access the settings menu, hold SHIFT and press BACK.

In the settings menu, use the encoder to navigate through the settings menu sections. Press ENTER or click the encoder to select a section, and BACK to return to the patch selection screen.

From within a menu section, press BACK (CNCL) to return to the main settings menu.

RETUNE: This function quickly retunes ISE-NIN's oscillators. Selecting this section of the settings menu displays the following message: "TO START RETUNE PRESS ENTER." Press ENTER to start the retune process. The display will read: "RECALIBRATION IN PROCESS." Retuning takes approximately 10 seconds. When complete, the display will update to "DONE". Press BACK to return to the patch selection screen.

MIDI SETTINGS

MODE: Determines how ISE-NIN interacts with a MIDI controller based on the controller's capabilities. The Settings are POLY AT (POLYPHONIC AFTERTOUCH), and MPE.

POLY AT (POLYPHONIC AFTERTOUCH): For basic MIDI controllers which use channel pressure and those capable of polyphonic aftertouch.

MPE: For MIDI Polyphonic Expression (MPE) supporting controllers, sequencers, or DAWs.

SLIDERS / KNOBS (GLOBAL): Changes ISE-NIN's behavior when the physical position of a slider or knob control is different from the value stored in the current saved patch. Options are PICK UP, MERGE, or INSTANT.

PICK UP: Moving controls has no effect until its position moves through the current patch's stored value. Once the slider or knob has moved through the stored value, changes will be audible based on the control's actual position.

MERGE: Moving controls has an immediate effect, but will not instantly reflect its physical position. In effect, the stored value of the current patch and the current position will meet each other gradually, eventually merging. This may be useful in a live setting in order to avoid noticeable (and often unwelcome) changes in parameters.

INSTANT: Moving knobs or sliders has an immediate effect. (This is much more responsive, but not recommended for live settings when relying on presets.)

CC (GLOBAL): Changes ISE-NIN's behavior when a MIDI CC (Continuous Control) signal is different from the value stored in the current saved patch. Options are PICK UP, MERGE, or INSTANT.

PICK UP: Incoming CC has no effect until its position moves through the current patch's stored value. Once the slider has moved through the stored value, changes will occur based on the CC's actual value.

MERGE: Incoming CC has an immediate effect, but will not instantly reflect its physical position. In effect, the stored value of the current patch and the current position will meet each other gradually, eventually merging. Once the values merge, changes will occur based on the parameter's actual value.

INSTANT: Incoming CC has an instant effect. (This is much more responsive, but not recommended for live settings when relying on presets.)

CHANNEL (GLOBAL): Selects the MIDI channel ISE-NIN will receive. The content of this menu section will change, depending on the selected controller MODE.
POLY AT is selected in MODE, ALL or channel 1-16 may be selected. The display will update to the currently selected MIDI channel (by default, channel 1).

If **MPE** is selected in **MODE**, only MIDI channels 1-8 can be selected. The **MPE** standard uses an individual MIDI channel for each voice in order to allow for polyphonic velocity, aftertouch, and other expressivity controls per voice. ISE-NIN assigns the channels above this base channel to each of its 8 voices. The master MIDI channel selected (1-8) assigns the master channel ISE-NIN will receive.

OUT CHANNEL (GLOBAL): Selects the MIDI channel (1-16) ISE-NIN will transmit on.

PITCHBEND RANGE (GLOBAL): Sets the amount of pitch bend in semitones.

MPE PITCHBEND RANGE (GLOBAL): Sets the amount of **MPE** controller pitch bend in semitones.

SPLIT POINT (GLOBAL): Sets the key at which the UPPER section begins in SPLIT KEY MODE.

CC RECEIVE (GLOBAL): Determines whether ISE-NIN will accept incoming continuous control (CC) messages from the connected sequencer or controller.
OFF ignores all incoming CC messages.

ON allows ISE-NIN to be modulated by external CC messages from the connected MIDI source.

CC74 REPLACE (GLOBAL): Some MPE controllers, such as the Roli Seaboard series and the Haken Continuum, allow additional expressivity by moving fingers up and down the vertical surface of the keys. These movements are translated to continuous control messages on channel 74, which can not be changed on the controller.
For this reason, ISE-NIN's firmware can select a new destination for CC74, in order to take advantage of the vertical dimension of MPE controller series' keys. Available destinations include:

Use the encoder to select the preferred destination, then press ENTER (SAVE) to save the selection.

MODWHEEL: Routes modwheel destinations of a connected MIDI controller, the polarity of the modwheel, and its attenuation.

DESTINATION (PER-PATCH): Assigns which parameter or parameters to activate. Press EDIT and the following destinations will appear. Scroll to the destination, press ADD/DELETE to select or deselect and press save.

- LFO RATE
- LFO VCO
- LFO VCF
- PWM (Pulse Width Modulation)
- CROSSMOD
- ARP RATE (Arpeggiator Rate)
- VCO MIX
- HPF CUTOFF (High Pass Filter Cutoff)
- LPF CUTOFF
- RESONANCE
- VCA LEVEL

POLARITY (PER-PATCH): Determines whether the connected controller's mod wheel increases or decreases the value of the destination it has been sent to in the MOD WHEEL DESTINATION setting.

POSITIVE: adds to the value of the CC destination as use of the mod wheel increases.

NEGATIVE: reduces the value of the CC destination as use of the mod wheel increases.

ATTENUATION (PER-PATCH): Sets from 1-100% attenuates the amount the modwheel affects the destination it is assigned to.

VELOCITY CURVE / AFTERTOUCH CURVE (PER-PATCH): Determines the shape of the spread of values applied to all velocity modulation parameters. These include LINEAR, LOGARITHMIC, EXPONENTIAL, STYPE, NTYPE.** (See next page for an explanation of this) VELOCITY and AFTERTOUCH shapes can most simply be explained with the following chart:
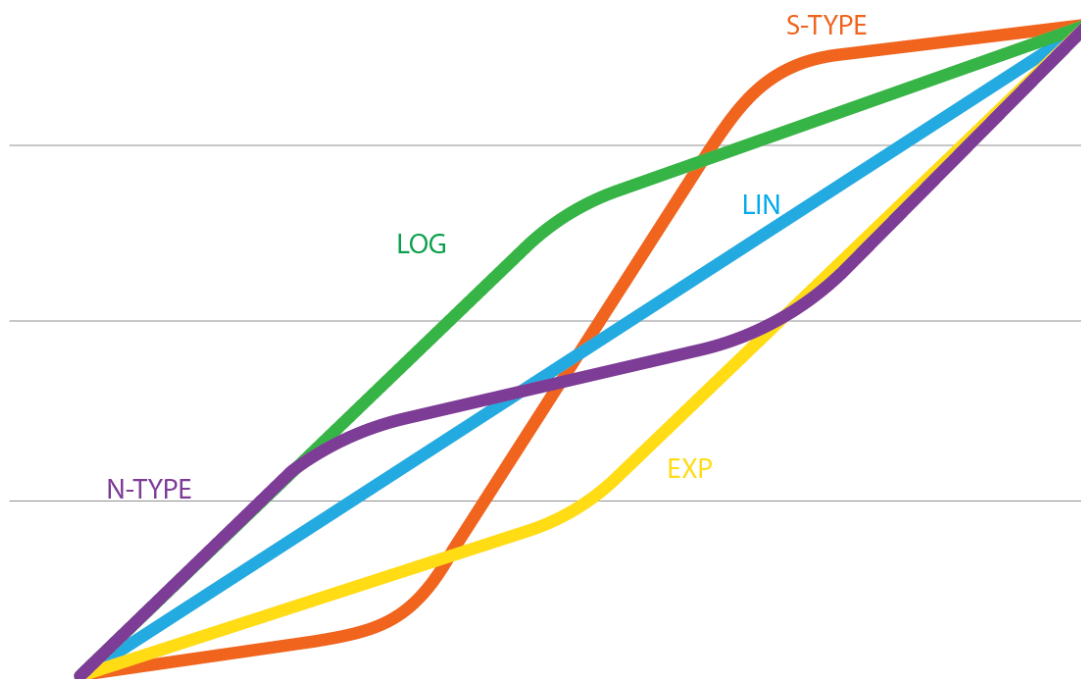
Use the encoder to select the preferred VELOCITY or AFTERTOUCH CURVE mode, then press ENTER (SAVE) to save the selection.

TRANSPOSE L / TRANSPOSE U: Moves the position of the LOWER and UPPER layers respectively from -36 semitones to +36 semitones.

PEDAL POLARITY: This function is necessary for pedals with reversed polarity which do not have a polarity switch.

CLOCK SOURCE: Selects how inputed MIDI clock is handled by ISE-NIN.

AUTO: Accepts clock coming in from both USB and MIDI Inputs.

USB: The tempo synchronizes to MIDI clock received from the USB port.

MIDI IN: The tempo synchronizes to MIDI clock received from the MIDI port.

VOICE SETTINGS (PER-PATCH)
VOICE settings change how ISE-NIN's various KEY MODES interact with its SPLIT MODES for different playing experiences.

NUMBER OF VOICES: Selects how many voices are played with each note entered. In Dual or SPLIT mode, 1-4 voices are available for each of the Upper and the Lower layers. When in WHOLE mode, ISE-NIN doubles up using voices from both layers.

OUTPUT: Determines whether the UPPER and LOWER layers are sent to the separate UPPER and LOWER outputs (SPLIT) or are summed into one signal (MIXED).

STEALING: When all of ISE-NIN's voices are being held, by default, no other voices can be triggered (OFF for classic behavior). When stealing is set to ON and all notes are engaged, the next notes "steal" voices based on the sequential order they were played.

LEGATO PRIORITY: In SOLO and UNISON modes, this selects which note gets priority when more than one note is played. LOW NOTE, is default, however HIGH NOTE may also be selected. Select NO PRIORITY so every new note plays regardless of how many other notes are held.

LEGATO RETRIG: Selects whether each note allows the envelope to continue its cycle as new notes are played (default OFF), or if each note played retriggers the envelope.

LFO allows for more advanced control of LFO behavior and interaction.

LFO MIN: Adjusts the slow range of the LFO frequency to 0.01 to 0.10Hz (Default 0.05Hz).

LFO MAX: Adjusts the high range of the LFO frequency to 1 to 100Hz (Default 40Hz)

SYNC to MIDI L / U: Allows for ISE-NIN's LFOs to sync to an incoming MIDI clock. When this is ON, the RATE slider indicator will show RATE as divisions or multiples of the incoming clock rate from 1/32 to 32X.

HERTZ / BPM: Selects the preferred display of the LFO rate slider when not MIDI synced.

PHASE OFFSET L / U: Moves the phase of the LFO between 0º and 360º.

RETRIG: When set to OFF (default), the LFOs are free running, when ON, each note restarts the LFO to the starting point of its cycle.

TIME SETTINGS (PER-PATCH)
TIME settings adjust the minimum and maximum length of the Attack, Decay, and Release parameters.

ATTACK MIN: Sets the minimum length of the attack stage of the VCF and VCA's envelopes. The default value is 1.0MS (milliseconds). The allowable range is 1.0MS to 100MS.
Use the encoder to select the desired number of milliseconds, then press ENTER (SAVE) to save the selection.

ATTACK MAX: Sets the maximum length of the attack stage of the VCF and VCA's envelopes. The default value is 10S (seconds). The allowable range is 1.0S to 10S.
Use the encoder to select the desired number of seconds, then press ENTER (SAVE) to save the selection.

DECAY MIN: Sets the minimum length of the decay stage of the VCF and VCA's envelopes. The default value is 3.0MS (milliseconds). The allowable range is 1.0MS to 100MS.
Use the encoder to select the desired number of milliseconds, then press ENTER (SAVE) to save the selection.

DECAY MAX: Sets the maximum length of the decay stage of the VCF and VCA's envelopes. The default value is 100S (seconds). The allowable range is 1.0S to 100S.
Use the encoder to select the desired number of seconds, then press ENTER (SAVE) to save the selection.

RELEASE MIN: Sets the minimum length of the release stage of the VCF and VCA's envelopes. The default value is 3.0MS (milliseconds). The allowable range is 1.0MS to 100MS.
Use the encoder to select the desired number of milliseconds, then press ENTER (SAVE) to save the selection.

RELEASE MAX: Sets the maximum length of the decay stage of the VCF and VCA's envelopes. The default value is 100S (seconds). The allowable range is 1.0S to 100S.
Use the encoder to select the desired number of seconds, then press ENTER (SAVE) to save the selection.

PORTA MAX: Sets the maximum amount of time (default 2 seconds) in which Portamento travels over an octave.

RESET TO DEFAULTS: Resets all TIME settings back to their default values. Selecting this section of the TIME menu displays the following message: "TO RESET TO FACTORY DEFAULTS PRESS ENTER."

ARPEGGIATOR SETTINGS (PER-PATCH)

SEPARATION: Selects whether UPPER and LOWER layers share the same ARPEGGIO settings (COMMON), or whether they have independent controls (SPLIT). WHOLE key mode is unaffected by this setting, however in DUAL and SPLIT key modes, it allows for various configurations of ISE-NIN's arpeggiator. For example, if in SPLIT *key mode* (not to be mistaken for SPLIT arpeggiator separation), COMMON should be selected for playing an arpeggiated line on the LOWER section of the keyboard while playing a sustained chord or soloing on the UPPER section. SPLIT, on the other hand, in SPLIT *key mode* allows for the UPPER and LOWER sections to play with their own independent arpeggiator settings.

VELOCITY: Sets whether the played notes correspond to the velocity of the played keys. When OFF, very note in the ARPEGGIO sequence is at a static velocity. This mode is faithful to the ARPEGGIO mode on the original JP-8. When set to ON, the notes in the ARPEGGIO sequence play back with varying velocity depending on each key press. This can create dynamic sounds which vary wildly depending on how the VELOCITY settings are mapped on each Layer.

RATE CURVE: LOG, by default, as ARPEGGIO RATE is reduced, the increments of the rate decrease. When set to LIN, the rate is increased or decreased evenly along the path of the slider.

HOLD: When set to CLASSIC, the hold function (SHIFT+U/L button) works on both arpeggiator and sustain, where MODERN will only hold the arpeggiator and the envelope releases as usual.

MULT: Multiplies arpeggio rate 1X-8X.

HERTZ / BPM: Selects the preferred display of the arpeggio rate slider when not MIDI synced.

ARP MIN: Adjusts the slow range of the arpeggio rate from 0.01 to 0.10Hz (Default 0.10Hz).

ARP MAX: Adjusts the high range of the arpeggio rate from 1 to 100Hz (Default 20Hz).

MICROTUNING

Microtuning allows for usage of an extended range of tuning beyond standard musical scales familiar in Western music. It allows for an expansion of creative expression with a broader range of tunings. ISE-NIN is designed to encourage exploration in this area, which is why it has been designed with microtuning setting.

MICROTUNING SETTINGS

- ON/OFF
- TUNING PROGRAM selects an uploaded and stored program
- SAVE SCALE selects the preset slot to save an uploaded program
- DELETE ALL PROGRAMS clears all saved tunings

ODDSOUND

Oddsound (https://oddsound.com/) can be used to load programs or in real time.OddSound's MTS-ESP MIDI CLIENT VST or AU plugin can send .mts files directly from your digital audio workstation (DAW) to ISE-NIN.

- Connect ISE-NIN to a computer via USB or DIN MIDI
- Make sure ISE-NIN is enabled in your computer or DAW's MIDI settings
- Open MTS-ESP MIDI Client plugin in your DAW. And set up as described in the Oddsound manual. This method can be done using the licensed version (MTS-ESP Master) or the free version (MTS-ESP Mini). Upload or select a scale.
- Next, open an instance of the MTS-ESP MIDI Client plugin which will connect to the main Master or Mini plug. On the panel of the MIDI Client, select MTS SYSEX from the METHOD pull down menu. Under Output, select ISE-NIN, or if using DIN MIDI select the correct port.
- Select the .mts file to be sent in the Master/Mini plug and click Send Dump on the MIDI Client. The desired .mts file should now be loaded into ISE-NIN and can be saved in the desired slot.
- On ISE-NIN, in the MICROTUNING menu, select SAVE SCALE and select the preset slot to save it to.

CALIBRATION SETTINGS

CALIBRATION calibrates slider positions, tunes oscillator voices as a group or individually and debugs issues with ISE-NIN.

POTS / SLIDERS: Calibrates the center position of pots and sliders with a center detent. Selecting this calibration setting updates ISE-NIN's display to read, "SET CENTER DETENT KNOBS / SLIDERS TO MIDDLE AND PRESS ENTER." These pots and sliders are the following:

- VCO-2: FINE TUNE

- MASTER TUNE

- UPPER / LOWER BALANCE

- VCO-1 / VCO-2 BALANCE

- VELOCITY UPPER

- VELOCITY LOWER

- AFTERTOUCH LOWER

- AFTERTOUCH UPPER

Ensure that all of the above knobs and sliders are in their center detent position before running calibrations, as the behavior of the sliders will be altered if their center position is relocated.

Press ENTER to start the calibration process. Calibration occurs instantly. When complete, the screen displays "DONE". Press BACK (OK) to return to the CALIBRATION settings screen.

OSCILLATORS: Calibrates the oscillators of all voices simultaneously or on a per-voice basis.

NOTE: For best results, allow the unit to warm up for 20 minutes before performing this procedure.

To tune all voices simultaneously, select TUNE ALL VOICES. The display will read "TO START AUTOTUNE PRESS ENTER."

Press ENTER to start the oscillator calibration process. The display will read: "OSC 1A TUNING," and displays a progress bar. Calibration takes approximately 1-3 minutes per voice and proceeds from OSC 1A to OSC 1B to OSC 2A and so on. Full calibration of all oscillators takes approximately 10-15 minutes. When complete, the screen displays "DONE." Press BACK (OK) to return to the CALIBRATION settings screen.

To tune an individual voice, select the desired voice number and press ENTER.

FILTERS: Calibrates the filters of all voices simultaneously or on a per-voice basis.

NOTE: For best results, allow the unit to warm up for 20 minutes before performing this procedure.

To tune all filters simultaneously, select TUNE ALL VOICES. The display will read "TO START AUTOTUNE PRESS ENTER."
Press ENTER to start the oscillator calibration process. The display will read: "FILTER 1" and displays the note and frequency as it calibrates. Calibration takes approximately 1-3 minutes per voice and proceeds from Filter 1 through Filter 8. Full calibration of all filters takes approximately 10-15 minutes.

When complete, the screen displays "DONE." Press BACK to return to the CALIBRATION settings screen.

To tune an individual voice, select the desired voice number and press ENTER.

CROSSMOD: Calibrates the cross modulation of all voices simultaneously or on a per-voice basis.

NOTE: For best results, allow the unit to warm up for 20 minutes before performing this procedure.
To tune all voices simultaneously, select TUNE ALL VOICES. The display will read "TO START AUTOTUNE PRESS ENTER."

Press ENTER to start the oscillator calibration process. The display will read: "CARD 1," and displays the percentage of progress. Calibration takes approximately 1-2 minute per voice and proceeds from CARD 1 to CARD 2 and so on. Full calibration of all voices takes approximately 8-10 minutes. When complete, the screen displays "DONE." Press BACK to return to the CALIBRATION settings screen.

To tune an individual voice, select the desired voice number and press ENTER.

DRIFT

In order to give ISE-NIN's modern circuits a bit of a vintage feel, Drift introduces minor imperfections to ISE-NIN's envelope and pitch. As a result, some very subtle uncertainties produced by drift can add character to a patch.

DRIFT SETTINGS
- ON/OFF

- ENV RANDOMIZE subtle randomization to the ADR times of ENV-1 and ENV-2 0-50%

- DRIFT AMOUNT sets the amount of pitch drift 0-5 cents

- DRIFT RATE sets the frequency of applied drift 0.01-1.00Hz

LED BRIGHTNESS 10%-100%

SCREENSAVER
- NEVER

- 5 MINUTES

- 10 MINUTES

- 30 MINUTES

- 1 HOUR

RESET SETTINGS (GLOBAL)
RESET SETTINGS reverts all ISE-NIN settings to their default. Selecting this will display the following message: "TO RESET SETTINGS PRESS ENTER."
Press ENTER to start the reset process. The display will now read: "CONFIRM RESET." Press ENTER (OK) again to confirm, or press BACK (BACK) to cancel the reset process.
Press ENTER (OK) a second time to start the reset process. Reset takes place immediately and returns all settings to their default values.

ABOUT
ABOUT displays the following information about the device:
Hardware revision number
Firmware revision number
Black Corporation copyright information

SETUP & CONNECTIONS

POWER

Connect the given plug tip for your region to the power supply. Insert the barrel end of the power supply into the input labeled 12VDC/2A POWER on the back of the unit. Plug the other end of the power supply into an AC outlet. Note that it may take a few minutes for the oscillators to reach stable tuning.

AUDIO/HEADPHONES OUTPUT

ISE-NIN has two balanced audio output jacks. One for the LOWER layer, one for the UPPER. Turn the VOLUME knob to minimum (fully counter-clockwise) before connecting an audio cable. Insert one end of a 1/4" instrument cable into each of the jacks labeled BALANCED AUDIO OUT (LOWER, UPPER) on the back of the unit, and the other end into a powered amplifier or the input of an audio mixer. Carefully adjust the volume to a comfortable level by turning the OUT knob clockwise.

NOTE: By default all Presets are set to MIXED mode, which sends the mixed audio of the Upper and Lower layers to both outputs. To engage the individual outputs, in the Settings menu, select Voice, and change the setting to Split mode.

The HEADPHONES output is a stereo output that either separates the LOWER and UPPER sections to the left and right channels or mixes them as two, depending on the Mixed or Split setting. Like the AUDIO OUT jack, the HEADPHONES output is controlled by the VOLUME knob. Turn the VOLUME knob to minimum before inserting a headphone cable, then adjust volume to a pleasing level.

MIDI CONNECTIONS

Because ISE-NIN does not have an onboard keyboard or sequencer, an external MIDI controller, DAW or hardware sequencer must be used to control the unit. ISE-NIN can be controlled with standard MIDI controllers, or for more expressivity, a polyphonic aftertouch controller, or MIDI Polyphonic Expression (MPE) controller.

DIN MIDI

To control ISE-NIN with a controller that uses a DIN5 MIDI output, connect a MIDI cable from the output of the controller to the jack labeled MIDI IN on the back of the unit. If desired, MIDI signals can be passed through the unit to another device by connecting a MIDI cable to the jack labeled MIDI THRU on the back of the unit to the MIDI input of another device. MIDI OUT can also be connected to send Sysex data to a computer or directly to another device.

USB MIDI

To send MIDI to and from ISE-NIN directly with a computer, USB-B cable connected to ISE-NIN and appropriate (USB-A or C) connector to the computer.

BANKS & PRESET SELECTION

When first exploring ISE-NIN, it may be helpful to experiment with the factory presets to understand the capabilities of the synthesizer. ISE-NIN's factory patches have been designed to demonstrate the vast range of capabilities and expressivity the synthesizer is capable of.

To enable the maximum amount of expressivity from ISE-NIN, make sure the MIDI MODE settings are configured to match the connected MIDI controller type. To make sure ISE-NIN is configured correctly for the connected controller type, see the SETTINGS section of this manual:
For most MIDI controllers, select the PAT (POLY AFTERTOUCH) setting.
For MIDI Polyphonic Expression (MPE) controllers such as ASM Hydrasynth, Expressive Osmose, Roli Seaboard, Roger Linn Linnstrument, or Haken Continuum, select the MPE setting.

PATCH BANK OVERVIEW
ISE-NIN has 5 available patch banks, including 3 Factory preset banks and 2 User Banks. The FACTORY patch banks are not editable, but factory patches can be edited and saved to User Bank 1 or User Bank 2.

M.STEIN: 128 factory presets programmed by composer and music producer Michael Stein.

BENEDEK: 128 factory presets programmed by musical artist and Black Corporation associate Nicky Benedek.

VINTAGE: The first 8 patches in this bank are faithful recreations of the original JP-8 Patch Presets, which include Dual and Split mode settings. The rest of the 64 patches in this bank are Dual and Split patches built from original JP-8 sounds from the ISE-NIN Vintage Layer Bank that stay true to its planetary heritage.

User Banks 1 and 2 (labeled BNK1 and 2): These patch banks each provide 128 user-editable patch slots.

LAYERS

ISE-NIN's patch creation is built around Layers, individual sounds which can be used individually or layered or split across the keyboard in DUAL and SPLIT modes, just as on the original JP-8.
From the main screen, press BACK. You will be taken to the LOAD LAYER screen. Scroll through to the Layer you want to load and press ENTER. To switch between the LAYER and VINTAGE LAYER banks, press SHIFT.
A Layer has now been loaded into the Upper Layer slot. In Whole mode this will be the sole Layer and play all 8 voices of ISE-NIN.
From the main screen, by pressing SHIFT and ENTER, these Layer banks can be accessed and scrolled through in the same way as the Preset Banks. However, in order to save Global settings for these sounds, they must be loaded into a Preset.

ISE-NIN includes 2 banks of Layers:
VINTAGE LAYERS: Faithful recreations of all 64 original JP-8 factory patches.
LAYERS: A blank bank of 500 slots for the user's own layers.

SELECTING BANKS

While holding SHIFT, press ENTER (FACTORY) to switch between patch banks.

To switch ISE-NIN back to the parameters currently set by the sliders in realtime, simply click the main data encoder while in the bank selection mode.

NOTE: If you have edited a preset patch or layer which you would like to save, please do so before as the changes you have made will not be saved after switching back to Panel mode.

NOTE: ISE-NIN responds to standard Program Change and Bank Change MIDI messages. Make sure that CC Receive is turned ON in the MIDI menu. Bank change uses MIDI CC message 0, with the values 0 = User Bank 1, 1 = User Bank 2, and 2 = Factory Bank.

SELECTING PATCH PRESETS

When navigating to a new bank, patch preset 1 will be selected.
Scroll between patches using the encoder.

Some MIDI controllers and DAWs are capable of sending Program Change messages. ISE-NIN will respond to Program Change messages, allowing for selection of the next, previous, or specific patch numbers from the current bank, or from a different bank entirely.

SAVING PATCH PRESETS

ISE-NIN has 256 user writable presets total, and 500 User Layer slots. Patches can be saved in the banks labeled Bank 1 and Bank 2. Each Preset Bank has 128 writable slots.

When editing and saving FACTORY PRESETS and LAYERS, you must save to Bank 1, Bank 2 or Layers. FACTORY PRESETS can not be overwritten.

SAVED PRESETS STORE THE FOLLOWING VALUES:
All front panel slider and switch positions.
DUAL, SPLIT, or Single settings
UPPER LAYER and LOWER LAYER (in SINGLE mode, Only UPPER is active)
All non-global MIDI settings:

TO SAVE/OVERWRITE A PRESET OR LAYER IN THE CURRENT PRESET MEMORY LOCATION:
Press ENTER (SAVE). The Active Voices display will be replaced by the option to select PRESET or LAYER. If LAYER is selected, only the currently selected Upper or Lower Layer will be saved. Check to make sure the intended Layer is currently selected.
Press ENTER (SAVE) again. The patch has been saved to the current location, overwriting the previous values of that PRESET or LAYER location.

TO SAVE/OVERWRITE A PRESET OR LAYER IN A NEW PRESET MEMORY LOCATION OF THE CURRENT BANK:
Press ENTER (SAVE) and select either PRESET or LAYER.
Use the encoder to navigate to the desired preset memory location. Be certain to save the patch in the correct location, as the previous values will be overwritten when the save process is complete.
Press ENTER (SAVE) a second time. The patch has been saved, overwriting the previous values of that preset location.

TO SAVE/OVERWRITE A PRESET OR LAYER IN A DIFFERENT BANK:
Hold the SHIFT Button and select the desired bank by scrolling using the encoder.
Press ENTER (SAVE) and select PRESET or LAYER.
Use the encoder to navigate to the memory location to be saved. Be certain to save the patch in the correct location, as the previous values will be overwritten when the save process is complete.
Press ENTER (SAVE) a second time. The patch has been saved, overwriting the previous values of that PRESET or LAYER location.

PATCH PROGRAMMING

Once a patch has been saved to Bank 1 or 2, it can be edited at any time by recalling it and adjusting the buttons and knobs or patch-specific settings until the desired sound is reached. Once adjustments have been made, save the preset to the bank and preset as desired.

BACKING UP PATCH PRESETS

Importing and exporting of ISE-NIN preset banks is done via SysEx. Connect ISE-NIN to your computer via USB or via DIN MIDI and MIDI interface, then set your SysEx program (such as SysEx Librarian or MidiOX) to listen to incoming SysEx.
Send entire selected Preset Bank / Layer Bank:
Hold the VCO-1 RANGE, VCO-1 WAVEFORM and SYNC buttons and press the Encoder button. This will send a SysEx burst via MIDI containing all of the bank's patch data.
Send single Preset / Layer:
Hold the VCO-1 RANGE and VCO-1 WAVEFORM buttons and press the Encoder knob. This will send a SysEx burst via MIDI containing all of the bank's patch data.

PANEL MODE

Panel mode is available to bypass all presets and create patches based on the current positions of all knobs and switches on the front panel. While ISE-NIN can not initialize patches to a default state, panel mode can create patches from panel settings, which can be saved to any non-factory location.

To place ISE-NIN in panel mode, press the encoder.

To exit panel mode, press the encoder again, or BACK (LOAD) to navigate to a saved patch.

UPDATING FIRMWARE

1. Download the latest firmware and download STM32 Cube Programmer from here:

https://www.st.com/en/development-tools/stm32cubeprog.html#get-software

2. Unzip the downloaded file.

3.   **For Windows users:** Open the unzipped folder and double click on the file SetupSTM32CubeProgrammer-   2.12.0.exe. Follow the instructions.

        For Mac users: Open the unzipped folder and double click on the file SetupSTM32CubeProgrammer-   2.12.0. If there is a problem with installing (it can happen if you have a MAC Silicon processor) go to step 3.1. If not go to step 4.

3.1 Right click on the unzipped folder and select *"Services -> New Terminal at Folder"*

3.2 Copy the line below. Paste it to Terminal and press enter:

java -jar SetupSTM32CubeProgrammer-2.12.0.exe

3.3 The installer should open. Follow the installation procedure.

3.4 After the installation, copy and paste the line below into Terminal and press enter:

cp -R ./jre /Applications/STMicroelectronics/
STM32Cube/STM32CubeProgrammer/STM32CubeProgrammer.app

3.5 Next, copy and paste the line below into Terminal and press enter.

cd /Applications/STMicroelectronics/STM32Cube/STM32CubeProgrammer/

3.6 Finally, copy and paste the line below into Terminal and press enter.

sudo xattr -cr ./STM32CubeProgrammer.app/
3.7 Type in your password and press enter.

3.8 The STM32CubeProgrammer software should now be in your Applications folder. Open it and you are ready to update your firmware.

4. Open the installed application

5. Connect ISE-NIN to your computer with a USB cable, and turn it on with the SHIFT button pressed. The LCD should show that the unit is in DFU MODE

6. In the application, select USB in the pulldown menu and press the refresh button. You should see the Port changed from No DFU to USBx
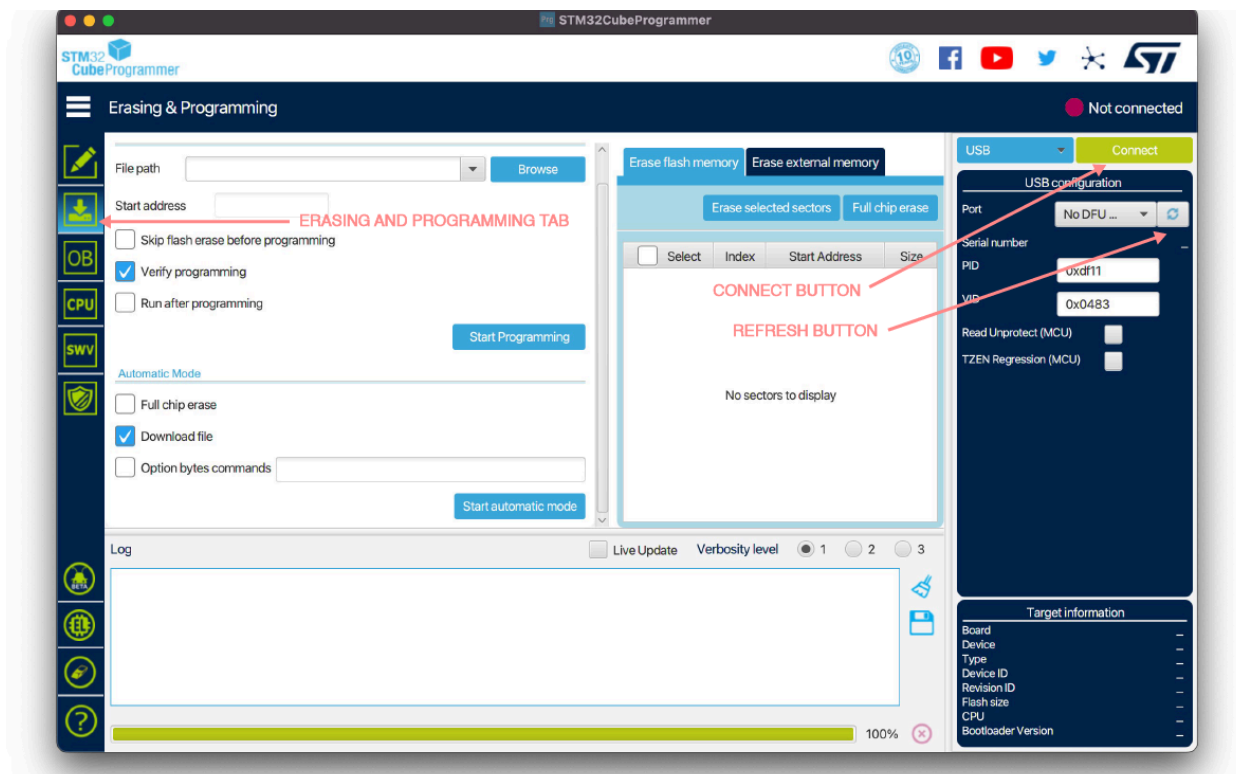
7. Press the connect button and go to the Erase and Programming tab:

8. Press the browse button and select file *ISENIN_X.X.X_1.hex.*

9. Make sure that the check boxes are set as shown.
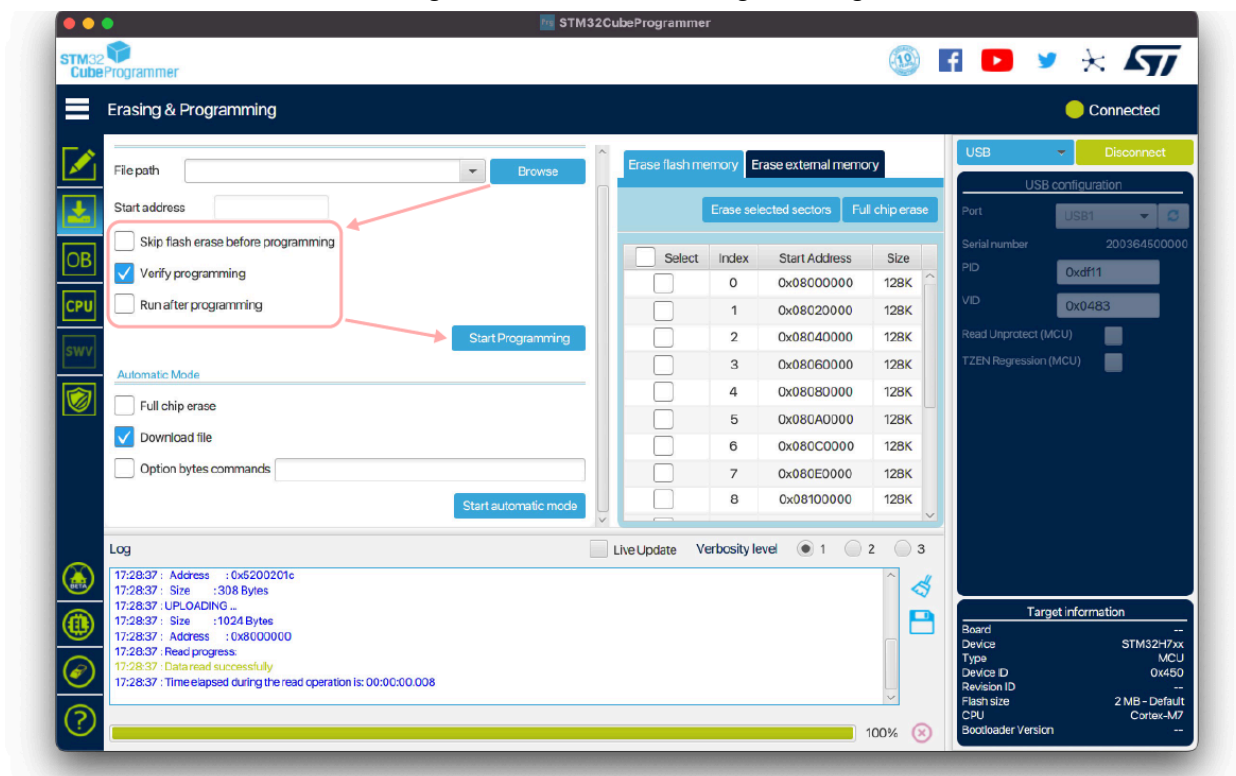
10. Press Start Programming and wait for the finish of programming and verifying

11. Close the popup windows and repeat steps 8-10 for file *ISENIN_X.X.X_2.hex.*

12. Press the disconnect button and restart ISENIN.

NOTE: STM32Cube Programmer may occasionally crash during operation. If it happens during programming, you may need to restart ISE-NIN and repeat steps 7 to 12.

MIDI CC CHART

CC NUMBER	FUNCTION	LAYER
CC0	BANK SELECT	
CC1	MODULATION WHEEL	
CC5	SLIDER PORTAMENTO	UPPER
CC7	KNOB MASTER VOLUME	
CC8	KNOB BALANCE	
CC9	BUTTON LFO WAVEFORM	LOWER
CC10	BUTTON LFO WAVEFORM	UPPER
CC11	BUTTON VCO MOD	LOWER
CC12	BUTTON VCO MOD	UPPER
CC13	BUTTON PWM MOD	LOWER
CC14	BUTTON PWM MOD	UPPER
CC15	SLIDER VCO MOD ENV	UPPER
CC16	SLIDER VCO MOD PWM	UPPER
CC17	SLIDER VCO1 CROSSMOD	UPPER
CC18	SLIDER VCO2 RANGE	UPPER
CC19	SLIDER PORTAMENTO	LOWER
CC20	BUTTON KEY MODE	
CC21	SLIDER VCO MOD ENV	LOWER
CC22	SLIDER VCO MOD PWM	LOWER
CC23	SLIDER VCO1 CROSSMOD	LOWER
CC24	SLIDER VCO2 RANGE	LOWER
CC25	SLIDER VCO2 FINE TUNE	LOWER
CC26	SLIDER HPF CUTOFF	LOWER
CC27	SLIDER VCF CUTOFF	LOWER
CC28	SLIDER VCF RESO	LOWER
CC29	SLIDER MIX	LOWER

CC30	POT VCF A	LOWER
CC31	POT VCF B	LOWER
CC32	BUTTON VCO1 RANGE	LOWER
CC33	BUTTON VCO1 RANGE	UPPER
CC34	BUTTON VCO1 WAVEFORM	LOWER
CC35	BUTTON VCO1 WAVEFORM	UPPER
CC36	BUTTON VCO2 SYNC	LOWER
CC37	BUTTON VCO2 SYNC	UPPER
CC38	BUTTON VCO2 VCO/LFO	LOWER
CC39	BUTTON VCO2 VCO/LFO	UPPER
CC40	SLIDER VCO2 FINE TUNE	UPPER
CC41	SLIDER HPF CUTOFF	UPPER
CC42	SLIDER VCF CUTOFF	UPPER
CC43	SLIDER VCF RESO	UPPER
CC44	SLIDER MIX	UPPER
CC47	SLIDER VCF ENV MOD	UPPER
CC48	SLIDER VCF LFO MOD	UPPER
CC49	BUTTON VCO2 WAVEFORM	LOWER
CC52	SLIDER VCF ENV MOD	LOWER
CC53	SLIDER VCF LFO MOD	LOWER
CC55	SLIDER ENV1 SUSTAIN	UPPER
CC56	SLIDER ENV1 RELEASE	UPPER
CC59	SLIDER VCF KEY FOLLOW	UPPER
CC60	SLIDER VCA LEVEL	UPPER
CC61	SLIDER ENV1 ATTACK	UPPER
CC62	SLIDER ENV1 DECAY	UPPER
CC64	SUSTAIN PEDAL	
CC65	SLIDER ARPEGGIO RATE	UPPER
CC66	BUTTON U L	

CC68	BUTTON ARP CLOCK	LOWER
CC71	SLIDER ENV2 SUSTAIN	UPPER
CC72	SLIDER ENV2 RELEASE	UPPER
CC73	SLIDER ENV2 ATTACK	UPPER
CC74	CC74 REPLACE (MPE)	
CC75	SLIDER ENV2 DECAY	UPPER
CC76	SLIDER LFO RATE	UPPER
CC77	SLIDER VCO MOD LFO	UPPER
CC78	SLIDER LFO DELAY	UPPER
CC80	SLIDER ENV1 RELEASE	LOWER
CC83	SLIDER VCF KEY FOLLOW	LOWER
CC84	SLIDER VCA LEVEL	LOWER
CC85	SLIDER ENV1 ATTACK	LOWER
CC86	SLIDER ENV1 DECAY	LOWER
CC87	SLIDER ARPEGGIO RATE	LOWER
CC88	KNOB MASTER TUNE	LOWER
CC89	SLIDER ENV2 SUSTAIN	LOWER
CC90	SLIDER ENV2 RELEASE	LOWER
CC91	BUTTON ARP RANGE	LOWER
CC92	BUTTON ARP RANGE	UPPER
CC93	BUTTON ARP MODE	LOWER
CC94	BUTTON ARP MODE	UPPER
CC95	BUTTON PORTAMENTO	LOWER
CC96	BUTTON PORTAMENTO	UPPER
CC97	BUTTON VCF SLOPE	LOWER
CC98	BUTTON VCF SLOPE	UPPER
CC99	BUTTON VCF ENV	LOWER
CC100	BUTTON VCF ENV	UPPER
CC102	SLIDER ENV2 ATTACK	LOWER

CC103	SLIDER ENV2 DECAY	LOWER
CC104	SLIDER LFO RATE	LOWER
CC105	SLIDER VCO MOD LFO	LOWER
CC106	SLIDER LFO DELAY	LOWER
CC107	BUTTON VCA LFO	LOWER
CC108	BUTTON VCA LFO	UPPER
CC109	BUTTON ENV1 KF	LOWER
CC110	BUTTON ENV1 KF	UPPER
CC111	BUTTON ENV1 INV	LOWER
CC112	BUTTON ENV1 INV	UPPER
CC113	BUTTON ENV2 KF	LOWER
CC114	BUTTON ENV2 KF	UPPER
CC115	BUTTON VCO2 WAVEFORM	UPPER
CC116	BUTTON ASSIGN MODE	

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